

(10) BUILDINGS.

A very useful and commodious shed has been erected to incorporate storage, seed cleaning, and to house implements, soil-sterilizing plant, &c. A set of cold frames has been erected, and arrangements are made for the erection of two additional glasshouses. Much needed tractor power arrived, but the machine sent is unsuitable in many ways and negotiations have been opened up to have it replaced by a more suitable machine. A top-dresser was secured, and this has proved eminently satisfactory. The old implement shed has been converted to a workshop.

ENTOMOLOGY DIVISION, NELSON.

Director: Dr. D. MILLER.

The following are the main features of activity upon which the Division of Entomology has been engaged during 1939-40:—

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| (1) Diamond-back moth. | (6) Timber insects. |
| (2) White butterfly. | (7) Tussock-moth. |
| (3) Subterranean grass-caterpillar. | (8) Routine. |
| (4) Lucerne-flea. | (9) Publications. |
| (5) Cheese-mites. | |

(1) DIAMOND-BACK MOTH.

(a) Investigations at Farnham Royal.

Work at Farnham Royal on the diamond-back-moth investigation has proceeded along the lines of determining which parasites from a list of those recorded would be most suitable for introduction into this country. Some very interesting and useful work has been carried out in connection with the inter-relationship of the different species of parasites, and when completed will prove to be of fundamental importance to biological control work as a whole.

(b) Breeding-work at Laboratory.

During the past year both species of parasites—that is, *Diadromus collaris*, the pupal parasite, and *Angitia cerophaga*, the larval parasite—were bred in the glasshouse, and as soon as the weather was suitable in the early summer this work was carried into the field and again large numbers of the parasites were bred up for distribution in definite localities.

(c) Field Survey of Plutella.

Field collections of the diamond-back moth were commenced in Hawke's Bay at the end of December, 1939, and were carried out until the middle of April, 1940. The survey was undertaken to determine—

- (i) Whether *Diadromus collaris*, which had been liberated there the previous year, had successfully overwintered; and
- (ii) How far it had spread from the initial point of infestation.

The survey showed that it had successfully overwintered and was well established. The survey extended as far north as Rissington, a point twenty miles from the place of liberation, and in the south as far as Woodville, which is approximately seventy miles from the point of liberation; the survey also extended to Porangahau on the coast. Large numbers of collections were made within this radius.

During January and February the severity of the diamond-back-moth injury to crops appeared to vary a great deal from place to place, and it is suggested that the influence the weather had upon the diamond-back moth was largely responsible for these variations. The majority of the crops where collections were made seemed to be quite vigorous, although in some instances they were suffering from lack of moisture. During this period the adult *Diadromids* were quite prevalent through the crops within a radius of twenty miles from the point of liberation, and the parasitized cocoons were readily recovered. During March and April it was observed that the crops were not as severely damaged by the moth as during the period of January and February, and it would seem that the reason for this was the prevalence of fungus attacks upon the moth larvae and pupæ; during this period also adult *Diadromids* were not so noticeable throughout the crops and the percentage of parasitism of the pupæ had dropped considerably, except in three cabbage patches in Hastings, where it was quite easy to recover parasitized cocoons in fair numbers. From the last results of the survey it was found that the parasite had spread as far south as Woodville.

(d) Field-cage Breeding.

At the latter part of December, 1939, a small portion of a rape crop on the property of Mr. L. C. Ferguson, Halcombe, was fenced off for the purpose of erecting field cages, in which the work of breeding *Diadromus collaris* was carried out. The first cages were erected and infested with *Plutella* on 22nd December, 1939, and the remainder were erected and infested with *Plutella* at different intervals, the last one being erected on 14th January, 1940, the number of cages used totalling one hundred. As the material in the cages became ready for the parasites, adult *Diadromids* which had been bred up at headquarters were sent out for this purpose. The parasites were successfully bred through in this fashion, and it is estimated that at least five thousand were concentrated in this manner.