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RESEARCH **P**APER

In vitro evaluation of bioagents against *Alternaria tenuissima* - An incitant of pigeonpea [*Cajanus cajan* (L.) Millsp.] leaf blight

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Pigeonpea leaf blight caused by *Alternaria tenuissima* is one of the most important foliar disease causing heavy losses under South Gujarat region. The present investigation was carried out to evaluate the inhibitory activity of different bioagents against *A. tenuissima* and to find out the efficient bioagent at preliminary level. The experiment conducted in the P. G. Research Laboratory, Department of Plant Pathology, N.M.C.A., Navsari Agricultural University, Navsari. Different bioagents *viz.*, *Trichoderma viride* Pers, ex. Grey, NAU isolate, *T. harzianum* Rifai, NAU isolate, *T. fasciculatum, Pseudomonas fluorescens* NAU isolate and *Bacillus subtilis* EII NAU isolate were evaluated against the growth of *A. tenuissima* by using standard dual culture technique. The investigation revealed that, maximum per cent growth inhibition (PGI) of *A. tenuissima* found against *T. viride* which was followed by *T. harzianum* and *T. fasciculatum*. *B. subtilis* was found least effective against *A. tenuissima*. The results indicated that among all bioagents, *T. viride* found most efficient bioagent against *A. tenuissima* as it gave highest PGI because it may contain viridin like antibiotics or may be the presence of some secondary metabolites or enzymes. Therefore, the *T. viride* can be explored for the management of pigeonpea leaf blight disease under field condition.

Key words : Pigeonpea leaf blight, *Alternaria tenuissima, Trichoderma* spp., *Pseudomonas fluorescens, Bacillus subtilis*

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INTRODUCTION

Pigeonpea [*Cajanus cajan* (L.) Millsp.] is a major grain legume of the tropics and sub-tropics worldwide. In India, pigeonpea is the third most important food legume after chickpea and field pea in area, production and productivity. The shift of pigeonpea cultivation from the traditional *Kharif* season to pre *Rabi* during September sowing has not only shown an increased production potential of this important pulse crop but have also opened altogether a new possibilities in land use pattern of the rainfed areas. Among the several factors, diseases occupy a vital place responsible for reduction of yield and quality deterioration of pigeonpea in India.

Leaf blight of pigeonpea [*Cajanus cajan* (L.) Millsp.] caused by *Alternaria tenuissima* (Kunze ex. Pers.) Wiltshire is one of the most important foliar disease causing heavy losses under South Gujarat region. Non-judicious use of pesticides leads to environmental pollution and health hazards. Biological control, in this context, is now gaining more importance as an eco-friendly means of disease management. In this paper, we have reported

antagonism of different bio-control agents against pigeonpea isolate of *Alternaria tenuissima* in the control of alternaria leaf blight of pigeonpea under laboratory conditions.

RESEARCH METHODOLOGY

Collection and isolation:

The leaves of pigeonpea plant showing the symptoms of blight were collected from the Pulse Research Farm, NAU, Navsari and subjected for isolation on Potato Dextrose Agar (PDA) medium in BOD incubator for four to five days. The mycelium was isolated and purified by serial dilution method.

Dual culture technique:

Seven days old culture of the bioagents and the pathogen were employed by following dual culture method (Dennis and Webster, 1971). In case of fungal antagonists, the mycelial disc of 5mm diameter from the both antagonist as well as *Alternaria* were placed at 70 mm apart from each other in Petri plates of PDA media and in case of bacterial bio control agents half portion of plates streaked and 5mm diameter mycelial disc from *Alternaria* placed at corner of Petri plates of PDA + NA. In control, only test pathogen was kept in the centre of Petri plate. The Petri plates were incubated at 27±1°C in BOD incubator for seven days and per cent growth inhibition was recorded after seven days of incubation. The per cent growth inhibition (PGI) of pathogen in each treatment was calculated by following formula (Asalmol *et al*., 1990).

$$\text{PGI} = \frac{C - T}{C} \times 100$$

where, I = Inhibition per cent

C = Colony diameter (mm) in control plate

T = Colony diameter (mm) in treated plate

RESEARCH FINDINGS AND ANALYSIS

The observations on mycelial growth and per cent growth inhibition (PGI) were recorded after seven days of incubation and results presented in Table 1.

