

INTRODUCTION.

Soybeans (Glycine max or Soja max) have for a long time been cultivated in the Far East, but it was not until comparatively recently that they have been grown on a large scale elsewhere. They have aroused much interest in the United States of America, and are being extensively grown there. In Manchuria, Korea and Japan, where the earliest cultivation took place, soybeans are grown chiefly for the oil which can be extracted from the seeds, but in the United States they are grown either for the seed or, more frequently, as a short term forage crop, and in this capacity, they are replacing to some extent a part of the alfalfa previously grown for this purpose.

The soybean is not a tropical crop, but because it is so adaptable to local conditions, several introductions to the tropics have been made. Soybeans were first introduced to Trinidad as a cover crop for sugar cane, but at first they were not very successful for a variety of reasons, amongst which were that the soybean root nodule bacteria were not present in the soil, and the varieties introduced were not well adapted to the climate. Later the crop became acclimatised, and more success was achieved.

Soybeans were first grown on the College farm in 1927; the seed used had been obtained from India, the United States and Venezuela. The crop did not at first do well for the same reasons that the first introductions to Trinidad did not, but also because the germination of the seed was extremely bad. The varieties which were grown varied in their adaptability to the local conditions, and so a selection of the best types was made, with the result that the types now grown are well suited to

the conditions on the College farm.

It has been stated frequently that if soybeans are grown frequently on the same land, natural inoculation with the right type of nodule forming bacteria will take place. This seems to have taken place on the College farm, because no seed inoculation has been done in the course of the normal farm practice, but the bacteria (Rhizobium japonicum) are certainly present.

In October 1937, the writer examined a number of volunteer soybean plants on different parts of the farm, and in most cases nodules were present on the roots: the plants from Fields 5 and 7 were especially well nodulated. The yield of seed from Field 5 was very high, and although this may have been in part due to the proximity to the cattle pen, it was thought that the numerous nodules may have been partly responsible for so good a crop. The question arose as to whether it would be advisable to inoculate soybeans artificially when they were to be grown on parts of the farm where they had not been grown before, or had not been grown for some considerable time. Accordingly, an experiment, which is fully described later, was designed to test whether inoculation was necessary or not.

The site chosen for this experiment was in Field 2, at the northern end, which has not carried a soybean crop for four years, and might reasonably be supposed to have few, if any, of the nodule forming bacteria in the soil, even though the previous crop of soybeans may have been nodulated.

The main experiment was not designed solely to

compare inoculated with uninoculated seed, but combined with these treatments was one in which a commercial preparation known as Fantastex was applied to the seed, in order to find out the effect that this treatment had on the inoculation and on the growth of the plants.

Another experiment, in which the relative efficiency of two commercial cultures of Rhizobium japonicum was compared, was also put down in Field 2. The results of these two experiments are discussed in detail in this dissertation, and notes on the application of Fantastex to sugar cane and to certain crop seeds are also made.

Nitragin consists of a liquid culture of a species of Rhizobium taken up in a finely ground starch basis powder. This powder is quite dry and it is sold in sealed cans to preserve the culture until required. Several different types of Nitragin are sold, one for each of the most important cross-inoculation groups of leguminous crop plants. The methods used in cultivating these cultures are fully described in a paper by Fred, Chittling and Hastings (1934).

Legumes are usually regarded as being in a cross-inoculation group by themselves, but it is interesting to note that recently Carroll (1934) has not found that is the case with all species. This does not agree with the generally accepted grouping of Walker (1927). Carroll and Carroll (1937), in their studies of red clover, reported that some strains of Rhizobium from some species would infect the roots of soybeans, but the reverse was not true. This is a very important discovery in soybean inoculation.