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Identification and Management of Ascochyta Blight of Chickpea (*Cicer arietinum* L.) Prevalent in Bundelkhand Region of Uttar Pradesh, India

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ABSTRACT

Field investigations were carried out during *rabi* (October–March), 2020–21 and 2021–22 in major chickpea-growing areas of Banda, Mahoba, Hamirpur and Chitrakoot districts of Bundelkhand region of Uttar Pradesh, India to find out a suitable management strategy for ascochyta blight disease in standing crop conditions. A survey study was carried out during January–February, 2022 to find out the occurrence of ascochyta blight. The overall severity of ascochyta blight observed in four surveyed districts ranged between 15.82–17.50%. The pathogen exhibited floccose and white to pale olive colored colony with irregular white periphery on potato dextrose agar media after 14 days of incubation. Maximum growth (46.2 mm) of mycelia was recorded on oatmeal agar media followed by the growth of 43.2 and 40.4 mm obtained in malt extract agar media and potato dextrose agar media, respectively. In standing crop conditions, two sprays of combination of Tebuconazole 50%+Trifloxystrobin 25% WG @ 0.1% gave the maximum reduction in disease incidence (47.05%) and disease severity (63.86%) along with the highest enhancement in grain yield (54.81%), number of pods plant^{-1} (55.56%) and 100 grain weight (62.28%). Results revealed that ascochyta blight of chickpea was prevalent in Bundelkhand region of Uttar Pradesh. Oatmeal agar medium can be used for cultivation of *Ascochyta rabiei*. In field, ascochyta blight can be managed by two sprays of combination of Tebuconazole 50% + Trifloxystrobin 25% WG @ 500 g ha^{-1} at symptoms initiation and after 15 days of first spray.

KEYWORDS: Ascochyta blight, *Ascochyta rabiei*, Bundelkhand, chickpea, occurrence

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1. INTRODUCTION

Pulses have been one of the most important constituents of the Indian crops and one of the less expensive sources of protein. Among pulses, chickpea (*Cicer arietinum*) is preferred to food legumes because of its multiple uses across the world (Mohanty and Satyasai, 2015). Chickpea is a self-pollinated annual legume which ranks second worldwide after soybean as a food legume crop (Varshney et al., 2013). It is cultivated mainly in arid and semi-arid areas of more than 50 countries across Asia, Africa, Europe, Australia, North America and South America (Chandora et al., 2020).Worldwide, 17.2 mt chickpea is produced from about 17.8 mha land which is 15% of total pulse area (Gayacharan et al., 2020).In India, chickpea is grown in an area of 9.99 mha with a production of 11.91 mt and productivity of 1192 kg ha^{-1}during 2020–21. On a 6.11 la area, Uttar Pradesh produced 7.59 lt of chickpea with productivity of 1243 kg ha^{-1} during 2020–21 (Anonymous, 2021). Bundelkhand region of Uttar Pradesh state in central India is a traditionally important chickpea-growing region (416,007 ha) that produces about 1,48,408 t of chickpea. In this region, chickpea crop holds a prominent position in all the major cropping sequences and mostly grown under rainfed mono-cropped conditions. Poor seed replacement and low productivity levels, high incidence of pod borer and root disease coupled with several abiotic stresses limit the average chickpea productivity in the region to 400 $kgha^{-1}$, against the 1037 kg ha^{-1} of national average (Sah etal.,2021, Ali and Gupta, 2012, Singh et al., 2022). The crop is reported to be susceptible to more than a dozen of well documented pathogens (Nene and Reddy, 1987, Cother, 1977). Chickpea is attacked by to more than a dozen well-known diseases. Among them, *Ascochyta* blight (*Ascochyta rabiei* Pass.) is one of most severe diseases of chickpea (Nene, 1982). The pathogen can also infect wild Cicer species (Collard et al., 2001).The disease has been reported from 34 countries across the six continents and is a major disease of west Asia, northern Africa and southern Europe (Nene and Reddy, 1987, Kaiser et al., 2000, Pande et al., 2005, Labdi et al., 2013,Sun et al., 2016, Tadesse et al., 2017). *Ascochyta* blight symptoms appeared on all aerial plant parts including leaves, stems, and pods. Necrotic lesions along with tiny black spots called pycnidia grouped in concentric rings are present on infected plant parts. Stem breakage, pod infection, girdling & collapse of twigs are also occurred in diseased plants. Secondary infection is by air borne conidia found inside the pycnidia (Reddy and Singh, 1990). It can cause yield loss of up to 100% (Pande et al., 2005). *A. rabiei* can be grown on different media and its rate of growth varied from media to media (Harveson et al., 2011). Host plant resistance against ascochyta blight has recently improved in a number of chickpea genotypes, but they still needed to treated with fungicides during the blooming and pod-forming stages (Chongo and Gossen, 2001). The host resistance mechanisms in newly developed chickpea varieties are also broken down by the *A. rabiei* since it is constantly evolving (Chen et al., 2004, Gan et al., 2006, Kanouni et al., 2011). Application of fungicides viz., chlorothalonil, trifloxystrobin50%WG, sulphur, propiconazole, mancozeb etc. are effective in control of ascochyta blight (Bashir and Ilyas 1983, Bashir et al., 1987, Nene and Reddy 1987, Demirci et al., 2003). Keeping the importance of chickpea as well as the associated disease in view, the present study was, therefore, conducted to find out the status of *Ascochyta* blight disease in Bundelkhand region of Uttar Pradesh, cultural characteristics of pathogen and its effective management strategies in standing crop conditions.