All the bioagents were significantly inhibiting the mycelial growth of *A. tenuissima* over control. Significantly lowest mycelial growth of pathogen found in *T. viride* (21.00 mm) recorded with highest 74.07 PGI at seven day after inoculation. The next best treatment in order of merit *T. harzianum* (23.00 mm), *T. fasciculatum* (25.75 mm) and *P. fluorescens* (38.00 mm) recorded 71.06, 68.21 and 53.08 PGI at seven day after inoculation, respectively. The highest growth of pathogen (40.75 mm) and lowest inhibition (49.70 PGI) was recorded *B. subtilis* against *A. tenuissima* seven day after inoculation.

The result was supported by the findings of Rani *et al*. (2018). They found maximum mycelial growth inhibition in *T. viride* (Pusa isolates) (80.36PGI) followed by *T. harzianum*-1(Delhi isolates) (74.960PGI), *T. harzianum*-2(Ranchi isolates) (69.91PGI) and *T. harzianum*-3 (ANGRAU isolates) (60.33PGI) against *A. alternata* infecting pigeonpea whereas in case of *A. tenuissima* infecting pigeonpea, maxium growth inhibition of pathogen found in *T. viride* (Pusa isolates) (74.27PGI) followed by *T. harzianum*-1 (Delhi isolates) (67.68PGI) and *T. harzianum*-2 (Ranchi isolates) (61.52PGI).

Present investigation also supported by findings of Lal and Upadhyay (2000) reported cent per cent mycelial growth inhibition of *A. tenuissima* infecting pigeonpea by *T. viride* followed by *Gliocladium virens* (90PGI)

Table 1 : Mycelial growth and per cent growth inhibition after seven days of incubation

	Treatments	Mycelial growth	PGI (%)
T_1	*Trichoderma viride* Pers, ex. grey NAU isolate	4.64*(21.00)	74.07
T_2	*Trichoderma harzianum* Rifai. NAU isolate	04.85(23.00)	71.60
T_3	*Trichoderma fasciculatum*	05.12(25.75)	68.21
T_4	*Pseudomonas fluorescens* NAU isolate	06.20(38.00)	53.08
T_5	*Bacillus subtilis* EII NAU isolate	06.42(40.75)	49.70
T_6	Control	09.03(81.00)	00.00
	S. E. ±	0.06	
	C.D. (P=0.05)	0.19	
	C.V. %	2.07	

*Figures outside the parentheses are √X transformation values where as figures in parentheses are original values
DAI: Days after inoculation

and *T. harzianum* (80PGI). Pamrao (2017) also recorded maximum mycelial suppression (78.33PGI) of *A. alternata* of green gram in *T. viride* followed by *B. subtilis* (66.94PGI) and *P. fluorescens* (61.38PGI).

LITERATURE CITED

Asalmol, M.N., Sen, B. and Awasthi, J. (1990). Role of temperature and pH in antagonism of *Aspergillus niger* and *Trichoderma viride* against *Fusarium solani*. Proc. Indian Phyto-Pathological Society (Western Zone). On Bio-control of Plant Pathogen. M.P.A.U., Pune. pp. 11-13.

Dennis, J. C. and Webster, J. (1971). Antagonistic properties of species groups of *Trichoderma.* Production of non-volatile antibiotics. *Trans. British Mycological Society*, **57** : 25-39.

Lal, H.C. and Upadhyay, J.P. (2000). Biological control of leaf blight caused by *Alternaria tenuissima* (Kunze ex. Pers.) Wiltshire in pigeonpea. *J. Biological Control*, **16**(2): 141-144.

Pamrao, K.M. (2017). Management of foliar fungal pathogens of green gram *in vitro*. M.Sc (Agri.) Thesis, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.) India.

Rani, N., Lal, H.C.,Kumar, P., Ekka, S. and Kumar, N. (2018). *In-vitro* evaluation of fungicides, bio agents and plant extracts against *Alternaria* spp. infecting pigeonpea. *Internat. J. Curr. Microbiol. & Appl. Sci.,* **7**: 5112-5118.