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Study of appearance of leaf and stem spot disease on Asalio (*Lepidium sativum* L.) under epiphytotic condition caused by *Alternaria alternata* (Fr.) Kiesser

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Abstract

Alternaria leaf and stem spot disease caused by *Alternaria alternata* (Fr.) Kiesser is serious aerial disease, commercially grown Asalio crops (*Lepidium sativum* L.) in western Madhya Pradesh of India. The present study investigated the effect of temperature, relative humidity and rain fall during 2009-10. Relative humidity is found to be 42.42% minimum and 84.14% maximum an average 63.28%, temperature 4.9 °C minimum and 29.14 °C maximum an average 17.02 °C and rain fall 20.0 mm, these indicate that moderate temperature high humidity and moderately rainfall are favorable for the development of leaf and stem spot disease on Asalio.

Keywords: Asalio (*Lepidium sativum* L.), *Alternaria alternata* (Fr.) Kiesser, stem spot disease

Introduction

Lepidium sativum L. is commonly known as Asalio and Chandrasur. It belongs to the family brassicaceae, in English it is known as "Garden Cress". It is an important medicinal plant from India (Hussain *et al.*, 1992). Seeds, leaves and roots are economically and medicinally important and it is mainly grown for seeds all over India. Asalio is under commercial cultivation in Madhya Pradesh having more than 25000 ha. Due to increase in demand the area under Chandrasur production is being increased year after year. The whole plant is used for secondary syphilis and tenesmus (Nadkarni *et al.*, 1954) [5], anti-diarrheal and anti-spasmodic (Najeeb *et al.*, 2012) [6], hypoglycemic (Eddouksa *et al.*, 2005) [3], laxative (Rehman *et al.*, 2011b) [8], anti-bacterial (Darwish *et al.*, 2010) [2], antioxidant, contraceptive effects (Sharief *et al.*, 2004) [9] and in inflammatory bowel disease (Rahimi *et al.*, 2010) [7]. It has been evaluated for its fracture-healing (Ahsan *et al.*, 1989) and diuretic activities (Wright *et al.*, 2007) [10]. Asalio suffer several pathogenic fungal diseases such as (powdery mildew, downy mildew and leaf spot *etc.*) but leaf spot is the most severe disease in Asalio caused by *Alternaria alternata* (Fr.) Kiesser. (Fig. 2 and 3) *Alternaria alternata* is an important pathogen causing leaf spot disease of Asalio (Melkanua, 1980) [4].



Fig 1: Healthy crops of Asalio

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Fig 2: Diseased crops of Asalio caused by *Alternaria alternata*

conical beak at the tip measured 45.12 μm x 13.49 μm. (fig. - 3, 4).



Fig 3: Stem spots caused by *Alternaria alternata*

Materials and Methods

Survey of leaf and stem spot disease of Asalio were conducted in the farmers’ field and research trials were conducted on research farm of KNK, College of Horticulture, Mandsaur to observed and recorded the occurrence of leaf and stem disease during 2009 and 2010. The samples were taken from ten points in diagonally in field. The leaf sample were collected from field in perforated polythene bag and fungus slides were prepared taking out mycelium, conidia and conidiophores through good quality transparent cello tape from fresh diseased leaves samples. The conidia and conidiophores were made by Leica camera model DFC 280 attached with research trinocular microscope. For each character, 50 observations were to assess the disease incidence and severity. Per cent of disease incidence was calculated according following formula:

$$\text{Incidence \%} = \frac{\text{No. of samples showing foliar spot}}{\text{Total No. of Samples}} \times 100$$

Table 1: Disease severity was assessed on a 0 - 5 visual rating scales

S. No.	Rating	Symptoms
1	0	No. symptoms
2	1	1 - 5% few spot on <50% of leaf
3	2	5 - 20% spot on <50% of leaves
4	3	20 - 50% spot on >50% of leaves
5	4	20 - 50% spot on <50% of leaves
6	5	>50% on >50% leaves

(Anon. 1996)

Results and Discussion

Taxonomical characters

Findings were based on the identical characters of conidiophores and conidia. Observation recorded under trinocular microscope revealed presence of mycelium, conidiophores and conidia. Mycelium, septate, 2.34 μm in diameter. Conidiophores unbranched, emerging through stomata, arising singly, pale brown, 47.28 μm in length and 4.29 μm in width. Conidia obclavate to pyriform with short



