



Research Article

SURVEY FOR ASSESSMENT OF PREVALENCE AND ANTHRACNOSE DISEASE SEVERITY IN CHILLI

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Abstract: The Research was conducted on Survey to assess the intensity of chilli anthracnose in different district of south Gujarat. The mean anthracnose disease intensity ranged from 37.93 to 51.31 per cent. Among the three surveyed districts (Navsari, Surat and Valsad), the highest mean disease intensity was recorded in the Valsad district (51.31 %) followed by Navsari (44.63 %) and Surat (37.93 %) districts.

Keywords: Survey, Anthracnose, Chilli and Gujarat

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Introduction

Chilli (*Capsicum annum* L.) is one of the important spice and vegetable crop of India and world. Chilli belongs to the family Solanaceae. India is the major producer, consumer and exporter of the chilli in the world and ranks fifth position in production. In Gujarat, chilli is grown in an area of 11,299 hectares with the production of 22,050 M.T. mostly in Anand, Banaskantha, Surat, Navsari, Mahesana, Sabarkantha, Saurashtra and Valsad districts [1]. Chilli is being confronted by different biotic and abiotic causes that restrain the considerable yield. Many diseases infect the chilli at different stages of plant growth, among them diseases infecting chilli crop, anthracnose caused by *Colletotrichum capsici* was one of the most destructive diseases causing accountable qualitative and quantitative losses. Anthracnose symptoms on chilli appeared in the form of small circular spots appear on the leaves. On fruit typical symptoms were found as circular or angular sunken lesions with a slightly raised rim. These spots were brown to dark brown surrounded by a dark margin. The spots at first were small and dark or water soaked. As they enlarge, they become irregular in shape, variable in size and give a scorched appearance. Severely infected leaves and fruits fall off leading to defoliation. The infection of growing tips leads to necrosis of branches which progress backward on the diseased branches, the die back symptom was severe and it may kill the whole plant. Looking to the seriousness of the particular disease and very meager information available, a series of experiments were conducted on "Symptomatology, characterization of chilli anthracnose caused by *Colletotrichum* sp. and its management." During *kharif* season of 2020-21 and 2021-22 at the College Research Farm and at the Department of Plant Pathology, N. M. College of Agriculture, Navsari Agricultural University, Navsari to generate more scientific information with suitable management strategies.

Materials and method

The roving field survey was conducted during *kharif* 2020-21 and 2021-22 in chilli growing areas in Navsari, Surat and Valsad districts to know the intensity of anthracnose disease on chilli. In each district, fields at villages were surveyed based on the availability of fields [Table-1]. In each field, 15 plants were selected randomly by diagonal walk method and diseased samples which shown typical symptoms were collected.

The average per cent disease intensity of anthracnose was worked out by using following 0-9 scale formula given by Datar and Mayee (1986) [2].

The disease intensity was worked out as below to calculate per cent disease intensity by using following formula given by Wheeler (1969) [3] [Fig-1].

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

Where, PDI-Per cent disease intensity, 0-No infection, 1-1-10 % infection, 3-11-25 % infection, 5-26-50 % infection, 7-51-75 % infection, and 9- > 75 % infection.



Fig-1 Disease rating scale (0-9) for chilli anthracnose

Result and Discussion

A roving survey of chilli fields from three districts viz., Navsari, Surat and Valsad of South Gujarat region of the Gujarat state was carried out during *kharif* 2020-21 and 2021-22 season to record intensity of anthracnose disease of chilli [Photo-2]. The village-wise disease intensity is presented in [Table-2] and depicted in [Fig-2, 3 and 4]. Results shown that during *kharif* 2020-21 average anthracnose disease intensity in the districts surveyed ranged from 38.65 per cent to 49.08 per cent. However, the chilli crops grown in the district of Valsad were found to be affected more severely with maximum average anthracnose disease intensity (49.08 %). This was followed by the Navsari and Surat districts with average anthracnose disease intensity of 43.80 and 38.65 per cent, respectively. During *kharif* 2021-22, anthracnose disease intensity was found to shown similar trend to that of *kharif* 2020-21. Average anthracnose disease intensity in the three districts surveyed during *kharif* 2021-22 ranged from 37.21 to 53.55 per cent. However, maximum average anthracnose disease intensity (53.55 %) was found in the chilli fields of Valsad district.

