

and its requirements with reference to soil, climate and water.

A. PART I.

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INTRODUCTION.

In an attempt to find a more remunerative crop for use in cover cropping the land on Sugar Estates and on other agricultural land in Trinidad attention has been directed to the possibilities of the Soy Bean plant. This plant is grown over enormous areas in Manchuria and China, in India and Japan, and as a recent introduction in the U. S. A. But in all those areas the crop is grown almost exclusively as a main crop and not as a secondary, either as forage or more especially for its seed from which the important Soy Bean oil is obtained and of which the residue makes an excellent cattle food. Among the products of the bean are "....oil, meal, flour, biscuits, milk powder, chocolate, soy sauce...." and, of course, the cattle cake mentioned above. To give some idea of the importance and possibilities of the crop a few figures of the production in Manchuria and the U.S.A. are given in Table I. from figures extracted from "The Soy Bean".

TABLE I.

Production (Tons) of Soy beans in Manchuria & U.S.A. 1907-21					
	1907	1909	1913	1918	1921
Manchuria	600,000	1,150,000	1,200,000		4,520,000
U.S.A.				50,400	50,300

While the production in the U.S.A. has been fairly steady that in Manchuria has been rising rapidly and a great part of that crop is milled in the U.S.A. or Europe, although there are several mills treating the produce in China itself. The U.S.A. Imported during 1920 1,400 tons of soy beans, while in 1914 European countries were importing 112,500 tons. These figures considered together with figures for the importation of oil and cake show the importance of the crop.

Before considering the possibilities of the crop in Trinidad we will briefly review the characteristics of the plant

and its requirements with reference to soil, climate and water. The soy bean is, of course, a legume with the typical trilobed leaf and normal zygomorphic flowers carried in racemes in the axils of the leaves, of which the leaflets vary from lanceolate to ovate. The root system has a poorly developed tap root and much branched secondary fibrous roots; it is not a deeply rooting plant. The plant itself exists in a tremendous number of varieties and exhibits a number of varying characters. In the wild state the plant is a slender twining type, but the best cultivated varieties are upright in habit, or show a tendency to bend above the ground and have a semi prostrate habit, which was seen in the plots this season (p.). There are two types of plant, the upright, practically unbranched, rather typical of a selection B III. (p.9A), and the bushy much branched type affording good cover, but yielding more often a small bean, although in good quantity. In that bushy type one finds some of the Darjeeling strains.

The plants are very pubescent, the colour of which may be brown or white: the brown colour is dominant and certain selections have been splitting for brown and white. In 1928-29 (2) a good 3 - 1 ratio was obtained and the segregation continued in the current year's investigations. Seed colour also varies greatly, together with the size of the seed, the hilum colour and the number of seeds per pod, which may be from 1 - 4. In colour the seeds may be yellow, black or bicoloured and the hilum varies from pale brown to black. The black varieties are not greatly favoured as they give a bad coloured cake and have a lower oil content.

The leaf shape has been used in the present investigations as a basis of distinction, but this shows signs of having been carried too far, as the personal error in deciding whether a plant carries narrow or leaves intermediate in size between narrow and broad is considerable. There are definitely narrow and broad leaved varieties, on which basis several selections (3) were made at first.

Flower colour may be white or purple. Such factors as yield, disease and pest resistance and period to maturity, bean size, shape and weight, of course, show varietal differences but except for that of yield, are less important at the moment, in the effort to separate pure lines.

The plant is fairly catholic in its agronomical requirements. It is indigenous to warm temperate regions, and grows as far North as 52°. Thus it may be seen what a wide range of latitude it is capable of covering as it has been grown in British Guiana.⁽¹⁾ However, there it was only on an experimental scale and did not give very successful results. The great property which recommends it to the tropical planter is that of drought resistance, coupled with an ability to thrive as well under wet conditions. The plant will definitely grow in the Tropics and it is surprising to find the following statement in Piper and Morse's book.⁽¹⁾ "....For some reason as yet obscure, under tropical or even sub-tropical conditions, the seeds fail to develop and the pods are empty." In Trinidad during the past two years in which investigations on Soy bean have been going on, the plant has definitely grown once the seed has germinated and good sets of pods have been obtained. In British Guiana varieties have been tested but results have not been too good. The difficulty in Trinidad has been in inducing germination in the seeds. Germination was poor in 1927-28 and again in 1928-29, while in 1929-30 it has been bad enough to cause the loss of certain selections (p. 8). The bad germinating power of the seed under Trinidad conditions seems to be the limiting factor in its growth here. It has been suggested that the bad germination is due to some fault in the storage of the seed, combined with its high oil content, but different strains showed considerable difference in their powers of germination. The beans showed under storage conditions in 1928-29 crinkled seed coats and germination tests were made with these against smooth coated seeds. The results of these tests were contrary to ex-

expectation, as the smooth seeds expected to be the poorer gave better results. The wrinkling did not seem due to greater ripeness of the seed as on storage the smooth coated seeds did not wrinkle; no definite conclusion was arrived at.

For soil the plant has succeeded on most types, but sandy or clay loams have shown the best results. The College soils may be termed sandy loams of alluvial origin, and have a pH value 6.2 - 7.0. Within these values lies the apparent optimum pH for soy beans as given by O. C. Bryan [(4)(p.20)] 6.5 - 7.0, and there is every possibility that Trinidad soils which receive lime from time to time would be very suitable for the crop.