



INTENSITY OF ANTHRACNOSE DISEASE (*Colletotrichum capsici* Sydow.) ON CHILLI CROP IN JAUNPUR DISTRICT REGION OF EASTERN U.P.

Manoj Kumar Yadav* and Ramesh Singh

Department of Plant Pathology, Tilak Dhari (P.G.) College, Jaunpur (U.P.) India

*Corresponding Author's E-mail: manojyadav514821@gmail.com

ABSTRACT: Anthracnose, caused by *Colletotrichum capsici*, is one of the most destructive diseases of chilli which causes a chief hindrance in chilli production. Typical anthracnose symptoms on chilli fruit appear as sunken necrotic tissues with concentric rings of acervulii. To assess the incidence and severity of anthracnose disease on chilli crop, a survey was conducted in 5 chilli growing areas of Jaunpur district of Eastern Uttar Pradesh. During the survey it was observed that percentage of incidence was more in green fruit and leaves than older parts.

Keywords : *Colletotrichum capsici*, chilli, survey, disease incidence.

Chilli (*Capsicum annuum* L.), belonging to the family Solanaceae, is an important vegetable, spice as well as a commercial crop in India. Chillies are used as green, ripe or ripe dried. It contains good nutrition and 'capsaicin', which is an alkaloid and is being used in medicines. Vitamin C is present in more quantities in fresh green chillies than citrus fruits and Vitamin A is high in red chilli than carrots. Colour of the chilli is due to presence of carotenoids and presence of numerous chemicals and mineral elements impart nutritional value to chilli (Thind and Jhooty, 9; Amusa *et al.*, 3; and Martin *et al.*, 5).

Chilli crop is susceptible for many diseases, viz. fungal, bacterial, viral and nematode diseases. Among all the diseases, seed borne fungal diseases, anthracnose (*Colletotrichum capsici*) and leaf spot (*Alternaria solani*) reduce seed germination and cause yield loss up to 30-60%. The anthracnose caused by *Colletotrichum capsici* (Sydow.) is a major problem which limits the yield in chilli growing areas of India. Chilli is an important economic crop worldwide and is severely infected by anthracnose which may cause up to 50% (Pakdeevaporn *et al.*, 6) or even 84% yield losses due to attack of *Colletotrichum capsici* (Than *et al.*, 8; Thind and Jhooty, 9). The seed borne fungal pathogens not only affect the market value of fruits but, also adversely affect the nutritive value. *Colletotrichum* is a large genus of Ascomycetes fungi, containing species that cause anthracnose disease on wide range crops of economic value.

To reduce crop losses and prevent the damage, it is important to know that which type of fungus cause

losses and which parts are affected by a specific fungus. By keeping the importance of chilli, the present survey was done for two successive years to the investigate the disease incidence *Colletotrichum capsici* (Sydow) in 5 tehsils of Jaunpur district viz. Shahganj, Badlapur, Jaunpur, Mariahu, Kerakat.

MATERIALS AND METHODS

The survey of anthracnose disease in chilli crop was conducted in 5 locations (5 tehsils) of Jaunpur district of Eastern U.P. during 2012-13 and 2013-14 to to assess severity of incidence of *Colletotrichum capsici* (Sydow). Disease intensity was observed according to the disease assessment done in 5 locations. Data were collected from the different sites through the application of participatory research appraisal tools and techniques, such as direct observation, group discussions, individual interviews, and field visits using a questionnaire following procedure of Adjatin *et al.* (1)).

The calculation of the mean anthracnose disease incidence of each location assessed by using following formula-

$$\text{PDI (Per cent Disease Index)} \\ = \frac{\text{No. of sample infected fruit}}{\text{Total no. of fruit per plant}} \times 100$$

Jaunpur district has a climate consistent with that of the Northern Plain and Central Highlands including the *Aravalli* range, hot semi-arid eco-region 4.3 and hot dry eco-region 9.2. The temperature varies between 4°C (39°F) and 44°C (111°F). The annual normal rainfall is 1,098 millimetres (43.2 in). The monsoon season occurs from the third week of June to the first

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Table 1: Selected locations and plants to assess anthracnose disease incidence on chilli crop.

Location	Total no. of selected plants	Total no. of observed fruits	No. of infected fruits	Per cent disease incidence
Shahganj	15	2508	1286	51.27
Badlapur	15	3148	1419	43.69
Jaunpur	15	1054	546	49.27
Mariahu	15	1097	592	47.84
Kerakat	15	986	518	50.08
Total	75	6012	2963	45.10

Table 2: Per cent disease incidence of chilli anthracnose in Shahganj and Badlapur location of Jaunpur district.

Sl. No. of selected plants	Total no. of observed fruits		No of infected fruits		Per cent disease incidence	
	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Shahganj Tehsil						
1	38	42	16	19	42.10	45.23
2	155	161	46	55	29.67	52.79
3	89	81	39	35	43.82	43.20
4	97	92	42	46	43.29	50.00
5	125	114	66	78	52.8	68.42
6	145	137	67	85	46.20	62.04
7	78	66	40	35	51.28	53.03
8	36	30	20	18	55.55	60.00
9	185	172	78	92	42.16	53.48
11	98	86	48	40	48.97	46.51
12	75	76	38	34	50.66	44.73
13	79	83	29	47	36.70	56.62
14	29	35	11	21	37.93	60.00
15	46	58	35	33	78.08	56.89
Total	1275	1233	575	711	47.86	57.66
Badlapur Tehsil						
1	87	92	37	45	42.52	48.91
2	158	145	58	53	36.70	36.55
3	154	158	74	83	48.05	52.53
4	140	135	72	61	51.42	45.18
5	162	153	95	87	58.64	56.86
6	86	78	43	35	50.00	44.87
7	130	134	56	55	43.07	41.04
8	152	142	63	51	41.44	35.91
9	95	94	37	32	38.94	34.04
11	53	49	23	18	43.39	36.73
12	65	55	39	29	60.00	52.72
13	98	92	28	34	28.57	36.95
14	141	138	58	56	41.13	40.57
15	79	83	49	48	62.02	57.83
Total	1600	1548	732	687	43.05	44.33

week of October. Normally, there are 46 rain days per year of which 31 occur in the monsoon season. The district regularly suffers drought and pestilence (Anon., 2).

