

Flora of Nepal

नेपालका वनस्पति

Rosaceae

Rosaceae: Webedition 2 (2012)

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Appendices

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- 2: Format, abbreviations and categories used in Flora of Nepal

See printed volumes of the Flora of Nepal (www.rbge.org.uk/publications/floraofnepal) and the project website (www.floraofnepal.org) for further information on the Flora of Nepal and acknowledgement of the institutes and people involved with this international collaborative project.



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Rosaceae

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Trees, shrubs or herbs, deciduous or evergreen. Herbs unarmed, trees and shrubs sometimes with thorns, spines or prickles. Stems erect, scandent, arching, prostrate or creeping. Stipules paired, free or adnate to petiole, rarely absent, persistent or deciduous. Petiole usually 2-glandular apically. Leaves alternate, simple or compound, margins often variously serrate, rarely entire. Inflorescences various, from solitary flowers to umbels, corymbs, racemes or cymose panicles. Flowers actinomorphic, bisexual, rarely unisexual and then plants dioecious. Hypanthium composed of basal parts of sepals, petals and stamens, free from or adnate to ovary, short or elongate. Sepals (technically calyx lobes) usually 5, rarely fewer or more, imbricate. Epicalyx of 5 episepals sometimes present, alternate with and usually smaller than sepals. Petals as many as sepals, free, imbricate, sometimes absent or similar to calyx lobes. Stamens usually numerous, rarely few, always in a complete ring. Filaments free. Anthers small, didymous, rarely elongate, 2-locular. Ovary inferior, semi-inferior or superior. Carpels 1 to many, free to connate and then adnate to inner surface of hypanthium. Ovules usually 2 in each carpel, sometimes 1–many. Styles as many as carpels, terminal, lateral or basal, free or sometimes connate. Fruit a follicle, pome, achene, drupe or aggregate of drupelets, exposed or enclosed in persistent hypanthium and sometimes also by sepals. Worldwide about 85 genera and 3000 species, cosmopolitan but most diverse in the temperate and warm regions of the N hemisphere. 26 genera and 155 species in Nepal.

A family of huge agricultural and horticultural importance in which the taxonomy of many groups is complicated by apomixis. For pragmatic reasons the arrangement of genera in this account mainly follows Lu *et al.* (Fl. China 9: 46. 2003), and so does not necessarily reflect the current understanding of phylogenetic relationships within the family.

Key to Genera

1a	Leaves pinnately or palmately divided to midrib.....	2
b	Leaves simple or shallowly lobed.....	18
2a	Evergreen or deciduous trees or shrubs.....	3
b	Deciduous perennial herbs or plants with woody stock and annual flowering shoots.....	7
3a	Ovary inferior.....	9. Sorbus
b	Ovary superior.....	4
4a	Stems without prickles.....	5
b	Stems prickly.....	6
5a	Leaves with 7–12 pairs of leaflets.....	3. Sorbaria
b	Leaves with 1 or 2 pairs of leaflets.....	16. Potentilla
6a	Carpels on convex receptacle.....	14. Rubus
b	Carpels enclosed in fleshy hypanthium.....	19. Rosa
7a	Leaves with 3 leaflets.....	8
b	Leaves pinnately divided or palmately divided with more than 3 leaflets.....	11
8a	Plants without stolons or rhizomes.....	9
b	Plants with spreading stolons or rhizomes.....	10
9a	Stamens 10–30.....	16. Potentilla
b	Stamens 4 or 5.....	17. Sibbaldia
10a	Flowers yellow or creamy-yellow.....	16. Potentilla
b	Flowers white or pink.....	18. Fragaria
11a	Petals absent.....	21. Sanguisorba
b	Petals present.....	12
12a	Epicalyx absent.....	13
b	Epicalyx present.....	15

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13a	Flowers yellow.....	20. Agrimonia
b	Flowers cream, white, pink or purplish.....	14
14a	Flowers unisexual, in spike-like racemes.....	2. Aruncus
b	Flowers bisexual, in large panicles.....	13. Filipendula
15a	Rosette herb with long, slender stolons.....	18. Fragaria
b	Rosette or prostrate herbs without long, slender stolons.....	16
16a	Leaves pinnate, with terminal leaflet much larger than lateral leaflets.....	15. Geum
b	Leaves palmate or if pinnate then all leaflets similar in size.....	17
17a	Stamens 10–30.....	16. Potentilla
b	Stamens 4 or 5.....	17. Sibbaldia
18a	Deciduous perennial herbs, or plants with woody stock and annual leafy and flowering shoots.....	19
b	Evergreen or deciduous trees and shrubs.....	20
19a	Leaves entire. Petals white.....	14. Rubus
b	Leaves palmately divided. Petals absent.....	22. Alchemilla
20a	Ovary superior.....	21
b	Ovary inferior or semi-inferior.....	27
21a	Carpel(s) enclosed in hypanthium.....	22
b	Carpel(s) clearly visible.....	23
22a	Stems without prickles. Carpel 1, enclosed in leathery hypanthium.....	4. Neillia
b	Stems prickly. Carpels many, enclosed in fleshy hypanthium.....	19. Rosa
23a	Carpels 5.....	1. Spiraea
b	Carpel 1.....	24
24a	Branches conspicuously thorny.....	23. Prinsepia
b	Branches thornless.....	25
25a	Petals distinct from sepals.....	24. Prunus
b	Petals not clearly distinguishable from sepals.....	26
26a	Leaves entire.....	25. Pygeum
b	Leaves toothed.....	26. Maddenia
27a	Ovary semi-inferior, carpels partially free above.....	28
b	Ovary inferior, carpels completely united.....	30
28a	Branches conspicuously thorny.....	6. Pyracantha
b	Branches thornless.....	29
29a	Leaves acute to rounded, if acuminate to 7 cm or rarely 8 cm.....	5. Cotoneaster
b	Leaves acuminate, more than 7 cm long.....	7. Photinia
30a	Carpels with 3 to many ovules.....	31
b	Carpels with 1 or 2 ovules.....	32
31a	Leaves toothed, at least at apex, sometimes slightly lobed.....	10. Docynia
b	Leaves entire.....	Cydonia
32a	Leaves evergreen, leathery.....	33
b	Leaves deciduous, papery.....	34

33a	Inflorescence a corymb	7. <i>Photinia</i>
b	Inflorescence a panicle.....	8. <i>Eriobotrya</i>
34a	Petals 3–8 mm. Inflorescence many-flowered. Leaves not clustered on short side shoots.....	9. <i>Sorbus</i>
b	Petals 8–20 mm. Inflorescence few-flowered. Leaves clustered on short side shoots.....	35
35a	Styles free	11. <i>Pyrus</i>
b	Styles connate at base.....	12. <i>Malus</i>

Key to Genera (fruiting material)

1a	Fruit a dehiscent follicle, rarely a capsule. Carpels 1–5. Stipules present or absent.....	2
b	Fruit an indehiscent achene, pome or drupe. Carpels 1–many. Stipules present	5
2a	Leaves simple, entire or shallowly lobed, if deeply lobed then at least part of the blade visible on either side of midrib.....	3
b	Leaves pinnately or palmately divided to midrib. Leaflets stalked or stalkless	4
3a	Stipules absent. Carpels 3–5. Follicles exposed.....	1. <i>Spiraea</i>
b	Stipules present. Carpel 1. Follicle enclosed within hypanthium	4. <i>Neillia</i>
4a	Perennial herb with woody stock and annual flowering shoots	2. <i>Aruncus</i>
b	Trees or shrubs	3. <i>Sorbaria</i>
5a	Ovary inferior or semi-inferior. Carpels (1 or)2–5, ± adnate to inner side of cupular hypanthium. Fruit a pome.....	6
b	Ovary superior. Carpels 1 to many, free from hypanthium. Fruit a drupe, achene or aggregate of several achenes or drupelets	16
6a	Leaves pinnate.....	9. <i>Sorbus</i>
b	Leaves simple, entire or lobed	7
7a	Fruit with 1–5 bony nutlets	8
b	Fruit with 1–5 leathery or papery cells, each containing 1 or more seeds	9
8a	Branches thornless.....	5. <i>Cotoneaster</i>
b	Branches conspicuously thorny.....	6. <i>Pyracantha</i>
9a	Leaves often deeply lobed to more than half-way towards midrib.....	10. <i>Docynia</i>
b	Leaves entire or shallowly toothed	10
10a	Leaf-margin toothed	11
b	Leaf-margin entire	12
11a	Inflorescence corymbose	7. <i>Photinia</i>
b	Inflorescence paniculate.....	8. <i>Eriobotrya</i>
12a	Inflorescence compound corymbose.....	13
b	Inflorescence umbellate, racemose, fasciculate or flowers solitary	14
13a	Leaves leathery, evergreen.....	7. <i>Photinia</i>
b	Leaves papery, deciduous	9. <i>Sorbus</i>
14a	Carpels with numerous ovules	<i>Cydonia</i>
b	Carpels with 1 or 2 ovules.....	15
15a	Styles free. Inflorescence corymbose-racemose. Fruit with numerous grit cells	11. <i>Pyrus</i>
b	Styles connate basally. Inflorescence a fascicle. Fruit without or with few grit cells.....	12. <i>Malus</i>
16a	Carpel 1(–2). Fruit a drupe, sepals often deciduous. Leaves simple.....	17
b	Carpels usually numerous, rarely few. Fruit 1 or more achenes, or an aggregate of fleshy drupelets, sepals persistent. Leaves compound, very rarely simple	20

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17a	Branches conspicuously thorny.....	23. <i>Prinsepia</i>
b	Branches thornless.....	18
18a	Fruit obscurely 2-lobed.....	25. <i>Pygeum</i>
b	Fruit unlobed.....	19
19a	Leaf margins eglandular or glands sessile. Stipules up to 15 mm, usually caducous.....	24. <i>Prunus</i>
b	Leaf margins at base with gland tipped hairs. Stipules longer than 15 mm, often persistent.....	26. <i>Maddenia</i>
20a	Leaves simple or shallowly lobed, if deeply lobed then at least part of the blade visible on either side of midrib.....	21
b	Leaves pinnately or palmately divided to midrib.....	22
21a	Fruit a berry of fleshy drupelets.....	14. <i>Rubus</i>
b	Fruit a cluster of achenes enclosed in persistent, dry hypanthium.....	22. <i>Alchemilla</i>
22a	Fruit a berry of fleshy drupelets.....	14. <i>Rubus</i>
b	Fruit of 1 or more achenes, exposed or enclosed in persistent hypanthium.....	23
23a	Evergreen or deciduous trees or shrubs.....	24
b	Deciduous perennial herbs or plants with woody stock and annual flowering-shoots.....	25
24a	Stems without prickles. Hypanthium dry and hard.....	16. <i>Potentilla</i>
b	Stems prickly. Fruit of achenes enclosed in fleshy hypanthium (hip).....	19. <i>Rosa</i>
25a	Leaves with 3 leaflets.....	26
b	Leaves pinnately divided or palmately divided with more than 3 leaflets.....	29
26a	Plants with spreading stolons or rhizomes.....	27
b	Plants without stolons or rhizomes.....	28
27a	Fruiting receptacle dry.....	16. <i>Potentilla</i>
b	Fruiting receptacle juicy, strawberry-like.....	18. <i>Fragaria</i>
28a	Stamens 10–30.....	16. <i>Potentilla</i>
b	Stamens 4 or 5.....	17. <i>Sibbaldia</i>
29a	Fruit of 1 or more achenes enclosed in persistent hypanthium.....	30
b	Fruit of achenes exposed on a flat or convex receptacle.....	32
30a	Leaves palmately divided or lobed. Epicalyx present.....	22. <i>Alchemilla</i>
b	Leaves pinnately divided. Epicalyx absent.....	31
31a	Fruiting hypanthium with hook-like spines outside.....	20. <i>Agrimonia</i>
b	Fruiting hypanthium winged, without hook-like spines.....	21. <i>Sanguisorba</i>
32a	Fruiting receptacle juicy, strawberry-like.....	18. <i>Fragaria</i>
b	Fruiting receptacle dry.....	33
33a	Achenes up to 12, borne on flat receptacle.....	13. <i>Filipendula</i>
b	Achenes numerous, borne on convex receptacle.....	34
34a	Styles lengthening in fruit, often with feathery hairs, or jointed.....	15. <i>Geum</i>
b	Styles not lengthening in fruit.....	35
35a	Stamens 10–30.....	16. <i>Potentilla</i>
b	Stamens 4 or 5.....	17. <i>Sibbaldia</i>

1. *Spiraea* L., Sp. Pl. 1: 489 (1753).

J. Crinan M. Alexander & Nirmala Joshi

Deciduous branched shrubs, rarely unbranched subshrubs, bisexual or dioecious. Twigs unarmed. Stipules absent. Leaves simple, sessile or shortly petiolate, serrate or incised to lobed, rarely entire, pinnately veined, rarely with 3–5 veins from the base. Inflorescences umbels, umbel-like racemes, corymbs or panicles. Flowers bisexual or unisexual, in umbels, umbel-like racemes, corymbs or panicles. Bracts linear to lanceolate, at base of pedicel, persistent or caducous. Hypanthium campanulate to cup-shaped, bearing sepals, petals, anthers and nectary-disk on rim. Sepals 5, valvate or slightly overlapping, usually slightly shorter than calyx-tube. Petals 5, overlapping or contorted, broadly obovate to orbicular, short-clawed, usually longer than sepals, glabrous. Stamens 15–40. Ovary superior, carpels (3–)5(–8), free; ovules pendulous, several (rarely 2 or 3) per carpel. Styles terminal or subterminal, not exceeding stamens; stigmas capitate or disciform. Fruit of (3–)5(–8) follicles, usually dehiscing along inner suture. Seeds minute, linear to oblong.

Worldwide about 100 species in the N hemisphere, from temperate regions to subtropical mountains. Nine species in Nepal, one of which is introduced.

Material should be collected with both fertile and sterile branches as leaves are often larger on the latter and this can be taxonomically informative. It is also important to note the growth form in order to distinguish *Spiraea hemicyptophyta* Grierson from similar species.

Key to Species

- 1a Leaves on flowering shoots ± sessile, narrowly attenuate at base2
 b Leaves on flowering shoots with distinct petioles3
- 2a Leaves obovate to spatulate, rounded, not toothed or lobed, to 6 mm wide **6 S. hypericifolia**
 b Leaves obovate or elliptic to almost circular in outline, some with teeth or lobes, some more than 7 mm wide
 **7 S. hypoleuca**
- 3a Main stems arched or spreading. Inflorescences lateral, on closely and regularly arranged erect side branches to 5(–7) cm. Leaves on fertile branches to 1.5 cm.....4
 b Main stems erect to ascending. Inflorescences terminal, or on side branches, the lower more than 7 cm. Some leaves on fertile branches longer than 1.5 cm5
- 4a Carpels glabrous. Pedicels and calyx tube moderately to densely hairy, sometimes reddish. Main stems arched, often black. Usually above ca. 3500 m..... **4 S. arcuata**
 b Carpels, pedicels and calyx tube densely white-hairy. Main stems straight or arched, red to black. Usually below ca. 3500 m **5 S. canescens**
- 5a Plant entirely glabrous (in Nepal). Inflorescence a dense umbel with many pedicels arising from a common peduncle. Peduncles and pedicels reddish..... **9 S. cantoniensis**
 b Plant hairy, at least in inflorescence. Inflorescences corymbose, peduncle dividing into smaller rays which further divide into pedicels. Peduncles and pedicels not reddish.....6
- 6a Plant almost always unbranched above ground. Stems annual, arising from an underground rhizome. Inflorescences terminal **2 S. hemicyptophyta**
 b Plant branched above ground. Stems perennial. Inflorescences terminal or lateral.....7
- 7a Inflorescences mostly terminal, to 30 cm across. Flowers to 5 mm across. Leaf length:width ratio > 2, tips attenuate. Carpels hairy **3 S. micrantha**
 b Inflorescences terminal and lateral, to ca. 5.5 cm across. Flowers more than 5 mm across. Leaf length:width ratio < 2, tips not or scarcely attenuate. Carpels glabrous or slightly pubescent on ventral suture8
- 8a Leaves with pointed teeth. Flowers usually pink, sometimes white. Carpels 2.5–3.5 mm..... **1 S. bella**
 b Leaves crenate, obtusely toothed to entire. Flowers white. Carpels 1.5–2 mm..... **8 S. vacciniifolia**

1. *Spiraea bella* Sims, Bot. Mag. 50: pl. 2426 (1823).
Spiraea amoena Spae; *S. expansa* Wall. nom. nud.

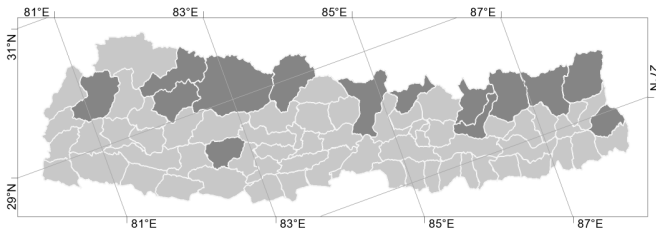
सेतो खरेटो Seto khareto (Nepali).

Rosaceae

Branched, usually dioecious shrubs to ca. 2.5 m. Branches yellowish to reddish brown, slightly angled, ± pubescent; buds pale brown to reddish brown, obtuse, glabrous. Petioles 2–5 mm, sparsely pubescent. Leaves grey-green below, brighter green above, thinly leathery, ovate to ovate-elliptic, 2–4 × 1–2 cm, base truncate or rounded to broadly cuneate, apex acute, sharply serrate or doubly serrate from below middle, glabrous or rarely puberulous above, almost glabrous to pubescent on veins below, pinnately veined. Corymbs terminal and lateral, compound, pubescent to densely hairy, 2–5.5 cm across, many-flowered. Pedicels 5–8 mm. Flowers mostly unisexual, 5–7 mm across, female slightly smaller. Hypanthium campanulate, slightly pubescent outside, more densely so inside. Sepals triangular, acute, gland-tipped, reflexed in fruit. Petals pink, rarely white, ca. 2.5 mm. Stamens ca. 20, reduced and shorter than petals in female flowers, slightly longer than petals in male flowers. Disk 10-lobed. Carpels pubescent, reduced in male flowers. Follicles spreading, well exerted, glabrous or very slightly puberulous on inner suture; styles spreading.

Fig. 1a

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 1800–4300 m.

Ecology: Broad-leaved, coniferous or mixed forests, thickets on slopes, open rocky hillsides.

Flowering: May–August. **Fruiting:** August–September.

Intermediates with *Spiraea micrantha* Hook.f. are sometimes found and the two species are not always clearly distinct. The length:width ratio of the leaves is usually less than 2.0, while in *S. micrantha* it is usually greater than 2.0.

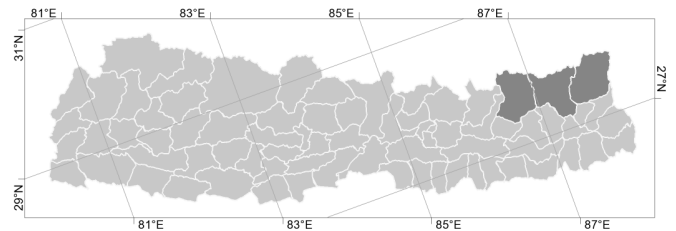
2. *Spiraea hemicryptophyta* Grierson, Notes Roy. Bot. Gard. Edinburgh 44: 262 (1987).

Perennial, rhizomatous, dioecious subshrubs to ca. 45 cm. Rhizome horizontal, at or below ground level, thin, stem-like. Stems annual, unbranched or with a few weak ascending branches below, pale yellowish to reddish brown, terete, finely striate, softly pubescent above, glabrous below. Buds pale to dark brown, acute, slightly hairy. Petioles 2–5 mm. Leaves olive-green above, paler below, broadly ovate-elliptic to orbicular, 2.5–5.0 × 1.8–3 cm, base rounded to broadly truncate, apex acute, coarsely double-serrate, glabrous, sparsely pubescent on veins beneath, pinnately veined. Corymbs terminal, compound, to 6 cm wide, many-flowered; moderately to densely crisped-hairy; primary stalks to ca. 15 mm. Pedicels to 6 mm. Flowers unisexual, to 7 mm across.

Hypanthium cupular, 1.5–2 × 2.5–3 mm, pubescent outside. Sepals triangular, 1.5–2 mm, persistent, reflexed in fruit, slightly acuminate, gland-tipped. Petals white to pink, 2.5–3 mm. Disk irregularly 8–12-lobed. Male flowers: stamens ca. 25; filaments ca. 3 mm; carpels reduced. Female flowers: staminodes 0.5–1 mm; carpels 5 or 6, ellipsoid, 1.5–2 mm; style ca. 1.5 mm, ± exerted from hypanthium. Follicles ca. 3 mm, shiny, brown to red or purple, hairy near ventral suture ca. half exerted.

Fig. 1b

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 3500–4300 m.

Ecology: Open areas in *Rhododendron* forests, rocky slopes.

Flowering: June–August. **Fruiting:** August–October.

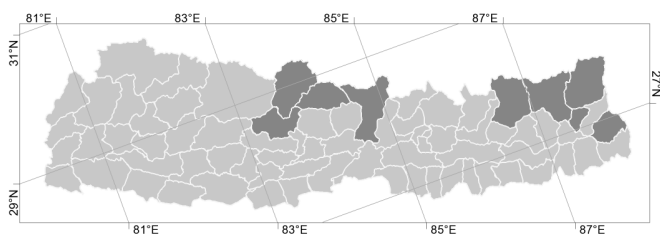
This species is related to *Spiraea bella* Sims though of very distinctive habit, consisting of tufted, upright, usually unbranched stems, arising from an underground rhizome. It was not recognized as a distinct species in Flora of China (9: 53. 2003).

3. *Spiraea micrantha* Hook.f., Fl. Brit. India 2[5]: 325 (1878). *Spiraea japonica* subsp. *micrantha* (Hook.f.) Kitam.; *S. japonica* var. *himalaica* Kitam.

Branched shrubs to 2.5 m. Branches reddish brown, finely ridged, pubescent. Buds brown to reddish brown, acute, pubescent. Petioles to ca. 1 cm. Leaves mid-green, slightly paler below, ovate to elliptic, 2.5–7 × 0.7–3 cm, base rounded to broadly cuneate, sharply serrate or doubly serrate from below middle, apex attenuate, acute, pubescent on veins below, less so above, otherwise ± glabrous, pinnately veined. Corymbs terminal or on long, leafy lateral branches, compound, pubescent, spreading, to 30 cm across, much-branched and many-flowered. Pedicels to ca. 4 mm. Flowers usually bisexual, 4–5 mm across. Hypanthium campanulate, pubescent outside. Sepals ca. 1.8–2.0 mm, reflexed in fruit. Petals white, rarely pinkish; blade ca. 1.5 mm. Stamens ca. 20, much longer than petals. Disk 10-lobed. Carpels hairy. Follicles ± erect, moderately to densely pubescent, 1–2 mm; styles spreading, slightly abaxial.

Fig. 1c

Distribution: Nepal, E Himalaya, Tibetan Plateau and Assam-Burma.



Altitudinal range: 1500–3000 m.

Ecology: Deciduous and mixed primary and secondary forest, open and shrubby mountain slopes.

Flowering: May–August. **Fruiting:** (May–)July–November.

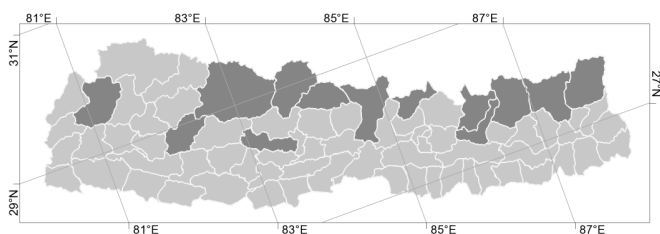
Spiraea micrantha is not clearly distinct from *S. bella* Sims, and intermediates between the two species are sometimes found.

4. *Spiraea arcuata* Hook.f., Fl. Brit. India 2[5]: 325 (1878).
Spiraea zabeliana C.K.Schneid.

पण्डा Panda (Nepali).

Arched shrubs to ca. 2 m. Branches robust, dark reddish brown to black, shiny, strongly ridged, glabrescent. Buds dark reddish brown, acuminate, glabrous. Petioles to ca. 4 mm, glabrous or subglabrous. Leaves olive-green above, paler below, narrowly elliptic to obovate, 8–12 × 3–5 mm on flowering shoots, up to ca. 15 × 10 mm on vegetative shoots, base cuneate, apex obtuse, rarely subacute, entire to obtusely 3–8-serrate or shallowly lobed apically, glabrous or subglabrous on both surfaces, pinnately veined. Corymbs terminal on short, lateral branchlets, compound, densely many-flowered, puberulous, to ca. 2.5 × 2.5 cm. Pedicels to ca. 8 mm (< 13 mm in fruit). Flowers bisexual, 6–8 mm across. Hypanthium turbinate, pubescent outside. Sepals triangular, reflexed in fruit, usually acute. Petals pink, ca. 3 mm. Stamens ca. 20, slightly shorter than or about equalling petals. Disk broadly crenate. Carpels glabrous. Follicles spreading, wholly exserted, shining, glabrous, rarely puberulous on inner suture only; styles terminal, slightly abaxial, divergent. Fig. 1d-f

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 2100–4900 m.

Ecology: Thickets and open areas on mountain slopes and river banks, subalpine rocky places.

Flowering: June–September. **Fruiting:** July–October.

Similar to, and sometimes hard to distinguish from, *Spiraea canescens* D.Don, though the carpels are almost always glabrous and it generally occurs above 3500 m.

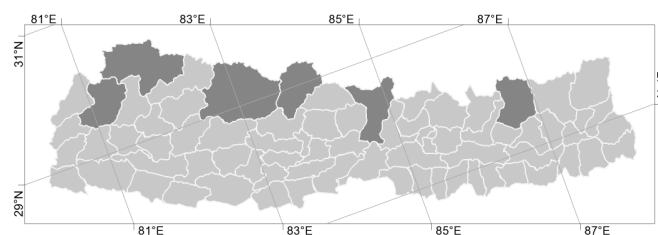
5. *Spiraea canescens* D.Don, Prodr. Fl. Nepal.: 227 (1825).
Spiraea cuneifolia Wall. ex Cambess.; *S. cuneifolia* Wall. nom. nud.

झिल्लेटी Jhilleeti (Nepali).

Shrubs to ca. 3.2 m. Branches spreading or slightly arched, brown or grey-brown, angled, pubescent, later glabrescent. Buds reddish brown, obtuse, pubescent. Petioles ca. 2 mm (up to 4 mm on vegetative shoots), pubescent. Leaves olive-green above, paler below, ovate or elliptic to obovate, 1–1.5 × 0.5–1.0 cm, base cuneate, apex obtuse, sometimes inconspicuously 3-lobed, margin entire or obtusely 3–5-dentate above middle, pubescent to glabrous above and below, pinnately veined. Corymbs terminal on short, lateral branchlets, compound, 2–4.5 × 3–5 cm, many-flowered, usually densely hairy. Pedicels 4–8 mm. Flowers bisexual, 5–7 mm across. Hypanthium campanulate, pubescent outside. Sepals triangular, erect or spreading in fruit, acute. Petals white to pink, ca. 2 mm. Stamens ca. 20, about equalling or slightly longer than petals. Disk with 10 broad emarginate lobes. Carpels moderately to densely hairy; styles shorter than stamens. Follicles slightly spreading, usually densely hairy, sometimes glabrous on outer suture; styles on outer side, divergent, ca. half exserted.

Fig. 1g

Distribution: Nepal, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 1500–3000 m.

Ecology: *Pinus wallichiana* forest, open shrubby vegetation of degraded areas and streambanks.

Flowering: April–June. **Fruiting:** September–October.

Similar to, and sometimes hard to distinguish from, *Spiraea arcuata* Hook.f., though the carpels are densely hairy and it generally occurs below 3500 m.

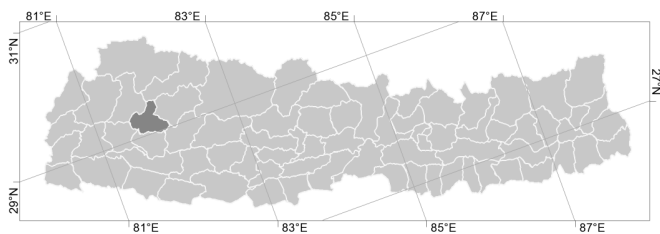
6. *Spiraea hypericifolia* L., Sp. Pl. 1: 489 (1753).

Shrubs to 1.6 m. Branches erect to spreading, greyish brown, becoming dark red as bark splits, slender, terete, glabrous or puberulous when young. Buds brown, acute, glabrous or

Rosaceae

subglabrous. Leaves \pm sessile, greyish olive-green above, paler below, obovate to spatulate, 10–15 \times 5–7 mm, base narrowly attenuate, apex rounded, margin entire, glabrous above, with long sparse hairs on margin and midrib below. Umbels \pm sessile, to 1.5 cm across, (1–)5–8-flowered, with cluster of leaves at base; pedicels 4–10 mm, glabrous, pinnately veined. Flowers bisexual, 5–7 mm across. Hypanthium campanulate, glabrous outside. Sepals greenish brown, triangular, ca. 1 mm, erect to spreading in fruit, acute. Petals white, ca. 4 mm. Stamens ca. 20, slightly shorter than or about equalling petals. Disk 10-lobed; lobes almost separate. Carpels and follicles glabrous though with fringe of hairs on ventral suture; styles not exceeding stamens. Follicles erect, ca. half exserted; styles terminal on outer side, \pm erect. Fig. 1h

Distribution: Nepal, W Himalaya, E Asia, N Asia, SW Asia and Europe.



Altitudinal range: ca. 1700 m.

Ecology: Sparse forests and thickets, open dry areas.

Flowering: March–April. **Fruiting:** April–June.

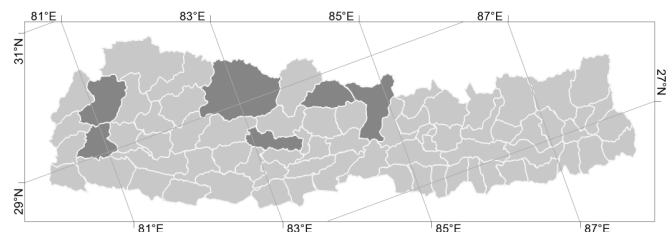
It is uncertain whether *Spiraea hypericifolia* occurs in Nepal as the name has been widely misinterpreted. The lectotype (LINN 651/5) has small, \pm spatulate leaves without any teeth or lobes, even on vegetative shoots, and glabrous inflorescences. The protologue says "Canada", probably in error. No Nepalese material seen matches this, though *Polunin, Sykes & Williams 1903* (BM) from Tila Valley (Western Nepal) is similar in leaf-shape but has hairy inflorescences. Plants assigned to this species from Turkey have toothed or divided leaves, and Lu & Alexander (Fl. China 9: 72. 2003) describe the leaves on sterile shoots as obtusely 2- or 3-dentate. Morphological data for this description were mostly taken from *Lambert, s.n. 10.3.1926 & 15.6.1926*, Kashmir (HUH), which closely match the Linnaean type. The record from Manang relates to *Nakao s.n. 26 May 1953* (KYO) (Kitamura, Fauna Fl. Nepal Himalaya: 161. 1955) but it has not been possible to check the specimen.

7. *Spiraea hypoleuca* Dunn, Bull. Misc. Inform. Kew 1921: 119 (1921).
Spiraea diversifolia Dunn.

Shrubs to ca. 2.5 m. Branches erect to spreading, grey to black, becoming dark or reddish brown, finely ridged, pubescent, becoming glabrous or black-scurfy. Buds brown, acute, densely grey- or red-silky. Leaves on flowering shoots \pm sessile, olive-green above, much paler beneath, obovate to elliptic, 10–20 \times 4–10 mm, base narrowly cuneate-attenuate, apex obtuse to rounded, margin entire below middle, bluntly

and irregularly toothed towards apex, glabrous above and below, though young unfurling leaves sometimes silky near base, pinnately veined. Leaves on vegetative shoots larger, with petiole to ca. 7 mm, broadly ovate-elliptic to orbicular, to ca. 2.5 \times 2 cm, often 3-palmatifid at apex. Umbels on short, lateral, few-leaved shoots to 1.5–(2) cm, 7–12-flowered. Pedicels 8–12 mm, glabrous or pubescent. Flowers bisexual, ca. 7 mm across. Hypanthium campanulate, glabrous or pubescent outside. Sepals triangular, green to brown, 1.5–2 mm, spreading to recurved in fruit. Petals white, ca. 4 mm. Stamens ca. 25, slightly shorter than or about equalling petals. Disk entire to 10-lobed. Carpels glabrous or pubescent; styles slightly shorter than stamens. Follicles \pm erect, slightly exserted, glabrous; styles divergent. Fig. 1i-l

Distribution: Nepal and W Himalaya.



Altitudinal range: 2100–4400 m.

Ecology: Evergreen and mixed forest, Juniper scrub, thickets, shady banks.

Flowering: April–June. **Fruiting:** April–August.

Dunn described *Spiraea diversifolia* as differing from *S. hypoleuca* in its glabrous inflorescences and sterile branches with circular, palmatifid leaves. Very often herbarium specimens do not include sterile branches. Most of those that do have palmatifid leaves and as some of these also have hairy inflorescences, it is not possible to distinguish the two species. It is suspected that most plants assigned to *S. hypoleuca* would have circular, palmatifid leaves on their sterile branches

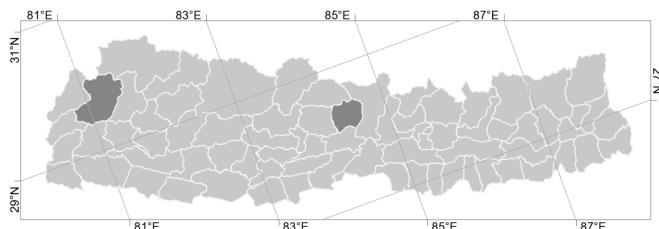
8. *Spiraea vacciniifolia* D. Don, Prodr. Fl. Nepal.: 227 (1825).
Spiraea laxiflora Lindl.; *S. rhamnifolia* Wall. nom. nud.

Branched shrubs to ca. 2 m. Branches reddish brown, smooth to slightly striate, densely appressed-hairy when young, glabrescent. Buds reddish brown, densely hairy, glabrescent. Petioles to ca. 8 mm, densely hairy, glabrescent. Leaves grey-green to olive-green above, \pm glaucous below, broadly ovate-elliptic to rhombic, 1.5–4(–5) \times 0.5–2(–2.5) cm, base rounded to broadly cuneate, apex obtuse to rounded, regularly crenate to blunt-toothed above middle, glabrous or with scattered hairs above and below, pubescent on veins especially below, pinnately veined; on finer branches leaves sometimes elliptic, minutely crenate or toothed, 1–2 cm \times 3–6 mm. Corymbs compound, densely crisped-hairy, many-flowered, terminal corymbs to 10 cm across, lateral corymbs to ca. 5 cm across, on branches to 25 cm. Pedicels 5–8 mm. Flowers bisexual, ca. 4 mm across. Hypanthium campanulate, pubescent outside.

Sepals triangular, green to brown, ca. 1 mm, crisped-hairy, erect in fruit. Petals white, 1.5–2.0 mm. Stamens 20–25. Disk 10-lobed. Carpels and follicles glabrous, ± erect; styles spreading, slightly abaxial.

Fig. 1m-n

Distribution: Nepal and W Himalaya.



Altitudinal range: 1500–2300 m.

Ecology: Among scrub on dry stony hillsides, *Castanopsis* forest.

Flowering: May–June. **Fruiting:** July–October.

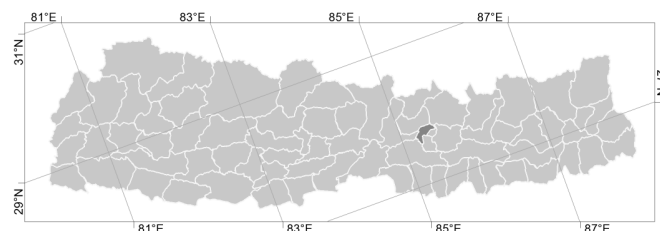
9. *Spiraea cantoniensis* Lour., Fl. Cochinch. 1: 322 (1790).

Glabrous shrubs to ca. 1.5 m. Branches ascending, dark reddish brown, later greyish brown, slender, terete. Buds grey to dark brown, obtuse, hairy. Petioles 4–7 mm. Leaves grey-blue below, dark green above, rhombic-lanceolate to rhombic-oblong, 2–8 × 0.8–2 cm, base cuneate, apex obtuse, margin irregularly and coarsely crenate to obtusely toothed above middle, with 3 main veins from near base. Umbels terminal on leafy lateral branches, well clear of leaves, to 4 cm across,

many-flowered, simple with pedicels all from one point, to 14 mm. Flowers bisexual, to 7 mm across. Hypanthium campanulate. Sepals triangular or ovate-triangular, erect in fruit, apex acute or shortly acuminate. Petals white, to 4 × 4.5 mm. Stamens 20–30, slightly shorter than to nearly equalling petals. Disk with irregular emarginate lobes. Styles shorter than stamens. Follicles spreading, glabrous; styles terminal, usually divergent.

Fig. 1o-p

Distribution: Nepal and E Asia.



Altitudinal range: (200–)500–2200 m.

Ecology: Possibly cultivated.

Flowering: November–May. **Fruiting:** Not known.

It is possible that the single Nepalese specimen, *Pande 72*, Sundarjal (BM), is cultivated, though this is not mentioned on the label. According to Lu & Alexander (Fl. China 9: 62. 2003) *Spiraea cantoniensis* is “Native at least in N Jiangxi; widely cultivated elsewhere in China [Japan], 200–300 m”. *Spiraea cantoniensis* was not included in Flora of Bhutan.

2. *Aruncus* L., Opera Var.: 259 (1758).

Hiroshi Ikeda

Dioecious perennial herbs. Twigs unarmed. Stipules obscure. Leaves radical and cauline, 2- or 3-ternate, petiolate; leaflets petiolulate, thinly charactaceous, margin doubly serrate, pinnately veined. Inflorescence a panicle with many flowers, terminal. Flowers unisexual, pedicellate. Bracts absent, bracteole solitary, linear, at apex of pedicel, persistent or caducous. Hypanthium shallowly cupulate. Sepals 5, valvate in bud. Petals 5, white, spatulate, inserted on the throat of hypanthium. Male flowers: stamens ca. 20; carpels degenerate. Female flowers: stamens degenerate; ovary superior, carpels 3–5(–7), free, erect. Style terminal. Fruit a follicle, pendulous with deflexed pedicel, coriaceous, ventrally dehiscent. Seeds several, narrowly fusiform, without endosperm.

Worldwide three to six poorly defined species in temperate regions of the N hemisphere. One species in Nepal.

1. *Aruncus dioicus* (Walter) Fernald, Rhodora 41: 423 (1939). *Actaea dioica* Walter, Fl. Carol.: 152 (1788); *Aruncus silvester* Kostel. ex Maxim. orth. var.; *A. silvester* Kostel. nom. nud.; *A. silvester* Kostel. ex Maxim.; *Spiraea aruncus* L.

Fig. 2a-d

1. *Aruncus dioicus* subsp. *triternatus* (Maxim.) H.Hara, in H.Ohashi, Fl. E. Himalaya, Sec. Rep., Bull.: 50 (1971).

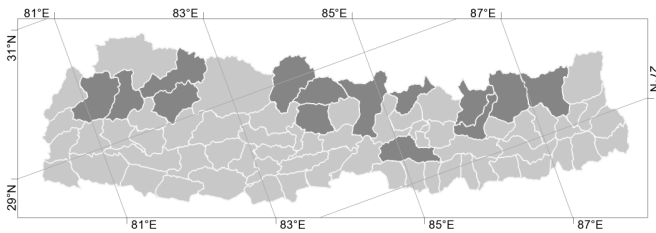
Aruncus dioicus var. *triternatus* (Maxim.) H.Hara; *A. silvester* var. *triternatus* Maxim.; *Spiraea triternata* Wall. nom. nud.

Plants 30–100 cm. Rhizomes short-creeping, stout. Stems erect, with a few scales at base, densely hirsute in lower part, sparsely pilose and pubescent above. Petioles 5–14 cm, glabrescent. Leaves to 20 cm; leaflets narrowly ovate to ovate-orbicular, 3–10 cm × 1–6 cm, base cuneate to truncate, apex caudate to acuminate, glabrescent above, glabrescent below

Rosaceae

except pubescent on veins. Inflorescence 10–30 cm; peduncles and pedicels densely short pubescent. Hypanthium nearly glabrous outside; sepals ovate, ca. 1 mm, apex obtuse. Male flowers: petals 1–1.2 × 0.3–0.6 mm. Stamens ca. 20; filaments 2–3 mm, glabrous; anthers globose, 0.3–0.5 mm across, apex rounded. Female flowers: petals 0.6–0.8 × 0.2–0.3 mm. Ovaries ca. 1 mm, glabrous; style ca. 0.5 mm, glabrous. Follicles oblong to ellipsoidal, 2–2.5 × 1–1.2 mm, greyish brown, glabrous. Seeds fusiform, ca. 1.5 × ca. 0.5 mm.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 3000–4200 m.

Ecology: Open meadows and within forests.

Flowering: June–August. **Fruiting:** July–September.

Don (Prodr. Fl. Nepal.: 228. 1825) and Hooker (Fl. Brit. Ind. 2: 323. 1878) partially misapplied the name *Spiraea aruncus* L. to this subspecies, and Kitamura (Fauna Fl. Nepal Himalaya: 147. 1955) misapplied the name *Aruncus sylvester* Kostel. ex Maxim. (as '*silvester*').

This subspecies is characterized by smaller, long acuminate leaflets with villous veins beneath, smaller flowers and smaller follicles.

3. *Sorbaria* (Ser.) A. Braun nom cons., Fl. Brandenburg 1(1): 177 (1860). *Spiraea* sect. *Sorbaria* Ser., in DC., Prodr. 2: 545 (1825).

Colin A. Pendry

Deciduous shrubs or small trees. Twigs unarmed. Stipules small, free, persistent. Leaves alternate, imparipinnate; leaflets opposite, sessile, biserrate, pinnately veined. Inflorescence a large, bracteate, terminal panicle. Flowers small, numerous, bisexual. Bracts linear, at base of pedicel, persistent. Hypanthium shallowly cup-shaped. Sepals 5, short, broad, persistent. Petals 5, imbricate, white. Stamens 20–25, equalling or longer than petals. Ovary superior, carpels 5, opposite sepals, basally connate, glabrous or subglabrous. Style terminal. Fruit of 5 basally connate follicles, glabrous, dehiscent along inner suture, remains of hypanthium persistent at base. Seeds several, linear, flattened.

Worldwide about nine species in temperate Asia. One species in Nepal.

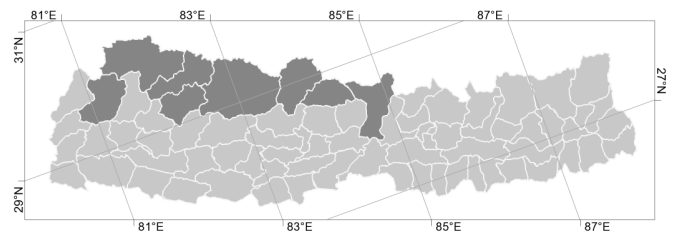
1. *Sorbaria tomentosa* (Lindl.) Rehder, J. Arnold Arbor. 19: 74 (1938).

Schizonotus tomentosus Lindl., Bot. Reg. 26: Misc. 71 (1840);
Spiraea lindleyana Wall. ex Lindl.; *S. lindleyana* Wall. ex Royle
nom. nud.; *S. lindleyana* Wall. nom. nud.; *S. sorbifolia* L.

Erect, much-branched, arching shrub to 4 m. Twigs smooth, glabrous. Stipules linear, 4–8 mm. Leaves 13–30 mm, rachis glabrous to minutely pubescent, especially around insertion of leaflets. Leaflets (4–)6–11 pairs, narrowly ovate, 3–8 × 1–2 cm, base rounded to cuneate, sometimes oblique, apex acuminate, villous on veins below, secondary veins 12–18(–24) pairs. Inflorescence to 25 × 20 cm, rachis glabrous to minutely pubescent. Bracts 2–3 mm. Pedicels 1–3 mm, glabrous. Flowers 5–6 mm across. Hypanthium ca. 1 × 2 mm, glabrous to minutely pubescent. Sepals rounded, to ca. 1 mm, membranous. Petals suborbicular, 1.5–2 mm. Stamens 2–2.5 mm. Carpels ca. 0.5 mm, ovoid, glabrous or basally pubescent. Ovules pendulous, 8–10. Styles 1.5 mm, spreading. Follicles 3 mm. Seeds linear, flattened.

Fig. 2e-g

Distribution: Nepal, W Himalaya, C Asia and SW Asia.



Altitudinal range: 1800–2900 m.

Ecology: *Pinus wallichiana* forest and degraded scrub.

Flowering: June–July. **Fruiting:** July–August.

Hooker (Fl. Brit. Ind. 2: 324. 1878) misapplied the name *Spiraea sorbifolia* (L.) Br. to this species.

The reddish brown infructescence persists on the plant until the following season.

Juice from the seed is used to treat liver problems.

4. *Neillia* D. Don, Prodr. Fl. Nepal.: 228 (1825).

Colin A. Pendry & Clíodhna D. Ní Bhroin

Deciduous shrubs. Twigs unarmed. Stipules conspicuous, entire or toothed, caducous or persistent. Leaves simple, petiolate, more or less 3-lobed, rarely entire, margins biserrate, pinnately veined. Inflorescences terminal, racemes or loose panicles. Flowers pedicellate, bisexual. Bracts linear to elliptic or narrowly ovate, at base of pedicel, persistent. Hypanthium campanulate or campanulate-urceolate. Sepals 5, persistent in fruit. Petals 5, equal to sepals. Stamens 8–30, in 1 or 2 whorls, those of the inner whorl shorter. Ovary superior, carpel 1. Style terminal. Fruit an ovoid follicle, dehiscing along one suture, surrounded by the persistent, often glandular-hairy hypanthium. Seeds 6–10, obovoid.

Worldwide about 20 species from the Himalaya, E Asia and SE Asia. Three species in Nepal.

Key to Species

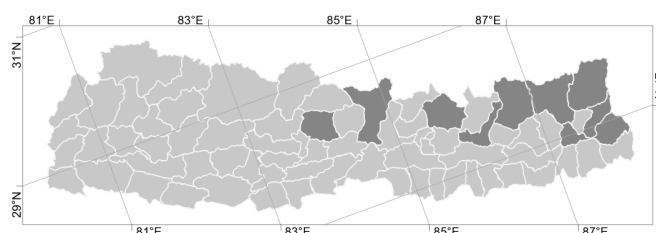
- 1a Inflorescence an open panicle, 6–14 cm. Stipule margin toothed **1 *N. thyrsoiflora***
 b Inflorescence a compact raceme, rarely with a few short branches at base, 2–6 cm. Stipule margin simple.....**2**
- 2a Ovary glabrous. Leaves glabrous or sparsely villous above and below, not velvety to the touch..... **2 *N. rubiflora***
 b Ovary villous. Leaves villous above and below, velvety to the touch **3 *N. velutina***

1. *Neillia thyrsoiflora* D. Don, Prodr. Fl. Nepal.: 228 (1825).
Neillia virgata Wall. nom. nud.

भोग्ला Bhogla (Gurung).

Shrubs to 2 m. Twigs very sparsely pilose, glabrescent. Buds usually in threes, with two supra-axillary. Stipules ovate-lanceolate to 6–8 mm, margins toothed. Petioles 9–14 mm, pilose, soon glabrescent. Leaves ovate, more or less 3-lobed, sometimes with the lobes indistinct or absent, 4–9 × 2.5–5 cm, base cordate to truncate or rounded, apex acuminate but occasionally acute, margins biserrate, occasionally serrulate, glabrous or with a few stiff, appressed hairs towards the margin above, sparsely pilose only on veins below. Inflorescence an open, spreading panicle to 14 cm, peduncle tomentose. Bracts 3–4 mm. Pedicels 2–3 mm, tomentose. Hypanthium campanulate, 2–3 × 3 mm, tomentose. Sepals triangular, 3–4 mm, acuminate, tomentose along middle outside, almost glabrous within. Petals white, broadly ovate or triangular, 2–3 mm. Stamens 8–20, to 1.5 mm. Ovary ovoid, ca. 2 mm, glabrous. Style ca. 2 mm. Capsule ovoid, 6–7 mm, sparsely pubescent around suture, enclosed by persistent hypanthium with 1–2 mm stalked glandular hairs.

Distribution: Nepal, E Himalaya, Assam-Burma and E Asia.



Altitudinal range: 1600–2400 m.

Ecology: *Castanopsis* forest and in scrub.

Flowering: August–September. **Fruiting:** September–November.

Ripe fruits are said to be edible.

2. *Neillia rubiflora* D. Don, Prodr. Fl. Nepal.: 229 (1825).

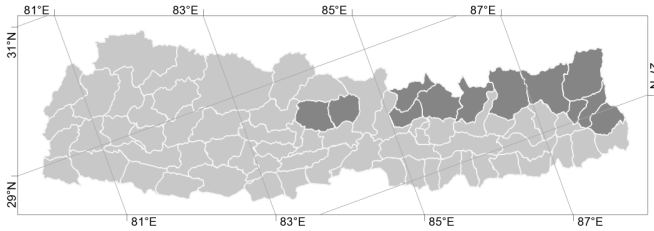
Shrubs to 4 m. Twigs tomentose, glabrescent. Buds usually solitary, axillary, rarely with 1 or 2 supra-axillary buds. Stipules ovate-lanceolate to linear-lanceolate, to 10 mm, margins entire. Petioles 10–12(–15) mm, glabrous to tomentose. Leaves ovate, usually 3-lobed, occasionally with the lobes indistinct or absent, 3–10 × 2–5 cm, base cordate, rarely truncate or rounded, apex acute to acuminate, margins serrate to biserrate, almost glabrous to densely hairy below, indumentum denser on veins. Inflorescence dense, racemose, rarely with up to 4 short branches at base, to 6 cm, peduncle tomentose. Bracts 4–6(–9) mm. Pedicels 2–3 mm, tomentose. Hypanthium campanulate-urceolate, 3–4 × 4 mm, tomentose. Sepals triangular, 2.5–4 mm, acute to acuminate, tomentose on inner

Rosaceae

and outer surfaces. Petals white or pink, orbicular, ca. 3 mm. Stamens 1.5–2 mm. Ovary subglobose, ca. 2 mm, slightly hairy at apex. Style ca. 3 mm. Capsule ovoid, ca. 6 mm, glabrous apart from a few sparse hairs around suture, enclosed by hypanthium with at least a few 2 mm long stalked glandular hairs.

Fig. 2j

Distribution: Nepal, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 1500–3500 m.

Ecology: In coniferous or broad-leaved evergreen forest with *Abies*, *Tsuga*, *Quercus* and *Rhododendron* and in scrub or grassland.

Flowering: June–July. **Fruiting:** August–September.

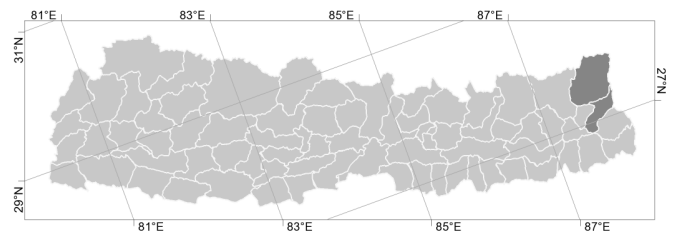
3. *Nellia velutina* Pendry, Phytotaxa 10: 38 (2010).

Shrub to 2 m. Twigs villous, glabrescent. Buds usually solitary. Stipules narrowly ovate, 4–7 mm, margin entire, rarely obscurely toothed, sparsely villous. Petioles 6–10 mm, densely villous. Leaves ovate, entire or somewhat 3-lobed, 2.5–7 × 1.5–4.5 mm, base cordate, apex acute to acuminate, margin

doubly serrate, sparsely villous above, denser below, especially on the veins, secondary veins 5–6 pairs. Inflorescence a terminal raceme, usually simple or occasionally branched at the base, 1.5–4 cm, peduncle densely villous. Bracts 3–4 mm. Pedicels 1.5–4 mm. Hypanthium urceolate-campanulate, 3–4 × 4–5 mm, densely villous outside, glabrous or with a few hairs basally within. Sepals triangular, 2.5–3 mm, apex acute to acuminate, densely villous outside, sparsely villous within. Petals suborbicular, shortly clawed, 2.5–3 mm. Stamens 20–30, irregularly 2-whorled, filaments 1–2 mm, anthers 0.5 mm. Ovary 2 mm, densely villous. Style 2.5 mm, glabrous except at base. Fruits not seen.

Fig. 2k-m

Distribution: Nepal and E Himalaya.



Altitudinal range: 2000–2600 m.

Ecology: In grassland and scrub.

Flowering: June–July. **Fruiting:** August–September.

The velvety leaves of *Nellia velutina* readily distinguish it from *N. rubiflora* D. Don and *N. thyrsoiflora* D. Don.

5. *Cotoneaster* Medik., Philos. Bot. 1: 154 (1789).

Anthony R. Brach

Shrubs, rarely small trees, erect, decumbent or prostrate, deciduous, semi-evergreen or evergreen. Branchlets mostly terete, rarely slightly angulate, unarmed. Stipules small, subulate or lanceolate, usually caducous. Leaves alternate, simple, entire, shortly petiolate, papery or leathery. Inflorescences terminal or axillary, corymbose or cymose, sometimes flowers solitary or in fascicles. Flowers bisexual. Bracts at base of pedicel; bracteoles present or absent. Hypanthium turbinate or campanulate, rarely cylindrical, adnate to ovary. Sepals 5, persistent, short. Petals 5, erect or spreading, imbricate in bud, white, pink or red. Stamens 10–20(–22), inserted in mouth of hypanthium. Ovary inferior or semi-inferior, 2–5-loculed; carpels 2–5, connate below, free above; ovules 2 per carpel, erect. Styles 2(–4), free; stigmas dilated. Fruit a red, brownish red or orange to black pome, with persistent, incurved, fleshy sepals, containing nutlets. Nutlets (1 or) 2–5, bony, 1-seeded; seeds compressed.

Worldwide about 50–70 species widespread in temperate and subtropical N Africa, Asia and Europe, most abundant in SW China. 13 species in Nepal.

The taxonomy of the genus is complicated by hybridization and apomixis and while this account follows a wide view of species concepts (Dickoré & Kasperek, Willdenowia 40: 28. 2010) other authors recognise up to 400 species worldwide (Fryer & Hylmö, Cotoneasters. 2009). The 39 species accepted in the Ann. Checkl. Fl. Pl. Nepal (2000) are here reduced to 13 more clearly defined species.

Key to Species

- 1a Inflorescences compact compound corymbs, with more than 20 flowers or fruits. Petals white, spreading. Leaves large, more than 2.5 cm long.....2
- b Inflorescences lax corymbs, with fewer than 20 flowers or fruits, sometimes reduced to a solitary flower. Petals either erect and pink or red, or spreading and white. Leaves often less than 2.5 cm long.....3
- 2a Leaves oblong or elliptic to ovate-lanceolate, to 8(–12) cm. Branchlets purplish brown or greyish brown. Fruit bright red, ellipsoid, 4–5 mm in diameter..... **1 C. frigidus**
- b Leaves ovate or elliptic-ovate to obovate, to 5(–10) cm. Branchlets reddish brown. Fruit purplish brown to black, ovoid to globose, 6–8 mm in diameter **2 C. affinis**
- 3a Leaves longer than 2 cm, rarely slightly shorter4
- b Leaves often less than 2 cm, rarely slightly longer.....7
- 4a Leaves subleathery. Flowers 9–10 mm across **4 C. hebephyllus**
- b Leaves papery. Flowers 6–9 mm across.....5
- 5a Inflorescences with 3–20 flowers or fruits. Leaves oblong to elliptic or ovate, glabrous or slightly pilose above, white tomentose below. Petals spreading **3 C. racemiflorus**
- b Inflorescences with 1–5 flowers or fruits. Leaves elliptic to ovate-lanceolate, both surfaces pubescent, or sparsely so above. Petals erect.....6
- 6a Flowers or fruits 3–6. Petioles 3–5 mm. Leaves broadly elliptic to suborbicular, to 2.5(–3) cm, both surfaces strigose-tomentose, sparsely so or subglabrous above, apex acute to acuminate. Petals dark red **10 C. symondsii**
- b Flowers or fruits 1 or 2. Petioles 5–7 mm. Leaves ovate to lanceolate, to 6.5(–8) cm, both surfaces villous or pilose, apex long acuminate to acute. Petals white or pink, rarely red **12 C. acuminatus**
- 7a Petals erect, red, rarely pink or white. Prostrate, spreading or erect, deciduous or semi-evergreen shrubs.....8
- b Petals spreading, white or pinkish or tinged red. Prostrate or low evergreen shrubs12
- 8a Prostrate dwarf shrubs **11 C. adpressus**
- b Erect shrubs9
- 9a Stems irregularly branched. Leaves ovate to elliptic, both surfaces pubescent, sometimes sparsely so above. Petals red or pink. Fruit subglobose or turbinate.....10
- b Stems ± distichously branched. Leaves ovate or obovate to suborbicular, both surfaces appressed pubescent. Petals white, pink, or stained reddish. Fruit obovoid or globose.....11
- 10a Flowers or fruit 3–6. Petioles 3–5 mm. Leaves broadly elliptic to suborbicular, both surfaces strigose-pilose, or becoming subglabrous above, apex acute to acuminate. Petals red. Leaves deciduous or semi-evergreen..... **10 C. symondsii**
- b Flowers or fruit 1 or 2. Petioles 5–7 mm. Leaves ovate to lanceolate, both surfaces villous or pilose, apex long acuminate to acute. Petals white or pink, rarely red. Leaves deciduous **12 C. acuminatus**
- 11a Branchlets strigose, glabrescent, not verruculose. Leaves apically acute and mucronate or obtuse. Flowers or fruit 2–6 **9 C. nitidus**
- b Branchlets conspicuously verruculose. Leaves apically emarginate or partly mucronulate. Flowers or fruit solitary **13 C. verruculosus**
- 12a Leaves suborbicular or broadly ovate, base broadly cuneate to rounded. Flowers 1–3. Fruit red, obovoid to turbinate, with 2 or 3 nutlets **8 C. rotundifolius**
- b Leaves elliptic, oblong or obovate to oblong-obovate, rarely oblanceolate, base cuneate to obtuse. Flowers 1–12. Fruit red or scarlet, globose, with 1 or 2 nutlets.....13
- 13a Leaves to 30 mm long. Flowers or fruit usually 3–12 **4 C. hebephyllus**
- b Leaves to 10 mm long. Flowers or fruit usually 1–5, except *C. buxifolius* and *C. integrifolius* up to 10-flowered14
- 14a Small shrubs, rigid, semi-evergreen. Branchlets greyish brown or brown. Leaves not shiny above, papery or thinly leathery. Flowers or fruit 3–5(–9) **5 C. buxifolius**
- b Prostrate or carpet-forming shrubs, flexuous, evergreen. Branchlets black, brown, red, green or purple. Leaves shiny above, leathery. Flowers or fruit 1(–3).....15

Rosaceae

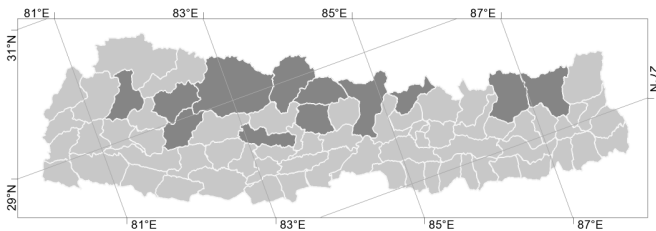
- 15a Prostrate shrubs with irregular branching. Leaf margin flat, apex obtuse to retuse, rarely acute, glabrous or glabrescent below **6 C. microphyllus**
- b Low or dwarf shrubs, divaricate or squarrose, with regular branching. Leaf margins ± revolute, apex obtuse, acute or acuminate, tomentose, pubescent or glabrescent below..... **7 C. integrifolius**

1. *Cotoneaster frigidus* Wall. ex Lindl., Edward's Bot. Reg. 15: pl. 1229 (1829).
Cotoneaster bacillaris Wall. nom. nud.; *C. frigidus* Wall. nom. nud.; *C. gamblei* G.Klotz; *C. himalaiensis* Zabel; *C. nepalensis* K.Koch.

छाँवाँ Chharwa (Tibetan).

Shrubs or small trees, deciduous, to 10 m or more, scandent, with spreading branches. Branchlets spiralled, purplish brown or greyish brown, angular, initially tomentose, glabrescent. Stipules linear-lanceolate, tomentulose, caducous. Petioles 4–7(–10) mm, tomentose. Leaves distichous, shiny, dark green above, oblong or elliptic to ovate-lanceolate, (3–)3.5–8(–12) × 1.5–3(–6) cm, base cuneate or obtuse, margin flat or revolute, apex acute or obtuse, sometimes mucronate with spiniform point, thickly papery to subleathery, glabrous above, initially tomentose below, gradually glabrescent, veins slightly impressed above and prominent below. Compound corymbs dense, 4–6 × 3–5 cm, 20–40-flowered or more; rachis and pedicels densely tomentose. Bracts linear-lanceolate. Pedicels 2–4 mm. Flowers 6–7 mm across. Hypanthium campanulate or broadly subcylindric, densely tomentose outside. Sepals triangular, apex obtuse or acute, tomentose or villous. Petals spreading, white, broadly ovate or suborbicular, 3–3.5 mm and nearly as broad, apex obtuse, glabrous or puberulous inside near base, rarely somewhat emarginate. Stamens 18–20, slightly shorter than petals; anthers pink or red to black. Styles 2. Fruit bright to dark red, ellipsoid or globose to obovoid, 4–5 mm in diameter; nutlets (1 or)2.
 Fig. 3a-c

Distribution: Nepal, W Himalaya, E Himalaya and Tibetan Plateau.



Altitudinal range: (900–)2200–3400 m.

Ecology: River valleys, broad-leaved deciduous forests on slopes.

Flowering: March–May(–June). **Fruiting:** September–October(–November).

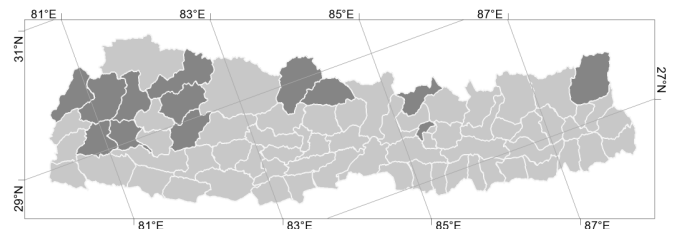
2. *Cotoneaster affinis* Lindl., Trans. Linn. Soc. London 13(1): 101 (1822).

Cotoneaster affinis forma *bacillaris* (Wall. ex Lindl.) Samjatinin; *C. affinis* var. *bacillaris* (Wall. ex Lindl.) C.K.Schneid.; *C. bacillaris* Wall. ex Lindl.; *C. bacillaris* var. *affinis* (Lindl.) Hook.f.; *C. confusus* G.Klotz ex Arv.Kumar & Panigrahi; *C. cooperi* C.Marquand; *C. frigidus* var. *affinis* (Lindl.) Wenz.; *C. hedegaardii* J.Fryer & B.Hylmö; *C. ignotus* G.Klotz; *C. obovatus* Wall. ex Dunn; *C. obtusus* Wall. ex Lindl.; *C. virgatus* G.Klotz; *C. wattii* G.Klotz; *Mespilus affinis* (Lindl.) D.Don.

राइन्स Raeens (Nepali).

Shrubs, deciduous, to 5(–8) m, with spreading branches. Branchlets spiralled, dark reddish brown, terete, verruculose, initially pilose or strigose. Stipules linear or lanceolate, tomentulose, caducous. Petioles 4–5(–11) mm, densely yellow tomentose. Leaves distichous, dark green and dull to shiny above, broadly ovate or elliptic-ovate to obovate, 2.5–5(–10) × 1.4–2(–6) cm, base broadly cuneate, rounded or obtuse, margin flat or revolute, apex obtuse or acute, sometimes truncate, rounded or apiculate, papery, glabrous or puberulous only along midvein above, densely yellow tomentose below, gradually glabrescent, midvein impressed above and prominent below. Compound corymbs (2.5–)3–4 cm across, densely (3–)15–30-flowered or more; rachis and pedicels densely yellow tomentose. Bracts linear-lanceolate. Pedicels 2–3(–5) mm. Flowers ca. 1 cm across. Hypanthium campanulate, tomentose outside. Sepals broadly triangular, apex acute, pilose or strigose. Petals spreading, white, suborbicular or ovate, (2.5–)3–4 mm, apex obtuse, pubescent within near base. Stamens 20, shorter than sepals; anthers white or pink to purple. Styles 2. Fruit purplish brown to dark violet or black, ovoid to globose, 6–8(–10) mm in diameter; nutlets (1 or)2.
 Fig. 3d-f

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma, S Asia, E Asia and C Asia.



Altitudinal range: (1100–)2200–3000(–3900) m.

Ecology: Slopes, mixed forests, thickets of river valleys, among shrubs on open ground.

Flowering: April–June. **Fruiting:** (June–)September–October(–November).

Further research is needed on the distribution of this taxon.

The wood is used for making walking sticks and tent pegs. A paste of the root is applied to treat headaches and the juice is given in cases of indigestion.

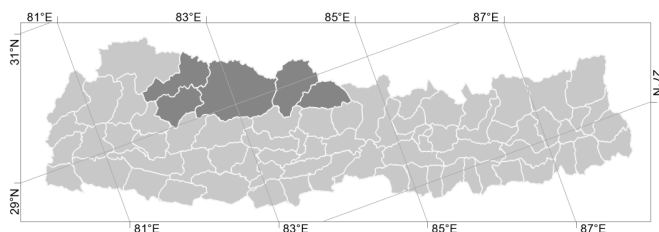
3. *Cotoneaster racemiflorus* (Desf.) K.Koch, Dendrologie 1: 170 (1869).

Mespilus racemiflorus Desf., Cat. Pl. Horti Paris., ed. 3: 409 (1829); *Cotoneaster inexpectatus* G.Klotz; *C. racemiflorus* var. *royleanus* Dippel; *C. tibeticus* G.Klotz; *C. zayulensis* G.Klotz.

Shrubs, deciduous, (0.3–)1–2.5 m, with spreading or ascending, arched branches. Branchlets spiralled, greyish brown or reddish brown, terete, slender, initially densely grey tomentose, glabrous when old. Stipules lanceolate, pilose or villous, caducous. Petioles (1.4–)2–5 mm, tomentose. Leaves spiralled or distichous, dull olive-green above, oblong or ovate to elliptic, rarely obovate, (1–)1.5–5 × (0.5–)1–2 cm, base rounded or broadly cuneate, margin revolute, apex obtuse and mucronate, often emarginate, sometimes acute or shortly acuminate, papery, glabrous or slightly pilose above, white tomentose below, veins slightly impressed above and prominent below. Corymbs (0.5–)1.5–2 cm, (3–)5–9(–20)-flowered; rachis and pedicels white tomentose. Pedicels 2–3 mm. Flowers 8–9 mm across. Hypanthium campanulate or turbinate, white tomentose outside. Sepals broadly triangular, 1–2 mm, apex acute, subglabrous or glabrous. Petals spreading, white, suborbicular or ovate to obovate, 2.5–3.5 × 2–3 mm, apex obtuse, rarely emarginate, white puberulous near base within. Stamens 18–20, slightly shorter than petals; anthers yellow, white or purple. Styles 2. Fruit red to bright red, broadly ellipsoid to subglobose or pyriform, (5–)8–10 mm; nutlets (1 or)2.

Fig. 3g-i

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma, E Asia, N Asia, C Asia, SW Asia and Africa.



Altitudinal range: (1400–)2700–4000 m.

Ecology: Shrub thickets on dry, stony slopes, forests, forest margins, river and mountain valleys.

Flowering: (April–)May–June. **Fruiting:** July–September(–October).

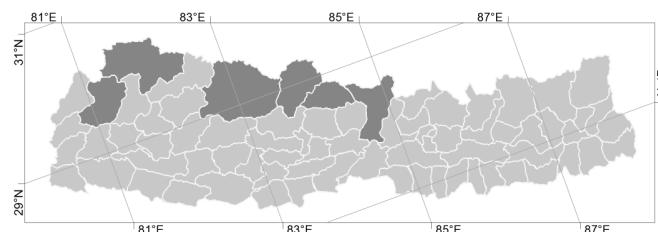
Some individuals have been observed with flowers possessing a single style and 1-locular ovary. In *Dobremez 2787* (BM), the type of *Cotoneaster inexpectatus* G.Klotz, some flowers have 2 styles and others 1 style. Further research is needed on the distributional range of this taxon.

4. *Cotoneaster hebeophyllus* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 273 (1912).

Cotoneaster ludlowii G.Klotz; *C. rotundifolius* T.T.Yu later homonym, non Wall. ex Lindl.; *C. schlechtendalii* G.Klotz; *C. sherriffii* G.Klotz.

Shrubs, semi-evergreen or deciduous, erect, to 1.5 m tall or more, with dense, ascending to irregularly spreading branches. Branchlets spiralled, greyish brown to reddish, terete, initially sparsely accumbent, strigose, glabrate, densely grey lenticellate when old. Stipules lanceolate or linear-lanceolate, villous, caducous. Petioles 1–4 mm, villous. Leaves distichous or spiralled, dark or pale green above, broadly elliptic or oblong-obovate to lanceolate-elliptic, rarely oblanceolate, 0.6–4 cm × 4–25 mm, base cuneate, rounded, or obtuse, margin flat or revolute, apex rounded, obtuse, or acute, sometimes mucronate, papery or subleathery, villous or glabrous above, densely yellowish or grey appressed villous, later subglabrous below, midvein impressed above, prominent below. Corymbs erect, 1–2.5 cm, 3–9(–15)-flowered; rachis and pedicels initially villous, glabrescent. Pedicels 3–6 mm. Flowers 9–10 mm across. Hypanthium campanulate, ± villous outside. Sepals triangular, apex acute, subglabrous. Petals spreading, white or pinkish, suborbicular, 3–4 mm wide, apex obtuse, puberulous inside near base. Stamens 16–20, shorter than petals; anthers purple-black. Styles 1 or 2. Fruit red or orange-red to bright red, globose or depressed-globose, 5–10 mm in diameter; nutlets (1 or)2.

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 2000–4000(–4100) m.

Ecology: River valleys, forests, slopes, shrubby areas.

Flowering: May–June. **Fruiting:** September–October.

Grierson (Fl. Bhutan 1: 589. 1987) included *Cotoneaster ludlowii* within the synonymy of *C. sherriffii*, and together they are treated here within *C. hebeophyllus*.

Ripe fruits are eaten to relieve coughs and colds.

5. *Cotoneaster buxifolius* Wall. ex Lindl., Edward's Bot. Reg. 15: pl. 1229 (1829).

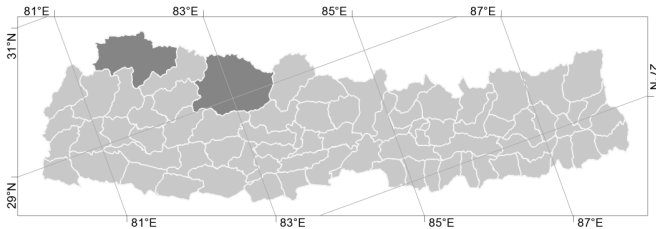
Shrubs, small, semi-evergreen to evergreen, erect, rigid, to 1.5(–3) m tall. Branchlets spiralled, dark greyish brown or brownish, terete, initially densely whitish tomentose, glabrate. Stipules subulate, tomentulose, caducous. Petioles 1–3 mm, tomentose. Leaves spiralled, green above, elliptic to oblong or elliptic-obovate, 5–10(–16) × (2–)4–9 mm, base narrowly to

Rosaceae

broadly cuneate, margin revolute, apex acuminate or acute and mucronate, subleathery or thickly papery, initially appressed pubescent above, glabrescent, densely grey tomentose below, midvein impressed above, prominent below. Inflorescences solitary flowers or cymose, 5–10 mm, (1 or)3–5(–9)-flowered. Bracts lanceolate. Pedicels 3–5 mm, tomentose. Flowers 7–9 mm across. Hypanthium campanulate, tomentose outside. Sepals ovate-triangular, apex acute, tomentose, glabrescent. Petals spreading, white, suborbicular or broadly ovate, 3–4 mm wide, apex obtuse, glabrous. Stamens 20, slightly shorter than petals; anthers pink to blackish. Styles 2, nearly as long as stamens. Fruit red, subglobose or depressed globose, 5–6 mm in diameter; nutlets usually 2.

Fig. 4a

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 2200–2900 m.

Ecology: Mountain regions, rocky mountain slopes, thickets, roadsides, river valleys.

Flowering: April–June. **Fruiting:** September–October.

6. *Cotoneaster microphyllus* Wall. ex Lindl., Bot. Reg. 13: pl. 1114 (1827).

Cotoneaster buxifolius forma *cochleatus* Franch.; *C. cochleatus* (Franch.) G.Klotz; *C. glacialis* (Hook.f. ex Wenz.) Panigrahi & Arv.Kumar; *C. microphyllus* var. *cochleatus* (Franch.) Rehder & E.H.Wilson; *C. microphyllus* var. *glacialis* Hook.f. ex Wenz.; *C. microphyllus* var. *nivalis* G.Klotz; *C. nivalis* (G.Klotz) Panigrahi & Arv.Kumar; *C. thymifolius* var. *cochleatus* (Franch.) Franch. ex H.Lév.

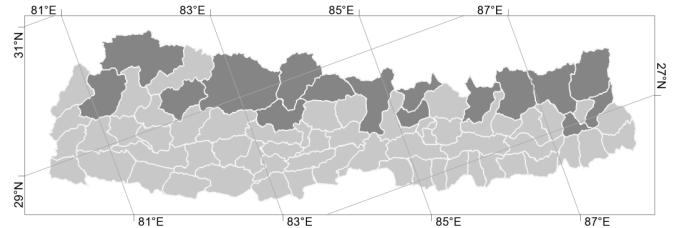
छालेपे Chhalep (Tibetan).

Shrubs, evergreen, dwarf, mostly prostrate or mound-forming, flexuous, to 1 m tall, with irregular, spreading branches. Branchlets spiralled, reddish brown to blackish brown, terete, initially yellow pubescent, gradually glabrate. Stipules lanceolate or linear, slightly pubescent, caducous. Petioles 1–2 mm or more, pubescent. Leaves spiralled or distichous, shiny, pale to dark green, obovate to obovate or lanceolate, 4–10(–16) × (1.5–)4–8(–9) mm, base broadly cuneate or slightly rounded, margin flat, apex obtuse or retuse, rarely acute, thickly to thinly leathery, glabrous or sparsely pubescent above, glabrous or glabrescent below, midvein impressed above, prominent below. Inflorescences solitary flowers or cymose, 4–8 mm, 1(–3)-flowered. Pedicels 2–3 mm, sparsely pubescent. Flowers 8–10 mm across. Hypanthium

campanulate, pubescent outside at least initially. Sepals ovate-triangular, apex obtuse, pubescent. Petals spreading, white, suborbicular, 2–4 mm long, apex obtuse, glabrous. Stamens 15–20, shorter than petals; anthers pink to brownish or violet-black. Styles 2. Fruit scarlet-red or crimson, globose or depressed globose, 5–6(–10) mm in diameter; nutlets (1 or)2(or 3).

Fig. 4b

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 900–5400 m.

Ecology: Open places, rocks, slopes, high mountain areas, thickets, roadsides.

