

FIRST INTRODUCTIONS OF SHEEP-BREEDS—*continued.*

Breed.	Date of Arrival.	Animals.	Introduced by	Province.	Breeder.	Introduced from
Scotch Blackface*	19th Aug., 1908	2 rams, 4 ewes	Mrs. Townsend	..	..	..
Suffolk Down ..	23rd Dec., 1913	1 ram, 6 ewes	G. Gould ..	Canterbury	1 ram and 2 ewes, S. R. Sherwood; 4 ewes, Chivers and Sons	England.
Dorset Down ..	7th Nov., 1921	2 rams, 5 ewes	J. C. N. Grigg	Canterbury	T. R. Spiller	Dorset.

\* Only importation of this breed.

## THE MEALY-BUG PEST IN ORCHARDS.

### CONTROL BY CRYPTOLAEMUS LADYBIRD.

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THE matter of the control of mealy bugs in orchards in certain parts of New Zealand has been attracting considerable attention among those interested. Owing to the nature of the insect and its habit of frequenting out-of-the-way places such as bud-scales, beneath bark, in crevices, in the calyx and stalk end of fruit, &c., present spraying methods are not an effective means of control. Control by beneficial insects has therefore been looked to as a possible means of overcoming the difficulty, and the work of establishing in New Zealand the ladybird beetle *Cryptolaemus montrouzieri* Muls. has been put under way for this purpose.

The female mealy bug is wingless, and characterized by a white mealy covering, though the insect itself is pinkish in colour. Further, the body is fringed with short leg-like appendages, the end ones in some species being long and tail-like. These appendages have nothing to do with locomotion, the three pairs of legs being situated on the under-side just behind the head. The insect moves about fairly rapidly from one part of a host-plant to another, and where it settles punctures the tissues and sucks up the sap through its proboscis. The male insect at an early stage becomes different from the female: it constructs a narrow white cocoon in some out-of-the-way place and there transforms, loosing its mouth-parts but developing a pair of wings and a pair of long tail-like appendages. When egg-laying commences the mature female constructs a woolly egg-sac, in the meshes of which the small yellowish eggs are entangled. When all the eggs have been deposited the sac may be larger than the parent itself. It frequently happens that the female will leave the host-plant in order to lay her eggs, and in consequence the egg-masses may occur in any convenient and sheltered crevice.

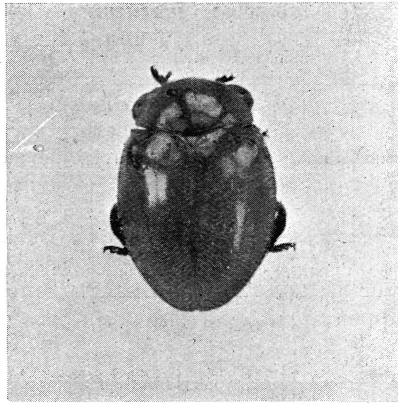


FIG. 1. *CRYPTOLAEMUS MONTROUZIERI* LADYBIRD BEETLE. MAGNIFIED 7 DIAMETERS.

