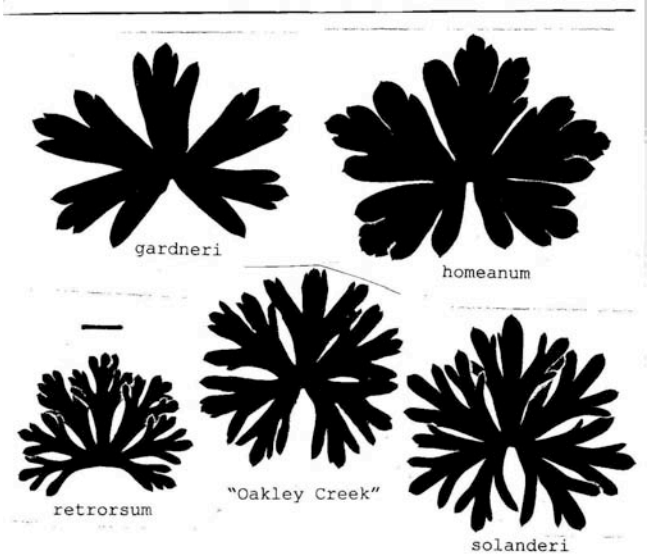

Fig. 1. Leaf-blades of some Auckland geraniums. Scale bar 1 cm (drawn by ROG).

The epithets "*gardneri*" and "*solanderi*" have a pleasing assonance, I can't resist saying. Unfortunately, when *G. solanderi* was introduced in 1964 as a replacement name for the illegitimate *G. pilosum* its author did not take cognisance of the traditional latinization "*solandri*" (as in *Nothofagus s.*, etc). Again unfortunately, the current Rules of Nomenclature do not allow a correction to this latter spelling.

Peter and I have noted that *G. gardneri* is still increasing its range, e.g., down the West Coast of the South Island — a strong indication of its adventive status, we think. Just as interesting is that *G. gardneri* doesn't seem to be as threatening a weed as it appeared to be in the 1980s. I do not know the reason for this - certainly it is not nearly as susceptible as *G. solanderi* and *G. retrorsum* to grazing by rabbits or slugs and snails.

The story of adventive Australian geraniums in Auckland is not over. Early in 2004 I found another such plant in the suburb of Wesley, along the top of the basalt blockwork that lines Oakley Creek. It has an only slightly swollen taproot, flowers about the size of *G. gardneri*, shallow and only slightly elongate seed-coat alveolae, and petiole-hairs that are slender and appressed like those of *G. homeanum*. Although it is not uncommon at the above site, and has spread a little in my garden, it seems not to have turned up anywhere else in Auckland. Anyone wanting to see it at Oakley Creek should hurry, since the area (immediately east of Alan Wood Park, grid ref. NZMS 260 R11 630768) is part of the Onehunga-Waterview S.H. 16 motorway now under construction.

Geranium gardneri and its relatives are tap-rooted perennials of grassland and light forest. Their "basal" leaves are produced in winter from a short stem and last into early summer, when they start drying off. Axillary shoots appear in spring. Growing up to half a metre so long these bear flowers in pairs, which generally self-pollinate to give a full set of seed. Then, like the basal leaves, the shoots die back completely. The shape of the leaf-blade — the degree of dissection and the shape and width of the lobes — is a useful visual clue to identity (Fig. 1.).

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Thelymitra matthewsii Cheeseman - One of Northland's special orchids

Anne Fraser

Prior to 1910 the Matthews family, R.H. Matthews and his sons of Kaitaia, had discovered the small terrestrial orchid now known as *Thelymitra matthewsii* in the heathland adjacent to the then Lake Tongonge to the west of Kaitaia. The plant was like no other with its spiral leaf inflated at the base and curled about the stem, the beautiful deep purple flower and the prominent golden anther and fleshy column arms (Fig. 1, 2, 3). As Matthews recognized that the species could be a new to science he sent samples to the eminent botanist T.F. Cheeseman, who agreed that it was new and named the species for Matthews. Cheeseman commented that it was 'a charming little plant worthily dedicated to its discoverer' (Cheeseman 1910).

