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FRONT-LINE DEMONSTRATION FOR MANAGEMENT OF ALTERNARIA STEM BLIGHT IN COTTON

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Abstract: The study was undertaken to experiment on the management of Alternaria stem blight in cotton by technology assessment treatment *i.e.* seed treatment with *Pseudomonas fluorescence* @10g/kg of seed, prophylactic spraying of propiconazole @ 1ml and trifloxystrobin + tebuconazole @ 0.8g/l of water at 45, 60 and 75 DAS in 5 locations of Bhadradri Kothagudem district of Telangana during *Kharif* 2018. Later in addition to the technology assessment treatment, technology refinement treatment *i.e.* crop rotation, spraying of pyraclostrobin + metiram@ 3gm/l, drenching with COC @ 3g/l of water was done during *Kharif* 2019. The cost benefit ratio (BC Ratio) was higher in technology assessment plots with 1.6:1 and 1.89:1 whereas BC ratio was lower comparatively in farmers practiced plots with 1.3: 1 and 1.49:1 in corresponding *Kharif* 2018 and 2019 respectively. The same technology assessment treatment was taken as recommended practice and conducted front line demonstration during *Kharif* 2020 and obtained higher BC ratio in recommended practice plots (1.9:1) compared to farmers practiced plots (1.3: 1).

Keywords: *Alternaria* stem blight, demonstration, technology, assessment, refinement

INTRODUCTION

Cotton is one of the most important commercial crops of the world as well as India which belongs to the botanical family ''Malvaceae". Cotton is referred as "King of Fibres" and is also popularly known as "White Gold". India is the largest cotton growing country in the world with an area of around 12.24 m ha. Total production of cotton in India is 36.1 million bales of 170 kg and productivity is 501 kg ha^{-1}. India's share in global cotton exports is around 22%. Cotton is a pivotal *Kharif* crop of Telangana. Many biotic and abiotic factors are responsible for reduction in yield and quality deterioration of cotton in India. Among the biotic stresses, diseases occupy a vital place. It has been reported by the authors that the cotton crop in India is known to suffer from fungal and bacterial diseases from early stage to maturity [2, 3, 4 & 6]. Among them, the economically most important ones are Alternaria stem blight, grey mildew and vascular wilts are mainly responsible for lower yields. The Alternaria stem blight and other leaf spotting fungus diseases of cotton pose an alarming situation [1]. In this context, the present on farm trail and front-line demonstration was undertaken to develop management strategies to manage the Alternaria stem blight in cotton at Bhadradri Kothagudem district of Telangana.

MATERIALS AND METHODS

The present study was undertaken at five locations in different farmers' fields of Bhadradri Kothagudem Districts of Telangana during

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Kharif 2018 and *Kharif* 2019. Treatments included, technology assessment, technology refinement and farmer's practice.

Technology assessment treatment included, seed treatment with *Pseudomonas fluorescence* @10g/kg of seed, prophylactic spraying of propiconazole @ 1ml and trifloxystrobin + tebuconazole @ 0.8g/l of water at 45, 60 and 75 DAS. Technology refinement treatment included, crop rotation, spraying of pyraclostrobin + metiram @ 3gm/l, drenching with COC @ 3g/l was done during *Kharif* 2019. Farmer practice is spraying of Mancozeb 2.5g/l, Carbendazim @1g/l after noticing the Alternaria incidence.

The experiment was conducted with technology assessment and farmers practice during *Kharif* 2018 in plot size of 0.2 ha each in 5 locations. In addition to the two treatments, technology refinement was also imposed during Kharif, 2019. The same technology assessment treatment was taken as recommended practice (demonstration) and conducted front line demonstration with plot size of 0.4 ha in ten locations at different farmers' fields during *Kharif* 2020 (Table 1).

The per cent disease incidence was calculated by randomly selecting 20 plants and observing the damage symptoms visually. To find out the economic impact of treatments on Alternaria incidence and cotton yield the cost benefit ratio was calculated.

RESULTS AND DISCUSSION

Results revealed that the disease incidence was lower in the technology assessed plot by seed treatment with *Pseudomonas fluorescence* @10g per kg seed, prophylactic spraying of propiconazole @ 1ml and Trifloxystrobin + tebuconazole (Nativo) @ 0.8g per liter of water at 45, 60 and 75 DAS with disease incidence per cent of 5.80, 9.08 and 7.60 during *Kharif* 2018; 4.20, 6.10, 5.10 during *Kharif* 2019 and 5.80, 9.08, 7.60 during *Kharif* 2020 for the corresponding flowering, boll development and harvesting stages, respectively. The higher per cent of disease incidence was observed in farmer practiced plot *i.e* 10.66, 14.48 and 13.08 during *Kharif* 2018; 8.36, 12.32, 11.07 during *Kharif* 2019 and 10.66, 14.48, 13.08 during *Kharif* 2020 for the corresponding flowering, boll and harvesting stages, respectively. The per cent disease incidence in technology refinement plot was high in comparison with technology assessment plot *i.e.,* 5.60, 8.30 and 6.60 per cent during *Kharif 2019* (Table 2).

The yield was higher in technology assessment plot with 1570 (kg/ha) and 1808 (kg/ha) in *Kharif* 2018 and 2019, respectively whereas lower yield was recorded in farmers practiced plots with 1430 (kg/ha) and 1630 (kg/ha) in *Kharif* 2018 and 2019, respectively. The per cent of increase in technology assessment plot when compared with the farmer's practiced plot was 9.70 and 10.90 in *Kharif* 2018 and 2019 respectively. The yield recorded in technology refinement plot was lower than technology assessment plots *i.e* 1788 (kg/ha) with 9.69 per cent increase in yield over farmers practice during *Kharif* 2019. Hence, the technology assessment treatment was considered for demonstration obtained yield of 1870 (kg/ha) with 11.30 per cent increase compared with farmers practiced plots.

