

STUDIES ON BRINJAL HYBRIDISATION-II

TRANSFERENCE OF BACTERIAL WILT RESISTANCE FROM A WILD BRINJAL VARIETY CULTIVATED BRINJAL VARIETIES

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Most of the cultivators of brinjal in India are susceptible to the bacterial wilt caused by *Pseudomonas solanacearum*. Davidson (1935) reported that the green varieties of egg plant were highly resistant to wilt disease. Srinivasan *et al* (1968) reported that the wild brinjal *Solanum melongena* var. *insanum* was resistant to the wilt disease. Gopimony and Sreenivasan (1970) found that crosses between the cultivated varieties of *S. melongena* and this wild variety did not wilt and a follow-up of these studies was undertaken, the results of which are presented in this paper.

Material and Methods

These studies covered the popular cultivar Purple Long Datta, the wild brinjal variety *Solanum melongena* var. *insanum* Prain and their F_1 and BC_1F_1 hybrids. The cultivar was the recurrent parent and the wild one the non-recurrent or donor parent. Reciprocal crosses were made between these two varieties.

As there were no marked differences between the two F_1 s the normal F_1 plants were used for back crossing; they were used as the pollen parents. Crossing operations were conducted between 6 and 8 in the morning.

To study the mode of inheritance of the character of resistance to wilt disease, 25 plants each of the donor parent, recurrent parent and normal hybrids and 200 plants of $B_1G_1F_1$ hybrids were grown in Pots of 22x30 cm, filled with wilt sick soil collected from the disease affected brinjal plots. The plants were top dressed with a standard vegetable mixture (7-10-5) at the rate of 2 oz per plant and watered twice every day.

All plants were inoculated by the streaking method. For this purpose fresh suspension of the bacterium was made from the wilted brinjal plants. After observing this suspension under the microscope for the presence of the virulent pathogen, it was used for

inoculation. The inoculation technique for determining resistance was broadly on the lines described by Winstead and Kelman (1952) and consisted of the following steps. A streak was made on the basal part of the stem of each plant with a sterilised needle and a drop of the bacterial suspension placed in it. Cotton dipped in sterile water was wound round the stem at the site of the streak. Further, water with which chopped diseased plants were mixed was used for watering the plants. The sap of wilted plants was examined microscopically to confirm that the wilt was caused by the bacterium.

Results

The observations showed that none of the donor parent plants wilted. Out of the 25 plants of the recurrent parent 13 wilted before inoculation and the remaining 12 wilted seven days after inoculation. Among the normal F₁ hybrids only one wilted and that too before inoculation (This was apparently due to stagnation of water in the pot). Out of the 200 B G F₁ hybrids studied, 65 wilted before inoculation and by the seventh day of inoculation the number of wilted plants totalled 93. It was also noticed that the incidence of wilting was highest just prior to flowering.

From the results it appeared that the donor parent was completely resistant to bacterial wilt and the recurrent parent highly susceptible. It is also evident that the character of resistance to bacterial wilt remained dominant in the F₁ hybrids. Among the B G F₁ hybrids the occurrence of 93 wilted plants out of 200 clearly showed that this character was segregating in a 1:1 susceptible to resistant types, a typical case of monohybrid test cross ratio. It can thus be inferred that the donor parent contained the dominant factor for resistance and the recurrent parent its recessive factor which resulted in its susceptibility. The F₁ was resistant to the disease since it also contained the dominant gene for resistance. When the F₁ was crossed with the recurrent parent the homozygous recessive, both susceptible and resistant plants were obtained in the first backcross generation in equal proportion. This confirmed that resistance to Wilt disease was governed by one single gene which was completely transmitted to the F₁ and backcross generations. These findings thus agree with the contention of Suzuki *et al* (1964) that wilt resistance in egg plant and related species was controlled by hereditary units.

WILT RESISTANCE OF BRINJAL

Summary

Hybridisation studies showed that resistance of brinjal plants to bacterial wilt disease was monogenically controlled and was transmitted to the F and backcross progenies completely. The donor parent (*Solanum melongena* var. *insanum* Prain.) carried the dominant gene for resistance. The recurrent parent (*S. melongena* cultivar Purple Long Datta) carried the recessive gene for resistance which resulted in susceptibility. The F hybrid resulting from the two was resistant since it had in its genotypic constitution the dominant gene for resistance. When this F hybrid was crossed with the recurrent parent, the homozygous recessive, a typical monohybrid test cross ratio of 1 resistant to 1 susceptible was obtained.

References

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