



Leaf Spot Caused by *Alternaria Solani* on *Capsicum Annuum* L. in Eastern Zone of Nepal & North Bihar, India

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ABSTRACT

Collection of 13 leaves from *Capsicum annuum* L. was taken for the observation of symptoms caused by *Alternaria solani* on date 15/12/2020. Size of leaves noted between 6.88 sq. cm. to 31.96 Sq.cm and Maximum number of spots was 18. The other symptoms shoot out, half lamina absent (in leaf), swelling of green tissue along with yellow spot with white mycelium, giving powdery mass in some leaves were common. Anatomical study was done on Date 25/12/2020 at 2-3 P.M in the laboratory, Department of Botany, M.M.A.M.CAMPUS, BIRATNAGAR.

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Introduction

By 1650 the cultivation and use of capsicum pepper as condiment had spread throughout Europe as well as through the African and Asian tropics. C.B. Heisler (1969) have recognised fine cultivated species of capsicum — *C. annuum* L., *C. frutescens* L., *C. chinense* Jacq., *C. pendulum* Willd and *C. pubescens* Ruiz & Pavon. The last three are lesser economic importance and grown in the western hemisphere. In India, 930000 ha of land is used to cultivate chillies, chillies are grown from seeds in the nursery. Well-drained sandy loams or clay loam are essential for good growth of chillies. It reaches maturity in 90-120 days. The spicy taste of chillies is due to capsaicin ($C_{18}H_{27}NO_3$) concentrated mainly in placenta region, where the seeds are attached to the spongy central portion. The small African chillies are extremely fiery, acrid and biting. Chillies are a good source of vitamin C, vitamin A and vitamin E.

The colouring matter of the ripe fruit consists of capsanthin ($C_{40}H_{58}O_3$) Capsorubin, zeaxanthin, Cryptoxanthin, lutein, α & β Carotenes & a few unidentified Xanthophylls. In Nepal, 'Akbare Khursani' is very famous for its coast and taste. Medicinally capsicum peppers have been used internally, in the past as a powerful Stimulant and carminative but externally as a counter irritant to Cure rheumatism. Capsicum is also used in arthritis kochhar(1998)⁸. According Gopalan et.al (2007)⁴ – 100 gms chillies contains

(A) Chillies dry -

Moisture- 10 g, Protein- 15.9 g, Fat- 6.2 g, Minerals- 6.1 g, crude fibres- 30.2 g, Carbohydrates- 31.6 g, Energy- 246 k. cal, calcium -160 mg, Phosphorus- 370 mg, Iron- 2.3 mg, Carotene -345 μ g, Thiamine- 0.93 mg, Riboflavin- 0.43 mg, Niacin- 9.5 mg, vitamin C- 50 mg, Sodium- 14 mg, Potassium-530 mg, Phytin P-71 mg, P-19%.

(B) Chillies green-

Moisture- 85.7 g, Protein- 2.9 g, fat- 0.6 g, Mineral- 1 g, crude fibres- 6.8 g, Carbohydrates- 3g, Energy – 29 K.cals, calcium- 30mg, phosphorus- 80 mg, Iron- 4.4 mg, Carotene- 175 μ g, Thiamine- 0.19 mg, Riboflavin- 0.39 mg, Niacin- 0.9 mg, Free Folic Acid- 6 μ g, Total Folic Acid- 29 μ g, Vitamin

c-111 mg, Mg- 272 mg, Cu-1.4 mg, Mn- 1.38mg, Mo- 0.070 mg, Zn- 1.78 mg, Cr- 0.040 mg, Oxalic acid- 67 mg, Phytin P- 7mg, P- 9%.

Review of Literature

Diseases of *capsicum annuum* L. caused by the pathogens- *Phytophthora Sp.*, *Colletotrichum capsici* (Syd.) Butters Bisby, *Cercospora Capsici* Heald & Wolf & *Alternaria Soloni*. Ell and mart. mostly. Among the other diseases of chilli are powdery mildew caused by *Leveillula taurica* (Lev.) Arn., wilt caused by *Fusarium sp.*, Stem rot caused by *Macrophomina phaseolina*, dry rot caused by *Sclerotium rolfsii* Sacc, root-knot caused by *Meloidogyne javanica* (Treb.) chit wood, leaf Curl caused by virus and Mosaic caused by different mosaic viruses found on collateral hosts such as tomato and tobacco, Rangaswami (1994)⁹. Chaudhary, J et al (2015)¹ reported Variability in *Phytophthora nicotinae* var. *nicotianae* causing leaf slight and fruit rot on sweet pepper (*capsicum annuum*) in North-western Himalayas. Katoch, A & Sharma, P.N (2015)⁷ mentioned association of *colletotrichum acutatum* with fruit rot of Capsicum in North-western Himalayas and identification of resistant sources. Singh, K et. al (2014)¹⁰ reported biochemical changes in chilli against *colletotrichum capsici*. Gupta, M & Bharat, N.K (2013)⁵ discovered gray mold rot of tomato and bell pepper under protected cultivation in Himachal Pradesh. Gaud, C.R & Manasa, k (2013)³ reported compatibility of fungicides with spinosad against fruit rot and pod borer in chilli. Devi, T. P et.al (2012)² mentioned *Proliferosphaera*, a new genus from India collected from the fruit of *Capsicum annuum* L. from Gujrat causing die back and fruit rot disease.

Field-work - 13 leaves of *Capsicum annuum* L. plant, having height 65 cm, different symptoms were present on leaves, which is shown in Table no. 1-

Micro-Scopic observation - on Date 25/12/2020 at 2-3 P.M. under the magnification - 40x, 100x & 400x showed the following structure-

i. Mycelium- Septate,, intracellular and intercellular.

Table No. 1

Leaf	Area of leaf in Sq. cms.	No. of Spot	Other Symptoms
1	14.7	Numerous	Shootout-0.1 Sq. cm, drying, curling of leaf
2	18.9	2	Dotted white mass at margin, half lamina (--), brownish minute spots.
3	23.7	18	One rounded white myceloid spot, one cut mark(+)
4	31.96	6	Several yellowish displacement of tissues of leaves.
5	14.4	6	Yellowish displacement of normal tissue of leaves
6	17.48	0	0.84 Sq. cm lobe is absent.
7	19.8	Numerous	5.6 Sq. cm Lamina is absent.
8	9.44	Numerous	Brownish-yellowish colour
9	6.88	0	Shoot-out-1, two rounded thickening of green tissues.
10	11.88	Numerous	Curling of leaves, one growth of tissue-irregular.
11	10.98	1	Leaf colour-brown, depression (+), constriction (+), white colour spot.
12	9.28	1	Largest rounded spot
13	10.4	10	Curling at the apex, loss of lobe at the distance 1.5 cm from the petiole.

ii. Conidiophore - elongated in rows.

iii. Conidia - thickened wall, dictyosporus condition (+) Identification as proposed by Hughes (1953)⁶, Tubaki(1958)¹⁴ and - Subramanian (1962-1965)^{11,12&13} i.e. *Alternaria solani*.

Discussion

From the table no. 1, the loss of productivity is 14.53 to 100% i.e. very poor process of fruit formation due to the infection of *Alternaria solani*. This disease also fascialates the viral infection because in some leaves, Curling is also noted during the observation of symptoms.

Climatic condition. The maximum and the minimum temperature from Dec. 2019 to Dec. 2020 is 40°C and 8°C respectively.

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