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LENTIBULARIACEAE

Peter Taylor

Herbs, rosulate or stoloniferous, always of damp or wet places or aquatic, variously adapted for the capture and digestion of small organisms. Leaves elliptic, obovate or linear or divided into capillary segments. Flowers solitary, scapose or racemose, bracteate and sometimes also bracteolate. Calyx lobes 2, 4 or 5. Corolla 2-lipped, the lower lip usually larger and spurred. Stamens 2, inserted at the base of the upper lip; anthers dorsifixed, ellipsoid; locules usually \pm confluent. Ovary globose or ovoid; placentation free basal; placenta fleshy; ovules 2–many; style usually short; stigma 2-lipped, the lower lip usually larger. Capsule globose or ovoid, variously valvate, circumscissile or indehiscent, 1–many-seeded. Seeds mostly very small, variously shaped and sculptured.

A family of 3 genera and about 280 species, widely distributed but mostly in tropical regions. Represented in Australia by 1 genus and 57 species.

C.S.Rafinesque, *Fl. Tellur.* 4: 107–111 (1838); A.de Candolle, Lentibulariaceae, in A.P.de Candolle (ed.), *Prodr.* 8: 1–25, 666, 667 (1844); G.Bentham, Lentibulariaceae, *Fl. Austral.* 4: 523–533 (1868); F.Kamiński, Lentibulariaceae, *Nat. Pflanzenfam.* 4, 3b: 108–123, preprint (1891) & Lieferung 83 (1893); J.H.Barnhart, Segregation of genera in Lentibulariaceae, *Mem. New York Bot. Gard.* 6: 39–64 (1916); F.E.Lloyd, Notes on *Utricularia*, *Victorian Naturalist* 53: 91–112 (1936); F.E.Lloyd, *The Carnivorous Plants* (1942); P.Taylor, The genus *Utricularia* in Africa (south of the Sahara) and Madagascar, *Kew Bull.* 18: 1–245 (1964); K.L.Huynh, Étude de la morphologie du pollen du genre *Utricularia* L., *Pollen & Spores* 10: 11–55 (1968); S.Komiya, New subdivisions of Lentibulariaceae, *J. Jap. Bot.* 48: 19–153 (1973); P.Taylor, Lentibulariaceae, *Fl. Males.*, ser. I, 8: 275–300 (1977); P.Taylor, New taxa in *Utricularia* (Lentibulariaceae), *Kew Bull.* 41: 1–18 (1986); P.Taylor, The genus *Utricularia*, a taxonomic monograph, *Kew Bull. Add. Ser.* 14: i–xii, 1–724 (1989); R.J.Gassin, *Utricularia beaugleholei* (Lentibulariaceae: subgenus *Utricularia*: Section *Pleiochasia*), a new species from South-eastern Australia, *Muelleria* 8: 37–42 (1993).

UTRICULARIA

Utricularia L., *Sp. Pl.* 1: 18 (1753); *Gen. Pl.* edn 5: 11 (1754); from the Latin *utriculus*, a small skin or leather bottle, alluding to the form of the traps.

Type: *U. vulgaris* L.

Meionula Raf., *Fl. Tellur.* 4: 108 (1838). T: *M. parviflora* Raf.

Enskide Raf., *op. cit.* 109 (1838). T: *E. chrysantha* (R.Br.) Raf.

Vesiculina Raf., *loc. cit.* (1838), *p.p.*, (all Australian spp., but excl. type). T: *V. purpurea* (Walter) Barnhart.

Nelipus Raf., *loc. cit.* (1838). T: *N. limosa* (R.Br.) Raf.

Cosmiza Raf., *op. cit.* 110 (1838). T: *C. coccinea* Raf.

Polypompholyx Lehm., *Bot. Zeitung (Berlin)* 2: 109 (Feb. 1844), *nom. cons.* T: *P. tenella* (R.Br.) Lehm.

Tetralobus A.DC. in A.P.de Candolle., *Prodr.* 8: 667 (Mar. 1844). T: not designated.

Setiscapella Barnhart in Small, *Fl. Miami* 170 (1913). T: *S. subulata* (L.) Barnhart

Pelidnia Barnhart, *Mem. New York Bot. Gard.* 6: 50 (1916). T: *P. caerulea* (L.) Barnhart

Pleiochasia (Kamiński) Barnhart, *op. cit.* 52 (1916); *Utricularia* sect. *Pleiochasia* Kamiński in H.G.A.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.* 4, 3b: 120 (1893). T: *P. dichotoma* (Labill.) Barnhart

Herbs, terrestrial or aquatic, affixed or freely suspended in water; stolons usually present (absent only in a few species, all Australian). Traps bladder-like, variously inserted on the vegetative parts, usually stalked, globose or ovoid; mouth basal, lateral or terminal, usually provided with appendages of very various kinds and closed by a door which bears on its outer surface varied glands or hairs. Inflorescence racemose or by reduction 1-flowered;

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peduncle often bearing sterile bracts (scales) between its base and the lowermost flower. Calyx lobes 2 or rarely 4.

A genus of about 217 species; 57 species (37 endemic) recorded from Australia, most numerous in the north. *Utricularia* is much the largest and most widespread genus of the family, occurring throughout the tropics and extending S to Stewart Is. (New Zealand), the Cape of Good Hope, and central Argentina, with a few species N into Arctic regions.

Detailed descriptions and illustrations of all Australian species in the genus, except *U. beaugleholei*, can be found in P. Taylor (1989).

Rafinesque (*Flora Telluriana* 4: 109 (1838) described the genus *Vesiculina* as differing from *Utricularia* in having the lower lip of the corolla 3-lobed, and stated "Types *V. saccata*, *setacea*, *purpurea*, *gibba*, *albiflora*, *compressa*, *graminifolia*, *tenella*, *pygmaea* &c. all *Utricul.* of authors see Sm. and Lec.". Opinions vary as to whether he here effectively made the combinations for all of these species but in my monograph I have assumed that he did. Barnhart (*Mem. New York Bot. Gard.* 6: 62 (1916) recognised this genus and cited it as "*Vesiculina* Raf.", giving as the type species *Vesiculina purpurea* (Walter) Raf., with *V. saccata* (Elliott) Raf. in synonymy, and pointing out that Rafinesque's genus was a very unnatural grouping of diverse elements. In my classification only two non-Australian species remain in *Vesiculina*, the type, *V. purpurea*, and *V. cucullata*. The remainder of Rafinesque's species of *Vesiculina* are included in *Utricularia*, in a wide range of sections. *Vesiculina setacea* is in sect. *Setiscapella* as a synonym of *U. subulata*; *V. gibba* is in sect. *Utricularia* as *U. gibba*; *V. albiflora* is in sect. *Pleiochasia* as *U. albiflora*; *V. graminifolia* (non-Australian) is in sect. *Oligocista* as *U. graminifolia*; *V. tenella* is in sect. *Polypompholyx* as *U. tenella*; *V. pygmaea* is in sect. *Meionula* as *U. pygmaea*; and *V. compressa* is, in the absence of any authentic material, in the section of "Rejected Names".

Morphology

Utricularia is well-known as a genus exhibiting a highly specialised series of morphological adaptations, many related to its predominately aquatic or bog-dwelling habitat, and to its invertebrate-predating lifestyle. These adaptations are described in detail in Taylor (1989), which should be consulted for further information. The summary below is much simplified and is intended only to facilitate use of the keys and descriptions in this book.

Roots / rhizoids

True roots are absent in all species. In many species their anchoring function at least is undertaken by capillary rhizoids. The rhizoids may be simple, twisted (corkscrew-shaped), branched or unbranched, and in some species bear special adhesive trichomes on their lower surfaces to attach the plants to a solid substrate. The branches of the rhizoids may be densely papillose or glandular. Occasionally (as in *U. volubilis*) the rhizoids may be rather fleshy, and in some species they are found also on the peduncles.

Stems

These are rarely well developed, but in *U. benthamii* the stem is relatively thick and short ('carrot-like') while in *U. volubilis* it is somewhat thinner.

Tubers

Several species produce small tubers, presumably as a survival or perennating mechanism. In some the tubers are normally present; in others they are produced only in response to adverse conditions, e.g. stranding or a lowering of water level. The tubers are formed in various positions on the plant, either basally, in the substrate at the apex of vertically descending shoots, at the base of a peduncle, as a moniliform series of swellings of the stolon, as a large swelling of a stolon internode, or terminally on stolon branches.

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Stolons

These are present on most species, excluding, in particular, those of subg. *Polypompholyx*. In terrestrial species they are filiform, usually a few millimetres to several centimetres long, and usually more or less densely branched. In aquatic species they are usually more robust and longer, to several metres. Leaves, rhizoids and traps are usually borne at the nodes of the stolons, which often also give rise to new inflorescences.

Traps

The distinctive traps found in all species of *Utricularia* have been clearly described by Lloyd (1942) and many others. They are globose or ovoid bodies 0.2 mm to 1.2 cm in length, with a trapdoor at one end. The internal pressure of these bladder-like bodies is maintained at less than the surrounding fluid. Small invertebrates touching sensitive bristles near the trapdoor trigger its sudden release, resulting in a rush of fluid into the trap, carrying the animal with it. The animal is subsequently digested to provide nutrients for the plant.

The position of the traps on the plant can provide useful taxonomic characters. In subg. *Polypompholyx* and some of sect. *Pleiochasia* the traps occur only on the stem and base of the peduncle. In *U. helix* and *U. volubilis* the stalk of the trap becomes expanded, green and leaflike, giving the appearance of traps at the tips of leaves. In most of the rest of sect. *Pleiochasia* the traps arise from the peduncle base, stolon nodes, and scattered on stolon internodes. In *U. tubulata* the traps and leaves are whorled at the stolon nodes only, the trap stalks being leaflike but smaller than the true leaves. In the other sections, in terrestrial or epiphytic species the traps are, in general, borne laterally on the leaves, and on the stolons and rhizoids (but rarely at the peduncle base or stolon nodes). On aquatic species they arise laterally on the leaves or leaf segments, in angles of the leaf segments, on modified substrate leaves, or on special stolon branches. Small clusters of reduced traps occur at the base of leaf segments of some aquatic species of sect. *Utricularia*, and in sect. *Vesiculina* they are terminal on apparently verticillate leaf segments.

While the traps in a few species are almost sessile, most are stalked, the stalk being basal (next to the mouth), terminal (at the other end to the mouth) or lateral (in a ventral position).

The shape of traps themselves provides a wealth of characters. In some species the traps are dimorphic or polymorphic. Usually there are appendages, in three main series, although sometimes one or more (rarely all) may be absent. The dorsal appendage is usually simple, rarely bifid or trifid, and was called the rostrum by Lloyd (1942). On the ventral side of the trap, more or less between the mouth and stalk, there are usually a pair of wing or lamella-like appendages, and in a lateral position on either side of the mouth there are usually winglike or setiform appendages. In sect. *Pleiochasia* the form of the traps is virtually sufficient to distinguish taxa at species level. In other groups, trap morphology is more or less uniform within sections, but differs between sections.

Internal Trap Glands

The internal walls of the traps bear glands of various shapes. The function of these glands may be concerned with digestion or with setting the trap. The multifarious shapes of these glands are best studied by dissection of the traps, or by special staining techniques, and provide useful taxonomic characters. While they are not utilised as characters in this treatment, extensive information is provided in Taylor (1989).

Inflorescence

The inflorescence is racemose, often of several alternate (spirally) arranged flowers, but in sect. *Pleiochasia* in opposite pairs or whorls of three. Sometimes the inflorescence is reduced to a single flower, or a single flower and abortive bud. The peduncle is usually filiform, erect, simple or sometimes branched, solid, sometimes hollow, and in aquatic species sometimes inflated as a float. The peduncle often bears sterile bracts (absent in subg. *Polypompholyx*, sect. *Pleiochasia* and sect. *Vesiculina*) below the lowermost flower, and in

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some aquatic species may bear whorls of floats which keep the raceme above water. The pedicels are usually filiform, and often more or less laterally 2-winged. Bracts are inserted at the base of the pedicels and also provide useful characters. They are predominantly basifixed, ovate, entire, or rarely dentate or fimbriate. Less commonly they may be medifixed or peltate, with a prolongation below the point of attachment. Bracteoles, if present, are usually similar to the bracts and are inserted laterally on either side of the bract.

Calyx

Subg. *Polypompholyx* has 4 calyx lobes, 2 small and 2 large, while subg. *Utricularia* has only 2 lobes. The lobes are often dissimilar in size and/or shape, accrescent, with entire or denticulate, dentate or fimbriate margins, and often distinctive venation. They are usually consistent in morphology at a species level, and persistent, thus providing a number of useful diagnostic characters.

Corolla

This is bilabiate, apparently lacking a tube, with a relatively small and simple upper lip, and more elaborate lower lip. The colour varies from yellow or violet to red, blue, white or brown, with numerous combinations and shades of these colours. At least some species are fragrant.

The upper lip is usually bilobed at the apex, but may be entire or 3-lobed. At its base is a more or less well-developed sac containing the sexual organs.

The lower lip is always spurred, although the spur may be rather short. The limb of the lower lip has at its base a palate with a more or less raised marginal rim. The palate may be pubescent or glandular, and ornamented distally or laterally with various wrinkles, lobes and projections. These features are often diagnostic. Distally to the palate, the limb itself is often flat, but the base of this region may be variously ridged or swollen, again in diagnostic patterns. Finally, the margin of the limb may be entire, or 2-, 3-, 4- or 5-lobed.

Stamens

In Australian species these are very uniform, being two in number, inserted at the junction of the corolla lips, at the base of the ventral side of the ovary. The anthers are dorsifixed, 2-celled and longitudinally dehiscent. The filaments are short, fleshy, flattened and usually incurved. Sometimes there is an apical lobe to the filament, projecting above the anthers.

Gynoecium

Again, the species show little variation. The ovary is superior, globose or ovoid, unilocular, with 2–many ovules on a free basal placenta. The style is simple, normally elongate, with an obliquely bilabiate stigma.

Fruit

The fruit is capsular, globose to laterally compressed ovoid, with a persistent, usually accrescent style. The capsule wall may be membranous, subfleshy or relatively solid and hard. Taylor (1989) recognised 17 different kinds of dehiscence mechanisms for the capsule, which are linked to sectional limits to some degree.

Seeds

These are small, 0.2 to 1 mm long, subglobose or ovoid to cylindrical, with a reticulate testa and a usually undifferentiated embryo. Testa morphology is diverse, and provides characters that can be diagnostic at both sectional and specific level. For a selection of SEM photographs showing the range of variation see Taylor (1989), Plates I–VIII

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KEY TO INFRAGENERIC TAXA

- | | | |
|-----|--|-------------------------------|
| 1 | Calyx lobes 4 | subg. 1. Polypompholyx |
| 2 | Traps with an apically bifid dorsal appendage | sect. 1. Polypompholyx |
| 2: | Traps with a deeply trifid dorsal appendage | sect. 2. Tridentaria |
| 1: | Calyx lobes 2 | subg. 2. Utricularia |
| 3 | Leaves simple | |
| 4 | Scales absent; flowers, if more than 1, in opposite pairs or verticillate | sect. 3. Pleiochasia |
| 4: | Scales present; flowers, if more than 1, alternate | |
| 5 | Bracts basifixed; bracteoles present | |
| 6 | Bracteoles not much narrower than the bract | |
| 7 | Corolla lower lip 3-lobed; bracts not keeled; testa cells of seeds with raised anticlines | sect. 4. Meionula |
| 7: | Corolla lower lip not lobed; bracts keeled; testa cells of seeds with sunken anticlines | sect. 5. Australes |
| 6: | Bracteoles very much narrower than the bract | |
| 8 | Traps with dorsal appendage 1, obtuse; lower lip of corolla 4-lobed | sect. 7. Enskide |
| 8: | Traps with dorsal appendages 2, subulate, simple or branched; lower lip of corolla not lobed | sect. 8. Oligocista |
| 5: | Bracts medifixed; bracteoles present or absent | |
| 9 | Bracteoles present | sect. 6. Nigrescentes |
| 9: | Bracteoles absent | sect. 10. Setiscapella |
| 3: | Leaves divided into narrowly linear or capillary segments | |
| 10 | Bracts medifixed; leaf segments not marginally setulose | sect. 9. Nelipus |
| 10: | Bracts (in Australian spp) basifixed; leaf segments marginally setulose | sect. 11. Utricularia |

KEY TO SPECIES

- | | | |
|----|---|-------------------------|
| 1 | Calyx lobes 4 | |
| 2 | Corolla bright pink (or sometimes white), with yellow spots on the palate | |
| 3 | Spur of corolla about as long as the lower lip | 2. U. tenella |
| 3: | Spur of corolla much shorter than the lower lip | 1. U. multifida |
| 2: | Corolla pale pink with darker pink spots on the palate | 3. U. westonii |
| 1: | Calyx lobes 2 | |
| 4 | Corolla yellow, apricot or orange-yellow | |
| 5 | Corolla spotted with dark red | 42. U. fulva |
| 5: | Corolla not spotted but may have red or brown nerves | |
| 6 | Lower lip of corolla 3- or 4-lobed | |
| 7 | Lower lip of corolla 4-lobed; bracts basifixed, bracteoles present | 41 U. chrysantha |
| 7: | Lower lip of corolla 3-lobed; bracts basisolute, bracteoles absent | 52. U. subulata |
| 6: | Lower lip of corolla entire or shallowly 2-lobed | |

