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IMPACT OF NITROGEN AND INTERCROPPING ON GROWTH BEHAVIOUR AND PRODUCTIVITY OF SUGARCANE

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ABSTRACT

An experiment on sugarcane intercropping was conducted at the Waimanalo research station of the University of Hawaii during 1993-94. Sugarcane was planted with sweet corn and wheat at N levels of 0, 75, 150, and 300 kg ha^{-1} to study the effects of N and intercropping on growth behaviour, and productivity of sugarcane. The results of the study indicated that the plant height was significantly affected by the cropping systems, at early growth stages, with the tallest plants in cane intercropped with corn and shortest in sole cane. Plant height in sole cane continued to be the maximum with 300 kg N ha^{-1} up to 216 days after DAP. Cane plants in sweet corn were taller at 150 kg N ha^{-1} at early stages and at 300 kg N ha^{-1} at later stages of growth. However, cane plants intercropped with wheat were tallest in 300 kg N ha^{-1} and shortest in 0 kg N ha^{-1} at all stages. At early stages Leaf Area Index (LAI) was higher at 150 kg N ha^{-1} in sole cane, and later it was maximum at 300 kg N ha^{-1}. Leaf Area Index (LAI) in intercropped cane was the maximum at 300 kg N ha^{-1} and minimum in control. Application of 150 kg N ha^{-1} produced the maximum dry matter (61.72 t ha^{-1}) and sugar yield (18.88 t ha^{-1}) in sole cane. Whereas, 300 kg N ha^{-1} was required to produce the maximum dry matter (62.49, and 57.86 t ha^{-1}) and sugar yield (15.92 and 14.33 t ha^{-1}) in cane intercropped with sweet corn and wheat, respectively. Total dry matter and sugar yields increased with increasing N levels from 0 to 150 kg ha^{-1} in sole cane. Whereas, both dry matter and sugar yield increased in intercropped cane with increasing N levels.

INTRODUCTION

fertilizer at appropriate rate and time. It is well known fact that a proper supply of nitrogen to crop plants is associated with the enhancement of photosynthetic activity, vigorous vegetative growth, and a dark green color of plant leaves (Black, 1993). Clements (1980) has regarded nitrogen as the most influential plant element in the regulation of sugarcane growth and production.

Slow initial growth and lateral spread of cane plants, during early growth, provides a suitable environment to grow a short duration crop as an intercrop. It is well known that intercropping systems have adavntage over the sole crop systems in terms of better utilization of available natural and applied resources. Intercropping in sugarcane shows promises for small farmers in countries like Pakistan, India and Bangladesh where manual labour is inexpensive and readily available. When two crop plants are grown together, they both compete for light, nutrients, space and moisture. This interspecific and intraspecific competition results in the change of growth behaviour of the component crop plants. Competition for light enhances the height of the plants, whereas, competition for space, nutrients and moisture may affect the vigour and final productivity of the crop plants. Similarly when sugarcane is grown in an intercropping system, its growth behaviour, development and final productivity may also be affected through interspecific and intraspecific competition. Many crop options are available as intercrops in sugarcane but there is a need to know the feasibility of intercropping, impact of [illegible] on cane growth and development and