2. MATERIALS AND METHODS

2.1. Survey for occurrence of ascochyta blight

Survey was carried out during January–February, 2022 to determine the status of ascochyta blight in major chickpea-growing regions of Banda, Hamirpur, Chitrakoot and Mahoba districts of Bundelkhand region of Uttar Pradesh, India (Table 1). The severity of the disease was recorded during the flowering or podding stage of the crop. To record the disease severity, five fields from each location were selected at random. For the observations, ten plants $plot^{-1}$ were selected at random. Each plant was rated based on the per cent area of infection covered on leaves, stem, and other upper plant parts by using the rating scale. The plots were scored on 1–9 scale (Pande et al., 2011) as soon as the blight symptoms appeared in the field. The disease severity was calculated using standard formula given by McKinney (1923).

2.2. Cultural and morphological characterization of the pathogen

Chickpea leaves exhibiting typical symptoms of ascochyta blight usually with necrotic elongated spots (Figure 1) were collected from the experimental field of College of Agriculture, Banda University of Agriculture and Technology, Banda, Uttar Pradesh during *rabi*, 2021–22 crop season.

To isolate the *A. rabiei* fungus, infected leaf samples were surface sterilized with sodium hypochlorite (0.5%) for 2 m, and washed twice with sterilized distilled water. Samples were plated on potato dextrose agar (PDA) medium under aseptic conditions. Plates were incubated for 8 days at 20–22°C and thereafter the mycelial growth in these plates was observed. The pathogen was sub-cultured aseptically on the PDA medium and slants in test tubes by using single hyphal-tip culture technique (Brown, 1924). The isolated fungus was identified on the basis of cultural characters observed right from initiation of growth up to 14 days. Slides were prepared with cotton blue as stain and examined under compound microscope for morphological characteristics of

Table 1: List of districts, blocks and villages surveyed for occurrence of *Ascochyta* blight

District: Hamirpur		District: Banda		District: Chitrakoot		District: Mahoba	
Block	Village	Block	Village	Block	Village	Block	Village
Gohand	Akauna	Badokhar Khurd	Chahitara	Ramnagar	Amawan	Jaitpur	Akuna
	Aunta		Chamraha		Bandhi		Badkhera
Rath	Bhaderwara	Bisanda	Akona	Mau	Ahiri	Kabrai	Atghar
	Akouni		Bhadawal		Bhitari		Banni
Muskara	Ainjhi	Jaspura	Barehta	Manikpur	Aruwara	Panwari	Amanpura
	Bagherka		Galauli		Bagrehi		Churari

Figure 1: Symptoms of ascochyta blight on chickpea under natural field conditions

the fungus. Single pycnidium was purified from plates and stored on PDA for pathogenicity test (Farahani et al., 2019).

