Research Article

Efficacy of Tebuconazole 25.9 EC against Cumin Blight (*Alternaria brunsii*)

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Abstract

A field experiment on the efficacy of tebuconazole 25.9 EC against cumin blight was conducted at farmers as well as the instructional farm of Krishi Vigyan Kendra, Jalore (Agriculture University, Jodhpur) to find out the bio-efficacy of tebuconazole 25.9 EC @ 1ml/lit. Experiment was completed with two treatments **T_1**: Carbendazim 12 + Mancozeb 63 % @ 2g/litre and **T_2** Tebuconazole 25.9 EC @ 1ml/litre of water. Experiments were conducted against the cumin blight during *rabi* season in both years. The incidence of blight appeared in the last week of January and reached its peak in the second week of February. The minimum disease intensity of cumin blight was found in the T_2 (Tebuconazole 25.9 EC @ 1ml/liter of water) with 6.00 percent, while 39.00 per cent disease intensity was observed in T_1 (Carbendazim 12 + Mancozeb 63 % @ 2g/liter). The economic yield of cumin was maximum increased in T_2 with 8.90 q/ha it is higher as compared to T_1.

Keywords: *Alternaria burnsii*, efficacy cumin, tebuconazole

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Introduction

Cumin or Jeera (*Cuminum cyminum* L.) is an important seed spices crop and it belongs to the family Umbelliferae. It is one of the popular seed spices and consumed at worldwide. Cumin is standing at the second position in the world after black pepper. Seeds of cumin are used as a spice throughout the world for their distinctive aroma. Cumin is the native of the southern Mediterranean area, the deserts of Egypt and other Arabian countries, and Central Asia (Turkestan). It is mainly grown in India, China, Indonesia, Iran, Japan, Morocco, Southern Russia, Syria, and Turkey. In India, it is cultivated in the states of Rajasthan, Gujarat, Madhya Pradesh, Haryana, Punjab, Uttar Pradesh, and Bihar. Rajasthan and Gujarat are the major cumin producing states in India and it is also grown in Uttar Pradesh. India covering the largest area under cumin production; the level of production and the total area under cumin cultivation has increased significantly during the last few years. In India, it's production is concentrated mainly in Rajasthan, Gujarat, and some parts of Uttar Pradesh only.

Cumin production is greatly affected by biotic and abiotic stresses, among biotic stresses pests and diseases are the major factor for low productivity. Cumin is highly susceptible to devastating diseases *viz.*, Fusarium wilt, Alternaria blight, powdery mildew, etc., which are the major yield-reducing factors. Among the major diseases of cumin, Alternaria blight caused by *Alternaria burnsii* is the most devastating disease in major cumin-growing areas in Rajasthan and Gujarat [1]. The disease was first reported in Maharashtra and appeared in sporadically. Blight (*Alternaria burnsii*) was reported first time in Gujarat [2] and now, it is a common disease in all cumin-growing areas in the state [3]. Now it is widely occurring in Rajasthan during the Rabi Season. The crop suffers from blight due to *Alternaria burnsii* [4-5]. *A. burnsii* affects cumin plant only after the flowering stage and causes complete failure of the crop in some years depending on climatic conditions [6]. *A. burnsii*, *A. raphani*, and *Fusarium spp.* were found to be associated with cumin plants in Turkey [7]. Blights appear as very minute brownish necrotic spots on leaves and stems, which later turn blackish, whereby the stem tips bend downwards. Affected plants are unable to produce economic yield. In some cases, dark-colored light-weight seeds are produced.

Warm and cloudy weather is the favorable conditions for the spreading of this disease and spread in the whole field within a short period [8].

The severity of this disease is varied from 16- 65 percent [9]. The pathogenic fungi attack leaves and stems, and foliar spraying with fungicides may be beneficial in controlling the disease. The application of fungicide and botanicals resulted in significantly greater Alternaria blight disease control [10]. Few fungicides were reported earlier

for the management of the disease [11], but the disease is still causing severe yield losses under favorable environmental conditions. Tebuconazole 25.9 EC @ 1ml/liter was causing the reduction in disease severity.

