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Biological and Chemical Control of Red Rot Disease in Sugarcane Variety Co 0238

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ABSTRACT

To determine the bio-efficacy of *Trichoderma harzianum*-a bio-agent, and the effect of combination of Azoxystrobin 18.2% + Difenoconazole 11.2% against red rot disease, nine demonstrations were conducted in four villages in the sugar mill zones of Uttarakhand. *T. harzianum* liquid 2% AS culture (cfu count $2x10^6$ per ml) was applied at planting and after germination in plant crops. A concentration of 1.0 ml Azoxystrobin 18.2% + Difenoconazole 11.2% diluted in 1.0 liter of water was applied in June before the onset of the monsoon, alone and in combination with PGR. After applying *Trichoderma harzianum* and the combination of Azoxystrobin 18.2% + Difenoconazole 11.2% with PGR, the reduction in disease incidence was recorded as relatively higher (89.4%), followed by the combination of *T. harzianum* and Azoxystrobin 18.2% + Difenoconazole 11.2% (89.0%). The sole application of *T. harzianum* and Azoxystrobin 18.2% + Difenoconazole 11.2% reduced the red rot incidence by 83.2% and 54.7%, respectively. Consequently, the number of millable canes and cane yield increased significantly in treated plots compared to the untreated control. There was a significant difference in the percentage of infection, growth and yield parameters between the treated and untreated plots. As a result, the number of millable canes (NMC) and cane yield showed a significant increase after the application of *Trichoderma harzianum* and the combination of Azoxystrobin 18.2% + Difenoconazole 11.2% with or without PGR.

Keywords: Sugarcane, *Colletotrichum falcatum*, fungicides, bio-agent, PGR

INTRODUCTION

Sugarcane variety Co 238 has become the most accepted variety since the last two decades in north Indian states of country by sugar industry and cane growers. This variety changed the scenario of sugar recovery concept in sub-tropical region. Sugarcane growers and Sugar mills grew this variety instantaneously. Sugar Industry touched a new height in sugar recovery after its introduction. Unfortunately, in the past two to three years, this elite variety became susceptible to the dreaded red rot disease caused by fungus, *Colletotrichum falcatum* Went, which is a battle-hardened disease in sugarcane crop.

This disease is most likely widespread sugarcane disease in the country and it has been a challenge for the last many years. Subsequently, excellent noble cane varieties get strayed in tropical and sub-tropical regions and finally rejected out from general cultivation (Viswanathan, 2018).

Recurrence of red rot mainly occurs through infected seed cane, infected stools and propagules in soils which play major roles in propagating an organism to the next stage in its life cycle (Singh et al. 1977); (Agnihotri et al. 1979). The secondary infection by the pathogen in congenial environment plays leading role as a major outbreak of red rot disease. (Singh and Shahi 2003) have reported 12 to 45% cane yield reduction in ratoon over preceding plant crop having varied level of disease infection. The predominant variety Co 1148 succumbed to the red rot pathogen during late 1970s. Subsequently, red rot epidemics resumed on Co 1148 and CoJ 64 after 1980s in sub-

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tropical region. After 2000 the popular varieties such as CoS 8436, CoSe 92423, CoSe95422 were severely damaged due to red rot epidemics and the popular variety Co 238 was identified from SBI Research Centre, Karnal to replace these varieties. The Co 238 was a most promising variety which covered more than 80 percent area under cultivation, reported to be affected by red rot recently in U.P. and Bihar (Viswanathan et al. 2022, 2024). Although, the sugar mills have taken steps to minimize and replace the area of Co 238 with new released varieties, but still is being grown in adequate areas. Sugarcane scientists are advising several technologies for red rot managements. However, many non- recommended fungicides have also been enforced for application which are ineffective. This study pertains to find out the bio- efficacy of *Trichoderma harzianum*- a bioagent in combination with Azoxystrobin 18.2% + Difenoconazole 11.4 % soluble concentrates and PGR against red rot management in Co 238 variety.

