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Evaluation of trifloxystrobin 25% + tebuconazole 50% (Nativo 75 WG) against *Exserohilum turcicum* causing leaf blight disease of maize

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Maize has its significance as a source of a large number of industrial products besides its uses as human food and animal feed. Diversified uses of maize for corn starch industry, corn oil production, baby corns, popcorns, etc., and potential for exports has added to the demand of maize all over world besides other commercial avenues. In India, maize is emerging as third most important cereal crop after rice and wheat. The area cultivated with maize in India is 7.27 million ha with an annual production of 15.86 million tonnes and average yield of 2181 kg ha^{-1} in 2011-12 (Anon., 2012). Maize can be raised during *kharif* and *rabi* in South India and Bihar but only during *kharif* season in most of the North Indian states (Joshi, *et al.*, 2005, Singh *et al*., 2012.). Now technology has been developed by Agricultural Universities to take up crop during *rabi* in North India but duration of crop is very long.

With the introduction of high yielding hybrids both indigenous and exotic and use of fertilizers, there has been a phenomenal increase in the area and production, but at the same time, it is prone to several foliar and stalk rot diseases (Payak and Sharma, 1980). In India, among the foliar diseases, Turcicum leaf blight (TLB) of maize caused by *Exserohilum turcicum* is a major constraint in large scale cultivation and production of the crop both in *kharif* and *rabi* season and the losses vary from 25 to 90 per cent depending upon the severity of the disease (Jha, 1993, Pant *et al*., 2000). The infection of *E. turcicum* is evident on maize commencing from seedling till harvesting. However, maximum severity was noticed during tasselling and six to eight weeks after silking which resulted in huge loss. The disease became well established before or at silking stage (Chenulu and Hora, 1962, Ullstrup, 1966). Therefore, an experiment was conducted to evaluate the bioefficacy of trifloxystrobin 25% +tebuconazole 50% (Nativo 75 WG) against *Exserohilum turcicum* causing leaf blight disease of maize for two seasons. Phytotoxicity of trifloxystrobin 25%+ tebuconazole 50% (Nativo 75 WG) on the crop was also evaluated.

The maize crop was raised with all standard and recommended packages of agronomic practices at the Instructional Farm of Bidhan Chandra Krishi Viswavidyalaya, Jaguli, Nadia during 2011 and 2012. Eight fungicidal treatments including an untreated control were evaluated following RBD with three replications. The treatments were T_1: Trifloxystrobin 25% +Tebuconazole 50% -75WG, T_2 :Trifloxystrobin 25% + Tebuconazole 50% -75WG, T_3: Trifloxystrobin 25% +Tebuconazole 50% -75WG, T_4: Trifloxystrobin (Flint) 50WG, T_5 : Tebuconazole (Folicur) 25.9EC, T_6 : Propiconazole (Tilt) 25 EC, T_7 : Mancozeb (Dithane M 45) 75WP and T_8 :Untreated Control.

The test fungicides were applied as foliar spray with knap sack sprayer fitted with hollow cone nozzle. About1.25 liters of water was mixed with each test fungicides and sprayed over the crop in each plot measuring 30 m^2; first spraying was done at the appearance of visible symptom (35 days after sowing) and second spray was given at 14 days after first spray. Ten plants were marked in each plot for recording percent disease severity following 0-9 rating scale. The plants were kept under close vigil to protect them from the ravages pests' attack.

The intensity of the disease was recorded just before each spraying. Disease intensity on leaves was graded in 0-9 rating scale (Mayee and Datar, 1986). The per cent disease intensity (PDI) was calculated by the following formula.

$$PDI = \frac{\text{Sum of all numerical ratings}}{\text{Total plants (leaves) observed} \times \text{Maximum rating scale used}} \times 100$$

Observation on grain weight $plot^{-1}$ was also recorded. Rating scale in 0-9 for disease intensity study are: No incidence-0, Less than 1% area affected-1,1-5% Leaf area affected-3,6-25%, Leaf area affected-5, 26-50%, Leaf area affected-7,61-100% Leaf area affected-9. Similarly phytotoxicity observations were taken in 0-10 scale on different parameters are No phytotoxicity -0, 1-10% phytotoxicity-1,11-20% phytotoxicity-2, 21-30% phytotoxicity -3, 31-40% phytotoxicity-4, 41-50% phytotoxicity -5, 51-60% phyto-toxicity -6, 61-70% phytotoxicity -7, 71-80% phytotoxicity -8, 81-90% phytotoxicity -9, 91-100% phytotoxicity-10. The observations were taken at 1, 3, 7, 10 and 15 days after spraying.

