

MYCOLOGY SECTION.

J. C. NEILL, Field Mycologist.

The Mycological Section is concerned with the fungi and bacteria associated with plants and plant products, with the reduction of economic losses caused by plant diseases, and with the supply of micro-organisms beneficial to agriculture. Work undertaken during the past year is reported briefly as follows:—

BRASSICA DISEASES.

Dry-rot (Phoma lingam).—Some seventy varieties and strains of swedes are under field test to determine their relative powers of resistance to this disease.

Club-root (Plasmodiophora brassicae).—Field tests of over one hundred varieties and strains of swedes and rape are in progress following up the results obtained during the previous season in regard to the fixation of the quality of resistance to this disease. The results to date show that in highly-infected soil, with favourable conditions for attack, no strain has yet been found that remains free from the disease. However, some varieties and strains have proved must more resistant than others, and future work should involve hybridization of these on an extensive scale to evolve a type highly resistant and suitable to New Zealand conditions.

Brown-heart (mottled-heart).—This disease of swedes, the cause of which is as yet unknown, has become increasingly prevalent in all swede-growing countries, including New Zealand. Elsewhere the use of small quantities of boron has given good control of the symptoms, and trials of the method are in progress both at the Station and by the Fields Division, in various parts of the Dominion.

Turnip-mosaic: This virus disease has assumed epidemic proportions on the brassica crops of the Station, very seriously interfering with the experimental programme. Its effects are particularly destructive to turnips but almost equally so to swedes, causing stunting and defoliation, followed by an offensive bacterial rot. It reduces the yield of rape by 25 per cent. The virus has been transmitted artificially to cauliflower and broccoli, causing mild mosaic symptoms. A survey is planned to determine the relative importance of this disease in the main turnip-growing districts.

CEREAL DISEASES.

Rusts.—Investigations on the biotypes of cereal rusts in New Zealand have been continued in collaboration with specialists overseas.

Seed-dressings.—Extensive field trials on the effects of organic-mercury dusts on wheat, barley, and oat seed sown at weekly intervals, have shown that, within limits, they are efficient controllants of such seed-borne diseases as the covered smuts and stripe, and result in an average increase of 10 per cent. in plant establishment.

POTATO DISEASES.

Virus.—It has been found that the variety "Aucklander Short Top" is a carrier of a masked virus causing severe losses when transmitted to other varieties—a discovery of great practical significance to growers of seed potatoes.

Internal Brown Fleck.—Experiments with various minerals for the control of this disease yielded negative results.

DISEASES OF LEGUMES.

Virus.—Investigations on the host range and methods of transmission of "pea-mosaic" have been carried out with a view to evolving measures for control. "Pea-streak," a disease which has troubled growers for some years past, has now proved to be of virus origin, and work is in progress to determine its host range and methods of transmission.

Bacterial-wilt of Beans.—Tests are in progress of varieties reported from abroad as being immune to this disease.

Seedling-vigour.—Experiments on the effect of organic-mercury dusts and of nodule organism inoculations on pea seed have yielded conflicting results—in some cases remarkable improvement in crop being obtained, in others little or none. The probable reason for this lies in the balance of seedling vigour and soil flora as governed by temperature and moisture, and this aspect will be considered in conjunction with the general investigation of soil flora now being undertaken.

DISEASES OF TOMATO AND TOBACCO.

Damping-off of seedlings.—The investigations on methods for the prevention of this trouble, continued from the previous season, have now been completed, and the results published for the guidance of growers.

Leaf-mould of Tomatoes.—The experiments on methods for the control of this disease on tomatoes under glass have also been completed and the results published.

Virus Diseases.—"Spotted-wilt" has been found to occur on tomatoes throughout the North Island but has not been reported from the South Island. The same virus has been proved to cause the disease known as "black-wilt" of tobacco, prevalent in Auckland and Bay of Plenty tobacco-growing areas. "Mosaic" of tobacco is becoming steadily more prevalent in New Zealand. Experiments are in progress on its persistence in the soil and on its host range and means of transmission.

FRUIT DISEASES.

Strawberry Virus.—It has been found that this disease may be transmitted by inarching of runners. Some two thousand plants are under observation at the Station in connection with this disease.

Strawberry Root-rot.—This is the most serious disease of strawberries in New Zealand. Up to the present attempts to find the causal agent have failed.

Bacterial Disease of Passion Fruit.—This disease appears to be widespread in the north. The bacterium has been isolated and its pathogenicity proved.

HOP DISEASES.

A survey of the hop-growing areas in Nelson has shown that the only disease of economic importance is "black root-rot." Experiments are under way to determine its cause and control. A chlorotic condition occasionally seen is under test on suspicion of being due to a virus.