

UMBELLIFERAE († P. Buwalda, Groningen)

Annual or perennial herbs, never woody shrubs (in Malaysia). Stems often furrowed and with soft pith. *Leaves* alternate along the stems, often also in rosettes; petiole usually with a sheath, sometimes with stipules at the base; lamina usually much divided, sometimes entire. *Flowers* polygamous, in simple or compound umbels, sometimes in heads, terminal or leaf-opposed, beneath with or without involucre and involucler. Calyx teeth 5, often obsolete. *Petals* 5, alternate with the calyx teeth, equal or outer ones of the inflorescence enlarged, entire or more or less divided, often with inflexed tips, inserted below the epigynous disk. Stamens alternate with the petals, similarly inserted. Disk 2-lobed, free from the styles or confluent with their thickened base, forming a stylopodium. Ovary inferior; styles 2. *Fruits* with 2 one-seeded mericarps, connected by a narrow or broad junction (*commissure*) in fruit separating, leaving sometimes a persistent axis (*carpophore*) either entire or splitting into 2 halves; mericarps with 5 longitudinal ribs, 1 dorsal rib at the back of the mericarp, 2 lateral ribs at the commissure; 2 intermediate ribs between the dorsal and the lateral ones; sometimes with secondary ribs between the primary ones, these without fascicular bundles; often vittae in the ridges between the ribs or under the secondary ribs, and in the commissure, seldom under the primary ribs.

Distr. Numerous genera and species, all over the world. The representatives native in Malaysia belong geographically to five types. (1) Ubiquitous genera (*Hydrocotyle*, *Centella*, *Oenanthe*); one species, *Hydrocotyle vulgaris*, shows a remarkable disjunction, occurring in Europe & N. Africa and also in New Guinea, Australia and the Marshall Islands. (2) Western elements are *Sanicula* (wide-spread in the N. hemisphere but absent from New Guinea and Australia), *Heracleum* and *Pimpinella*; though some *spp.* are endemic their close relatives are found in SE. Asia. (3) A distinctly N. element is the Japano-Formosan *Peucedanum japonicum* in the islands N. of Luzon. (4) A distinct Australian element is *Trachymene* which centers in Australia and occurs also in New Caledonia and Fiji; this genus shows a relatively rich secondary centre in East Malaysia; another Australian alliance is found in ubiquitous *Eryngium* of which the only native Malaysian species hitherto known is allied to Australian *spp.* (5) A distinct Subantarctic-distributed genus is *Oreomyrrhis* which centers in New Guinea by 4 *spp.*; one of these occurs from Kinabalu to Australia, New Zealand to Andine South America as far as Mexico; a marked instance of the ancient alpine-Papuan South Pacific plant refuge (v. St.).

Ecol. As to altitude both the cultivated and native *spp.* prefer microtherm localities: *Pimpinella*, *Trachymene*, *Heracleum*, *Oreomyrrhis*, *Eryngium*, and *Hydrocotyle vulgaris* are confined to the montane or subalpine zones, *Sanicula* descending to the colline subzone. Some *Umbelliferae* are found in the alpine zone above 4000 m alt., e.g. *Hydrocotyle sibthorpioides*, and *Oreomyrrhis andicola*. Several oreophytes show a remarkable reduction of the leaf surface, and some are reduced to cushions (*Oreomyrrhis andicola*) or true pin-cushions (*Trachymene pulvilliforma* and *Oreomyrrhis azorellacea*). There are only very few *spp.* preferring a shaded locality, e.g. *Sanicula europaea*, *Hydrocotyle javanica*, *Trachymene erodioides*, ? *Heracleum sumatranum*. *Pimpinella javana* and *P. pruatjan* are often found in *Casuarina* forests. *Oenanthe javanica*, *Centella*, and the *Hydrocotyles* decidedly prefer moist or marshy places. In the semi-arid regions of Malaysia *Umbelliferae* are exceedingly scarce; *Hydrocotyle javanica* is a typical indicator for everwet conditions. Many *spp.* show a remarkable adaptive capacity to wide altitudinal limits, e.g. *Hydrocotyle sibthorpioides* 1–4050 m, *H. javanica* 1–2900 m, *Oenanthe javanica* 1–2800 m, *Centella asiatica* 1–2500 m, *Sanicula europaea* 500–3060 m (v. St.).

Uses. Quite a number of *Umbelliferae* are cultivated for the essential oil contained in their fruit and are used as condiments. The leaves of some *spp.* are eaten as vegetables or for medicinal purposes. Under the several species data are mentioned drafted from HEYNE, *De Nuttige Planten* ed. 2 (1927), OCHSE & BAKHUIZEN VAN DEN BRINK, *Indische Groenten* (1931) and BURKILL, *A dictionary of the economic products of the Malay Peninsula* (1935).

Notes. The extensive treatment in my former revision (Blumea 2, 1936) is mostly followed; several novelties are added. Of the genera which are represented only by introduced or cultivated *spp.* generic characters are not given.

When collecting *Umbelliferae* it is to be observed that ripe fruits and basal leaves are essential for identification.

PS. The MS. of the present revision was made before the author received the rich New Guinean collections of L. J. BRASS, M. S. CLEMENS, C. E. CARR; on the latter he prepared a separate paper to be

published in the Journal of the Arnold Arboretum which he finished just before his sudden and lamented death (*cf.* Bull. Bot. Gard. Btzg III, 17 (1948) 377). I am responsible for fitting the new data to the original MS. as well as for the description of *Peucedanum* (v. St.).

Figures 1 & 5 *courtesy Pasuruan Exp. Station*, fig. 2-4, 6 & 10 *courtesy Blumea*.

KEY TO THE GENERA

1. Flowers in simple umbels¹ or heads often united in more compound inflorescences, but not in compound umbels.
 2. Leaves and involucre prickly. Flowers in heads 5. *Eryngium*
 2. Leaves and involucre not prickly. Flowers in umbels.
 3. Fruits with uncinat bristles 4. *Sanicula*
 3. Fruits without uncinat bristles.
 4. Fruit at least twice as long as broad; generally not laterally flattened 9. *Oreomyrrhis*
 4. Fruit not longer than broad, laterally flattened.
 5. Mericarps 7-9-ribbed, with connecting veins between the ribs. Leaves simple, crenate, reniformous 2. *Centella*
 5. Mericarps 3-ribbed. Leaves otherwise.
 6. Leaves without sheaths but with distinct entire stipules. Corolla valvate 1. *Hydrocotyle*
 6. Leaves with sheaths, with or without lacerate stipule-like appendages. Corolla imbricate 2. *Trachymene*
1. Flowers in compound umbels which are sometimes united in more compound inflorescences.
 7. Mericarps winged on the margin.
 8. Fruit not strongly dorsally flattened, more than twice as long as broad. Leaves tripinnate, ultimate segments nearly filiform 19. *Anethum*²
 8. Fruit strongly dorsally flattened, at most twice as long as broad. Leaves pinnate to bipinnate, extreme segments not filiform.
 9. Leaflets or ultimate leaf-segments cuneate-obovate, only dentate or incised at the broadened apex. Mericarps about twice as long as broad 22. *Peucedanum*
 9. Leaflets or ultimate leaf-segments not cuneate-obovate, margin serrate or crenate. Mericarps at most 1½ times as long as broad.
 10. Ovary hairy. Involucels 6-7. Wing of the mericarps 2½ mm broad. Corolla white or reddish, radiating 21. *Heracleum*
 10. Ovary glabrous. Involucels 0-2. Wing of the mericarps ¼-½ mm broad. Corolla yellow, not radiating 20. *Pastinaca*
 7. Mericarps not winged at the margin.
 11. Fruit laterally flattened. Leaves simple, roundish 1. *Hydrocotyle*
 11. Fruit not laterally flattened. Leaves usually compound.
 12. Fruit with a sterile neck or a short beak visible on the ovary as a dark green ribbed neck 6. *Chaerifolium*
 12. Fruit without a sterile neck or beak.
 13. Calyx teeth distinct.
 14. Ovary and fruit bristly.
 15. Fruit with uncinat bristles; stems and leaves hairy; leaf-segments not very narrow; flowers not radiating 7. *Torilis*
 15. Fruit with stellate hairs; stems and leaves glabrous; extreme leaf-segments linear to filiform; flowers radiating 10. *Cuminum*
 14. Ovary and fruit entirely glabrous.
 16. Mericarps hollow at the ventral side; primary ribs visible as undulate lines, secondary ribs somewhat more prominent; flowers radiating 8. *Coriandrum*
 16. Mericarps not hollow at the ventral side; marginal ribs thicker than the lateral ones, secondary ribs absent; flowers not radiating 17. *Oenanthe*
 13. Calyx teeth not distinct.
 17. Ovary and fruit entirely glabrous.
 18. Leaves ternate; umbels and umbellules few-rayed. 14. *Cryptotaenia*
 18. Leaves pinnate or bipinnate.
 19. Flowers yellow or yellowish green.
 20. Involucels many-leaved; leaves 3-4-pinnate with ± filiform segments 18. *Foeniculum*²
 20. Involucels 0-2-leaved; lower leaves 3-pinnate with nearly obovate or cuneate leaflets 19. *Petroselinum*
 19. Flowers white or reddish.

(1) Rarely solitary (1-flowered umbels).

(2) *Foeniculum* and *Anethum* are very alike with the exception of their fruits, which in *Anethum* are very distinctly winged, in *Foeniculum* not. They may further be distinguished, besides by their characteristic odor, by fine-punctulate stems in *Foeniculum* which are absent in *Anethum*.

21. Ripe fruits 1½–2 mm through, roundish when seen from the lateral side; carpophore entire or very shortly bifid at the apex 11. *Apium*
 21. Ripe fruits 4–5 mm long and half as broad; carpophore bifid to nearly 2/3 of its length 15. *Carum*
 17. Ovary and fruits bristly, hairy, or with scale-like trichomes.
 22. Involucres pinnatifid 23. *Daucus*
 22. Involucres not pinnatifid.
 23. Leaves simple, or pinnate with simple leaflets; leaves and stems hairy 16. *Pimpinella*
 23. Leaves pinnate with divided leaflets; leaves and stems glabrous 13. *Trachyspermum*

1. HYDROCOTYLE

LINNÉ, *Sp. Pl.* 1 (1753) 234; BUW. *Blumea* 2 (1936) 122 (*lit.*).

Perennial, stems prostrate or rooting at the nodes, sometimes suberect. *Leaves* petiolate and stipulate, in outline rhomboid, peltate or cordate, palminerved, entire, lobed or divided, crenate to crenate-serrate. *Umbels* simple, sometimes irregularly subcompound. Involucral bracts few or 0. Calyx teeth minute or obsolete. *Petals* entire, valvate in bud. Disk plane, margin elevated. Styles from the base filiformous or with thickened base. *Fruit* laterally flattened, commissure narrow; vittae 0; mericarps with dorsal ribs, marginate, lateral ribs in the commissure, intermediate ones straight or arcuate.

Distr. About 100 *spp.* all over the world, mainly in the S. hemisphere.

KEY TO THE SPECIES

1. Leaves peltate 3. *H. vulgaris*
 1. Leaves not peltate.
 2. Leaves usually less than 3 cm in diam. Stems creeping, sometimes with ascending extremities. Inflorescences single, sessile or short-peduncled, along the creeping stems and the ascending tips. Fruits up to 15 in each inflorescence, yellow to dark-brown when ripe 2. *H. sibthorpioides*
 2. Leaves usually more than 3 cm in diam. Stem creeping with ascending branches. Inflorescences single or in bundles, sessile to long-peduncled, usually along the ascending branches only. Fruits more than 15 in each inflorescence, blackish brown when ripe 1. *H. javanica*

1. *Hydrocotyle javanica* THUNB. *Diss. Hydroc.* (1798) p. 3 no 17, p. 6, t. 2; BUW. *Blumea* 2 (1936) 122 (*lit.*)—*H. hirta* R. BR. *ex* RICH. *Ann. Gén. Sc. Phys.* 4 (1820) 64.—*H. nepalensis* HOOK. *Exot. Fl.* 1 (1823) t. 30.—*H. sundaica* BL. *Bijdr.* 15 (1826) 883.—*H. globata* BL. *Bijdr.* 15 (1826) 883.—*H. zeylanica* DC. *Prod.* 4 (1830) 67.—*H. podantha* MOLKENB. in MIQ. *Pl. Jungh.* (1851) 89.—*H. rotundifolia* (*non* DC., 1830) WARB. *Bot. Jahrb.* 13 (1891) 397.—*H. novo-guineensis* WARB. *Bot. Jahrb.* 16 (1892) 24.—*H. versteegii* HEMSL. *Kew Bull.* (1909) 259.

Stems rarely entirely erect, 10–50 cm, terete, glabrous or short-hairy. Stipules 3–8 by 4–6 mm broad-ovate, roundish to acute, membranaceous, entire or the apex fringed. Petioles 2–20 cm, short-hairy; lamina usually 3–8 cm through, rarely only 1½ cm, roundish to 5–8-angular in outline, cordate, 5–8-lobate, lobes crenate to crenate-serrate, more or less triangular, glabrous, rarely sparsely hairy. *Inflorescences* single or in groups, opposite to the leaves, sometimes united to an umbel with an involucre of few small bracts, sometimes also terminal. Peduncles 1–7 cm, rarely absent, glabrous or short-hairy. Involucres many around and between the flowers, 1 by ¾ mm, ovate-acute, entire or base with small teeth, outer ones reflexed in fruit. Pedicels 15–50, 0–½ mm, rarely longer. Petals 1 by ½ mm, lanceolate, acute. *Mericarps* 1–

1¼ by nearly ¾ mm, glabrous or short hirsute or even with short curved hairs, sometimes red-punctulate when young, red-brown to blackish when ripe.

Distr. SE. and E. Asia to the Solomon Islands, Australia, Tasmania, and in tropical Africa, in *Malaysia*: all over the Archipelago, not yet found in the Lesser Sunda Islands, Madura and Kangean Islands.

Ecol. In shaded and forested places, 1–2900 m, but in the periodically dry parts of Central and E. Java not below 1000 m, rarely descending to 700 m near hot springs or along stream banks, decidedly avoiding the semi-arid regions.

Uses. Leaves as a fish-poison.

Vern. *Pegagah gajah* (Mal. Pen.); *pegagoh*, *pegagan*, *mangi-mangi* (Sum.); *dulang sontak*, *daun sontok*, S; variable in Javanese.

Notes. Small forms from high altitudes are difficult to separate from *H. sibthorpioides* LAMK. These specimens have at least 15 fruits in the umbellule, and for that reason I refer them to *H. javanica*. In New Guinea some specimens have very long-pedicelled flowers; there is a series of transitions to subsessile and sessile flowers.

2. *Hydrocotyle sibthorpioides* LAMK. *Enc. Méth. Bot.* 3 (1789) 153; BUW. *Blumea* 2 (1936) 128 (*lit.*).—*H. nitidula* RICH. *Ann. Gén. Sc. Phys.* 4 (1820)

60, t. 63, fig. 33.—*H. ranunculoides* var. *incisa* BL. Bijdr. 15 (1826) 884.—*H. splendens* BL. Bijdr. 15 (1826) 884.—*H. hirsuta* var. *minuta* BL. Bijdr. 15 (1826) 884.—*H. rotundifolia* DC. Prod. 4 (1830) 64.—*H. hirsuta* (non SW., nec SPRENG.) DC. Prod. 4 (1830) 67.—*H. latisecta* ZOLL. Syst. Verz. (1854) 138, 140.—*H. zollingeri* MOLKENB. in MIQ. Pl. Jungh. (1851) 91.—*H. puncticulata* MIQ. Fl. Ind. Bat. 1, 1 (1856) 732.—*H. benguetensis* ELM. Leaf. Philip. Bot. 2 (1909) 628.—*H. delicata* ELM. Leaf. Philip. Bot. 2 (1909) 629.—Fig. 1a–b.

Stems long-creeping or with ascendent extremities, sometimes almost caespitose, terete, thin or almost filiformous, glabrous or sparsely hairy. Stipules $1/2$ –1 by nearly $1\frac{1}{2}$ mm, ovate to obovate, acute, entire or fringed. Petioles $1/2$ –6 cm, or even shorter in the uppermost leaves, more or less

hairy; lamina $1/3$ – $2\frac{1}{2}$ cm through, roundish to 5-angular in outline, deeply cordate, 3–5-lobate to 3–5-partite; segments crenate to serrate, more or less pilose to hirsute. Inflorescences single along the creeping stems; peduncles 0–3 cm, filiformous, glabrous or short hairy; involucre 4–10 around and between the flowers, nearly 1 by $1/2$ mm, ovate, lanceolate, acute, base with 2 acute teeth, sometimes filiformous, lower ones reflexed in fruit. Pedicels 10–15; petals greenish white, nearly $3/4$ by $1/2$ mm, ovate, acute. Mericarps 1 – $1\frac{1}{4}$ by $3/4$ mm, yellow to brown, glabrous or with short stiff hairs, sometimes red-punctulate.

