Field Resistance in Extra-short-duration Pigeonpea Lines to Dry Root Rot

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Dry root rot caused by *Rhizoctonia bataticola* (Taub.) Butler = *Macrophomina phaseolina* [Tassi] Goid. is widely prevalent in pigeonpea-growing countries (Kannaiyan et al. 1984). At ICRISAT Center, extra-short-duration (3 months) genotypes are relatively more susceptible to the disease than medium- and long-duration types (6–9 months) During 1988–90, genotypic differences in susceptibility to the disease were observed in extra-short-duration pigeonpea lines included in agronomy and breeding trials at ICRISAT Center. These lines were evaluated for resistance to the disease during 1988/89 and 1992/93. Thirty genotypes sown on Vertisols and Alfisols with and without irrigation on different dates (July–January) were evaluated in 1988/89. The disease incidence was highest in January sowing. During 1992/93, 100 lines sown on Vertisols on different dates (August-October) were evaluated and it was found that disease incidence was high in August sowing. In both the seasons, each line was sown in two 4-m row plots in a randomized-block design with three replications. For each entry the total number of plants and dead plants were counted at maturity and the percentage of death was calculated.

Of the 30 lines evaluated in 1988/89, three lines (ICPL 86005, ICPL 86020, and ICPL 87105) and one hybrid (ICPH 149) showed 10% or less disease when grown on Vertisols or Alfisols, with or without irrigation (Table 1). Disease incidence in these lines was generally higher on nonirrigated Vertisols than in other treatments. Disease incidence was 86% on ICPL 87110 and 83% on ICPL 87097. Of the 100 lines evaluated during 1992/93, ICPL 91028, ICPX 860200, and ICPX 870023 showed less than 10% mortality compared to 100% mortality in susceptible lines such as Manak, ICPL 4, and UPAS 120 (Table 2).

Field evaluations indicated availability of resistance to dry root rot. However, resistance of the promising lines

Table 2. Field resistance to dry root rot in three pigeonpea lines, ICRISAT Center, Patancheru, 1992/93.

Line	Mortality due to dry root rot (%)	Flowering habit
ICPL 91028	4.5	Indeterminate
ICPX 860200	1.5	Determinate
ICPX 870023	6.6	Indeterminate
Trial mean (n = 100)	65.0	
Range	1.5–100.0	
SE	±3.75	
CV (%)	43.9	

Table 1. Field resistance to dry root rot in three pigeonpea lines and one hybrid, ICRISAT Center, Patancheru, 1988/89.

Pigeonpea line	Mortality due to dry root rot (%)				Flowering habit
	Vertisol		Alfisol		
	Nonirrigated	Irrigated	Nonirrigated	Irrigated	
ICPL 86005	10.0	3.9	1.4	7.7	Determinate
ICPL 86020	10.0	1.9	1.7	1.7	Determinate
ICPL 87105	1.9	1.1	1.4	1.4	Determinate
ICPH 149	5.1	4.8	1.6	2.3	Indeterminate
Trial mean (n = 30)	45.3	18.9	18.7	23.3	
Range	1.9–85.9	1.1–69.4	1.2–55.9	1.4–71.3	
SE	±9.94	±9.14	±7.90	±9.20	
CV (%)	21.9	48.3	42.5	39.5	

needs to be confirmed under controlled environmental conditions. The resistant lines included both determinate and indeterminate types. Two of the resistant lines, ICPX 860087 and ICPX 860200 bear large pods and seeds.

The reasons for the higher susceptibility of extra-short-duration lines to dry root rot compared to medium- and long-duration lines are not understood. The disease was particularly serious at the pod-filling stage of the crop indicating some relationship between the physiological stage of the crop and susceptibility to the disease (Sekhar et al. 1987). Disease incidence was more on Vertisols than on Alfisols. Vertisols are known to support the pathogen better than Alfisols. This is the first report of lines resistant to dry root rot.

References

Kannaiyan, J., Nene, Y.L., Reddy, M.V., Ryan, J.G., and **Raju, T.N.** 1984. Prevalence of pigeonpea diseases and associated crop losses in Asia, Africa and the Americas. Tropical Pest Management 30(1):62–71.

Sekhar, G., Anahosur, K.H., and **Hegde, R.K.** 1987. Evaluation of susceptibility of sorghum to charcoal rot infection. Indian Phytopathology 40(3):405.