BOTANICAL AND OTHER OBSERVATIONS IN THE CHRISTCHURCH BOTANIC GARDENS DURING THE SUMMER OF 2014-2015

Dean Pendrigh
Christchurch Botanic Gardens

Introduction

In the wake of the February 22nd earthquake of 2011 the Water Garden and Rock Garden ponds in the Christchurch Botanic Gardens both suffered damage from liquefaction. This resulted in the water of both ponds draining away completely as the seal of the pond was breached. As a result of the damage, the ponds were dug out and re-lined with clay during spring and summer of 2011-2012. This left both ponds rather lifeless and with murky water from suspended clay particles. The rock garden pond was subsequently invaded by oxygen weed *Lagarosiphon major* and *Potamogeton crispus* in the 2012-2013 summer. These weeds were the target of an eradication programme, but they are still proving difficult to eradicate completely to this day.

The water garden pond on the other hand has not had the same weed problems. It has taken some time for the suspended clay particles to settle, the pond being still heavily silted in the 2012-2013 summer aggravated to some extent by wild fowl agitating the clay bottom. The suspended clay had cleared more by the 2014-2015 summer to the extent that the water is now clear for long periods especially after rain.

Nitella hyalina

In November 2014 the first aquatic plant was observed in the pond, gradually spreading to the extent I was concerned it may become a problem. Closer observation of the plant suggested it was in the Characeae family possibly in the genus *Chara*. I called Trevor Partridge to confirm identification, but my initial identification turned out to be wrong. In fact it was *Nitella hyalina*, which incidentally is in the same family.

Commonly referred to as charophytes, these species look like rooted aquatic plants but are in fact macro-algae, an ancient lineage that dates back to the Silurian and that are the closest living relatives to the land plants. They have whorls of lateral branches and grow by means of a single apical cell, resembling land plants by lacking true parenchyma. The charales have specialised male and female gametangia called antheridia and oogonia, which resemble the archegonia and antheridia of land plants. *Nitella hyalina* is widely distributed around the world favouring slow moving, low nutrient (oligotrophic) fresh water habitats in ponds,

lakes and streams. This species is outcompeted by other species if nutrient levels increase. There follows an account of the first naturally introduced plant species in the Water Garden pond.

Callitriche petriei

The second species of plant to arrive in the Water Garden pond appeared in late January. Being a pale green colour the plants stood out in contrast to the darker green leaves of *Nitella*. Using the book "Wetland plants in New Zealand" by Johnson & Brooke (1989), I identified it as the native *Callitriche petriei* (Family Callitrichaceae, Fig. 1). The illustration of the leaves on page 221 of this book is exactly the same as the Water Garden specimen. Trevor Partridge was able to confirm my identification, although he said to be 100% sure we would need to have flowers and fruit, which we did not have at the time. Therefore, Trevor took a rooted specimen to grow on at home to try and encourage it into flower. This species is dioecious and has wingless fruits in contrast to the monoecious flowers and winged fruits of the more common adventive *Callitriche stagnalis*.

Figure 1 *Callitriche petriei* collected in the Christchurch Botanic Gardens.

In the wild *C. petriei* is found on the edges of ponds, lakes or streams where it takes on a prostrate growth habit, or grows totally submerged, in which case plants are erect and up to 30 cm tall. In the pond, plants of *C. petriei* are growing totally submerged. *Callitriche stagnalis*, which had been present in the Water Garden before the earthquakes, is prostrate and is found growing only around the edges of the pond and has never

been observed totally submerged. The distribution of *C. petriei* in New Zealand extends through the North, South and Chatham Islands, but is not a widespread species being absent from some districts.

Limosella lineata

Another interesting find was *Limosella lineata* growing in gravel at the edge of the Water Garden pond. This is the first record of this species occurring in the Botanic Gardens. It has most likely been introduced to the pond by water fowl. Commonly known as mudwort, *L. lineata* is a stoloniferous tufted herb, with linear or narrow spathulate leaves 20-30 mm long. The diminutive 2-3 mm diameter flowers are white, clustered at the bases of the leaves. Fruit is a sub-globose capsule. *Limosella lineata* is a pioneer species native to New Zealand, found growing in freshly exposed mud of fresh water wetlands or gravel margins of lakes, ponds, streams water races and dune hollows.