Flowering: May–June(–August). **Fruiting:** August–October(–November).

This widespread and common Nepalese species is often grown in horticulture in temperate regions.

Ripe fruits are eaten fresh and are used medicinally. Leaves are used as incense. The plant is planted for fences and is also used as firewood.

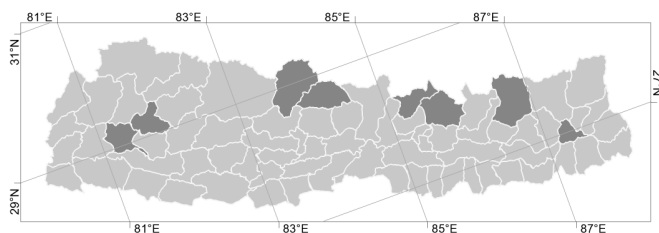
7. *Cotoneaster integrifolius* (Roxb.) G.Klotz, Wiss. Z. Martin-Luther-Univ. Halle-Wittenberg, Math.-Naturwiss. Reihe 12(10): 779 (1963).

Crataegus integrifolia Roxb., Fl. Ind., ed. 1832, 2: 509 (1832); *Cotoneaster buxifolius* var. *marginatus* Lindl. ex Loudon; *C. congestus* Baker; *C. lanatus* Jacques; *C. linearifolius* (G.Klotz) G.Klotz; *C. marginatus* (Lindl. ex Loudon) Schldl.; *C. meuselii* G.Klotz; *C. microphyllus* forma *lanatus* Dippel; *C. microphyllus* forma *linearifolius* G.Klotz; *C. microphyllus* var. *buxifolius* Dippel; *C. microphyllus* var. *thymifolius* (Baker) Koehne; *C. poluninii* G.Klotz; *C. prostratus* Baker; *C. prostratus* var. *lanatus* (Dippel) Rehder; *C. rotundifolius* var. *lanatus* (Dippel) C.K.Schneid.; *C. thymifolius* Baker.

Shrubs, evergreen or semi-evergreen, small, (0.2–)0.5–1.5(–5) m tall, divaricate or squarrose, with regular branching; branches rigid, erect to decumbent. Branchlets spiralled, purple-black or green, terete, initially strigose. Stipules lanceolate, strigose, caducous. Petioles 1–5 mm, strigose. Leaves spiralled, shiny and pale to dark green above, lanceolate to oblong or ovate, 0.4–1.7(–2.9) cm × (1.5–)3–8(–17) mm, base cuneate, margin ± revolute, apex acute or acuminate, sometimes obtuse, leathery or papery, subglabrous above, tomentose, pubescent or glabrescent below, midvein impressed above, prominent below. Inflorescences solitary flowers or cymose, 5–10 mm, 1–10-flowered or more. Pedicel 3–7 mm. Hypanthium campanulate, strigose. Sepals ovate-

triangular, acute or obtuse, sometimes mucronate, pubescent or glabrous. Petals spreading, white or pinkish white, suborbicular, ca. 5 mm wide, glabrous, apex obtuse. Stamens 20, erect; anthers reddish purple or violet-black. Styles 2(or 3). Fruit red or crimson, depressed-globose or globose, 7–9 mm; nutlets (1 or)2, rarely 3.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 1100–3500(–3900) m.

Ecology: High mountain areas.

Flowering: May–July. **Fruiting:** October–November.

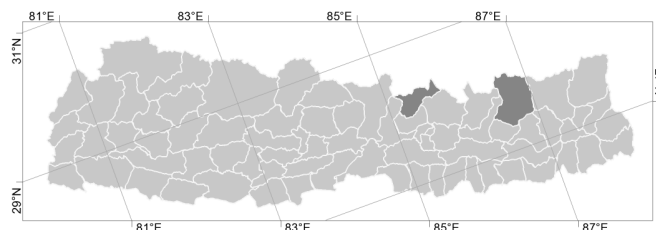
The treatment of this taxon follows Dickoré & Kasperek (Willdenowia 40: 28. 2010), who noted that this species has been frequently confused with other species of *Cotoneaster*, particularly *C. microphyllus* Wall. ex Lindl. It is certainly under-recorded in Nepal.

8. *Cotoneaster rotundifolius* Wall. ex Lindl., Edward's Bot. Reg. 15: pl. 1229 (1829).

Cotoneaster microphyllus var. *rotundifolius* (Wall. ex Lindl.) Wenz.; *C. microphyllus* var. *uva-ursi* Lindl.; *C. uva-ursi* (Lindl.) G.Don.

Shrubs, evergreen, to 4 m tall, with ± erect branches. Branchlets spreading, distichous or spiralled, greyish brown to blackish brown, terete, initially appressed villous, glabrous when old. Stipules lanceolate, puberulous, persistent or caducous. Petioles 1–3 mm, pilose. Leaves shiny, dark green above, suborbicular to broadly ovate or broadly obovate, 0.8–2(–2.5) cm × 6–10(–16) mm, base broadly cuneate to rounded, margin revolute, apex obtuse or emarginate, sometimes acute and mucronate, subleathery, glabrous or rarely puberulous above, pilose below, midvein impressed above, prominent below. Inflorescences solitary flowers or cymose, 4–7 mm, 1–3-flowered. Bracts linear-lanceolate, caducous. Pedicels 2–4 mm, pubescent. Flowers ca. 1 cm across. Hypanthium campanulate, pilose outside. Sepals triangular, apex acute, glabrous or pilose. Petals spreading, white or tinged reddish, broadly ovate or obovate, 4–5 mm and nearly as broad, apex obtuse or emarginate. Stamens 20, about as long as or somewhat shorter than petals; anthers white. Styles 2 or 3, nearly equalling or shorter than stamens. Fruit red to bright scarlet, obovoid to turbinate, 7–9 mm in diameter; nutlets 2 or 3(or 4).

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 1200–4000(–4300) m.

Ecology: Grassy slopes, rocks, mountain summits.

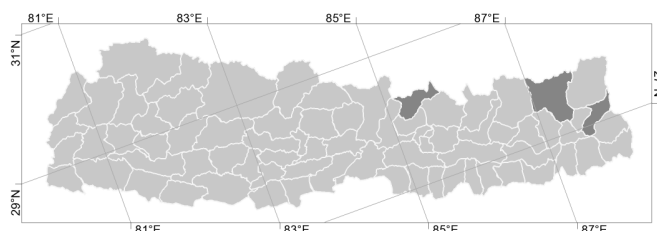
Flowering: May–June(–July). **Fruiting:** August–September(–December).

9. *Cotoneaster nitidus* Jacques, J. Soc. Imp. Centr. Hort. 5: 516 (1859).

Cotoneaster cavei G.Klotz; *C. cordifolius* G.Klotz; *C. distichus* Lange; *C. distichus* var. *parvifolius* T.T.Yu; *C. encavei* J.Fryer & B.Hylmö; *C. milkedandaensis* J.Fryer & B.Hylmö; *C. nitidus* subsp. *cavei* (G.Klotz) H.Obashi; *C. nitidus* subsp. *taylorii* (T.T.Yu) H.Obashi; *C. nitidus* var. *parviflorus* (T.T.Yu) T.T.Yu; *C. rupestris* D.Charlton; *C. taylori* T.T.Yu.

Shrubs, deciduous or semi-evergreen, erect, to 2.5 m tall. Branchlets ± distichous, greyish brown when old, terete, initially densely yellow strigose, gradually glabrescent. Stipules lanceolate, pilose, persistent. Petioles 1–3 mm, villous. Leaves spiralled or distichous, dark green above, broadly ovate or broadly obovate, (0.4–)0.8–1.5(–2.5) × (0.5–)0.7–1.3(–1.8) cm, base rounded or broadly cuneate, apex acute and mucronate, rarely obtuse, subleathery or thickly papery, both surfaces appressed villous, more densely so above, midvein impressed above, prominent below. Inflorescences cymose, 5–10 mm, 2–6-flowered; rachis strigose or subglabrous. Pedicels 1–2(–5) mm. Flowers 5–7 mm across. Hypanthium campanulate, glabrous outside. Sepals broadly triangular, apex acute to obtuse, glabrous or villous. Petals erect, white or stained reddish, ovate or suborbicular, 3–4 mm wide, apex obtuse, glabrous. Stamens (10 or)20, shorter than petals; anthers white. Styles (2 or)3(or 4). Fruit red or scarlet, broadly obovoid, 7–8 mm in diameter, shortly puberulous; nutlets (2 or)3(or 4).

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: (1600–)2500–2600(–4000) m.

Ecology: Thickets, forests, grassy slopes, mountain regions and valleys.

Rosaceae

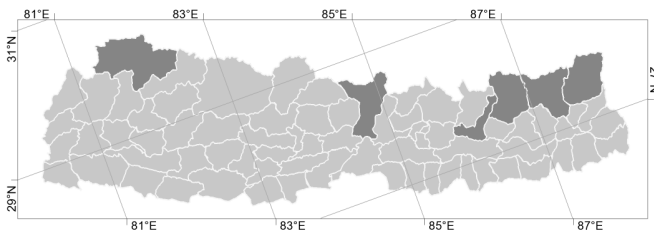
Flowering: June–July. **Fruiting:** September–October.

Several authors (e.g. Hooker, Fl. Brit. Ind. 2: 386. 1878) have partially misapplied *Cotoneaster rotundifolia* Wall. ex Lindl. to this species.

10. *Cotoneaster symondsii* T. Moore, Proc. Roy. Hort. Soc. London, n.s. 1: 298 (1861).
Cotoneaster simonsii Baker.

Shrubs, deciduous or semi-evergreen, erect, 1–4(–5) m tall. Branchlets divaricate, spiralled, erect to spreading, terete, initially strigose-tomentose, late glabrescent. Stipules caducous. Petioles 1–3 mm, strigose-pilose. Leaves spiralled, deep green above, pale green below, broadly elliptic or rhombic-elliptic to suborbicular, rarely obovate-elliptic, 0.9–2.5(–3.5) × 0.5–1.7(–2) cm, base obtuse or broadly cuneate, margin revolute, apex acute, rarely obtuse or shortly acuminate, mucronate, papery to subleathery, sparsely strigose-pilose or subglabrous above, strigose-pilose below, midvein impressed above, prominent below. Inflorescence cymose, 5–15 mm, 2–6-flowered; rachis strigose. Hypanthium campanulate, strigose-villous. Sepals triangular, apex acuminate, densely villous at margin. Petals erect, red, glabrous. Stamens 15–20, somewhat shorter than petals, anthers white. Fruit bright scarlet, obovoid-ellipsoid or turbinate, 8–9.5 mm, ca. 6 mm in diameter, nutlets 3 or 4.

Distribution: Nepal, E Himalaya and Assam-Burma.



Altitudinal range: 3000–3800 m.

Ecology: In shrubby areas, river valleys.

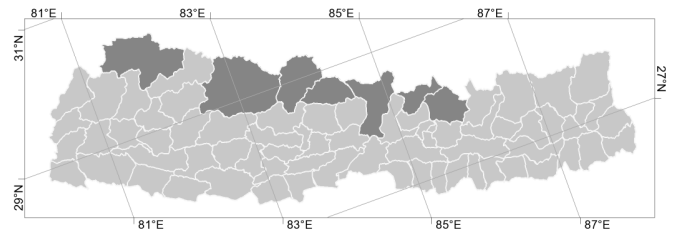
Flowering: May–July. **Fruiting:** October.

11. *Cotoneaster adpressus* Bois, Frutic. Vilmor.: 116 (1904).
Cotoneaster distichus var. *duthianus* C.K.Schneid.; *C. duthianus* (C.K.Schneid.) G.Klotz; *C. horizontalis* var. *adpressus* (Bois) C.K.Schneid.; *C. nitidus* var. *duthianus* (C.K.Schneid.) T.T.Yu.

Shrubs, deciduous, prostrate, to 30(–100) cm high, irregularly branched; branches divaricate. Branchlets distichous, reddish brown or greyish brown to greyish black, terete, slender, initially strigose, glabrous when old. Stipules subulate, caducous. Petioles 1–2(–4) mm, glabrous or pilose. Leaves spiralled, dull green above, broadly ovate or obovate, rarely elliptic, 5–25 × 4–18(–20) mm, base cuneate or obtuse, margin flat or revolute, apex obtuse to acute and shortly mucronate, margin undulate, thinly papery, sparsely pubescent or glabrous below, glabrous above, midvein impressed above, prominent below. Inflorescences solitary flowers or cymose, 5–10 mm, 1-

or 2(–4)-flowered. Flowers subsessile, 7–8 mm across. Hypanthium campanulate, sparsely pubescent outside. Sepals ovate-triangular, shorter than petals, apex acute, glabrous or pilose. Petals erect, pink or red, obovate, 4–5 mm and nearly as broad, apex emarginate or obtuse, glabrous. Stamens ca. 10–15, shorter than petals; anthers white or pink to red. Styles 2. Fruit bright red, subglobose or oblong, 7–9 mm in diameter; nutlets (1 or)2, rarely 3.
Fig. 4c

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: (1900–)3000–4500 m.

Ecology: Mixed forests on slopes, rocky places.

Flowering: May–June. **Fruiting:** August–September.

12. *Cotoneaster acuminatus* Lindl., Trans. Linn. Soc. London 13: 101 (1822).

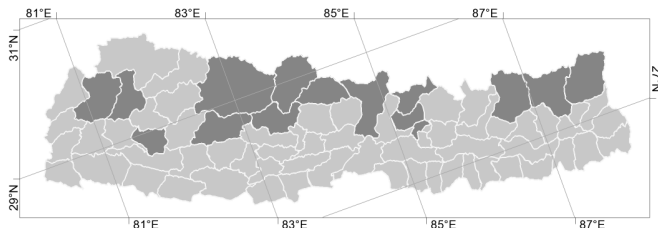
Cotoneaster bakeri G.Klotz; *C. bisramianus* G.Klotz; *C. kongboensis* G.Klotz; *C. mucronatus* Franch.; *C. nepalensis* André later homonym, non K.Koch; *C. paradoxus* G.Klotz; *C. sanguineus* T.T.Yu; *C. staintonii* G.Klotz; *C. stracheyi* G.Klotz; *Crataegus acuminata* (Lindl.) Desf. ex Steud.; *Mespilus acuminatus* (Lindl.) Lodd.

ढल्के फूल Dhalke phul (Nepali).

Shrubs, deciduous, erect, 2–3(–4) m tall. Branchlets spiralled, greyish brown to brownish, or greyish black when old, terete, initially yellowish strigose, glabrous when old. Stipules lanceolate or linear-lanceolate, villous, partly caducous. Petioles 3–7 mm, villous or pilose. Leaves spiralled or distichous, shiny, pale to bright green above, lanceolate to ovate or elliptic, (1–)2–6.5(–8) × (0.7–)2–3 cm, base broadly cuneate or rounded, rarely obtuse, margin undulate, apex acuminate or acute, rarely obtuse or rounded, mucronulate, papery, both surfaces villous or pilose, more densely so below, glabrescent, veins impressed or flat above, prominent below. Inflorescences cymose, 1–2 cm, 1(–3)-flowered, sometimes more; rachis and pedicels yellowish villous. Bracts lanceolate or linear. Pedicels to 3–5 mm. Flowers (5–)6–8(–10) mm across. Hypanthium campanulate, appressed villous or subglabrous outside. Sepals triangular, apex acute or obtuse, glabrous or pubescent. Petals erect to spreading, white or pink, rarely red, ovate to obovate, (2.5–)3–4(–5) mm and nearly as broad, apex obtuse or erose, glabrous. Stamens (10 or)20, shorter than petals; anthers white, sometimes purple. Styles 2. Fruit red, bright red or scarlet, ellipsoid or subglobose, 8–10 × 7–8 mm; nutlets (1 or)2(or 3).

Fig. 4d

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: (1500–)2500–3700(–4200) m.

Ecology: Mixed forests, thickets, fields, open sunny places, slopes, gullies.

Flowering: (April–)May–July(–August). **Fruiting:** (August–)September–October.

Cotoneaster sanguineus is treated here as synonymous with this taxon, differing only in having red petals and small leaves (at the low end of the range of leaf size but comparable, e.g., *Delavay* 3738).

Wood is used to make walking sticks.

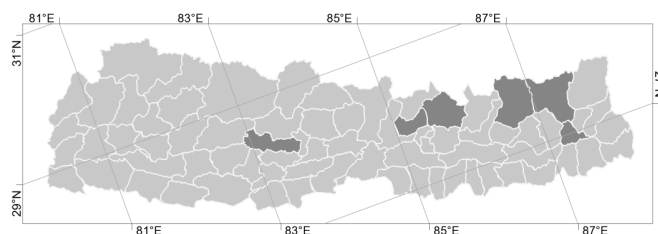
13. *Cotoneaster verruculosus* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 272 (1912).
Cotoneaster distichus var. *verruculosus* (Diels) T.T.Yu; *C. sandakphuensis* G.Klotz.

Shrubs, semi-evergreen or evergreen, prostrate to erect, (0.2–)0.6–1.2(–2) m tall; branches erect or ascending. Branchlets spiralled or distichous, initially dark reddish brown to greyish brown, dark grey when old, terete, initially densely yellow strigose, glabrate, conspicuously verruculose when old.

Stipules lanceolate, pubescent, persistent. Petioles 2–5 mm, pubescent. Leaves spiralled, dark green above, suborbicular or broadly ovate to broadly obovate, 0.7–1.4 cm × (4–)6–12 mm, base broadly cuneate or rounded, margin revolute, apex emarginate or partly mucronulate, both surfaces appressed pilose, glabrescent, subleathery, midvein impressed above, prominent below. Inflorescences usually 1-flowered. Flowers 7–8 mm across, nearly sessile. Hypanthium campanulate, glabrous outside. Sepals ovate-triangular, apex ± obtuse, glabrescent. Petals erect, pink, suborbicular, 4–4.5 mm wide, glabrous. Stamens 20, shorter than petals; anthers white. Styles 2. Fruit red, globose, 7–8 mm in diameter; nutlets 2(or 3).

Fig. 4e

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: (2800–)3000–3800 m.

Ecology: Mixed forests on dry slopes, grasslands, fields, roadsides.

Flowering: May–June. **Fruiting:** September–October.

Further research is needed on the identity of *Cotoneaster sandakphuensis* and the distributional range of *C. verruculosus*.

6. *Pyracantha* M.Roem., Fam. Nat. Syn. Monogr. 3: 104, 219 (1847).

Colin A. Pendry

Thorny evergreen shrubs or small trees. Stipules minute, free, caducous. Leaves simple, alternate, fascicled on short shoots in the axils of the spines, shortly petiolate, margin crenulate. Inflorescences compound corymbs. Flowers bisexual. Bracts solitary; bracteoles 2. Hypanthium short, cupulate. Sepals 5, spreading. Petals 5, spreading, white, base shortly clawed. Stamens 20, anthers yellow. Ovary semi-inferior, carpels 5, lower half adnate to hypanthium, apically free, each with 2 ovules. Styles 5, free. Pome red or orange at maturity, globose, with persistent erect sepals at apex. Pyrenes (nutlets) 5, 1-seeded.

Worldwide three species from SE Europe and Asia. One species in Nepal.

1. *Pyracantha crenulata* (D.Don) M.Roem., Fam. Nat. Syn. Monogr. 3: 220 (1847).
Mespilus crenulata D.Don, Prodr. Fl. Nepal.: 238 (1825);
Crataegus crenulata (D.Don) Roxb.

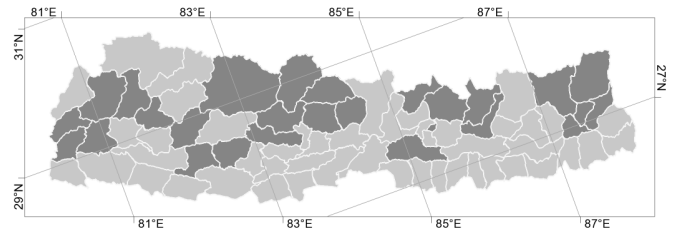
घङ्गारु Ghangaru (Nepali).

Plants to 3(–5) m. Young twigs and leafy short shoots tomentose, older twigs and branches dark red-brown, glabrous. Thorns lateral, to 2 cm, or terminating short side

Rosaceae

branches. Petioles 3–5 mm, glabrous. Leaves oblong or obovate, rarely elliptic, 1.5–6 × 0.7–2.5 cm, base broadly cuneate or slightly rounded, apex obtuse, margin crenulate or sparsely so, glabrous. Corymb to 3 cm. Peduncle glabrescent. Bracts oblong-elliptic, ca. 2 mm, sparsely hairy. Pedicels 3–10 mm, glabrous. Flowers 6–9 mm across. Hypanthium 1–2 × 2–3 mm, glabrous. Sepals spreading, ca. 1 mm, rounded. Petals broadly ovate, 3–4 × 2.5–3 mm, apex rounded, sometimes notched, sparsely hairy at base within. Stamens 2–3 mm. Carpels 0.5–1 mm, densely long white pubescent apically. Styles nearly as long as stamens. Pome 3–8 mm in diameter. Fig. 5a

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 800–2800 m.

Ecology: Roadsides, forest margins and abandoned cultivated areas.

Flowering: April–August. **Fruiting:** July–September.

Ripe fruits are eaten fresh. Powdered dry fruits are taken in case of bloody dysentery. Branches are used as walking sticks.

7. *Photinia* Lindl., Bot. Reg. 6: pl. 491 (1820).

Stranvaesia Lindl.

Mark F. Watson

Evergreen shrubs or trees. Twigs unarmed. Stipules subulate, minute, caducous. Leaves alternate, simple, unlobed, leathery, midvein pronounced below. Inflorescence a terminal corymbose panicle. Flowers bisexual. Bracts and bracteoles linear, caducous. Hypanthium cup-shaped. Sepals 5, small, persistent in fruit. Petals 5, white or cream, contorted or imbricate in bud, obovate or ovate, base clawed, apex rounded entire or irregularly toothed, glabrous. Stamens ca. 20. Ovary semi-inferior to almost inferior, 2–5-celled, ovules 2 per locule. Styles 2–5, fused at least at the base, stigmas truncate. Fruit a pome, globose, somewhat fleshy, 2–5-celled, calyx rim set back from apex. Seeds (1 or)2, testa leathery.

Worldwide about 40 species, from the Himalaya to Japan and in SE Asia south to Sumatra. Two species in Nepal.

The Nepalese species are sometimes confused with *Cotoneaster* which have similar leaves and fruit, but *Cotoneaster* fruit have seeds in woody nutlets. Following overwhelming evidence from taxonomic research in recent decades, *Stranvaesia nussia* is now treated within *Photinia* (see also commentary under *Stranvaesia* in Fl. China 8: 119. 2003).

Key to Species

- 1a Leaf margin entire. Hypanthium, sepals and inflorescence branches glabrous or almost so. Petals up to 3 mm. Styles 2 **1 *P. integrifolia***
- b Leaf margin obscurely dentate or crenate, at least towards apex. Hypanthium, sepals and inflorescence branches densely pilose. Petals longer than 4.5 mm. Styles (4–)5..... **2 *P. nussia***

1. *Photinia integrifolia* Lindl., Trans. Linn. Soc. London, Bot. 13: 103, pl. 10 (1821).

Eriobotrya integrifolia (Lindl.) Kurz; *Photinia eugenifolia* Lindl.; *P. integrifolia* var. *notoniana* (Wight & Arn.) J.E.Vidal; *P. notoniana* Wight & Arn.; *Pyrus integerrima* D.Don.

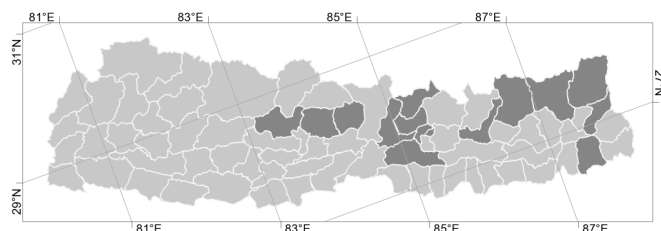
लहरे बाकलपाते Lahare bakalpate (Nepali).

Shrub or tree, 2–9(–15) m, often epiphytic, sometimes climbing. Branchlets brown or blackish, becoming grey and

lenticellate with age. Petioles (0.5–)1–2 cm, glabrous. Leaves elliptic or narrowly obovate, 6–12(–15) × (2–)3–5 cm, base cuneate, apex abruptly and shortly acuminate, tip 0.5–1.5 cm and bent downwards, margin entire, upper surface very sparsely hairy, lower surface densely minutely papillose, essentially glabrous. Inflorescence diffuse, 7–12(–18) × 8–15(–25) cm, branches glabrous or sparsely pubescent, lenticels absent. Very early flowering material (in tight bud) with small bracts and bracteoles ca. 1.5 mm, apex with white tufts of hairs, very early caducous. Pedicels 3–5 mm. Flowers 4–6 mm across. Hypanthium 1–1.5 mm, glabrous. Sepals ca. 1 mm,

broadly triangular, tips pubescent otherwise glabrous. Petals white or cream, orbicular, ca. 1.5–2 × 1.5–2 mm, apex rounded. Stamens ca. 1.5 mm, almost equal. Ovary semi-inferior, densely pubescent. Styles 2, ca. 0.75 mm, fused at base, glabrous. Fruit dark reddish brown becoming purplish black, subglobose, 4–5 × 4–4.5 mm, glabrous or with some hairs remaining at apex within the calyx remains, stamens caducous, styles persistent.

Distribution: Nepal, W Himalaya, E Himalaya, Assam-Burma, E Asia and SE Asia.



Altitudinal range: 1300–3000 m.

Ecology: Free standing or epiphytic on trees or boulders in warm temperate mixed evergreen forests with *Castanopsis*, *Quercus*, *Rhododendron* and *Acer*, also in disturbed open places.

Flowering: April–May. **Fruiting:** August–November.

The abruptly acuminate downward pointing leaf tips and entire margins are characteristic of this species. *Photinia arguta* Lindl. is recorded from the Tarai in Darjeeling district and may occur in far eastern border regions of Nepal. It is readily distinguished by the serrate margins to the leaves (but also compare with *Eriobotrya*) and branches which are strongly warted with lenticels.

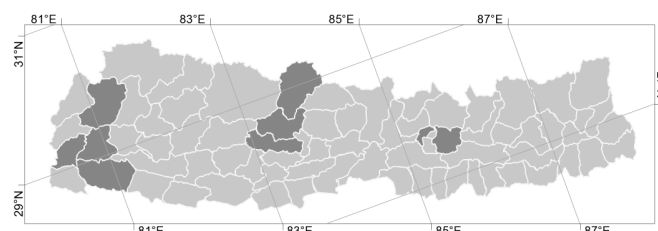
2. *Photinia nussia* (Buch.-Ham. ex D.Don) Kalkman, Blumea 21(2): 429 (1973).

Pyrus nussia Buch.-Ham. ex D.Don, Prodr. Fl. Nepal.: 237 (1825); *Cotoneaster affinis* Lindl. ex Wall. nom. nud.; *Crataegus glauca* Wall. nom. nud.; *C. glauca* Wall. ex G.Don; *Stranvaesia glaucescens* Lindl.; *S. nussia* (Buch.-Ham. ex D.Don) Decne.

Shrub or medium-sized tree, 2–10(–15) m. Branches purplish brown when old, densely pilose when young, glabrescent. Petioles ca. 1 cm, densely pilose. Leaves lanceolate to narrowly obovate, 6–10 × 2–4 cm, base cuneate, apex acute, margin obscurely dentate or crenate, sometimes very shallowly so, but usually with at least some teeth towards the apex, upper surface glabrous except pilose along impressed midvein, lower surface pilose with long hairs at least along the midvein. Corymbs flat-topped, compact, 6–9 × 8–13 cm, inflorescence branches densely pilose, bracts and bracteoles 2–3 mm, pubescent. Pedicels 5–10 mm, densely pilose, at least at apex. Flowers ca. 10 mm across. Hypanthium 3–4 mm, densely pilose. Sepals broadly triangular, 1–1.5 × 1.5–1.75 mm, densely pilose. Petals white, broadly obovate, 4.5–5 × 3–3.5 mm, apex irregularly shallowly lobed. Stamens unequal, 2–3 mm. Ovary semi-inferior, densely pilose. Styles (4–)5, ca. 2.7 mm, fused for half their length, glabrous. Fruit orange-red, globose ca. 8 × 8 mm, hairy when young, later glabrous, styles and filaments persistent.

Fig. 5b

Distribution: Nepal, W Himalaya, Tibetan Plateau, Assam-Burma, E Asia and SE Asia.



Altitudinal range: 700–2200 m.

Ecology: Degraded areas and open subtropical to warm temperate mixed hill forests with *Schima*, *Shorea*, *Engelhardia*, Lauraceae and *Quercus*.

Flowering: April–May. **Fruiting:** August–January.

Sometimes confused with the morphologically similar *Cotoneaster frigidus* Wall. ex Lindl. which differs in having 2 styles and narrower, less leathery and less shiny leaves.

8. *Eriobotrya* Lindl., Trans. Linn. Soc. London 13: 96, 102 (1821).

Colin A. Pendry & Cathy King

Small to medium-sized evergreen trees. Twigs unarmed. Stipules persistent or caducous. Leaves simple, alternate, coriaceous, petiolate, more or less serrate, secondary veins prominent, glabrous or tomentose beneath. Inflorescence a tomentose panicle or cymose thyrse. Flowers numerous, sweet-scented, bisexual. Bracts solitary; bracteoles 2. Hypanthium cup-shaped or funnel-shaped, tomentose or villous. Sepals 5, triangular. Petals 5, white or yellow, orbicular, clawed. Stamens 15–20. Ovary inferior, 2–5 locular, with 2 ovules per locule. Styles 2–5, connate at base, glabrous or villous. Fruit an elongated fleshy pome with persistent calyx remains. Seeds large, 1 or 2.

Worldwide about 20 species from the Himalaya to China and Malesia. Three species native to Nepal with another species cultivated.

Rosaceae

The Japanese native *Eriobotrya japonica* (Thunb.) Lindl. (syn. *Mespilus japonica* Thunb.) is cultivated in villages of Nepal and widely in temperate areas of the northern hemisphere. It is included in the key to species, but not otherwise treated.

Key to Species

- 1a Twigs glabrous, 2–4 mm thick.....1 *E. dubia*
 b Twigs tomentose, 5–9 mm thick.....2
- 2a Leaves densely tomentose below. Stipules persistent, subulate. Cultivated..... *E. japonica*
 b Leaves glabrous or glabrescent below. Stipules caducous. Wild.....3
- 3a Petioles 16–50 mm. Leaves usually only slightly toothed towards apex2 *E. elliptica*
 b Petioles 5–9 mm or leaves sessile. Leaves serrate with hooked teeth in at least apical three quarters of margin
 3 *E. hookeriana*

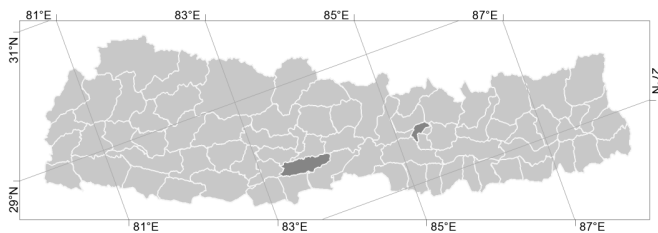
1. *Eriobotrya dubia* (Lindl.) Decne., Nouv. Arch. Mus. Hist. Nat. 10: 145 (1874).
Photinia dubia Lindl., Trans. Linn. Soc. London 13: 104, pl. 10 (1821); *Crataegus shicola* Buch.-Ham. ex Lindl. nom. inval.; *C. shicola* Buch.-Ham. ex D. Don nom. inval.; *Mespilus tinctoria* D. Don nom. illegit.

जुरे काफल Jure kaphal (Nepali).

Trees to 10 m. Twigs 2–3 mm thick, glabrous. Stipules oblong, 2–3 mm, caducous. Petioles 5–10 mm, glabrous. Leaves elliptic to narrowly obovate, 6–11 × 2–4 cm, base cuneate to attenuate, apex acute to acuminate, margins serrate, the serrations denser towards the apex, glabrous, secondary veins 9–14 pairs. Inflorescence an open panicle to 7 cm, branches tomentose. Bracts 2–2.5 mm, bracteoles 1–2 mm. Hypanthium shallowly cup-shaped, ca. 1 mm, tomentose. Sepals narrowly triangular, 1 mm, tomentose outside, glabrous within. Petals white. Stamens 15–20, ca. 2 mm. Styles 2, ca. 1 mm, villous at base. Fruit ellipsoid, 10–12 mm.

Fig. 5c

Distribution: Nepal, W Himalaya and E Himalaya.



Altitudinal range: 1300–2800 m.

Ecology: Moist evergreen forest.

Flowering: September–November. **Fruiting:** February–April.

The small leaves, slender, glabrous twigs and rather small inflorescence of *Eriobotrya dubia* readily distinguish it from the other species in Nepal.

Ripe fruits are eaten fresh.

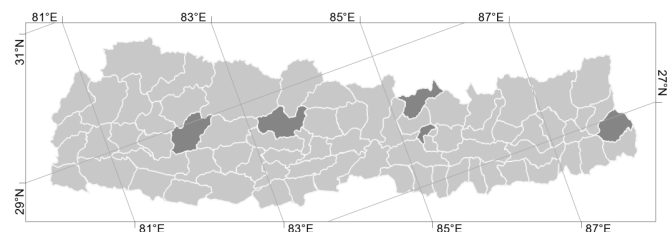
2. *Eriobotrya elliptica* Lindl., Trans. Linn. Soc. London 13: 102 (1821).
Mespilus cuila Buch.-Ham. ex Lindl. nom. inval.; *M. cuila* Buch.-Ham. ex D. Don nom. inval.

मया Maya (Nepali).

Trees to 15 m. Twigs 6–8 mm thick, densely tomentose when young. Stipules triangular, 2–3 mm, caducous. Petioles 16–40 mm, tomentose, glabrescent. Leaves elliptic to oblong or slightly ovate or obovate, 12–22(–30) × 4–9(–13) cm, base rounded to cuneate, apex acute to acuminate, margins entire and obscurely repand, somewhat serrate towards the apex, rarely sparsely serrate towards base, glabrous, secondary veins 12–24 pairs. Inflorescence a cymose thyse to 9 cm, densely rusty villous. Bracts 6–8 mm, bracteoles ca. 4 mm. Flowers subsessile or on pedicels to 3 mm. Hypanthium funnel-shaped, 5 mm, rusty villous. Sepals triangular, 4 mm, villous outside, glabrous within. Petals white or pale yellow, 8 mm, glabrous, slightly villous at base within. Stamens ca. 20, 5–6 mm. Styles 5, 4–5 mm, villous. Fruit obovoid-globose, 8–12 mm.

Fig. 5d

Distribution: Nepal and Tibetan Plateau.



Altitudinal range: 500–2800 m.

Ecology: Moist evergreen forest.

Flowering: April. **Fruiting:** June.

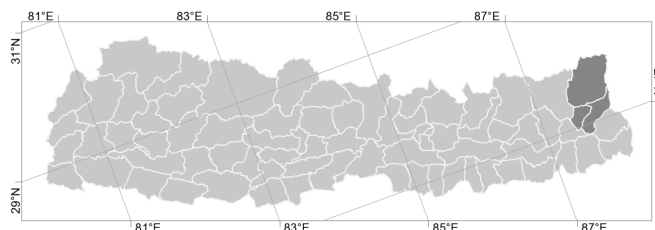
The large leaves of *Eriobotrya elliptica* with their long petioles are unlike any of the other Nepalese species. The cultivated *E. japonica* (Thunb.) Lindl. has similarly sized leaves, but they are

subsessile or only shortly petiolate and densely tomentose below.

3. *Eriobotrya hookeriana* Decne., Nouv. Arch. Mus. Hist. Nat. 10: 146 (1874).

Trees to 10 m. Twigs 4–6 mm thick, tomentose. Stipules elliptic to oblong, 3–7 mm. Petioles 5–9 mm, tomentose, or leaves subsessile. Leaves elliptic to oblong or narrowly obovate, 12–25 × 4–8 cm, base cuneate to rounded, apex acuminate, margins serrate, sometimes entire towards base, young leaves densely tomentose, soon glabrescent except sometimes tomentose on veins above and below, secondary veins (12–)16–34 pairs. Inflorescence an open panicle to 12 cm, densely tomentose. Bracts 4 mm, bracteoles 2 mm. Flowers subsessile. Hypanthium campanulate, 2 mm, tomentose. Sepals triangular, 1.5–2 mm, tomentose on margins only. Petals white, 2–3 mm, glabrous. Stamens ca. 20, 2 mm. Styles 2, 1 mm, glabrous, villous at base. Fruit ellipsoid to almost globose, to 14 mm.

Distribution: Nepal and E Himalaya.



Altitudinal range: 1400–2400 m.

Ecology: Mixed evergreen broad-leaved forest.

Flowering: October–November. **Fruiting:** March–June.

The combination of shortly petiolate leaves with dense serrations along almost the whole margin is found only in *Eriobotrya hookeriana*.

9. *Sorbus* L., Sp. Pl. 1: 477 (1753).
Aria (Pers.) Host.

Mark F. Watson & Vidya K. Manandhar

Trees or shrubs, all Nepalese species deciduous. Twigs unarmed. Stipules present, often caducous. Leaves alternate, simple or imparipinnate, margins mostly serrate, sometimes entire, glabrous or variously hairy, especially below. Inflorescences terminal and lateral compound corymbs, glabrous, pubescent or tomentose. Flowers bisexual. Bracts solitary; bracteoles 2, early caducous. Hypanthium campanulate. Sepals 5. Petals 5, free, usually clawed at base. Stamens 15–25, equal or somewhat unequal. Ovary semi-inferior or inferior. Styles 2–5, free or connate, glabrous or hairy. Fruit a pome, ovoid or globose, with or without persistent sepals, locules 2–5. Seeds brown, 1 or 2 per locule.

Worldwide about 100 species in temperate regions of N hemisphere. 13 species in Nepal.

Himalayan *Sorbus* is taxonomically problematic with apomictic reproduction and polyploidy contributing to the creation of locally distinct variants and the blurring of species boundaries across the region. The simple and pinnate-leaved species form natural groups, and are sometimes recognized as separate genera (*Aria* and *Sorbus*). This division is gaining support in recent molecular studies, but as the classification for the genus as a whole has not been completed a broad generic concept is adopted here. Identification of simple-leaved species is usually straightforward, as long as material is gathered from mature plants and not juvenile growth. Pinnate-leaved species are more complex as three types of shoots are produced: short reproductive shoots, short vegetative shoots and long vegetative shoots, and these have somewhat different leaf and stipule morphologies. The short shoots are most useful for identification, ideally combining short vegetative shoots (best for leaf and stipule characters) with short reproductive shoots (good for flower and fruit characters, but sometimes with atypical stipules). Long vegetative shoots are found on young plants and as suckers on old plants, and these should be avoided as the stipules and leaflets are often very atypical.

Key to Species

- | | | |
|----|--|-------------------------------|
| 1a | Leaves simple, sometimes shallowly lobed..... | 2 |
| b | Leaves pinnate..... | 7 |
| 2a | Leaves glabrous or brown pubescent on the veins below, never white tomentose. Sepals deciduous in fruit..... | 3 |
| b | Leaves white or cream tomentose below. Sepals persistent in fruit..... | 4 |
| 3a | Leaves (7–)10–12 cm, lower surface glabrous, lateral veins 12–15 pairs, strongly raised. Petioles 1–1.5 cm..... | 1 <i>S. rhamnoides</i> |
| b | Leaves 4–8 cm, lower surface sparsely rusty brown pubescent when young, lateral veins 7–10 pairs, not raised. Petioles 0.5–1 cm..... | 2 <i>S. thomsonii</i> |

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- 4a Leaves un-lobed, sometimes doubly serrate.....5
 b Leaves more or less lobed or lobulate.....6
- 5a Leaf ovate to rounded, width to length ratio 0.58–0.68(–0.82), veins 11–16 pairs. Petioles short, 0.5–1.5 cm, 4–9% of lamina length. Petals sparsely hairy within. Fruit 0.9–1.5 cm across, lenticels dense, prominent..... **3 S. sharmae**
 b Leaf lanceolate-ovate, width to length ratio 0.33–0.57, veins 6–11 pairs. Petioles long, 1–2.5 cm, 9–12% of lamina length. Petals woolly within. Fruit 1.5–2.0 cm across, lenticels sparse, not prominent..... **4 S. vestita**
- 6a Leaf midrib and lateral veins with distinct brown tomentum below, lobes shallow, acute. Styles white woolly only at base. Fruit 1.0–1.3 cm across, with lenticels..... **5 S. hedlundii**
 b Leaf midrib and lateral veins without brown hairs below, lobes deep, rounded. Styles white woolly all over. Fruit 1.3–2.0 cm, without lenticels **6 S. lanata**
- 7a Leaflet pairs 3–8(–9)8
 b Leaflet pairs 8–14(–18)10
- 8a Leaflet pairs 3–5. Leaflets more than 5 cm **7 S. insignis**
 b Leaflet pairs 4–8(–9). Leaflets less than 3 cm.....9
- 9a Leaflet pairs 4–6. Leaflets toothed in apical half, shiny above, lower surface not prominently papillose. Stipules on short shoots ovate-lanceolate, acuminate or caudate with a toothed margin **8 S. kurzii**
 b Leaflets pairs (6–)7–8(–9). Leaflets entire or almost so, matt above, white hairy above and below when young, older leaves glabrescent, lower surface densely papillose. Stipules on short shoots subulate **9 S. wallichii**
- 10a Leaflet pairs 12–14(–18), very rarely only 8 or 9. Leaflets (1.0–)1.5–2(–2.4) × (0.3–)0.5–0.8(–1) cm, rarely more than 2.4 cm. Stipules small, 3–4 mm long, subulate-lanceolate, dark brown, caducous..... **10 S. microphylla**
 b Leaflet pairs 8–12(–13). Leaflets 2.5–6 × 0.7–1.5 cm. Stipules at least 5 mm long, lanceolate, brown and caducous or broad, green and persistent.11
- 11a Stipules narrowly lanceolate or subulate, brown and caducous. Largest leaflets to 3.5 cm. Terminal branchlets slender, less than 4 mm thick. Styles hairy at base..... **11 S. himalaica**
 b Stipules broadly lanceolate to suborbicular, green and persistent. Largest leaflets usually more than 3.5 cm. Terminal branchlets stout, more than 4 mm thick. Styles glabrous or hairy at base.....12
- 12a Stipules broadly ovate, stalked and clasping, 5–15 mm broad. Leaflets entire or only remotely toothed. Styles glabrous **12 S. arachnoidea**
 b Stipules ovate or lanceolate, 2–3 mm broad. Leaflets serrate in apical half or quarter. Styles hairy at base..... **13 S. foliolosa**

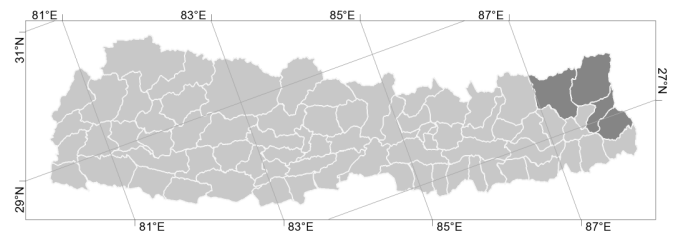
1. *Sorbus rhamnoides* (Decne.) Rehder, in Sarg., Pl. Wilson. 2(2): 278 (1915).

Micromeles rhamnoides Decne., Nouv. Arch. Mus. Hist. Nat. 10: 59 (1874); *Aria rhamnoides* (Decne.) H. Ohashi & H. Iketani; *Pyrus rhamnoides* (Decne.) Hook. f.; *Sorbus sikkimensis* var. *oblongifolia* Wenz.

Shrub or tree, 3–5(–10) m, sometimes epiphytic. Branchlets dark brown, 2.5–5 mm thick, glabrous, young shoots red-brown. Buds globose 2–2.5 mm, apex obtuse, scales brown, glabrous. Stipules linear, ca. 4 × 0.5 mm, caducous. Petioles 1–1.5 cm, glabrous. Leaves simple, oblong-elliptic, (7–)10–12 × 2.5–4 cm, base broadly cuneate, apex acuminate, margin finely serrate, lateral veins 12–15 pairs, almost parallel, strongly raised, upper surface glabrous or glabrescent, lower surface glabrous, white tomentose along veins when young. Inflorescence ca. 7 cm diameter, rachis and pedicels sparsely white tomentose with conspicuous lenticels, glabrous in fruit. Bracts red-brown, linear, 6–8 mm, glabrous. Flowers 5–6 mm diameter. Pedicels 4–5 mm. Sepals oblong, 2–3 mm, apex acute, outer surface sparsely white tomentose towards apex.

Petals white, oblong-ovate, 4–5 × 2–3 mm, base shortly clawed, apex obtuse or rounded, glabrous. Stamens 20, cream, 5–5.5 mm. Styles 2, 4–4.5 mm, glabrous, connate at base. Fruit pale yellow, globose or slightly ovoid, solid, 3.5–7 mm diameter, lenticels absent, sepals deciduous in fruit leaving a ring-shaped scar.

Distribution: Nepal, E Himalaya, Assam-Burma and E Asia.



Altitudinal range: 2500–3000(–3500) m.

Ecology: In mixed forests.

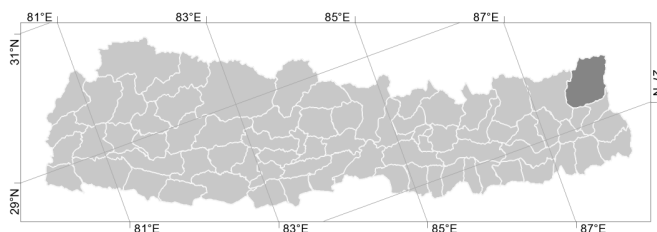
Flowering: May–June. **Fruiting:** September–October.

This species is similar to *Sorbus thomsonii* (King ex Hook.f.) Rehder, but it is easily distinguished by longer petioles, strongly raised veins on lower surface of leaves and fruits not spotted with lenticels. Records from the far eastern Himalayan region require further taxonomic study.

2. *Sorbus thomsonii* (King ex Hook.f.) Rehder, in Sarg., Pl. Wilson. 2(2): 277 (1915).
Pyrus thomsoni King ex Hook.f., Fl. Brit. India 2[5]: 379 (1878);
Aria thomsonii (King ex Hook.f.) H. Ohashi & H. Iketani.

Tree or large shrub, ca. 10 m. Branchlets grey brown, 2.5–5 mm thick, glabrous. Buds ovoid, ca. 5 × 2.5 mm, apex acute, bud scales pale brown, glabrous. Petioles 5–7 mm, glabrous, white tomentose when young. Stipules brown, lanceolate, 1–3 × 0.5–1 mm, sometimes minute, glabrous, caducous. Leaves simple, ovate-elliptic or oblong-elliptic, 4–8 × 1.8–2.8 cm, base cuneate, apex acute or short acuminate, margin minutely serrate, apically minutely toothed, lateral veins 7–10 pairs, upper surface glabrous, lower surface sparsely rusty brown hairy when young. Inflorescence 2.5–4 cm diameter, rachis and pedicels white pubescent. Pedicels 3–7 mm. Bracts brown, linear, 3–4 mm, glabrescent. Flowers 8–10 mm diameter. Sepals triangular-ovate ca. 2 mm, apex obtuse, outer surface pubescent, inner glabrous. Petals creamy white, obovate-elliptic, 4–5.5 × 3–4 mm, base clawed, apex obtuse, sparsely hairy at base within. Stamens 20, unequal, longer 3.5–4.5 mm, shorter 1.5–2 mm, filaments pale brown, anthers dark brown. Styles 3 or 4, 4–4.5 mm, glabrous, connate at base. Fruit light pink, globose, solid, 10–12 mm diameter, with few lenticels, sepals deciduous.

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 1700–2000 m.

Ecology: In warm temperate habitats.

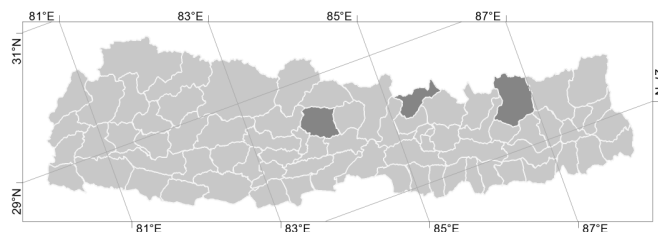
Flowering: April–May. **Fruiting:** August–September.

3. *Sorbus sharmae* M.F. Watson, V. Manandhar & Rushforth, Int. Dendrol. Soc. Year Book 2009: 79 (2010).

Tree, 10–15 m. Branchlets grey brown, (4–)5–8 mm thick, young shoots white tomentose, later glabrescent. Buds ovoid with acute apex, 5–8 mm, scales red-brown, glabrous, apex pubescent. Stipules yellow brown, linear-lanceolate, ca. 9 × 0.8 mm, white hairy within, caducous. Petioles 0.5–1.5 cm, white

tomentose, later glabrescent. Leaves simple, broadly elliptic, 8–22 × 3.5–11 cm, base cuneate, apex acute or short acuminate, margin double serrate, teeth rounded with a forward beaked tip, lateral veins 11–16 pairs, almost parallel, upper surface dark green, glabrous, lower surface white tomentose. Inflorescence 4–7 cm diameter, white tomentose. Pedicels 2–3.5 mm, white hairy. Flowers 1–1.2 cm diameter, white tomentose. Sepals triangular, 2–3.5 mm, apex acute or acuminate with red tip. Petals white or creamy yellow with brown veins, spatulate, 5–7 × 3–5 mm, base shortly clawed, apex obtuse, glabrous, adaxially sparsely hairy towards apex. Stamens 15–20, ca. 3.5 mm, filaments white, anthers crimson. Styles 2–5, 4–4.5 mm, connate and densely hairy at base. Fruit red-brown, ovoid, solid, 0.9–1.5(–2) cm diameter, lenticels dense, sepals persistent.

Distribution: Endemic to Nepal.



Altitudinal range: 2500–3200 m.

Ecology: Mixed and open forest with *Pinus* and *Salix*, sometimes isolated trees on degraded hillsides.

Flowering: May–August. **Fruiting:** June–September.

Recent research has revealed that Nepalese plants formerly treated as *Sorbus thibetica* (Cardot) Hand.-Mazz. (syn. *Pyrus thibetica* Cardot) are quite different from the Chinese type specimens in some leaf characters but especially in the abundant lenticels on the fruit (*S. thibetica* has no lenticels). Nepalese material has now been recognized as a new endemic species *Sorbus sharmae*. This species is similar to *S. vestita* (Wall. ex G. Don) Lodd. and in Nepal it is often confused with it, but it differs in leaf characters (see key) as well as the densely lenticellate fruits. The species are also distinguished by their distributions, with *S. sharmae* occurring predominantly eastwards from Central Nepal (Langtang), and *S. vestita* replacing it to the west.

4. *Sorbus vestita* (Wall. ex G. Don) Lodd., Cat. Pl., ed. 16: 66 (1836).

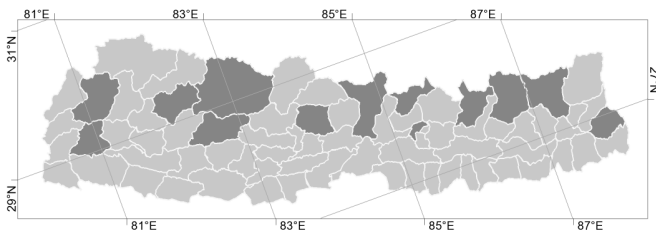
Pyrus vestita Wall. ex G. Don, Gen. Hist. 2: 647 (1832); *Aria vestita* (Wall. ex G. Don) M. Roem.; *Crataegus cuspidata* Spach nom. illegit.; *Pyrus crenata* Lindl. later homonym, non D. Don; *P. vestita* Wall. nom. nud.; *Sorbus crenata* K. Koch nom. superfl.; *S. crenata* S. Schauer; *S. cuspidata* (Spach) Hedl. nom. illegit.

Tree, 6–10(–13) m. Branchlets glabrous, brown, 5–7 mm thick, young shoots white tomentose, lenticels ellipsoid. Buds ovoid, 0.7–1.4 cm, scales brown, glabrous. Stipules brown, lanceolate, 0.8–1 cm, entire, tomentose, caducous. Petioles 1–2.5 cm, white pubescent. Leaves simple, broadly elliptic or

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lanceolate-ovate, 12–20 × 7–11 cm, base rounded or broadly cuneate, apex acute or obtuse, margin regularly serrate or crenate, lateral veins 6–11 pairs, almost parallel, upper surface dark green, glabrous, pubescent when young, lower surface dense white tomentose. Inflorescence 4–7 cm diameter, young rachis and pedicels white tomentose, later glabrescent, lenticels small, obscured by indumentum. Bracts reddish, linear, 10–12 mm, ciliate, caducous. Pedicels 5–7 mm. Flowers 5–6 mm diameter. Sepals triangular, 2.5–3 × 1.5–2.5 mm, apex acute, white woolly. Petals white or cream, oblong-ovate, 5.5–7.5 × 4–5 mm, base shortly clawed, apex rounded, glabrous on outside, variably hairy within from densely white woolly to almost glabrous. Stamens ca. 20, 5–6 mm, filaments brown, anthers pale purple. Styles 3 or 4, ca. 4 mm, connate, white woolly at base. Fruit yellow-green flushed red to dark purple-red, globose, solid, 1.5–2 cm diameter, lenticels sparse, sepals persistent.

Distribution: Nepal and W Himalaya.



Altitudinal range: (1350–)2000–3700 m.

Ecology: Mixed forests with *Pinus*, *Taxus*, *Quercus*, *Acer*, *Rhododendron* and *Corylus*, and open rocky or grassy slopes.

Flowering: (April–)May–June. **Fruiting:** (July–)August–September.

Lindley (Bot. Reg. 20: t. 1655. 1835) misapplied the name *Pyrus crenata* D. Don to this species.

Sorbus vestita has been reported further east into E Himalaya and China, but recent research (Rushforth, Int. Dendr. Soc. Yearb. 2009: 74. 2010) suggests that these records refer to other taxa and true *S. vestita* is restricted to central Nepal to NW India. See also note under *Sorbus sharmae* M.F. Watson, V. Manandhar & Rushforth.

5. *Sorbus hedlundii* C.K. Schneid., Ill. Handb. Laubholz. 1: 685 (1906).

Pyrus hedlundii (C.K. Schneid.) Lacaïta.

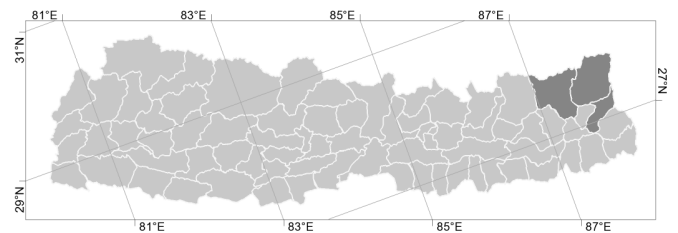
नाझील Najhil (Nepali).

Tree, 10–15 m. Branchlets dark brown, 5–8(–8) mm thick, glabrous, youngest shoots white tomentose. Buds ovoid, 5–6 mm diameter, scales brown, glabrous, inner surface white tomentose. Stipules brown, linear, 1.5–2 cm, white tomentose, caducous. Petioles 5–18 mm, white tomentose. Leaves simple, broadly elliptic, 18–30 × 4–20 cm, base cuneate, apex acute or rounded, margin serrate, sometimes shallowly lobulate, lateral veins 12–15 pairs, upper surface dark green, glabrous or glabrescent, lower surface white tomentose with midrib and

veins prominently brown tomentose. Inflorescence 5–8 cm diameter, rachis and pedicels brown hairy, lenticels present, small. Bracts brown, linear, 1.8–2.5 cm, white ciliate, caducous. Flowers 5–7 mm diameter. Sepals 5–7 mm, linear-triangular, reflexed, apex acuminate, brown hairy. Petals white, obovate, 6–7 × 3–4 mm, base clawed, apex rounded often with irregular toothing, glabrous. Stamens 20, 3–4 mm, filaments pale brown, anthers pale yellow. Styles 3–5, 3–4 mm, connate, white woolly at base, later glabrescent. Fruits yellowish, globose, solid, 1–2 cm diameter, lenticels present, sepals persistent.

Fig. 6f

Distribution: Nepal and E Himalaya.



Altitudinal range: (2500–)2700–3050(–3400) m.

Ecology: Mixed forests with *Tsuga*, *Betula*, *Quercus*, *Rhododendron*, forest remnant in degraded areas.

Flowering: May–June. **Fruiting:** (September–)October–November.

In leaf this species with tomentose leaves and lobulate margins can be confused with *Sorbus lanata* (D. Don) Schauer, however, it is readily distinguished by the brown hairs along the veins on the lower leaf surface of mature growth.

Ripe fruits are eaten fresh.

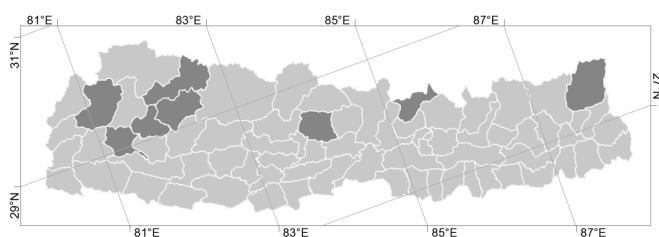
6. *Sorbus lanata* (D. Don) Schauer, Übers. Arbeiten Veränd. Schles. Gs. Vaterl. Kult., 1847: 292 (1848).

Pyrus lanata D. Don, Prodr. Fl. Nepal.: 237 (1825); *Aria lanata* (D. Don) Decne.; *Pyrus kumaonensis* Wall. nom. nud.

Tree, 5–15 m. Branchlets shiny brown, 4–7(–9) mm thick, young shoots densely white woolly, at least at first. Buds ovoid with obtuse or acute apex, scales brown, glabrous except apex hairy. Stipules pale brown, linear-lanceolate, 5–7 × 1 mm, caducous, white tomentose. Petioles 1.5–2 cm, white tomentose. Leaves simple, broadly oblong, 6–13 × 3–9 cm, base cuneate, apex acute, margin lobulate, lobules serrulate, lateral veins 9–15, almost parallel, upper surface glabrescent, lower surface white woolly. Inflorescences ca. 6 cm diameter, white woolly. Bracts linear, pale brown, 6–7 mm, ciliate, caducous. Pedicels 4.5–5.5 mm, densely white woolly. Flowers 12–15 mm diameter. Sepals brown with pale tip, ovate, 4–5 mm, apex acute, white woolly. Petals creamy white, obovate, 3.5–4.5 mm, base shortly clawed, apex obtuse, glabrous. Stamens 20, ca. 2 mm, filaments cream to pale brown, anthers pale yellow or brownish. Styles 3, ca. 2 mm, connate at base, white woolly all over. Fruit red or dark brown, globose, solid, 1.3–2(–3) cm diameter, sepals persistent.

Fig. 7f-g

Distribution: Nepal and W Himalaya.



Altitudinal range: 2200–3400 m.

Ecology: In mixed forests with *Abies*, *Picea*, *Taxus*, *Tsuga*, *Aesculus*, *Acer*, *Betula* and *Quercus*.

Flowering: (February–)April–May. **Fruiting:** (May–)June–August(–September).

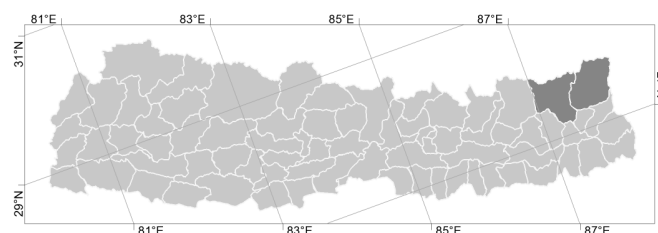
Morphologically this species can be difficult to distinguish from other white-tomentose simple-leaved *Sorbus*, although the pronounced lobulate leaf margin is usually characteristic. In fruiting specimens it is easily separated by the lack of lenticels on the fruit, and in flowering stage by the connate styles completely covered by woolly white hairs. In Nepal the geographic locality may be helpful to distinguish from other similar species (except *Sorbus vestita* (Wall. ex G. Don) Lodd.) as it is a predominantly W Himalayan species.

Ripe fruits are eaten fresh. Leafy branches are lopped for fodder.

7. *Sorbus insignis* (Hook.f.) Hedl., Kongl. Vetensk. Acad. Handl. 35: 32 (1901).
Pyrus insignis Hook.f., Fl. Brit. India 2[5]: 377 (1878).

Tree, 4–10 m. Branchlets greyish brown, stout, to 9 mm thick, glabrous, rusty brown tomentose when young. Buds ovoid, 10–15 × 5–10 mm, apex acute, scales red-brown, margin and apex brown ciliate. Stipules green, suborbicular, 1–2 cm, persistent, sometimes lobed, margin entire or serrate with pointed teeth, glabrous. Petioles (2–)3–5 cm, glabrous. Leaves pinnate, 20–30 cm, rachis grooved above, sparsely tomentose becoming glabrescent. Leaflets 3–5 pairs, sessile, oblong, 5.5–10.5 × 1.5–2.5 cm, base obliquely rounded, apex acute or obtuse, margin finely serrate but recurved and serrations obscured, upper surface dark green, glossy, lower surface brown glaucous, sparsely white hairy when young soon becoming glabrescent apart from tufts of brown hairs at base. Inflorescence 10–15 cm diameter, rachis and pedicels stiff, sparsely pubescent, lenticels present. Bracts brown, linear, 6–8 mm, sparsely hairy within. Flowers 5–6 mm diameter. Calyx lobes triangular, ca. 1.5 mm, glabrous or slightly puberulous. Petals creamy white, ovate or suborbicular, ca. 4 × 3 mm, base clawed, apex rounded with mucronate tip, glabrous. Stamens ca. 20, 2–3 mm, colour not recorded. Styles 2–3, ca. 2 mm, glabrous, lower half connate. Fruit somewhat fleshy, white or crimson when mature, globose or ovoid, 5–8 mm diameter, glabrous, lenticels present, calyx lobes persistent.

Distribution: Nepal, E Himalaya, Tibetan Plateau and Assam-Burma.



Altitudinal range: (2800–)2900–3200 m.

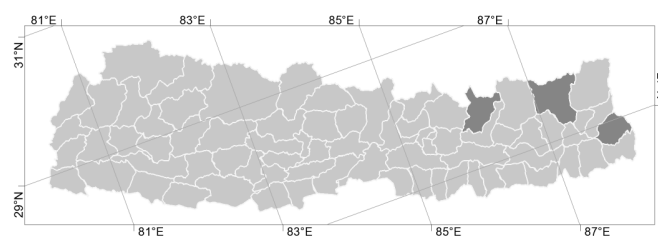
Ecology: In mixed broad leaved forests with *Acer* and *Rhododendron*.

Flowering: May–June. **Fruiting:** August–October.

8. *Sorbus kurzii* (Watt ex Prain) C.K.Schneid., Bull. Herb. Boissier, Sér 2 6: 315 (1906).
Pyrus kurzii Watt ex Prain, J. Asiat. Soc. Bengal 73: 203 (1904).

Tree, 4–5 m, sometimes epiphytic. Branchlets greyish brown, slender, 3–5 mm thick, glabrous or almost so. Buds ovoid, 0.5–0.8 × 0.2–0.3 mm, apex acute, scales red-brown, glabrous. Stipules green, ovate-lanceolate, ca. 10 × 5 mm, persistent, apex acuminate or caudate with entire or toothed margin, glabrous. Petiole 1.2–2.8 cm, glabrous. Leaves pinnate, 7–11 cm, rachis and petioles slightly grooved above, glabrous. Leaflets 4–6 pairs, subsessile (petiolules 1–1.5 mm), obovate, 1.8–3 × 0.8–1.8 cm, base obliquely round, apex rounded or obtuse, margin entire in lower portion, apical portion finely toothed, glabrescent, upper surface dark green, shiny, lower surface glaucous. Inflorescence 2–3 cm diameter, rachis and pedicels brown, glabrous in fruit, lenticels present. Calyx lobes triangular, 2–3 mm, glabrous to minutely pubescent. Petals white, obovate, 2.5–3 × 1.8–2.2 mm, base clawed, apex rounded, glabrous. Stamens ca. 20, ca. 2.5 mm, colour not recorded. Styles 3–5, 1.5–2 mm, free or slightly connate at base, glabrous. Fruit fleshy, red-pink, later fading almost to white, globose, 5–6 mm diameter, lenticels absent, calyx lobes persistent.

Distribution: Nepal, E Himalaya, Tibetan Plateau and Assam-Burma.



Altitudinal range: 2800–3700 m.

Ecology: In mixed broad leaved forests with *Abies* and *Rhododendron*.

Flowering: May–June. **Fruiting:** July–September.

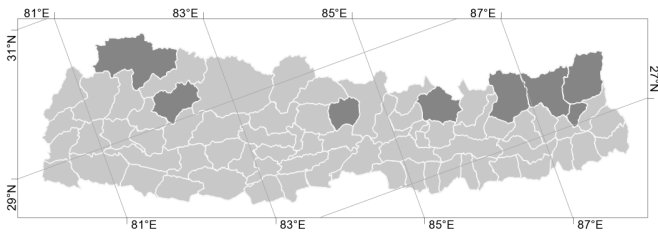
Rosaceae

The persistent green, ovate stipules are characteristics of this species which help to distinguish it from other species that can have low leaflet numbers, such as *Sorbus wallichii* (Hook.f.) T.T.Yu. Literature records of lower altitudes in Nepal (down to 2300 m) have not yet been verified by herbarium collections.

9. *Sorbus wallichii* (Hook.f.) T.T.Yu, in T.T.Yu, Fl. Reipubl. Popularis Sin. 36: 329 (1974).
Pyrus wallichii Hook.f., Fl. Brit. India 2[5]: 376 (1878).

Shrub or tree, 4–7 m, often epiphytic at lower altitudes. Branchlets greyish brown, 2–4(–6) mm thick, densely white woolly when young, glabrescent. Buds ovoid, ca. 5 × 3 mm, apex acute, scales brown, glabrous, apically sparsely ciliate. Stipules brownish green, linear-lanceolate or subulate, 3–5 mm, persistent, entire, glabrous. Leaves pinnate, 9–13 cm, rachis grooved above, glabrescent. Petioles 1–2.5(–3.5) cm, densely white hairy at first, glabrescent. Leaflets (6–)7–8(–9) pairs, sessile, oblong-ovate, 2–4 × 0.8–1.2 cm, base obliquely round, apex acute or rounded, mucronate, margin entire or obscurely serrate with few minute teeth towards apex, upper surface dark green, matt, not shiny, glabrous, lower surface pale green, densely white woolly when young, later glabrous. Inflorescence 4–6 cm diameter, rachis and pedicels brown tomentose, becoming glabrous and densely lenticellate with age. Pedicels 4–5 mm. Calyx lobes brown, triangular, 1–1.5 mm, apex dark brown, acute, glabrescent. Petals white, broadly obovate, 1.5–2 × 1.3–1.8 mm, base shortly clawed, apex rounded, glabrous. Stamens ca. 20, 1.5–2 mm, filaments cream, anthers pink. Styles 3, 2.5–3 mm, free, glabrous. Fruits, green ripening to red when mature, soft not fleshy, globose or ovoid, 2–2.5 mm diameter, bearing an apical ring of persistent dark purple-black calyx lobes, lenticels absent.

Distribution: Nepal, E Himalaya, Assam-Burma and E Asia.



Altitudinal range: 1900–4100 m.

Ecology: In mixed forests with *Pinus*, *Abies*, *Castanopsis*, *Quercus*, *Betula*, *Rhododendron* and *Lyonia*.

Flowering: April–May(–June). **Fruiting:** (July–)September–October(–November).

Schneider (Ill. Handb. Laubholz. 1: 680. 1906) misapplied the name *Sorbus foliolosa* (Wall.) Spach to this species.

Sorbus wallichii a very distinctive species with interesting habit and morphological characteristics. At low altitudes, it is often epiphytic while at higher altitudes it can grow to a small tree. When in flower, young shoots and leaves of this species are densely covered with a white woolly indumentum and plants become glabrescent with age. *Sorbus* specimens are

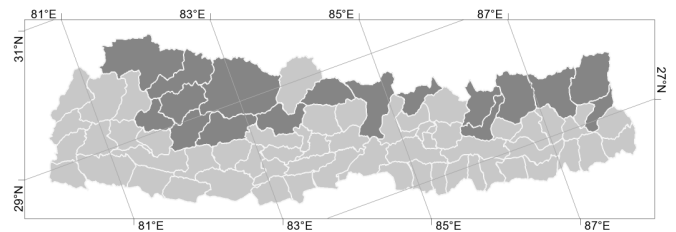
usually collected in full flower or with mature fruit, and conspicuous changes in characters with age, such as the loss of the woolly indumentum, can confuse accurate identification. Flowering material of *S. wallichii* is easily recognized by the indumentum which is quite unlike any other Nepalese pinnate-leaved species. Fruiting material is characterized by the densely lenticellate infructescence branches and dark purple-black hypanthium and sepals.

10. *Sorbus microphylla* Wenz., Linnaea 38: 76 (1873).
Pyrus microphylla (Wenz.) Wall. ex Hook.f.; *P. microphylla* Wall. nom. nud.; *Sorbus khumbuensis* McAll.

बझार Bajhar (Nepali).

Shrub or tree, 2–5(–7) m. Branchlets greyish brown, reddish brown, 2–4(–6) mm thick, puberulous when young. Buds narrowly ovoid, ca. 6 × 1.5 mm, apex acute, scales brown, glabrous. Stipules dark brown, narrowly lanceolate, ca. 4 × 2 mm, caducous, apex acuminate. Petiole 1–2 cm, sparsely brown hairy. Leaves pinnate 9–14 cm, rachis grooved above, glabrous, brown puberulous when young. Leaflets 12–14(–18) pairs, very rarely only 8 or 9 pairs, sessile, ovoid-elliptic to oblong, (1.0–)1.5–2(–2.4) × (0.3–)0.5–0.8(–1) cm, rarely more than 2.4 cm, base rounded, apex obtuse or acute, margin serrate with acute teeth, both surfaces glabrous or brown hairy along veins when young. Inflorescence 2–4 cm diameter, glabrous, lenticels present on rachis and pedicels. Bracts linear-lanceolate, 2–3 mm, caducous. Pedicels 6–8 mm. Flowers 7–10 mm diameter, glabrous. Sepals triangular, 1.5–2 mm, apex acute. Petals white flushed pink to deep pink with a white margin, suborbicular, 3–4 mm, base clawed, apex rounded, sometimes irregularly toothed, glabrous. Stamens 20, 2.5–3.5 mm, filaments white, anthers pink or purple. Styles 5, ca. 3.5 mm, free or slightly connate, pubescent at base. Fruits white, flushed pink or crimson, globose or ovoid, fleshy, 8–10 mm diameter, glabrous, lenticels absent, sepals persistent.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 2000–4200 m.

Ecology: In several mixed forest types (*Pinus*, *Abies*, *Picea*, *Tsuga*, *Quercus*, *Populus*, *Rhododendron* and *Betula*), open woods and tall shrubs, along river banks and streams, moraines, stony and grassy slopes.

Flowering: (May–)June–July(–August). **Fruiting:** (July–)August–October.

Long (Fl. Bhutan 1: 597. 1987) considered *Sorbus rufopilosa*

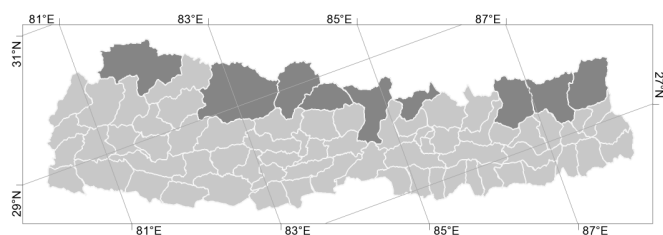
Rushforth as a distinct species but with doubtful status. This E Himalayan and Chinese species is characterized by densely rusty red pubescent inflorescence branches, smaller (less than 10 mm) and more numerous leaflets (14–17 pairs) with fewer teeth and smaller mature fruit (less than 10 mm). In NE Nepal specimens of *S. microphylla* with numerous small leaflets are reminiscent of *S. rufopilosa*, and are sometimes determined as such. However, we consider that they form a part of variation within *S. microphylla* agg. as herbarium specimens cannot be confidently determined as *S. rufopilosa*. Similarly, *S. khumbuensis* with many pairs (12–19) of small leaflets is not morphologically discontinuous and is not recognized here. Hence, all Nepalese and Bhutanese plants of this group are considered as a part of an aggregate *S. microphylla*.

Leafy branches are lopped for fodder.

11. *Sorbus himalaica* Gabrieljan, Bot. Zhurn. [Moscow & Leningrad] 56: 658, pl. 1–2 (1971).

Shrub or tree, 2–6(–8) m. Branchlets greyish brown, ca. 4 mm thick, glabrous or glabrescent. Buds ovoid, ca. 8 × 3 mm, apex obtuse, scales brown, rusty brown pubescent. Stipules brown, linear, 5–9 mm, densely brown hairy, caducous. Petiole 1.2–2.5(–3.5) mm, densely brown hairy, becoming glabrescent. Leaves 8–15 cm, pinnate, rachis grooved above, winged, rusty puberulous. Leaflets 8–12(–13) pairs, sessile, oblong-elliptic, 2.5–3(–3.5) × 0.8–1.2 cm, base obliquely rounded, apex obtuse or acute, margin serrate to below middle, upper surface dark green, glabrescent, lower surface pale green, rusty brown hairy, denser along the veins. Inflorescence 4–10 cm diameter, rachis and pedicels rusty brown hairy, lenticels present. Pedicels 2–5 mm. Bracts linear, ca. 4 mm, brown hairy. Flowers 6–10 mm in diameter. Sepals 1.5–2 mm, triangular, red-brown, hairy on outside, glabrous within, apex obtuse or acute. Petals red or pink, broadly ovate, 4–5 × 2–2.5 mm, base clawed, apex rounded, glabrous. Stamens 20, 2.5–3 mm, filaments pink, anthers brown. Styles 1.5–2 mm, free, white hairy at base. Fruits red or pink, globose, fleshy, 5–9 mm diameter, with a few lenticels, sepals persistent. Fig. 7a-e

Distribution: Nepal and E Himalaya.



Altitudinal range: 2500–4100 m.

Ecology: Mixed forest with *Abies*, *Betula* and *Rhododendron*.

Flowering: May–June. **Fruiting:** August–September(–October).

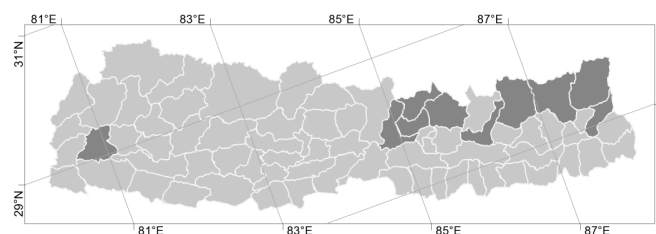
Sorbus foliolosa (Wall.) Spach and *S. himalaica* are high altitude plants with similar morphological characteristics and are difficult to distinguish. Stipule characters can usually be

helpful to separate these species: in *S. himalaica*, stipules are long subulate or toothed, pubescent with brown hairs, never green and leafy, while in *S. foliolosa* they are ovate or lanceolate and reddish brown hairy. These species often grow with *S. microphylla* Wenz.

12. *Sorbus arachnoidea* Koehne, Repert. Spec. Nov. Regni Veg. 10: 514 (1912).

