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Management of powdery mildew of Ber (*Oidium erysiphoides* f. sp. *Ziziphi*) through Noval combined formulations of fungicides

Sushila Yadav, RP Ghasolia, Astha Sharma and Deepak Yadav

Abstract

Ber (*Ziziphus mauritiana* Lamk.) is commercially grown in arid and semi-arid regions of India and other countries. The powdery mildew of ber incited by *Oidium erysiphoides* f. sp. *ziziphi* Yan and Wang (perfect stage: *Microsphaera alphitoides* f. sp. *ziziphi* Griffon and Maublance) is a major disease in India, and causing heavy loss in productivity and quality of fruits and mostly appeared in the last week of October and reaches at peak in the month of December. To manage the disease, five fungicides along with newer combined formulations (tebuconazole 50% + trifloxystrobin 25% WG, metiram 55% + pyraclostrobin 5% WG, fluxapyroxad 250g/l + pyraclostrobin 250 g/l, myclobutanil and azoxystrobin 23% SC) were sprayed twice under natural conditions in orchard. Among these tebuconazole 50% + trifloxystrobin 25% WG (@ 0.1%) was recorded highly effective with minimum disease intensity (6.47%). In conclusion, the use of noval fungicides in combined formulations may be the most powerful tools in combating this disease with economical return.

Keywords: Ber, *Ziziphus mauritiana*, powdery mildew, newer fungicides

Introduction

Ber (*Ziziphus mauritiana* Lamk.) is commercially grown in arid and semi-arid regions of India and other countries. Powdery mildew fungi are obligate parasite (An organism whose growth relies on nutrients from the living host cells) and damage to a wide variety of vegetables, fruits and fields crops. Powdery mildew disease is easily recognized by the presence of white floury patches appearing mostly on leaves and young or immature fruits. These grow superficially as white or creamy mycelial cover on host surface with initial slow growth when congenial conditions prevail during susceptible stage of host. The peak per cent disease index (12.69%) of disease is generally obtained in the month of December, Jat and Goyal, (2009) [6]. Ber is a tropical and sub-tropical fruit native to the northern hemisphere, Lyrene, (1979) [7]. The major production regions for Indian jujube are the arid and semi-arid regions of India. The production ber fruits was 5,13,000 million tonnes with the productivity of 10.26 tonnes/ha in India. In Rajasthan, major production regions for Indian jujube are Bharatpur (mostly Deeg area), Alwar (Tijara and Ramgarh area), Barmer, Sri Ganganagar, Jodhpur, Jaipur (Chomu area), Pali, Chittorgarh and Hanumangarh. In Rajasthan, total area under ber cultivation is 738.4 hectares with an average annual production of 5248 metric tonnes with productivity 7108 kg/ha, Anonymous, (2017- 2018). However, 17.0 -71.0 per cent disease index at fruiting stage of ber was reported due to powdery mildew (*Oidium* spp.) disease in Bijapur, India (Jamadar and Desai (1996) [5]. Jamadar *et al.* (2009) [4] have also been reported 50-60 per cent loss in the fruit yield due to powdery mildew of jujube and reduced market value of the produce. Present study was undertaken to evaluate some newer fungicides against powdery mildew of ber. The disease can be managed by use of fungicides, early planting and by use of resistant cultivars. The disease has been reported to be managed by fungicide application. Chemical control of the disease has been reported to be effective if applied at proper time and different chemicals have been tested for their efficacy against the disease from time to time. The present investigation was therefore undertaken to test the efficacy of new fungicides for effective management of powdery mildew disease of ber.

Materials and Methods

The experiment was conducted in orchard at Horticulture Farm, Jobner during 2020-21, the following five systemic and non-systemic fungicides were evaluated by applying as foliar

spray in RBD with four replications on 10 year old susceptible variety Gola. Two sprays of each fungicide were applied, first spray was done at the time of disease initiation and second spray after 20 days of first spray.

Table 1: List of newer fungicides

S. No.	Common name of fungicide	Trade name	Dose (%)
1.	Tebuconazole 50% + Trifloxystrobin 25% WG	Nativo 75% WG	0.1
2.	Metiram 55% + Pyraclostrobin 5% WG	Cabrio Top 60% WP	0.1
3.	Fluxapyroxad 250 g/l + Pyraclostrobin 250g/l SC	Merivon	0.1
4.	Myclobutanil 10 WP	Index	0.05
5.	Azoxystrobin 23%SC	Mirador	0.1

Result and Discussion

The data revealed (Table 2) that out of five systemic and non systemic newer fungicides (tebuconazole 50% + trifloxystrobin 25% WG, metiram 55% + pyraclostrobin 5% WG, fluxapyroxad 250g/l + pyraclostrobin 250 g/l, myclobutanil and azoxystrobin 23% SC) tested against powdery mildew of ber under orchard conditions, tebuconazole 50% + trifloxystrobin 25% WG was recorded highly effective with minimum disease intensity (6.47%) followed by myclobutanil (8.43%), azoxystrobin 23% SC (10.14%) and fluxapyroxad 250g/l + pyraclostrobin 250 g/l (11.15%) while metiram 55% + pyraclostrobin 5% WG (18.20%) was found least effective. Statistically, all the fungicides were found significantly superior over check. However, myclobutanil was found at par with azoxystrobin while azoxystrobin was at par with fluxapyroxad + pyraclostrobin. Nasir *et al.*, (2017) [9] have been tested

