

Original Research Article

Evaluation of Fungicides against Paddy Stem Rot

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ABSTRACT

Keywords

Disease incidence, fungicides, stem rot and yield

Fungicides were tested against stem rot of paddy during *kharif*, 2016-17 at Agricultural Research Station, Gangavathi with randomized complete block design (RCBD) consisting of ten treatments replicated thrice on popular but susceptible variety BPT-5204. The fungicides evaluated were applied as foliar spray just after the appearance of stem rot disease. The total numbers of plants present and number of plants showing stem rot symptoms were counted and recorded. The results revealed that, all the fungicides showed significantly superior compared to control. Three sprays of fungicide Thiophanate methyl 70% WP @ 1gm/l found to be superior with lowest disease incidence (11.02 %) and highest grain yield (66.10 q/ha) followed by spray of Tebuconazole 50% + Trifloxystrobin 25% WG@ 0.4gm/l and Propiconazole 25% SC @1ml/l. The highest disease incidence was recorded in untreated control with the incidence of 37.77 per cent with lowest grain yield of 40.80 q/ha.

Introduction

Rice (*Oryza sativa* L.) is not only a staple food crop for more than 60 per cent of the world's population, but also a way of life in Asia, with more than 250 million farm households dependent on the crop for their livelihood. Rice is one of the diverse crops grown in different agro-climatic conditions of the world, grown on an area of 158.85 mha with production and productivity of 738.2 mt and 4647 kg ha⁻¹, respectively (Anon., 2015b). India has the largest area under rice cultivation and positioned second rank in production after China with a total annual production of 106.54 mt from an area of 43.95 mha and with a productivity of 2424 kg ha⁻¹. In Karnataka it is grown in an

area of 1.42 mha with an annual production and productivity of 3.57 mt and 2464 kg ha⁻¹, respectively (Anon., 2015a). Rice suffers from many diseases, among them soil borne diseases cause major economic losses to the crop. The minor diseases *viz.*, stem rot, false smut, bakanae, sheath rot and grain discoloration which were of less significance earlier, are now emerging as serious threat and considered as future diseases in rice cultivation. Stem rot disease caused by *Sclerotium oryzae* it is an important fungal disease of rice, which was earlier considered as a minor disease has now became one of the major limiting factors in rice cultivation. Although, the disease manifests from panicle initiation

stage but the conspicuous diagnostic symptoms are usually seen at later growth stages of crop *i.e.*, from milky to grain hardening stage. In severe cases, lodging of the crop may occur and sclerotia of the pathogen are found within the host tissues. The disease is prevalent in Punjab, Andhra Pradesh, Tamil Nadu, Bihar, Uttar Pradesh and Madhya Pradesh. Stem rot of rice caused by *Sclerotium oryzae* is becoming a serious problem of rice cultivation in the Indian subcontinent (Singh *et al.*, 2002). Singh and Devi (1999) reported the occurrence of the stem rot of rice in Manipur in almost all the varieties cultivated. During 2012-13, this disease caused about 30 per cent yield loss on paddy cultivar BPT-5204 in North eastern part of Karnataka (Pramesh *et al.*, 2014). This disease was also reported to be the major constraint for paddy cultivation in Andhra Pradesh state in recent years (Gopika *et al.*, 2016).

Sharma and Verma (1985) conducted pot experiment where carbendazim and thiophanate methyl were found to be effective in controlling the stem rot of rice disease and increased the yield. Ram Singh *et al.* (1988) concluded that application of thiophanate-methyl most effective an economical followed by carbendazim in reducing the paddy stem rot disease incidence.

Gopika *et al.* (2011) evaluated fungicides on the disease severity in rice cv. MTU 3626 and found treatment consisting of propiconazole @100 ppm followed by treatment consisting of hexaconazole @ 200 ppm along with bioagent was the effective with low disease index of 0.6 and 1.8 per cent, respectively. Though several chemicals *viz.*, carbendazim, validamycin A, edifenphos, benomyl, thiophanate-methyl, difenoconazole and tricyclazole followed foliar spray of bioagents has been found to be effective against stem rot (Singh *et al.*,

2002; Sumitra *et al.*, 2011; Kumar and Sunder, 2015). Considering occurrence of stem rot in devastating form on important crop with reports of severe yield loss in different parts is the major concern and is a severe threat in the successful cultivation of rice. Hence, the present investigations carried out to know the efficacy of different fungicides on the disease incidence and yield of paddy.

