

INTRODUCTION

This report covers a part of a scheme for the improvement of the Pigeon pea, (Cajanus cajan (L) Druce = C. indicus), that was started in Trinidad under H.J. Gooding (2).

The main purpose of this scheme is to reduce the cost of labour for harvesting and thus allow a greater return to the farmer.

A number of dwarf and semi-dwarf types have been selected with determinate inflorescences. It is hoped that it may be possible to pick these more economically than the tall and late varieties now cultivated by most farmers.

The height of the strains now under observation ranges from two to six feet, as opposed to that of several Indian selections measured in 1932 (9) whose height ranged from six to sixteen feet. This is an improvement since plants taller than three feet are considered too high for easy picking.

For these reasons the present aims for selection are:

1. Dwarf trees.
2. The main crop must come in a short time.
3. High yields.
4. An early crop.
5. A low pea to pod ratio.
6. A low number of pods per weight unit.

Dwarf trees are easier picked than tall varieties, where the picker has to reach for the pods. If the main crop comes in a short time less picking rounds will have to be made. It might even be possible to harvest the crop mechanically in the near future. An early crop is desirable, so that the land is not too long occupied with the crop, and it may be used as a crop between two main crops, like sugar cane. The picking of the pods must be done carefully as immature pods have a very low pea/pod ratio and overmature pods have to be discarded as they are not accepted on the market. For this reason the pods are selected when they are picked, and the less pods have to be felt for ripeness, the quicker will the picking be. It would therefore help to select for a low number of pods per weight unit.

It is very well possible that a tree with an outstanding gross yield may have pods with a low pea/pod ratio and so produce less pea weight than a

tree with a smaller gross yield, but with pods that have a high pea/pod ratio. It is obvious that selection cannot take place by simply measuring the gross yields per tree.

For these reasons the gross yield is broken down to its yield components i.e. those physiological factors of the plant that contribute directly to the gross yield of that plant.

A number of workers have attacked yield of a crop by its yield components, especially in small grains, cotton and soy beans, in general crops where yield consists of the final product and an amount of waste material. It may be significant that Griffing (4) discarded the work for yield components on tomatoes, as in this crop the harvest is the same as the final product and there is no waste material.

Grafius (3) compared yield with a box, which dimensions are the yield components. An increase of one component would give a decrease in other components, so that the total yield would stay the same. If this view-point is correct, it would pay to find the different relationships of the yield components of the pigeon pea, so that one component, the total pea weight, is increased and other components, like number of abortive ovules per pod and the weight of shuck are decreased as far as the relationships between these yield components allow this.

In his preliminary study Johnson (6) takes the following yield components into consideration: pod weight, seed weight, number of mature seeds per pod, number of abortive ovules per pod and number of pods per tree. For the four strains he measured the various components and studied the variation within each yield component and their respective relations with yield and each other.

Although working with very heterogeneous material and only a few strains, he suggested that "an approach to yield improvement through selection based on yield components may be effective in the pigeon pea."

Based on these results, in 1964 a larger project was started, dealing with nineteen strains instead of four, and each tree was examined. This in contrast with the earlier investigations, where the yields of all trees were bulked before sampling.

This report, which deals with the pea/pod ratio is mainly concerned with quality consideration which affects the consumer at the present time, since pigeon peas are generally sold in a green, unshelled condition and only peas are used for consumption. Under these conditions a large proportion of the weight of the product bought by the consumer is comprised of shuck and no purpose has as yet been found for the shuck. Thus an increase in the pea/pod ratio would increase the output of consumable peas.

This report considers weight of shuck, weight of peas and number of peas per pod, while special emphasis has been laid on the pea/pod ratio, this is the total weight of peas per pod, compared with the total weight of the pod.