RESULTS AND DISCUSSION

The survey on anthracnose disease was conducted in 5 purposively selected locations (Table 1) of Jaunpur district in Eastern Uttar Pradesh. During the survey, so many biotic and abiotic constraints were appeared. The most important were leaves, flowers

Table 3: Per cent disease incidence of chilli anthracnose in Jaunpur, Mariahu and Kerakat tehsils of Jaunpur district.

Sl. No. of selected plants	Total no. of observed fruits		No. of infected fruits		Per cent disease incidence	
	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Jaunpur Tehsil						
1	87	78	43	41	49.42	52.56
2	83	72	50	48	60.24	66.66
3	75	86	26	24	34.66	27.90
4	78	83	34	36	43.58	43.37
5	68	65	38	40	55.88	61.53
6	87	85	39	36	44.82	42.35
7	58	55	28	21	48.27	38.18
8	73	69	41	39	56.16	56.52
9	47	53	33	36	70.21	67.92
11	75	80	46	44	61.33	55.00
12	49	56	29	31	59.61	55.35
13	96	91	37	32	38.54	35.16
14	105	103	56	51	53.33	49.51
15	73	75	46	42	63.01	56.00
Total	1054	1051	546	521	49.27	50.58
Mariahu Tehsil						
1	56	61	31	33	55.35	54.09
2	132	126	78	73	59.00	57.93
3	92	96	65	67	70.65	69.79
4	96	88	48	43	50.00	48.86
5	35	34	21	18	60.00	52.94
6	91	86	43	45	47.25	52.32
7	83	92	43	48	51.80	52.17
8	71	68	44	39	61.97	57.35
9	96	99	46	50	47.91	50.50
11	32	38	24	26	75.00	68.42
12	93	91	37	39	39.78	42.85
13	68	65	35	37	51.47	56.92
14	84	87	42	49	50.00	56.32
15	68	72	35	42	51.47	58.33
Total	1097	1103	592	609	47.84	55.62
Kerakat Tehsil						
1	44	51	25	26	56.81	58.86
2	82	78	38	35	46.34	44.87
3	46	53	27	31	58.69	58.49
4	83	72	39	35	46.98	48.61
5	99	103	42	45	43.75	43.68
6	94	85	62	55	65.95	64.70
7	56	72	36	46	64.28	63.88
8	82	90	42	49	51.21	54.44
9	78	85	38	51	48.71	60.00
11	34	38	20	26	58.82	68.42
12	63	70	46	42	73.01	60.00
13	58	69	24	31	41.37	44.92
14	89	70	37	35	41.57	50.00
15	78	83	42	40	53.84	48.19
Total	986	1019	518	547	50.08	54.93

and fruits attacked by insect pests, viral diseases, organ fall (leaves, flowers, fruits) of the plant, and damping-off, among them anthracnose appeared a serious disease which caused huge losses to chilli production. Impact of anthracnose on chilli production (yield losses reaching up to 90%) is, now a days, well documented worldwide. During the survey the data were observed from 5 selected locations viz. Shaganj, Badlapur, Jaunpur, Mariahu and Kerakat Tehsils of Jaunpur district. The data were recorded in the both the year i.e. 2012-13 and 2013-14. For the calculation of disease incidence in each area, selected 15 chilli plants and counted each plant total number of fruits and infected fruits. In the Shahganj tehsil, there were randomly selected 15 locations and each selected location tagged 15 plants for data observation. In the year 2012-13, a total of 1275 plants were selected out of which 575 plants were found infected and average disease incidence was 47.86 per cent. Similar process was continued in the year 2013-14 and the data were observed from the same selected location and counted 1233 plants from 15 selected locations out of them 711 plants were found infected with incidence intensity of 57.66 per cent (Table 2). The disease incidence in 2013-14 was more than in 2012-13 because of the environmental condition was favourable for fungal growth. In the Badlapur tehsil, among 1600 plant selected in the year 2013, 732 plants were found infected with the anthracnose disease with average disease incidence of 43.5 per cent. In next year, 2013-14, the disease incidence was 44.33 per cent in 1548 total plants with 687 infected plants (Table 2). In the Jaunpur tehsil region, a total of 1054 plants were selected out of them 546 plants were infected with 49.27 per cent disease incidence in the year 2012-13 (Table 3). Among 1051 plants selected from 15 locations in 2013-14, 521 plants were found infected with disease intensity of 50.58 per cent. In Mariahu tehsil, 1097 plants were selected for observation, among which 592 plants were infected with incidence of 47.84 per cent during 2012-13. In the same locations, the data collected in 2013-14, 609 plants were found infected out of 1103 plants where disease incidence was 55.62 per cent (Table 3). The last selected locations was Kerakat tehsil of Jaunpur districts from where in 15 selected locations, total 986 plants were selected among which 518 plants were infected with 50.58 per cent disease incidence during 2012-13. In the same locations, the data were observed during 2013-14 and 1019 plants were selected in which 547 plants were found infected with disease incidence of 54.93 per cent. Among all locations, the Kerakat Tehsil showed the maximum average diseases incidence in the both of the year i.e.

2012-13 and 2013-14. These results are similar to those reported by Park *et. al.* (7) and Krishnareddy *et. al.* (4).

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