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Disease status of alternaria leaf blotch of apple in Kashmir valley

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Abstract

The present study was carried out in Budgam district of Kashmir valley as this is one of the emerging apple growing area of Jammu and Kashmir and the economy of the UT primarily depends upon this remunerative crop. Every season the crop is suffered from Alternaria leaf blotch in wet climate and has been appearing in moderate to severe form in different apple growing areas of Budgam district of Jammu and Kashmir. The mean disease incidence and disease severity varied between 27.30 to 60.30 percent and 11.74 to 25.93 percent, respectively for two consecutive years 2021 and 2022.

Keywords: Disease, alternaria, Kashmir, valley, apple

Introduction

Apple (*Malus × domestica* Borkh.) belongs to family Rosaceae and it is the most important fruit crop grown extensively in temperate regions of the world. The commercial cultivation of apple fruit in India is confined to North Himalayan hill region comprising the states of Jammu & Kashmir, Himachal Pradesh and Uttarakhand and to a limited extent to the states of Arunachal Pradesh, Sikkim, Nagaland, Meghalaya and Manipur covering a total area of 3.08 lakh ha with production of 23.16 lakh tons and productivity of 7.52 tons per hectare (Anonymous, 2018a, Chhagan *et al.*, 2019) [2, 15]. In Jammu & Kashmir, the area under apple is 1.65 lakh ha and 18.82 lakh tons and productivity is around 11.40 tons per hectare (Anonymous, 2018b, Singh *et al.*, 2021) [16]. Out of which Budgam accounts for 13777 hectares with production of about 148276 tons (Anonymous, 2018b) [3].

Like other horticultural crops apple is also attacked by several pathogens which impair the quality and quantity of the fruit (Grove *et al.*, 2003, Babu *et al.*, 2023) [7, 13]. Apple crop is attacked by more than 70 plant diseases, of which the majority is caused by pathogenic fungi (Madhu *et al.*, 2020) [9]. A number of diseases like scab, Alternaria leaf blotch, Marsonena, Sooty blotch, Fly-speck and a number of post-harvest diseases have been reported to cause losses in apple. Among the foliar diseases, Alternaria leaf blotch caused by *Alternaria mali* is one of the most serious disease causing premature leaf fall in apple. The occurrence of Alternaria leaf blotch in J&K was reported by Shahzad *et al.* (2002) [11] and the disease is prevalent in almost all the apple growing districts of Kashmir valley (Sofi *et al.*, 2013, Nazir *et al.*, 2020) [10, 14]. Alternaria leaf blotch was considered a disease of minor importance in comparison to apple scab. However, the disease resulted in epidemic during summer of 2013, and about 40-60 percent yield loss was reported (Anonymous, 2013) [1].

Materials and Methods

Disease incidence and severity

The status of the disease was ascertained by undertaking systematic surveys in the month of August and September in the year 2021 and 2022 in Budgam district of Jammu and Kashmir. Three representative regions were selected from the district and the number of sites from each region were twelve and three orchards were selected from each site. Apple leaves were selected randomly for estimation of the disease incidence. Total number of leaves examined and the number of leaves showing Alternaria leaf blotch symptoms were recorded from each orchard and percent disease incidence was calculated by using the formula.

$$\text{Disease Incidence (\%)} = \frac{\text{No. of diseased leaves}}{\text{Total no. of leaves observed}} \times 100$$

To calculate percent disease severity of *Alternaria* leaf blotch, randomly collected hundred leaves per plant were selected. The *Alternaria* leaf blotch intensity was recorded as per the modified 0-5 scale of Filajdic and Sutton (1991) [6].

Table 1: Category numerical value criteria

Category	Numerical Value	Criteria
I.	0	Disease free
II.	1	>0- ≤3% leaf area covered with disease lesions
III.	2	>3-≤6% leaf area covered with disease lesions
IV.	3	>6-≤12% leaf area covered with disease lesions
V.	4	>12-≤25% leaf area covered with disease lesions
VI.	5	>25% leaf area covered with disease lesions or chlorotic leaf with petiole infection

Disease intensity was estimated as

$$\text{Disease Intensity(\%)} = \frac{\text{Sum of all numerical ratings}}{\text{Total no. of leaves observed} \times \text{maximum disease grade}}$$



Fig 1: *Alternaria* blotch symptoms on apple leaves

Results and Discussion

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads

Disease incidence and severity

Perusal of data (Table 2) revealed that maximum mean disease incidence upto an extent of 60.30 percent on leaves was recorded in the apple orchards at wanbal followed by

chadoora (59.80%) whereas, minimum (27.30%) was recorded at Chawni in district Budgam. Perusal of data presented in Table 3 revealed that maximum mean disease severity on leaves was recorded in apple orchards at wanbal (25.93%) followed by chadoora (25.71%) whereas, minimum (11.74%) at Chawni in Budgam district. Bhat *et al.*, 2015 [4] and Chauhan *et al.*, 2019 [12] also reported *Alternaria* leaf blotch caused by *Alternaria mali* from Kashmir valley (Budgam district) and Himachal Pradesh (Shimla district).