Distr. Australia, tropical Asia, tropical Africa, S. America (?), in *Malaysia*: all over the Archipelago.

Ecol. Sunny or slightly shaded, damp, fertile localities, along streambanks, between stones of pathways and alongside walls, from 1–4050 m.

Uses. Raw or steamed eaten with rice; medicinal against skin diseases.

Vern. *Kurawet galeng*, *antan* in several combinations, S, *sumud*, *samangi* in several combinations, J, but Javanese names are rather variable; *salatun*, *patekan tjèna*, Md.

Notes. Very variable as to leaf shape, depth of incisions, and hairiness; the numerous forms are connected by series of transitions.

3. *Hydrocotyle vulgaris* LINNÉ, Sp.Pl. 1 (1753) 234; Buw. Blumea 2 (1936) 133 (*lit.*).

Stems thin, creeping. Petioles 1–17 cm, with spreading hairs to the apex; lamina $3/4$ – $3\frac{1}{2}$ cm through, orbicular, peltate, 8–13-nerved, coarsely crenate to slightly lobed. Inflorescences solitary or few together on the nodes; peduncles $1/2$ –14 cm, filiformous; with 1–10 whorls of flowers, each flower with an ovate membranous, acute bract. Petals nearly $3/4$ mm, ovate, white or reddish. Fruits smooth, $1\frac{1}{2}$ –2 by $1\frac{3}{4}$ – $2\frac{1}{2}$ mm, transversely elliptical.

Distr. Europe, N. Africa, Australia, and the Marshall Islands, apparently absent in continental Asia; in *Malaysia* only in W. New Guinea (Arfak Mts).

Ecol. In open marshes, \pm 2000 m.

Notes. Description after European and New Guinean materials. In Malaysian specimens the fruits are smooth, not covered with reddish warts as in the European form.

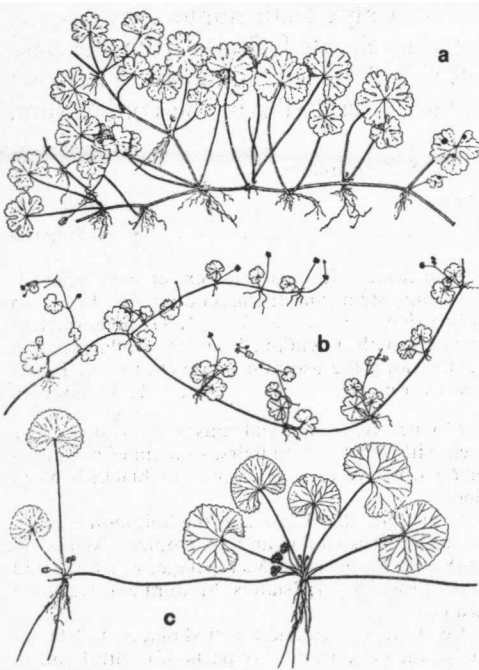


Fig. 1. a–b. *Hydrocotyle sibthorpioides* LAMOUR., $\times 1/2$, c. *Centella asiatica* URBAN., $\times 1/5$.

2. CENTELLA

LINNÉ, Pl. Afr. Rar. (1760) 28; Buw. Blumea 2 (1946) 133.—*Hydrocotyle* sect. *Centella* Bth. Fl. Austr. 3 (1866) 338.

Perennial, sometimes suffruticose, erect, prostrate, or rooting at the nodes. Leaves entire, crenate or lobate, palminerved; petioles with sheaths. Umbels simple, sessile or subsessile. Involucres few or 0. Calyx teeth obsolete. Petals entire, imbricate in bud; disk plane, margin elevate; styles from the base filiformous. Fruits laterally flattened, vittae 0; commissure narrow; mericarps with dorsal ribs marginate, lateral and intermediate ribs arcuate, all connected by veins, sometimes with 2–4 secondary ribs.

Distr. All over the world.

Note. *Solandra* L. Syst. ed. 10 (1759) 1269 is an older name for *Centella* but is rejected against the Solanaceous *Solandra* Sw. (1787); it is, therefore, not available in the *Umbelliferae*.

1. *Centella asiatica* (L.) URB. in MART. Fl. Bras. 11, 1 (1879) 287, t. 78, fig. 1; BUW. Blumea 2 (1936) 134.—*Pes equinus* RUMPH. Herb. Amb. 5, p. 455, t. 169, f. 1.—*Hydrocotyle asiatica* LINNÉ, Sp.Pl. 1 (1753) 234.—*Trisanthus cochinchinensis* LOUR. Fl. Coch. 1 (1790) 176.—*Hydrocotyle hebecarpa* DC. Prod. 4 (1830) 63.—*H. asiatica* var. *hebecarpa* HASSK. Pl. Jav. Rar. (1848) 459.—*H. asiatica* var. *pedunculata* O.K. Rev. Gen. 1 (1891) 268.—Fig. 1c.

Stems creeping with long stolons, more or less puberulous in the young state. *Leaves* in rosettes; petioles 1–40 cm, sometimes puberulous; lamina 1–7 cm diam., roundly reniform, crenate or crenate-dentate. Umbels solitary or 2–5 together in the axils of nearly 3 mm long bracts; peduncles 1/2–5 cm, shorter than the petioles. *Flowers* usually 3, middle one sessile, lateral ones pedicellate; in-

volucre 2, 3–4 by nearly 1 1/2 mm, ovate. Petals red, 1–1 1/2 by 3/4 mm. Mericarps about 2 by 1 1/2 mm, subhairy when young.

Distr. Pantropic, in *Malaysia*: all over the Archipelago.

Ecol. Sunny or slightly shaded, fertile, damp localities, along streambanks, also between stones of pathways and alongside walls, 1–2500 m.

Uses. Leaves raw or steamed eaten with rice. Medicinal uses many, especially against skin diseases and as a diuretic. Capacity for holding earth against erosion.

Vern. (*daun*) *Pegaga* (Mal. Pen., Sum., Born.) *daun kaki kuda*, *antan* in several combinations, S; *patjul gowang*, *rendeng*, *gagan-gagan*, J (but rather variable), *kolotide manora* (Tern.), *dogauke*, *gogauke*, *andan* (New Guinea).

3. TRACHYMENE

RUDGE, Trans. Linn. Soc. Lond. I, 10 (1811) 300; NORMAN, J. Bot. 69 (1931) 287; BUW. Blumea 2 (1936) 138.—*Didiscus* DC. in CURT. Bot. Mag. 55 (1828) t. 2875; DOMIN, Sitz. Ber. Böhm. Ges. Wiss. (1908) 2.

Annual or perennial, hirsute to glabrous, sometimes glandular-hairy. Stems erect, procumbent or ascendent, branched, often in a sympodial way. *Leaves* alternate along the stems, sometimes also in rosettes, roundish cordate to broadly cuneate, ternately divided, or entire, narrow-cuneate to subspathulate; petioles with sheaths. *Umbels* simple, terminal or opposite the leaves, sometimes in a corymbiform di-monochasium. Involucre linear. Calyx teeth minute, rarely subulate. Petals entire, imbricate in bud. Disk plane. Styles from the base filiform. *Fruits* laterally flattened, vittae 0; commissure narrow; mericarps with dorsal ribs, marginate, lateral ribs in the commissure, intermediate ribs arcuate, subprominent. Carpophore persistent, undivided.

Distr. This genus is chiefly Australian; outside Australia it is spread to New Caledonia and the Fiji Islands, in *Malaysia* it occurs in New Guinea, Timor, Flores, Celebes, Borneo, and the Philippines.

KEY TO THE SPECIES

- 1. Plant glandular-hairy.
 - 2. Ovary hairy; ripe fruits roughly tuberculate with glandular hairs; annual, erect, cultivated 16. *T. caerulea*
 - 2. Ovary glabrous; ripe fruits smooth; wild mountain species 11. *T. adenodes*
- 1. Plant not glandular-hairy.
 - 3. Leaves nearly triangular and somewhat hastate in outline, tripartite or ternate with the middle segment longer than the lateral ones 6. *T. erodioides*
 - 3. Leaves never triangular hastate, more roundish or more cuneate in outline, if tripartite or ternate, then the middle segment hardly longer than the lateral ones.
 - 4. Leaves about as long as broad, base cuneate.
 - 5. Petiole at least twice as long as the lamina. Prolongated leafy stems absent. Stem not papillose. 2. *T. novoguineensis*
 - 5. Petiole at most as long as the blade. Leafy branched stems present. Stems, petioles, and peduncle densely papillose 13. *T. flabellifolia*
 - 4. Leaves broader than long or longer than broad.
 - 6. Leaves longer than broad, all of them cuneate to spathulate.
 - 7. Pedicels 1–2. Leaf-blade spoon-shaped, 1-nerved, 2–2 1/2 by 1/2–3/4 mm, tip mucronate. Leaves densely imbricate. Cushion plant 15. *T. pulvilliforma*

7. Pedicels at least 10. Leaf-blade otherwise, at least 7 by 3 mm, mostly with at least 3 apical teeth.
8. Leaves coriaceous and stiff, the lamina at least 5 times as long as broad 4. *T. rigida*
8. Leaves not coriaceous and stiff, the lamina at most 3 times as long as broad.
9. Petiole at least twice as long as the lamina; prolonged leafy stems absent.
2. *T. novoguineensis*
9. Petiole as long as the lamina or shorter; leafy stems present.
10. Peduncles shorter than the leaves. Leaves subspathulate, not in rosettes but somewhat crowded towards the extremities of the stems 14. *T. rosulans*
10. Peduncles longer than the leaves. Leaves cuneate.
11. Leaves broad-cuneate, 1–2½ by 1–3 cm, single or few together in axillary clusters
13. *T. flabelliformis*
11. Leaves narrow-cuneate, 1–2 by ½–1 cm, about twice as long as broad, in rosettes at the base of the stem and the branches. 3. *T. koebrensis*
6. Leaves broader than long, sometimes the upper ones cuneate, rarely also the lower broadly cuneate.
12. Stems procumbent; leaves to 1 cm long and broad, their teeth with apical hairs. 5. *T. acrotricha*
12. Stems erect or ascendent, sometimes caespitose; leaves generally more than 1 cm long and broad, their teeth not with apical hairs.
13. Plants with rosettes at the base of the stems, sometimes also in the upper leaf axils and at the bases of the branches.
14. Umbels single from the rosettes, or moreover from the prostrate stems, but never forming a corymbiform dichasium 1. *T. saniculaefolia*
14. Umbels forming a corymbiform dichasium on more or less erect stems.
15. Calyx teeth at most ¾ mm long; leaves more or less divided, but not ternate. 7. *T. celebica*
15. Calyx teeth up to 2½ mm long; leaves ternate 8. *T. sarasinorum*
13. No rosettes at the base of the stems and the branches, or if small rosettes are present at the base of the stems, these rosettes have disappeared before flowering and the umbels do not form a terminal corymb.
16. Leaves to 1–2 cm long and 3–4 cm broad; surface of stems, sheaths, and petioles densely papillose; fruit with knob-shaped trichomes 12. *T. papillosa*
16. Leaves more than 2 cm long and 3 cm broad; stems, sheaths and petioles not papillose; fruits smooth.
17. Leaves not in rosettes but more densely placed in the lower thicker portion of the stem, 3-fid to ternate, biserrate with acute teeth 9. *T. acerifolia*
17. Probably small rosettes at the very base of the stem, the latter very slender in its lower portion. Leaves 2½–7 by 4–8 cm, ternate with petiolulate leaflets, the latter serrate with broad, shortly acuminate teeth 10. *T. arfakensis*

1. *Trachymene saniculaefolia* STAFF IN HOOK. Ic. Pl. 24 (1894) t. 2308; BUW. Blumea 2 (1936) 141 (lit.).—*Didiscus saniculaefolius* MERR. Philip. J.Sc. Bot. 2 (1907) 255, 256, 292.—*Hydrocotyle azorellacea* F.v.M. J. Bot. 31 (1893) 324, *nomen*.

Perennial, reddish, more or less hirsute to glabrous; caudex with rosettes from which sympodial leafy stems with terminal inflorescences and axillary rosettes, flower-bearing or not. Stems terete, striate. *Sheaths* 5–10 by 2–3 mm, tapering into the petiole, ciliate; petioles 3–13 cm; lamina ¾–4 by 1–6 cm, roundly reniform to broadly cuneate, trifid to tripartite, even ternate, segments broadly rhomboid or narrower, sometimes divided again, apical part: ultimate segments serrate to lobate. *Umbels* terminal in the rosettes or on elongated stems opposite the leaves; peduncles 3–29 cm; involucre 7–25, 5–15 by 1–3 mm, lanceolate, acuminate, sometimes dentate, spreading, appressed in fruit; pedicels 5–more than 30, 5–15 mm, inner ones gradually shorter, spreading, incurved in fruit. Calyx teeth ½–2 by 1–1½ mm, triangular, acute, equally developed or one larger. Petals 2–2½ by ½–1½ mm, white to dark pink, ovate to lanceolate; styles ½–1½ mm. *Mericarps* 1½–3 by 1–2 mm, glabrous, reddish purple to purple.

Distr. Australia (N.S. Wales), in *Malaysia*:

Philippines (Mindoro), Br. N. Borneo and E. New Guinea.

Ecol. Open shallow damp places, at the base of rock walls at falls, rock crevices, grasslands, on burnt over ground and in forest glades, 1800–4020 m.

Uses. In Borneo used as Dusan medicine.

Notes. Rather variably as to the length of the stems, hairiness, shape and incision of the lamina.

2. *Trachymene novoguineensis* (DOMIN) BUW. Blumea 2 (1936) 144, fig. 2a.—*Didiscus saniculifolius* var. *novoguineensis* DOMIN, Sitz. Ber. Böhm. Ges. Wiss. (1908) 67.—Fig. 2a.

Perennial, often reddish, more or less hirsute to glabrous; caudex with rosettes, bearing again axillary rosettes; dwarf forms only 2–3 cm. *Leaf sheaths* 2½ by 3 mm, ciliate, tapering in the petiole; petioles 1–13 cm; lamina (3)–7–30 by (2½)–5–17 mm, cuneate, trilobate or trifid, apical part: segments with 2–3 subacuminate teeth. Peduncles (1½)–3½–37 cm, terete, striate or subsulcate; involucre 7–13, 8–12 by ½–1¼ mm, lanceolate, acute, glabrous or margin ciliate, spreading, appressed in fruit; *pedicels* 12–30, to 5 mm, inner ones gradually shorter, spreading, to 14 mm and incurved in fruit, glabrous. Calyx teeth ¼–½ mm,

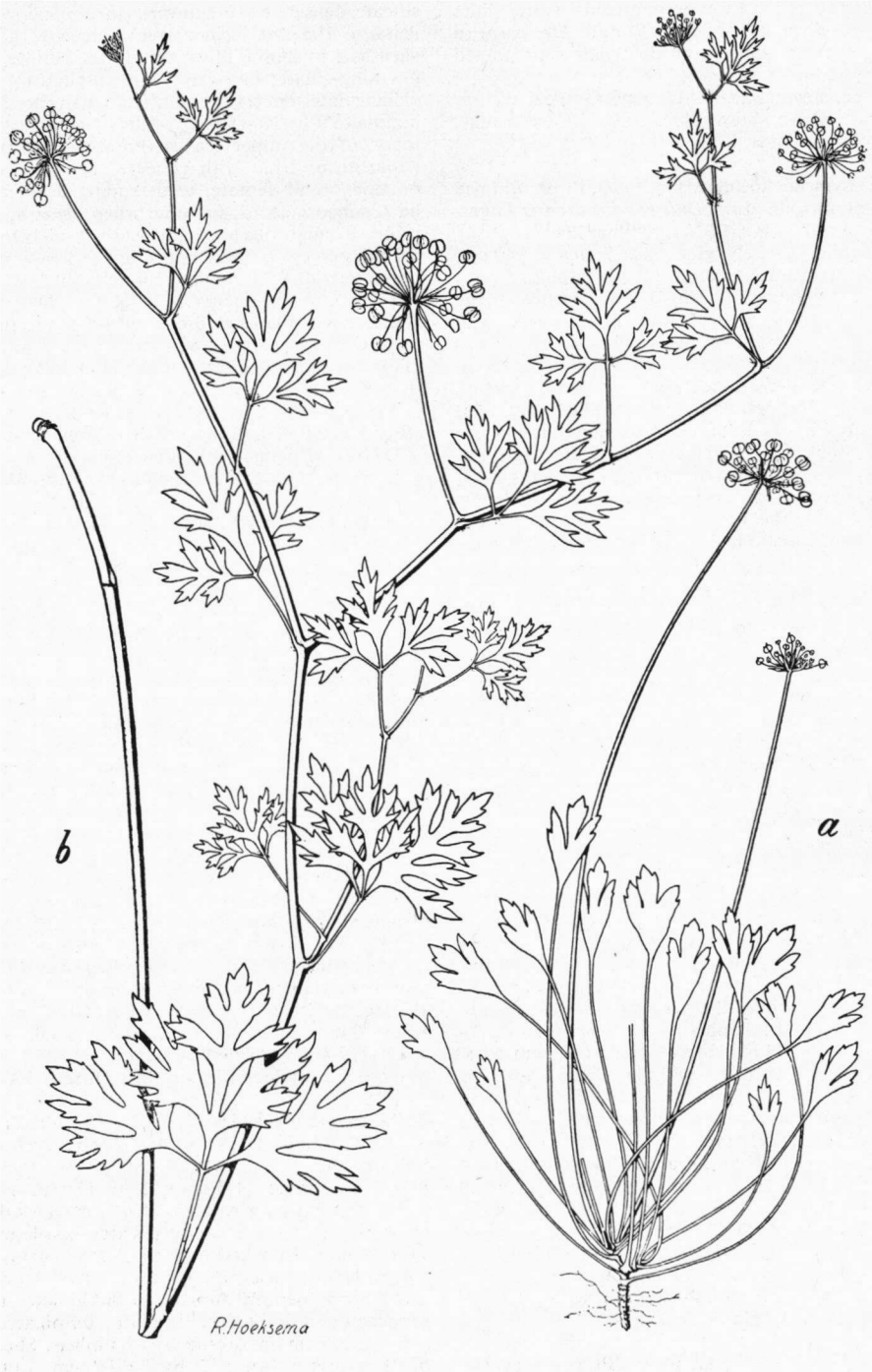


Fig. 2. a. *Trachymene novoguineensis* (DOMIN) BUW., b. *Trachymene arfakensis* (GIBBS) BUW., $\times \frac{2}{3}$.

narrow or broad-triangular, somewhat enlarged in fruit. Petals *c.* 1½ by ¾ mm, creamy white, white or violet, elliptical. Styles to ¾ mm. *Mericarps* to 3 by 1½ mm, glabrous, brown-yellow or tinged with red to dark violet.

