

Study of Vicinism With Relation to selfing in *Gossypium arboreum* Cotton

Cotton is predominantly a self fertilized crop because of the autogamous nature of the flower and prepotency condition of self pollen. However, a wide range of vicinism of natural crossing was reported by several workers on this crop. A wide range of cross pollination in this crop has been reported by Collings and Wallace (1931). Fikry (1931) had reported Vicinism varying from 0.6 per cent to 4 per cent in Egypt. Under Indian conditions, only 2 per cent natural crossing was reported between contiguous rows of both *Gossypium arboreum* and upland cottons (Khan and Afzal, 1950) but under field conditions, natural crossing varied from 0.046 per cent to 0.052 per cent for *desi* and American cottons (Afzal and Khan, 1950). A study was therefore made at the Regional Agricultural Research Station, Kovilpatti during two seasons viz., 1970-'71 and 1971-'72 to assess the extent of vicinism in *G. arboreum* cotton under rainfed black soil conditions.

Generally red plant body is used for studies on vicinism. However, other markers such as glandless boll (Michael, 1954) and glandless seed (Cross and Richmond, 1959) were also used by different workers to study the natural crossing in *G. hirsutum* cotton. Finkner (1954) reported that red leaf marker was superior to that of other stocks in effecting fertilization in upland cotton. However, an instance against the use of red plant body in

such studies had been reported by Berninger (1960). Therefore, to be in line with the common marker, the red plant body (dominant character) was utilised as a marker in the present study to determine the amount of natural crossing in *G. arboreum* cotton under Kovilpatti (rainfed black soil tract) conditions. The trial was laid out during 1970-71 main season with five rows of G. 27, a red *G. arboreum* (dominant for red plant body) variety flanked on either side with ten rows of K 7, a green *G. arboreum* variety with a spacing of 45 x 15 cm. The distance from the red coloured (marker) variety to green coloured variety was limited to 4.5 meters (15 feet) as maximum vicinism was observed to be within this distance (Khan and Afzal, 1950) under Indian conditions. Seeds from all the individual plants in the green coloured variety during 1970-71 season were collected and the entire seeds were sown for testing for the contamination for plant body colour during 1971-72 main season.

A detailed observation on all the single plants individually from cotyledonary stage to maturity indicated that none of the plants found to exhibit red coloured plant body. The result of the present study indicates that natural crossing is practically nil in *G. arboreum* cotton under Kovilpatti (rainfed black soil tract) conditions in contrast to 1 to 81 per cent in U. S. A. 0.003 per cent to 5 per cent in Russia, 0.6 per cent to 4 per cent in Egypt and 0.05 per cent

to 2 per cent in Punjab, India. According to Khan and Afzal (1950), vicinism, was entirely entomophilous, bees were mainly responsible for vicinism, wind direction had no effect on vicinism and maximum crossing took place within 15 feet (4.5 meters) from the marker plants. Therefore, the zero level vicinism in rainfed *G. arboreum* cotton under Kovilpatti conditions may be due to the lack of activities of bees because of the intensive plant protection measures now being taken up at frequent intervals. This is in line with earlier results of Berninger (1960) whose study on cross fertilization of cotton at the Tikam station revealed that use of insecticides reduces cross pollination.

The present results on natural crossing in *G. arboreum* cotton under Kovilpatti conditions suggest the possibilities of elimination of selfing in rainfed *G. arboreum* cotton. It also indicates a very short isolation distance between cotton varieties for the maintenance of varietal purity. The present study is also in line with the remarks of Innes (1971) who visited cotton areas in India. He opined it as paradoxical that while breeders are to create and maintain variability, there is strict selfing in nucleus stock of commercial varieties. According to him, the level of natural crossing has apparently become very low because of the increased use of insecticides which has reduced the number of pollinators. Gene exchange between closely related materials is unlikely to do any harm in adapted stocks but could release some variability for exploitation by further selection.

Further, the data on fibre and spinning characters of selfed and unselfed rainfed *G. arboreum* cotton for six years from 1966-67 to 1971-72 indicated difference in the fibre and spinning characters between the successive progenies of selfed and unselfed crops.

The present study brings out the fact that vicinism or natural crossing is practically nil in rainfed *G. arboreum*, cotton under Kovilpatti conditions and the differences in the fibre and spinning characteristics of the successive selfed as well as the unselfed progenies of *G. arboreum* cotton are not much altered. Further, it is suggestive that the importance of selfing in rainfed *G. arboreum* cotton crop for maintaining the varietal purity need not be over emphasised. It also indicates the possible short isolation distance to cotton seed production.

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High Yielding Short Duration Rice Variety for Kharif Season in Madurai Tract

Rice is grown in Tamil Nadu in over 2.7 million hectares. Among the rice producing centres in Tamil Nadu, Madurai district has an extent of 1.6 lakh hectares. In recent years, new high yielding rice strains have come in large numbers in quick succession. It is imperative to know their suitability and their performance to different fertilizer levels in order to maximise the production. With a view to fix up a short duration high yielding rice variety suitable for Madurai district a trial was laid out during the kharif season of 1971 at the Madurai Agricultural College Farm. The experiment was conducted in split plot design with levels of fertilization in main plot and varieties in sub-plots and replicated thrice. Eleven high yielding rice varieties viz., Karuna (CO 33), Kanchi (CO 34), Cauvery (CO 35), Bala, Krishna, Sabarmathi, Yamuna, Kannagi (Pusa 2-21), CR-44-11 (Ratna), Culture

5524 and Culture 5652 (Karikalan) were compared under three levels of fertilization viz., low (52.5 kg N+35 kg P_2O_5 +17.5 kg K_2O /ha), medium (125 kg N+62.5 kg P_2O_5 +62.5 kg K_2O /ha), and high (187.5 kg N+87.5 kg P_2O_5 +87.5 kg K_2O /ha). Nitrogen was applied in two splits, half at the time of planting and the remaining half on the 30th day of planting. Entire quantity of phosphorus and potash were applied as a basal dose as per the treatment schedule. The operations like hand weeding, irrigation and plant protection were given to all experimental units uniformly. The weather during the growth period of the crop was normal and the stand of the crop was good throughout the period. Biometric observations were recorded on height, ears per clump, grain number per ear and 1000 grain weight. Finally, the yield of grain and straw was recorded. The data are furnished in Table 1.