

Pterostylis micromega,
an endangered orchid,
in the Chatham Islands

DOC SCIENCE INTERNAL SERIES 11

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Published by
Department of Conservation
P.O. Box 10-420
Wellington, New Zealand

DOC Science Internal Series is a published record of scientific research carried out, or advice given, by Department of Conservation staff, or external contractors funded by DOC. It comprises progress reports and short communications that are generally peer-reviewed within DOC, but not always externally refereed. Fully refereed contract reports funded from the Conservation Services Levy are also included.

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© October 2001, New Zealand Department of Conservation

ISSN 1175-6519

ISBN 0-478-22161-4

This is a client report commissioned by Wellington Conservancy and funded from the Unprogrammed Science Advice fund. It was prepared for publication by DOC Science Publishing, Science & Research Unit; editing and layout by Geoff Gregory. Publication was approved by the Manager, Science & Research Unit, Science Technology and Information Services, Department of Conservation, Wellington.

CONTENTS

Abstract	5
1. Introduction	6
2. <i>Pterostylis micromega</i> habitat	6
3. Associated species	8
4. Threats	8
5. Management	9
6. Acknowledgements	9
7. References	9
Appendix 1. Supplementary statement	10

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ABSTRACT

Pterostylis micromega, an orchid endemic to several parts of New Zealand and the Chatham Islands, is listed as a threatened species with highest priority for conservation, Category A. There are no recent records of *P. micromega* from the Chatham Is, and early historic collections give no indication of its habitat there. Most of its mainland New Zealand habitats are relatively fertile, mesotrophic wetlands, where it tends to be confined to moist hummocks or pedestals, generally above prolonged water level. The most likely habitats on Chatham I. for *P. micromega* are mesotrophic communities such as the sedgeland in the lower reaches of streams, and the shrub-sedgeland along stream and drainage channels, and around lake margins, such as those found in the vicinity of Lake Huro. Should *P. micromega* re-establish or be re-discovered on Chatham I. it is likely to face similar threats to those affecting mainland populations, namely, drainage, extensive continued degradation of its habitat from animal use, and invasion by introduced weeds, especially grasses. It is suggested that *P. micromega* was probably never common on the Chatham Is, and its habitat was much less extensive than appears to be the case on the New Zealand mainland, and subject to greater modification by seemingly uncontrolled burning, land drainage, and grazing and trampling by cattle and sheep, both domestic and wild. Should the species be re-discovered, its protection by appropriate means would be desirable, followed by a monitoring programme to assess the major factors affecting its continued survival. It would be prudent to put in place a management plan similar to that adopted in central North Island, but tailored to Chatham I. conditions.

Keywords: Chatham Islands, Orchidaceae, *Pterostylis*, *Pterostylis micromega*, endangered species, wetlands, habitat, threats, management.

© October 2001, New Zealand Department of Conservation. This paper may be cited as:
Molloy, B.P.J. 2001. *Pterostylis micromega*, an endangered orchid, in the Chatham Islands. *DOC Science Internal Series 11*. Department of Conservation, Wellington. 10 p.

1. Introduction

Pterostylis micromega, an orchid endemic to several parts of New Zealand and the Chatham Islands, is listed as a threatened species with highest priority for conservation, Category A (Molloy & Davis 1994; de Lange et al. 1999). A Department of Conservation publication (Dopson et al. 1999) suggested that the Chatham Is were a priority site for survey for the species. This report addresses the following questions:

1. What are the specific habitat requirements of *P. micromega* on the Chatham Is?
2. What plant species are associated with *P. micromega* on the Chatham Is that could be used to indicate habitat for the species?
3. Are there threats to the long-term survival of *P. micromega*?
4. What management actions are recommended to ensure survival or recovery of the species on the Chatham Is?

2. *Pterostylis micromega* habitat

There are no recent records of *P. micromega* from the Chatham Is, and early historic collections give no indication of its habitat there. The species was first collected from Chatham I. by H.H. Travers (e.g. CHR 288394), but not apparently from Pitt I., where he also stayed for several weeks. Travers visited the Chatham Is on two separate occasions; once in 1863, and again in 1871. On both visits he collected numerous specimens of plants from the main island, and also from Pitt I. Sets of these specimens were sent to Hooker at Kew; to Mueller at Melbourne; to the Colonial Museum at Wellington (now Te Papa Tongarewa); and to other institutions. His first visit was sponsored by his father, W.T.L. Travers, his second by the Colonial Museum. His first collection (1863) sent to Melbourne formed the basis of Mueller's *Vegetation of the Chatham Islands* (Mueller 1864; Connor 1998), but no mention was made then of *P. micromega*. His combined collection in the Colonial Museum (now WELT) was enumerated by Buchanan (1875), who listed *P. micromega* along with nine other orchids collected by Travers. Unfortunately, there are very few collecting dates or site details accompanying Travers' specimens.