Distr. *Malaysia*: W.-E. New Guinea.

Ecol. Open, stony localities, brook banks, marshy grasslands, 2700–3720 m.

3. *Trachymene koebrensis* (GIBBS) BUW. *Blumea* 2 (1936) 146, fig. 1a.—*Didiscus koebrensis* GIBBS, *Contr. Arfak Mts* (1917) 165.—Fig. 3a.

Perennial, entirely glabrous. Stems to 40 cm, erect or prostrate, sometimes finely papillose, with leaves over the whole length and rosettes in the leaf axils, densely set with swollen petiole-bases in the basal part and below the rosettes, with branches from the axillary rosettes, again with rosettes in the leaf axils. Sheaths nearly 2 by 3 mm, tapering into the petiole; petiole 1–2 cm, canalliculate above; lamina 1–2 by ½–1 cm, cuneate, tapering into the petiole, apex with 3–5 triangular, acute teeth. Peduncle 6½–8½ cm, terete, striate; involucre 5–13, nearly 6 by ½ mm, lanceolate, acute; pedicels 15–30, to 5 mm, the inner ones shorter, spreading, somewhat incurved in fruit. Calyx teeth ¾–1½ mm, narrowly triangular or subulate, sometimes unequally developed. Petals nearly 1¼ by ¾ mm, obovate, white or white with purple tinge; styles nearly 1¼ mm. *Mericarps* to 2½ by 1½ mm, tuberculate or smooth.

Distr. *Malaysia*: W. New Guinea.

Ecol. Open burnt localities and sterile limestone slopes, 2400–3225 m.

4. *Trachymene rigida* BUW. *Blumea* 2 (1936) 147, fig. 1 b–d.—*Didiscus odontocoleus* BUW. *ex* STEEN. *Bull. Jard. Bot. Btzig III*, 13 (1934) 255, *nomen*. Fig. 3b–d.

Perennial, entirely glabrous; branched caudex with rosettes from which sympodial leafy stems with terminal inflorescences and axillary few-leaved rosettes from which stems branched in the same mode. Stems procumbent, angulate, sulcate, at the nodes incrassate. Sheaths 1–3 mm long and broad with subulate thick coriaceous to 3 mm long appendages; petioles 2 by 0.1 cm, difficult to distinguish from the lamina; leaves with petiole 2–9 cm; lamina 4–7 mm broad, thick and stiff-coriaceous, narrow-cuneate-spathulate, apex with 1–5, mostly 3, obtuse, triangular teeth 3 by 1–2 mm; margin entire, subrecurved. Peduncles 5½–11 cm, ½–1½ mm thick, angulate, sulcate; involucre 10–12, 5–10 by ½–1½ mm, lanceolate, acute or sub-obtuse; pedicels 20 or more, 2–4 mm, somewhat spreading, erect in fruit. Calyx teeth ¼–¾ mm, obtuse, persistent. Petals 1½–2 by 1 mm, oblong-ovate, inside white; styles 1½–2 mm. *Mericarps* to 3 by 2½ mm, dark violet or brownish.

Distr. *Malaysia*: W. New Guinea.

Ecol. Open localities, 3000 m.

5. *Trachymene acrotricha* BUW. *Blumea* 2 (1936) 148, fig. 1e–f.—Fig. 3e–f.

Perennial; caudex at the top densely set with in-

crassate leaf rudiments. Stems to 13 cm, prostrate, sulcate, densely-hirsute towards the tip, hairs divaricate, to 1½ mm. Leaves sparse, rosettes absent; sheaths 4 by 2 mm, tapering into the petiole, margin long-ciliate, hairs to 3 mm; petiole to 7 cm, canalliculate, densely long-hirsute, hairs to 2 mm; lamina to 7 by 10–15 mm, of the lower leaves reniform, of the upper leaves rhomboid in outline, tripartite or trifid with cuneate segments, apical portion broad-dentate, teeth ending in an apical hair, subcoriaceous, involute when dried up, palm-nerved, glabrous above, beneath sparsely hirsute on the nerves. Umbels opposite the leaves in the upper portion of the stem; peduncles ½–2 cm, densely hirsute; involucre 8–10, 4 mm, lanceolate, acute, canalliculate, glabrous with hairy teeth and tip; pedicels 10–20, to 4 mm, the inner ones shorter, glabrous, somewhat dilatate at the tip. Calyx teeth ½–1 by 1 mm, elliptical, triangular, acute. Petals *c.* 1½ by 1 mm, apiculate. Styles to ¾ mm. *Mericarps* 2¼–3 by 1½–2 mm, glabrous, ribs indistinct.

Distr. *Malaysia*: SW. Celebes.

Ecol. Stony localities, mountain heaths, 3100 m.

6. *Trachymene erodioides* BUW. *Blumea* 2 (1936) 149, fig. 1 g–h.—*Didiscus erodioides* BUW. *ex* STEEN. *Bull. Jard. Bot. Btzig III*, 13 (1934) 255, *nomen*.—Fig. 3g–h.

Small; stems creeping, terete, subincrassate at the nodes, hirsute or subhirsute, with hairs to 2 mm. Leaves single and in few-leaved axillary rosettes; sheaths *ca* 2 by 1 mm, tapering into the petiole, outside densely hirsute, hairs 1–5 mm; petioles 1½–4 cm, canalliculate, pilose with divaricate crisp hairs; lamina 1½–2½ by 1–2 cm, in outline ovate-triangular, somewhat hastate, tripartite or ternate, terminal segment 1–2 by ½–1½ cm, triangular-rhomboid, lateral segments 5–12 by 5–7 mm, ovate, all segments pinnatifid at the base, crenate towards the apex with short acuminate tips. Umbels terminal or from the axillary rosettes; peduncles 2½–3½ cm, ascending, slender, terete, striate, densely hairy, hairs 1–2 mm, crisp; involucre 5–6, 3–5 mm, lanceolate, glabrous or sub-ciliate; pedicels 12–15, to 7 mm, inner ones shorter, glabrous. Calyx teeth to ¼ mm or absent (on the fruits). Styles ± ½ mm. *Mericarps* 2½–3 by nearly 2 mm, glabrous, equal or subequal.

Distr. *Malaysia*: SW. Celebes.

Ecol. Stony localities in mossy forest, 2700 m.

7. *Trachymene celebica* HEMSL. *Kew Bull.* (1896) 37; BUW. *Blumea* 2 (1936) 149.—*Didiscus celebicus* SARASIN, *Reisen in Celebes* 2 (1905) 337.—*Didiscus buginensis* WOLFF in FEDDE, *Rep.* 17 (1921) 439.

Perennial; caudex with rosettes from which flower-bearing stems and lateral rosettes, sessile or on short stolons from the upper leaf axils. Stems 20–50 cm, erect or ascending, nearly terete, more or less ribbed, densely hirsute to subhirsute, little branched and few-leaved beneath, terminated by a corymbiform inflorescence of umbels. Sheaths of the rosette leaves 2 by ¾–1½ cm, outside glabrous, towards the apex hirsute and ciliate, hairs 2–4 mm; petioles 5–15 cm, hirsute; lamina



Fig. 3. a. *Trachymene koebrensis* (GIBBS) BUW., b-d. *Trachymene rigida* BUW., e-f. *Trachymene acrotricha* BUW., g-h. *Trachymene erodioides* BUW. (plants $\times \frac{2}{3}$, fruits $\times 4$).

5-13 by 7-14 cm, in outline roundish, deeply cordate, 3-7-palmatifid, segments obovate, 3-lobed, biserrate, densely hirsute; cauline leaves and inflorescence bracts gradually smaller and shorter petioled, uppermost ones subsessile with less numerous and narrower segments and smaller sheaths. *Peduncles* 2½-6 cm, upper ones shorter; involucre numerous, nearly 10 mm, narrowly lanceolate, long-acuminate, appressed; pedicels more than 50, up to 17 mm, inner ones shorter, spreading, incurved in fruit. Calyx teeth small, acute, persistent. Petals white, nearly 2½ by 1½ mm, elliptic, acute. Styles nearly 3 mm, persistent. *Mericarps* nearly 4 by 3 mm, red.

Distr. *Malaysia*: SW. Celebes.

Ecol. Open, stony localities, 2300-3000 m.

Uses. Roots (raw) as medicine against stomach-ache.

Vern. *Kriongo*, *djahé merah*.

8. *Trachymene sarasinorum* (WOLFF) BUW. *Blumea* 2 (1936) 151.—*Didiscus sarasinorum* WOLFF in FEDDE, Rep. 17 (1921) 440.

Perennial; caudex with rosettes from which flower-bearing stems and lateral rosettes, sessile or on short stolons from the upper leaf axils. Stems erect, 30-40 cm, terete, striate, sparingly hirsute, more densely at the nodes. *Leaves* nearly all in a rosette; sheaths 3-6 by 5-8 mm, at the back and the margin with 1-2 mm long hairs, abruptly contracted into the petiole; petiole 6-8 cm, hirsute, more densely towards the lamina; lamina 4-4½ by 6-7 cm, roundish in outline, deeply cordate, ternate, the central leaflet nearly 4 by 3½ cm, tripartite, lateral leaflets hardly smaller, obliquely trifid, all ultimate segments 2-3-lobed, coarsely serrate, rather sparingly appressedly hirsute; cauline leaves smaller, shorter petioled, bracts of the dichasium nearly sessile. *Peduncles* 3-4 cm, terete, striate, shortly hirsute; involucre numerous, 7-10 by ½ mm, narrowly lanceolate, acuminate with few hairs at the margin and on the midrib, spreading, appressed in fruit; *pedicels* 7-11 mm, spreading, suberect in fruit. Calyx teeth nearly 2½ mm, subulate. Petals 2-2½ by 1 mm, ovate, white. Styles nearly 2 mm. *Mericarps* nearly 4½ by 3½ mm, entirely glabrous.

Distr. *Malaysia*: SW. Celebes.

Ecol. Probably open, stony localities, 1100 m.

9. *Trachymene acerifolia* NORMAN, Journ. Bot. 69 (1931) 287; BUW. *Blumea* 2 (1936) 151, fig. 3.—*Didiscus acerifolia* STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 255.

Stems 20-45 cm, erect and terete in the lower portion, terete or subangular in the upper part, with spreading branches, the whole densely velvety hairy with yellowish brown indumentum, glabrescent; glabrous in the young state. *Leaves* rather densely set in the basal part, more remote upwards, hirsute to glabrous; petioles of the lower leaves to 13½ cm, gradually shorter upwards, in the upper leaves nearly absent, all of them slightly sheathing at the base, hairy like the stems; lamina palmatifid to ternate, segments rhomboid to obo-

vate, the middle one 3-lobate to trifid, besides, all biserrate with acuminate teeth; lamina of the upper leaves smaller and more cuneate. *Umbels* opposite the leaves; peduncles 1-5 cm, to 7 cm in fruit, terete, grooved, hairy like the stems; involucre 7-10, to 3 mm broad, shorter as or as long as the pedicels, lanceolate, hairy like the leaves; pedicels 25-40, to 7 mm, to 15 mm in fruit, inner ones shorter. Calyx teeth to ½ mm, acute or obtuse. Petals to 2 by 1 mm, cream to pink, elliptical, acute. Styles nearly ½ mm, to 1½ mm in fruit. *Mericarps* to 6 by 4 mm, equal.

Distr. *Malaysia*: Lesser Sunda Islands (Timor, Flores), SE. Celebes.

Ecol. In mountain forests, damp places, 1800-2600 m.

Notes. The specimens from Celebes differ from those from the Lesser Sunda Islands by stronger developed leaf sheaths, by broader involucre which enclose the flower when young, and by pink to purple flowers.

10. *Trachymene arfakensis* BUW. *Blumea* 2 (1936) 154, fig. 2b.—*Didiscus arfakensis* GIBBS, Contr. Arfak Mts (1917) 166.—Fig. 2b.

Stems to 60 cm, erect or suberect, glabrous, slender, base thickened with scars and remnants of leaf sheaths, unbranched in the lower portion, terete, striate to subsulcate, several times dichotomously branched in the upper part, branches spreading and sympodial. Sheath 2-7 by 1½-4 mm, tapering into the petiole, ciliate with hairs to 2 mm; petioles 2-7 cm in the lower leaves, gradually shorter upwards, canaliculate, glabrous or towards the lamina with few to 2 mm long hairs; lamina 2½-7 by 4-8 cm, roundish-cordate, ternate, leaflets with petiolules to 1½ cm, 2-3-fid to 2-3-partite, segments 3-lobed and coarsely serrate, teeth acuminate and apiculate, upper surface subglabrous, beneath sparingly hirsute, especially on the nerves, base long-ciliate. *Umbels* opposite to each other leaf; peduncles 1¼-7 cm, terete to sulcate, involucre 5-10, 5-10 mm, linear to filiform, broadest ones with few filiform teeth; *pedicels* 20-30, 5-8 mm, 10-15 mm in fruit, spreading, inner ones shorter. Calyx teeth hardly any. Petals 1-1½ by ¾-1 mm, white, ovate, acute. Styles 1-1½ mm. *Mericarps* to 5 by 3 mm.

Distr. *Malaysia*: Celebes, W. New Guinea (Mt Arfak).

Ecol. Marshy, muddy localities, often in groups, 1500-2400 m.

11. *Trachymene adenodes* BUW. *Blumea* 2 (1936) 155, fig. 4a-b.—Fig. 4a-b.

