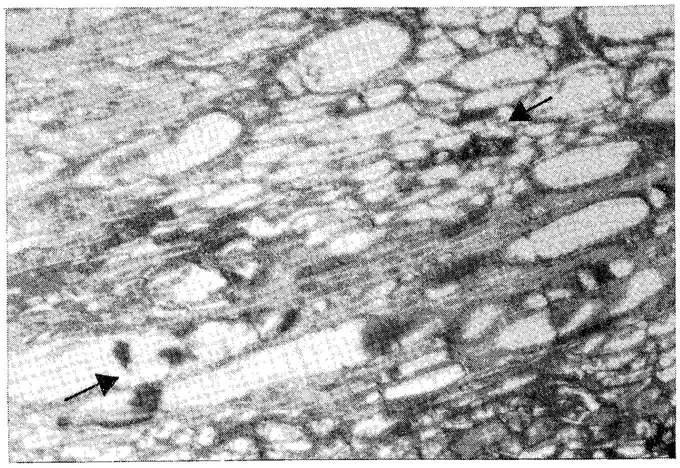

Figure 2. Photomicrograph of dry root rot (*R. bataticola*) infected chickpea roots. LS showing intraxylem sclerotial bodies.

above the ground till flowering and podding. The infected plants of susceptible cultivars suddenly collapse at the pod-filling stage. This sudden collapse could be because of plugging of the xylem vessels by mycelium and sclerotial bodies of *R. bataticola.* This type of sudden death also occurs because of wilt in susceptible varieties within a month after sowing. But many tolerant cultivars survive in the field with extensive blackening of xylem and die at a later stage. Thus in the field it is difficult to identify late wilt and dry root rot based on xylem discoloration alone. In case of dry root rot, it seems most logical to conclude that reduction in the mass of functional roots in an infected plant contributes to sudden wilting, particularly in postflowering stage, which coincides with the increase in daytime ambient temperatures.

This is the first study in which intraxylem mycelium and sclerotial bodies of *R. bataticola* were found in dry root-rot infected chickpeas and their possible role in sudden death of plants implicated.

References

Feder, N., and **O'Brien, T.P.** 1968. Plant microtechnique : Some principles and new methods. American Journal of Botany 55:123-142.

Nene, Y.L., Haware, M.P., and **Reddy, M.V.** 1978. Diagnosis of some wilt-like disorders of chickpea (*Cicer arietinum* L.). Information Bulletin no. 3. Patancheru, A.P. 502 324, India: International Crops Research Institute for the Semi-Arid Tropics. 44 pp.

Nene, Y.L., Sheila, V.K., and **Sharma, S.B.** 1989. A world list of chickpea (*Cicer arietinum* L.) and pigeonpea (*Cajanus cajan* (L.) Millsp.) pathogens. (Updated April 1989.) ICRISAT Legumes Pathology Progress Report 7. 23 pp.

Effect of Age on Susceptibility of Chickpea to *Rhizoctonia bataticola*

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Rhizoctonia bataticola (Taubl.) Butler [*Macrophomina phaseolina* (Tassi) Goid.] is one of the most destructive pathogen of crops in the tropics and subtropics (Ghaffar et al. 1964). Dry root rot caused by *R. bataticola* is a serious disease of chickpea grown in the semi-arid regions (Nene et al. 1989).

The damage because of dry root rot in chickpea is more severe at flowering and podding stages than at seedling stage. Evaluation of many chickpea germplasm and breeding lines for resistance to dry root rot at ICRISAT Center, Patancheru, India, failed to reveal higher genetic resistance to the disease. Many 5-day old chickpea lines found resistant to *R. bataticola* using a blotter paper technique (Nene et al. 1981) showed susceptibility under field conditions. Therefore, experiments were conducted to find out the effect of age of chickpea on susceptibility to *R. bataticola* to select an appropriate age for screening chickpeas for resistance to the pathogen.

Five chickpea lines, i.e., BG 212, ICC 5126, ICC 6098, ICC 202, and ICC 554 were inoculated with *R. bataticola* at differing ages of 7, 15, 30, 45, 60, and 75 days, using the blotter-paper technique (Nene et al. 1981).

Table 1. Effect of age of chickpea on susceptibility to *R. bataticola* in a blotter-paper technique.

