Nearby was a schist headland with a more sheltered inlet, with a fine array of green, brown and red algae. The coarse southern form of *Pachymenia lusoria* was seen here, together with *Cystophora scalaris*, *Splachnidium rugosum*, *Adenocystis utricularis*, *Colpomenia peregrina* and *Ulva* species 1. The curious *Gigartina lanceata*, with leafy, papillate fronds, was found on rocks adjoining sand.

Port Hutt

Port Hutt (Whangaroa Harbour) is comparatively sheltered, with abundant growth of intertidal seaweeds on the schist reefs. Species recorded were *Hormosira banksii*, *Scytothamnus australis*, *Champia novae-zelandiae*, *Colpomenia peregrina*, *Gigartina* spp., *Cystophora torulosa*, *Zonaria turneriana*, and *Ulva* spp.

Glory Bay and Flower Pot (Pitt Island)

The tide was well in at Glory during a brief visit. The upper tidal rocks had a covering of the limp, brownish skins of *Porphyra*. There was opportunity for just a brief look here at seaweeds near Flower Pot wharf, but here on rocks beside the sandy beach were *Halopteris paniculata*, *Sarcothalia lanceata* and *Gigartina decipiens*.

Te Whanga Lagoon

Two places were visited on the western shore of this enormous, shallow salt-water lagoon. The red alga *Gracilaria chilensis* was frequent, but the dominating growth was a mass of foetid blue-green algae (Cyanobacteria).

Waitangi Wharf reefs

The substrate here is volcanic tuff, and the reefs are sheltered. The water is clear though probably nutritionally-enriched by effluent from the fish factory. The dominant intertidal seaweed here is *Hormosira banksii*, and with it *Gigartina decipiens*, *Champia novae-zelandiae, Caulacanthus ustulatus*, *Ulva* spp., *Scytothamnus australis*, *Colpomenia peregrina*, *Leathesia difformis*, *Corallina officinalis*, *Codium fragile*, *Myriogloea intestinalis* and *Splachnidium rugosum*. The sublittoral fringe was dominated by *Carpophyllum maschalocarpum* and *C. plumosum*.

Waitangi Beach

The beach drift gave a glimpse of the composition of the sub-tidal algal forest in deeper water (Schiel, *et al.* 1995). Waitangi Beach had a good haul of wash-up brown seaweeds, those identified being *Durvillaea antarctica*, *D. chathamensis*, giant kelp (*Macrocystis pyrifera*), *Lessonia tholiformis*, *Carpophyllum* spp., *Cystophora* spp., *Landsburgia* spp. and *Marginariella urvilliana*. There were also numerous red algae in the drift, including a common, delicate pink one, and *Gigartina* spp.

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Notes on Chatham Island fungi and some plant pests

Ross E. Beever

The fungi of the Chatham Islands are relatively well known through the publications of Eric McKenzie and Peter Johnston, who made several visits to the islands since the 1980s and 1990s (McKenzie 1991a & b, McKenzie 1993, McKenzie & Johnston 1999, McKenzie & Johnston 2004). However, while these mycologists list over 200 species, with emphasis on plant pathogenic species, this is in reality only the tip of the iceberg and many more species await discovery. One of their more striking records was of the threatened rust fungus *Puccinia embergeria* (Fig. 1) found in the endangered Chatham Island sow thistle (*Embergeria grandifolia*), one of the spectacular megaherbs found on these islands. Intriguingly, inspection of the second Chatham Island megaherb, the endemic Chatham Island forget-me-not (*Myosotidium hortensia*), in the DoC nursery at Te One on the second full day of our visit revealed that this species

also hosts a rust fungus. To date, we have only found the summer spore (uredinial) stage, which indicates it is a species of *Uredo* (Fig. 2). It is almost certainly an undescribed species and likely to be restricted to this host; the winter (telial) spore stage, which will help in describing the species, should be looked for in autumn and winter. On returning to the mainland, I examined *M. hortensia* growing in the Botanic Gardens in Christchurch, at Geoff Davidson's 'Oratia Native Plant Nursery' and Muriel Fisher's native plant garden 'Fernglen' in Auckland, but did not find the rust, and no reports of it have been forthcoming from garden contacts in Dunedin or elsewhere around the country. In general, *M. hortensia* struggles in mainland gardens, so it is perhaps undesirable to add to its woes by introducing the rust here. However, given that *M. hortensia* itself is endangered, the rust itself is also endangered and an argument could be mounted that it should be established on the mainland. Such are the difficulties in conserving threatened fungi! Of course the best solution is for both these threatened hosts (*E. grandifolia* and *M. hortensia*) and their companion rusts be conserved as part of ecologically self-sustaining communities on the Chathams themselves. To date, *P. embergeria* is known in the wild only from the population of *E. grandifolia* growing at Kaiangaroa, although we did note a few pustules on the plants growing in the gardens at the DoC centre at Te One. The myosotidium rust is presently only known from the DoC nursery, the nearby DoC house garden and also from Admiral Gardens, where it occurs on both the common blue-flowered form of the host as well as the white-flowered form (L. Croon pers. comm.). It will be interesting to determine the incidence of the myosotidium rust in wild populations of the host, if indeed it occurs in the wild. While we saw *M. hortensia* growing naturally at Kaiangaroa on the first full day of our visit, I did not closely inspect it for the rust, which was only discovered the following day.

