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# Resistance in Mungbean to bacterial leaf spot disease

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## Abstract

Fifty-eight mungbean genotypes/cultivars of indigenous as well as exotic origin were screened against natural infection of bacterial leaf spot disease under field conditions at National Agriculture Research Centre, Islamabad during Kharif season of 2002. Two genotypes exhibited highly resistant reaction, 10 displayed resistant reaction and 18 were tolerant, while the rest were either susceptible or highly susceptible against the disease. Identified resistant sources may be exploited for the development of high yielding disease resistant cultivars of mungbean by using in hybridization programme.

**Key Words** Mungbean, *Vigna radiata*, bacteria, genotypes, resistance.

## Introduction

Mungbean [*Vigna radiata* (L.) Wilczek.] is an important grain legume crop of Pakistan but average yield of the crop is very low due to inherent low yield potential of the crop varieties and their susceptibility to disease (Singh, 1987). One of the yield limiting diseases is the bacterial leaf spot of mungbean, caused by *Xanthonomas phaseoli* (Smith) Dowson, which is extensively prevalent in humid mungbean growing areas of Pakistan (Bashir & Zubair, 1985).

The bacterium can infect beans and lentils as well but the infection becomes severe on mungbean (Patel & Jindal, 1972). It is a seed-borne disease, though the percent seed transmission is lower (Shekhawat & Patel, 1977) and generally perpetuates in dead leaves from one growing season to the next (Patel *et al*., 1972). Field sanitation practices, three-years crop rotation and use of disease free healthy seed may reduce disease incidence but the use of genetic resistance of the crop cultivars is the cheapest and more effective control measure for the disease. This paper reports on the reaction of 58 mungbean genotypes to natural infection by bacterial leaf spot disease in Pakistan.

## Materials and Methods

Fifty-eight mungbean genotypes of indigenous as well as exotic (AVRDC) origin were screened for identification of resistant sources against natural infection by bacterial leaf spot disease under field conditions at National Agricultural Research Centre, Islamabad during the Kharif season of 2002. The test entries were planted during mid July and harvested during the last week of October. Each test entry was planted in a single row subplot of 4 m length in an augmented design with row to row and plant to plant spacing of 30cm and 10 cm, respectively. One row of susceptible check (NHM-51) was planted after every two test entries and also all around the experiment. Though the natural disease incidence was quit severe during the season due to conditions favourable for the development of the disease, the crop was also inoculated artificially several times with the bacterial suspension isolated in culture from the diseased leaves of mungbean. Disease intensity on each genotype was recorded on 50 days after sowing when the susceptible check rows exhibited hundred percent infection, using a 1-5 disease rating scale (Park, 1978) where 1= highly resistant and 5= highly susceptible response.

## Results and Discussion

Bacterial leaf spot symptoms appeared at 25 days of sowing. Disease intensity gradually increased thereafter and resulted in complete defoliation of susceptible cultivars. Disease intensity reached its maximum limit during cloudy and rainy days in the month of August and September. Average disease reaction of each of the 58 genotypes is given in Table 1. Graphical representation of disease reaction for these genotypes is also revealed in Fig-1. The genotypes varied greatly for their reactions and only two genotypes (VC-3960 and 98cmg-018) were found highly resistant. Moreover, ten (NM-92, NCM-209, BRM-202, C2/94-4-42, NM-2, Mung-1, BRM-188, BARI Mung-2, Chakwal Mung-97, NCM 257-6) exhibited resistant and 18 were moderately resistant while others showed susceptible and highly susceptible reaction.

**Table-1:** Response of mungbean germplasm to *Xanthomonas phaseoli* under field conditions during Kharif season of 2002 at National Agricultural Research Center, Islamabad.

| Disease Rating | Disease reaction | Germplasm accessions |
|---|---|---|
| 1 | Highly Resistant (HR) | VC-3960, 98 cmg-018 |
| 2 | Resistant (R) | NM-92, NCM-209, BRM-202, C2/94-4-42, NM-2, Mung-1, BRM-188, BARIMung-2, Chakwal Mung-97, NCM257-6 |
| 3 | Moderately resistant (MR) | SM-1, 98-cmg-003, LIP5/5/89, C1/94-4-19, BRM-195, 98cmg-016, Basanti, Pusa-9072, Vc-6173-B, ML-267, NCM 251-16, NCM 255-8, NCM 258-7. MCM 257-5, NCM 251-8, NCM257-2, NCM 257-8, NCM 257-10 |
| 4 | Susceptible (S) | NCM-98, VC 3960-A89, Mung-6, CO-3, SML-134, SML-32, PDM-11, PGM-54, NCM 255-2, NCM 253-1, NCM 254-1, NCM 259-2, NCM 251-1, NCM 255-3, NCM 258-1, NCM 2554-4, NCM 251-12, NCM-92 |
| 5 | Highly susceptible (HS) | NM-1, NM-98, VC3960-88, NCM 254-3, NCM 254-7, NMC 251-4, NCM 252-10, NCM 252-1, NCM 251-13, NCM 252-5 |

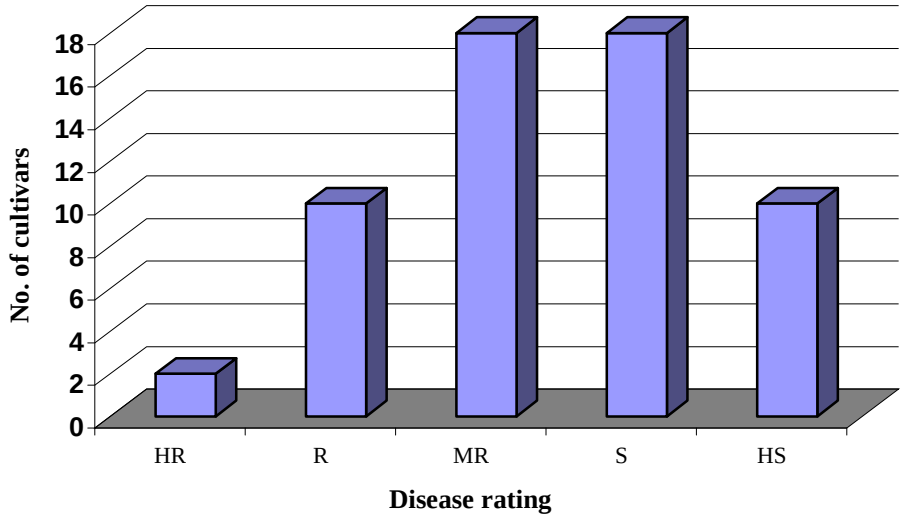


**Fig-1:** Disease reaction of fifty-eight mungbean cultivars to bacterial leaf spot.

Patel *et al*. (1972) screened 2160 mungbean germplasm lines for resistance to *X. phaseoli* and reported a few resistant lines. Similarly, Iqbal *et al*. (1991) screened 100 mungbean genotypes under field conditions to natural infection and among them eight were found resistant to the disease. Present investigations also indicated that the prevalence of resistant sources in mungbean germplam against bacterial leaf spot is not uncommon. The determination of genetic basis of these sources and incorporation of their resistant genes into commercial cultivars may help in the development of high yielding disease resistant cultivars.

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