Material Methods

The experiment was conducted at Farmer's field and instructional farm of KVK, Jalore, during the Rabi season of 2018-19 and 2019-20 to find out the efficacy of tebuconazole 25.9 EC @ ml/liter against the *Alternaria* blight of cumin. Followed all agronomical practices during field preparation and carried out by Randomized Complete Block Design with ten replications. The size of the plots was 3.0 m × 4.0 m and plant spacing was 30 cm × continuous sowing. Two fungicidal treatments (T_1:Carbendazim 12 + Mancozeb 63 @ 2g/litre and T_2:Tebuconazole 25.9 EC @ 1ml/litre) were tested against the *A.* blight. The fungicides were applied twice at 15 days intervals from disease initiation (flowering stage). Observations from vegetative to maturity stage were regularly observed and mean data was prepared. Data were recorded on blight, the number of infected plants, and no. of healthy plants. The economical yield was also recorded in both treatments.

Table 1 Treatment Details

S.No.	Treatments	Treatment Details
1.	T_1	Carbendazim 12 + Mancozeb 63 @ 2 g/litre
2.	T_2	Tebuconazole 25.9 EC @ 1ml/litre

Table 2 Trial Details

S.No.	Crop	Variety	Treatments	Replication
1	Cumin	GC-4	T_1:Carbendazim 12 + Mencozeb 63 @ 2g/litre T_2:Tebuconazole 25.9 EC @ 1ml/litre	10

Results and Discussion

Results on the effect of fungicides against *Alternaria* blight of cumin are presented in Tables 3 and 4.

Effect of fungicides in managingAlternaria blight of cumin

Results on the effect of fungicides in managing *Alternaria* blight of cumin are presented in **Table 3**. *Alternaria* blight severity was significantly reduced by the tebuconazole 25.9 EC @ 1 ml/liter. The severity ranged from 6 to 39 percent. The lowest disease infestation (6%) was observed in T_2 while the maximum severity (39 %) was recorded in T_1.

Table 3 Effects of Fungicides on Alternaria blight

Treatment	No.of Replication	Incidence of blight (%)
T_1:Spray of carbendazim 12 %+ mencozeb 63 @ 2 ml/litre	10	39
T_2:Spray of Tebuconazole 25.9 EC @ 1 ml/litre		9

Effect of fungicides on seed yield of cumin

The maximum seed yield of cumin was observed in T2 (8.90q/ha) whereas the lowest in T1 (6.00) is presented in **Table 4**.

Table 4 Effects of Fungicides on Cumin Yield

Treatment	No.of Replication	Yield (q/ha)
T_1:Spray of carbendazim 12 %+ mancozeb 63 @ 2 ml/litre	10	6.00
T_2 :Spray of Tebuconazole 25.9 EC @ 1 ml/litre		8.90

Many fungicides against *A. burnsii* and found that hexaconazol, tebuconazole, and mancozeb were proved most effective in terms of disease severity. Similarly, tebuconazole (0.1%) + Azadirachtin (0.2%), and tebuconazole were tested on pot-grown plants, and both were found the most effective against the *Alternaria* blight of cumin. The foliar spray of tebuconazole (0.05% concentration) under field conditions minimized the incidence of Alternaria blight of cumin up to 71.9 per cent. The lowest disease index was found with the treatment hexaconazole + *B. subtilis* (10.8%)

and the disease suppression over control was 79.4%. This was followed by hexaconazole (16.6%) which was on par with tebuconazole (18.3%) and propiconazole (19.1%) [11]

Conclusion

It may be concluded that foliar application of tebuconazole 25.9 EC @ 1 ml/liter at 15 days intervals reduces the severity of *Alternaria* blight and increased the seed yield of cumin.

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