Stems to 50 cm and more, terete, striate, lower portion ascendent with rosettes at the base, glabrous, unbranched, upper portion dichotomously later sympodially branched, densely hirsute, hairs to 2 mm. *Leaves* rather densely in the lower portion, upwards more remote; sheaths 5-8 by 3-5 mm, semi-amplexicaulous, tapering into the petiole, glabrous, margin long-ciliate with partly glandular hairs to 3 mm; petioles 7-20 cm, upwards gradually shorter, uppermost ones nearly

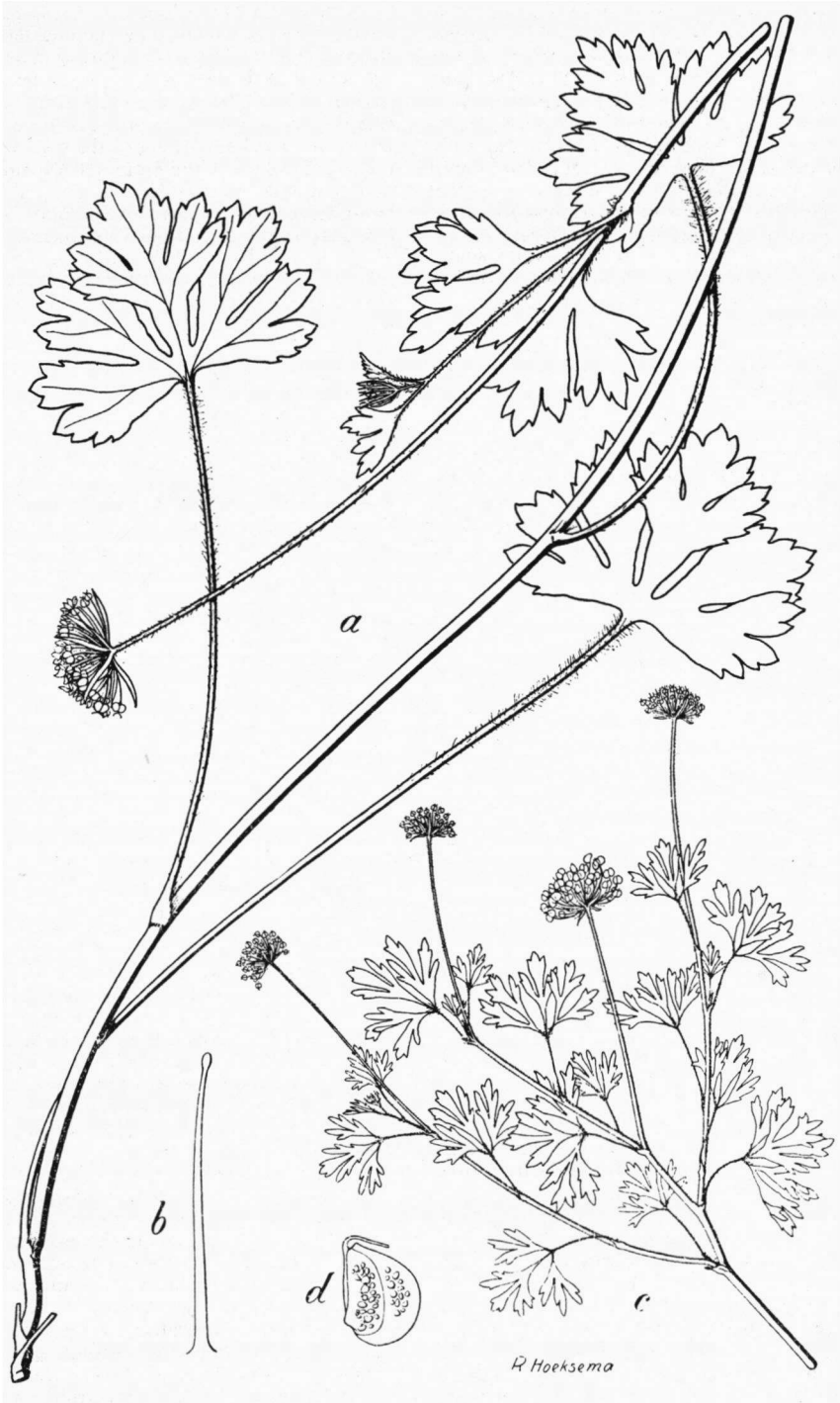


Fig. 4. a-b. *Trachymene adenodes* Buw., c. *Trachymene papillosa* Buw. (plants $\times \frac{2}{3}$, b. glandular hair of the petiole $\times 16$, d. $\times 4$.)

absent, towards the lamina densely hirsute with glandular hairs to 3 mm; lamina of the rosette leaves and lower leaves 4½ by 7½ cm, roundish-cordate to subreniform, 3–5-partite to ternate, segments rhomboid-ovate, middle ones trifid with 2–3-lobate parts, all segments moreover serrate with broad, subacuminate to subapiculate teeth, sparsely pilose with partly glandular appressed hairs, to 2 cm especially towards the margin and in the incisions. *Umbels* opposite the leaves and in the bifurcations; peduncles to 10 cm, shorter towards the end of the stems, towards the top with glandular hairs; involucre 6–8, 7–10 by 1–1½ mm, lanceolate, acute, glabrous or long-ciliate; pedicels ± 30, 7–9 mm, inner ones shorter, glabrous. Calyx teeth nearly ¼ mm, broad-triangular. Petals 1½–2 by 1–1½ mm, obovate. Styles ± 1½ mm. *Mericarps* (unripe) 2 by ¾ mm, glabrous.

Distr. *Malaysia*: NE. New Guinea.

Ecol. Mountains, 2400–3000 m.

Notes. When more material will come to hand this species might possibly appear to be referable to *T. arfakensis* which it resembles in leaf-shape but from which it differs by its longer petioles, longer peduncles and the glandular indumentum of the petioles, stems and peduncles. As yet I have seen no transitional forms.

12. *Trachymene papillosa* BUW. *Blumea* 2 (1936) 157, fig. 4c–d.—*Didiscus scabriusculus* BUW. ex STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 255, *nomen*.—Fig. 4c.

Stems 20–40 cm, probably ascendent, terete, densely papillose and densely hirsute with 1 mm long, stiff hairs, branched in the upper portion. *Leaves* sparse; sheaths 2–3 by 2 mm, semi-plexicaulous, tapering into the petiole, papillose like the stem, above long-ciliate, hairs 1–2 mm; petioles ½–2½ cm, hirsute and papillose like the stems; lamina 1–2 by 3–4 cm, orbicular-reniform in outline, ternate; leaflets 1–2 by 1–1½ cm, attenuate towards the base, 2–3-fid or 2–3-partite, terminal segments often biserrate, at the base papillose to glabrous, on both sides sparsely hirsute to glabrous. *Umbels* terminal, often opposite the leaves; peduncles 3–8½ cm, terete, striate, hirsute and papillose like the stem or glabrous; involucre 6–12, 4–5 by ½–1 mm, linear-lanceolate, acute, glabrous or long-ciliate; pedicels 30–50, to 5 mm, inner ones shorter, glabrous, spreading, erect to reflexed in fruit. Calyx teeth ¼–½ mm long and broad, triangular, equal. Petals circa 1½ mm, reddish white, ovate, acute. Style 1–1½ mm. *Mericarps* to 2 mm long and broad, equal, black, with tuberculiform scales, especially between the intermediate ribs and the commissure, to entirely smooth.

Distr. *Malaysia*: SW. New Guinea (Central Range).

Ecol. Grassy, deforested slopes, on sandy soil, also forest edges, 1600–3500 m.

13. *Trachymene flabellifolia* n. sp.

Species nova ad Tr. papillosam BUW. *accedens tamen foliis cuneatis flabelliformibus distinguenda*.

Perennial herb. Rhizome 7–12 mm thick; stems

up to 30 cm long, branching from the base, ascendent, furrowed or subangulate, near the base black-corky, roughish, upper part densely papillose and hirsute (hairs up to 1 mm long, appressed, and stiffish). *Leaves* single or few together in axillary clusters, 5–15 mm apart; sheath 2–3 mm long, 1½–2 mm wide, narrowing to the petiole and on the margin ciliate (hairs up to 2 mm long); petiole 6–11 mm long, sparsely hirsute (hairs up to 1 mm long); blade 1–2½ cm long, 1–3 cm wide, fan-shaped, incised or split into 2–3-parted wedge-shaped segments, at the tip sharply toothed; main nerves on both surfaces distinctly flabellate. *Umbels* placed in the upper part of the stem opposite the leaves; peduncle terete, striate, subpapillose, 7–5½ cm long, sparsely hirsute (hairs up to 1½ mm long, spreading); bracts forming an involucre, 11 or less, up to 11 mm long and c. ¾ mm wide, acute, lanceolate, at the base connate; pedicels 30–50, terete, slender, glabrous, the outer up to 5 mm long, the inner shorter, slightly longer when in fruit. Calyx with c. ¼ mm long, sharp teeth. *Petals* ¾–1 mm long, c. 1 mm wide, ovate, subconcave. Stamens 5, anthers dorsifix, rounded-elliptic. Styles 2, subfiliform, 1¼–1½ long, curved inwards. *Fruit* much flattened, kidney-shaped. *Mericarps* up to 3 mm long and up to 2½ mm wide, median rim c. 1 mm distant from the commissure, slightly crowned by the styles, densely covered by knobby hair-like outgrowths; carpophore entire, 1½–1¾ mm long, hardly two-tipped.

Distr. *Malaysia*: West New Guinea (Central Range, near Lake Habbema, 3225 m camp, BRASS 9586, *type*).

Ecol. Common in mossy glades, 3225 m alt.

Notes. Allied to *T. papillosa* but different by its cuneate to flabelliform leaves.

14. *Trachymene rosulans* (DANS.) BUW. *Blumea* 2 (1936) 158.—*Didiscus rosulans* DANS. *Brittonia* 2 (1936) 135, *cum icone*.

Perennial (or annual). Main root fusiform, branched. Main stem erect, to 13 cm, at the base to 2½ mm thick, almost covered with the thickened bases of leaf sheaths, producing procumbent or ascendent branches, with scale-like leaves, to 14 cm; upper portion with branches that are like the upper portion of the main stem, whole plant a semi-globose whole. *Leaves* scattered, more densely set towards the extremities, somewhat forming terminal rosettes; sheaths 2–12 by 3 mm, with membranous margin, tapering into the lamina; lamina 8–18 by 3–9 mm, spatulate, apical portion with 3 acute or obtuse teeth. *Umbels* opposite the leaves; peduncles 5–12 mm, terete, striate; involucre 8–12, 6–9 by 1½ mm, lanceolate; pedicels 10–20, 4–7 mm, inner ones shorter, hardly elongated in fruit. Calyx teeth to ¾ mm, triangular, acute. Petals nearly, 1½ by 1 mm, pink or pale pink, roundish-elliptical; styles nearly 1¼ mm. *Mericarps* to 3½ by 3 mm, entirely glabrous.

Distr. *Malaysia*: SE. New Guinea.

Ecol. Open places, burnt fringes of forest, grasslands, 2840 m.

15. *Trachymene pulvilliforma* n. sp.

Ab omnibus speciebus generis Trachymene differt modo crescendi, pulvillos densos formante, foliis densissime imbricatis apicem caulis versus et magis minusve in rosulas confertis. Pars inferior folii semi-amplexicaulis et vaginans, lamina cochlearis 2-2½ mm longa, ½-¾ mm lata, apice mucronata, uninervata. Umbellae simplices, brevissime pedunculatae bracteis 2-4 involucretae, pedicellis 1-2. Ex affinitatis T. rosulans (DANSER) BUW.

A herb, probably perennial, entirely glabrous; root fusiform, branching, fibrous; stem prostrate and much branching from the base, branches close, the slightly ascending upper ones forming a half-spherical cushion which is up to 1 cm deep and 5-15 cm in diam. *Leaves* very densely imbricate, near the top more or less in clusters together, the basal part half amplexicaulous and sheathing; sheath appressed, 1½-3 mm long, ½-1 mm broad, narrowing towards the blade; blade spoon-shaped, 2-2½ mm long, ½-¾ mm wide, one-nerved, tip mucronate. *Umbels* terminal or opposite the leaf clusters, when flowering hidden among the leaves, when in fruit slightly exserted; peduncle somewhat flattened c. 2 mm long; bracts 2-4, forming an involucre, 1½-2 mm long, up to ½ mm wide, lanceolate or spatulate-lanceolate. *Pedicels* 1-2, slightly flattened, c. 1 mm long, in fruit up to 2½ mm long. *Calyx* indistinctly toothed. *Petals* 5, c. 1 mm long, c. ¾ mm wide, white. *Stamens* 5, anthers dorsifix, rounded-elliptical, pink. *Styles* 2, subfiliform, c. ½ mm long. *Fruit* glabrous, strongly flattened, kidney-shaped. *Mericarps* up to 2 mm long and up to 1½ mm wide, rim indistinct, the median ¾ mm distant from the commissures, slightly crowned by the styles, carpophore entire, c. 1 mm long, hardly two-tipped.

Distr. Malaysia: West New Guinea, (3 miles E

of the summit of Mt Wilhelmina, BRASS 9426, *type*).

Ecol. Forming bright green cushions, c. 5-15 cm in diam. on old camp site, 3650 m alt.

Notes. Different from all other *spp.* by its dense mode of growth, its peculiar leaf-shape, and its umbels being 1-2-pedicelled. In mode of growth it comes nearest to *T. rosulans*.

16. *Trachymene caerulea* GRAH. Edinb. New Phil. Journ. 5 (1828) 380; BUW. Blumea 2 (1936) 158. —*Didiscus caeruleus* HOOK. in CURT. Bot. Mag. 55 (1828) t. 2875. — *D. cyaneus* DC. Mém. Omb. 11 (1829) 28. — *Huegelia caerulea* REICHENB. Iconogr. Exot. (1829) t. 20.

Annual, pilose and glandular in nearly all parts. Main root fusiform with fibrous branches. Stems single, erect, upper portion with usually simple branches not overtopping the main stem. Lower *leaves* petioled, petioles 1½-4 cm, hardly sheathing; lamina roundish in outline, ternate, leaflets bipinnatifid to bipinnatifid, segments narrow with subacute to subobtusely apiculate tips; upper leaves sessile or subsessile, less divided, uppermost ones with only 3 narrow segments. *Umbels* terminal on the main stem and the branches, ∞-flowered; involucre ∞, linear, nearly filiform towards the tip, nearly as long as the flowers; pedicels 10-25 mm, inner ones gradually shorter, spreading, more erect in fruit. Outermost flowers larger than the other ones, not fruit-bearing, probably male. *Calyx* teeth very short, subulate. *Petals* 2¾-3 by 2-2¼ mm, ovate to obovate, shortly unguiculate at the base, outside with short glandular hairs. *Styles* nearly 1 mm; ovary glandular hairy. *Mericarps* 3¼ by up to 2¾ mm, roughly tuberculate with glandular hairs.

Distr. Australia, in *Malaysia:* cultivated as a garden plant.

4. SANICULA

LINNÉ, Sp.Pl. 1 (1753) 235; BUW. Blumea 2 (1936) 159 (*lit.*).

Erect herbs; *leaves* palmately 3-5-partite, segments dentate, lobed or pinnately dissected. *Flowers* in irregular compound umbels with few rays; involucre leaf-like; umbellules usually small, with small involucre. *Calyx* teeth subherbaceous or membranaceous. *Petals* white, emarginate with inflexed tip, slightly imbricate. Disk flat with raised margin encircling the styles. *Styles* from the base filiform or subincrassate. *Fruits* echinate, ovoid, subterete or laterally subflattened; commissure broad; *mericarps* with obscure ribs, lateral ones in the commissure, inner surface flat; vittae slender, solitary in each ridge, some very slender scattered in the endosperm.

Distr. About 40 *spp.* (depending on specific delimitation) distributed throughout the world and in Hawaii and Patagonia, but not in Australia and New Zealand.

1. *Sanicula europaea* LINNÉ, Sp.Pl. 1 (1753) 235; BUW. Blumea 2 (1936) 159 (*lit.*). — *S. elata* D. DON, Prod. Fl. Nep. (1825) 183. — *S. javanica* BL. Bijdr. 15 (1826) 882. — *S. montana* BL. Bijdr. 15 (1826) 882; MOLKENB. in MIQ. Pl. Jungh. (1851) 93, *cum var. genuina, javanica, divaricata.* — *S. montana* var.

genuina, var. javanica ZOLL. Syst. Verz. (1854) 138. — *S. elata* var. *normalis, var. partita* O.K. Rev. Gen. Pl. 1 (1891) 269. — *S. europaea* var. *javanica* WOLFF in Pfl.R. 61 (1913) 64.

Perennial with more or less creeping rhizomes. Stems 15-75 cm, slender, deeply grooved, glabrous

or rarely like the whole plant hairy. Petiole of the lower leaves 3–20 cm, lamina tripartite to ternate, segments incised and serrate-crenulate, teeth mucronulate. Umbels in a dichasium, ending in monochasia, sessile or on peduncles up to 1½ cm, with 5–8 involucre, 4–6 flowered, with 2–3 outer male flowers on pedicels ½–1 mm, and 2–4 female flowers, sessile or on pedicels up to ½ mm. Calyx teeth 1½–1 by ¼ mm, oblong, acute. Petals nearly 1¼–by ½ mm, with inflexed tip. Mericarps nearly 2 by 1 mm, densely covered with about 1½ mm long uncinuate bristles.

Distr. Temperate and tropical parts of Europe, Africa and Asia; in *Malaysia*: all over the Archipelago eastwards to Ceram.

Ecol. Mountain forests, 500–3060 m.

Vern. *Daun ketapan, kundje, tespong, tetespongan*, S; Javanese names rather variable.

Notes. The Malaysian material is rather uniform; it differs from the European form by its umbels arranged in widely branched di-monochasia, whereas the latter has more crowded inflorescences and consequently nearly compound umbels.

5. ERYNGIUM

LINNÉ, Sp.Pl. 1 (1753) 232; Buw. *Blumea* 2 (1936) 164 (*lit.*).

Erect herbs, often spinescent. Leaves spiny dentate, entire, lobed or dissected. Flowers in heads or compact spikes, all bracteolate. Calyx teeth rigid, acute or prickly. Petals erect, white, with inflexed tip, scarcely imbricate. Disk flat, raised margin encircling the styles. Styles from the base filiform. Fruit ellipsoid, nearly cylindrical, commissure broad; mericarps with subprominent ribs, inner surface subconcave; vittae inconspicuous or 0; carpophore deciduous.