It is interesting to note that this species also grows in dune slacks in Bottle Lake Plantation and Brooklands Lagoon. There is a good population around the pond at the entrance to the Plantation near the North Shore subdivision. Recently (early 2012) the Selwyn Plantation Board logged the block of *Pinus radiata* adjacent to Rothsay Avenue. A forestry track runs through the middle of this block providing a short cut directly to the beach. Covered in the dense shade of the pines, one section of the track was particularly wet especially in winter. Water would pond for months on end, and even at the height of summer the track would still remain moist. Now that the trees have been removed the track is exposed to full sun. While walking along this track at the beginning of 2014, *L. lineata* was observed in flower growing in damp sand on the edges of the track. *Limosella lineata* has quickly taken advantage of the now exposed track, highlighting its ability to invade newly exposed habitats. It will be interesting to see how long it will survive before being out competed by more aggressively growing plants.

Arocatus rusticus (swan plant bug)

While searching for seed of *Parsonsia* for the Botanic Gardens Index Seminum in early February 2015, I came across a specimen of *Parsonsia capsularis* covered in reddish bugs. Both nymphs 4-5 mm and adults up to 1cm long were present. Photos were taken and passed on to Brian Patrick for identification. The bug in question is the swan plant bug, *Arocatus rusticus*. This is a bug introduced from Australia that has an affinity for Apocynaceae (Asclepiadaceae), a plant family that is renowned for species containing poisonous sap.

In its native range in Australia, *A. rusticus* is found on *P. straminea*, while in New Zealand it has been recorded on *P. heterophylla*. Other exotic hosts include swan plant (*Gomphocarpus physocarpa*) and *Tweedia*. The swan

plant is known for its toxicity, which the monarch caterpillar (*Danaus plexippus*) is able to tolerate, thus making themselves toxic to predators. As *A*. *rusticus* also uses the swan plant as a host it is assumed that they would themselves taste bad to predators hence the vivid bright orange-red colours of their bodies. Whether or not New Zealand *Parsonsia* are a useful defence for *Arocatus* is debateable as there is no evidence to suggest that *Parsonsia heterophylla* is poisonous. In feeding trials carried out at Wallaceville, *P*. *heterophylla* resulted in no ill effects when fed to rats and sheep (Connor 1977). It is possible that the sap may have a bitter taste while not being poisonous and *A. rusticus* is able to utilise the sap to its advantage. It was interesting to note that only one plant was favoured by *A*. *rusticus*; other plants of *Parsonsia* nearby were devoid of bugs.

Arocatus rusticus has a widespread distribution in New Zealand being found throughout the North Island and as far south as Central Otago in the South Island. I would be interested to know if any members of the Society have seen these bugs while botanising in the wild or whether anyone has seen them on plants in cultivation.

Acknowledgements

I wish to thank Trevor Partridge for identifying *Nitella hyalina*, sharing his knowledge of the species and for confirming my identification of *Callitriche petriei*, and taking photographs. John Clemens for proof reading the manuscript and finally Brian Patrick for identification of *Arocatus rusticus*.

References and further reading

Connor HE 1977. The poisonous plants in New Zealand. Government Printer, Wellington.

Johnson PN, Brooke PA 1989. Wetland plants in New Zealand. DSIR Publishing, Wellington.

Johnson PN, Gerbeaux P 2004. Wetland types in New Zealand. Department of Conservation / Te Papa Atawhai, Wellington.

Simpson MG 2006. Plant systematics. Academic Press, Amsterdam.

http://www.terrain.net.nz/friends-of-te-henui-group/local-insects/bug-arocatus-rusticus-swan-plant-bug.html [accessed 05/06/2015].

http://www.brisbaneinsects.com/brisbane_lygaeoidbugs/SmallMilkweedBug.htm [accessed 06/06/2015].