2.3. Evaluation of different media for growth of ascochyta rabiei

The mycelial growth and colony characters of *Ascochyta rabiei* were studied on 4 solid media including PDA (Peeled potato - 200 g, Agar-agar - 20 g, Dextrose - 20 g and Distilled water - 1000 ml), oat meal agar (Oat meal- 20 g, Agar-agar- 18 g and Distilled water - 1000 ml), V8 juice agar (V-8 juice - 24.3 g, Agar-Agar- 20 g and Distilled water- 1000 ml) and malt extract agar (Malt Extract- 30 g, Mycological peptone- 5 g, Agar-15 g and Distilled water- 1000ml). A set of 6 petriplates (90 mm diameter) sterilized in hot air oven were maintained for each medium. All the media were sterilized in an autoclave at 15 psi for 15 m at 121˚C. Twenty ml sterilized, melted but cooled medium was aseptically poured in each Petriplate in a laminar air flow chamber. The medium plates were allowed to solidify before inoculation. Mycelial discs were aseptically cut by a sterilized 5 mm cork borer, from the margins of the 15 days old culture. A single disc was placed in the center of each Petriplate aseptically, using sterilized inoculating needle. The disc was kept in such a manner that the mycelial portion of the disc touched the surface of medium. The inoculated plates were incubated for 21 days at 20±2˚C for further growth and development. Colony diameter/ radial growth of mycelia and colony color were observed and recorded after 3 weeks of incubation. The data on radial growth was compared with growth on other medium and analyzed statistically.

2.4. Evaluation of fungicides against Ascochyta blight disease

The present investigation (Figure 2) on chemical management of ascochyta blight disease of chickpea was conducted in the experimental field of Banda University of Agriculture and Technology, Banda, Uttar Pradesh, India which is located at 25°4'N latitude, 80°3'E longitudes and at an altitude of 141 m above the mean sea level. Field experiments were conducted during the two successive crop seasons *viz, rabi* 2020–2021 and *rabi* 2021–22 (October to March) to study the efficacy of different fungicides on ascochyta blight. The chickpea cultivar "GNG 1958" was used as test variety and sown @ 90 kg ha^{-1} with spacing of 30×10 cm^2. The crop was sown in 1st week of November and harvested in the last week of March in both years. The soil of experimental field was silty clay loam and the NPK fertilizers were applied @ 20:50:00 kg ha^{-1}, respectively at the time of last harrowing besides ensuring recommended

Figure 2: Field trial: evaluation of fungicides against ascochyta blight disease of chickpea.

agronomy package of the crop. Sprinkler irrigation was given at branching and pod formation stages. The mean of maximum and minimum temperature, relative humidity and average rainfall from November, 2020 to March, 2021 was 26°C, 12.88°C, 85.58%, 46.07 and 3.57 mm, respectively, whereas it was 23°C, 18.76°C, 85.99%, 45.20% and 6.89 mm, respectively, during the months from November, 2021 to March, 2022. A set of five fungicides viz., three levels of combination of Tebuconazole 50%+Trifloxystrobin 25% WG @ 0.06, 0.08 and 0.1%, Tebuconazole 250 g l^{-1} EC @ 0.1%, Trifloxystrobin 50%WG @ 0.05%, Chlorothalonil 75%WP @ 0.2% and Sulphur 80%WP @ 0.25% popularly used for management of foliar diseases were evaluated against *Ascochyta* blight disease of chickpea under natural field conditions during both the seasons to find out an effective fungicide for control of this disease in standing crop conditions. In each treatment, the crop was grown in 5×5 m^2 plot size and every treatment was replicated thrice under randomized block design. The fungicide treatments were applied as foliar sprays and a total of two sprays were given at the time of initial disease symptoms appearance and later at fifteen days after first spray. The spray operation was done during the evening with the help of Knap sack sprayer. The crop was sprayed till run off and in control plot only plain water was sprayed. Observations on disease incidence and disease severity (PDI) were recorded prior to spray of fungicides and at 5 days intervals from the second spray of fungicide using standard rating scale (Pande et al., 2011) and calculated with the help of formula given by McKinney (1923). Yield parameters *viz.,* number of pods $plant^{-1}$, grain yield ha^{-1} and 100-grain weight was recorded during the experimental period. The data of each observation/experiment recorded in above investigations were statistically analyzed and calculations were made after applying the test of significance for the treatment means. Analysis of data was carried out using angular transformation at 5% level of significance with the help of OPSTAT software (Sheoran, 2006). The observations recorded for ascochyta blight and yield parameters were calculated by using appropriate formula as given under.

