THE TIME AND RATE OF NUTRIENT ABSORPTION
BY FLUE-CURED TOBACCO

A. L. GRIZZARD, H. R. DAVIES, AND L. R. KANGAS

Rapid chemical plant tissue tests have been found useful in studying the time and rate of nutrient absorption by plants, the effect of the absorption of one nutrient on that of another, and in determining the range in concentration of a specific nutrient in which it is not a limiting factor in growth to a particular plant (3, 4, 6, 12). It has also been shown that, as a rule, if a given plant is able to maintain a high concentration of nutrients in its conducting tissue, there can be little doubt that the soil has supplied the nutrient requirements of the plant for those particular elements.

The physiological reactions of the tobacco plant are essentially governed by such factors as rainfall and its distribution, temperature, soil conditions, and the supply of available nutrients present in the soil. In the past, a considerable part of the research carried out in connection with the production of flue-cured tobacco has dealt with such factors as the amounts, ratios, and rates of application of nitrogen, phosphorus, potassium, calcium, magnesium, chlorine, sulfur, and boron. However, few attempts have been made to determine when the tobacco used plant nutrients, and how much of the individual nutrients it used during certain periods of growth.

A study was made in 1939 and 1940 at the Tobacco Experiment Station, Chatham, Va., to determine (a) the effects of different forms of nitrogen on nitrogen absorption; (b) the effect of split applications of nitrogen and of potash, as well as fertilizer placement, on nutrient absorption; (c) the effect of different sources of magnesia on magnesia absorption; and (d) at what stage or stages during plant growth maximum absorption of nutrients occurs. The results of this study are herein reported.

MATERIALS AND METHODS

Yellow Mammoth tobacco was grown on Granville sandy loam soil. Nine treatments were used in duplicate on 1/40 acre plots. Although there were variations in time of application and in source of nitrogen and magnesium, the total application of fertilizer on each plot was equivalent to 900 pounds of a 3-10-6 fertilizer per acre. This application, in addition to the 27 pounds of nitrogen, 90 pounds of phosphoric acid and 54 pounds of potash, supplied 90 pounds each of calcium (CaO) and sulfur (SO₃) and 18 pounds each of magnesia (MgO) and chlorine.

Phosphoric acid was derived from 20% superphosphate and potash from the

---

1Contribution from the Department of Agronomy, Virginia Agricultural Experiment Station, Blacksburg, Va. Received for publication October 27, 1941.
2Associate Agronomist and Research Fellows, respectively. The writers are indebted to the Ammonia Department of the E. I. DuPont de Nemours Company, Inc., for the fellowship awards to the Agronomy Department which made this work possible. Thanks are extended to E. M. Matthews of the Pittsylvania County Station for assistance with the field work required in connection with the study.
3Figures in parenthesis refer to "Literature Cited", p. 338.

327

Published April, 1942