Later, as the environs of Lake Tongonge were drained and the heathlands converted to pasture, the orchid disappeared, the last known collection being a herbarium sheet in 1923 (AK 70809, pers. comm. E.K. Cameron, Auckland Museum). As it had not been reported from anywhere else, the species was considered extinct (Given 1981, Johns and Molloy 1983)

Sixty-four years later, in 1987, *T. matthewsii* was re-discovered by D. McCrae while carrying out an orchid

survey of the Te Paki Reserves. A single plant in fruit was seen near the serpentine mine in the North Cape Scientific Reserve (McCrae 1988).

During an Auckland Botanical Society trip to the Far North in October 1995, members will remember the euphoria of the discovery of *T. matthewsii* flowering in the harsh habitat of the Surville Cliffs. The habitat is specific, the species being found in remnants of the heathland vegetation of the Far North in loosely compacted sand dunes, and older harder sandstones near the West Coast and the Surville Cliffs. It has also been found, in one locality, on the weathered clays of the volcanic highlands of the Te Paki Reserves. The main heathland shrub species associated with the orchid are *Leptospermum scoparium, Kunzea ericoides, Leucopogon fasciculatus Leptecophylla juniperina, Morelotia affinis, Pomaderris kumeraho* and the invasive *Hakea* species, *H. gibbosa* and *H. sericea*. There are some different species on the clay highlands, indicating a return to forest rather than heath, (McLean et al. 1985) with species including *Corokia cotoneaster, Coprosma rhamnoides, Phormium tenax* and *Geniostoma ligustrifolium.*

After seeing it in 1995 this little plant got under my skin and prompted me to submit a proposal for an ecological study of it as a subject for a Master of Science degree at Waikato University. Happily the project was accepted. The Master's study was conducted using data collected from 2002-2004. Five permanent monitoring sites were established in the three localities of known populations. A census of population numbers and life stages, the habitat and vegetation, and known factors of climate and geology were assessed for each site.

A search of studies of orchids in literature revealed some studies of durations up to 15 years and longer. My association with the species has now exceeded ten years, as I am still monitoring it. This study now ranks among the longest for an orchid in New Zealand.

My study found that *T. matthewsii* has four discreet life stages, or growth forms. The term life stage was chosen for ease of reference without implying steps to maturity. It was apparent that plant development is related to tuber size. The smallest leaf, a hook up to 15mm in height arises from a single small tuber. What could be considered the second stage is a spiral leaf coiled like a small spring, reaching 20mm or slightly more with two, the current and replacement, tubers. In the next stage the non-flowering plant is more robust, the coils less tidy and the leaf reaching up to 50mm in height. The tubers are larger than for the previous life stages. In all of these pre-adult life stages the leaf is not expanded at the base, as the species is commonly described in literature, but rises smoothly from the tuber. The species does not come up in the smaller stages and develop into a flowering plant in one growing season. The life stage which emerges remains in that life stage for the current season, withering and dying as that stage. A flowering adult emerges as an adult with the leaf expanded at the base, and the stem carrying the bud then extends with growth during the season until the bud is mature.

During each census plant presence or absence, height and life stage were recorded and labeled. This made it possible to follow the life stages of plants that appeared, and it was found that progression from smallest to flowering was not mandatory. A life stage model showed that a life stage was more likely to re-appear as the same one as in the previous season. The non-flowering life stage (the larger of the juvenile stages) did precede a flowering adult at a number of labels, but not consistently. The results of the study found that succession of spiral, non-flowering, adult, occurred in only 5% of all tagged plants in the three year period. The populations were composed of all life stages in varying numbers. No life stage appeared dominant, although 'new' plants, which appeared following a previous monitoring and therefore receiving new tags, were most often at the hook life stage. I suggest that the disturbance of monitoring to read identification numbers and measuring plants may have encouraged these putative seedlings to appear. Orchids are known to relish disturbance, and contrary to other groups of the species in the same areas, which had all but disappeared, the numbers within the monitored sites increased two-fold in the three seasons. For example, a site with 24 plants in 2002 at the beginning of data collection showed an increase to 48 plants in 2004. Another increased from 55 to 109 plants in the same time span.These different life stages and the spiral leaf are distinct in *Thelymitra* in New Zealand.

