5. THE RELATION OF INOCULATION TO QUALITY AND YIELD OF PEAS

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The relation of inoculation to the quality of legume crops has been much less studied than its relation to yield. The quality factor is often thought of as an increase in protein, sugar, calcium, or some other desirable constituent. This is most common with farm legumes, but with special crops, such as canning peas and beans, quality includes such factors as tenderness, color, and flavor, in addition to protein and sugar content. Quality in the canned product is sought, but it must first be created in the field. It is rapidly being conceded that the production of quality in the raw product is a field problem. A study of quality as influenced by inoculation was considered as important as the study of the possible increases in yield in the work reported in this paper.

The conditions prevailing in Wisconsin in regard to inoculation for peas need explanation in order to grasp fully the actual value of the results obtained in the study reported. The belief has been altogether too common in Wisconsin that peas do not need inoculation. There are places in the state where this is true, but it is only true where wild vetch, wild peas, soup, field, seed, or canning peas have previously been grown to an extent that ample numbers of pea bacteria are present. The more acid soils and some of the heavier types cause the pea bacteria to decrease and prevent their distribution, with the result that the inoculation applied proves beneficial.

The experiments were planned to study the effect of reinforcing the inoculation present in the soil by applying pure cultures. The inoculation present was supposedly developed from the previous growing of peas, but the pea bacteria had not been associated with the growing pea plants for periods varying from 2 to 12 years. In some cases they had been associated with the host plant only once, while in other cases they had passed through the cycle of soil and plant three or four times. This afforded an opportunity to include in the study any possible effect of increased efficiency and increased numbers. Some of the smaller increases in yield were considered worthy of special study, as large increases have been repeatedly ob-

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