Percent disease incidence=(Number of plants infected in a micro plot/Total number of plants in a micro plot)×100

Percent disease index (PDI)=(Sum of all numerical rating/ Total number of ratings×Maximum grade)×100

Percent disease control=(PDI in control-PDI in treated/ PDI in control)×100

Per cent yield Increase=(Yield under protected-Yield under unprotected/Yield under unprotected)×100

3. RESULTS AND DISCUSSION

3.1. Survey for occurrence of Ascochyta blight

The surveys were conducted during the time (January–February, 2022) so that they should coincide with appropriate crop growth stages in all fields sampled. During the survey, it was found that the ascochyta blight disease was prevalent with low to high intensity almost in all chickpea crops grown in different areas in Bundelkhand. highest severity (17.50%) of ascochyta blight was recorded in Mahoba district followed by Chitrakoot (17.05%) and Banda (16.67%) districts. The least severity (15.82%) of ascochyta blight was noticed in Hamirpur district. Overall, severity of ascochyta blight of chickpea ranged between 15.82–17.50% (Table 2). The occurrence of Ascochyta blight of chickpea was reported from >30 countries**.** In general, Ascochyta blight prevalent almost in all chickpea growing areas of the country where chickpea crop is grown (Nene, 1982, Nene and Sheila, 1992, Nene et al., 1996, Khan et al.,1999). Atik et al. (2011) recorded 18 to 100% severity of *Ascochyta* blight in fields surveyed in different districts of Syria. Tadesse et al. (2017) noticed 0 to 45.6% of incidence of *Ascochyta* blight in 30 out of the 251 farm-fields in major regions of Ethiopia that were surveyed. The reports of these workers are quite supportive to the present findings on occurrence of ascochyta blight disease in Bundelkhand region of Uttar Pradesh.

3.2. Cultural and morphological characteristics of Ascochyta rabiei

The pathogen *A. rabiei* was successfully isolated on potato dextrose agar (PDA) medium by tissue isolation method from the infected leaves of chickpea variety -GNG 1958 collected from the experimental field using standard pathological techniques. The PDA plates were inoculated by the pathogen *A. rabiei* and incubated in BOD incubator at 22±2°C for three weeks. Irregular white periphery, floccose and white to pale olive colored colony with 37.1 mm radial growth of mycelia appeared in the plates after 14 days of inoculation. However, after three weeks of inoculation, irregular white periphery, dark to black olivaceous sparse mycelium at the center along with 53.6 mm radial growth of mycelia were exhibited in the Potato Dextrose Agar plates. Pycnidia began to develop after fifteen days. The underside of colony was black olivaceous with white periphery after seventh day of observation. Under microscopic observation, the mycelium of isolated fungus was septate, with dark brown-colored hyphae when examined individually and irregularly branched, measuring 3.4–4.2 µm in width with an average of 3.80 µm. Conidia were hyaline, 1–2 septate, oval to oblong with size of 8–10×3.8–4.2 µm. Singh (2009) observed septate, hyaline to brownish mycelium of *A. rabiei*. The conidia were hyaline measuring 10–16×3.5 µm in size, oval to rectangular, straight or slightly curved, and septate. Samia et al. (2015) reported that the mycelial colour of *A. rabiei* varying from light brown to brown to green. The hyaline, ovate to oblong, single-celled, straight or slightly

Table 2: Level of ascochyta blight of chickpea in 4 districts of Bundelkhand region of Uttar Pradesh Jan–Feb, 2022

District	Block	Village	PDI (%)
Hamirpur	Gohand	Akauna	20.20
		Aunta	16.22
		Mean	18.21
	Rath	Bhaderwara	15.87
		Akouni	13.19
		Mean	14.53
	Muskara	Ainjhi	17.21
		Bagherka	12.23
		Mean	14.72
	Over all Mean		15.82
Banda	BadokharKhurd	Chahitara	9.98
		Chamraha	18.11
		Mean	14.04
	Bisanda	Akona	14.91
		Bhadawal	18.21
		Mean	16.56
	Jaspura	Barehta	21.78
		Galauli	17.09
		Mean	19.44
	Over all Mean		16.67
Chitrakoot	Ramnagar	Amawan	18.70
		Bandhi	15.56
		Mean	17.13
	Mau	Ahiri	22.04
		Bhitari	17.70
		Mean	19.87
	Manikpur	Aruwara	12.98
		Bagrehi	15.32
		Mean	14.15
	Over all Mean		17.05
Mahoba	Jaitpur	Akuna	12.98
		Badkhera	15.79
		Mean	14.38
	Kabrai	Atghar	21.92
		Banni	16.56
		Mean	19.24
	Panwari	Amanpura	18.34
		Churari	19.45
		Mean	18.89
	Over all Mean		17.50

curved, and rounded at the tip pycnidiospores which measure 8.2–10×4.2–4.5 µm, are produced in pycnidia. Baite et al. (2016) reported that on artificial media, *A. rabiei* colonies were first seen as light creamy, but with time they either became greyish white or turned green to greenish black. Conidia formed on short conidiophores and ranged in shape from oval to rectangular, with straight to slightly curved ends and a length of 9.19–12.51×3.36–4.32 µm. Thus, the findings of present investigation are in conformity with the reports of earlier workers like Singh (2009), Samia et al. (2015) and Baite et al. (2016).

