

EFFECT OF DATE OF SOWING ON ALTERNARIA BLIGHT OF CUMIN AND ITS CORRELATION WITH WEATHER PARAMETERS

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ABSTRACT

The present investigation on “Management of Alternaria blight in cumin (Cuminum cyminum L.)” comprised five different dates of sowing. Among different dates of sowing, 15th November (D₃) was found to be the most effective for reducing the disease (36.15 %) and enhancement of cumin seeds yield (540 kg/ha). It was found at par with 30th October (D₂) and 30th November (D₄) in succession to per cent disease intensity 37.58 and 41.24 per cent with reduction in yield 435 and 373 kg/ha, respectively and vise-versa. The volatile oil per cent (4.12 %) and 1000-seed weight (4.55 g) was recorded when crop sown on 15th November (D₃), whereas, they were at bottom in late sown crop of 15th December (D₅) with 3.80 per cent volatile oil content and 3.37 g of 1000-seed weight. The correlation between disease intensity and weather parameters was non-significant in case of timely sown crop of 15th November. For 30th October (D₂), the maximum temperature was showed positive and significant correlation with disease intensity. In late sowing of 15th December (D₅), the maximum temperature showed negative correlation, whereas wind speed recorded positive correlation with per cent disease intensity of Alternariab light in cumin. It was found that cool and wet weather; and high humidity with cloudy weather is favourable for development of disease. Wind is congenial for not only development of disease, but very fast spread of the disease.

KEY WORDS: Alternaria blight, Cumin, Correlation, weather parameters

INTRODUCTION

Cumin (*Cuminum cyminum* L.) popularly known as "Zeera," is one of the most important seed spices crop of India. It has many synonyms corresponding to regions viz., Jeeru (Gujarati), Jirakam (Malayalam), Jiregire (Marathi), Jiragum (Tamil), Kumin (Japanese), Kuming (Chinese) and Sugandhum, Jiraka (Sanskrit). It belongs to the family *Apiaceae*. The cultivation of cumin is confined to the tropical and sub-tropical region of the world and India is one of the principal countries

engaged in its cultivation. It is also considered to be the native of Egypt, Turkey and East Mediterranean region. It is mainly cultivated in India, Pakistan, Iran, Turkey, China, Egypt and Israel, etc. In India, it is mainly cultivated in Gujarat, Rajasthan and in some parts of Madhya Pradesh as well as Uttar Pradesh. The main cumin growing districts in Gujarat are Patan, Banaskantha and Mehsana of North Gujarat region and Surendranagar, Rajkot, Junagadh, Jamnagar and Amreli of Saurashtra region. Cumin seeds are largely used as a condiment and

form an essential ingredient in all mixed spices and curry powder for flavouring soups, pickles and for seasoning breads and cakes. Cumin seeds are considered as stimulant, carminative, stomachic, astringent and useful in diarrhea and dyspepsia. It is good medicine against digestive and intestinal upsets and used in veterinary medicine (Aiyer and Narayan, 1950). Cumin seed contains 2.5 to 4.5 per cent of volatile oil. The oil is extensively used in perfumery and for flavouring liquors and cordials. The seed also contains cumin aldehyde or cuminol which attributes the aroma and special medicinal properties. In addition to this, the seed also contains 6.2 per cent moisture, 17.7 per cent protein, 23.8 per cent fat, 9.1 per cent crude fiber, 35.5 per cent carbohydrate, 7.7 per cent mineral matter, 0.09 per cent calcium, 0.45 per cent phosphorous, 0.048 per cent iron, 1.6 per cent sodium, 2.1 per cent potassium and also vitamins B₁, B₂, vitamin 'C' and vitamin 'A' etc. (Shankaracharya and Natrajan, 1971). Cumin is a “rabi” season crop, generally grown on sandy to loamy sand soil. Healthy crop under natural conditions matures in 110 to 115 days. Seed quality and crop production are badly affected with little alteration in sowing, irrigation, fungicidal spraying and other cultural practices. The market value of cumin depends much on its quality and therefore, the farmers are very much concerned with the quality of the produce, besides the yield.

MATERIALS AND METHODS

The trial was conducted during the year 2016-17 at Seed Spices Research Station, Jagudan, S. D. Agricultural University, Sardarkrushinagar. Gujarat Cumin 4 (GC-4) was sown as per the dates of sowing at a distance 30 cm in a plot size of 4.0 m x 3.0 m. The study was laid out in RBD with four replicates of five date of sowing. These plants were sown in natural conditions and were regularly observed for

the development of the disease till harvest, without adding any inoculum. The observation on Per cent Disease Intensity (PDI) (as per the formula given by Datar and Mayee, 1981), Seed yield, Volatile oil per cent (as per the methods described in (AOAC, 2000) and 1000-seed weight (g) were recorded. During the period of investigation, the standard week wise weather parameters viz., maximum temperature, minimum temperature, mean temperature, relative humidity, bright sunshine hours and wind speed were recorded at meteorological observatory, Seed Spices Research Station, S. D. Agricultural University, Jagudan and these data were used for correlating with the severity of *Alternaria* blight.

