



P-ISSN: 2349-8528

E-ISSN: 2321-4902

IJCS 2019; 7(3): 543-545

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Received: 18-03-2019

Accepted: 21-04-2019

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## Survey and screening of germplasm against chilli anthracnose

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**Abstract**

Chilli is an important spice, vegetable as well as cash crop of Gujarat, mostly cultivated in *Kharif* season, which is quite remunerative for farmers. It is affected by several diseases, but anthracnose is a most devastating disease caused by fungus *Colletotrichum capsici* (Sydow) Butler and Bisby, is a serious disease and one of the major constraints in chilli cultivation throughout the world. In the present study a Survey on anthracnose disease of chilli was carried out in three taluka of Banaskantha district of Gujarat viz., Dantiwada, Deesa and Palanpur during *Kharif* season 2017-2018. The survey clearly revealed that anthracnose intensity ranged between 40.22 and 59.48 per cent. Anthracnose disease was more severe in Deesa taluka (59.48%) followed by Dantiwada (50.51%) and Palanpur (46.49%) taluka. Thirty chilli germplasms were evaluated under field conditions against anthracnose disease of chilli during *kharif*, 2018. Among them, three germplasms showed resistant reaction (JDNYC 07-73, JCS 10-98 and JDNYC09-70), which can be further used for breeding programme.

**Keywords:** Chilli anthracnose, survey, screening, germplasm

**Introduction**

Chilli (*Capsicum annum* L.) is a remunerative vegetable, spice cum cash crop worldwide which belongs to the Solanaceae family represents a diverse plant group. Chilli is grown in tropical and sub-tropical climate. The major chilli growing countries are India, China, Pakistan, Thailand and Africa. India is one of the major chilli growing countries. In India, it is grown mainly in Gujarat, Rajasthan, Tamil Nadu, Maharashtra, Karnataka, Nagaland, Andhra Pradesh, Assam, Orissa, West Bengal and parts of Madhya Pradesh. In India during 2016-17, area under chilli cultivation was 287000 ha with a total production of 3406000 MT (Anon., 2016-17) <sup>[1]</sup>. Several biotic and abiotic factors affect the productivity of the chilli crop worldwide. Among the biotic factors, numerous fungal, bacterial, nematodes and virus result into devastating diseases which deteriorate the quality and quantity of the produce and are often difficult to control (Nono womdim, 2001) <sup>[5]</sup>.

Chilli anthracnose caused by *Colletotrichum capsici* is a major problem in chilli production which infects the ripened fruits and result into fruit rot, occur frequently around the world in chilli growing areas (Poulos, 1992) <sup>[7]</sup>. In India, the anthracnose was first reported by Sydow (1928) from Coimbatore of Madras Presidency. Yield loss up to 50% in Thailand, 21-47% in Sri Lanka, 15% in Korea and 50% in Malaysia has been reported by various workers (Than *et.al.*, 2008) <sup>[10]</sup>. Bansal and Grover (1969) <sup>[2]</sup> during their studies reported 10 – 35% fruit loss due to anthracnose in 1966 and 20 to 60% fruit loss during 1967 in six districts of Punjab and Haryana. Thind and Jhooty (1985) <sup>[11]</sup> reported fruit loss up to 66-84% in Northern Karnataka. Chauhan (2010) <sup>[3]</sup> reported 21.12% to 64.41% yield loss due to anthracnose in different districts of North Gujarat. Management of the anthracnose disease is still under extensive research. It often involves frequent application of fungicides that have negative effects on farmer's income, health and environment (Vorrrips *et. al.*, 2004) <sup>[12]</sup>. Therefore managing this disease by host plant resistance is a good option. So, the survey for disease incidence and to find out the source of resistance among chilli germplasms against anthracnose was carried out.

**Materials and Methods****Survey**

A field survey was under taken of different chilli growing areas of Banaskantha district of Gujarat. From Banaskantha district three taluka viz., Deesa, Palanpur and Dantiwada was selected and from each taluka five village was selected and from each village five samples

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were collected and per cent disease intensity of chilli anthracnose was recorded during 2017-2018. The average per cent disease incidence of anthracnose was worked out by using following 0-9 scale formula given by Mayee and Datar (1986) [4]. The disease incidence was worked out as below to calculate per cent disease index by using following formula given by Wheeler (1969) [13].

$$\text{PDI} = \frac{\text{Total sum of numerical rating}}{\text{Number of fruits/leaves observed} \times \text{Maximum grade value}} \times 100$$

Where,

PDI = Per cent disease incidence

0 = No infection

1 = 1-10% infection

3 = 11-25% infection

5 = 26-50% infection

7 = 51-75% infection

9 = > 75% infection

### Screening of chilli varieties / germplasm

Resistant source in germplasms and different released varieties of chilli were screened against anthracnose disease under field condition. Different released variety of chilli was collected from AAU, Anand JAU, Junagadh NAU, Navsari and Vegetable Research Station, SDAU, Jagudan and germplasm were collected from Vegetable research station, Jagudan. Ten plants of each variety / germplasm were sown one row and the disease intensity was recorded before harvesting of fruits by 10 plants of each varieties / germplasm sown 0-9 grade (Mayee and Datar, 1986) [4]. PDI was calculated by using formula given by Wheeler (1969) [13]. On the basis of per cent disease index, the germplasm was categorized as following reaction.