3.3. Evaluation of different media for mycelial growth of Ascochyta rabiei

To ascertain the best solid media for the maximum mycelial growth, the pathogen was grown on four different solid media viz., Potato dextrose agar, Oatmeal agar, V8 juice agar and Malt extract agar. The average radial growth (mm) was recorded in each media after 15 days of incubation at 22±2°C. Among the media tested for mycelial growth, the maximum growth i.e., 46.2 mm was recorded on oatmeal agar followed by 43.2 and 40.4 mm obtained in Malt Extract agar and Potato dextrose agar, respectively. V8 juice agar medium exhibited the least mycelial growth i.e., 22.8mm. In the experiment, it was observed that fungus can utilize a number of media for its growth (Table 3). Kaiser (1973) observed maximum spore production of *A. rabiei* on chickpea seed meal agar (CSMA), whereas maximum mycelial growth obtained on CSMA or oatmeal agar. Singh and Pal (1993) observed Potato dextrose agar as good medium for sporulation of *A. rabiei*. Basaran (2021) found that malt extract agar supported the maximum mycelial growth of *A. rabiei* followed by potato dextrose agar, oat meal agar and chickpea dextrose agar. The above findings of earlier workers are almost similar to what it was observed in present experiment.

3.4. Effect of fungicides on the incidence of ascochyta blight and yield of chickpea

The findings of both crop seasons (*rabi* 2020–21 and 2021–22) indicated that twice spray of combination of Tebuconazole 50%+Trifloxystrobin 25% WG @ 0.1% at 1st appearance of symptoms and after 15 days of first spray gave the maximum reduction (47.05%) in disease incidence over the unprotected crop followed by twice sprays of combination of Tebuconazole 50%+Trifloxystrobin 25% WG @ 0.08% which resulted in 42.27% reduction in incidence. The next effective fungicide to minimize (32.93%) the incidence of ascochyta blight was spray of Tebuconazole 250 g l^{-1} EC @ 01%. In view of disease severity, spray of Tebuconazole 50%+Trifloxystrobin 25% WG @ 01% showed the maximum reduction (63.86%) in severity and it was followed by sprays of Tebuconazole 50%+Trifloxystrobin 25% WG @ 0.08% and Tebuconazole

Table 3: Effect of different media on growth of *A. rabiei* after 21 days of incubation

Sl. No.	Media	Radial mycelial growth (mm)
1.	Oatmeal agar	46.2
2.	Malt Extract Agar	43.2
3.	Potato dextrose agar	40.4
4.	V 8 Juice Agar	22.8
SEm±		0.93
CD (p=0.05)		3.04

250 g l^{-1} EC @ 01% showed 58.08 and 49.61% reduction in severity, respectively. Among the fungicidal treatments, spray of Sulphur 80%WP was found to be least effective in respect to reduction of incidence (6.48%) and severity (18.11%) of ascochyta blight disease. In the present investigation, it was observed that twice application of fungicides enhanced the yield parameters like number of podsplant^{-1}, hundred grain weight and grain yield over the unprotected crop. Maximum enhancement in grain yield (54.81%), pod plant^{-1} (55.56%) and 100 seed weight (62.28%) were recorded in crop where twice sprays of Tebuconazole 50%+Trifloxystrobin 25% WG @ 0.1% were done. Second highest enhancement in grain yield and other yield parameters was exhibited in crop where sprays of Tebuconazole 50%+Trifloxystrobin 25% WG @ 0.08% were done and it was followed by sprays of Tebuconazole 250 g L^{-1} EC. Among all five fungicides, spray of Sulphur 80%WP was found to be least effective to reduce the disease incidence/ severity as well as to increase the yield and its components (Table 4). During the investigation, it was found that the ascochyta blight severity in field trial of fungicidal management was more comparatively the severity recorded during the survey. It might be due to chickpea variety used as test variety in the field experiment or due to monocropping. Wazir (2019) found that Tebuconazole 25 EC and Chlorothalonil 75 WP were effectively inhibited the growth of *A. rabiei* under In vitro conditions. Jabbar et al. (2014) reported

Table 4: Effect of fungicides on ascochyta blight and yield parameters of chickpea