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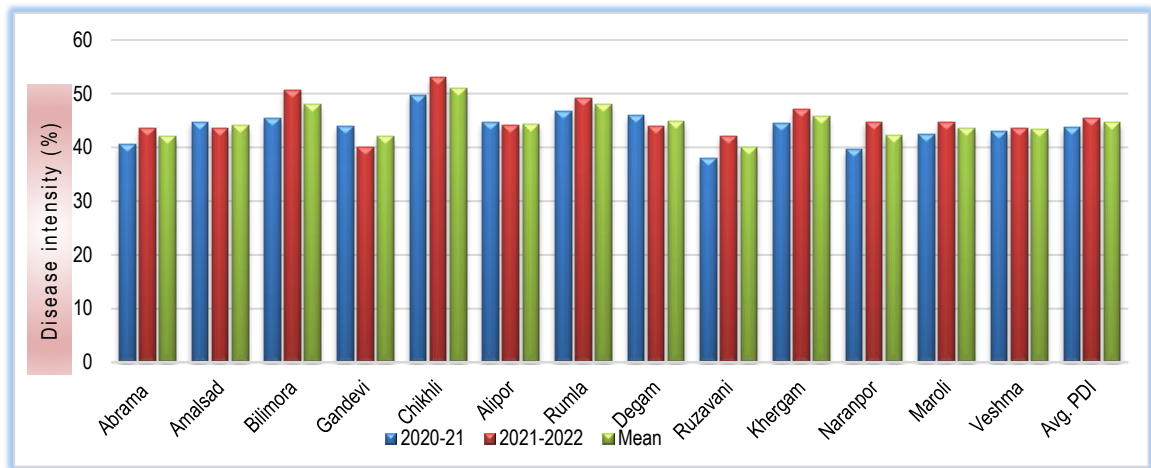


Fig-2 Disease intensity (%) of chilli anthracnose at different villages in Navsari district

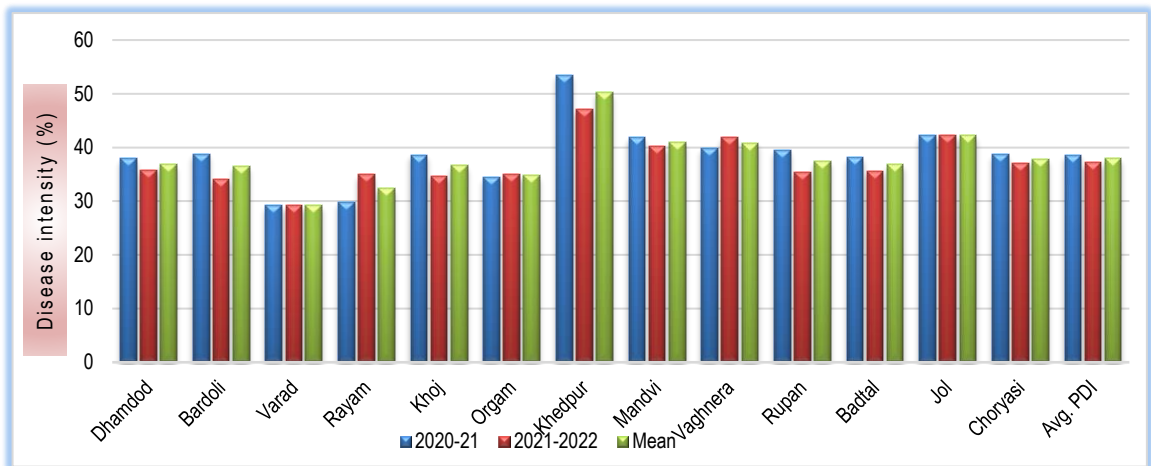


Fig-3 Disease intensity (%) of chilli anthracnose at different villages in Surat district

