

ART. V.—*A few Words on the Codlin-moths, Carpocapsa pomonella, L., and Cacoecia excessana, Walk.*

By G. V. HUDSON, F.E.S.

[Read before the Wellington Philosophical Society, 2nd July, 1890.]

MUCH has been written and said at various times on *Carpocapsa pomonella* in its relation to apple-culture in New Zealand, but, so far as I am able to ascertain, our knowledge of the insect's economy in this country is at present very incomplete. In the following notes I do not pretend to supply fresh information of any consequence, but merely wish to draw attention to a few points of special importance in connection with any steps that might be taken at some future date to eradicate the insect from New Zealand.

In the first place, Mr. Fereday has discovered, and I have verified, that the New Zealand Tortrix, known as *Cacoecia excessana*, attacks the apple in a similar manner to *Carpocapsa pomonella*. This, of course, is a very important discovery, and if the indigenous species really commits great havoc in the orchards it will be an extremely serious matter, and most difficult to deal with. However, I am disposed to think that the occurrence of *Cacoecia excessana* as an apple-destroyer is rare, and that by far the greater portion of the damage is committed by the introduced insect, *Carpocapsa pomonella*. It is, of course, highly desirable that steps should be taken to ascertain the relative destructiveness of the two insects, as it would be necessary to entirely alter our line of action if we found the indigenous species injurious to any extent. I should here mention that *Cacoecia excessana* feeds on a great variety of plants, manuka and honeysuckle being amongst the number, and hence it would always find any amount of food in the absence of apples, so that the method I am about to describe in connection with *Carpocapsa pomonella* would not apply if we had to deal with *Cacoecia excessana*. My reason for thinking that the bulk of the damage is done by *Carpocapsa pomonella* is that in the up-country districts round Nelson, where *Carpocapsa pomonella* has not yet arrived, there are extremely few, if any, apples attacked, while as we approach civilisation the orchards become more and more infested, until we come to Nelson, where, I understand, in some cases as many as 90 per cent. of the apples are spoilt.

What is required is to prove the above facts completely, and arrive at an accurate knowledge of the damage committed by the two species. This can only be accomplished either by obtaining the assistance of the fruit-growers or else by a careful inspection of many orchards.

I should suggest the distribution of a number of coloured figures illustrating the complete life-history of both species, considerably enlarged in order to show all details. These would enable persons in each district to ascertain, without any special knowledge of entomology, which insect was producing the mischief, and much valuable information could thus be easily obtained. A large number of such illustrations could be chromo-lithographed very cheaply in London. There are on the table some figures of the Codlin-moth (*Carpocapsa pomonella*), which, being uncoloured, are really practically valueless for purposes of identification. Assuming that after a thorough investigation it was found that the injury committed by *Cacoecia excessana* was comparatively insignificant, I would propose quarantining the infected districts for a year, and destroying all the apples in such districts about December. Judging from the insect's behaviour in England, I should imagine that at that season the larvæ would all be feeding inside the apples, and by adopting this method we should absolutely kill the lot, for if by chance any moths remained over for a few weeks they would have nowhere to lay their eggs, as the insect only feeds on apples, pears, and possibly quinces. It would, of course, be necessary to ascertain all these particulars accurately before applying the scheme, and the principal questions we should require to answer are these:—

- (1.) When are the eggs deposited?
- (2.) When are the larvæ feeding in the apples?
- (3.) When do the earliest of the larvæ leave the apples?
- (4.) Does *Carpocapsa pomonella* infest quinces or any other fruit besides apples and pears?

These would have to be ascertained by numerous observations.

By quarantining the infected districts, I of course mean preventing any infected apples from being introduced into them or taken away; for it is evident that if this were not done the scheme I have proposed would be of little or no use.

Even if the method I have indicated did not destroy every codlin-moth in the districts operated upon, I feel sure that great benefit would be felt for many years afterwards, especially in highly-infected districts, where 90 per cent. of the apples are now destroyed annually by the moth.

I have several times tried to work out the life-history of *Carpocapsa pomonella* in New Zealand, but have never properly succeeded in doing so, partly on account of the difficulty of obtaining a sufficient number of infected apples in Wellington, but chiefly owing to my time being much occupied in

other ways. An investigation of this kind, to be of any real service in economic matters, requires to be carried out on such a large and exhaustive scale that it is quite beyond the power of any one situated as I am to do it without assistance.

[Since writing the above, Mr. Hobbs, M.H.R., has kindly furnished me with specimens of *Carpocapsa pomonella* in all stages of existence from Auckland, so that material is now available for figuring the complete life-history of this species. From this circumstance it also appears probable that the ravages observed in the Auckland District are due to *Carpocapsa pomonella*, and not to the indigenous *Cacoecia excessana*.]

ART. VI.—Notes on the New Zealand Squillidæ.

By CHAS. CHILTON, M.A., B.Sc.

[Read before the Otago Institute, 13th October, 1890.]

Plate X.

DURING the early part of this year I obtained from Mr. W. M. Innes, of Port Chalmers, some very fine specimens of a *Squilla*, and, in endeavouring to identify them with the forms already described from New Zealand, I have been led to make the following notes, which are perhaps worthy of publication:—

In Miers's "Catalogue of the Stalk- and Sessile-eyed Crustacea of New Zealand," published in 1876, two species of *Squillidæ* are given, both on the authority of Heller. These are *Squilla nepa*, Latr., and *Gonodactylus trispinosus*, White. It is doubtful, however, whether either of these really belongs to New Zealand. In a paper on the Stalk-eyed Crustacea of New Zealand, in the *New Zealand Journal of Science*, vol. i., p. 263, Professor Hutton gives *Squilla nepa* in a list of species which he considers as "very doubtful," but which he was not yet prepared to dismiss from the New Zealand Catalogue. *Gonodactylus spinosus*, he says, may possibly belong to the colony, but was not represented, so far as he knew, in any collection in the colony.

So far as I know, neither of these species is yet represented in any New Zealand collection, but there I fear the matter must be allowed to rest for the present, as it is desirable to hesitate long before removing any species from the list.