Fig 4: Conidia and conidiophores of *Alternaria alternata*



Fig 5: Conidia of *Alternaria alternata*

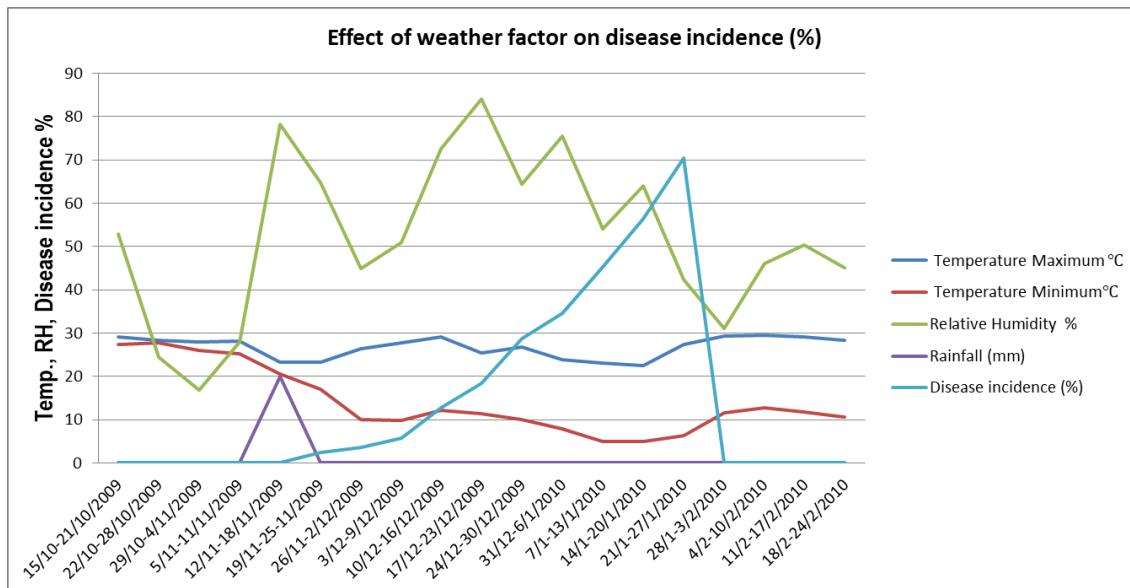


Fig 6: Effect of weather factors on disease incidence (%) in Chandrashoor.

Disease incidence and severity

Present study was to evaluate leaf spot disease incidence, and severity on basis of disease rating scale. Disease severity was recorded 70.33 per cent assessed.

Effect of whether factor on disease development

The first symptom of the leaf and stem spot disease on Asalio was seen in the third week of November 2009 which was spread rapidly in all field and become epidemic by second week of January 2010 in our survey and observation about

70.33% disease severity of leaf and stem spot disease caused by *Alternaria alternata* was recorded when relative humidity in found to be 42.42% minimum and 84.14% maximum an average 63.28%. Temperature 4.9 °C minimum and 29.14 °C maximum an average 17.02 °C and rain fall 20.00mm., these indicate that moderate temperature high humidity and moderately rainfall favorable weather condition for the development of leaf and stem spot disease on Asalio. (Table-2).

Table 2: Weekly Temperature, Relative humidity and Rain fall at Mandsaur, (Weather Data 2009-10)

Weeks	Temperature		Relative Humidity%	Rainfall (mm)	Disease incidence (%)
	Maximum °C	Minimum°C			
15/10-21/10/2009	29.2	27.4	52.9	-	-
22/10-28/10/2009	28.35	27.7	24.5	-	-
29/10-4/11/2009	28.02	25.91	16.85	-	-
5/11-11/11/2009	28.04	25.15	28.0	-	-
12/11-18/11/2009	23.32	20.62	78.14	20.0	-
19/11-25-11/2009	23.34	17.1	64.85	-	2.35
26/11-2/12/2009	26.45	10.0	44.85	-	3.56
3/12-9/12/2009	27.78	9.77	51.0	-	5.63
10/12-16/12/2009	29.14	12.2	72.57	-	12.66
17/12-23/12/2009	25.4	11.34	84.14	-	18.34
24/12-30/12/2009	26.76	10.05	64.28	-	28.63
31/12-6/1/2010	23.75	7.88	75.43	-	34.62
7/1-13/1/2010	23.14	4.91	54.14	-	45.34
14/1-20/1/2010	22.55	4.9	64.0	-	56.33
21/1-27/1/2010	27.4	6.24	42.42	-	70.33
28/1-3/2/2010	29.31	11.48	31.14	-	-
4/2-10/2/2010	29.51	12.78	46.0	-	-
11/2-17/2/2010	29.07	11.84	50.28	-	-
18/2-24/2/2010	28.41	10.68	45.14	-	-

Conclusion

It is concluded that 70.33% disease severity of leaf and stem spot disease caused by *Alternaria alternata* was recorded when relative humidity is found to be 42.42% minimum and 84.14% maximum an average 63.28%, temperature 4.9 °C minimum and 29.14 °C maximum an average 17.02 °C and rain fall 20.00 mm, these indicate that moderate temperature high humidity and moderately rainfall favorable weather condition for the development of leaf and stem spot disease on Asalio.

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