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Anthracnose intensity and per cent pod infection of cowpea in Beed district

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Abstract

The importance of pulses has been realized due to their high protein, better nutritional food, and fodder and soil enrichment qualities. Pulses have been considered as an integral part of our diet from time immemorial and have also found their reference in ancient scriptures such as Puranas and Mahabharata. The major fungal diseases of cowpea anthracnose caused by *Colletotrichum destructivum*. In this study all the botanicals, bioagents and fungicides tested against anthracnose disease of cowpea during *Kharif* 2013 and *Kharif* 2014 were found effective and significantly reduced the mean disease intensity and pod infection over unsprayed control. Anthracnose intensity and pod infection slightly increases in *Kharif* 2014 as compared to *Kharif* 2013.

Keywords: Colletotrichum; Cowpea; Bioagents; Anthracnose

1. Introduction

India is an agriculture-based country and its growth, development and economy mainly depends upon agriculture. Presently, contribution of agriculture about one third of the national GDP (Gross Domestic Product) and provides employment to over 70 % of Indian population in agriculture and related activities. The importance of pulses has been realized due to their high protein, better nutritional food, and fodder and soil enrichment qualities. In India during 2013-2014 total area under pulses is about 25.2 million ha with total production of 19.3 million tonnes and average yield about 764 kg/ha (Anonymous 2014-2015).

The various pulses grown in India, Cowpea (*Vigna unguiculata* (L.) Walp) is an important vegetable pulses crop and is popularly known as 'Chowli'. It probably originated in Asia, Africa and even South America. Central Africa is considered to be the original home of cowpea plant. Vavilov (1949) considered India is the main center of origin of this crop. The major fungal diseases of cowpea anthracnose caused by *Colletotrichum destructivum* is one of the most destructive diseases of cowpea that cause a great reduction in cowpea yield (Allen et al. 1998, Latunde-Dada et al. 1999). In India the disease was first reported by Prassana (1985). The pathogen attacks on all aerial parts of plant and symptoms usually appear in the form of irregular brown sunken lesions on leaves, lesions merging to girdle stems and petioles. If conditions are ideal, disease development is rapid causing severe economic losses up to range from 40 to 50 % (William 1975).

2. Material and methods

The survey was conducted in cowpea growing areas during *Kharif* 2013 and 2014 in the eleven tahsils of Beed district viz. Beed, Georai, Majalgaon, Parali, Ambajogai, Kaij, Dharur, Wadwani, Shirur (Ka), Patoda and Ashti to know anthracnose intensity and pod infection. Observations on anthracnose intensity were recorded on ten randomly selected cowpea plants per field survey, applying standard 0-9 grade disease rating scale where, 0 = No infection, 1 = 1-10 % infection, 3 = 11-25 % infection, 5 = 26-50 % infection, 7 = 51-75 % infection and 9 = > 75 % infection before

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harvesting given by Mayee and Datar (1986). Based on numerical ratings or scale observed per cent disease intensity (PDI) was calculated by using following formula given by McKinney (1923).

3. Results and discussion

Results revealed that all the botanicals, bioagents and fungicide tested against anthracnose disease of cowpea during *Kharif* 2013 and 2014 were found effective and significantly reduced the mean disease intensity and pod infection as compared to control. Among botanicals tested (at 10 %), Neem was found most effective and recorded least mean disease intensity and pod infection 22.24 and 16.65 % in *Kharif* 2013 and 24.34 and 23.60 % in *Kharif* 2014, respectively and there by caused highest reductions in the mean disease intensity and pod infection to the tune of 46.42 and 57.66 % in *Kharif* 2013 and 47.33 and 50.17 % in *Kharif* 2014 respectively over unsprayed control. Drumstick was found comparatively least effective and recorded highest mean disease intensity and pod infection 31.31 and 32.72 % in *Kharif* 2013 and 33.38 and 39.56% in *Kharif* 2014, respectively and there by caused lowest reductions in the mean disease intensity and pod infection to the tune of 19.96 and 16.68 % in *Kharif* 2013 and 25.72 and 16.44 % in *Kharif* 2014, respectively over unsprayed control.

Among bioagents tested (at 0.5 %), *T. harzianum* was found most effective and recorded least mean disease intensity and pod infection 22.78 and 18.34 % in *Kharif* 2013 and 26.58 and 25.58 % in *Kharif* 2014, respectively and there by caused highest reductions in the mean disease intensity and pod infection to the tune of 44.57 and 53.32 % in *Kharif* 2013 and 42.15 and 45.97 % in *Kharif* 2014, respectively over unsprayed control. Whereas, *P. fluorescens* was found comparatively least effective and recorded highest mean disease intensity and pod infection 26.69 and 24.87 % in *Kharif* 2013 and 31.72 and 35.66 % in *Kharif* 2014, respectively and there by caused lowest reductions in the mean disease intensity and pod infection 34.24 and 36.66 % in *Kharif* 2013 and 29.83 and 24.67 % in *Kharif* 2014, respectively over unsprayed control.