tebuconazole 50% + trifloxystrobin 25% WG and found effective in controlling powdery mildew of mango up to 90.19 per cent. Manjunatha *et al.* (2017) [8] have assessed tebuconazole 50% + trifloxystrobin 25% WG and hexaconazole against powdery mildew of mulberry and found to be more effective in reducing the disease to 74.76 per cent and 66.28 per cent, respectively over control. Amin *et al.* (2018) [2] have also been determined the effectiveness of tebuconazole 50% + trifloxystrobin 25% WG against powdery mildew disease of cumin (*Erysiphe polygoni*) @350g/ha and found effective in reducing disease with higher seed yield. Agrawal *et al.* (2020) [1] tested the comparative efficacy of various newer fungicides in management of powdery mildew disease of garden pea and found that tebuconazole 50% + trifloxystrobin 25% WG (@ 350 g/ha) was highly effective in controlling disease after 1st, 2nd and 3rd, sprays as compared to other fungicides.

Table 2: Efficacy of newer fungicides against powdery mildew of ber

S. No.	Fungicides	Dose (%)	% disease intensity*	% disease control
1	Tebuconazole 50% + Trifloxystrobin 25% WG	0.1	6.47	84.02
			(14.74)	
2	Metiram55% +Pyraclostrobin 5% WG	0.1	18.20	55.04
			(25.25)	
3	Fluxapyroxad 250g/l +Pyraclostrobin 250 g/l	0.1	11.15	72.46
			(19.51)	
4	Myclobutanil	0.05	8.43	79.17
			(16.88)	
5	Azoxystrobin 23% SC	0.1	10.14	74.95
			(18.57)	
6	Control	-	40.48	0.00
			(39.51)	
	S.Em ±		0.69	
	CD (p=0.05)		2.11	
	CV (%)		6.89	

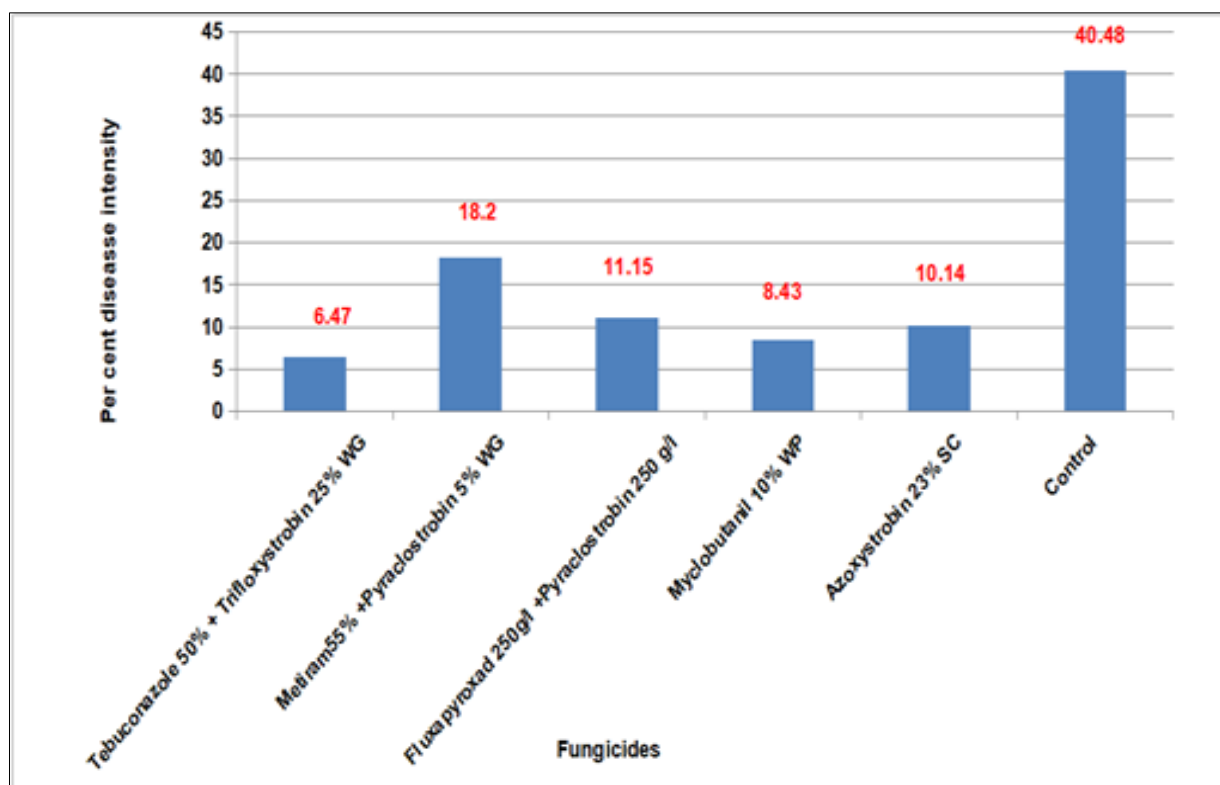


Fig 1: Efficacy of newer fungicides against powdery mildew of ber

Conclusion

Among fungicides, tebuconazole 50% + trifloxystrobin 25% WG was recorded highly effective with minimum disease intensity (6.47%) followed by myclobutanil (8.43%) in controlling powdery mildew disease of ber.

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