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- 8 Bracteoles present, much narrower than the bract; terrestrial plants with simple leaves
- 9 Peduncle twining
- 10 Corolla 10–15 mm long **47. *U. involvens***
- 10: Corolla \pm 5 mm long **48. *U. circumvoluta***
- 9: Peduncle erect
- 11 Corolla 6–10 mm long; inflorescence 3–20 cm high **45. *U. bifida***
- 11: Corolla 10–15 mm long; inflorescence 25–55 cm high **46. *U. odorata***
- 8: Bracteoles absent; aquatic plants with divided leaves
- 12 Inflorescence with a whorl of ellipsoid floats above the middle
- 13 Floats shortly stipitate; seeds lenticular with a narrow wing **53. *U. muelleri***
- 13: Floats sessile; seeds prismatic and winged on all the angles **54. *U. stellaris***
- 12: Inflorescence without a whorl of floats or with narrowly fusiform floats at or near the base
- 14 Ultimate segments on each leaf few (2–8) **57. *U. gibba***
- 14: Ultimate segments on each leaf very numerous (20–80)
- 15 Primary segments 3 or more; scales always absent **55. *U. aurea***
- 15: Primary segments 2; 1 or more scales present on the peduncle **56. *U. australis***
- 4: Corolla white or shades of red, violet or brown, usually with a yellow palate
- 16 Scales present on peduncle
- 17 Bracts basifixed; bracteoles present
- 18 Peduncle twining **43. *U. foveolata***
- 18: Peduncle erect, not twining
- 19 Bracts much wider than bracteoles **44. *U. uliginosa***
- 19: Bracts not, or not much, wider than bracteoles
- 20 Corolla lower lip 3-lobed **37. *U. minutissima***
- 20: Corolla lower lip entire or emarginate
- 21 Inflorescence 8–30 cm tall, 3–10-flowered; corolla upper lip narrower than calyx **38. *U. lateriflora***
- 21: Inflorescence up to 5 cm tall, 1-flowered; corolla upper lip wider than calyx **39. *U. simplex***
- 17: Bracts basisolute; bracteoles present or absent
- 22 Bracteoles present **40. *U. caerulea***
- 22: Bracteoles absent
- 23 Spur of corolla 7–15 mm long, 0.5–1 mm thick; leaf segments flattened **49. *U. leptoplectra***
- 23: Spur of corolla 3–5 mm long, 1–2 mm thick; leaf segments terete
- 24 Corolla deep violet, 7–10 mm long; leaf segments opposite **50. *U. biloba***
- 24: Corolla white, tinged with pale violet, 4.5–6 mm long; leaf segments alternate **51. *U. limosa***
- 16: Scales absent from peduncle
- 25 Peduncle twining

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- 26 Corolla lower lip entire, 20–40 mm wide **5. U. volubilis**
- 26: Corolla lower lip 3-lobed, ± 6 mm wide **6. U. helix**
- 25: Peduncle erect or ascending, not twining
- 27 Corolla with 2 capillary lobes extending vertically above flower
- 28 Capillary lobes arising from the apex of the corolla upper lip
- 29 Corolla lower lip 5-lobed **33. U. capilliflora**
- 29: Corolla lower lip 3-lobed **34. U. dunlopilii**
- 28: Capillary lobes arising laterally from the base of the corolla lower lip
- 30 Corolla lower lip (excluding capillary lobes) about half as long as the spur; spur apex bifid **35. U. dunstaniae**
- 30: Corolla lower lip (excluding capillary lobes) greatly reduced to 3 minute deltoid teeth; spur apex rounded **36. U. antennifera**
- 27: Corolla without capillary lobes extending above flower
- 31 Corolla lower lip 5-lobed
- 32 Corolla white
- 33 Corolla ± 2 mm wide **29. U. quinquedentata**
- 33: Corolla 4–8 mm wide **30. U. holtzei**
- 32: Corolla pink or mauve
- 34 Corolla upper lip longer than the upper calyx lobe; base of lower lip with 4 rounded ridges **31. U. rhododactylos**
- 34: Corolla upper lip shorter than the upper calyx lobe; base of lower lip without ridges **32. U. cheiranthos**
- 31: Corolla lower lip 2–4-lobed or entire
- 35 Freely suspended aquatic with verticillate, narrowly linear leaves **23. U. tubulata**
- 35: Terrestrial or affixed aquatic; leaves not verticillate
- 36 Corolla bright red; spur 2–4 times as long as corolla lower lip, 2–3 mm thick **4. U. menziesii**
- 36: Corolla violet, mauve or white; spur shorter than corolla lower lip, or if longer then less than 2 mm thick
- 37 Bracts and bracteoles basisolute, the inferior parts connate to form a sleeve-like tube below the point of attachment
- 38 Corolla lower lip shallowly 3-lobed or entire, with a prominent, lobed basal swelling **15. U. kimberleyensis**
- 38: Corolla lower lip deeply 3-lobed without a prominent basal swelling **16. U. georgei**
- 37: Bracts and bracteoles basisolute or basifixed, if basisolute then inferior part not connate to form a tube
- 39 Peduncle hairy, at least near the base
- 40 Bracts and bracteoles ciliate **24. U. lasiocaulis**
- 40: Bracts and bracteoles not ciliate
- 41 Corolla lower lip deeply divided into 3 long linear lobes; trap appendages ciliate with fine hairs **25. U. kamienskii**
- 41: Corolla lower lip divided into 3 short rounded lobes; trap appendages not ciliate

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- 42 Traps uniform, with the mouth basal and all appendages deeply lacinate **26. U. kenneallyi**
- 42: Traps dimorphic, with the mouth lateral and only the ventral wings lacinate **27. U. leptorhyncha**
- 39: Peduncle glabrous throughout or at the most minutely papillose at the base
- 43 Corolla white and yellow, about 3 mm long **28. U. albiflora**
- 43: Corolla various shades of violet, more than 4 mm long
- 44 Stolons absent, all leaves and traps arising from a short stem at the base of the peduncle
- 45 Corolla 4–9 mm long; spur about twice as long as lower lip **9. U. violacea**
- 45: Corolla 10–20 mm long; spur shorter than to scarcely longer than the lower lip
- 46 Corolla upper lip cream or yellow, lower lip violet; lower lip distinctly 3-lobed, with 4 parallel yellow ridges at the base **7. U. benthamii**
- 46: Corolla upper and lower lips violet; lower lip with rounded entire apex and 5 or more diverging yellow ridges at the base **8. U. inaequalis**
- 44: Stolons present, with leaves and traps at their nodes
- 47 Traps with all appendages narrowly deltoid to narrowly ovate, with margins entire; inner margins of all ciliate with numerous fine deflexed hairs **23 U. lasiocaulis (glabrous form)**
- 47: Traps not as above
- 48 Corolla lower lip distinctly 3-lobed
- 49 Corolla lower lip lobes about as long as wide **19. U. arnhemica**
- 49: Corolla lower lip lobes 3 or more times as long as wide **20. U. tridactyla**
- 48: Corolla lower lip entire or obscurely 2–4 crenate
- 50 Leaf apex acuminate
- 51 Traps with dorsal and lateral appendages subulate; ventral appendages absent, or if present, then with margin entire
- 52 Corolla 15–20 mm long; lower lip transversely elliptic, entire; upper lip apex truncate or emarginate **12. U. terrae-reginae**
- 52: Corolla 6–12 mm long; lower lip square, obscurely 3–4 crenate; upper lip apex deeply 2-lobed **17. U. hamiltonii**
- 51: Traps with dorsal appendage subulate; lateral and ventral appendages apically fimbriate **11. U. beaugleholei**
- 50: Leaf apex acute to rounded
- 53 Spur of corolla subulate with apex acute **18. U. triflora**
- 53: Spur of corolla cylindrical or conical with apex obtuse
- 54 Peduncle hollow; none of the trap appendages with fimbriate margins; lower lip of the corolla without conspicuous ridges at the base
- 55 Corolla with lower lip at least twice as long as spur **21. U. singeriana**
- 55: Corolla with lower lip shorter than spur **22. U. fistulosa**

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- 54:** Peduncle not hollow; at least some of the trap appendages with fimbriate margins; lower lip of corolla with conspicuous ridges at the base, with the central ridges yellow
- 56** Central yellow pair of ridges not projecting distally beyond the ridges on either side **14. U. uniflora**
- 56:** Central yellow pair of ridges projecting distally beyond the ridges on either side
- 57** Inflorescence 10–50 cm tall, 1–many-flowered; corolla 12–22 mm long **10. U. dichotoma**
- 57:** Inflorescence 1–5 cm tall, usually 1-flowered; corolla 6–10 mm long **13. U. monanthos**

Subg. 1. Polypompholyx

Utricularia subg. *Polypompholyx* (Lehm.) P.Taylor, *Kew Bull.* 41: 1 (1986)

Polypompholyx Lehm., *Bot. Zeitung (Berlin)* 2: 109 (9 Feb. 1844); *Flora* 27: 82 (14 Feb. 1844); *Nov. Stirp. Pugill.* 8: 48 (Apr. 1844), *nom. cons.* T: *P. tenella* (R.Br.) Lehm.

Cosmiza Raf., *Fl. Tellur.* 4: 110 (1838). T: *C. coccinea* Raf.

Tetralobus A.DC. in A.P.de Candolle, *Prodr.* 8: 667 (Mar. 1844). T: *T. pusillus* A.DC.

Rosulate terrestrial or subaquatic herbs. Stolons absent. Traps long stalked, triangular in cross-section; stalk distally setose; mouth basal. Scales absent. Bracts and bracteoles basifixed. Calyx lobes 4. Corolla lower lip 3-lobed. Seeds globose, conspicuously reticulate.

A subgenus of 2 sections, confined to Australia.

Sect. 1. Polypompholyx

Utricularia sect. *Polypompholyx* (Lehm.) P.Taylor, *Kew Bull.* 41: 2 (1986)

Traps with stalk distally inflated; dorsal appendage shortly bifid; lateral appendages ciliate; door with globose, sessile glands.

A section of 2 species in southern Australia.

1. *Utricularia multifida* R.Br., *Prodr.* 432 (1810)

Polypompholyx multifida (R.Br.) F.Muell., *Fragm.* 6: 162 (1868); *Cosmiza multifida* (R.Br.) Barnhart, *Mem. New York Bot. Gard.* 6: 49 (1916). T: King George Sound, [W.A.], *R.Brown s.n.*; holo: BM.

U. latiloba Benth. in S.L.Endlicher, *Enum. Pl. Huegel.* 82 (1837); *Polypompholyx latiloba* (Benth.) Lehm., *Bot. Zeitung (Berlin)* 2: 109 (Feb. 1844). T: King George Sound, W.A., *K.A.A.F.Huegel s.n.*; holo: W?, *n.v.*

Cosmiza coccinea Raf., *Fl. Tellur.* 4: 110 (1838) *nom. illeg.* T: as for *U. multifida*.

Polypompholyx endlicheri Lehm., *Bot. Zeitung (Berlin)* 2: 109 (Feb. 1844). T: King George Sound, W.A., *K.A.A.F.Huegel s.n.*; holo: W?, S?, *n.v.*

U. preissii A.DC. in A.P. de Candolle, *Prodr.* 8: 666 (March 1844). T: Swan R., W.A., *J.A.L.Preiss 1919*; holo: G-DC.

Tetralobus preissii A.DC. in A.P. de Candolle, *Prodr.* 8: 667 (March 1844). T: Swan R., W.A., *J.A.L.Preiss 1921*; holo: G-DC; iso: MEL.

Utricularia similis Lehm., *Nov. Stirp. Pugill.* 8: 46 (April 1844). T: Perth, W.A., *J.A.L.Preiss 1919*; holo: S?, *n.v.*; iso: BR, MEL, W.

Illustrations: R.Erickson, *Pl. Prey* t. 16, fig. 11 & t. 17, figs 23–25 (1968); B.D.Morley & H.R.Toelken, *Fl. Pl. Australia* fig. 169q–w (1983).

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Terrestrial herb. Leaves numerous, petiolate, narrowly obovate, 5–15 mm long. Traps numerous, 2–2.5 mm long. Inflorescences 1–3, erect, 3–45 cm long; flowers 1–5; raceme elongate; peduncle filiform, solid; pedicels erect, 2–20 mm long. Outer calyx lobes slightly unequal, 2–3 mm long; inner calyx lobes 1–1.5 mm long. Corolla 4–15 mm long, bright pink, with yellow spots on the palate; upper lip oblong, acutely 2-lobed; lower lip lobes with apex rounded, truncate, or more usually emarginate; spur cylindrical, short, slightly constricted at the middle, sparsely glandular. Capsule globose, 2–3 mm long. Seeds c. 0.25 mm long.

Occurs in south-western W.A. from about 130 km north of Perth to the Albany region. Grows in wet sand in swamps, on rocky hillsides and in open *Eucalyptus* forest. Flowers Sep.–Nov.

W.A.: Crystal Spring, 16 km NW of Walpole, *A.S.George 9707* (K, PERTH); 140 km N of Perth, 22 Sept. 1962, *M.E.Phillips* (CBG); Northeastern Road, 80 km SE of Perth, *P.Taylor 17031* (K).

2. *Utricularia tenella* R.Br., *Prodr.* 432 (1810)

Vesiculina tenella (R.Br.) Raf., *Fl. Tellur.* 4: 109 (1838); *Polypompholyx tenella* (R.Br.) Lehm., *Bot. Zeitung (Berlin)* 2: 109 (Feb. 1844). T: King George Sound, [W.A.], *R.Brown s.n.*; holotype: BM.

Tetralobus pusillus A.DC. in A.P. de Candolle, *Prodr.* 8: 667 (March 1844). T: Swan R., W.A., *J.A.L.Preiss 1920*; holotype: G-DC; isotype: MEL.

Polypompholyx exigua F.Muell., *Trans. Philos. Soc. Victoria* 1: 50 (1855). T: Serra & Victoria Ranges, Grampians, Vic., *F.Mueller s.n.*; syn: K, MEL; Echunga, S.A., *F.Mueller s.n.*; syn: K, MEL.

Illustrations: R.Erickson, *Pl. Prey* t. 16, fig. 12 & t. 17, fig. 22 (1968).

Terrestrial herb. Leaves numerous, petiolate, narrowly obovate, 3–10 mm long, 0.5–1.5 mm wide. Traps numerous, 1–1.2 mm long. Inflorescences 1–3, erect, 2.5–13 mm long; flowers 1–3; raceme ±elongate; peduncle filiform, solid; pedicels erect, filiform, 1–4 mm long. Outer calyx lobes slightly unequal, c. 1.5 mm long; inner calyx lobes c. 1 mm long. Corolla 3–9 mm long, pink with yellow spots on the palate; upper lip oblong, acutely 2-lobed; lower lip lobes with apex rounded, truncate or emarginate; spur cylindrical, short, sparsely glandular. Capsule globose, 1.5–2 mm long. Seed c. 0.3 mm long.

Occurs in south-western W.A. from just north of Perth to c. 75 km east of Esperance, south-eastern S.A. including the Eyre Peninsula and Kangaroo Is., through southern and central Vic. east to Wilsons Promontory, and on Cape Barren and Flinders Is., Tas. Grows in damp soil in swamps and heath. Flowers Aug.–Nov.

W.A.: Twin Swamps Reserve, 35 km N of Perth, *A.S.George 10387* (K, PERTH); Cape Le Grand, *P.Taylor 17013* (K). S.A.: Eyre Peninsula, *D.E.Symon 11710* (AD). Vic.: Quail Is., *R.Melville 2135* (BRI, K, MEL, NSW, PERTH). Tas.: Cape Barren Is., *J.Whinray 174* (AD).

Sect. 2. *Tridentaria*

Utricularia sect. *Tridentaria* P.Taylor, *Kew Bull.* 41: 2 (1986)

Type: *U. westonii* P.Taylor

Traps with stalk not distally inflated; dorsal and lateral appendages united to form a single broad acutely 3-lobed appendage; door with 6 long setae.

A section containing a single species from south-western W.A.

3. *Utricularia westonii* P.Taylor, *Kew Bull.* 41: 2 (1986)

T: Cape Le Grand Natl Park, W.A., *P.Taylor 17008*; holotype: K; isotype: CANB, L, M, MEL, PERTH, US.

Terrestrial or subaquatic herb. Leaves rather few, narrowly linear-cuneate, 6–12 mm long, reddish brown. Traps numerous, 3–4 mm long. Inflorescences 3–5, erect, 10–25 cm long; flowers 2–5; peduncle hollow, 1–1.5 mm thick; pedicels erect, 2–5 mm long. Outer calyx lobes slightly unequal, oblong, c. 3 mm long; inner calyx lobes c. 1.5 mm long. Corolla 5–7 mm long, very pale pink with darker spots on the palate; upper lip oblong, acutely

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bilobed; lower lip lobes with apex rounded; spur cylindrical, short, densely glandular. Capsule globose, 3–3.5 mm long. Seeds c. 0.5 mm long.

Occurs in south-western W.A., apparently restricted to the Cape Le Grand Natl Park. Grows in shallow water or mud in swamps. Flowers Nov.

W.A.: S of Hill 49, Cape Le Grand Natl Park, *P.Taylor 17015* (K); swamp E of Frenchman's Peak, Cape Le Grand Natl Park, *A.S.Weston 10788* (PERTH).

Subg. 2. *Utricularia*

Utricularia L. subg. *Utricularia*

Meionula Raf., *Fl. Tellur.* 4: 108 (1838). T: *M. parviflora* Raf., *nom. illeg.*

Enskide Raf., *op. cit.* 109 (1838). T: *E. chrysantha* (R.Br.) Raf.

Nelipus Raf., *loc. cit.* (1838). T: *N. limosa* (R.Br.) Raf.

Setiscapella Barnhart in J.P.Small, *Fl. Miami* 170 (1913). T: *S. subulata* (L.) Barnhart

Pelidnia Barnhart, *Mem. New York Bot. Gard.* 6: 50 (1916). T: *P. caerulea* (L.) Barnhart

Pleiochasia (Kamiński) Barnhart, *op. cit.* 52 (1916). T: *P. dichotoma* (Labill.) Barnhart

Terrestrial, subaquatic, aquatic or (not in Australia) epiphytic herbs. Leaves entire to much divided. Stolons usually present. Traps very varied. Scales present or absent. Bracts and bracteoles basifixed, medifixed or peltate; bracteoles sometimes absent. Calyx lobes 2. Seeds very varied.

A subgenus of 33 sections, 9 of which are found in Australia.

Sect. 3. *Pleiochasia*

Utricularia sect. *Pleiochasia* Kamiński in H.G.A.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.* 4, 3b: 120 (1893)

Pleiochasia (Kamiński) Barnhart, *Mem. New York Bot. Gard.* 6: 52 (1916). T: *P. dichotoma* (Labill.) Barnhart

Terrestrial or aquatic herbs; stolons present or absent. Leaves entire. Traps arising from the peduncle base and on the stolons at the nodes or on the internodes, never lateral on the leaves; mouth usually lateral, with a single dorsal appendage, a pair of lateral appendages, and a pair of ventral wings. Scales always absent. Bracts and bracteoles similar, basifixed or medifixed, sometimes peltate. Flowers solitary or racemose in opposite pairs or verticillate; corolla very diverse in shape, usually violet, red or flesh-coloured, never wholly yellow. Seeds cylindrical or obovoid; testa cells elongate, with raised anticlines.

A section of 34 species, largely Australian, but occurring also in New Zealand and New Caledonia.

