

SUMMARY

Intraspecific crosses involving two subspecies of Urena lobata were carried out. Cytomorphology of the hybrids and the parents was studied. On the basis of regular bivalent pairing in the hybrids it is inferred that the genomes of the two taxa are closely related. From a study of the F_1 , F_2 and F_3 generations of the hybrid, leaf lobing in U. lobata is shown to be a monogenic character with incomplete dominance.

In Abelmoschus, 12 interspecific cross-combinations were attempted using A. angulosus, A. manihot, A. esculentus and A. moschatus ssp. moschatus var. moschatus. Though all the combinations gave fruit set, fertile seeds were obtained only from crosses of A. angulosus to A. manihot and A. esculentus to A. manihot and A. angulosus.

A. angulosus x A. manihot hybrids showed regular bivalent formation. This and the very low percentage of pollen sterility and seed sterility in the hybrids suggest close homology of the genomes of the two species.

During meiosis A. esculentus x A. manihot hybrid showed up to seven bivalents and A. esculentus x A. angulosus hybrid showed up to nine bivalents. From these results it is inferred

that the chromosomes of A. esculentus have some homology with those of A. manihot and A. angulosus.

The crosses of A. moschatus ssp. moschatus var. moschatus with A. angulosus, A. manihot and A. esculentus gave fruits with only empty seeds. This would suggest that A. moschatus ssp. moschatus var. moschatus is reproductively isolated from other three species.

In Hibiscus, 94 interspecific cross-combinations were attempted using 16 species. Of these, the following nine gave seed set.

- (1) H. hirtus x H. ovalifolius
- (2) H. ovalifolius x H. hirtus
- (3) H. hirtus x H. scindicus
- (4) H. scindicus x H. hirtus
- (5) H. hirtus x H. syriacus
- (6) H. ovalifolius x H. scindicus
- (7) H. scindicus x H. ovalifolius
- (8) H. furcatus x H. surattensis
- (9) H. surattensis x H. furcatus

Hybrid seeds of the above crosses did not germinate. The embryos showed signs of growth in culture medium. Embryos of the crosses between H. furcatus and H. surattensis ceased

growth after slight enlargement. Embryos of all the other combinations were maintained in the culture for 55 to 90 days, by which time they developed 2-5 leaves. None of the hybrid seedlings survived on transplantation. It is observed that fruit and seed set were obtained only in crosses involving species belonging to the same section of the genus. Intersectional crosses did not yield fruit or seed set. This provides some genetic evidence in favour of the division (on morphological grounds) of the genus into sections as done by Borssum (1956).

Pollen tube growth studies made in 21 out of the 94 interspecific crosses of Hibiscus showed that pollen tubes were inhibited at different levels in the style. It is shown that the inhibition of pollen tube growth is not related to the differences in chromosome numbers between the parents. Incongruity is cited as the cause of the above cross failures.

Interspecific crosses involving four species of Favonia, four species of Sida and five species of Abutilon were also made in this study. All the above crosses were unsuccessful.

Intergeneric crosses involving five species of Abelmoschus and 18 species of Hibiscus were attempted. No fruit set was obtained in the above crosses. Pollen tube growth studies made in 20 of the above crosses showed inhibition of pollen tube growth on the stigmatic surface.