RESULTS AND DISCUSSION

During the experimentation year 2017-18, the per cent disease intensity (PDI) of *Alternaria* blight was minimum (36.15 %) with seed yield of 540 kg per ha in case of timely sown crop of 15th November (D₃). Whereas, seed yield (305 kg/ha) was lowest and PDI (47.40 %) was maximum in late sown crop of 15th December (D₅) (Table 1).

During year of investigation, the highest volatile oil per cent (4.12 %) and 1000-seed weight (4.55 g) was recorded in case of timely sown crop i.e., 15th November (D₃), whereas they were the lowest in late sown crop of 15th December (D₅) (Table 2).

The correlation between disease intensity and weather parameters was non-significant in case of timely sown crop 15th November. For 30th October (D₂), the maximum temperature was showed positive and significant correlation with disease intensity. In late sowing on 15th December (D₅), the maximum temperature showed negative correlation whereas, wind speed recorded positive correlation with per cent disease intensity of *Alternaria* blight in cumin (Table 3). It was found that cool and wet weather; and high humidity with cloudy

weather is favourable for development of disease. Wind is congenial for not only development of disease, but very fast spread of the disease.

Arslan and Bayrak (1987) reported that maximum seed yield of cumin was in early sown crop and reduced the grain yield in succeeding dates of sowing. Sowing dates has no effect on the volatile oil content of the seeds. Very severe infection in late sown crops (15th December), in which all plant parts like leaf, stem and seeds were heavily infected. It was found that disease intensity with two early sown dates was comparatively lesser than later sowing dates.

CONCLUSION

Sowing of cumin on 15th November (D₃) was found to be the most effective for reducing the disease (36.15 %) of *Alternaria* blight and enhancement of cumin seeds yield (540 kg/ha). The volatile oil per cent (4.12 %) and 1000-seed weight (4.55 g) was recorded when crop sown on 15th November (D₃). It was found that cool and wet weather; and high humidity with cloudy weather is favourable for development of

disease. Wind is congenial for not only development of disease, but very fast spread of the disease.

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Table 1: Effect of different dates of sowing on disease intensity of *Alternaria* blight and seed yield of cumin

Treatments	Disease Intensity (%)	Seed Yield (kg/ha)
D ₁ : 15 th October	41.02 (42.65)*	346
D ₂ : 30 th October	38.07 (37.58)	435
D ₃ : 15 th November	37.21 (36.15)	540
D ₄ : 30 th November	40.20 (41.24)	373
D ₅ : 15 th December	43.77 (47.40)	305
S.Em. ±	1.19	11.44
C.D. at 5 %	3.66	35.27
C.V. %	5.93	5.73

*Figures in parentheses are retransformed values and outside the parenthesis are arcsine transformed values

Table 2: Effect of different dates of sowing on 1000-seed weight and volatile oil of cumin

Treatments	1000 Seed Weight (g)	Volatile Oil (%)
D ₁ : 15 th October	3.72	3.90
D ₂ : 30 th October	4.35	4.07
D ₃ : 15 th November	4.55	4.12
D ₄ : 30 th November	4.17	3.92
D ₅ : 15 th December	3.37	3.80
S.Em. ±	0.10	0.02
C.D. at 5 %	0.32	0.07
C.V. %	5.18	1.24

Table 3: Correlation between meteorological variables and disease intensity of *Alternaria* blight influencing by different date of sowing

Variables	Correlation Coefficient ('r')				
	15 th October (D ₁)	30 th October (D ₂)	15 th November (D ₃)	30 th November (D ₄)	15 th December (D ₅)
Minimum temperature (°C)	0.67	1.00*	0.62	-.0.89*	-0.92*
Maximum temperature (°C)	0.73	0.70	0.76	-1.00*	0.59
Mean temperature (°C)	0.71	0.74	0.64	0.70	0.54
Relative humidity (%)	0.59	0.56	0.58	0.61	0.68
Wind speed (km/hrs)	0.66	0.68	0.72	0.82	1.00*

Critical value (5 %): 0.87

* Significant at 5 % level

[MS received : February 21 , 2019]

[MS accepted : March 12, 2019]