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Notes on the Occurrence of the Nematode *Mermis nigrescens* Dujardin and its Effect on the Common Earwig in Tasmania

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Since its introduction into Tasmania at a probably early date, the common brown earwig (*Forficula auricularia* Linn.) has multiplied and spread throughout the State. It is present in such considerable numbers as to cause great annual damage to fruit and green vegetable crops and is a scourge of the amateur gardener. *Forficula auricularia* has long been known to harbour the nematode *Mermis nigrescens* Dujardin. Baylis (1944) described the artificial infection of earwigs by feeding them aphids coated with the eggs of the worm. Baylis also indicated that the emergence of the larvae from the body of the host prior to the worm's sojourn in the soil brought about the death of the host. Further, earwigs were sometimes killed by heavy initial infections before the larvae had developed to any degree.

Mermis nigrescens Linn. has apparently been introduced into Tasmania through the earwig. This insect provides the University Zoology Department with a convenient source of the Sporozoon *Gregarina ovata* Duf. During the dissection of the earwigs, students and instructors frequently find the abdomen occupied by the well-developed larvae of *Mermis*. In class procedure this generally occurs in March or April. Infection apparently takes place in October or November of the previous year when the females of *Mermis* are stimulated by the warmth and moisture of the infrequent thunderstorms of that period. They rise to the surface of the soil and climb low plants to lay innumerable eggs.

Some indication of the incidence of *Mermis* in the earwig and of its effect on that host should not always prove of interest to Tasmanians but supplements the work of Baylis.

In January, 1946, one hundred earwigs were collected from my garden at Glenorchy, and dissected. The details of the infections are as follows:—

	Sex of Earwig	Worms Present	Respective Lengths mm.
January 4, 1946	f	1	72
	f	3	47 57 65
	f	2	54 65
	m	3	37 54 66
	f	1	29
	m	3	52 55 56
	f	1	86
	?	2	58 90
	?	2	55 88
	f	1	78
	f	1	34
	6m	0	

	Sex of Earwig	Worms Present	Respective Lengths mm.
January 10	m	2	54 90
	m	3	50 51 58
	f	1	75
	m	9	31 32 36 40 43 45 45 45 50
	m	1	100
	f	6	33 35 36 41 43 45
	m	5	30 35 36 53 56
January 11	m	1	67
	f	1	120
	m	1	87
	f	1	100
	m	1	128
	m	1	34
	m	1	71
	f	4	42 42 46 84
	m	1	114
	m	1	68
	9m	0	
	3f	0	
January 14	m	2	39 102
	m	1	52
	?	8	25 29 34 35 39 41 41 41
	5m	0	
	9f	0	
January 17	f	2	83 85
	m	4	45 50 54 57
	m	6	32 33 35 40 42 45
	f	1	85
	1f	0	
January 19	f	3	55 75 77
	m	3	61 62 66
	f	1	97
	f	8	34 39 39 40 41 45 53 55
	f	4	42 51 55 58
	m	2	79 92
	f	3	59 71 75
	?	5	27 29 29 29 29
	f	9	34 35 37 38 40 41 41 42 75
	f	1	106
	m	1	? (emerged and damaged)
	m	9	22 25 32 35 36 38 41 55 67
	f	2	52 55
	f	1	83
	m	2	90 93
	m	1	108
	4m	0	
	11f	0	
	1?	0	

Thus fifty-one of the hundred earwigs were infected by *Mermis*. Generally speaking, the number of larvae present in a single earwig is in inverse ratio to their average size. This is to be expected, as the size of the body cavity of the insect is the limiting factor. The larvae are found tightly packed in the abdomen but may extend into the thorax. The worms lie free in the cavity, not being enclosed by a cyst or envelope of any kind. No fat body is present in infected insects and, whereas most of the females free from worms are carrying eggs at this time of the year, no eggs are present in infected females.

On the 8th February, 1946, Professor Hickman kindly collected eighteen earwigs at New Town. These remained in a jar, with lettuce leaves, for three days, at the end of which they were examined. Damaged and partly eaten nematodes were present in the jar and two male earwigs were dead. Of these two, the one appeared to be pierced ventrally between the posterior pair of legs and the other between the fifth and sixth abdominal segments. Of the remaining sixteen insects only one male was found to be infected. Two larvae were present 32 and 102 mm. long respectively.

On the third of March I collected a further one hundred and thirty-eight earwigs from my garden at Glenorchy. One hundred and twenty were dissected, but only thirteen of these were infected. The remaining eighteen, which appeared to be distended and therefore likely to contain worms, were separately confined in Petri dishes containing lettuce and a moist filter paper. These were observed daily and the following noted:—

March 5: One larva 86 mm. had emerged from a female earwig which died during the evening.

March 6: One larva (partly eaten) had emerged from a female which died on March 8th.

March 7: One larva 111 mm. had emerged from a female which died during the evening of March 8th.

March 8: No emergences.

March 9: Two larvae 51 mm. and 65 mm. had emerged from a female which died during the evening of March 10th.

March 10-16: No emergences.

March 17: One larva 74 mm. had emerged from a male which died during the evening of March 19th.

As no further emergences had occurred by April 8th the remaining thirteen earwigs were dissected and found to be free from infection. All the females contained eggs.

On March 15th a parallel experiment was conducted with a number of earwigs collected from New Town. The following observations were made:—

March 20: A larva 121 mm. had emerged from near the anus of a male earwig. The insect bled a little from this region and died during the evening of March 21st.

March 25: Three emergences had taken place—

1. A larva 116 mm. had emerged from a male which was bleeding from the abdominal spiracles. The insect died on March 26th.
2. Two larvae 62 mm. and 126 mm. had emerged from a female which was now dead.
3. A single larva 148 mm. had emerged from a female which died on March 26th.

A further eighteen insects were dissected on April 8th. One further male was found to be infected containing a single larva 73 mm. The females all contained eggs.

These results showed that emergences of *Mermis* are taking place rapidly during March and resulted in all observed cases in the death of the host earwig.

Summary

The presence of *Mermis nigrescens* Dujardin in the body cavity of the common earwig *Forficula auricularia* Linn. in Tasmania is reported. This is considered to be of some economic importance in Tasmania, as it reduces the earwig population in the following ways:—

1. The presence of nematode larvae prevents the formation of eggs during a period in which the females are normally producing offspring.
2. It is possible that the fertility of the males is similarly affected.
3. The emergences of the nematode larvae are responsible for a considerable number of deaths.
4. Very heavy initial infections may cause the death of the host (Baylis 1944).

References

Baylis, H. A., 1944.—Observations on the nematode *Mermis nigrescens* and related species. *Parasitology* 36 (1/2), 122-132.