Distr. Over 200 spp. described, distributed throughout the world with exception of trop. & S. Africa, centering in the New World specially Mexico, in the tropics usually on the mountains, *E. rostratum* circum-S.Pacific.

KEY TO THE SPECIES

- | | |
|---|-------------------------|
| 1. Radical leaves simple, with a dentate margin | 1. <i>E. foetidum</i> |
| 1. Radical leaves distinctly 2-pinnately lobed | 2. <i>E. moluccanum</i> |



Fig. 5. *Eryngium foetidum* L., × 1/5.

1. *Eryngium foetidum* LINNÉ, Sp.Pl. 1 (1753) 232.—Buw. *Blumea* 2 (1936) 164.—Fig. 5.

Roots fusiform. Stems 15–60 cm, many times dimonochasially branched with spreading branches, subglabrous, grooved. Leaves nearly all in a rosette, 3–32 by 1–4 cm, glabrous, lanceolate-spathulate, obtuse, sessile, base more or less narrowly sheathy, margin dentate, teeth with a spiny hair. Bracts of the inflorescences 1–6 cm, palmatilobate to -partite, with spiny tips and teeth, strongly nerved, lowermost often like normal leaves. Peduncles 1–10 mm; heads 5–10 mm, cylindrical; involucre 5–7, spreading, nearly lanceolate with few spiny teeth. Flowers sessile in the axils of narrow membranous-margined bracts 1¼–1½ mm long. Calyx teeth nearly ¾ mm, lanceolate, acute with narrow membranous margin. Petals ½–¾ by ± ¼ mm, greenish white. Mericarps 1–1½ by ½–¾ mm, densely warty, glabrous, ribs indistinct.

Distr. Indigenous in tropical America, introduced in some parts of tropical Africa and Asia; in *Malaysia*: Malay Peninsula, Sumatra, Java.

Ecol. In not too dry regions, in shaded or sunny, fertile localities, arable lands and grasslands, sawah-dikes, forest edges and along streambanks.

Uses. Raw or steamed eaten with rice.

Vern. *Kangkong kerbau, jeraju gunung* (Mal. Pen.); *umbu Palembang, ketumbor djawa* (Sum.); (*rumpu*) *walang, katuntjar walanda, katuntjar blanda walang* in several combinations, S, *tumbaran unga, ketumbar landa, ketul kebo, djinten, djintenan, J; stinkdistel* (Dutch).

Notes. In the Malay Peninsula for the first time collected in 1888; in Java observed as early as 1896 [EDELING, Nat. Tijd. Ned. Ind. 31 (1870) 294], in Sumatra in 1915.

The plants smell of bugs caused by an aromatic oil containing the aldehyd dodecen-2-al-1 (KOOL-HAAS, Rec. trav. chim. Pays-Bas 51 (1932) 460).

2. *Eryngium moluccanum* n. sp. prov.

Habit of *E. campestre*. Leaves petioled, broad triangular-ovate in outline, 10–15 cm through, prickly. Stem little branched. Heads oblong.

Distr. *Malaysia*: Moluccas (Ceram, summit zone of Mt Pinaja, ca 3000 m alt., EYMA a. 1937/8).

Notes. A provisional examination in 1940 of the rather few specimens of this most remarkable discovery by the late Dr EYMA gave as a result that it was a new species, probably allied to some Australian species. Unfortunately the specimens cannot be traced, and are probably lost. (v. St.).

6. CHAEREFOLIUM

HALL. Hist. Stirp. Helv. 1 (1768) 327; BUW. Blumea 2 (1936) 168.—*Anthriscus* PERS. Syn. 1 (1805) 320.

1. *Chaerofolium cerefolium* SCHINZ & THELL. Vierteljahrsschr. Naturf. Gesell. Zürich 53 (1909) 554; BUW. Blumea 2 (1936) 168.—*Scandix cerefolium* LINNÉ, Sp.Pl. 1 (1753) 257.—*Anthriscus cerefolium* HOFFM. Gen. Pl. Umbell. (1814) 41.

Herb, somewhat hirsute. Stems 25–50 cm, striate and grooved. Lower leaves with petioles to 7 cm with sheathing base, upper leaves subsessile to sessile on the sheaths; lamina 4–11 by 3–15 cm, triangular in outline, bi- to tripinnate, primary leaflets ovate, obtuse, 1/2–2 1/2 cm petiolulate, secondary leaflets ovate, pinnatifid, with obtuse tips. Compound umbels sessile in a di-monochasium; rays 3–5, 5–25 mm; pedicels 4–9, 2–4 mm, to 5 mm

in fruit; involucre absent; involucels 3–4, nearly 2 by 3/4 mm, lanceolate, acute with narrow membranous margin. Petals nearly 1–1 1/2 by 1/2–1 mm, white, obcordate with short inflexed tips. Mericarps 5–6 by 1 mm, sometimes antrorsely hirsute when unripe, black and finely granular when ripe, grooved inside, with a beak to 2 1/2 mm; disk flat.

Distr. Indigenous in SE. Europe and W. Asia, cultivated and subspontaneous in all parts of the world; in *Malaysia* stated to be cultivated in Java [Miq. Fl. Ind. Bat. I, 1 (1856) 744].

Notes. Description after European materials; no specimens from *Malaysia* seen by me.

7. TORILIS

ADANS. Fam. Pl. 2 (1763) 99; BUW. Blumea 2 (1936) 169.—*Caucalis* BENTH. & HOOK. f. Gen. Pl. 1 (1867) 928, *pro parte*.

Annual to perennial erect herbs, retrorsely pubescent. Leaves pinnately divided. Umbels compound, rays often few. Involucre many to 0, involucels many. Flowers white or reddish, outer ones radiating. Calyx teeth triangular, acute. Petals cuneate or obovate, emarginate, with inflexed tips. Disk continuous with the base of the styles. Fruits ovate to oblong, laterally subflattened, constricted at the broad commissure; mericarps with primary and secondary ribs obscure or subprominent, lateral ribs in the commissure, muricate-setose, inner face sulcate; carpophore entire or 2-fid.

1. *Torilis japonica* DC. Prodr. 4 (1830) 219; BUW. Blumea 2 (1936) 169.—*Tordylium anthriscus* LINNÉ, Sp.Pl. 1 (1753) 240.—*Caucalis anthriscus* HUDS. Fl. Angl. ed. 1 (1762) 99.—*Caucalis japonica* HOUTT. Nat. Hist. II, 8 (1777) p. 42, t. 45, 1.—*Torilis anthriscus* (non GAERTN. 1788) GMEL. Fl. Bad. 1 (1806) 615.—*Torilis scabra* (non DC. 1830) ZOLL. Syst. Verz. (1854) 139.

Stems to more than 1 m, finely striate, rough by appressed bristles. Leaves triangular in outline, sparingly appressedly hirsute, pinnate, leaflets pinnatifid, segments pinnatifid to serrate. Umbels terminal and axillary; peduncles 5–20 cm; rays 4–12, 1/2–3 cm; pedicels 4–10, 1–4 mm, all antrorsely

hirsute; involucre 2–6; involucels 3–7, nearly filiform. Calyx teeth nearly 1/2 mm, triangular-lanceolate, mucronulate. Petals 1/2–1 mm through, appressedly hairy outside. Mericarps about 4 by 1 1/2 mm, oblong, ribs obtuse, grooves with densely placed uncinat bristles.

Distr. Indigenous in Europe, N. Africa, temperate Asia, Himalayan Mts, introduced in S. Asia and America, in *Malaysia*: N. half of Sumatra and E. Java (Mt Tengger).

Ecol. Mountains, 1225–2500 m.

Vern. *Ambo-ambo* (Sum.), *tumbaran alas*, J.

Notes. This species is said to have been introduced in S. Asia and America among clover seed.

8. CORIANDRUM

LINNÉ, Sp.Pl. 1 (1753) 256; BUW. Blumea 2 (1936) 170.

1. *Coriandrum sativum* LINNÉ, Sp. Pl. (1753) 256; MERR. Comm. Lour. (1935) 294; BUW. Blumea 2 (1936) 171.—*Coriandrum testiculatum* (non L.) LOUR. Fl. Cochinch. (1790) 180.—*Bifora loureirii* KOSTEL. Allg. Med.-Pharm. Fl. 4 (1835) 1183.—*Atrema testiculatum* MIQ. Fl. Ind. Bat. 1, 1 (1856) 744.

Annual, entirely glabrous. Stems to 75 cm, terete, striate. Lower leaves palmatilobate to -partite, middle leaves pinnate, segments gradually narrower, obtuse, upper leaves pinnate to bipinnate, segments $\frac{1}{2}$ mm broad. Compound umbels terminal or seemingly lateral, peduncles 2–10 cm; rays 3–5, 1–2 $\frac{1}{2}$ cm; pedicels 3–5 mm; involucre 0–1, to 5 mm; involucres 3–5, to 5 by $\frac{1}{2}$ mm, linear. Calyx teeth nearly 1 mm, triangular-lanceolate to oblong-lanceolate, somewhat radiating. *Petals*

white, radiating, outer ones 3–4 mm, all deeply bipartite with inflexed tips. *Mericarps* 4 by 2 mm, inside hollow, forming a nearly globose fruit; primary ribs undulated lines, secondary ribs subprominent, filiformous.

Distr. Indigenous from the Mediterranean region to central Asia; cultivated in nearly all parts of the world, in *Malaysia*: cultivated from 0–2200 m.

Uses. Fruit as spice; mixed with rice in preparing yeast; leaves for flavouring foods; medicinal as a mild stimulant.

Vern. *Wansui*, *katuntjar*, *ketumbar*, *J*, *koriander* (Dutch).

Notes. Unripe fruits smell of bugs.

The coriander seeds sold in the markets are stated to have been introduced from India.

9. OREOMYRRHIS

ENDL. Gen. Pl. (1839) 787; BUW. Blumea 2 (1936) 172.

Perennial herbs, often caespitose, often pubescent or villose. *Leaves* with sheaths, pinnately dissected, or entire, often all in rosettes. Umbels simple. Involucres many. Calyx teeth inconspicuous. *Petals* entire, imbricate in bud. Disk continuous with the base of the styles. *Fruit* oblong or narrow, slightly laterally flattened, usually tapering towards the end; commissure broad; mericarps subterete, ribs obtuse, prominent, lateral ones close to the commissure; vittae 1 under each groove and usually 2 at the commissure. Carpophore often bipartite.

Distr. Few spp. circum-S. Pacific from Mexico to N. Borneo.

KEY TO THE SPECIES

1. Leaves compound.
2. Leaves pinnate to bipinnate; primary leaflets in several pairs. Peduncles 0.7–8 cm. Involucres 2–4 mm. Pedicels 1–9. Fruits 2 $\frac{1}{2}$ –3 $\frac{1}{2}$ cm 1. *O. andicola*
2. Leaves subternate; lateral leaflets 3–5-partite; terminal leaflet ternate with tripartite segments. Peduncles 12–33 cm. Involucres 5–8 mm. Pedicels 15–30. Fruits 4–6 mm 2. *O. papuana*
1. Leaves not compound, linear to narrowly spatulate:
3. Pedicels 6–8. Fruits 5 by c. 1–1 $\frac{1}{2}$ mm. Leaves 2–20 cm 3. *O. linearis*
3. Pedicels solitary. Fruits c. 1 $\frac{1}{2}$ by $\frac{3}{4}$ mm. Leaves 3–4 mm 4. *O. azorellacea*

1. *Oreomyrrhis andicola* HOOK. f. Fl. Antarct. 2 (1844–47) p. 288, t. 101; BUW. Blumea 2 (1936) 173.—*Myrrhis andicola* KUNTH in HUMB. & BONPL. Nov. Gen. & Sp. 5 (1821) p. 13, t. 419.—*Caldasia andicola* DC. Mém. Ombell. (1829) 60.—*Oreomyrrhis colensoi* HOOK. f. Fl. Nov. Zel. 1 (1853–55) 92.—*O. haastii* HOOK. f. Handb. N. Zeal. Fl. (1864) 91.—*O. borneensis* MERR. Am. Journ. Bot. 5 (1918) 515, ic. 36.—*O. pumila* RIDL. Trans. Linn. Soc. II, Bot. 9 (1916) 63.

Small tufts to spreading soft-haired cushions. Main root fusiform. Caudex with few erect branches bearing one or more rosettes. *Leaves* 0.8–16 cm; sheath 3–30 by 1–3 $\frac{1}{2}$ mm, tapering into the petiole, margin membranaceous, dorsally glabrous or short-hirsute, inside short-hirsute or sparingly pilose, rather densely ciliate; petiole 0.3–10 cm, canaliculate, glabrous or short-hirsute; lamina $\frac{1}{2}$ –4 by 0.4–1.6 cm, triangular-ovate, pinnate to bipinnate, leaflets 5–11, lower ones with 3–5 secondary leaflets, all leaflets pinnatifid to pinna-

tipartite, segments 1–2 $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ mm, thinly coriaceous, glabrous or shortly hirsute, sometimes mucronulate, finely ciliate, margins sometimes recurved; small leaflets only with acute, broad-triangular teeth. *Umbels* 1 to several in each rosette; peduncles 0.7–8 cm, terete, densely hairy with spreading somewhat silky hairs, or short hirsute towards the apex, sometimes glabrescent, sometimes exceeding the leaves; involucre 5–10, 2–4 mm, ovate-lanceolate with broad base, outside densely sericeous or shortly hirsute, sometimes finely ciliate; pedicels 1–9, 0– $\frac{1}{2}$ mm, to 3 mm in fruit. *Petals* nearly 1 mm, broad elliptic-ovate, base shortly ciliate or glabrous, white or reddish. *Fruits* 2 $\frac{1}{2}$ –3 $\frac{1}{2}$ by $\frac{3}{4}$ –1 $\frac{1}{4}$ by $\frac{3}{4}$ –1 $\frac{1}{2}$ mm, oblong ovate, somewhat incurved, densely short-hirsute to glabrous.

Distr. Central and S. America from Mexico to the Falkland Islands, moreover in Australia and New Zealand, in *Malaysia*: Br. N. Borneo (Kina-balu) and New Guinea.

Ecol. Open places, rock crevices, alpine grassland, open bogs, among shrubs, 3150–4240 m.

Notes. *Oreomyrrhis andicola* is very polymorphic. In the vast area which it covers it is glabrous to white-tomentose; the height varies from 1½–

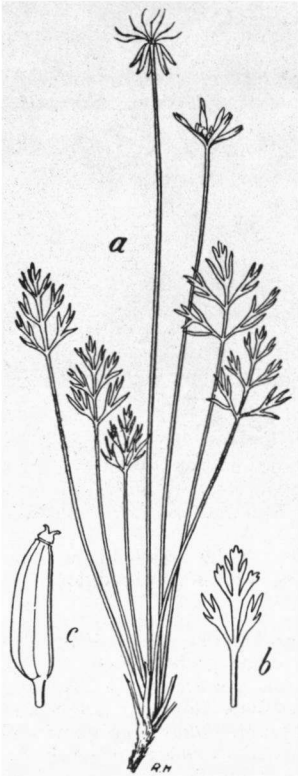


Fig. 6. *Oreomyrrhis papuana* Buw. (plant $\times 2/3$, fruit $\times 4$).

50 cm; the rosettes are dense or loose bearing simple umbels or slightly branched stems with few leaves and several umbels arranged again nearly in an umbel; the leaves are bi- to tripinnate, rarely simply pinnate with pinnately divided leaflets; the petioles are longer or shorter than the lamina.

2. *Oreomyrrhis papuana* Buw. *Blumea* 2 (1936) 175, fig. 5.—Fig. 6.

Perennial, main root fusiform. Caudex with few erect branches with rosettes. *Leaves* to 18 cm; sheaths 1–4 by ½ cm; tapering into the petioles, glabrous, margin scarcely membranaceous; petioles 4–12 cm, canaliculate, subglabrous, apical part subhirsute; lamina 1½–2½ by 0.8–2 cm, rhomboid-ovate in outline, subternate to pinnate, segments 2–3-partite, ultimate segments to 7 by 1 mm, lanceolate-cuneate to linear-lanceolate, thick-coriaceous, at the thick margin and beneath on the nerves with antrorse bristles. *Umbels* 1 or more in each rosette; peduncles 12–33 cm, terete, subsul-

cate, towards the apex densely hirsute with small retrorsely appressed bristles; involucre 6–9, 5–8 by 1–2 mm, oblong-spathulate, broad at the base, texture and indumentum as the leaf segments, reflexed in fruit; pedicels 15–30, very short when flowering, to 5 mm in fruit, inner ones shorter, scabrous with short retrorsely appressed bristles. *Petals* 1–1¼ by $\pm 3/4$ mm, oblong-ovate or oblong-ovate. *Fruits* 4–6 by ca ¾ by 1¼ mm, glabrous. Carpophore undivided.

Distr. *Malaysia*: W. New Guinea (Central Range).

Ecol. Open swampy, grassy localities, 3200–3500 m.

