INTRODUCTION

Alfalfa has been called “Queen of Forage Crops” because of its remarkable ability to produce high yields of rich, palatable, nutritious forage under a wide range of soil and climatic conditions. There are undoubtedly many factors that contribute to this plant’s excellence, but recognition must be given to the microsymbiont, the nodule bacteria that fix free nitrogen from the atmosphere.

Alfalfa originated in Persia and spread from there to the Mediterranean countries and into North and South America. Attempts to extend culture of alfalfa to new soils or to new countries often failed. There is a good possibility that many of the early failures were directly attributable to the lack of effective nodule bacteria. Two German scientists, Hellriegel and Wilfarth, discovered in 1886 that the bacteria we know today as rhizobia were responsible for improved growth of leguminous plants. Nobbe and Hiltner introduced the first laboratory-produced rhizobia inoculant a decade later.

THE RHIZOBIA: LEGUMINOUS PLANT ASSOCIATION

The Microsymbiont, Rhizobium meliloti

Early studies of the rhizobia:legume association revealed that there were many kinds of nodule bacteria and that various leguminous plants had their preferences (40). The bacteria that nodulated alfalfa also nodulated sweet clover (Melilotus sp.), fenugreek (Trigonella sp.), burclover, buttonclover, barrel medic, and other species of Medicago, but not other species of the LEGUMINOSAE. Leguminous plants mutually susceptible to nodulation by the same strains of rhizobia constitute a cross-inoculation group. The rhizobia capable of nodulating plants within a group are considered a species.