

larger in wetter, sheltered areas than they do in open exposed situations. With the large numbers of these two species growing in close proximity on this mountain I never found a single hybrid.

D. stenopetala disappeared at about 2000 ft and were not found at the top of the mountain. At least I think it was the top. All I could see was the inside of a very grey cloud.

I made it back to the hut just as the rain began to fall. I did not find any *U. monanthos* which also grows in these mountains, but as anyone knows a *utricularia* without a flower is almost impossible to find. The next morning I left early in the pouring rain with a pair of fast walking Germans so that I could catch the first boat back to civilization and a hot shower. Unfortunately this was not to be as we managed to lose the track and find the biggest, deepest mud hole you could ever imagine. Needless to say we missed the first boat but luckily there were showers at the visitors centre to bring the warmth back to my bones.

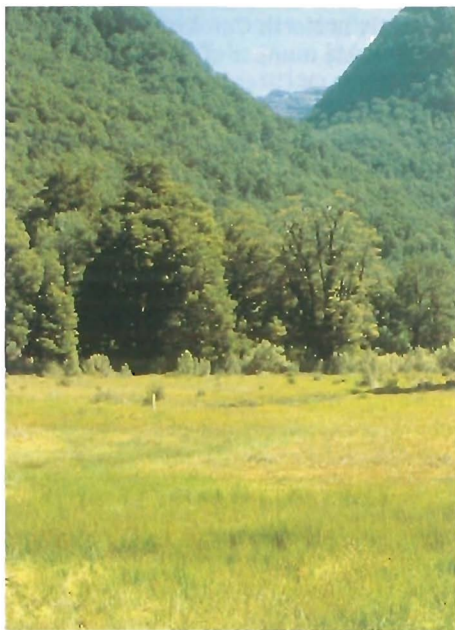


Figure 1. Warren Burn Swamp, Fiordland National Park, New Zealand.

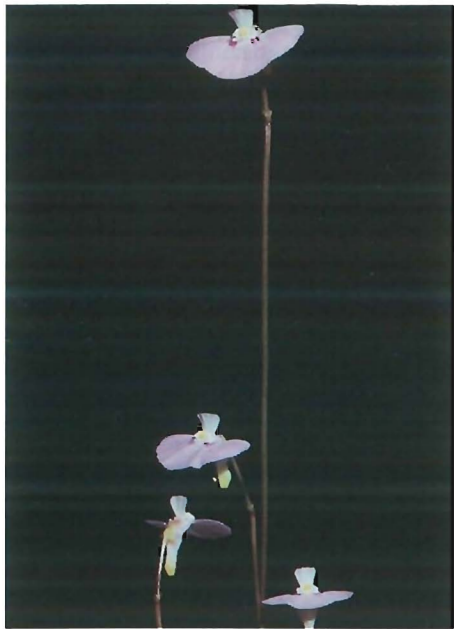


Figure 1: *U. uniflora* in flower



Figure 2: An overhead view of a *U. uniflora* flower

Focusing on *U. uniflora*—a Butterfly Look Alike

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I grow many *Utricularia* from around the world and of the small terrestrials my favorite is *U. uniflora*. It is easy to grow, requires little space and its flowers are lovely. Attached to the tip of a dark glossy scape, each blossom resembles a little butterfly gliding in the air (Figure 1). Best of all, the flowers last several weeks. This article addresses *U. uniflora*'s cultural requirements so you can grow it successfully, and its morphology so you can be certain of its identification if you believe you are growing it.

In describing *U. uniflora* we must be careful because several similar species are in cultivation: *U. uniflora*, *U. monanthos*, *U. novae-zelandiae*, and *U. dichotoma*. Over time these plants have become confused in collections. The introduction of interesting new forms of these plants, especially by Allen Lowrie and other explorers, may compound this confusion. I hope this article on *U. uniflora* will help decrease some of the bewilderment. In the future I'll provide details on how to distinguish among these other species, but until then and in difficult cases you can refer to Taylor's monograph. Much of the information in this article is drawn from that work. If you are baffled by my use of botanical terminology, refer to my earlier CPN article, *Focusing on U. calycifida—a Variable Species* (CPN 21:1–2).