Shrub or tree, 4–8(–10) m. Branchlets greyish brown, ca. 5 mm thick, densely rusty brown pubescent when young, glabrescent. Buds ovoid, ca. 9 × 3 mm, apex acute, scales brown, glabrous or rusty puberulous apically. Stipules green, broadly ovate or suborbicular, 6–7 × 5.5–10 mm, persistent, entire or remotely toothed, apex mucronate, glabrous. Petioles 1.4–2.3 mm. Leaves pinnate, 12–18 cm, rachis winged, glabrescent. Leaflets 7–12 pairs, oblong-elliptic, sessile, 2.3–5.0 × 0.5–1.2 cm, base obliquely cuneate, apex mucronate, margin finely serrate towards apex, upper surface dark green, glabrous, lower surface pale green, brown pubescent along veins. Inflorescence 4.5–7.5 cm diameter, rachis and pedicels brown tomentose, lenticels present, inconspicuous. Pedicels 0.5–1 mm. Bracts linear, 8–10 mm, sparsely brown hairy. Flowers ca. 3 mm diameter, glabrous. Sepals triangular, 1–1.2 mm, apex obtuse to acute, glabrous. Petals white or pink, oblong-ovate, 2–3 × 1.8–2.2 mm, base clawed, apex rounded, glabrous. Stamens 20, 1.5–2 mm, filaments pale pink, anthers pale brown. Styles 4–5, 1.25–2 mm, free, glabrous. Fruits initially crimson, becoming pink to white flushed pink, globose, fleshy, 9–10 mm diameter, slightly brown pubescent, lenticels absent, sepals persistent. Fig. 6a-e

Distribution: Nepal and E Himalaya.



Altitudinal range: 2800–4200 m.

Ecology: In mixed forests with *Abies*, *Quercus*, *Rhododendron* and *Juniperus*, often at margins or in open areas and shrubland.

Flowering: May–June(–July). **Fruiting:** (June–)July–August(–September).

Sorbus arachnoidea has very distinctive stout twigs, dark green leaflets and large, broad, green leaf-like stipules which often clasp the stem. However, this species is often overlooked and usually confused with *S. foliolosa* (Wall.) Spach. but it can be readily distinguished by stipule characters. Although this is predominantly an E Himalayan species, one specimen (*Shrestha 4219*, KATH) has been collected from W Nepal.

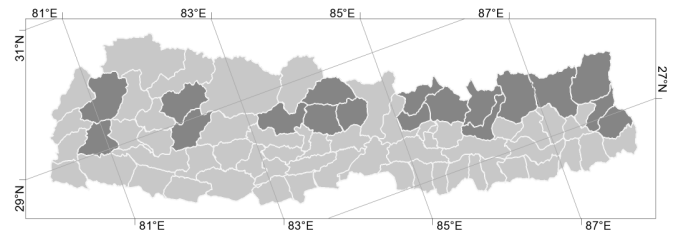
Rosaceae

13. *Sorbus foliolosa* (Wall.) Spach, Hist. Nat. Veg. 7: 96 (1839).

Pyrus foliolosa Wall., Pl. Asiat. Rar. 2[8]: 81, pl. 189 (1831); *Photinia foliolosa* (Wall.) Koehne; *Pyrus ursina* Wall. nom. nud.; *Sorbus foliolosa* var. *ursina* Wenz.; *S. ursina* (Wall. ex G. Don) Decne. nom. superfl.; *S. ursina* (Wall. ex G. Don) S. Schauer; *S. ursina* var. *wenzigiana* C. K. Schneid.; *S. wenzigiana* (C. K. Schneid.) Koehne.

Shrub or small tree, 2–5(–9) m. Branchlets greyish brown, fairly stout, ca. 5.5 mm thick, glabrescent, densely rusty pubescent when young. Buds ovoid, ca. 9 × 2.5 mm, apex obtuse, scales brown, glabrous or rusty puberulous apically. Stipules greenish-brown, ovate or lanceolate, 4–8 × 2–3 mm, margin entire or serrate with a few apical teeth, reddish brown hairy, persistent. Petioles 1.4–2.3 cm, densely pubescent becoming glabrescent. Leaves 7–14 cm, pinnate, rachis grooved above, slightly rusty puberulous, winged. Leaflets 6–9 pairs, oblong-elliptic, sessile, (2.5–)3–4.5 × 0.8–1.4 cm, base obliquely rounded, apex obtuse, margin sharp toothed apically, upper surface dark green, glabrescent, lower surface pale green, papillose, rusty brown hairy along the veins. Inflorescence 4.5–20 cm diameter, rachis and pedicels rusty brown hairy, lenticels present. Pedicels 3–5 mm. Bracts linear, ca. 5 mm, brown hairy. Flowers 6–9 mm diameter. Sepals triangular, 3–5 mm, apex obtuse or acute, glabrous. Petals white or flushed pink (especially on the reverse), broadly ovate, 2–3 × 1.5–2 mm, base clawed, apex rounded, glabrous. Stamens 20, ca. 2 mm, filaments white, anthers pink. Styles 5, 1.5–2 mm, free, white hairy at base. Fruits red, yellowish-red or pale red, globose, 4–6 mm diameter, glabrous, lenticels very sparse, sepals persistent.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 2200–4300 m.

Ecology: Mixed forests with *Abies*, *Juniperus*, *Quercus*, *Betula*, *Rhododendron*, *Prunus* and *Salix*, often near and above the tree line, usually near streams and on north-facing slopes.

Flowering: (April–)May–June(–July). **Fruiting:** (July–)August–September(–October).

Sorbus foliolosa (Wall.) Spach has been misapplied in the Indian and Nepalese literature to this species.

It is not possible to follow Lu & Spongberg (Fl. China 8: 154, 2003) in distinguishing '*wenzigiana*' at any rank in Nepal, and we agree with Long (Fl. Bhutan 1: 598, 1987) both in recognizing one broad species and in treating *S. ursina* as a synonym of *S. foliolosa*.

A paste of the leaves is applied to treat boils.

10. *Docynia* Decne., Nouv. Arch. Mus. Hist. Nat. 10: 125, 131 (1874).

Colin A. Pendry

Trees, semi-evergreen or deciduous. Twigs unarmed. Stipules caducous. Leaves simple, alternate, stipulate, petiolate, margin toothed at least towards apex, sometimes slightly lobed. Inflorescences terminal, flowers solitary or 2–5-fascicled, emerging with the leaves. Flowers bisexual. Bracts small, caducous. Hypanthium funnel-shaped to campanulate, densely pale tomentose outside. Sepals 5, lanceolate. Petals 5, white, base shortly clawed. Stamens ca. 30, in 2 whorls. Ovary inferior, 5-loculed, with 3–10 ovules per locule. Styles 5, connate at base, villous. Fruit a subglobose or ellipsoid pome with persistent erect or incurved sepals. Seeds 10–20.

Worldwide 15 species from the Himalaya to China and SE Asia. One species in Nepal.

1. *Docynia indica* (Colebr.) Decne., Nouv. Arch. Mus. Hist. Nat. 10: pl. 14 (1874).

Pyrus indica Colebr., in Wall., Pl. Asiat. Rar. 2[8]: 56 (1831); *Docynia docynioides* (C. K. Schneid.) Rehder; *D. griffithiana* Decne.; *D. hookeriana* Decne.; *D. rufifolia* (H. Lév.) Rehder.

पासी Paasi (Nepali).

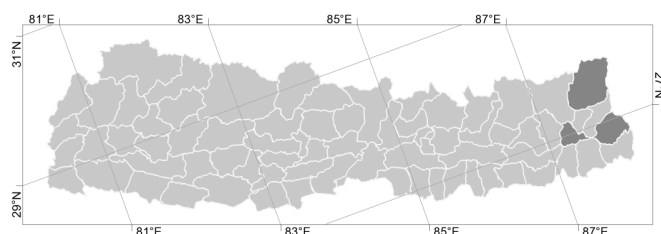
Trees to 2–3 m tall. Branchlets purplish brown or blackish brown when old, terete, initially densely tomentose,

glabrescent. Stipules lanceolate, 5–6 mm, apex acuminate. Petiole 1–2.5 cm, pubescent, glabrescent. Leaf blade elliptic or oblong-lanceolate, 6–14 × 2.5–5 cm, base broadly cuneate or rounded, sometimes oblique, apex acute or acuminate, margin serrate or shallowly crenate, rarely only toothed towards apex, glabrous and lustrous above, sparsely pubescent or subglabrous below, secondary veins 6–9 pairs. Bracts lanceolate. Flowers ca. 2.5 cm across. Pedicel short or nearly absent, pubescent. Hypanthium 6–10 mm long. Sepals narrowly triangular, 5–11 mm, apex acute or acuminate, margin entire, tomentose on both surfaces. Petals oblong or

oblong-obovate, 15–25 × 8–12 mm. Stamens 10–12 mm. Styles about as long as stamens, connate and pubescent at base. Pome yellow, 2–3 cm in diameter, slightly pubescent when young.

Fig. 8a-d

Distribution: Nepal, E Himalaya, Assam-Burma, E Asia and SE Asia.



Altitudinal range: 700–2000 m.

Ecology: Open forests, stream-sides, thickets.

Flowering: March–May. **Fruiting:** August–December.

Propagated by seed and cuttings. Closely related to *Cydonia* which differs in having free styles. *Cydonia oblonga* Mill. is occasionally cultivated in Nepal for its edible fruit (quince).

11. *Pyrus* L., Sp. Pl. 1: 479 (1753).

Mark F. Watson

Deciduous trees, usually unarmed, but juvenile vegetative shoots sometimes with short, spine-tipped lateral branches. Stipules subulate, caducous. Leaves alternate, simple, unlobed, clustered on short side shoots. Inflorescence a corymb, appearing before or with young leaves. Flowers bisexual. Bracts and bracteoles linear, tomentose, caducous. Hypanthium urn-shaped, constricted at the ovary apex then expanded above. Sepals 5. Petals 5, white, obovate, base clawed, apex rounded. Stamens 25–30, slightly shorter than petals, filaments white, anthers deep pink at first, becoming purple-black. Ovary inferior, 3–5 locular, ovules 2 per locule. Styles 3–5, about as long as stamens, free, usually pubescent at base. Fruit a pome, ellipsoid or obovoid, fleshy, juicy, granular with stone cells, 3–5-celled, endocarp (core) cartilaginous, sepals deciduous or somewhat persistent. Seeds almost black, 1(–2) per locule.

Worldwide about 15–25 species in Europe and Asia (especially SW Asia). One species native in Nepal.

Pyrus crenata Buch.-Ham. ex D.Don (Prodr. Fl. Nepal.: 237. 1825) is only known from the type collection made by Buchanan-Hamilton at Swayambhunath (Kathmandu Valley), flowering in July 1802. Unfortunately the specimen that Don would have used has not yet been found in the BM herbarium, nor is there a duplicate in the Smith herbarium (LINN-SM). Don's description of leaves ovate-acute, crenate, long petioles, glabrous above, young branches snowy tomentose, corymbs lanuginose and sepals ovate-acute, is insufficient to confirm identification and so it is currently impossible to apply this name. July is very late for a *Pyrus* or *Malus* to be in flower, and it is more likely that this name refers to a species of *Photinia*, *Cotoneaster* or *Eriobotrya*.

1. *Pyrus pashia* Buch.-Ham. ex D.Don, Prodr. Fl. Nepal.: 236 (1825).

Pyrus kumaoni Decne. ex Hook.f.; *P. nepalensis* Hort. ex Decne. nom. inval.; *P. nepalensis* Lodd. ex Loudon nom. nud.; *P. nepalensis* Buch.-Ham. ex Hook.f. nom. inval.; *P. pashia* var. *kumaoni* (Decne. ex Hook.f.) Stapf; *P. variolosa* Wall. ex G.Don; *P. variolosa* Wall. nom. nud.; *Sorbus variolosa* (Wall. ex G.Don) S.Schauer.

मयल Mayal (Nepali).

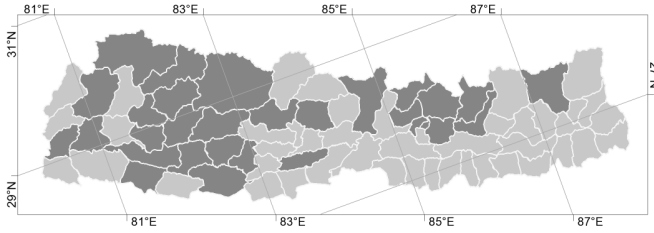
Tree, 5–10(–15) m. Branchlets densely white hairy when young, soon glabrescent, bark purplish brown becoming almost black. Stipules 4–10 mm, base fused to petiole. Petioles 1.8–4(–5.5) cm, initially white pilose, soon

glabrescent. Leaves ovate, 4.5–9(–12) × 2.5–6 cm, base rounded or slightly cordate, rarely cuneate, apex acuminate, margin finely obtusely serrate, sparsely white tomentose at first, glabrescent, upper surface usually glossy. Corymbs umbellate, 3–8-flowered, inflorescence branches and pedicels densely tomentose at first, soon glabrescent. Pedicels 1–2(–3) cm, elongating to 3.5 cm in fruit. Flowers 2–5 cm diameter. Hypanthium 2.5–3 mm. Sepals shortly triangular, 2.5–4 × 2–2.5 mm, margin with glands often obscured by hairs, brownish or white tomentose within and on margins, variably pubescent or glabrescent on outside. Petals 8–17 × 6–11 mm. Ovary pubescent. Pomes grey-brown, densely pale spotted, ellipsoid or globose, 1.8–2.5(–3) × 1.7–2.5(–3) cm, essentially glabrous, sepals deciduous.

Fig. 8e, f

Rosaceae

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma, E Asia and SE Asia.



Altitudinal range: 700–3100 m.

Ecology: Hillsides and near rivers in mixed temperate evergreen and deciduous forests (with *Castanopsis*, *Schima*, *Quercus*, Lauraceae), and open shrubland. Isolated trees often found in degraded habitats, around cultivation and near habitation.

Flowering: March–April. **Fruiting:** (June–)July–October(–February).

A tree with remarkably wide altitudinal range. Although flowering is mostly restricted to March and April, it occasionally flowers out of season in October or November, the edible fruit retained on tree until the spring flowering. The cultivated pear, *Pyrus communis* L., has broadly ovate leaves (up to 6 cm broad) with abruptly acute apex, crenately serrate or subentire margins, longer petioles (up to 6 cm), and larger fruit (4–6 cm diameter) borne on short (2.5–3 cm), much scarred shoots.

Pyrus pashia is often used as a rootstock for grafting cultivated pear varieties. Juice of ripe fruits is put in the eyes of cattle to treat conjunctivitis. Wood is used for making walking sticks.

12. *Malus* Mill., Gard. Dict. Abr., ed. 4, 2: [835] (1754).

Mark F. Watson

Deciduous trees or shrubs, spines absent. Stipules linear-ovate, caducous. Leaves alternate, simple, unlobed, clustered on short side shoots. Corymbs terminal on short lateral shoots, appearing with the young leaves. Flowers bisexual. Bracts and bracteoles caducous. Hypanthium ellipsoid narrowed at top of ovary, widening to cup-shaped above. Sepals 5, about equalling the hypanthium. Petals 5, white or pink, elliptic to broadly so or obovate, base clawed, apex rounded. Stamens 15–20(–50), of unequal length, filaments white, anthers yellow or orange-yellow. Ovary inferior, 4–6-locular, ovules 2 per cell. Styles 3–5, fused at least at base. Fruit a pome, fleshy, juicy, pithy but not granular (stone cells absent), 3–6-celled, endocarp (core) cartilaginous, sepals persistent or deciduous. Seeds dark brown, 1 or 2 per cell.

Worldwide about 40–50 species in temperate zones of N America, Europe and Asia. Three species in Nepal.

Key to Species

- 1a Pedicels short and thick, 1–2 cm. Fruit thickly fleshy, more than 4 × 2.5 cm **1 *M. pumila***
b Pedicels long and slender, 3–4 cm. Fruit thinly fleshy less than 1.5 × 1 cm..... **2**
- 2a Underside of leaves, petioles, pedicels and calyx lobes densely white pubescent, at least at first. Corymbs 4–20-flowered. Pomes ca. 1.5 × 1 cm, calyx persistent **2 *M. sikkimensis***
b Undersides of leaves at most finely pubescent along veins and other parts not densely white pubescent. Corymbs 3–7-flowered. Pomes 7–8 × 4–5 mm, calyx deciduous **3 *M. baccata***

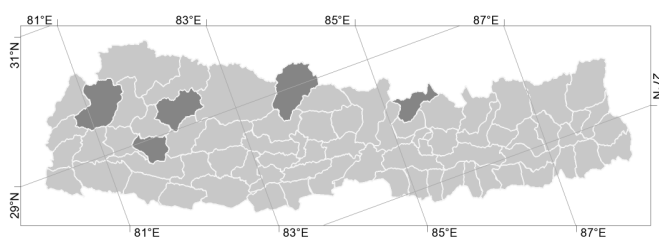
1. *Malus pumila* Mill., Gard. Dict., ed. 8: Malus n. 3 (1768).
Malus communis Poir.; *M. domestica* Borkh.; *M. domestica* subsp. *pumila* (Mill.) Likhonos; *M. sylvestris* Mill.; *Pyrus malus* L.; *P. malus* var. *sylvestris* L.

स्यारु Syau (Nepali).

Shrub or tree, 4–10(–15)m. Branchlets densely tomentose when young, soon glabrescent, purplish brown with age. Stipules green, 3–5 mm, margin eglandular, densely puberulous. Petioles (1.5–)2–3 cm, stout, puberulous. Leaves elliptic or broadly so, 3.5–8 × 2–5 cm, base rounded to broadly

cuneate, apex acuminate, margin sharply serrate, pubescent when young, especially on lower surface, glabrescent. Corymbs 4–7-flowered, 4–6 cm across. Pedicels (0.5–)1–1.5(–2.5) cm, short and stout. Flowers 3–4 cm diameter. Hypanthium 4–5(–8) mm, glabrous or almost so. Sepals erect, triangular-ovate or narrowly so, about equalling tube, apex acuminate, tomentose on both surfaces. Petals white or tinged pink, deep pink on reverse, elliptic to broadly so, 1–2 × 0.7–1 cm, glabrous. Stamens 20, about half as long as petals. Ovary 5-locular, styles 5, slightly longer than stamens, fused at base, pubescent at base. Pome green, yellow or red at maturity, ovoid-ellipsoid or subglobose, 4–8 × 2.5–7 cm, thickly fleshy, floral parts somewhat persistent.

Distribution: Cosmopolitan.



Altitudinal range: 2000–3300 m.

Ecology: Open shrubland or degraded areas, often near villages or former areas of habitation, probably originally planted.

Flowering: April–May. **Fruiting:** August–October.

The domestic apple, native to SW Asia and Europe, widely cultivated in temperate regions of SW Asia and Europe, China, NW Himalaya. Under recorded in Nepal.

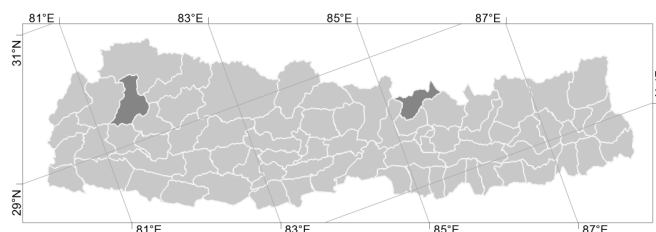
Fruit edible.

2. *Malus sikkimensis* (Wenz.) Koehne, Gatt. Pomac.: 27 (1890).

Pyrus pashia var. *sikkimensis* Wenz., *Linnaea* 38: 49 (1873); *Malus baccata* subsp. *sikkimensis* (Wenz.) Likhonos; *Pyrus sikkimensis* (Wenz.) Hook.f.

Tree 6–9 m, branchlets grey tomentose when young, soon glabrescent, red-brown becoming blackish with age. Stipules green, 6–8 mm, margin glandular, apex acuminate. Petioles 2–3 cm, slender, densely white pubescent at first. Leaves elliptic, ovate or ovate-lanceolate, 5–8(–13) × 2–4(–6.5) cm, base rounded to broadly cuneate, apex acuminate, margin sharply serrate, lower surface white or greyish pubescent, especially on veins. Pedicels (1.5–)3.5–4.5(–5), long and slender, densely white pubescent at first, glabrescent in fruit. Corymbs (4–)7–10(–15)-flowered, 5–9 cm across. Flowers 2.5–3 cm diameter. Hypanthium 3–4 mm, outside densely white pubescent at first, glabrescent in fruit. Sepals recurved, narrowly triangular-ovate, 4–7 × 1.8–2.2 mm, apex acute, densely white pubescent at first. Petals white, pink on reverse, suborbicular, 12–15 mm, pubescent at base. Stamens 25–30, about half as long as petals. Ovary 5–6-locular, styles 5(–6), ca. 7 mm, slightly longer than stamens, fused to half way, fused section exerted above hypanthium, glabrous. Pomes in clusters of 3–7, dark red with white spots, ellipsoid to obovoid, 1.5–2 × 1–1.5 cm, thinly fleshy, sepals persistent.

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 2400–3000 m.

Ecology: Open mixed forest, often in moist valleys.

Flowering: April–May. **Fruiting:** August.

Rarely collected in Nepal, more common in the E Himalaya, especially Bhutan. Flowering material is most easily distinguished from *Malus baccata* (L.) Borkh. by the dense pubescence on the pedicels and hypanthium, and in fruit by the persistent sepals.

3. *Malus baccata* (L.) Borkh., Theor. Prakt. Handb. Forstbot. 2: 1280 (1803).

Pyrus baccata L., *Mant. Pl.: 75 (1767)*; *Malus baccata* subsp. *himalaica* (Maxim.) Likhonos; *M. baccata* subsp. *mandshurica* (Maxim.) Likhonos; *M. baccata* subsp. *sachalinensis* (Juz.) Likhonos; *M. baccata* var. *himalaica* (Maxim.) C.K.Schneid.; *M. baccata* var. *mandshurica* (Maxim.) C.K.Schneid.; *M. baccata* var. *sibirica* (Maxim.) C.K.Schneid.; *M. mandshurica* (Maxim.) Kom. ex Juz.; *M. pallasiana* Juz.; *M. rockii* Rehder; *M. sachalinensis* Juz.; *M. sibirica* Borkh.; *Pyrus baccata* var. *himalaica* Maxim.; *P. baccata* var. *mandshurica* Maxim.; *P. baccata* var. *sibirica* Maxim.

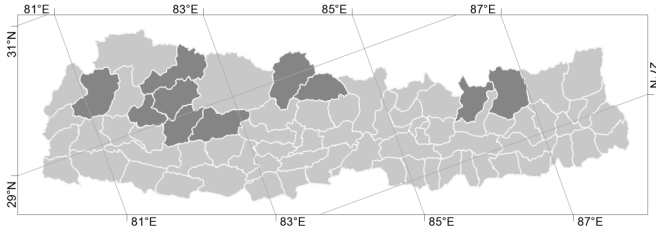
जंगली स्याउ Jungali syau (Nepali).

Shrub or tree, 3–6(–10) m, branches often arching and pendulous, bark red-brown darkening with age, glabrous. Stipules red-tipped, 3–5 mm, margin glandular, sparsely pubescent. Petioles 0.6–4(–5) cm, slender, moderately to sparsely hairy at first, glabrescent. Leaves narrowly elliptic, sometimes broadly so, (1.6–)3–8.5(–9) × (1–)1.5–3.5(–5) cm, base cuneate or rounded, apex acute to acuminate, margin sharply finely serrate, sparsely hairy along midrib at first (especially above), glabrescent. Corymbs umbellate, 3–7-flowered, 5–7 cm across. Pedicels (1.5–)3–4(–5) cm, long and slender, glabrous or almost so. Flowers 1.7–3 cm in diameter. Hypanthium 2–3 mm, outside glabrous or almost so. Sepals erect, lanceolate, 5–6(–7) × 1.5–2.5 mm, apex acute, densely white hairy within, outside glabrous or almost so. Petals white or tinged pink (especially in bud), obovate, (10–)12–13.5(–15) × 6–9(–10) mm, glabrous. Stamens 15–20, half as long as petals. Ovary 4–5-locular, styles 4–5, ca. 10 mm, conspicuously longer than stamens, fused at base, densely white pubescent at base. Pomes in clusters of (2–)3–6, red or yellowish, globose at maturity (ovoid when young), 7–11 × (4–)7–11 mm, thinly fleshy, floral parts deciduous at maturity, floral scar ca. 2 mm diameter.

Fig. 8g, h

Rosaceae

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma, E Asia and N Asia.



Altitudinal range: 1800–4100 m.

Ecology: Occasional tree in mixed evergreen or deciduous forests, often solitary trees found in degraded situations or in cultivated areas around habitation where it has possibly been planted for its sweet fleshy fruit.

Flowering: April–June. **Fruiting:** (July–)August–October.

A beautiful ornamental tree widely grown in temperate gardens for its showy flowers and colourful fruit. Commonly used as a rootstock for grafting the cultivated apple (*Malus pumila* Mill.). A paste of the fruits is applied to the forehead to relieve headaches.

13. *Filipendula* Mill., Gard. Dict. Abr., ed. 4, 1: 512 (1754).

Hiroshi Ikeda

Perennial herbs. Rhizomes stout. Stipules leaf-like, adnate basally. Radical leaves pinnate, terminal leaflets large, palmately lobed, toothed; lateral leaflets small or sometimes obsolete. Inflorescence a cyme. Flowers bisexual or rarely unisexual. Bracts and bracteoles absent. Hypanthium short, flat. Epicalyx absent. Sepals 4 or 5, reflexed. Petals 4 or 5, white or pinkish. Stamens numerous, deciduous after anthesis; filaments filiform. Ovary superior, carpels free, 5–15, stipitate or subsessile; ovules 1 or 2 in each carpel. Style short, terminal. Achenes glabrous or ciliate, laterally flattened, stipitate or sessile.

Worldwide about 15 species in temperate to cool regions of the N hemisphere. One species in Nepal.

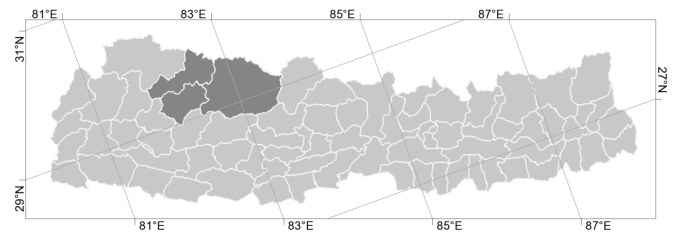
1. *Filipendula vestita* (Wall. ex G. Don) Maxim., Trudy Imp. S.-Peterburgsk. Bot. Sada 6: 248 (1879).
Spiraea vestita Wall. ex G. Don, Gen. Hist. 2: 521 (1832);
Spiraea camtschatica var. *himalensis* Lindl.

Perennial herbs. Stems erect, 70–140 cm, slightly angled, sparsely or densely pubescent. Stipules semicordate, margin serrate. Leaves lyrate-pinnate with 3–5 pairs of lateral leaflets and intercalary segments, 10–30 × 5–15 cm, glabrescent above, densely greyish white tomentose below, rusty brown pubescent on veins; terminal leaflet ovate to nearly orbicular, 3–12 × 4–15 cm, palmately 3–5-lobed, lobes narrowly ovate, margin doubly serrate or incised-toothed, apex acute to acuminate, base subcordate; lateral leaflets often obscure in upper leaves; petioles and rachis sparsely or densely pubescent. Inflorescence to 10 cm. Peduncles and pedicels densely tomentose. Flowers 5–7 mm across. Hypanthium densely tomentose outside. Sepals ovate, 1.9–2.1 × 1–1.3 mm, apex obtuse or semiacute, margin entire or sparsely serrate near apex, sparsely pubescent outside, glabrous inside. Petals 5, white, elliptic to obovate, 3–4 × 2–2.5 mm, margin entire or slightly undulate, apex rounded, base cuneate to widely cuneate, short-clawed. Filaments 3–4 mm; anthers ellipsoid, 0.6–0.8 mm. Carpels oblanceolate, subsessile, 1–1.3 × 0.5–0.6 mm, strigose-ciliate along outer side; style slightly curved near base, 0.6–0.8 mm; stigma inflated, papillate. Achenes narrowly

oblong, sessile, 2–3 × 1–1.2 mm, strigose-ciliate along inner and outer sides.

Fig. 8i-l

Distribution: Nepal, W Himalaya, E Asia and SW Asia.



Altitudinal range: 2200–3200 m.

Ecology: Open moist meadows and river banks or under forest.

Flowering: July–August. **Fruiting:** August–September.

Wallich (Numer. List: 21 n. 704. 1829) misapplied the name *Spiraea camtschatica* Pall. (as '*kamtschatica*') to this species.

14. *Rubus* L., Sp. Pl. 1: 492 (1753).

David E. Boufford, Mohan Siwakoti & Colin A. Pendry

Shrubs, or subshrubs, deciduous, rarely evergreen or semi-evergreen, or perennial creeping dwarf herbs. Stems erect, climbing, arching or prostrate, glabrous or hairy, usually with prickles or bristles, sometimes with glandular hairs, rarely unarmed. Stipules either \pm adnate to petiole basally, persistent and undivided or occasionally lobed, or free, near base of petiole or at junction of stem or petiole, persistent or caducous, mostly dissected, occasionally entire. Leaves alternate, petiolate, simple, palmately or pinnately compound, divided or undivided, toothed, glabrous or pubescent, sometimes with glandular hairs, bristles or glands. Inflorescences cymose panicles, racemes or corymbs, or flowers several in clusters or solitary. Flowers bisexual, rarely unisexual and plants dioecious. Bracts solitary, at base of pedicel; bracteoles absent. Hypanthium short, broad. Epicalyx absent. Sepals (4 or)5(–8), sometimes unequal, erect, spreading or reflexed, persistent. Petals usually 5, rarely more, occasionally absent, white, pink or red, glabrous or hairy, margin entire, rarely premorse. Stamens numerous, sometimes few, inserted at mouth of hypanthium; filaments filiform; anthers 2-locular. Ovary superior, carpels 4–100 or more, inserted on convex torus, each carpel becoming a drupelet or drupaceous achene; locule 1; ovules 2, pendulous, only 1 developing. Style filiform, subterminal, glabrous or hairy; stigma simple, capitate. Drupelets or drupaceous achenes aggregated on hemispherical, conical or cylindrical torus, forming an aggregate fruit, separating from torus and aggregate hollow, or adnate to torus and falling with torus attached at maturity and aggregate solid.

Worldwide about 700 species, particularly abundant in the temperate N hemisphere with a few species extending into the S hemisphere. 32 species in Nepal.

The order of species is based mainly on their sequence in Lu & Boufford (Fl. China 9. 2003) and does not necessarily reflect a phylogenetic sequence. Specimens of *Rubus* from Nepal are relatively few, and some species appear to be rare, making complete information difficult to obtain for some species. *Rubus hibiscifolius* Focke was described from Nepal based on material in Copenhagen, but as for Hara (Enum. Fl. Pl. Nepal 2: 145. 1979) we were unable to trace any material corresponding to it and so it is not included in this account.

Key to Species

- | | | |
|-----|---|-------------------------------|
| 1a | Herbs or herb-like, prostrate or creeping, rooting at nodes | 2 |
| b | Shrubs, plants erect, arching, climbing or scandent, not rooting at nodes | 6 |
| 2a | Leaves simple or both simple and 3-foliolate | 3 |
| b | Leaves compound, 3- or 5-foliolate | 4 |
| 3a | Leaves all simple | 18 <i>R. calycinus</i> |
| b | Leaves both simple and 3-foliolate | 32 <i>R. x seminepalensis</i> |
| 4a | At least some leaves pedately 5-foliolate | 29 <i>R. franchetianus</i> |
| b | All leaves 3-foliolate | 5 |
| 5a | Stems and petioles pilose, without bristles or prickles, sometimes with intermixed small glandular hairs | 30 <i>R. fockeanus</i> |
| b | Stems and petioles with bristles, pilosulose and hispidulous | 31 <i>R. nepalensis</i> |
| 6a | Leaves both simple and 3-foliolate | 32 <i>R. x seminepalensis</i> |
| b | Leaves simple or leaves pinnately, palmately or pedately compound, plants without both simple and compound leaves | 7 |
| 7a | Leaves simple | 8 |
| b | Leaves pinnately, palmately or pedately compound | 17 |
| 8a | Leaves unlobed, elliptic to elliptic-lanceolate, oblong to narrowly ovate, ovate-oblong or lanceolate | 9 |
| b | Leaves shallowly to conspicuously 3–11 lobed, narrowly ovate to suborbicular | 11 |
| 9a | Leaves subcoriaceous to coriaceous, abruptly acuminate. Petioles 0.5–1 cm long | 22 <i>R. hamiltonii</i> |
| b | Leaves membranaceous, long acuminate to caudate. Petioles 0.2–2 cm long | 10 |
| 10a | Petiole 1–2 cm long. Leaves ovate-oblong or lanceolate. Fruit red | 23 <i>R. acuminatus</i> |
| b | Petiole 0.2–1 cm long. Leaves elliptic to elliptic-lanceolate to oblong-lanceolate. Fruit black | 24 <i>R. griffithii</i> |
| 11a | Inflorescences terminal panicles, 8–40 × 5–35 cm. Leaves mostly longer than wide, some leaves unlobed but at least a few on each stem with very shallow lobes | 12 |

Rosaceae

- b Inflorescences axillary clusters or terminal racemes or slender panicles on short axillary shoots, 5–9 × 3–6 cm. Leaves ovate to suborbicular, some often as wide as long, obviously but sometimes shallowly 3–11 lobed13
- 12a Petioles and branchlets without glandular hairs. Petals 6–8 mm **19 *R. paniculatus***
 b Petioles and branchlets with at least a few glandular hairs. Petals 4–5 mm **20 *R. glandulifer***
- 13a Stems and petioles densely stipitate glandular and with sparse needle-like prickles **25 *R. treutleri***
 b Stems and leaves variously pubescent, but without stipitate glands14
- 14a Stems, petioles and abaxial midrib of leaves unarmed or with few weak straight or recurved prickles **26 *R. kumaonensis***
 b Stems, petioles and abaxial midrib often with conspicuous straight, recurved or reflexed hard prickles15
- 15a Petioles 1.5–2.5 mm. Sepals 4 mm **21 *R. efferatus***
 b Petioles 2.5–11 mm. Sepals 8–15 mm16
- 16a Pedicels 2–15 mm long. Sepals 11–15 mm long, margins lacerate, apex acute or sometimes lacerate **27 *R. calycinoides***
 b Pedicels 2–7 mm long. Sepals 8–12 mm long, margins entire, apex acute to acuminate **28 *R. rugosus***
- 17a Leaves palmately, digitately or pedately compound. Petiolules of terminal and lateral leaflets ± equal in length or all leaflets sessile. Leaflets 3 or 518
 b Leaves pinnately compound. Petiolule of terminal leaflet longer than petiolules of lateral leaflets. Leaflets 3–1121
- 18a Leaflets with 20 or more pairs of secondary veins19
 b Leaflets with up to 14 pairs of secondary veins20
- 19a Branchlets, petioles, inflorescence branches and pedicels softly tomentose with soft appressed hairs, without long patent hairs. Leaves mostly 5-foliolate **16 *R. lineatus***
 b Branchlets, petioles, inflorescence branches and pedicels hispidulous with long patent gland tipped hairs. Leaves mostly 3-foliolate **17 *R. splendidissimus***
- 20a Calyx lobes 8–18 mm long, glabrous except for velutinous band along margin. Petals pink **14 *R. thomsonii***
 b Calyx lobes 3–5 mm long, with short straight spines. Petals white **15 *R. pentagonus***
- 21a Leaflets 322
 b Leaflets 5–11, some leaves with 3 leaflets27
- 22a Calyx lobes 3–5 mm long, with short straight spines, but otherwise glabrous. Petals white **15 *R. pentagonus***
 b Calyx lobes 4–20 mm long, variously pubescent or glabrous, with or without spines or prickles, if glabrous, then without spines. Petals white or pink23
- 23a Branchlets, petioles and inflorescence branches hispid and with dense to sparse sharply unguiculate spines. Leaflets widely elliptic to obovate **3 *R. ellipticus***
 b Branchlets petioles and inflorescence branches glabrous, pilose, softly stipitate glandular or with appressed hairs, with sparse straight or slightly unguiculate spines or prickles. Leaflets narrowly to widely ovate, rarely narrowly elliptic 24
- 24a Lower surface of leaves glabrous or slightly softly hairy, or pubescent only along midvein, green **11 *R. macilentus***
 b Lower surface of leaves white velutinous or densely grey or yellowish grey tomentose25
- 25a Calyx and sepals glabrous. Lower surface of leaves densely grey or yellowish grey tomentose. Base of terminal leaflet broadly cuneate to rounded. Petals white, suborbicular, longer than sepals **5 *R. biflorus***
 b Calyx and sepals pubescent. Lower surface of leaves white pubescent. Base of terminal leaflet cuneate, rounded, truncate to shallowly cordate. Petals white or pink, shorter than sepals26
- 26a Base of terminal leaflet cuneate, rounded or truncate; petals white, ca. 6 mm long **6 *R. alexeterius***
 b Base of terminal leaflet rounded to shallowly cordate; petals pink 4 × 3-4 mm **7 *R. hoffmeisterianus***
- 27a Leaflets 3 or 528
 b Leaflets (3–)7–1129
- 28a Inflorescences terminal on short axillary branches, 2–7 flowered or flowers solitary **2 *R. foliolosus***
 b Inflorescences terminal and axillary, several to more than 20-flowered **4 *R. mesogaeus***

- 29a Lower surface of leaves white or grey tomentose. Leaflets 5–11 **1 *R. niveus***
 b Lower surface of leaves green or dark green, pubescent, glabrous or slightly pubescent along midvein. Leaflets 3–1130
- 30a Calyx and base of calyx lobes with dense straight spines **10 *R. pungens***
 b Calyx variously hairy, but without spines 31
- 31a Inflorescences axillary, 1 or 2 flowered. Flowers 3–5 cm across 32
 b Inflorescences terminal, corymbose, 3-several flowered. Flowers up to 2 cm across 33
- 32a Leaves without yellow glands abaxially softly hairy and with small prickles along veins, adaxially glabrous or with sparse appressed hairs **9 *R. amabilis***
 b Leaves with yellow glands on both surfaces, abaxially pilose to subglabrescent and with sparse minute prickles along midvein, adaxially pilose to subglabrescent **13 *R. rosifolius***
- 33a Glandular hairs absent. Aggregate fruit globose **8 *R. inopertus***
 b Glandular hairs present on branchlets, petioles, inflorescence rachis, pedicels and calyx. Aggregate fruit oblong or oblong-conic **12 *R. sumatranus***

1. *Rubus niveus* Thunb., Rubo: 9 (1813).

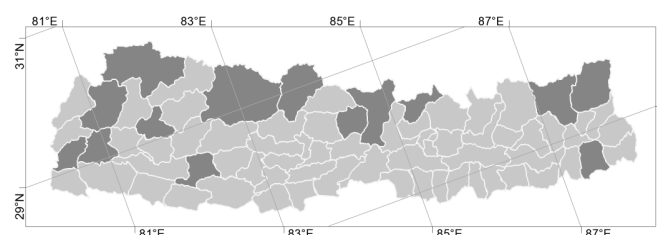
Rubus bonatii H.Lév.; *R. bouderi* H.Lév.; *R. distans* D.Don; *R. foliolosus* var. *incanus* (K.Sasaki ex Y.C.Liu & T.Y.Yang) S.S.Ying; *R. incanus* K.Sasaki ex Y.C.Liu & T.Y.Yang; *R. lasiocarpus* Sm.; *R. lasiocarpus* var. *ectenothyrsus* Cardot; *R. lasiocarpus* var. *membranaceus* Hook.f.; *R. lasiocarpus* var. *micranthus* (D.Don) Hook.f.; *R. lasiocarpus* var. *pauciflorus* (Wall. ex Lindl.) Hook.f.; *R. longistylus* H.Lév.; *R. mairei* H.Lév.; *R. micranthus* D.Don; *R. mysorensis* F.Heyne ex Roth; *R. niveus* var. *micranthus* (D.Don) H.Hara; *R. niveus* var. *pauciflorus* (Wall. ex Lindl.) Focke; *R. pauciflorus* Wall. ex Lindl.; *R. pinnatus* D.Don; *R. pyi* H.Lév.; *R. rosiflorus* Roxb.; *R. rosiflorus* Roxb. nom. nud.; *R. tongchouanensis* H.Lév.

कालो ऐसेलु Kalo ainselu (Nepali).

Scandent shrubs, 1–2.5 m. Branchlets purple or green, tomentose when young, soon glabrous, with whitish bloom, with sparse prickles. Stipules linear-lanceolate, 5–8 mm, persistent, softly hairy. Leaves (5–)7–9(–11)-foliolate, softly hairy along veins or glabrate above, white or grey tomentose below. Petiole 1.5–4 cm, petiolule of terminal leaflet 0.5–1.5 cm, lateral leaflets sessile, petiolule and rachis tomentose, with sparse minute curved prickles. Blade of leaflets elliptic, ovate-elliptic or rhombic-elliptic, terminal leaflet ovate to elliptic, slightly longer than lateral leaflets, 2.5–6(–8) × 1–3(–4) cm, base cuneate to rounded, apex acute, rarely obtuse, terminal leaflet sometimes acuminate, margin coarsely serrate or doubly serrate, sometimes terminal leaflet 3-lobed. Inflorescences terminal or axillary, terminal corymbs, rarely short thyrses, many-flowered, 4–6 cm, axillary corymbs 1–few-flowered, rachis and pedicels tomentose. Bracts lanceolate or linear, ca. 5 mm, pubescent. Pedicels 0.5–1 cm. Flowers to 1 cm across. Outer surface of calyx densely tomentose, with intermixed soft hairs. Sepals erect, triangular-ovate or triangular-lanceolate, 5–8 × 2–3 mm, apex acute or abruptly pointed, rarely shortly acuminate. Petals red, suborbicular, 3–5 mm in diameter, sparsely hairy, shorter than sepals, base shortly clawed. Stamens nearly as long as petals; filaments broadened basally. Pistils ca. 55–70, nearly as long as stamens. Ovary grey tomentose. Styles purplish red, base

densely grey tomentose. Aggregate fruit dark red when immature, black at maturity, semiglobose, 0.8–1.2 cm in diameter, enclosed by calyx, densely grey tomentose, style persistent. Pyrenes shallowly rugose.

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma, E Asia, SE Asia and SW Asia.



Altitudinal range: 1000–3100 m.

Ecology: Thickets on slopes, sparse forests, montane valleys, streamsides, flood plains.

Flowering: May–July. **Fruiting:** August–September.

Ripe fruits are eaten fresh. Leaf juice is used to treat fever.

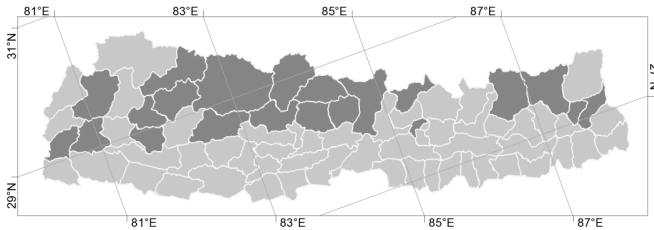
2. *Rubus foliolosus* D.Don, Prodr. Fl. Nepal.: 256 (1825). *Rubus concolor* Wall. nom. inval.; *R. gracilis* Roxb. later homonym, non J.Presl & C.Presl; *R. gracilis* Roxb. nom. nud.; *R. gracilis* var. *chiliacanthus* Hand.-Mazz.; *R. gracilis* var. *pluvialis* Hand.-Mazz.; *R. hypargyrus* Edgew.; *R. hypargyrus* var. *concolor* (Hook.f.) H.Hara; *R. hypargyrus* Edgew. var. *hypargyrus*; *R. hypargyrus* var. *niveus* (Wall. ex G.Don) H.Hara; *R. microphyllus* D.Don later homonym, non L.f.; *R. niveus* Wall. ex G.Don later homonym, non Thunb.; *R. niveus* Wall. nom. nud.; *R. niveus* var. *concolor* Hook.f.; *R. niveus* var. *hypargyrus* (Edgew.) Hook.f.; *R. niveus* var. *pedunculatus* (D.Don) Hook.f.; *R. pedunculatus* D.Don; *R. pedunculatus* var. *concolor* (Hook.f.) Kitam.; *R. pedunculatus* var. *hypargyrus* (Edgew.) Kitam.; *R. roylei* Klotzsch.

Rosaceae

कालो ऐसेलु Kalo ainselu (Nepali).

Straggling shrubs, 1–2 m. Branchlets brownish to reddish brown, initially pubescent, gradually glabrescent, with few prickles or nearly unarmed. Stipules linear or linear-lanceolate, 5–8 mm, persistent, softly hairy. Leaves 3-foliolate, rarely 5-foliolate, pubescent above, densely persistently white tomentose below, glabrescent. Petiole 3–5 cm, rachis pubescent, with sparse, minute prickles. Blade of leaflets ovate or broadly ovate, rarely ovate-lanceolate, 2.5–6 × 2–5 cm, base rounded to shallowly cordate, apex acute to acuminate, margin irregularly incised and roughly sharply doubly serrate. Inflorescences terminal on short axillary branches, corymbose, 2–5 cm, 2–7-flowered or flowers solitary. Pedicels 1.5–3.5 cm, softly hairy. Flowers 1.5–2 cm across. Calyx to ca. 1.5 cm, outer surface pubescent. Hypanthium pelviform. Sepals erect after anthesis, narrowly ovate to ovate-lanceolate, 1–1.2 cm × 3–6 mm, margin tomentose, apex long acuminate or caudate. Petals pink or red, ovate, 7–10 × 4–6 mm, shorter than sepals, base shortly clawed, apex slightly incised or entire. Stamens many. Pistils somewhat shorter than or nearly as long as stamens. Ovary sericeous, softly hairy. Aggregate fruit initially yellowish orange, red or black at maturity, ovoid-globose.

Distribution: Nepal, W Himalaya, E Himalaya and Tibetan Plateau.



Altitudinal range: 1600–3200 m.

Ecology: Forested slopes, thickets, degraded woodland.

Flowering: March–November. **Fruiting:** April–November.

Smith (in Rees, Cylc. 30: Rubus n. 21. 1815) and Wallich (Numer. List.: 22 n. 736. 1829) misapplied the name *Rubus parvifolius* L. to this species.

Rubus foliolosus is treated as a synonym of *R. niveus* Thunb. by Lu & Boufford (Fl. China 9: 205. 2003).

Ripe fruits are eaten fresh. Immature fruits are chewed to relieve headache.

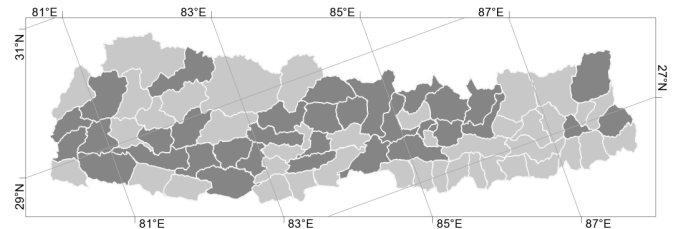
3. *Rubus ellipticus* Sm., in Rees, Cycl. 30(2): Rubus no.16 (1815).

Rubus ellipticus forma *obcordatus* Franch.; *R. ellipticus* subsp. *fasciculatus* (Duthie) Focke; *R. ellipticus* var. *fasciculatus* (Duthie) Masam.; *R. ellipticus* var. *obcordatus* (Franch.) Focke; *R. erythrolasius* Focke; *R. fasciculatus* Duthie; *R. flavus* Buch.-Ham. ex D. Don; *R. gowreephul* Roxb.; *R. gowryphul* Roxb. ex Wall. nom. nud.; *R. gowryphul* Roxb. nom. nud.; *R. obcordatus* (Franch.) Thuan; *R. pinfaensis* H. Lévl. & Vaniot; *R. rotundifolius* Wall. nom. inval.; *R. wallichianus* Wight & Arn.

ऐसेलु Ainselu (Nepali).

Scandent shrubs, 1–3 m. Branchlets purplish brown or brownish, hispid, with sparse curved prickles and dense purplish brown bristles or glandular hairs. Stipules linear, 7–11 mm, caducous, pubescent, with intermixed glandular hairs. Leaves 3-foliolate, pubescent along midvein above, densely tomentose below, with purplish red bristles along prominent veins. Petiole 2–6 cm, petiolule of terminal leaflet 2–3 cm, lateral leaflets subsessile, petiolule and rachis purplish red hispid, pubescent, with minute prickles. Blade of leaflets elliptic or obovate, 4–8(–12) × 3–6(–9) cm, terminal leaflet much larger than lateral leaflets, base rounded, apex acute abruptly pointed, shallowly cordate or subtruncate, margin unevenly minute sharply serrate. Inflorescences terminal, dense glomerate racemes, (1.5–)2–4 cm, flowers several–10 or more, or flowers several in clusters in leaf axils, rarely flowers solitary; rachis and pedicels hispid. Bracts linear, 5–9 mm, pubescent. Pedicels 4–6 mm. Flowers 1–1.5 cm across. Outer surface of calyx pubescent, intermixed yellowish tomentose, sparsely hispid. Sepals erect, ovate, 4–5(–6) × 2–3(–4) mm, densely yellowish grey tomentose without, apex acute and abruptly pointed. Petals 6–8 × 3–5 mm, white or pink, spatulate, longer than sepals, margin premorse, densely pubescent, base clawed. Stamens shorter than petals; filaments broadened and flattened basally. Ovary pubescent. Styles glabrous, slightly longer than stamens. Aggregate fruit golden yellow, subglobose, ca. 1 cm in diameter, glabrous or drupelets pubescent at apex, styles persistent. Pyrenes triangular-ovoid, densely rugulose.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma, S Asia, E Asia and SE Asia.



Altitudinal range: 300–2600 m.

Ecology: Dry slopes, montane valleys, sparse forests, thickets.

Flowering: March–April. **Fruiting:** April–May.

Rubus ellipticus may be separated into var. *ellipticus* and var. *obcordatus*. The former has elliptic leaflets with acute apices and hispid pedicels and calyces, while the latter has obovate leaflets with shallowly cordate or subtruncate apices and pedicels and calyces with few bristles.

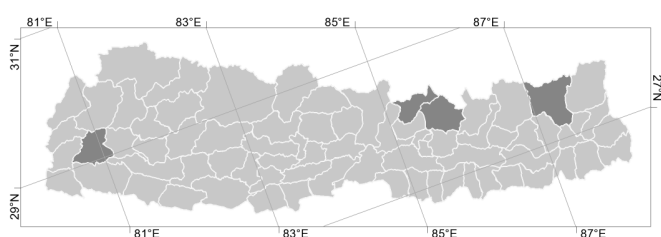
A common plant of ruderal habitats with sweet tasting fruit that is sometimes preserved as a jam. The plant is astringent and tonic, and a concentrated decoction of the ripe fruit is taken for dysentery. Root paste is applied to wounds.

4. *Rubus mesogaeus* Focke, Bot. Jahrb. Syst. 29: 399 (1900).

Rubus eous Focke; *R. euleucus* Focke; *R. idaeus* var. *exsuccus* Franch. & Sav.; *R. illudens* H.Lév.; *R. kinashii* H.Lév. & Vaniot; *R. kinashii* forma *macrophyllus* Cardot; *R. kinashii* forma *microphyllus* Cardot; *R. mesogaeus* forma *floribundus* Focke; *R. mesogaeus* var. *incisus* Cardot; *R. niveus* var. *microcarpus* Hook.f.; *R. occidentalis* var. *exsuccus* (Franch. & Sav.) Makino; *R. occidentalis* var. *japonicus* Miyabe; *R. rarissimus* Hayata.

Shrubs, scandent, 1–4 m. Branchlets reddish brown or purplish brown, softly hairy, with sparse needle-like prickles or nearly unarmed. Old branches greyish brown, with sparse prickles broadened basally. Stipules linear, to 1.2 cm, pubescent, margin entire. Leaves often 3-foliolate, rarely 5-foliolate, appressed pubescent or glabrescent above, densely grey tomentose below. Petiole 3–7 cm, petiolule of terminal leaflet 1.5–4 cm, lateral leaflets shortly petiolulate or sessile, petiolules and rachis pubescent, with sparse minute curved prickles. Blade of leaflets variable in shape, terminal leaflet broadly rhombic-ovate or elliptic-ovate, base rounded to subcordate, apex acuminate, margin often pinnate-lobed, lateral leaflets obliquely elliptic or ovate, 4–9(–11) × 3–7(–9) cm, base cuneate to rounded, apex acute, margin unevenly coarsely serrate, often lobed. Inflorescences terminal or axillary, corymbose, (2–)3–4.5 cm, shorter than petiole, several- to more than 20-flowered; rachis and pedicels pubescent, with sparse needle-like prickles. Bracts linear, 7–10 mm; pubescent. Pedicels 6–12 mm. Flowers ca. 1 cm or more across. Outer surface of calyx densely pubescent. Sepals often reflexed after anthesis, lanceolate, (4–)5–8 × 3–4 mm, inner sepals with tomentose margin, apex acute to shortly acuminate. Petals white or pink, obovate, suborbicular or elliptic, 5–6 × 4–5 mm, premorse, base slightly pubescent and shortly clawed. Stamens about as long as petals. Ovary pilose. Styles glabrous. Aggregate fruit purplish black, compressed globose, 6–8 mm in diameter, glabrous. Pyrenes triangularly ovoid-globose, rugose.

Distribution: Nepal, E Himalaya, Tibetan Plateau, E Asia and N Asia.



Altitudinal range: 900–3600 m.

Ecology: Slopes, forests in montane valleys, river banks.

Flowering: April–May. **Fruiting:** July–August.

Hooker (Fl. Brit. Ind. 2: 335. 1878) partially misapplied the name *Rubus niveus* Wall ex. G. Don to this species.

The plants in Nepal are of the typical variety, *R. mesogaeus* vars *glabrescens* T.T. Yu & L.T. Yu and var. *oxycornus* Focke are recorded from China.

5. *Rubus biflorus* Buch.-Ham. ex Sm., in Rees, Cycl. 30(2): Rubus no.9 (1815).

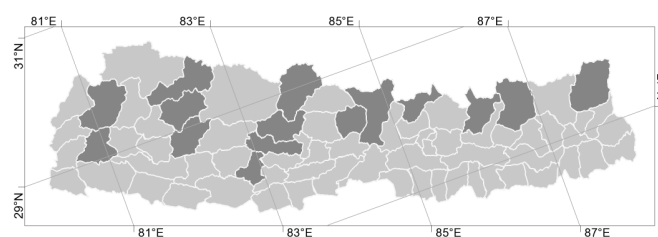
Rubus biflorus forma *parceglanduligera* Focke; *R. biflorus* var. *adenophorus* Franch.; *R. biflorus* var. *quinqueflorus* Focke.

सानु गुलाफ Sanu gulaph (Nepali).

Shrubs, scandent, 1–3 m tall. Branchlets purplish brown to brownish, glabrous, with sparse robust curved prickles and glaucous bloom, flowering branches are angled. Old branches terete. Stipules narrowly lanceolate, 6–8 mm, persistent, pubescent, with few stipitate glands. Leaves 3-foliolate, rarely 5-foliolate, appressed pubescent above, densely grey or yellowish grey tomentose, with sparse minute prickles along midvein below. Petiole 2–4(–5) cm; petiolule of terminal leaflet 1–2.5 cm, lateral leaflets sessile, glabrous, rarely pilose, sparsely stipitate glandular. Blade of terminal leaflet broadly ovate or suborbicular, larger, 4–5 × 3–5 cm; blade of lateral leaflets ovate or elliptic, 2.5–5 × 1.5–4(–5) cm, base broadly cuneate to rounded, apex acute or acuminate, margin unevenly coarsely serrate or doubly serrate, often deeply 3-lobed on terminal leaflet. Inflorescences terminal, rarely axillary, corymbs, 4–6 cm, often 4–8-flowered, or flowers 2–several in clusters in leaf axils; rachis and pedicels glabrous or pubescent, with needle-like prickles. Bracts linear or narrowly lanceolate, 4–7 mm, glabrous, rarely pilose. Pedicels (1–)2–3 cm. Flowers 1.5–2 cm across. Outer surface of calyx glabrous. Sepals erect, spreading at anthesis, broadly ovate or orbicular-ovate, 6–8 × 5–7 mm, apex acute, apiculate. Petals white, suborbicular, 7–8 mm in diameter, longer than sepals. Stamens shorter than petals; filaments linear, broader at base. Pistils somewhat shorter than stamens. Base of style and apex of ovary densely grey tomentose. Aggregate fruit enclosed in calyx, yellow, globose, 1–1.5(–2) cm in diameter, glabrous; drupelets apically with persistently tomentose styles. Pyrenes reniform, densely rugulose.

Fig. 9a-c

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 1500–3500 m.

Ecology: Valleys, riversides, mixed forests and forest margins.

Flowering: May–June. **Fruiting:** July–August.

Two varieties may be recognized in *Rubus biflorus*: var. *biflorus* has glabrous petioles, pedicels and calyces, usually without stalked glands, while var. *adenophorus* has tomentose petioles, pedicels and calyces, sparsely set with stalked glands.

Rosaceae

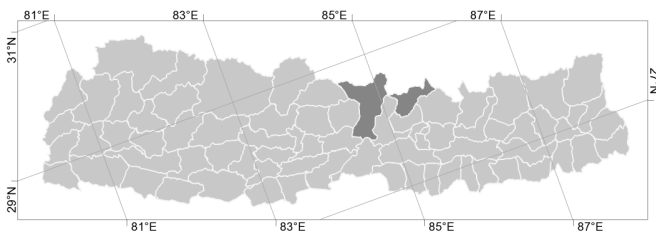
Ripe fruits are eaten fresh.

6. *Rubus alexeterius* Focke, Notes Roy. Bot. Gard. Edinburgh 5: 75 (1911).

Rubus acaenocalyx H.Hara; *R. alexeterius* var. *acaenocalyx* (H.Hara) T.T.Yu & L.T.Lu.

Scandent shrubs, 1–2 m tall. Old branches reddish brown, glabrous, glaucous and 6–8 mm curved prickles. Flower-bearing branchlets short, densely villous, with minute curved prickles. Stipules linear or subulate, 4–6 mm, villous, persistent. Leaves 3-foliolate, rarely 5-foliolate, appressed villous above, densely grey tomentose below. Petiole 2.5–3.5 cm, petiolule of terminal leaflet 0.5–1 cm, lateral leaflets subsessile, petiolules and rachis densely villous, with sparse minute curved prickles. Terminal leaflet rhombic, rarely ovate, larger than others, 4–5 × 2.5–3.5 cm, base cuneate, rounded or truncate, apex acute, incised lobed; lateral leaflets ovate or elliptic, 3–4(–5) × 1.5–3 cm, base cuneate to rounded, apex acute, margin irregularly sharply serrate or incised doubly serrate above middle, sometimes 3-lobed or incised-lobed on terminal leaflet. Inflorescences clusters of 3 or 4 flowers at apex of short lateral branchlets, or flowers solitary in leaf axils. Pedicels 1–2(–3) cm, villous, with slender prickles. Flowers 1.5–2 cm across. Calyx 1.5–2 cm long, villous without, with needle-like prickles; tube pelviform. Sepals erect, spreading, ovate-lanceolate or lanceolate, unequal in length, longer sepals to 1.5 cm, shorter sepals 6–10 mm, occasionally with sparse glandular hairs, apex caudate and enlarged, sometimes divided. Petals white, suborbicular, ca. 6 mm, shorter than sepals, base shortly clawed. Stamens shorter than petals; filaments linear or basally somewhat broadened. Pistils many, shorter than stamens. Ovary glabrous or tomentose only at apex. Styles densely white tomentose basally. Aggregate fruit yellow, globose, 1.2–1.5(–2) cm in diameter, glabrous, enclosed in calyx; drupelets apically with persistently tomentose styles. Pyrenes reniform, shallowly rugulose. Fig. 9d-f

Distribution: Nepal, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 2000–3700 m.

Ecology: Montane valleys, streamsides, degraded slopes, forest clearings and forest margins.

Flowering: April–May. **Fruiting:** June–July.

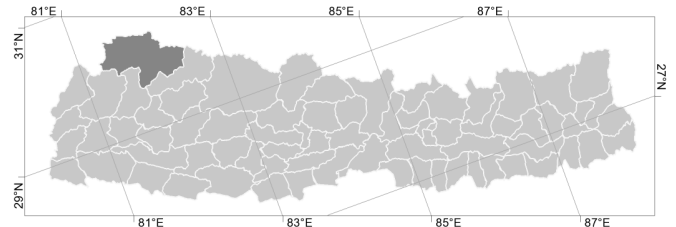
Two varieties can be recognized in *Rubus alexeterius*: var. *alexeterius* has petioles, pedicels and calyces, without glandular hairs, while var. *acaenocalyx* has petioles, pedicels and calyces with prominent glandular hairs.

7. *Rubus hoffmeisterianus* Kunth ex Bouché, Index Seminum Hort. Bot. Berol. 1847: 14.

Rubus niveus var. *aitchisoni* Hook.f.

Shrubs, erect or reclining, 1–1.5 m. Branchlets green, pilose and stipitate glandular. Stipules linear, ca. 1.5 mm, sericeous and stipitate glandular. Leaves pinnately trifoliolate, with sparse, erect straight hairs above, below white velutinous, midrib with long straight hairs, with or without few stiff, straight or hooked prickles. Petiole 2–5 cm; petiolule of terminal leaflet 1–5 cm; petiolule of lateral leaflets 1–3 mm, white sericeous and stipitate glandular. Blade of terminal leaflet ovate to widely ovate, shallowly few-lobed or not, 3–8 × 2.5–7 cm, base rounded to shallowly cordate; blade of lateral leaflets ovate, only slightly oblique, 1.5–5 × 1–4 cm, base cuneate to widely cuneate, apex acute, margin doubly dentate. Inflorescences axillary and terminal, racemes or panicles, 2–7 cm, 2–15-flowered, rachis and pedicels pilose and stipitate glandular and with stiff hooked prickles. Bracts linear, white tomentose and stipitate glandular. Pedicels 2–8 cm. Flowers ca. 1.2 cm across. Outer surface of calyx white tomentose and pilose. Sepals spreading at anthesis, ovate, 1–1.5 cm, apex acuminate. Petals pink, widely obovate to rounded, clawed, ca. 4 × 3–4 mm, shorter than sepals. Stamens about equalling petals; filaments linear, tapering from base to apex. Pistils longer than stamens. Base of style and apex of ovary white sericeous. Aggregate fruit enclosed by calyx, orangish yellow, ellipsoid, 1–2 cm long, style of drupelets persistent, white pilose. Pyrenes ovoid, reticulate.

Distribution: Nepal, W Himalaya and SW Asia.



Altitudinal range: 1600–2300 m.

Ecology: Shaded slopes, clearings.

Flowering: May–June. **Fruiting:** August–September.

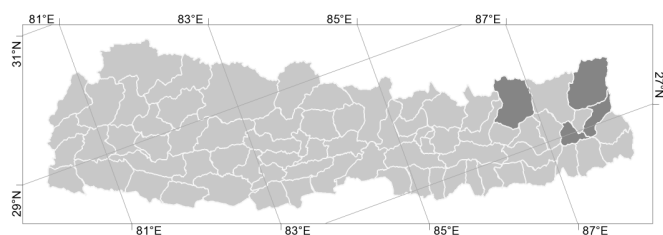
8. *Rubus inopertus* (Focke) Focke, Biblioth. Bot. 72: 182 (1911).

Rubus niveus subsp. *inopertus* Focke, Bot. Jahrb. Syst. 29(3-4): 400 (1900); *Rubus lasiocarpus* var. *rosifolius* Hook.f.; *R. niveus* var. *rhodophyllos* Focke; *R. niveus* var. *rosifolius* (Hook.f.) H.Hara.

Shrubs scandent, climbing to 2 m. Branchlets brownish to purplish brown, slender, angled, puberulous or glabrescent, armed with sparse, backward-curved prickles ca. 5 mm. Stipules linear-lanceolate, entire, 2–4(–5) mm, glabrous or margin puberulous. Leaves imparipinnate, (5–)7–9(–11)-foliolate, pubescent along veins above, pilose below. Petiole (1.5–)3.5–6.5 cm, purplish brown, petiolule of terminal leaflet 0.6–3 cm, lateral leaflets subsessile, petiolules and rachis

moderately pubescent, armed with sparse, curved prickles ca. 2 mm. Leaflet blade ovate to narrowly ovate, (1.4–)3.5–7(–9) × (0.7–)1–3(–4) cm, base rounded or subtruncate, apex acute to acuminate, margin coarsely sharply double serrate. Terminal leaflets larger and more acuminate than laterals, sometimes imperfectly separated from last pair of lateral leaflets or appearing 3-lobed. Inflorescences terminal or axillary, several-flowered corymbs or clusters, 2–3 cm in diameter, sometimes flowers solitary in axils, rachis and pedicels densely puberulous. Bracts linear-lanceolate, 1.5–3 mm, densely puberulous. Pedicels 4–7 mm. Flowers 0.8–1.2 cm across. Outer surface of calyx glabrous. Sepals erect to spreading at anthesis, reflexed in fruit, narrowly ovate or triangular-ovate, 4–7 × 2–4 mm, inner sepals apex acute to acuminate, margin white tomentose. Petals pink to dark pink, broadly obovate, 3–4 × 4–5 mm, base shortly clawed, margin and apex irregularly toothed, glabrous. Stamens numerous, 2–4 mm, filaments linear, sometimes broadened at base. Pistils 4–5 mm. Ovary and base of style densely white woolly pubescent. Aggregate fruit purplish black, globose, 8–9 mm in diameter, thinly pubescent. Pyrenes rugulose.

Distribution: Nepal, E Asia and SE Asia.



Altitudinal range: 2400–2600 m.

Ecology: River banks.

Flowering: June. **Fruiting:** July.

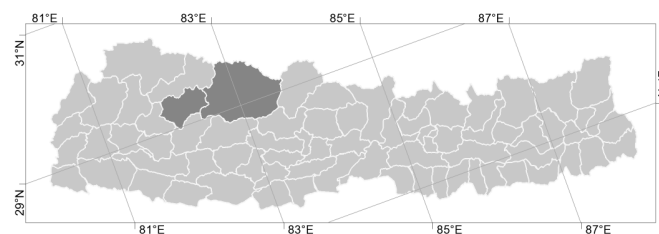
A poorly understood and under-collected species in Nepal, only known from a few specimens. The Nepalese material differs slightly from the description given by Lu & Boufford (Fl. China 9: 218. 2003) as the stems and inflorescence branches are moderately to densely puberulent. The Nepalese plants match the type specimen, *Hooker s.n.* (K) from Sikkim. Description of the fruit has been taken from Chinese material. Amongst the synonyms the spelling of the epithet as '*rosaefolius*' is often found in older literature

9. *Rubus amabilis* Focke, Bot. Jahrb. Syst. 36(Beibl.82): 53 (1905).

Shrubs, 1–3 m. Branches purplish brown or dark brown, glabrous, with sparse prickles. Flower-bearing branchlets short, softly hairy, with minute prickles. Stipules linear-lanceolate, 5–8 mm, softly hairy. Leaves 7–11-foliolate, glabrous or with sparse appressed hairs above, softly hairy and with small prickles along veins below. Petiole 1–3 cm; petiolule of terminal leaflet absent or to ca. 1 cm, lateral leaflets subsessile, petiolule and rachis pubescent when young, gradually glabrescent, glabrous or subglabrescent, with small sparse prickles. Blade of leaflets ovate or ovate-lanceolate, 1–

5.5 × 0.8–2.5 cm, usually upper ones larger than lower ones, base rounded, sometimes subcuneate on terminal leaflet, apex acute, often acuminate on terminal leaflet, margin incised to doubly serrate, occasionally terminal leaflet 2- or 3-lobed or fused basally with upper lateral leaflets. Flowers solitary, terminal on lateral branchlets, pendent. Pedicels 2.5–6 cm, softly hairy, with sparse minute prickles, sometimes with intermixed sparse stipitate glands. Flowers 3–4 cm across. Calyx green, tinged red, outer surface pubescent, unarmed, rarely with sparse short needle-like prickles or stalked glands; tube pelviform. Sepals spreading, broadly ovate, 1–1.5 × 0.5–0.8 cm, apex acuminate or abruptly pointed. Petals white, suborbicular, 1–1.7 cm in diameter, longer than or nearly as long as sepals, base shortly clawed and pubescent. Stamens slightly shorter than petals; filaments whitish, linear, broadened basally. Pistils shorter than stamens. Ovary pubescent. Styles greenish, glabrous. Aggregate fruit red, oblong, rarely ellipsoid, 1.5–2.5 × 1–1.2 cm, sparsely pubescent when young, glabrescent. Pyrenes reniform, somewhat reticulate.

Distribution: Nepal, Tibetan Plateau and E Asia.



Altitudinal range: 1000–3800 m.

Ecology: Ravines, montane valleys, slopes, forests, thickets, forest margins, roadsides.

Flowering: April–May. **Fruiting:** July–August.

The fruits are edible.

10. *Rubus pungens* Cambess., in Jacquem., Voy. Inde 4(1): 48 (1841).

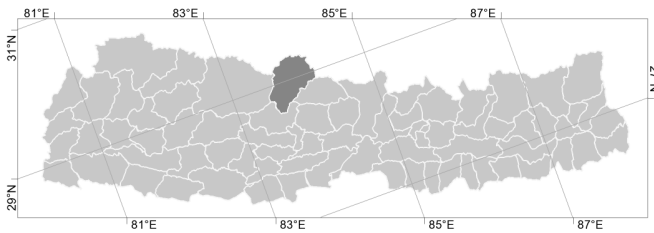
Rubus pungens var. *discolor* Prochanov; *R. pungens* var. *fargesii* Cardot.

Shrubs, to 3 m. Branchlets brownish to reddish brown, terete, pubescent, gradually glabrescent, glabrous when young, usually with dense needle-like prickles. Stipules linear, 4–7 mm, pubescent. Leaves (3–)5–7(–9)-foliolate, pubescent above, pubescent below especially along midvein and veins. Petiole (2–)3–6 cm; petiolule of terminal leaflet 0.5–1 cm, lateral leaflets subsessile, petiolule and rachis pubescent or subglabrous, with sparse minute prickles and with glandular hairs. Blade of leaflets ovate, triangular-ovate or ovate-lanceolate, (1–)2–5(–6) × 1–3 cm, base rounded to subcordate, apex acute to shortly acuminate, but usually acuminate on terminal leaflet, margin sharply or incised doubly serrate, terminate leaflet often pinnately lobed. Inflorescences terminal or axillary, with flowers solitary or rarely corymbose and 2–4-flowered; rachis and pedicels pubescent, with minute prickles. Bracts linear, 4–6 mm, pubescent. Pedicels 2–3.5 cm. Flowers 1–2 cm across. Outer surface of calyx pubescent, with

Rosaceae

dense needle-like prickles; tube semiglobose. Sepals erect, rarely reflexed, linear to lanceolate or triangular-lanceolate, 0.8–1.2(–2) × 0.2–0.4 cm, apex long acuminate. Petals white, oblong, obovate or suborbicular, 7–9 × 5–6 mm, much shorter than sepals, glabrous, base clawed. Stamens unequal in length, longer ones longer than petals, shorter ones nearly as long as or slightly shorter than petals; filaments somewhat broadened and flattened basally. Pistils numerous. Ovary softly hairy or subglabrous. Styles glabrous or sparsely softly hairy basally. Aggregate fruit red, subglobose, 1–1.5 cm in diameter, pubescent or subglabrous. Pyrenes ovoid-globose, conspicuously rugose.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 2200–3300 m.

Ecology: Forested slopes, forest margins, riversides.

Flowering: April–May. **Fruiting:** July–August.

Represented by var. *pungens* in Nepal with several additional varieties in China, Japan and Korea.

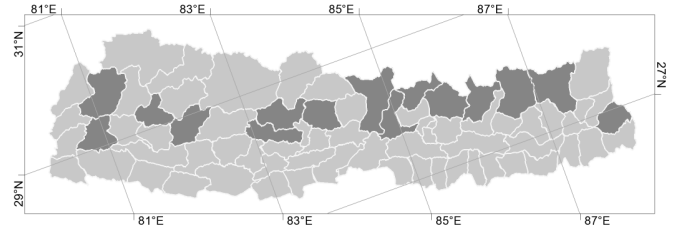
11. *Rubus macilentus* Cambess., in Jacquem., Voy. Inde 4(1): 49 (1841).
Rubus minensis Pax & K.Hoffm.; *R. trichopetalus* Hand.-Mazz.;
R. uncatus Wall. nom. nud.

जोगी ऐसेलु Jogi ainselu (Nepali).

Shrubs, 1–2 m tall. Branchlets brown or reddish brown, terete, villous, with unequal long straight, reflexed or recurved prickles. Stipules linear or linear-lanceolate, 4–6 mm, softly hairy. Leaves 3-foliolate, rarely simple, glabrous above or slightly softly hairy, glabrous below or slightly softly hairy, with sparse minute prickles only along veins. Petiole 0.8–1(–1.5) cm; petiolule of terminal leaflet 0.5–1 cm, lateral leaflets subsessile, pubescent, with minute prickles. Blade of leaflets lanceolate, ovate-lanceolate or ovate, terminal leaflet much longer than lateral leaflets, 3–5 × 1–2.5 cm, lateral leaflets 1–2 × 0.7–1.4 cm, base rounded or broadly cuneate, margin sharply serrate, apex acute, rarely obtuse, often shortly acuminate on terminal leaflet. Inflorescences terminal on short lateral branchlets, 1–3-flowered. Bracts lanceolate or linear-lanceolate, somewhat smaller than stipules, softly hairy. Pedicels 0.6–1 cm, villous, sometimes with sparse minute prickles. Flowers ca. 1 cm across. Outer surface of calyx villous. Sepals erect, rarely spreading, lanceolate or triangular-lanceolate, 6–8 × 2–3(–4) mm, apex short caudate. Petals white, broadly ovate to oblong, slightly longer than or nearly as

long as sepals, both surfaces softly hairy, base clawed. Stamens shorter than sepals; filaments broadened. Pistils many, slightly shorter than stamens. Base of style and upper part of ovary sparsely villous. Aggregate fruit orange or red, subglobose, glabrous or somewhat softly hairy, enclosed in calyx. Pyrenes globose, deeply reticulate.
Fig. 9g, h

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 900–3300 m.

Ecology: Slopes, roadsides, near watercourses, forest margins.

Flowering: April–May. **Fruiting:** July–August.

The plants in Nepal are the typical variety: var. *angulatus* Funch. has prominently angled branchlets and is found in Yunnan.

Ripe fruits are eaten fresh.

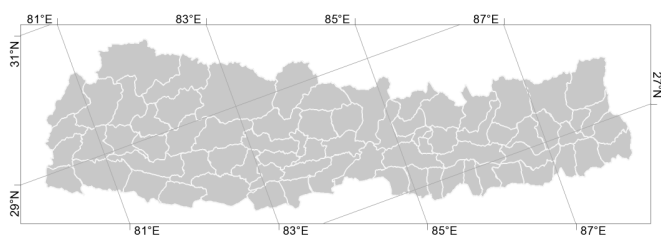
12. *Rubus sumatranus* Miq., Fl. Ned. Ind., Eerste Bijv. [2]: 307 (1860).

Rubus asper Wall. ex D.Don later homonym, non J.Presl & C.Presl; *R. asper* var. *grandifoliolatus* (H.Lév.) Focke; *R. asper* var. *myriadenus* (H.Lév. & Vaniot) Focke; *R. asper* var. *pekanius* Focke; *R. dolichocephalus* Hayata; *R. indotibetanus* Koidz.; *R. myriadenus* H.Lév. & Vaniot; *R. myriadenus* var. *grandifoliolatus* H.Lév.; *R. rosifolius* subsp. *sumatranus* (Miq.) Focke; *R. rosifolius* var. *asper* (Wall. ex D.Don) Kuntze; *R. somai* Hayata; *R. sorbifolius* Maxim.; *R. takasagoensis* Koidz.

