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Short Communication

Efficacy of fungicides against black leaf spot of ber caused by *Isariopsis indica*

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Ber (*Zizyphus mauritiana* Lamk.) occupies as an important fruit crop of arid and semi-arid region and its plantation is increasing gradually every year in India. Its cultivation on marginal land with poor soil conditions can give very good revenues with less input. However, the major constraints in higher production are attack of diseases and it has been observed that some of the diseases (leaf spot and fruit rot) and post harvest diseases are concern with productivity and economic yield in this crop.

Black leaf spot is caused by *Isariopsis indica* var. *ziziphi*, one of the serious diseases in ber which can cause an economical yield loss upto 60 per cent. Gupta and Madaan (1977) have reported this disease for the first time from Haryana. It is common in southern and northern parts of the country. Black spots, which are sooty, tuft like circular to irregular black spots develop on leaf surface. During advanced stage, the lower surface of leaves also covered in larger area and corresponding upper surface shows brownish discoloration. In severe infection, leaves and twigs are dried rapidly causing necrosis and browning.

The experiments were conducted from 2005 to 2009 on the effect of fungicides, botanicals and biocontrol agents against black leaf spot disease of ber in B2 block of Regional Research Station, Aruppukottai. There were ten treatments replicated thrice by adopting randomized block design. The treatment comprises of,

1 Mancozeb 0.2%
2 Carbendazim 0.1%
3 Copper oxychloride 0.2%
4 Tilt 0.1%
5 Score 0.1%
6 NSKE 5.0%
7 Neem oil 3.0%
8 Untreated control
9 *Prosopis julifera* 10% LE
10 *Trichoderma viride* 0.2%

The black leaf spot symptoms usually occur during November December. The first foliar spray was given immediately after the occurrence of black leaf spot and the second spray was given at an interval of 10 days after the first spray. The disease intensity was assessed based on the grade (0 to 4) and the per cent disease index was calculated by using the formula,

$$\text{Per cent Disease Index (PCI)} = \frac{\text{Sum of numerical ratings}}{\text{Total number of ratings}} \times \frac{100}{\text{Maximum grade observed}}$$

The per cent disease reduction over the control was also calculated by using the formula,

$$\text{Per cent disease reduction over control} = \frac{\text{Control} - \text{Treatment}}{\text{control-treatment}} \times 100$$

The pooled data (2005 2009) were statistically analysed by following the method of Gomez and Gomez (1984).

The fungicides, bioagents and botanicals have been evaluated for their efficacy against this disease and among them, Propiconazole (Tilt) and Difenconazole (Score) each at 0.1per cent were found effective in reducing the disease index to 10.7 and 11.6 PDI, respectively as against untreated control which recorded 40.8 PDI (Table 1). Two foliar sprays of either Propiconazole (Tilt) or Difenconazole (Score) at 0.1 per cent given immediately after the disease appearance and another at 10 days interval which were found effective recording 74 and 72 per cent disease reduction over control.

The results were found similar with the findings of Kumar and Godara (2008) revealed that two foliar sprays of Difenconazole (Score) at 0.1 per cent was found effective in reducing the intensity of *Alternaria* leaf blight of cumin followed by 0.1 per cent Tilt (Propiconazole). Similarly the *in vitro* results of Nallathambi and Thakore (2003) supported that propiconazole and tridemorph completely inhibited the mycelial growth of *Alternaria* causing fruit rot in ber with the inhibition range of 72.52 to 98.63 per cent.

Table 1. Effect of fungicides, biocontrol agents and botanicals on leaf spot of ber.
(Pooled mean of 2005 2009)

Treatments	Black leaf spot (PDI)*	Per cent reduction over control
1. Mancozeb 0.2%	22.8	44.1
2. Carbendazim 0.1%	17.8	56.3
3. Copper oxychloride 0.2%	19.3	52.6
4. Propiconazole 0.1%	10.7	73.7
5. Difenconazole 0.1%	11.6	71.5
6. Neem Seed Kernel Extract 5.0%	21.4	47.5
7. Neem oil 3.0%	19.9	51.2
8. Untreated control	40.8	-
9. *Prosopis julifera* 10% LE	25.8	36.7
10. *Trichoderma viride* 0.2%	23.7	41.9
CD (P=0.05)	**0.45**	

References

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