

relation of a physical condition in the soil that permits of a uniform water-holding capacity, the correct blending of topsoil and subsoil, and the elimination of deep layers of fibrous materials that tend to accumulate unduly over the years where acid-promoting manures are used. The incorporation into this fibrous material of sand and similar light, friable topsoil has intensified the burning-out and drying-out of many greens during the present dry summer. Weed greens, particularly among bowlers, tend to increase in popularity, but it is difficult to arrive at a satisfactory conclusion regarding these weed greens owing to the lack of definite ecological measurement as to their persistency and spread. After the war there is bound to be a big demand for playing-greens, and the problems associated with the laying-down and maintenance of these are still far from solved. Particularly difficult is the reconditioning of old-established greens where the physical conditions of the soil have become entirely unsuited to the growing of a grass or weed sward wherever copious watering is not permitted.

Vegetable-production.—Crops continue to be produced for the dehydration of vegetable work by the Chemical Laboratory.

Substations.—For some time work has been conducted at Lincoln in order that pasture types selected at Palmerston North might be thoroughly tested under the drier arable conditions of Canterbury. In the past it has not been possible to use the animal for trials under grazing conditions, but it is hoped to extend the facilities so that this may be done in future.

The possibility of establishing additional substations located in Southland and North Auckland is also being explored, in order to ensure that types developed at Palmerston North are suitable for the wide range of climatic and farming conditions existing in these areas.

PLANT DISEASES DIVISION, OWAIRAKA, AUCKLAND

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1. PLANT DISEASES INVESTIGATIONS

(1) *Cereal Diseases.*—Corn ear-worm (*Heliothis armigera*): This introduced pest is becoming increasingly troublesome to maizegrowers, since it enters the cob and damages the apex of the husk. A series of experiments was run with a view to working out an economic means of control, infestation being reduced, in one trial, from 15 per cent. in the cheeks to 9 per cent.

(2) *Legume Diseases.*—Two further trials have been made to ascertain the relative resistance to bacterial-wilt, anthracnose, and mosaic of some eighty-three lines of beans. Results, in general, confirm those previously secured—namely, that runner varieties are resistant to all three diseases; the Burnley selections of Canadian Wonder and Dun french beans are highly resistant to bacterial-wilt and mosaic, though the former is susceptible to anthracnose; white-seeded varieties are highly resistant to bacterial-wilt; and Black Prince, Blue Pod, Wood's Centenary, Dun, and Zulu King varieties are moderately resistant to all three diseases. For production of green beans the runner varieties are the most highly resistant to grow.

(3) *Linen-flax Diseases.*—A detailed survey was made of all crops grown in the four South Canterbury factory areas of Geraldine, Washdyke, Makikihi, and Fairlie. Owing to the unusually dry season, diseases were found to be of minor importance, save in a few crops. Browning (*Polyspora lini*) was found in one crop only, whereas in previous seasons it was widely distributed. A species of *Phoma* was isolated from plants in three crops, associated with a canker near the base of the stem. Rust (*Melampsora lini*) was present in all crops to a slight extent, but caused moderate or severe infection only in a few late-sown ones. It was found to be common also on the introduced *Linum marginale*.

A series of thirty-eight crosses and strains of linen flax produced by the Agronomy Division are being tested for resistance to browning.

(4) *Fruit-tree Diseases.* (See Fruit Research report, p. 12).

(5) *Small-fruit Diseases.*—Tomato Leaf-mould (*Cladosporium fulvum*): Further quantities of seed of the resistant tomato Vetomold have been collected and distributed to growers throughout the Dominion. In some localities during the past season individual plants of this variety have been found infected with the leaf-mould organism, indicating that a strain of the latter to which Vetomold is not resistant has made an appearance. Consequently, work has been commenced with a view to producing F_2 plants resistant to both strains. Work of a similar nature is in progress to produce a leaf-mould-resistant dwarf tomato variety.

Fig Mosaic: Positive transmissions were obtained by budding and grafting, demonstrating the presence of this virus in figs in New Zealand. It closely resembles one recorded from the United States of America.

Grease-spot of Passion Fruits: Further work on control of this disease has been undertaken, adequate control being secured with Bordeaux 3–4–50 sprays applied during the autumn months, provided vines are pruned and trained on wires.

Raspberry Cane-spot and Septoria-spot: Field spraying trials were continued in a commercial garden at Riwaka, Nelson. Canes were cleaner, brighter in colour, and foliage more healthy in Bordeaux-sprayed plots. Bud-moth infection was reduced from 44 per cent. in check plots to 8 per cent. in those sprayed with lead arsenate.

(6) *Vegetable Diseases.*—Carrot Rust-fly: Field-work has been continued on the seasonal cycle of this pest, mechanical traps being employed to indicate the abundance of adults throughout the year. Results show the presence of three distinct generations, with a partial fourth in early April.

Work is being continued on effects of naphthalene dusts for control of the pest, results showing a marked reduction in the percentage of infestation when frequent applications are made.

Lettuce Ring-spot (Marssonina paratloniana): Applications of Bordeaux mixture and Cuprox materially reduced infection on winter-grown lettuce; yields were considerably increased.