Secondly, the best plants within the best inbred progenies have been grouped according to type, and unrelated plants intercrossed, necessitating 260 separate crosses. Since the plants and families utilized were selected on account of their uniformity and small loss of vigour on inbreeding, it is hoped, by further inbreeding and combination, to build up strains of good type that will lose only the least possible vigour on self-fertilization.

Investigations in connection with the pollination of lucerne have been completed, and the results are being published.

Rape.—Each year an attempt is made to raise mother seed for distribution to growers who are producing seed commercially under certification. A measure of improvement has been attained each year, as indicated by yield trials conducted this past season :—

Best commercial Giant rape	= 100·0
Mother seed distributed for 1934–35	= 107·4
Mother seed distributed for 1935–36	= 116·0
Mother seed distributed for 1936–37	= 122·4
Mother seed for distribution for 1937–38	= 125·6

An attempt has been made to combine in one cross the best features of Giant and Broad-leaf Essex rapes. This has been to a large extent successful. The type has been improved, and is associated with a marked increase in production.

Best commercial Giant	= 100·0
(Giant × Broad-leaf Essex) × Giant	= 122·6
Best commercial Broad-leaf Essex	= 100·0
(Giant × Broad-leaf Essex) × Broad-leaf Essex	= 128·0

Brassica Crosses.—Some 259 intervarietal and interspecific crosses have been made during the past season. Certain of these have as a direct objective the breeding for resistance to club-root.

Hybrid Vigour in Tomatoes.—The combination in F_1 of early maturity in association with high yield that characterized the preliminary work warranted further investigation, and fifty-nine crosses between seven varieties have been made. It is hoped that estimates of hybrid vigour attending these crosses will be undertaken next season.

Miscellaneous Trials.—A variety trial with soya beans was undertaken, and has revealed much preliminary information in regard to yield, maturity, and synonymity.

Several selections of onions were seeded, and sufficient seed is now available for yield trials next season.

Austrian winter field peas have proved to be very resistant to severe winter conditions, and superior in this respect to Partridge. Seed is being increased for distribution.

Trials of vetches and tares indicate that purple vetch and woolly-podded vetch may prove useful varieties in New Zealand.

Safflower, a new oil-bearing plant, was tried out for the first time. It grows to perfection at Palmerston North ; but owing to the spiny and unpalatable nature of the plant it was deemed unwise to extend these trials, and the plot was destroyed.

Maize variety trials were destroyed during a severe storm.

Entomological Section.

(By J. Muggeridge.)

For convenience the work of this Section is dealt with under two headings—(*a*) Routine, and (*b*) Research.

Routine.—During the past year a considerable amount of time was taken up in replying to correspondence concerning the identification of various insect pests and giving information in regard to their control where practicable.

Owing to the abnormally wet conditions in the North Auckland Province there was a serious outbreak of "armyworm" caterpillars. The appearance of the caterpillars in epidemic proportions had the effect of stripping pastures that were being kept for hay or for feeding-off during the late autumn and winter months. The area affected—over 15,000 acres—proved to be low-lying country subject to flooding. A full report on this matter has been presented.

Research.—White Butterfly : Work on the biological control of this pest was continued throughout the year, and it is pleasing to report that there was a distinct falling-off in the prevalence of the pest in the areas where the parasite was well established. At the end of the 1935 season the butterfly was under good control in Hawke's Bay, so much so that it was difficult to find a butterfly chrysalid in places where hundreds might be found before ; in the Manawatu, Taranaki, and Wellington Provinces during this period parasitism of the chrysalids reached as high as 90 per cent., and consequently towards the end of the season in these latter places there was a marked diminution in the prevalence of the pest.

At the commencement of the 1936 season there was every indication that the butterfly was under good control in the areas referred to above. As the season advanced, however, it was noted that it was increasing ; at first in parts of Hawke's Bay and subsequently in the Manawatu and Taranaki districts. The increase did not bring the population up to the original epidemic proportions, but, nevertheless, it was sufficient to be alarming. As far as time would permit field studies were made, and it was found that, apparently owing to wet conditions, there was a differential rate of parasitism between material collected from grass and that collected from posts.

During the 1935 season no such differences were noted, parasitism of the chrysalids being equally high whether they were taken from grass or from posts. It is possible that this trouble may in the future be overcome by the provisions of suitable places in which the butterfly can pupate.