3. *Oreomyrrhis linearis* HEMSL. in HOOK. *IC. Pl.* 26 (1899) t. 2590; Buw. *Blumea* 2 (1936) 176.

Perennial, caespitose. Roots with fibrous branches. Caudex with numerous erect branches, to 12 cm, beset with fibrous leaf rudiments, at the extremities bearing dense or lax rosettes. *Leaves* 2–20 cm; sheaths 5–35 by 1–4½ mm, very short when flowering, to 5 mm in fruit, inner ones shorter, scabrous with short retrorsely appressed bristles. *Petals* 1–1¼ by $\pm 3/4$ mm, oblong-ovate or oblong-ovate. *Fruits* 4–6 by ca ¾ by 1¼ mm, glabrous. Carpophore undivided.

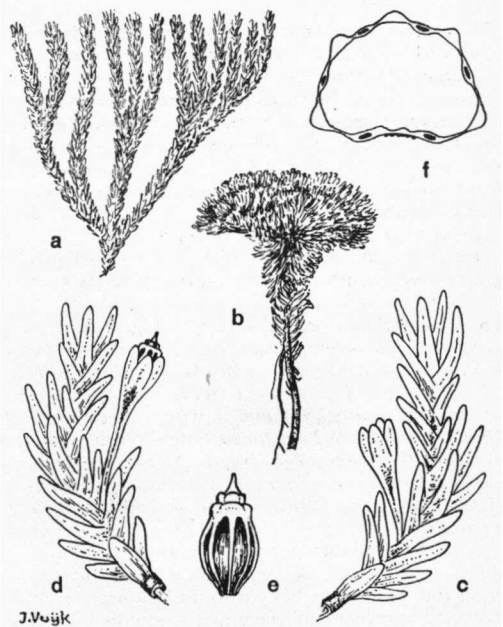


Fig. 7. *Oreomyrrhis azurellacea* Buw. *a*–*b*. mode of branching, $\times 1$, *c*–*d*. flowering and fruiting twigs, $\times 4$, *e*. fruit, $\times 8$, *f*. mericarp in cross-section, $\times 24$.



Fig. 8. *Oreomyrrhis azurellacea* Buw., a cushion plant of the alpine grassland on summit of Mt Albert Edward (Papua), \pm 4000 m alt. (BRASS, ARCHBOLD expeditions)

gles subincrassate, retrorsely hirsute towards the apex with appressed whitish bristles to $\frac{1}{2}$ mm, finally glabrescent; involucre 5–6, 2–5 by $\frac{1}{2}$ – $1\frac{1}{4}$ mm, lingulate, obtuse, towards the connate base retrorsely hirsute; pedicels 6–8, to $1\frac{1}{2}$ mm, inner ones sessile, in fruit $2\frac{1}{2}$ –10 mm, densely retrorsely hirsute. *Petals* 1.1–1.2 by 0.8 mm, violet, triangular. *Fruits* to 5 by nearly 1 by $1\frac{1}{2}$ mm, slightly curved, entirely glabrous.

Distr. Malaysia: SE. New Guinea.

Ecol. Open sunny localities, open grasslands, grassy creek banks in open country, 3000–3900 m.

4. *Oreomyrrhis azurellacea* n. sp.—Fig. 7–8.

*Species nova glabrata suberecta, habitu maxime ut aliquis species generis Azorella. Faciliter distinguenda caule 3–4 $\frac{1}{2}$ cm longo, foliis 2–4-fariis, densissime imbricatis, 3–4 mm longis, inflorescentia uniflora, pedunculo 2 mm longo, bracteis involucratis 4, pedicello $\frac{1}{2}$ mm longo, fructu $1\frac{1}{2}$ mm longo et $\frac{3}{4}$ mm lato. Forma foliorum valde ad *O. linearis* HEMSL. accedens tamen planta in toto distincte minor.*

A herb, probably perennial, entirely glabrous; stem nearly erect, 3– $4\frac{1}{2}$ cm long, much branching from the base, branches up to 3 cm long, closely packed and rather stiff, the upper gradually shorter and forming a comparatively dense cushion. *Leaves* very densely imbricate in 2–4 rows, 3–4 mm long, the lower part amplexicaulous and sheathing; sheath appressed, up to 1 mm wide, slightly ciliate

on the pellucid margin and gradually narrowing in the petiole; blade up to $1\frac{1}{2}$ mm long, up to 1 mm wide, stiffish, coriaceous, spreading, concave, 1-nerved, ciliolate along the submembranaceous margin, tip blunt. *Inflorescences* uniflorous, on top of short branches along the stem, hidden among the foliage during flowering and when in fruit. Peduncle 2 mm long, more or less flattened, bracts 4, forming an involucre, spreading, lanceolate, $1\frac{1}{2}$ –2 mm long, $\frac{1}{2}$ – $1\frac{1}{4}$ mm wide, connate at the base, suggesting leaves. *Flowers* on up to $\frac{1}{2}$ mm long pedicels. Calyx tube shortly campanulate, laterally slightly compressed, c. 1 mm long, $1\frac{1}{2}$ mm wide, indistinctly furrowed; teeth absent. *Petals* red, 1 mm long, $\frac{1}{2}$ mm wide, single-nerved, elliptical, acute. *Stamens* c. $\frac{1}{2}$ mm long, anthers dorsiflex, rounded-ellipsoid, up to $\frac{1}{2}$ mm long and as wide. *Styles* 2, conical, up to $\frac{1}{2}$ mm long. *Fruit* c. $1\frac{1}{2}$ mm long, $\frac{3}{4}$ mm wide, slightly narrowed near the top and slightly compressed laterally; rims obtuse, equally slightly prominent, beside the commissures, joining near the top of the fruit; stylopodium conical, up to $\frac{1}{2}$ mm long; mericarp nearly terete.

Distr. Malaysia: East New Guinea (Mt Albert Edward, BRASS 4306, *type*).

Ecol. Tiny vivid-green plant occurring in dense pin-cushion masses, common on alpine grasslands, 3680 m alt.

Notes. In mode of growth and inflorescence it resembles fallaciously some *ssp.* of *Azorella*. How-

ever, it has a parenchymatic endocarp, the vittae are solitary in the furrows and 2 at the commissure; the endosperm is furrowed at the commissure on

cross section. Therefore, it is an *Oreomyrrhis*. Its leaf shape comes very close to *O. linearis*, but it is much smaller in all parts.

10. CUMINUM

LINNÉ, Sp.Pl. 1 (1753) 254; BISSCHOP-GREV. Plant. Ned. Ind. (1883) 204; BUW. Blumea 2 (1936) 178.

1. *Cuminum cyminum* LINNÉ, Sp.Pl. 1 (1753) 254; BUW. Blumea 2 (1936) 178.

Annual. Stems 15–50 cm, erect, strongly divergently branched from the base, terete, striate, entirely glabrous. *Leaves* short-petioled or sessile on a sheath to 1 by $\frac{1}{2}$ cm with membranaceous white margins, auriculate at the apex or tapering into the petiole; lamina 3–10 cm, bipinnate, segments to $1\frac{1}{2}$ mm broad, linear. Compound *umbels* opposite to the leaves or terminal; peduncles 2–4 cm; rays 4–6, 1– $1\frac{1}{2}$ cm; pedicels 3–7, 4–5 mm; involucre 3–5, 2– $3\frac{1}{2}$ cm, tripartite or twice tripartite, segments filiform, sessile on a $\frac{1}{2}$ mm long sheath with membranaceous white margins; involucels 2–4, to 9 mm, margin white-membranaceous. Calyx teeth 1– $1\frac{1}{2}$ mm, linear to subulate, persistent. *Petals* nearly 1 by $\frac{1}{2}$ mm, white to reddish, obcor-

date with inflexed tips. *Mericarps* 5–7 by nearly 3 mm, somewhat laterally flattened, main ribs filiform, bristly, ridges with a stellate-hairy line.

Distr. Indigenous in Turkestan, cultivated in all parts of the world; in *Malaysia*: stated to be cultivated in the mountains of Java (HEYNE, OCHSE & BAKH., *ll.cc.*).

Uses. Oil distilled from the seeds for making liqueurs; seeds for seasoning curries; medicinal externally and internally as stomachic and astringent.

Vern. *Djinten putih*, M, *djinten bodas*, S, *djinten poté*, Md, *komijn* (Dutch), *cumin* (Engl.), *Kümmel* (Germ.).

Notes. Description after plants from the Orient; no specimens from Malaysia seen by me. The *Cuminum* sold in the markets is stated to have been introduced from India.

11. APIUM

LINNÉ, Sp.Pl. 1 (1753) 264; BUW. Blumea 2 (1936) 179.

KEY TO THE SPECIES

1. Leaves pinnate, with broad tripartite to trilobate petiolate leaflets 1. *A. graveolens*
1. Leaves bi- to tripinnate, with very narrow or filiform segments 2. *A. tenuifolium*

1. *Apium graveolens* LINNÉ, Sp.Pl. 1 (1753) 264; BUW. Blumea 2 (1936) 179.

Main root fusiform or tuberiform. Stems 25–90 cm, angular, striate and grooved. Petioles rather long; sheaths to 2 cm in the lower leaves, white-margined; lamina pinnate, leaflets 2– $2\frac{1}{2}$ by to 3 cm, trilobate to tripartite, petiolulate, in the upper leaves smaller, ternate to 3-partite. Compound umbels opposite the leaves; peduncles 0–2 cm; rays 10–15, 1–3 cm; pedicels 6–10, 2–3 mm; involucre and involucels absent. Calyx teeth absent. *Petals* $\frac{1}{2}$ mm through, white or greenish, with inflexed tips. *Mericarps* 1 by up to $\frac{3}{4}$ mm, ribs narrowly winged; stylopodium nearly $\frac{1}{4}$ mm high, halves conical. Carpophore emarginate.

Distr. Indigenous in the temperate parts of Europe, Africa and Asia, also in S. America, cultivated elsewhere, in *Malaysia*: cultivated from 1–2100 m.

Uses. Leaves, petioles and tuberiform roots for flavouring dishes; seeds as spice and medicinal.

Vern. *Saladri*, S, *cetery* (Engl.), *selderie* (Dutch).

2. *Apium tenuifolium* THELL. in HEGI, Ill. Fl. Mitteleur. 5, 2 (1926) 1140; BUW. Blumea 2 (1936) 181.—*Sison ammi* (non L. 1753). JACQ. Hort. Vindob. (1773) t. 200 *excl. syn. ex* THELL. in HEGI *l.c.*—*Cnidium tenuifolium* MOENCH, Meth. (1794) 98, *excl. syn.*—*Pimpinella leptophylla* PERS. Syn. 1 (1805) 324.—*Helosciadium leptophyllum* DC. Mém. Soc. Phys. Genève 4 (1828) 493.—*Apium leptophyllum* BENTH. Fl. Austr. 3 (1866) 372.—*Apium ammi* URB. in MART. Fl. Bras. 11, 1 (1879) 341, t. 91.

Main root fusiform. Stems 40–50 cm, striate, nearly glabrous. *Leaves* bi- to tripinnate, segments $\frac{1}{2}$ –1 mm broad, nearly filiform. Compound umbels opposite the leaves; peduncles 0–2 cm; rays 3–5, $\frac{1}{2}$ –1 cm; pedicels 5–10, 2–4 mm; involucre and involucels absent. Calyx teeth 0. *Petals* nearly 0.4–0.6 by 0.2 mm, with strongly inflexed tips, white. *Mericarps* \pm $\frac{1}{2}$ by $\frac{1}{2}$ mm, ribs obtusely keeled. Stylopodium bipartite, halves small, conical. Carpophore to \pm $\frac{1}{2}$ from the apex bipartite.

Distr. Central and S. America, Australia, New Zealand, cultivated and adventive in Europe and Asia, in *Malaysia*: subsontaneous, 700–750 m.

12. PETROSELINUM

HILL, Brit. Herbal (1756) 424; BUW. Blumea 2 (1936) 191.—*Carum sect. Petroselinum* BENTH. & HOOK. f. Gen. Pl. 1 (1879) 891.

1. *Petroselinum crispum* (MILL.) NYMAN *ex auctt.* Kew in Handlist Herb. Pl. Kew ed. 3 (1925) 122.—*Apium petroselinum* LINNÉ, Sp.Pl. 1 (1753) 263.—*Petroselinum vulgare* HILL, Brit. Herb. (1756) 424, *ic.* p. 60; BUW. Blumea 2 (1936) 182.—*Apium crispum* MILL. Gard. Dict. ed. 8 (1768) no 2; SHAW, Kew Bull. (1938) 257; *ibid.* (1939) 168.—*Petroselinum hortense* HOFFM. Gen. Pl. Umbell. (1814) 163, t. I, 7.—*Petroselinum sativum* HOFFM. *op. cit.* 177.—*Carum petroselinum* BENTH. & HOOK. f. Gen. Pl. 1 (1867) 891.—*Petroselinum petroselinum* KARST. Fl. Deutschl. 2 (1895) 394.

Stems 25–100 cm, erect, grooved. Lower leaves to tripinnate, leaflets obovate to cuneate, tripartite; upper leaves ternate. Compound umbels terminal and axillary; peduncles 2–12 cm; rays 5–10, 1–

3 cm; pedicels 3–15, 2–5 mm; involucre 1–3, involuclcs 3–8. Calyx teeth absent. *Petals* nearly 1 by 1/2 mm, with inflexed tips, greenish yellow. *Mericarps* 2–2 1/2 by nearly 1 mm, ribs filiformous.

Distr. Indigenous in S. Europe and N. Africa, cultivated and subsponaneous elsewhere, in *Malaysia*: cultivated up to 2000 m.

Uses. Leaves for flavouring dishes, and as a diuretic.

Vern. *Potrasoli*, M, *parsley* (Engl.), *peterselie* (Dutch).

Notes. According to SHAW the names in HILL's British Herbal are nomenclaturally not eligible since HILL did not accept the binary system of nomenclature in this work.

13. TRACHYSPERMUM

LINK, Enum. Hort. Berol. 1 (1821) 267; BUW. Blumea 2 (1936) 183.—*Carum sect. Trachyspermum* BENTH. & HOOK. f. Gen. Pl. 1 (1867) 891.

KEY TO THE SPECIES

1. Leaves 2–3-pinnatisect, the ultimate segments of the lower leaves to 1 mm broad. Calyx teeth distinct. Fruit with broad, roundish, scale-like hairs 1. *T. ammi*
2. Leaves 2-pinnatisect, ultimate segments of the lower leaves more than 2 mm broad. Calyx teeth obsolete. Fruit with narrow, obtuse, nipple-shaped hairs 2. *T. roxburghianum*

1. *Trachyspermum ammi* SPRAGUE, Kew. Bull. (1929) 228; BUW. Blumea 2 (1936) 183.—*Carum RUMPH.* Herb. Amb. 5, p. 270.—*Amudium RUMPH. l.c.*—*Sison ammi* LINNÉ, Sp.Pl. 1 (1753) 252.—*Ammi copticum* LINNÉ, Mantissa 1 (1767) 56.—*Ligusticum ajowan* ROXB. Hort. Beng. (1814) 21, *nomen.*—*L. ajowan* ROXB. Fl. Ind. ed. CAREY, 2 (1832) 91.—*Trachyspermum copticum* LINK, Enum. Hort. Berol. 1 (1821) 267.—*Ptychotis coptica* DC. Mém. Soc. Phys. Genève 4 (1828) 496.—*P. ajowan* DC. Mém. Soc. Phys. Genève 4 (1828) 497.—*Ammi glaucifolium* (non L.) BLCO, Fl. Filip. (1837) 213.—*Daucus anisodoros* BLCO, *op. cit.* ed. 2 (1845) 150, ed. 3, 1 (1877) 269.—*Carum copticum* HIERN, Fl. Trop. Afr. 3 (1871) 12.

Stems 25–45 cm, striate, glabrous, usually strongly branched. *Leaves* 2–3-pinnate, ultimate segments to 1 mm broad, narrow-oblong. Compound *umbels* terminal or seemingly lateral; peduncles 1–6 1/2 cm; rays 5–9, 1/2–1 cm, to 2 cm in fruit; pedicels 4–15, 1–6 mm; involucre 3–5, oblong, sometimes divided; involuclcs 4–5, oblong; the bracts of both very unequal in length, hirsute with membranaceous margin. Calyx teeth nearly 0.2 mm, thickly subulate. *Petals* 0.6–0.7 mm through, obcordate with inflexed tips. *Fruits* to 2 by 1 mm, along the ribs with broad scale-like hairs.

Distr. Indigenous and cultivated in Egypt, Abyssinia, SW. Asia to E. India, subsponaneous in Europe, in *Malaysia*: stated to be formerly cultivated in Java (HEYNE *l.c.*).

Uses. Seeds medicinal as a carminative and in plasters; their medicinal agent is thymol. The seeds sold in the native drugstores are stated to have been introduced from India.

Vern. *Mungsi*, M, *mosé*, Md, *musi* (Bali).