4. *Utricularia menziesii* R.Br., *Prodr.* 431 (1810)

T: King George Sound, [W.A.], *A.Menzies s.n.*; holo: BM.

U. macroceras A.DC. in A.P. de Candolle, *Prodr.* 8: 666 (1844); *U. menziesii* var. *macroceras* (A.DC.) Lehm., *Pl. Preiss.* 339 (1845). T: Swan R., [W.A.], *J.A.L.Preiss 1917*; holo: G-DC; iso: FI, MEL, W.

Illustrations: R.Erickson, *Pl. Prey* t. 16, fig. 8 (1968); R.Erickson, A.S.George, N.Marchant & M.Morcombe, *Flowers & Pl. Western Australia* t. 64 (1979).

Tuberous terrestrial herb without stolons. Tubers clustered, narrowly obovoid. Leaves densely rosulate, long-petiolate, obovate with apex rounded, 2–4 cm long, 2–3 mm wide. Traps very numerous, uniform, 0.6–1.6 mm long, long-stalked. Inflorescence solitary, erect, 3–7 cm long, 1-flowered; peduncle c. 1 mm thick; bracts and bracteoles medifixed; pedicel erect, 6–15 mm long. Calyx lobes subequal, broadly obovate, c. 4 mm long. Corolla 15–25 mm

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long, bright red with a yellow spot on the palate; upper lip broadly obovate; lower lip transversely elliptic; spur narrowly cylindrical, slightly curved, 2–3 mm thick and 2–4 times as long as the lower lip. Capsule globose, 2.5–3 mm long. Seeds broadly ovoid, 0.3–0.35 mm long.

Occurs near the south-western coast of W.A. from about 200 km north of Perth to Duke of Orleans Bay east of Esperance. Grows in wet sand and in moss cushions on rocks. Flowers Jul.–Aug.

W.A.: Mt. Gardner, E of Albany, *A.S.George 6329* (PERTH); Cockleshell Gully, 9 km N of Mt Benia, *E.A.Griffen s.n.* (K); 54 km S of Williams, *R.Melville 4351* (K, MEL); Cannington, *A.Morrison 12626* (K, PERTH); Stirling Ra., 25 km E of Cranbrook, *P.Wilson s.n.* (AD).

5. *Utricularia volubilis* R.Br., *Prodr.* 430 (1810)

T: King George Sound, [W.A.], *R.Brown s.n.*; holo: BM; iso: K.

Illustrations: R.Erickson, *Pl. Prey* t. 17, figs 15–18 (1968); P.Taylor in B.D.Morley & H.R.Toelken, *Fl. Pl. Australia* fig. 169p (1983).

Affixed aquatic herb without stolons. Leaves few, rosulate, petiolate, narrowly linear, acuminate, 1–10 cm long, 1–1.5 mm wide. Traps very numerous, polymorphic, 1–6 mm long, long-stalked. Inflorescence solitary, twining, up to 1 m long; flowers 2 or 4 in distant pairs; peduncle 0.5–1 mm thick; bracts and bracteoles medifixed; pedicels erect, 10–25 mm long. Calyx lobes slightly unequal, orbicular, 4–6 mm long. Corolla 15–25 mm long, violet with yellow streaks on palate; upper lip transversely elliptic; lower lip reniform, entire, 20–40 mm wide; spur cylindrical, about as long as lower lip. Capsule globose, c. 4 mm long. Seeds cylindrical, c. 0.7 mm long.

Occurs in south-western W.A. from just north of Perth to Cape Le Grand. Grows in swamps and pools, usually in water 5–45 cm deep. Flowers Oct.–Nov.

W.A.: 2.5 km E of Walpole, *A.S.George 9706* (K, PERTH); Wanneroo, about 20 km N of Perth, *P.Taylor 17033* (K); Cape Le Grand, *P.Taylor 17005* (CANB, K, MEL, NSW, PERTH)

6. *Utricularia helix* P.Taylor, *Kew Bull.* 41: 4 (1986)

T: Just SW of Hill 49, Cape Le Grand Natl Park, W.A., *P.Taylor 17016*; holo: K; iso: BM, CANB, GH, L, MEL, NSW, NT, PERTH.

Affixed aquatic herb without stolons. Leaves few, rosulate, petiolate, narrowly linear, very acute, 10–15 mm long, c. 0.3 mm wide. Traps very numerous, polymorphic, 1–3 mm long, long-stalked. Inflorescences 1–3, twining, up to 35 cm long; flowers 2–4 in distant pairs; peduncle filiform; bract and bracteoles medifixed; pedicels erect, 5–12 mm long. Calyx lobes equal, broadly obovate, c. 3 mm long. Corolla 5–6 mm long, mauve with violet and yellow streaks on the palate; upper lip transversely elliptic; lower lip 3-lobed, with apex of each lobe truncate and denticulate; spur conical, about as long as lower lip. Capsule globose, 2.5–3 mm long. Seeds cylindrical, c. 0.5 mm long.

Occurs in south-western W.A., where it is known only from two populations in Cape Le Grand Natl Park. Grows in shallow water in swamps. Flowers Nov.

W.A.: NE corner of old boundary of Cape Le Grand Natl Park, *A.S.Weston 7322* (PERTH).

7. *Utricularia benthamii* P.Taylor, *Kew Bull.* 41: 3 (1986)

T: near Lake Muir, W.A., *P.Taylor 17029*; holo: K; iso: CANB, MEL, PERTH.

Terrestrial herb without stolons. Leaves few, rosulate, petiolate, very narrowly linear, acute or acuminate, 3–12 mm long, c. 0.25 mm wide. Traps numerous, polymorphic, 0.5–6 mm long, stalked. Inflorescences 1–3, erect, 5–20 cm long; flower solitary; peduncle 0.5–1 mm thick; bracts and bracteoles medifixed; pedicel erect, 2–8 mm long. Calyx lobes slightly unequal, orbicular, 3–4 mm long. Corolla 10–20 cm long, violet with 4 parallel yellow ridges on the palate and with upper lip cream; upper lip transversely elliptic with apex emarginate;

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lower lip broadly 3-lobed; spur cylindrical, about as long as the lower lip. Capsule globose, c. 3.5 mm long. Seeds narrowly ovoid, c. 0.6 mm long.

Occurs in south-western W.A., apparently mainly in the Lake Muir – Manjimup – Bridgetown region but also recorded from King George Sound and near Esperance. Grows in swampy flats among *Melaleuca*. Flowers Oct.–Nov.

W.A.: Dwalganup, *C.B.Carter 112* (K); 14 km N of Manjimup, *A.S.George 9740* (K, PERTH); King George Sound, *J.R.Muir* (MEL 90146); Gordon R., *A.F.Oldfield 205* (K); Cape Le Grand Natl Park, *A.S.Weston 10789* (PERTH).

Has been confused with *U. inaequalis*, but is distinguished by its corolla which has a 3-lobed lower lip with 4 parallel ridges on the palate and a cream upper lip. The known distributions of the two species scarcely overlap.

8. *Utricularia inaequalis* A.DC. in A.P. de Candolle, *Prodr.* 8: 666 (March 1844)

T: Swan R., W.A., *J.A.L.Preiss 1918*; holo: G-DC; iso: C, BR, MEL, P, W.

U. hookeri Lehm., *Bot. Zeitung (Berlin)* 2: 109 (Feb. 1844) *nom. nud.* & *Nov. Stirp. Pugill.* 8: 47 (Apr. 1844). T: Swan R., W.A., *J.A.L.Preiss 1918*; lecto: not designated; iso: C, BR, G-DC, MEL, P, W.

U. linearifolia Benj., *Linnaea* 20: 306 (1847) *p.p.*, excl. spec. Ins. van Diemen, *R.C.Gunn s.n.* T: Swan R., W.A., *J.A.Drummond 508*; lecto: K, *fide* P.Taylor, *Kew Bull. Add. Ser.* 14: 103 (1989); isolecto: G, W.

Utricularia latilabiata Benj., *Linnaea* 20: 315 (1847). T: Swan R., W.A., *J.A.Drummond 128*; holo: K.

Terrestrial herb without stolons. Leaves few, rosulate, petiolate, narrowly linear with apex acute, up to 20 mm long, 0.3–0.5 mm wide. Traps numerous, polymorphic, 1–6 mm long, long-stalked. Inflorescences 1–3, erect, 4–20 cm long; flower solitary; peduncle 0.3–1 mm thick; bracts and bracteoles medifixed; pedicel erect, filiform, 2–8 mm long. Calyx lobes subequal, orbicular, 2.5–3 mm long. Corolla 10–20 mm long, violet with yellow divergent streaks on the palate; upper lip deeply 2-lobed; lower lip flabellate or reniform, entire, with up to 8 obscure divergent ridges on the palate; spur conical, usually much shorter than lower lip. Capsule globose, c. 2.5 mm long. Seeds ellipsoid, c. 0.3 mm long.

Occurs in south-western W.A. from about 30 km north of Perth south to the Blackwood R., apparently not extending eastwards from the coast more than about 60 km. Grows in clay or sand in winter wet swamps. Flowers Sep.–Nov.

W.A.: Carrington, *S.Carlquist 5630* (K); Geographe Bay, 1890, *Mrs Craigg* (MEL); 32 km N of Perth, *A.S.George 10395* (K, PERTH); Blackwood R., 1877, *M.Hard* (MEL); Upper Swan R., Nov. 1934, *F.E.Lloyd* (C, MEL).

9. *Utricularia violacea* R.Br., *Prodr.* 431 (1810)

T: King George Sound, [W.A.], *R.Brown s.n.*; holo: BM.

Utricularia perminuta F.Muell., *Fragm.* 6: 160 (1868). T: Mt Melville, W.A., *F.Mueller s.n.*; holo: MEL; iso: BOG, K, US, W.

Illustration: R.Erickson, *Pl. Prey* t. 16, fig. 10 (1968).

Terrestrial herb without stolons. Leaves numerous, rosulate, petiolate, very narrowly cuneate with rounded apex, up to 12 mm long, c. 0.5 mm wide. Traps numerous, uniform, 1–2 mm long, long-stalked. Inflorescences 1–4, erect, 2.5–10 cm long; flower solitary; peduncle filiform; bracts and bracteoles medifixed; pedicel erect, 1–4 mm long. Calyx lobes subequal, orbicular, 1.5–2.5 mm long. Corolla 4–9 mm long, violet with a yellow patch on the palate; upper lip obovate with apex bilobed; lower lip transversely elliptic, obscurely 3-lobed; spur cylindrical with apex rounded, longer than the lower lip. Capsule globose, 1.5–2 mm long. Seeds ovoid, c. 0.3 mm long.

Occurs in south-western W.A. from about 35 km north of Perth to Cape Le Grand, in a small area of south-eastern S.A. near Mount Gambier and the adjacent part of Vic. and Tas. (Bass Strait Islands). Grows in wet sand or peat in swamps. Flowers Oct.–Dec.

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W.A.: 35 km N of Perth, *A.S.George 10386* (K, PERTH); Cape Le Grand, *P.Taylor 17009* (CANB, K, PERTH). S.A.: 25 km S of Naracoorte, *D.Hunt 2284* (AD). Vic: between Dergholm and Penola, *A.C.Beauglehole 6504* (CANB, MEL). Tas.: Furneaux Group, 1893, *J.Gabriel* (MEL).

Although usually quite distinct, at least one population in W.A. shows a complete gradation between *U. violacea* and *U. inaequalis*.

10. *Utricularia dichotoma* Labill., *Nov. Holl. Pl.* 1: 11 (1805)

Pleiochasia dichotoma (Labill.) Barnhart, *Mem. N.Y. Bot. Gard.* 6: 53 (1916). T: Capite Van-Diemen [Tasmania], *J.J.H.Labillardiere s.n.*; holo: FI; iso: MEL.

U. oppositiflora R.Br., *Prodr.* 430 (1810). T: Sydney, N.S.W., *R. Brown s.n.*; holo: BM; iso: K.

U. speciosa R.Br., *Prodr.* 430 (1810). T: between Sydney and Botany Bay, N.S.W., *R.Brown s.n.*; holo: BM; iso: K.

U. linearifolia Benj., *Linnaea* 20: 306 (1847), *p.p.* T: Insula Van Diemen [Tasmania], *R.C.Gunn 49*; holo: CBG; iso: K.

U. billardieri F.Muell., *Fragm.* 6: 161 (1868), *nom. superfl.* T: Based on *U. dichotoma* Labill.

U. moorei F.Lloyd, *Victorian Naturalist* 53: 107 (1936). T: East Australia, *C.Moore s.n.*; holo MEL; iso BM, K.

U. rotundifolia F.Lloyd, *Victorian Naturalist* 53: 166 (1937), *nom. inval.* T: Based on a collection from King George Sound, W.A., *R.Brown s.n.*, held in NSW; name not accepted by author.

Illustrations: R.Erickson, *Pl. Prey* t. 16, fig. 6 & t. 17, fig. 9 (1968); N.T.Burbidge & M.Gray, *Fl. A.C.T.* fig. 337 (1970). P.Taylor in B.D.Morley & H.R.Toelken, *Fl. Pl. Australia* fig. 169a–e (1983).

Terrestrial or subaquatic herb with stolons. Leaves usually few, rosulate and at stolon nodes, petiolate, narrowly linear to elliptic with apex rounded to acute, 3–14 cm long, up to 5 mm wide. Traps numerous, polymorphic, 1–5 mm long, long-stalked. Inflorescence solitary, several or successive, erect, 5–50 cm long; flowers 1–9; peduncle 0.5–1.5 mm long; bracts and bracteoles basifixed and basally gibbous or shortly produced below point of attachment; pedicels erect, 1.5–15 mm long. Calyx lobes unequal, upper lobe orbicular, 2–5 mm long; lower lobe narrower with apex shortly bifid. Corolla 12–22 mm long, violet with prominent yellow ridges on the palate; central pair of ridges exceeding lateral ones distally; upper lip obovate; lower lip semicircular or flabellate; spur cylindrical with apex obtuse, shorter than lower lip. Capsule globose, 4–5 mm long. Seeds obovoid, c. 0.5 mm long.

Occurs in south-western W.A. from just north of Perth to Cape le Grand, in S.A. from Kangaroo Is. and the Flinders Ra., eastwards through Qld (mainly south of Fraser Island, with a few records as far north as Croydon), N.S.W., Vic. and Tas. Grows in peaty soil or shallow pools in wet grassland up to 1500 m alt. Flowers mostly Aug.–Dec.

W.A.: Cape Le Grand, *P.Taylor 17006* (K). S.A.: southern Mt Lofty Ra., *R.Schodde 606* (AD, CANB, K). Qld.: Brisbane, *C.E.Hubbard 4110* (BRI, K). N.S.W.: Tianjara Falls, 6.4 km E of Sassafras, *R.Coveny & R.Bisby 4014* (K, NSW). Vic.: E Gippsland, *A.H.Corrick 382* (K, MEL). Tas.: Lake St Clair, *N.T.Burbidge 3378* (CANB, K).

11. *Utricularia beaugleholei* Gassin, *Muelleria* 8: 37 (1993)

T: 8 km NNE Strathmerton near site of Mywee railway station in the Murray Mallee, Vic., 30 Sept. 1978, *T.B.Muir 5322*; holo: MEL *vide* Gassin, *loc. cit.*, *n.v.*

Terrestrial herb with stolons. Leaves sparsely rosulate and on the stolons, petiolate, linear to very narrowly ovate, acutely acuminate, to 44 mm long, 1.6 mm wide. Traps few, uniform, to 2 mm long, long-stalked. Inflorescences solitary or several arising in succession, erect, 4–35 cm long; flowers solitary, in opposite pairs or whorls of 3; peduncle 0.8–2 mm thick; bract and bracteoles basifixed, with or without a gibbous base; pedicels erect, 0.25–1.5 cm long. Calyx lobes unequal; upper lobe circular or broadly ovate, 2.5–4.5 mm long; lower lobes similar but emarginate. Corolla 1.2–2 cm long, dark violet with yellow streaks at base of lower lip; upper lip limb erect, obcordate, with lateral margins reflexed; lower lip broadly obovate, with apex rounded or obscurely 3-crenate, with 4–11 raised radiating yellow ridges basally; spur cylindrical, shorter than lower lip. Capsule globose, 3–5 mm long. Seeds narrowly obovoid, c. 0.8 mm long.

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Occurs from south-eastern S.A. through southern and eastern Vic. to the adjacent part of N.S.W. Grows in wet sand or clay at the margins of swamps and in roadside drains and seasonally flooded grassland. Flowers Sept.–Mar. Map***.

S.A.: (Mary Seymour Conservation Park, *A.Lowrie fide R.J.Gassin l.c.*). N.S.W.: Goulburn, *F.Mueller s.n.* (MEL 89873). Vic.: 10 km NNW of Anglesea P.O., *A.C.Beauglehole 63333* (MEL); 12.5 miles [20 km] WSW of Casterton P.O., *A.C.Beauglehole 238112* (MEL).

This species was described very recently and no authentic material has been seen by the present author. It is very close to *U. dichotoma* but is said to constantly differ in leaf shape, the form of the traps, the nature of the yellow ridges on the lower lip of the corolla, and the relatively longer upper corolla lip with reflexed margins.

12. *Utricularia terrae-reginae* P.Taylor, *Kew Bull.* 41: 5 (1986)

T: 10 km E of Edward R. settlement, Qld., *S.T.Garnett, s.n.*; holotype: K.

Terrestrial herb with stolons. Leaves few, sparsely rosulate and on the stolons, petiolate, linear to narrowly obovate, acutely acuminate, up to 15 mm long, 0.5–2 mm wide. Traps few, uniform, 1.5–2 mm long, long-stalked. Inflorescence solitary, erect, up to 17 cm long; flower solitary; peduncle hollow, 0.5 mm thick; bracts and bracteoles basifixed; pedicel erect, 1.2–2.5 mm long. Calyx lobes unequal; upper lobe broadly ovate, c. 4 mm long; lower lobe smaller, orbicular with apex emarginate. Corolla 15–20 mm long, white or very pale violet with darker violet streaks; upper lip cuneate; lower lip transversely elliptic; spur cylindrical with apex rounded, shorter than lower lip. Fruit and seed not known.

Known only from the Cape York Peninsula, Qld. Grows in wet sedge flats and wet open *Melaleuca* woodland. Flowers Apr.–Jun.

Qld.: Musgrave, *G.Jacobson* (BRI 053035); Laura, *G.M.Storr 12996* (BRI).

