GROWTH RESPONSE OF PLANTS TO RIBOFLAVIN AND ASCORBIC ACID

Experiments at the University of Iowa on mineral nutrition of plants, involving the addition of riboflavin and ascorbic acid, have disclosed certain marked responses to these vitamins. Data are given for replicate pot cultures of eggplant (*Solanum melongea,* variety Black Beauty) and tobacco (*Nicotiana tobaccum,* variety Little Turkish) grown in silica gravel with Withrow's nutrient solution. Controls received only mineral salts while test cultures of the eggplant were supplemented with 2.5 P.P.M. synthetic (Merck) riboflavin, and those of tobacco were supplemented with 10 P.P.M. synthetic (Merck) ascorbic acid, dissolved directly in the aqueous solution. Pots were drained on alternate days and fresh nutrient solution added to maintain a uniform supply of mineral salts and vitamins.

Data (Table I A) show that riboflavin increased the growth of eggplant and (Table I B) that ascorbic acid increased the growth of tobacco.

TABLE I

A. Growth Response of Eggplant in Nutrient Solution Containing Riboflavin

Age of plants in days	Stem length, cm.		Fresh weight of tops in gms.		Per cent. dry weight		Fresh weight of roots in gms.		Per cent. dry weight	
	Control	Test	Control	Test	Control	Test	Control	Test	Control	Test
56	6.2	12.1	13.5	45.5	17.5	12.3	1.6	3.0	14.0	20.2
77	7.1	14.2	48.5	121.0	12.7	12.3	12.5	22.9	9.9	9.4
B. Growth Response of Tobacco in Nutrient Solution Containing Ascorbic Acid										
56	25.1	34.2	38.2	82.8	8.2	8.1	3.0	5.9	12.1	16.3

The initial gain of eggplants receiving riboflavin was maintained throughout growth. The leaves were consistently coarser in texture, thicker, and darker in color than the controls. The roots were coarser and more extensive. Shoots of 56-day-old riboflavin plants were more highly hydrated (dry weight 12.3 per cent.) than controls (dry weight 17.5 per cent.), but the converse relationship existed in the roots (dry weight of riboflavin plants 20.2 per cent., controls 14.0 per cent.). These differences in percentage of dry weight tended to level out in both tops and roots with increasing age. At the age of 77 days the dry weight of tops of both test and control plants was approximately 12.5 per cent. and of both sets of roots about 9.5 per cent.

In most respects the tobacco plants receiving ascorbic acid showed gains in growth comparable to those of the eggplants receiving riboflavin. Hydrogen ion determinations of the press sap showed that riboflavin increased the acidity of the apices of the eggplant, while with the ascorbic acid there was a slight decrease in the acidity of the stem tips of the tobacco plants. The plants receiving the vitamins showed smaller pH variations of the different regions than in the controls. Initial gains due to the two vitamins were maintained throughout the experiment. Compositional differences persisted in mature plants even where gross external contrasts tended to disappear.

The data suggest definite species differences in response to riboflavin and ascorbic acid, as well as the marked stimulatory effect of riboflavin which has not been previously reported. The experiments are being continued to determine the exact character of the histological and metabolic differences in various species under the influence of riboflavin and ascorbic acid.

Raymond Dennison
State University of Iowa

SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE USE OF PLASTIC AS A SUBSTITUTE FOR COVER GLASSES

As a result of the present conflict in Europe, the price of cover glasses used in the preparation of slides for the microscopic study of tissues has risen so much that the question as to how to meet this increase in price has become a serious problem for those laboratories in which the number of tissues studied in serial sections is great. There seems, accordingly, to be a widely felt need for a less expensive substitute for imported cover glasses. We have found that plastic serves for this purpose.

The use of plastic as a substitute for cover glasses in microscopic technique is not new, since Lentze[1] had recommended similar material about ten years ago. However, some difficulties are encountered in the covering of microscopic sections with plastic, which seem so far to have prevented the wider use of this material; but it is possible to overcome these difficulties to a very large extent and we wish therefore to describe the method which we have found to be satisfactory.

We are using cellulose acetate, trade name "Vue Pak,"[2] which can be obtained in sheets 0.005 inch or 0.127 mm thick, corresponding approximately to the thickness of cover glasses No. 1, which varies between 0.13 mm and 0.14 mm. The refractive index of this material is 1.49 to 1.50, which is very nearly that of glass. Resistance to heat is 140–180° F. Exposure of the mounted and dried slides first to a temperature of 110–115° F. for twelve hours, then keeping them at room temperature for another twelve hours, with a

[1] H. Lentze, *Klin. Wochenschr.*, 9: 1470, 1930.

[2] "Vue Pak" prepared by Monsanto Chemical Company.