Velvet Worms: A Special Case of Invertebrate Fauna Conservation

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Abstract

A novel approach to the conservation of rare invertebrate animals is described. Forest operations are permitted where the animals occur, with operational constraints based on a knowledge of the animals' distribution and ecology. Special care is to be taken within 'Wildlife Priority Areas' where the animals are particularly abundant.

Introduction

The conservation of rare invertebrate animals is a new and challenging task for Tasmanian forest managers.

In the case of two velvet worm species recently discovered in north east Tasmania, the challenge is especially daunting. All species of velvet worms are regarded as 'vulnerable' by the International Union for the Conservation of Nature (IUCN), but the new discoveries are particularly vulnerable as they are confined almost entirely to forested areas within Fingal Forest District. The velvet worms, furthermore, are effectively invisible, hiding deep within rotting logs and leaving no traces of their presence.

This article summarises how practical conservation measures for the rare velvet worms were developed. For more information about the invertebrates themselves, see the accompanying box 'Two New Velvet Worms'.

Facing the Problem

Two extreme responses to the velvet worm discoveries can be imagined. The first would be for the District Forester to ignore the animals. It could be argued that velvet worms have already survived thousands of years of fire, flood and drought in the District, and a little logging wouldn't hurt them. This 'common sense' approach might be applauded by the forest industry, but it would make enemies for the District Forester in the conservation movement and the scientific community.

At the other extreme, large parts of Fingal District could be withdrawn from production forestry to 'save the worms'. High level Government meetings would probably be required to determine how and by whom a Velvet Worm Reserve should be administered. This process could be lengthy, and compromises on boundaries and expenditure (including compensation) would be inevitable. There would be grumblings from forestry companies and cries of 'inadequate' from the concerned public.

Neither of these responses - the 'she'll be right' and the 'reservation lock-up' - requires any knowledge of the ecology of velvet worms. In both cases, forest managers would remain ignorant of exactly where the velvet worms occurred in Fingal District, or how the animals would be affected by forest operations.

A third approach to invertebrate conservation is currently on trial in Fingal District. Its basic premise is that forest practices can be modified, where necessary, so that fauna protection has priority over wood production. This 'Fauna First' style of forest management demands detailed information about the

ecology of the animals concerned. Fortunately, in the case of the Giant and Blind Velvet Worms this information was already available.

Getting the Facts

I carried out two separate field studies on the velvet worms of Fingal District and its surround. The first, in 1987, was sponsored by the Plomley Foundation through the Queen Victoria Museum and Art Gallery. A longer, follow-up study in 1988 was supported by the Australian Heritage Commission through the former Department of Lands, Parks and Wildlife. The two studies allowed me to draw a distribution map (see Fig. 1) reliable enough for planning purposes.

I also established three key features of Giant and Blind Velvet Worm ecology:

1. Both species are largely restricted to moist habitats. Over most of their ranges this means streamsides, gully forest and the shady south and east faces of forested hills.

2. Both species commonly occur in burned and selectively logged forest. However intense fires and intensive clearing (e.g. for pine plantations) have created velvet worm-free patches in otherwise suitable forest habitat.

3. Both species have 'centres of abundance' within their overall distributions. The Blind Velvet Worm has a large and almost continuous population on Mt. Elephant, with only minor occurrences elsewhere. The Giant Velvet Worm, on the other hand, has dense colonies in a substantial number of wet sclerophyll patches through the dry portion of its range: green 'habitat islands' in a sea of brown forest.

Copies of my reports went to the Forestry Commission, Tasmania which in 1989 arranged consultations in the field with Fingal District foresters. Possible modifications of District practices were discussed, and velvet worm conservation in particular catchments was considered with regard to District burning and harvesting plans.

Managing for Protection

The outcome of the field consultations was a velvet worm conservation plan for Fingal District.

Over the whole of the known ranges of the Giant and Blind Velvet Worms, green belts along **all** watercourses, no matter how small the stream or how narrow the belt, are to be protected from fire. Hot regeneration burns in general are to be avoided, cool or no burn regeneration is to be preferred. Fuel reduction burning - essential to protect velvet worm habitat from catastrophic wildfire - will be by cool burns only, with the aim of preserving the existing boundaries between wet and dry sclerophyll vegetation.

The same prescriptions will apply to specially designed Wildlife Priority Areas (WPAs), which correspond to centres of velvet worm abundance (see map). In addition, logging in WPAs will be restricted so as to encourage re-establishment or recolonisation on disturbed ground. A special exemption from the Forest Practices Code has been granted to the velvet worm WPAs, so that trees and slash which fall into streamside reserves are left where they are, and not dragged out. These streamside reserves, furthermore, are to be defined by the 'green/brown' vegetation boundary if the usual definition would reduce the area of wet sclerophyll habitat along the creek. Finally the velvet worm WPAs are to be given a high priority in the District's fuel reduction burning program.