13. *Utricularia monanthos* J.D.Hook., *Fl. Tasman.* 1: 299 (1859)

T: Arthurs Lakes, Tas., *R.C.Gunn 896*; holotype: K; isotype: NSW.

Terrestrial herb with stolons. Leaves numerous, sparsely rosulate and on stolons, petiolate, linear to very narrowly elliptic with apex rounded or acute, up to 30 mm long and 1 mm wide. Traps numerous, uniform, 1–2 mm long, stalked. Inflorescence solitary, erect, usually less than 5 cm long; flowers 1 or 2; peduncle c. 0.5 mm long; bracts and bracteoles basifixed and usually gibbous at the base; pedicels erect, 2–4 mm long. Calyx lobes unequal; upper lobe oblong-elliptic, c. 3 mm long; lower lobe smaller, ovate with apex bifid. Corolla 6–10 mm long, violet with yellow ridges on the palate; central pair of ridges exceeding lateral ones distally; upper lip obovate; lower lip transversely elliptic; spur broadly conical, with apex obtuse, very much shorter than lower lip; capsule globose, c. 2.5 mm long. Seeds obovoid, c. 0.5 mm long.

Occurs in south-eastern Australia in the Snowy Mts., N.S.W., the eastern highlands, Vic. and in central Tas; also in New Zealand. Grows in wet soil by streams and pools in mountains up to 1750 m alt. Flowers Dec.–Feb.

N.S.W.: Happy Jack's Plain, 26 Jan. 1965, *M.E.Phillip* (CBG, NSW). Vic.: Bogong High Plains, N of Mt Cope, *A.C.Beauglehole 15489* (MEL). Tas.: Mt Field Natl Park, 1943, *W.M.Curtis* (HO).

It has been suggested that this is just a high altitude variant of *U. dichotoma*, but the two species apparently sometimes grow together and certainly their altitudinal range overlaps considerably in a number of localities.

14. *Utricularia uniflora* R.Br., *Prodr.* 431 (1810)

U. dichotoma Labill. var. *uniflora* (R.Br.) Benth., *Fl. Austral.* 4: 529 (1868). T: Sydney, N.S.W., *R.Brown s.n.*; lectotype: BM, *fide* P.Taylor, *Kew Bull. Add. Ser.* 14: 119 (1989).

Illustration: K.Kondo & B.Whitehead, *Phyton (Argentina)* 29: figs 1–4 (1972).

Terrestrial herb with stolons. Leaves few, on stolons, petiolate, obovate, 4–8 mm long, 1–2 mm wide. Traps few, polymorphic, 0.8–1.5 mm long, stalked. Inflorescence solitary, erect,

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usually 10–20 cm long; flowers 1 or 2; peduncle c. 0.5 mm thick; bracts and bracteoles basifixed or very shortly produced below the point of attachment; pedicels erect, 2–10 mm long. Calyx lobes unequal; upper lobe ovate, 3–6 mm long; lower lobe shorter, with apex truncate or emarginate. Corolla 9–15 mm long, mauve or violet with yellow and white ridges on the palate; central pair of ridges not exceeding lateral ones distally; upper lip obovate; lower lip very broadly ovate; spur cylindrical with apex rounded, about as long as lower lip. Capsule globose, c. 3 mm long. Seeds obovoid, 0.3–0.4 mm long. n = 28; *vide* K.Kondo & B.Whitehead, *Phyton (Argentina)* 29: 95 (1972).

Occurs from Noosa, Qld, south to E Gippsland, Vic. and in Tas. Grows in bogs and among rocks by streams, often in shade. Flowers Sep.–Jan.

Qld.: c. 7 km SW of Noosa Heads, *P.Baxter & B.Lebler 1119A* (BRI, K). N.S.W.: Blackwater, Govett's Leap, *P.Taylor 17049* (K). Vic.: Mallacoota Inlet Natl Park, *A.C.Beauglehole & E.W.Finck 32535* (MEL). Tas.: McPartlan Pass, *D.I.Morris 8047* (K).

This species has been much confused with the common 1-flowered form of *U. dichotoma*. For instance, A.C.Beauglehole, *Vict. Vasc. Pl. Checklists* 13 (1980) gives its distribution as more or less throughout Vic. The diagnostic character is in the corolla, in the relative lengths of the yellow ridges (see key, leads 56–57:).

15. *Utricularia kimberleyensis* C.A.Gardner, *For. Dept. Bull. W. Australia* No. 32: 90 (1923)

T: Charnley R., Kimberley, W.A., *C.A.Gardner 1412*; holo: PERTH; iso: NSW.

Illustration: R.Erickson, *Pl. Prey* t. 17, fig. 4 (1968).

Terrestrial herb with stolons. Leaves numerous, rosulate and on stolons, petiolate, elliptic with rounded apex, 1–12 mm long, 0.5–2 mm wide. Traps few, polymorphic, 1.5–3 mm long, stalked. Inflorescences 1 or 2, erect, 5–25 cm long; flowers 1–3; peduncle 0.4–0.6 mm thick, glabrous or basally hispid; bracts and bracteoles medifixed with the inferior parts connate; pedicels erect, 10–15 mm long. Calyx lobes unequal; upper lobe ovate, 3–5 mm long; lower lobe smaller, broadly ovate with apex bifid. Corolla 8–20 mm long, violet with 2 cream ridges on the palate; upper lip cuneate; lower lip flabellate; spur cylindrical with apex obtuse or subacute, slightly shorter than lower lip. Capsule globose, c. 3 mm long. Seeds obovoid, c. 0.5 mm long.

Occurs in northern W.A. from the Dampier Peninsula to Drysdale R. and Fitzroy Crossing and in N.T. near Darwin, Pine Creek and Jabiru. Grows in wet sand in grassland. Flowers Feb.–Aug.

W.A.: Drysdale R. Natl Park, *A.S.George 13912* (PERTH); 23 km SE of Mitchell Plateau Mining Camp, *A.S.George 14515* (K, PERTH); Dampierland, *K.F.Kenneally 6202* (K, PERTH). N.T.: 65 km E of Darwin, *P.Taylor 17134* (K); c. 9 km NE of Pine Creek, *L.G.Adams 1743* (CANB, K).

16. *Utricularia georgei* P.Taylor, *Kew Bull.* 41: 3 (1986)

T: Mitchell R., Kimberley, W.A., *C.R.Dunlop 5296*; holo: K; iso: DNA.

Terrestrial herb with stolons. Leaves few, rosulate and on stolons, petiolate, obovate with apex rounded, 3–7 mm long, 1–1.5 mm wide. Traps few, polymorphic, 0.8–2 mm long, stalked. Inflorescence 1, or 2–3 in succession, erect, 5–17 cm long; flowers usually 3; peduncle c. 0.4 mm thick, glabrous; bracts and bracteoles medifixed with the inferior parts connate; pedicels erect, 5–20 mm long. Calyx lobes unequal, upper lobe ovate-oblong, c. 2 mm long; lower lobe smaller, oblong, with apex bifid. Corolla 11–18 mm long, white, tinged with violet and with a yellow palate; upper lip narrowly oblong-obovate with apex bifid; lower lip deeply 3-lobed with lobes narrowly oblong-obovate; spur subulate, slightly shorter than lower lip. Capsule globose, c. 1.5 mm long. Seeds oblong-obovoid, c. 0.25 mm long.

Occurs in north-western Kimberley, W.A. Grows in wet sand by streams and among rocks. Flowers Mar. and Aug.

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W.A.: King Edward R., *C.R.Dunlop* 5385, (DNA, K); Prince Regent River Res., *A.S.George* 12535 (K, PERTH); Mitchell Plateau, *K.F.Kenneally* 8177 (K, PERTH).

17. *Utricularia hamiltonii* F.Lloyd, *Victorian Naturalist* 53: 109 (1936)

T: near Adelaide R., N.T., *M.Holtze* 1161; holo: MEL; iso: BM.

Illustrations: F.E.Lloyd, *Victorian Naturalist* 53: 108, figs 8, 13–15, & *op. cit.* 110, fig. 1 (1936); R.Erickson, *Pl. Prey* t. 18, figs 19, 20 (1968).

Affixed aquatic herb with stolons. Leaves few, at base of peduncle and on stolons, petiolate, very narrowly obovate, acutely acuminate, 5–15 mm long, 0.5–0.8 mm wide. Traps few, stalked, uniform, 2–3 mm long. Inflorescence solitary, erect, 5–10 cm long; flower solitary; peduncle hollow, 0.5–0.8 mm thick; bracts and bracteoles basifixed; pedicel erect, 8–15 mm long. Calyx lobes unequal; upper lobe transversely elliptic, c. 2 mm long; lower lobe smaller, broadly ovate with apex bifid. Corolla 6–12 mm long, violet with an orange-yellow palate; upper lip oblong, deeply and acutely bifid; lower lip square, obscurely 3- or 4-lobed; spur narrowly cylindrical with apex obtuse, shorter than lower lip. Capsule and seeds not known.

Occurs near Darwin, N.T. Grows in very shallow water in sandy swamps. Flowers Feb.–May.

N.T.: 77 km E of Mary R. on Arnhem Hwy, *C.R.Dunlop* 4684 (DNA, K); Koolpinyah Stn, c. 30 km E of Darwin, *P.Taylor* 17100 (CANB, K).

18. *Utricularia triflora* P.Taylor, *Kew Bull.* 41: 5 (1986)

T: 32 km SE of Darwin, N.T., *J.A.Must* 702; holo: K; iso: CANB, DNA, NT.

Terrestrial herb, with stolons. Leaves few, at base of peduncle and on stolons, petiolate, linear, acute, up to 20 mm long, 0.3–0.5 mm wide. Traps few, dimorphic, c. 1 or c. 3 mm long, stalked. Inflorescence solitary, erect, 6–14 cm long; flowers 2–4; peduncle hollow, 0.5–1 mm thick; bracts and bracteoles basifixed, basally gibbous; pedicels suberect, 4–8 mm long. Calyx lobes unequal; upper lobe orbicular, c. 2 mm long, lower lobe smaller, square with apex emarginate. Corolla 6–12 mm long, mauve with a cream palate; upper lip oblong, deeply bilobed with the lobes apically rounded; lower lip transversely elliptic; spur subulate, curved, about as long as the lower lip. Capsule broadly ovoid, c. 2 mm long. Seeds cylindrical, c. 0.7 mm long.

Occurs in northern N.T. near Howard Springs and McMinns Lagoon, south-east of Darwin, and at Kapalga, c. 50 km east of Darwin. Grows in seasonal swamps and margins of lagoons. Flowers May–Jun.

N.T.: near Darwin, *R.Erickson* (K); near McMinns Lagoon, *P.Taylor* 17175 (CANB, DNA, MEL, NT, PERTH).

19. *Utricularia arnhemica* P.Taylor, *Kew Bull.* 41: 3 (1986)

T: about 65 km from Pine Creek on Oenpelli [Gunbalanya] rd, N.T., *P.Taylor* 17156; holo: K; iso: CANB, DNA, L, MEL, NSW, NT, PERTH).

Illustration: *Natl Geogr. Mag.* 143: 203 (1973) as *Utricularia* sp.

Affixed aquatic or terrestrial herb with stolons. Leaves numerous, rosulate and on stolons, petiolate, narrowly linear to obovate with apex rounded to acute, 3–60 mm long, up to 2 mm wide. Traps numerous, dimorphic, 1–1.5 mm or 3–12 mm long, stalked. Inflorescence solitary or 2 or more in succession, erect, 5–30 cm long; flowers 1–10; peduncle 0.3–1.5 mm thick, bracts and bracteoles basifixed; pedicels erect, 5–25 mm long. Calyx lobes unequal, upper lobe ovate, 2.5–3.5 mm long; lower lobe smaller, oblong with apex emarginate. Corolla 10–15 mm long, violet with a yellow palate; upper lip oblong with apex shortly bifid; lower lip 3-lobed, with the midlobe much larger; spur clavate, curved, shorter than lower lip. Capsule globose, c. 3 mm long. Seeds obovoid, 0.4–0.6 mm long.

Occurs only on the Arnhem Land escarpment, from near Jabiru south to Katherine, N.T. Grows in sandy stream beds and on wet sandstone rocks. Flowers Feb.–May.

N.T.: Mt Gilruth, *C.R.Dunlop* 4425 (DNA, K, NT); Deaf Adder Gorge, *C.R.Dunlop* 4457 (DNA, K, MEL); Mt Brockman, *C.R.Dunlop* 5487 (DNA, K); 28 km NE of Katherine, *I.B.Wilson* 340 (CANB, K).

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20. *Utricularia tridactyla* P.Taylor, *Kew Bull.* 41: 5 (1986)

T: Revolver Ck, upper slopes of Carr Boyd Ra., Kimberley, W.A., *W.Hartley 14510*; holo: CANB.

Terrestrial herb with stolons. Leaves few, sparsely rosulate and on stolons, petiolate, elliptic to obovate with apex rounded, up to 60 mm long and 1.5 mm wide. Traps numerous, uniform, 0.8–3 mm long, stalked. Inflorescence 1, or 2 in succession, erect, 10–20 cm long; flowers 1–3; peduncle c. 0.5 mm thick, bracts and bracteoles basifixed; pedicels erect, 6–10 mm long. Calyx lobes unequal; upper lobe ovate, 3–4 mm long; lower lobe smaller, ovate, with apex retuse. Corolla 10–16 mm long, violet with 2 yellow ridges on the palate; upper lip oblong; lower lip deeply 3-lobed, with the lobes narrowly oblong; spur narrowly cylindrical, longer than lower lip. Capsule ovoid, 2–3 mm long. Seeds narrowly obovoid, c. 0.4 mm long.

Occurs in north-eastern W.A. near Kununurra. Grows in moist soil in grassland. Flowers Mar.

W.A.: 25 km SE of Kununurra, *K.Pajmans 2445* (CANB).

21. *Utricularia singeriana* F.Muell., *J. & Proc. Roy. Soc. New South Wales* 24: 76, 176 (1890)

T: Port Darwin, N.T., *M.Holtze 1026*; holo: MEL; iso: K, NSW.

U. pachyceras O.Schwarz, *Feddes Repert.* 24: 98 (1927). T: 6 km NE of Darwin, N.T., *F.A.K.Bleeser 212*; holo: B (destroyed).

Terrestrial herb with stolons. Leaves few, solitary at peduncle base and stolon nodes, petiolate, narrowly obovate with apex rounded, up to 12 mm long, 1–1.5 mm wide. Traps few, uniform, 2–3 mm long, stalked. Inflorescence solitary, erect, 7–30 cm long; flowers solitary; peduncle hollow, 1–1.5 mm thick; bracts and bracteoles basifixed; pedicels erect, 4–20 mm long, hollow, dorsiventrally compressed. Calyx lobes unequal; upper lobe broadly ovate, 3–6 mm long; lower lobe smaller, orbicular, with apex emarginate. Corolla 10–22 mm long, purple; upper lip cuneate; lower lip flabellate; spur broadly conical with apex obtuse, much shorter than lower lip. Capsule globose, 4–5 mm long. Seeds cylindrical, 0.8–1 mm long.

Occurs only near Wyndham and Kununurra, W.A., and Darwin, N.T. Grows in wet sand in swamps. Flowers Mar.

W.A.: 5 km SSE of Kununurra, *K.Pajmans 2309* (CANB); 18 km SE of Wyndham, *K.Pajmans 2532* (CANB). N.T.: near Darwin, *M.Holtze s.n.* (NSW).

22. *Utricularia fistulosa* P.Taylor, *Kew Bull.* 41: 3 (1986)

T: Prince Regent R. Reserve, Kimberley, W.A., *A.S.George 12507*; holo: K; iso: PERTH.

Affixed aquatic herb with stolons. Leaves numerous, 1–4 from each stolon node, sessile, narrowly linear, acute, to 30 mm long, c. 0.3 mm wide. Traps numerous, dimorphic, 1–1.2 mm and c. 2 mm long, stalked. Inflorescence solitary, erect, 5–50 cm long; flowers 1–5; peduncle hollow, 1–2 mm thick; bracts and bracteoles basifixed; pedicels erect, 1.5–9 mm long. Calyx lobes unequal; upper lobe transversely elliptic, c. 3 mm long; lower lobe smaller, orbicular, with apex emarginate. Corolla 8–10 mm long, white, tinged with mauve and with a yellow palate; upper lip broadly elliptic; lower lip transversely elliptic; spur broadly conical with apex obtuse, longer than the lower lip. Capsule globose, c. 3 mm long. Seeds narrowly obovoid, c. 0.67 mm long.

Occurs in northern W.A. from the Buccaneer and Bonaparte Archipelagoes to the King Leopold Ranges and the King Edward R. Grows in shallow pools and streams on sandstone. Flowers Feb.–Aug.

W.A.: Mitchell Plateau, *C.R.Dunlop 5318* (DNA, K); Long Is., Buccaneer Archipelago, *A.J.M.Hopkins BA 150* (K, PERTH); King Leopold Ra., *D.E.Symon 12068* (ADW, K); Augustus Is., Bonaparte Archipelago, *P.G.Wilson 10881* (PERTH).

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23. *Utricularia tubulata* F.Muell., *Fragm.* 9: 48 (1875)

T: Cashmere, c. 70 km W of Kennedy, Qld, *W.E.Armit* 222; holo: MEL; iso: BM, BOG, K.

Illustration: P.Taylor in B.D.Morley & H.R.Toelken, *Fl. Pl. Australia* fig. 169n (1983).

Suspended aquatic herb with stolons to 1 m long. Leaves 3–6-verticillate, sessile, linear, acute, 5–25 mm long, 0.2–0.4 mm wide. Traps frequent, uniform, 1–2.2 mm long, long-stalked. Inflorescence solitary, ascending, 2–37 cm long; flowers 3–8; peduncle hollow, 2–6 mm thick; bracts and bracteoles basifixed; pedicels erect at anthesis, up to 40 mm long. Calyx lobes unequal; upper lobe broadly obovate, c. 2 mm long; lower lobe smaller, oblong with apex bifid. Corolla 16–25 mm long, pale pink with a white palate; upper lip obovate; lower lip flabellate; spur filiform, 15–20 mm long. Capsule depressed globose on a reflexed pedicel, 5–8 mm long. Seeds narrowly obovoid, c. 1.3 mm long, covered with prominent cylindrical processes.