The treatment of fungicide (Carbendazim 12% + Mancozeb 63 %) tested (at 0.1%) was found comparatively more effective than the botanicals and bioagents in respect of reducing the disease intensity and pod infection as compared to unsprayed control. Carbendazim 12% + Mancozeb 63 % (at 0.1%) was recorded least mean disease intensity and pod infection 20.53 and 13.55 % in *Kharif* 2013 and 21.56 and 15.41 % in *Kharif* 2014), respectively and there by caused highest reductions in the mean disease intensity and pod infection to the tune of 50.42 and 65.45 % in *Kharif* 2013 and 53.79 and 67.67% in *Kharif* 2014, respectively over unsprayed control.

Table 1 Tahsilwise anthracnose intensity (PDI) and per cent pod infection (PPI) of cowpea in the tahsils of Beed district during *Kharif* 2013 and 2014

Tahsils of Beed District	No. of Locations	Anthracnose intensity(PDI)		Per cent pod infection(PPI)	
		<i>Kharif</i> 2013	<i>Kharif</i> 2014	<i>Kharif</i> 2013	<i>Kharif</i> 2014
Beed	5	28.77	36.38	32.51	39.10
Georai	4	28.35	31.90	32.00	34.68
Majalgaon	5	34.30	31.58	37.67	34.60
Parali	3	34.12	35.35	36.72	38.72
Ambajogai	5	30.82	37.01	35.16	39.52
Kaij	3	35.17	31.22	38.71	33.79
Dharur	5	32.34	24.32	36.05	27.15
Wadwani	4	29.70	37.07	33.20	41.11
Shirur (K)	3	33.62	42.32	36.32	45.34
Patoda	5	27.44	23.30	30.79	27.00
Ashti	4	26.10	36.30	29.75	39.00
Mean (%)	46.00	30.97	33.34	34.44	36.36

Thus all the botanicals, bioagents and fungicides tested against anthracnose disease of cowpea during Kharif 2013 and Kharif 2014 were found effective and significantly reduced the mean disease intensity and pod infection over unsprayed control. But anthracnose intensity and pod infection slightly increases in Kharif 2014 as compared to Kharif 2013 (Table 1 and Graph 1). Efficacy of botanicals, bioagents and fungicides in controlling anthracnose disease of cowpea were reported earlier by several workers (Obi 1991, Emechebe and Florini 1997, Awurum et al. 2005, Enyiukwu and Awurum 2012 and Mogle 2013).

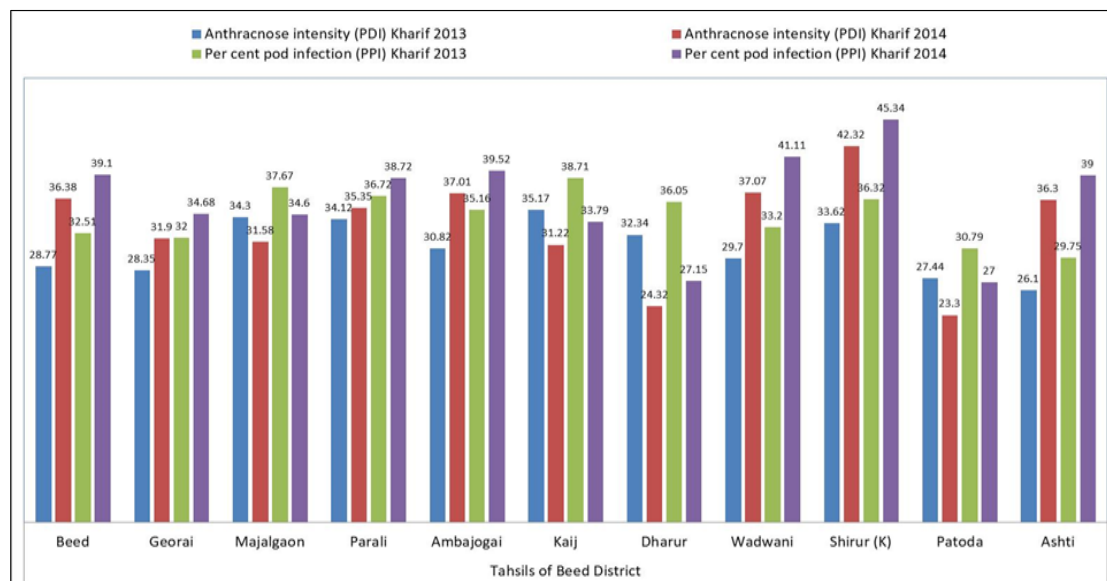


Figure 1 Tahsilwise anthracnose intensity (PDI) and per cent pod infection (PPI) of cowpea in the tahsils of Beed district during *Kharif* 2013 and 2014

4. Conclusion

The present research work is very useful to increase the productivity and yield of cow pea through bio-control of the botanicals and bio-agents tested against anthracnose disease of cowpea. This applications are useful to increase the economy and cost benefit ratio to the regular agricultural activity for cowpea production.

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