Where,

PDI Disease reaction

0 = highly resistant

1 = Resistant

3 = moderately resistant

5 = moderately susceptible

7 = Susceptible

9 = highly susceptible

### Results and Discussion

#### Survey

Survey on anthracnose disease of chilli was carried out using multi stage sampling technique in three taluka of Banaskantha district viz., Dantiwada, Deesa and Palanpur during *Kharif*, 2017-2018 (Table 1). The survey clearly revealed that the anthracnose intensity was ranged between 40.22 to 59.48 per cent. In Deesa taluka, the maximum anthracnose intensity was recorded in Malgadh village (59.48%) followed by Vasada (57.88%), Khadosan (56.65%), Aseda (54.50%) and Vadaval (50.55%) village, while, in Dantiwada taluka, highest per cent disease intensity (56.60%) was recorded in Vaghrol village followed by Panthawada (54.36%), Jegol (48.65), Rampura (47.55) and Kuchavada (45.40%) village. In Palanpur taluka, the highest per cent disease intensity (49.52%) was recorded in Laxmanpura village followed by Jagana (47.76%), Bhutedi (46.55%), Chadotar (44.40%) and Songadh (40.22%) village. Overall, in surveyed taluka of Banaskantha, the anthracnose intensity of chilli was more in Deesa taluka (59.48%) followed by Dantiwada (50.51%) and Palanpur (46.49%)

taluka. Present results are in conformity with the findings of Thind and Jhooty (1985) [11]. They reported that the disease causes severe damage to fruits in the field as well as in storage and takes heavy loss up to 84 per cent. Chauhan (2010) [3] conducted a survey on anthracnose of chilli in different district of North Gujarat (Banaskantha, Sabarkantha, Patan, and Mehsana) and reported that chilli crop was severely infected by anthracnose which cause yield losses ranged between 21.12 to 64.41 per cent.

### Screening of chilli varieties / germplasm

Thirty chilli germplasms were screened against anthracnose disease during *kharif*, 2018 (Table 2). The per cent disease index ranged between 6.00 to 60.35 per cent. Most of germplasms were found susceptible to moderately resistant. The data presented in Table 4.10 revealed that out of thirty chilli germplasms, three germplasms showed resistant reaction (JDNYC 07-73, JCS 10-98 and JDNYC09-70), nine germplasms were moderately resistant (JDNYC 26, JDNYC 42, JDNYC 44, JDNYC07-70, JDNYC10-44-1, JDNYC-07-73-1, JDNYC 10-99 and SELJCH 788 ), seven germplasms were moderately susceptible ( ACC 136, ACC 139, JDNYC 07-73-2, JCS 10-76, ACC 133, ACC 141 and JCS10-83 ) and eleven germplasms were showed susceptible (JCH 719, JDNYC 07-79, ACC 1271, JDNYC 10-44, JDNYC 10-70, JCS 07-79, JCS 07-70, ACC 143, JCS 08-48, JCH 740-2 and Rupal IPS 3 ) reaction against anthracnose disease. Similar results have also been presented by Singh and Vishunavat (2007) [8]. They reported that no chilli cultivar was found to be immune against anthracnose disease but five cultivars viz., Pant C 2, Pant C 6, Indra, DLC 1 and DLC 2 showed resistant reaction with 1-5 per cent disease incidence, whereas, Pant C7, LCA 206, JCA 283, Pant selection 4, F 112-5-13, Co 4 and Ajeet were found highly susceptible to anthracnose disease of chilli. Parey *et al.*, (2013) [6] revealed that none of genotypes / varieties was resistant; however, DC-4, Ankalohit, LCA-235, LCA-333 and LCA-301 exhibited moderately resistant reaction under both field and pot culture conditions. Chauhan (2010) [3] screened eleven genotypes of chilli against anthracnose / die-back or fruit rot disease under natural field conditions and reported that ACH 238 were found moderately resistant, while five germplasms viz., ACH 201, ACH 251, ACH 252, ACH 255 and GVC 111 (C) were found moderately susceptible and five germplasms viz., ACG 216, ACH 240, ACH 256, GVC 121 (C) and GM 1 were found susceptible.

