

Some thoughts on moth plant (*Araujia hortorum*) and its control

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Introduction

This article presents some observations on moth plant (*Araujia hortorum*) and its relationship to woolly nightshade (*Solanum mauritianum*) taken over several years in the course of weed control. It is based on extensive observations taken on Waiheke Island and some preliminary mainland observations. It presents an interesting subjective working hypothesis that has proved itself as a strategy by our company, PC Weed Control, in controlling moth plant on Waiheke Island.

A description of Moth Plant (*Araujia hortorum*)

Moth plant, also known as kapok vine, cruel plant and white bladder flower, is a slender evergreen, poisonous, creeping vine that can climb 5-7(-10) m in height and potentially can completely cover the tree canopy. If broken, the plant exudes a creamy sap that can cause skin irritation. It has arrowhead-shaped, opposite leaves, dark green on top, grey-green below, and produces clusters of small creamy-coloured, waxy, tubular flowers from December to May. During autumn to winter its large choko-like seed pods dry and split, releasing 250-1000 parachute-like seeds that are dispersed by wind for up to 30 km, and can also be spread on clothing and animal fur (Auckland Council pest plant database). The plant grows on forest margins, gaps in the forest, hedges, wasteland and coastal areas. It prefers loose, fertile soils, a warm climate and moderate rainfall. The seedlings are shade tolerant, allowing establishment in relatively undisturbed forest.

Moth plant is a native of South America (Argentina, Brazil, Paraguay, Uruguay) and was introduced in many other countries as an ornamental plant, but it is now considered a noxious weed. Nowadays its naturalised distribution includes southern Europe, South Africa, North America (California, Georgia), Australia and New Zealand (Popay et al., 2010).

Moth plant was formerly known as *Araujia sericifera*. However, this was brought into question by the Argentinean botanist, Dr Carlos Villamil. Villamil and his team undertook botanical surveys of the four *Araujia* species (*A. angustifolia*, *A. hortorum*, *A. megapotamica* and *A. sericifera*) in Argentina. Closer examination of the flower morphology revealed that the species in New Zealand is *A. hortorum* rather than *A. sericifera*. *Araujia hortorum* occurs in southern Argentina at the same temperate latitudes as moth plant in New Zealand, while *A. sericifera* only grows in the tropical part of northern Argentina (near Iguazu Falls) and is not found in the cooler southern parts (Waipara 2006, Barton 2008).

We know moth plant climbs, and climbs quite high, where it can flower and produce pods to disperse wind-blown seeds, but have we ever stopped to think what it likes to climb over in particular? In the Buenos Aires Province of Argentina, the southernmost limit for moth plant in Argentina, moth plant grows among treeless pampas (*Cortaderia*) grasslands and scrambles over low shrubs and fences, whereas further north it can climb a small native scrubby tree called tala (*Celtis tala*) (Waipara 2006). Looking at Waiheke Island sites however, I have not found moth plant growing with pampas unless woolly nightshade is also present. An example is the large wetland in the middle of the island. Here raupo (*Typha orientalis*) is overtaken by huge clumps of pampas over several hectares – but there is not a moth plant in sight.

Initial hypothesis

Our company was approached by Rob Fenwick to do moth plant control at his property on the western side of Te Matuku Bay, Waiheke Island. Initially I was asked to produce a report on the problem and develop a control strategy (White 2012) in order to apply for a grant under the Environmental Initiatives Fund administered by the Auckland Council. A survey of the property showed that moth plant occurred in areas where woolly nightshade (*Solanum mauritianum*) was present (Fig. 1). I also noted that where native vegetation occurred without the presence of woolly nightshade, moth plant was absent. It was interesting to note that where moth plant was observed climbing native trees it had usually climbed woolly nightshade first (Fig. 2). These observations appeared to have no correlation to sunny or shaded situations, i.e. if the woolly nightshade occurred under tall native trees, moth plant was also present.

I hypothesised that the control of moth plant at this site was intimately connected to the control and eventual eradication of woolly nightshade. Control of moth plant at this site was also dependent, in certain areas, on control of gorse (*Ulex europaeus*). I theorised that gorse provided a perfect nursery for woolly nightshade, which in turn attracted moth plant.

Looking at other Waiheke Island sites

On the eastern side of Te Matuku Bay we find the same situation occurring. Here moth plant is a serious weed along the esplanade reserve, in parts of Te Matuku Scenic Reserve administered by Department of Conservation (DoC) and on private properties. Once again wherever moth plant occurs so too does woolly nightshade.



Fig. 1. A woolly nightshade tree heavily laden with moth plant vines, 5 Mar 2014. Figs. 1-3 taken at Rob Fenwick's property, Te Matuku Bay, Waiheke I. by Petra White.



Fig. 2. Moth plant present in the canopy of a kanuka (*Kunzea* sp.) but has climbed a woolly nightshade tree first, 6 Mar 2014.

