

Studies on Bacterial Wilt (*Pseudomonas solanacearum* E.F. Smith) Resistance in Brinjal

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ABSTRACT

The investigation was undertaken to ascertain the mode of inheritance of bacterial wilt disease and incorporation of resistance in a susceptible but otherwise potentially adapted variety (Pusa Purple Long) of Himachal Pradesh. The resistance sources used were Arka Kesev and Arka Neelkanth. The segregation of plants (resistant: susceptible) of two different crosses viz., arka Kesev × Pusa Purple Long and Arka Neelkanth × Pusa Purple Long in F₂ and back cross generations indicated the presence of single dominant gene governing resistance to bacterial wilt. The resistance to the disease can be incorporated in the hybrids by using resistant stock as one of the parent. Alternatively, resistance to bacterial wilt can be incorporated in the susceptible cultivars through back cross pedigree method.

Brinjal (*Solanum malongena* L.), is one of the most common vegetable crops grown all the year round in the country (Choudhury, 1979). Brinjal is grown on commercial scale for its immature, unripe fruits which are used in a variety of ways as cooked vegetable, pickle and in curries. Of late, the successful production of brinjal has suffered to a great extent because of the attack of bacterial wilt disease in the areas having high temperature and humidity during rainy season (Sood and Singh, 1992). Sometimes the attack is so severe that the entire crop is destroyed resulting in complete loss to the economy of the growers. The chemical control of the disease is cumbersome and involves huge expenditure. To overcome this menace, the only alternative lines in the development of high yielding, resistant genotypes possessing good horticultural attributes. The present study was undertaken to ascertain the mode of inheritance of disease and to screen out the potential resistant crosses alongwith desirable horticultural traits.

MATERIAL AND METHODS

The present investigation was carried out at the vegetable Research Farm, Himachal Pradesh Krishi Vishvavidyalaya, Palampur during *Kharif*, 1991-1993. The experimental material consisted of two bacterial wilt resistant parents, viz, Arka Kesev and Arka Neelkanth received from IIHR, Bangalore and a highly susceptible but otherwise potentially adapted variety (Pusa Purple Long) of mid hill areas of Himachal Pradesh. The resistant parents were crossed to a common susceptible one during *Kharif*, 1991 following standard methods of emasculation and pollination. Subsequently, during *Kharif*, 1992, selfing of F₁'s and back crossing with either of the parents was done to get F₂'s, B₁'s and B₂'s. All these entries were grown in a randomized block design with three replications on a soil highly infested with bacteria (sick plots). Each experimental plot

Table 1. Segregation of plants in F2 and back cross generations

Cross	Number of resistant plants	Number of susceptible plants	Expected ratio	Chi-square (cal.)	Chisquare (tab.)	Type of gene action or No. of genes
AKV×PPL (F2)	256	76	3:1	0.79	3.84	Monogenic dominant
F1 (AKV×PPL)× AKV (B1)	143	0	1:0	—	—	Monogenic dominant
F1 (AKV×PPL) × PPL (B2)	61	77	1:1	1.86	3.84	Monogenic dominant
ANK×PPL (F2)	239	65	3:1	2.12	3.84	Monogenic dominant
F1 (ANK×PPL) ×ANK (B1)	128	0	1:0	—	—	Monogenic dominant
F1 (ANK×PPL) ×PPL (B2)	52	67	1:1	1.89	3.84	Monogenic dominant

AKV = Arka Kesev, ANK = Arka neelkanth, PPL = Pusa Purple Long

consisted of 3 rows of 2.70m length for P1, P2 and F1; 9 rows for B1 and B2 and 20 lines for F2. The plants were spaced at 60x45cm apart. Number of bacterial wilt affected plants in each generation were counted after 45, 60 and 90 days after transplanting, out of the total plant population per replication in each case. For testing the agreement of observed frequencies with those expected upon the given hypothesis, the chi-square (X^2) test of goodness of fit was used.

RESULTS AND DISCUSSION

All F1 plants were observed resistant to the disease during 1992-93. The data F2 and back cross generation segregation pattern (resistant Vs. susceptible) have been presented in Table 1. The segregation of plants in F2 generation of two crosses i.e. Arka Kesev × Pusa Purple long and Arka Neelkanth x Pusa Purple Long when considered separately, the resistant and susceptible plants were in the ratio of 3:1, indicating thereby resistance to bacterial wilt is governed by a single dominant gene. The segregation of plants in back crosses with susceptible parent (Pusa Purple long) was in the ratio of 1:1 (resistant: susceptible) and Chi-square test at 5% level of significance gave a good fit. All the plants in back crosses with resistant parents (Arka Kesev and Arka Neelkanth) were resistant. The results are in close agreement with the findings of Swaminathan and Sreenivasan, 1971, Graham and Yap, 1976, Gangappa, 1986 and Gopinath and Madalageri, 1986.

In the present situation, the resistance to bacterial wilt is conditioned by a single dominant gene, it may be incorporated in the hybrids by using resistant stock as one of the parents. Alternatively, it shall be worthwhile to effect selection of potential resistant plants in first filial generation followed by back crossing in order to reconstitute the entire cytoplasm of the recurrent parent.

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