MATERIALS AND METHOD

Efficacy of *Trichoderma harzianum* - a bio agent applied at planting + drenching after germination and foliar application of Azoxystrobin 18.2% + Difenoconazole 11.4 % soluble concentrates solo and mixed with PGR against red rot disease in Co 238 variety was studied on nine farmers field in four different villages of RBNS Sugar Mills area. Demonstrations were conducted in 2023-24 spring planting season. Out of 9 demonstrations, 6 were conducted in one village and rest each in three villages (Table 1).

Demonstrations were conducted in 2000sq.m area keeping each treatment in 400 sq.m. Untreated plot was kept as control. Disease free, healthy, two budded setts of sugarcane variety Co 238 were planted in furrows in the month of March, 2023. Row to row distance was kept 90 cm. apart. In T1 treatment, the recommended dose of *Trichoderma herzianium* liquid 2.0 lit was diluted in 200 lit. water/ acre was given at planting and second dose was applied after 35- 40 days of planting (April). Further in T2 treatment, foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC, 250 ml fungicides diluted in 250 lit. water/ acre was applied after 100-120 DAP while in T3 treatment, *Trichoderma* liquid 2.0 lit diluted in 200 lit. water/ acre was given at planting and second dose was applied after 35-40 days of planting (April) + foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP. In T4 treatment, drenching of *Trichoderma harzianum* liquid 2.0 lit diluted in 200 lit. water/ acre was given at planting and second dose was applied after 35- 40 days of planting (April) + foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP mixed with 250 ml PGR. Untreated control plot was left without any biological and chemical treatment.

These treatment combinations were applied at all the locations on respective farmers' field. Foliar spray was carried in good soil moisture condition. All the cultural and agronomical practices were followed as per local recommendations.

After 30 days of planting (DAP), germination data in each plot were recorded. In the month of October, red rot infected plants were counted in 5.0-meter row length randomly at three places in each plot in each treatment. After recording data, the red rot infected canes were rouged out and soil of respective places was treated with Bleaching powder. On the basis of total canes and infected canes in each 5.0-meter row length, percent infection was calculated in each treatment. Shoots were counted in the month of June and other yield data were taken at the time of harvest.

The details of village, farmers and time of application of *Trichoderma* and chemical fungicides are listed in (Table 1).

Table 1 : Details of demo's conducted in sugar mills areas

Sl. No.	Name of village	Name of farmers whose plots were used in the study	Time of *Trichoderma harzianum* application (2.0 litT. *harzianum* diluted in 200 lit. water/ acre)	Time of Azoxystrobin 18.2% + Difenoconazole 11.2%, application (250 ml fungicides diluted in 250 lit. water/ acre)	Time of Azoxystrobin 18.2% + Difenoconazole 11.2% + PGR, application (250 ml fungicides and 250 ml PGR diluted in 250 lit. water/ acre)
1	Kankarkhata	1. Dharmendra 2. Sanjay 3. Mansingh 4. Raj Pal Singh 5. Sudhir Singh 6. Sukhpal	At planting and in the month of April	In the month of June before onset of monsoon	In the month of June before onset of monsoon
2	Bhurni	1. Ram Singh			
3	Dhadheki	1. Samar Singh			
4	Malakpur	1. Mani Ram			

RESULTS AND DISCUSSION

Red rot disease varied from 0.79 to 7.42 percent. The stride of red rot reduction was noticed in treated treatments as compared to control. Minimum incidence 0.79 (T4) and 0.81 (T3) was found in bio-fungicide and chemical fungicides combinations. However, alone application of either of the fungicides did not show effective control satisfactorily showing 1.24 (T1) and 3.36 (T2) percent red rot infection. The cane yield was recorded over control varied from 9.6 to 26.7 percent (Table 2).

Germination percent and number of tillers did not show any deformity of any disease. Significant differences could be noted probably due to management or other factors. All the treatments were completed before onset of monsoon. Significant variation noted in number of millable canes. During observation it was observed that in each treatment red rot infected canes were counted and hence, the millable canes and cane yield were adversely affected. Maximum number of millable canes and cane yield could be recorded in T4 treatment followed by T3 treatment. Although, T1 and T2 treatments, where *Trichoderma harzianum* (T1) alone and Azoxystrobin 18.2% + Difenoconazole 11.4 % soluble concentrates (T2) alone were given, produced more millable canes and cane yield than that of untreated control T5. In T3 and T4 treatments Bio-fungicide and chemical fungicides combinations were applied. These combined formulations checked the spread of disease further and consequently produced more millable canes and cane yield. The combined effect of PGR in T4 was recorded maximum cane yield (Table 2).

