

Outside New Zealand, *O. petiolatum* has a wide range in the tropics, but its exact distribution is difficult to determine because of confusion with *O. reticulatum*. The plant was referred to *O. pedunculatum* by Allan (*Flora of New Zealand*, Vol. I), but this name is definitely incorrect. In New Zealand, the species is at the southern limit of its distribution and is now very rare. Unfortunately, plants at Hokio are threatened by grazing and planting of pines. Another population has recently been discovered by Anthony Wright in an isolated area of Great Barrier Island, and the species should certainly be looked for in remaining wetland areas of the North Island.

Annual Growth of Bulbous Buttercup (*Ranunculus bulbosus*)

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One sometimes reads of the naturalised plant, bulbous buttercup, that a bulb is not always present, or that the plant sometimes disappears after flowering. It seemed that a study of the growth pattern could provide answers.

From the following, it will be seen that (a) the "bulb" (corm) is not present in early stages of the seedling plants, and is not very recognisable while it is totally enclosed within the sheathing bases of many petioles; and that (b), the developed corm has a dormant stage which may be brief or long, the plant's survival depending on available moisture before the corm becomes too desiccated.

In April 1978, rosettes of prostrate leaves were seen in poor pasture on a low gravel terrace at Ohau. The leaves were rather similar to those of creeping buttercup, having three, deeply-lobed and serrated leaflets, but the leaves were more numerous and there were no trailing stems. Some plants dug up showed that the leaf rosettes were springing as offsets from a shallowly buried corm. Several rosettes were gathered to grow for study.

As seedlings, the plants are just a cluster of leaves above a number of stout roots. The leaves increase in number during winter and during the flowering stage, the outer ones dying off in succession. By mid-September, a stout corm has been built up within the sheathing petiole bases. At this stage it is about 15 mm in diameter with an outer layer 4 mm thick from which spring the leaves and roots. By now the developing floral scapes are crowding at the centre of the cluster and the first flower appears, long-stemmed. At the base of the stem are what appear to be leaves with narrow strap-shaped lobes. As the scape thrusts upwards

these are seen to be bracts with secondary flower shoots emerging from their axils. The scape becomes diffuse and straggling and there are many flowers, each with pale, reflexed calyx lobes. Flowering is generally finished by mid-December, though in a late season it may continue throughout January.

Meanwhile, the corm has been developing between the bases of successive leaves. This will provide for the following season's growth. As the last flower dies, so does the last leaf. The growing corm has had roots till near the end of the flowering period, but now their work has been done, even though the rootless corm still has dead flower stems quite firmly attached. With the death of the leaves the corm has become exposed and is only partly in the ground. A slight tug at dead flower stems easily lifts the whole plant, so it is not only vulnerable to excessive drying out, but also to accidental removal. A summer shower can initiate new growth immediately, so the plant may appear to be growing continuously, whereas in drought its growth is delayed.

At this time the corm is about as long as a peanut shell but stouter, with a number of small nodules towards the top. On 30 December 1980, a dry corm which had been pulled up a week or more previously was set in a glass of shallow water. A day later, the first small roots sprouted from the base of a growth nodule from which a single leaf was beginning to emerge. A few hours later a second nodule was increasing in size. On 2 January 1981, the first shoot was about to send out more leaves. It had five roots, the longest 5 mm. Two more nodules showed development. Thus it can be seen how rapid is the growth of offsets from a dormant corm once moisture is available. Another corm, which had been out of the ground for a longer period, was treated the same way, but after one sickly leaf appeared the whole corm rotted, moisture having been delayed too long.

Illustrations available to me show the corm in different stages of development and thus are not readily compared. The best one is in Allan¹ (p. 12) showing an offset growing from the corm, while another illustration on p. 49 shows the corm at a late stage of development, late in the flowering season. In Martin² plate 3, the "bulb" appears truly onion-like and is misleading. Keble Martin describes this buttercup as abundant in dry pastures. This would be in contrast to the habitats of other buttercups. A well-drained winter pasture gives the leaf rosette its best chance for healthy development while other herbage is still low growing or dormant. As has been shown, extremes of drought are not suitable.

REFERENCES

1. Allan, H. H. 1940: *A handbook of naturalised flora of New Zealand*. E. V. Paul, Govt. Printer. 344 p.
2. Martin, W. Keble 1965: *The concise British flora in colour*. Ebury Press. Michael Joseph. 231 p.