Occurs in north-eastern W.A. near Kununurra, in the Alligator Rivers region, N.T. and in two widely separated localities in northern Qld. Grows in lagoons and billabongs, usually intermingled with other aquatic plants. Flowers Apr.–May (and perhaps earlier).

W.A.: 3 km S of Kununurra, *C.Glover* 77 (K, PERTH). N.T.: Kakadu Natl Park, *P.Taylor* 17137 (BRI, CANB, DNA, K, L, MEL, NSW, NT, PERTH). Qld.: Corinda, near Doomadgee, *S.Jacobs* 1465 (NSW).

24. *Utricularia lasiocaulis* F.Muell., *Australas. Chem. Druggist*, Oct. 1885: 50 (1885), & *Bot. Centralbl.* 24: 338 (1885)

T: near Darwin, N.T., *M.Holtze* 477; holo: MEL.

Terrestrial herb with stolons. Leaves few, on the stolons, petiolate, narrowly obovate with apex rounded, 2–6 mm long, 0.5–0.8 mm wide. Traps numerous, uniform, c. 1.5 mm long, subsessile. Inflorescence solitary, erect, 5–25 cm long; flowers 1 or 2; peduncle 0.3–0.8 mm thick, basally hispid throughout or rarely glabrous; bracts and bracteoles basifixed with base gibbous, ciliate; pedicels erect, 0.5–10 cm long. Calyx lobes unequal; upper lobe ovate, 1.5–3 mm long; lower lobe smaller, oblong with apex bifid. Corolla 7–20 mm long, violet with a yellow palate, externally orange-yellow; upper lip transversely elliptic to cuneate; lower lip reniform to cuneate, with apex entire to quite deeply 3-lobed; spur cylindrical, shorter than lower lip. Capsule globose, 1.5–2 mm long. Seeds cylindrical, 0.25–0.45 mm long.

Occurs in disjunct populations, from Kimberley, W.A., northern N.T., and in Qld. at Croydon and a number of localities near Brisbane. Grows in wet sand or clay in swamps. Flowers Feb.–Sep. in the north, later (to Dec.) near Brisbane.

W.A.: Prince Regent R. Reserve, *A.S.George* 12538 (K, PERTH). N.T.: 15 km NE of Mudginberry on Oenpelli [Gunbalanya] rd, *S.Jacobs* 1809 (K, NSW); McMinns Lagoon, *J.Must* 753 (DNA, K); Katherine Gorge [Nitmiluk Natl Park], *P.Taylor* 17162 (DNA, K). Qld.: Maroochy airfield, *P.Taylor* 17075 (K).

An extremely variable species. The large flowered forms with an entire lower corolla lip look very different from the small flowered forms with a ±deeply 3-lobed lip. However intermediate forms frequently occur, and the variation within a population is often very large.

25. *Utricularia kamienskii* F.Muell., *Victorian Naturalist* 9: 175 (1893), & *Bot. Centralbl.* 54: 93 (1893)

T: near the Adelaide R., N.T., *M. & N.Holtze* 1158; holo: MEL; iso: AD, K.

Illustration: R.Erickson, *Pl. Prey* t. 16, fig. 4 (1968).

Terrestrial herb with stolons. Leaves few, on the stolons, petiolate, narrowly obovate with apex rounded, 4–8 mm long, 0.5–1 mm wide. Traps numerous, c. 1 mm long, subsessile. Inflorescence solitary, erect, 4–20 cm long; flowers 1–3; peduncle 0.3–0.5 mm thick, glabrous above, hispid below; bracts and bracteoles medifixed, glabrous; pedicels erect, 5–60 mm long. Calyx lobes unequal; upper lobe ovate, 2.5–3 mm long; lower lobe smaller, narrowly oblong with apex bifid. Corolla 10–17 mm long, white or lilac with a yellow palate;

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upper lip narrowly oblong; lower lip deeply divided into 3 linear lobes; spur narrowly cylindrical with apex obtuse, slightly shorter than lower lip. Capsule and seeds not known.

Occurs in N.T. in a few localities near Darwin and the Arnhem Land escarpment. Grows in wet sand in swamps and by creeks. Flowers Apr.–May.

N.T. 17 km NE of Moline, *C.R.Dunlop 3481A* (DNA, K); Kakadu Natl Park, *M.Lazarides 8998A* (CANB, K); Koolpinyah Stn, *P.Taylor 17101* (K).

26. *Utricularia kenneallyi* P.Taylor, *Kew Bull.* 41: 4 (1986)

T: Mitchell Plateau, Kimberley, W.A., *K.F.Kenneally 8143*; holo: K; iso: PERTH.

Terrestrial herb with stolons. Leaves few, rosulate and on the stolons, petiolate, obovate with apex rounded, 3–6 mm long, c. 1 mm wide. Traps few, uniform, 1.5–2.5 mm long, long-stalked. Inflorescence solitary, erect, 9–13 cm long; flowers 1 or 2; peduncle 0.4–0.5 mm thick, hispid below; bracts and bracteoles basifixed with gibbous base; pedicels erect, 2–7 mm long. Calyx lobes unequal; upper lobe ovate-oblong, c. 3 mm long; lower lobe smaller, ovate with apex emarginate. Corolla 10–12 mm long, mauve streaked with violet; upper lip elliptic; lower lip flabellate, 3-lobed; spur subulate with apex acute, much longer than the lower lip. Capsule not known. Seeds obovoid, c. 0.35 mm long.

Known only from the type specimen from the Kimberley, W.A. Grows in wet seepage among grass on basalt pavement. Flowers Apr.

27. *Utricularia leptorhyncha* O.Schwarz, *Feddes Repert.* 24: 97 (1927)

T: near Berry Springs, c. 32 km SSE of Darwin, *L.G.Adams 1722*; neo: K, *fide* P.Taylor, *Kew Bull. Add. Ser.* 14: 148 (1989).

Terrestrial herb with stolons. Leaves few, rosulate and on stolons, petiolate, elliptic with apex rounded, 4–8 mm long, 0.5–0.8 mm wide. Traps few, dimorphic, 0.5–0.7 mm or c. 1 mm long, long stalked. Inflorescence solitary, or 2 or more in succession, erect, 8–16 cm long; flowers 1–4; peduncle c. 0.25 mm thick; hispid below; bracts and bracteoles basifixed or shortly produced below the point of attachment; pedicels erect, 3–40 mm long. Calyx lobes unequal; upper lobe narrowly ovate-oblong, c. 2 mm long; lower lobe smaller, oblong with apex emarginate. Corolla 8–11 mm long, pale violet with a yellow palate; upper lip oblong with apex deeply bifid; lower lip flabellate, distinctly 3-lobed; spur subulate with apex very acute, about as long as the lower lip. Capsule ovoid, c. 2 mm long. Seeds obovoid, c. 0.25 mm long.

Occurs on the Mitchell Plateau, Kimberley, W.A. and in several localities near Darwin and the Arnhem Land Plateau, N.T. Grows in damp sand in swamps and on sandstone pavement. Flowers Feb.–Mar.

W.A.: Mitchell Plateau, *C.R.Dunlop 5319* (DNA, K). N.T.: about 30 km E of Jabiru, *L.A.Craven 2493* (CANB, K); near Berry Springs, about 32 km SSE of Darwin, *L.G.Adams 1722* (CANB, K).

28. *Utricularia albiflora* R.Br., *Prodr.* 431 (1810)

Vesiculina albiflora (R.Br.) Raf., *Fl. Tellur.* 4: 109 (1838). T: Point Lookout, [Qld], *J.Banks & D.Solander s.n.*; holo: BM.

Illustrations: J.Britten in *J.Banks & D.Solander, Ill. Austral. Pl. Cook's Voy.* t. 222b (1905).

Terrestrial herb with stolons. Leaves few, solitary at peduncle base and stolon nodes, petiolate, narrowly linear with apex long-acuminate, up to 15 mm long and 0.3 mm wide. Traps dimorphic, 1.5–2 mm long, stalked. Inflorescence solitary, erect, 1.6–6 cm long; flower solitary; peduncle c. 0.4 mm thick; bracts and bracteoles basifixed; pedicel erect, 1–1.5 mm long. Calyx lobes unequal, upper lobe orbicular, c. 1.5 mm long; lower lobe smaller, orbicular with apex emarginate. Corolla 3–4 mm long, white, tinged with pale yellow on the palate; upper lip narrowly oblong with apex emarginate; lower lip broadly cuneate with apex distinctly 3-lobed; spur narrowly cylindrical with apex obtuse, slightly longer than lower lip. Capsule globose, c. 1.5 mm long. Ripe seeds not known.

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Known only from the type specimen and one other from north-eastern Qld. and possibly a third from the western coast of the Cape York Penin. Grows in wet sand. Flowers Aug.

Qld: between the Norman and Gilbert Rivers, *T.Gulliver 125* (MEL); Emu Swamp, 8.5 km W of the North Kennedy R., *J.R.Clarkson 4282* (BRI, K).

A very rare and little known species. The Gulliver collection is very incomplete and in unripe fruit only. The Clarkson specimen is therefore the first certain re-collection for 212 years.

29. *Utricularia quinquedentata* F.Muell. ex P.Taylor, *Kew Bull.* 41: 4 (1986)

T: near Adelaide R., N.T., *M. & N.Holtze 1177*; holo: MEL; iso: BM.

[*Utricularia albiflora* auct. non R.Br.: F.Mueller, *Victorian Naturalist* 9: 176 (1893); F.Lloyd, *Victorian Naturalist* 53: 105 (1937)].

Terrestrial herb with stolons. Leaves numerous, 2–4 from peduncle base and stolon nodes, petiolate, obovate with apex rounded, 1.5–3 mm long, 0.2–0.5 mm wide. Traps numerous, uniform, 0.5–1 mm long, stalked. Inflorescence solitary, or 2 in succession, erect, 3–5 cm long; flowers solitary; peduncle capillary; bracts and bracteoles basifixed; pedicels erect, 0.5–1 mm long. Calyx lobes unequal; upper lobe narrowly ovate, c. 1 mm long; lower lobe smaller, ovate with apex bifid. Corolla c. 2 mm long, white with yellow palate; upper lip ovate, bilobed; lower lip semicircular, deeply 5-lobed; spur cylindrical, c. 1 mm long. Capsule globose, c. 1 mm long. Seeds narrowly obovoid, c. 0.2 mm long.

Occurs in several disjunct areas from the Kimberley, W.A., through N.T. and Qld south to Brisbane. Grows in moist sand in swamps and seasonally flooded flats. Flowers Aug. (W.A.), May and Jun. (N.T.), Apr. (Cape York Peninsula, Qld) and Sep. (Brisbane, Qld).

W.A.: Prince Regent R. Reserve, *A.S.George 12534* (K, PERTH). N.T.: Katherine Gorge Natl Park [Nitmiluk Natl Park], *C.R.Dunlop 3779*; Koolpinyah Stn, *P.Taylor 17104* (K); 65 km from Pine Creek on Oenpelli [Gunbalanya] rd, *P.Taylor 17159* (K). Qld: Stradbroke Is., *M.Perceval 5* (K).

This tiny species must be one of the smallest of flowering plants.

30. *Utricularia holtzei* F.Muell., *Victorian Naturalist* 9: 176 (1893)

T: near Adelaide R., N.T., *M. & N.Holtze 1164*; holo: MEL; iso: AD, K.

Affixed aquatic herb with few stolons. Leaves few, solitary at peduncle base and stolon nodes, very long petiolate, obovate with apex rounded, 6–10 mm long, 0.5–0.8 mm wide. Traps few, uniform, 1–1.5 mm long, very long stalked. Inflorescences 1 or 2, erect, 2.5–6 cm long; flower solitary; peduncle 0.15–0.25 mm thick; bracts and bracteoles basifixed; pedicels erect, 1–4 mm long, thicker than the peduncle. Calyx lobes unequal; upper lobe narrowly ovate, c. 2 mm long; lower lobe much smaller, ovate with apex bifid. Corolla 4–8 mm long, cream with a yellow palate, externally yellow; upper lip broadly oblong; lower lip orbicular, deeply 5-lobed; spur turbinate, very much shorter than lower lips. Capsule narrowly ovoid, 2–3 mm long. Seeds ellipsoid, c. 0.4 mm long.

Occurs in a few localities near Darwin and the Arnhem Land escarpment, N.T. Grows in small very shallow pools in wet grassland. Flowers May–Jun.

N.T.: 15 km N of Mudginberry on Oenpelli [Gunbalanya] rd, *S.Jacobs 1810* (K, NSW); Koolpinyah Stn, about 30 km E of Darwin, *P.Taylor 17103* (CANB, K).

31. *Utricularia rhododactylos* P.Taylor, *Kew Bull.* 41: 5 (1986)

T: Deaf Adder Gorge, Mt Gilruth, N.T., *C.R.Dunlop 4414*; holo: K; iso: DNA.

Affixed aquatic herb with stolons. Leaves numerous, rosulate and at stolon nodes, petiolate, linear-obovate with apex rounded, 3–7 mm long, 0.2–0.4 mm wide. Traps numerous, dimorphic, 0.6–1 mm long, stalked. Inflorescence solitary, or 2 in succession, erect, 5–7 cm long; flowers solitary; peduncle 0.2–0.3 mm thick; bracts and bracteoles basifixed, distinctly gibbous at the base; pedicels erect, 1–2 mm long. Calyx lobes unequal; upper lobe ovate-oblong, c. 1.5 mm long; lower lobe much smaller, oblong with apex bifid. Corolla 5–7 mm long, mauve with a yellow palate; upper lip narrowly oblong; lower lip semicircular, deeply

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5-lobed; spur subulate, shorter than lower lip. Capsule ovoid, c. 1.5 mm long. Seeds ovoid, c. 0.2 mm long.

Known only from the type collection from the Arnhem Land escarpment, N.T. Grows in water in shallow depressions on sandstone pavement. Flowers Feb.

31. *Utricularia cheiranthos* P.Taylor, *Kew Bull.* 41: 3 (1986)

T: c. 33 km SW of Oenpelli [Gunbalanya], N.T.; *P.Taylor 17145*; holo: K.

Terrestrial herb with stolons. Leaves few, solitary at peduncle base and stolon nodes, petiolate, narrowly obovate with apex rounded, up to 2 mm long, c. 0.2 mm wide. Traps few, uniform, c. 0.5 mm long, stalked. Inflorescence solitary, erect, 2–3 cm long; flowers solitary; peduncle 0.2–0.3 mm thick; bracts and bracteoles basifixed; pedicel erect, 1–2 mm long. Calyx lobes unequal; upper lobe narrowly ovate, c. 1.5 mm long; lower lobe smaller, elliptic-oblong with apex bifid. Corolla c. 3 mm long, bright pink with a yellow palate; upper lip oblong with apex retuse; lower lip semicircular, deeply 5-lobed; spur subulate, shorter than lower lip. Capsule and seeds not known.

Known only from the type collection from the foot of the Arnhem Land escarpment, N.T. Grows in damp grassland by streamsides. Flowers May.

32. *Utricularia capilliflora* F.Muell., *J. & Proc. Roy. Soc. New South Wales* 24: 176 (1890)

T: Adelaide R., N.T., *N.Holtze 1176*; holo: MEL; iso: K, NSW.

Illustrations: F.E.Lloyd, *Victorian Naturalist* 53: figs 1, 2, 5, 12 (1936); R.Erickson, *Pl. Prey* t. 16, fig 2, t. 18, figs 10, 14 (1968).

Terrestrial herb with stolons. Leaves few, 1–2 at peduncle base and stolon nodes, petiolate, obovate with apex rounded, 2–4 mm long, 0.5–0.7 mm wide. Traps numerous, uniform, 0.5–1.5 mm long, stalked. Inflorescence solitary, erect, 5–12 cm long; flower solitary; peduncle c. 0.2 mm thick; bracts and bracteoles basifixed, distinctly gibbous at base; pedicels erect, 1.5–3 mm long. Calyx lobes unequal; upper lobe oblong, constricted at middle, c. 1.5 mm long; lower lobe smaller, broadly ovate, with apex bifid. Corolla excluding erect appendages 2–3 mm long, flesh-coloured; upper lip ovate with 2 apical capillary appendages 10–30 mm long; lower lip deeply 5-lobed; spur scrotiform, short. Capsule ovoid, c. 2 mm long. Seeds oblong-ovoid, c. 0.25 mm long.

Occurs in N.T. near Darwin and at the foot of the Arnhem Land escarpment. Grows in damp sand by streams and in marshes. Flowers Apr.–May.

N.T.: Kakadu Natl Park, *L.A.Craven 6569* (CANB, K); Koolpinyah Stn, *C.R.Dunlop 5118* (DNA, K); Yarrowonga, *C.R.Dunlop 5422* (DNA, K); Baralil Ck on Arnhem Hwy, *P.Taylor 17152* (K).

34. *Utricularia dunlopii* P.Taylor, *Kew Bull.* 41: 3 (1986)

T: Little Nourlangie Rock, N.T., *C.R.Dunlop 4737*; holo: K; iso: DNA, NT.

Terrestrial herb with few stolons. Leaves numerous, rosulate and on stolons, petiolate, narrowly obovate with apex rounded, 2–8 mm long, 0.5–0.7 mm wide. Traps numerous, uniform, 0.4–0.6 mm long, stalked. Inflorescence solitary, or 2 in succession, erect, 8–12 cm long; flowers 3–5; peduncle c. 0.3 mm thick, shortly hispid below; bracts and bracteoles medifixed with the inferior parts connate and forming a tube; pedicels erect, 4–22 mm long. Calyx lobes unequal; upper lobe ovate, c. 1.5 mm long; lower lobe smaller, ovate, with apex bifid. Corolla excluding erect appendages c. 3.5 mm long, flesh-coloured with darker lobes; upper lip narrowly ovate, with 2 apical capillary appendages 10–30 mm long; lower lip deeply 3-lobed; spur ovoid, laterally compressed, about as long as lower lip. Capsule ellipsoid, c. 1.5 mm long. Seeds oblong-obovoid, c. 0.2 mm long.

Occurs in the Kimberley, W.A., and near Darwin and on the Arnhem Land plateau, N.T. Grows in damp depressions in sandstone pavement and in sandy swamps. Flowers Feb.–May.

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W.A.: Mitchell Plateau, Kimberley, *C.R.Dunlop 5313* (DNA, K, MEL, PERTH); King Edward R., Kimberley, *C.R.Dunlop 5388* (DNA, K, PERTH). N.T.: 15 km NNE of Jabiru, *L.A.Craven 6554* (CANB, K); Howard Ck, about 20 km E of Darwin, *P.Taylor 17112* (K).

