Journal of Cereal Research
13(3): 313-316
Homepage: http://epubs.icar.org.in/ejournal/index.php/JWR
Research Article

Efficacy of different fungicides for leaf blight (*Alternaria triticina*) management in wheat

Kapadiya Iteshkumar Bhupatbhai*, Chandrakant Singh, Pansuriya Ashwin Govindbhai, Kommeta Mahesh

Wheat Research Station, Junagadh Agricultural University, Junagadh- 362 001, Gujarat.

Article history:
Received: 13 Oct., 2021
Revised: 23 Nov., 2021
Accepted: 19 Dec., 2021

Citation:
Kapadiya Iteshkumar B, Chandrakant Singh, Pansuriya Ashwin G and Kommeta M. 2021. Efficacy of different fungicides for leaf blight (*Alternaria triticina*) management in wheat. *Journal of Cereal Research* ***13(3):*** *313-316.* http://doi.org/10.25174/2582-2675/2022/119837

****Corresponding author:***
E-mail: ibkapadiya@jau.in

Abstract

***A. triticina*, a seedborne pathogen, can cause major damage to susceptible wheat varieties under wet or humid conditions. Considering the importance of leaf blight of wheat caused by *Alternaria triticina*, the field study was conducted using different fungicides. The different fungicides like, Mancozeb 75% WP, Propineb 70% WP, Hexaconazole 5% SC, Propiconazole 25 % EC, Azoxystrobin 11% + Tebuconazole 18.30% SC and Hexaconazole 4% + Zineb 68% WP tested as foliar spray under field conditions the lower disease intensity (15.79 %) was recorded in foliar application of Propiconazole 25 % EC (500 ppm) followed by Hexaconazole 4 % + Zineb 68 % WP (18.44 %) at 1000 ppm. The maximum grain yield (3831 kg/ha) was also recorded in foliar spray of Propiconazole 25 % EC which was at par with Hexaconazole 4 % + Zineb 68 % WP and Hexaconazole 5 % SC.**

Keywords: Wheat, Leaf blight, Fungicide, Management

1. Introduction

Wheat is the world's most favoured staple food. Wheat provides more nourishment for humans than any other food source. Wheat crop having more nutritional value, the nutritional composition indicated that 100 g of bread wheat provides 326-335 calories and it consists carbohydrates 71 g, protein 14 g, fat 2.5 g, minerals 2 g and considerable proportions of vitamins (thiamine and vitamin-B) and minerals (zinc and iron) (Wolde *et al.*, 2016). It is known for its remarkable adaptation to a wide range of environments and its role in world economy. Three species of wheat *viz., Triticum aestivum* (bread wheat), *Triticum durum* (macaroni wheat) and *Triticum dicoccum* (emmer wheat) are presently grown as commercial crop in India. Globally wheat has 224.98 million hectares area, 735.50 million metric tons production and 3.27 metric tons per hectare productivity and in India wheat has 30.78 million hectares area, 98.51 million metric tons production and 3.20 metric tons per hectare productivity during 2016-17 (Anon., 2018). In Gujarat wheat has 0.99 million hectares area, 2.73 million metric tons production and 2.75 metric tons per hectare productivity during 2016-17 (Anon., 2017).

Leaf blight caused by *Alternaria triticina*, *Helminthosporium* sp., *Curvularia* sp. etc. but *Alternaria triticina* is widely prevalent in wheat growing areas especially in Eastern and South- Central India (Joshi *et al.,* 1978). It causes serious damage in crops as well as in grain yield (Chenulu *et al.,* 1967). During 1963-64 wheat season, the outbreak of the disease was so severe at the botanical sub-station, Pusa, Bihar. That not a single genetic stock under cultivation had escaped the disease (Prasada and Prabhu, 1964). The leaf blight of wheat caused by *Alternaria triticina* is one of the most important diseases of wheat causing considerable losses in Rajasthan on the high yielding Mexican varieties. Prabhu and Prasada (1966) reported that as the disease progresses, the irregularly scattered necrotic spots coalesce and cover large areas resulting in the death of entire leaf. In case of severe infection, the symptoms may appear on the leaf sheath, seed and wild host in the soil.