Chickpea genotype	Root necrosis on 1-9 scale[1]		
	7 days	15 days	30-75 days
BG 212	7	9	9
ICC 5726	5	7	9
ICC 6093	7	7	9
ICC 202	5	6	9
ICC 554	5	7	9

1. Each reading is average of 20 seedlings where 1 = no damage, and 9 = 100% rotting of the root.

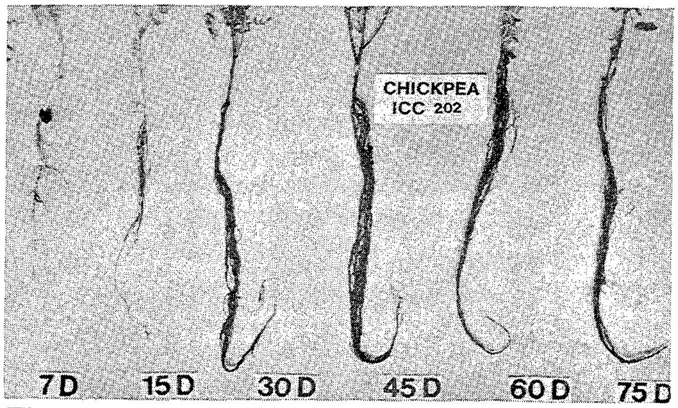

Figure 1. ***Rhizoctonia bataticola*** **inoculated chickpea roots (ICC 202) showing increase in susceptibility to dry root rot with plant age.**

These cultivars were selected as they showed differences in susceptibility to *R. bataticola* when inoculated at the age of 5 days by the blotter-paper technique.

Data in Table 1 show that chickpea cultivars differ in their susceptibility to *R. bataticola* with age. The susceptibility increases with the age (Fig. 1). The lines showed lesser disease up to the age of 15 days but from 30 days onwards all cultivars showed equal susceptibility. It is necessary that screening of chickpeas for resistance to *R. bataticola* should be carried out with plants that are 30 days old or more.

References

Ghaffar, A., Kafi, A., and **Mirza, R.** 1964. Some new hosts of *Macrophomina phaseoli* (Maubl.) Ashby. Pakistan Journal of Science and Industrial Research 7:71-72.

Nene, Y.L., Haware, M.P., and **Reddy, M.V.** 1981. Chickpea diseases: resistance-screening techniques. Information Bulletin no.10. Patancheru, Andhra Pradesh 502 324, India: International Crops Research Institute for the Semi-Arid Tropics. 12 pp.

Nene, Y.L., Sheila, V.K., and **Sharma, S.B.** 1989. A world list of chickpea (*Cicer arietinum* L.) and pigeonpea (*Cajanus cajan* (L.) Millsp.) pathogens. (Updated April 1989.) ICRISAT Legumes Pathology Progress Report 7. 23 pp.

Physiology/Agronomy

Response of Chickpea Cultivars under Different Dates of Sowing in Chhattisgarh Region of Madhya Pradesh

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In Chhattisgarh region of Madhya Pradesh, rice is the major rainy-season crop. In this region, medium-duration (around 140 days), tall varieties of rice are grown. This results in delayed harvest of rice crop. Also, in the rice-based cropping system, the land preparation after harvest of rice is delayed for 10-15 days. Therefore, sowing of the postrainy season crop is not possible before the 1st week of December. Chickpea cultivation after harvest of rice crop is becoming a common practice as the crop is highly remunerative and requires low inputs. An experiment was conducted to determine the suitability of chickpea varieties under different dates of sowing in a rice-based cropping system.

The experiment was conducted in a split-plot design replicated four times. The chickpea cultivars were sown on different dates (10 Dec, 20 Dec, 30 Dec, and 10 Jan) in the main plots and varieties (JG 74, JG 1263 and H 355) in subplot treatments. The soil was clay-loam with neutral pH (7.0), low in available nitrogen (191 kg N ha^{-1}) and phosphorus, (10.6 kg P_2O_5), and high in available potash (325 kg K_2O ha^{-1}). The value of organic carbon and EC were 0.6% and 0.20 dS m^{-1}. Seed rate, as well as amount of fertilizer (as diammonium phosphate) used, were at the rate of 100 kg ha^{-1}. Fertilizer was placed in rows 5 cm below the seeds. Noninoculated seeds were drilled in lines 20-cm apart. The crop was irrigated at sowing, flowering, and grain-filling stage.

Seed yield of chickpea was influenced significantly by date of sowing (Table 1). The maximum grain yield of 2.51 t ha^{-1} for three varieties was obtained by sowing chickpea on 10 December, which was found significantly superior to the later dates of sowing. With progressive delay in sowing beyond 10 December a yield reduction of 28%, 57%, and 66% was recorded with successive delays in sowing at every 10 days interval. Sowing of chickpea on 10 January yielded the lowest and it was found to be on par by sowing on 30 December. Similar reduction in yield of chickpea under late-sown conditions were observed by Kumar et al. (1983) and Rajput et al. (1984). The seed yield of chickpea under different dates of sow-