35. *Utricularia dunstaniae* F.Lloyd, *Victorian Naturalist* 53: 106, 108 (1936), as *dunstani*

T: Howard R., N.T., *N.Holtze 1340*; holo: MEL; iso: BM, K, NSW.

Illustrations: F.E.Lloyd, *op. cit.* 108, figs 1 (right), 3, 7, 11 (1936); R.Erickson, *Pl. Prey* t. 16, fig. 1 (1968).

Terrestrial or subaquatic herb with stolons. Leaves few, 1–2 at peduncle base and stolon nodes, petiolate, narrowly obovate with apex rounded, 2–12 mm long, 0.5–0.8 mm wide. Traps few, uniform, 0.8–1.2 mm long, stalked. Inflorescence solitary, erect, 6–15 cm long; flower solitary; peduncle c. 0.3 mm thick; bracts and bracteoles basifixed; pedicels erect, 1–10 mm long. Calyx lobes unequal; upper lobe oblong, constricted at the middle, c. 2 mm long; lower lobe much smaller, ovate, with apex bifid. Corolla excluding erect appendages 3.5–4 mm long, flesh-coloured. Upper lip orbicular. Lower lip 3–5-lobed; lateral lobes erect, capillary, 1.5–4 cm long; middle lobe or lobes descending, deltoid, much shorter than the scrotiform spur. Capsule and seeds not known.

Occurs in the Kimberley, W.A. and in a few localities near Darwin and the Arnhem Land escarpment, N.T. Grows in wet sand or very shallow water in swamps. Flowers Mar.–May (N.T.) and Aug. (W.A.).

W.A.: 50 km NE of Mitchell River Homestead, *A.C.Beaglehole & E.G.Errey 58874* (Herb. Beaglehole). N.T.: 25 km NE of Jabiru, *L.A.Craven 6610 p.p.* (CANB); 38 km S of Darwin on Stuart Hwy, *A.S.George 6522* (K, PERTH); E of McMinns Lagoon, *P.Taylor 17122* (K).

36. *Utricularia antennifera* P.Taylor, *Kew Bull.* 41: 2 (1986)

T: Mitchell Plateau, Kimberley, W.A., *C.R.Dunlop 5320*; holo: K, iso: CANB, DNA, MEL, PERTH.

Terrestrial herb with stolons. Leaves few, at peduncle base and stolon nodes, petiolate, narrowly ovate with apex rounded, 4–5 mm long, c. 0.5 mm wide. Traps numerous, uniform, 0.5–1 mm long, stalked. Inflorescence solitary, or 2 in succession, erect, 7–12 cm long; flowers solitary; peduncle c. 0.3 mm thick; bracts and bracteoles basifixed, gibbous at the base; pedicels erect, 1.5–9 mm long. Calyx lobes unequal; upper lobe oblong, constricted at the middle, c. 2 mm long; lower lobe smaller, ovate, with apex bifid. Corolla excluding erect appendages 2.5–3 mm long, flesh-coloured; upper lip oblong; lower lip 5-lobed, with the lateral lobes erect, capillary, 2–5 cm long and the remaining lobes reduced to minute deltoid teeth c. 0.3 mm long; spur inflated, transversely ellipsoid. Capsule ovoid, c. 2.5 mm long. Seeds oblong-obovoid, c. 0.25 mm long.

Known only from the type collection and 2 others from nearby in the Kimberley, W.A. Grows in wet gravel or sand over basalt or sandstone. Flowers Feb.–Mar.

W.A.: Mitchell R., *C.R.Dunlop 5297* (DNA, K); Mitchell Plateau, *C.R.Dunlop 5411* (DNA, K, PERTH).

Sect. 4. *Meionula*

Utricularia sect. *Meionula* (Raf.) P.Taylor, *Kew Bull.* 41: 5 (1986), *p.p.*, & *Kew Bull. Add. Ser.* 14: 169 (1989)

Meionula Raf., *Fl. Tellur.* 4: 108 (1838). T: *M. parviflora* Raf.

Terrestrial herbs, stolons present. Leaves entire. Traps arising from the stolons and also lateral on the leaves; mouth lateral with a single, usually straight, dorsal appendage and a ventral pair of 1 or 2 rows of gland-tipped trichomes; glands botuliform. Scales present. Bracts and bracteoles basifixed, not keeled. Flowers racemose, alternate; corolla with lower lip 3-lobed. Seeds globose; testa cells with raised anticlines.

A section of 3 species, from India to Australia; 1 widespread species in Australia.

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37. *Utricularia minutissima* Vahl, *Enum.* 1: 204 (1804)

T: Malacca, [peninsular Malaysia], *J.G.Koenig s.n.*; holo: C.

U. pygmaea R.Br., *Prodr.* 432 (1810); *Vesiculina pygmaea* (R.Br.) Raf., *Fl. Tellur.* 4: 108 (1838). T: Cape Grafton, [Qld], *J.Banks & D.Solander s.n.*; holo: BM.

Meionula parviflora Raf., *Fl. Tellur.*, 4: 108 (1838), *nom. illeg.*, non *U. parviflora* R.Br. T: Based on *U. minutissima* Vahl.

Illustrations: R.L.Specht, *Rec. Amer.-Austral. Exped. Arnhem Land* 3: fig. 22b (1958) as *U. calliphysa*; P.Taylor, *Fl. Males.*, ser. 1, 8: fig. 10 (1977).

Terrestrial herb with stolons. Leaves few, on peduncle base and stolons, petiolate, narrowly obovate to linear, up to 30 mm long, 0.4–0.8 mm wide. Traps numerous, 0.2–0.4 mm long, stalked. Inflorescence erect, 2–15 cm long; flowers 1–5 or more; peduncle 0.2–0.5 mm thick, glabrous or sparsely pubescent; pedicels erect, 0.5–1 mm long. Calyx lobes subequal, ovate, 2–3.5 mm long. Corolla 6–10 mm long, violet, mauve or white; upper lip narrowly oblong to obovate; lower lip orbicular, distinctly 3-lobed; spur subulate, up to twice as long as the lower lip. Capsule ellipsoid, c. 2 mm long. Seeds c. 0.25 mm long.

Occurs near Kununurra, W.A., near Darwin, the Arnhem Land escarpment and eastern Arnhem Land in N.T., and scattered in near-coastal Qld. (probably overlooked) from Cape York to just S of Brisbane. Widespread from western India to Japan, through SE Asia to Australia. Grows in wet sand in open vegetation. Flowers Feb.–Aug. in the north, later, to Nov. in southern Qld.

W.A.: 30 km SE of Kununurra, *K.Paijman* 2632 (CANB). N.T.: c. 5 km W of Pine Creek, *L.G.Adams* 1739 (CANB); Galiwinku, Elcho Is., *C.R.Dunlop* 4028 (DNA, K); Katherine Gorge Natl Park [Nitmiluk Natl Park], *P.Taylor* 17169 (K). Qld: Capalaba, *M.Percival* 8 (K).

For the extensive extra-Australian synonymy of this species see P.Taylor, *Kew Bull. Add. Ser.* 14: 171 (1989).

Sect. 5. Australes

Utricularia sect. *Australes* P.Taylor, *Kew Bull. Add. Ser.* 14: 179 (1989)

Type: *U. lateriflora* R.Br.

Utricularia sect. *Meionula* (Raf.) P.Taylor, *Kew Bull.* 41: 5 (1986), *p.p.*

Terrestrial herbs, stolons present. Leaves entire. Traps arising from the stolons and leaf petioles; mouth lateral; processes consisting of a single, dorsal, usually reflexed, appendage and a ventral pair of 1 or 2 rows of gland-tipped trichomes; glands globose. Scales present. Bracts and bracteoles basifixed, keeled. Flowers solitary or racemose, alternate; corolla with lower lip entire or retuse. Seeds subglobose; testa cells with sunken anticlines.

A section of 3 species confined to Australia and New Zealand; 2 endemic species in southern Australia.

38. *Utricularia lateriflora* R.Br., *Prodr.* 431 (1810)

T: Sydney, N.S.W., *R.Brown s.n.*; lecto: BM, *vide* P.Taylor, *Kew Bull. Add. Ser.* 14: 180 (1989); iso: K.

U. parviflora R.Br., *Prodr.* 431 (1810). T: Sydney, N.S.W., *R.Brown s.n.*; holo: BM; iso: K.

Illustrations: L.Rodway, *Tasman. Fl.* t. 26 (1903); E.R.Rotherham, B.G.Briggs, D.F.Blaxell & R.C.Carolin, *Flowers & Pl. N.S.W. & Southern Queensland* t. 98 (1975), as *U. dichotoma*.

Terrestrial herb. Leaves few, scattered on stolons, petiolate, very narrowly ovate, with apex rounded, up to 20 mm long, 0.3–0.5 mm wide. Traps numerous, 0.5–0.7 mm long, stalked. Inflorescence erect, usually 8–20 cm long; flowers 3–5 or more; peduncle angular, 0.3–0.6 mm thick; pedicels erect, c. 0.5 mm long. Calyx lobes subequal, elliptic or ovate, c. 2 mm long. Corolla 6–10 mm long, lilac or mauve, with a white or yellow palate; upper lip narrowly oblong-obovate; lower lip orbicular; spur narrowly conical with apex bidentate, slightly longer than the lower lip. Capsule globose, c. 3 mm long. Seeds c. 0.25 mm long.

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Occurs from Fraser Is., Qld south through eastern N.S.W. and Vic. to south-eastern S.A. and Tas. (including Bass Strait Islands). Grows in wet sand in open vegetation. Flowers throughout the year.

S.A.: Myponga, 1923, *J.B.Cleland* (AD). Qld.: Peregian, *P.Taylor 17069* (K). N.S.W.: Broadwater Natl Park, *R.Coveny 9338* (K, NSW). Vic.: East Gippsland, *A.C.Beauglehole* (MEL 525283). Tas.: Strahan, 1947, *W.M.Curtis* (HO).

A very closely allied species, *U. delicatula* Cheeseman, occurs in New Zealand.

39. *Utricularia simplex* R.Br., *Prodr.* 431 (1810)

T: King George Sound, [W.A.], *R.Brown s.n.*; holo: BM.

Illustrations: R.Erickson, *Pl. Prey* t. 16, fig. 7, t. 17, figs 12–14 (1968).

Terrestrial herb. Leaves few, 1 or 2 at peduncle base and on stolons, petiolate, narrowly obovate with apex rounded, 4–6 mm long, 0.5–2.5 mm wide. Traps numerous, 0.3–0.5 mm long, stalked. Inflorescence erect, 2–5 cm long; flower solitary; peduncle terete, 0.25–0.4 mm thick; pedicel erect, c. 1 mm long. Calyx lobes subequal, broadly elliptic, c. 2 mm long. Corolla 5–8 mm long, pale lilac, with a yellow palate; upper lip broadly obovate or orbicular; lower lip transversely elliptic; spur cylindrical with apex shortly bidentate, slightly longer than the lower lip. Capsule ellipsoid, 2–2.5 mm long. Seeds 0.25–0.3 mm long.

Confined to a narrow coastal strip in south-western W.A. from near Augusta to Mt Melville. Grows in open vegetation in moist peaty heath. Flowers Oct., Nov. and Mar.

W.A.: W of Albany, 1936, *F.E.Lloyd* (C, MEL, PERTH); Mt Melville, Nov. 1867, *F.Mueller* (K, MEL); Walpole-Nornalup Natl Park, *P.Taylor 17023* (K).

Sect. 6. Nigrescentes

Utricularia L. sect. *Nigrescentes* (Oliver) Komiya, *J. Jap. Bot.* 48: 151 (1973)

Utricularia 'group' *Nigrescentes* Oliver, *J. Linn. Soc. Bot.* 3: 184 (1859). T: *U. caerulea* L.

Pelidnia Barnhart, *Mem. N. Y. Bot. Gard.* 6: 50 (1916). T: *P. caerulea* (L.) Barnhart

Terrestrial herbs with stolons. Leaves entire. Traps arising from the stolons and also lateral on the leaves, dimorphic; mouth lateral; larger traps with a long carinate, glandular, dorsal appendage; smaller traps with a similar but much reduced appendage. Scales present. Bracts and bracteoles (in the Australian species) medifixed. Flowers racemose, alternate. Corolla white, yellow or violet. Seeds obovoid, sometimes papillose.

A section of 3 species, 1 very widespread from Madagascar to Australia, the other 2 narrowly endemic in central Africa and eastern China respectively.

40. *Utricularia caerulea* L., *Sp. Pl.* 1: 18 (1753)

T: Ceylon, *P.Hermann s.n.*; holo: BM.

U. charnleyensis W.Fitzg., *J. Roy. Soc. Western Australia* 3: 207 (1918). T: Charnley R., Kimberley, W.A., *W.V.Fitzgerald 1409*; holo: PERTH; iso: NSW.

[*Utricularia baueri* auct. non R.Br.: G.Bentham, *Fl. Austral.* 4: 531 (1869)].

Illustrations: J.Britten in J.Banks & D.Solander, *Ill. Austral. Pl. Cook's Voy.* t. 222C, 227A & B (1901), as *U. baueri*; P.Taylor, *Fl. Males.* ser. 1, 8: fig. 12 (1977).

Terrestrial herb with stolons. Leaves numerous, rosulate and on stolons, petiolate, narrowly obovate with apex rounded, up to 10 mm long and 1.5 mm wide. Traps numerous, 1–1.5 mm and 0.25–0.5 mm long, stalked. Inflorescence erect, usually 5–30 cm long; flowers 1–20 or more; peduncles 0.25–1.3 mm thick; pedicels erect at anthesis, 0.5–1 mm long. Calyx lobes unequal; upper lobe ovate-oblong, 1.5–3 mm long; lower lobe shorter, transversely elliptic. Corolla 2–8 mm long, white to pale or dark violet, with a yellow palate; upper lip oblong; lower lip broadly ovate; palate transversely crested; spur narrowly conical, usually much

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longer than the lower lip. Capsule globose, 1.5–2 mm long on a spreading or reflexed pedicel. Seeds smooth or papillose, 0.2–0.25 mm long.

Occurs in widely scattered, mainly near-coastal, disjunct areas from the Kimberley, W.A. through N.T., Qld and eastern N.S.W. as far south as 30° S latitude. Very widespread from Madagascar to Japan, through SE Asia to Australia. Grows in damp sand in wet grassland. Collected in flower all months except Jan.

W.A.: Drysdale R. Natl Park, *A.S.George 13892* (K, PERTH). N.T.: Galiwinku, Elcho Is., *C.R.Dunlop 3883* (DNA, K); Koolpinyah Stn, *P.Taylor 17108* (K). Qld: Browns Ck, Pascoe R., *L.J.Brass 19619* (CANB, K, L). N.S.W.: Red Rock, *R.Coveny 9316* (K, NSW).

This species is extremely variable throughout its wide range. The small, white flowered form does look very different from the large, violet flowered form, but intermediates are of frequent occurrence. For a discussion of the typification, and the extensive extra-Australian synonymy, see P.Taylor, *Kew Bull. Add. Ser.* 14: 187–194 (1989).

Sect. 7. Enskide

Utricularia sect. *Enskide* (Raf.) P.Taylor, *Kew Bull.* 41: 9 (1986)

Enskide Raf., *Fl. Tellur.* 4: 109 (1838). T: *E. chrysantha* (R.Br.) Raf.

Terrestrial herbs with stolons. Leaves entire. Traps arising from the stolons and also lateral on the leaves; mouth lateral with a short, truncate dorsal appendage which, together with the ventral lip, is naked or fringed with a variable number of unicellular papillae. Scales present. Bracts and bracteoles basifixed with the bracts very much broader than the bracteoles. Flowers racemose, alternate. Corolla yellow; lower lip 4-lobed. Seeds obovoid.

A section of 2 species, both in northern Australia, 1 extending also to southern New Guinea.

41. *Utricularia chrysantha* R.Br., *Prodr.* 432 (1810)

Enskide chrysantha (R.Br.) Raf., *Fl. Tellur.* 109 (1838). T: Point Lookout, [Qld], *J.Banks & D.Solander s.n.*; holo: BM.

U. flava R.Br., *Prodr.* 432 (1810). T: Endeavour R., [Qld], *J.Banks & D.Solander s.n.*; holo: BM.

U. barbata R.Br., *Prodr.* 432 (1810). T: Endeavour R., [Qld], *J.Banks & D.Solander s.n.*; holo: BM.

Illustrations: R.Erickson, *Pl. Prey* t. 16, fig. 5 (1968), as *U. flava*; M.Morcombe, *Australia's Wildflowers* 88 (1970); P.Taylor, *Fl. Males.* ser. I, 8: fig. 9 (1977).

Terrestrial herb. Leaves numerous, on the stolons, petiolate, linear with apex rounded or retuse, 3–30 mm long, 0.3–0.7 mm wide. Traps numerous, 0.35–0.6 mm long, stalked. Inflorescence erect, 2–60 cm long; flowers 2–20 or more; peduncle usually filiform, rarely thick and fleshy, 0.3–3 mm thick; pedicels erect, 0.5–2 mm long. Calyx lobes subequal, ovate, 2–3 mm long. Corolla 8–15 mm long, pale to bright yellow, sometimes tinged with brick red; upper lip oblong; lower lip semicircular, variably, but usually distinctly, 4-lobed; spur subulate, about as long as lower lip. Capsule globose, 1.5–2 mm long. Seeds c. 0.25 mm long.

Occurs in tropical Australia from the Kimberley, W.A., through N.T. and Qld south to Cardwell. Also in southern New Guinea. Grows in swamps and wet grassland. Flowers Feb.–Nov.

W.A.: Mitchell Plateau, N Kimberley, *K.F.Kenneally 8594* (K, PERTH). N.T.: 1 km S of Koongarra Jumpup, *M.O.Rankin 1965* (DNA, K); E of McMinns Lagoon, *P.Taylor 17176* (K). Qld: Jardine R., *L.J.Brass 18909* (CANB, G, K, L); Olive R. area, 10 Sep. 1974, *P.S.Lavarack* (K).

In the Kimberley region of W.A. and in N.T. this species invariably has a filiform peduncle (0.5–1 mm thick) but in Qld specimens sometimes occur with the peduncles quite thick and fleshy (the Lavarack specimen cited above is extreme with the peduncle only 20 mm long and over 2 mm thick), but there are no vegetative or floral differences. Throughout its range, *U. chrysantha* is very variable in the lobing of the lower corolla lip.

