MEDIRES
Symbol of Quality Research

Pesticide Science and Pest Control
info@mediresonline.org

ISSN: 2833-0943 RESEARCH ARTICLE

Evaluation of new generation molecules against frogeye leaf spot and pod blight disease in soybean under field condition

DL Yadav*, Pratap Singh, Chaman K Jadon & Harphool Meena,

Agricultural Research Station, Kota Agriculture University, Kota, Rajasthan (India)

***Corresponding Author**: DL Yadav, Agricultural Research Station, Kota Agriculture University, Kota, Rajasthan (India)

Received: 03 March 2023; **Accepted:** 12 April 2023; **Published:** 21 April 2023.

Citation: DL Yadav* (2023) Evaluation of new generation molecules against frogeye leaf spot and pod blight disease in soybean under field condition.2(1). Journal of Pesticide Science and Pest Control. DOI: 10.58489/2833- 0943/017

Abstract

In this study, bio-efficacy of new generation fungicides Picoxystrobin 7.05%+Propiconazole 11.71%, Propiconazole 25 % EC, Picoxystrobin 22.52% SC, Pyraclostrobin 20% WG and Hexaconazole 5% EC against frogeye leaf spot and anthracnose/pod blight disease of soybean were evaluated under field conditions. Pooled results revealed that combination of two fungicide Picoxystrobin 7.05%+Propiconazole 11.71% w/w SC @ 1000 ml/ha resulted in minimum disease severity (7.0 and 3.4%) as well as maximum (71.3 and 77.6%) disease management of frogeye leaf spot and anthracnose/pod blight disease in soybean, respectively. However, it was found to be significantly at par with the same fungicide applied with higher dose @ 1125 ml/ha. Maximum seed yield (23.18q/ha) was recorded with the treatment Picoxystrobin 7.05% +Propiconazole 11.71% w/w SC @ 1000 ml/ha which was on par with the spray of higher dose of same fungicide @ 1125ml/ha. However, minimum yield (17.18q/ha) was recorded in untreated control.

Keywords: *Soybean, frogeye leaf spot, anthracnose/pod blight disease, Picoxystrobin, Propiconazole, Pyraclostrobin, fungicide.*

Introduction

Soybean has an important place in world's oilseed cultivation scenario, due to its high productivity, profitability and vital contribution towards maintaining soil fertility. The crop also has a prominent place as the world's most important seed legume, which contributes 25% to the global vegetable oil production, about two thirds of the world's protein concentrate for livestock feeding and is a valuable ingredient in formulated feeds for poultry and fish. The wide spread cultivation of the crop has dramatically changed the socioeconomic status of the farmers of Rajasthan. It is a primary source of vegetable oil and protein concentrates. Soybean is an excellent source of major nutrients with about 40 per cent of dry matter being protein and 20

Materials and Methods

The experiment was conducted at Agricultural Research Station, Agriculture University, Kota during *kharif* 2018 and 2019 to evaluate the efficacy of various Strobilurin and triazole group fungicides against cercospora leaf spot and pod blight disease of soybean. The experiment was laid out in a Randomized Block Design (RBD) with three replications and eight treatments. Cultivar RKS 45 was sown in 20 m2 plot at 45 cm row to row distance. Crop was raised as per the recommended package of practices as per zone and protective irrigation was given as and when required. Fungicides were sprayed twice using a hand operated knapsack sprayer fitted with hollow cone nozzle and water volume of 500 lit/ha was maintained. First spraying was given just after the appearance of the disease and second was given 14 days after the first spray. Observations related to diseases were recorded 15 days after first application (at 15 days) and second 15 days after second application (at 30 days). It was recorded from randomly selected 10 plants in each treatment (plot). Each selected plants were approximately divided into three positions as bottom, middle and top. From each position two to four leaves were graded as per the following disease assessment key which was mainly based on the per cent leaf area infected (0-9 scales)5.

Disease rating scale: Rating scale for Frog eye leaf spot disease of soybean.
Every infected leaf has been assigned 0-9 ratings/ grades which are given below based on the percent leaf area infected.

Grades	Descriptions
0	*No lesions/spots*
1	*1 % leaf area covered with lesions/spots*
3	*1.1 to 10 % leaf area covered with lesions/spots, no spots on stem*
5	*10.1 to 25% of leaf area covered, no defoliation; little damage*
7	*25.1 to 50 % leaf area covered; some leaves drop; death of a few plants, damage conspicuous*
9	*More than 50 % area covered, lesions/spots very common on all plants, defoliation common; death of plants common; damage more than 50 %.*

Rating scale for pod blight of soybean

Grades	Descriptions
0	*No lesions/spots/discoloration*
1	*1 % area covered with lesions/spots/discoloration*
3	*1.1 to 10 % area covered with lesions/spots/ discoloration*
5	*10.1 to 25% area covered with lesions/spots/ discoloration*
7	*25.1 to 50 % area covered with lesions/spots/ discoloration*
9	*More than 50 % area covered with lesions/spots/ discoloration*

Calculation of Per cent Disease index (PDI)

These grades are then utilized for the calculation of PDI by using the following formula of Wheeler.

$$\text{Per cent Disease Index (PDI)} = \frac{\text{Sum of individual rating}}{\text{No. of leaves examined}} \times \frac{100}{\text{Max. Disease rating}}$$

Yield assessment: The soybean seed
per treatment was recorded and con
yield

These grades are then utilized for the calculation of PDI by using the following formula of Wheeler.