U. uniflora is one of many species with small leaves that poke randomly out of the soil. The dark green leaf blades are round, elliptical, or obovate, 1–2 mm wide and 2–3 mm long. Each is flat or often slightly curled, and a single almost undetectable vein runs along its middle. Palid-green or white petioles connect the leaf blades to threadlike stolons 5–10 mm underground. Bladders are produced only from the subterranean network of stolons and are uncommon. The traps are small, 0.5–1.5 mm across, and are borne on delicate stalks about 1 mm long.

Flowering begins with the appearance of a single smooth peduncle about 0.5 mm thick and round in cross-section. The peduncle is lustrous olive-green or brown-green, and never bears scales or branches. The scape grows almost perfectly vertically as if guided by a plumb line and is topped by a little 1 mm ball—the embryonic flower. On the plants I have grown or seen, the growing scape always holds the spherical flower bud at its apex, like a seal balancing a beach ball on its muzzle, until the peduncle reaches its maximum size of 8–20 cm (occasionally longer). The pedicel, round in cross section and like a smaller version of the peduncle, then elongates to 2–15 mm long. Meanwhile the flower bud swells in preparation for flowering. The scape is striking in its simplicity even at this stage before the flower opens. Usually several peduncles appear in succession, sparsely scattered in the pot.

The epithet *uniflora* means single-flower and this species lives up to this description. As with all *Utricularia*, a bract is formed at the union of the peduncle and pedicel (a bract is a usually small, often leaf-like organ produced in association with flowers). This species, like many others, also produces two bracteoles, one on either side of the bract. The bract and bracteoles on a *U. uniflora* flower are a few mm long, and are ovate or elongated with blunt tips. They are basifixed, which means they are attached by their bases to the peduncle. Since the species is single flowered, you would expect three little growths at the pedicel base: one bract and two bracteoles. But with

U. uniflora there are six! If you examine them closely with a hand lens you can see why. Nestled among the cluster of organs is a tiny dormant flower. This is why there are three extra parts—one bract and two bracteoles to accompany the dormant bud. So the epithet “single-flower” is only partly true. But why would the plant produce an unused flower bud? Perhaps the evolution of *U. uniflora* is reducing (or increasing) the number of flowers per scape and the bud is a vestigial appendage, a reminder of the plant's ancestry (or possible future). Or perhaps the second bud is an emergency back-up to be used if the first flower is damaged. To test this hypothesis I have removed the active flower bud from inflorescence at various stages of maturity, but the dormant buds have never been activated. Taylor states in his monograph that there can be two flowers to a scape, but this may be conjecture on his part—for example, rare double-flowered inflorescence have been observed for *U. menziesii* and *U. resupinata*. My *U. monanthos* very rarely produces double-flowered peduncles. A double-flowered *U. uniflora* would no doubt bear its two flowers in a pair at the peduncle terminus, as does my *U. monanthos* and *U. dichotoma* in their double-flowered incarnations.

What are the mature flowers like? The corolla's upper lip extends vertically a few mm from beneath the upper calyx lobe. It gently widens to its end which is often notched, or as is the case with my plants, faintly four-lobed. The lower lip is much larger than the upper, about 0.9–1.5 cm long. It is nearly level with respect to the ground, and in outline it is like an open hand-held fan or an extremely generous portion of a pie: two straight edges diverge from each other at an angle of 150 to 180 degrees, then are connected at their endpoints by a circular arc. Sometimes the outer margin is not quite circular, but is instead somewhat three-lobed. The lower lip is often perfectly flat, as if it had been pressed between the pages of a book, but in some specimens it is flexed downward or upward at the corners, like a skate or manta ray swimming undersea. There is no palate bulge on the lip, but near where the upper and lower lips touch is a row of 6–10 parallel ridges 1 mm long (Figure 2). As we shall see, these ridges are important in keying out this species. The spur is about as long as the lower lip and points 90 degrees away from it, down towards the ground. The spurs of many *Utricularia* taper to a point, *U. subulata* or *U. sandersonii* for example. On this plant it is cylindrical and even flares slightly to a rounded, unforked, tip. The calyx lobes are about 3–6 mm long and the upper lobe is a little larger than the lower. They are elliptical or ovate with rounded tips, but the lower lobe can be notched.

The petals are colored very nice shades of lilac or purple. My plants are lilac-mauve, with streaky patches of dark purple near the row of ridges on the lower lip. The central pair of ridges is always yellow, the flanking ones are white or the colour of the rest of the flower. The spur is white or pale green, and grades into pale yellow at the tip—the spurs on my plants have dark pinstripes. The calyx lobes are green but may be tinged lilac.