Notes. Description after materials cultivated by HEYNE in his garden.

2. *Trachyspermum roxburghianum* CRAIB, Fl. Siam. Enum. 1 (1931) 788; WOLFF, Pflanzenr. 90 (1927) 129, *nom. altern.*; BUW. Blumea 2 (1936) 184.—*Apium involuclratum* ROXB. *ex FLEM.* Ind. Med. Pl. in As. Research. 11 (1810) 157.—*Ptychotis roxburghiana* DC. Prod. 4 (1830) 109.—*P. involuclrata* ROYLE, Ill. Bot. Himal. 1 (1839) 229.—*Carum roxburghianum* KURZ, J. As. Soc. Beng. 46, II (1877) 114.—*Carum involuclratum* MERR. En. Philip. Fl. Pl. 3 (1923) 239.—*Trachyspermum involuclratum* (non MAIRE, 1922) WOLFF in Pflanzenr. 90 (1927) 89.

Stems 15–90 cm, striate, subglabrous, usually strongly branched. *Leaves* pinnate; leaflets pinnatifid to pinnatipartite, extreme segments to 3 mm broad, those of the upper leaves gradually narrower to nearly filiform. Compound umbels terminal and axillary; peduncles 2–8 cm; rays 2–6, 1–2 1/2 cm; pedicels 5–15, 2–6 mm; involucre 2–5; involuclcs 5–8; both very narrow, finely ciliate. Calyx teeth hardly 0.1 mm. *Petals* nearly 1 1/4 by 3/4 mm, obcordate with inflexed tips, white or greenish white. *Mericarps* nearly 2 1/2 by 3/4 mm, oblong, with very short obtuse spreading hairs.

Distr. Of unknown provenance, now cultivated and subsponaneous in tropical SE. Asia, in *Malaysia*: throughout the Archipelago.

Uses. Raw or steamed eaten with rice; also for flavouring dishes.

Vern. *Renggirung*, *adas*, *djentoa* (Sum.), *suragé*, *S. pletikapu*, *J. sorowai* (Halmaheira).

14. CRYPTOTAENIA

DC. Mém. Ombel. (1829) 42; BUW. Blumea 2 (1936) 185.

1. *Cryptotaenia canadensis* DC. Prod. 4 (1830) 119; BUW. Blumea 2 (1936) 185.—*Sison canadense* LINNÉ, Sp.Pl. 1 (1753) 252.—*Cryptotaenia japonica* HASSK. Retzia 1 (1855) 113.

Rhizome 1-2 by to 1 cm, chambered. Stems erect, to 90 cm, terete, striate. *Petioles* to 10 cm, upper ones gradually shorter; sheaths with membranous margins, apex auriculate; lamina ternate, leaflets sessile or short-petiolulate, ovate to rhomboid, irregularly biserrate to bidentate, lateral ones often bifid to bipartite. Compound *umbels* terminal on the stems and the branches, united to leafy panicles; peduncles 1-8 cm; rays 5-7, 3-50 cm, those of one umbel very different in length; pedicels 6-10, 1 1/2-15 mm, those of one umbellule very

different in length; involucre 0-2, to 4 mm, subulate; involucels 2-5, to 1 mm, subulate. Calyx teeth absent, short in fruit. *Petals* nearly 1 by 1/2-3/4 mm, obovate with inflexed tips, white. *Mericarps* 4-6 by 1 1/2 mm, oblong-ellipsoidal, attenuate at both ends, somewhat laterally flattened, distinctly ribbed; stylopodium conical, bipartite, the halves together with the styles forming nearly 3/4 mm long beaks.

Distr. Indigenous in eastern N. America, China and Japan, in *Malaysia*: stated to be cultivated by the Japanese (OCHSE & BAKH., l.c.).

Vern. *Salderi djepang*, M.

Notes. Description after materials cultivated in the Bot. Gardens of Buitenzorg and Groningen.

15. CARUM

LINNÉ, Sp.Pl. 1 (1753) 263; BUW. Blumea 2 (1936) 186.—*Carum sect. Carvi* BENTH. & HOOK. f. Gen. Pl. 1 (1867) 890.

1. *Carum carvi* LINNÉ, Sp.Pl. 1 (1753) 263; BUW. Blumea 2 (1936) 186.

Stems to 55 cm, erect, terete, striate. *Petioles* to 13 cm, upper ones gradually shorter, uppermost ones absent, all of them with a sheath with membranous margin and auriculate apex; lamina to 13 by 5 cm, oblong, bipinnate, segments divided. Compound *umbels* terminal to the stems and its branches; peduncles 1-11 cm; rays 5-8, 1/2-2 cm; pedicels 6-14, 1 1/2-5 mm, to 9 mm in fruit; involucre none or 1, subulate; involucels none. Calyx teeth none. *Petals* to 1 1/4 by 1 mm, obovate with short inflexed tips, white. *Mericarps* 4-5 by 1 mm,

often falcate, ribs distinct, yellowish. Stylopodium bipartite, halves low-conical.

Distr. Indigenous in Europe, temperate Asia, cultivated elsewhere, in *Malaysia*: stated to be cultivated in the mountains of Java (MIQUEL, BUWALDA, l.c.).

Uses. Seeds in confectionery, also as medicine; oil from the seeds for making liqueur.

Vern. *Karwij* (Dutch).

Notes. Description after European materials, no Malaysian specimens seen by me. The seeds sold in native drugstores are stated to have been introduced from India.

16. PIMPINELLA

LINNÉ, Sp.Pl. 1 (1753) 263; BUW. Blumea 2 (1936) 187.—*Murrithia* ZOLL. Nat. & Geneesk. Arch. 2 (1845) 576.—*Heterachaena* ZOLL. Nat. & Geneesk. Arch. 2 (1845) 577.—*Anisometros* HASSK. Flora 30 (1847) 602.

Annual to perennial herbs. *Leaves* 1-2-pinnate, 1-2-ternate or decompound, rarely undivided and only dentate. *Umbels* compound; involucre and involucels few or none. Calyx teeth obsolete or small. *Petals* usually emarginate, often with inflexed tips. Disk continuous with the base of the styles. *Fruits* ovate or broader than long, laterally flattened, usually constricted at the broad commissure; mericarps terete to subpentagonal, often dorsally flattened, ribs slender, obscurely prominent, inner face flat; ridges with 2-3 vittae. Carpophore entire, 2-fid or 2-partite.

Distr. Over 100 spp. described from Africa, Europe and continental Asia, in *Malaysia*: Java, Bali, and Luzon.

KEY TO THE SPECIES

- 1. Involucres 3 to more. Lower leaves usually imparipinnate. 3. *P. pruatjan*
- 2. Fruits densely warty 4. *P. ascendens*
- 2. Fruits hairy 4. *P. ascendens*
- 1. Involucres 1-2. Lower leaves mostly simple.
- 3. Lower and middle leaves simple, with serrate margin, not lobed. Umbel rays 20-30 2. *P. javana*
- 3. Lower leaves orbicular to reniform, often crenate, sometimes lobate, middle leaves ternate to pinnate with incised leaflets. Umbel rays 8-14 1. *P. anisum*



Fig. 9. *Pimpinella javana* DC. on Mt Tengger (E. Java), in open *Casuarina junghuhniana* forest. (DE VOOGD)

1. *Pimpinella anisum* LINNÉ, Sp.Pl. 1 (1753) 264; BUW. Blumea 2 (1936) 187.

Annual. Stems erect, terete, grooved, pubescent. Petioles of the lower leaves 4–10 cm, upper ones gradually shorter, uppermost leaves sessile, all with membranously margined sheaths, lower lamina cordate, crenate to serrate, subsequent ones successively incised, ternate and nearly pinnate, leaflets dentate to incised. Umbels terminal to the stems and its branches; peduncles 2½–7 cm; rays 8–14, 4–25 mm; pedicels 7–13, 1–5 mm; involucre 0–2, 3–4 mm, narrow; involucels 0–2, 1 mm, subulate. Petals nearly 1 mm, obcordate with inflexed tips. Mericarps to 5 by 2 mm, ellipsoid, short-hairy by antrorse hairs.

Distr. From an unknown provenance, probably from the Orient, cultivated and subspontaneous through the world, especially in the Mediterranean region and Central Europe, in *Malaysia*: stated to be sometimes cultivated in Java (MIQ. Fl. Ind. Bat. I, 1 (1856) 740; BISSCHOP-GREV. Plant. Ned. Ind. (1883) 204; KOORD. Exkurs. Fl. Java, 2 (1912) 727; WIGMAN in VAN GORK. O.I. Cult. 2 (1913) 883).

Uses. Fruits carminative and as medicine.

Notes. Description after European materials; no specimens from *Malaysia* seen by me. The fruits sold in native drugstores are stated to be from India, which gets its supply from Persia.

2. *Pimpinella javana* DC. Prod. 4 (1830) 122; MOLKENB. in MIQ. Pl. Jungh. (1851) 96, cum var. *macrophylla*, *sylvestri*, *microphylla*; BUW. Blumea 2 (1936) 188.—*Murrithia cordata* ZOLL. Nat. & Geneesk. Arch. 2 (1845) 576.—Fig. 9.

Stems erect or ascendent, 50–150 cm, terete, striate, shortly and densely hairy, almost tomentose in the youth, later glabrescent. Lower leaves nearly in a rosette; petioles to 10 cm, sheaths 3–6 cm; lamina to 12 by 10 cm, entire, ovate in outline, deeply cordate, subobtusely to acutely serrate; upper leaves gradually smaller and shorter petioled, more acutely serrate or even dentate, uppermost ones with branches in their axils, often tripartite, all of them more or less hairy above, white-tomentose beneath in the youth, glabrescent later. Umbels in an oblong panicle, terminal on the stems and its branches or seemingly opposite the leaves; peduncles 4–15 cm; rays 20–30, 2–4 cm; pedicels 12–16, 3–8 mm; involucre 0–4, involucels 1–4, nearly filiform, shorter than the outer pedicels. Petals nearly 1½ by 1 mm with small inflexed tips. Mericarps nearly 2 by 1 mm, densely hairy with short spreading hairs.

Distr. *Malaysia*: Java (from Mt Sindoro eastward) and Lesser Sunda Islands (Bali).

Ecol. Open or lightly forested localities, between 1200 and 3125 m.

Vern. *Glongong, gembogan, kemboan, sum-pungan, J.*

Notes. *P. javana* is closely allied to the group of allied forms from SE. Asia described as *P. candolleana* W. & A., *P. leschenaultii* CLARKE, *P. pulneyense* GAMBLE, *P. yunnanensis* WOLFF, *P. cambodgiana* DE BOISS., *P. coriacea* DE BOISS.; it differs only by its densely hairy fruits which in the above-mentioned species is more or less covered with scale-like papillae.

In Bali I found in a moist locality, some umbels which had produced small roots; this shows the relative value of this character which was used in *P. pruatjan* for specific distinction (v. St.).

3. *Pimpinella pruatjan* MOLKENB. in MIQ. Pl. JUNGH. (1851) 97, cum var. *depressa*; BUW. Blumea 2 (1936) 191.—*Heterochaena alpina* ZOLL. Nat. & Geneesk. Arch. 2 (1845) 577.—*Anisometros alpina* HASSK. Flora 30 (1847) 602.—*Pimpinella panatjan* MIRB. ex ROSENTH. Syn. Pl. Diaphor. (1862) 533.—*Carum panatjan* BAILL. Hist. Pl. 7 (1880) 178.—*Pimpinella alpina* (non HOST, 1827); KOORD.-SCHUM. Syst. Verz. I, 1, fam. 228 (1911) 98.—*P. leeuwenii* WOLFF in FEDDE, Repert. 20 (1924) 159.—*P. pruatjan* var. *prolifera* STEEN. Bull. Jard. Bot. Btzg III, 13 (1935) 349.

Perennial. Stems several, 5–50 cm, ascending, sometimes spreading, rooting and forming rosettes, terete, striate, puberulous when young, later glabrescent. Leaves mostly in rosettes; petioles to 10 cm; sheaths to 3 cm; lamina imparipinnate, leaflets usually 5, rarely to 11 or only 1, 1–2½ cm, sessile or subsessile, roundly cordate, crenate-serrate to bicornate-serrate, or slightly lobed; upper leaves shorter petioled and smaller, leaflets less densely incised with narrower more acute segments; all sparingly hairy above, densely so beneath in the youth, later glabrescent. Umbels terminal to the stems and branches, often seemingly opposite the leaves; peduncles 1–7 cm; rays 4–8, 7–25 mm; pedicels 4–8, 1–4 mm; involucre 3–6, nearly filiform;

involucels 3–6, nearly filiformous, shorter than the pedicels. Petals nearly 1¼ by 1 mm, with inflexed tips. Mericarps nearly 2 by 1 mm, warty.

Distr. Malaysia: Java (from Mt Pangrango in W. Java to Mt Argapura (Jang) in E. Java).

Ecol. Slightly shaded localities, on grasslands, in Casuarina-forests, along pathways and stream-banks, 1800–3300 m.

Uses. Roots medicinal as a diuretic.

Vern. *Antanan kawat, antanan gunung, S, pur-wotjeng, tjumbuan, rumput demooh, J.*

4. *Pimpinella ascendens* DALZ. in HOOK. J. Bot. & Kew Gard. Misc. 2 (1850) 261.—*P. pinetorum* MERR. Philip. J. Sci. 29 (1926) 482; BUW. Blumea 2 (1936) 192.

Perennial herb. stems erect or ascendent, to 40 cm, terete, striate, shortly and densely white-hairy, later glabrescent. Leaves in a rosette at the base of the stems and few along the stems; petioles 2–10 cm, sheaths to 12 mm; lamina imparipinnate, leaflets 5–7, 6–15 by 6–18 mm, sessile or subsessile, subcordate to suborbiculate, to truncate; crenate-serrate to bicornate-serrate; upper leaves shorter petioled and smaller; all densely white-hairy above and beneath. Umbels terminal to the stems and its branches; peduncles 11–17 cm; rays 5–6, 11–30 mm; pedicels 4–10, 2–5 mm; involucre 1–2, 4–8 mm; involucels 1–4, 1½–2 mm, shorter than the outer pedicels. Petals nearly 1¼ by ¾ mm, with inflexed tips. Mericarps nearly 1¾ by 1 mm, sparsely hairy.

Distr. Peninsular India, in Malaysia: Philippines (Luzon, Benguet, Mt Pulog).

Ecol. Along trails in pine-forest, c. 2000 m alt., locally rather abundant.

Notes. Philippine material is in the herbaria very scarce. According to MERRILL it is in all probability most closely allied to *P. nitakayamensis* HAYATA of Formosa, from which it is at once distinguishable by its indumentum.

17. OENANTHE

LINNÉ, Sp. Pl. 1 (1753) 254; BUW. Blumea 2 (1936) 194.—*Sium* sect. *Drepanophyllum* BL. Bijdr. 15 (1826) 881.

Glabrous herbs. Roots fusiform or fasciculate-tuberculate. Leaves 1–3-pinnate, ultimate segments large, linear or minute, rarely reduced to sheaths. Umbels compound. Involucres and involucels several, sometimes few or none. Calyx teeth small, acute. Petals emarginate, with long inflexed tips, white; outer ones of the inflorescence often enlarged. Disk continuous with the base of the styles. Fruits glabrous, ellipsoid or globose, nearly terete; commissure broad; mericarps dorsally flattened, inner face flat; lateral primary ribs broad, corky; dorsal and intermediate ones often much smaller, sometimes obsolete, seldom all ribs subequal; ridges with 1 vitta. Carpophore 0.

Distr. Some dozens of spp. (depending on specific delimitation), mostly in the N. hemisphere, also in S. Africa and trop. Australia.

1. *Oenanthe javanica* DC. Prod. 4 (1830) 138; BUW. Blumea 2 (1936) 194.—*Stium javanicum* BL. Bijdr. 15 (1826) 881.—*Stium laciniatum* BL. Bijdr. 15 (1826) 881.—*Falcaria javanica* DC. Prod. 4 (1830) 110.—*F. laciniata* DC. Prod. 4 (1830) 110.—*Oenanthe stolonifera* DC. Prod. 4 (1830) 138.—*O. linearis* DC. Prod. 4 (1830) 138.—*Dasyloma benghalensis* DC. Prod. 4 (1830) 140.—*Phellandrium stoloniferum* ROXB. Hort. Beng. (1814) 21, nomen.—*Oenanthe laciniata* ZOLL. Syst. Verz. (1854) 139.—*Dasyloma javanicum* MIQ. Fl. Ind. Bat. I, 1 (1856) 741.—*Dasyloma laciniatum* MIQ. Fl. Ind. Bat. I, 1 (1856) 741.—*Dasyloma japonicum* MIQ. Ann. Mus. Bot. Lugd. Bat. 3 (1867) 59.—*Dasyloma subbipinnatum* MIQ. Ann. Mus. Bot. Lugd. Bat. 3 (1867) 59.—*Oenanthe benghalensis* BENTH. & HOOK. f. Gen. Pl. 1 (1867) 906.—*Oenanthe thomsonii* CLARKE in HOOK. f. Fl. Br. Ind. 2 (1879) 697.—*Oenanthe stolonifera* var. *javanica* KUNTZE, Rev. Gen. Pl. 1 (1891) 269.—*Oenanthe schlechteri* WOLFF in SCHUM. & LAUT. Nachtr. Fl. Deut. Schutzgeb. (1905) 333, t. 14.—*O. rivularis* DUNN, J. Linn. Soc. Bot. 35 (1907) 496.

