



EXPLORING THE CULTURAL VARIABILITY OF *Rhizoctonia bataticola* (Taub.) BUTLER INCITANT OF DRY ROOT ROT IN PIGEONPEA

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ABSTRACT

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Pigeonpea cultivation is subjected to high yield losses every year. Dry root rot or *Macrophomina* stem canker caused by *Rhizoctonia bataticola* (Taub.) of pigeonpea is an emerging and serious problem in late sown or summer crops and in perennial or ratooned pigeonpea. Keeping in mind the minimal work done with respect to this pathogen, the present study was conducted to explore the cultural variability of the different *R. bataticola* isolates of pigeonpea. Ten isolates were characterized in vitro to study their cultural characteristics. The presence of cultural variability among the different isolates were evident from the study.

KEYWORDS: Organic, inorganic, sheep penning, rainfed, protective irrigation, groundnut yield.

INTRODUCTION

Pigeonpea (*Cajanus cajan* (L) Mill sp.) is an grain legume crop of rain fed agriculture in semi-arid tropics and is the second most important pulse crop grown in India. Being a hardy crop, it is a natural choice for small and marginal farmers particularly, in semi-arid dryland areas because it can be grown successfully under rainfed or low input condition and provides nutritive food, feed, fodder and fuel wood. Pigeonpea cultivation is subjected to high yield losses every year. Of the many factors resulting in the economic loss, diseases appear to be the major biological constraints to pigeonpea production. Dry root rot or *Macrophomina* stem canker caused by *Rhizoctonia bataticola* (Taub.) Butler [syn-*Macrophomina phaseolina* (Tassi) Goidanich] of pigeonpea is an emerging and serious problem in late sown or summer crops and in perennial or ratooned pigeonpea. *Rhizoctonia bataticola* is a soil and seed borne necrotrophic fungal pathogen that has a global distribution and causes disease in more than 500 cultivated and wild species plant species including several economically important crops (Kaur *et al.*, 2012).

(Farr *et al.*, 1995) In contrast to many pathogens favored by changes to moisture conditions (Garrett *et al.*, 2006), *R. bataticola* is problematic in agricultural areas where climate change results in longer drought periods and higher temperatures. A very little work has been done on dry root rot pathogen in pigeonpea crop with respect to its variability. Keeping in mind the importance of the disease with respect to changing climate, the present study explores the cultural variability of the different *R. bataticola* isolates of pigeonpea.

MATERIALS AND METHODS

Fungal cultures

Ten isolates of the pathogen *Rhizoctonia bataticola* (syn. *Macrophomina phaseolina*) was procured from the Legumes Pathology Division, ICRISAT, Patancheru, Hyderabad. The isolates were sub cultured and transferred on PDA and was serially designated from Rb1 to Rb10.

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Cultural Characterization

All ten isolates were characterized in vitro for their cultural characteristics. The mycelial discs of 5 mm diameter were cut from the periphery of three days old culture and transferred to 90mm Petri dish containing 20ml PDA. These plates were incubated at 30°C with 12h photoperiod. Each treatment was replicated thrice. Radial growth of the cultures was measured at 48h after inoculation. Seven days old cultures were used to record texture, colour and presence or absence of aerial mycelium

RESULT AND DISCUSSION

Cultural variability existed among the isolates tested (Table 1). The radial growth at 48 HAI ranged from 71.17 mm (Rb 6) to 50.67 mm (Rb 2) (Fig.1). The colony colour varied from black to grey except for Rb 1 producing off white colonies. The colony texture was fluffy to partially fluffy (Fig.2). The presence of aerial mycelia was observed in all isolates. Similar results were observed by Charul and Biswas (2009) while evaluating morphological variability of *R. bataticola* which is the causal agent of leaf spot and blight disease of pigeon pea. Their results revealed that the nature of mycelium varied from fluffy dark brown to partially fluffy mycelium colony with smooth margin. Also, Hildebrand *et al.* (1945) observed the sclerotial colour to be black and smooth varying from spherical to oblong to irregular shaped and also reported that the sclerotial shape of any isolate varied with substrate on which fungus was grown.

Table 1 Cultural characteristics of different *R. bataticola* isolates of pigeonpea

S.No	Isolate Code	Radial growth 48 HAI (mm)	Colony colour	Colony texture	Aerial mycelium
1	Rb 1	70.17	Off white	Fluffy	Present
2	Rb 2	50.67	Black	Partially fluffy	Present
3	Rb 3	61.50	Black	Partially fluffy	Present
4	Rb 4	56.83	Black	Partially fluffy	Present
5	Rb 5	69.33	Grey	Partially fluffy	Present
6	Rb 6	71.17	Grey	Fluffy	Present
7	Rb 7	68.17	Grey	Fluffy	Present
8	Rb 8	60.33	Black	Fluffy	Present
9	Rb 9	59.50	Black	Partially fluffy	Present
10	Rb 10	62.83	Grey	Partially fluffy	Present
	Mean	63.05			
	C.D. (0.05)	6.73			

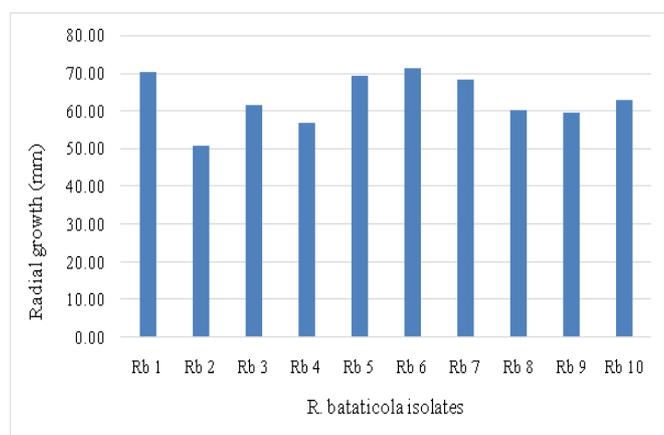


Fig. 1 Radial growth of different *R. bataticola* isolates of pigeonpea

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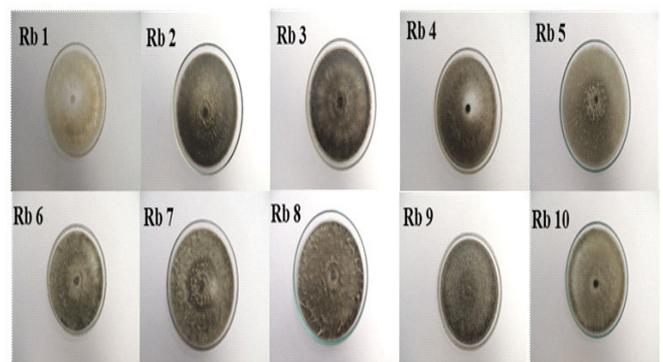


Fig. 2 Seven day old cultures of different *R. bataticola* isolates pigeonpea

CONCLUSION

In this study we have demonstrated the presence of cultural variability among the different *R. bataticola* isolates of pigeonpea tested. For a better understanding of the changes in the pathogenic nature of *R. bataticola* of pigeonpea depending on spatial or temporal distribution, frequent cultural and morphological characterization studies of the pathogen is essential.

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