

A REVIEW OF NEW ZEALAND LEECHES

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THE leeches of the world are a small, systematically compact assembly of animals sharply set off from other annelids. In this respect, their position in the Annelida is comparable with that of the Primates in the Mammalia. Both are distinct assemblies of animals with few major systematic subdivisions, containing groups of limited size, but with marked morphological, ecological and behaviouristic specialisations. The Primates achieved a reasonably wide distribution. The study of these animals has given valuable insight to zoogeographical problems. The leeches have achieved and maintained an extremely wide distribution. The study of leeches can supply much useful information to assist solution of such problems. The fresh-water leeches are particularly interesting in the study of dispersal.

The Hirudinea contains only two main groups: the Rhynchobdellae, which includes the marine and freshwater fish-leeches (*Piscicolidae*) and the freshwater *Glossiphoniidae*; and the Arynchobdellae, including *Erpobdellidae* and *Hirudinidae*. The latter includes freshwater and terrestrial leeches. Only the fish-leeches and a minority of the others are actively sanguivorous. The bulk of known species are scavengers or predators feeding on molluscs and insect larvae. In spite of this, it has been common in the past to accept the hypothesis that the leeches have been dispersed by passive means, that they have achieved their distribution by attaching themselves to the feet or other parts of aquatic birds, and that eggs have been carried on the feet of birds or on mammals.

This hypothesis is contrary to the bulk of known facts. The Rhynchobdellids and Piscicolids deposit their eggs in cocoons attached to stones, sticks or weed. Glossiphonids carry eggs and the young on the venter of the adult. Neither habit offers a ready opportunity for transport by birds, nor in spite of the marked differences in the breeding habits of the two groups is there any obvious indication of a greater dispersal for the one group than the other. It is reasonable to expect that the sanguivores, which habitually attack and attach to a host, would show a wider dispersal than non-sanguivores, if bird transport were an effective method of dispersion; but this is not the case. The bulk of leeches of very wide distribution are at best limited sanguivores, sensitive to disturbance, secretive in habit, rarely attaching to birds and then only for brief periods even under the most favourable experimental conditions. Bird transport is definite in the case of leeches of the genus *Theromyzon*, of which two species have been recorded in the nasal passages of birds; but the distribution of these species is no greater and often less than of other non-sanguivorous, timid species.

In analysing the leech fauna of Prince Edward Island (*Can. Field Naturalist*, 57: 89-91) it was possible to demonstrate on the basis of known behaviour the extreme improbability of bird transport for three of the six species, and the high improbability for two others. Although this means of transport can be accepted for a very limited number of species, some other method of dispersal must be available to the rest. Migratory behaviour has been shown for one North American species (*Idem.*, 56: 67-70), giving an indication of the method of dispersion over continuous land masses; but the means of passage across salt-water barriers cannot yet be considered solved. Certainly, bird transport is not the solution and the New Zealand leech fauna gives valuable additional evidence on this point.

The leech fauna of this country is rich in genera. Speciation is poor, but the known species have a wide distribution. The group has been largely neglected by students. Parker reported the first leech, proposing in 1892 the name of *B. rajae* for a *Branchellion* from the ray. The species is still undescribed. It is common on dogfish in Cook Strait. Parker and Haswell's text contained for several editions the statement that there were no freshwater leeches in New Zealand, a statement holding until Dendy and Olliver described a biannulate Glossiphonid now referable as *Oligobdella novae-zealandiae*. This came from Lake Takapuna.

Benham has made the sole subsequent contributions to the knowledge of the leeches in this country. He has very adequately described *Placobdella maorica* and *Hirudobdella antipodum*, shown the presence of *Limnobdella australis*, and recorded the presence of a *Pontobdella* from elasmobranchs. In addition, Benham has described the peculiar erpobdellid *Ornithobdella edentula* and *Notobdella*

nototheniae from the Southern Islands. The latter has been considered a possible synonym of *Ichthyobdella tentaculata*, which is described from South America. The doubtful early record of *Haemadipsa limbata* still stands unconfirmed.

To the above list can be added a species of *Ichthyobdella* known only from a single specimen taken at 80 fathoms in Cook Strait; specimens of the genus *Platybdella* from Cook Strait; and a Glossiphonid which is common at least in shallow coastal lakes. These are all in process of description. The Glossiphonid is of the genus *Glossiphonia*, a member of the *heteroclitia* group, but so far not referable to a known species.

The characters of the leech fauna can be briefly summarised. There are at least four marine species representing the genera: *Pontobdella*, *Ichthyobdella*, *Platybdella*, and *Branchellion*. Three, if not all four, are distinct species, a point of interest in view of the strong endemic element among the coastal fishes, particularly the elasmobranchs. These genera are all known from Australia, South America, the Antarctic, and the northern oceans.

The freshwater leeches are of more interest. *L. australis* is a voracious sanguivore, formerly a medicinal leech, and in all probability introduced into this country. This fall, I received specimens which had come alive through the mail from Australia. *H. antipodum* seems a valid endemic species of an Australasian genus. The genus *Oligobdella* occurs at least in the Americas as well as here.

The knowledge of our leech fauna is progressing, but cannot yet be considered complete. Even in its present state, it shows features which are important and can reasonably be taken into account at this time. In particular there is the remarkable absence of species and genera which have achieved extensive dispersal. Most noteworthy is the absence of the voracious terrestrial sanguivores, the Haemadipsinae which, while primarily Indo-Malayan, are present in the Pacific, occurring in Fiji, and are even represented in South America. The absence of non-sanguivorous land leeches, excepting *O. edentula*, is also important.

This country is in frequent contact with lands to the north and north-west. The number of migratory birds arriving at and departing from these shores each year is great. The number of species is not high. The number of species making the journey with limited immersion in salt water is less, but the degree and nature of this contact is still sufficiently good for us to expect that we would share a leech fauna with the lands along the flight paths of these birds if bird-transport is significant in leech dispersal.

This certainly does not appear to be the case. The distribution of leeches through the South Pacific islands may result from carriage on short-range migrants not reaching this distance; but certainly many hundreds of years of active migration does not seem to have established any links with the Indo-Malayan or oceanic leeches in this country.

Briefly, the known freshwater leeches present in this country share no particular habit favouring their transport by birds either as adults or eggs. The many species which could on the basis of distribution and habits more reasonably be expected to be carried here by birds are absent from the fauna. The known facts do not warrant continued support of the concept of bird transport as an effective means of animal dispersal.

There is real need of an extensive knowledge of the leeches of this country and of the South Pacific islands. The leeches are a small group with definite habits. An intimate knowledge of their systematics, distribution and habits will provide a most valuable circumscribed body of facts useful in the testing of our concepts of the methods of animal dispersion.

THE SPECIES PROBLEM IN NEW ZEALAND LAND SNAILS

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THIS paper is a composite one, for the final results will appear in three separate contributions. During an investigation into native snail populations, spread over the last twenty years, many interesting data have accumulated which have a definite bearing upon the species concept. The evidence is more in the nature of clues than watertight conclusions. Therefore I present my interpretation of this evidence for what it is worth, and invite criticism.