Treatments	Disease Incidence		Ascochyta blight severity		No. of pod plant^{-1}		100- seed weight (g)		Seed yield (q ha^{-1})	
	Percent incidence	Percent reduction in incidence	Percent severity	Percent reduction in severity	No. of pod	Percent increase in number of pods	Seed weight	Percent increase in seed weight	Seed yield	Percent increase in seed yield
T_1	23.44 (28.95)	–	31.30 (34.01)	–	107.67	–	14.90	–	15.36	–
T_2	16.88 (24.25)	27.98	17.67 (24.85)	43.54	146.17	35.75	19.97	34.02	20.44	33.07
T_3	13.53 (21.56)	42.27	13.12 (21.22)	58.08	161.50	49.99	23.12	55.16	22.84	48.69
T_4	12.41 (20.62)	47.05	11.31 (19.61)	63.86	167.50	55.56	24.18	62.28	23.78	54.81
T_5	15.72 (23.35)	32.93	15.77 (23.39)	49.61	151.67	40.86	21.35	43.28	21.25	38.34
T_6	17.91 (25.04)	23.59	19.89 (26.47)	36.45	140.50	30.49	18.48	24.02	19.33	25.84
T_7	19.64 (26.31)	16.21	22.71 (28.44)	27.44	131.83	22.43	17.30	16.10	17.85	16.21
T_8	21.92 (27.91)	6.48	25.66 (30.43)	18.01	122.33	13.61	16.12	8.18	16.65	8.39
SEm±	0.33	–	0.40	–	0.08	–	0.04	–	0.03	–
CD (p=0.05)	1.00	–	1.21	–	0.24	–	0.13	–	0.10	–

T_1: Untreated control; T_2: Tebuconazole50%+Trifloxystrobin 25% WG @ 0.06%; T_3: Tebuconazole 50%+Trifloxystrobin 25% WG @ 0.08%; T_4: Tebuconazole50%+Trifloxystrobin 25% WG @ 0.1%; T_5: Tebuconazole 250 g l^{-1} EC @ 0.1%; T_6: Trifloxystrobin 50% WG @ 0.05%; T_7: Chlorothalonil 75% WP @ 0.2%; T_8: Sulphur 80% WP @ 0.25%

that Tebuconazole w/w 50%+Trifloxystrobin w/w 25% significantly reduced the growth of *A. rabiei* colony at 500 ppm. He found that Trifloxystrobin 25%+Tebuconazole 50% (65 g acre^{-1}) significantly reduced the ascochyta blight disease under field conditions. The application of aqueous solution of Tebuconazole 50%+Trifloxystrobin 25% WG reduced 55.5% ascochyta blight disease severity. Anand et al. (2013) found that among the three doses (250, 300 and 350 g ha^{-1}) of Tebuconazole 50%+Trifloxystrobin 25% WG, two sprays @ 350 g ha^{-1} at the first appearance of visible symptom (35 days after sowing) and after 14 days of first spray were found most effective against *Exserohilum turcicum* causing leaf blight disease of maize. Application of Trifloxystrobin 25% WG+Tebuconazole 50%-75 WG is effective against leaf spot of cabbage (Saha et al., 2018) and Alternaria blight in Tomato (Saha et al., 2014). Foliar application of several fungicides including chlorothalonil, Trifloxystrobin 50% WG andSulphur are also effective in control of ascochyta blight (Bashir and Ilyas, 1983, Bashir et al., 1987, Nene and Reddy 1987, Demirci et al., 2003). Tebuconazole 50%+Trifloxystrobin 25% WG has systemic acropetal penetration and also protect secondary infection. The results thus obtained have been discussed in the light of findings of related experiments conducted by different workers/groups in the recent past. The findings of present investigation are in conformity with the reports of earlier workers. As per investigation, it is found that a defensive approach to manage the ascochyta blight disease should be adopted. If no disease has been detected seven to ten days earlier than bloom start or at bloom opening, a curative application of fungicides may be advised. In general, a reduction in Ascochyta blight severity was observed after 7–10 days of fungicides application.

4. CONCLUSION

The ascochyta blight disease was prevalent almost in all chickpea growing areas of Hamirpur, Banda, Chitrakoot and Mahoba districts of Bundelkhand region of Uttar Pradesh. Oatmeal agar medium was found very suitable for culturing the pathogen. Two sprays of Tebuconazole 50%+Trifloxystrobin 25% WG @ 500 g ha^{-1} at symptoms initiation and after 15 days of first spray was found most effective for controlling the ascochyta blight of chickpea under field conditions.

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