Shrubs, erect or scandent, to 2 m. Branchlets brownish to dark reddish brown, terete, long softly hairy, usually with scattered setose purplish red glandular hairs and curved prickles; glandular hairs and prickles unequal in length, glandular hairs to 4–5 mm, prickles to 8 mm. Stipules lanceolate or linear-lanceolate, 6–8 mm, softly hairy, with intermixed glandular hairs. Leaves to 15 cm, 5–7-foliolate, rarely 3-foliolate, villous above, especially along midvein, villous below with gland-tipped hairs and small prickles along midvein. Petiole 3–5 cm; petiolule of terminal leaflet to 1 cm; lateral leaflets shortly petiolulate, petiolule and rachis softly hairy, with intermixed glandular hairs and minute curved prickles. Blade of leaflets ovate-lanceolate to lanceolate, 3–8 × 1.5–3 cm, base rounded, apex acuminate, margin irregularly sharply serrate to doubly serrate, sometimes 3-lobed on terminal leaflet. Inflorescences terminal, corymbose, 4–7 cm, 3- to several-flowered, rarely flower solitary; rachis and pedicels villous, with intermixed long glandular hairs and minute prickles. Bracts lanceolate or linear, 5–7 mm, softly hairy, with intermixed glandular hairs. Pedicels

2–3 cm. Flowers 1–2 cm across. Outer surface of calyx with soft hairs, intermixed with long, unequal, gland-tipped hairs. Sepals reflexed in fruit, lanceolate or oblong-lanceolate, 7–12 × 2–4 mm; apex long caudate. Petals white, narrowly obovate or spatulate, slightly shorter than sepals, base clawed. Stamens shorter than petals. Pistils many. Style and ovary glabrous. Torus raised, oblong, base shortly stalked. Aggregate fruit orange-red, oblong to oblong-conic, 1.2–1.8 × 0.7–1.1 cm, glabrous. Pyrenes reticulate.

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma, E Asia and SE Asia.



Altitudinal range: 700–2500 m.

Ecology: Forests, forest margins, thickets, bamboo forests, grasslands.

Flowering: April–June. **Fruiting:** July–August.

Hooker (Fl. Brit. Ind. 2: 34. 1878) partially misapplied the name *Rubus rosifolius* Sm. to this species.

Rubus sumatranus was reported from Nepal by Lu & Boufford (Fl. China 9: 225. 2003). Although we have not seen specimens to substantiate that report, *R. sumatranus* has been collected in Sikkim and Darjeeling is very likely also to be in Nepal and so is included here as a full entry without distribution map. Information for the description is taken from Fl. China and E Himalayan specimens.

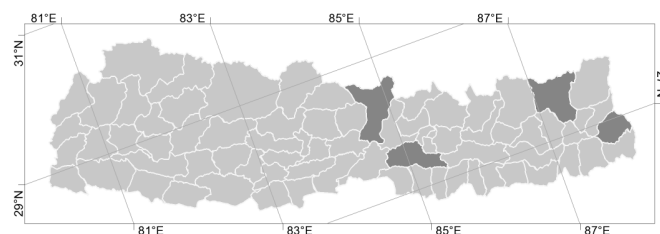
13. *Rubus rosifolius* Sm., Pl. Icon. Ined.(3): pl. 60 (1791). *Rubus coronarius* (Sims) Sweet; *R. rosifolius* forma *coronarius* (Sims) Kuntze; *R. rosifolius* forma *coronarius* (Sims) Focke; *R. rosifolius* var. *coronarius* Sims.

रातो ऐसेलु Rato ainselu (Nepali).

Shrubs, erect or climbing, 2–3 m. Branchlets greyish brown or dark reddish brown, terete, softly hairy or subglabrous, with straight to curved prickles and yellowish glands. Stipules linear or lanceolate to ovate-lanceolate, 8–12 × 1.5–3.5 mm, sparsely softly hairy. Leaves usually 7–11-foliolate, pilose to subglabrescent above, with yellow glands, pilose to subglabrescent below and with sparse minute prickles along midvein, with yellow glands. Petiole 2–3 cm; petiolule of terminal leaflet 0.8–1.5 cm, lateral leaflets subsessile, petiolule and rachis softly hairy, with sparse, minute prickles, sometimes subglabrous, with yellowish glands. Blade of leaflets ovate or ovate-elliptic to lanceolate, 4–7(–10) × 1.5–5 cm, base rounded, apex acuminate, margin sharply incised doubly serrate or coarsely doubly serrate. Inflorescences terminal or in leaf axils, 1- or 2-flowered. Bracts linear or lanceolate, 5–9

mm, puberulous. Pedicels (1–)2–3.5 cm, ± softly hairy, with sparse, minute prickles, sometimes glandular. Flowers 3–5 cm across. Outer surface of calyx softly hairy and glandular. Sepals erect before anthesis, reflexed after anthesis, triangular-lanceolate or ovate-lanceolate, 0.8–1.2(–1.4) × 0.4–0.6 cm, apex long caudate. Petals white, oblong, narrowly obovate or suborbicular, 0.8–1.5 × 0.8–1.2 cm, short hairy outside, base clawed, apex obtuse. Stamens shorter than petals; filaments broad. Pistils to 2 mm, shorter than stamens. Ovary glabrous, sometimes glandular. Styles glabrous. Torus shortly stalked. Aggregate fruit red, ovoid-globose or narrowly obovoid to oblong, 1–1.5 × 0.8–1.2 cm, glabrous, with few glands. Pyrenes deeply foveolate. Fig. 10a-c

Distribution: Nepal, E Himalaya, Assam-Burma, E Asia, Africa and Australasia.



Altitudinal range: 600–2500 m.

Ecology: Mixed forests, forest margins, grassy slopes, roadsides, landslides. Often cultivated.

Flowering: March–May. **Fruiting:** June–July.

Originally published using the spelling '*rosaefolius*', and sometimes listed as this in the older literature. The double-flowered form, with fragrant flowers, originally described from cultivated plants in England, and now occasionally cultivated for ornamental use throughout SE Asia, is named *Rosa rosifolius* forma *coronarius* (Fl. Bhutan 1: 562. 1987). *Rosa rosifolius* may not be truly wild in Nepal.

14. *Rubus thomsonii* Focke, Abh. Naturwiss. Vereine Bremen 4: 198 (1874).

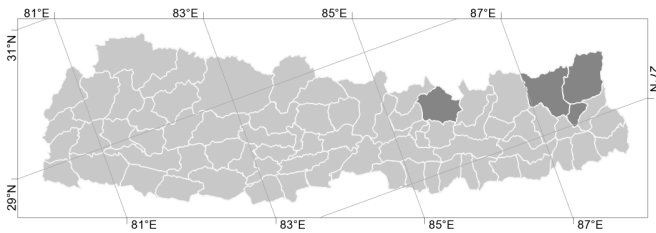
ऐसेलु Ainselu (Nepali).

Shrubs, prostrate, climbing or arching, height unknown. Branchlets green, glabrous or strigillose, often in lines, with recurved or straight hard prickles. Stipules linear to linear-lanceolate, entire or with a few long lacerations, ca. 5 mm, sparsely pubescent. Leaves pinnately 3-foliolate, sparsely strigillose above, nearly glabrous below with a few hooked prickles along midvein. Petiole 1–4 cm; petiolule of terminal leaflet 2–4 mm; petiolule of lateral leaflets ca. 1 mm, strigillose, with a few stiff hooked prickles. Blade of terminal leaflet rhomboid to elliptic, 6–12 × 3–5 cm, base cuneate, apex acute to long acuminate; blade of lateral leaflets obliquely ovate, 2.5–5 × 1–2.5 cm, base cuneate, apex acute to long acuminate, margin irregularly and coarsely doubly dentate to doubly serrate. Inflorescences axillary, panicles, racemes or flowers

Rosaceae

solitary, 2–5 cm, (1–)3–20-flowered; rachis and pedicels pilosulose, with few stiff recurved prickles. Bracts linear, entire or with 1–few lacerations, glabrous or with few hairs. Pedicel 0.7–2.5 cm. Flowers 1.2–2.4 cm across. Outer surface of calyx glabrous except for velutinous band along margin. Sepals spreading at anthesis, ovate to broadly ovate, 3–5 mm, apex acuminate. Petals pink, broadly elliptic to widely ovate, ca. 3 × 2 mm, shorter than sepals. Stamens equalling or slightly longer than petals; filaments linear, uniform in width, except narrower below anther. Pistils longer than stamens. Base of style and ovary pilose. Aggregate fruit not enclosed by calyx, red, globose or depressed globose, 0.5–0.8 cm in diameter, pilose; style of drupelets persistent, pilose. Pyrenes oblong to lunate, thickened, surface smooth or with a few raised lines.

Distribution: Nepal and E Himalaya.



Altitudinal range: 2600–3700 m.

Ecology: Forests, thickets, clearings.

Flowering: August–October. **Fruiting:** October–December.

Ripe fruits are edible.

15. *Rubus pentagonus* Wall. ex Focke, *Biblioth. Bot.* 72: 145 (1911).

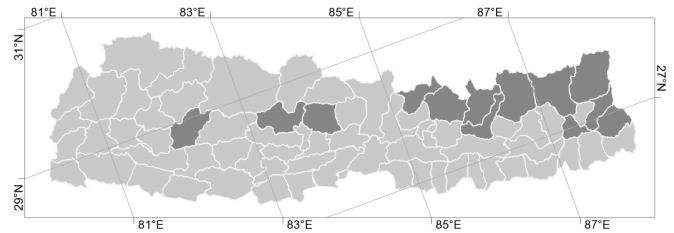
Rubus alpestris Blume.

लेख ऐसेलु Lekh ainselu (Nepali).

Shrubs, scrambling, 1.5–3 m. Branchlets climbing, brownish to dark brown, slightly pubescent when young, later glabrous, with minute or needle-like prickles and stalked glands. Stipules linear-lanceolate, 7–10 mm, persistent, puberulous, margin with shortly stalked glands, margin entire or deeply 2-laciniate. Leaves palmately 3- or 5-foliolate, pilose along veins above, sparsely pubescent below. Petiole 2–4 cm, sparsely pubescent, with stalked glands and minute prickles, rarely without stalked glands, leaflets sessile. Blade of leaflets rhombic-lanceolate, 3–8(–11) × 1.5–4 cm, base cuneate, apex acuminate to caudate, margin coarsely incised to doubly serrate. Inflorescences terminal, corymbose, 2–3 cm long, 2- or 3-flowered or with flowers solitary in leaf axils. Bracts linear-lanceolate, 6–9 mm, often with stalked glands, margin entire or 2- or 3-laciniate. Pedicel 1.5–2.5 cm, glabrous, with sparse gland-tipped hairs and small prickles. Flowers 1.5–2 cm across. Calyx glabrous, outer surface glandular pubescent, with minute prickles. Sepals erect, spreading, lanceolate or ovate-lanceolate, 8–15 × 5–8 mm, margin entire or 3-laciniate, inner sepals with tomentose margin, apex acuminate or caudate. Petals white, elliptic or oblong, much shorter than

sepals, base shortly clawed. Stamens with broad filaments. Pistils 10–15, slightly shorter than stamens. Ovary and style glabrous. Aggregate fruit red or orange-red, subglobose, to 2 cm in diameter, glabrous, enclosed in calyx. Pyrenes reniform, to 4 mm, rugose.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma, E Asia and SE Asia.



Altitudinal range: 2000–3100 m.

Ecology: Evergreen forests, mixed forests, thickets.

Flowering: April–May. **Fruiting:** June–July.

Hooker (*Fl. Brit. Ind.* 2: 332. 1878) misapplied the name *Rubus alpestris* Blume to this species.

Nepalese plants are the typical variety, several additional varieties occur in China.

Ripe fruits are eaten fresh.

16. *Rubus lineatus* Reinw., in Blume, *Bijdr. Fl. Ned. Ind.* [17]: 1108 (1827).

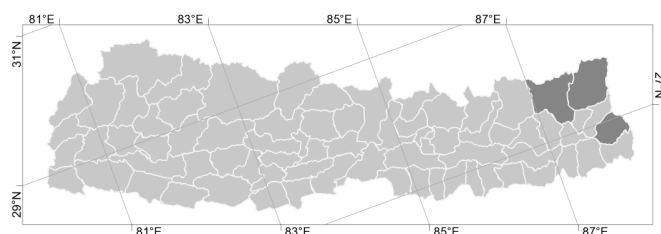
Rubus pulcherrimus Hook.

घ्याम्पे ऐसेलु Ghyampe ainselu (Nepali).

Shrubs, 1–2 m, much-branched. Branchlets brownish to greyish brown, terete, with sparse minute prickles, with dense appressed silvery-grey or yellowish grey silky hairs, glabrescent. Stipules caducous, free, lanceolate or ovate-oblong, 1.2–2 cm, sometimes to 2–3 cm on sterile branchlets, often broad, membranaceous, abaxially densely sericeous, not divided. Leaves palmately compound, 3–5-foliolate, glabrous above or long hairy along midvein, densely silvery-grey or yellowish grey appressed-sericeous below. Petiole 2–5 cm, sericeous, lateral leaflets sessile or subsessile. Blade of leaflets oblong or lanceolate to oblanceolate, 8–12 × 1.5–3.5 cm, base cuneate, apex acuminate to caudate, margin sharply serrate to doubly serrate, pinnately veined with (20–)30–50 pairs of parallel lateral veins terminating at margin, midvein and lateral veins impressed above, prominent below. Inflorescences terminal and in axils of upper leaves, cymose panicles, ca. 15–20-flowered, sometimes flowers in clusters in leaf axils; rachis and pedicels sericeous or glabrescent. Bracts lanceolate or ovate-oblong, smaller than stipules, sericeous. Pedicels 1–2 cm. Flowers ca. 1.5 cm across. Outer surface of calyx densely silvery-grey or yellowish grey, sericeous or glabrescent. Sepals ovate-triangular to ovate-lanceolate, 6–12 × 3–7 mm, apex acuminate to caudate, margin entire. Petals white or greenish white, elliptic or obovate, much smaller than sepals, glabrous, base not distinctly clawed. Stamens

somewhat shorter or as long as petals. Pistils ca. 80–100 or more, shorter than stamens. Lower part of style and apical part of ovary long hairy. Aggregate fruit orange to red at maturity, semiglobose or globose-ovoid, 7–10 mm in diameter, sericeous when young, glabrescent. Pyrenes distinctly rugose.

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma, E Asia and SE Asia.



Altitudinal range: 1400–3100 m.

Ecology: Slopes, valleys, forests, margins of forests, fallow fields.

Flowering: July–August. **Fruiting:** September–October.

The plants in Nepal are all the typical variety. The other two varieties are restricted to Yunnan.

17. *Rubus splendissimus* H.Hara, J. Jap. Bot. 40: 327 (1965).

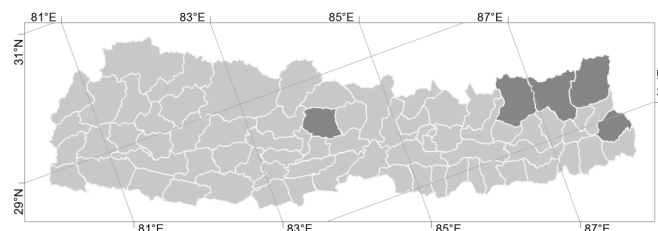
Rubus andersonii Hook.f. later homonym, non Lefèvre.

चौदे ऐसेलु Chande ainselu (Nepali).

Shrubs, erect or scrambling, to 3 m tall. Branchlets green or purplish, pubescence glandular hispid and velutinous-sericeous. Stipules lanceolate, 0.7–2 cm, outer surface sericeous and glandular hispid, inner surface glabrous. Leaves pinnately 3-foliolate, with scattered erect hairs above, white or silvery sericeous below, unarmed along midvein. Petiole 5–10 cm; petiolule of terminal leaflet 0.1–0.7 cm; petiolule of lateral leaflets absent to 2 mm, glandular hispid and sericeous. Blade of terminal leaflet elliptic to widely elliptic to obovate, 5–18 × 4–11 cm, base cuneate with straight or slightly concave sides, apex acuminate, margin doubly serrate; blade of lateral leaflets obliquely elliptic to obliquely widely elliptic or obliquely oblong, 5.5–10 × 2–6 cm, midrib with appressed straight hairs, base rounded, apex acuminate, margin doubly serrate, many prominent parallel veins. Inflorescences terminal and in upper axils, panicles or racemes, 3–15 cm, 2–many-flowered; rachis and pedicels glandular hispid and sericeous-velutinous, unarmed. Bracts persistent, elliptic or lanceolate-elliptic, 5–15 mm, outer surface glandular hispid and velutinous, glabrous within. Pedicels 0.6–2.5 cm. Flowers 2–3 cm across. Outer surface of calyx glandular hispid and velutinous. Sepals spreading at anthesis, triangular to narrowly triangular or triangular-lanceolate, 1.5–2 cm, apex acuminate to caudate. Petals white, widely elliptic to obovate, ca. 0.7–1 cm in diameter, shorter than sepals. Stamens shorter than petals; filaments linear, broadened toward base. Pistils longer than stamens. Base of style and apex of ovary glabrous. Aggregate

fruit exposed, orange, orangish red or red, globose, 1–1.3 cm in diameter, glabrous; style of drupelets persistent, glabrous. Pyrenes half round or lunate, thickened, surface shallowly reticulate.

Distribution: Nepal and E Himalaya.



Altitudinal range: 2200–3100 m.

Ecology: Thickets, forests.

Flowering: June–October. **Fruiting:** September–November.

Ripe fruits are edible.

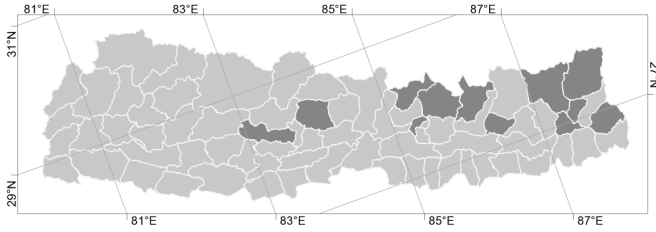
18. *Rubus calycinus* Wall. ex D.Don, Prodr. Fl. Nepal.: 235 (1825).

Dalibarda calycinus (Wall. ex D.Don) Ser.; *Rubus lobatus* Wall. nom. nud.

Herbs, creeping, 15–20 cm, main stems creeping, to 2–3 m long, rooting at nodes, with erect, sparsely branched or unbranched lateral branches. Stems with sparse needle-like prickles or nearly unarmed, with sparse hairs. Stipules ovate, rarely obovate, 8–13 × 6–11 mm, persistent, margin shallowly coarsely serrate, rarely entire. Leaves simple, pilose above when young, gradually glabrescent, hairy only along veins in age, with needle-like prickles along veins. Petiole 5–10 cm, villous, with needle-like prickles. Leaf blade orbicular-ovate or suborbicular, 2.5–6 cm in diameter, base deeply cordate, apex obtuse or rounded, margin undulate or shallowly 3–5-lobed, irregularly coarsely serrate. Inflorescences usually terminal, 1- or 2-flowered. Bracts ovate, 6–10 × 5–9 mm, coarsely serrate, rarely entire. Pedicel 3–5 cm, usually villous, with needle-like prickles. Flowers to 3 cm across. Outer surface of calyx softly hairy, with straight subulate prickles; tube broadly pelviform, 3.5–5 mm in diameter. Sepals leaf-like, narrowly ovate to elliptic, 0.8–1.4 × 0.6–1.1 cm, outer sepals broader, pinnately lobed or incised-serrate, inner sepals narrower, apex or margin coarsely incised-serrate, sometimes entire. Petals ca. 8 × 5 mm, white, obovate to elliptic, equalling or slightly shorter than sepals, puberulous outside, base clawed. Stamens shorter than petals; filaments to 6 mm; anthers ca. 1 mm. Pistils ca. 30–50(–70), slightly shorter than stamens. Ovary glabrous. Styles to 5 mm long, glabrous. Aggregate fruit red to dark red, globose, 0.9–1.4 cm in diameter, consisting of few drupelets, enclosed in persistent calyx. Pyrenes rugulose. Fig. 10d, e

Distribution: Nepal, W Himalaya, E Himalaya, Assam-Burma, E Asia and SE Asia.

Rosaceae



Altitudinal range: 1200–3000 m.

Ecology: Slopes, forests, forest margins.

Flowering: May–June. **Fruiting:** July–August.

Ripe fruits are eaten fresh.

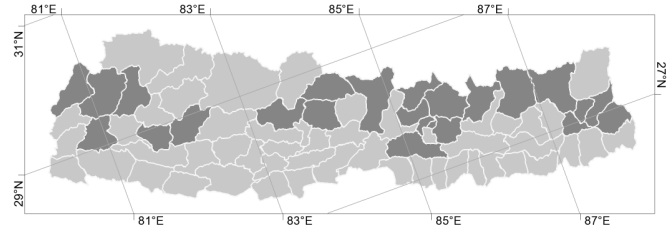
19. *Rubus paniculatus* Sm., in Rees, Cycl. 30(2): Rubus no.41 (1815).

Rubus cordifolius D.Don later homonym, non Noronha; *R. paniculatus* forma *tiliaceus* (Sm.) H.Hara; *R. tiliaceus* Sm.

भालु ऐसेलु Bhalu ainselu (Nepali).

Shrubs, scandent, to 3 m. Branchlets brownish or reddish brown, terete, yellowish grey tomentose-villous, gradually glabrescent, with sparse minute prickles. Stipules oblong or ovate-lanceolate, to 8–11 mm, villous, margin lacinate lobed above middle, lobes linear. Leaves simple, villous above, more densely so along veins, densely yellowish grey to grey tomentose below, villous along veins or glabrescent. Petiole 2–4 cm, yellowish grey or grey tomentose-villous, usually unarmed. Leaf blade ovate to narrowly ovate, 9–15 × 6–10 cm, base cordate, apex acuminate, margin undulate or inconspicuously lobed, irregularly coarsely serrate to doubly serrate, lateral veins 5–7 pairs. Inflorescences terminal or axillary, terminal inflorescences cymose panicles, laxly spreading, 10–24 cm, axillary inflorescences smaller, racemose with few flowers; rachis and pedicels yellowish grey or grey tomentose-villous. Bracts elliptic or oblong to lanceolate, 7–9 mm, villous, apex lobed or not divided. Pedicel to 1.5 cm. Flowers to 1.8 cm across. Outer surface of calyx tomentose and villous. Sepals ovate to lanceolate, 5–7 × 2–4 mm, apex acute to caudate-acuminate, outer sepals lobed, inner sepals entire. Petals white to yellowish white, oblong, 6–8 mm in diameter. Stamens shorter than petals; filaments linear, glabrous. Pistils longer than stamens, glabrous. Aggregate fruit dark red to blackish purple, globose, glabrous, ca. 1 cm in diameter, enclosed by calyx. Pyrenes distinctly rugose, style present.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 1500–3200 m.

Ecology: Mixed forests on slopes, ravines, stream-sides.

Flowering: June–September. **Fruiting:** August–October.

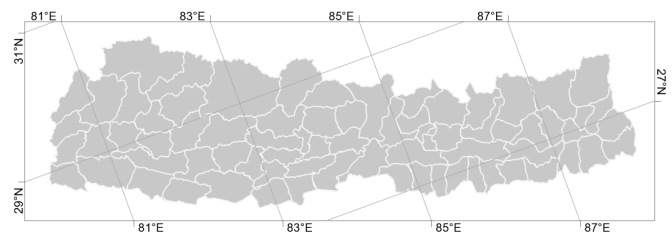
Ripe fruits are edible. A paste of the bark is applied to scabies and other rashes. A paste of the leaves is applied to sprains.

20. *Rubus glandulifer* N.P.Balacr., J. Bombay Nat. Hist. Soc. 67: 58 (1970).

Rubus lanatus Wall. ex Hook.f. later homonym, non Focke; *R. lanatus* Wall. nom. nud.

Shrubs, scandent, to 8 m. Branchlets yellowish grey, densely tomentose, with few to many glandular hairs and sparse prickles to 1.5 mm, broadened basally or nearly unarmed. Stipules linear, to 5 mm, densely pubescent, margin 3–5-toothed. Leaves simple, glabrous or pubescent on veins above, densely grey tomentose below. Petiole 1.5–4.5 cm, densely tomentose, with or without glandular hairs, rarely with small prickles. Leaf blade ovate to broadly ovate, 5–10 × 4–8 cm, base cordate, apex acute to shortly acuminate, margin obscurely to shallowly 3–5-lobed, irregularly finely serrate. Inflorescences terminal, paniculate, 8–15 cm, 20–40-flowered, rachis and pedicels softly pale tomentose, with or without glandular hairs. Bracts linear, 5–10 mm, 2–7-fid, pubescent. Pedicels 5–12 mm. Flowers ca. 2 cm or more across. Outer surface of calyx densely tomentose. Sepals spreading to reflexed after anthesis, lanceolate, 8–12 × 3–5 mm, apex acute to shortly acuminate. Petals white, obovate, or elliptic, 4–5 × 2–2.5 mm, base shortly clawed. Stamens about as long as petals. Styles glabrous. Ovary pilose. Fruit purplish black, globose, ca. 1 cm in diameter, glabrous. Pyrenes ovoid, foveolate.

Distribution: Nepal and W Himalaya.



Altitudinal range: 900–2500 m.

Ecology: Forests, thickets.

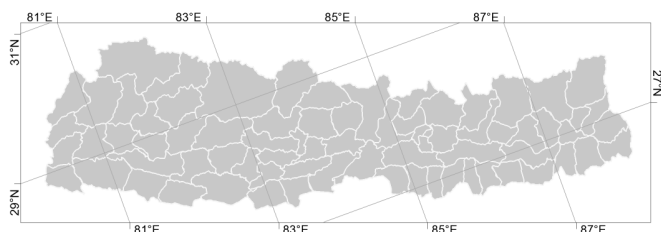
Flowering: May–June. **Fruiting:** June.

The presence of this W Himalayan species in C Nepal requires confirmation. *Rubus glandulifer* is currently known only from Wallich 746 (BM), the type of *R. lanatus*, which lacks accurate locality data and so cannot be mapped. It was probably collected during Wallich's stay in the Kathmandu Valley, but could have been collected along the route to Kathmandu.

21. *Rubus efferatus* Craib, Fl. Siam. 1(4): 570 (1931).
Rubus ferox Wall. nom. nud.; *R. ferox* Wall. ex Kurz later homonym, non Vest ex Tratt.; *R. kurzii* N.P. Balakr. nom. superfl.; *R. moluccanus* var. *ferox* Kuntze; *R. sterilis* Kuntze.

Shrubs, scandent. Branchlets brownish grey, densely villous, with numerous prickles ca. 1.5 mm, broadened basally. Stipules linear, 4–5 mm, densely pubescent, margin 5–7-toothed. Leaves simple, sparsely pubescent above, glabrous below, except rather densely villous on veins above and below, occasional small prickles on midrib. Petiole 1.5–2.5 cm, densely villous, with several small prickles. Leaf blade ovate to broadly ovate, 2.5–9 × 1.5–6 cm, base cordate, apex acute to shortly acuminate, margin obscurely to shallowly 3–7-lobed, irregularly finely serrate. Inflorescences terminal and axillary, racemose, 4–7 cm, 5–7-flowered, rachis and pedicels densely villous. Bracts linear, ca. 4 mm, long-toothed, pubescent. Pedicels 6–8 mm. Flowers ca. 1 cm across. Outer surface of calyx densely tomentose. Sepals erect, broadly triangular, ca. 4 × 4 mm, apex acute, fimbriate-dentate. Petals white, elliptic, ca. 4 × 3 mm, base shortly clawed. Stamens about as long as petals. Styles glabrous. Ovary pilose. Fruit not seen.

Distribution: E Himalaya, Assam-Burma and SE Asia.



Altitudinal range: ca. 1200 m.

Ecology: Thickets.

Flowering: ?June.

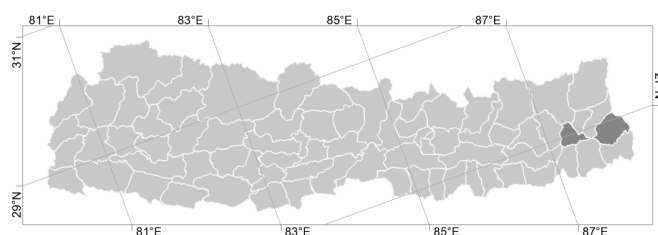
Rubus efferatus is currently known in Nepal only from Wallich 724 (BM), which lacks accurate locality data and so cannot be mapped. It is assumed to have been collected during Wallich's stay in the Kathmandu Valley, but it could also be from the journey to or from Kathmandu.

22. *Rubus hamiltonii* Hook.f., Fl. Brit. India 2[5]: 328 (1878).

Shrubs, to 8 m. Branchlets green, velutinous, with few slightly reflexed short prickles. Stipules not seen. Leaves simple, subglabrous above or with ascending or erect hairs along main veins, below with sparse long straight hairs, unarmed along midvein. Petiole 0.5–1 cm. Leaf blade oblong to narrowly ovate, 6–9 × 2.5–4 cm, base rounded, apex shortly acuminate,

margin finely denticulate to finely serrulate. Inflorescences terminal, panicles, 2–15 cm, 5–50 or more-flowered; rachis and pedicels velutinous or softly pilosulose, unarmed. Bracts ovate, entire or apically lacinate, 2–9 mm long, velutinous-pilose. Pedicels 5–8 cm. Flowers 0.9–1.2 cm across. Outer surface of calyx velutinous. Sepals spreading at anthesis, ovate, 4–5 mm, acute to shortly acuminate, spreading at anthesis. Petals white, obovate to oblanceolate, shorter than sepals. Stamens longer than petals; filaments linear, not broadened at base. Pistils shorter than stamens. Base of style and apex of ovary glabrous. Fruit not enclosed by calyx, globose, 0.8–1 cm in diameter, glabrous; style of drupelets persistent or deciduous, glabrous. Pyrenes lunate, thickened or obliquely obovoid, with few coarse reticulations.

Distribution: Nepal, E Himalaya and Assam-Burma.



Altitudinal range: 300–700 m.

Ecology: Forest margins, clearings.

Flowering: August–November. **Fruiting:** October–December.

23. *Rubus acuminatus* Sm., in Rees, Cycl. 30(2): Rubus no. 43 (1815).

Rubus betulinus D. Don.

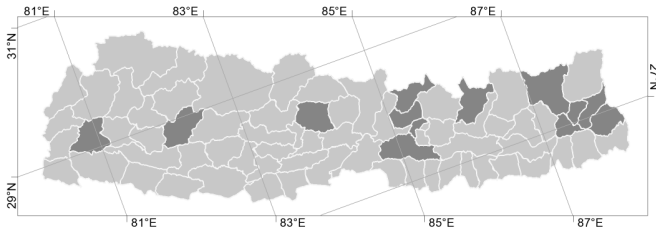
रातो ऐंसेलु Rato ainselu (Nepali).

Shrubs, scandent, to 8 m. Branchlets brown or reddish brown, slightly angled, thinly pubescent, glabrescent, with sparse minute prickles. Stipules usually caducous, free, linear or lanceolate, 4–6 mm, margin entire or toothed. Leaves simple, glabrous above, glabrous below or sparsely pubescent only along veins. Petiole 1–2 cm, slightly puberulous, with sparse minute prickles. Leaf blade ovate-oblong to lanceolate, 7–12 × 3–5 cm, base rounded, apex caudate, margin sharply serrulate, lateral veins 6–8 pairs, slightly raised below. Inflorescences terminal or axillary, terminal inflorescences narrow cymose panicles (6–)10–16 cm long, axillary inflorescences racemose, sometimes subcorymbose, less than 8 cm long; rachis and pedicels usually glabrous, occasionally sparsely pubescent. Bracts linear or lanceolate, 3–5 mm, margin entire or dentate, pubescent. Pedicels 1–2 cm. Flowers ca. 1 cm across. Outer surface of calyx glabrous; tube shallowly cupular. Sepals erect in fruit, ovate, 4–6 × 2–4 mm, inner sepals tomentose marginally, margin undivided, apex shortly acuminate. Petals white, broadly elliptic or oblong, 4–5 × 2–3 mm, equalling or shorter than sepals, glabrous, base shortly clawed. Stamens shorter than petals; filaments slightly broadened basally. Pistils ca. 10–20, shorter than stamens.

Rosaceae

Ovary glabrous. Aggregate fruit red, glabrous, with a few large drupelets enclosed in persistent calyx. Pyrenes ovoid, rugose. Fig. 10f,g

Distribution: Nepal, E Himalaya, Assam-Burma, E Asia and SE Asia.



Altitudinal range: 1000–2500 m.

Ecology: Bamboo thickets, streamsides, roadsides.

Flowering: July–September. **Fruiting:** October–November.

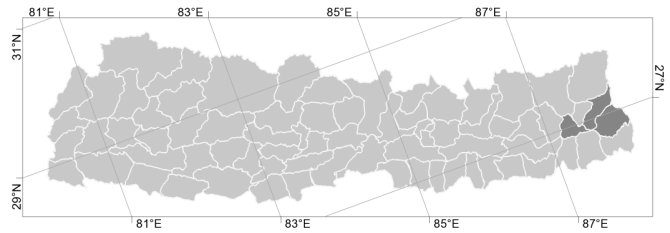
Ripe fruits are eaten fresh. Juice of the bark is given to ease indigestion.

24. *Rubus griffithii* Hook.f., Fl. Brit. India 2[5]: 327 (1878).

भुईँ ऐंसेलू Bhui ainselu (Nepali).

Shrubs, erect to ascending, ca. 3 m. Branchlets green or reddish brown, finely pubescent with more or less appressed straight hairs. Stipules subulate, ca. 10 mm, persistent, softly hairy. Leaves simple, glabrous above, below with a few short hairs between veins, veins with dense ascending straight hairs, midvein unarmed. Petiole 2–10 mm. Leaf blade elliptic to elliptic-lanceolate to oblong-lanceolate, 5–14 × 3–6 cm, base truncate to shallowly cordate, apex acuminate, margin singly or doubly serrulate-serrate. Inflorescences terminal or axillary, panicles or racemes, 5–12 cm, (1–)4–many-flowered; rachis and pedicels velutinous or softly pubescent with short curved hairs, unarmed. Bracts linear, serrate, 5 mm, softly pubescent. Pedicels 8–19 mm. Flowers 1.5–3 cm across. Outer surface of calyx minutely velutinous. Sepals spreading at anthesis, narrowly lanceolate to lanceolate or narrowly ovate, 1.2–1.5 cm, apex long acuminate to caudate. Petals white, spatulate, ca. 3 mm, much shorter than sepals. Stamens much longer than petals; filaments linear, gradually widened towards base. Pistils longer than stamens. Base of style and apex of ovary with few sparse straight hairs. Aggregate fruit exserted, black, globose, 8–12 mm in diameter, apically with a few hairs. Styles persistent, with a few long hairs. Pyrenes thickly lunate to thickly semicircular, with conspicuous rounded horizontal ridges.

Distribution: Nepal and E Himalaya.



Altitudinal range: 1400–2400 m.

Ecology: Woodland margins, clearings, thickets.

Flowering: August–December. **Fruiting:** October–January.

Hara & Ohashi (Fl. E. Himalaya: 129. 1966) misapplied the name *Rubus hexagynus* Roxb. to this species.

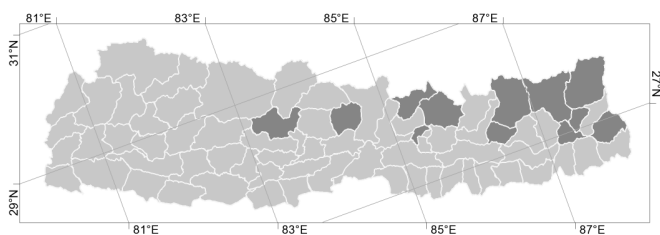
Rubus griffithii is a near endemic to Nepal, also found in adjacent areas of Sikkim. *R. hexagynus* Roxb. has a more easterly distribution and is not found further west than Assam. Ripe fruits are eaten fresh.

25. *Rubus treutleri* Hook.f., Fl. Brit. India 2[5]: 331 (1878). *Rubus arcuatus* Kuntze; *R. reticulatus* Wall. nom. nud.; *R. rosulans* Kuntze; *R. tongloensis* Kuntze.

धूलो ऐंसेलू Thulo ainselu (Nepali).

Scandent shrubs, 0.5–1 m. Branches greyish brown, brown or blackish brown, villous, purplish red stipitate glandular, with sparse needle-like prickles. Stipules free, 1–1.5 cm, palmatipartite nearly to base; lobes linear to linear-lanceolate, villous, stipitate glandular. Leaves simple, sparsely villous above but more densely so along veins, with sparse stipitate glands along veins, below densely tomentose-villous when young, glabrate in age, sparsely stipitate glandular along veins. Petiole 2.5–5.5 cm, with dense purplish red stipitate glands, long hairs and sparse needle-like prickles. Leaf blade suborbicular, 6–12 cm in diameter, base deeply cordate, margin 3–5-lobed, terminal lobe slightly larger than lateral lobes, apex acute, lateral lobes obtuse, rarely acute, margin irregularly coarsely serrate. Inflorescences terminal, racemose, 3–4 cm or slightly longer, several- to more than 10-flowered, or flowers few in clusters in leaf axils; rachis, pedicels and outer surface of calyx densely villous, stipitate glandular. Bracts 1–1.3 cm, palmatipartite; lobes linear, villous, stipitate glandular. Pedicels 5–10 mm. Flowers 1.5–2(–2.5) cm across. Calyx tube cup-shaped, ca. 5 mm. Sepals narrowly ovate or narrowly ovate-lanceolate, 8–15 × 5–7 mm, apex acuminate, outer sepals leaf-like, margin lacinate or pinnately divided into lanceolate lobes, inner sepals entire. Petals pink, suborbicular, 8–11 mm in diameter, barely clawed. Stamens shorter than petals; filaments broad, flat. Pistils nearly as long as stamens. Ovary and style glabrous. Aggregate fruit red, globose, 8–10 mm in diameter, enclosed in calyx. Pyrenes densely rugulose.

Distribution: Nepal, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 2300–3700 m.

Ecology: Forests, forest margins.

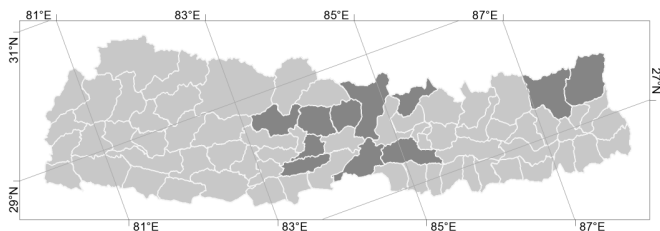
Flowering: June–July. **Fruiting:** August–September–October).

Ripe fruits are edible.

26. *Rubus kumaonensis* N.P.Balacr., J. Bombay Nat. Hist. Soc. 67: 58 (1970).
Rubus reticulatus Wall. ex Hook.f. later homonym, non A.Kern.

Shrubs, scandent, to 1 cm tall. Branchlets brown, grey to yellowish grey tomentose, softly hairy, with sparse minute curved prickles, rarely unarmed. Stipules subflabellate, pectinately lobed; lobes divided again, with lanceolate lobules, tomentose, softly hairy. Leaves simple, pilose above, densely so along veins, densely yellowish grey tomentose below, with long hairs along veins. Petiole 4–9 cm, grey to yellowish grey tomentose, softly hairy, with sparse minute prickles. Leaf blade broadly ovate to suborbicular, 12–20 × 10–18 cm, base cordate, margin distinctly 5-lobed, lobes apically acute or ± obtuse, unevenly densely serrate, palmately 5-veined, lateral veins 5–7 pairs, prominent below. Inflorescences terminal and axillary, terminal inflorescences lax narrow, racemose or cymose-paniculate, ca. 6 cm, axillary inflorescences racemose or a few flowers in clusters in leaf axils; rachis and pedicels densely grey or yellowish brown tomentose and villous. Bracts subflabellate, margin entire or apically divided, thin tomentose, softly hairy. Pedicels 1.5–3(–4) cm. Flowers 1–1.5 cm across. Calyx densely tomentose and villous. Sepals broadly ovate, 4.5–5 mm and about as broad, margin entire or slightly lobed, apex acuminate. Petals white or yellowish white, obovate to suborbicular, ca. 5 × 5 mm. Stamens glabrous; filaments linear. Pistils numerous. Style and ovary glabrous. Aggregate fruit red, globose, 1–1.5 cm in diameter, enclosed by calyx.

Distribution: Nepal, W Himalaya, E Himalaya and Tibetan Plateau.



Altitudinal range: 1100–2800 m.

Ecology: Broadleaved evergreen forests in montane valleys, ravines, thickets on slopes.

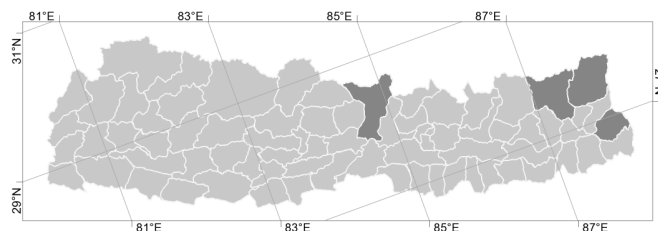
Flowering: July–August. **Fruiting:** September–October.

Ripe fruits are edible. Juice of the fruits is given in case of stomach disorders.

27. *Rubus calycinooides* Kuntze, Meth. Sp.-Besch. Rubus: 67, 78, 83 (1879).
Rubus bhotanensis Kuntze; *R. darschilingensis* Kuntze; *R. diffusus* Focke; *R. himalaicus* Kuntze.

Shrubs, erect or arching, 1–2 m or more. Branchlets green, velutinous or tomentose. Stipules lanceolate to ovate, lacerate, 1–1.5 × 0.2–0.5 cm, caducous, sparsely velutinous or subglabrous. Leaves simple, velutinous or subglabrous above, without prickles, velutinous below, midrib with or without minute straight or hooked prickles. Petiole 3–11 cm, velutinous or minutely tomentose. Leaf blade ovate to widely ovate or suborbicular in outline, 5–20 × 5.5–22 cm, base shallowly to deeply cordate, apex acute to shortly acuminate, shallowly 3- or 5-lobed, lobes acute or rounded, margins minutely singly or doubly serrulate to dentate-serrate, finely and more or less conspicuously reticulate above and below. Inflorescences axillary and terminal, racemose or paniculate, 2–15 cm, 2–20-flowered, flowers clustered in axils and along main axis of inflorescence; rachis and pedicels velutinous or slightly tomentose, with sparse hooked or straight prickles. Bracts broadly ovate to rounded, 5–15 mm, sparsely velutinous. Pedicels 2–15 mm, variable in length within a single inflorescence. Flowers 2–2.5 cm across. Outer surface of calyx velutinous to tomentose. Sepals erect or spreading at anthesis, lanceolate to widely ovate, 11–15 mm, margins sometimes with few lacerations, apex acute, sometimes with three narrowly lanceolate lacerations. Petals white, obovate to rounded, clawed, ca. 7 mm in diameter, shorter than or equalling sepals. Stamens ± equalling petals; filaments linear, gradually and slightly broadened toward base. Pistils longer than stamens. Base of style and apex of ovary glabrous. Aggregate fruit enclosed by calyx or slightly exerted, red, globose to ovoid, 1.2–1.5 cm in diameter, glabrous; style of drupelets persistent, glabrous. Pyrenes thickly lunate, horizontally ribbed.

Distribution: Nepal, E Himalaya and Assam-Burma.



Altitudinal range: 1200–2200 m.

Ecology: Clearings, thickets, woodlands, woodland margins.

Flowering: June–October. **Fruiting:** October–December.

Rosaceae

Plants frequently offered in the nursery trade under the name *Rubus calycioides* Hayata ex Koidzumi (a later homonym of *R. calycioides* Kuntze) are *R. rolfei* Vidal.

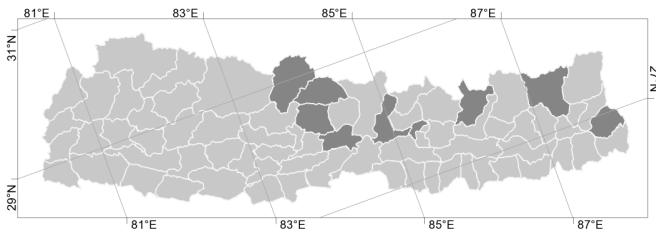
28. *Rubus rugosus* Sm., in Rees, Cycl. 30(2): Rubus no.34 (1815).

Rubus hamiltonianus Ser.; *R. rugosus* Buch.-Ham. ex D. Don nom. superfl.

गोरु ऐसेलु Goru ainselu (Nepali).

Shrubs, climbing or scandent, to 5 m. Branchlets green, velutinous. Stipules ca. 1.5 cm, ovate, entire or serrate, with long straight hairs. Leaves simple, with sparse straight hairs above, below rugose or bullate-like, shortly pilose and arachnoid, midvein with or without sharp, recurved prickles. Petiole 2.5–10 cm, strigose or strigillose, with sharp recurved spines. Leaves ovate to suborbicular, 6–12 × 5–12 cm, base cordate to shallowly cordate, apex acute to rounded, 3 or 5 (or 7)-angled or lobed, margin irregularly denticulate. Inflorescences terminal and axillary clusters or racemes with flowers clustered at nodes, 3–20 cm long, 2–30-flowered; rachis and pedicels densely pilose, with a few straight or slightly curved prickles. Bracts ovate to broadly elliptic, ca. 5 mm, pilose. Pedicels 4–7 mm. Flowers 0.7–1 cm across. Outer surface of calyx tomentose and pilose. Sepals erect at anthesis, ovate, 0.8–1.2 mm, apex acute to acuminate. Petals white, obovate, ca. 8 mm in diameter, shorter than to equalling sepals. Stamens shorter than petals; filaments linear, broadest at base and tapering gradually to apex. Pistils longer than stamens. Base of style and apex of ovary glabrous. Aggregate fruit half enclosed by calyx, red, black at maturity, globose, 1–1.4 cm in diameter, glabrous; style of drupelets persistent, glabrous. Pyrenes lunate, thickened, surface raised reticulate.

Distribution: Nepal, E Himalaya and Assam-Burma.



Altitudinal range: 600–2700 m.

Ecology: Thickets, clearings, disturbed forests.

Flowering: May–September. **Fruiting:** July–September.

Hooker (Fl. Brit. Ind. 2: 330. 1878) partly misapplied the name *Rubus moluccanus* L. to this species.

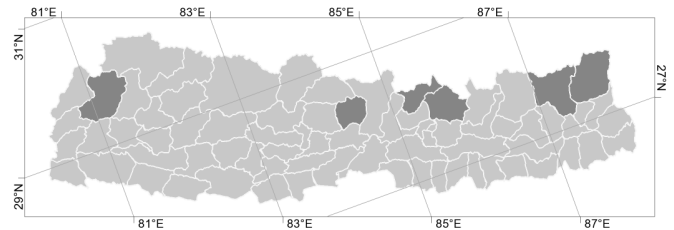
Ripe fruits are eaten fresh.

29. *Rubus franchetianus* H.Lév., Bull. Acad. Int. Geogr. Bot. 20: 71 (1909).

Rubus arcticus var. *fragarioides* (Bertol.) Focke nom. illegit.; *R. fragarioides* Bertol. later homonym, non (Michx.) Dum.Cours.

Herbs, perennial, prostrate or creeping. Stems greenish brown or brownish, woody, softly hairy. Stipules free, ovate or elliptic, 7–10 × 5–7 mm, apex acute to obtuse. Leaves 3–5-foliolate, usually glabrous above and below. Petiole 3–9 cm, slightly softly hairy; leaflets shortly petiolulate or sessile. Blade of leaflets obovate to suborbicular, 2–5 × 1.5–3.5 cm, base cuneate, apex acute or obtuse, margin usually lobed, incised or coarsely sharply serrate or doubly serrate. Inflorescences usually terminal, with 1 or 2 flowers, rachis and pedicels softly hairy. Flowers 1–2 cm across. Pedicels 1–3(–5) mm. Outer surface of calyx glabrous or softly hairy; tube shallowly cup-shaped. Sepals ovate-lanceolate, 6–10 × 2–4 mm, margin entire, apex long acuminate to caudate. Petals white, obovate, 0.8–1.2 × 0.5–0.6 cm, apex acute. Stamens unequal in length, shorter than petals; filaments dilated in lower part. Pistils 4–6, shorter than stamens. Ovary usually glabrous. Aggregate fruit 7–9 mm in diameter, with several drupelets, persistent calyx lobes erect; drupelets to 4 mm. Pyrenes rugose.

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 3000–4200 m.

Ecology: High mountains, grasslands on slopes, forests, forest margins.

Flowering: May–July. **Fruiting:** July–September.

Nepalese material refers to the typical variety, other varieties occur in China.

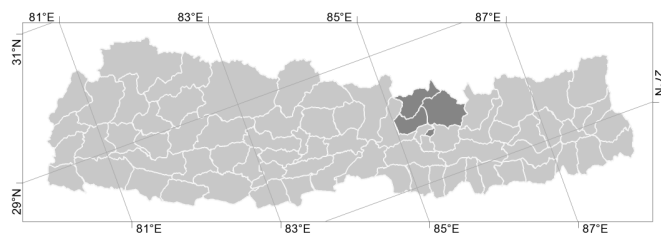
30. *Rubus fockeanus* Kurz, J. Asiat. Soc. Bengal 44(2): 206 (1875).

Rubus allophyllus Hemsl.; *R. loropetalus* Franch.; *R. nutans* var. *fockeanus* (Kurz) Kuntze; *R. radicans* Focke.

Herbs, perennial, prostrate or creeping, rooting at nodes. Branchlets pilose, without bristles or prickles, sometimes with intermixed small glandular hairs. Stipules free, elliptic, 5–7 × 3–5 mm, persistent, membranaceous, margin entire, rarely toothed, apex obtuse or shortly pointed. Leaves 3-foliolate, pilose above, pilose below along veins. Petiole 2–5 cm, pubescent, terminal leaflet shortly petiolulate, lateral leaflets subsessile. Blade of leaflets suborbicular to broadly obovate, 1–4 × 1–5 cm, base broadly cuneate to rounded, apex obtuse, margin unevenly coarsely obtusely serrate; base of lateral leaflets oblique. Flowers solitary or in pairs, terminal. Bracts elliptic, 3–5 × 2–2.5 mm, smaller than stipules, membranaceous, puberulous, margin entire or toothed. Pedicels 2–5 mm, pubescent, sometimes bristly. Outer surface of calyx pubescent, or intermixed with sparse reddish brown bristles. Sepals ovate-lanceolate to narrowly lanceolate, 7–10

× (2–)3–4 mm, undivided, rarely shallowly lacinate, apex long acuminate. Petals white, obovate-oblong to linear-oblong, 7–11 × 3–5 mm, base clawed. Stamens shorter than petals; filaments enlarged towards base. Pistils 4–20, shorter than stamens. Ovary glabrous or slightly puberulous. Styles glabrous or basally slightly pubescent. Aggregate fruit red, globose, glabrous, with few semiglobose drupelets. Pyrenes ellipsoid, rugose.

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 2000–4000 m.

Ecology: Grassy slopes, forests.

Flowering: May–June. **Fruiting:** July–August.

Ripe fruits are eaten fresh.

31. *Rubus nepalensis* (Hook.f.) Kuntze, Meth. Sp.-Besch. Rubus: 125 (1879).

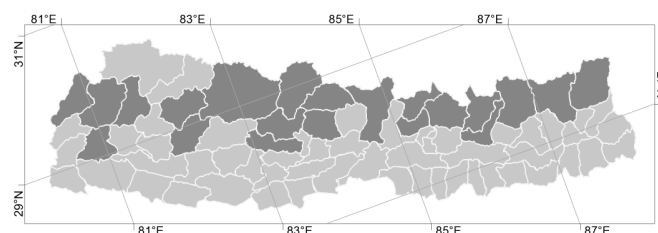
Rubus nutans var. *nepalensis* Hook.f., Fl. Brit. India 2[5]: 334 (1878); *Rubus barbatus* Edgew. later homonym, non Fritsch; *R. nutans* Wall. ex G.Don later homonym, non Vest; *R. nutans* Wall. nom. nud.; *R. nutantiflorus* H.Hara.

न्यालाङ्ग Nhyalang (Sherpa).

Herbs, creeping or prostrate. Branchlets green or purplish, pilosulose and hispidulous. Stipules lanceolate to ovate, 5–15 mm, persistent, softly hispid and sometimes also tomentose, entire or apically lacerate. Leaves 3-foliolate, strigose or strigillose above, strigillose along midvein below. Petiole 1.5–7.5 cm; petiolule of terminal leaflet 0.3–0.7 cm; petiolule of lateral leaflets 0.2–0.4 cm, softly pilosulose and hispidulous. Blade of terminal leaflet slightly larger than lateral leaflets, 1–4.5 × 1–4 cm, rhombic to obovate, base cuneate to broadly cuneate, sides straight or slightly concave to rachis, apex rounded, sometimes shallowly lobed below middle, margins finely doubly denticulate to doubly serrulate. Blade of lateral leaflets oblique, 1–4.5 × 0.8–4 cm, base obliquely cuneate, apex rounded, margin finely doubly denticulate to doubly serrulate. Inflorescences terminal on short braches but appearing axillary, racemose or flowers solitary, 3–12 cm long, up to 6-flowered; rachis and pedicels tomentose and sparsely hispidulous. Bracts elliptic to narrowly ovate, 5–9 mm, margins with a few soft hairs. Pedicels 4–9 cm. Flowers 1.5–3.8 cm across. Outer surface of calyx hispidulous and minutely tomentose. Sepals spreading at anthesis, lanceolate to ovate or broadly ovate, 1–1.4 cm, apex acuminate to caudate. Petals white, obovate to widely obovate or rounded, 0.8–1.3 mm,

equalling or longer than sepals, glabrous. Stamens shorter than petals; filaments slightly flattened, broader at base. Pistils shorter than stamens. Base of style and apex of ovary with few erect straight hairs. Aggregate fruit exposed, red or orangish red, globose, ca. 1.5 cm in diameter, glabrous; style of drupelets persistent, glabrous. Pyrenes lunate, smooth or with few faint raised lines.

Distribution: Nepal, W Himalaya and E Himalaya.



Altitudinal range: 1800–3500 m.

Ecology: Thickets, among boulders on open slopes, clearings, mixed and deciduous forests.

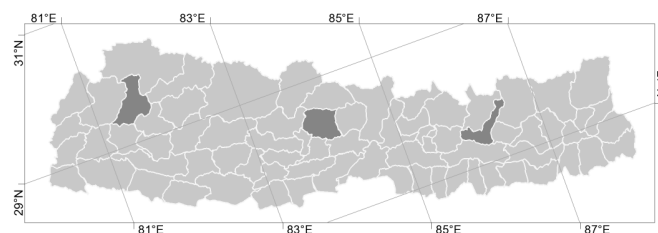
Flowering: July–October. **Fruiting:** October–December.

Ripe fruits are edible.

32. *Rubus x seminepalensis* Naruh., J. Jap. Bot. 65(6): 187 (1990).

Shrubs, prostrate. Branchlets densely hispid and sparsely villous. Stipules digitate-pectinate, 8–12 mm, villous. Petioles 5–7 cm, hispid and villous. Leaves simple or 3-foliolate, sparsely villous above, white hirsute below along veins, unarmed along midvein, margins velutinous; petiolule of lateral leaflets 1–2 mm, villous. Blade of terminal leaflet obovate to elliptic, 6–7 × 3–3.5 cm, base cuneate, apex acute, blade of lateral leaflets obliquely deltoid-ovate, base cuneate, apex acute to acuminate, margin serrulate. Blade of simple leaves deltoid-orbicular, trilobed or triparted, base cordate, apex acute. Inflorescences axillary and terminal, racemose, 1–4-flowered. Pedicels 1.5–3.5 cm, hispid and villous. Sepals lanceolate, ca. 10 × 5 mm, apex aristate to 3-parted, hispid and villose, margins and between veins tomentose. Petals purplish red, ovate, ca. 10 mm, shorter than sepals. Stamens ca. 5 mm, shorter than petals; filaments linear, dilated. Pistils ca. 4.5 mm, longer than stamens. Fruit unknown.

Distribution: Endemic to Nepal.



Altitudinal range: 2300–3100 m.

Rosaceae

Ecology: Forests.

Flowering: July–August.

Rubus x *seminepalensis* is an apparently sterile hybrid

between the compound-leaved *R. nepalensis* (Hook.f.) Kuntze and the simple-leaved *R. treutleri* Hook.f. Naruhashi (J. Jap. Bot. 65: 186-191. 1990), from whom this description was largely taken, noted differences and similarities between *R. x seminepalensis* and the two parents.

15. *Geum* L., Sp. Pl. 1: 500 (1753).

Hiroshi Ikeda

Perennial herbs with stout rootstock. Radical leaves pinnate, petiolate, stipulate; stipules adnate to petiole; leaflet margin toothed or cleft; cauline leaves few, reduced in size towards top. Flowers terminal, 1–3 in cymes. Hypanthium cupulate to turbinate. Sepals 5, valvate. Episepals 5, alternate with and much smaller than sepals. Petals 5, yellow or white. Stamens many, inserted at mouth of hypanthium. Carpels many, densely hirsute or glabrescent, apically tapering into persistent style; style terminal; ovule semi-basal. Fruit an achene.

Worldwide about 70 species, widespread in temperate zones in N and S hemispheres. Three species in Nepal.

Key to Species

- 1a Style jointed, deciduous above joint after flowering..... **3 *G. roylei***
- b Style not jointed, persistent **2**

- 2a Terminal leaflet of radical leaves ovate to broadly elliptic, similar to lateral ones in size. Petals yellow, rarely crimson **1 *G. elatum***
- b Terminal leaflet of radical leaves broadly ovate to suborbicular, much larger than lateral ones. Petals white to pale pink **2 *G. sikkimense***

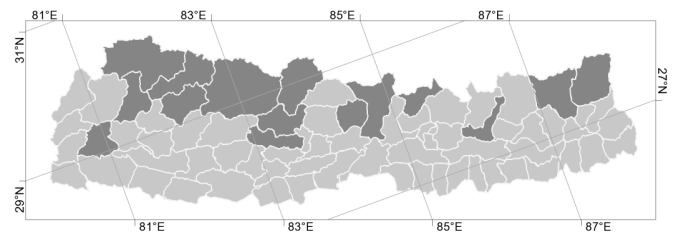
1. *Geum elatum* Wall. ex G.Don, Gen. Hist. 2: 256 (1832).
Acomastylis elata (Wall. ex G.Don) F.Bolle; *A. elata* var. *leiocarpa* (W.E.Evans) F.Bolle; *Geum adnatum* Wall. nom. nud.; *G. elatum* Wall. nom. nud.; *G. elatum* var. *humile* (Royle) Hook.f.; *G. elatum* var. *leiocarpum* W.E.Evans; *Potentilla adnata* Wall. ex Lehm.; *Sieversia elata* (Wall. ex G.Don) Royle; *S. elata* var. *humile* Royle.

बेलोचन Belochan (Nepali).

Rosulate herb, 10–40 cm. Rootstock stout, terete. Flowering stems from axils of radical leaves, pubescent, sometimes mixed with multicellular glandular hairs. Radical leaves broadly linear in outline, 8–20(–30) × 1.5–5(–7) cm, with 9–13 pairs of leaflets, interrupted with alternating smaller leaflets, pubescent or pilose, rarely glabrescent on both surfaces except on veins; petiole 1–4 cm, pilose or glabrescent; terminal leaflets broadly obovate to semiorbicular, 7–30 × 5–30 mm, base broadly cuneate, apex rounded; cauline leaves reduced in size toward top, upper ones bract-like, oblanceolate, deeply parted. Inflorescence terminal, in cyme, 1–3(–5)-flowered. Flowers 2.5–3.5(–4) cm across; pedicel pubescent, sometimes with multicellular glandular hairs. Episepals green or deep purple outside, green inside, lanceolate to narrowly ovate, much smaller than sepals, 2–3 × 1–1.2 mm, apex acute, sparsely or densely hirsute outside, glabrescent inside. Sepals green or deep purple outside, green inside, ovate-triangular, 6–8 × 3–5

mm, apex acute or obtuse, sparsely or densely hirsute outside, glabrescent inside. Petals yellow or bright red, obovate to broadly obovate, 1.2–1.5 × 0.8–1.2 cm, glabrous, apex emarginate. Filaments 3.5–5 mm; anthers dark green, ellipsoid, ca. 1.2 × ca. 0.9 mm. Ovary glabrous to densely hirsute, 1.5–2 × ca. 0.8 mm; style not twisted, glabrous or sparsely pilose near base; stigma minute. Achenes ovoid, 3–3.3 × 1.5–1.8 mm excluding persistent style.
 Fig. 11c-e

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and E Asia.



Geum elatum var. *humile* (Royle) Hook.f. is a dwarf form of *G. elatum*, but the variation of morphological characters between the two overlap and they are indistinguishable.

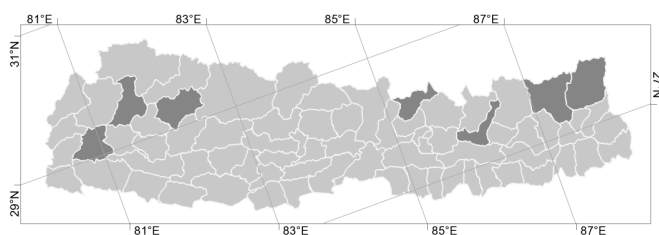
Leaves are pounded and applied to wounds. It is also useful in diarrhoea, for sore throats, and leucorrhoea.

- 1a Petals yellow forma *elatum*
 b Petals crimson..... forma *rubrum*

Geum elatum Wall. ex G.Don forma *elatum*

Petals yellow.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and SW Asia.



Altitudinal range: 2900–4500 m.

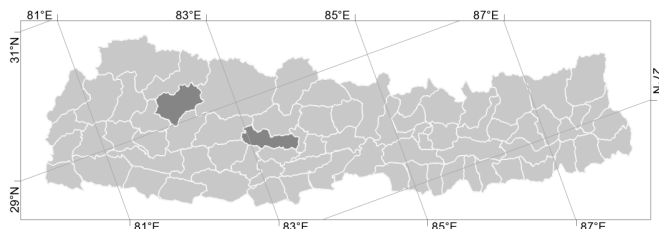
Ecology: Alpine meadows.

Flowering: June–August. **Fruiting:** August–October.

Geum elatum forma *rubrum* Ludlow, Bull. Brit. Mus. (Nat. Hist.), Bot. 5: 276, pl. 30B (1976).

Petals crimson.

Distribution: Endemic to Nepal.



Altitudinal range: 3000–4400 m.

Ecology: Open grassy slopes.

Flowering: May–July.

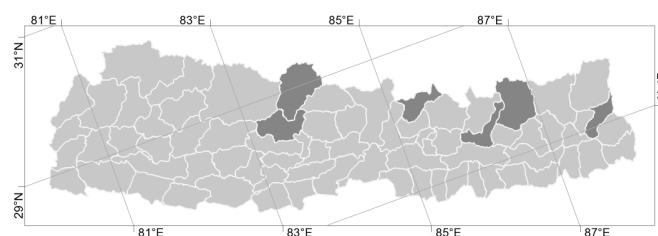
2. *Geum sikkimense* Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73: 200, pl. 7 (1904).
Acomastylis sikkimensis (Prain) F.Bolle; *Geum versipatella* C.Marquand.

Rosulate herbs, 5–40 cm. Rootstock stout, terete. Flowering stems from axils of radical leaves, pubescent with mixed with long and short hairs. Radical leaves lyrate-pinnate, lanceolate in outline, 4–25 × 1.5–7.5 cm, with 5–10 opposite or alternate pairs of smaller leaflets, sparsely or densely pilose on both surfaces; petiole 1–3 cm, pubescent, mixed with long and short hairs; terminal leaflets lyrate, broadly obovate to semiorbicular, 1.5–7 × 1.2–7 cm, base shallowly to deeply cordate, apex rounded, margin shallowly incised-serrate, serrate tips obtuse;

cauline leaves reduced in size towards top, simple or with a few smaller leaflets, oblong to ovate. Inflorescence terminal, in cyme, 1–3-flowered. Flowers nodding, 1.5–2.5 cm across; pedicel pubescent. Episeals broadly lineate to lanceolate, much smaller than sepals, 2–3 × 0.5–1.2 mm, apex acute or obtuse, sparsely hirsute outside, glabrescent inside. Sepals ovate-triangular, 4–8(–11) × 3–5(–6) mm, apex acute or obtuse, sparsely hirsute outside, glabrescent inside. Petals white to pale pink, obovate, 5–9 × 4–7 mm, sparsely hairy in lower half outside, glabrous inside, apex rounded or shallowly emarginate. Filaments 3–4 mm, pilose; anthers ellipsoid, ca. 0.7 × ca. 0.5 mm. Ovary densely hirsute, 1.5–2 × ca. 1 mm; style not twisted, 3.5–4 mm, glabrous, slightly hooked near stigma; stigma minute.

Fig. 11a-b

Distribution: Nepal and E Himalaya.



Altitudinal range: 3000–4400 m.

Ecology: Alpine meadows.

Flowering: June–August.

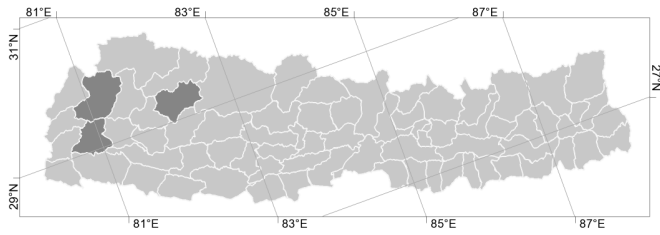
3. *Geum roylei* Wall. ex Bolle, Repert. Spec. Nov. Regni Veg. Beih. 72: 66 (1933).
Geum roylei Wall. nom. nud.

Rosulate herb, 30–50 cm. Stems pubescent with spreading hispid hairs. Radical leaves oblanceolate to narrowly obovate in outline, 10–20 × 5–10 cm; lateral leaflets 3–5 pairs with alternate smaller secondary leaflets, uppermost pair much larger than others; terminal leaflet, rhombic-obovate to broadly ovate, 3–6 × 2.5–6 cm, apex acute or obtuse, base broadly cuneate, margin irregularly toothed, both surfaces sparsely hispid; petiole 3–6 cm, erect-hispid. Cauline leaves short-petiolate, 3(–5)-foliolate. Inflorescence terminal or from axils of upper cauline leaves, in cymes, 2–5-flowered. Flowers 1.5–2 cm across. Episeals much smaller than sepals, linear to narrowly lanceolate, 2–3 × ca. 0.5 mm, margin entire or sometimes deeply divided into two lobes, sparsely hispid outside, glabrescent inside, apex obtuse. Sepals ovate-triangular, 6–9 × 3–5 mm, apex acuminate to semi-caudate, sparsely hispid outside, sparsely puberulent inside. Petals yellow, oblong to narrowly ovate, 7–9 × 4–5 mm. Filaments 1.5–2 mm; anthers flattened globose, ca. 1 mm across. Ovary obliquely oblong, 0.8–1 × ca. 0.5 mm, densely hispid; style jointed, glabrous basally, strigose above joint, deciduous above joint after flowering. Achenes 2–2.5 mm × ca. 1 mm, hispid.

Fig. 11f

Distribution: Nepal, W Himalaya and SW Asia.

Rosaceae



Altitudinal range: 1900–3500 m.

Ecology: Forest margins, thickets.

Flowering: June–July. **Fruiting:** July–August.

Hooker (Fl. Brit. Ind. 2: 342. 1878) and Nepalese authors (Bull. Dept. Med. Pl. Nepal 7: 78. 1976) misapplied *Geum urbanum* L. to this species. *Geum urbanum* is a species from Europe and the Middle East.

16. *Potentilla* L., Sp. Pl. 1: 495 (1753).
Duchesnea Sm.

Hiroshi Ikeda

Perennial, rarely annual herbs or subshrubs. Stems erect, ascending or prostrate, sometimes stoloniferous. Stipules adnate to petioles, upper part (auricle) free or more or less connate, membranous or leaf-like. Leaves radical or cauline, pinnate, trifoliolate or palmately compound. Inflorescences cymose or flowers solitary. Flowers usually bisexual, rarely unisexual. Bracts at base of pedicel, leafy or membranous; bracteoles absent. Hypanthium cupulate. Episepals 5, alternating with sepals. Sepals 5, valvate. Petals 5, yellow, rarely orange or bright red or white with crimson base. Stamens usually 20 in 3 whorls, rarely fewer or more, anthers 4-locular. Ovary superior, carpels many, crowded on a dome-shaped receptacle. Styles subterminal, lateral or basal. Achenes on a dry or swollen, somewhat spongy receptacle, sepals and episepals persistent.

Worldwide about 500 species in temperate, arctic, and alpine zones, mostly in the N hemisphere, several in the S hemisphere. 31 species in Nepal.

In the following treatments three species groups are tentatively used for aggregates of morphologically similar species: *Potentilla griffithii* agg., *P. multifida* agg., and *P. saundersiana* agg. Within these species groups species delimitation is extremely difficult because of their morphological plasticity (plant size, leaf shape, leaflet number, and indumentum), because of the ease of hybridization amongst species and consequent apomictic reproduction of their progeny. Further systematic studies are needed to clarify the taxonomic status of entities within these species groups.

Several putative natural hybrids among *Potentilla* species have been described from Nepal. *Potentilla* x *microcontigua* H.Ikeda & H.Ohba, J. Jap. Bot. 68: 35 (1993) (= *P. contigua* Soják x *P. microphylla* D.Don); *P.* x *micropeduncularis* H.Ikeda & H.Ohba, J. Jap. Bot. 71: 253 (1996) (= *P. microphylla* D.Don x *P. peduncularis* D.Don); *P.* x *polyjosephiana* H.Ikeda & H.Ohba, Bot. J. Linn. Soc. 112: 183 (1993) (= *P. josephiana* H.Ikeda & H.Ohba x *P. polyphylla* Wall. ex Lehm. var. *polyphylla*). The following three putative hybrids were also noted by Ikeda and Ohba (Bot. J. Linn. Soc. 112: 184. 1993): *P. festiva* Soják x *P. lineata* Trev.; *P. festiva* Soják x *P. polyphylla* Wall. ex Lehm.; *P. lineata* Trev. x *P. polyphylla* Wall. ex Lehm.

Key to Species

- 1a Shrubs or subshrubs with woody stems2
- b Perennial or annual herbs. Stems not woody5

- 2a Shrubs with stems 20–100 cm tall **1 *P. fruticosa***
- b Plant rhizomatous or cushion-forming3

- 3a Plant cushion-forming. Leaves 5–7-foliolate **4 *P. biflora***
- b Plant rhizomatous. Leaves trifoliolate4

- 4a Leaflets 3-dentate **2 *P. cuneata***
- b Leaflets shallowly to deeply 3–5 divided **3 *P. eriocarpa***

- 5a Petals orange, bright red or white with crimson base6
- b Petals yellow8

- 6a Petals white with crimson base. Leaves pinnate, leaflets deeply divided into linear segments **28 *P. coriandrifolia***
- b Petals orange or crimson. Leaves trifoliolate or palmate7

7a	Leaves trifoliolate	23	<i>P. argyrophylla</i>
b	Leaves palmate	27	<i>P. nepalensis</i>
8a	Leaves trifoliolate or palmate	9	
b	Leaves pinnate	13	
9a	Plant stoloniferous. Flowers on stolons	31	<i>P. indica</i>
b	Plant not stoloniferous. Flowers (inflorescences) from axils of radical leaves	10	
10a	Stems creeping or ascending	11	
b	Stems erect	12	
11a	Leaves trifoliolate. Flowers terminal, solitary. In alpine zone	22	<i>P. monanthes</i>
b	Leaves palmate. Flowers in cymes. In temperate zone	30	<i>P. sundaica</i>
12a	Stems usually more than 20 cm. Leaves trifoliolate	23	<i>P. argyrophylla</i>
b	Stems usually less than 20 cm. Leaves usually palmate, rarely trifoliolate	24	<i>P. saundersiana</i>
13a	Stipules of radical leaves adnate to lateral side of petiole	14	
b	Stipules of radical leaves adnate to ventral side of petiole	18	
14a	Rhizomes long-creeping, branched	5	<i>P. bifurca</i>
b	Rhizomes short, not or little-branched	15	
15a	Stems much-branched at base, decumbent or repent. Flowers small, 6–8 mm across	29	<i>P. supina</i>
b	Stems erect or ascending. Flowers larger, more than 1 cm across	16	
16a	Leaflets deeply divided, segments linear to narrowly lanceolate	26	<i>P. multifida</i>
b	Leaflets oblong to elliptic with serrate margin	17	
17a	Stems ascending, usually less than 20 cm. Leaflets less than 1 cm	24	<i>P. saundersiana</i>
b	Stems erect, usually more than 30 cm. Leaflets more than 1 cm	25	<i>P. griffithii</i>
18a	Plant stoloniferous	21	<i>P. anserina</i>
b	Plant not stoloniferous	19	
19a	Cauline leaves more than 4	20	
b	Cauline leaves 1–3	23	
20a	Auricles of stipules of radical leaves 2, connate from base to middle	6	<i>P. festiva</i>
b	Auricles of stipules of radical leaves 2, free from each other	21	
21a	Base of uppermost pair of leaflets decurrent	7	<i>P. josephiana</i>
b	Base of uppermost pair of leaflets cuneate	22	
22a	Peduncles and hypanthium with gland-tipped multicellular hairs	8	<i>P. lineata</i>
b	Peduncles and hypanthium without gland-tipped multicellular hairs	9	<i>P. polyphylla</i>
23a	Uppermost pair of leaflets sessile	24	
b	Uppermost pair of leaflets decurrent	28	
24a	Smaller leaflets usually present between leaflets	14	<i>P. turfosoides</i>
b	Smaller leaflets between leaflets usually absent	25	
25a	Rhizomes with a few slender roots	13	<i>P. aristata</i>
b	Rhizomes without slender elongate roots	26	
26a	Stamens 5–8(–10)	12	<i>P. glabriuscula</i>
b	Stamens ca. 20	27	

Rosaceae

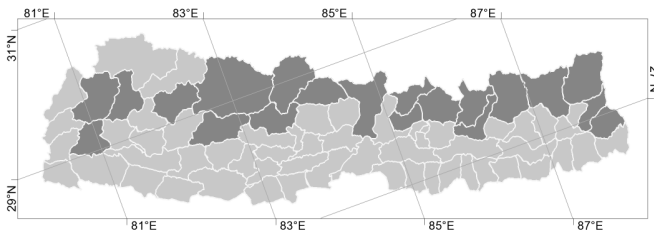
- 27a Auricles of stipules of radical leaves 2, apex acute **10 *P. microphylla***
 b Auricles of stipules of radical leaves 1, apex rounded **11 *P. makaluensis***
- 28a Inflorescence umbel-like **20 *P. leuconota***
 b Inflorescence cymose 29
- 29a Rhizome creeping 30
 b Rhizome erect 31
- 30a Auricles of stipules of radical leaves 1, apex rounded **15 *P. peduncularis***
 b Auricles of stipules of radical leaves 2, apex acute **16 *P. contigua***
- 31a Auricles of stipules of radical leaves 1, apex rounded **19 *P. commutata***
 b Auricles of stipules of radical leaves 2, apex acute 32
- 32a Auricles of stipules of radical leaves free **17 *P. cardotiana***
 b Auricles of stipules of radical leaves connate from base to middle **18 *P. tristis***

1. *Potentilla fruticosa* L., Sp. Pl. 1: 495 (1753).
Dasiphora fruticosa (L.) Rydb.