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42. *Utricularia fulva* F.Muell., *Trans. Philos. Soc. Victoria* 3: 63 (1858)

T: near Macadam Ra., 260 km SSW of Darwin, N.T., *F.Mueller s.n.*; holotype: MEL; iso: K.

Terrestrial or subaquatic herb. Leaves numerous, on stolons, sessile, narrowly linear, acute, up to 8 cm long, c. 0.3 mm wide. Traps numerous, 0.3–0.5 mm long, stalked. Inflorescence erect, 7–40 cm long; flowers 2–10 or more; peduncle rather stout and flexuous, up to 1.8 mm thick; pedicels erect, up to 1 mm long. Calyx lobes subequal, ovate, 3–4 mm long. Corolla 12–15 mm long, pale apricot, with a very pale yellow palate, spotted with vinous red; upper lip deeply divided into 2 divergent lobes; lower lip semicircular, distinctly 3-lobed; spur subulate, shorter than the lower lip. Capsule globose, c. 2 mm long. Seeds c. 0.25 mm long.

Occurs in N.T., chiefly along the Arnhem Land escarpment from near Oenpelli [Gunbalanya] south to Katherine, with only the type specimen and a few others from elsewhere. Grows in or at the edge of sandy stream beds. Flowers Mar.–Oct.

N.T.: Katherine Gorge Natl Park [Nitmiluk Natl Park], *C.R.Dunlop 3745* (DNA, K, NT); 16 km NNE of Mt Cahill, *J.Must 1132* (BRI, CANB, DNA, K, L, MEL, NO, NSW, NT); Koongarra Jumpup, *P.Taylor 17147* (CANB, DNA, K, L, NT, PERTH).

Sect. 8. *Oligocista*

Utricularia sect. *Oligocista* A.DC. in A.P. de Candolle, *Prodr.* 8: 12 (1844).

Type: *U. bifida* L.

Terrestrial herbs with stolons. Leaves entire. Traps arising from the stolons and also lateral on the leaves; mouth usually basal, with 2 dorsal, simple or very rarely branched appendages and sometimes also a single ventral appendage. Scales present. Bracts and bracteoles basifixed with the bracts very much broader than the bracteoles. Flowers racemose, alternate. Corolla yellow or violet or rarely blue; lower lip (in Australian species) not lobed. Seeds globose to elliptic or obliquely ovoid.

A section of 35 species, mostly in the Old World tropics but with a few in America; 6 species in Australia, one endemic.

43. *Utricularia foveolata* Edgew., *Proc. Linn. Soc.* 1: 351 (1847)

T: Bengal, India, *S.Kurz s.n.*; neo: Titalya, N Bengal, India, *S.Kurz s.n.*, CAL, *vide* P.Taylor, *Kew Bull. Add. Ser.* 14: 394–396 (1989).

U. baoulensis A. Chev., *Mém. Soc. Bot. Fr.* 8: 186 (1912, ante Sep. 21). T: Baoulé, Ivory Coast, West Africa, *A.Chevalier 22247*; holotype: P.

U. tenerrima Merrill, *Philipp. J. Sci., Bot.* 7: 247 (1912, Sept. 30). T: Madras, India, *Herb. Hooker s.n.*; holotype: K.

[*Utricularia scandens* auct. non Benj.: D.Oliver in *J. Linn. Soc. Bot.* 3: 181 (1859).

Illustrations: P.Taylor, *Kew Bull.* 18: fig. 21 (1964); P.Taylor, *Fl. Males.* ser. I, 8: fig. 8 (1977).

Terrestrial herb with stolons. Leaves few, on stolon nodes, petiolate, linear with apex acute or rounded, up to 30 mm long, 0.4–1 mm wide. Traps few, 0.8–1.2 mm long, shortly stalked; appendages branched. Inflorescence twining, up to 20 cm long; flowers 2–5; raceme very lax; peduncle c. 0.5 mm thick; pedicels erect at anthesis, 2–3 mm long. Calyx lobes subequal, ovate, 2–4 mm long. Corolla 3–4 mm long, pale mauve; upper lip oblong; lower lip orbicular; spur narrowly conical with apex obtuse, about as long as the lower lip. Capsule ovoid, c. 2.5 mm long, on a sharply reflexed pedicel. Seeds ellipsoid, c. 0.3 mm long.

Known in Australia from a single record from northern Qld. Very widespread but rarely collected, from W. Africa to Madagascar, India, China (Hainan), Thailand, Philippines and Java. Grows in seasonally wet grassland. Flowers Apr. (Qld).

Qld: Gorge Ck, Mareeba, *H.S.McKee 9289* (NSW).

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Utricularia

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44. *Utricularia uliginosa* Vahl, *Enum.* 1: 203 (1804)

T: 'India orientalis', *J.G.Koenig s.n.*; holotype: C; isotype: LD.

U. cyanea R.Br., *Prodr.* 431 (1810). T: Grose R., N.S.W., *R.Brown s.n.*; holotype: BM.

[*Utricularia graminifolia* auct. non Vahl: R.Brown, *Prodr.* 432 (1810)].

Illustration: P.Taylor, *Fl. Males.* ser. I, 8: fig. 5 (1977).

Terrestrial or subaquatic herb. Leaves numerous, at stolon nodes, petiolate, linear with apex rounded to acute, up to 5 cm long, 1.5–6 mm wide. Traps numerous, 1–1.5 mm long, stalked. Inflorescence erect, 3–30 cm long; raceme elongate; flowers 2–10; peduncle slightly angular, 0.5–1.2 mm thick; pedicels erect or suberect, 1.5–6 mm long. Calyx lobes subequal, very broadly ovate, 3–5 mm long. Corolla 5–8 mm long, lilac or violet, sometimes white; upper lip broadly oblong; lower lip orbicular; spur subulate, curved, about as long as the lower lip. Capsule ovoid, 2.5–3.5 mm long. Seeds globose, c. 0.3 mm long, with conspicuous isodiametric reticulation.

Occurs in the Kimberley, W.A., between Darwin and Katherine in N.T., and in a near-coastal strip of Qld and eastern N.S.W. from Cape York to south of Sydney. Also from western India to Japan and through SE Asia to New Guinea, Guam, Palau and New Caledonia. Grows in seasonally flooded grassland and by streams. Flowers more or less throughout the year in N.S.W. and Qld, and May–Jul. in N.T. and W.A.

W.A.: Drysdale R. Natl Park, *A.S.George 13857* (K, PERTH). N.T.: Baroalba Soak, Koongarra, *M.O.Rankin 1958* (DNA, K); Katherine Gorge Natl Park [Nitmiluk Natl Park], *P.Taylor 17166* (K). Qld: Brown's Ck, Pascoe R., *L.J.Brass 19644* (CANB, K, L). N.S.W.: Royal Natl Park, Crystal Pool, *P.Taylor 17056* (K).

For the extensive extra-Australian synonymy of this species see P.Taylor, *Kew Bull. Add. Ser.* 14: 333–335 (1989).

45. *Utricularia bifida* L., *Sp. Pl.* 1: 18 (1753)

Nelipis bifida (L.) Raf., *Fl. Tellur.* 4: 109 (1838). T: Guangdong, China, *P.Osbeck s.n.*; holotype: LINN; isotype: C.

Illustration: P.Taylor, *Fl. Males.* ser. I, 8: fig. 4 (1977).

Terrestrial herb. Leaves few, at stolon nodes, petiolate, narrowly linear with apex rounded or subulate, up to 20 mm long, 0.5–1 mm wide. Traps few, 0.5–1 mm long, shortly stalked. Inflorescence erect, 3–20 cm long; flowers 1–10; raceme elongate; peduncle 0.4–1.2 mm thick; pedicels spreading at anthesis, broadly winged, 2–5 mm long. Calyx lobes subequal, broadly ovate with apex obtuse, 2.5–7 mm long. Corolla 6–10 mm long, yellow; upper lip oblong; lower lip orbicular; spur subulate, curved, about as long as the lower lip. Capsule broadly ellipsoid, 2.5–3 mm long, on recurved pedicel. Seeds obliquely obovoid, 0.4–0.5 mm long.

Occurs in the Kimberley, W.A., between Darwin and Katherine and in eastern Arnhem Land, N.T., and from Cape York south to Townsville, Qld. Widespread from western India to Japan and through SE Asia to New Guinea, Guam, Palau and Australia. Grows in swamps and wet sand by streams and pools. Flowers Jan.–Sep.

W.A.: Blyxa Ck, Prince Regent R. Reserve, *A.S.George 12514* (K, PERTH). N.T.: Bickerton Is., *R.L.Specht 511* (GH, K, L); 65 km from Pine Creek on Oenpelli [Gunbalanya] rd, *P.Taylor 17160* (K). Qld: Jardine R., *L.J.Brass 18908* (CANB, G, GH, K, L, SING); 18 km N of Cardwell, *L.A.Craven 3180* (CANB, K).

46. *Utricularia odorata* Pellegrin, *Bull. Mus. Nat. Hist. Paris* 26: 182 (1920)

T: Kampot, Cambodia, *Geoffray 464*; holotype: P.

U. pterocalycina O.Schwarz, *Feddes Repert.* 24: 97 (1927) p.p. T: Koolpinyah, N.T., *F.A.K.Bleeser 392*; holotype: B (destroyed).

[*Utricularia wallichiana* auct. non Wight vel Benj. p.p.: F.Mueller, *J. & Proc. Roy. Soc. New South Wales* 24: 76 (1890)].

[*Utricularia tortilis* auct. non Oliver p.p.: F.Mueller, *J. & Proc. Roy. Soc. New South Wales* 24: 76 (1890)].

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Terrestrial herb. Leaves numerous, branch-opposed on stolons, petiolate, narrowly linear, obtuse, 5–10 mm long, 0.5–0.8 mm wide. Traps numerous, 0.5–1.5 mm long, stalked. Inflorescence erect, 25–55 cm long; peduncle with numerous scales; flowers 2–20 or more; raceme often congested; peduncle 0.5–1 mm thick; bracts and bracteoles basifixed; pedicels suberect at anthesis, broadly winged, 2–10 mm long. Calyx lobes subequal, broadly ovate, 5–10 mm long. Corolla 10–16 mm long, yellow, often fragrant; upper lip obovate-oblong; lower lip transversely elliptic; spur subulate, straight or slightly curved, longer than the lower lip. Capsule broadly ellipsoid on a spreading pedicel, c. 3 mm long. Seeds obliquely ovoid, conspicuously reticulate, c. 0.4 mm long.

Occurs in N.T. from the Darwin area and the Arnhem Land escarpment area south to Katherine; also in Indochina (Thailand, Cambodia, Laos and Vietnam). Grows in swamps and wet sandy grassland. Flowers throughout the year.

N.T.: Edith R., *C.R.Dunlop 3641* (DNA, K); Nabarlek, *M.Lazarides 7535* (CANB, DNA, BRI, NSW, K, L, US); McMinns area, about 31 km S of Darwin, *M.Parker 119* (CANB, DNA, K, NT).

47. *Utricularia involvens* Ridley, *J. Bot.* 33: 11 (1895)

T: Gunong Jerai, Malay Peninsula, *H.N.Ridley. s.n.*; holotype: SING.

U. pterocalycina O.Schwarz, *Feddes Repert.* 24: 97 (1927) *p.p.* T: Koolpinyah, N.T., *F.A.K.Bleeser 392*; holotype: B (destroyed).

[*Utricularia wallichiana* auct. non Wight vel Benj. *p.p.*: F.Mueller, *J. & Proc. Roy. Soc. New South Wales* 24: 76 (1890)].

[*Utricularia tortilis* auct. non Oliver *p.p.*: F.Mueller, *J. & Proc. Roy. Soc. New South Wales* 24: 76 (1890)].

Illustration: P.Taylor, *Fl. Males.* ser. I, 8: fig. 3 (1977).

Terrestrial herb. Leaves numerous, on rhizoids and stolon nodes, petiolate, obovate to linear with apex rounded, thalloid, 5–30 mm long, 2–5 mm wide. Traps few, 0.5–1.2 mm long, shortly stalked or sessile. Inflorescence twining, up to 60 cm long; flowers 2–12; peduncle 0.5–1 mm thick, with several scales; raceme elongate and lax; bracts and bracteoles basifixed; pedicels erect or spreading at anthesis, narrowly winged, 8–20 mm long. Calyx lobes subequal, broadly ovate, 3–6 mm long. Corolla 10–15 mm long, yellow, sometimes fragrant; upper lip orbicular; lower lip transversely oblong with apex emarginate; spur subulate, curved, longer than the lower lip. Capsule broadly ellipsoid, 3–4 mm long. Seeds obliquely ovoid, conspicuously reticulate, 0.5–0.6 mm long.

Occurs in N.T. from the Darwin region to the Arnhem Land escarpment. Also in Burma (Tavoy), Thailand and peninsular Malaysia. Flowers Feb.–May.

N.T.: near Berry Springs, about 32 km SSE of Darwin, *L.G.Adams 1718* (CANB, K); Darwin, *M.Holtze 1025* (MEL); Jabiluka, about 30 km SW of Oenpelli [Gunbalanya], *P.Taylor 17138* (DNA, K).

48. *Utricularia circumvoluta* P.Taylor, *Kew Bull.* 41: 9 (1986)

T: E of McMinns Lagoon, c. 25 km SE of Darwin, N.T., *P.Taylor 17123*; holotype: K.

[*Utricularia bifida* auct. non L.: P.Taylor in R.L.Specht, *Rec. Amer.-Austral. Exped. Arnhem Land* 3: 300 (1958)].

[*U. scandens* auct. non Benj., *p.p.*: P.Taylor, *Fl. Males.* ser. I, 8: 283 (1977)]

Terrestrial or subaquatic herb. Leaves few, petiolate, narrowly linear, up to 10 mm long, c. 0.25 mm wide. Traps numerous, c. 0.5 mm long, shortly stalked. Inflorescence twining, 10–40 cm long; peduncle 0.3–0.5 mm thick, with numerous scales; flowers 2–5; raceme elongate; bracts and bracteoles basifixed; pedicels erect, broadly winged, 1–2 mm long. Calyx lobes subequal, broadly ovate, 3.5–5 mm long, decurrent at the base; lower lobe slightly smaller. Corolla c. 5 mm long, pale yellow; upper and lower lips orbicular; spur narrowly conical, slightly longer than the lower lip. Capsule ovoid, c. 2 mm long. Seeds ovoid, 0.2–0.25 mm long.

Restricted to N.T. near Darwin and eastern Arnhem Land, and in Qld to the northern part of Cape York Peninsula. Grows in shallow water by streams and in swamps. Flowers May–Aug.

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N.T.: Yirrkala, *R.L.Specht* 891 (AD, CANB, K); Katherine Gorge Natl Park [Nitmiluk Natl Park], *P.Taylor* 17168 (K). Qld.: 3.8 km E of Aurukun – Beagle North Camp rd, 6.8 km S of Cowplace Ck, *J.R.Clarkson* 4471 (BRI, K); 1 km N of Bamaga airstrip, *K.Paijmans* 3080 (CANB).

Sect. 9. Nelipus

Utricularia sect. *Nelipus* (Raf.) P.Taylor, *Kew Bull.* 41: 15 (1986).

Nelipus Raf., *Fl. Tellur.* 4: 109 (1838). T: *N. limosa* (R.Br.) Raf.

Affixed aquatic or terrestrial herbs with stolons. Leaves pinnately divided into filiform or very narrowly linear segments; segments not marginally setulose. Traps on the stolons and also lateral on the leaves; mouth lateral, with 2 dorsal setiform branched appendages. Scales present. Bracts medifixed. Bracteoles absent. Flowers racemose, alternate. Corolla with lower lip 2-lobed, violet or white. Seeds globose; testa with isodiametric reticulation.

A section of 3 species, all Australian, with 1 extending also into Malesia and Indochina.

49. *Utricularia leptoplectra* F.Muell., *Australas. Chem. Druggist, Oct. 1885*: 50 (1885), & *Bot. Centralbl.* 24: 338 (1885)

T: near Port Darwin, N.T., *M.Holtze* 508; holo: MEL.

Illustration: R.Erickson, *Pl. Prey* t. 17, figs. 1, 2 (1968).

Terrestrial or affixed aquatic herb. Leaves numerous, at peduncle base and stolon nodes, long-petiolate, up to 10 cm long, bipinnately divided into numerous alternate, narrowly linear segments 0.2–0.5 mm wide. Traps numerous, 0.5–1.3 mm long, long-stalked. Inflorescence erect, up to 1 m long; peduncle up to 3 mm thick; flowers 2–10; pedicels curved, papillose, up to 15 mm long. Calyx upper lobe transversely elliptic, c. 2 mm long; lower lobe smaller, oblong. Corolla 1–2.5 cm long, deep blue-violet with a white palate and the outer surface usually yellow; upper lip ovate; lower lip deeply bilobed; spur filiform, longer than lower lip. Capsule globose, c. 3 mm long. Seeds c. 0.25 mm long.

Occurs in W Kimberley, W.A. and in N.T. near Darwin, the Arnhem Land escarpment south to Katherine, and in eastern Arnhem Land. Grows in swamps and by pools in mud or shallow water. Flowers Jan.–Jul.

W.A.: 35 km SE of AMAX campsite, *K.F.Kenneally* 6730 (K, PERTH). N.T.: near Berry Springs, about 32 km SSE of Darwin, *L.G.Adams* 1721 (CANB, K, L, NT, US); Yirrkala, *R.L.Specht* 920 (AD, BRI, K, L, MEL, NSW, PERTH, US); Katherine Gorge Natl Park [Nitmiluk Natl Park], *P.Taylor* 17106 (K).

50. *Utricularia biloba* R.Br., *Prodr.* 432 (1810)

Nelipus biloba (R.Br.) Raf., *Fl. Tellur.* 4: 109 (1838). T: Sydney, N.S.W. *R.Brown* s.n.; holo: BM.

U. baueri R.Br., *Prodr.* 431 (1810). T: Sydney, N.S.W., *F.L.Bauer* s.n.; lecto: MEL, *fide* P.Taylor, *Kew Bull. Add. Ser.* 14: 555 (1989); iso W.

U. lawsonii F.Lloyd, *Victorian Naturalist* 53: 110 (1936). T: Sydney, N.S.W., *F.Lloyd* s.n.; holo: BM; iso: BRI, K, MEL, PERTH.

