

Forage legume inoculation

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This paper summarized the antecedents and activities in biological nitrogen fixation in forage legumes in the Soils Microbiology Department – Land and Water Division – Renewable Natural Resources General Direction – Ministry of Livestock, Agriculture and Fisheries – Uruguay, discusses the main technological adoption factors and compare the use of inoculants in different countries. The Department was created in 1960 in the Plan Agropecuario to study the importance of legume inoculation in the establishment, productivity and persistence of forage legumes in the country. The Project was initiated with a rhizobia strain selection programme and supports (peat) for inoculants production. The National Inoculant Industry was established as a result of this first effort, as well as the legal frame to guarantee inoculants quality. Due to this reason, a very close functional tie was created between this Department, the Inoculant Industry and the Farmers. The role of the Plan Agropecuario in relation to the spreading/application of this technology in the farms is pointed out, as well as the identification of the limiting factors for symbiosis, which allowed to define a research program close related to the productive sector demands. During the 1980s the use of sterile peat in inoculants was spread and the requirement levels were enlarged to 2 and 1×10^{-9} rhizobia/gr of product at marketing and expiration time respectively. A very important interdisciplinary and inter-institutional relationship has been established since 1990, through research projects with external financing and grade thesis with university students. This relationship enabled the extension of activities to study the agronomic potential of other plant growth promoting micro-organisms with emphasis in gramineous plants. A wide range of activities and projects with emphasis in BNF by the *Rhizobium*-legume symbiosis is being developed since 2000, but keeping increasing efforts on other systems. The definition of a research policy based on coordinated projects at national and international levels is emphasized. At the same time, new inoculants formulations (liquid inoculants) and inoculation techniques are being developed and validated with the industry support, especially in response to the increasing booming of soybean cultivation in the country. Forage legume inoculation is a very wide practice in Uruguay with adoption percentages close to 100%. This situation represents for the agricultural sector and the country, an annual saving of 300 million dollars for partial substitution of nitrogen fertilizers, which it would have been necessary to import to reach actual productivity levels of pastures and crops. Even though, these systems would not be sustainable in time, as the mechanisms of biologic nitrogen fixation is ecologically more stable and uses a natural renewable resource.