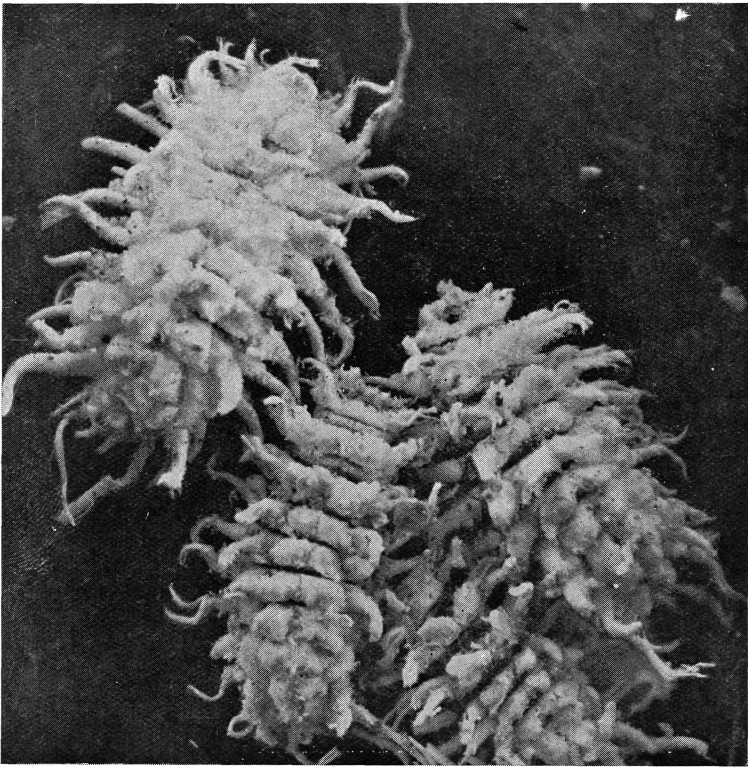


FIG 2. LARVÆ OF *C. MONTROUZIERI*. MAGNIFIED 7 DIAMETERS.  
At this stage the parasite feeds on the mealy bug.

[Photos by H. Drake.]

There are several species of mealy bugs in New Zealand. Two—Baker's mealy bug (*Pseudococcus maritimus* Erh.) and Comstock's mealy bug (*P. comstocki* Kuw.)—are commonly found, but the host-plants are varied.

The ladybird *Cryptolaemus montrouzieri* is a native of Australia, and has been imported into California and other countries for the purpose of combating mealy bugs. The beetle itself measures about  $\frac{1}{16}$  in. long (Fig. 1) and is easily recognized by its colour-pattern, both ends of the blackish body being orange-yellow. The eggs are laid in the egg-masses of the mealy bug; from two to three weeks later the beetle-larvæ hatch, and feed on the mealy bugs. These larvæ are very like the female mealy bug in general appearance, being white and having numerous leg-like appendages projecting from the body (Fig. 2). The larva becomes fully grown in about four or five weeks and seeks out some convenient crevice, where it transforms to the pupa, retaining the old larval skin as a covering. About a fortnight later the beetle emerges. The period taken to develop from egg to adult varies with conditions of temperature and moisture, the mealy bug, also, being similarly affected.

As early as 1897 an attempt was made by the Department of Agriculture to establish this ladybird in New Zealand, numbers having been liberated in the North Island, particularly in the Auckland District. For a time no good results were noticed, but in 1901 it was reported that mealy bugs—except in glasshouses—were under control. The reports on this attempt to introduce the ladybird are, however, of too meagre a nature to base any conclusions upon. Of recent years the beetle has become uncommon in the North Island. It was introduced into Canterbury shortly after 1900 to combat the gum-tree scale, but did not survive.

Last August a consignment of the ladybirds was received from Mr. W. B. Gurney, Government Entomologist, New South Wales, and from this lot a colony was started at the Biological Laboratory. A second consignment arrived during December, so that sufficient material became available for distribution in small quantities. A third consignment including two other species of mealy bug natural enemies (*Scymnus binaevatus* and *Leptomastix abnormis*), which arrived at this Laboratory on 16th February, was sent from California through the kindness of Professor H. S. Smith and Dr. H. M. Armitage.

The method of rearing the ladybirds here is much the same as that adopted by the California Department of Agriculture, at Sacramento. Mealy bugs are bred upon sprouted potatoes, and small shallow boxes containing the latter, heavily infested, are placed in the breeding-cages with the ladybirds. As soon as adults emerge from pupæ they are transferred to a separate cage and another brood started.

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*Threshing-machines.*—When threshing or chaff-cutting it is important to stipulate that the machine shall be thoroughly cleaned of all weed-seeds before it comes on to the farm. Weed-infested screenings should be burnt before there is a chance of their being spread.