भैरुङपाते Bhairung paate (Nepali).

Small shrubs, erect or sometimes prostrate. Stipules membranous, lower half adnate to petiole, glabrous inside, sparsely lanate outside, surrounding stem. Petioles sparsely lanate or glabrescent. Leaves imparipinnate with 2–3 pairs of lateral leaflets, rarely trifoliate; base of uppermost leaflet pair decurrent; terminal leaflet linear-oblong to elliptic, base cuneate, apex obtuse to acute, margin entire, often revolute, pubescent on both sides. Flowers 2–4 cm across, terminal, solitary. Pedicels white-hairy. Episepals leafy, oblong to elliptic, apex acute, sometimes two-lobed, often revolute, sparsely or densely pubescent on both sides. Sepals oblong-ovate, apex acute, glabrescent inside, sparsely or densely pubescent outside. Petals yellow, obovate to nearly orbicular, apex rounded. Stamens 20–35, anthers compressed cordate-oblong. Carpels many, on dome-shaped receptacle, styles subbasal, tapering toward base; ovary with dense long hairs.

Distribution: Asia, Europe and N America.



Var. *fruticosa* is widespread in the N hemisphere and is distinguished from the other varieties by its leaflets which are sparsely pilose or subglabrous below, with inconspicuous venation and flat margins.

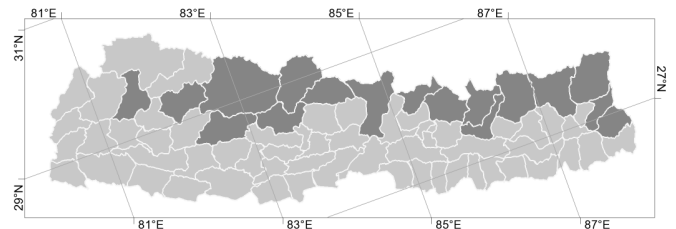
- 1a Stems prostrate, 5–20 cm var. ***pumila***

- b Stems erect, 30–120 cm 2
- 2a Leaves sparsely or densely lanate above, glabrescent or lanate on veins beneath var. ***arbuscula***
 b Leaves densely white hairy above, white tomentose except midvein beneath var. ***ochreatea***

Potentilla fruticosa* var. *arbuscula (D. Don) Maxim., Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg 9: 158 (1873).
Potentilla arbuscula D. Don, Prodr. Fl. Nepal.: 256 (1825);
Potentilla fruticosa var. *rigida* (Wall. ex Lehm.) Wolf; *P. nepalensis* D. Don later homonym, non Hook.; *P. rigida* Wall. ex Lehm.; *P. rigida* Wall. nom. nud.

Stems erect, 50–120 cm. Petioles 0.5–1.5 cm. Leaves usually with two pairs of lateral leaflets, rarely trifoliate, 1–3.5 × 0.8–2.5 cm, sparsely or densely lanate above, glabrescent or lanate on veins beneath, terminal leaflet 0.5–1.7 × 0.2–0.7 cm. Flowers 2–4 cm across. Episepals 5–10 × 2–4 mm. Sepals 4–8 × 3–4 mm. Petals 10–15(–20) × 9–12(–17) mm. Anthers 1–1.2 × ca. 1 mm. Carpels ca. 0.5 × 0.3 mm, styles 1.2–1.5 mm. Fig. 12a-b

Distribution: Nepal, W Himalaya, E Himalaya and Tibetan Plateau.



Altitudinal range: 2700–6000 m.

Ecology: Open meadows, thickets, forest edges, rocky slopes.

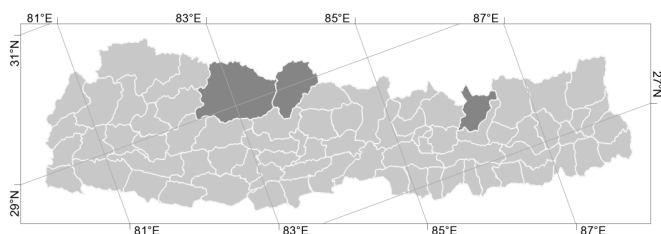
Flowering: July–September.

Potentilla fruticosa* var. *ochreata Lindl. ex Lehm., Revis. Potentill.: 17 (1856).

Potentilla ochreata Lindl. ex Wall. nom. nud.

Stems erect, 30–100 cm. Petioles 0.2–0.8 cm. Leaves with 2–3 pairs of lateral leaflets, lowermost pair of lateral leaflet often deeply divided into two lobes, 0.5–1.5 × 0.3–1.2 cm, densely white hairy above, white tomentose except midvein beneath, terminal leaflet 2–8 × 0.5–2.5 mm. Flowers 2–2.5 cm across. Episepals 4–6 × 1.5–2.5 mm. Sepals 4–6 × 3–4 mm. Petals 8–12 × 6–8 mm. Anthers ca. 1.5 × 1 mm. Carpels ca. 0.6 × 0.3 mm, styles ca. 1.5 mm.

Distribution: Nepal and Tibetan Plateau.



Altitudinal range: 3300–4600 m.

Ecology: Open meadows, rocky slopes, sandy river banks.

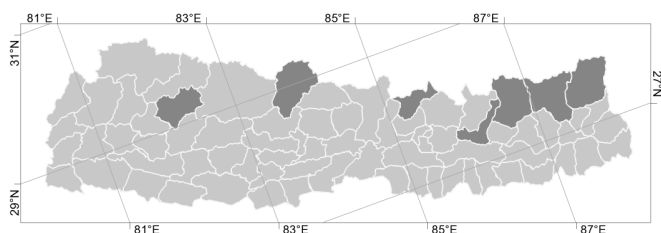
Flowering: July–September.

Potentilla fruticosa* var. *pumila Hook.f., Fl. Brit. India 2[5]: 348 (1878).

Potentilla arbuscula var. *pumila* (Hook.f.) Hand.-Mazz.

Stems prostrate, 5–20 cm. Petioles 0.3–0.8 cm. Leaves with two pairs of lateral leaflets, 0.8–1.5 × 0.8–1.3 cm, sparsely or densely lanate above, glabrescent or lanate on midvein beneath, terminal leaflet 0.3–0.8 × 0.2–0.3 cm. Flowers 2–3 cm across. Episepals 5–6 × 2–4 mm. Sepals 5–7 × 3–4 mm. Petals 9–15 × 8–13 mm. Anthers 1–1.2 × ca. 1 mm. Carpels ca. 0.5 × 0.3 mm, styles ca. 1.5 mm.

Distribution: Nepal, W Himalaya, E Himalaya and Tibetan Plateau.



Altitudinal range: 3800–6000 m.

Ecology: Open meadows, thickets, forest edges, rocky slopes, sandy river banks.

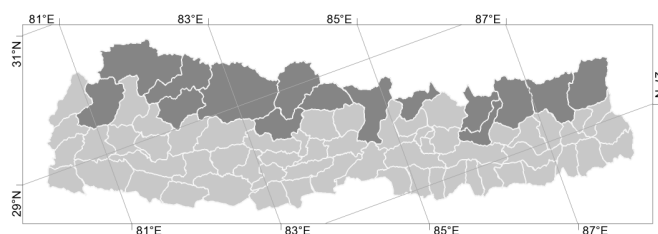
Flowering: July–September.

2. *Potentilla cuneata* Wall. ex Lehm., Nov. Stirp. Pug. 3: 34 (1831).

Potentilla ambigua Cambess.; *P. cuneata* Wall. nom. nud.; *P. cuneifolia* Bertol.; *P. dolichopogon* H.Lév.

Prostrate mat-forming subshrubs to 10cm. Stems much branched, slender, woody. Stipules of radical leaves membranous, brown, glabrous inside, spreading pilose outside. Leaves trifoliolate, 2–3(–4) × 0.8–2 cm; leaflets subsessile or shortly petiolulate, obovate to narrowly obovate, 5–12 × 3–7 mm, base cuneate, apex acute 3-dentate, margin entire, densely or sparsely pilose on both surfaces. Flowering stems erect or ascending, 2–10 cm, with appressed or ascending hairs. Stipules of cauline leaves leaf-like, ovate to lanceolate, glabrescent inside, sparsely pilose outside. Flowers 1.6–2.5 cm across, solitary or in 2–3-flowered cymes. Episepals oblong to elliptic, 3–5 × 2–2.5 mm, entire or notched at apex, apex obtuse, sparsely pilose on both sides. Sepals triangular-ovate, 4–7 × 2.5–3.5 mm, apex acute or obtuse, glabrous except short brown hairy near apex and margin inside, sparsely pilose outside. Petals yellow, broadly obovate, 6–10 × 7–11 mm, apex rounded or slightly emarginate. Stamens ca. 20, anthers compressed ellipsoid to ovoid, 0.6–0.8 × 0.8–1 mm. Carpels obliquely ellipsoid, 0.6–0.8 × 0.4–0.5 mm, with 3–4 mm hairs, styles subbasal, filiform, 3.5–4.5 mm, stigmas slightly inflated, papillate. Achenes ellipsoid-ovoid, ca. 1 × 0.8 mm, long hairy.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 1900–4900 m.

Ecology: Open meadows, sandy river banks, forest edges, rock crevices.

Flowering: May–September. **Fruiting:** July–October.

3. *Potentilla eriocarpa* Wall. ex Lehm., Nov. Stirp. Pug. 3: 35 (1831).

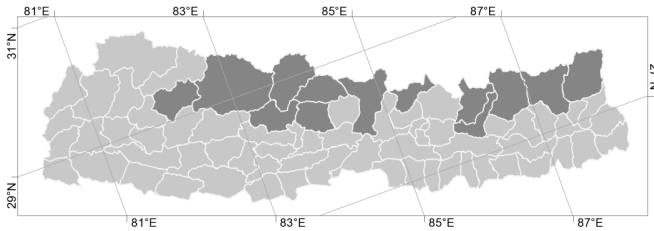
Potentilla eriocarpa Wall. nom. nud.

Prostrate mat-forming subshrubs to 12 cm. Stems slender or robust, woody, densely covered with remains of old stipules. Stipules of radical leaves membranous, brown, abaxially white-villous. Radical leaves dark green above, green below, palmately ternate, including petiole 3–7 cm; leaflets short-petiolulate or subsessile, obovate-elliptic or rhombic-elliptic, base cuneate, apically serrately or dentately (3–)5–7(–9)-divided, teeth ovate or elliptic-ovate, sometimes narrowly

Rosaceae

lanceolate, apex acute or acuminate, lower margin entire, sparsely pilose or glabrescent above, sparsely white-villous along veins below, other parts glabrescent later. Flowering stems erect or ascending, 4–12 cm, sparsely white-villous or glabrescent. Cauline leaves absent or only with bracteole leaf, or occasionally 3-foliolate. Stipules of cauline leaves herbaceous, ovate-elliptic, entire or slightly serrate, apex acuminate. Flowers 1.8–2.8 cm across, in 1–3(–4)-flowered cymes. Pedicels 10–30 mm, white-villous or glabrescent. Episepals oblong-elliptic or elliptic-lanceolate, entire or apically bifid, adaxially sparsely pilose or subglabrous. Sepals triangular-ovate, apically acuminate. Petals yellow, broadly obovate to nearly rounded, apically emarginate or rounded. Stamens ca. 20, filaments filiform, anthers globose, bright red or sometimes pale orange before dehiscent. Carpels oblong-ellipsoid, dense long white hairy; styles subterminal, filiform, stigmas slightly dilated.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and E Asia.



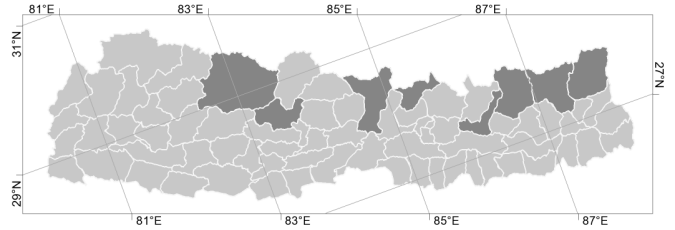
- 1a Stems slender, 2–5(–8) mm in diameter. Leaves herbaceous. Terminal leaflet dentately 3–7-divided. Petals bright yellow with orange base, apparently emarginate..... var. **eriocarpa**
- b Stems robust, 5–10 mm in diameter. Leaves somewhat coriaceous. Terminal leaflet serrately 5–9-divided. Petals creamy yellow with orange base, apically rounded or slightly emarginate var. **major**

Potentilla eriocarpa Wall. ex Lehm. var. **eriocarpa**

Stems slender, 2–5(–8) mm in diameter. Leaves herbaceous, terminal leaflet dentately 3–7-divided. Episepals 3.3–6 × 1.5–3 mm. Sepals 5–7.5 × 3.5–4 mm. Petals bright yellow with orange base, 8–12 mm long, 7–13 mm wide, apically apparently emarginate. Longer stamens 4.5–7 mm, anthers 1–1.2 mm across. Carpels 0.7–0.9 mm × ca. 0.4 mm, styles 2.3–3.3 mm.

Fig. 12c-d

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 3500–5100 m.

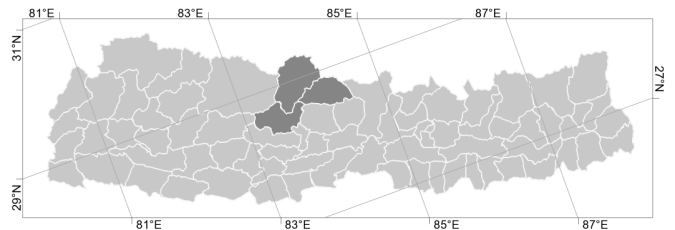
Ecology: Rocky crevices.

Flowering: July–September.

Potentilla eriocarpa var. **major** Kitam., Acta Phytotax. Geobot. 15(5): 130 (1954).

Stems robust, 5–10 mm in diameter. Leaves somewhat coriaceous, terminal leaflet serrately 5–9-divided. Episepals 6.8–10 mm × 2.5–4 mm. Sepals 9.5–10.5 × 5–7 mm. Petals creamy yellow with orange base, 8–10 × 7–11 mm, apically rounded or slightly emarginate. Longer stamens 6.5–8.5 mm, anthers 1.2–1.8 mm across. Carpels 0.8–1.1 × 0.4–0.5 mm, styles 4.2–5.2 mm long.

Distribution: Endemic to Nepal.



Altitudinal range: 3400–3900 m.

Ecology: Rocky crevices.

Flowering: July–September.

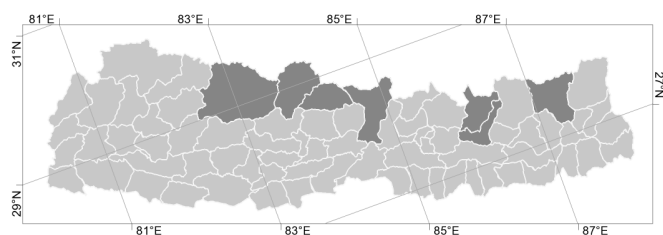
4. *Potentilla biflora* Willd. ex Schldl., Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesamnten Naturk. 7: 197 (1816).

Potentilla inglisii Royle; *P. inglisii* var. *lahulensis* Wolf.

Perennial cushion-forming herbs. Rhizomes stout, much branched near ground, covered with remains of old leaves. Petioles 1–2 cm, lower part adnate with stipules. Radical leaves crowded, pinnately or subpalmately 5–7-foliolate, 1.5–2.5 × 0.4–1 cm; leaflets broadly linear, 0.6–1.2 × 0.1–0.2 cm, base narrowly cuneate, apex acute to obtuse, margin revolute, densely strigose on both sides. Flowering stems from radical leaves, 1–2 cm, densely villous with white hairs. Flowers 1.2–1.8 cm across, solitary or rarely in 2–3-flowered cymes. Episepals oblong-elliptic, 4–6 × 2–3 mm, entire, apex acute or obtuse, sparsely strigose on both sides. Sepals ovate to widely ovate, 5–7 × 4–6 mm, entire, apex acute or obtuse, glabrous except shortly lanate near apex inside, sparsely strigose

outside and margin. Petals yellow, broadly elliptic to obovate, 5–7 × 5–8 mm, apex rounded or slightly emarginate. Stamens 20, anthers ellipsoid, ca. 0.8 × 0.6 mm. Carpels oblong-ellipsoid, ca. 1 × 0.6 mm, glabrous but concealed by long hairs from receptacle, styles subterminal, filiform, 2–2.5 mm, stigmas slightly inflated.

Distribution: Nepal, W Himalaya, Tibetan Plateau, N Asia and N America.



Altitudinal range: 4000–5000 m.

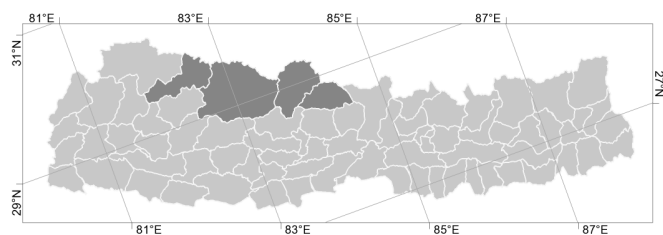
Ecology: Alpine meadows, rocky crevices, among gravel.

Flowering: June–October. **Fruiting:** June–October.

5. *Potentilla bifurca* L., Sp. Pl. 1: 497 (1753).

Perennial dioecious herbs. Rhizomes woody, much branching, slender and long-creeping. Stipules of lower leaves membranous, brown, glabrous inside, pilose outside; stipules of upper leaves herbaceous, ovate to lanceolate, glabrescent inside, sparsely pilose outside. Leaves pinnate, with 3–8 pairs of lateral leaflets, 1–5 × 0.6–1.5 cm; leaflets oblong to elliptic, sessile or uppermost 2 or 3 pairs decurrent, 3–12 × 2–5 mm, base cuneate, apex acute, margin entire or dentately divided into two or three lobes at apex, glabrescent above, sparsely appressed pilose below and on margin. Flowers 0.7–1.0 cm across, terminal, solitary or several in cymes. Episepals oblong-elliptic, 2–3 × 1–1.5 mm, entire or notched at apex, apex acute or obtuse, glabrescent inside, sparsely pilose outside. Sepals triangular-ovate, 3–4 × 2–2.5 mm, apex acute or obtuse, glabrous except shortly pubescent near apex inside, sparsely pilose outside. Petals yellow, broadly elliptic to obovate, 4–5 × 3–4 mm, apex rounded or slightly emarginate. Stamens ca. 20, anthers compressed ellipsoid, 0.5–0.8 × 0.5–0.7 mm. Carpels obliquely ellipsoid, 0.4–0.5 × ca. 0.3 mm, glabrous, styles lateral to subbasal, rod-shaped, tapered toward base, ca. 1.5 mm long, stigmas inflated, papillate. Achenes ellipsoid-ovoid, ca. 1.5 × 1.2 mm, smooth.

Distribution: Asia and Europe.



Altitudinal range: 3100–5200 m.

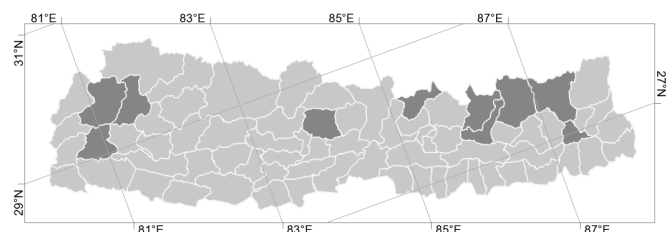
Ecology: Sandy river banks, open meadows, among gravel.

Flowering: May–September. **Fruiting:** May–September.

6. *Potentilla festiva* Soják, Candollea 43: 166 (1988).

Perennial rosulate herbs to 30 cm. Rhizomes stout, terete. Stipules of radical leaves with membranous auricles, connate in basal part. Petioles 1–2 cm. Radical leaves oblanceolate, 4–15 × 2–4 cm, pinnate with 5–15 pairs of lateral leaflets, with alternating smaller leaflets; base of uppermost leaflet pair cuneate; terminal leaflet subsessile, oblong to narrowly obovate, 1–3 × 0.5–1.2 cm, sharply serrate with 18–38 teeth, lanate above, white sericeous below. Flowering stems from radical leaves, 5–30 cm tall, with patent or ascending white hairs. Stipules of cauline leaves with leafy auricles, serrate with 5–15 teeth. Cauline leaves similar to radical leaves, reducing in size upwards, lower leaves with 5–10 pairs of leaflets, upper leaves with 2–3 pairs of leaflets, smaller leaflets absent. Flowers 0.7–1.2 cm across, in 5–9-flowered cymes. Pedicels 0.5–2 cm, with patent or ascending hairs. Episepals oblong to obovate, 3–5 × 1.5–3 mm, entire or with 3 teeth, apex acute or obtuse, sparsely strigose above, sericeous below. Sepals elliptic to ovate, 4–6 × 2.5–4.5 mm, entire, apex acute or obtuse, glabrous except lanate near tips above, strigose below. Petals yellow, oblong to elliptic, 5–7 mm × 4.0–5.5 mm, apex rounded. Stamens 20, anthers globose to ellipsoid, 0.6–1.0 × 0.4–0.9 mm. Carpels ellipsoid, 0.6–0.8 × 0.4–0.6 mm, glabrous, styles lateral, slender, 0.9–1.3 mm, stigmas slightly inflated.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 2200–3800 m.

Ecology: Open meadows, forest margins, roadsides.

Flowering: June–October. **Fruiting:** June–October.

Ohashi (Enum. Fl. Pl. Nepal 2: 140) partially misapplied the name *Potentilla fulgens* Wall. ex Hook. to this species.

7. *Potentilla josephiana* H.Ikeda & H.Ohba, Bot. J. Linn. Soc. 112(2): 168 (1993).

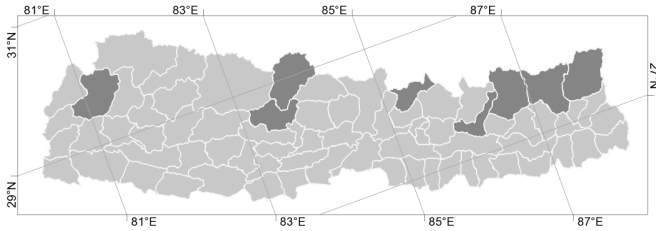
Potentilla fulgens var. *intermedia* Hook.f.; *P. lineata* var. *intermedia* (Hook.f.) R.D.Dixit & Panigrahi.

Perennial rosulate herbs to 35 cm. Rhizomes stout, terete. Stipules of radical leaves with free, membranous auricles. Petioles 2–5 cm. Radical leaves oblanceolate, 4–20 cm × 2–5

Rosaceae

cm, pinnate with 5–15 pairs of lateral leaflets alternating with smaller leaflets; base of uppermost leaflet pair decurrent; leaflets appressed short hairy above, pubescent, especially villous on main and lateral veins below; terminal leaflet sessile, broadly lanceolate to oblong, 1–3 × 0.5–1.0 cm, sharply serrate with 20–30 teeth. Flowering stems from radical leaves, 5–35 cm, with lanate hairs. Stipules of cauline leaves with leaf-like auricles, serrate with 7–12 teeth. Cauline leaves similar to radical leaves, reducing in size upwards, lower leaves with 5–12 pairs of lateral leaflets, upper leaves with 1 or 2 pairs, smaller leaflets absent. Flowers 1–1.5 cm across. Pedicels 2–4 cm, with appressed or ascending white hairs. Episepals oblong to elliptic, 3–6 × 2–4 mm, entire or with 3–6 teeth, apex acute to acuminate, villous on both sides. Sepals ovate to broadly ovate, 3–6 × 3–5 mm, entire, apex acute to obtuse, glabrous except lanate near tips above, villous below and margin. Petals yellow, obovate to broad obovate, 5–10 × 5–8 mm, apex rounded. Stamens 20, anthers globose, 0.6–1.0 × 0.6–1.0 mm. Carpels ellipsoid to ovoid, 0.5–1.0 × 0.4–0.8 mm, glabrous, styles lateral, 0.8–1.4 mm, stigmas slightly inflated. Fig. 13c

Distribution: Nepal, W Himalaya and E Himalaya.



Altitudinal range: 3200–4100 m.

Ecology: Alpine meadows, forest margins.

Flowering: June–August. **Fruiting:** June–August.

8. *Potentilla lineata* Trevir., Index Sem. Hort. Bot. Vratisl.: unpaginated (1822).

Potentilla fulgens Wall. ex Hook.; *P. fulgens* var. *acutiserrata* (T.T.Yu & C.L.Li) T.T.Yu & C.L.Li; *P. lineata* subsp. *exortiva* Soják; *P. martinii* H.Lév.; *P. siemersiana* Lehm.; *P. siemersiana* var. *acutiserrata* T.T.Yu & C.L.Li; *P. splendens* Wall. ex D.Don later homonym, non Ramond.

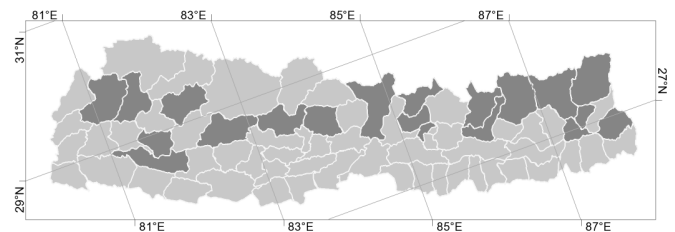
बज्रदन्ती Bajradanti (Nepali).

Perennial rosulate herbs to 50 cm. Rhizomes stout, terete. Stipules of radical leaves with free, membranous auricles. Petioles 2–5 cm. Radical leaves oblanceolate, 4–30 × 2–8 cm, pinnate with 5–20 pairs of lateral leaflets with alternating smaller leaflets; base of uppermost leaflet pair cuneate; leaflets sparsely or densely lanate above, white sericeous below; terminal leaflet subsessile, oblong to broadly obovate, 1.5–4 × 0.8–1.5 cm, sharply serrate with 20–40 teeth. Flowering stems from radical leaves, (5–)10–50 cm, white hairy throughout, mixed with glandular hairs upper part. Stipules of cauline leaves with leaf-like auricles, serrate with 10–20 teeth. Cauline leaves similar to radical leaves, reducing in size upwards,

lower leaves with 5–13 pairs of leaflets, upper leaves with 1–2 pairs, smaller leaflets absent. Flowers 1–1.5 cm across. Pedicels 2–4 cm, white hairy with glandular hairs. Episepals oblong to elliptic, 5–7 × 3–6 mm, entire with acute tips, lanate above, white sericeous below. Sepals elliptic to ovate, 5–9 × 4–6 mm, entire or with 2 or 3 teeth, apex acute to obtuse, lanate near tips but otherwise glabrous above, white sericeous beneath. Petals obovate to broadly obovate with round or retuse apex, 8–15 × 7–13 mm, margin often recurved. Long stamens 3–5 mm, anthers ovoid, 1–1.3 × 0.6–1.2 mm. Carpels narrowly ovoid, 1.2–2 × 0.8–1.4 mm, glabrous, styles lateral, 1.4–2 mm, stigmas not inflated.

Fig. 13i

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma, E Asia and SE Asia.



Altitudinal range: 1700–3700 m.

Ecology: Open meadows, forest margins, roadsides.

Flowering: June–October. **Fruiting:** June–October.

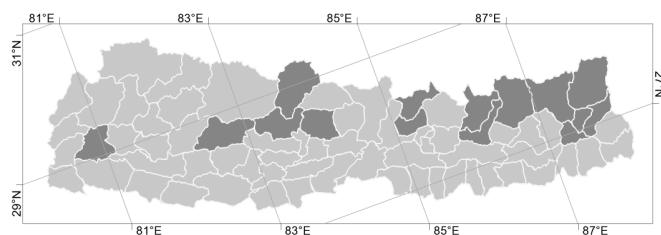
Roots are used to relieve throat infection. Root paste is stomachic and is used to treat peptic ulcers, coughs and colds.

9. *Potentilla polyphylla* Wall. ex Lehm., Nov. Stirp. Pug. 3: 13 (1831).

Potentilla mooniana Wight; *P. polyphylla* Wall. nom. nud.; *P. polyphylla* var. *barbata* Lehm.; *P. sordida* Klotzsch.

Perennial rosulate herbs to 40 cm. Rhizomes stout, terete. Stipules of radical leaves with membranous, free auricles. Petioles 2–5 cm. Radical leaves oblanceolate; lateral leaflets 5–20 pairs with alternating smaller leaflets; base of uppermost leaflet pair cuneate; terminal leaflet petiolulate or subsessile, margin sharply serrate. Flowering stems from radical leaves, 5–40 cm, with patent or ascending white hairs. Stipules of cauline leaves with leaf-like auricles, serrate with 10–20 teeth. Cauline leaves similar to radical leaves, reducing in size upwards, lower leaves with 5–13 pairs of leaflets, upper leaves with 1–2 pairs, smaller leaflets absent. Flowers 1–3 cm across. Episepals oblong to obovate, usually serrate with 3–5 teeth, rarely entire, apex acute, glabrescent or sparsely strigose inside, strigose outside. Sepals elliptic to ovate, entire, apex acute to obtuse, lanate inside, strigose outside and margin. Petals yellow, obovate to broadly obovate, apex rounded or shallowly emarginate. Stamens 20, anthers globose. Carpels ellipsoid to ovoid, glabrous, styles nearly basal, fusiform or rod-shaped, stigmas slightly inflated.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma, S Asia, E Asia and SE Asia.

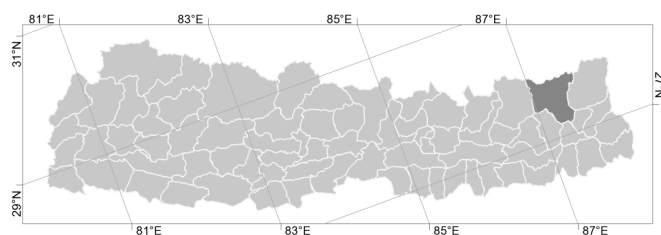


- 1a Radical leaves 16–30 cm. Terminal leaflets oblong to oblong-oblancoelate, densely villous on both sides..... var. *interrupta*
- b Radical leaves 4–20(–25) cm. Terminal leaflets elliptic to obovate, sparsely strigose on both sides 2
- 2a Petals 9–11 × 9–12 mm. Episepals 4.5–7.5 mm var. *himalaica*
- b Petals 5–9 × 4.5–9 mm. Episepals 2.5–5 mm var. *polyphylla*

Potentilla polyphylla var. *himalaica* H.Ikeda & H.Ohba, Bot. J. Linn. Soc. 112: 179 (1993).

Radical leaves 8–20(–25) × 2–5 cm, leaflets sparsely strigose on both sides, terminal leaflet oblong to obovate, 1–3 × 1–2 cm, serrate with 20–25 teeth. Flowers 1.5–3 cm across. Episepals 4–7 × 3–6 mm. Sepals 4–6 × 3–4.5 mm. Petals 9–11 × 9–12 mm. Anthers 0.9–1.2 × 1–1.2 mm. Carpels 0.7–0.8 × 0.4–0.6 mm, styles 1–1.4 mm, rod-shaped.

Distribution: Nepal and E Himalaya.



Altitudinal range: 3400–4000 m.

Ecology: Open alpine meadows.

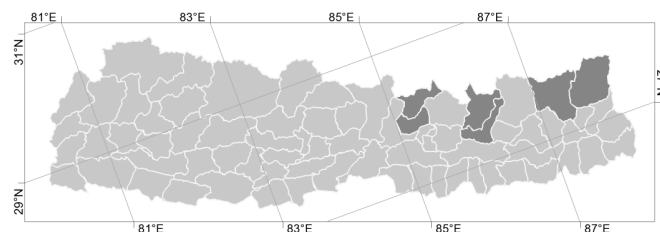
Flowering: July–September. **Fruiting:** July–September.

Potentilla polyphylla var. *interrupta* (T.T.Yu & C.L.Li) H.Ikeda & H.Ohba, Bot. J. Linn. Soc. 112(2): 179 (1993).
Potentilla interrupta T.T.Yu & C.L.Li, Acta Phytotax. Sin. 18: 8 (1980).

Radical leaves 16–30 × 2–5 cm, leaflets densely villous on both sides, terminal leaflet oblong to oblong-oblancoelate, 3–6 × 1.5–2.5 cm, serrate with 25–50 teeth. Flowers 1.5–2 cm across. Episepals 3–5 × 2–3 mm. Sepals 4–5.5 × 3–4 mm.

Petals 8–9.5 × 6–8.5 mm. Anthers 0.6–1 × 0.5–0.8 mm. Carpels 0.7–0.9 × 0.5–0.6 mm, styles 1–1.3 mm, rod-shaped.

Distribution: Nepal, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 3500–4200 m.

Ecology: Open alpine meadows.

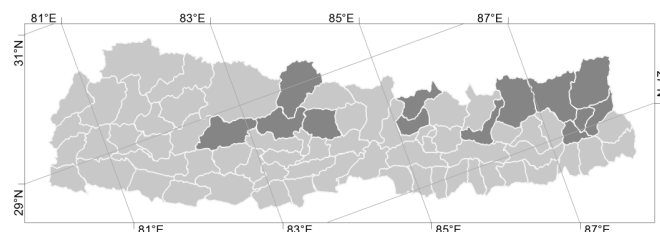
Flowering: July–September. **Fruiting:** July–September.

Potentilla polyphylla Wall. ex Lehm. var. *polyphylla*

Radical leaves 4–20(–25) × 2–6 cm, leaflets sparsely strigose on both sides, terminal leaflet elliptic to obovate, 1.5–4 × 0.8–1.5 cm, serrate with 14–24 teeth. Flowers 1–1.5 cm across. Episepals 2.5–5 × 1.5–3.5 mm. Sepals 2.5–5.5 × 2–4 mm. Petals 5–9 × 4.5–9 mm. Anthers 1–1.3 × 0.6–1.2 mm. Carpels 0.6–0.8 × 0.4–0.6 mm, styles 0.9–1.2 mm, fusiform or rod-shaped.

Fig. 13a

Distribution: Nepal, W Himalaya, E Himalaya, Assam-Burma, S Asia and SE Asia.



Altitudinal range: 1400–4000 m.

Ecology: Open meadows, forest margins, roadsides.

Flowering: July–September. **Fruiting:** July–September.

10. Potentilla microphylla D.Don, Prodr. Fl. Nepal.: 231 (1825).

Potentilla microphylla var. *depressa* Wall. ex Lehm.; *P. microphylla* var. *glabriuscula* Wall. ex Lehm.; *P. microphylla* var. *latifolia* Wall. ex Lehm.; *P. microphylla* var. *latiloba* Hook.f.

ताछेर Tachher (Tibetan).

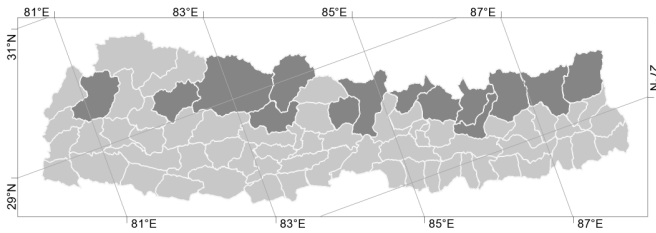
Perennial cushion-forming herbs to 10 cm. Stipules of radical leaves with membranous, free auricles. Petioles 0.5–4 cm. Radical leaves oblanceolate, 0.5–6 × 0.4–1 cm, with 2–10

Rosaceae

pairs of lateral leaflets, smaller leaflets absent; base of uppermost pair of leaflets cuneate; leaflets glabrous or sparsely strigose above, strigose or hirsute below; terminal leaflet sessile or subsessile, oblong to narrowly obovate, 2–4 × 1.5–2.5 mm, deeply serrate with 3–9 teeth. Flowering stems slender, much-branched near ground, 1–10 cm. Stipules of cauline leaves with entire or rarely 3-lobed, membranous auricles. Cauline leaves simple, entire or tri-lobed. Pedicel 2–12 mm, densely villous. Flowers 1–1.5 cm across, solitary or in 2- or 3-flowered cymes. Episepals lanceolate to oblong, 1.5–3.5 × 0.5–1 mm, entire or deeply divided into two lobes, apex acute or obtuse, sparsely strigose on both sides. Sepals elliptic to ovate, 3.5–4.5 × 1.5–3 mm, entire, apex acute or obtuse, glabrescent above, sparsely strigose below and margin. Petals yellow, oblong to elliptic, 3–8 × 2.5–6 mm, apex rounded or slightly emarginate. Stamens 20, anthers globose to ellipsoid, 0.4–0.7 × 0.4–0.7 mm. Carpels ellipsoid, 0.5–0.8 × 0.4–0.5 mm, glabrous, styles lateral, 0.5–1.3 mm, stigmas slightly inflated.

Fig. 13d

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and Assam-Burma.



Altitudinal range: 3400–5200 m.

Ecology: Open meadows, gravelly slopes, moist silty ground.

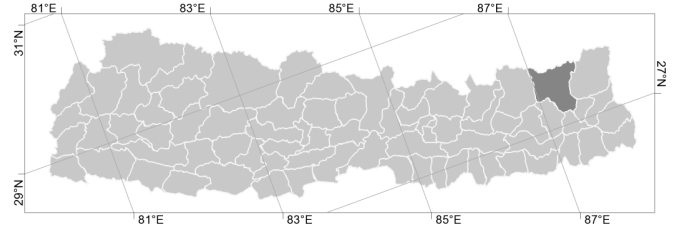
Flowering: July–September. **Fruiting:** July–September.

11. *Potentilla makaluensis* H.Ikeda & H.Ohba, J. Jap. Bot. 67(3): 149 (1992).

Perennial rhizomatous herbs to 5 cm. Rhizomes slender, 1.5–3.5 cm, with sparse degenerated leaves. Stipules of radical leaves with membranous auricles connate from base to top, apex rounded. Petioles 4–10 mm. Radical leaves oblanceolate, 2–4 cm with 4–5 pairs of lateral leaflets, without smaller leaflet; base of uppermost pair of leaflets cuneate; leaflets glabrescent above, strigose below; terminal leaflet subsessile, oblong to obovate, 3–7 × 3–4.5 mm, deeply serrate with 5–9 teeth. Flowering stems from radical leaves, 1.5–5 cm tall. Stipules of cauline leaves with leaf-like auricles. Cauline leaves simple, oblanceolate, apically 1–3 lobulate. Flowers 1–1.5 cm across, solitary. Episepals oblong to elliptic, 2–3 × 1–1.5 mm, entire or shallowly incised, apex acute, glabrescent above, strigose below and margin. Sepals elliptic to ovate, 3–4 × 2–3 mm, entire, apex acute to obtuse, glabrous except puberulent near apex above, strigose below and margin. Petals yellow, obovate to broadly obovate, 5.5–7 × 5–7 mm, apex rounded or shallowly emarginate. Stamens 20, anthers orbicular, 0.7–1 × 0.6–0.9 mm. Carpels ellipsoid to ovoid, 0.7–0.9 × 0.6–1 mm,

glabrous, styles lateral, 1–1.2 mm, stigmas slightly or apparently inflated.

Distribution: Endemic to Nepal.



Altitudinal range: ca. 4000 m.

Ecology: Wet, silty ground.

Flowering: July–August. **Fruiting:** July–August.

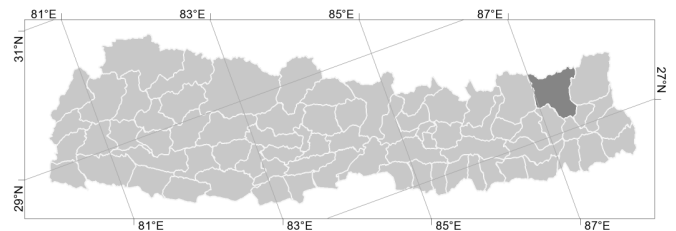
Known from several collections around the Shipton La, Sankhuwasabha District.

12. *Potentilla glabriuscula* (T.T.Yu & C.L.Li) Soják, Candollea 43: 453 (1988).

Sibbaldia glabriuscula T.T.Yu & C.L.Li, Acta Phytotax. Sin. 19: 516 (1981).

Perennial rosulate herbs to 2.5 cm. Rhizomes stout, short, few-branched. Stipules of radical leaves with membranous auricles, connate from base to top, apex rounded. Petioles 3–12 mm. Radical leaves oblanceolate, 1.8–5.0 × 0.5–1.0 cm, with 3–7 pairs of lateral leaflets, without smaller leaflets; base of uppermost pair of leaflets cuneate; sparsely strigose on both sides of leaflets and rachis; terminal leaflet subsessile, oblong to narrowly obovate, 3.5–4.2 × 2–4 mm, serrate with 3–7 teeth. Flowering stems from radical leaves, 0.5–2.5 cm, with appressed or ascending hairs. Stipules of cauline leaves with entire auricles. Cauline leaves simple, entire or 3-lobed. Flowers 0.4–1.2 cm across, solitary. Episepals lanceolate to oblong, 1.8–3.0 × 0.4–1.2 mm, entire, apex acute or obtuse, glabrescent above, sparsely strigose below. Sepals elliptic to ovate, 2.0–3.0 × 1.0–1.8 mm, entire, apex acute or obtuse, glabrous except puberulent near apex above, sparsely strigose below and margin. Petals yellow, oblong to elliptic, 3.0–5.0 × 2.0–4.0 mm, apex rounded. Stamens 5–10, anthers globose to ellipsoid, 0.5–0.7 × 0.4–0.8 mm. Carpels ellipsoid, 0.6–0.8 × 0.4–0.5 mm, glabrous, styles lateral, 0.6–0.8 mm, stigmas slightly inflated.

Distribution: Nepal, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 3500–5000 m.

Ecology: Alpine meadows, moist silty ground.

Flowering: June–October. **Fruiting:** June–October.

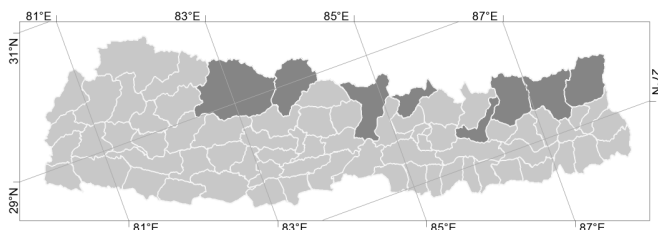
13. *Potentilla aristata* Soják, *Candollea* 43: 159, pl. 1 fig. 7-9 (1988).

Potentilla microphylla var. *achilleifolia* Hook.f.

Perennial rosulate herbs to 4 cm. Rhizomes short, with several slender roots. Stipules of radical leaves with membranous, free auricles. Petioles 5–8 mm. Radical leaves oblanceolate, 1.5–5(–9) × 0.5–1.2 cm, with 13–16 pairs of lateral leaflets, without alternating smaller leaflets; base of uppermost pair of leaflets cuneate; leaflets glabrescent above, strigose beneath and margins. Terminal leaflet subsessile, oblong to narrowly obovate, 2–3 × 1.5–2.5 mm, deeply serrate with 8–12 teeth. Flowering stems from radical leaves, 1–4 cm, with appressed white hairs. Stipules of cauline leaves with entire, leaf-like auricles. Cauline leaves simple to with 4 or 5 pairs of leaflets. Flower 1–1.5 cm across, solitary. Episepals lanceolate to oblong, 2–3 × 1.5–2.5 mm, entire or deeply divided into two lobes, apex acute or obtuse, sparsely strigose on both sides. Sepals elliptic to ovate, 2.5–4 × 1.5–2.5 mm, entire, apex acute or obtuse, glabrescent above, strigose below. Petals yellow, oblong to elliptic, 6–7 × 4.5–6 mm, apex rounded. Stamens 20, anthers globose to ellipsoid, 0.5–0.7 × 0.5–0.7 mm. Carpels glabrous except usually sparsely strigose near top, ellipsoid, 0.7–1.2 × 0.5–0.8 mm, styles lateral, 1.3–1.8 mm, stigmas slightly inflated.

Fig. 13b & Fig. 12e

Distribution: Nepal, E Himalaya and Tibetan Plateau.



Altitudinal range: 3600–4700 m.

Ecology: Open meadows.

Flowering: June–August. **Fruiting:** June–August.

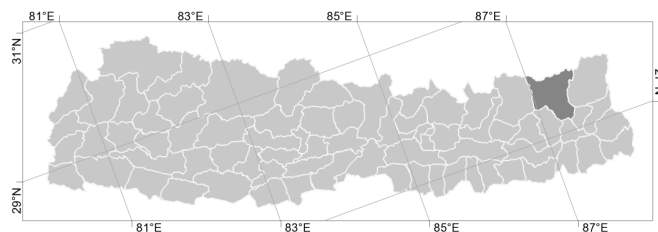
14. *Potentilla turfosoidea* H. Ikeda & H. Ohba, in H. Ohba, *Himal. Pl.* 3: 62 (1999).

Potentilla turfosa var. *caudiculata* Soják.

Perennial rosulate herbs to 20 cm. Rhizomes stout, terete. Stipules of radical leaves with free auricles. Petioles 1–2 cm. Radical leaves oblanceolate, 3.5–11 × 1.2–2 cm, with 5–8 pairs of lateral leaflets, with smaller leaflets between uppermost and next uppermost pair of leaflets; base of uppermost pair of leaflets cuneate; leaflets glabrescent or sparsely strigose above, glabrescent except villous along veins below; terminal

leaflet subsessile, oblong to narrowly obovate, 6–10 × 4–7 mm, serrate with 12–18 teeth. Flowering stems from radical leaves, 3–20 cm, with appressed or ascending hairs. Stipules of lower cauline leaves with entire auricles connate in lower half, those of upper leaves entire or serrate with 2–4 teeth. Cauline leaves similar to radical leaves, reducing in size upwards, lower leaves with 2–4 pairs of leaflets, upper leaves simple or trifoliolate. Flowers 1–1.5 cm across, solitary or in 2 (rarely 3)-flowered cymes. Episepals oblong to obovate, 2–3 × 0.8–1.2 mm, entire or deeply divided into two lobes, apex acute or obtuse, glabrescent or sparsely strigose on both sides. Sepals elliptic to ovate, 3.0–3.5 × 2–3 mm, entire, apex acute or obtuse, glabrous except puberulent near tips above, sparsely strigose below. Petals yellow, oblong to elliptic, 5–6.5 × 4.5–6 mm, apex rounded or shallowly emarginate. Stamens 20, anthers globose to ellipsoid, 0.5–0.8 × 0.6–0.7 mm. Ovary glabrous, ellipsoid, 0.7–0.9 × 0.5–0.6 mm, styles lateral, 0.7–0.9 mm, stigmas slightly inflated.

Distribution: Endemic to Nepal.



Altitudinal range: 3500–4100 m.

Ecology: Open meadows, gravelly slopes.

Flowering: July–August. **Fruiting:** July–August.

Known from several collections around the Shipton La, Sankhuwasabha District.

15. *Potentilla peduncularis* D. Don, *Prodr. Fl. Nepal.*: 230 (1825).

Potentilla peduncularis var. *subcontigua* Soják; *P. velutina* Wall. nom. nud.

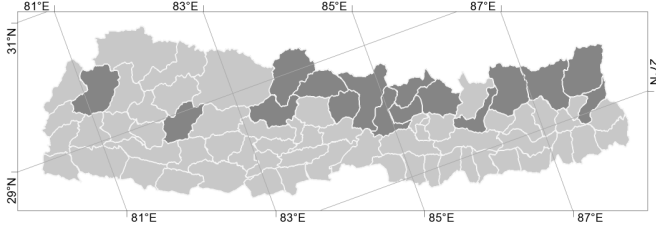
मूला झार Mula jhaar (Nepali).

Perennial rhizomatous herbs. Rhizomes stout, terete, long-creeping underground. Stipules of radical leaves with auricles connate from base to top, apex rounded. Petioles 0.5–5 cm. Radical leaves oblanceolate, imparipinnate with 10–18 pairs of lateral leaflets, usually without alternating smaller leaflets; base of uppermost pair of leaflets decurrent; terminal leaflet sessile, oblong to narrowly obovate, margin serrate with 10–15 teeth. Flowering stems from radical leaves, 10–25 cm, with dense appressed white hairs. Stipules of cauline leaves with leaf-like auricles, entire or serrate with 3–5 teeth. Cauline leaves simple or with 1 or 2 pairs of leaflets. Flowers 2–3.5 cm across, in 2–4(–7)-flowered cymes. Episepals oblong to obovate, entire or 3-dentate, apex acute or obtuse. Sepals elliptic to ovate, entire, apex acute or obtuse. Petals yellow, oblong to widely elliptic, apex rounded or slightly emarginate. Stamens 20–25, anthers

Rosaceae

globose to ellipsoid. Carpels glabrous, ellipsoid to narrowly obovoid, styles lateral, rod-shaped, stigmas slightly inflated.

Distribution: Nepal, E Himalaya, Tibetan Plateau and E Asia.



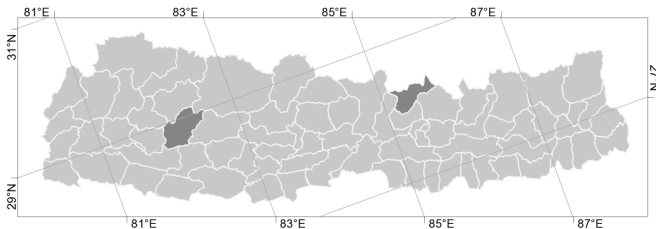
A paste of roots is given to treat profuse menstruation. It is taken with milk to treat diarrhoea.

- 1a Leaflets sparsely lanate beneath. var. *ganeshii*
- b Leaflets sericeous beneath.. var. *peduncularis*

Potentilla peduncularis var. *ganeshii* H.Ikeda & H.Ohba, J. Jap. Bot. 71: 252, pl. 1 fig. i (1996).

Radical leaves 4–20 × 1.5–3 cm, lateral leaflets 10–20 pairs, terminal leaflets 0.8–1.5 × 0.4–0.8 cm, with 5–13 teeth, sparsely lanate on both sides. Flowers 2–2.5 cm across. Episepals 4–6 × 2.5–3.5 mm, sparsely strigose on both sides. Sepals 5–6.5 × 3.5–4.5 mm, glabrescent inside, sparsely strigose outside. Petals 12–14 × 12–13 mm. Anthers 1–1.5 × 1–1.6 mm. Carpels ca. 1 × 0.7 mm, styles 1.5–2 mm.

Distribution: Endemic to Nepal.



Altitudinal range: 3400–4300 m.

Ecology: Open meadows.

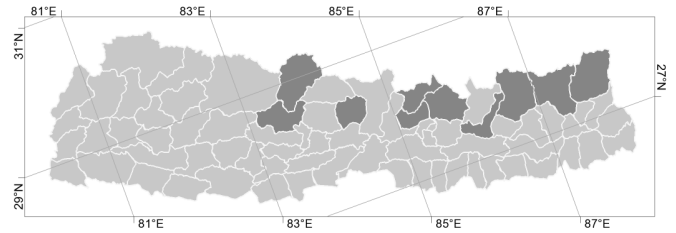
Flowering: July–August. **Fruiting:** July–August.

Potentilla peduncularis D.Don var. *peduncularis*

Radical leaves 10–25 × 2–6 cm, lateral leaflets 10–15 pairs, terminal leaflets 1.5–3 × 0.5–1 cm, with 10–15 teeth, sparsely or densely lanate above, sericeous beneath. Flowers 2–3.5 cm across. Episepals 6–7 × 2.5–3.5 mm, sparsely strigose inside, densely strigose outside. Sepals 6–7 × 4–5 mm, glabrescent except shortly lanate near tips inside, sparsely to densely strigose outside. Petals 12.5–14.5 × 12–13.5 mm. Anthers 1.2–1.7 × 1–1.5 mm. Carpels 1.2–1.5 × 0.8–1 mm, styles 1.8–2.2 mm.

Fig. 13j

Distribution: Nepal, E Himalaya and Tibetan Plateau.



Altitudinal range: 3000–4700 m.

Ecology: Open meadows, thickets, gravelly slopes.

Flowering: June–September. **Fruiting:** June–September.

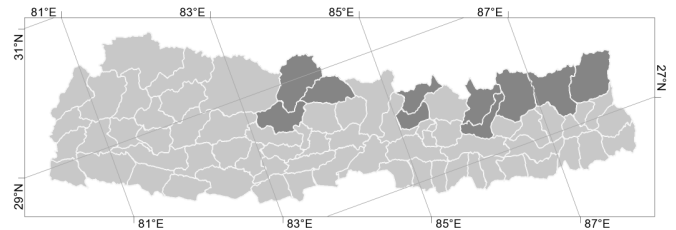
16. Potentilla contigua Soják, Candollea 43: 160, pl. 3 fig. 1 (1988).

Potentilla peduncularis var. *clarkei* Hook.f.

Perennial rhizomatous herbs to 30 cm. Rhizomes stout, terete, creeping underground. Stipules of radical leaves with free auricles. Radical leaves oblanceolate, 10–20 × 1.5–4.5 cm, with 13–16 pairs of lateral leaflets, usually without alternating smaller leaflets; base of uppermost pair of leaflets decurrent; leaflets densely or sparsely villous above, densely villous below; terminal leaflet sessile, oblong to narrowly obovate, 1–2 × 0.5–0.7 cm, serrate with 11–15 teeth. Flowering stems from radical leaves, 6–30 cm, with patent or ascending pale brown hairs. Stipules of cauline leaves with leaf-like auricles, serrate with 3–6 teeth. Cauline leaves similar to radical ones, with 3–5 pairs of leaflets. Flowers 1.5–2.5 cm across, in (1 or)2–5-flowered cymes. Pedicels 1.5–4.0 cm. Episepals oblong to obovate, 4–5 × 2–3 mm, entire or with 3(or 5) teeth, apex acute or obtuse, villous on both sides. Sepals elliptic to ovate, 4.5–6.0 × 3.5–4.5 mm, entire, apex acute or obtuse, glabrous except puberulent near tips above, villous below. Petals yellow, oblong to elliptic, 9.5–10.5 × 9.5–11.0 mm, apex rounded or slightly emarginate. Stamens 20–30, anthers globose to ellipsoid, 1.1–1.3 × 0.9–1.1 mm. Carpels glabrous, ellipsoid, 1.0–1.3 × 0.8–1.0 mm, styles lateral, 1.6–2.0 mm, stigmas slightly inflated. Achenes obliquely ellipsoid, 2–2.5 × 1.3–1.5 mm, rugose.

Fig. 13e & Fig. 12f

Distribution: Nepal, E Himalaya and Tibetan Plateau.



Altitudinal range: 3500–4700 m.

Ecology: Open meadows, thickets.

Flowering: June–September. **Fruiting:** June–September.

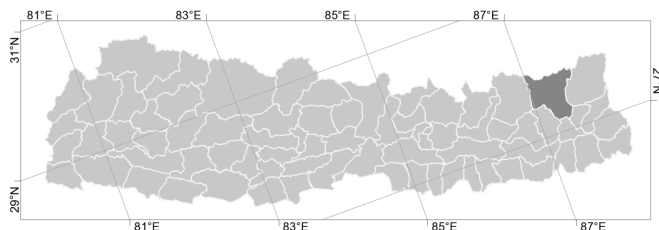
Ohashi (Enum. Fl. Pl. Nepal 2: 140. 1979) partially misapplied the name *Potentilla peduncularis* D. Don to this species.

17. *Potentilla cardotiana* Hand.-Mazz., Acta Horti Gothob. 13: 322 (1939).

Potentilla cardotiana var. *nepalensis* H. Ikeda & H. Ohba, in H. Ohba, Himal. Pl. 3: 72 (1999).

Perennial rosulate herbs to 20 cm. Rhizomes stout, terete, short. Stipules of radical leaves with free auricles. Petioles 2–4 cm. Radical leaves oblanceolate, 7–16 cm × 2–3 cm, with 10–22 pairs of lateral leaflets, usually with alternating smaller leaflets; base of uppermost pair of leaflets decurrent; leaflets strigose with appressed or ascending hairs above, densely villous below; terminal leaflet sessile, lanceolate or narrowly oblong, 1–2 × 0.4–0.7 cm, serrate with 15–38 teeth. Flowering stems from radical leaves, 15–20 cm tall, with appressed white hairs. Stipules of cauline leaves with leaf-like auricles, serrate with 3–6 teeth. Cauline leaves with 1 or 2 pairs of lateral leaflets. Flowers 1–1.5 cm across, in 3–6-flowered cymes. Pedicels 1.5–2 cm. Episeals oblong to obovate, 3–5 × 1.5–3 mm, entire or with 3 teeth, apex acute or obtuse, glabrescent above, densely villous below. Sepals elliptic to ovate, 4–6 × 2.5–4.5 mm, entire, apex acute or obtuse, glabrous except puberulent near tips above, densely villous below. Petals yellow, oblong to elliptic, apex rounded, 5–7 × 4–5.5 mm. Stamens 20, anthers globose to ellipsoid, 0.4–1 × 0.4–0.9 mm. Carpels glabrous, ellipsoid, 0.5–0.8 × 0.4–0.6 mm, styles lateral, 0.5–1.3 mm, stigmas slightly inflated.

Distribution: Endemic to Nepal.



Altitudinal range: ca. 3800 m.

Ecology: Open meadows, thickets.

Flowering: July–August. **Fruiting:** July–August.

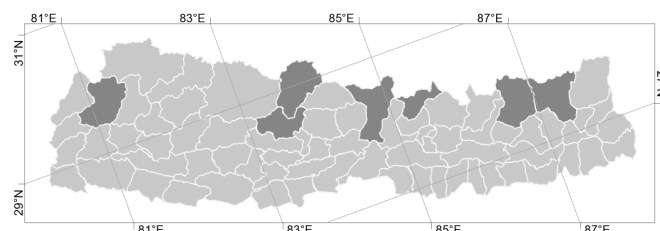
Potentilla cardotiana var. *nepalensis* is restricted to the upper Arun Valley, E Nepal whilst var. *cardotiana* is distributed in E Asia (Yunnan) and Assam-Burma. The varieties differ in their stature and indumentum, with var. *nepalensis* smaller with silvery hairs on the undersides of the leaves, while var. *cardotiana* has golden hairs.

18. *Potentilla tristis* Soják, Preslia 63: 333 (1991).

Potentilla peduncularis var. *obscura* Hook.f.; *P. tristis* forma *ciliata* H. Ikeda & H. Ohba.

Perennial rosulate herbs to 12 cm. Rhizomes stout, terete, few-branched. Stipules of radical leaves with auricles connate from base to middle. Petioles 0.5–1 cm. Radical leaves oblanceolate, 2–7 × 1–1.5 cm, with 8–13 pairs of lateral leaflets, usually with alternating smaller leaflets; base of uppermost pair of leaflets decurrent; leaflets villous above, villous with patent hairs below, especially on veins; terminal leaflet sessile, oblong to obovate, 4–5 × 4–5 mm, serrate with 6–11 teeth. Flowering stems from radical leaves 3–12 cm tall, with ascending hairs. Stipules of cauline leaves with leaf-like auricles, serrate with 2–4 teeth. Cauline leaves with 1 or 2 pairs of leaflets. Flowers 0.8–1.2 cm across, solitary or in 2–3-flowered cymes. Episeals oblong to obovate, 2–3.5 × 1.2–2.3 mm, entire or with 3 teeth, apex acute or obtuse, sparsely villous above, villous below. Sepals elliptic to ovate, 2–3.5 × 1.5–3 mm, entire, apex acute or obtuse, glabrous except puberulent near tips above, villous below. Petals yellow, oblong to elliptic, 4–5.2 × 4–4.5 mm, apex rounded or emarginate. Stamens 20, anthers globose to ellipsoid, 0.5–0.7 × 0.4–0.7 mm. Carpels glabrous, ellipsoid, 0.6–0.8 × 0.4–0.6 mm, styles lateral, 0.9–1.3 mm, stigmas slightly inflated. Achenes compressed globose, ca. 2 mm across, slightly rugose. Fig. 13g

Distribution: Nepal and W Himalaya.



Altitudinal range: 3300–5000 m.

Ecology: Open meadows, gravelly slopes.

Flowering: July–September. **Fruiting:** July–September.

19. *Potentilla commutata* Lehm., Nov. Stirp. Pug. 3: 16 (1831).

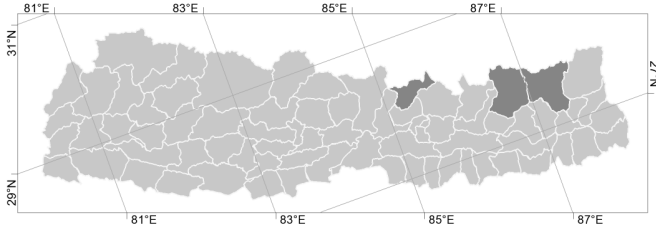
Potentilla microphylla var. *commutata* (Lehm.) Hook.f.

Perennial rosulate herbs to 10 cm. Rhizomes stout, terete, few-branched. Stipules of radical leaves with membranous auricles, connate from base to top, apex rounded. Radical leaves oblanceolate, imparipinnate, without smaller leaflets; base of uppermost pair of leaflets decurrent; leaflets villous above, densely sericeous below; terminal leaflet sessile or subsessile, oblong to narrowly obovate. Flowering stems from radical leaves, 2–10 cm, with dense pale brown hairs. Stipules of cauline leaves with leaf-like auricles, entire or with 2 or 3 teeth. Cauline leaves simple or with one pair of leaflets, entire or 3-lobed. Flowers 0.5–1.2 cm across, solitary or occasionally in 2-flowered cymes. Episeals lanceolate to oblong, entire or with 3 teeth, apex acute or obtuse, sparsely strigose above, densely villous below. Sepals elliptic to ovate, entire, apex acute or obtuse, glabrous except puberulent near apex above, densely villous below. Petals yellow, oblong to elliptic, apex rounded. Stamens 10–20, anthers globose to ellipsoid. Carpels

Rosaceae

glabrous, ellipsoid, styles subterminal, stigmas slightly inflated. Achenes obliquely ellipsoid, ca. 1.5 × 1 mm, smooth or slightly rugose.

Distribution: Nepal, W Himalaya, E Himalaya and Tibetan Plateau.

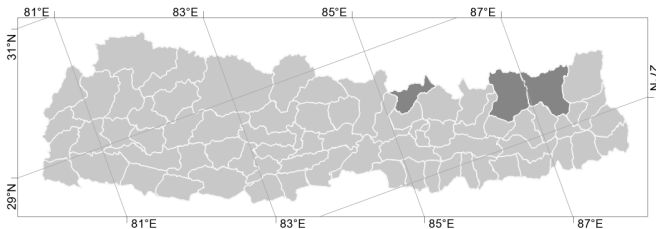


- 1a Radical leaves 2–4 cm. Lateral leaflets 5–9 pairs. Stamens 10–14 var. **commutata**
 b Radical leaflets 3–8 cm. Lateral leaflets 10–15 pairs. Stamens around 20 var. **polyandra**

Potentilla commutata Lehm. var. **commutata**

Radical leaves with 3–5 mm petioles, 2–4 × 0.6–0.8 cm, lateral leaflets 5–9 pairs; terminal leaflet 3.5–5 × 2–3 mm, with 7–12 teeth. Peduncles 0.5–1.5 cm. Pedicels 3–7 mm. Flowers 0.5–0.8 cm across. Hypanthium 4–6 mm across. Episepals 1.5–2.5 × 1.5–2.5 mm, with 3 teeth. Sepals 1.5–2.2 × 1.5–2 mm. Petals 3.5–4.5 × 3–4.2 mm. Stamens 10–14, anthers 0.5–0.7 × 0.5–0.7 mm. Ovaries 0.6–0.8 × 0.4–0.5 mm, styles 0.4–0.5 mm. Fig. 13h

Distribution: Nepal, W Himalaya and E Himalaya.



Altitudinal range: 3500–4500 m.

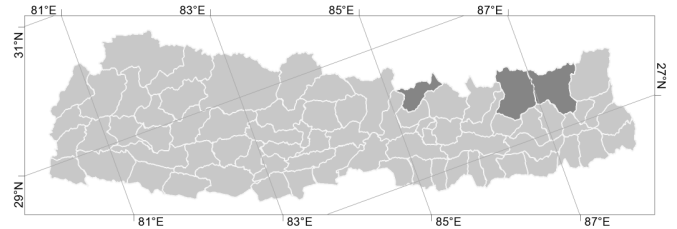
Ecology: Open meadows, gravelly slopes.

Flowering: July–August. **Fruiting:** July–August.

Potentilla commutata var. **polyandra** Soják, Bot. Jahrb. Syst. 116: 38 (1994).
Potentilla mieheorum Soják.

Radical leaves with 0.5–1 cm petioles, 3–8 × 1–1.5 cm, lateral leaflets 10–15 pairs, terminal leaflet 5–8 × 3–4 mm, with 7–11 teeth. Peduncles 2–5 cm. Pedicels 1–2.5 cm. Flowers 0.8–1.2 cm across. Hypanthium 6–8 mm across. Episepals 1.5–2 × 0.7–1 mm. Sepals 2–2.5 × 1.5–2 mm. Petals 3–4 × 2.6–3.3 mm. Stamens ca. 20, anthers 0.4–0.5 × 0.4–0.5 mm. Ovaries 0.5–0.6 × 0.4–0.5 mm, styles 0.5–0.7 mm.

Distribution: Nepal, W Himalaya, E Himalaya and Tibetan Plateau.



Altitudinal range: 4000–4500 m.

Ecology: Open meadows, gravelly slopes.

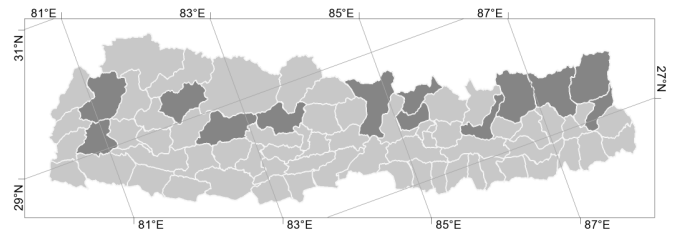
Flowering: July–August. **Fruiting:** July–August.

20. *Potentilla leuconota* D. Don, Prodr. Fl. Nepal.: 230 (1825).

सक्कली झारे जरो Sakkali jhare jaro (Nepali).

Perennial rosulate herbs to 20 cm. Rhizomes stout, terete. Stipules of radical leaves with auricles connate from base to middle. Petioles 1–4 cm. Radical leaves oblanceolate, 2.5–20 × 1–4 cm, with 6–18 pairs of lateral leaflets, usually with alternating smaller leaflets; base of uppermost pair of leaflets decurrent; leaflets sparsely sericeous with appressed hairs above, densely sericeous below; terminal leaflet sessile, oblong to narrowly obovate, 0.5–2 × 0.3–1 cm, serrate with 10–25 teeth. Flowering stems from radical leaves, (2–)5–20 cm with dense appressed white hairs. Stipules of cauline leaves with leaf-like auricles, serrate with 5–10 teeth. Cauline leaves similar to radical leaves, with 2–10 pairs of leaflets. Flowers 0.5–0.8 cm across, in 3–12-flowered umbel-like cymes. Episepals lanceolate to oblong, 1.5–2 × 0.7–1 mm, entire, apex acute or obtuse, sparsely strigose above, white sericeous beneath. Sepals elliptic to ovate, 2–2.5 × 1.5–2 mm, entire, glabrous above except puberulent near apex, white sericeous beneath. Petals yellow, oblong to elliptic, 3–4 × 2.6–3.3 mm, apex rounded. Stamens 20, anthers globose to ellipsoid, 0.4–0.5 mm across. Carpels glabrous, ellipsoid, 0.5–0.6 × 0.4–0.5 mm, styles lateral, 0.5–0.7 mm, stigmas slightly inflated. Achenes ellipsoid, ca. 1 × 0.7 mm, smooth. Fig. 13f

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 2700–4500 m.

Ecology: Alpine meadows, forest margins, thickets.

Flowering: June–September. **Fruiting:** June–September.

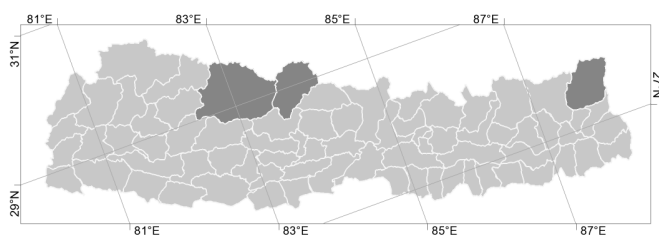
An infusion of the roots is given to ease indigestion.

21. *Potentilla anserina* L., Sp. Pl. 1: 495 (1753).

येचुरुक Yechuruk (Tibetan).

Perennial stoloniferous herb. Stolons from axils of radical leaves, glabrous or sparsely hairy. Roots from nodes often with fusiform tubers. Stipules of radical leaves with membranous auricles, connate from base to top, apex rounded. Petioles 1–2 cm. Radical leaves 3–12 cm with 4–10 pairs of lateral leaflets, sometimes with alternating smaller leaflets; sparsely pilose or glabrescent; leaflets oblong to narrowly obovate, reduced in size towards leaf base, petiolulate or sessile, base cuneate, apex obtuse or rounded, margin serrate or deeply incised, glabrescent or sparsely hairy above, silvery-white sericeous below; terminal leaflet 0.5–1.2 × 0.4–1 cm, with 13–19 teeth. Flowers 1.5–2.5 cm across, solitary from axils of radical leaves or on stolons. Pedicels 2–5 cm, glabrous. Episeals oblong to obovate, 3–8 × 1–4 mm, entire or with 2–4 teeth, apex acute or obtuse, sparsely hairy above, silvery-white sericeous below. Sepals elliptic to ovate, 3–8 × 2–5 mm, entire, apex acute or obtuse, glabrous except puberulent near apex above, silvery-white sericeous below. Petals yellow, oblong to obovate, 5–12 × 3–7 mm, apex rounded or slightly emarginate. Stamens 20–30, anthers compressed ellipsoid, 0.8–1.2 × 0.4–0.8 mm. Carpels glabrous, ellipsoid, 0.8–1.2 × 0.4–0.8 mm, styles lateral, 2–4 mm, stigmas slightly inflated.

Distribution: Asia, Europe, N America, S America and Australasia.



Altitudinal range: 3100–4600 m.

Ecology: Open meadows, gravelly roadsides, sandy slopes or river banks.

Flowering: June–September. **Fruiting:** June–September.

The plant is astringent and tonic, root nodules are edible and dried flowers and leaves are taken to relieve nausea, vomiting and heart-burn.

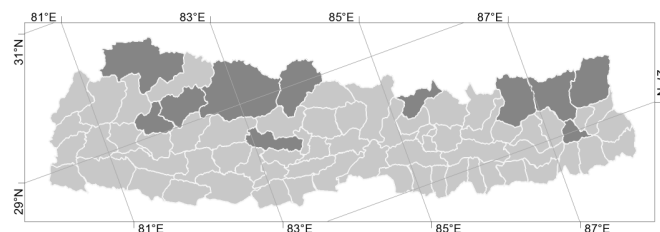
22. *Potentilla monanthes* Wall. ex Lehm., Nov. Stirp. Pug. 3: 33 (1831).

Potentilla cryptantha Klotzsch; *P. monanthes* Wall. nom. nud.; *P. monanthes* var. *alata* Soják.

साप्लङ्ग Saplang (Tamang).

Perennial prostrate herb. Rhizomes not developed. Stipules of radical leaves membranous. Radical leaves trifoliolate; leaflets subsessile or short-petiolulate, oblong-obovate to obovate, base cuneate, margin bluntly serrate, apex obtuse, pilose on both sides, often with sessile glands; petiole sparsely or densely pilose. Stipules of cauline leaves leaf-like, entire or 2- or 3-incised at apex. Flowering stems many, tufted, prostrate or ascending, sparsely or densely pilose, often with short glandular hairs. Cauline leaves similar to radical leaves, trifoliolate. Flowers in cyme, congested terminally. Pedicels densely villous, with short glandular hairs. Episeals lanceolate or elliptic-lanceolate, apex obtuse or acute, pilose with subsessile glands on both sides. Sepals triangular-ovate, apex acute, sparsely pilose with subsessile glands outside, glabrous except lanate near apex inside. Petals yellow, obovate, apex emarginate. Stamens 15–20, anthers globose. Carpels many, on globose receptacle glabrous, styles subterminal, base thickened, stigmas slightly dilated.

Distribution: Nepal, W Himalaya and E Himalaya.



Murata (Fl. E. Himalaya: 124. 1966) misapplied the name *Potentilla monanthes* var. *sibthorpioides* Hook.f. to the typical variety of this species.

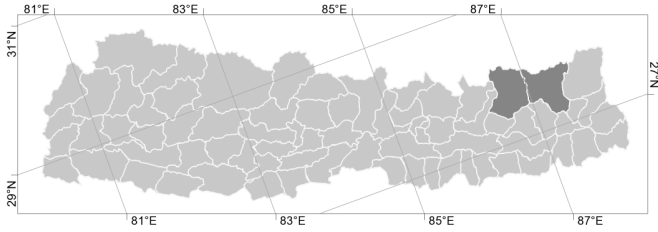
- 1a Radical leaves 2–6(–8) cm. Terminal leaflet 0.7–1.5(–2.5) cm. Flowers 8–12 mm across. Lateral leaflets 5–9 pairs. Stamens ca. 20 var. ***monanthes***
- b Radical leaflets 0.8–2(–4.5) cm. Terminal leaflets 0.3–0.6 cm. Flowers 6–7 mm across. Stamens ca. 15 var. ***sibthorpioides***

Potentilla monanthes Wall. ex Lehm. var. ***monanthes***

Radical leaves with 1.5–3.5(–5.5) cm petioles, 2–6(–8) × 1.2–3(–3.5) cm, terminal leaflet 0.7–1.5(–2.5) × 0.5–0.8(–1.2) cm. Flowers 0.8–1.2 cm across. Episeals 3–3.5 × 1.8–2.3 mm. Sepals 3–3.5 × 2.5–3 mm. Petals 5–6 × 4.5–6 mm. Stamens ca. 20, anthers 0.6–0.7 mm across. Ovaries 0.5–0.6 × 0.4–0.5 mm, styles ca. 1 mm.

Distribution: Nepal, W Himalaya and E Himalaya.

Rosaceae



Altitudinal range: 3000–4800 m.

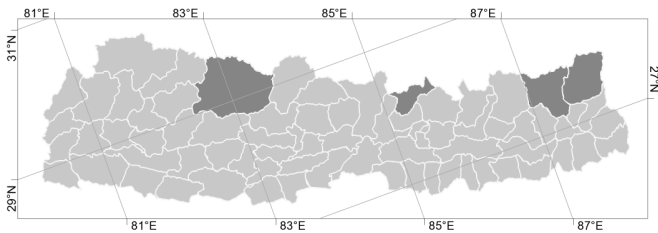
Ecology: Open meadows.

Flowering: July–August. **Fruiting:** July–August.

Potentilla monanthes var. *sibthorpioides* Hook.f., Fl. Brit. India 2[5]: 358 (1878).

Radical leaves with 0.3–1(–4) cm petioles, 0.8–2(–4.5) × 0.6–1.2 cm, terminal leaflet 3–6 × 2.5–6 mm. Flowers 0.6–0.7 cm across. Episeals 1.8–2.2 × 1–1.4 mm. Sepals 2–2.5 × ca. 1.5 mm. Petals 3–4 × 2.5–3.5 mm. Stamens ca. 15, anthers ca. 0.4 mm across. Ovaries ca. 0.5 × 0.4 mm, styles 0.6–0.7 mm.

Distribution: Nepal and E Himalaya.



Altitudinal range: 4100–4700 m.

Ecology: Open meadows.

Flowering: June–July. **Fruiting:** June–July.

23. *Potentilla argyrophylla* Wall. ex Lehm., Nov. Stirp. Pug. 3: 36 (1831).

