THE occurrence of root nodules on legumes was recorded nearly 500 years ago, but not until 1858 did Lochmann report that nodules do not form on all legumes. Since that date several non-nodulating legumes have been found by various investigators. Only a few of the many species of legumes have been carefully examined in this regard and it should be expected therefore that others will be added to the list.

While studying the leguminous plants and their associated organisms, it was observed that certain species appeared to symbiose as measured by nodulation with strains of the rhizobia whose morphological and physiological characters were almost identical, while other species appeared to symbiose with a large number of diverse strains whose morphological and physiological characters were extremely dissimilar. Thus, there appear to be recognizable at least three divisions of the legumes as related to nodulation, namely, the non-nodulating legumes, those that symbiose with strains nearly alike, and those that symbiose with dissimilar strains of the organism. These divisions appear to merge from one into the other so gradually that sharp demarkations are difficult to make.

All the previous research on the nodulation of legumes included species of about 40 genera, of which there are about 500, and of only a few of the comparatively large number of strains of the rhizobia. Thus, a more complete list of the symbionts as regards their relationship to each other is needed. From the information available it appears that at one extreme the non-nodulating plants are found and at the other those legumes that nodulate with a large number of strains of the rhizobia, and that an uneven gradation of species from one condition to the other is found between these extremes.

Attempts have been made to explain why plants symbiose with one strain and not with another or not at all with any strain. Apparently no satisfactory explanation exists. The root nodule organisms were divided by Mazé (7) into two groups. One group symbiosed with plants that grew on alkaline soil and the other with plants that grew on acid soil. The limiting hydrogen-ion concentration for the growth of the organisms was roughly correlated by Fred and Davenport (3) with the acidity of the juice expressed from the corresponding plants. A correlation between the protein constitution of the seeds and the specific Rhizobium with which the species will symbiose was offered by Baldwin, Fred, and Hastings (1), while Sütching (12) held that the bacteria produce a “toxin” which stimulates the plant to produce an antibody, and that the relationship between these two