Perennial. Stems 10–100 cm, erect or ascending from a creeping base, terete, ramose. *Petioles* to 10 cm, often with sheaths; lamina pinnate to bipin-

nate, segments ovate, serrate to narrowly oblong, or divided again, this making the leaf 4–5-pinnate. *Umbels* terminal and opposite the leaves; peduncles 1–20 cm, rarely none; rays 5–15, $1/2$ –3 cm; pedicels 10–25, 2–5 mm; involucre none or 1; involucre 2–8, 2–4 mm, linear. Calyx teeth nearly $1/2$ mm, acute. *Petals* nearly 1 by $3/4$ mm. *Mericarps* 2–3 by $1/2$ –1 mm, ribs swollen, marginal much more than the dorsal ones, the latter if strongly swollen nearly confluent.

Distr. SE. and E. Asia, Formosa, Japan, Queensland, in *Malaysia*: all over the Archipelago.

Ecol. Swampy places, along streams, wet grasslands, and clearings, 1–2800 m, but especially above 1000 m, sometimes cultivated.

Uses. Vegetable, raw or steamed eaten with rice.

Vern. *Lamong*, *selemor*, *shelum* (Mal. Pen.), *batjarongi*, *piopo* (Sum.), *tespong*, *S*, *pambong*, *pampung*, *pangpung*, *matjen salade ajer*, *sladri gunung J*, *rukut teleme* (Celebes).

Notes. Very variable as to the dimensions of all its parts, the compoundness of its leaves, the length of the peduncles, the number of pedicels in the umbellules, and the dimensions of the fruits. Many forms formerly described as distinct species; all are connected by intermediates.

18. FOENICULUM

ADANS. Fam. Pl. 2 (1763) 101; BUW. Blumea 2 (1936) 200.

1. *Foeniculum vulgare* MILLER, Gard. Dict. ed. 8 (1768); BUW. Blumea 2 (1936) 200.—*Anethum foeniculum* LINNÉ, Sp.Pl. 1 (1753) 263.—*Foeniculum capillaceum* GILIB. Fl. Lithuan. Inchoat. coll. IV (1782) 40.—*F. officinale* ALLIONI, Fl. Pedem. 2 (1785) 25.—*Ozodia foeniculacea* W. & ARN. Prod. (1834) 375.

Perennial, entirely glabrous. Stems erect, to 2 m. Sheaths 4–12 cm in the lower *leaves*, shorter upwards, apex with cucullate-connate auricles; lamina usually 3–4-pinnate, segments filiform. Compound umbels terminal to the stems and the branches; peduncles 5–16 cm; rays 30–70, 5–7 cm; pedicels 5–30, $1/2$ –1 cm; involucre and involucrels

none. Calyx teeth none. *Petals* yellow, strongly curved inward. *Mericarps* nearly 8 by 2 mm, ribs filiformous, nearly equal, not at all winged.

Distr. Indigenous in the Mediterranean region, cultivated all over the world, in *Malaysia*: cultivated throughout the Archipelago, subsponaneous on several mountains in E. Java, common on Mt Tengger (Sand Sea).

Uses. Young leaves and fruits for flavouring dishes; medicinal for giving agreeable flavour to medicines; in European confectionery. The seeds sold in Java are stated to be introduced from India.

Vern. *Adas*, *adas manis*, *J*, *venkel* (Dutch).

19. ANETHUM

LINNÉ, Sp.Pl. 1 (1753) 263; BUW. Blumea 2 (1936) 202.—*Peucedanum* sect. *Anethum* BENTH. & HOOK. f. Gen. Pl. 1 (1867) 919.

1. *Anethum graveolens* LINNÉ, Sp.Pl. 1 (1753) 263; BUW. Blumea 2 (1936) 202.—*Anethum sowa* DC. Prod. 4 (1830) 186.—*Peucedanum graveolens* HIERN, Fl. Trop. Afr. 3 (1871) 19.

Annual. Stems 50–100 cm, terete, striate; sheaths $1\frac{1}{2}$ –2 cm in the lower *leaves*, shorter upwards, white-margined, apex with cucullate-connate auricles; lamina 3-pinnate, segments filiform. Compound umbels terminal to the stems and its branches; peduncles 4–13 cm; rays 5–15, 2–4 cm; pedicels 5–25, $1/2$ –1 cm; involucre and involucrels none. Calyx teeth none. *Petals* yellow, strongly

curved inward. *Mericarps* nearly 5 by 3 mm, more-over with a wing $1/4$ – $1/2$ mm, oblong.

Distr. Indigenous in S. and SW. Asia, cultivated in most parts of the world, in *Malaysia*: cultivated throughout the Archipelago from 10–1050 m.

Uses. Raw or steamed eaten with rice; fruits for flavouring drinks, for native confectionery, in soups, sauces, etc. The fruits sold in Java are stated to be introduced from India.

Vern. *Adas* (Sum.), *walahandji* (Sumba), *djinten*, *adas sowa*, *M*, *dille* (Dutch).



Fig. 10. *Heracleum sumatranum* Buw. (a-c. $\times 1/2$, d-f. $\times 3$).

20. PASTINACA

LINNÉ, Sp.Pl. 1 (1753) 262; BUW. Blumea 2 (1936) 203.

1. *Pastinaca sativa* LINNÉ, Sp.Pl. 1 (1753) 262; BUW. Blumea 2 (1936) 203.

Main root fusiform. Stems angular and strongly grooved. *Leaves* pinnate, leaflets 2–13 by 1–5 cm, oblong-ovate, often 3-lobate to 3-partite, irregularly crenate. Compound umbels terminal on the stems and its branches; peduncles 3–7 cm; rays 5–12, 1–4 cm; pedicels 10–20, 2–7 mm; involucre and involucels none or 1–2. Calyx teeth none.

Petals yellow, with inflexed tips. *Mericarps* inclusive the $1/4$ – $1/2$ mm broad marginal wing 5–7 by 4–5 mm, broad-elliptic.

Distr. Spontaneous in Europe and temperate Asia, elsewhere cultivated and subsontaneous; in Malaysia cultivated in W. Java, ca 900 m.

Uses. Medicinal as a diuretic.

Notes. Description after European materials; Malaysian specimens scanty.

21. HERACLEUM

LINNÉ, Sp.Pl. 1 (1753) 249; BUW. Blumea 2 (1936) 204.

Perennial or biennial herbs, seldom glabrous. *Leaves* broad-lobate to tripinnate, rarely ternately dissected, segments broad. Umbels compound with many rays. Involucres few or 0, simple, rarely many; involucels many, rarely divided. *Flowers* polygamous, often radiating, white or yellowish. Calyx teeth obsolete, seldom small, linear, lanceolate. *Petals* obovate, cuneate-rhomboid or unguiculate, emarginate to 2-fid with inflexed tips. Ovary hairy or pubescent. *Fruits* orbicular-obovate or elliptical, strongly dorsally flattened; dorsal and intermediate ribs thin-filiformous, lateral ribs usually with a broad wing; vittae usually solitary in each ridge, as long as the mericarps or abbreviated and dilatated below. Carpophore 2-partite.

Distr. Over 70 spp. confined to the N. hemisphere.

1. *Heracleum sumatranum* BUW. Blumea 2 (1936) 204, fig. 6.—Fig. 10.

Stems probably erect, striate or subsulcate, upwards more or less hirsute, incrassate at the nodes; internodes 20–55 cm, upwards shorter. *Leaves* few, with small rosettes in the axils, sessile on a sheath. Sheaths 40 by 15 mm, amplexicaulous, margins membranous, tips auriculate or narrowed. Lamina to 20 by 28 cm, deltoid in outline, biternate to ternate; terminal leaflet with a to 10 cm long petiole, tripartite or ternate; lateral ones with to $3\frac{1}{2}$ cm long petioles; petioles of the secondary and tertiary leaflets gradually shorter to 0; leaflets oblong-ovate, long-acuminate, all serrate to biserrate with short-acuminate apiculate teeth, beneath thin-hirsute on the nerves. *Peduncles* 10–20 cm; involucre none; involucels 6–7 by circa $\frac{1}{2}$ mm, lanceolate, long-acuminate, somewhat hirsute with narrow, membranous margin; rays 9–12, $1\frac{1}{2}$ –3 cm, sulcate, shortly hirsute, to 4–6 cm in fruit, spreading, reflexed later; pedicels to 20, 2–5 cm, densely

thin-hirsute, to 8–12 cm in fruit, spreading, later reflexed. Calyx teeth inconspicuous or to $1\frac{1}{4}$ mm in the marginal flowers. *Petals* of the central flowers to $1\frac{1}{2}$ by 1 mm, elliptical to obovate, inflexed tip 1 mm; marginal flowers radiating, outer petals to 3 by 4 mm, broad-obcordate. *Mericarps* $6\frac{1}{2}$ –8 by $5\frac{1}{2}$ –7 mm, roundly ovate, glabrous, with a $2\frac{1}{2}$ mm broad wing; marginal ribs $\frac{1}{2}$ mm from the margin, vittae transversely septate.

Distr. *Malaysia*: Central Sumatra (Mt Singalang).

Ecol. Mountain forests, 2400 m.

Notes. Closely allied to the group enumerated in the Fl. Br. Ind. from *H. wallichii* DC. to *H. barmanicum* KURZ. As these species show only slight differences, and *H. sumatranum* BUW. differs more from them than these species *inter se*, it is maintained as a different species; however, it might perhaps be better to unite them all to one polymorphic species.

22. PEUCEDANUM

LINNÉ, Sp.Pl. (1753) 244.

Often robust herbs, root fusiform, sometimes tuberous. *Leaves* pinnate. *Flowers* bisexual, upper ones sometimes ♂, white or yellow, rarely purple. Compound umbels without involucre. Involucels present. Calyx rim abbreviate, shortly or distinctly toothed. *Petals* broad-ovate, with a long, inflexed tip. Stylopodium thick-conical, surrounded by the calyx rim. *Fruit* strongly dorsally compressed, narrow- to broad-elliptic, sometimes emarginate; marginal wings coherent, loosening when the meri-



Fig. 11. *Peucedanum japonicum* THUNB. Basal leaf and flowering stem, $\times \frac{1}{2}$, mericarps, $\times 5$ (SIEBOLD H.L.B. 908. 260.-495), root, $\times \frac{1}{2}$ (MAXIMOVICZ Iter 2, H.L.B. 908. 260.-483).

carps are ripe. Mericarps rather thin and slightly concave, with a distinct marginal wing in the base of which the marginal ribs are merging; dorsal side with 3 distinct ribs; vittae narrow, 1–3 between the ribs and 2–6 at the commissure. Carpophore split to the base, filiform.

Distr. Large polymorphous genus, sometimes split into several genera formerly recognized as sections, about 200 *spp.*, centering in the Orient, NE. Africa and W. North America, not or scarcely in S. America and absent in Australia, in *Malaysia* only known from the islands N of Luzon.

1. *Peucedanum japonicum* THUNB. Fl. Jap. (1784) 117; HAYATA, Ic. Pl. Form. 2 (1912) 57; MERR. Philip. J.Sc. 30 (1926) 418.—Fig. 11.

Taproot elongated fusiform, apex with erect remnants of sheath nerves 1 cm long; flowering parts puberulous otherwise glabrous. Stem terete, grooved, slightly flexuose, erect, often branched, $\frac{1}{2}$ – $\frac{3}{4}$ cm diam., solid, 15–100 cm tall. Branches with distinct nodes, alternate, rather erect. Basal leaves in large specimens long-petioled with 3 biguage, long-stalked, ternate segments, blade c. 30–40 cm diam.; leaves of small specimens and flowering stems much smaller, 7–10 cm diam., biternate; petiole 3–5 cm sheathing over its entire length, amplexicaulous at the base, striate; lateral segments $\frac{1}{2}$ –2 cm petiolulate, terminal ones $1\frac{1}{2}$ –4 cm, all 3-parted; leaflet-segments sessile, often connate at the base, lateral ones oblique, all obovate-cuneate, margins entire, apex broadened 3–5-toothed or -lobed, lobes often dentate, about equal in size $2\frac{1}{2}$ –4 by 1–3 cm; uppermost leaves reduced. Inflorescence corymbiform. Compound umbels terminal, 4–7 cm wide; peduncle 6–7 cm, in fruit to 10 cm, stout, striate, erect. Rays 15–25, unequal in length, $\frac{1}{2}$ – $2\frac{1}{2}$ cm. Involucres 0. Secondary peduncles in flower 1–2, in fruit 2–3 cm long, hardening. Involucels 7–10, subequal or very unequal, lanceolate-oblong, acute, 2–6 mm. Pedicels 17–20,

in flower 1–2 and 4–5 mm, outer largest, in fruit hardening but not elongating. *Flowers* not radiant. Calyx indistinct. Petals ? white, c. $1\frac{1}{4}$ by 1 mm, emarginate through inflexed tip. Stamens inflexed in bud; filaments 2 mm. Stylopodium blunt, very thick, cap-like covering tip of ovate ovary and as broad as it, margin crenate. Styles 2, exceedingly short. *Fruit* partly abortive, 5–6 by $2\frac{1}{2}$ –3 mm, elliptic, crowned by the stylopodium. Mericarps dehiscing from the base, pendent from the filiform carpophore halves, minutely puberulous to subglabrous, marginal wing ca $\frac{1}{3}$ – $\frac{1}{2}$ mm broad, ventral side rather flat, through wing subconvex; body darkish, wings and ribs pale brown (description after Japan. specimens in Rijksherbarium).

Distr. Japan, Taiwan, in *Malaysia*: Philippines (Batan Islands, N of Luzon: Sabtan Island, MERRILL 11755, not seen).

Ecol. In crevices of cliffs along the seashore.

Notes. The insertion of this species is wholly on Dr MERRILL's authority who collected and identified it. His identification was checked with the late Dr HAYATA while the late Dr JUEL compared a fragment with THUNBERG's type. The only difference with the type was that the Philippine specimen was glabrous. By Ind. Kew. it is wrongly reduced to *Ligusticum acutifolium*, an error for *L. acutilobium* S. & Z. (v. St.).

23. DAUCUS

LINNÉ, Sp.Pl. 1 (1753) 242; BUW. Blumea 2 (1936) 207.

1. *Daucus carota* LINNÉ, Sp.Pl. 1 (1753) 242; BUW. Blumea 2 (1936) 208.

Annual, biennial or perennial. Main root fusiform. Stems erect, striate or grooved, hirsute. *Leaves* 2–3-pinnatipartite, segments lanceolate. Compound umbels with flat or round surface when flowering, with incurved peduncles and pedicels and hollow surface in fruit; peduncles 2–25 cm; rays 15–30, 1–6 cm; pedicels 20–30, $\frac{1}{2}$ – $1\frac{1}{2}$ cm; involucres 3–5 cm, pinnatipartite, white-margined towards the base; involucels 5–7, $\frac{1}{2}$ –2 cm, entire to pinnatipartite, lanceolate. Calyx teeth $\frac{1}{4}$ – $\frac{1}{2}$ mm, triangular, acute. *Petals* white or dark red in 5–7 central sterile flowers of the central umbel,

with inflexed tips, peripheric ones radiating. *Mericarps* 3 by $1\frac{1}{2}$ –2 mm, nearly oblong; primary ribs filiform with rather few nearly $\frac{1}{4}$ mm long, fine bristles, secondary ribs beset with nearly 1 mm long, rigid bristles.

Distr. Spontaneous in Europe, N. Africa, and temperate Asia, cultivated in all parts of the world, in *Malaysia*: cultivated from 0–1800 m, subsponaneous on grassy mountain sides.

Uses. Roots as vegetable, young leaves raw or steamed eaten with rice.

Vern. *Boktel*, *S*, *peen*, *wortelen* (Dutch), *carrot* (Engl.).

Excluded & doubtful

Conium maculatum L.; BOERL. Handl. 1, 2 (1890) 616. This species has never been found in *Malaysia*.

Hydrocotyle monopetala BLCO, Fl. Filip. (1837) 213. MERRILL places this with doubt in *Ophiorrhiza* (*Rub.*), cf. En. Philip. Fl.Pl. 3 (1923) 502.

Hydrocotyle nuanavoides F.V.M. Bot. Centr. Bl. 1 (1892) 194, *nomen*. New Guinea.

Hydrocotyle villosa (non L. f.) KOORD. Teysmanian 11 (1901) 252. Prob. a writing mistake; *H. villosa* L. f. is a native of S. Africa.