CHEMICAL FACTORS INFLUENCING THE SET OF HENDERSON LIMA BEANS

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SOME 12,000 acres of Henderson lima beans are grown annually in the southern New Jersey area with a possible annual value of approximately $1,000,000. It has been estimated that failure of vines to form fruit or to set quite often may cause a 50% reduction in yield and considerable decrease in quality of fruit that is set. A solution or amelioration of the problem would be a great boon to both vegetable growers and packers in the region.

The failure of fruit formation or set of Henderson lima beans has long been a problem receiving considerable study. Climatic factors often have been held responsible for the failure of proper setting and undoubtedly are important. However, during the summer of 1941, vines within the same fields, in southern New Jersey subjected to the same climatic conditions varied greatly as to the number of beans set. Some vines had a good set while others but a few feet away failed to set a single-bean. Vines failing to set had considerable blossoms, which would fall off to be followed by a new crop of blossoms. This process was repeated until harvest time when, quite often, such vines had failed to form any beans.

It has been a common practice to plant Henderson lima beans on well-rested soils, rich in organic matter (heavy growth of weeds). Such soils for 1 or 2 years often outyield neighboring soils devoted to continuous culture. In lieu of this fact, it was thought that chemical differences might be partly responsible for failure to set beans. It was decided to make an investigation as to differences in available nutrient content existing between well- and poorly-set plants. This paper reports the findings of the initial investigation.

METHODS AND RESULTS

PLANT TESTS

It was felt that a determination of the "available" nutrients in the plant would be the best index to the supplying power of the soil. Accordingly, Morgan's (3) system of rapid soil tests for phosphorus, potassium, magnesium, and calcium and the phenoldisulfonic test for nitrates were adapted for use in this study. A photometer was used to measure accurately changes in turbidity or color (6).

Sixty-six samples of bean vines having either good or poor set were collected just prior to commercial harvesting. A preliminary study (Table 1) had shown great variation in concentration of nutrients, depending upon the portion of plant tested. As a result, it was decided to test the main and young stems. The plant samples upon being brought into the laboratory were divided into main and

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3 Figures in parenthesis refer to "Literature Cited", p. 650.