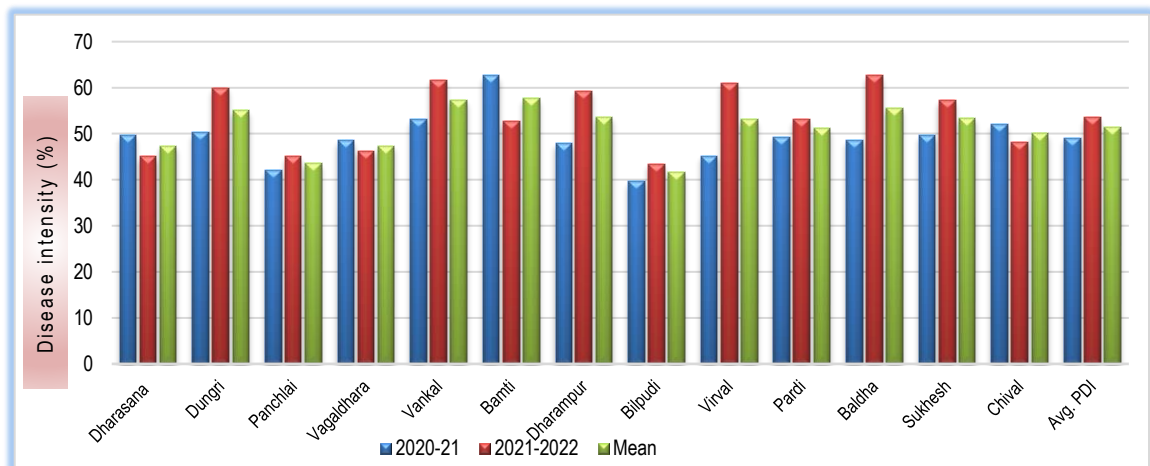


Fig-4 Disease intensity (%) of chilli anthracnose at different villages in Valsad district

This was followed by the Navsari and Surat districts with average disease intensity of 45.47 and 37.21 per cent, respectively. In Navsari district, highest disease intensity 49.77 per cent and 53.03 per cent was observed in Chikhli village during the *kharif* 2020-21 and 2021-22, respectively and second highest disease intensity (46.71 %) during *kharif* 2020-21 was recorded in Rumla village. While during *kharif* 2021-22, second highest disease intensity 50.66 per cent was recorded in Bilimora village. Minimum disease intensity 37.92 per cent and 42.12 per cent was observed in Ruzavani village during the late *kharif* 2020-21 and 2021-22 respectively [Table-2 and Fig-2]. In Surat district, maximum disease intensity 53.48 per cent and 47.10 per cent was recorded in Khedpur village followed by Jol

village 42.26 per cent and 42.29 per cent and minimum disease intensity was observed in Varad village 29.13 per cent and 29.18 per cent during the *kharif* 2020-21 and 2021-22, respectively [Table-2 and Fig-3]. However, in Valsad district, maximum disease intensity (62.66 %) during *kharif* 2020-21 was recorded in Bamti village. While during *kharif* 2021-22, maximum disease intensity (62.64 %) was recorded in Balsha village. Second highest disease intensity was observed in village Vankal 53.06 per cent and 61.71 per cent during the *kharif* 2020-21 and 2021-22, respectively. Minimum disease intensity was observed in Bilpudi village 39.55 per cent and 43.48 per cent during the *kharif* 2020-21 and 2021-22, respectively [Table-2 and Fig-4].



Fig-5 Surveyed fields of Navsari, Surat and Valsad district

Table-1 Details of villages surveyed during kharif 2020-21 and 2021-22 for anthracnose of chilli

Navsari district			Surat district			Valsad district		
Village	No. of fields surveyed		Village	No. of fields surveyed		Village	No. of fields surveyed	
	2020-21	2021-22		2020-21	2021-22		2020-21	2021-22
Abrama	3	3	Dhamdod	3	3	Dharasana	2	2
Amalsad	3	3	Bardoli	3	3	Dungri	1	3
Bilimora	3	2	Varad	3	3	Panchlai	3	3
Gandevi	2	3	Rayam	2	3	Vagaldhara	2	3
Chikhli	3	3	Khoj	3	3	Vankal	3	3
Alipor	3	3	Orgam	2	3	Bamti	3	2
Rumla	3	3	Khedpur	3	3	Dharampur	3	3
Degam	3	2	Mandvi	2	2	Bilpudi	2	3
Ruzavani	2	3	Vaghnera	2	2	Virval	3	3
Khergam	2	3	Rupan	3	3	Pardi	3	2
Naranpor	3	3	Badtal	3	3	Balda	3	3
Maroli	3	2	Jol	3	2	Sukhesh	3	3
Veshma	2	3	Choryasi	3	3	Chival	2	1
Total No. of Fields	35	36	-	35	36	-	33	34

Table-2 Disease intensity (%) of anthracnose disease of chilli at different villages of South Gujarat

