Management of Foliar Diseases of Forage Sorghum

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Management of foliar diseases of forage sorghum

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Introduction

Sorghum (*Sorghum bicolor* L. Moench.) is an important food, feed, fodder and fuel crop grown in India. It forms staple food for poor class of people living in the dry tracts of the country. The crop is mostly grown during *Kharif* and *Rabi* seasons in Maharashtra, Karnataka, Andhra Pradesh and Madhya Pradesh states. It is also very popular as green forage in most parts of north India and nearly 2.5 million ha area is planted during *kharif*. In summer, under irrigated conditions, multicut sorghum is very popular. Forage sorghum is characterized by quick growth, high biomass accumulation, dry matter content and wide adaptability beside drought withstanding ability. It is also suitable for silage and hay making. The losses caused by diseases were estimated to be 12% (Frederiksen, 1986). With the change in climate, cropping pattern and with the introduction of high yielding varieties and hybrids of sorghum for cultivation, the disease scenario has also changed. Forage sorghum is suffered by charcoal rot, downy mildew, foliar diseases like zonate leaf spot, anthracnose and leaf blight. The disease is serious both in grain as well as fodder sorghum as it reduces yield and quality of fodder considerably. Disease resistance, cultural, biological and fungicides have been utilized to manage sorghum diseases (Frederiksen, 2000). The present study was undertaken to find out suitable management practice for foliar diseases of forage sorghum.

Materials and Methods

The experiment was conducted in the year 2012 and 2013 of *Kharif* season at four different locations of All India Coordinated Research Project on Forage Crops namely, Indian Grassland and Fodder Research Institute, Jhansi. Orissa University of Agriculture & Technology, Bhubaneswar, Punjab Agricultural University, Ludhiana and CSK Himachal Pradesh Agricultural University, Palampur. The experiment was laid out in randomized block design with 10 treatments namely T_1 = Seed treatment with carbendazim (2 g/kg of seed), T_2 = Seed treatment with *T. viride* (5g/kg of seed), T_3 = Two foliar sprays of *T. viride* (0.5%), T_4 = Two foliar sprays of propiconazole (0.1%), T_5 = Two foliar sprays of copper oxychloride (0.3 %), T_6 = Seed treatment with carbendazim (2 g/kg of seed) + Two foliar sprays of propiconazole (0.1), T_7 = Seed treatment with *T. viride* (5g/kg of seed) + Two foliar sprays of propiconazole (0.1 %), T_8 = Seed treatment with carbendazim (2 g/kg of seed) + Two foliar sprays of copper oxychloride (0.3%), T_9 = Seed treatment with *T. viride* (5g/kg of seed) + Two foliar sprays of copper oxychloride (0.3 %) and T_{10} = Control and replicated 3 times for each treatment. The size of plot was 4 m x 3 m, row to row spacing was 30 cm. Recommended agronomic practices including fertilizer doses and intercultural operations were adopted. Foliar applications of fungicides were given at evening time. The spray was applied with the help of a knapsack sprayer at evening. All the 10 plots of each replication were treated at a time avoiding the drifts of spray fluid on neighboring plots.

Results and Discussion

The results of the trial revealed that all the treatments were found to be significantly effective to reduce disease severity compared to control plot where no management practice was followed. At all the locations lowest disease severity was recorded in treatment T_6 where, seed treatment with carbendazim @ 2 g/kg of seed + two foliar sprays of propiconazole @ 0.1% was applied. However, it was at par with treatment T_7 where seed treatment with *T. viride* @ 5g/kg of seed + two foliar sprays of propiconazole @ 0.1 % was applied at IGFRI, Jhansi., OUAT, Bhubaneswar and PAU, Ludhiana. This variation in result may be accredited to variation in pathogen type and environment, both in micro and macro level. From the above results it can be concluded that the efficacy of foliar spray of fungicide propiconazole and seed treatment with carbendazim or *Trichoderma viride is* significantly effective against foliar diseases of forage sorghum (Table 1).The findings may be further supported by work done by Harlapur *et al.*, (2007) who reported that propiconazole @ 0.1 per cent was effective, against *Exserohilum turcicum* in Maize. Jadhav *et al.*, (2009) evaluated bio control activity

of *Trichoderma harzianum, Trichoderma viride, Pseudomonas fluorescens* and *Bacillus subtilis* against *Colletotrichum gloeosporioides* Penz. and reported that bioagent *Trichoderma viride* showed maximum growth reduction in growth of *C. gloeosporioides* (84.26 %) than all other bio-agents. Jagtap *et al*. (2013) evaluated efficacy of ten fungicides *in vitro* with three different concentrations against Colletortricum *capsici* (Syd.) Butler and Bisby by poisoned food technique and reported that propiconazole (0.05%) was found to be significantly superior among all the treatments against *Colletortricum capsici* (Syd.) Butler and Bisby. Among different bio-agents namely, *Trichoderma viride, Gliocladium* spp., *Trichoderma harzianum, Trichoderma koningii* and *Pseudomonas fluorescens* used *T. harzianum* was observed more the most effective than other with percent inhibition of 53.33 % followed by *T. viride* with 52.32 %. Likewise Jegathambigai *et al*. (2009) also reported that in the field trials, seed treatment with a spore suspension of *Trichoderma* completely eliminated leaf spot disease in *Chrysalidocarpus lutescens caused by Helminthosporium*.

Table 1: Efficacy of various treatments against leaf blight disease severity at different locations.

Treatments	**Leaf blight disease severity (%)**			
	Jhansi	**Bhubaneswar**	**Ludhiana**	**Palampur**
T_1: Seed treatment with carbendazim @ 2g/kg seed	6.6	8.9	57.0	28.7
T_2: Seed treatment with @ *T. viride* 5g/kg seed	11.6	10.4	62.5	33.5
T_3: Two foliar sprays of @ *T. viride* 0.5%	15.0	7.9	59.0	34.3
T_4: Two foliar sprays of propiconazole @ 0.1%	5.0	4.5	35.0	19.0
T_5: Two foliar sprays of copper oxy chloride @ 0.3%	13.3	6.4	69.5	64.5
T_6: T_1 + two foliar sprays of propiconazole @ 0.1%	3.3	2.3	33.5	12.8
T_7: T_2 + two foliar sprays of propiconazole @ 0.1%	8.3	4.2	35.5	16.3
T_8: T_1 + two foliar sprays of copper oxy chloride @ 0.3%	10.0	5.4	65.0	61.4
T_9: T_2 + two foliar sprays of copper oxy chloride @ 0.3%	15.0	5.8	69.0	55.5
T_{10}: Control	18.3	19.0	73.0	74.4
CD (p=0.05)	8.0	2.3	8.93	2.93

Conclusion

Forage sorghum suffers from foliar diseases like anthracnose, zonate leaf spot and various types of leaf blights.The present case of study was conducted to manage above mentioned foliar diseases of forage sorghum at different locations of India in a collaborative approach. The result revealed that in all tested locations disease severity was lowest in treatment where, seed treatment with carbendazim @ 2 g/kg of seed + two foliar sprays of propiconazole @ *0.1%* was applied.

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