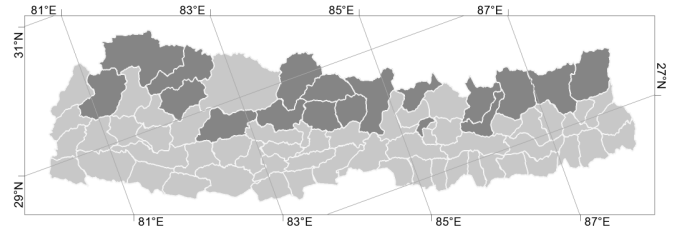
Potentilla argyrophylla Wall. nom. nud.; *P. argyrophylla* var. *leucochroa* Hook.f.; *P. atrosanguinea* var. *cataclines* (Lehm.) Wolf; *P. cataclines* Lehm.; *P. insignis* Royle ex Lindl.; *P. jacquemontiana* Cambess.; *P. leucochroa* Lindl. ex Wall. nom. nud.; *P. nivea* var. *himalaica* Kitam.; *P. venusta* Soják.

आटे Aate (Nepali).

Perennial rosulate herbs to 40 cm. Rootstock stout, short, simple or sometimes branched. Radical leaves trifoliolate; petiole pubescent with appressed white hairs; terminal leaflet oblong to narrowly obovate, base cuneate, apex obtuse, margin acutely or obtusely serrate, densely or sparsely appressed hairy above, densely sericeous below. Flowering stems from axils of radical leaves, pubescent with appressed or ascending hairs. Cauline leaves reducing in size upwards, lower leaves trifoliolate, upper leaves simple. Flowers 1.2–2.2

cm across. Pedicels pubescent. Episeals lanceolate to narrowly ovate, apex acute, densely or sparsely hirsute on both sides. Sepals ovate-triangular, apex acute, glabrescent inside, densely or sparsely hirsute outside. Petals yellow, orange or crimson, obovate to broadly obovate, apex emarginate. Stamens 20, anthers compressed globose to ellipsoid. Carpels ellipsoid, glabrous, styles subterminal, slightly swollen at base, stigmas slightly inflated.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and SW Asia.



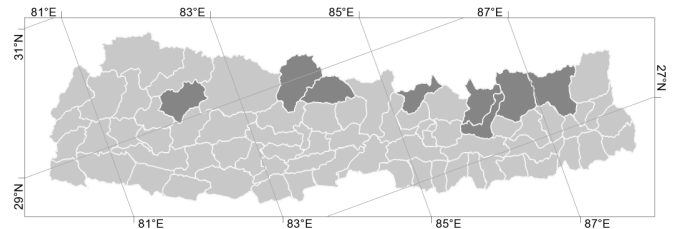
A paste or juice of the root is applied to treat toothache.

- 1a Petals yellow var. *argyrophylla*
b Petals crimson or orange .. var. *atrosanguinea*

Potentilla argyrophylla Wall. ex Lehm. var. *argyrophylla*

Radical leaves with (0.5–)1–15 cm petioles, 1–20 × 0.8–7 cm, terminal leaflet 0.5–4.5 × 0.3–2.5 cm. Flowering stems 3–40 cm. Flowers 1.2–2 cm across. Episeals 3–5(–7) × 1–3(–4) mm. Sepals 4–6(–8) × 2–3.5 mm. Petals yellow, (4–)5–8 × 4–8 mm. Anthers ca. 1 mm across. Carpels 0.6–0.7 × ca. 0.4 mm, styles ca. 2 mm.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and SW Asia.



Altitudinal range: 3600–4800 m.

Ecology: Open meadows, sandy river banks.

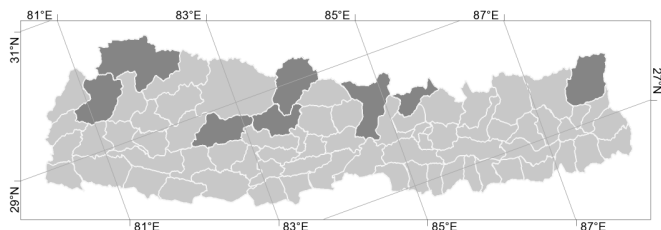
Flowering: May–September. **Fruiting:** May–September.

Potentilla argyrophylla var. *atrosanguinea* (Lodd.) Hook.f., Fl. Brit. India 2[5]: 357 (1878).
Potentilla atrosanguinea Lodd., Bot. Cab. 8(9): pl. 786 (1823);
Potentilla cautleyana Royle.

Radical leaves with 2–8 cm petioles, 5–12 × 3–5.5 cm, terminal leaflet 2–4 × 1.2–2.5 cm. Flowering stems 15–30 cm. Flowers

1.5–2.2 cm across. Episepals 4–6 × 2–3 mm. Sepals 4.5–7 × 3–5 mm. Petals crimson or orange, 6–8 × 6–9 mm. Anthers ca. 1 mm across. Carpels ca. 0.7 × 0.5 mm, styles ca. 2 mm.

Distribution: Nepal, W Himalaya and Tibetan Plateau.



Altitudinal range: 2900–4600 m.

Ecology: Open meadows, sandy river banks.

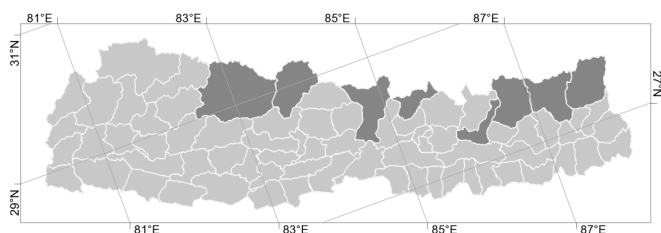
Flowering: June–September. **Fruiting:** June–September.

24. *Potentilla saundersiana* Royle, Ill. Bot. Himal. Mts. [6]: 207, pl. 41 fig. I (1835).

Potentilla caespitosa Lehm.; *P. caliginosa* Soják; *P. forrestii* W.W.Sm.; *P. forrestii* var. *caespitosa* (Wolf) Soják; *P. forrestii* var. *segmentata* Soják; *P. illudens* Soják; *P. jacquemontii* (Franch.) Soják; *P. multifida* var. *saundersiana* (Royle) Hook.f.; *P. potaninii* Th.Wolf; *P. saundersiana* var. *caespitosa* Wolf; *P. saundersiana* var. *segmentata* (Soják) Soják; *P. thibetica* Cardot; *P. williamsii* Soják.

Perennial rosulate herbs to 20 cm. Rootstock stout, short, with several slender roots. Petioles 0.5–3.5(–6) cm, pubescent with patent or appressed hairs. Radical leaves palmately 5-foliolate, sometimes mixed with trifoliolate leaves, 1–6(–8) × 0.7–2.5 cm; terminal leaflet oblong to narrowly obovate, 0.5–2 × 0.3–1 cm, base cuneate, apex obtuse, margin serrate or bluntly incised, densely or rarely sparsely lanate above, densely white sericeous below; cauline leaves reduced in size towards top, usually trifoliolate. Flowering stems from axils of radical leaves, 2–10(–20) cm, densely covered with patent or ascending hairs. Flowers 1–1.6 cm across. Pedicels pubescent. Episepals lanceolate to oblong, 3–5 × 1.5–3 mm, apex acute, densely or sparsely hirsute on both sides. Sepals ovate-triangular, 3–4.5(–6) × 1.5–2.5 mm, apex acute, glabrescent inside except shortly lanate near apex, densely hirsute outside. Petals yellow with orange base, obovate to broadly obovate, 5–7 × 5–7 mm, apex emarginate. Stamens 20, anthers compressed ellipsoid, ca. 0.8 × 0.7 mm. Carpels ellipsoid, ca. 0.5 × 0.3 mm, glabrous, styles subterminal, ca. 1 mm.

Distribution: Nepal, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 3100–4900 m.

Ecology: Open meadows, thickets, gravelly slopes, sandy riversides.

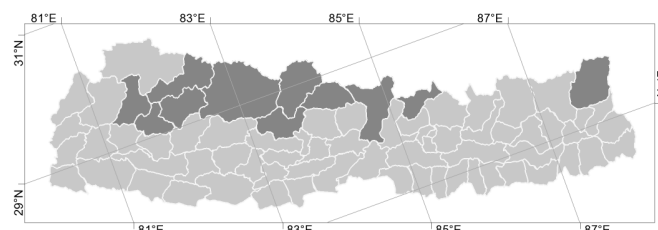
Flowering: May–August. **Fruiting:** May–August.

Kitamura (Fauna Fl. Pl. Nepal Himalaya: 149. 1955) misapplied *Potentilla argentea* L. to this species.

25. *Potentilla griffithii* Hook.f., Fl. Brit. India 2[5]: 351 (1878). *Potentilla griffithii* var. *metallica* Soják; *P. jeschenaultiana* Ser.; *P. sikkimensis* Th.Wolf; *P. spodioclora* Soják.

Perennial rosulate herbs to 50 cm. Rootstock stout, short, with several slender roots. Petioles 3.5–8 cm, pubescent with patent or appressed hairs. Radical leaves imparipinnate with 2–5 pairs of lateral leaflets, 5–15(–20) × 2–4.5 cm; terminal leaflet oblong to narrowly oblong, 1.5–3.5 × 0.8–2 cm, base cuneate, apex obtuse, margin acutely serrate, densely or rarely sparsely lanate above, densely white sericeous below. Flowering stems from axils of radical leaves, 10–40(–50) cm tall, densely covered with patent or ascending hairs. Cauline leaves reduced in size towards top, lower leaves 5-foliolate, upper leaves 3-foliolate. Flowers 1.2–1.8 cm across. Pedicels pubescent. Episepals lanceolate to elliptic, 3–7 × 2–4 mm, margin entire, often revolute, apex acute, densely or sparsely hirsute on both sides. Sepals ovate-triangular, 5–6 × 2.5–3.5 mm, apex acute to acuminate, glabrescent inside except shortly lanate near apex, densely hirsute outside. Petals yellow with orange base, obovate to broadly obovate, 6–8 × 5–8 mm, apex emarginate. Stamens 20, anthers compressed ellipsoid, ca. 0.8 × 0.5 mm. Carpels ellipsoid, ca. 0.3 × 0.2 mm, glabrous, styles subterminal, ca. 1.5 mm, slightly swollen at base.

Distribution: Nepal, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 1600–4000 m.

Ecology: Open meadows, forest margins, thickets.

Flowering: July–September. **Fruiting:** July–September.

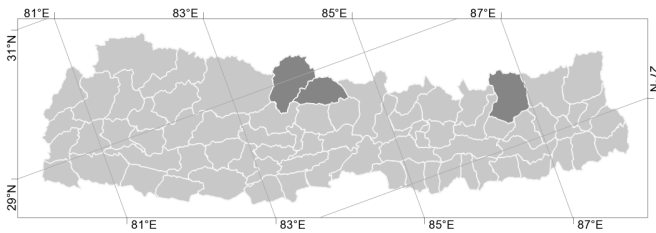
26. *Potentilla multifida* L., Sp. Pl. 1: 496 (1753). *Potentilla exigua* Soják; *P. ornithopoda* Tausch; *P. plurijuga* Hand.-Mazz.; *P. plurijuga* var. *lhasana* Soják.

Perennial rosulate herbs to 30 cm. Rootstock stout, terete. Petioles 0.5–3(–6) cm, pubescent with patent or appressed hairs. Radical leaves imparipinnate with 2–5 pairs of lateral leaflets, 2–10 × 1–2.5 cm; leaflets divided into linear lobes;

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terminal leaflet oblanceolate to oblong, 1–3 × 0.6–0.8 cm, base narrowly cuneate, apex obtuse, margin deeply incised into linear lobes, sparsely lanate above, densely white sericeous below. Flowering stems from axils of radical leaves, (5–)10–30 cm, densely covered with patent or appressed hairs. Cauline leaves reducing in size upwards. Flowers 0.8–1.2 cm across; pedicel pubescent. Episeals lanceolate to oblong, 2–4 × 1–1.5 mm, apex acute, densely or sparsely hirsute on both sides. Sepals ovate-triangular, 3.5–5 × 2.5–3.5 mm, apex acute, glabrescent except shortly lanate near apex inside, densely hirsute outside. Petals yellow with orange base, obovate, 5–6 × 5–6 mm, apex emarginate. Stamens 20, anthers compressed ellipsoid to ovoid, ca. 0.8 × 0.6 mm. Carpels ellipsoid, ca. 0.6 × 0.4 mm, glabrous, styles subterminal, ca. 1.5 mm.

Distribution: Asia and Europe.



Altitudinal range: 2900–4500 m.

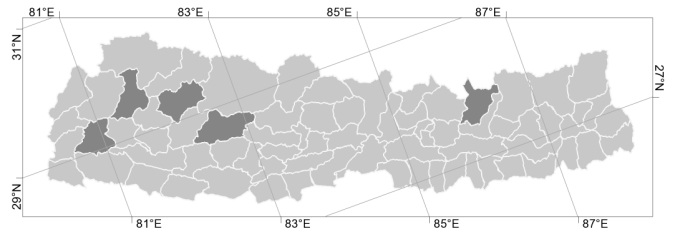
Ecology: Open meadows, forest margins, roadsides.

Flowering: June–August. **Fruiting:** June–August.

27. *Potentilla nepalensis* Hook., Exot. Fl. 2[7]: pl. 88 (1824). *Potentilla formosa* D. Don nom. illegit.; *P. formosa* Sweet; *P. guillemi-waldermarii* Klotzsch.

Perennial rosulate herbs to 80 cm. Rootstock stout, short, with several slender roots. Petioles (0.5–)1–4 cm, pubescent with patent hairs. Radical leaves palmately 5-foliolate, 3–8 × 1–5 cm; terminal leaflet oblong to oblong-obovate, 0.5–3.5 × 0.4–1.5 cm, base cuneate, apex obtuse, margin acutely or obtusely serrate, pilose on both surfaces, sometimes glabrescent above, densely appressed villous below. Flowering stems from axils of radical leaves, (5–)20–60(–80) cm, pubescent with patent or ascending hairs. Cauline leaves reducing in size upwards, lower leaves 5-foliolate, upper leaves 3-foliolate. Flowers 1.2–1.6 cm across. Pedicels pubescent. Episeals lanceolate to narrowly ovate, 3–7 × 1–3 mm, apex acute, sparsely hirsute on both sides. Sepals ovate-triangular, 3.5–6(–8) × 1.5–3(–4) mm, apex acute to acuminate, glabrescent inside, sparsely hirsute outside. Petals crimson, obovate to broadly obovate, 5–7 × 4–6 mm, apex shallowly emarginate. Stamens 20, anthers compressed ellipsoid, ca. 1.2 × 0.9 mm. Carpels ellipsoid, ca. 0.6 × 0.3 mm, glabrous, styles subterminal, ca. 1.5 mm, slightly swollen at base.

Distribution: Nepal and W Himalaya.



Altitudinal range: 2000–2600 m.

Ecology: Open meadows, forest margins, roadsides.

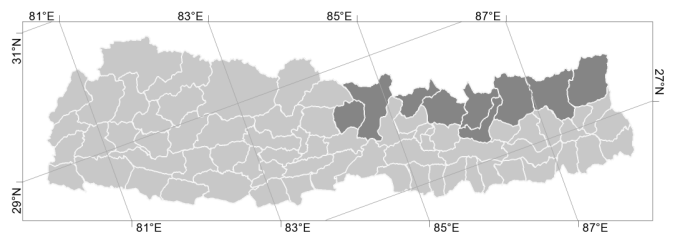
Flowering: May–August. **Fruiting:** May–August.

28. *Potentilla coriandrifolia* D. Don, Prodr. Fl. Nepal.: 232 (1825).

Potentilla meifolia Wall. ex Lehm.; *P. meifolia* Wall. nom. nud.

Perennial rosulate herbs to 12 cm. Rootstock robust, terete, somewhat thickened, blackish, simple or occasionally branched. Stipules of radical leaves membranous, brown. Radical leaves elongated lanceolate, 3–10 cm, pinnate with 3–8 pairs of lateral leaflets; leaflets opposite, subsessile, palmately divided into linear lobes, apex acuminate, sparsely appressed pilose or glabrescent inside, appressed villous or glabrescent outside. Flowering stems from axils of radical leaves, erect or ascending, 3–12 cm, sparsely pilose or glabrescent. Stipules of cauline leaves leaf-like, glabrescent inside, appressed villous outside. Cauline leaves 1 or 2, similar but much smaller than radical leaves, dissected into linear lobes. Flowers 1.0–1.7 cm across, solitary or in 2–3(–5)-flowered cymes. Pedicels 1.2–3 cm, appressed or ascending pubescent. Episeals lanceolate, 2–4 × 1–1.5 mm, apex acute or acuminate, glabrescent inside, sparsely pilose outside. Sepals triangular-ovate, 3–5 × 2–3 mm, apex acute or acuminate, glabrescent inside, lanate near apex, sparsely pilose outside. Petals white with crimson base, obovate to broadly obovate, 4–7 × 3–7 mm, apex emarginate. Stamens 20, anthers globose, ca. 0.5 mm across. Carpels ellipsoid to obovoid, glabrous, smooth, ca. 1 × 0.6–0.8 mm, styles subterminal, 1.2–1.5 mm. Achenes obovoid, smooth, ca. 1.5 × 1 mm.

Distribution: Nepal, W Himalaya, E Himalaya and Tibetan Plateau.



Altitudinal range: 3700–5600 m.

Ecology: Open meadows, silty slopes.

Flowering: June–September. **Fruiting:** June–September.

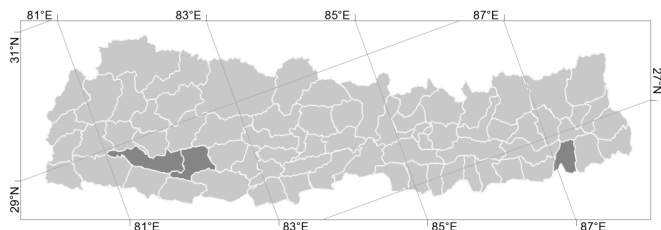
29. *Potentilla supina* L., Sp. Pl. 1: 497 (1753).

Comarum flavum Buch.-Ham. ex Roxb.; *C. flavum* Buch.-Ham. ex Roxb. nom. nud.; *Potentilla heynii* Roth; *P. paradoxa* Nutt.; *P. supina* var. *paradoxa* (Nutt.) Th.Wolf.

बज्रदन्ती Bajradanti (Nepali).

Annual or biennial herbs to 30 cm. Stipules of radical leaves membranous, brown, glabrous inside, pilose outside. Radical leaves pinnate with 2–4 pairs of lateral leaflets, 2–8 cm long; leaflets alternate or opposite, subsessile, oblong to obovate, 5–12 × 2–8 mm, base cuneate except those uppermost pair decurrent, margin incised-serrate, apex obtuse, pilose or glabrescent upper, sparsely to densely pilose lower. Flowering stems erect or ascending, (6–)10–30 cm, pubescent. Stipules of cauline leaves leaf-like, obliquely ovate to lanceolate, sparsely pilose or glabrescent inside, sparsely to densely pilose outside. Cauline leaves similar to radical leaves, but with fewer leaflets. Flowers 0.5–0.8 cm across, solitary terminal. Pedicel 3–10 mm long, pubescent. Episeals oblong-elliptic, 2–3 × 0.8–1.2 mm, entire or divided into two lobes, apex acute or obtuse. Sepals triangular-ovate, 2.5–4 × 1.5–2.5 mm, apex acute or obtuse, glabrescent inside, sparsely to densely pilose outside. Petals yellow, oblong to obovate, 1.5–4 × 0.8–3 mm, apex rounded or slightly emarginate, usually shorter than sepals. Stamens 15–20, filaments filiform, anthers compressed globose, ca. 0.2 × 0.4 mm. Carpels many, crowded on dome-shaped receptacle, obliquely ellipsoid, ca. 0.3 × 0.2 mm, glabrous, styles subterminal, ca. 0.5 mm long, stigmas slightly dilated. Achenes oblong to narrowly ovoid, ca. 0.4 × 0.3 mm, smooth except ridged margin.

Distribution: Asia and Europe.



Altitudinal range: 100–2000 m.

Ecology: Field margins, river banks, moist meadows, gravelly slopes.

Flowering: March–July. **Fruiting:** March–July.

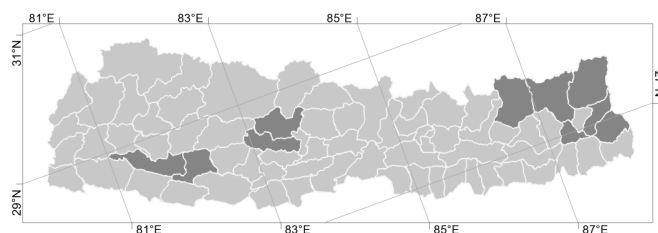
Root paste is applied to boils. Pieces of root are chewed to relieve toothache.

30. *Potentilla sundaica* (Blume) Kuntze, Revis. Gen. Pl. 1: 219 (1891).

Fragaria sundaica Blume, Bijdr. Fl. Ned. Ind. [17]: 1106 (1827); *Potentilla anemonefolia* Lehm.; *P. bodinieri* H.Lév.; *P. kleiniana* Wight; *P. wallichiana* Delile ex Lehm. later homonym, non Ser.

Perennial herbs to 50 cm, ascending or prostrate, often rooting at nodes. Stipules of radical leaves membranous, pale brown, glabrous inside, sparsely pilose or glabrescent outside. Radical leaves subpedately 5-foliolate, 3–12 cm long; leaflets subsessile or short-petiolulate, oblanceolate to oblong-obovate, 5–30 × 4–17 mm, base cuneate, margin serrate, apex obtuse, sparsely pilose upper, appressed villous lower, especially along veins. Flowering stems 10–50 cm, pilose or spreading villous. Stipules of cauline leaves leaf-like, ovate or ovate-lanceolate, glabrous inside, sparsely villous outside. Cauline leaves similar to radical leaves; lower cauline leaves 5-foliolate, upper leaves 3-foliolate. Flowers 0.8–0.9 cm across, crowded terminally in many-flowered cymes. Pedicels 5–12 mm, appressed or ascending villous. Episeals lanceolate or oblong-lanceolate, 2.5–4 × 1–1.3 mm, apex acute or acuminate, glabrescent inside, pilose outside. Sepals triangular-ovate, 3–4 × 1.5–2.2 mm, apex acute or acuminate, glabrescent inside, pilose outside. Petals yellow, oblong-obovate, 3.5–5 × 2.5–3 mm, apex slightly emarginate. Stamens ca. 20. Carpels many, crowded on dome-shaped receptacle obliquely ellipsoid, smooth, 0.3–0.4 × 0.2–0.3 mm, styles subterminal, 0.7–0.8 mm long, base thickened, stigmas slightly dilated. Achenes ovoid, 0.6–0.7 × 0.4–0.5 mm, rugose.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma, S Asia, E Asia and SE Asia.



Altitudinal range: 1000–2400 m.

Ecology: Field margins, river banks, moist meadows, forest margins.

Flowering: March–September(–December). **Fruiting:** March–September(–December).

Roots and stems are considered toxic and they are pounded and applied to abscesses and the bites of snakes and centipedes.

31. *Potentilla indica* (Andrews) Th.Wolf, in Asch. & Graebn., Syn. Mitteleur. Fl. 6,1(Lief 6): 661 (1904).
Fragaria indica Andrews, Bot. Repos. 7: pl. 479 (1807);
Duchesnea fragiformis Sm.; *D. indica* (Andrews) Focke;
Potentilla denticulosa Ser.; *P. wallichiana* Ser.

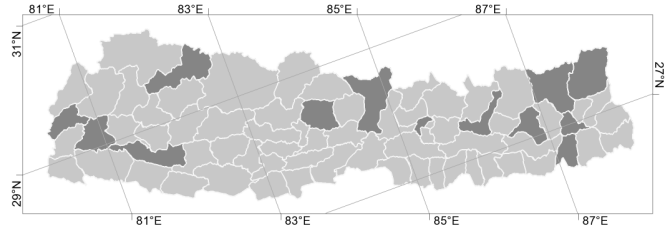
भुईँ काफल Bhuin kaphal (Nepali).

Perennial stoloniferous herbs. Rhizomes not developed. Stolons from radical leaves, usually rooting at nodes after flowering. Stipules of radical leaves membranous, free. Radical leaves with appressed or ascending hairy petioles, trifoliolate or rarely 5-foliolate, sparsely hairy upper, sparsely or densely

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hairy lower, especially densely hairy on veins; terminal leaflet rhombic-oblong to elliptic, apex acute, margin usually single, sometimes doubly serrate, (0.7–)1–4 × (0.5–)0.7–2.5 cm. Flowers 1.2–2 cm across, on stolons. Episepals obovate to broadly obovate, 5–8 × 4–9 mm, apex 3–5-lobed, densely hairy outside, sparsely hairy inside. Sepals triangular-ovate, 5–9 × 3–4 mm, apex acute to acuminate, densely hairy outside, glabrous lower half, lanate upper half inside. Petals yellow, narrowly obovate, 6–9 × 4–6 mm. Carpels ellipsoid, glabrous, styles subterminal, ca. 1 mm. Stamens 20, anthers compressed ellipsoid, 0.6–0.8 mm. Carpels on globose receptacle, ellipsoid, glabrous, 0.3–0.4 mm, styles subterminal, ca. 1 mm. Fruiting receptacle spongy, red, globose, glabrous, 7–13 mm across. Achenes crowded on receptacle, red, 1–1.3 × 0.5–0.8 mm, nearly smooth.

Distribution: Nepal, W Himalaya, E Himalaya, E Asia, SE Asia and SW Asia.



Altitudinal range: 900–2500 m.

Ecology: Field margins, river banks, moist meadows, forest margins, thickets.

Flowering: April–June. **Fruiting:** May–October.

Fruits are taken to treat blisters on the tongue.

17. *Sibbaldia* L., Sp. Pl. 1: 284 (1753).

Hiroshi Ikeda

Perennial herbs, stems often woody at base. Stipules adnate to petioles, upper part (auricle) free or more or less connate, membranous or leaf-like. Leaves pinnate or palmately 3–5-foliolate; leaflets serrate or dentate at apex. Inflorescences cymose or flowers solitary, terminal or from axils of radical leaves. Flowers bisexual or rarely unisexual. Bracts at base of pedicel, leafy or membranous; bracteoles absent. Hypanthium cupulate or saucer-shaped. Episepals (4 or)5. Sepals (4 or)5, alternate, persistent. Petals (4 or)5, yellow, dark red or white. Stamens (4 or)5(–10); anthers 2-locular. Ovary superior, carpels free, 4–20; ovule usually ascending. Style subbasal, lateral or subterminal. Achenes 4–20, inserted on somewhat swollen receptacle.

Worldwide about 20 species in arctic or alpine regions of N hemisphere. Eight species in Nepal.

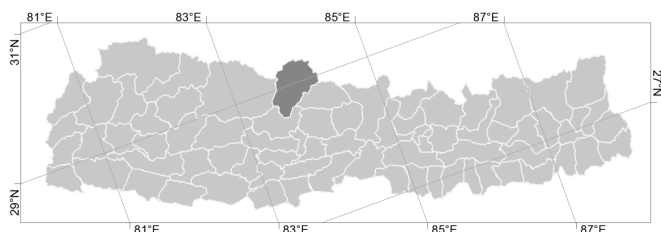
Key to Species

- 1a Radical leaves pinnate2
- b Radical leaves trifoliolate or palmately 5-foliolate.....4
- 2a Rhizomes slender, long-creeping under ground..... **1 *S. adpressa***
- b Rhizomes short. Flowering stems decumbent, above ground.....3
- 3a Petals red. Auricles of stipules of radical leaves connate from base to top..... **3 *S. emodi***
- b Petals yellow or pale orange. Auricles of stipules of radical leaves free..... **5 *S. micropetala***
- 4a Radical leaves palmately 5-foliolate **7 *S. purpurea***
- b Radical leaves trifoliolate.....5
- 5a Flowers usually tetramerous, rarely pentamerous..... **8 *S. tetrandra***
- b Flowers usually pentamerous, rarely tetramerous.....6
- 6a Petals red ***S. melinotricha***
- b Petals white or yellow7
- 7a Rhizomes short, aerial stems woody, tufted on ground. Petals yellow **2 *S. cuneata***
- b Rhizomes slender, long-creeping under ground. Petals white8
- 8a Petals shorter or as long as sepals **1 *S. adpressa***
- b Petals longer than sepals **6 *S. perpusilloides***

1. *Sibbaldia adpressa* Bunge, Fl. Altaic. 1: 428 (1829).
Sibbaldia minutissima Kitam.

Perennial herbs. Rhizomes woody, much-branched, slender and long-creeping. Stipules adnate to petioles in lower half, auricles triangular to linear, entire, apex acute to acuminate, glabrous inside, sparsely strigose outside and on margin. Petiole 1.0–2.2 mm long, with appressed or ascending hairs. Radical leaves trifoliolate or imparipinnate with 5 leaflets, oblanceolate or obovate, 0.5–5.5 × 0.3–2.2 cm; leaflets almost glabrous on upper surface, strigose on lower surface and margin. Lateral leaflets lanceolate to narrowly elliptic, 2.2–13 × 0.9–3.2 mm, apex acute, entire; base of uppermost leaflet pair decurrent. Terminal leaflet narrowly obovate to oblanceolate, 2.3–13 × 1.1–6.2 mm, base cuneate, apex tridentate. Cauline leaves 1 or 2, similar to radical leaves. Flowers hermaphrodite, solitary or 2–5 in cymes, 3.5–7.0 mm in diameter. Peduncles and pedicels with appressed hairs. Hypanthia shallowly cupulate, strigose outside, sparsely strigose inside. Episeals 5 (rarely 4), ovate to broadly lanceolate, 0.8–1.2 × 0.7–1.0 mm, apex obtuse to acute, strigose with minute glandular hairs outside, glabrous or sparsely hairy inside. Sepals triangular to broadly ovate, 1.5–2.2 × 1.3–1.7 mm, apex obtuse, strigose with minute glandular hairs outside, short villous on upper portion inside. Petals 5 (rarely 4), white to creamy white, spatulate to narrowly obovate, 1.7–2.5 × 1.0–1.3 mm. Stamens 10 (rarely 8); filaments glabrous, 0.3–0.5 mm; anthers semi-orbicular, 0.3–0.4 mm across. Carpels 10–16; ovaries ovoid, 0.5–0.6 × 0.4–0.5 mm, glabrous; styles lateral, slightly fusiform, 1.0–1.2 mm; stigmas slightly inflated, papillate.

Distribution: Nepal, Tibetan Plateau, E Asia and N Asia.



Altitudinal range: 3900–4400 m.

Ecology: Open meadows, roadside dumps.

Flowering: July–August.

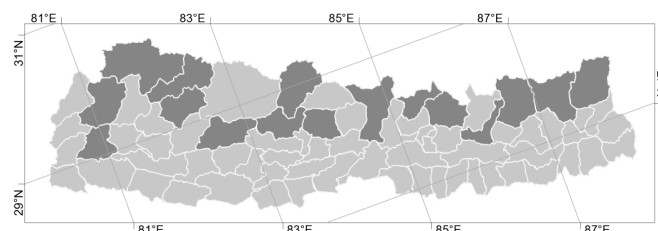
Kitamura described *Sibbaldia minutissima* from a single specimen collected by Nakao at Sangda, Mustang District (KYO). Ikeda and Ohba collected specimens near the type locality and concluded that *S. minutissima* was a small form of *S. adpressa*.

2. *Sibbaldia cuneata* Hornem. ex Kuntze, Linnaea 20: 59 (1847).
Potentilla sibbaldi Hook. f.; *Sibbaldia parviflora* Edgew. later homonym, non Willd.

Prostrate or tufted shrublets. Rhizomes woody, much-branched, upper part covered with old stipules and petioles. Flowering stems 5–14 cm long, erect or ascending, with

appressed or ascending hairs. Stipules of radical leaves adnate to petioles in lower half, auricles membranous, brown to light brown, apex acute to acuminate. Petioles 1.0–6.0 (–7.0) cm, with appressed or ascending hairs. Radical leaves trifoliolate, 1.5–8 (–10) cm; sparsely or densely pilose on both surfaces. Terminal leaflet short-petiolulate or sessile, broadly obovate to obovate, 5–15 × 4–13 mm wide, base cuneate, apex dentate with 3–5 teeth. Cauline leaves 1 or 2, similar to radical leaves. Inflorescence a terminal, compact cyme. Flowers 5–7 mm across. Episeals 5, lanceolate to narrowly elliptic, shorter than sepals, 1.5–3 × 0.5–1.0 mm, apex acute to acuminate, pilose with appressed or ascending hairs outside. Sepals 5, ovate or oblong, 2.0–4.0 × 1.5–2.0 mm, apex acute. Petals 5, yellow, narrowly obovate, 0.8–1.0 × 0.5–0.7 mm, apex rounded or shallowly retuse, as long as or a little longer than sepals. Stamens 5. Style lateral. Achenes glabrous.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, E Asia, N Asia and SW Asia.



Altitudinal range: 3000–4900 m.

Ecology: Alpine meadows, rocky crevices.

Flowering: June–August. **Fruiting:** August–October.

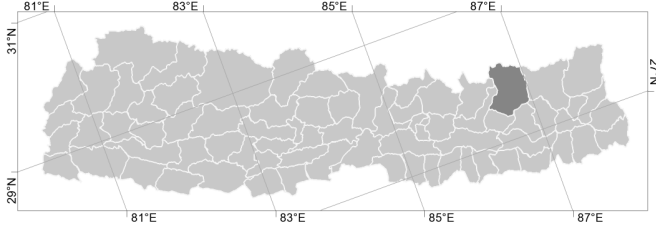
3. *Sibbaldia emodi* H. Ikeda & H. Ohba, J. Jap. Bot. 71: 188 (1996).

Rosulate herbs with prostrate flowering stems. Stipules of radical leaves connate with membranous auricles, apex rounded or 2–3-divided. Radical leaves interrupted-imparipinnate with 7–17-foliolate, 3–6 × 1.2–2.4 cm, leaflets sparsely hairy on upper surface, sericeous on lower surface. Terminal leaflet 0.8–1.4 × 0.5–0.8 cm, serrate with 5–9 teeth. Cauline leaves 3–5-foliolate, sparsely hairy on upper surface, sericeous on lower surface. Flowering stems axillary from radical leaves. Flowers solitary, terminal; pedicels 2–8 mm long, with appressed white hairs. Episeals lanceolate to ovate, 1.5–3.0 × 1.0–1.3 mm, densely sericeous outside, sparsely sericeous with strigose hairs inside. Sepals ovate to triangular, 1.8–3.1 × 1.2–1.9 mm, apex obtuse, sericeous outside with long and minute hairs, glabrous inside except densely pilose in upper half. Petals deep red, narrowly elliptic to lanceolate, 1.5–2.0 × 1.0–1.5 mm. Stamens 5; filaments 0.4–0.6 mm, pale red; anthers globose, 0.3–0.5 mm across, dark yellow before dehiscence. Ovaries ovoid, 0.5–0.8 mm long, 0.3–0.5 mm wide, with short multicellular stalked glands, pale green; styles subbasal, 0.8–1.1 mm long, pale green; stigmas inflated and papillate; ovule single. Achenes pale to

Rosaceae

dark brown, 1.8–2.2 mm long, rugose with swollen appendages of spongy tissue, 1-seeded. Seeds smooth.

Distribution: Endemic to Nepal.



Altitudinal range: 4000–4100 m.

Ecology: Open meadows.

Flowering: August. **Fruiting:** August.

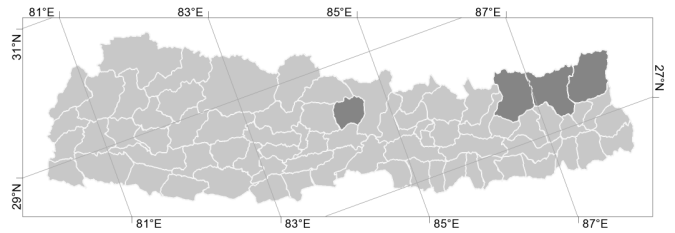
Sibbaldia emodi is similar to *S. micropetala* (D. Don) Hand.-Mazz. in gross appearance, but differs in having deep red petals compared with the usually yellow petals of *S. micropetala*. *Sibbaldia emodi* also differs from *S. micropetala* in the stipules of its radical leaves which have connate upper parts while those of *S. micropetala* are free.

4. *Sibbaldia sikkimensis* (Prain) Chatterjee, Notes Roy. Bot. Gard. Edinburgh 19: 327 (1938).

Potentilla sikkimensis Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73(5): 201 (1904); *Sibbaldia melinotricha* Hand.-Mazz.

Rosulate perennial herbs. Roots robust, terete, upper part covered with old petioles and stipules. Flowering stems erect or ascending, 5–20 cm tall, with patent or ascending hairs. Stipules of radical leaves membranous, light to dark brown, pilose outside, auricles lanceolate to triangular, apex acute to acuminate. Petioles 1–8 cm long, with patent or ascending hairs. Radical leaves trifoliate, 3–10 × 1.3–4 cm; leaflets sparsely pilose on both surfaces. Terminal leaflet short-petiolulate or sessile, obovate to broadly elliptic, 7–23 × 5–17 mm, base broadly cuneate or subrounded, coarsely dentate-serrate with 5–9 teeth in upper half, acute or obtuse at tips. Cauline leaves 1–2, similar to radical leaves but smaller in size. Stipules of cauline leaves herbaceous, auricles ovate to triangular, pilose outside. Inflorescence terminal, umbel-like. Flowers 5–8 mm across. Pedicel 5–12 mm long, with patent or ascending hairs. Episepals lanceolate to narrowly ovate, usually shorter than sepals, 1.5–2.5 × 0.8–1.2 mm, pilose. Sepals ovate to triangular, 2–4 × 1–1.5 mm wide, apex acute. Petals 5 (rarely 6), dark red, obovate, 4–6 × 3–4 mm, apex rounded, truncate or shallowly retuse, nearly as long as sepals. Stamens 5 (rarely 6); filaments ca. 0.5 mm; style subterminal, 0.4–0.6 mm. Ovaries ovoid, 0.6–0.7 × 0.4–0.5 mm. Achenes ovoid, light brown, 1.2–1.5 mm long, 0.7–1.0 mm wide, glabrous.

Distribution: Nepal, E Himalaya, Assam-Burma and E Asia.



Altitudinal range: 3300–4800 m.

Ecology: Open alpine meadows or at edge of shrubberies.

Flowering: June–July. **Fruiting:** July–September.

Chinese plants have been treated by some authors as a distinct species *Sibbaldia melinotricha*, but they are not distinguishable from *S. sikkimensis*.

5. *Sibbaldia micropetala* (D. Don) Hand.-Mazz.,

Vegetationsbilder 22(8): 6 (1932).

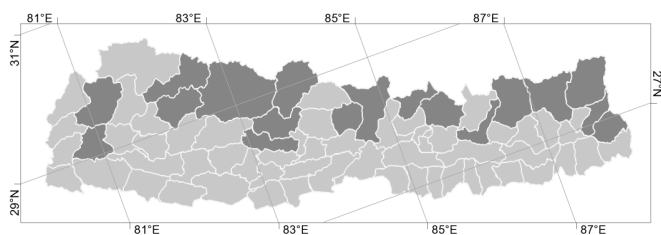
Potentilla micropetala D. Don, Prodr. Fl. Nepal.: 231 (1825);

Potentilla albifolia Wall. ex Hook.f.; *P. albifolia* Wall. nom. nud.;

Sibbaldia potentilloides Cambess.

Rosulate perennial herbs. Roots robust, terete. Flowering stems repent or ascending, 5–30 cm long, white tomentose or glabrescent. Stipules of radical leaves membranous, pale brown, adnate to the lower side of petioles in lower half, auricles free, apex acute to acuminate. Radical leaves imparipinnate, 5–11-foliolate and sometimes with alternate smaller leaflets, 2–20 × 1–6 cm wide, sparsely pilose on upper surface and margin, white tomentose on lower surface. Terminal leaflet sessile or subsessile, elliptic to obovate, 0.5–2.5 × 0.5–2.5 cm wide, margin coarsely dentate-serrate with 10–20 teeth, teeth tips acute. Stipules of cauline herbaceous, auricles obliquely ovate to lanceolate, margin entire or with several teeth. Cauline leaves similar to radical leaves but reduced in number and size, leaflets glabrescent or sparsely pilose on upper surface and white tomentose on lower surface. Flowers solitary, terminal, 4–7 mm across. Episepals narrowly lanceolate to narrowly elliptic, usually shorter than sepals, sparsely or densely white tomentose outside. Sepals narrowly to broadly ovate, 2.5–4 × 1.5–2 mm wide, apex acute to acuminate. Petals yellow or pale orange, oblong to lanceolate, 1.4–1.5 × 0.8–1.0 mm, apex obtuse or shallowly retuse, usually shorter than sepals. Stamens 5, alternate with sepals; filaments, ca. 0.5 mm long. Ovaries ovoid, 0.5–0.6 × 0.3–0.4 mm, style lateral to subbasal. Achene ovoid, with swollen appendage on outer side, 1.3–1.5 mm long, 1.1–1.2 mm wide, brown with shallow grooves except smooth appendage. Fig. 14a-b

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 2300–4800 m.

Ecology: Open meadows.

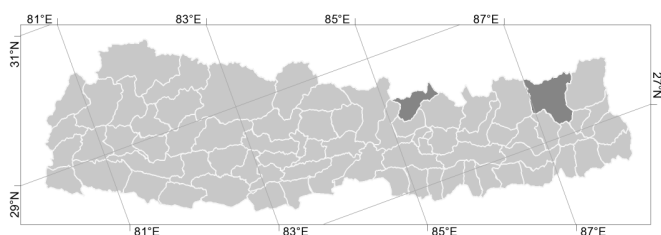
Flowering: June–August. **Fruiting:** July–September.

6. *Sibbaldia perpusilloides* (W.W.Sm.) Hand.-Mazz., Symb. Sin. 7(Leif 3): 520 (1933).

Potentilla perpusilloides W.W.Sm., Rec. Bot. Surv. India 4: 188 (1911).

Perennial herbs. Rhizomes slender, slightly woody, branching with fine roots. Flowering stems short, 3–15 mm tall, with sparse appressed hairs. Stipules membranous, pale to dark brown, subglabrous except ciliate margin; glabrous or sparsely hairy. Leaves radical, trifoliolate, 5–15 × 4–10 mm; leaflets subglabrous on both surfaces except sparsely pilose on margin; terminal leaflet short-petiolulate or sessile, obovate to broadly obovate, 2–4 × 1.5–3 mm, 3–5-dentate near apex, teeth with acute tips. Flowers hermaphrodite, solitary, terminal, 6–10 mm across. Episeals lanceolate, oblong or oblanceolate, a little shorter than sepals, 1.5–2 × 0.6–1 mm, entire or shallowly to deeply divided, apex acute to obtuse, sparsely hairy or subglabrous outside, glabrous inside, ciliate on margin. Sepals ovate, 2–2.5 × 0.8–1.2 mm, apex acute or obtuse. Petals 5, white, obovate to broadly obovate, apex rounded or shallowly retuse, longer than sepals. Stamens 10 or fewer; filaments 0.5–0.6 mm. Ovaries ovoid, smooth style lateral. Achenes ovoid, 1.2–1.3 × 0.8–0.9 mm, glabrous.

Distribution: Nepal, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 4000–4200 m.

Ecology: Moist rocky crevices, often with mosses.

Flowering: June–August. **Fruiting:** July–September.

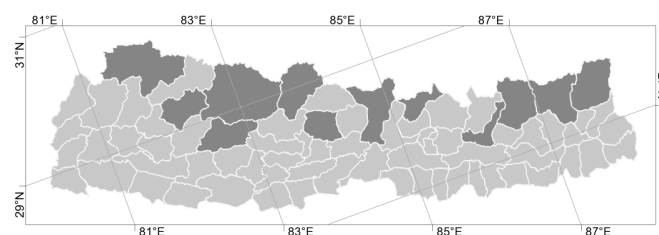
7. *Sibbaldia purpurea* Royle, Ill. Bot. Himal. Mts. [4]: pl. 40 fig. 3 (1834).

Potentilla purpurea (Royle) Hook.f.; *Sibbaldia macropetala* Murav.

Dioecious, prostrate, tufted shrublets. Rhizomes woody, much branched, mat-forming, upper part covered with old stipules and petioles. Flowering stems short, erect or ascending, 0.5–2 cm tall, with appressed hairs. Stipules membranous, pale purple-brown when young, turned to dark brown, sparsely pilose outside; petioles with appressed hairs. Radical leaves palmately 5-foliolate, 0.8–2 × 0.5–1.5 cm; leaflets sparsely appressed villous on upper surface, densely villous on lower surface. Terminal leaflet sessile or subsessile, obovate or obovate-oblong, 3–10 × 2–6 mm wide, base cuneate, apex obtuse, entire except for 2 or 3 teeth at apex. Flowers solitary, unisexual, axillary from radical leaves, pedicels shorter or as long as radical leaves. Flowers 4–6 mm across. Episeals lanceolate to narrowly oblong, shorter than sepals, 1–1.5 × 0.5–0.7 mm, apex acute to obtuse, sparsely pilose outside. Sepals ovate to triangular-ovate, 0.8–1 × 0.6–0.7 mm, apex acute to obtuse. Petals 5, purple-red, oblanceolate to narrowly obovate, 1.5–2 × 1–1.2 mm, apex rounded or shallowly retuse; nectary disk developed, purple-red; male flowers with 5 stamens alternating with petals; filaments ca. 0.7 mm. Female flowers with 10–15 carpels style lateral to subterminal. Achenes ovoid, glabrous, purple-brown.

Fig. 14c

Distribution: Nepal, W Himalaya, E Himalaya and Tibetan Plateau.



Altitudinal range: 3600–5700 m.

Ecology: Open meadows, rocky crevices.

Flowering: June–August. **Fruiting:** July–September.

Sibbaldia macropetala Muraj. (from Sikkim, Bhutan, SW China) is sometimes treated as a variety of *S. purpurea*, but it differs from *S. purpurea* by having flowers usually in corymbs which exceed the radical leaves, and hermaphrodite flowers.

8. *Sibbaldia tetrandra* Bunge, Verz. Altai Pfl.: 17 (1836).

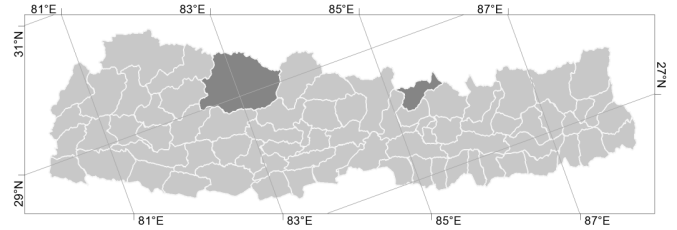
Dryadanthe bungeana Ledeb.; *D. tetrandra* (Bunge) Juz.; *Potentilla tetrandra* (Bunge) Bunge ex Hook.f.

Low, tufted, perennial herbs. Usually dioecious. Rhizomes robust, terete, much branched, mat-forming, upper part covered with old leaves. Flowering stems short, 0.5–1 cm tall. Stipules membranous, pale to dark brown, adnate to petioles, pilose outside. Petioles dilated in lower half, upper half with pilose hairs. Leaves trifoliolate, 0.5–1.5 × 0.4–1 cm; leaflets pilose on both surfaces. Terminal leaflet sessile to subsessile, oblong to obovate, 4–8 × 3–4 mm wide, base cuneate, apex retuse, 3-dentate. Flowers 1 or 2, 4–8 mm across. Episeals 4, lanceolate to narrowly ovate, nearly as long as or shorter than sepals, 1.5–2.5 × 0.5–1 mm, apex acute to obtuse. Sepals 4,

Rosaceae

ovate to triangularly ovate, 1.5–2 × 1–1.2 mm wide, apex obtuse to subrounded. Petals 4, creamy white to pale yellow, oblong to narrowly obovate, 1.5–2 × 0.7–1 mm, alternate with sepals, nearly as long as or a little longer than sepals. Male flowers with 4 stamens, opposite to sepals; filaments 0.8–1 mm; nectary disk developed. Female flowers with 4 or 5 carpels; ovaries ovoid, ca. 1 mm × 0.5 mm; style lateral to subterminal, 1–1.2 mm; stigma slightly inflated. Achenes glabrous.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, N Asia and C Asia.



Altitudinal range: 4500–6000 m.

Ecology: Rocky slopes or rock crevices, meadows.

Flowering: May–July. **Fruiting:** July–September.

18. *Fragaria* L., Sp. Pl. 1: 494 (1753).

Hiroshi Ikeda

Perennial herbs with slender prostrate stolons. Stipules partly adnate to base of petioles. Leaves rosulate, alternate, 3(or 5)-foliolate, toothed, petiolate. Flowers solitary, rarely 2- or 3-flowered, axillary from rosulate leaves. Flowers bisexual. Bracts at base of pedicel; bracteoles present or absent. Hypanthium shallowly cupulate. Episepals 5. Sepals 5. Petals 5, usually white, rarely pinkish. Stamens 20–30. Ovary superior, carpels many, free, inserted on a semi-globose receptacle. Style lateral. Achenes small, inserted on a cavity of enlarged fleshy receptacle.

Worldwide about 20 species in the temperate and warmer regions of the N hemisphere and in S America. Three species in Nepal.

Key to Species

- 1a Mature fruiting receptacle conical. Terminal leaflet oblanceolate to obovate, with 3–6 teeth on each side, shiny deep green on upper surface **1 *F. daltoniana***
- b Mature fruiting receptacle subglobose. Terminal leaflet narrowly to broadly obovate, with 4–13 teeth on each side, not shiny on upper surface **2**
- 2a Petioles and flowering stems with brownish patent hairs. Petals 4–6 mm **2 *F. nilgerrensis***
- b Petioles and flowering stems with whitish appressed hairs. Petals 7–10 mm **3 *F. nubicola***

1. *Fragaria daltoniana* J.Gay, Ann. Sci. Nat., Bot., Sér. 4 8: 204 (1857).

Fragaria rubiginosa Lacaita; *F. sikkimensis* Kurz; *F. vesca* var. *collina* Hook.f.

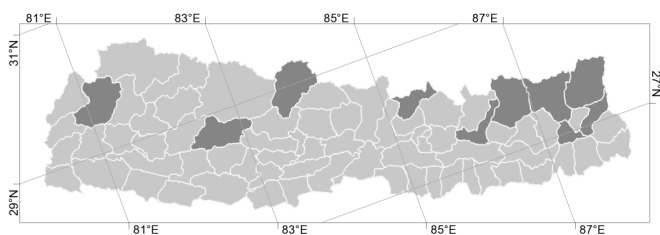
कर्णफूल झार Karnaphul jhar (Nepali).

Stolons subglabrous or sparsely appressed hairy. Radical leaves trifoliolate, (1–)1.5–7(–10) × (0.7–)1–3(–4) cm; petiole slender, 0.5–4(–9) cm, whitish appressed hairy; leaflets shortly petiolulate, oblanceolate to obovate, (0.5–)1–2(–2.5) × 0.5–1.2(–1.5) cm, base of terminal leaflet cuneate, base of lateral leaflets obliquely cuneate, apices obtuse or acute, margin incised serrate, 3–6 teeth on each side, shiny deep green above, sparsely appressed hairy when young, glabrous when old, appressed hairy below, especially along midvein and lateral veins. Flower solitary; scape 1–5 cm, with white appressed hairs. Episepals oblong, 3.5–5 × 1.5–2 mm,

glabrescent or sparsely white appressed hairy above, white appressed hairy below, apex 2–4-toothed, acute to acuminate. Sepals ovate, 3–5 × 2–2.5 mm, glabrescent above, white appressed hairy below. Petals white, broadly obovate to semiorbicular, 4–7 × 3–6.5 mm. Stamens 15–20; filaments 1–1.5 mm; anthers flattened ellipsoid, ca. 1 × ca. 0.7 mm. Ovaries ellipsoid, ca. 0.5 × ca. 0.3 mm; style ca. 0.8 mm. Fruiting receptacle globose when young, becoming conical when mature, reddish, pink or whitish, 0.7–2.5(–3) × 0.5–1(–1.5) cm; persistent sepals spreading. Achenes smooth, glabrous, ca. 1 × ca. 0.6 mm.

Fig. 14d

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and Assam-Burma.



Altitudinal range: 2000–4000 m.

Ecology: Forest margins, moist banks, open meadows.

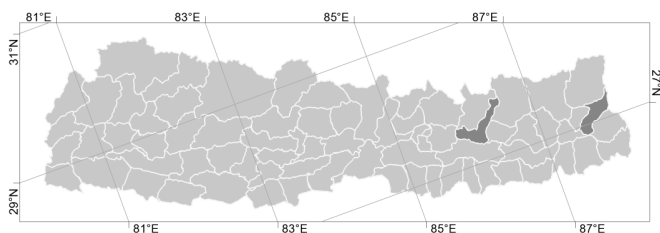
Flowering: June–July. **Fruiting:** July–August.

Fruits are edible. Juice of the roots is taken to treat fever.

2. *Fragaria nilgerrensis* Schldl. ex J.Gay, Ann. Sci. Nat., Bot., Sér. 4 8: 206 (1857).

Stolons brownish patent hairy. Radical leaves trifoliolate, (1–)1.5–10(–15) × (1.2–)1.5–4(–6) cm; petiole slender, 0.8–8(–12) cm, brownish patent hairy; leaflets shortly petiolulate, oblanceolate to obovate, (0.8–)1–3(–4) × (0.5–)1–2(–3) cm, base of terminal leaflet cuneate, base of lateral leaflets obliquely cuneate, apices obtuse or acute, margin incised serrate, 4–10 teeth on each side, sparsely or densely brownish patent hairy above, adaxially brownish patent hairy below, especially along midvein and lateral veins. Flower 1 or 2(or 3); scape 1–5(–10) cm, with brownish patent hairs. Episepals lanceolate to oblong, 4–5 × 1.5–2 mm, sparsely brownish ascending hairy above, brownish patent hairy below, entire, apex acute. Sepals oblong-ovate, 4–5 × 2–2.5 mm, glabrescent above, brownish patent hairy below. Petals white, broadly obovate to semiobicular, 4–6 × 3–6 mm. Stamens around 20; filaments 0.7–2 mm; anthers flattened, narrowly ovoid, 0.8–1 × ca. 0.6 mm. Ovaries ellipsoid, ca. 0.6 × ca. 0.4 mm; style fusiform, ca. 1 mm. Fruiting receptacle subglobose, whitish to pink, 0.8–1.5 cm in diameter; persistent sepals appressed to aggregate fruit. Achenes smooth, glabrous, ca. 1 × ca. 0.8 mm.

Distribution: Nepal, E Himalaya, Assam-Burma and E Asia.



Altitudinal range: 2800–4200 m.

Ecology: Forest margins and moist meadows.

Flowering: May–June. **Fruiting:** June–July.

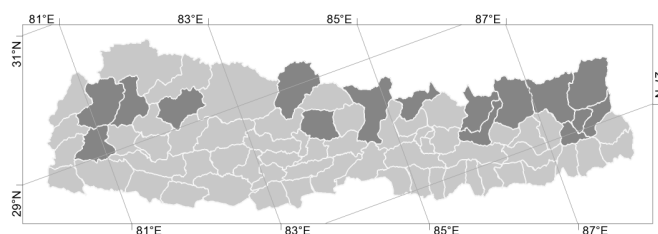
3. *Fragaria nubicola* (Hook.f.) Lacaïta, J. Linn. Soc., Bot. 43: 467 (1916).

Fragaria vesca var. *nubicola* Hook.f., Fl. Brit. India 2[5]: 344 (1878); *Fragaria nubicola* Lindl. ex Wall. nom. nud.

Stolons subglabrous or sparsely appressed hairy. Radical leaves trifoliolate, sometimes bearing 2 additional minor leaflets; terminal leaflet 1.5–10(–15) × 1.5–4(–5) cm; petiole slender, 1–8(–12) cm, whitish appressed hairy; leaflets shortly petiolulate or sessile, narrowly to broadly obovate, 1–4(–5) × (0.7–)1–2(–3) cm, base of terminal leaflet cuneate, base of lateral leaflets obliquely cuneate, apices obtuse or acute, margin incised serrate, 5–13 teeth on each side, light green above, sparsely white appressed hairy, white appressed hairy below, especially along midvein and lateral veins. Flowers 1 or 2; scape 2–8(–13) cm, with white appressed hairs. Episepals oblong to spatulate, 3–5(–7) × 1–2 mm, glabrescent above, sparsely white appressed hairy below, apex 2–4-toothed, sometimes deeply divided into two lobes, acute to acuminate. Sepals ovate, 3–5(–7) × 1.5–3(–4) mm, glabrescent above, white appressed hairy below. Petals white, broadly obovate to semiobicular, 7–10 × 5–10 mm. Stamens 20–25; filaments 2–3 mm; anthers flattened ovoid, ca. 1.2 × ca. 1 mm. Ovaries oblong, ca. 0.8 × ca. 0.3 mm; style ca. 1.2 mm. Fruiting receptacle subglobose, bright red, 0.8–1.2 cm in diameter; persistent sepals appressed to aggregate fruit. Achenes smooth, glabrous, ca. 1 × ca. 0.8 mm.

Fig. 14e

Distribution: Nepal, W Himalaya, E Himalaya and Tibetan Plateau.



Altitudinal range: 1600–4000 m.

Ecology: Forest margins, moist banks, open meadows.

Flowering: April–July(–October). **Fruiting:** May–July.

Rao (Indian Forester 93: 47. 1967) misapplied the name *Fragaria vesca* L. to this species.

The juice of the plant is given to give relief from profuse menstruation. Root juice is taken to treat fever. Unripe fruits are chewed to treat blemishes on tongue.

19. *Rosa* L., Sp. Pl. 1: 491 (1753).

Rosaceae

Hideaki Ohba & Colin A. Pendry

Shrubs, erect and diffuse or climbing, mostly prickly, bristly, or rarely unarmed. Stipules persistent and adnate to petiole or free except base and caducous, rarely absent. Leaves alternate, odd pinnate, rarely with a leaf-like bract with the appearance of a simple leaf. Flowers solitary or in corymbs, umbels or fascicles, usually bracteate, usually 5-, rarely 4-merous. Flowers bisexual. Bracts solitary, at base of pedicel; bracteoles absent or rarely present. Hypanthium ovoid to globose or obovoid. Epicalyx absent. Sepals 4 or 5, entire or with variously pinnately lobed margins, inner surface usually densely hairy. Petals 4 or 5 or numerous (double flowers), imbricate, inserted at mouth of hypanthium. Stamens numerous, in several whorls. Ovary superior, carpels free, numerous, rarely few, inserted at margin or base of hypanthium, ovules pendulous. Styles terminal or lateral, free or connate and column-like. Fruit a hip, formed from fleshy hypanthium with numerous (rarely few) achenes. Seed pendulous.

Worldwide 100 to 150 species from N temperate regions. Five species native to Nepal, with another eight species reported to be cultivated.

Rosa taxonomy is complicated because of hybridization, and many species may actually be ancient hybrids of complex and disputed taxonomy (Mabberley, Plant Book: 745-747. 2008). There is a huge commercial rose industry which produces numerous new hybrids every year, combining different cultivars to produce the desired combination of traits. Eight species have been reported to be cultivated in Nepal and are included in the key but not treated further. *Rosa chinensis* Jacq. is the basis for the 'China roses'. *Rosa x odorata* (Andrews) Sweet, the 'tea rose', is a hybrid between *R. chinensis* and *R. gigantea* Collett ex Crép. *Rosa moschata* Herrm. is the 'musk rose', whose exact origins are uncertain, but thought to be Himalayan or SW Asian; it is cultivated primarily for its scent and is the source of rose water. *Rosa gallica* L. is native to S Europe and W Asia and has long been cultivated there. *Rosa x damascena* Mill., the 'damask rose', is the natural hybrid between *R. moschata* and *R. gallica*. The three climbing species cultivated in Nepal are *R. banksiae* Aiton, *R. laevigata* Michx. and *R. multiflora* Thunb. var. *carnea* Thory, and all originate from China.

Key to Species

- 1a Stipules predominantly free from petiole, caducous2
- b Stipules predominantly adnate to petiole, usually persistent4

- 2a Branchlets villous. Leaflets 9–11. Flowers with leaf-like bracts **5 *R. clinophylla***
- b Branchlets glabrous. Leaflets 3–5. Flowers without bracts3

- 3a Flowers numerous, in corymbs, ca. 2 cm across. Pedicels with minute spine-like hairs, hypanthium glabrous ***R. banksiae***
- b Flowers solitary, 6–8 cm across. Pedicel and hypanthium with many needle-like spines ***R. laevigata***

- 4a Styles connate, column-like, conspicuously exerted from hypanthium, as long as stamens5
- b Styles free or slightly exerted from hypanthium, shorter than stamens7

- 5a Stipules entire **4 *R. brunonii***
- b Stipules dentate or pectinate6

- 6a Styles villous ***R. moschata***
- b Styles glabrous ***R. multiflora* var. *carnea***

- 7a Petals 4 or 5. Sepals erect or spreading, persistent in fruit. Wild8
- b Petals numerous. Sepals reflexed, caducous. Cultivated or naturalized10

- 8a Flowers 4-merous, without bract, white, always solitary **1 *R. sericea***
- b Flowers 5-merous, bracteate, pink or red, solitary or up to 5 in a fascicle9

- 9a Leaflets 5–9, 0.6–2 cm, upper surface glabrous or sparsely puberulous along veins, apex mostly rounded-obtuse. Pedicel 1–1.5 cm **2 *R. webbiana***
- b Leaflets usually 9–11, 2.2–6 cm, upper surface villous, apex mostly acute. Pedicel 1.5–3.5 cm **3 *R. macrophylla***

- 10a Hypanthium glabrous. Sepal margin usually entire11
- b Hypanthium glandular. Sepal margin variously lobed or toothed12

- 11a Flowers pink to crimson. Leaflets downy on midvein beneath ***R. chinensis***
- b Flowers white, yellow or pale pink. Leaflets completely glabrous ***R. x odorata***

- 12a Leaflets simply serrate. Flowers solitary or in groups of 2–4..... *R. gallica*
 b Leaflets doubly serrate. Flowers in clusters of up to 12..... *R. x damascena*

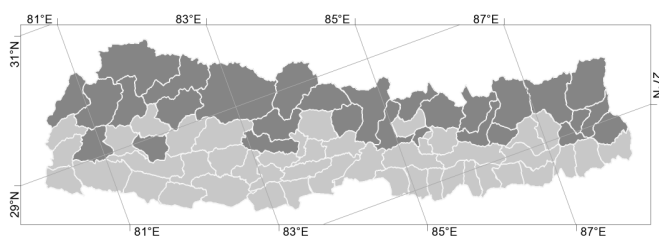
1. *Rosa sericea* Lindl., Ros. Monogr.: 105, pl. 12 (1820).
Rosa sericea var. *hookeri* Regel; *R. sericea* var. *omeiensis* (Rolfe) Rowley; *R. sericea* var. *pteracantha* A.R.Bean; *R. tetrasepala* Royle nom. nud.; *R. wallichii* Tratt.

दारिमपाते Darimpate (Nepali).

Erect shrubs to 1–2 m. Twigs robust, smooth to villous or glandular-hairy with bristles throughout. Prickles usually in pairs below leaves and scattered or rarely absent, to 1.2 cm long, robust, abruptly flaring to broad base, or rarely wing-like. Stipules mostly adnate to petiole, free parts auriculate, hairy or glabrous, margin glandular. Leaves including petiole 3.5–8 cm, rachis and petiole hairy. Leaflets (5–)7–11, ovate to obovate-oblong, 0.8–2 × 0.5–0.8 cm, base broadly cuneate, apex rounded-obtuse or sometimes acute, margin serrate in upper part, entire below, glabrous to sparsely villous above, sericeous-villous or glabrous below, sometimes with glandular hairs. Flowers solitary, axillary, 2.5–5 cm across. Bracts absent. Pedicel 1–2 cm, glabrous. Hypanthium obovoid or globose, nearly glabrous. Sepals 4, ovate-lanceolate, 8–15 mm, apex acuminate or acute, margin entire, outer surface glabrous to sparsely hairy, sometimes rather densely glandular, inner surface appressed hairy. Petals 4, white or often with creamy base, rarely pale yellow, broadly obovate, base broadly cuneate, apex emarginate. Styles free, shorter than stamens, slightly exerted, villous. Hip red or purple-brown, shiny, obovoid or globose, 8–15 mm across, glabrous, with persistent, erect sepals.

Fig. 15a-c

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 2100–4600 m.

Ecology: Open woods, forest margins, scrub, dry sunny places, sometimes gregarious.

Flowering: May–August. **Fruiting:** July–September.

A distinctive 4-petalled rose, common throughout Nepal. The shape of the hip is variable, with globose hips common in W and C Nepal, and obovate hips in E Nepal. Four varieties are recognized in Nepal, but Grierson (Fl. Bhutan 1: 586. 1987) noted that their characters overlap; var. *sericea* with slender, green fruiting pedicels; var. *omeiensis* with thickened, fleshy,

reddish fruiting pedicels; var. *pteracantha* with broad prickles up to 2 cm along the base and var. *hookeri* with small prickles, bristles and glands on its stems.

Ripe fruits are edible. A paste of flowers is applied to treat headaches and also given for liver complaints.

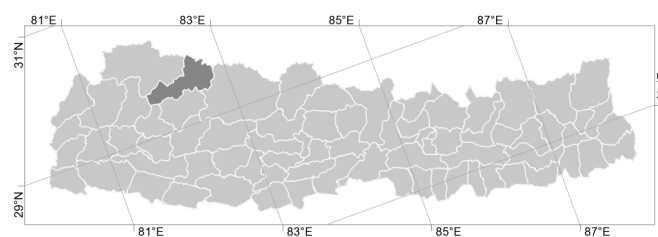
2. *Rosa webbiana* Wall. ex Royle, Ill. Bot. Himal. Mts. [4]: pl. 42 fig. 2 (1834).

Rosa webbiana Wall. nom. nud.

Shrubs 1–2 m. Twigs slender, purple-brown. Prickles in pairs below leaves, and scattered, straight, to 1 cm, stout, gradually tapering with broad base. Stipules mostly adnate to petiole, free parts ovate, apex acute, margin glandular-hairy. Leaves including petiole 3–4 cm, rachis and petiole glabrous. Leaflets 5–9, suborbicular, obovate, or broadly elliptic, 0.6–2 × 0.4–1.2 cm, base rounded or cuneate, apex rounded-obtuse, rarely acute, margin simply serrate in upper part, entire below, glabrous above, glabrous or sparsely hairy below, especially along veins. Flowers solitary, rarely 2 or 3 in fascicles, 3.5–5 cm across. Bracts ovate, margin glandular serrate, upper surface with conspicuous midvein and lateral veins. Pedicel 1–1.5 cm, glabrous or glandular-hairy. Hypanthium subglobose or ovoid, glabrous or glandular-hairy. Sepals 5, triangular-lanceolate, 10–15 mm, apex elongate, margin entire, outer surface glandular-hairy. Petals 5, reddish or pink, broadly obovate, base cuneate, apex emarginate. Styles free, shorter than stamens, hairy. Hip nodding, bright red, subglobose or ovoid, 1.5–2 cm across, glabrous, with persistent, spreading sepals.

Fig. 15d-f

Distribution: Nepal, W Himalaya, Tibetan Plateau and N Asia.



Altitudinal range: 2200–2900 m.

Ecology: Scrub, forest margins, grassy places, valley slopes.

Flowering: June–August. **Fruiting:** July–September.

3. *Rosa macrophylla* Lindl., Ros. Monogr.: 35, pl. 6 (1820).
Rosa hookeriana Wall. nom. nud.; *R. macrophylla* var. *hookeriana* Hook.f.

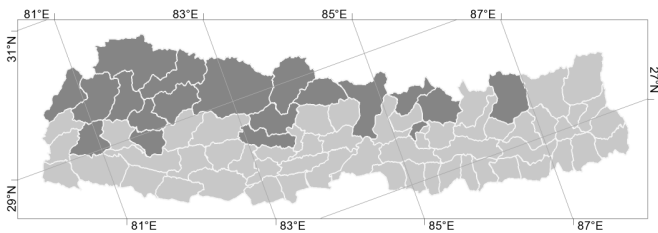
जंगली गुलाब Jungali gulab (Nepali).

Rosaceae

Shrubs 1.5–3 m. Twigs robust, purple-brown. Prickles in pairs below leaves or absent, straight. Stipules mostly adnate to petiole, free parts triangular to narrowly ovate, usually glabrous, apex shortly acuminate, margin glandular-serrate. Leaves including petiole 7–15 cm, rachis and petiole villous, often with sparse glandular hairs, sometimes with small prickles. Leaflets (7 or) 9–11(–13), narrowly oblong or elliptic-ovate, 2.2–5(–7) × 0.9–2.5(–3) cm, base rounded, rarely broadly cuneate, apex acute, rarely rounded-obtuse, margin nearly entire or doubly serrate, glabrous above, glabrous or sometimes sparsely glandular below, with prominent villous veins. Flowers 3.5–7 cm across, solitary, or 2 or 3 in fascicles. Pedicel 1.5–3.5 cm, usually with dense stipitate glandular hairs. Bracts 1 or 2, ovate, 1.5–2.5 cm, apex acuminate, margin glandular-hairy, upper surface puberulous along midvein or glabrous, with prominent veins. Hypanthium ovoid or narrowly ovoid, with dense stipitate glandular hairs. Sepals 5, narrowly triangular to narrowly ovate, 2–3.5(–5) cm, apex long caudate, often expanded into elliptic apical appendages to 1.2 cm, margin entire, outer surface stipitate glandular hairy, inner surface densely hairy. Petals 5, deep red, obtriangular-obovate or obovate, base broadly cuneate, apex rounded or emarginate. Styles free, much shorter than stamens, hairy. Hip purple-red, shiny, oblong-ovoid or narrowly ovoid, 1.5–3 × ca. 1.5 cm, often with stipitate glandular hairs, apex shortly necked, with persistent, erect sepals.

Fig. 15g–h

Distribution: Nepal, W Himalaya, E Himalaya and Tibetan Plateau.



Altitudinal range: 2100–4400 m.

Ecology: Scrub, forest margins, slopes.

Flowering: June–July. **Fruiting:** August–November.

Paste of the fruits is regarded as a tonic, and good for eyesight, and is also useful in fever, diarrhoea, and bile problems.

4. *Rosa brunonii* Lindl., Ros. Monogr.: 120, pl. 14 (1820).
Rosa clavigera H.Lév.; *R. moschata* var. *nepalensis* Lindl.; *R. pubescens* Roxb.

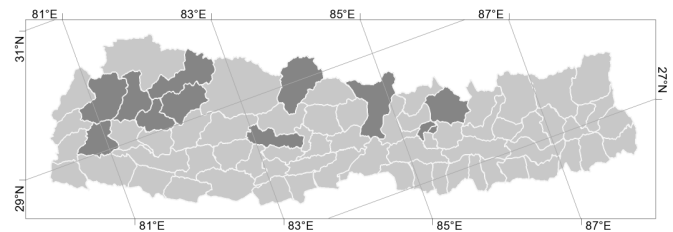
भैसीकाँडा Bhainsikanda (Nepali).

Climbing or scandent shrubs, 4–6 m. Twigs, red- or purple-brown, terete, glabrate. Prickles scattered, curved, to 5 mm long, flat, gradually tapering from broad base. Stipules mostly adnate to petiole, free parts lanceolate, apex acuminate, margin glandular, both surfaces hairy. Leaves including petiole

6–9 cm, rachis and petiole densely hairy, with scattered small prickles. Leaflets 5 or 7, oblong or oblong-lanceolate, 3–8 × 1–2.6 cm, broadly cuneate to rounded truncate, apex acuminate or acute, margin serrate, glabrous above, glabrous or sparsely hairy below, sometimes with glandular hairs along veins. Flowers 3–5 cm across, numerous in compound corymbs. Pedicel 2.8–3.5 cm, hairy with sparse glandular hairs. Bracts sometimes a unifoliate leaf. Bracteoles tiny or absent. Hypanthium obovoid, outer surface hairy. Sepals 5, deciduous, lanceolate, 1.5–2 cm, apex acuminate, often with 1 or 2 pairs of lobes, both surfaces hairy. Petals 5, white, fragrant, broadly obovate, base broadly cuneate, apex rounded or emarginate. Stamens numerous, filaments pale yellow, anther yellow or orange. Styles connate into column, exserted, slightly longer than stamens, hairy. Hip purple-brown or dark red, shiny, ovoid 0.7–1.2 cm across, glabrous.

Fig. 15i–j

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 1300–3000 m.

Ecology: Margins of thickets, scrub, newly opened slopes.

Flowering: April–June. **Fruiting:** July–November.

Hooker (Fl. Brit. Ind. 2: 367. 1878) and later authors in India have misapplied the name *Rosa moschata* Mill. to this species.

Rosa multiflora Thunb. var. *camea* Thory (in Redouté, Roses 2: 70, t. 1821) is a climbing rose cultivated as an ornamental. It is easily distinguished from *R. brunonii* by its pinkish, double-petalled flowers, fimbriate stipules and glabrous styles.

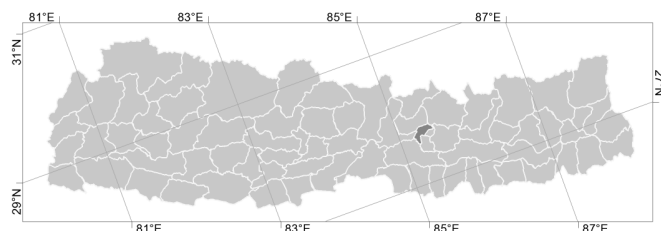
5. *Rosa clinophylla* Thory, Roses 1: 43 (1817).

Rosa involucrata Roxb. ex Lindl.; *R. involucrata* Roxb. nom. nud.; *R. lyellii* Lindl.; *R. palustris* Buch.-Ham. ex Lindl.

Erect shrubs, to 6 m. Stems and twigs silky-villous. Prickles in pairs below stipules. Stipules shortly adnate to petiole, free parts linear-lanceolate, margin fimbriate, apex acuminate. Leaves rachis and petiole densely pubescent, with glandular-villous hairs and minute prickles. Leaflets 9–11, sessile or nearly so, oblong-elliptic or elliptic, 1.5–3.5 × 0.5–1.5 cm, base rounded-cuneate, apex acute to obtuse, margin serrate, glabrous and shiny above, villous below throughout or on venation. Flowers usually solitary on leafy branchlets, 3–5 cm across. Bract a unifoliate leaf. Pedicel 2.8–3.5 cm, villous. Hypanthium globose, densely villous. Sepals 5, long triangular, 13–17 mm, apex acuminate, outer surface villous, sometimes with minute straw-coloured prickles, inner surface villous. Petals 5, white, base often with yellow shade, broadly obovate,

base broadly cuneate, apex emarginate. Styles connate into column, exserted, as long as stamens, glabrous. Hip globose, ca. 1 cm across, villous.

Distribution: Nepal, W Himalaya, Assam-Burma, S Asia and SE Asia.



Altitudinal range: 100–1000 m.

Ecology: Often growing on river banks or in marshy conditions.

Flowering: June. **Fruiting:** July–November.

Hooker (Fl. Brit. Ind. 2: 365. 1878) described *Rosa clinophylla* (as *R. involucrata*) as the "common rose of the Bengal plains and foot of the Himalaya and the only really tropical species of India". It is probably much more common in the Tarai region of Nepal than suggested by the distribution map.

20. *Agrimonia* L., Sp. Pl. 1: 448 (1753).

Hiroshi Ikeda

Perennial herbs. Rootstock robust. Stipules adnate to petioles in lower part, free in upper part. Leaves imparipinnate with small accessory leaflets, petiolate; leaflets serrate at margin. Inflorescence a many-flowered terminal raceme. Flowers bisexual, shortly pedicellate. Bracts solitary, at base of pedicel; bracteoles 2, at apex of pedicel. Hypanthium turbinate, constricted at throat, with many hooked prickles. Epicalyx absent. Sepals 5. Petals 5. Stamens 5–15, inserted in throat of hypanthium; filaments free, filiform; anthers 2-locular. Ovary superior, carpels 2, enclosed in hypanthium; ovule 1, pendulous. Style subterminal, filiform; stigma dilated. Achene dry, enclosed in hardened hypanthium.