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Short Communication

Table 1: Efficacy of different treatments on *turcicum* leaf blight of maize under field conditions

Treatments	Formulation (g or ml ha^{-1})	Per cent disease intensity (two years pool)	Per cent disease reduction over control	Yield ($t.ha^{-1}$)
T_1	250	19.80 (26.40)	72.56	25.68
T_2	300	15.91 (23.50)	76.96	27.80
T_3	350	14.63 (22.48)	78.23	29.08
T_4	175	30.90 (33.77)	52.50	20.33
T_5	700	33.82 (35.55)	50.96	19.85
T_6	500	36.34 (37.07)	45.09	18.95
T_7	1500	48.14 (43.93)	28.29	12.72
T_8	-	66.38 (54.57)	-	9.50
SEm (±)		**0.410**		**0.130**
LSD (0.05)		**1.188**		**0.377**

** Figures in the parentheses indicate angular transformed values*

Note : T_1: Trifloxystrobin 25% +Tebuconazole 50% -75WG, T_2 :Trifloxystrobin 25% + Tebuconazole 50% -75WG, T_3: Trifloxystrobin 25% +Tebuconazole 50% -75WG, T_4: Trifloxystrobin (Flint) 50WG, T_5 : Tebuconazole (Folicur) 25.9EC, T_6 : Propiconazole (Tilt) 25 EC, T_7 : Mancozeb (Dithane M 45) 75WP and T_8 :Untreated Control.

Table 2: Phytotoxicity effect trifloxistrobin 25% + tebuconazole 50% - 75 WG on maize (2011 - 12)

Treatment	3, 5, 7,10 and 15 days after each application						
	Leaf chlorosis	Leaf necrosis	Leaf hyponasty	Leaf tip burning	Leaf epinasty	Vein clearing	Wilting and Rosetting
T_1	0	0	0	0	0	0	0
T_2	0	0	0	0	0	0	0
T_3	0	0	0	0	0	0	0
T_4	0	0	0	0	0	0	0
T_5	0	0	0	0	0	0	0

Treatment	Treatments	Dosage formulation (g. ha^{-1})	Application time and method
T_1	Untreated control (Water Spray)	-	One spray
T_2	Trifloxystrobin 25% +Tebuconazole 50% - 75 WG	300	was given at
T_3	Trifloxystrobin 25% +Tebuconazole 50% - 75 WG	350	50 days old
T_4	Trifloxystrobin 25% +Tebuconazole 50% - 75 WG	700	crop (50 days
T_5	Trifloxystrobin 25% +Tebuconazole 50% - 75 WG	1400	after sowing).

Ten plants per plot were selected randomly, then total number of leaves that showed phytotoxicity symptoms were taken into consideration and calculation was made by using above mentioned scale.

The disease initially appears on the lower leaves as slightly oval, water-soaked, small spots and continues to increase in size and number as the plant grow. These spots grow into elongated spindle shaped, necrotic lesions until a complete burning of the foliage (Leon, 1978). It is evident from the result (Table-1) that all the treatments significantly reduced the disease severity over control. The significant minimum disease severity was recorded in the plants treated with trifloxistrobin 25% + tebuconazole 50% (75WG) @ 87.5+175 g a.i./ha . That was followed by its dose of 75+150 g a.i./ha. The per cent disease control was 78.2 and 77.0 due to application of trifloxistrobin 25% + tebuconazole 50% (75WG) @ 87.5+175g and 75+150g a.i. ha^{-1}, respectively. Trifloxistrobin 50WG @87.5 g a.i./ha and Tebuconazole 25.9EC @175 g a.i./ha respectively reduced 52.5 and 51.0 percent disease intensity significantly. All the treatments reduced more than 50% disease over control except Propiconazole and Mancozeb 75 WP; though the effectiveness of fungicides carboxin, mancozeb and propiconazole against *E. turcicum* has been reported by other scientist (Singh and Gupta, 2000, Patil, 2000, Praveen *et al*., 2010) but in present investigation less effect on controlling the disease was recorded. Maximum grain yield was, 29.08 q ha^{-1} when trifloxistrobin + tebuconazole 75WG @87.5+175g a.i. ha^{-1} was sprayed and found at par with its dose of 75+150 g a.i. ha^{-1} where grain yield was recorded 27.8 q ha^{-1}. There was no phytotoxic effect like leaf chlorosis,necrosis,tip burning,wilting etc. when higher doses was sprayed over the crops. So from the above finding it may be concluded that trifloxistrobin 25% + tebuconazole 50% (Nativo 75 WG) @87.5+175g a.i./ha may be recommended for controlling the leaf blight disease of maize in West Bengal.

Evaluation of the efficacy of trifloxystrobin 25% + tebuconazole 50% (Nativo 75WG) against *Exserohilum turcicum* causing leaf blight disease and investigation on phytotoxicity of the fungicide on maize was carried out during experimentation. Summarisation of result indicated that trifloxistrobin 25% + tebuconazole 50% @ 87.5+175g a.i. ha^{-1} controlled 78.23% disease severity and was at par with its dose of 75+150g a.i. ha^{-1}. Grain yield was recorded maximum at trifloxistrobin 25% + tebuconazole 50% @ 87.5+175g a.i. ha^{-1} being, 29.08 q ha^{-1} and found at par with its dose of 75+150 g a.i. ha^{-1}. No phytotoxic effect of trifloxistrobin + tebuconazole 75 WG up to 350+700g a.i. ha^{-1} dose was noticed on maize.

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