Navsari district				Surat district				Valsad district			
Village	PDI			Village	PDI			Village	PDI		
	2020-21	2021-22	Mean		2020-21	2021-22	Mean		2020-21	2021-22	Mean
Abrama	40.63	43.65	42.14	Dhamdod	37.92	35.84	36.88	Dharasana	49.62	45.07	47.34
Amalsad	44.73	43.60	44.16	Bardoli	38.81	34.06	36.43	Dungri	50.22	59.91	55.06
Bilimora	45.32	50.66	47.99	Varad	29.13	29.18	29.15	Panchlai	42.02	45.03	43.52
Gandevi	43.99	40.09	42.04	Rayam	29.84	34.95	32.39	Vagaldhara	48.44	46.26	47.35
Chikhli	49.77	53.03	51.04	Khoj	38.61	34.71	36.66	Vankal	53.06	61.71	57.38
Alipor	44.68	44.09	44.38	Orgam	34.43	35.06	34.74	Bamti	62.66	52.66	57.66
Rumla	46.71	49.25	47.98	Khedpur	53.48	47.10	50.29	Dharampur	47.94	59.34	53.64
Degam	45.97	43.94	44.95	Mandvi	41.84	40.19	41.01	Bilpudi	39.55	43.48	41.51
Ruzavani	37.92	42.12	40.02	Vaghnera	39.85	41.84	40.84	Virval	45.18	61.03	53.10
Khergam	44.58	47.06	45.82	Rupan	39.55	35.35	37.45	Pardi	49.27	53.03	51.15
Naranpor	39.65	44.71	42.18	Badtal	38.12	35.65	36.88	Baldha	48.58	62.64	55.61
Maroli	42.46	44.78	43.62	Jol	42.26	42.29	42.27	Sukhesh	49.62	57.26	53.44
Veshma	43.10	43.65	43.37	Choryasi	38.72	37.03	37.87	Chival	51.92	48.14	50.03
Avg. PDI	43.80	45.47	44.63	-	38.65	37.21	37.93	-	49.08	53.55	51.31

The data revealed that among the villages of three districts, disease intensity was lowest (29.13 % and 29.18 %) in Varad village of Surat district with mean average disease intensity of 29.15 per cent. Highest disease intensity of 62.66 per cent was observed in Bamti village of Valsad district during *kharif* 2020-21, followed by 62.64 per cent was disease intensity observed in Balda village of Valsad district during *kharif* 2021-22, and highest average mean disease intensity 57.66 per cent was observed in Bamti village of Valsad district. Overall average mean anthracnose disease intensity was found to be maximum (51.31 %) in Valsad district. This was followed by Navsari (44.63 %) and Surat (37.93 %) district.

The results revealed that the PDI varied from location to location. However, the anthracnose disease was found in almost all the chilli fields surveyed. In those fields having continuous cultivation of the chilli there was recurrent appearance of the disease. In the fields with the previous record of anthracnose over the years, the disease was found more severe. The overall average disease intensity was

more in Valsad district. This may be due to favorable weather conditions for anthracnose disease development in Valsad district.

Present finding was supported with the findings of present results which were in conformity with the findings by Thind and Jhoo (1985) [4]. 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) [5] conducted a survey on anthracnose of chilli in different district of north Gujarat viz., Banaskantha, Sabarkantha, Patan and Mehsana. He reported that chilli crop was severely infected by anthracnose which cause yield losses ranged between 21.12 to 64.41 per cent. Ragul *et al.* (2021) [6] conducted a survey to assess the incidence of chilli anthracnose during 2020-2021 at three districts in Southern districts of Tamil Nadu, and they reported maximum disease incidence (55.19 %) was observed in Subramaniapuram village of Thoothukudi district and Pudhupatti village (50.37 %) of Virudhunagar district.

Sachin and Tomar (2022) [7] conducted a survey to assess the incidence of chilli anthracnose during 2019-20 and 2020-21 at different districts of Madhya Pradesh, and they reported percent disease intensity of both of the year the, the PDI was ranges from 45.26 per cent to 50.69 per cent. The maximum percent disease intensity was recorded in the Ashta block (50.69 %) while the minimum percent disease intensity was found in Sehore (45.26 %) block of Madhya Pradesh. The mean percent disease intensity was calculated (47.54 %).

Conclusion

Survey studies indicated that anthracnose disease of chilli was most common and widely distributed in all the three districts of South Gujarat region. Maximum mean disease intensity (51.31 %) was recorded in Valsad district followed by Navsari district (44.63 %) and least mean disease intensity in Surat district (37.93 %). However, among the three districts, viz., Navsari, Surat and Valsad maximum disease intensity was recorded in Valsad district.

Application of research: Study of chilli anthracnose caused by *Colletotrichum* sp. and it's management

Research Category: Plant Pathology

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Study area / Sample Collection: South Gujarat, India

Cultivar / Variety / Breed name: Chilli (*Capsicum annum* L.)

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Ethical Committee Approval Number: Nil

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