

ABSTRACT

Considerable variability in grain yield, grain protein and forage yield existed among the many early or medium maturity sorghums (*Sorghum bicolor* (L.) Moench) studied. The hybrids were generally the higher yielders, but some relatively high-yielding inbred lines and an ordinary variety were also identified. Grain yields were greater in the ratoons than plant crops and indications are that selected high-yielding lines can be cultivated instead of some hybrids.

Differences in terminal yield components, harvest index, threshing percentage, TDM production, remobilization and capacity for storage of labile carbohydrates, crop growth rates, leaf area indices, leaf efficiencies and nitrogen assimilation were among the plant factors responsible for yield variability in the sorghums whereas moisture and nitrogen supply and plant density variations were the major environmental components influencing yield. Indications are that an optimal plant density for the sorghums may well exceed 222×10^3 plants/ha.

Grain yield demonstrated significant relationships with yield components and several parameters of growth and development. Grain number was generally the most important of the main yield components which were affected more by plant density than nitrogen supply. Harvest index and threshing percentage, but not duration to maturity and plant height at maturity,

emerged as reliable indices of yield performance. A high harvest index seems to be directly influenced by a high nitrogen transfer efficiency.

Most sorghums were relatively low in grain tannin but relatively high in grain protein contents which varied with cultivars, moisture supply and plant density.

Differences in stool carbohydrate reserves, estimated as dry matter of etiolated shoots, existed in selected sorghums.

Thanks are also due to the staff of the U.W.I. Lecture Hall, Crop Farm, the University Field Station, the Department of Crop Science and the Department of Soil Science for their co-operation, Mr. G. Taylor of the Computing Centre, U.W.I., and Mrs. J. Sanchez of the Caribbean Agricultural Research and Development Institute (CARDI) for assistance with statistical analyses, Mr. E. Shorash of CARDI for assisting in analysing plant samples, Mr. Anthony Whitehall (formerly of the Department of Crop Science) for assistance in photography. Also appreciation is expressed to Temuco Trinidad Inc., for their financial support of these investigations as well as to the various seed agencies for supplying seed material.

Finally, I am grateful to the University of the West Indies for the grant of a post-graduate award and to Mrs. G. Ferguson and Miss Clementine Ferguson for their interest and the typing of the manuscript.