

A similar study is being made of *Actinomyces* isolated from soil samples of widely varying origin and supplied by the Soil Bureau and the Soil Fertility Research Station. Of the 120 cultures thus obtained, about half have been tested and 36 show antagonistic properties. Some of the strongly antagonistic cultures are being grown in submerged culture to determine the most suitable medium for antibiotic production. The opportunity is being taken also to attempt some work on the systematics of this rather confused group of micro-organisms.

At the request of the Medical Research Council, a survey is being made of the atmospheric spore load throughout New Zealand. Plate exposures at twenty-five selected localities give an approximate but useful measure of the numbers and types of moulds in the atmosphere. The most common types are isolated and grown in mass cultures for the production of dry spores for skin tests. A number of positive reactions for allergens have been reported from these spore preparations.

MINERALS IN PASTURE

The carefully conducted trials by the Grasslands Division on the effect of clovers on the sward, with and without the addition of lime and phosphate, have been used in a detailed study of the mineral constituents of the separate components of the sward. The most important results from the first two-and-a-half-years are :—

- (1) Protein content of the grass component is highest during the winter months (up to 33 per cent.), with a minimum for the high-producing swards during the summer of 20 per cent. Clovers with a maximum protein content of 35 per cent. show less seasonal variation.
- (2) The lime content of both clovers and grasses show seasonal variations, the average content of the former being about twice as great as of the latter.
- (3) The phosphate content of the grasses is always slightly higher than that of the associated clovers, and it is estimated that, on an average high-production sward, phosphate uptake by grasses represents between 75 per cent. and 80 per cent. of the phosphate removal from the soil.

FORAGE CROPS

The branch laboratory at the Agronomy Division, Lincoln, has been established and equipped, and a start has been made on the biochemical problems connected with the breeding and utilization of forage crops.

PLANT DISEASES DIVISION

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PLANT DISEASES INVESTIGATIONS

Tomato Spotted-wilt.—The natural host range has been extended to include buttercup, wild radish, cape gooseberry, *Primula malacoides*, *Schizanthus*, and *Viscaria*. A number of strains of the virus have been separated, but further purification is necessary before their exact number can be determined. Under natural conditions, strains always occur as complexes.

Cucumber-mosaic.—The natural host range has been extended to include celery and *Delphinium*. Two of seven lines of cucumbers introduced from the United States of America showed resistance under test conditions.

Tobacco-mosaic and Tomato-streak.—The natural host range of tomato-streak has been extended to include cape gooseberry.

Both viruses are transmitted with uncleaned seed, whereas trials have shown that they are not carried with seed cleaned by fermentation or acid treatment. Extraction by fermentation allows the seed to be thoroughly washed and removes a considerable amount of the virus. Acid treatment not only allows thorough washing, but the low pH actually destroys the viruses.