The only other collection of *P. micromega* from the Chatham Is that I am aware of is the specimen gathered by F.A.D. Cox in July 1891 (WELT 3441). Again, no site details were provided. In both cases the collections consist of a solitary specimen, suggesting that the species was not common then. Collections of other species by Travers and Cox are represented by many more specimens, often spread over several sheets.

As far as one can judge from the (father and son) Travers' writings (Travers 1869, 1872, 1873), apart from visiting Pitt I. where there is no record of *P. micromega*, H.H. Travers spent most of his time collecting in the northern part of the main island, and did not visit the southern tableland. We may presume that he collected *P. micromega* from this northern region. Cox, on the other hand, lived and farmed on the rolling land overlooking Lake Huro and the Te Awatea wetlands, and it is a fair assumption that he collected *P. micromega* from somewhere in this district. For some indication of the likely habitat of *P. micromega* on Chatham I. we have to rely upon existing populations on mainland New Zealand, e.g. Ihupuku Swamp near Waverley; 'Kaweka Lakes', Kaweka Range; Opuatia wetland, Waikato; and several sites in the Tongariro region. Most if not all of these habitats are relatively fertile, mesotrophic wetlands, where *P. micromega* tends to be confined to moist hummocks or pedestals, generally above prolonged water level. In these habitats the water appears to be continuously moving, albeit slowly, with a constant influx of dissolved nutrients from inflowing water similar to that in hill slope wet flushes. Most of these sites also have a history of burning and animal use, and the hummocks and pedestals are partly due to animal trampling and partly to natural processes. The hummocks usually support a sparse cover of small rosette, rhizomatous, or stoloniferous herbs, and mosses, often set in a matrix of taller sedges and rushes, umbrella fern, and scattered manuka (see further below).

P. micromega appears to avoid deep shade, dense vegetation and infertile or oligotrophic conditions, and responds positively to periodic habitat disturbance judging by the examples seen to date.

The extensive wetlands on Chatham I. might seem, at first glance, a suitable habitat for *P. micromega*, but a closer inspection reveals otherwise. Perhaps the dominant wetland community is the *Sporodanthus-Olearia* shrub-rushland developed over deep infertile peat—the fire-induced so-called 'clears'. However, this dense plant community supports few if any orchids, although degraded variants are prime sites for sun orchids (*Thelymitra* spp.). Likewise the heavily used herbfields marshes and rushland of the lagoon and lake shores generally lack an orchid flora.

The most likely habitats on Chatham I. for *P. micromega* are mesotrophic communities such as the sedgeland in the lower reaches of streams, and the shrub-sedgeland along stream and drainage channels, and around lake margins, such as those found in the vicinity of Lake Huro. This conclusion has been arrived at after a close inspection of several likely wetland plant communities during my most recent visit to Chatham I., when Amanda Baird and I examined a range of wetland types and intergrades in the southern tableland, especially in the Tuku catchment and Lake Rakeinui areas, and in the northern part of Chatham I., including the margins of Lake Huro and Te Whanga Lagoon, Wharekauri, Ocean Mail, and several smaller lagoons. We also examined the hummocky wetland just south of the Taiko base camp where *P. micromega* had been reportedly found in 1982 (Mayhill 1983). Armed with a photograph of a *Pterostylis* taken in the area at that time, and notes on its whereabouts (courtesy P. Mayhill and B. Woolley), we were able to establish that the orchid thought to be *P. micromega* was in fact a small form of *P. banksii* var. *silvicultrix*, easily the most abundant greenhood orchid on

Chatham I., and normally found in moorland forest. To date, my examination of likely habitats for *P. micromega* has not been exhaustive, and has been hampered to some extent by the prohibition of access to certain areas and the physical difficulty of visiting others.

