AMOUNTS OF FERTILIZER ELEMENTS REMOVED
BY PEAS AT THREE STAGES OF GROWTH

Benjamin Wolf

Knowledge of the amounts of nutrients removed by a crop, the rate of such removal, and the soil’s ability to meet such demand is of great practical importance to the agronomist. The results reported in this paper are an attempt to obtain such knowledge for a crop of canning peas (variety Thomas Laxton) grown under South Jersey conditions.

METHODS

Two fields were selected in 1943 for the purpose of this study. The fields, consisting of Sassafras loam soil, varied considerably in previous crop yields. Peas were planted in field No. 7 on April 15 and in field No. 92 on April 17. They had been fertilized before planting with approximately 1,500 pounds per acre of a 4-12-8 fertilizer, broadcast and disked into the surface. Abundant moisture and favorable temperatures aided in producing large crops. Harvested on June 17 and 19, field No. 7 produced 4,300 pounds and field No. 98, 2,400 pounds of shelled peas, respectively.

Five crop samples consisting of 2 sq. ft. each of growing peas were selected from each field approximately 35, 49, and 63 days after planting. Nearly all vines were blossoming and a number of small pods had formed at the end of the 49-day period. The sampling at 63 days after planting was just prior to harvesting.

In all cases, the plants were carefully dug from the soil in an effort to remove the majority of the roots. The roots were later washed free of soil. The plants of the last sampling were divided into roots, vines, pods, and seeds.

Samples of the A, layer of soil were also collected at each sampling date.

 Portions of the plant samples were dried and ground to a fine powder. These samples were analyzed for total N, P₂O₅, and K₂O by rapid chemical tests (1). Samples of the fresh tissue (stems) and soil were analyzed for soluble phosphorus and potassium (2). Nitrate N in both plant and soil was determined by the Brucine reaction (3).

RESULTS

The results of the various tests are given in Tables 1 and 4. The amounts of dry matter produced and the nutrients removed during three different periods of growth are given in Table 1.

It was quite apparent from the results in Table 1 that the amounts of nutrients removed bore a direct relationship to the yields of the crop. The 4,300 pounds of (fresh weight) shelled peas in field No. 7 removed 81 pounds of N, 37 pounds of P₂O₅, and 70 pounds of K₂O as compared to 45 pounds of N, 20 pounds of P₂O₅, and 37 pounds of K₂O for the 2,400 pounds of shelled peas in field No. 98. However, the amounts of nutrients removed by the crop to produce a hundred weight of shelled peas was quite similar (Table 2).

Analyses of various portions of the pea plants of the last sampling were used to calculate the amount of nutrients removed from an acre to form various portions of the plant. The results are given in Table 3.

1Contribution from the G. L. F. Seabrook Farms Raw Products Research Division, Seabrook Farms, Bridgeton, N. J. Received for publication December 4, 1944.
2Soil Chemist.
3Figures in parenthesis refer to “Literature Cited”, p. 296.