Red rot, being the dreaded fungal disease in sugarcane did not cure by any fungicide till now. Several elite varieties have been rejected only due to this disease. Singh et al. (2022) reported that the new isolate CF 0238 has been designated as pathotype Cf 13 in AICRP pathology meeting based on its pathogenic virulent behavior in sub-tropical part of India. This pathotype Cf 13 is more virulent than earlier prevailing pathotypes Cf 07, Cf 08, and Cf 09 of North Western/ Central Zones.

Intensity of disease spread can be minimized by using suitable bio-agent/ systemic fungicides. Several workers have tried to check the spread of disease on different susceptible varieties using different fungicides time to time (Khan et al. 2009; Malathi et al. 2004; Singh and Gupta, 2013). Shailbala and Kumar (2016, 2017) studied on various fungicides along with Azoxystrobin 18.2% + Difenoconazole 11.4% against red rot and concluded that Azoxystrobin 18.2% + Difenoconazole 11.4% combination @1.0 ml per liter water showed significantly better results in minimizing red rot infection in susceptible sugarcane varieties. Srivastava et al. (2023) also reported similar findings. Present findings also indicated the similar trend. Malathi et al. (2022) reported four effective *Trichoderma spp.* (*T. asperullum,*

T. atroviride, T. harzianum and *T. auroviride*) and two Paenibacillusalvei isolates against red rot pathogen under in vitro conditions. The present authors tried to test one bio-agent *T. harzianum* alone in combinations of others and found effective in controlling the spread of red rot. (Srivastava et al. 2022a, b) reported positive response of PGR (Maxyld) in enhancing growth of sugarcane crop. In the present experiments PGR also reported to promote the cane yield.

Being outstanding in respect of cane yield and sugar recovery, sugar industry and cane growers do not want to quit Co 0238 variety. But red rot disease natural spread in this variety has threatened to minimize the area of this variety. Suitable systemic and recommended bio-agents/ fungicides should be evaluated time to time to confirm effectiveness against red rot in variety Co 238, where still no incidence has been recorded.

Data recorded in (Table 2) revealed that the red rot infection was recorded in variety Co 238 more or less in all the treatments but intensity of disease was found checked in treated plots though, there was variability in results achieved. This may be due to the fact that *Colletotrichum falcatum* spores spread through soil, water and air and this variety is now susceptible to red rot therefore, there are chances of natural infection. All the biological and chemical treatments responded well. Variability in red rot incidence could be recorded. This study clearly indicated that the treatments given alone was not able to control this disease at satisfactory level. Bestowing the reports received from respective farmers, the incidence of red rot in plant cane threatened to become a big challenge if, it is not taken seriously. Summary data of 9 demo's in the study suggested that in sugarcane variety Co 238 cultivation, there is need of extra care by utilizing combination of biological and chemical means.

Table 2 : Effect of treatments of *Trichoderma harzianum,* Azoxystobin + Difenoconazole and PGR against red rot in variety Co 238

1-Demonstration - Village - Kankarkhata (Farmer 1)

Sl. No.	Treatment	Percent Germination	Shoots/ha (000)	Millable canes/ha (000)	% Red rot infection	Cane Yield/ha (MT) (% increase over control)
1	Drenching of *Trichoderma harzianum at* planting and after 35-40 DAP	40.0	145.0	80.6	0.70	71.0
2	Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	38.8	134.6	72.0	3.20	62.0
3	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	41.0	152.0	88.8	0.20	79.6
4	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC mixed with PGR after 100-120 DAP	41.4	162.2	89.6	0.10	82.8
5	Untreated control	40.0	136.5	67.0	5.00	64.5
	CV	1.88	2.00	1.38	32.81	1.96
	SE (m)					
	0.38.	1.46	0.55	0.30	0.70	
	SE (d)	0.53	2.06	0.77	0.42	1.00
	CD	1.18	4.55	1.71	0.94	2.20

2 - Demonstration- Village- Kankarkhata (Farmer 2)

