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EFFECT OF YIELD COMPONENT AND GENOTYPE- ENVIRONMENT INTERACTIONS IN KENAF

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ABSTRACT

The experiment was conducted at Manikganj, Kishoreganj and Faridpur during three years with three Kenaf (*Hibiscus cannabinus* L.) varieties viz. HC-2, HC-4 and HC-95. Analysis of variance revealed that HC-95 was the best variety in respect of base diameter and fibre yield. Combined analysis of fibre under comparative yield trial showed significant differences among varieties (G), stations (L), years (Y) and interaction items: variety × station (G×L), variety × year (G×Y) and station × year (L×Y).

Key words: Combined analysis, Kenaf varieties, interaction effects.

INTRODUCTION

Although kenaf is inferior to jute in quality of fibre, it yields higher biomass in poor low land with less care than jute. In addition to the use of Kenaf fibre as jute substitute, Watt (1890) mentions that the fibre of Kenaf was used in Bengal for the same purpose as jute including the production of pulp. He cites, "The paper made from kenaf fibre was superior in strength to the paper made by Bank of England for note pulp."In some countries, the plants are potential source of paper pulp. The young shoots and leaves are rich in protein and vitamines.

In Bangladesh, *H. cannabinus* L. is found in greater Faridpur, Kishoreganj and Barisal districts. In view of its potential a study was undertaken to asses the relative performance of selected Kenaf varieties and to ascertain the importance of genotype-environment (GE) interactions in fiber yield responses of these varieties.

MATERIALS AND METHODS

Three Kenaf varieties, HC-2, HC-4 and HC-95 were grown at three stations viz. Manikganj, Kishoreganj and Faridpur during three years of study. They were seeded in a randomized complete block design with eight replications. Each experimental unit consisted of 7.2 × 7.2 sq.m. The rows were spaced 30cm apart with 7.5cm between plants within rows. Ten plants were selected randomly from each plot for plant height and base diameter. All plants in a plot were considered for green weight, fibre weight and stand/hectare.

The analysis of variance of these combined experiment is based on the principle of the combined experiment followed by the method of Leclerg *et al.* (1962). The first part represents a single classification analysis as "between experiments" and "within experiments". Subsequently, the "between experiments" is subdivided into its component parts as location, years and location × years. The second part of the analysis considers varietal effect and their interactions with location and years.

RESULTS

Statistical analysis revealed that the variety HC-95 was significantly different from HC-2 (1% level) and HC-4 (5% level) for base diameter and fibre yield of HC-95 also showed similar phenomenon at 5% level. The plant height and green weight of HC-95 were high but the differences among varieties were insignificant. From table 2 it was observed that the stations (L), years (Y), varieties (G) and interaction items: station × year (L×Y), varieties × station (G×L) and varieties × year (G×Y) effects were significant.

DISCUSSION

Variety HC-95 was highest yielder because of high magnitude of yield component, whereas stand/hectare was lower than HC-2. Grafius (1956) stated that it would be easier to increase yield by selecting genotypes on the basis of yield components. Eunus (1968) reported that base diameter of a jute plant is a good indicator of its yield potentiality. Maiti and Chakravarty (1977) reported that plant height and base diameter were considered as general guiding criteria for efficient production of fibre in a particular genotype.

The varieties (G), stations (L) and years (Y) were significantly different from each other on the basis of their mean yield performance. The significance of G × L and G ×Y effects demonstrated that varieties responded differently to variation in environmental conditions. Chakroun *et al*. (1990) reported that the variation of environment was attributable to different climatic conditions for the different years and locations and to different edaphic conditions among the different locations.

The interaction items of genotypes, locations and years indicated the necessity of testing at multiple locations over time for accurate characterization of genotypic performance over a divergent geographical region. The standard analysis of variance provided information on the presence and magnitude of interactions between genotypes and environmental factors. So, the presence and magnitude of genotype × environment (GE) interactions is important to plant breeder in making decisions regarding the development and evaluation of new cultivars.

Table 1. Yield and yield contributing characters of three Kenaf varieties over the three years and three locations.

varieties	Plant height (m)	Base diameter (mm)	Green weight (t/ha)	Fibre weight (t/ha)	Stand /hectare in million
HC-2	3.19	18.11	29.71	1.63	0.193
HC-4	3.24	18.75	30.65	1.65	0.180
HC-95	3.33	19.75	35.01	1.78	0.182
C.V. (O.05)	NS	0.42	NS	0.11	NS
C.V. (0.01)		1.10		0.18	

NS= Non significant

Table 2. Combined analysis of Kenaf fibre (t/ha) under comparative yield trial during three years at Manikganj, Kishoreganj and Faridpur.

Source	**df.**	**SS**	**MS**
Total	215	138.33	
Station(L)	2	51.68	25.84**
Year (Y)	2	6.73	3.36**
L×Y	4	46.00	11.50
Error (1)	63	9.94	0.16
Varieties (G)	2	0.91	0.45*
G×L	4	3.43	0.86**
G×Y	4	3.32	0.83**
G × L × Y	8	1.83	0.23
Error (2)	126	14.49	0.12

*, ** Indicates significance at the 0.05 and 0.01 level of probability respectively.

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