

Onion Downy-mildew: Concentrated Bordeaux sprays gave a significant increase in yield of 18 per cent. over checks, but did not prevent infection from spreading to the sprayed from unsprayed plots.

Onion Thrips: Nicotine sulphate only slightly reduced infestation, and tartar emetic gave somewhat better results.

Tomato Late-blight: Cuprox has again proved superior to Bordeaux as a spray. It had much less damaging effects on plants, resulting in increased yields, and gave adequate control of late-blight.

Cabbage Pests: Work has been continued on treatment of cabbages for control of white butterfly, diamond-back moth, and aphides. Derris dust has proved equal to nicotine-sulphate/lead-arsenate sprays for control of white butterfly and diamond-back moth, but inferior in control of aphids. Promising results were secured with derris dust impregnated with nicotine.

Soft-rot of Vegetables: Extensive losses have occurred in cabbages, cauliflowers, swedes, turnips, and carrots produced by the Services' vegetable-production projects. Investigation showed bacterial soft-rot organisms to be the main cause of wastage, and preliminary trials have demonstrated how such losses may be substantially reduced.

Dry-rot of Swedes: Five lines of New-Zealand-grown swede-seed were tested for presence of *Phoma lingam*. Only one sample showed infection to a slight extent—0.1 per cent.

(7) *Diseases of Medicinal Plants.*—A survey was made of diseases attacking medicinal plants being grown by the Botany Division at Lower Hutt. It was found that many had spread from adjoining market gardens, or the soil which had previously been used for market-gardening.

A virus disease attacking henbane has been studied and found to be unrecorded overseas.

II. PLANT PROTECTION

Therapeutant Testing.—Routine check tests have been made with samples of lead arsenate and lime sulphur. All certified brands have been found to comply with certification standards. Owing to short supplies from overseas, it has been necessary to allow import of lead-arsenate paste which does not comply with the standard set for lead-arsenate powders. Further, some slight modification has been made necessary by war conditions in the standard for oil emulsions.

Little further progress has been made in the general technique of biological testing owing to labour scarcity.

A high degree of disease control, and marked improvement in plant growth, was secured in small-scale trials in glasshouse soils when chloropierin was used as a soil therapeutant for control of nematodes and soil fungi.

Sperguson was compared with several copper compounds as a seed dust for control of pre-emergence damping-off. There was no significant difference between treatments and checks, though a higher percentage germination was secured with Sperguson and Cuproicide at 2½ oz. per bushel than with the other products tested.

To reduce damage in stored beans caused by *Bruchus obtectus*, a New Zealand earth has been employed in place of hydrated lime and other inert materials commonly employed. This kaolin gave adequate control at a concentration of 1 per cent., as against the 50-per-cent. dosages necessary with those other products commonly used.

III. TIMBER PRESERVATION

(See Building Research report, p. 4.)

IV. POMOLOGY INVESTIGATIONS

(See Fruit Research report, p. 12.)

V. MISCELLANEOUS

Lucerne Culture.—Cultures sufficient to inoculate 169,500 lb. of seed have been supplied to 1,450 farmers, a substantial increase of 20,000 lb. over any previous season's supply.

Glasshouse trials of six strains of the nodule organism taken from different parts of New Zealand showed slight differences in effectiveness. The present strain being supplied to farmers is as efficient as any of those tested.

Clover Cultures.—Field trials at Owairaka of several strains of clover-nodule organisms confirmed results secured in the glasshouses that marked differences exist in effectiveness of strains of nodule bacteria.

Rotproofing of Fabrics.—Work has been commenced on methods for proofing canvas fabrics, cordage, &c., against destruction by mould fungi. Several species of fungi have been isolated, and means are being evolved for testing various therapeutants.

Pyrethrum.—Samples of flowers harvested this past season showed a higher percentage of pyrethrin than those of the past two years. Plants have been raised from cuttings and despatched to the Botany Division for developmental work. Seed from both high-yielding lines produced by the Division has been forwarded to those interested in commercial production.

New Records of Diseases and Pests.—During the year the following additional diseases were identified: *Entyloma calendulae* on marigold; *Cylindrosporium concentricum* on cauliflower; *Peronospora obovata* on spurrey; *Ramularia primulae* on polyanthus; *Peronospora parasitica* on twin cress; *Bacterium pruni* on peach; and fig-mosaic on cultivated fig.

Two new pests were also identified. A Scolytid beetle, regarded as a serious pest of forest trees in California, *Phloeosinus cupressi*, on *Cupressus lawsoniana*; and a pest of vegetables and small fruits, *Otiorrhynchus ovatus*.