Leaf blight of wheat caused by *Alternaria triticina* is often a destructive disease in various parts of India like Kanpur, Orissa, Maharashtra, Bihar and West Bengal (Prabhu and Prasada, 1966). Mehta (1950) added that since last few years this disease has become widely prevalent in Bihar also causing substantial losses in yield.

2. Materials and methods

A field experiment was laid out with the chemicals which were found effective under laboratory screening to test relative field efficacy of different fungicides in controlling the Alternaria leaf blight disease of wheat during *Rabi* season, 2018.

The experiment was laid out in Randomized Block Design with seven treatments. These include: Mancozeb 75% WP (2000 ppm), Propineb 70% WP (2000 ppm), Hexaconazole 5% SC (500 ppm), Propiconazole 25% EC (500 ppm), Azoxystrobin 11% + Tebuconazole 18.30% SC (1000 ppm), Hexaconazole 4% + Zineb 68% WP (1000 ppm) and water. The gross plot size was 5 m × 2.025 m and net plot size was 4 m × 1.575 m with spacing of 22.5 cm between two rows. Two spraying of the fungicides were carried out on wheat DBW 110, first at the time of initiation of the disease and second fifteen days after the first spraying. Five plants from each of the plot were selected for recording observation on leaf blight. From each plant, random leaves were observed for leaf blight. The disease rating was done by using 0-9 scale and average disease severity index based on percentage leaf area affected was calculated. Per cent disease intensity (PDI) was calculated by using the following formula (Saari and Prescott (1975):

$$PDI = \frac{\text{Sum of total rating}}{\text{Total plants observed}} \times \frac{100}{\text{Maximum disease rating}}$$

Loss was estimated on the basis of yield obtained in different treatments in terms of percentage according to formula given below

$$\text{Yield loss} = \frac{\text{Yield of treatment - Yield of check}}{\text{Yield of treatment}} \times 100$$

3. Results and Discussion

For controlling *Alternaria leaf* blight disease of wheat under field conditions, the chemicals which were found effective under laboratory screening were further evaluated under field conditions. The efficacy of each of these fungicides was compared with control. The per cent disease intensity (PDI) was worked out and is presented in Table 1 and depicted in Figure 1.

Table 1 Field efficacy of different fungicides against *A. triticina* under *in vivo* condition

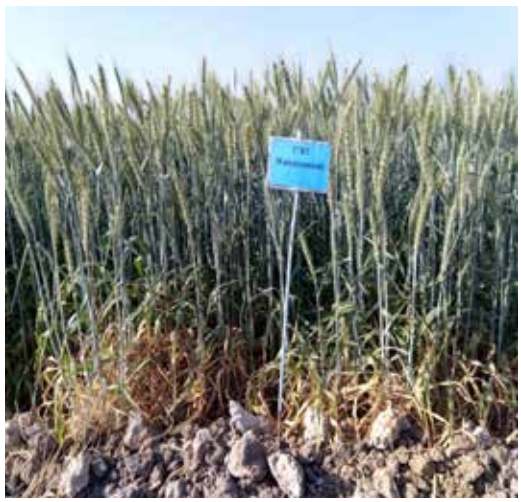
Sr. No.	Treatments	Conc. (ppm)	Leaf blight intensity (%)	Disease control over check (%)	Grain yield (kg ha^{-1})	Yield increase over control (%)
1	Mancozeb 75% WP	2000	25.38 (30.27)	46.64	3088*	16.87
2	Propineb 70% WP	2000	33.13 (35.16)	30.34	2932	12.45
3	Hexaconazole 5% SC	500	21.38 (27.56)	55.05	3326	22.82
4	Propiconazole 25 % EC	500	15.79 (23.43)	66.80	3831	32.99
5	Azoxystrobin 11% + Tebuconazole 18.30% SC	1000	24.45 (29.65)	48.59	3199	19.75
6	Hexaconazole 4% + Zineb 68% WP	1000	18.44 (25.44)	61.23	3634	29.36
	Control	-	47.56 (43.62)	0.00	2567	-
	S.Em±		0.40		171.89	
	C.D. at 5%		1.23		529.64	
	C.V.%		1.76		9.23	

* Mean of three replications

The data presented in Table-1 revealed that all the fungicidal treatments significantly reduced the disease intensity as compared to control. Propiconazole 25% EC was found significantly superior over the rest of treatments showing minimum disease intensity (15.79 %) at 500 ppm concentration with maximum disease control (66.80 %) and followed by Hexaconazole 4% + Zineb 68% WP

(A) Field view of wheat

(B) Propiconazole



(C) Control

Figure 1. Field evaluation of effective fungicides against *A. triticina*

(18.44 %) at 1000 ppm concentration with maximum disease control 61.23 per cent.