Table 2: Disease incidence of Alternaria leaf blotch of apple at different locations of apple growing district of Kashmir valley during 2021 and 2022

District	Location	Disease Incidence (%)		
		2021	2022	Pooled mean
Budgam	Kralpora	43.58	51.80	47.69
	Borowa	44.20	51.20	47.70
	Lolipora	41.60	50.80	46.20
	Dadaompورا	54.40	56.60	55.50
	Surasyar	52.00	55.80	53.90
	Badipora	53.80	55.60	54.70
	Hanjoora	55.40	57.40	56.40
	Zoohama	54.60	56.80	55.70
	Wagam	55.80	57.60	56.70
	Kanir	58.40	61.00	59.70
	Chadoora	56.60	63.00	59.80
	Wanbal	57.60	63.00	60.30
	Malpora	44.00	47.60	45.80
	Budgam	42.60	46.00	44.30
	Radbugh	43.00	47.40	45.20
	Chairhara	46.00	48.80	47.40
	Makhama	46.00	48.40	47.20
	S.K. Pora	46.40	49.40	47.90
	Kanihama	49.00	52.40	50.70
	Panches	47.80	51.00	49.40
	Badran	46.80	50.60	48.70
	Chairhara	52.00	53.40	52.70
	Mazhama	51.80	53.80	52.80
	Kantbag	51.80	54.60	53.20
	Zinpanchal	26.60	28.80	27.70
	Chawni	26.40	28.20	27.30
	Zaipora	26.00	29.40	27.70
	Hapatnar	29.40	31.60	30.50
	Zaloosa	29.20	32.00	30.60
	Malpora	28.40	30.80	29.60
Zaipora	30.20	32.40	31.30	
Hayatpora	30.60	32.60	31.60	
Dardpora	28.60	31.20	29.90	
Telsur	32.40	33.60	33.00	
Futlipora	31.60	33.20	32.40	
Lolipora	31.60	34.00	32.80	
Mean		42.95	46.16	

Table 3: Disease severity of Alternaria leaf blotch of apple at different locations of apple growing district of Kashmir valley during 2021 and 2022

District	Location	Disease severity (%)		
		2021	2022	Pooled mean
Budgam	Kralpora	18.73	22.27	20.50
	Borowa	19.00	22.01	20.51
	Lolipora	17.88	21.84	19.86
	Dadaompورا	23.39	24.33	23.86
	Surasyar	23.36	23.99	23.68
	Badipora	23.13	23.90	23.52
	Hanjoora	23.82	24.68	24.25
	Zoohama	23.47	24.42	23.95
	Wagam	23.99	24.76	24.38
	Kanir	25.11	26.23	25.67
	Chadoora	24.33	27.09	25.71
	Wanbal	24.76	27.09	25.93
	Malpora	18.92	20.46	19.69
	Budgam	18.31	19.78	19.05
	Radbugh	18.49	20.38	19.44
	Chairhara	19.78	20.98	20.38
	Makhama	19.78	20.81	20.30
	S.K. Pora	19.95	21.24	20.60
	Kanihama	21.07	22.53	21.80
	Panches	20.55	21.93	21.24

Badran	20.12	21.75	20.94
Chairhara	22.36	22.96	22.66
Mazhama	22.27	23.13	22.70
Kantbag	22.27	23.47	22.87
Zinpanchal	11.48	12.38	11.93
Chawni	11.35	12.12	11.74
Zaipora	11.18	12.64	11.91
Hapatnar	12.64	13.58	13.11
Zaloosa	12.55	13.56	13.06
Malpora	12.21	13.24	12.73
Zaipora	12.98	13.93	13.46
Hayatpora	13.15	14.01	13.58
Dardpora	12.29	13.41	12.85
Telsur	13.93	14.44	14.19
Futlipora	13.58	14.27	13.93
Lolipora	13.58	14.62	14.10
Mean	18.49	19.84	

Higher disease incidence and intensity in various locations surveyed could be attributed to lower altitude areas of a location, higher plant density, non-disposal of the fallen diseased leaves, predominance of old and senile orchards, canopy type, leaf type, extensive presence of susceptible delicious cultivars, non-adherence of practice of orchard sanitation, use of inappropriate or spurious fungicides. Bhat *et al.*, 2015 ^[4] also reported the epidemic of *Alternaria* of apple in lower belts of Budgam district. The lesser disease incidence and intensity could be attributed to higher altitude, lesser plant density and better orchard management.