It is intriguing that rust fungi are very well represented on the Chathams, perhaps reflecting the climate characterised by moderate rainfall with many misty overcast days and consequent low evapotranspiration, conditions conducive to rust infection. McKenzie (1991a) listed 42 rusts and McKenzie & Johnston (1999) added a further 21, from a variety of native, introduced and cultivated hosts. Apart from the new mysotidium rust, a further 3 known species were found on the ABS visit: *Uredo histiopteris* (REB 2674) on the fern *Histiopteris incisa*; *Puccinia neglectus* on the native dock *Rumex neglectus* (Fig. 4, REB 2689); *Miyagia pseudosphaeria* on the introduced sow thistle *Sonchus oleraceus* (REB 2691).

The virtual absence of native ectomycorrhizal hosts on the Chathams means that many of the conspicuous macrofungi common in beech and tea-tree communities on the mainland will not occur here. However, *Pinus radiata* has been planted and wild seedlings were noticed around Port Hutt. Thus it was not surprising to see the red-capped mushroom *Amanita muscaria* at this site and also near a plantation on Pitt Island. Another introduced mushroom, *Laccaria ohiensis*, was also found under *P. radiata* (REB 2686). Saprotrophic macrofungi are better represented on the Chathams, although even with this group, the relative absence of podocarps and other large forest trees will limit the diversity present. A species of the edible *Pleurotus* (Fig. 5., REB 2662, 2695) was quite common on kopi (*Corynocarpus laevigatus*) at Hapupu, along with another edible species, the ear fungus *Auricularia conea* (=*A. polytricha*). However, if kopi is in fact a Polynesian introduction as has been suggested (Molloy, 1990), then the diversity on this host may be low relative to its biota on the mainland. The genus *Armillaria* (the 'bootlace' fungi) comprises a group of mushrooms that are active parasites of vascular plants. They are characterised by production of large, dark bootlace-like rhizomorphs (Fig. 6. REB 2676, 2693) which assist their spread to new hosts. These characteristic rhizomorphs were seen commonly in degraded forest on dying trees of for example *Coprosma chathamica* and *Myrsine chathamica*.

As well as these, a number of collections of various sorts, including various leaf-spotting fungi, were collected for further examination in the laboratory. All collections will be lodged in the New Zealand Fungal Herbarium (herb PDD) maintained by Landcare Research and will be available for future studies.

Wearing my plant pathologist hat, I kept an eye out for ailing plants irrespective of cause. On Ocean Mail, a plant of *Aciphylla traversii* was observed heavily infested with an aphid. It turned out to be the leafcurl plum aphid (*Brachycaudus helichrysi*) an introduced species of wide host range, previously known from a range of native plants including *A. squarrosa* (N. A. Martin pers. comm.). Some leaf tufts of the spectacularly flowering rautini (*Brachyglottis huntii*) on Pitt Island showed the silvering characteristic of thrips damage. A sample was sent to L. A. Mound of CSIRO Entomology, who reported that it is an undescribed species of *Adelphithrips*, most likely restricted to this host. Some of the plants of *B. huntii* in rough pastureland on Pitt Island were showing ill-thrift, branchlet dieback and occasional death probably as a result of stock disturbance. Of more concern were a pair of dead plants in an otherwise very healthy fenced-off stand of this species. A crust fungus growing on the base of these trees was later identified as *Hypochnicium lyndoniaea* (REB 2696), a saprotroph unrelated to their demise. Soil samples from under these trees were baited back in the laboratory for *Phytophthora* and results are awaited. I am unaware of any reports of root-infecting species of this group of 'plant destroyers' for the Chathams. However, potato (*Solanum tuberosum*) was cultivated very successfully for many years from the mid 19th century

and pioneer farmer E. R. Chudleigh shipped potatoes to the mainland until the early 1900s, when the arrival of the aerially-dispersed potato blight (*Phytophthora infestans*) put a stop to this activity (Richards 1950, Lawrie & Powell 2006). On 15th January 1910 Chudleigh wrote wearily and somewhat briefly in his diary "Wharekauri [the name he gave to his farm] is slowly falling back. .... I went to the new potato ground, every stalk flat and black with blight ....".