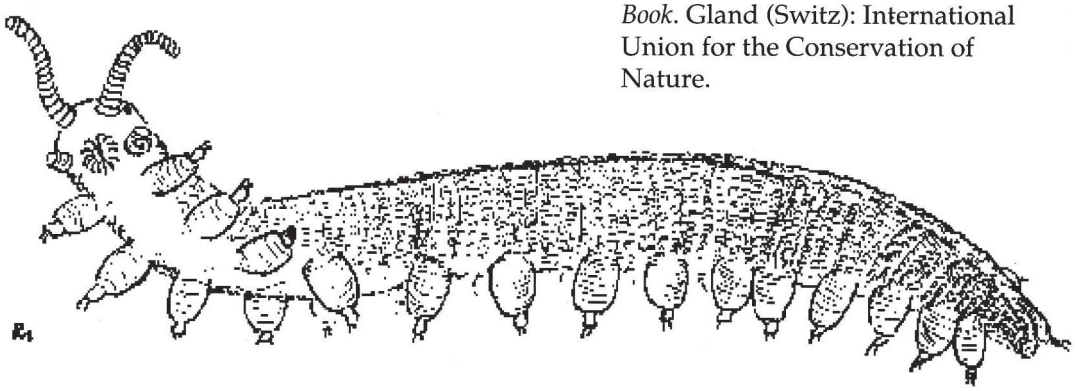
All these prescriptions are map-based. In other words, Fingal District field staff know just which forest management units are inhabited by the rare velvet worms, and which units overlap the WPAs, where velvet worm conservation **is more important than any other forest use**. The aggregate WPAs are 1715 ha for the Giant Velvet Worm and

1955 ha for the Blind Velvet Worm.

Evidence so far available indicates that logging *per se*. is not detrimental to either velvet worm species. Nevertheless, logging in one of the Giant Velvet Worm WPAs during the 1990s will be in two stages, with the second stage to be delayed until the effects of the first have been assessed.

Conclusion

This is the first time in Tasmania that invertebrates have been regarded, for forest management purposes, as highly as mammals and birds. Hopefully the Fingal District experience will serve as a model for the conservation of rare forest invertebrates in future



Acknowledgements

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Further Reading

Mesibov, R. (1988) Tasmanian Onychophora. Unpublished report for the Department of Lands, Parks and Wildlife.

Wells, S.M., Pyle, R.M. and Collins, N.M. (1983) 'Peripatus', pp. 515-520 in *The I.U.C.N. Invertebrate Red Data Book*. Gland (Switz): International Union for the Conservation of Nature.

TWO NEW VELVET WORMS

Velvet worms, often called 'peripatus', are known to zoologists as onychophorans, members of the Phylum Onychophora. They are related to the annelids (segmented worms, such as earth-worms and leeches) and the arthropods (such as insects, spiders and crustaceans), and are sometimes seen as the 'missing link' between these two groups. Onychophorans are also regarded as 'living fossils' because they seem to have changed very little over the past several hundred million years.

Onychorans live in forest litter in the tropics and subtropics, and in the cool temperate zone of the Southern Hemisphere. They range in size from 1 to 15 cm and are exclusively carnivorous, feeding on other litter animals such as termites and crickets. The name 'velvet worm' refers to the velvety appearance of the skin which is densely covered with minute bumps. Overall, the animal looks like a caterpillar with the head of a slug.

There may be less than 200 species of onychophoran in the world. The number of known Australian species has grown rapidly in recent years, thanks to extensive field work by two Macquarie University biologists, Drs. Noel Tait and David Briscoe.

Tasmania is now known to have at least four onychophoran species. The egg-laying *Ooperipatellus insignis* has 14 pairs of legs and is camouflage-coloured; it is widespread and abundant and appears to tolerate considerable habitat disturbance. *Euperipatoides leuckarti*, which has 15 pairs of legs and gives birth to live young, lives in the South-West and the southern part of the West Coast. It is a blue-grey animal with bright orange speckling.

The two remaining species (subjects of this article) have 15 pairs of legs and both give birth to live young. The Giant Velvet Worm grows to 7cm in length and is pink-mauve with a white under-belly. The related Blind Velvet Worm is typically 4 cm long and completely white. The eyelessness of the Blind Velvet Worm suggests that this species evolved as a cave-adapted onychophoran. Today it occupies the same microhabitats, such as rotting logs, as do the other three Tasmanian species. Another curious feature of the ecology of these rare north east onychophorans is that their ranges adjoin, but don't overlap. However, each can be found sharing a log with the common *O.insignis*.

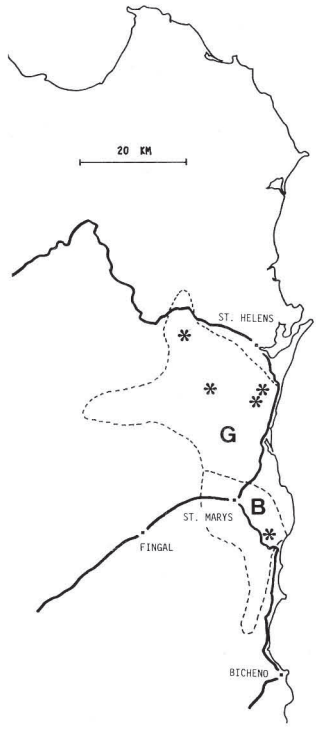

Fig. 1. Distributions of Giant Velvet Worm (G) and Blind Velvet Worm (B) in north-east Tasmania. Dotted lines are approximate range boundaries; the two distributions do not overlap. Asterisks indicate locations of Wildlife Priority Areas.

The Giant and Blind Velvet Worms were discovered in 1984 and 1987, respectively. Papers on their taxonomy, ecology and conservation are currently being prepared by the author, Drs. Noel Tait, David Briscoe and Hilke Ruhberg of Hamburg, Germany.