PSEUDOPARASITISM OF DOMESTIC AND NATIVE ANIMALS BY GEOPLANID LAND PLANARIANS

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SUMMARY: Three cases of pseudoparasitism of a pullet, Pygmy possum and domestic cat by geoplanid land planarians are reported. Unlike similar reports from Japan and America, there is no implication of gastrointestinal pseudoparasitism in these Australian cases. It is believed that the incidents described arose from accidental attachment of land planarians to the animals concerned.

Introduction

Land planarians (Turbellaria: Trichladida: Terricola) are entirely free-living carnivorous flatworms (Jennings 1971). They belong to the same animal phylum (Platyhelminthes) as Trematodes and Cestodes. Normally nocturnal in habit, they frequent dark, humid, but not wet situations beneath logs and leaf litter in a variety of habitats ranging from tropical rainforest to arid semi-desert. Various species of land planarians have been inadvertently introduced from their natural habitat into gardens and other man-modified areas. In rural districts they have been found near pigsties and poultry yards (Froehlich 1955). Land planarian secretions are very sticky, and are injurious to prey (Froehlich 1955) and possibly to some predators (Arndt and Manteufel 1925).

Their food comprises annelids, arthropods and molluscs found in the same ecological niche. Some species are cannibalistic, others necrophagic. Although non-parasitic, land planarians are of medical and veterinary importance.

Geoplanid land planarians have been implicated as paratenic or carrier hosts of Angiostrongylus cantonensis, the nematode responsible for a form of eosinophilic meningitis, in Hawaii and Tahiti (Alicata 1962; and New Caledonia (Alicata 1963; Ash 1976). A similar life cycle for this nematode may exist in Queensland. In this state A. cantonensis has been found in rats (Mackerras and Sandars 1955); veronicellid molluscs which are intermediate hosts (Bishop 1977) and land planarian carrier hosts are common and possibly provide reservoirs of infection. Land planarians have also been implicated as pseudoparasites of man and domestic animals, and from Japan and America there have been several recent reports of pseudoparasitism by bipalid land planarians.

In Japan, a boy aged 18 months coughed-up a live specimen of a flatworm, tentatively identified as Bipalium fuscatum; severe coughing spells and respiratory difficulty experienced by the child for the preceding four days, ceased after elimination of the worm (Walton and Yokogawa 1972). Another case in Japan, involved a woman aged 83 years suffering from rectal bleeding of five months duration. She was treated for suspected amoebic dysentery. Ten weeks following the development of perforative peritonitis and vaginal fistula, an active blood-covered flatworm was released during defecation. The worm was tentatively identified as Bipalium venosum. Bleeding ceased subsequent to evacuation of the worm; the patient died some twelve weeks later. No autopsy was performed (Walton and Yokogawa 1972; Okabe and Kamachi 1974). The third case from Japan concerned the discovery of flatworms, all identified as B. fuscatum, in the faeces of a Shiba bitch (Hayasaki et al 1974). It was presumed by the authors that the bitch ate the worms which were discharged undigested in the faeces.

There are four reports from America all involving Bipalium kewense, an exotic land planarian introduced from Oriental regions. A specimen of B. kewense was found in the napkin of a child aged 10 months who had been playing outdoors on the lawn (Walton and Yokogawa 1972) and in another case a specimen of B. kewense was washed from a child's napkin (Daly et al 1977). B. kewense has also been found on the flank of a dog near the anus, and on another occasion wrapped around the leg of a cat (Daly et al 1976).

The purpose of this paper is to report three cases of pseudoparasitism of domestic and native animals by geoplanid land planarians in Australia.

Case Reports

Case 1 — On a farm at Bundaberg, Queensland, a pullet foraging in long wet grass was seen to
behave in an extremely agitated manner. As there was no obvious reason for this distress, the fowl was captured and carefully examined. A land planarian was found partially coiled in an external ear of the pullet. Just prior to the incident, heavy rain had fallen and the ground was quite wet. The planarian was tentatively identified as Geoplana caerulea (Moseley) by Mr P. Ricketts, but lysed before it could be preserved.

Case 2 — In late January 1977, a female Pygmy possum (Cercartetus nanus) was collected 1500 metres from O'Reilly's Guest House at 1750 hours, in the Lamington National Park, South Eastern Queensland. When found it was sitting in the middle of the O'Reilly-Canungra road, which is bordered on either side by rainforest. Following capture the possum was kept (under permit) in a sterile glass terrarium and later thoroughly examined by staff of the Queensland Museum and Mr B. Macness of the National Parks and Wildlife Service. Seven days following capture, at 2020 hours, a land planarian was found crawling through the possum's fur. The worm was identified as a species of Geoplana by the Zoology Department, Queensland University; the specimen has since been mislaid.

Case 3 — Mrs L. Clarke of Taroona near Hobart, Tasmania, found a land planarian on the fur of a cat. The planarian was forwarded to the Tasmanian Museum and later identified by the author as Geoplana typhlops Dendy, a native Tasmanian species. The exact circumstances under which the cat picked up the worm are not known.

