

Botanical Analyses.—The service offered by this Division to other Departments is still being availed of. Many samples continue to be sent in even though experimental field trials have been cut down throughout the country. In addition, all trials on the Station are maintained under full botanical measurement. The method adopted of storing separations gives a ready supply of pure species for any special chemical work desired.

AERODROME-TURF PRODUCTION

Good progress has been made during the year in the establishment of hard-wearing turfs. This improvement has followed the adoption of the principles underlying playing-turf construction rather than following the well-established principles underlying pasture practice. Strict adherence to ecological concepts is of prime importance, and when one considers the very wide range of soil types and climate upon which aerodromes are placed, full application of the ecological knowledge which this Division has accumulated over its wide grassland experience is imperative.

The transition of certain low-load-bearing turfs and soil types to high-load-bearing turf by species modification, drainage, and acidification of the soil to discourage worm and bacterial activity, is a special feature of the aerodrome-turf-construction programme. In this transition mistakes of the past in conserving and replacing unsuitable topsoil and in the use of high-producing pasture grasses and clovers, together with the over-use of lime and phosphate, have and still will require much attention before the ideal aimed at is reached. It has been by no means an easy task to counter the popular belief that aerodrome-turf construction should proceed along the lines of general farming practice, and the fact that many aerodromes of secondary importance are still open to grazing by stock further complicates the issue from an advisory point of view. Where, however, the prime objective is a turf solely for the use of aircraft and where mowers have replaced stock, turf principles rather than pasture principles must apply. Nitrogen in the form of sulphate of ammonia has been the main factor in aerodrome-turf establishment and in the building of a sod-bound, hard-wearing turf.

Acid soils (usually referred to as sour) are of fundamental importance in the production of a dense hard-wearing turf. Such soil conditions combined with good drainage and an inherent lack of the common plant nutrients favour the dense turf and mat-forming species. This set of soil conditions, however, discourages clovers, weeds, and coarse tussocky grasses. Clovers are undesirable, as they produce a slippery surface.

A useful step forward was made during the latter part of the year under review by the holding at Palmerston North of a conference, relative to aerodrome-turf construction, of responsible officers in charge of aerodrome administration. The Greens Research turf plots at Hukowhitu proved invaluable in demonstrating the general principles upon which our advisory work is based.

PLANT DISEASES DIVISION, OWAIRAKA, AUCKLAND

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I. PLANT DISEASES INVESTIGATIONS

(1) *General.*—Two new fungus diseases, two new hosts for known pathogens, and eleven new insect pests have been recorded during the year.

(2) *Grass Diseases.*—Work has been continued on the endophytic fungi associated with *Lolium* and *Festuca*. Five bushels of endophyte-free tall fescue and 2 bushels of endophyte-infected darnel-seed have been harvested for animal-nutrition studies at Wallaceville.

(3) *Crop Diseases.*—Detailed surveys have been made of the diseases present in crops of linen flax and seeding swedes. Trials of seed treatments were carried out with the former. Mite infestation of linen-flax seed was found to be conditioned by moisture content of the seed on entering the store.

(4) *Potato Diseases.*—Trials were carried out to compare copper oxychloride with Bordeaux sprays for the control of late blight. The former causes less foliage damage, but the differences in yield were not significant. No advantage was secured by the addition of cotton-seed oil to Bordeaux. A fine misty spray gave better control of the disease than did a spray composed of larger droplets.

(5) *Vegetable Diseases and Pests.*—Much work has been carried out on the biology and control of the carrot rust-fly (*Psila rosae* F.). It has been found that the fly can complete its life-cycle at any season, that the time period is longer in winter than in summer, and that there is much overlapping of generations. The life-history of the vegetable weevil (*Listroderes obliquus* Klug), which attacks most vegetables, is being studied with a view to methods of control.

Late blight of tomatoes was controlled by both copper oxychloride and Bordeaux sprays, but yields were higher with the former owing to reduced damage to foliage. The same sprays gave only partial control of leaf-mould. Seed-production of the leaf-mould-resistant tomato variety Vetamold has continued, 526 packets having been distributed to growers. In some localities Vetamold has shown susceptibility to the local strains of the fungus, and cross-breeding with other varieties is in progress in the hope of evolving more highly resistant strains.

Downy-mildew of onion was largely controlled by sprays of Bordeaux with various spreaders and wetting agents, giving increased yields. Pre-emergence damping-off of peas, which causes severe mortality and loss of vigour in early-sown peas under conditions of high soil moisture, was effectively controlled by copper oxide and copper carbonate dusts, the former giving slightly better results. Better and cheaper control of white butterfly and diamond-back moth on cabbage and cauliflower was secured with derris dust than with