Isolation of Kenaf for Seed Increase

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KENAF (Hibiscus cannabinus L.) has complete flowers, similar to those of cotton, with many anthers borne on a staminal column adnate to the pistil. The nature of the pollen is such that wind is not an agent in pollen dispersal; thus, any crossing that might occur results from insect activity. The flowers are large, conspicuous and attractive to insects.

The production of seed is complicated by natural crossing in areas using more than one variety. The handling of several strains on a breeding farm also presents a problem.

This paper contains data on the extent of natural crossing occurring in Kenaf in Cuba and recommendations for the isolation of breeding materials and for seed increase.

REVIEW OF LITERATURE

The reports in the literature show a wide range in the amount of crossing occurring in different countries. These differences probably reflect variations in the insect populations and in the amount of Kenaf growing in the areas with both factors being interrelated.

Tamargo and Jones (4) reviewed the literature on natural crossing in Kenaf. The amount of crossing varied from complete self-pollination in central Asia (3) to 3.92% in the variety vulgaris in Russia (5). The amount of crossing for 9 strains grown at Santiago de las Vegas, was determined by Tamargo and Jones (4). The crossing varied from 1.79% in varieties Cuba 797-5 and Java 1X51 to 23.76% in Cuba IX88A.

In a later investigation, Jones and Tamargo (2) reported that the honey bee, Apis mellifica L., was the most important pollinator of Kenaf flowers. The number of flowers visited by the honey bee during a foraging flight varied from 11 to 41 with an average of 20. Individual Kenaf flowers were visited by as many as 49 bees during a day with an average of 16.7 ± 8.7. The peak of honey bee population in the Kenaf field occurred between 11:30 a.m. and 2:00 p.m.

A wasp, Campsomeris trifasciata Fabr., was observed also by Jones and Tamargo in the field in large numbers, however, it visited only the nectar glands on the seed capsules during most of the flowering season.

MATERIALS AND METHODS

In 1952 and 1953, tests were conducted to determine the effect of distance and border rows on outcrossing from a source of foreign pollen. A block consisting of 40 rows, 200 feet long with the rows planted 24 inches apart served as the source of genetically marked pollen. In 1952, this block was planted to Java 1X51 and to Cuba 108 in 1953. Both of these varieties have green plants with entire leaves. Crossed seed blocks produced hybrids that were characterized and divided leaves from the 1952 planting and with divided leaves from the 1953 planting. These were planted in September each year and isolated 25, 40, and 60 rods from the genetically marked pollen. Due to the possibility of some volunteer plants, were used each year. Directions and arrangement are shown in figure 1, which also summarizes the results.

Rows in each block were harvested individually and seed from each row was planted for classification and the number of divided-leaf hybrids were determined percentage of crossed seeds calculated directly from these counts.

The area around the blocks of Kenaf was kept free of weeds throughout the season. An apiary containing five hives of honey bees was located approximately one mile from each block.