Regarding grain yield, the treatment effects were significant. Propiconazole was found significantly superior that recorded higher grain yield (3831 kg ha^{-1}) which was at par with Hexaconazole 4% + Zineb 68% WP (3634 kg ha^{-1}) and Hexaconazole 5 % SC (3326 kg ha^{-1}).

In present study, Propiconazole was found significantly superior in reducing leaf blight and achieving the higher grain yield over rest of treatments. The next effective treatment was Hexaconazole 4% + Zineb 68% WP. Whereas, Pandey and Tewari (1999), Singh *et al.* (2000) and Tewari and Zewde (2000) reported that the Propiconazole was most effective in reducing the leaf blight of wheat with higher grain yield.

[#] Data in parentheses are arcsine transformed values and outside are retransformed values

Acknowledgements

The authors are grateful to the Wheat Research Station, JAU, Junagadh for giving support for conducting the trials on field.

Conflict of Interest

Authors declares that they do not have any conflict of interest

Ethical Compliance Statement

NA

Authors Contribution

The compliance of referee comments has been made. The manuscript Comparative Evaluation of Different Fungicides for Management of leaf blight of Wheat Caused by (*Alternaria triticina*) is a part of M. Sc. Ag. Thesis of Mr. Kommeta Mahesh submitted in Junagadh Agricultural University, Junagadh

4. References

1. Anonymous, 2017. Directorate of Economics and Statistics. Department of Agriculture, Cooperation Farmers welfare, Ministry of Agriculture and Farmers Welfare http//: enads.dacnet.nic.in accessed on 26th February, 2018.
2. Anonymous. 2018. World Agricultural Production. United States Department of Agriculture (USDA), Foreign Agricultural Service. Available at https:// apps.fas.usda.gov/ accessed on 30th October, 2018.
3. Chenulu, V. Y.; Singh, A. and Joshi, L. M. 1967. Estimation of losses due to *Alternaria* leaf blight of wheat caused by *Alternaria triticina. Abstract International Symposium Plant Pathology* **193**(1): 190-192.
4. Joshi, L. M.; Srivastava, K. D.; Singh, D. V.; Goel, L. B. and Nagarajan, S. 1978. Annotated compendium on wheat diseases in India. *Indian Council of Agricultural Research.* New Delhi. Pp. 332.
5. Mehta, P. R. 1950. Some new diseases of plants of economic importance in Uttar Pradesh. *Plant Protection Bulletin.* New Delhi. **2**: 50-51.
6. Pandey, A. S. and Tewari, A. N. 1999. Field evaluation of wheat varieties against leaf blight and its control. *Plant Disease Research.* **14**(1): 52-54.
7. Prasada, R. and Prabhu, A. S. 1964. Leaf blight of wheat. *FAO Plant Protection Bulletin.* **12**: 117.
8. Prabhu, A. S. and Prasada, R. 1966. Pathological and epidemiological studies on leaf blight of wheat caused by *Alternaria triticina. Indian Phytopathology.* **19**(1): 95-111.
9. Saari, E. E. and Prescott, J. M. 1975. A scale for appraising the foliar intensity of wheat diseases. *Plant Disease Reporter.* **59**(5): 377- 380.
10. Singh, D. P.; Nagarajan, S. and Gael, L. B. 2000. Evaluation of wheat lines for resistance of leaf blight caused by *Bipolaris sorokiniana* and *Alternaria triticina. Plant Disease Research.* **15**(1): 110-112.
11. Tewari, A. N. and Zewde, T. 2000. ChemicaI control of foliar disease of wheat by systemic fungicides. *Plant Disease Reports.* **15**(1): 78-80.
12. Wolde, T.; Assefa, E. and Mecha, B. 2016. Genetic variability, heritability and genetic advance for yield and yield related traits in durum wheat accessions. *Journal of Agricultural Research.* **5**(3): 42-47.