

Of recent years the subject of green manuring has become increasingly important and it is certain that the agricultural development of soils in the Tropics will, to a large extent, be influenced by the knowledge of the principles underlying the practice. Decomposition of organic matter and the leaching out of soluble salts formed during the breakdown process are such powerful factors in countries where the temperature and rainfall are high, that the need for an easy and comparatively cheap means of restoring and maintaining fertility of soils is a very present one. Consequently all the information that can be obtained from experimental work on green manuring is likely to be of value to the tropical agriculturalist. A great deal of work on the subject has been done, and no publication of present day agricultural interest is complete without a reference to green manurial problems.

There are certain special problems attached to the study of the practice of green manuring. "Green Manuring" in essence, means simply the turning under of some green organic material into the soil. The nature of the green material

ploughed under, the purpose for which the practice is carried out, the nature of the soil under consideration, the crop which is to follow the manuring, and the time of ploughing in of the manure, are all subjects which require close investigation. A very large proportion of the research carried out by investigators of green manuring problems has been concerned with the study of the most suitable crops to use as green manures, as gauged by measurements of yield of the following crop and by careful investigation of soil conditions, physical and chemical, and also by bacteriological researches. Little work has been done by tropical workers on the question of the most suitable time to plough in the manure. As will easily be perceived, this is a matter of fundamental economic importance, but, from the point of view of the investigator, it is an extremely wide field. So many factors can enter into the matter and effect the results that it is obviously impossible for any one investigator to lay down hard and fast rules on the results of experiments carried out at one or even several different places on the world's surface. The variability of soil type, the wide extremes of temperature, the large range and varying distribution of rainfall, the different methods of cultivation, and the susceptibility or otherwise of the particular area to insect and other attacks, are a few of the more important of these factors. If, however, experiments are carried out by different workers in areas of different types, at different times of the year, and for long periods of time, ultimately sufficient data will exist to enable a correlation of all the results to be made. Then, and only then, will the results be of universal application.

In the meantime, however, all work done on the subject is valuable, and the particular aspect of the question of green manuring to which this investigation is devoted is that of the

time factor. For a long time it has been known that heavy dressings of green manure ploughed into the soil often cause a depression in yield of the crop immediately following, although succeeding results show large increases of yield over unmanured land. Since an outline of the present day theoretical principles underlying green manuring is given below, it is not proposed to deal at length at this point with the reasons for this. It suffices to say, however, that the reason given for the depression in yield after ploughing in green manure is due to the competition of soil bacteria - and particularly the non-nitrifying organisms, for organic matter. The nitrifying bacteria will not grow in the presence of large amounts of organic matter and consequently the formation of nitrates is inhibited until all the organic matter has been oxidised by other bacteria. It is obvious from this that the time which elapses before all the organic matter is decomposed is of the greatest importance in agricultural practice. The date of ploughing in the green manure is therefore a first rate consideration in green manuring. The climatic conditions are equally important, but climatic conditions are not capable of being controlled while the time factor is within easy control by the grower.

It was with the idea, primarily, of investigating the question as to the best time to plough in the green manure that the particular experiment described below was carried out. Other incidental objects were to study the effects of the manure on the crop of maize which followed, while part of the field used for the experiment was set aside as an observation plot in order to study the effects of green manuring with Bengal Beans on Cotton, and more particularly to test the incidence of the "Sore Skin" disease of Cotton, which disease has been noted after green manuring with Bengal Beans on the

skin

Cotton Experiment Station in Trinidad. The aims of the experiment on Field "F", then, may be briefly summarized as follows:-

- (1) To determine the best time, out of four different dates of ploughing in, to plough in Bengal Beans when followed by a Maize crop.
- (2) To obtain all possible information as to the effects of ploughing in the green manure, both on the crop and the soil.
- (3) To determine whether or not Bengal Beans, when ploughed in, influence the incidence of "Sore Skin" Disease of Cotton.
- (4) To make observations on Bengal Beans as green manure both for Maize and Cotton.