There is increasing concern on the Chathams about biosecurity, and processes are in place to attempt to stem the inexorable stream of alien organisms such as weeds and pests. As with many weeds, local gardens will provide stepping stones for such organisms to establish in the wild. While numerous exotic pathogens are present, all efforts should be made to restrict the incursion of other species. In general, gardeners should be encouraged not to bring plants growing in soil to the island, as even apparently healthy plants from mainland nurseries will often harbour root pathogens. As a corollary, many gardening enthusiasts on the mainland would love to be able to grow swathes of *M. hortensia* as we saw at the Admiral Gardens. Such plants are the essence of the Chathams and local gardeners should be encouraged to 'play to their strengths' and plant local species. The small populations of some of the rare and endangered plants on the Chathams put them at particular risk from stresses imposed by exotic pathogens and pests. One pest we did not see evidence for on the islands is the echium leafminer (*Dialectica scalariella*), a leaf feeding moth that attacks members of the Boraginaceae. It was introduced to Australia as a biocontrol agent to control Patterson's Curse (*Echium plantagineum*). It soon crossed the Tasman and thereafter, for the last decade or so Auckland gardeners found it difficult to grow the giant bugloss (*E. pininana*), as leaf mining reduces the vigour of the young rosettes. While there was no evidence for it attacking *M. hortensia* on the island, plants in cultivation around Auckland are susceptible to this pest, which reduces their vigour. One way to help prevent this pest establishing on the Chathams would be to discourage local planting of ornamental forget-me-nots and comfrey, as these could act as foci for establishment of local populations of the pest.

Acknowledgments

Lynda Guard for help with collecting samples of the myosotidium rust, Lois Croon for showing us Admiral Gardens and its swathes of *M. hortensia*, Murray Dawson for suggesting gardening contacts growing *M. hortensia* on the mainland, Maureen Young for organising the trip, the ABS team for companionship in the field, and the Waitangi Hotel team for wonderful hospitality. Eric McKenzie, Barbara Paulus and Peter Johnston helped with fungal identications; Rosa Henderson, Laurence Mound and Disna Gunawardana with invertebrate identifications.

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Fig 1. *Puccinia emergeria* rust pustules on the underside of a leaf of its host *Embergeria grandiflora.*

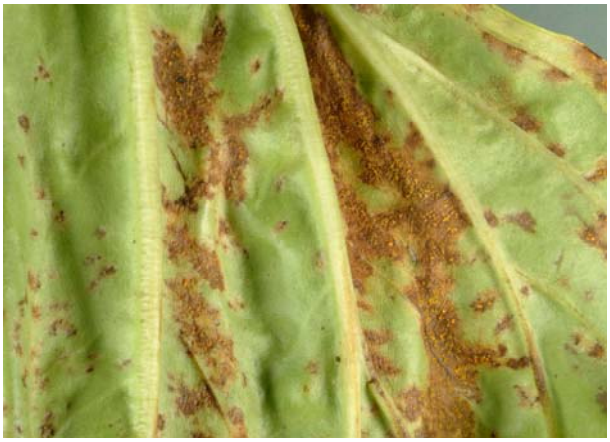

Fig 2. *Uredo* sp. pustules on the underside of a leaf of its host *Myosotidium hortensia.*

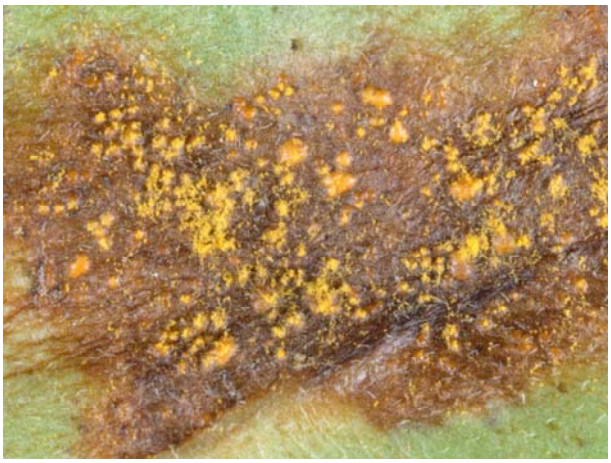

Fig. 3. *Uredo* sp. pustules (detail)

Fig 4. *Puccinia neglectus* rust pustules on the upper surface of a leaf of its host *Rumex neglectus*.

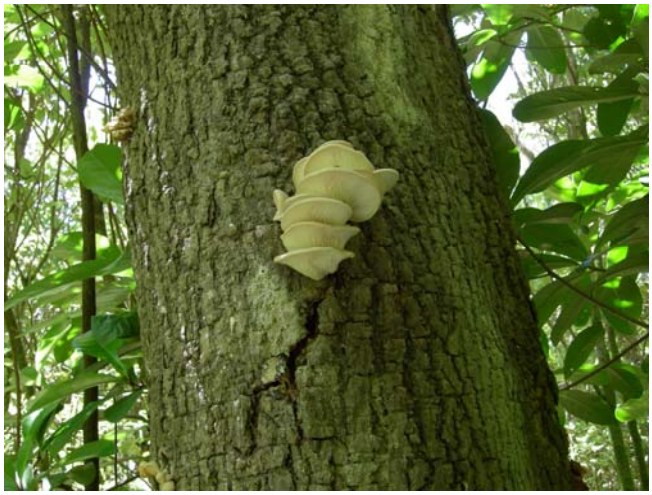

Fig 5. *Pleurotus* sp. fruiting on kopi (*Corynocarpus laevigata*) Hapupu.

Fig 6. 'Bootlaces' of a species of the parasitic mushroom, *Armillaria*, growing on a dead *Mysine chathamica,* Hapupu.