

effect of nitrogen from different sources was in striking contrast to the results from the same treatments last season. This season during the dry spell those plots receiving the readily-available forms of nitrogen made the best growth, while those receiving only organic forms were slow and backward. In the method of application it appeared as if all the fertilizer in side bands resulted in too slow a start, and that a proportion of the fertilizer should be within easy reach of the root system.

INTAKE OF PLANT NUTRIENTS BY TOBACCO

The chemical data for tobacco plants of the 1942-43 season showed that in the toppings the dry matter was rich in all constituents determined, especially in potash and nitrogen, which reached 5.06 per cent. and 3.31 per cent. respectively. Ripe leaves were higher in lime, potash, and phosphoric acid, but lower in nitrogen than neighbouring nearly ripe leaves. As sampling progressed, leaves being taken higher and higher up the plant, the ripe leaves became increasingly richer in nitrogen but lower in potash content. The stalk was relatively poorly supplied with all constituents determined.

On an acre basis the plants at the time harvesting began had absorbed 36 lb. CaO, 9 lb. MgO, 12 lb. P₂O₅, 69 lb. K₂O, and 27 lb. N. Further absorption occurred as the remaining leaves developed and reached maturity. Even in the stalks, absorption of nutrient appeared to continue until the end of the season.

In the 1943-44 season observations were commenced earlier than in the 1942-43 season, but a similar procedure of harvesting sample material was adopted as had been used in the former season. Dry weather restricted growth in the earlier part of the season, and irrigation was resorted to; later on rain came, with the result that excellent final growth developed in the experimental area. The plants were larger in 1943-44 than in the previous season, but the increase in dry matter resided mainly in the stalks of the plants. The following data show the rapid development of dry matter that occurred in the five weeks preceding the beginning of the harvesting period (expressed in pounds of dry matter per acre):—

Date of Sampling.	Leaves.	Stalks.	Whole Plant.
13th January, 1944..	800	199	999
25th January, 1944 ..	989	489	1478
2nd February, 1944 ..	1237	754	1991
15th February, 1944 ..	1612	1377	2989

MAGNESIUM DEFICIENCY

The value of finely-ground dolomite and magnesite for the control of magnesium deficiency in tobacco has been tested in the 1943-44 season. Owing to seasonal conditions, magnesium-deficiency symptoms were ill-defined on all plots, so no conclusions could be drawn concerning the relative value of these magnesium compounds for the control of "sand-drown."

EXPERIMENTS IN RAISING TOBACCO SEEDLINGS

Although the main object of the seed-bed experiments was to study the effect of soil treatment on incidence of mosaic in the field, a good deal of valuable information concerning the raising of tobacco seedlings was obtained. Probably owing to the very wet conditions which prevailed in the early spring, fertilizer applications in the seedling beds did not produce the striking differences in growth that were noticeable in the previous season. In general, however, the same trends were observed as in the previous season. On the sandy soils of the Research Station, using steam-sterilized soil, mixed fertilizer at the rate of $\frac{1}{2}$ lb. per square yard of seedling bed gave optimum results. When the proportion of organic constituents was increased in the mixed fertilizer, a retardation of germination of tobacco-seeds was noticed. The elimination of nitrogen from the fertilizer mixture seriously retarded the growth of plants. A noticeable feature of the seed-bed experiments was the association of more sturdy and better-rooted plants with reduced rates of seeding in the beds.

MOSAIC INVESTIGATIONS

Officers of the Research Station and the Cawthron Institute co-operated in the conduct of an extended programme of mosaic investigations covering the use of fertilizers in the seed-beds, the effect of fertilizers under field conditions on the incidence of mosaic, the transmission of mosaic through handling of plants, and the value of milk and tannin sprays for the prevention of mosaic distribution.

(i) *Seed-bed Experiments.*—The most important experiments dealt with the effect of different treatments in the tobacco seedling beds on the final incidence of mosaic in the field. The results from this experiment confirm those of previous years in indicating again the greater freedom from mosaic of bed-sown plants as against pricked-out seedlings. In addition, the results indicate that the use of fertilizers at rates exceeding $\frac{1}{2}$ lb. per square yard is frequently associated with higher percentages of mosaic when the seedlings are transplanted to the field. The lowest incidence of mosaic was associated with the fertilizer which contained no nitrogen at all. The highest incidence of mosaic was associated with the pricked-out plants where 1 lb. of mixed fertilizer had been used per square yard.

(ii) *Field Studies of Mosaic Incidence.*—Mosaic results from manurial experiments have not given any very significant differences. Increasing the mixed fertilizer from 800 lb. to 1,400 lb. per acre has made relatively little difference to the initial percentages of mosaic in the tobacco plants. When the proportion of nitrogen in the field dressings has been increased from 2 per cent. to 5 per cent. nitrogen, no significant difference in the amount of initial mosaic was found. The pulling and removal of tobacco stalks did not result in any apparent benefit in mosaic reduction, nor was there any increase in mosaic on continuous tobacco plots as compared with tobacco alternating regularly with oats.