# ABSTRACT

A Numerical Classification of Some Regional

and Exotic Collections of Pigeonpea (Cajanus cajan)

Germplasm

Michael Andrew George Joseph

Seventy (70) Cajanus cajan accessions originating from the Caribbean, India and Australia and taken from the U.W.I. germplasm collection, were grown over two seasons at the University of the West Indies Field Station, Valsayn, Trinidad, and data was collected on 29 morphological and agronomic variables. An agglomerative hierarchial method of clustering was employed to classify the accessions utilizing the Average Euclidean Distance Dissimilarity Coefficient ($ed_{ij}$) and the Average Linkage Method of clustering. Principal components analysis and multiple discriminant analysis were also used to support the numerical classification produced, to examine the variability and patterns of correlations within the data and the groups formed, to determine the redundant variables and to examine the agronomic performances of the accessions. Several potentially useful accessions for solving various agronomic problems and/or for use in breeding were also identified.

Two groups of accessions were produced from the final hierarchial classification, with the taller, indeterminate and later-maturing Caribbean/Regional accessions in one group, and the exotic (Indian and Australian) accessions in the other. High variability was observed within the data for several characaters,

including time to maturity, plant height, the number of seeds per pod and growth habit. High correlations were indicated among the variables concerned with time to maturity and plant height.

Study of the agronomic performance of the accessions revealed two agronomic groups differing mainly by the time taken to maturity, with most of the Regional and Exotic accessions in separate groups.

To lend further support to the numerical classification, a random sample of 15 Group 1 accessions were surveyed electrophoretically using disc polyacralamide-gel electrophoresis. The zymograms produced using soluble proteins and peroxidase (PER) isozymes extracted from germinating seeds and seedling leaves respectively were then compared. The banding patterns of the accessions appeared similar in both cases.

Suggested applications of this study are also given.