Material and Methods

A field experiment was carried to know the bio efficacy of different fungicides against stem rot of paddy during *kharif*, 2016-17 at Agricultural Research Station, Gangavathi. All standard agronomic practices were followed as per the Recommended Package of Practices of University. The experiment was laid out in randomized complete block design (RCBD) with transplanting 30 days old seedling of popular but susceptible variety BPT-5204 with ten treatments and was replicated thrice in plot size of 5 X 4 m². The fungicides were applied as foliar spray just after the appearance of stem rot disease at mid and maximum tillering stage in the main field. The plots were inspected regularly to see the disease development and further two more spray were applied at an interval of 15 days.

The plants were visually examined for characteristic stem rot lesions during mid tillering, flowering, maturity and harvesting stages of the crop following the procedure given by Ou (1985). The observations such as total numbers of plants present and number of plants showing stem rot symptoms due to *S. oryzae* in five spots of each treatment were counted and recorded after each spray and finally one week before harvest. Later, the per cent stem rot incidences were calculated using following formula (Wheeler, 1969).

Statistical analysis

Statistical analysis was carried out as per the procedures given by Panse and Sukhathme (1985). Actual data in percentage were converted to arc sine values, before analysis according to the table given by Snedecor and Cochran (1967).

Results and Discussion

The results revealed that, all the fungicides showed reduced stem rot disease incidence and significantly superior compared to control during *kharif* 2016. Three sprays of fungicide Thiophanate

methyl 70% WP @ 1gm/l of starting from disease initiation was significantly superior to other treatments in controlling the disease incidence (11.02%) with highest grain yield (66.10 q/ha). The treatment consisting spray of Tebuconazole 50% + Trifloxystrobin 25% WG@ 0.4gm/l at same interval recorded disease incidence of 12.72 per cent with grain yield of 64.50 q/ha, followed by three sprays of Propiconazole 25% SC @1ml/l which recorded 12.98 per cent and 64.20 q/ha of disease incidence and grain yield, respectively. These next best two treatments are on par with each other and significantly superior over other in reducing disease and yield.

Table.1 Effect of fungicides on stem rot and yield of rice during *kharif* 2016

Treatment details	Disease incidence (%)	Yield (q/ha)
T ₁ -Hexaconazole 4% + Zineb 68% WP @ 2gm/l	19.43 (26.13)	55.80
T ₂ - Tebuconazole 50% + Trifloxystrobin 25% WG@ 0.4gm/l	12.72 (20.85)	64.50
T ₃ -Propiconazole 25% SC @1ml/l	12.98 (21.15)	64.20
T ₄ -Thiafluzamide 24% SC @1.5ml/l	14.11 (22.06)	59.30
T ₅ -Mancozeb 63% + Carbendazim 12% WP @ 2gm/l	22.41 (28.23)	50.20
T ₆ -Azoxytrobin 23% SC @ 1ml/l	17.84 (24.95)	56.00
T ₇ - Thiophanate methyl 70% WP @ 1gm/l	11.02 (19.37)	66.10
T ₈ -Hexaconazole 5% SC @ 1ml/l	20.68 (22.54)	54.50
T ₉ -Tebuconazole 25.9% EC @ 1ml/l	16.49 (22.93)	56.90
T ₁₀ -Untreated Control	37.77 (37.88)	40.80
S. Em ±	0.49	0.74
CD at 5%	1.52	2.24

The highest disease incidence was recorded in untreated control with the disease incidence of 37.77 per cent with lowest grain yield of 40.80 q/ha. Several fungicides such as Benomyl, Edifenphos, Thiophanate Methyl, Propiconazole have been found to be effective in reducing stem rot disease severity under field condition (Singh *et al.*, 2002; Kumar *et al.*, 2003; Gopika *et al.*, 2016). These results are similar to those of previous study, which demonstrated that fungicides can be applied over a range of growth stages and obtain satisfactory control (Groth, 2008). The results are in agreement with Gopika *et al.* (2011), they found reduced incidence of stem rot disease with fungicide application along with bioagents. This clearly indicated that there was growth promotion of rice and inhibition of pathogen at early stages of crop growth. Fungicides have been used successfully to control fungal diseases of rice.

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