Curiously however, given that moth plant seeds can travel on the wind up to 30 km., and the predominant wind at Te Matuku Bay is from the south, there is no evidence of moth plant incursion in the complex of reserves at the head of the bay. These reserves are administered by Auckland Council, DoC and Royal Forest and Bird Protection Society of NZ Inc., and no significant weed control is being undertaken there. So what is the difference? The reserves consist of relatively intact native forest.

Low amounts of gorse and pampas are present, but there is no woolly nightshade.

Looking further afield to other Waiheke Island sites we found the same pattern of both woolly nightshade and moth plant occurring together. Sites studied include Rangihoua Sports Park, Whakanewha Regional Park, and numerous private properties, including my own property in Rocky Bay; and also Motukaha and Rakino Islands.

I became so convinced of the validity of my hypothesis that on a recent visit to assess a moth plant site in Owhanake Bay (NW Waiheke I.) for a client, and in the absence of a letterbox, I looked for woolly nightshade plants instead...and there, sure enough, I found the moth plant.

On a recent trip our company made to northern Ponui Island for weed control we found woolly nightshade growing but no moth plant was seen. It must be noted from this and other examples I have observed that woolly nightshade itself grows frequently without the presence of moth plant.

A description of woolly nightshade (*Solanum mauritianum*)

Woolly nightshade, also known as flannel leaf, kerosene plant, tobacco weed and wild tobacco tree, is a small tree or shrub up to 8 m tall. Like moth plant it is native to South America (northern Argentina, southern Brazil, Paraguay and Uruguay). According to the Global Invasive Species Database it has been introduced (or naturalised) in Cook Islands, Fiji, Hawai'i, New Caledonia, Norfolk Island, Solomon Islands, Tonga, Réunion Island, Mauritius, Madagascar, Australia, New Zealand, India and several southern African countries.

Woolly nightshade grows quickly and can establish large stands of plants. It takes over an area by crowding out other plants and stopping them from growing. The leaves smell of kerosene and are greyish-green on the upper surface, white to yellowish green beneath, and covered in dense felt-like hairs. Clusters of purple flowers occur at the end of branches. The berries are yellow and have many seeds, a single plant producing up to 10,000 seeds. The seeds are spread by birds, and can remain viable in the soil for 20-30 years before germinating (Waikato Regional Council pest plant database).

The plant grows on vacant land, farmland, gullies, urban areas and bush margins from Taupo north. It tolerates a wide range of habitats, including shade. All parts of the plant are poisonous to humans, especially the green berries (Global Invasive Species Database). Minute stellate hairs from the plant irritate the skin, eyes, nose and throat.



Fig. 3. Moth plant seedlings finding it difficult to compete with meadow rice grass. The seedlings are also showing the effects of herbicide, 5 Mar 2014.

The RPPMS and control measures

Under the Regional Pest Plant Management Strategy (RPPMS) moth plant is a Containment (Removal) Pest Plant in the Hauraki Gulf Islands and various mainland sites (Anon. 2007). Landowners/occupiers must successfully destroy (to prevent seeding) all adult and juvenile plants of moth plant on land they occupy. Over the years those controlling moth plant have spent many hours collecting pods as a means of preventing seeding. This seems to make sense given the number of seeds the pods produce and the distance they can travel before taking root, but is this really a productive way to use the client's money and our time as contractors?

My observations have shown that, although some seeds may travel long distances, the pods disperse most of their seeds primarily in the vicinity of the mature plants and very little drifts off site. Also, if my initial hypothesis was correct then the seeds need to germinate among woolly nightshade plants. We therefore took a different approach to moth plant control on Waiheke Island. Forget about the pods; instead, cut away vines climbing native trees and spray everything growing on the ground and over other weed species. Concurrently we worked to eliminate or, at large sites, reduce the incidence of woolly nightshade and factor in three-monthly follow up visits. We have noticed that wherever woolly nightshade has been controlled on sites we have worked on there is a reduction in moth plant and follow up control work has been easier to implement and less costly for the

References

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Fig. 4. Moth plant and woolly nightshade growing together in a driveway at St Mary's Bay, Auckland. Photo: Petra White, 20 Feb 2014.

landowner. Taking out the weed species by spraying with a selective herbicide has also allowed grasses such as meadow rice grass (*Microlaena stipoides*) and kikuyu (*Cenchrus clandestinus*) to establish and moth plant finds it difficult to compete (Fig. 3).

Conclusions

There is no doubt in my mind that there is a connection between moth plant and woolly nightshade on Waiheke Island. It could be that woolly nightshade creates the right soil conditions for moth plant to establish. It may also be that native vegetation on its own is partly resistant to the establishment of moth plant.

On mainland Auckland there are many instances of both species growing together (Fig. 4), but as a company we have not done enough weed control work to determine whether the Waiheke pattern is prevalent there. Also, the editors note (pers. comm.) that in Auckland they have seen many cases of moth plants growing without woolly nightshade.

At the moment, complete removal of woolly nightshade under the RPPMS is only required in the Waitakere Ranges Weed Control Zone and Great Barrier Island. In the remainder of the region the RPPMS only requires removal within 20 m of a boundary (Anon. 2007). In my view, to control moth plant the complete removal of woolly nightshade should be a requirement wherever moth plant is found.