

In all, approximately 1,000,000 seedlings were raised in a non-tomato glasshouse, in which the soil had been sterilized with steam and the walls with formalin. In the glasshouse every precaution was taken to prevent infection, including the prohibition of smoking, frequent sterilization of the workers' hands, arms, and implements, the use of special aprons, &c.

The seedlings were distributed to forty-six growers and were pricked out into the beds in accordance with their usual routine. In three beds the soil was sterilized with formalin prior to pricking-out to determine whether such treatment would reduce the percentage of mosaic.

The beds were inspected just prior to transplanting into the field, and the number of seedlings showing mosaic symptoms was recorded. Although a few infected seedlings were found in many beds, the highest record did not exceed 0·7 per cent.

Records in the field were taken approximately four weeks and eight weeks after transplanting. As controls for the experimental plants a similar number of other plants, of the same variety and growing under similar conditions, but derived from another source, were also recorded. The record unit was 1,000 plants in rows selected at random through the fields. At the time of the first field record the percentage of mosaic varied from 0 per cent. to 50 per cent. There was a general increase in most cases at the second recording, and in a few there was more than 90 per cent. infection.

In all, 83,438 plants were recorded. There were comparable lots of experimental and control plants. There was little difference in the amount of infection in the experimental and control plants—viz., 7,851 infected in 42,826 experimental plants, as compared with 7,581 in 40,612 control plants. Expressed as percentages, these figures are 18·33 per cent. and 18·67 per cent. respectively.

The conclusions arrived at from the experiment are as follows:—

- (1) Under this season's conditions the raising of tobacco-seedlings in a non-tomato glasshouse did not prevent the development of mosaic in the seedlings in the seedling-bed.
- (2) Where formalin was used for the treatment of beds prior to the pricking-out of tobacco-seedlings grown in a non-tomato glasshouse no mosaic was found at the bed-stage. This, however, did not prevent the appearance of mosaic in the field after the transplanting.
- (3) There was no evidence that raising tobacco-seedlings in commercial tomato glasshouses was responsible for any increase in the amount of mosaic in the crop.
- (4) While the percentage of mosaic in the seedling-beds does not appear high, the subsequent increase in the disease between bed and field indicates the importance of the bed-phase (in its wider sense, from pricking-out to transplanting) in the multiplication of the disease.
- (5) Handling and cultural operations after the planting in the field, while spreading mosaic, were of less importance than the equivalent operations at the bed-phase, owing to such secondary field infection taking place too late to seriously impair the development of the crop-leaves.

CHEMICAL INVESTIGATIONS.

At the Cawthron Institute a start has been made with soil and plant analyses relating to tobacco-culture. A set of sixty soil samples collected by the Tobacco Research Officer from the tobacco-seedling beds throughout the district has been examined in the soil laboratory for available plant-food and soil reaction. Information secured from growers earlier in the season suggested that a great variation in manurial treatment of tobacco-beds occurred in different parts of the district and that in certain cases actual harm was being done by excessive manurial treatment. The analytical data indicate that in certain cases liming and the use of wood-ash is excessive and that the use of potassic manures is haphazard.

The range of pH values in the top 0 in. to 3 in. was 5·3 per cent. to 7·7 per cent., with an average value for forty-one soil samples of 6·4. There were six soil samples with values as high as 7·0 or higher. As tobacco is considered to grow best under acid soil conditions, these high pH values suggest that in certain cases actual harm to tobacco-seedlings has resulted from excessive applications of lime and wood-ash.

The percentage of available potash in the top 0 in. to 3 in. of soil varied from 0·009 to 0·051, with an average figure for forty samples of 0·023. In certain cases the figures indicate that little, if any, potassic manure is used in the manurial treatment of the tobacco-seedling beds, and that in other cases the amount of potassic manure is unnecessarily high and possibly detrimental to young seedlings.

With few exceptions, the figures for available phosphoric acid in the top 0 in. to 3 in. of soil were high, indicating that phosphatic manures are used by all tobacco-growers in the preparation of the seedling-beds. The percentage of available phosphoric acid varied from 0·035 to 0·114, with an average figure for thirty-nine soils of 0·081 per cent.

With a view to correlating quality of tobacco-leaf with chemical composition, experience of the methods developed by Dr. Earl in Australia is being obtained. This work is necessarily only in its preliminary stages and results will not be available until next season. In the meantime samples of leaf from different varieties and at different growth-stages have been secured with a view to more intensive work during the winter and spring.

INSECT PESTS.

The Entomology Division of the Plant Research Bureau has recently reported the occurrence of two serious pests of stored tobacco in one factory—viz., the tobacco-moth (*Ephestia eleutella*) and the cigarette-beetle (*Lasioderma serricorne*). Growers' bulking-sheds may possibly be a source of infection, as well as manufacturers' stores.