Discussion

Gastrointestinal pseudoparasitism is implied in all but one of the reports from Japan and America. This is based mainly upon circumstantial evidence: the presence of land planarians in faeces, napkins or about the anal area of the host. Daly et al (1977) for B. kewense, advanced experimental evidence against gastrointestinal pseudoparasitism. They concluded that the failure to recover B. kewense in feeding experiments using dogs, and the effects of temperature, anaerobiosis and dog faeces upon the worm, suggested that it was highly unlikely that this species could survive ingestion and intestinal passage, and result in gastrointestinal pseudoparasitism. However, these observations may not be applicable to other species, particularly B. fuscatum and B. venosum. In the 3 Australian cases there is no suggestion of gastrointestinal pseudoparasitism.

Land planarians are particularly active in wet and overcast conditions. They may crawl up grass-stems or other raised objects to escape from water logged habitat. This may have been the situation in Case 1, in which following heavy rain, the pullet, moving through grass, touched the planarian which then adhered to the bird. The exact circumstances remain conjecture; the pullet's external ear undoubtedly provided an ideal dark and sheltered environment for the stranded flatworm. The planarian in this case, Geoplana caerulea (Figure 1), has a yellowish white middorsal stripe on a dark blue-black ground colour.

Figure 1: Geoplana caerulea (Moseley), from Townsville, Queensland. One cent scale is 1.7 cm diameter.

Figure 2: Geoplana typhlops Dendy, from Eaglehawk Neck, Tasmania. About natural size.

Figure 3: Bipatium kewense Moseley, from Townsville, Queensland. About natural size.
and blue-green ventral surface. The normal habitat of this species is tropical rainforest and tall open eucalypt forest in Eastern Australia. It has been introduced into many public and private gardens in the eastern states.

It is assumed that the land planarian found on the Pygmy possum (Case 2) originally came from the bush in Lamington National Park. There would be numerous opportunities for a Pygmy possum to accidentally pick up a land planarian: while climbing vegetation, sheltering beneath bark or whilst walking over leaf litter during nocturnal foraging. Where the planarian secreted itself on the possum, and how it survived is uncertain. Possible hiding places include the pouch area, an ear, nostril, the rectum, or the worm may have lain beneath the fur close to the skin. The biology of the possum and planarian tend to rule out the possibility of some commensal relationship. As the land planarian was not fully identified, no further comment can be made.

Food remains in areas where pets are fed appear to attract land planarians. In Townsville, Queensland, a species of *Platydemus* was found curled beneath chop bones on a moist cement floor. At another home *B. kewense* and *G. caerulea* were found crawling over the area where the cat was regularly fed. In both circumstances light rain had been falling (Winsor, unpublished observations). A specimen of *B. kewense* was also found in a poultry yard, Brisbane (Queensland Museum specimen G4890). In such situations there would be an increased possibility of domestic animals making accidental contact with a land planarian foraging for food, as perhaps occurred in Case 3. The planarian in this incident, *G. typhlops* (Figure 2) is one of a number of species of similar appearance that are frequently found around human habitation ("man-followers"). They are all red to white in colour, and markedly dorso-ventrally flattened, giving a strap-like appearance. This species group occurs naturally in a wide variety of habitats ranging from Temperate to Tropical rainforest and wet to dry sclerophyll forest throughout eastern Australia.

The exotic land planarian *B. kewense* (Figure 3), implicated in cases of pseudoparasitism in America, also occurs in Australia and has been recorded from all states except South Australia, Tasmania and the Northern Territory. It can be readily recognized by the shovel-shaped head, flat elongate body, and five longitudinal dorsal stripes on an olivaceous ground colour with dark transverse "neck" band. It is restricted to man-modified areas, and may be prevalent after heavy rain. No cases of pseudoparasitism involving *B. kewense* have as yet been reported in Australia.

Three major land planarian families predominating in different regions of the world. The Rhynchochelidae occur in all zoogeographic regions with the exception of the arctic and antarctic, and is the dominant family in Europe and North America. The Biplaiididae, consisting of the sole genus *Biplium*, are essentially Oriental. In the Australian and South American regions, the Geoplanidae are the dominant family. It is possible that the involvement of particular land planarians in these cases of pseudoparasitism merely reflects this predominance of land planarians in different areas: bipaliid planarians in Japan, geoplanid planarians in Australia. In North America, the native land planarians are small and uncommon. However, the large exotic *Biplium kewense*, introduced from the Orient, is well established in urban areas, particularly in the eastern states.

In the light of the present knowledge of the biology of Australian land planarians, pseudoparasitism may be an inappropriate term for what would appear to be simply accidental attachment of geoplanid land planarians to the animals concerned in these three new cases reported here.

Veterinary practitioners who may encounter similar incidents to those described, are urged to preserve the land planarians in alcohol or formalin, and forward the specimens together with relevant notes to the author or state museum.

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References


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