The overall variation in disease severity may be because of the variation in various factors like altitude, climate, temperature, delayed rains, canopy, plant age and management practices. The variation in incidence and intensity of *Alternaria* leaf blotch disease in various locations have previously been reported by Filajdic and Sutton, 1991 ^[6]; Bulajic *et al.*, 1996 ^[5]. Bhat *et al.*, 2015 ^[4] and Shahzad, 2003 ^[8] also reported the occurrence of *Alternaria* leaf blotch (*Alternaria mali*) on apple from the orchards in Kashmir valley.

Conclusion

Alternaria leaf blotch of apple is a matter of concern, due to its potential to cause foliar damage, reduce fruit quality and yield, and impose economic challenges on growers. The overall mean PDI in district Budgam was maximum at Wanbal followed by Chadoora whereas minimum at Chawni. The Effective disease management strategies based on the prevalence of *Alternaria* leaf blotch of apple in Kashmir are crucial to mitigate the impact of *Alternaria* leaf blotch and maintain the health and productivity of apple orchards.

References

1. Anonymous. Spurious Pesticides, bad weather spoil 60% of apple production. The Daily Kashmir Times; 2013 September 22.
2. Anonymous. NHB Statistical Database; c2018a. <http://www.nhb.gov.in>
3. Anonymous. Area and production under major horticulture crops in Jammu and Kashmir. Directorate of Horticulture, Kashmir; c2018b. <http://hortikashmir.gov.in/DATA/AREA%20PROD%20NET>.
4. Bhat KA, Peerzada SH, Anwar A. *Alternaria* epidemic of apple in Kashmir. African journal of microbiology research. 2015;9(12):831-837.
5. Bulajic A, Filajdic N, Babovic M, Sutton TB. First report of *Alternaria mali* of apples in Yugoslavia. Plant Disease. 1996;80(6):709.
6. Filajdic N, Sutton TB. Identification and distribution of *Alternaria mali* on apples in North Carolina and susceptibility of different varieties of apple to *Alternaria* blotch. Plant Disease. 1991;75:1045-1048.
7. Grove GG, Eastwell KC, Jones AL, Sutton TB. Diseases of apple. In: Apples: botany, production and uses (Eds. Ferree DC and Warrington IJ. Wallingford, United Kingdom: CABI Publishing; c2003. p. 459-488.
8. Shahzad A. Studies on *Alternaria* leaf blotch of apple in Kashmir. Ph.D. (Ag.) Thesis, Post Graduate Faculty, Shere- Kashmir University of Agricultural Sciences and Technology, Shalimar, Kashmir; c2003. p. 112.
9. Madhu GS, Sajad Un Nabi, Mir JI, Raja WH, Sheikh MA, Sharma OC, *et al.* *Alternaria* leaf and fruit spot in apple: Symptoms, cause and management. European Journal of Biotechnology and Bioscience. 2020;8:24-26.
10. Sofi TA, Muzafer AB, Dar GH, Ahangar FA, Hamid A. Virulence variation in *Alternaria mali* (Roberts) and evaluation of systemic acquired resistance (SAR) activators for the management of *Alternaria* leaf blotch of apple. American Journal of Food and Agriculture. 2013;25(3):196-204.
11. Shahzad A, Bhat GN, Mir NA. *Alternaria mali*-A new pathogen of apple in Kashmir. SKUAST Journal of Research. 2002;4:96-98.
12. Praneet C, Gupta AK. Disease status of *Alternaria* blotch of apple in Himachal Pradesh, India. International Journal of agricultural Sciences. 2019;15(1):56-59.
13. Babu S, Das A, Singh R, Mohapatra KP, Kumar S, Rathore SS, *et al.* designing an energy efficient, economically feasible, and environmentally robust integrated farming system model for sustainable food production in the Indian Himalayas. Sustainable Food Technology, 2023;1(1):126-142.
14. Nazir SF, Singh L, Shah BA, Ali ORI. Rice-Wheat cropping system under changing climate scenario: A review. Journal of Pharmacognosy and Phytochemistry. 2020;8(2):1907-1914.
15. Chhagan BR, Sharma MP, Sharma KR, Samanta A, Owais AW, Kachroo D, *et al.* Impact of organic, inorganic and biofertilizers on crop yield and N, P and K uptake under rainfed maize-wheat cropping system. International Journal of Current Microbiology and

Applied Science. 2019;8(4):2546-2564.

16. Singh G, Batra N, Salaria A, Wani OA, Singh J. Groundwater quality assessment in Kapurthala district of central plain zone of Punjab using hydrochemical characteristics. Journal of Soil and Water Conservation. 2021;20(1):43-51.