Sl. No.	Treatment	Percent Germination	Shoots/ha (000)	Millable canes/ha (000)	% Red rot infection	Cane Yield/ha (MT) (% increase over control)
1	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP	38.8	140.0	78.0	0.90	68.8
2	Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	40.0	130.0	68.0	4.20	60.0
3	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	36.6	148.0	80.8	0.28	69.9
4	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC mixed with PGR after 100-120 DAP	34.0	155.0	82.2	0.20	73.6
5	Untreated control	37.7	150.0	62.0	8.00	54.5
	CV	3.34	2.66	1.81	14.21	13.86
	SE(m)	0.62	1.92	0.67	0.19	4.99
	SE(d)	0.88	2.72	0.95	0.27	7.05
	CD	3.34	6.00	1.81	0.60	15.54

3 - Demonstration- Village- Kankarkhata (Farmer 3)

Sl. No.	Treatment	Percent Germination	Shoots/ha (000)	Millable canes/ha (000)	% Red rot infection	Cane Yield/ha (MT) (% increase over control)
1	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP	35.5	158.0	78.8	1.50	70.0
2	Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	38.8	150.0	75.0	3.80	73.0
3	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	36.6	160.0	85.0	0.22	75.0
4	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC mixed with PGR after 100-120 DAP	40.0	162.0	88.0	0.24	76.0
5	Untreated control	36.6	150.0	70.0	8.8	60.8
	CV	3.72	0.74	2.45	9.25	2.12
	SE(m)	0.69	0.57	0.97	0.13	0.75
	SE(d)	0.98	0.81	1.38	0.19	1.06
	CD	2.17	1.79	3.04	0.42	2.34

4 - Demonstration- Village- Kankarkhata (Farmer 4)

Sl. No.	Treatment	Percent Germination	Shoots/ha (000)	Millable canes/ha (000)	% Red rot infection	Cane Yield/ha (MT) (% increase over control)
1	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP	33.0	142.0	75.0	0.90	68.0
2	Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	34.0	145.0	78.0	2.80	68.8
3	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	32.0	140.0	82.0	0.70	70.0
4	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC mixed with PGR after 100-120 DAP	38.8	148.0	86.0	0.72	71.0
5	Untreated control	36.6	141.0	70.0	7.20	56.0
	CV	3.87	1.28	2.25	14.06	2.25
	SE(m)	0.67	0.92	0.88	0.17	0.75
	SE(d)	0.95	1.30	1.24	0.24	1.06
	CD	2.10	2.87	2.74	0.54	2.34

5 - Demonstration- Village- Kankarkhata (Farmer 5)

Sl. No.	Treatment	Percent Germination	Shoots/ha (000)	Millable canes/ha (000)	% Red rot infection	Cane Yield/ha (MT) (% increase over control)
1	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP	40.1	151.0	70.0	1.00	62.0
2	Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	42.0	155.0	75.0	3.00	60.0
3	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	43.0	148.0	82.0	0.80	68.5
4	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC mixed with PGR after 100-120 DAP	38.0	160.0	84.0	0.81	68.0
5	Untreated control	41.5	152.0	65.0	6.80	53.8
	CV	3.37	1.80	2.63	15.23	3.15
	SE(m)	0.69	1.38	0.99	1.18	0.98
	SE(d)	0.97	1.95	1.40	0.26	1.39
	CD	2.14	4.30	3.08	0.58	3.07

6 - Demonstration- Village- Kankarkhata (Farmer 6)

Sl. No.	Treatment	Percent Germination	Shoots/ha (000)	Millable canes/ha (000)	% Red rot infection	Cane Yield/ha (MT) (% increase over control)
1	Drenching of *Trichoderma harzianum* at planting & after 35-40 DAP	36.5	158.0	68.0	1.20	58.8
2	Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	38.0	162.0	66.0	3.60	62.0
3	Drenching of *Trichoderma harzianum* at planting & after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	34.4	156.0	72.8	0.92	69.9
4	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC mixed with PGR after 100-120 DAP	32.2	165.0	74.4	0.90	68.8
5	Untreated control	34.0	160.0	62.8	7.80	54.4
	CV	5.32	3.04	3.02	9.64	2.51
	SE(m)	0.93	2.43	1.03	0.13	0.78
	SE(d)	1.31	3.44	1.47	0.19	1.11
	CD	2.90	NS	3.23	0.43	2.45