**Table 1:** Surveys of chilli anthracnose disease in Banaskantha districts

Sr. No	Taluka	Village	Anthracnose PDI (%)	Mean (%)
1	Deesa	Malgadh	59.48	55.81
		Vasada	57.88	
		Vadaval	50.55	
		Aseda	54.50	
		Khadosan	56.65	
2	Dantiwada	Vaghrol	56.60	50.51
		Panthawada	54.36	
		Kuchavada	45.40	
		Rampura	47.55	
		Jegol	48.65	
3	Palanpur	Laxmanpura	49.52	45.69
		Jagana	47.76	
		Songadh	40.22	
		Chadotar	44.40	
		Bhutedi	46.55	

**Table 2:** Reaction of chilli germplasms against anthracnose disease in field conditions

Sr. No.	Genotypes	Per cent disease index	Disease Reaction
1	JDNYC 07-73	10.00	Resistant
2	JCS 10-98	6.00	Resistant
3	JDNYC 09-70	6.00	Resistant
4	JDNYC 26	12.22	Moderately resistant
5	JDNYC 42	15.70	Moderately resistant
6	JDNYC 44	17.78	Moderately resistant
7	JDNYC 07-70	16.67	Moderately resistant
8	JDNYC 10-44-1	12.00	Moderately resistant
9	JDNYC 07-73-1	24.44	Moderately resistant
10	JDNYC 10-99	15.67	Moderately resistant
11	JCS 10-79	23.30	Moderately resistant
12	SELJCH 788	16.00	Moderately resistant
13	ACC 136	30.67	Moderately susceptible
14	ACC 139	25.33	Moderately susceptible
15	JDNYC 07-73-2	32.73	Moderately susceptible
16	JCS 10-76	25.90	Moderately susceptible
17	ACC 133	44.40	Moderately susceptible
18	ACC 141	36.33	Moderately susceptible
19	JCS 10-83	32.73	Moderately susceptible
20	JDNYC 10-44	56.20	Susceptible
21	JDNYC 10-70	55.22	Susceptible
22	JCS0 7-79	56.50	Susceptible
23	JCS 07-70	57.60	Susceptible
24	ACC 143	60.35	Susceptible
25	JCS 08-48	55.55	Susceptible
26	JCH 740-2	56.67	Susceptible
27	Rupal IPS-3	52.50	Susceptible
28	JCH 719	53.00	Susceptible
29	JDNYC 07-79	57.00	Susceptible
30	ACC 1271	55.00	Susceptible

9. Sydow H. Butrage zur kenntnis der pilzflora des sudlichen ostindiens. J. Ann Mycol. 1913; 11:329-330.
10. Than PP, Jeewon R, Hyde KD, Pongsupasam S, Mongkolporn O, Taylar PWJ. Characterization and pathogenicity of *Colletotrichum* species associated with anthracnose on chilli (*Capsicum spp.*) in Thailand. Plant Pathol. 2008; 51:562-572.
11. Thind TS, Jhooty JS. Relative prevalence of fungal diseases of chilli fruits in Punjab. J Mycol. Pl. Pathol. 1985; 15(3):305-307.
12. Vorrips RE, Finkers R, Sanjaya L, Groenwold R. QTL mapping of anthracnose (*Colletotrichum spp.*) resistance in a cross between *Capsicum annum* and *Capsicum chinense*. Theoret and Appl Gen. 2004; 109:1275-1282.
13. Wheeler BEJ. An introduction to Plant disease. John Willey and Sons Ltd., Newyork, 1969, 374.

## References

1. Anonymus. Government of Gujarat. Directorate of Agriculture Gujarat State, Gandhinagar, 2016-17.
2. Bansal RD, Grover RK. Reaction of chilli (*Capsicum frutescens*) varieties to *Colletotrichum truncatum*. J Res. Ludhiana. 1969; 6(2):345-348.
3. Chauhan YB. Studies on anthracnose disease of chilli (*Capsicum annum* L.) caused by *Colletotrichum capsici* (Sydow) Butler and Bisby and its management. Thesis submitted to SDAU M.Sc. (Ag.) Pl. Path Thesis, Department of Plant Pathology, SD Agricultural University, Sardarkrushinagar, Gujarat, 2010.
4. Mayee CD, Datar VV. Phytopathometry. Technical Bulletin-I. Marathawada Agricultural University, Parbhani, 1986.
5. Nono-womdin R. An overview of major virus diseases of vegetable crops in Africa and some aspects of their control. In: Proceedings of Plant Virology in sub Saharan Africa. 2001.213-230.
6. Parey MA, Razdan VK, Sofi TA. Comparative study of different fungi associated with fruit rot of chilli and screening of chilli germplasm against *Colletotrichum capsici*. Internat. J. Agric. Crop Sci. 2013; 5(7):723-730.
7. Poulos JM. Problems and progress of chilli pepper production in the tropics. In: CB Hock, LW Hong, M Rejab, AR Syed, (eds).Proceedings of the conference on chilli pepper production in the tropics. Malaysia: Kuala Lumpur. 1992, 98-129.
8. Singh K, Vishunavat K. Evaluation of chilli (*Capsicum annum*) cultivar against anthracnose (*Colletotrichum capsici*). J Mycol. Pl. Pathol. 2007; 37(3):550-551.