Worldwide about 10 species in temperate zones of the N hemisphere. One species in Nepal.

1. *Agrimonia pilosa* Ledeb., Index Seminum Dorpat. Suppl.: 1 (1823).

Agrimonia pilosa var. *nepalensis* (D. Don) Nakai, Bot. Mag. [Tokyo] 47: 247 (1933).

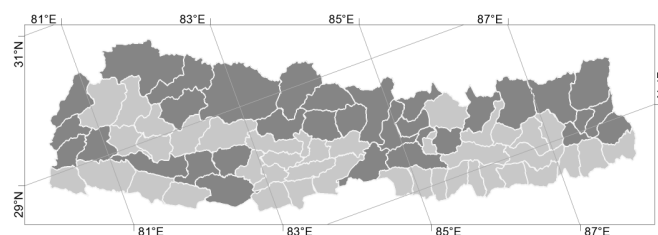
Agrimonia nepalensis D. Don, Prodr. Fl. Nepal.: 229 (1825); *Agrimonia eupatoria* var. *nepalensis* (D. Don) Kuntze; *A. lanata* Wall. ex Wallr.; *A. lanata* Wall. nom. nud.

बोक्रोमरन Bokromaran (Tamang).

Stems erect, 30–100 cm tall, sparsely pilose and pubescent, and densely hirsute in lower part. Radical leaves remaining and often withered at anthesis, 7–20 × 3–8 cm, interrupted pinnate with 2–4 pairs of leaflets. Petioles 1–5 cm, hirsute; free part of stipules membranous, obliquely lanceolate to narrowly ovate; leaflets subopposite, deep green above, powdery green below, subsessile, oblong to narrowly obovate, 2–5 × 1–3 cm, base cuneate, apex acute or obtuse, margin serrate. Cauline leaves similar to radical leaves; stipules of cauline leaves leafy, falcate, margin dentato-serrate. Inflorescence 10–30 cm; bracts deeply divided into three lobes. Hypanthium sparsely hairy outside. Sepals narrowly ovate, 1.2–1.5 × 0.6–0.8 mm, margin entire, glabrous above, sparsely hirsute and glandular below. Petals yellow, oblong to narrowly oblong, 2.5–3 × 1.3–2 mm. Filaments 1–1.2 mm; anthers globose, ca. 0.6 mm in diameter. Pistils 2; ovary oblong, 0.5–0.7 × 0.3–0.4 mm; style

1, 0.8–1 mm. Hypanthium hardened in fruit, grooved, 4–5 × 3–4 mm, patent hairy, with persistent sepals and many hooked prickles, containing 1 or 2 achenes. Fig. 16a-c

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 1000–3900 m.

Ecology: Open meadows and forest edges.

Flowering: July–September. **Fruiting:** August–October.

A decoction of plant is given for abdominal pain, diarrhoea, dysentery, sore throats, coughs, colds and tuberculosis. Ash of the plant is applied to wounds. Roots are used to treat bowel complaints and as an anti-venom.

Rosaceae

21. *Sanguisorba* L., Sp. Pl. 1: 116 (1753).

Hiroshi Ikeda

Perennial herb. Rootstock robust. Stipules adnate to petioles in lower part, free in upper part. Leaves imparipinnate, petiolate; leaflets serrate. Inflorescence terminal or lateral from axils of upper cauline leaves, densely capitate. Flowers bisexual. Bracts solitary, at base of pedicel; bracteoles absent. Hypanthium with constricted throat. Epicalyx absent. Sepals 4, petaloid, dark brown to tinged green. Petals absent. Stamens 2, inserted in throat of hypanthium; filaments free; anthers 2-locular. Ovary superior, carpel 1, included in hypanthium; ovule pendulous. Style terminal, filiform; stigmas 2, penicillate. Aggregate fruit capitate, achenes solitary, dry, each included in hardened, winged hypanthium.

Worldwide about 30 species in Asia, Europe and N America. One species in Nepal.

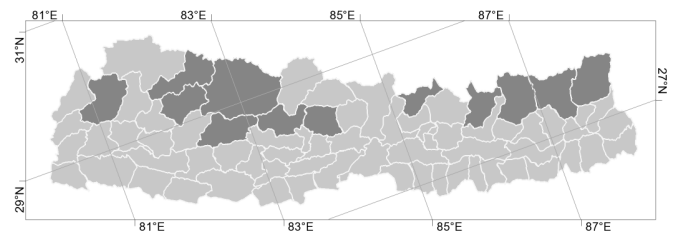
1. *Sanguisorba diandra* (Hook.f.) Nordborg, Opera Bot. 11(2): 60 (1966).

Poterium diandrum Hook.f., Fl. Brit. India 2[5]: 362 (1878);
Sanguisorba diandra Wall. nom. nud.; *S. dissita* T.T. Yu & C.L. Li.

Stems 25–90 cm, glabrescent or sparsely glandular pubescent. Radical leaves remaining or often withered at anthesis, 10–25 × 3–7 cm, with 4–8 pairs of leaflets. Petiole 0.5–2 cm, glabrescent or sparsely glandular pubescent. Leaflets alternate or subopposite, light to deep green above, powdery green below, petiolulate, narrowly ovate to elliptic, 0.6–3 × 0.5–2.5 cm, base cordate to truncate, apex obtuse or rounded, margin dentato-serrate. Cauline leaves similar to radical leaves; stipules of cauline leaves leafy, falcate, margin dentato-serrate. Inflorescence capitate, terminal or lateral from axils of upper cauline leaves, 5–8 mm in diameter, with 3–5 bracts at base; bracts lanceolate, membranous, margin ciliate. Flowers bisexual, subsessile. Hypanthium narrowly ellipsoid to cylindrical, 4-ridged, 2 × 1 mm, glabrescent or with sparsely short glandular hairs. Sepals 4, dark brown to tinged green, oblong to elliptic, 1.5–2.0 × 0.8–2.3 mm, margin entire, glabrous above, with short tufted hairs near tips below. Stamens 2, exerted from hypanthium; filaments filiform, 1.6–2.0 mm; anthers globose, ca. 1 mm in diam. Ovary oblong,

1.0–1.2 × 0.7–0.8 mm; style ca. 1 mm. Aggregate fruit 1–1.5 cm in diameter, hypanthium 5–7 × 3–5 mm, glabrous, with persistent sepals, containing 1 seed; wings 1.2–2 mm wide. Fig. 16d-g

Distribution: Nepal, W Himalaya, E Himalaya and Tibetan Plateau.



Altitudinal range: 2400–4400 m.

Ecology: Meadows, forest margins and thickets.

Flowering: June–August. **Fruiting:** August–September.

22. *Alchemilla* L., Sp. Pl. 1: 123 (1753).

Hiroshi Ikeda & Mark F. Watson

Deciduous perennial rosulate herbs. Flowering stems from radical leaves. Stipules present, toothed or lobed, adnate to petioles. Leaves alternate, simple, orbicular, margin palmately lobed, palmately veined, stem leaves often less lobed than basal leaves. Inflorescence cymose, a much branched corymb, bracts and bracteoles absent. Flowers numerous, very small, inconspicuous, pale green, bisexual, shortly pedicellate. Bracts solitary, leafy; bracteoles absent. Hypanthium urceolate, throat slightly constricted, persistent. Episepals 4, alternating with sepals. Sepals 4, valvate in bud. Petals absent. Nectariferous disk lining hypanthium with thickened margin. Stamens 4, filaments free, short. Ovary superior, carpel 1, sessile or almost so, ovule 1, basal. Style basal, filiform, glabrous, stigma capitate. Fruit an achene.

Worldwide 13–300 species (or more: see below), alpine and cool temperate regions of Asia, Europe, Africa and N America, and mountains in tropical areas of S America and Africa, most diverse in mountainous regions of Europe and the Caucasus. One species in Nepal.

A taxonomically complex genus with identification often problematic because of blurred morphological boundaries between species. Ancient hybridization events coupled with obligate apomictic reproduction and high polyploid levels contribute to this. Local

morphologically uniform populations are maintained through apomixy and have resulted in some authors recognizing 1000 or more microspecies. Summer-season, well-grown material is preferred for identification as late-season growth can be atypical.

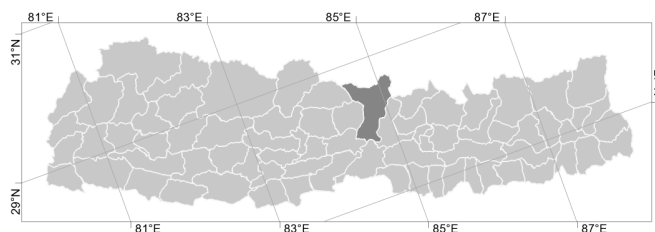
Alchemilla subcrenata Buser *sensu* Hara (Enum. Fl. Pl. Nepal 2: 133. 1979) was reported from Nepal from a single collection, *Pande 75* (BM). This collection is almost certainly associated with the Botanical Garden at Godavari and not considered native nor naturalized, so is excluded from this account. Hara cited this collection as *A. subcrenata* based on an identification by S.M. Walters, however, the BM specimen only bears a single determination slip by Walters, as *A. trollii* Rothm. dated June 1980. *Alchemilla trollii*, part of the *A. vulgaris* L. complex, has previously been considered restricted to Kashmir and Pakistan (Dhar & Kachroo, Alp. Fl. Kashmir Him. 1983).

1. *Alchemilla vulgaris* L., Sp. Pl. 1: 123 (1753).

Medium-sized green herbs 10–25(–30) cm. Rhizome 5–9 mm thick. Stems slender, erect or ascending; stem, petioles and most of plant moderately pilose with spreading straight rather coarse hairs some slightly downward-pointing. Lower leaf stipule pale brown, narrowly ovate, 6–10 mm, apex acute or lacerate, papery. Petiole (5–)10–20 cm. Blade subreniform to orbicular, 2–4(–6) × 2.5–5(–7) cm, base caudate, apex rounded, margin 5–7(–9)-lobed, lobes deep (to one third length of leaf) and broad with coarse teeth each side, both surfaces usually moderately pilose with long coarse hairs, densely so at the margin, or glabrescent. Cauline leaves 3 or 4, similar to basal leaves but reducing in size upwards, less deeply lobed, more shallowly caudate, with shorter petioles (0.5–3 cm) and conspicuous, green, leaf-like stipules. Inflorescences few, narrow, little-branched, ascending, ca. 7 × 3 cm, glabrescent to pilose with spreading hairs. Pedicel 1–2.5 mm, glabrous. Flowers 2.5–3.5 mm diameter, in few-flowered loose heads or solitary. Hypanthium 1–1.2 mm, glabrous or pilose with coarse hairs. Episepals linear-lanceolate, ca. 1.2 × 0.4 mm, apex acute, outer surfaces sparsely pilose with coarse hairs towards apex. Sepals ovate, ca. 1.2 × 1.0 mm, apex acute, outer surfaces sparsely pilose with coarse hairs on outside towards apex. Stamens 0.5–1 mm. Achenes pale brown, ovoid, ca. 1.5 × 1 mm.

Fig. 16h–i

Distribution: Nepal, W Himalaya, SW Asia and Europe.



Altitudinal range: 4000–4300 m.

Ecology: Amongst tall herbs and between rocks, humus rich soils in alpine gullies.

Flowering: June–August. **Fruiting:** August.

This *Alchemilla* species was found in Manaslu Himalaya in 2008 (*Ikeda et al. 20815161, 20811203, 20811218* in E, KATH, and TI). Unlike a previous record which is almost certainly of cultivated origin, this is the first record of an *Alchemilla* indigenous to Nepal. However, the identity of this plant is currently uncertain, and awaits revision along with other *Alchemilla* species in the Pan-Himalayan region. Several morphologically similar species in the *A. vulgaris* aggregate species complex have been described in NW India, of which the Manaslu material most closely matches *A. ypsilotoma* Rothm.

23. *Prinsepia* Royle, III. Bot. Himal. Mts. [3]: pl. 38 fig. 1. a–g (1834).

Colin A. Pendry

Deciduous thorny shrubs. Thorns sometimes with a few leaves. Perulate winter buds absent; axillary buds 1 or 2. Stipules minute, soon caducous. Leaves petiolate, alternate, simple, margins serrulate. Inflorescences below thorns, racemose, solitary or fascicled. Bracts solitary, minute, persistent; bracteoles 2. Flowers bisexual, pedicellate. Hypanthium cup-shaped with an annular disk at mouth. Sepals 5, unequal, 3 large and 2 small, persistent in fruit. Petals 5, base shortly clawed. Stamens ca. 30, in 2–3 whorls, inserted on hypanthium rim. Ovary superior, glabrous, 1-locular, ovules 2. Style lateral; stigma capitate. Fruit a drupe; mesocarp fleshy.

Worldwide about five species in China and the Himalaya. One species in Nepal.

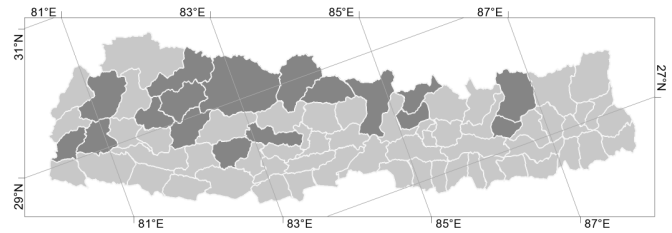
1. *Prinsepia utilis* Royle, III. Bot. Himal. Mts. [6]: 206 (1835).

धटेलो Dhatelo (Nepali).

Rosaceae

Shrubs to 4 m. Young twigs greenish brown, tomentose, soon glabrescent, older twigs greyish green, robust, glabrous. Thorns 2–5 cm. Stipules 0.3 × 1 mm. Petioles 5–11 mm, glabrous. Leaves narrowly ovate to elliptic, 3–6 × 1–2.5 cm, base broadly cuneate, sometimes unequal, margin serrulate, apex acute to acuminate, veins 3–5 pairs, glabrous above and below except sometimes tomentose on midrib and veins. Racemes 2–5(–7) cm. Peduncle brown pubescent, soon glabrescent. Bracts and bracteoles lanceolate, brown pubescent, glabrescent. Pedicels 6–8 mm. Flowers ca. 1 cm across. Hypanthium cup-shaped, glabrous. Sepals semi-orbicular to broadly ovate, small sepals ca. 2 mm, large sepals ca. 4 mm. Petals white, reflexed, broadly obovate or suborbicular, 5–6 mm, base shortly clawed, margin apically erose. Stamens 3–4 mm. Ovary ca. 1 mm, glabrous. Style 2–3 mm. Drupe purplish, oblong to obovoid-oblong, 10–15 mm. Fig. 17a-b

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and E Asia.



Altitudinal range: 1100–3400 m.

Ecology: Along trail-sides and in disturbed open areas.

Flowering: (October–)March–April. **Fruiting:** May–June.

Seed oil is applied externally in cases of rheumatism, muscular pain, coughs and colds. Heated oil cake is applied as a poultice to the abdomen to relieve pain. Seed oil is used for cooking and lighting. A deep purple pigment is obtained from fruits and is used for colouring windows and walls. The spiny branches make a formidable stock-proof fence

24. *Prunus* L., Sp. Pl. 1: 473 (1753).

Hideaki Ohba, Colin A. Pendry & Sangeeta Rajbhandary

Trees or shrubs, deciduous or evergreen. Twigs unarmed or rarely spiny. Perulate winter buds present or absent, leaving a ring of scars around twig; axillary buds 1–3. Stipules membranous, often early caducous, margin entire or toothed. Leaves simple, alternate, petiolate, often with glands present at the apex of the petiole or base of leaf, margins variously crenate, rarely entire or undulate, the teeth often gland-tipped. Flowers solitary or in few-flowered fascicles or umbels or many-flowered racemes. Inflorescences terminal or on short axillary branches, with or without an involucre of persistent floral bud scales, bracteate if more than 1-flowered; bracteoles absent. Flowers bisexual, opening before or after the leaves, subsessile to pedicellate. Hypanthium campanulate to cup-shaped or urceolate. Sepals and petals 5, imbricate. Stamens 10–100, in 1 or 2 whorls. Ovary superior, 1-locular; ovules 2, collateral, pendulous. Style terminal, elongated. Fruit a drupe, glabrous, often glaucous, with or without a longitudinal groove; mesocarp fleshy; endocarp bony, ovoid or globose, sometimes laterally compressed, smooth or variously grooved, pitted or rugose. Seed solitary.

Worldwide about 200 species. 15 species in Nepal, some of which are cultivated.

The subgenera *Amygdalus* (peach), *Armeniaca* (apricot), *Cerasus* (cherry), *Laurocerasus* and *Padus* are sometimes treated as distinct genera (e.g. Fl. China), but recent molecular studies (Bortiri *et al.*, Syst. Bot. 26: 797–807. 2001) do not support their separation and they are not recognised here.

Key to Species

- 1a Flowers in elongate racemes with more than 10 flowers.....2
- b Flowers solitary or in short racemes. Corymbs or umbels with fewer than 10 flowers.....6
- 2a Leaves evergreen, coriaceous (subgenus *Laurocerasus*).....3
- b Leaves deciduous, herbaceous (subgenus *Padus*).....4
- 3a Leaf margin entire or rarely with a few teeth. Racemes solitary or 2–4 in a fascicle, 5–40 cm long. Stamens 3–4 mm long. Ovary hairy **14 *P. undulata***
- b Leaf margin serrate throughout. Racemes solitary, 4–5 cm long. Stamens 2.5–3 mm long. Ovary glabrous **15 *P. jakarkotensis***
- 4a Racemes without basal leaves. Sepals persistent in fruit..... **13 *P. venosa***
- b Racemes with basal leaves. Sepals caducous in fruit.....5

- 5a Peduncles and pedicels not thickened and without lenticels in fruit. Nectaries at petiole apex, conspicuous. Leaf margin sparsely serrulate. Peduncles velutinous at flowering. Drupes ca. 0.8 cm across..... **11 P. cornuta**
 b Peduncles and pedicels thickened with conspicuous lenticels in fruit. Nectaries near base of blade, inconspicuous. Leaf margin coarsely serrate or sometimes undulate. Peduncles glabrous or subglabrous at flowering. Drupes 1–3 cm across **12 P. napaulensis**
- 6a Ovary and fruit hairy. Pedicels less than 1 cm7
 b Ovary and fruit glabrous, usually shiny. Pedicels more than 2 cm10
- 7a Leaves broadly ovate to orbicular-ovate. Axillary bud 1 (subgenus *Armeniaca*) **5 P. armeniaca**
 b Leaves narrowly ovate to elliptic or oblong. Axillary buds 3 (subgenus *Amygdalus*).....8
- 8a Endocarp smooth, with shallow furrows, without pits. Leaf margin crenate.....**2 P. mira**
 b Endocarp deeply furrowed and pitted. Leaf margin serrate.....9
- 9a Upper surfaces of leaves glabrous. Outside of calyx glabrous. Mesocarp thin and rather dry. Endocarp usually not laterally compressed, apex obtuse..... **1 P. davidiana**
 b Upper surfaces of leaves sparsely hairy in vein axils, rarely glabrous. Outside of calyx hairy. Mesocarp thick and succulent. Endocarp laterally compressed, apex acuminate **3 P. persica**
- 10a Fruit more than 4x longer than pedicel or nearly sessile. Leaves with 5–7 pairs of secondary veins (subgenus *Prunus*) **4 P. cerasifera**
 b Fruits less than one third the length of pedicel. Leaves with 9–15 pairs of secondary veins (subgenus *Cerasus*).....11
- 11a Peduncles hairy..... **7 P. himalaica**
 b Peduncles glabrous.....12
- 12a Petiole with 2–4 glands towards apex. Petals usually emarginate. Leaf margin acutely biserrulate or biserrate, also serrate (the apex of teeth acuminate ending in a minute capitate gland to 0.2 mm). Flowers 1–4 in umbel, opening before or at the same time as leaves **6 P. cerasoides**
 b Petiole eglandular, glands sometimes present at base of leaf. Petals entire. Leaf margin sharply serrulate (the apex of teeth acuminate ending in a conspicuous conical or capitate gland to 0.4 mm). Flowers usually 1 or 2 in umbel, opening at same time as the leaves13
- 13a Petals glabrous. Leaves ovate or narrowly ovate, lower surface with white or pale brown, straight hairs, margins sharply doubly serrate. Calyx-tube urceolate **9 P. topkegolensis**
 b Petals sparsely pubescent. Leaves elliptic or narrowly obovate to obovate-elliptic, lower surface with even indumentum of brown, crisped hairs or villous only on veins. Calyx tube tubular to campanulate14
- 14a Hypanthium 11–15 mm long. Leaves 2.8–5 cm wide, villous along veins below..... **8 P. rufa**
 b Hypanthium 7–10 mm long. Leaves 0.8–2 cm wide, lower surface with dense indumentum of brown, crisped hairs **10 P. taplejunica**

1. *Prunus davidiana* (Carrière) N.E.Br., Suppl. Johnson's Gard. Dict.: 991 (1882).
Persica davidiana Carrière, Rev. Hort. 1872: 74, pl. 10 (1872).

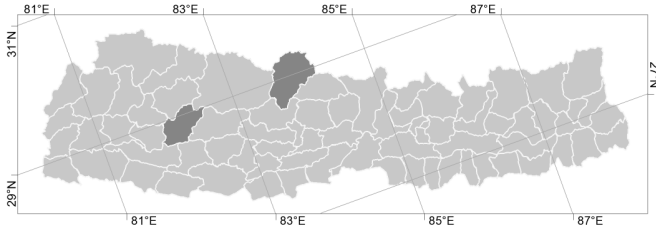
झुसेआरु Jhuse aaru (Nepali).

Deciduous trees to 10 m. Twigs brown, glabrous. Stipules subulate, 3–5 mm, toothed, caducous. Axillary winter buds (2 or)3, lateral ones flower buds, central one a leaf bud, terminal winter buds present. Petioles 1–2 cm, glabrous, usually with glands. Leaves ovate-lanceolate, 5–13 × 1.5–4 cm, base cuneate to rounded, apex acuminate, margin acutely or obtusely serrate, glabrous on both surfaces, secondary veins ca. 15 pairs, fine with smaller intermediate veins. Flowers

solitary, opening before leaves, 2–3 cm across, subsessile. Bud scales 2–4 mm caducous. Pedicels 1–2 mm, 3–4 mm in fruit, glabrous. Hypanthium campanulate, glabrous outside. Sepals ovate to ovate-oblong, apex obtuse, glabrous outside. Petals pink, obovate to suborbicular, 1–1.5 × 0.8–1.2 cm, apex obtuse or rarely emarginate. Stamens nearly as long as petals. Ovary hairy. Style longer or about as long as stamens. Drupe yellowish, globose to ellipsoid or oblong, 2.5–3.5 cm across, base truncate, apex obtuse, densely hairy; mesocarp thin, not splitting when ripe; endocarp not compressed on both sides, surface with numerous furrows and pits, separating from mesocarp.

Distribution: Nepal, Tibetan Plateau and E Asia.

Rosaceae



Altitudinal range: 2100–2700 m.

Ecology: Cultivated.

Flowering: March–April. **Fruiting:** July–August.

Serafimov considered *Polunin*, Sykes & Williams 3893 (BM) to be a hybrid between *P. davidiana* and *P. amygdalus* Batsch (*Prunus dulcis* (Mill.) Rchb., the almond).

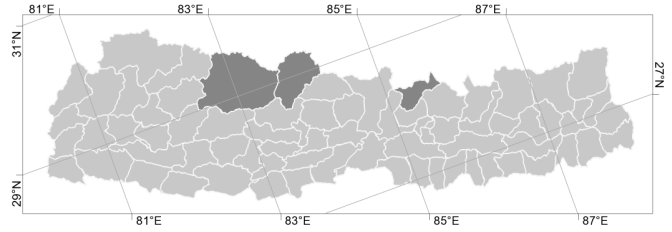
Fruits are useful in lung complaints, eye troubles, and for wounds. Seed oil is used as a hair tonic.

2. *Prunus mira* Koehne, Pl. Wilson. 1(2): 272 (1912).
Amygdalus mira Ricker; *Persica mira* (Koehne) Kovalev & Kostina.

1. *Prunus mira* subsp. *nepalensis* (Seraf.) H.Hara, Enum. Fl. Pl. Nepal 2: 142 (1979).
Persica mira subsp. *nepalensis* Seraf., Dokl. Bolg. Akad. Nauk 27(6): 835, pl. 1 fig. 1 (1974).

Deciduous trees to 10 m. Twigs first green, then greyish brown, glabrous. Stipules unknown. Axillary winter buds (2 or)3, lateral ones flower buds, central one a leaf bud; terminal winter buds present. Petioles 0.8–1.5 cm, glabrous, often with flattened nectaries. Leaves narrowly ovate, 5–11 × 1.5–4 cm, base broadly cuneate to subrounded, apex acuminate, margin shallowly crenate, with gland-tipped teeth, upper surface glabrous, lower surface hairy along midvein, secondary veins 12–15 pairs, fine with smaller intermediate veins. Flowers solitary, opening before leaves, 2.2–3 cm across. Pedicel 1–3 mm, 4–5 mm in fruit, glabrous, surrounded at base by persistent bud scales ca. 2 mm. Hypanthium campanulate, purplish green, glabrous. Sepals ovate to narrowly ovate, apex obtuse. Petals pink, broadly obovate, 1–1.5 cm, apex emarginate. Stamens much shorter than petals. Ovary hairy. Style longer or about as long as stamens. Drupe subglobose, ca. 3 cm across, densely hairy, base subtruncate and slightly asymmetric, apex acute; mesocarp fleshy, not splitting when ripe; endocarp compressed ovoid-globose, ca. 2 cm, slightly flattened on both sides, surface smooth with few longitudinal shallow furrows only on dorsal and ventral sides.

Distribution: Nepal, Tibetan Plateau and E Asia.



Altitudinal range: 2700–4000 m.

Ecology: Mountain slopes in thickets.

Flowering: March–April. **Fruiting:** August–September.

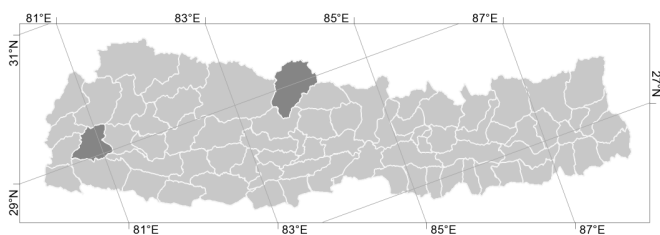
According to Lu & Bartholemew (Fl. China 9: 395. 2003) *Prunus mira* is cultivated for its fruits and seeds and it is often uncertain whether collections are wild, cultivated or naturalized.

3. *Prunus persica* (L.) Batsch, Beitr. Entw. Gewächsr. 30 (1801).
Amygdalus persica L., Sp. Pl. 1: 472 (1753); *Persica vulgaris* Mill.; *Prunus persica* var. *compressa* (Loudon) Bean; *P. persica* var. *platycarpa* (Decne.) L.H.Bailey; *P. vulgaris* Mill.; *P. vulgaris* var. *compressa* Loudon.

आरु Aaru (Nepali).

Deciduous trees to 3–8 m. Twigs reddish green, glabrous, lustrous. Stipules narrowly triangular, 5–8 mm, toothed, caducous. Axillary winter buds (2 or)3, lateral ones flower buds, central one a leaf bud; terminal winter buds present. Petioles 1–2 cm, with or without 1 to several glands. Leaves blade oblong- or elliptic-lanceolate to obovate-oblongate, 7–15 × 2–4 cm, base broadly cuneate, apex acuminate, margin finely to coarsely serrate, upper glabrous, lower surface with or without a few hairs in vein axils, secondary veins 10–14 pairs, fine with smaller intermediate veins. Flowers solitary, opening before leaves, 2–3.5 cm across, subsessile, pedicel to 2–4 mm in fruit, glabrous. Flower bud scales 2–5 mm, caducous. Hypanthium shortly campanulate, 3–5 mm, glabrous, gland-spotted. Sepals ovate to oblong, about as long as hypanthium, apex obtuse, densely tomentose outside. Petals pink or white, oblong-elliptic to broadly obovate, 1–1.7 × 0.9–1.2 cm. Stamens 20–30; anthers purplish red. Ovary hairy. Style nearly as long as stamens. Drupe ovoid to broadly ellipsoid or compressed globose, (3–)5–7(–12) cm across, apex acuminate, usually densely hairy, with ventral suture; mesocarp succulent, fragrant; endocarp ellipsoid to suborbicular, compressed on both sides, surface with longitudinal and transverse furrows and pits.

Distribution: Nepal, E Himalaya and E Asia.



Altitudinal range: 1100–3600 m.

Ecology: Cultivated and possibly naturalized.

Flowering: March–April. **Fruiting:** August–September.

The peach. Cultivated and not known in the wild, though thought to originate in N China. It is possibly a cultigen derived from *Prunus davidiana* (Mabberley, Plant Book: 704. 2008). Under represented by herbarium collections.

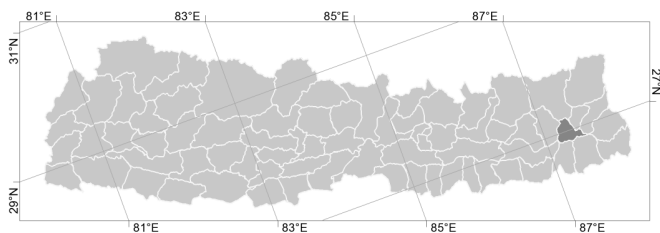
Ripe fruits are edible. Seed oil is used for cooking and lighting. Juice of the leaves is applied to wounds. Flowers are diuretic and purgative.

4. *Prunus cerasifera* Ehrh., Beitr. Naturk. 4: 17 (1789).
Prunus cerasifera subsp. *myrobalana* (L.) C.K. Schneid.; *P. domestica* L.; *P. domestica* var. *myrobalana* L.

आरुबखरा Aarubakhara (Nepali).

Deciduous shrubs or trees to 8 m. Twigs dark red, glabrous, sometimes spiny. Stipules narrowly elliptic, 3–6 mm, glandular-toothed. Axillary winter buds solitary; perulate terminal winter buds present. Petioles 0.6–1.2 cm, without glands. Leaves elliptic to ovate or obovate or rarely elliptic-lanceolate, 3–6 × 2–5 cm, base cuneate to subrounded, apex acute, margin crenate or sometimes doubly crenate, upper surface dark green, glabrous, lower surface hairy on midvein, secondary veins 5–7 pairs. Flowers solitary, opening before leaves, rarely 2 in a fascicle, 2–2.5 cm across. Pedicel 1–2.2 cm, glabrous or sparsely hairy, at base with persistent involucre of bud scales ca. 1 mm. Hypanthium campanulate, glabrous. Sepals narrowly to broadly ovate, apex obtuse, glabrous, margin shallowly serrate. Petals white, oblong to spatulate, base cuneate, apex obtuse, margin undulate. Stamens 25–30. Ovary villous. Style slightly shorter than stamens, stigma disc-shaped. Drupe subglobose to ellipsoid, 2–3 cm across, slightly glaucous; endocarp ellipsoid to ovoid, smooth or scabrous, sometimes pitted.

Distribution: Nepal, W Himalaya, E Himalaya, E Asia, C Asia, SW Asia and Europe.



Altitudinal range: ca. 1800 m.

Ecology: Sometimes cultivated.

Flowering: April. **Fruiting:** August.

The plum. Cultivated for its edible fruits.

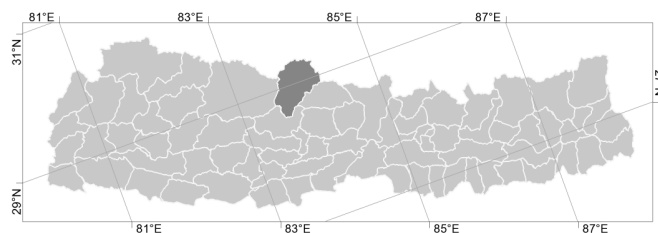
Ripe fruits are eaten fresh and have laxative properties. Foliage is cut for fodder.

5. *Prunus armeniaca* L., Sp. Pl. 1: 474 (1753).
Armeniaca vulgaris Lam.; *Prunus ansu* (Maxim.) Kom.; *P. armeniaca* var. *ansu* Maxim.

खुरपानी Khurpani (Nepali).

Deciduous trees to 5–8(–12) m. Twigs purplish brown, glabrous. Stipules minute, rounded, to 0.5 mm, persistent. Axillary winter buds solitary; perulate terminal winter buds present. Petioles 2–3.5 cm, glabrous or hairy, with 1–6 glands. Leaves broadly ovate to orbicular-ovate, 5–9 × 4–8 cm, base cuneate to rounded or subcordate, with several glands, apex acute to shortly acuminate, margin crenate, upper surface hairy with white hairs, lower surface hairy in vein axils, secondary veins 5–8 pairs. Flowers opening before leaves, 2–4.5 cm across. Pedicel 1–3 mm, hairy, at base with persistent involucre of bud scales to 2 mm. Hypanthium cylindrical, pubescent towards base. Sepals purplish green, ovate to ovate-oblong, 3–5 mm, apex usually acute, reflexed after flowering. Petals white or pink, orbicular to obovate, 0.8–1.2 cm, base unguiculate, apex rounded. Stamens 20–100, slightly shorter than petals; filaments white. Ovary hairy. Style slightly longer to nearly as long as stamens, basally hairy. Drupe globose to ovoid or rarely obovoid, 1.5–2.5 cm across, base symmetric or rarely asymmetric, apex obtuse to rounded, hairy, usually glaucous; mesocarp succulent, not splitting when ripe; endocarp globose or ellipsoid, compressed laterally, with keel-like ribs on ventral side, surface scabrous or smooth.

Distribution: Cosmopolitan.



Altitudinal range: 2900–3500 m.

Ecology: Cultivated and sometimes naturalizing.

Flowering: March–April. **Fruiting:** June–July.

The apricot. Widely cultivated for its edible fruits and seed oil, it is probably originally from C Asia.

The ripe fruits are eaten fresh or dried and have laxative properties. Seeds are edible and anthelmintic, and are used to

Rosaceae

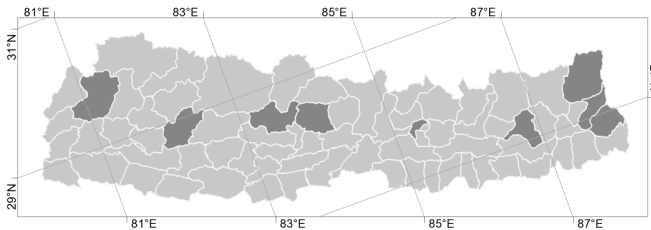
treat liver diseases, piles, earache and deafness. Seed oil is used for cooking.

6. *Prunus cerasoides* D.Don, Prodr. Fl. Nepal.: 239 (1825). *Cerasus cerasoides* (D.Don) S.Ya.Sokolov; *C. cerasoides* var. *rubea* (Ingram) T.T.Yu & C.L.Li; *C. phoshia* Buch.-Ham. ex D.Don; *C. puddum* Roxb. ex Wall. nom. superfl.; *C. puddum* Roxb. ex Ser.; *Maddenia pedicellata* Hook.f.; *Prunus carmesina* H.Hara; *P. cerasoides* var. *majestica* (Koehne) Ingram; *P. cerasoides* var. *rubea* Ingram; *P. majestica* Koehne; *P. puddum* (Roxb. ex Ser.) Brandis.

पैयू Pailyu (Nepali).

Deciduous trees to 3–10 m. Twigs green, hairy, glabrescent. Stipules linear, branched basally, 5–15 mm, fimbriate, glandular-toothed. Axillary winter buds solitary, perulate terminal winter buds present. Petioles 1.2–2 cm, with 2–4 glands towards apex. Leaves ovate to oblong or obovate, 6–12 × 3–5 cm, base rounded, apex acuminate to long acuminate, margin acutely biserrulate to biserrate or serrate, the teeth with a 0.1–0.2 mm capitate apical gland, upper surface dark green, lower surface pale green, glabrous or villous along veins, secondary veins 10–15 pairs. Flowers 1–4 in an umbel, opening at the same time or before leaves. Bud scales ca. 2 mm, caducous. Peduncles 1–1.5 cm, glabrous. Bracts suborbicular, 1–1.2 cm, apically divided, margin glandular serrate, withered after anthesis. Pedicels 1–2.3 cm, to 3 cm and apically thickened in fruit. Hypanthium campanulate to widely campanulate, glabrous. Sepals usually reddish, triangular, 0.4–5.5 mm, apex acute to obtuse, erect. Petals white or pink, ovate to obovate, apex usually emarginate. Stamens 32–34, shorter than petals. Ovary glabrous. Style as long as stamens, glabrous; stigma disciform. Drupe purplish black, ovoid, 1.2–1.6 × 0.8–1.2 cm, apex obtuse; endocarp ovoid, laterally deeply furrowed and pitted.
Fig. 17c-e

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma, E Asia and SE Asia.



Altitudinal range: 1300–2700 m.

Ecology: Evergreen *Quercus* forest, thickets on slopes.

Flowering: October–January. **Fruiting:** January–March.

Hara (Enum. Fl. Pl. Nepal 2: 141. 1979) described *Prunus carmesina* for specimens flowering before emergence of the leaves, with crimson hypanthium and deep pink, erect petals. Although this species was recognized by Grierson (Fl. Bhutan 1: 541. 1987) the distinction was not maintained by Li &

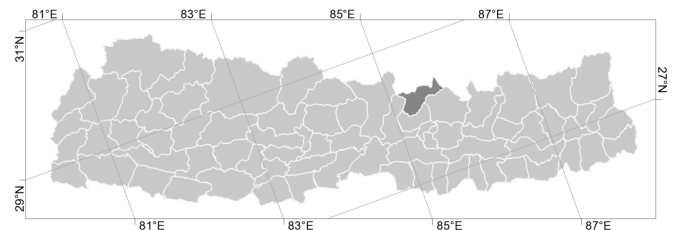
Boufford (Fl. China 9: 418. 2003).

Ripe fruits are eaten fresh. Juice of the bark is applied to treat back pain. Leafy branches are lopped for fodder. Branches are used for making walking sticks.

7. *Prunus himalaica* Kitam., Acta Phytotax. Geobot. 15: 131 (1954).

Deciduous trees to ca. 2 m. Branches purplish, with red-brownish hairs. Stipules not known. Perulate terminal winter buds present. Petioles 0.9–1 cm, with brownish hairs. Leaves elliptic, 6–8 × 4–5 cm, base rounded, apex caudate-acuminate, margin acutely double-serrate, upper surface green, sparsely minutely hirsute, lower surface pale, with dense brown hairs in vein axils, secondary veins 9–13 pairs. Flowers 1 or 2 in an umbel. Peduncle 1 cm, hairy. Bracts oblong, 1.5–2.7 cm, apex acute, margin serrulate. Pedicels 3.5–4.5 cm, sparsely hairy. Hypanthium urceolate, glabrous. Sepals ovate, 4 mm, apex acute, margin with glandular serrations. Petals pale pink. Stamens ca. 45. Ovary and fruits unknown.

Distribution: Endemic to Nepal.



Altitudinal range: ca. 3900 m.

Ecology: Unknown.

Flowering: Probably autumn. **Fruiting:** Probably winter.

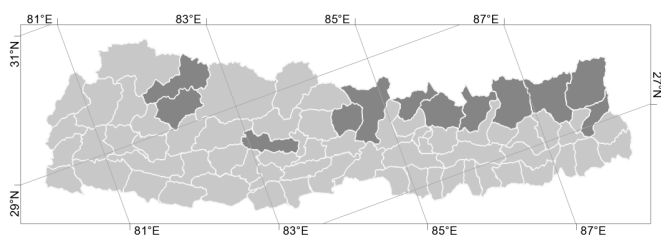
Known only from the incomplete type specimen collected by Nakao, 3 July 1953, at Shin Gompa, Langtang (KYO). Kitamura reported that it was close to *Prunus rufa* Hook.f. with its densely pubescent twigs and 'urceolate' hypanthium, but differing from it in its doubly serrate leaves which are rounded at the base.

8. *Prunus rufa* Hook.f., Fl. Brit. India 2[5]: 314 (1878). *Cerasus rufa* Wall. nom. nud.; *C. rufa* T.T.Yu & C.L.Li; *Prunus imanishii* Kitam.; *P. rufa* Steud. nom. inval.; *P. rufa* var. *trichantha* (Koehne) H.Hara; *P. trichantha* Koehne; var. *rufa* (Koehne) T.T.Yu & C.L.Li.

Deciduous trees to 2–10 m. Twigs purplish brown, rufous tomentose initially, glabrate. Axillary winter buds solitary, perulate terminal winter buds present. Stipules linear, 4–13 mm, prominently glandular-toothed. Petioles 0.5–1 cm, densely hairy, without glands. Leaves narrowly obovate to obovate-elliptic, 3–12 × 2.5–5 cm, base cuneate, apex acuminate to caudate-acuminate, margin sharply serrulate, the teeth with prominent 0.2–0.4 mm conical or capitate glands, upper surface pilose but soon glabrescent, lower surface villous along veins, secondary veins 9–11 pairs. Flowers 1 or 2 (rarely more) in umbel, opening at same time as leaves. Peduncles

very short. Bracts oblong-spathulate, 1–1.2 cm, margin glandular. Pedicels 1–2.2 cm, glabrous. Flowers 1–1.3 cm across. Hypanthium tubular to campanulate, 1–1.5 × ca. 0.4 cm, hairy outside. Sepals straight or spreading, triangular-ovate, 2–4 mm, margin sparsely glandular. Petals white or pink, ovate to obovate, 5–6 × 4–6 mm, entire or apically emarginate, outside pilose. Stamens ca. 45. Ovary basally hairy. Style as long as stamens, basally hairy, stigma obtuse, not lobed. Drupe ellipsoid to obovoid, 1.2–1.8 cm, apex obtuse, endocarp ovoid, laterally deeply furrowed and pitted.

Distribution: Nepal, E Himalaya and Tibetan Plateau.



Ecology: Mixed forests with *Rhododendron*, *Betula utilis* and *Abies spectabilis*.

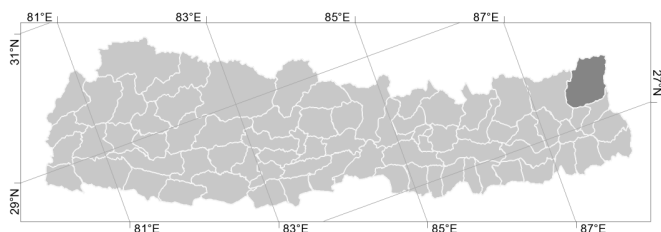
Flowering: May–June. **Fruiting:** July–August.

A collection from Kangchenjunga, KEKE 657 (E) keys out to *P. rufa*, but has relatively broader, more coarsely biserrate leaves and may be *Prunus latidentata* Koehne or an allied species.

9. *Prunus topkegolensis* H.Ohba & S.Akiyama, Bull. Natl. Sci. Mus., Tokyo, B. 36: 134 (2010).

Deciduous shrub to 2 m. Twigs slender, spreading; glabrous, initially greenish, later pale red-purplish. Axillary winter buds solitary, perulate terminal winter buds present. Stipules linear, ca. 5 mm, prominently glandular-toothed. Petioles 6–11 mm. Leaves ovate to narrowly ovate, 4.2–6.6 × 2.1–3 cm at flowering, base rounded to cuneate, apex acuminate, margin sharply doubly serrate, mostly with gland at apex of tooth, lower surface with sparse to moderate white or pale brown straight hairs near base. Flowers solitary in axil, opening at same time as leaves. Pedicels ca. 1.3 cm. Hypanthium urceolate, ca. 7 mm. Sepal triangular-ovate, ca. 2.5 mm, with sparse pale brown crisped hairs, margin entire or serrate. Petals glabrous, white with faint pink markings, erect at flowering, suborbicular, ca. 5.5 × 3 mm. Style exserted, glabrous apically. Fruits unknown.

Distribution: Endemic to Nepal.



Altitudinal range: ca. 3700 m.

Ecology: In thickets along steep gorge.

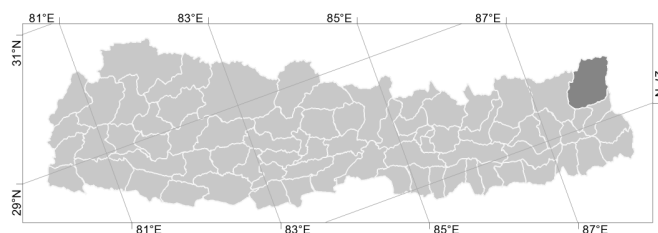
Flowering: June. **Fruiting:** probably August.

Prunus topkegolensis differs from *P. rufa* Hook.f. in having deeply double serrate margins, glabrous leaves except pilose nerves on both sides, solitary relatively small flowers with urceolate calyx tube. It is close to the Japanese species *P. incisa* Franch. & Sav.

10. *Prunus taplejunica* H.Ohba & S.Akiyama, Bull. Natl. Sci. Mus., Tokyo, B. 36: 135 (2010).

Deciduous shrub, ca. 2 m. Twigs glabrous, slender, spreading, initially greenish, later pale red-purplish. Axillary winter bud solitary. Petioles glabrous, 4–14 mm. Leaves elliptic, 2.6–5.1 × 0.8–2 cm, base rounded to cuneate, with a pair of glands, apex acute to acuminate, margin serrate, lower surface with brown crisped dense hairs near base. Flowers usually solitary or 2 in axillary inflorescence. Peduncles 1–2 mm, pedicels 0.5–2.8 cm. Hypanthium 7–11 mm. Sepals triangular-ovate, 2–4 mm, with brown crisped dense hairs, margin serrate. Petals white, suborbicular, 5–6 × 3–4 mm, with very sparse brown hairs. Style exserted. Fruits unknown.

Distribution: Endemic to Nepal.



Altitudinal range: 2400–3600 m.

Ecology: Open thickets on hills.

Flowering: May–June. **Fruiting:** Unknown.

Prunus taplejunica was collected from close to the locality of *P. topkegolensis* H.Ohba & S.Akiyama. The elliptic leaves, gradually narrowing toward both ends and with conspicuously double serrate margins, distinguish *P. taplejunica* from *P. topkegolensis*.

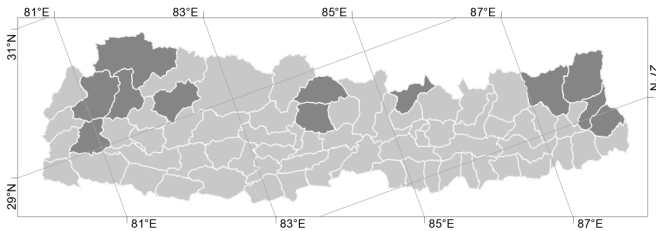
11. *Prunus cornuta* (Wall. ex Royle) Steud., Nomencl. Bot., ed. 2, 2(3): 403 (1841).
Cerasus cornuta Wall. ex Royle, Ill. Bot. Himal. Mts. [6]: 205, pl. 38 (1835); *Cerasus cornuta* Wall. nom. nud.; *Padus cornuta* (Wall. ex Royle) Carrière; *P. cornuta* var. *glabra* Fritsch ex C.K. Schneid.; *P. cornuta* var. *villosa* G.Singh; *Prunus cornuta* forma *villosa* (H.Hara) H.Hara; *P. cornuta* var. *villosa* H.Hara.

लेख आरु Lekh aaru (Nepali).

Rosaceae

Deciduous trees to 3–15 m. Twigs purplish brown, glabrous or sometimes velutinous. Stipules linear, 8–15 mm, margin glandular serrate. Axillary winter buds solitary; perulate terminal winter buds present. Petioles 1–2.3 cm, usually glabrous, apex with 2 glands. Leaves narrowly elliptic to oblong, rarely oblong-ovate or obovate, 6–11 × 3–5 cm, base subcordate to broadly cuneate, apex shortly acuminate to shortly caudate, margin sparsely serrulate, upper surface dark green, glabrous, lower surface pale green, glabrous or with tufts of hair at vein axils, secondary veins 10–14 pairs. Flowers opening after the leaves. Racemes solitary, 8–16 cm, many-flowered, basally with 1–3 leaves, rachis velutinous. Bracts narrowly ovate, 6–8 mm, glandular-toothed, very early caducous. Flowers 6–8 mm across. Pedicels 5–7 mm, velutinous. Hypanthium campanulate, velutinous at base outside. Sepals triangular-ovate, apex obtuse, margin glandular serrulate, soon caducous, glabrous outside. Petals white, obovate, base cuneate and shortly clawed, margin apically erose. Stamens 20–25. Ovary glabrous. Style slightly shorter than stamens, stigma disc-shaped. Drupe blackish brown, ovoid-globose, ca. 8 mm in diameter, glabrous.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau and SW Asia.



Altitudinal range: 2100–3500 m.

Ecology: Secondary forest, thickets.

Flowering: April–May. **Fruiting:** May–October.

Brandis (Forest Fl. N.W. India: 194. 1874) and Hooker (Fl. Brit. Ind. 2: 315. 1878) misapplied the name *Prunus padus* L. to this species.

The ripe fruits are eaten and used for brewing local liquor. The foliage is cut for fodder.

12. *Prunus napaulensis* (Ser.) Steud., Nomencl. Bot., ed. 2, 2(3): 403 (1841).

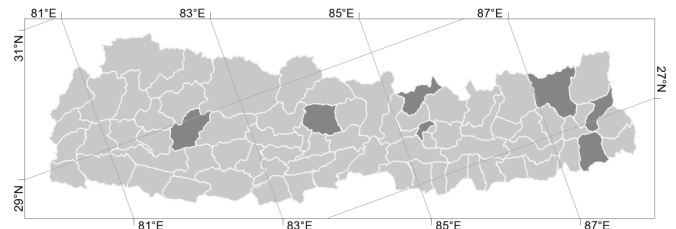
Cerasus napaulensis Ser., Prodr. 2: 540 (1825); *Cerasus glaucifolia* Wall. nom. nud.; *Padus napaulensis* (Ser.) C.K. Schneid.

जंगली आरु Jungali aaru (Nepali).

Deciduous trees to 27 m. Twigs reddish brown, glabrous. Axillary winter buds solitary; perulate terminal winter buds present. Stipules linear, to 15 mm, margin glandular serrate. Petioles 0.8–1.5 cm, glabrous, without glands. Leaves narrowly elliptic to ovate-elliptic, 6–14 × 2–6 cm, base cuneate, apex acute to shortly acuminate, margin coarsely serrate or sometimes undulate, upper surface dark green, glabrous,

lower surface pale green, glabrous or very rarely sparsely hairy when young, secondary veins 9–15 pairs. Flowers opening after the leaves. Racemes solitary, 7–14 cm, basally with 2 or 3 leaves, rachis glabrous or subglabrous, later thickened, with pale lenticels. Bracts linear-elliptic, ca. 2 mm, toothed, very early caducous. Flowers ca. 1 cm across. Pedicel 4–6 mm, conspicuously thickened in fruit, velutinous, with pale lenticels in fruit. Hypanthium cup-shaped, outside usually hairy. Sepals triangular-ovate, apex acuminate, soon caducous, outside hairy, margin serrulate. Petals white, obovate-oblong, base cuneate and shortly clawed, apically erose. Stamens 22–27. Ovary glabrous. Style longer than stamens; stigma disc-shaped. Drupe dark purple to black, ovoid, 1–2 cm across, glabrous.

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 1600–3000 m.

Ecology: In forest on hill slopes.

Flowering: April–June. **Fruiting:** July–October.

The narrowly ovate-elliptic leaves are very characteristic of *Prunus napaulensis*, as are the thickened, lenticellate pedicels of the fruit. Variant spellings of the name in the literature include '*nepaulensis*' and '*nepalensis*'.

Ripe fruits are eaten fresh. Wood is used as timber and firewood. Young leaves and shoots are poisonous to cattle.

13. *Prunus venosa* Koehne, Pl. Wilson. 1(2): 60 (1912).

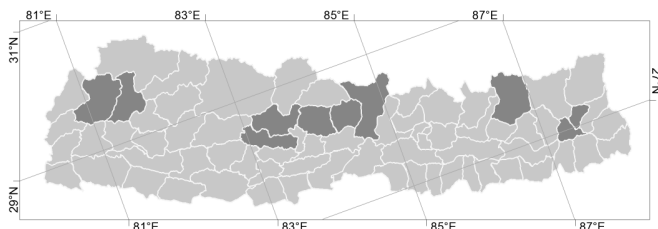
Prunus buergeriana var. *nudiuscula* Koehne; *P. undulata* forma *venosa* (Koehne) Koehne.

Deciduous trees to 6–12(–25) m. Twigs purplish brown, usually glabrous. Axillary winter buds solitary, perulate terminal winter buds present. Stipules linear, ca. 5 mm, margin glandular-serrate, very early caducous. Petioles 1–1.5 cm, eglandular, usually glabrous. Leaves elliptic, oblong- or rarely obovate-elliptic, 4–10 × 2.5–5 cm, base rounded to widely cuneate, apex caudate-acuminate to shortly acuminate, margin crenulate, upper surface dark green, glabrous, lower surface pale green, glabrous, secondary veins 7–10 pairs. Flowers opening after the leaves. Racemes solitary, 6–10 cm, 20–30-flowered, without basal leaves, rachis more or less hairy. Bracts not seen, very early caducous. Flowers 5–7 mm across. Pedicel ca. 2 mm, to 3 mm in fruit, hairy, glabrescent. Hypanthium campanulate, outside glabrous. Sepals triangular-ovate, apex acute, margin irregularly serrulate, persistent in fruit, subglabrous outside. Petals white, broadly ovate, base cuneate to shortly clawed, apically erose. Stamens 10–14. Ovary glabrous. Style ca. half as long as stamens, stigma

discoid to semi-rounded. Drupe blackish brown, subglobose to ovoid, ca. 5 mm across, glabrous.

Fig. 17f-g

Distribution: Nepal, W Himalaya, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



Altitudinal range: 1600–3200 m.

Ecology: Forest or thickets with *Pinus wallichiana*, *Rhododendron arboreum*, *Alnus* or *Corylus*.

Flowering: April–May. **Fruiting:** May–October.

Hooker (Fl. Brit. Ind. 2: 316. 1878) and Koehne (Bot. Jahrb. Syst. 52: 285. 1915) misapplied the name *Prunus undulata* Buch.-Ham. ex D. Don to this species.

The fruits with the remains of the sepals and stamens persisting at the base are very distinctive. The young foliage is poisonous to goats.

14. *Prunus undulata* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal.: 239 (1825).

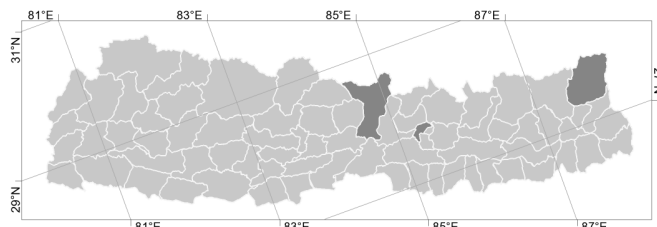
Cerasus acuminata Wall.; *C. acuminata* Wall. nom. nud.; *C. capricida* G. Don nom. superfl.; *C. capricida* Wall. nom. nud.; *C. undulata* (Buch.-Ham. ex D. Don) Ser.; *C. wallichii* (Steud.) M. Roem.; *Laurocerasus acuminata* (Wall.) M. Roem.; *L. undulata* (Buch.-Ham. ex D. Don) M. Roem.; *Prunus acuminata* (Wall.) D. Dietr.; *P. wallichii* Steud.

खोसीनी Khoshini (Nepali).

Evergreen shrubs or trees to 5–16 m. Twigs greyish brown to purplish brown, glabrous. Axillary winter buds solitary; perulate terminal winter buds absent. Stipules early caducous, not seen. Petioles 0.5–1 cm, glabrous, eglandular. Leaves elliptic to oblong-lanceolate, 6–16.5 × 3–5 cm, base broadly cuneate to subrounded, apex acuminate, margin entire or rarely with a few teeth, papery to thinly leathery, glabrous above and below; usually with a pair of flat glands near base and sometimes additional small glands above; secondary veins 6–9 pairs. Flowers opening after the leaves. Racemes solitary or 2–4 in a fascicle, 5–10 cm; rachis glabrous. Bracts 1–2 mm, soon caducous, basal ones sometimes with a tridentate apex. Pedicels 2–5 mm, glabrous. Flowers 3–5 mm across. Hypanthium broadly campanulate, glabrous outside. Sepals ovate-triangular, apex obtuse, glabrous outside. Petals creamy white, elliptic to obovate, 2–4 mm. Stamens 10–30, 3–4 mm. Ovary hairy. Style shorter than stamens. Drupe purplish black,

ovoid-globose to ellipsoid, 1–1.6 × 0.7–1.1 cm, apex acute to obtuse, glabrous; endocarp thin, smooth.

Distribution: E Himalaya, Assam-Burma, E Asia and SE Asia.



Altitudinal range: 1500–2600 m.

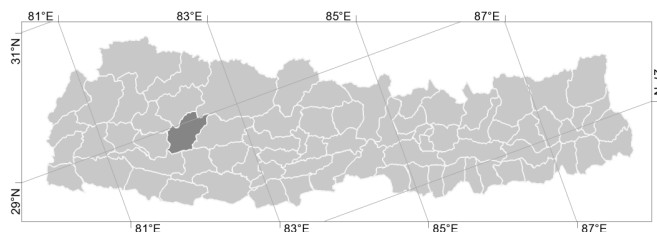
Ecology: Slopes or stream-sides in evergreen broad-leaved forests.

Flowering: August–October. **Fruiting:** December–March.

15. *Prunus jajarkotensis* H. Hara, J. Jap. Bot. 52(12): 355, fig. 2 (1977).

Evergreen trees to 6–7.5 m tall. Twigs greenish brown, glabrous. Axillary winter buds solitary, perulate terminal winter buds absent. Stipules early caducous, not seen. Petioles 1–1.5 cm, glabrous, without glands. Leaves oblong to narrowly oblong-ovate, 5–18 × 2.5–4 cm, base broadly cuneate, apex acuminate, margin crenulate, coriaceous, both surfaces glabrous, secondary veins 6–8 pairs. Flowers opening after the leaves. Racemes solitary, 4–5 cm, rachis glabrous. Bracts small, soon caducous. Pedicels 5–10 mm, glabrous. Flowers ca. 5 mm across. Hypanthium broadly campanulate, glabrous. Sepals long-triangular, 2–2.5 mm, outside glabrous, reflexed in flowering. Petals cream, oblong, 2–2.5 mm long, margin hairy. Stamens 25–35, 2.5–3 mm; anthers pale yellow. Ovary green, glabrous. Style 2–2.5 mm. Drupe unknown.

Distribution: Endemic to Nepal.



Altitudinal range: ca. 1000 m.

Ecology: Unknown.

Flowering: Autumn (October). **Fruiting:** Probably December–March.

Known only from the type collection, *Polunin, Sykes & Williams 5784* (BM) from Jajarkot.

Rosaceae

25. *Pygeum* Gaertn., Fruct. Sem. Pl. 1: 218 (1788).

Colin A. Pendry

Evergreen trees. Twigs unarmed. Perulate winter buds absent; axillary buds solitary. Stipules free, soon caducous. Leaves simple, alternate, petiolate, usually with a pair of flat glands near base below, margin entire. Inflorescences unbranched axillary racemes. Bracts small, soon caducous; bracteoles absent. Flowers bisexual, pedicellate. Hypanthium funnel-shaped. Perianth segments 10, small, sepals and petals rather similar in shape and texture. Stamens 25–30, in 1 series inserted on rim of hypanthium. Ovary superior, 1-locular, glabrous; ovules 2. Style terminal, stigma capitate. Fruit a drupe, dry, usually transversely oblong to ellipsoid, obscurely didymous, at the base with the remains of the circumscissile hypanthium persisting as a ring of tissue. Seed solitary.

Worldwide about 40 species in tropical Africa, S and SE Asia, NE Australia, New Guinea and the Pacific Islands. One species in Nepal.

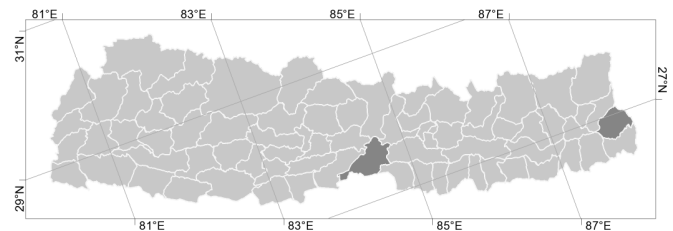
Although molecular evidence indicates that *Pygeum* should be included within *Prunus* (Jun Wen *et al.*, J. Syst. Evol. 46: 322–332. 2008), it has been considered distinct in recent Nepalese floristic publications and Lu & Bartholomew (Fl. China 9: 430–432. 2003), and so this approach is followed here.

1. *Pygeum zeylanicum* Gaertn., Fruct. Sem. Pl. 1: 218, pl. 46 (1788).

Polydontia ceylanica Wight; *Prunus ceylanica* (Wight) Miq.;
Pygeum acuminatum Colebr.; *P. glaberrimum* Hook.f.

Trees to 25 m. Twigs glabrous, lenticellate. Stipules ca. 1 mm. Petioles 1–1.5 cm, grooved above. Leaves elliptic to ovate, 6–15 × 2.5–6 cm, base cuneate to rounded, apex acute to acuminate, glabrous, secondary veins 7–8 pairs, midrib and secondary venation impressed above. Racemes to 8 cm, tomentose, glabrescent. Bracts narrowly triangular, to 1 mm. Flowers white. Pedicels ca. 2 mm. Hypanthium to 1.5 mm, glabrous within, sericeous outside. Sepals triangular, ca. 1 mm, glabrous within, sericeous outside. Petals elliptic, ca. 1 mm, glabrous within, sericeous outside. Stamens to 5 mm. Ovary globose, ca. 1 mm, glabrous. Style 5 mm. Fruit ca. 1.5 × 2–2.5 cm, glabrous, on 8–10 mm pedicel.
Fig. 18a

Distribution: Nepal and S Asia.



Altitudinal range: 300–500 m.

Ecology: Subtropical forest.

Flowering: August–November. **Fruiting:** December–April.

26. *Maddenia* Hook.f. & Thomson, Hooker's J. Bot. Kew Gard. Misc. 6: 381, pl. 12 (1854).

Colin A. Pendry

Trees or shrubs, deciduous. Twigs unarmed. Perulate winter buds present, leaving a ring of scars around twig; axillary buds solitary. Stipules large, persistent. Leaves alternate, simple with toothed margins, the teeth simple or glandular. Inflorescences terminal, racemose, many-flowered. Bracts large, soon caducous; bracteoles absent. Flowers reddish green, bisexual or functionally female with anthers absent or non-functional. Hypanthium campanulate. Perianth segments 10–12, sepals and petals indistinguishable. Stamens or staminodes 20–30, irregularly inserted on rim of hypanthium. Ovary superior, with 1 or occasionally 2 carpels, each with 2 pendulous ovules. Style equalling stamens, stigma capitate. Fruit a drupe with a thin, fleshy mesocarp. Seeds 1 or 2.

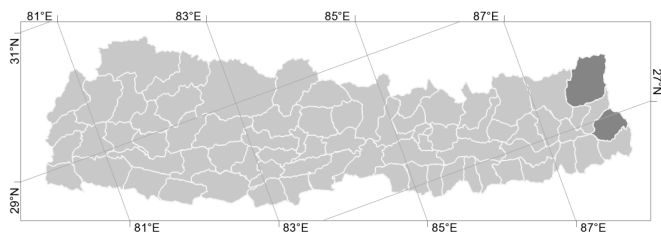
Worldwide about seven species in the Himalaya and China. One species in Nepal.

Although molecular evidence indicates that *Maddenia* should be included within *Prunus* (Jun Wen *et al.*, J. Syst. Evol. 46: 322–332. 2008), it has been considered distinct in recent Nepalese floristic publications and Gu & Bartholomew (Fl. China 9: 432–434. 2003), and so this approach is followed here.

1. *Maddenia himalaica* Hook.f. & Thomson, Hooker's J. Bot. Kew Gard. Misc. 6: 381, pl. 12 (1854).
Maddenia himalaica var. *glabrifolia* H.Hara.

Trees or shrubs to 4 m. Current year's twigs more or less densely brown villous, older twigs purple-brown, smooth. Stipules strap-shaped to very narrowly ovate, to 20 × 6 mm, sparsely sericeous, with or without glandular hairs on margins. Petioles 2–3 mm, villous. Leaves ovate to oblong, 5–12 × 2–5 cm, base rounded to cordate, apex acuminate, margins serrulate to biserrate, the teeth gland-tipped towards the base, veins 12–19 pairs, glabrous above, villous below, especially on the veins. Inflorescences to 5 cm, peduncle brown villous. Bracts ca. 10 mm, sericeous, margins with glandular hairs towards base. Pedicels 2–5 mm. Hypanthium 2–3 mm, villous outside, glabrous within. Perianth segments 2–3 mm, villous outside. Stamens and staminodes cream, 5–6 mm. Carpels 2–3 mm, glabrous or sparsely villous at apex. Styles 6–8 mm. Drupes dark red, ovoid, ca. 1 cm.
 Fig. 18b-d

Distribution: Nepal, E Himalaya, Tibetan Plateau and Assam-Burma.



Altitudinal range: 2500–3400 m.

Ecology: Coniferous forests with *Rhododendron*.

Flowering: April–May. **Fruiting:** July.

Rosaceae

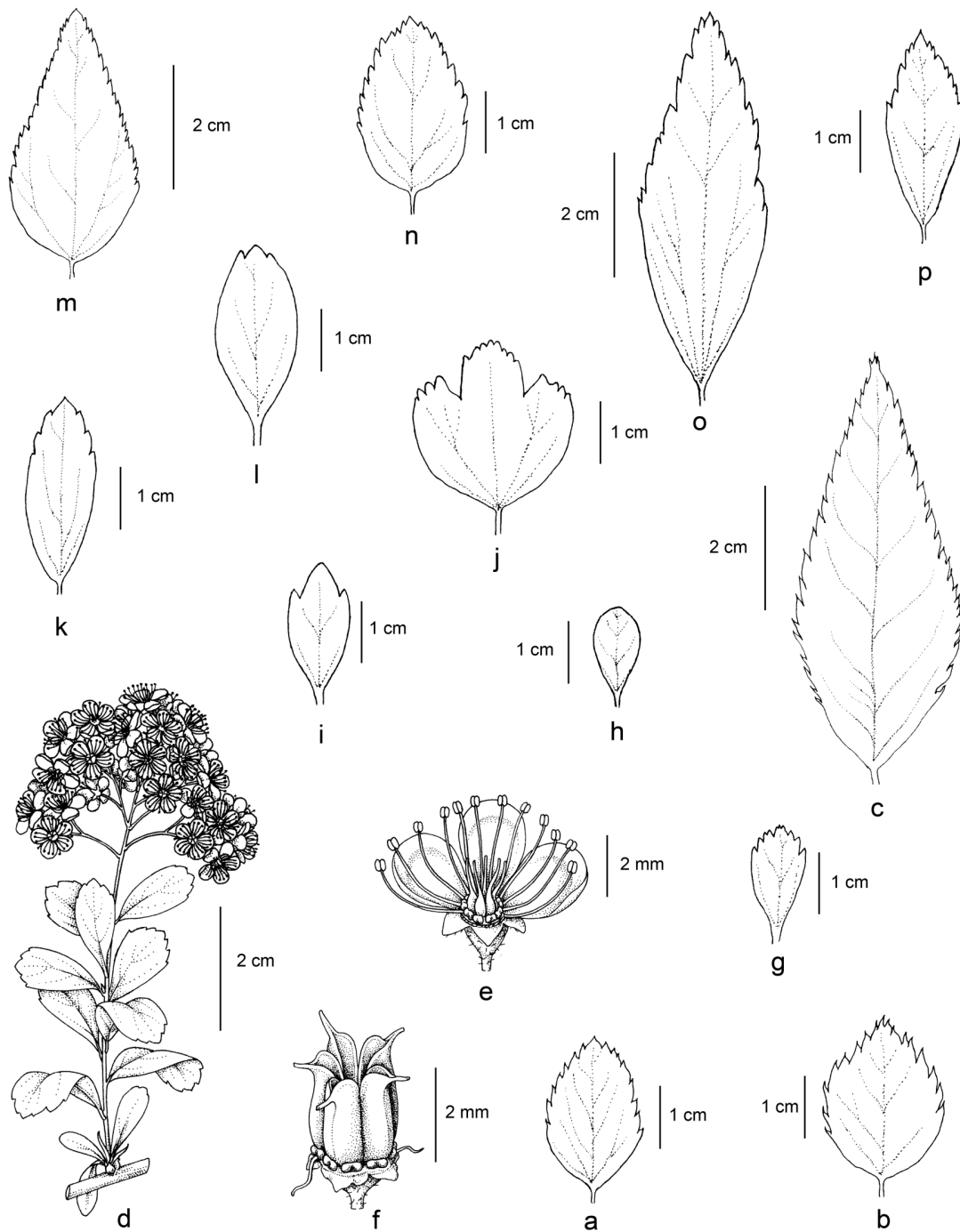


Fig. 1.
 ROSACEAE. *Spiraea bella*: a, leaf. *Spiraea hemicyptophyta*: b, leaf. *Spiraea micrantha*: c, leaf. *Spiraea arcuata*: d, inflorescence leaves; e, opened flower with two petals removed; f, mature follicles. *Spiraea canescens*: g, leaf. *Spiraea hypericifolia*: h, leaf. *Spiraea hypoleuca*: i–j, leaves (vegetative shoot); k–l, leaves (fertile shoot). *Spiraea vacciniifolia*: m–n, leaves. *Spiraea cantoniensis*: o–p, leaves.

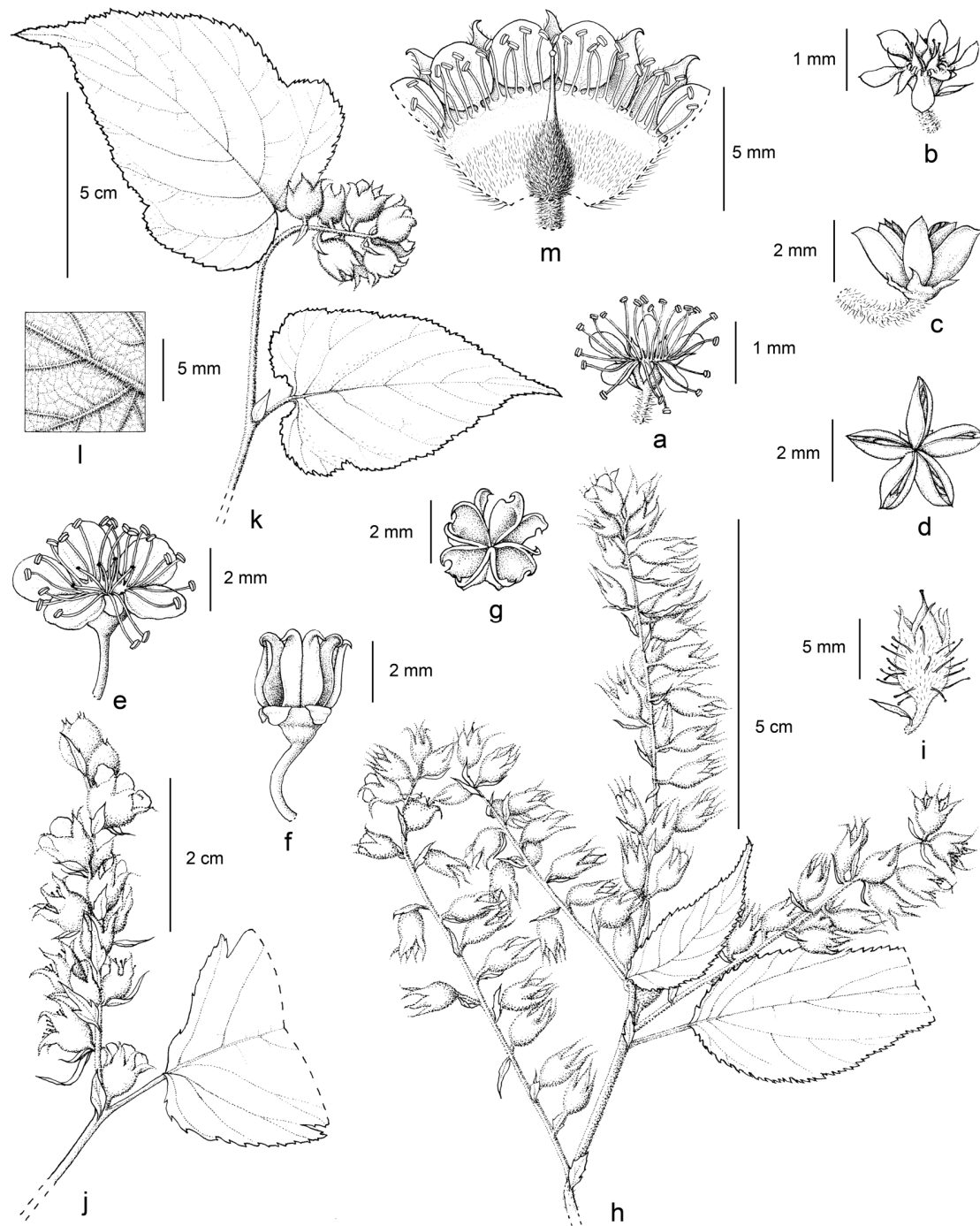


Fig. 2.

ROSACEAE. **Aruncus dioicus**: a, male flower; b, female flower; c, fruit side view; d, fruit vertical view. **Sorbaria tomentosa**: e, flower; f, fruit side view; g, fruit vertical view. **Neillia thrysiflora**: h, inflorescence with fruits; i, fruit. **Neillia rubiflora**: j, inflorescence. **Neillia velutina**: k, inflorescence and leaves; l, lower surface of leaf; m, opened flower.