7 - Demonstration- Village - Bharni

Sl. No.	Treatment	Percent Germination	Shoots/ha (000)	Millable canes/ha (000)	% Red rot infection	Cane Yield/ha (MT) (% increase over control)
1	Drenching of *Trichoderma harzianum* at planting & after 35-40 DAP	38.8	152.0	72.0	1.20	62.0
2	Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	36.0	168.0	76.6	2.90	60.0
3	Drenching of *Trichoderma harzianum* at planting & after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	32.5	155.0	78.8	1.00	68.5
4	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC mixed with PGR after 100-120 DAP	38.2	154.0	80.2	1.10	69.0
5	Untreated control	36.8	160.0	68.8	7.20	54.4
	CV	2.73	3.15	2.68	6.42	1.93
	SE(m)	0.49	2.48	1.01	0.08	0.60
	SE(d)	0.70	3.51	1.42	0.12	0.85
	CD	1.55	7.75	3.14	0.26	1.88

8 - Demonstration- Village - Dhadheki

Sl. No.	Treatment	Percent Germination	Shoots/ha (000)	Millable canes/ha (000)	% Red rot infection	Cane Yield/ha (MT) (% increase over control)
1	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP	41.0	148.0	66.8	1.80	52.2
2	Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	42.0	150.0	62.8	3.80	50.4
3	Drenching of Trichoderma harzianum at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	40.0	146.0	72.4	1.40	58.8
4	Drenching of Trichoderma harzianumat planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC mixed with PGR after 100-120 DAP	38.8	144.0	74.4	1.20	60.0
5	Untreated control	40.0	146.0	60.0	8.00	48.8
	CV	5.07	1.68	1.64	7.70	6.02
	SE(m)	1.02	1.23	0.55	0.12	1.62
	SE(d)	1.44	1.74	0.78	0.17	2.30
	CD	NS	3.84	1.72	0.38	5.06

9 - Demonstration- Village- Maikpur

Sl. No.	Treatment	Percent Germination	Shoots/ha (000)	Millable canes/ha (000)	% Red rot infection	Cane Yield/ha (MT) (% increase over control)
1	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP	38.2	160.0	85.0	2.00	68.8
2	Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	39.0	165.0	88.0	3.00	66.0
3	Drenching of Trichoderma harzianum at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	36.6	162.0	91.0	1.80	72.2
4	Drenching of Trichoderma harzianumat planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC mixed with PGR after 100-120 DAP	32.8	168.0	92.0	1.60	74.4
5	Untreated control	33.0	164.0	66.6	8.00	59.8
	CV	3.15	3.99	2.70	6.90	0.93
	SE(m)	0.56	3.27	1.14	0.11	0.31
	SE(d)	0.80	4.62	1.61	0.16	0.44
	CD	1.76	NS	3.56	0.35	0.99

Table 2 : Effect of *Trichoderma harzianum,* Azoxystobin + Difenoconazole and PGR against red rot in variety Co 0238 (Summary of 9 demonstrations)

Sl. No.	Treatment	Percent Germination	Shoots/ha (000)	Millable canes/ha (000)	% Red rot infection	Cane Yield/ha (MT) (% increase over control)
1	Drenching of *Trichoderma harzianum* at planting & after 35-40 DAP	37.98	150.4	74.9	1.24	64.62 (14.51)
2	Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	38.73	151.0	73.4	3.36	62.46 (9.61)
3	Drenching of *Trichoderma harzianum* at planting & after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC after 100-120 DAP	36.96	151.8	81.5	0.81	70.27 (24.50)
4	Drenching of *Trichoderma harzianum* at planting and after 35-40 DAP + Foliar spray of Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC mixed with PGR after 100-120 DAP	35.13	157.5	83.4	0.79	71.51 (26.70)
5	Untreated control	37.35	151.0	65.8	7.42	56.44
	CV	1.94	4.58	10.32	55.43	10.44
	SE (+ / -)	0.72	2.31	2.61	0.32	2.26
	CD	2.06	4.67	5.28	0.64	4.57

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