The net return was higher in technology assessment plots with Rs. 30356/- and Rs. 44900/- in *Kharif* 2018 and 2019, respectively whereas net return was lower comparatively in farmers practiced plots with Rs. 17285/- and Rs. 28415/- in *Kharif* 2018 and 2019, respectively. The net return recorded in technology refinement plot where lower than technology assessment plots *i.e.*, Rs. 41450 during *Kharif* 2019, during 2020. The highest net return of Rs. 49820/- was recorded in the demo plot compared to farmers practice (Rs.43700/-).

The benefit cost ratio (BC Ratio) was higher in technology assessment plots with 1.6: 1 and 1.89:1 in *Kharif* 2018 and 2019 respectively whereas benefit cost ratio (BC Ratio) was lower comparatively in farmers practiced plots with 1.3:1 and 1.49:1 in *Kharif* 2018 and 2019 respectively. The BC ratio in technology refinement plot was 1.79:1 during *Kharif* 2019. In *Kharif* 2020 BC ratio in demonstrated plot was highest *i.e* 1.90: 1 (Table 3).

Fungicides are most commonly used to reduce the economic losses caused by soil-borne diseases. Their ease of application and effectiveness has made them the most common mean to combat many fungal diseases [2]. The results are in concurrence with of previous publication where, fungicides application

Table 1: Disease incidence at different stages of cotton crop during *Kharif* 2018-20

Season	*Stage*	*Mean Disease Incidence (%)*		
		Farmers practiced	*Technology assessment*	*Technology refinement*
***Kharif* 2018**	Flowering	10.66	5.80	-
	Boll Development	14.48	9.08	-
	Harvesting	13.08	7.60	-
***Kharif* 2019**	Flowering	8.36	4.20	5.60
	Boll Development	12.32	6.10	8.30
	Harvesting	11.07	5.10	6.60
***Kharif* 2020**	Flowering	10.66	5.80	-
	Boll Development	14.48	9.08	-
	Harvesting	13.08	7.60	-

increases the yield of rice [2, 3, 6,7,8,9 &10]. The increased yield is mainly due to reduced disease severity of stem rot disease of rice. Propiconazole was found most promising and provided 47.5 per cent and 26.5 per cent reduction in disease incidence and severity, respectively along with 7.7 per cent increase in grain yield [5] which is similar to present study. For successful management of diseases under field condition use of fungicides and also the biological and cultural method are efficient under epidemic condition. Thus, in present situation cultural practices combined with seed treatment and foliar spray of fungicide is the most efficient and economical practice to manage the Alternaria stemblight disease.

Table 2: Economic impact of experiment during *Kharif* 2018-20

	Kharif 2018		*Kharif 2019*			*Kharif 2020*	
	Farmer's practice	*Technology assessment*	*Farmer's practice*	*Technology assessment*	*Technology refinement*	*Farmer's practice*	*Demo*
Yield (Kg/ha)	1430	1570	1630	1808	1788	1430	1870
Per cent increase over farmers practice	-	9.70	-	10.90	9.69	-	11.3
Net Return (Rs.)	17285	30356	28415	44900	41450	43700	49820
B:C ratio	1.3:1	1.6:1	1.49:1	1.89:1	1.79:1	1.3:1	1.9:1

Table 3: Details of the farmers in Bhadradri Kothagudem district, where demonstrations were conducted (2018-19, 2019-20 and 2020-21)

S. No	*Name of the Farmer*	*Village/ Mandal*	*GPS Co-ordinates*	*Survey Number*	*Crop/DOS*
1	Jalagam Raghavaiah	Ramapuram/ Chanchupally	N 17° 31'33.745'' E80° 37'54.640''	365/38/ఆ	29-06-2020
2	V. Ramu	Tippanapalli Chandrugonda	N 17° 26'33.721'' E80° 39'54.602''	1045/E/ ఆ	17-06-2020
3	A. Sreenu	Tippanapalli Chandrugonda	N 17° 25'55.450'' E 80° 38'77.659''	95A,99E	18-06-2020
4	R. Saidaiah	Tippanapalli Chandrugonda	N 17° 24'33.701'' E 80° 37'70.7790''	1025	15-06-2020
5	R. Nageswar Rao	Tippanapalli Chandrugonda	N 17° 22' 10.121'' E 80° 37'59.247''	116/1	28-06-2020
6	G. Ramesh	Tippanapalli Chandrugonda	N 17° 25' 21.321'' E 80° 38' 65.774''	19,146/11	20-07-2020
7	K. Venkateswara Rao	Ramapuram/ Chanchupally	N 17°29149'9.5463'' E 80° 36'2.71727	365	03.07.2020
8	M. Ramdas	Bendalpadu / Sujathanagar	N 17° 21'35.590'' E 80° 38' 74.156''	1018	09-06-2020
9	K. Laxman	Gurramgudem / Chandrugonda	N 17° 23'67.580'' E 80° 39'77.875''	1018	30-06-2020
10	K. Dharma	Lakshmidevipalli	E 80°25'50.211'' N 17° 37'40.529''	986, 988, 969	10-06-2020

CONCLUSION

The lower per cent of disease incidence at flowering, boll development and harvesting stages and highest yield and BC ratio was observed in technology assessment plot during *Kharif* 2018 and *Kharif* 2019, respectively. Technology assessment plot when taken as demonstration plot it has recorded the same trend of positive results. Therefore, it concluded that the demonstrated plot which was derived from the technology assessment plot experimented in preceding years can be recommend in wide scale to Bhadradri Kothagudem district the farming community.

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