Disease Investigations

(*a*) *Angular Leaf-spot.* In view of the identification of angular leaf-spot in several tobacco gardens last season, a close inspection was made of the seedling-beds of those growers where the disease had been observed. The seedling-beds of twelve growers in the Dovedale, Stanley Brook, and Pangatotara localities were closely inspected and in four cases slight to moderate infection was found. Arrangements were made for the spraying of these beds with Bordeaux.

Late in the season a field inspection covering fifty-three tobacco gardens distributed in different parts of the tobacco-growing areas was made. The survey showed a rather wide distribution of angular leaf-spot in the Riwaka and Motueka districts, Dovedale and Stanley Brook being comparatively free from this disease. Of the fifty-three gardens inspected, ten were healthy, nine were rather badly infected, and the remainder showed slight to moderate infection. No doubt the wet season which continued into the harvesting of the tobacco leaf assisted very materially in the spread of this bacterial disease.

(*b*) *Black Root-rot.*—A careful watch for black root-rot, which causes a stunting of tobacco plants, was maintained during the season. Several fresh cases of poor growth caused by this disease were identified.

(*c*) *Collar-rot.*— The seedling-bed experiments for the control of *Sclerotinia* have been continued. In addition to semesan, bluestone, formalin, and zinc oxide, chloropicrin was tested on seedling-beds which previously had been heavily infected with *Sclerotinia*. In several cases there was a severe retardation of the growth of the tobacco seedlings as a result of using the chemicals. In no case was an entirely satisfactory control obtained, but both bluestone and chloropicrin showed a considerable reduction in the amount of infection on the tobacco seedlings.

(*d*) *Mosaic Investigations.* —These have comprised a survey of mosaic in typical gardens throughout the tobacco-growing districts and a continuation of seedling-bed experiments with a view to securing more information on the incidence and transmission of mosaic:—

(1) Survey of Mosaic in Tobacco Gardens: An examination was made of five lots of two hundred plants in the tobacco gardens of twenty-one growers located in Dovedale, Motueka, and Riwaka. The survey showed a great reduction in initial mosaic over the position in the previous season, the average percentage being 8·7, compared with 37·1 in the 1943–44 season. For seven growers in Dovedale the average figure was 5·8 per cent. initial mosaic, as against 24·5 per cent. for the previous season. For six growers in Motueka the average figure was 9·5 per cent., compared with 57·7 per cent. in the 1943–44 season; while for eight growers in the Riwaka locality the percentage was 9·5 per cent., compared with 33 per cent. in the previous season:

(2) Influence of Soil Disinfectants and Fertilizers on the Incidence of Mosaic in the Field: In view of the known value of steam-sterilization of seedling-beds in reducing the amount of mosaic, several soil disinfectants were tested on unsteamed soil with a view to ascertaining their value in mosaic control. Formalin, urea, and chloropicrin were used in these experiments. Unfortunately, applications were made too late in the season, and in several cases harmful effects on the tobacco seedlings were brought about. As far as the experiments have gone there is some indication that both formalin and urea are valuable in reducing the amount of mosaic in seedling-beds. Further confirmation has been obtained of increased mosaic incidence with liberal nitrogenous manuring of the seedling-beds.

Milk sprays used on the seedling-beds prior to the pulling of the plants did not give any noticeable protection against mosaic transmission when the plants were pulled by a worker whose hands were infected. On the other hand, milk and tannin sprays gave a high degree of immunity to seedling plants where a virus spray was applied after the milk and tannin sprays. The field treatments with fertilizers and variations in soil and crop management gave confirmation of results in previous seasons. The removal of tobacco stalks as against ploughing-in of stalks did not give any significant result. Continuous tobacco compared with tobacco grown in rotation was equally low in the amount of initial mosaic.

Increases in the amount of fertilizer mixture from 800 lb. to 1,400 lb. per acre, variations in the amounts of nitrogen and potash in the fertilizer mixture, and the omission of single plant-foods from the fertilizer mixture did not give any significant result in the amount of initial mosaic. In every case the amount of initial mosaic under field conditions was less than 5 per cent., seldom exceeding 2 per cent.

A valuable experiment showing the ease with which mosaic can be transferred by workers handling plants at different stages in the pulling and planting of seedlings in the field was arranged at the Tobacco Research Station. The following figures illustrate the great importance of observing simple precautions in the handling of tobacco plants:—

	Mosaic, per Cent.
Control (clean hands)	5·0
Plants pulled with infected hands	36·0
Plants laid out with infected hands	67·5
Plants pulled after thorough washing of hands	1·5

Seed-production and Plant-breeding

The Research Station continues to supply manufacturers with seed for sowing the commercial crop. During the past season 36 lb. of seed were supplied, as against 16½ lb. and 17 lb. in the previous two seasons. Experience with the seed-production work emphasizes the necessity for once testing the single-plant selections before they are put into commercial use.

Plant-breeding to obtain mosaic-resistant varieties continues. Some of the crosses are segregated for resistance, but much work remains to be done before the desired flue-cured characteristics are obtained. Breeding-work to produce black root-rot resistant varieties was carried a stage further. The hybrid material was grown on infected ground and resistant plants back-crossed to the flue-cured parents. Two varieties resistant to black root-rot were received from United States of America and on a first season's trial on infected land have shown great promise.