U. uniflora and *U. dichotoma* are in the section of *Utricularia* called *Pleiochasia*. They are similar species, and *U. uniflora* has often been considered to be only a variety of *U. dichotoma*. In his monograph, Taylor did not recognize any taxa below the species level, but in *U. uniflora* we have a rare case where he chose to recognize a tentative variety as a new species, instead of subsuming it into the old species. The two species are different in several ways, but the diagnostic Taylor sets out in his key relies on the ridges on the flower's lower corolla lip. For *U. uniflora*, the central yellow ridges are always shorter than or barely as long as the white and purple ridges flanking them. In contrast, the yellow ridges in *U. dichotoma* are much longer than the white or purple ones flanking them. The yellow ridges on my *U. dichotoma* are so much larger and more

conspicuous I never even noticed the purple ones until I read Taylor's descriptions and keys. Excellent photographs of *U. dichotoma* that illustrate this feature are in CPN 11:1, p18 and especially Slack's *Insect Eating Plants and How to Grow Them*, p172. There are other differences between the species. The flowers of *U. dichotoma* are usually heavily perfumed while those of *U. uniflora*, at least mine, are odorless. While *U. uniflora* seems exclusively single or perhaps double flowered, *U. dichotoma* can have one to three flowers arranged in a terminal whorl, or even more with pairs of flowers set opposite each other on the raceme. Lastly, Kondo and Whitehead found that while *U. dichotoma* is diploid, *U. uniflora* is tetraploid. That the yellow lower lip ridges are not longer than the flanking ones also distinguishes *U. uniflora* from the other species *U. monanthos* and *U. novae-zelandiae*.

In the wild *U. uniflora* grows in southeastern Australia: Tasmania, New South Wales, and southeastern parts of Victoria and Queensland. It grows in bogs and near streams and appears to prefer shadier habitats than the sun-loving *U. dichotoma*. It has been collected in flower during the spring and summer, from September to January.

The culture of this plant is easy. I use a method that works for almost all the tropical *Utricularia* except those that do better in live *Sphagnum*, and of course aquatics and semi-aquatics. When CPers refer to "standard *Utric* culture," the following procedure (or close to it) is usually what is meant. Use either pure dead milled *Sphagnum* or a 2:1 peat-sand mix in a 5 cm (2") pot. I use water purified by distillation or reverse osmosis and keep the water table at least a few cm beneath the soil surface. For established plants Slack suggests raising the water table above the soil surface but I don't. I know some growers are fortunate enough to be able to use tap water, but my Arizona tap water contains far too many dissolved chemicals. Keep them warm year round, around 20–30C (68–86F). If the plants are kept warmer they will survive but the flowers do not last as long. Since they are found in shady places in the wild I give them medium light. While this means some shade in the greenhouse, the light available in most 4–6 fluorescent bulb terrarium set-ups is fine. Even in the best conditions, *U. uniflora* does not grow quickly. It takes several months to fill the surface of a 5 cm pot with its little leaves. Its stolons do not explore too deeply into the pot, and I have never seen the plant grow out of the bottom as often happens with other species. Still, it is easy to propagate—carefully detach from the mother pot a hunk of leaves, stolons, and bladders, and plant it in a new pot. In time you will be rewarded with a display of lovely and long-lived flowers. While none of the major CP nurseries offer *U. uniflora* and it is rarely if ever stocked in the ICPS seed bank, many CPers grow the plant and by writing around you can usually locate some. Despite attempts at self and cross pollination, I have never been able to yield seed from my plants.

I hope this article and photographs have convinced you *U. uniflora* is an attractive species worthy of being in your collection. I like it so much that, whenever it is flowering and my wife and I are entertaining guests, I always bring the pot out of the greenhouse, wipe off any algae, and set it on the dinner table as an accent. Although dainty, its bold form always generates praise and pleases our guests—even those unfamiliar with my peculiar hobby and who gauge flowers by the gaudy excess of roses, Dahlias, or Iris. Their interest and delight is always heightened when I tell them the plant is a carnivorous guest joining us for the meal—a genteel individual that won't eat loudly, belch, or rudely interrupt conversation. Truly..... cultivated.