Thelymitra matthewsii is also found in Victoria, Australia. The Australian plant was originally known as *T. D'Altonii (T. daltonii*) after its Australian discoverer, Mr C. W. D'Alton (Rogers 1930). Maureen Young and I travelled to Australia in 1997 and were privileged to see the populations of *T. matthewsii* there (Fig. 4) with the kind assistance of Margaret MacDonald of Anglesea (south of Melbourne). These were more scattered and smaller in number than the populations in Northland. Australia has some other spiral leaved species but it is not known whether these juvenile stages occur in them. In all other *Thelymitra* species in New Zealand the juvenile plants resemble the adults, with smaller, more slender, but similar leaves, the veining less pronounced (Hatch 1952).

A characteristic of the flower of *T. matthewsii* is the absence of the post anther lobe, leaving the anther

Fig. 1.*Thelymitra matthewsii* showing the striped column and golden column arms, Te Paki Farm Park. Photo: Kevin Matthews.

Fig. 2. Column of *T. matthewsii* with vestigal post-anther lobe at the back of the anther. Photo: Kevin Matthews.

Fig. 3. Flower of *T. matthewsii*. Note the slight difference in colour of petals and sepals. Photo: Kevin Matthews.

Fig. 4. *T. matthewsii* in Anglesea Heath National Heritage Area, Sth Victoria, Australia. Photo: Margaret McDonald.

prominent. Descriptions of a feature, essentially the vestigial post anther lobe at the back of the anthervary in the literature. Cheeseman (1910: p.177) remarked 'occasionally there was evidence of a slight crest connecting the lateral lobes' and added 'the column wing scarcely crested in the back behind the anther". Jones (1993: p.299) described the post anther lobe as 'short, not hooded, sometimes notched with a dense grape-like cluster of calli, sometimes flanked by short accessory lobes'. Jones (2006: p.253) repeated this description and reiterated 'a dense grape-like cluster of globose glands'. Rogers (1930) describing *T. daltonii* reported the middle lobe much shorter (than the column) or obsolete 'without any dorsal crest'. Calli so far examined on flowers of *T. matthewsii* in the Far North appear to be quite sparse. This presents an anomaly that would benefit from further study.

A decline in the number of plants is now becoming a major feature of my data and suggests that the populations are entering the disappearing phase common to orchids. Surveys of adjacent populations will be carried out to determine whether there are still viable populations, (i.e. with adults to provide seed) in the areas surrounding the monitored areas, to ensure the species presence in this, the last habitat of *T. matthewsii* in New Zealand.

Acknowledgement
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Ethnobotany, germination and growth of *Eleocharis sphacelata*

Mieke Kapa

Eleocharis sphacelata, distributed over Australia, Papua New Guinea and New Zealand (predominantly in the north of the North Island) occupies the littoral margins of fresh water wetlands and lakes. It is an emergent sedge that displays morphological changes with increasing water depths, enabling it to out-compete other wetland macrophytes. To assist revegetation efforts with *Eleocharis sphacelata*, research was conducted to (1) record traditional ecological knowledge held by users; (2) determine the best methodologies for germination of seed; and (3) develop techniques for improved transfer of juvenile plantlets.

Ethnobotany: Kuta (Maaori name for *Eleocharis sphacelata* commonly used by Ngaapuhi, alternatively paopao is used by Te Arawa) is a culturally significant wetland plant that once harvested and prepared was traditionally woven into items such as cloaks, maro (aprons), paatae taua (mourning wreaths), and more commonly taapou (mats) (Kapa & Clarkson 2009). Cultural uses, conservation and ecology were investigated by exploring published information and Traditional Ecological Knowledge (TEK) held by Maaori (communicated to the researcher via interviews). Research identified that kuta, together with other wetland plant species, was used traditionally in commonplace events, rituals and tikanga, and that although kuta has a reduced everyday contemporary use, there is still a significant living repository among Maaori, particularly weavers, of TEK relating to this plant and that use of kuta within a cultural context is still practised and valued. Reduced access to, and drainage of, traditional kuta harvesting sites is a concern which could partially be mitigated by using culturally appropriate restoration techniques and methodologies in degraded locations.

Seed germination: Water depth and seasonal responses for seed germination may have implications for management practices to increase germination potential. Although *Eleocharis sphacelata* produces on average 75.3 seeds per seed head (Bell 2000) many commercial operators have had difficulty (as with many other wetland plant species) with low germination rates. Research undertaken attempted to