Rosaceae

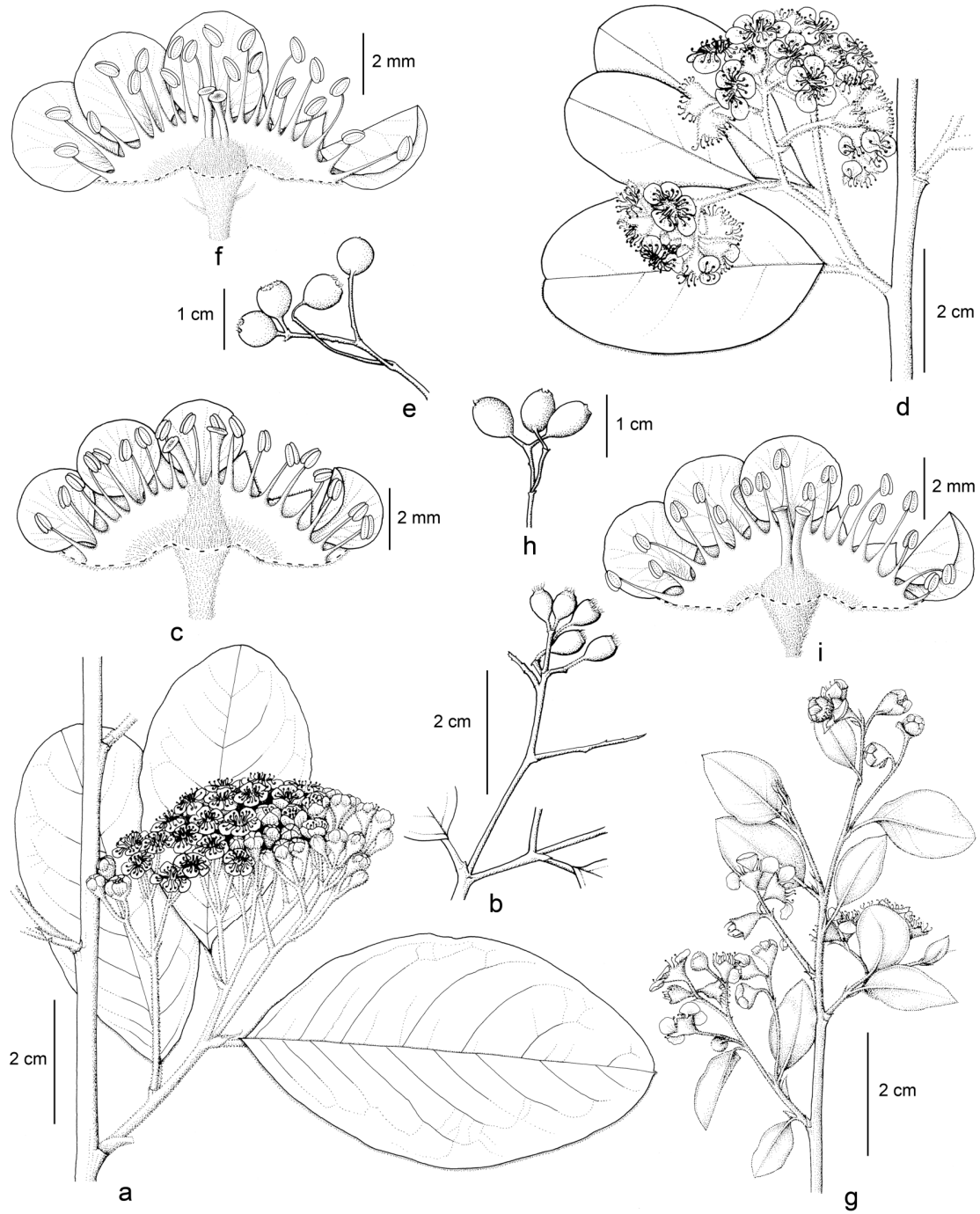


Fig. 3.
ROSACEAE. *Cotoneaster frigidus*: a, inflorescence and leaves; b, infructescence; c, opened flower. *Cotoneaster affinis*: d, inflorescence and leaves; e, infructescence; f, opened flower. *Cotoneaster racemiflorus*: g, inflorescence and leaves; h, infructescence; i, opened flower.



Fig. 4.
 ROSACEAE. **Cotoneaster buxifolius**: a, inflorescence and leaves. **Cotoneaster microphyllus**: b, inflorescence and leaves. **Cotoneaster adpressus**: c, inflorescence and leaves. **Cotoneaster acuminatus**: d, infructescence and leaves. **Cotoneaster verruculosus**: e, inflorescence and leaves.

Rosaceae

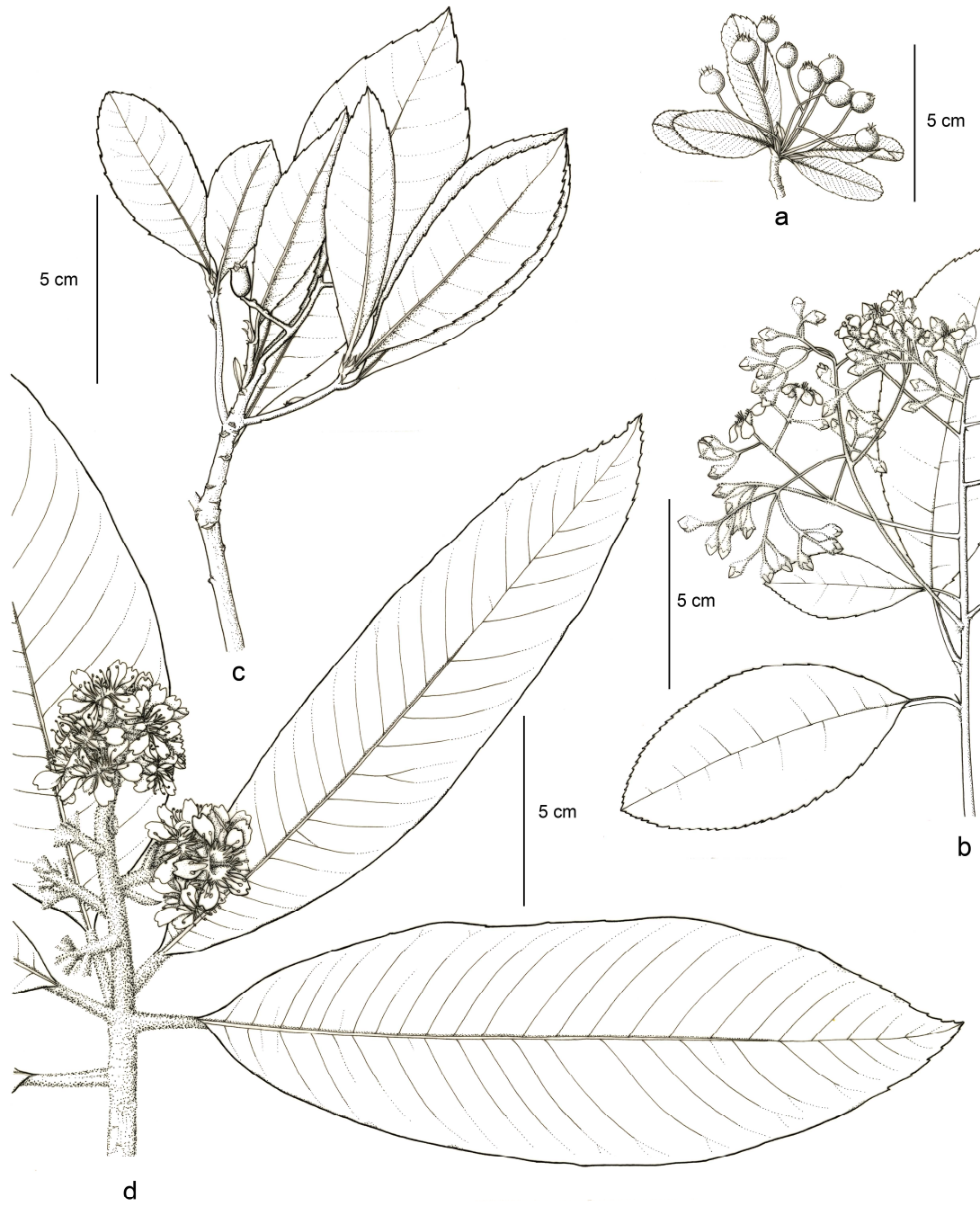


Fig. 5.
ROSACEAE. *Pyracantha crenulata*: a, infructescence and leaves. *Photinia nussia*: b,
inflorescence and leaves. *Eriobotrya dubia*: c, infructescence and leaves. *Eriobotrya elliptica*:
d, inflorescence and leaves.

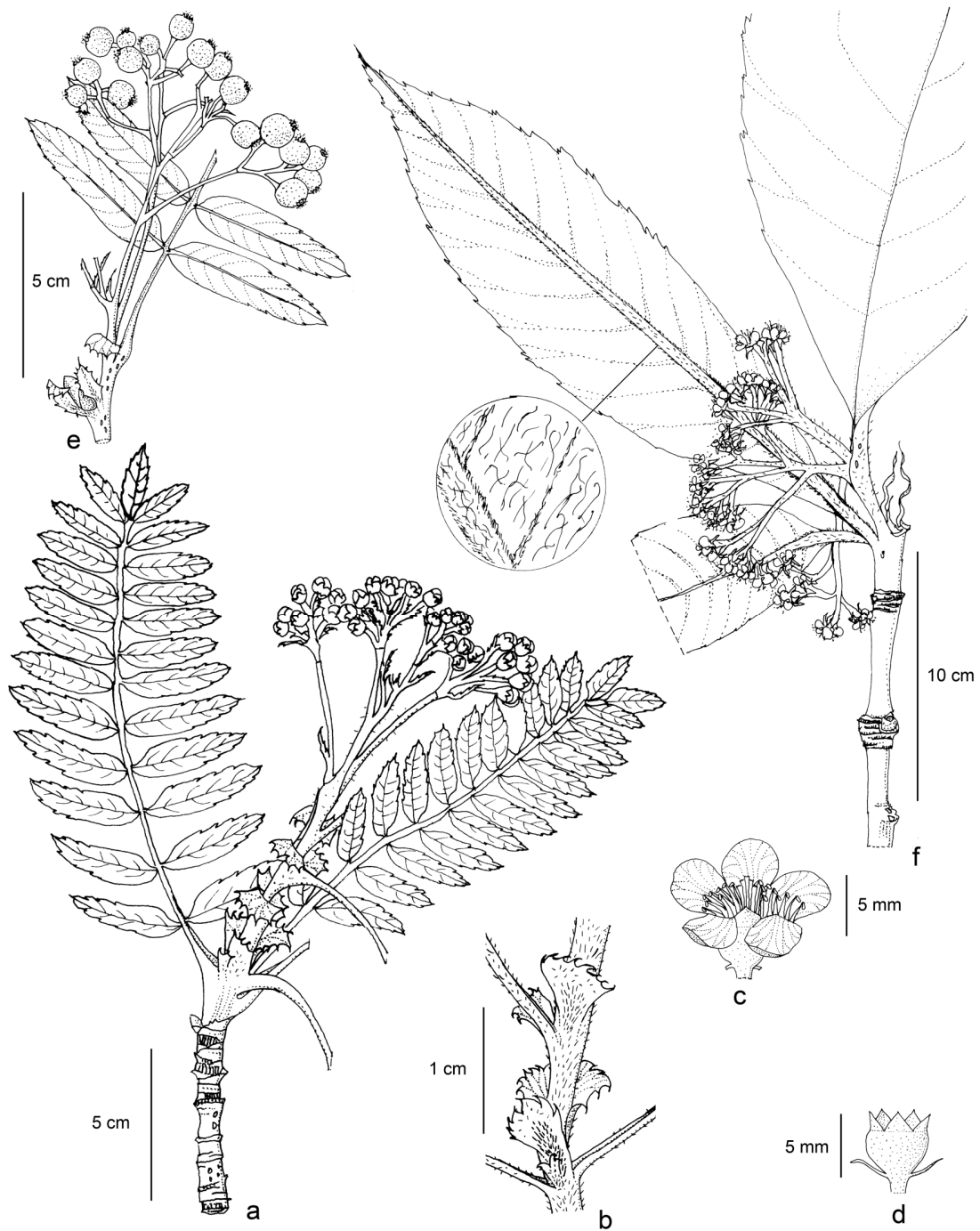


Fig. 6.
Sorbus arachnoidea: a, inflorescence and leaves; b, stipules; c, flower; d, hypanthium; e, infructescence and leaves. ***Sorbus hedlundii***: f, inflorescence and leaves.

Rosaceae

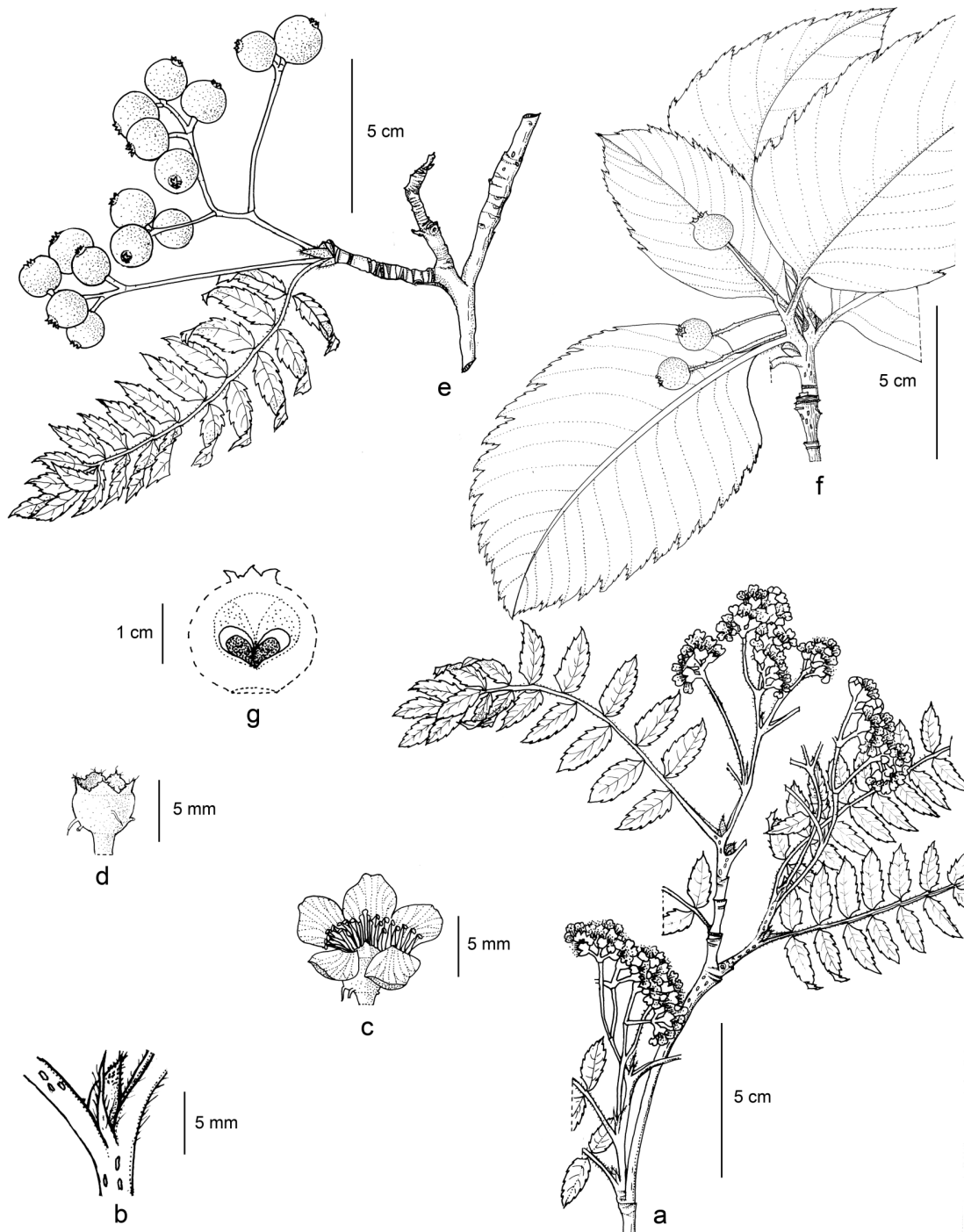


Fig. 7.
ROSACEAE. *Sorbus himalaica*: a, inflorescence and leaves; b, stipules; c, flower; d, hypanthium;
Sorbus lanata: f, fruiting branch; g, longitudinal section of fruit.

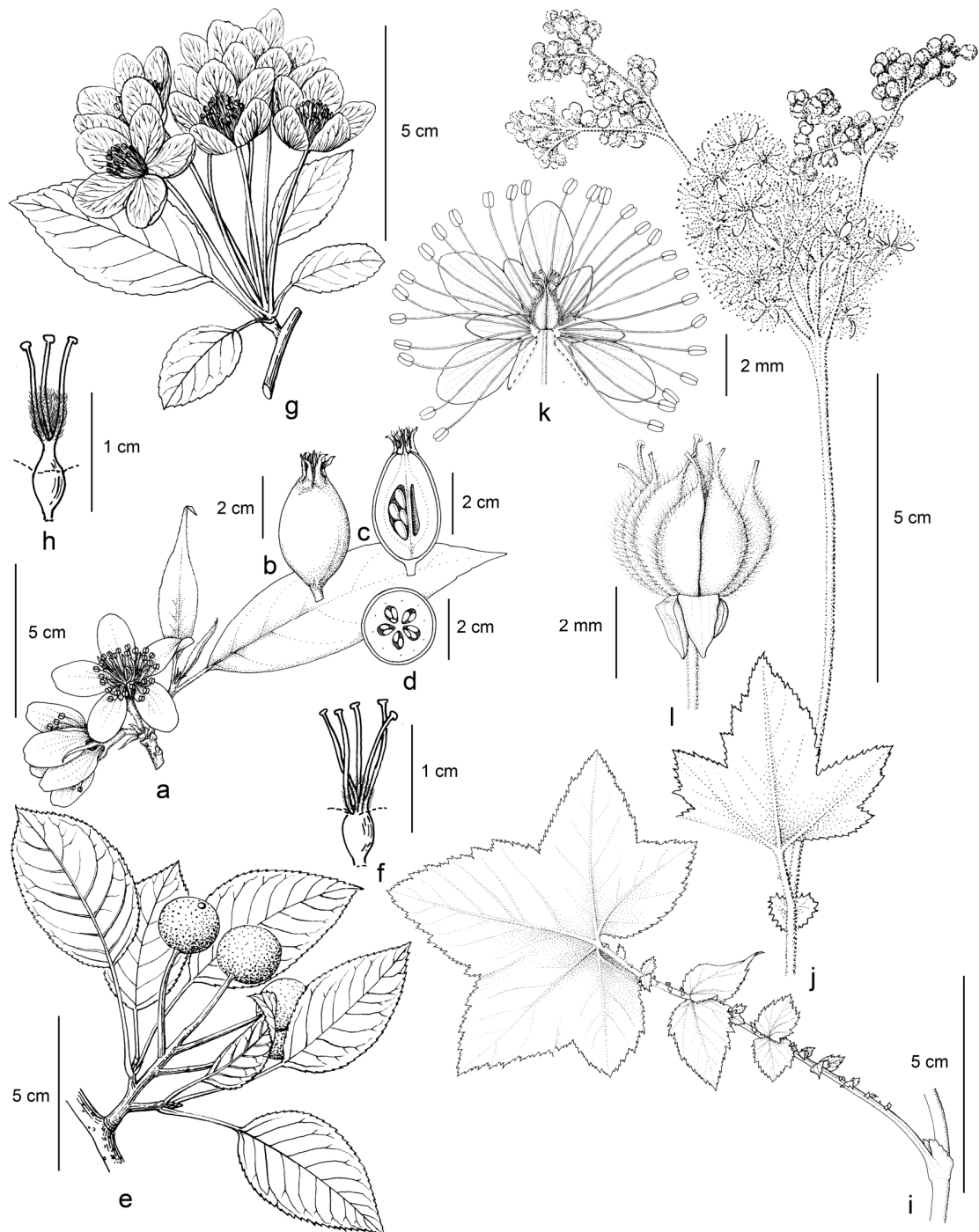


Fig. 8.
 ROSACEAE. **Docynia indica**: a, inflorescence and leaves; b, fruit; c, longitudinal section of fruit; d, transverse section of fruit. **Pyrus pashia**: e, infructescence and leaf; f, ovary. **Malus baccata**: g, inflorescence and leaves; h, ovary. **Filipendula vestita**: i, lower leaf; j, inflorescence; k, opened flower; l, fruit.

Rosaceae

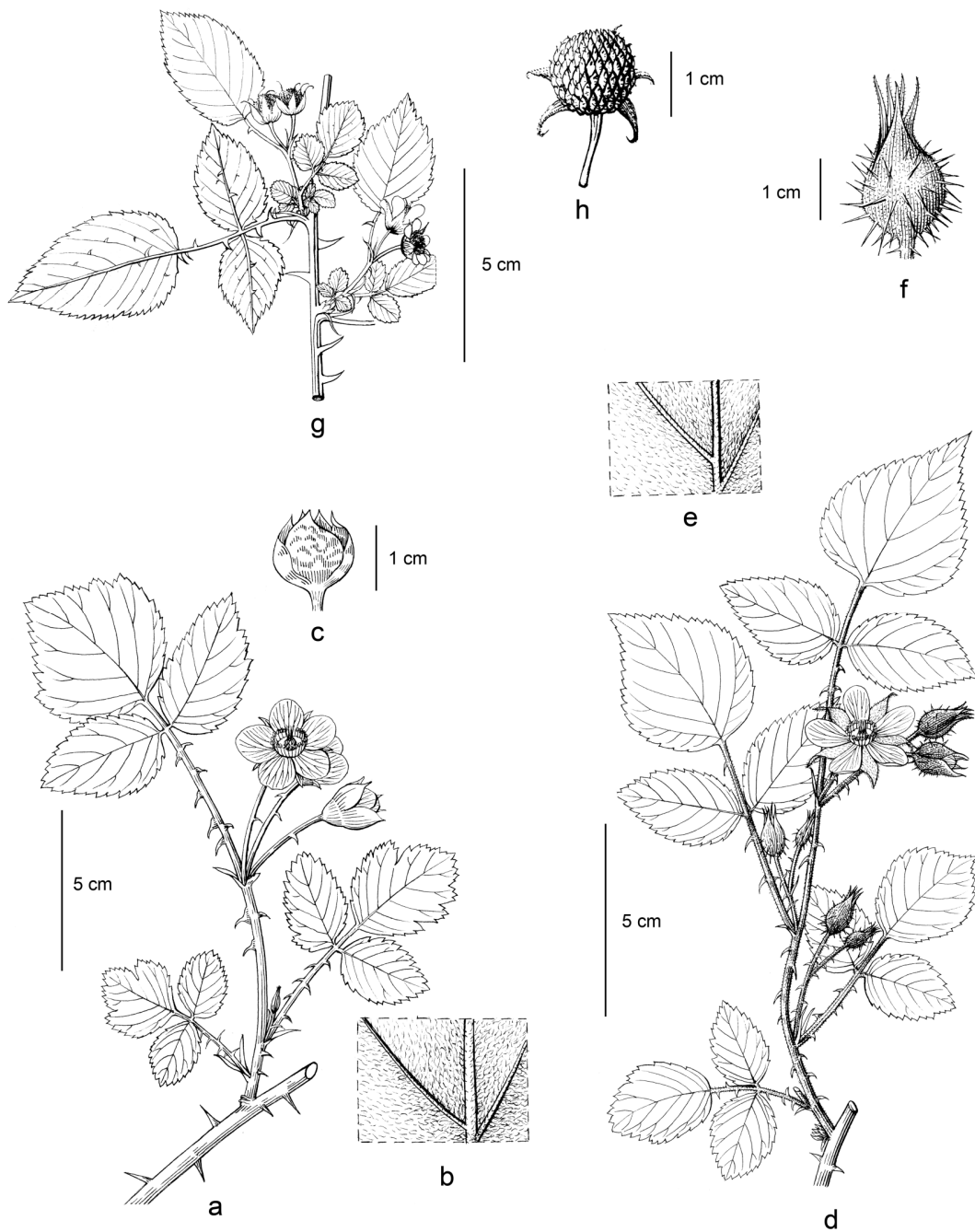


Fig. 9.
ROSACEAE. **Rubus biflorus**: a, inflorescence and leaves; b, lower surface of leaf; c, fruit with persistent calyx. **Rubus alexeterius**: d, inflorescence and leaf; e, lower surface of leaf; f, fruit with persistent calyx. **Rubus macilentus**: g, inflorescence with fruits and leaves; h, fruit with persistent calyx.

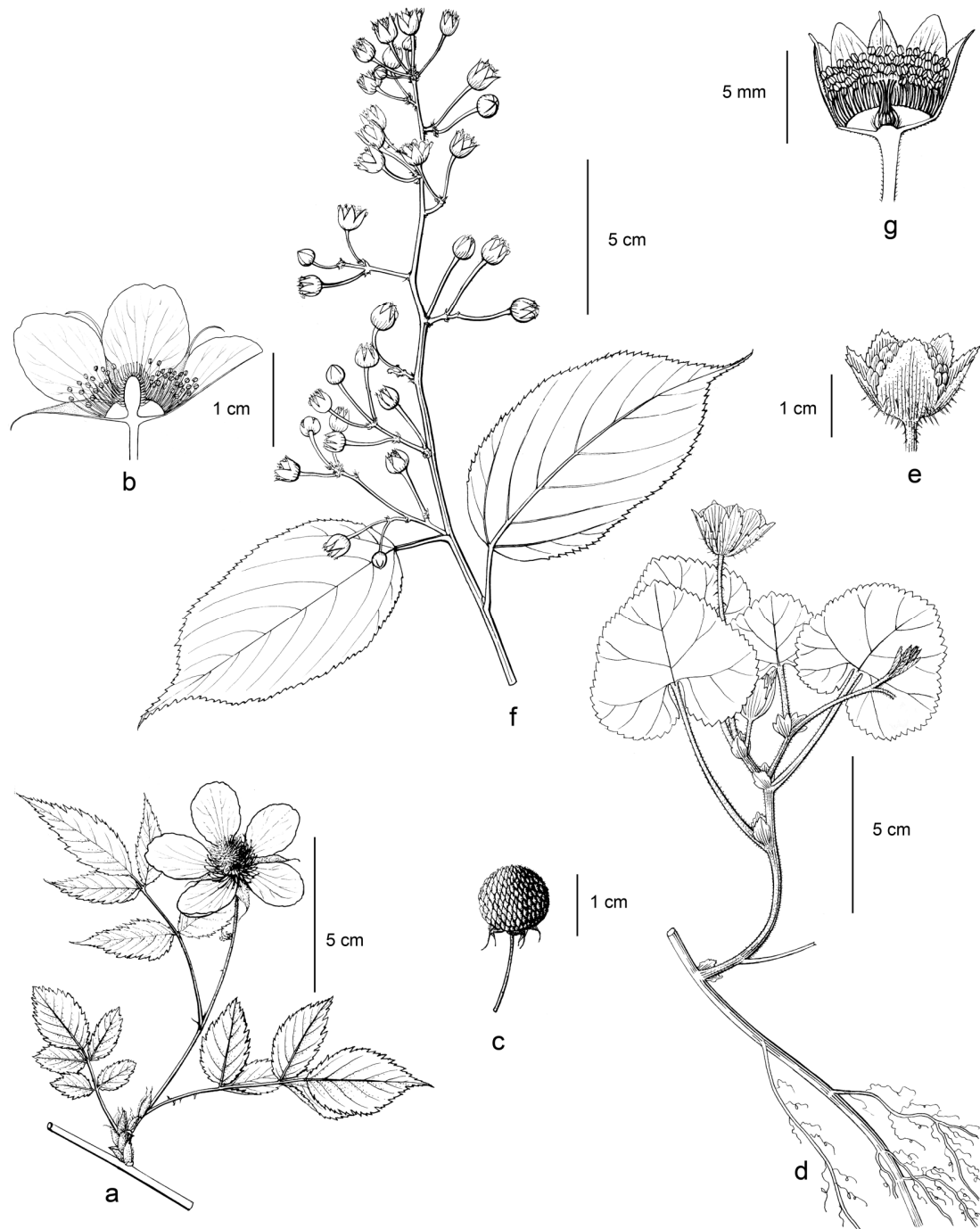


Fig. 10.
 ROSACEAE. **Rubus rosifolius**: a, inflorescence and leaves; b, longitudinal section of flower; c, fruit with persistent calyx. **Rubus calycinus**: d, flowering plant; e, fruit with persistent calyx. **Rubus acuminatus**: f, inflorescence and leaves, g, longitudinal section of flower.

Rosaceae

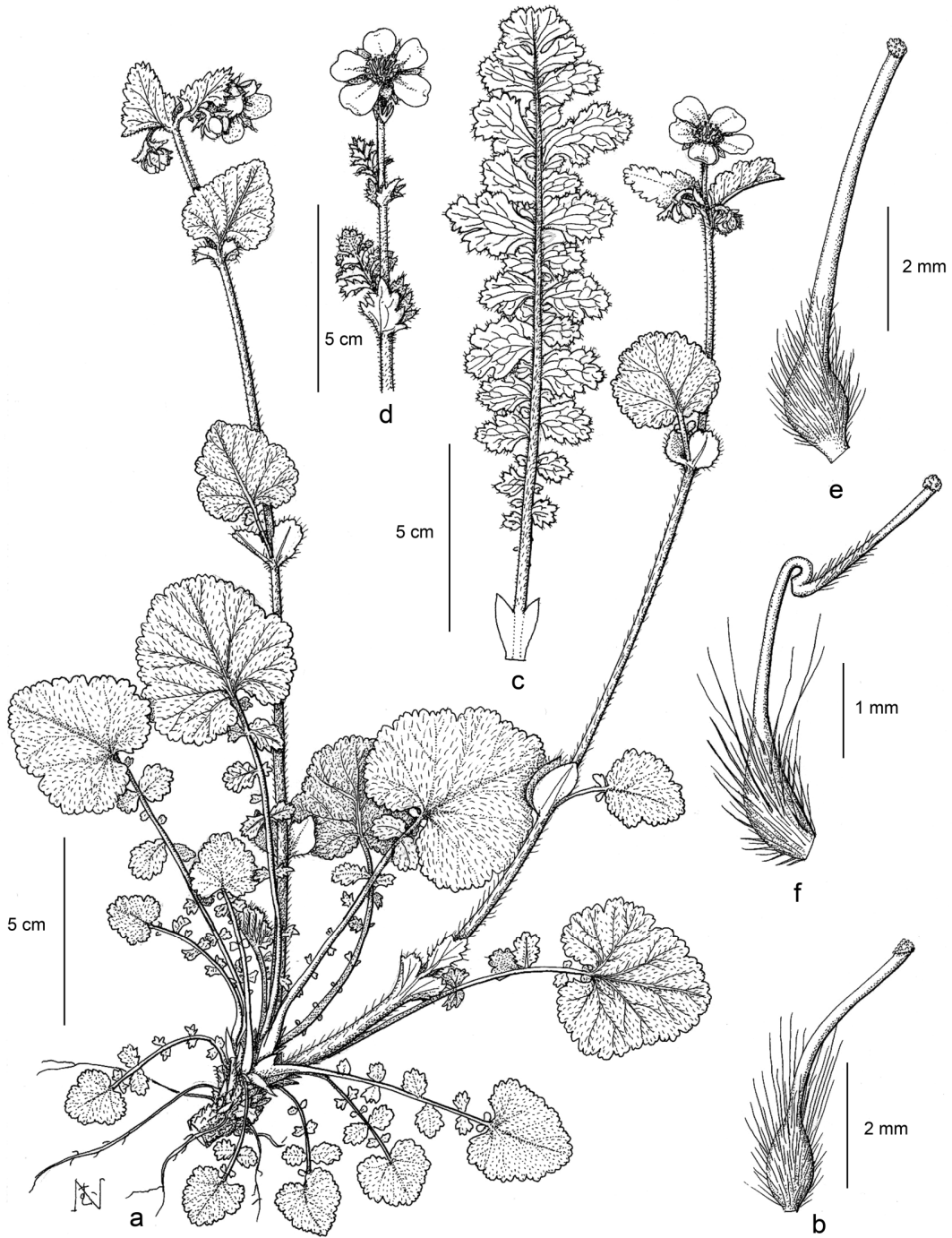


Fig. 11.
ROSACEAE. **Geum sikkimense**: a, flowering plant; b, pistil. **Geum elatum**: c, radical leaf; d, inflorescence and cauline leaves; e, pistil. **Geum roylei**: f, pistil.

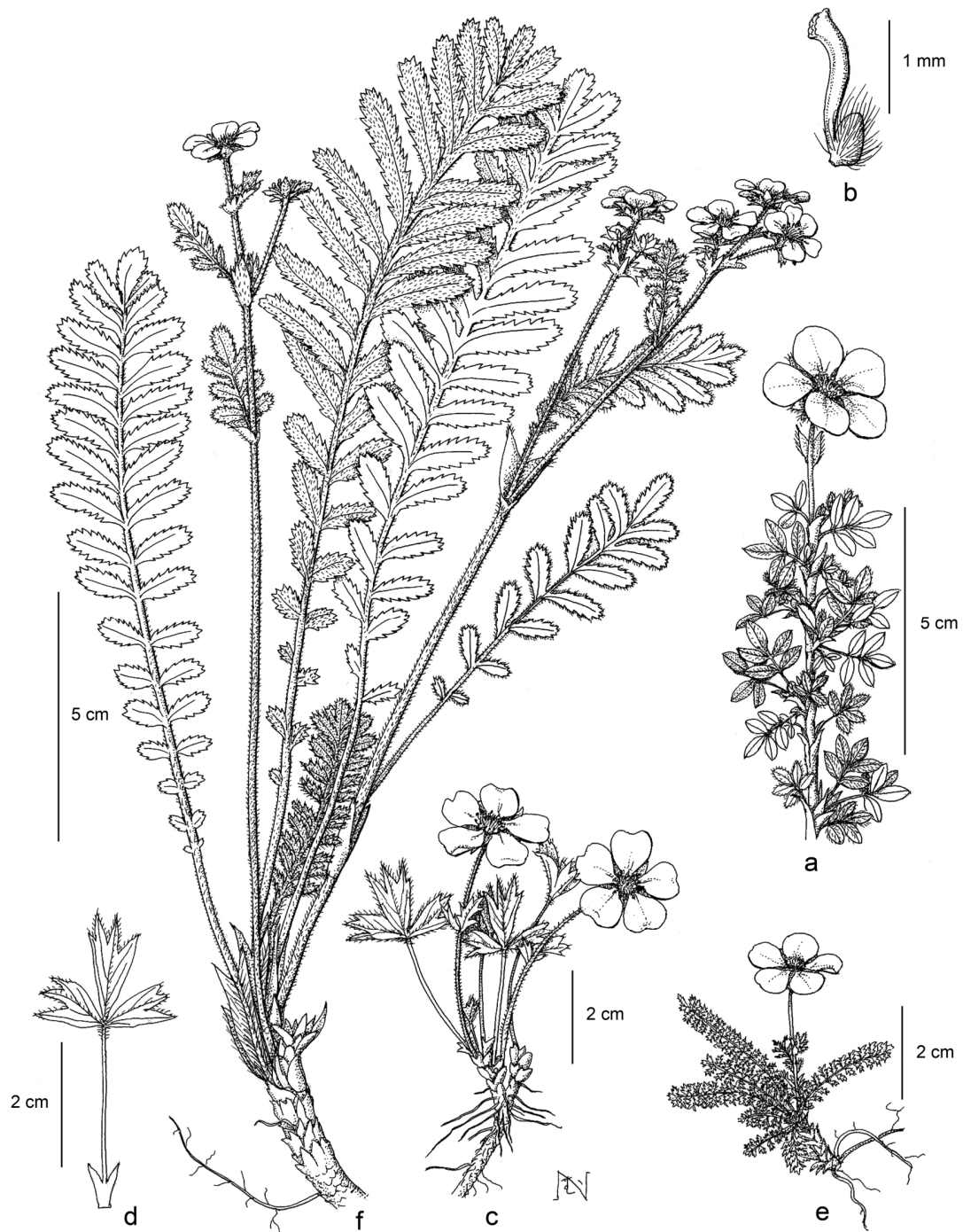


Fig. 12.
 ROSACEAE. **Potentilla fruticosa** var. *arbuscula*: a, flowering shoot; b, pistil.
Potentilla eriocarpa var. *eriocarpa*: c, flowering plant; d, radical leaf. **Potentilla aristata**: e, flowering plant. **Potentilla contigua**: f, flowering plant.

Rosaceae

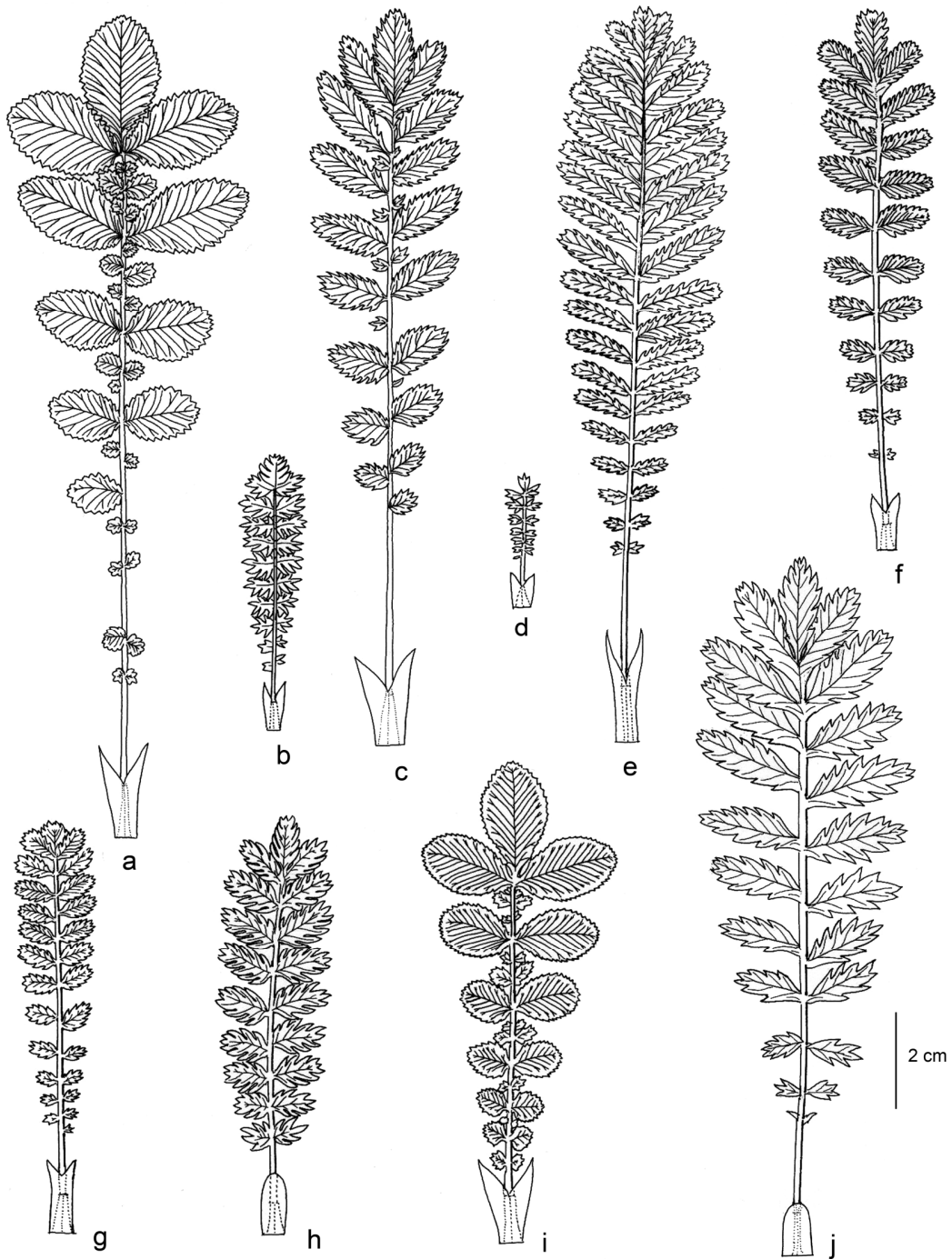


Fig. 13.
 ROSACEAE. Radical leaves of *Potentilla* species. a, *Potentilla polyphylla* var. *polyphylla*; b, *Potentilla aristata*; c, *Potentilla josephiana*; d, *Potentilla microphylla*; e, *Potentilla contigua*; f, *Potentilla leuconota*; g, *Potentilla tristis*; h, *Potentilla commutata* var. *commutata*; i, *Potentilla lineata*; j, *Potentilla peduncularis* var. *peduncularis*.

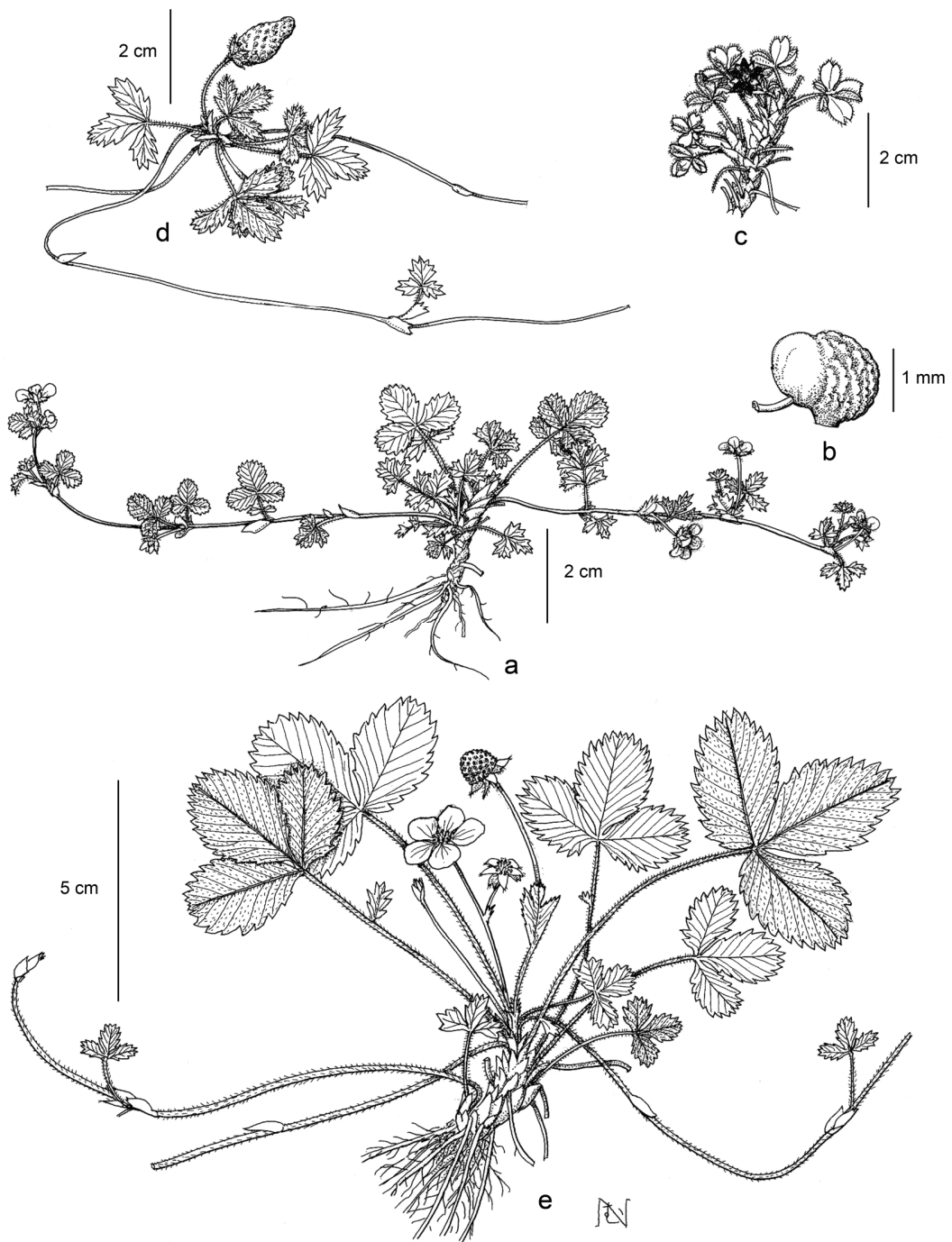


Fig. 14.
 ROSACEAE. ***Sibbaldia micropetala***: a, flowering plant; b, achene. ***Sibbaldia purpurea***: c, flowering plant. ***Fragaria daltoniana***: d, fruiting plant. ***Fragaria nubicola***: e, flowering plant.

Rosaceae

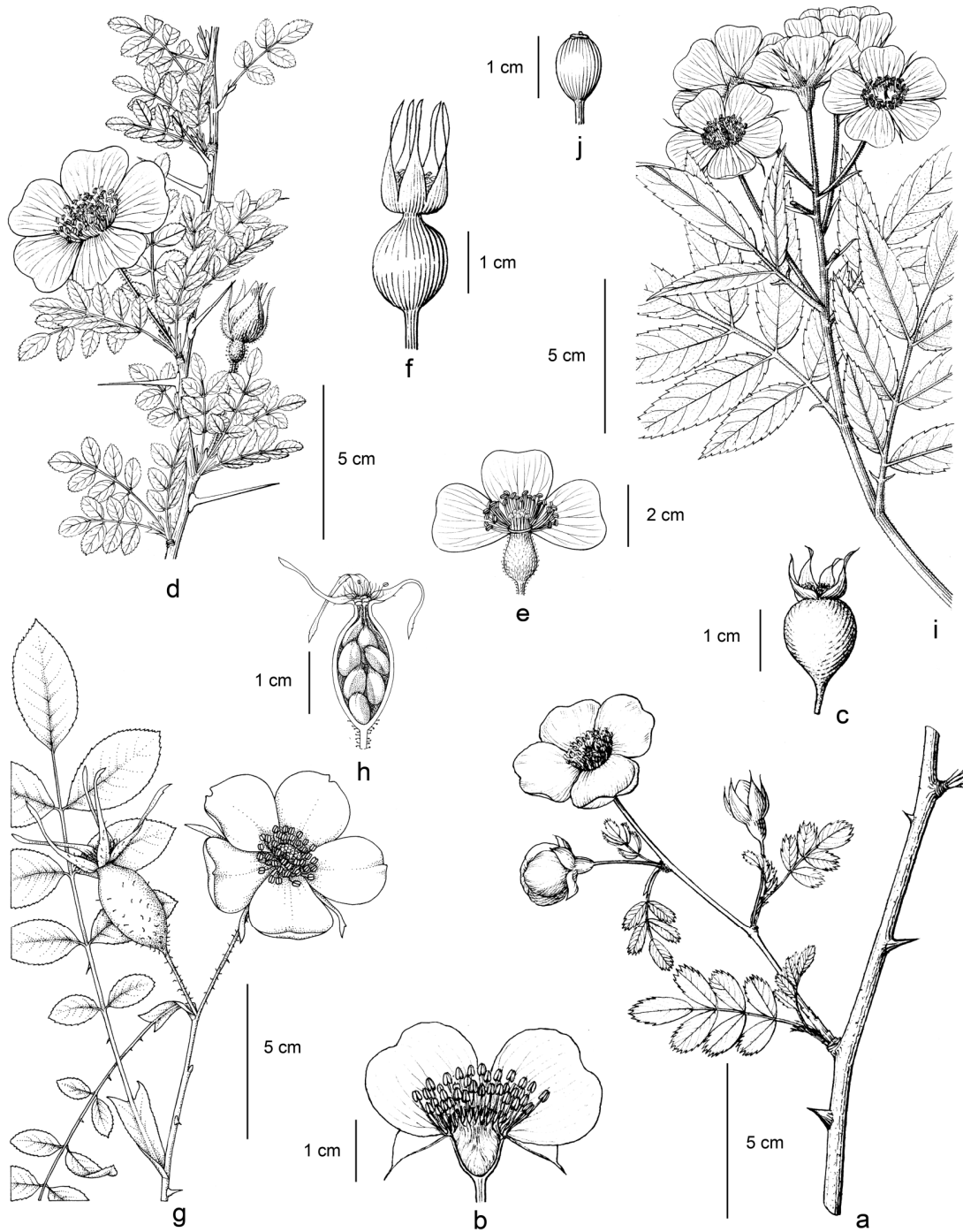


Fig. 15.
 ROSACEAE. **Rosa sericea**: a, inflorescence and leaves; b, longitudinal section of flower; c, fruit with persistent calyx. **Rosa webbiana**: d, inflorescence and leaves; e, flower with sepals and two petals removed; f, fruit with persistent calyx. **Rosa macrophylla**: g, inflorescence with fruit and leaves; h, longitudinal section of fruit with persistent calyx. **Rosa brunonii**: i, inflorescence and leaves; j, fruit.

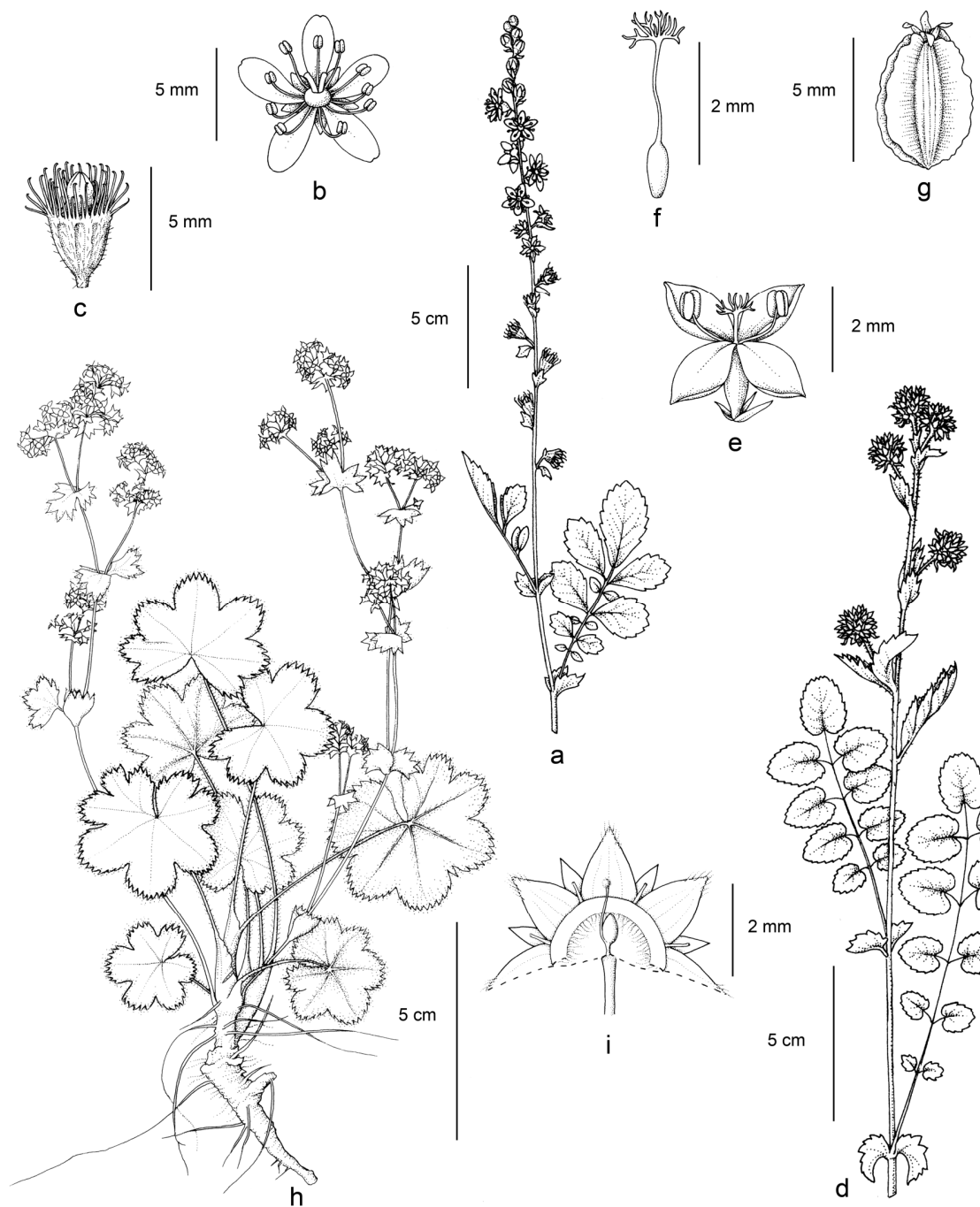


Fig. 16.

ROSACEAE. *Agrimonia pilosa* var. *nepalensis*: a, inflorescence and leaves; b, flower; c, fruit. *Sanguisorba diandra*: d, inflorescence and leaves; e, flower; f, pistil; g, fruit. *Alchemilla vulgaris*: h, flowering plant; i, opened flower.

Rosaceae

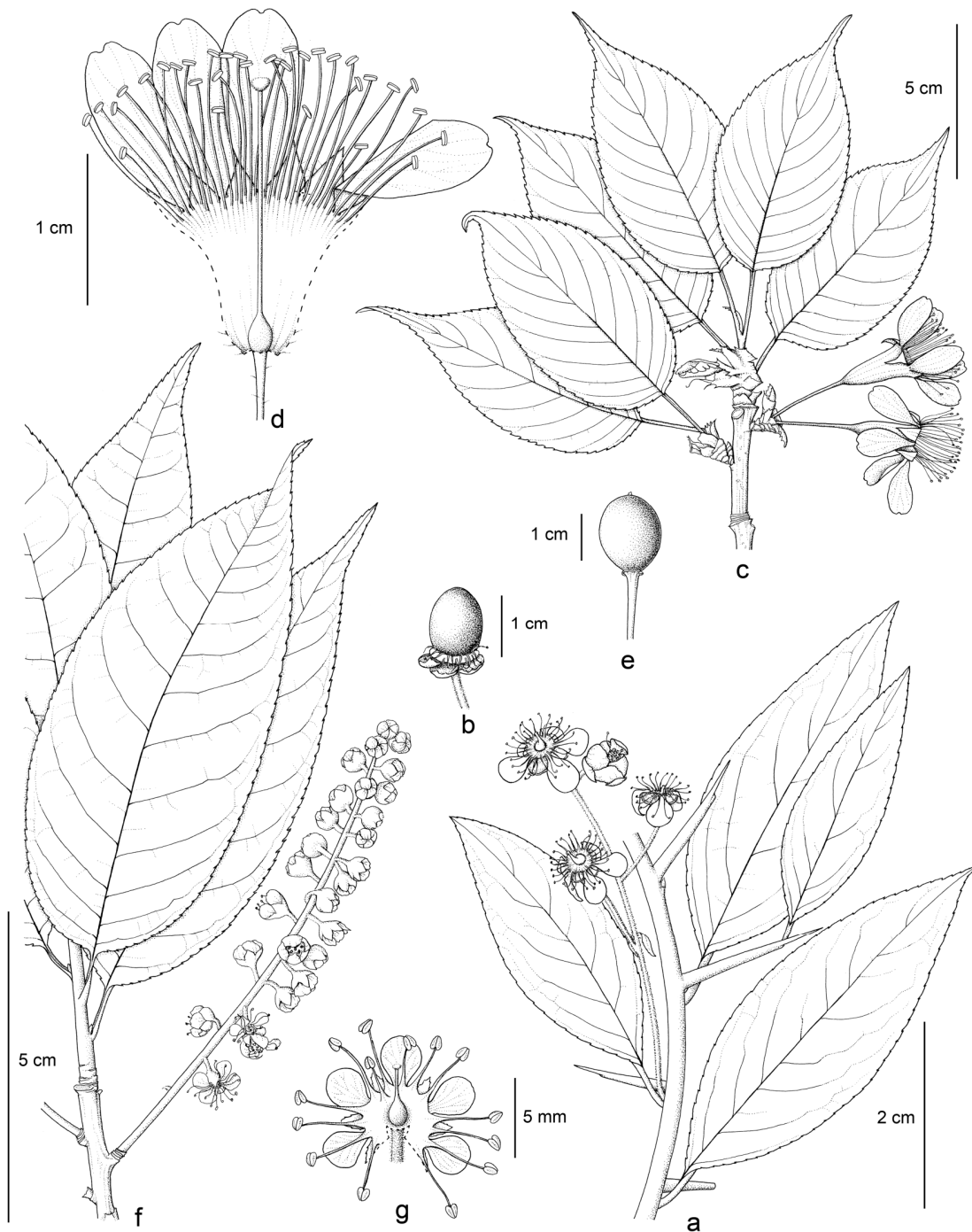


Fig. 17.
ROSACEAE. *Prinsepia utilis*: a, inflorescence and leaves; b, fruit. *Prunus cerasoides*: c, inflorescence and leaves; d, opened flower; e, fruit. *Prunus venosa*: f, inflorescence and leaves; g, opened flower.

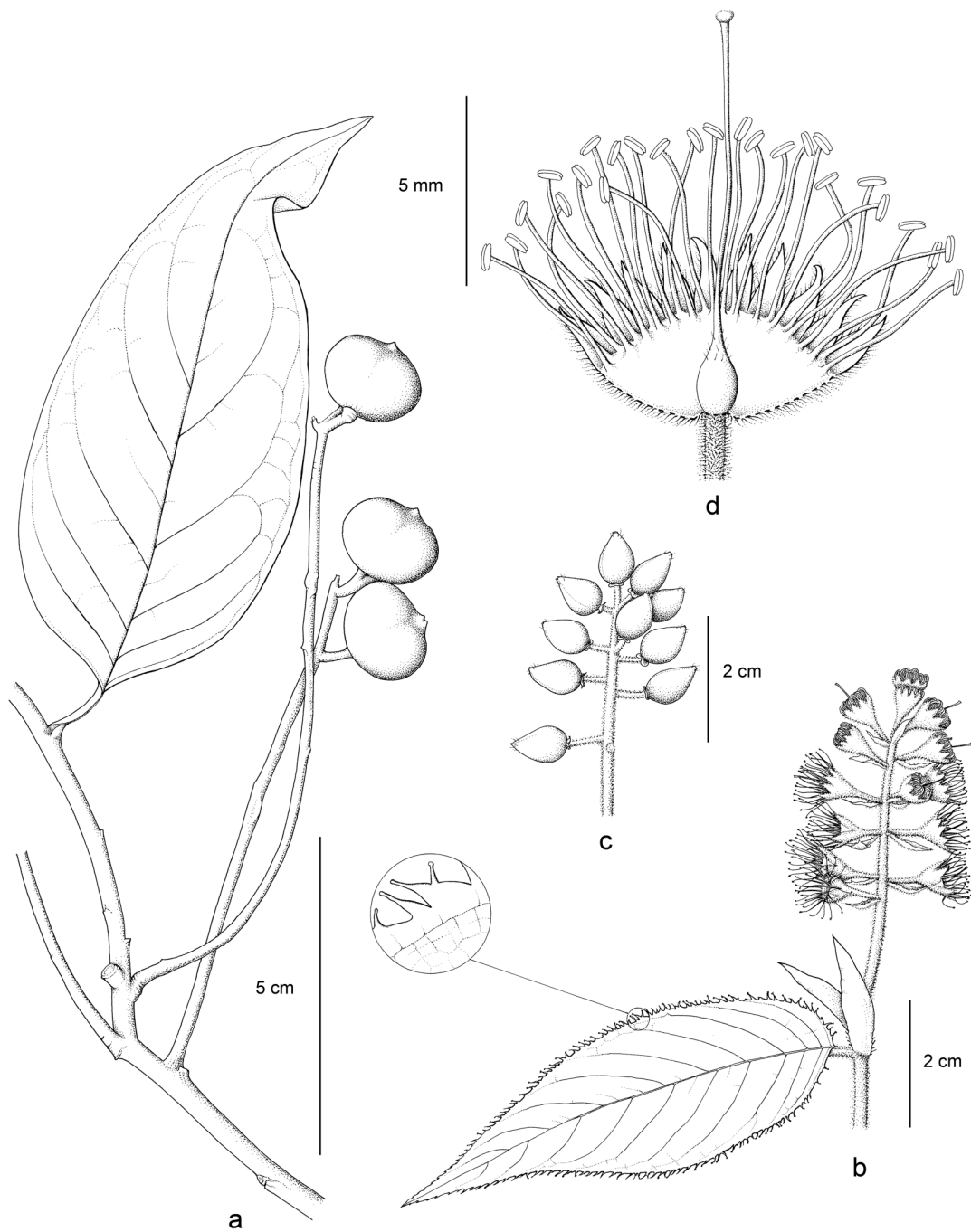


Fig. 18.
ROSACEAE. *Pygeum zeylanicum*: a, inflorescence and leaf. *Maddenia himalaica*: b, inflorescence and leaf; c, inflorescence; d, opened flower.

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Fig. 1

- a-c Clíodhna Ni Bhroin
- d-f FOB 3(1): FIG 38. Mary Bates
- g-p Clíodhna Ni Bhroin

Fig. 2

- a-m Claire Banks

Fig. 3

- Claire Banks

Fig. 4

- Claire Banks

Fig. 5

- Claire Banks

Fig. 6

- Neera Pradhan

Fig. 7

- Neera Pradhan

Fig. 8

- a-d FOB 3(1): FIG 38. Mary Bates
- e, f FOCI 9: 76. FRPS 36: 369, pl. 50. 1974.-Wu Zhanghua & Liu Jingmian
- g, h FOCI 9: 77. FRPS 36: 379, pl. 51. 1974.-Zhao Baoheng; redrawn by Cai Shuqin
- i-l Claire Banks

Fig. 9

- a-c FOCI 9: 88. FRPS 37: 75, pl. 7. 1985.-Wang Jinfeng
- d-f FOCI 9: 89. FRPS 37: 75, pl. 7. 1985.-Wang Jinfeng
- g, h FOCI 9: 90. FRPS 37: 87, pl. 9. 1985.-Anonymous

Fig. 10

- a-c FOCI 9: 91. FRPS 37: 97, pl. 10. 1985.-Liu Chunrong
- d, e FOCI 9: 110. FRPS 37: 207, pl. 29. 1985.-Wang Jinfeng
- f,g FOCI 9: 104. FRPS 37: 135, pl. 16. 1985.-Liu Chunrong

Fig. 11

- Mutsuko Nakajima

Fig. 12

- Mutsuko Nakajima

Fig. 13

- Mutsuko Nakajima

Fig. 14

- Mutsuko Nakajima

Fig. 15

- a-c FOCI 9: 140. FRPS 37: 386, pl. 59. 1985.-Zhang Taili
- d-f FOCI 9: 147. FRPS 37: 386, pl. 66. 1985.-Wang Jinfeng
- g, h FOB 1 (3): Fig 37. Mary Bates
- i, j FOCI 9: 149. FRPS 37: 430, pl. 68. 1985.-Wang Jinfeng

Fig. 16

- a-c FOB 1 (3): Fig 37. Mary Bates
- d-g FOB 1 (3): Fig 37. Mary Bates
- h, i Claire Banks

Fig. 17

- Claire Banks

Fig. 18

- Claire Banks

How to use this pdf web edition

This Web-edition pdf document forms part of a set of Flora accounts for families and genera that have been finalized, including those in volumes yet to be printed. These pdf documents are made accessible via the *Flora of Nepal* website (www.floraofnepal.org) and will be periodically updated in numbered versions, permanently available and citable.

Flora of Nepal takes an innovative approach to Flora writing, with an underlying data base system managing the *Flora of Nepal Knowledge Base* from which the printed volumes and the 'online Flora' (www.floraofnepal.org) are generated. The Internet-accessible dataset augments the printed Flora by presenting all herbarium specimen data, detailed taxonomic information (such as full nomenclatural references and typification), distribution maps with point occurrences and images used when preparing the Flora. Much of this information is accumulated as a normal part of taxonomic working practices when undertaking a floristic revision, but it is usually lost to a wider audience as it is rarely included in the traditional printed Flora.

Flora of Nepal includes all native and fully naturalized vascular plants recorded within the political borders of Nepal, including brief references to agricultural and horticultural plants as appropriate. For pragmatic reasons the arrangement of families in the printed *Flora of Nepal* follows a modified Englerian sequence, closely following that of the *Flora of China* and, to a lesser extent, the *Flora of Bhutan*.^{1,2} In recent years the world view on the arrangement of families has radically changed following overwhelming phylogenetic evidence. The emergent family-level classification, now in its third iteration as APG III, is reasonably stable and widely accepted.³ It has not been possible to alter the family sequence in *Flora of Nepal* printed volumes midway through the project, but as the data are stored separately in a database, the families can be reorganized electronically at a later date to reflect alternative classifications. Circumscription of families and genera, however, generally does follow a contemporary understanding of their relationships, except where group experts advise otherwise. Genera and species are treated in taxonomic order, or if there is disagreement then morphologically similar species are usually grouped together or occasionally listed alphabetically. Intraspecific taxa are always presented in alphabetical order. Intermediate ranks, such as subfamily, tribe, subgenus, section and series, are only used when they are useful in the treatment of large families or genera.

Information on nomenclature and classification is given for all accepted scientific names and synonyms pertaining to Nepal and nearby regions. Emphasis is given to those names listed in the primary checklists for Nepal: *Enumeration of the Flowering Plants of Nepal*,⁴ *Annotated Checklist of the Flowering Plants of Nepal*,⁵ and *Flowering Plants of Nepal (Phanerogams)*.⁶ At the generic level, synonyms widely used in the Asian literature are included. Full bibliographic citation with authorship is given for all accepted names and their basionyms at the rank of genus and below. As far as possible, the bibliographic citations of all accepted names and their basionyms have been verified with the original literature. The basionym precedes all other synonyms, which are listed alphabetically. Misapplied names (misidentifications encountered in the literature) are not included in synonymy, but are discussed in the supporting information at the end of a taxon. Authors of plant names follow the standard forms given in *Authors of Plant Names* and its continuously updated online supplement (www.ipni.org).⁷ Bibliographic references are given using the standard abbreviations in BPH-2 for serial publications (journals and periodicals) and in TL-2 (and its supplements) for books.^{8,9} In some cases books were published in several fascicles on different dates, sometimes over different years, but not indicated as such in the printed work. Date of publication is critical for establishing nomenclatural priority, and so it is important to be precise when citing names published in such works. The fascicle composition and publication dates of these often complex cases are clearly explained in TL-2, but the standard abbreviation does not differentiate between them. In these instances the TL-2 abbreviation has been amended with brackets to clearly indicate which fascicle is being referred to, for example Wallich, N., Pl. As. Rar. 2[8]. 1831. Books and periodicals not included in these two standard references have been abbreviated according to the recommendation in Appendix A of BPH-2.

Rosaceae

Where a taxon has a widely recognized local name this is given in Devanagari script, followed by its transliteration into the Latin alphabet and the language of the vernacular name in parentheses '()'. One local name is given in the printed Flora, whereas multiple alternative vernacular names in different languages may be included in the *Flora of Nepal Knowledge Base* and made available online. Separate indexes to vernacular names in Devanagari, their Latin transliterations and scientific names are included at the end of each volume.

Descriptions are given for all taxa (family, genus, species, infraspecies and occasionally intermediate ranks) and wherever possible are based on primary observations and measurements made on specimens from Nepal. If no such material was available to authors, descriptions are taken from specimens from adjacent countries or secondary sources, and annotated as such. Most descriptions are about 150 words long, but exceptionally they are shorter or longer depending on the complexity of the taxon being described. For species with more than one infraspecific taxon, a full description is given for the species and short diagnoses for the lower taxa. Descriptions aim to be consistent and parallel between taxa of the same rank within a higher taxon. Authors were asked to standardize descriptive terms using the definitions given in *Plant Identification Terminology*.¹⁰ If a single measurement is given it refers to length, and if width is also given it is in the format length x width. Ranges are separated by an en-dash (–) and discontinuous states by the word 'or'. Exceptional measurements are given in parentheses '()'. Taxon statistics and short statements on worldwide distribution are provided for families and genera, with summary statistics of lower taxa represented in Nepal.

Identification keys are dichotomous and presented in a bracketed format, with all elements strictly parallel between the two leads of each couplet. Keys are artificial and not intended to reflect any taxonomic classification. There is usually a single key to genera within a family, combining flowering, fruiting and vegetative characters, but where this is unwieldy separate keys are given for flowering and fruiting material (e.g. Cruciferae, Rosaceae). Keys are also given for species within a genus and taxa within a species. Figures are provided to aid identification by illustrating the diagnostic characters of each family and genus, and for large genera variation in major morphological features is represented.

The geographic distribution within Nepal is indicated for each species and infraspecific taxon at the political district level by a shaded distribution map. The distribution maps are evidence-based, produced from the *Flora of Nepal Knowledge Base* using locality information taken from authenticated herbarium specimens and records of plants *in situ* made by credible observers. Ideally all specimens identified by authors should be geo-referenced and databased when they are preparing *Flora of Nepal* accounts, but where this is not possible a minimum of one specimen per district is required. Sometimes the distribution of a species is greater than the sum of the distribution maps of its infraspecific taxa. This is a result of some herbarium specimens only being identifiable to species level. Occasionally species are known only from poorly localised collections, especially those from the early 19th century. For example, Wallich often only gave 'Nepalia' as the locality for many of his 1820–1821 collections. These specimens are most likely to have come from the Kathmandu Valley, known as the 'Nepal Valley' or just 'Nepal' at that time, but they might also have been collected during his inward and outward journeys from India via Hetauda, or by pilgrims going north to 'Gossainthan' (Gossainkund). It is therefore impossible to be sure of the correct district and in such cases this is noted in the supporting information and the map omitted. The *Flora of Nepal* website gives access to the underlying distribution and specimen information through an interactive dot map plotting all geo-referenced occurrence records and a listing of all material recorded.

Distribution for species and infraspecific taxa occurring outside Nepal is indicated by a list of geographical regions, with the resolution becoming coarser with increasing distance from Nepal. In order to utilise information contained within other published Floras these areas are defined according to political borders, with countries or provinces grouped to form regions that have some underlying biogeographic basis. For example, although the Tibetan Plateau extends into parts of Sichuan and Yunnan, we limit it to Xizang and Qinghai. *Flora of Nepal* takes no stance on any politically disputed border areas and is following the current

international mapping convention of using the 'lines of control' to delineate its regions. The names used for the regions are intended to be descriptive and non-political. The regions are:

<i>W Himalaya</i>	India (Jammu & Kashmir, Himachal Pradesh, Uttarakhand), northern Pakistan (Khyber Pakhtunkhwa, previously known as North West Frontier Province).
<i>E Himalaya</i>	Sikkim, Darjeeling, Bhutan, NE India (Arunachal Pradesh).
<i>Tibetan Plateau</i>	China (Xizang, Qinghai).
<i>Assam-Burma</i>	Assam, Nagaland, Manipur, Myanmar.
<i>S Asia</i>	Eastern Pakistan (Punjab, Sind, Islamabad), Peninsular India, Sri Lanka, Bangladesh, Maldives.
<i>E Asia</i>	China (excluding Xizang, Xinjiang, Qinghai), Korea, Japan, Taiwan.
<i>SE Asia</i>	Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, Philippines, New Guinea.
<i>N Asia</i>	China (Xinjiang), Russia, Mongolia.
<i>C Asia</i>	Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan, Kyrgyzstan.
<i>SW Asia</i>	Afghanistan, western Pakistan (Baluchistan, Federally Administered Tribal Areas), Iran, Middle East, Arabian Peninsula, Turkey, Azerbaijan, Armenia, Georgia.
<i>Asia</i>	collective term for all above areas of Asia.
<i>Europe</i>	includes Ukraine, Belarus, Baltic republics.
<i>Africa</i>	includes Madagascar.
<i>N America</i>	includes C America south to Panama.
<i>S America</i>	south of Panama.
<i>Australasia</i>	Australia, New Zealand, Pacific Islands.
<i>Cosmopolitan</i>	collective term for a generally worldwide distribution.

Altitudes (elevation above sea level) are based on herbarium specimen data or records from credible observers. They are given to the nearest 100 m rounded up or down, with exceptional altitudes given in parentheses '()'. Likewise, flowering and fruiting times are based on specimens collected from Nepal, or on material from adjacent regions if these data are lacking and a note is provided to explain this. The short statement on the ecological preference of each species and infraspecific taxon is mostly taken from herbarium specimen data. Currently these often lack detail, a reflection of the shortcomings of poor-quality data recorded by the past collectors of herbarium material, but these will improve with more field studies.

Supplementary information is given at the end of a taxon account discussing taxonomic issues, highlighting spot characters useful for identification, noting similar species that could cause confusion, and detailing the misapplication of names. Summary information is provided for ethnobotanical and other uses, but this is not intended to be exhaustive and is derived from secondary sources, such as *Plants and People of Nepal* and *A Compendium of Medicinal Plants of Nepal*.^{11, 12}

Abbreviations

Standard abbreviations for the International System of Units (SI) are used for measurements. Herbaria are cited using the standard abbreviation in *Index Herbariorum*.¹³ Other abbreviations used in the text include:

C	central.
ca.	<i>circa</i> – about, approximately.
comb. nov.	<i>combinatio nova</i> – new combination of name and epithet.
dbh	diameter at breast height – measured on tree trunks at 1.3 m above the ground.
E	east, eastern.
et al.	<i>et alia</i> – and others.
fig.	figure.
N	north, northern.

Rosaceae

nom. cons.	<i>nomen conservandum</i> – name officially conserved in ICBN. ¹⁴
nom. illegit.	<i>nomen illegitimum</i> – illegitimate name, according to ICBN. ¹⁴
nom. inval.	<i>nomen invalidum</i> – invalid name, according to ICBN. ¹⁴
nom. nud.	<i>nomen nudum</i> – name lacking a description, or reference to an effectively published description, and so invalid according to ICBN. ¹⁴
nom. rej.	<i>nomen rejiciendum</i> – name officially rejected in ICBN. ¹⁴
nom. superfl.	<i>nomen superfluum</i> – name superfluous when published, and so illegitimate according to ICBN. ¹⁴
pl.	plate.
q.v.	<i>quod vide</i> – which see.
S	south, southern.
s.l.	<i>sensu lato</i> – for a taxon treated in a broad sense.
s.s.	<i>sensu stricto</i> – for a taxon treated in a narrow sense.
sect.	section.
subfam.	subfamily.
subgen.	subgenus.
subsp.	subspecies.
subvar.	subvariety.
syn.	synonym
var.	variety.
W	west, western.
>	greater than
<	less than

References

- 1 Wu, Z.Y., Raven, P.H. & Hong, D.Y. (1994–ongoing). *Flora of China*, Science Press (Beijing) & Missouri Botanical Garden Press, St Louis [available online at flora.huh.harvard.edu/china].
- 2 Grierson, A.J.C., Long, D.G. & Noltie, H.J. (1983–2002). *Flora of Bhutan*, Royal Botanic Garden Edinburgh, Edinburgh.
- 3 Angiosperm Phylogeny Group III (2009). 'An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants': APG III. *Bot. J. Linn. Soc.* 161: 105–21.
- 4 Hara, H., Stearn, W.T., Williams, W.T. & Chater, A.O. (1978, 1979, 1982). *An Enumeration of the Flowering Plants of Nepal*, 3 volumes, Trustees of the British Museum (Natural History), London.
- 5 Press, R., Shrestha, K.K. & Sutton, D.A. (2000). *Annotated Checklist of Flowering Plants of Nepal*, Natural History Museum: London & Tribhuvan University, Kathmandu [updated version available online at efloras.org].
- 6 Singh, A.P., Bista, M.S., Adhikari, M.K. & Rajbhandari, K.R. (2001). *Flowering Plants of Nepal (Phanerogams)*, HM Government of Nepal, Ministry of Forests, Department of Medicinal Plants, Kathmandu.
- 7 Brummit, R.K. & Powell, C.E. (1992). *Authors of Plant Names*, Royal Botanic Gardens, Kew, London [available online with revisions at www.ipni.org].
- 8 Bridson, G.D.R. & Smith, E.R. (1991). *Botanico-Periodicum-Huntianum*, ed. 2, Hunt Institute for Botanical Documentation, Pittsburgh.
- 9 Stafleu, F.A., Cowan, R.S. & Mennega, E. (1973–1988). *Taxonomic Literature*, ed. 2 (TL-2), Bonn, Scheltma & Holkema, Utrecht/Antwerpen; dr. W. Junk b.v., The Hague/Boston [available online at tl2.idcpublishers.info].
- 10 Harris, J.G. & Harris, M.W. (2001). *Plant Identification Terminology*, ed. 2, Spring Lake Publishing, Utah.
- 11 Manandhar, N.P. (2002). *Plants and People of Nepal*, Timber Press, Oregon.
- 12 Baral, S.R. & Kurmi, P.P. (2006). *A Compendium of Medicinal Plants in Nepal*, Mass Printing Press, Kathmandu.
- 13 Holmgren, P.K., Holmgren, N.H. & Barnett, L.C. (eds) (1990). *Index Herbariorum. Part 1: The Herbaria of the World*. ed. 8. New York Botanic Garden: New York. [available online with revisions at sweetgum.nybg.org/ih].
- 14 McNeill, J., Barrie, F.R., Burdet, H.M., Demoulin, V., Hawksworth, D.L., Marhold, K., Nicolson, D.H., Prado, J., Silva, P.C., Skog, J.E., Wiersema, J.H. & Turland, N.J. (eds) (2006). *International Code of Botanical Nomenclature (Vienna Code)*, Regnum Vegetabile 146. Gantner, Ruggell.