Yield assessment: The soybean seeds were harvested and weighed plot wise; the average seed yield per treatment was recorded and converted into quintals per ha and statistically analyzed.

Results and Discussion

In present experiment, all applied fungicides were found significantly superior in reducing the disease severity as compared to check against frogeye leaf spot and anthracnose/pod blight disease of soybean during *Kharif* 2018 and 2019 and both the year similar treatment trend was observed. Pooled result of cercospora leaf spot disease revealed that among the different treatments, foliar spraying of Picoxystrobin 7.05% +Propiconazole 11.71% w/w SC @ 1125 ml/ha provided minimum disease severity (6.4%) and maximum (73.8%) disease management along with highest (23.23q/ha) seed yield which was at par with the same fungicide applied with lower dose @ 1000 ml/ha, provided (PDI 7.0), 71.3 per cent management of the disease and recorded 23.18 q/ha seed yield when compared to untreated (PDI 24.4.0) and seed yield (17.18q/ha). Whereas, Propiconazole 25 % w/w EC @ 500ml/ha (PDI 10.8 and PDC 55.7), Picoxystrobin 22.52% w/w SC @ 400ml/ha (PDI 12.0 & PDC 50.8), Pyraclostrobin 20%w/w WG @ 500ml/ha (PDI 12.2 and PDC 50.0) and Hexaconazole 5

Table 1: Bio-efficacy of new generation fungicides against Cercospora leaf spot disease of soybean

Treatments	g ai/ha	Dose g or ml/ha	PDI on Cercospora leaf spot					
			Ist Spray		*2nd Spray*		*Pooled data after second spray*	*PDC*
			2018	*2019*	*2018*	*2019*		
T1: Picoxystrobin 7.05% + Propiconazole 11.71% w/w SC	*175*	*875*	*11.3 (19.95)*	*10.3 (18.72)*	*11.7 (19.66)*	*11.0 (19.36)*	*11.4 (19.51)*	*53.3*
T2: Picoxystrobin 7.05% + Propiconazole11.71% w/w SC	*200*	*1000*	*6.7 (16.05)*	*6.2 (14.34)*	*7.7 (14.90)*	*6.3 (14.53)*	*7.0 (14.71)*	*71.3*
T3: Picoxystrobin 7.05% + Propiconazole 11.71% w/w SC	*225*	*1125*	*6.3 (14.90)*	*5.7 (13.76)*	*6.7 (14.57)*	*6.0 (14.18)*	*6.4 (14.38)*	*73.8*
T4: Picoxystrobin 22.52% w/w SC	*100*	*400*	*12.0 (20.85)*	*10.7 (19.06)*	*12.7 (20.26)*	*11.3 (19.67)*	*12.0 (19.84)*	*50.8*
T5: Propiconazole 25 % w/w EC	*125*	*500*	*10.7 (19.82)*	*9.7 (18.11)*	*11.5 (19.06)*	*10.0 (18.43)*	*10.8 (18.75)*	*55.7*
T6: Pyraclostrobin20%w/w WG	*100*	*500*	*12.3 (20.56)*	*11.0 (19.36)*	*12.6 (20.54)*	*11.7 (19.96)*	*12.2 (20.25)*	*50.0*
T7: Hexaconazole 5								

Conclusion

Ready mixture Picoxystrobin 7.05% +Propiconazole 11.71% w/w SC @ 1000 ml/ ha can effectively disease management i.e. frog eye leaf spot and anthracnose/pod blight of soybean. This dose was also found at par and effective compared to higher dose @ 1125 ml/ ha which gave the similar level of disease control. Thidosewas also found better yield which on par with higher dose of test fungicide.

Acknowledgements

The authors are highly thankful to the Zonal Director Research, ARS, Kota for encouragement and providing necessary facilities and other faculty members for facilitating required needs as well as rendering moral support during the entire research work.

Conflict of interest

Authors declare no competing interests.

References

1. Sinclair JB, & Backman PA, Compendium ofSoybean Diseases, 3rd ed., American Phytopathological Society, St. Paul (1989).
2. Hartman GL, Worldwide importance of soybean pathogens and pests. The American Phytopathology USA (2015).
3. Wrather J, Anderson T, Gai J, Arysad D, Pota-Puglia A, Ram H & Yorinori J, Soybean Disease Loss Estimates for the Top 10 Soybean Producing Countries in 1994. Plant Disease, 81 (1997) 107-110.
4. Dashiell K & Akem C, Yield losses in soybeans from frogeye leaf spot caused by Cercospora sojina. CropProtection, 10 (1991) 6: 465-468.
5. Mayee CD & Datar VV, Phytopathometry: A Technical Bulletin-I, Marathawad Agricultural University,Parbhani, India. (1986). p.146.
6. Miles MR, Levy C, Morel W, Mueller T, Steinlage T, Van Rij N, Frederick RD & Hartman GL, International fungicide efficacy trials for the management of soybean rust. Plant disease. 91 (2007) 1450-1458.
7. Sauter, H., Steglich, W., & Anke, T. (1999). Strobilurins: evolution of a new class of active substances. *Angewandte Chemie International Edition*, *38*(10), 1328-1349.
8. Tsuda M, Itoh H, & Kato S, Evaluation of the systemic activity of simeconazole in comparison with that of other DMI fungicides. Pest Manage. Sci. 60 (2004) 875-880.