Illustrations: F.E.Lloyd, *op. cit.* t. 12, & 110, fig. 2 (1936) as *U.lawsonii*; R.Erickson, *Pl. Prey* t. 16, fig. 3 (1968).

Terrestrial herb. Leaves numerous, at stolon nodes, petiolate, up to 18 cm long, simple or bi- or tri-pinnately divided into numerous opposite, narrowly linear segments 0.2–0.3 mm wide. Traps numerous, 0.5–1.5 mm long, long-stalked. Inflorescence erect, 10–45 cm long; flowers 2–20; peduncle 0.5–1.2 mm thick; pedicels erect, straight, 3–6 mm long, smooth. Calyx lobes unequal; upper lobe orbicular, 1.5–2 mm long; lower lobe larger, transversely elliptic. Corolla 7–10 mm long, dark blue-violet with white streaks on the palate; upper lip broadly obovate; lower lip transversely elliptic, shallowly 2-lobed; spur cylindrical, about as long as the lower lip. Capsule globose, c. 2.5 mm long. Seeds 0.2–0.25 mm long.

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Utricularia

Occurs in a narrow coastal strip from Fraser Is., Qld, south to Sydney, N.S.W. Grows in wet sand and shallow pools in heath. Flowers Oct.–Jun.

Qld: W side of Fraser Is., *K.Paijmans 2003* (CANB); Maroochy Airfield, *P.Taylor 17074* (K). N.S.W.: Broadwater Natl Park, *R.Coveny 9337* (NSW); Smiths Lake, Bulahdelah, *H.M.R.Rupp* (NSW 58071).

51. *Utricularia limosa* R.Br., *Prodr.* 432 (1810)

Nelipus limosa (R.Br.) Raf., *Fl. Tellur.* 4: 109 (1838). T: Endeavour R., [Qld], *J.Banks & D.Solander s.n.*; holo: BM.

U. ceratophylloides O.Schwarz, *Feddes Repert.* 24: 98 (1927). T: 14 miles E of Port Darwin, N.T., *F.A.K.Bleeser 484*; holo: B, (destroyed).

Illustrations: R.L.Specht, *Rec. Amer.-Austral. Exped. Arnhem Land* 3: fig. 22a (1958); R.Erickson, *Pl. Prey* t. 17, fig. 26 (1968); P.Taylor, *Fl. Males.* ser. I, 8: fig. 17 (1977).

Terrestrial or subaquatic herb. Leaves numerous, at peduncle base and stolon nodes, petiolate, up to 5 cm long, pinnately divided into alternate capillary segments 0.1–0.3 mm wide. Traps numerous, 0.5–1.2 mm long, long-stalked. Inflorescence erect, 5–35 cm long; flowers 2–20; peduncle 0.5–0.8 mm thick; pedicels curved, up to 6 mm long, papillose. Calyx lobes unequal; upper lobe transversely elliptic, up to 1.5 mm long; lower lobe obovate-oblong, a little longer. Corolla 4.5–6 mm long, violet, or white with pink lobes and yellow palate; upper lip broadly ovate; lower lip square, shortly bilobed; spur cylindrical, longer than the lower lip. Capsule globose, 2–3 mm long. Seeds c. 0.25 mm long.

Occurs in the Kimberley, W.A., in N.T. from Darwin east to the Qld border and in Qld from the tip of Cape York Peninsula south to Cardwell; also in Thailand, Laos, Vietnam, China (Hainan Dao and Guangdong), peninsular Malaysia and New Guinea. Grows in wet sand and mud or shallow water in swamps. Flowers Feb.–Sep.

W.A.: Mitchell Plateau, W Kimberley, *K.F.Kenneally 4755* (K, PERTH). N.T.: Galiwinku, Elcho Is., *C.R.Dunlop 3877* (DNA, NT, K); 9 km NE of Pine Creek, *L.G.Adams 1742* (CANB, K). Qld: Jardine R., *L.J.Brass 18918* (GH, K, L).

Sect. 10. *Setiscapella*

Utricularia sect. *Setiscapella* (Barnhart) P.Taylor, *Kew Bull.* 41: 15 (1986)

Setiscapella Barnhart in J.K.Small, *Fl. Miami* 170 (1913). T: *S. subulata* (L.) Barnhart

Terrestrial or affixed aquatic herbs with stolons. Leaves simple, linear or pinnately divided into linear segments. Traps on the stolons and also laterally on the leaves; mouth lateral with 2 dorsal, branched, narrowly subulate appendages. Scales present. Bracts peltate. Bracteoles absent. Flowers racemose, alternate. Corolla with lower lip 3-lobed, usually yellow. Seeds ellipsoid; testa with long narrow cells.

A section of 11 species, mostly American, but with 1 very widespread, including Australia.

52. *Utricularia subulata* L., *Sp. Pl.* 1: 18 (1753)

T: Virginia, U.S.A. *J.Clayton 31*; holo: BM; iso: photo GH, photo K.

Utricularia setacea Michx., *Fl. Bor.-Amer.* 1: 12 (1803); *Vesicularia setacea* (Michx.) Raf., *Fl. Tellur.* 4: 109 (1838). T: Carolina, U.S.A., *Herb. Michaux*; holo: P.

Illustration: P.Taylor, *Fl. Males.* ser. I, 8: fig. 18 (1977).

Terrestrial herb. Leaves few, simple, petiolate, narrowly linear, subacute, up to 20 mm long and 1 mm wide. Traps numerous, 0.2–0.7 mm long, stalked. Inflorescence erect, 2–10 cm long; flowers 1–6; peduncle filiform 0.3–0.6 mm thick; pedicels ascending, 2–10 mm long. Calyx lobes subequal, broadly ovate, 1–1.5 mm long. Corolla 5–10 mm long (or much reduced when cleistogamous), yellow; upper lip broadly ovate; lower lip broadly cuneate, deeply 3-lobed; spur narrowly cylindrical (or shortly conical when cleistogamous), about as long as the lower lip. Capsule globose, 1–2.5 mm long. Seeds 0.2–0.3 mm long.

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Utricularia

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Occurs near Darwin, N.T. and northern Cape York Peninsula, Qld. Pan-tropical, widespread in the Americas and Africa, scattered in Asia (India, Thailand, peninsular Malaysia, Borneo). Grows in wet grassland. Flowers Feb. (Qld, chasmogamous) and May (N.T., cleistogamous).

N.T.: E of McMinns Lagoon, about 25 km SE of Darwin, *P.Taylor 17180* (CANB, DNA, K). Qld: Tozers Gap, *P.S.Lavarack 3042* (K); Foot of Mt Tozer ex J.W.Wrigley 761323 cult. Canberra Bot. Gardens, *D.Verdon* (CBG 067723).

For the extensive extra-Australian synonymy of this species see P.Taylor, *Kew Bull. Add. Ser.* 14: 526–528 (1989).

Sect. 11. *Utricularia*

Utricularia L. sect. *Utricularia*

Type: *U. vulgaris* L.

Suspended or affixed aquatic herbs with long stolons. Leaves usually divided into more or less numerous, capillary, and (in Australian species) setulose segments. Traps lateral on the leaf segments, in the angle between leaf segments or sometimes replacing the segments; mouth lateral, with 2 dorsal, usually branched, setiform appendages and often further lateral simple setae. Scales present or absent. Bracts usually basifixed, sometimes auriculate. Bracteoles always absent. Flowers racemose, alternate. Corolla usually yellow. Capsule usually circumscissile, sometimes valvate. Seeds very varied, often winged.

A section of 34 species, throughout the range of the genus; 5 species in Australia.

53. *Utricularia muelleri* Kamiński, *Ber. Deutsch. Bot. Ges.* 12: 5 (1894)

T: Darwin, N.T., *M.Holtze 474*; lecto: MEL, *vide* P.Taylor, *Kew Bull. Add. Ser.* 14: 635 (1989).

[*Utricularia stellaris* auct. non L.f.: G.Bentham, *Fl. Austral.* 4: 525 (1868) *p.p.*]

Suspended aquatic herb with long stolons. Leaves numerous, divided from the base into 3 or more primary segments; ultimate segments numerous, capillary, setulose. Traps rather few, lateral on the segments, 1–3 mm long, stalked. Inflorescence erect, 5–30 cm long; peduncle with a whorl of 4–8 spongy, ovoid, stipitate floats at or above the middle; scales absent; flowers 2–14; bracts basifixed; pedicels spreading, becoming reflexed, 3–10 mm long. Calyx lobes not accrescent, ovate, c. 2 mm long. Corolla 6–7 mm long, externally glandular; upper lip yellow, oblong; lower lip yellow with reddish streaks at base, transversely elliptic; spur truncate-conical, shorter than lower lip. Capsule globose, circumscissile, 3–4 mm long. Seeds lenticular, with a narrow wing c. 2 mm wide.

Occurs in the Kimberley, W.A., from the Darwin region south to Katherine, N.T., in scattered localities fringing the Gulf of Carpentaria, and in Cape York Peninsula, Qld. Also in SW New Guinea. Grows in deep or shallow still water in lagoons and *Melaleuca* swamps. Flowers Apr.–Oct.

W.A.: Kununurra, *K.Paijmans 2306* (CANB). N.T.: Jabiru, *T.S.Henshall 3366* (NT, K); Knuckeyes Lagoon, *P.Taylor 17117* (K). Qld: Wenlock, Batavia R., *L.J.Brass 19678* (CANB, L, SING).

54. *Utricularia stellaris* L.f., *Suppl.* 86 (1781)

Lepiactis stellaris (L.f.) Raf., *Fl. Tellur.* 4: 109 (1838). T: India, *J.G.Koenig s.n.*; holo: BM; iso: LD.

Hamulia flava Raf., *Fl. Tellur.* 4: 109 (1838), *nom. illeg.* T: as for *U. stellaris* L.f.

Illustration: H.I.Aston, *Aquatic Pl. Australia* fig. 39a–j (1973).

Suspended aquatic herb. Leaves very numerous, 1–6 cm long, divided from the base into 3 or more primary segments; ultimate segments numerous, capillary, setulose. Traps numerous, lateral on the segments, 1–3 mm long, stalked. Inflorescence erect, 3–30 cm long; peduncle with a whorl of 3–8 spongy, ovoid, sessile floats near the apex; scales absent; flowers 2–12; bracts basifixed; pedicels erect, becoming reflexed, 1–5 mm long. Calyx lobes broadly ovate, 3–4 mm long. Corolla 7–10 mm long, externally pubescent, yellow; upper lip ovate; lower lip

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Utricularia

transversely elliptic; spur cylindrical, shorter than lower lip. Capsule globose, circumscissile, 3–4 mm long. Seeds disk-shaped, angular, 0.8–1.2 mm wide with the angles winged.

Occurs in widely scattered populations, near Wyndham, W.A., north-central N.T., and in Qld from the southern Cape York Peninsula south to 26° S lat.; also throughout tropical Africa, Madagascar and India to Burma and Vietnam, but strangely absent from Malesia. Grows in shallow water in lagoons and swamps. Flowers Apr.–Jul.

W.A.: 20 km SE of Wyndham, *N.G.Marchant 77/154* (PERTH). N.T.: Newcastle Waters Stn., Tandigee Bore, *T.S.Henshall 999* (MEL, NT). Qld: Valley of Lagoons, 110 km W of Ingham, *H.I.Aston 2297* (K, MEL); Tyrone, 5 km E of Langlo Crossing, *E.C.Macdonald 383* (K).

55. *Utricularia aurea* Lour., *Fl. Cochinch.* 1: 26 (1790)

T: Vietnam, *J.Loureiro*; n.v.

[*Utricularia flexuosa* auct. non Vahl: G.Bentham, *Fl. Austr.* 4: 525 (1868) p.p.].

Illustration: P.Taylor, *Fl. Males.* ser. I, 8: figs 21–23 (1977).

Suspended aquatic herb with long stolons. Leaves very numerous, 1–8 cm long, divided from the base into 3 or more primary segments; ultimate segments numerous, capillary, setulose. Traps few, lateral on the segments, 1–4 mm long, stalked. Inflorescence erect, 5–25 cm long; floats absent or narrowly fusiform at or near the peduncle base; scales absent; flowers 5–10; bracts basifixed; pedicels erect, becoming reflexed, 4–20 mm long. Calyx lobes ovate, accrescent, reflexed and up to 9 mm long in fruit. Corolla 10–15 mm long, externally pubescent, yellow; upper lip ovate; lower lip transversely elliptic; spur cylindrical, about as long as lower lip. Capsule globose, circumscissile, up to 5 mm long, with a long persistent style. Seeds disk shaped, angular, 1.5–2 mm wide, with the angles winged.

Occurs in the Kimberley, W.A., through N.T. and Qld to north-eastern N.S.W. Widespread in tropical Asia from western India to Japan and New Guinea. Grows in shallow or deep water in pools and swamps. Flowers Feb.–Oct.

W.A.: Drysdale R., *A.S.George 13761* (PERTH). N.T.: about 9 km NE of Pine Creek, *L.G.Adams 1741* (CANB, K); near Robin Falls, S of Darwin, *D.Symon 7999* (ADW, CANB, K, L, NT, PERTH). Qld: Lakefield, *A.Kanis 1959* (CANB, K). N.S.W.: Lake Minnie Water, *Timms* (NSW 100416).

56. *Utricularia australis* R.Br., *Prodr.* 430 (1810)

T: between Hawkesbury and Parramatta, N.S.W., *R.Brown s.n.*; holo: BM.

[*Utricularia flexuosa* auct. non Vahl: G.Bentham, *Fl. Austr.* 4: 525 (1868) p.p.]

Illustrations: H.I.Aston, *Aquatic Pl. Australia* fig. 38 (1973); P.Taylor, *Fl. Males.* ser. I, 8: fig. 25 (1977); G.R.Sainty & S.W.L.Jacobs, *Waterplants N.S.W.* 276, 278 (1981).

Suspended aquatic herb. Leaves very numerous, 1.5–4 cm long, divided from the base into 2 primary segments; ultimate segments numerous, capillary, setulose. Traps numerous, lateral on the segments, 0.5–2.5 mm long, stalked. Inflorescence erect, 10–30 cm or more long; floats absent; flowers 4–10; peduncle with 1–3 scales always present; bracts basifixed; pedicels erect at anthesis, later spreading, 1.5–3 cm long. Calyx lobes subequal, ovate, 3–4 mm long. Corolla 12–20 mm long, yellow; upper lip very broadly ovate; lower lip reniform; spur broadly conical, shorter than the lower lip. Capsule and seeds extremely rare.

Occurs sporadically in south-western W.A., northern N.T., Flinders Ranges and south-eastern S.A., eastern Qld and N.S.W., more frequent and widespread in Vic., scattered in Tas. Widespread in temperate Eurasia extending southwards into Africa, India, SE Asia and New Zealand. Grows in still water in pools and swamps. Usually sterile but collected in flower Nov.–Apr.

W.A.: Cape le Grand Natl Park, *P.Taylor 17010* (K). N.T.: Manton R., *A.C.Beaglehole 13504* (NT). S.A.: Flinders Ra., Wilpena Pound, *D.Symon 577* (AD, ADW). Qld: Hasties Swamp, near Atherton, *H.I.Aston 1797* (K). N.S.W.: Picton Lakes, about 1 km W of Couridjah, *R.Coveny 804* (K, NSW). Vic: c. 10 km ENE of Echuca, *H.I.Aston 1800* (K, MEL). Tas.: Cataract, South Esk River, *R.Gunn 1225* (HO, K, NSW).

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57. *Utricularia gibba* L., *Sp. Pl.* 1: 18 (1753)

Vesiculina gibba (L.) Raf., *Fl. Tellur.* 4: 109 (1838). T: Virginia, [U.S.A.], *J. Clayton s.n.*; holo: BM.

U. biflora Lam., *Illustr.* 1: 50 (1791). T: Carolina, [U.S.A.], *J. Fraser s.n.*; holo P; iso C.

U. exoleta R.Br., *Prodr.* 430 (1810). T: Hawkesbury, N.S.W., *R. Brown s.n.*; holo: BM.

Illustrations: H.I. Aston, *Aquatic Pl. Australia* fig. 39 k-o (1973); P. Taylor, *Fl. Males.* ser. I, 8: fig. 20 (1977); G.R. Sainty & S.W.L. Jacobs, *Waterplants N.S.W.* 279 (1981).

Affixed or suspended aquatic herb. Leaves numerous, 1–20 mm long, forked from the base into capillary segments; ultimate segments up to 8 in number, sparsely setulose. Traps lateral on the leaf segments, 1–1.5 mm long, stalked. Inflorescence erect, 2–35 cm long; floats absent; scales few or absent; flowers 1–6; bracts basifixed; pedicels erect, 2–30 mm long. Calyx lobes subequal, broadly ovate, 1–3 mm long. Corolla 4–25 mm long, yellow; upper lip ovate, usually obscurely 3-lobed; lower lip smaller, approximately circular, entire; spur conical to subulate, with apex obtuse, variable in length relative to the lower lip. Capsule globose, valvate, 2–4 mm long. Seeds lenticular, 0.8–1 mm in diam., with an irregular wing.

Occurs in W.A. (south-west and Kimberley), northern N.T., the Gulf of Carpentaria, eastern Qld and eastern N.S.W. Almost cosmopolitan, throughout the tropics and extending northwards to Canada and the U.S.A., Europe, China and Japan and southwards to Argentina, South Africa and New Zealand. Grows in mud and shallow water and also suspended (usually sterile), or affixed (cleistogamous) in deep water. Flowers more or less throughout the year, when temperature and water level are favourable.

W.A.: L. Jandabup, Wanneroo, *P. Taylor 17032* (K). N.T.: Koolpinyah Stn., *M.O. Rankin 2360* (DNA, K); Jabiru, 10 May 1976, *C.R. Dunlop* (DNA, K). Qld: near L. Weyba, *P. Taylor 17071* (K). N.S.W.: 7.6 km N of St Albans, *R. Coveny & P. Hind 10537* (K, NSW).

For the extensive extra-Australian synonymy of this species see P. Taylor, *Kew Bull. Add. Ser.* 14: 572–576 (1989).

Doubtful and excluded names

Utricularia compressa R.Br., *Prodr.* 431 (1810)

Vesiculina compressa (R.Br.) Raf., *Fl. Tellur.* 4: 109 (1838). T: tropical Australia, *J. Banks & D. Solander, n.v.*

Like G. Bentham, *Fl. Aust.* 4: 525 (1868), I can locate no specimen of this species nor, from the description, can I assign it with any certainty to any known species.

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