Pak. J. Bot., 18(2): 347–350, 1986.

EVALUATION OF BACTERIAL LEAF SPOT DISEASE RESISTANCE IN PEPPER

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Abstract

Eight red pepper cultivars were tested against bacterial leaf spot by spray inoculation with *Xanthomonas campestris* pv. *vesicatoria*. Disease severity was high in pot experiments as compared to field. Cultivars "Nilum" and "Jelapeno" were found to be resistant while "Picora" was moderately susceptible.

Introduction

Bacterial leaf spot in red pepper (*Capsicum annuum*) is caused by *Xanthomonas campestris* pv. *vesicatoria* (Doidge) Dawson (*X. vesicatoria*) (Young *et al.*, 1978; Adaskaveg & Hine, 1985). It is one of the most serious pepper diseases in Pakistan (Akhtar *et al.*, 1985). The bacteria affect leaf, stem and petiole forming dry brown black scabby spots, in severe cases girdling of stem takes place causing death of plants. It causes considerable damage in quantity and quality of fruit (Shekhawat & Chakravarti, 1977). The disease can be controlled to some extent by spraying bactericides (Crosssan & Krupka, 1955). Varietal differences in resistance have been found (Cook & Stall, 1963; Sowell & Dempsey, 1977; Shekhawat & Chakravarti, 1979; Cook & Srall, 1982; and Cook & Guevara, 1964). Since bacterial leaf spot disease has been observed for the first time in Pakistan, the present studies were undertaken to evaluate susceptible/resistant pepper cultivars towards bacterial leaf spot.

Materials and Methods

Eight varieties of red pepper were evaluated for resistance to *Xanthomonas campestris* pv. *vesicatoria* earlier isolated from pepper (Akhtar *et al* 1985) and maintained at the National Agricultural Research Centre, Islamabad. The plants were evaluated in pots as well as in the field. For pot experiments, 5 seedlings of each cultivar per pot were grown in 10 cm diam., plastic pots. Two-month old seedlings were inoculated with *X. campestris* pv. *vesicatoria* (XCV), suspended in water in the proportion of about 10^8 bacterial cells/ml, using an atomizer connected to a pressure pump from a distance of approximately 18 cm at a pressure of about 1.1 Kg/cm^2. First inoculation was followed

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Table 1: Reaction of pepper varieties to bacterial leaf spot caused by *Xanthomonas campestris* pv. *vesicatoria.*

Varieties	Pot		Field	
	X	Y	Z	W
Tatapiri	4.0	S	3.0	MS
Peshawar selection II	3.0	MS	2.0	MR
Nilum	1.0	R	1.0	R
Improved Yolo Wonder	4.0	S	3.0	MS
Jelapeno	1.1	R	1.3	R
Hungarian Hot Wax	4.0	S	3.0	MS
Picora	3.0	MS	2.6	MS
Sirono	4.0	S	2.6	MS

X and Z = Disease intensity is average of 15 plants in the pot and field experiments and statistically significant at 1% level according to the comparison of means of non-parametric test.
Y and W = R-resistant, MR-moderately resistant, MS-moderately susceptible, S-susceptible.

by two sucessive inoculations at 3-day intervals. The plants were sprinkled with water in the morning and evening for at least three subsequent days to provide increased humidity. The control plants were sprayed with sterile distilled water. The pots were kept in a growth chamber at 30°C and 14 h light regime.

Twenty days after inoculation disease rating was made according to an arbitrary scale of 0-5 of symptom expression. Where 0 = no infection; 0.5-1 (Resistant) = very few spots on some leaves and no infection on stem; 1.5-2 (Moderately resistant) = spot scattered covering 1/4 to 1/2 leaf surface, with or without infection on stem, if infected then very few spots. 2.5-3 (Moderately susceptible) = leaf surface covered densely with spots, with or without spots on petiole and stem; 3.5-4 (Susceptible) = whole plant infected with dense spots on leaves as well as on stems followed by yellowing of leaves; 4.5-5 (Highly susceptible) = distoration and defoliation of foliage, girdling of stems often causing death of plants.

In field experiments, 15 seedlings were transplanted in 750 cm long rows, 75 cm apart with 50 cm spacing between plants. In a randomized complete block design with three replications. Ten plants of each 8 cultivar, (Table 1) were inoculated with suspension of the same bacterial cells as for the pot experiments. Inoculation was made by an air compressed hand sprayer of 1.5 L capacity from a distance of about 15 cm. The first inoculation was made on 2 month-old plants followed by two successive inoculations at 3-day intervals. Humidity was maintained by spraying the plants with water in the mor-

ning and evening for 3 consecutive days. Diseased leaf samples were collected and bacteria was isolated from the samples on yeast extract dextrose calcium carbonate medium (Schaad, 1980) and compared with the cultural characteristics of original culture maintained at C.D.R.I. Lab. The data on the occurrence of leaf spots was recorded after 20 days and were analysed according to non-parametric test (Sreel & Torrie, 1980).

Results and Discussion

Black, brown and scabby spots on leaves with shredding of leaf lamina, midribs and cracking of petioles and stems were noticed and the infected plants either died before flowering or flower formation was delayed. Control plants did not show leaf disease symptom in the pots as well as in the field. Results showed that "Nilum" and "Jelapeno" were resistant while "Picora" was moderately susceptible under both conditions (Table 1). Red pepper cultivar "Peshawar selection II" was moderately susceptible in pot experiment and moderately resistant in the field experiment. Pepper varieties – Tatapiri, Sirono, Improved Yolo Wonder and Hungarian Hot Wax were susceptible under field conditions. The leaf spot disease formation was similar in response to disease reaction found in pepper by Cook & Stall (1963, 1982) and Shekhawat & Chakravarti (1979) in chillies. Low incidence of the disease found in field as compared to pot may be due to difference in humidity and temperature. Since high humidity and temperature ranging between 22-34°C are necessary for disease severity (Shekhwat & Chakravarti, 1976).

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(Received for publication 10 March 1986)