3. Associated species

Until *P. micromega* is re-discovered on the Chatham Is it is not possible to define precisely its associated species there. Again, we are obliged to rely on the species associated with this orchid on mainland New Zealand for guidance. From unpublished information kindly supplied by Colin Ogle and Peter de Lange, and visits to two populations with Peter de Lange and Nick Singers, it is possible to list some common indigenous associates of *Pterostylis micromega*. Foremost, and relevant to Chatham I., are the sedges *Baumea rubiginosa*, *B. tenax*, *Carex secta*, *Eleocharis acuta*, and *Lepidosperma australe*; flax *Phormium tenax*; the ferns *Blechnum minus* and *Gleichenia dicarpa*; *Hierochloa redolens*; *Epilobium chionanthum* and *E. pallidiflorum*; and several species of *Hydrocotyle*, *Nertera*, *Euchiton*, and *Ranunculus*. Other orchids associated with this group of mesotrophic indicators are *Pterostylis paludosa*, *Microtis unifolia* and *Spiranthes novae-zelandiae*. The above list is by no means a complete inventory of indigenous associates of *Pterostylis micromega* on the mainland, but serves as a useful guide. A key indicator species is the often-dominant sedge *Baumea rubiginosa*.

This short list of indicator species is very similar to that obtained from the mesotrophic wetlands flanking Lake Huro on Chatham I., which also has a comparable hummocky topography, derived mainly from cattle trampling. As suggested earlier, this is the most likely place where F.A.D. Cox collected *P. micromega* in 1891. Other terrestrial orchids collected from around Lake Huro include *Microtis unifolia*, *M. oligantha*, *Spiranthes novae-zelandiae*, and *Corybas orbiculatus*, indicating the close similarity of this site to mainland habitats of *P. micromega*, and their essential mesotrophic conditions.

4. Threats

Should *P. micromega* re-establish or be re-discovered on Chatham I. it is likely to face similar threats to those affecting mainland populations, namely, drainage, extensive continued degradation of its habitat from animal use, and invasion by introduced weeds, especially grasses. It would seem that the species may never have been common on Chatham I. and is extremely vulnerable to habitat modification. On the other hand, small populations of such plants are also vulnerable to post-disturbance succession towards a smothering dense sedge or shrub-sedge community.

Chatham I. itself has a long history of burning in Maori and European times, although the threat posed by burning is probably not as great as that due to widespread habitat modification by grazing animals, both wild and domestic. The threats facing a vulnerable species such as *P. micromega* would appear to be greater on the Chatham Is than on mainland New Zealand.

5. Management

A first requirement is to establish whether or not there are any surviving populations of *P. micromega* on the Chatham Is. Such populations may be genuine survivors on the one hand, or genuine new arrivals on the other. Neither proposition can be discounted. To achieve this it may be desirable to employ a similar approach to that adopted in central North Island for the same species, namely, the identification of likely mesotrophic habitats from the air, followed by intensive ground survey at the optimum flowering time, say late December to January. Should the species be re-discovered, its protection by appropriate means would be desirable, followed by a monitoring programme to assess the major factors affecting its continued survival. Again, it would be prudent to put in place a management plan similar to that adopted in central North Island, tailored preferably to Chatham Is conditions. *P. micromega* is the most vulnerable orchid of the Chatham Is, and deserves further investigative study.

6. Acknowledgements

During my most recent visit to Chatham Island, I was ably assisted by Amanda Baird, Area Conservation Officer, Chatham Is Area Office, DOC. I am also indebted to P. Mayhill and B. Woolley for their notes on the whereabouts of a *Pterostylis*. Geoff Walls, Colin Ogle and Peter de Lange kindly provided me with unpublished information, and Peter de Lange and Nick Singers took me on visits to two populations of *Pterostylis micromega* on mainland New Zealand.

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Appendix 1. Supplementary statement

Since preparing my science advice report on *Pterostylis micromega*, new information on early historic collections has been brought to my attention by Peter de Lange, who undertook a search of the National Museum herbarium (WELT) for me. Four sheets of specimens, incorrectly labelled *Pterostylis foliata*, were located in a recently returned loan. All four sheets supported specimens of *Pterostylis micromega* collected by H.H. Travers, either during his first visit to the Chatham Islands in 1863, or his second in 1871, or both. There are no dates, localities, or habitat details on any of these sheets:

WELT 34001	2 specimens
WELT 3554	12 specimens
WELT 3553	9 specimens
WELT 3379	2 specimens

As Travers distributed plant specimens to a number of institutions worldwide, there may well be material of *P. micromega* from the Chatham Is elsewhere.

Travers' collections might suggest that this orchid was reasonably plentiful at that time, or its mesotrophic habitat was then largely unmodified. However, since only one specimen has been collected since then (WELT 3441, F.A.D. Cox, 1891), a more likely scenario is that *P. micromega* was probably never common on the Chatham Is, and its habitat was much less extensive than appears to be the case on the New Zealand mainland, and subject to greater modification by seemingly uncontrolled burning, land drainage, and grazing and trampling by cattle and sheep, both domestic and wild.