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Research Article

Prevalence of Powdery Mildew in Cucumber Growing Areas in North Eastern Karnataka, India

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ABSTRACT

Cucumber (Cucumis sativus L.) is one of the oldest cultivated vegetable crop belongs to family cucurbitaceae. Powdery mildew is a serious disease of cucumber, caused by Erysiphe cichoracearum (DC). To know the severity and surveillance of powdery mildew of cucumber a roving survey was carried out during 2017-18 Raichur, Kalaburgi and Yadagiri districts of North Eastern Karnataka. Among the three districts surveyed, maximum disease severity was observed in Raichur district with mean per cent disease index (PDI) of 36.61 followed by Yadagiri with mean PDI of 34.83 and minimum mean PDI of 30.31 recorded in Kalaburgi district. Among all the villages surveyed, maximum mean PDI (55.66) recorded in Palakamdoddi village of Raichur taluk, whereas least mean PDI (18.44) recorded in Kopper village of Devadurga taluk.

Key words: *Cucumber, Survey, Powdery mildew, Erysiphe cichoracearum (DC).*

INTRODUCTION

Cucumber (*Cucumis sativus* L.) is a very important vegetable crop grown throughout the year. Cucumber is a broadly cultivated vegetable and it is a creeping vine that bears cucumiform flowers, end result which can be used as greens. Family Cucurbitaceae consists of approximately 118 genera and 825 species. In India, a number of major and minor cucurbits are cultivated, which share about 5.6 per cent of the total vegetable production. In India approximately 112 open pollinated varieties of several cucurbits have been recommended for cultivation at national and state level. The main goal of research on cucurbitaceous vegetables in India is to improve productivity on sustainable basis through developing biotic and abiotic resistant varieties/hybrids coupled with quality attributes[10]. In India area under cucumber cultivation is 1,30,000 ha with a production of 15,50,000 tonnes. In Karanataka cucumber grown in an area of 8,660 ha with a production of 14,602 tonnes[3]. The vulnerability of this crop to several biotic and abiotic stresses accounts for its low yield potential and in turn the high cost of production. *Alternaria* blight, powdery mildew, downy mildew and cucumber mosaic diseases are the major foliar diseases which are responsible for yield loss and quality parameters in cucumber.

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Among them, Powdery mildew caused by *Erysiphe cichoracearum* (DC) is one of the important diseases causing economic yield loss in recent years. Yield loss due to powdery and downy mildew diseases was estimated to be 50-70 per cent[13]. There is a need for evaluation of disease development in various geographical situations in North Eastern Karnataka by conducting roving survey for the disease to get information on disease distribution, stage of severity, volume of spread and to locate hot spots in cucumber growing areas of North Eastern Karnataka.

MATERIAL AND METHODS

A roving survey was taken up to record the severity of powdery mildew of cucumber in Raichur, Kalaburgi and Yadagiri districts of North Eastern Karnataka during 2017-18. The information on cucumber growing areas was collected from department of Horticulture of respective districts. Details of individual fields visited and necessary information on disease severity was recorded. From each field, five plants were randomly selected and powdery mildew severity was assessed by following 0-9 scale through visual observations[8] as given below.

Score	Description
0	No symptom of powdery mildew on leaves.
1	Small scattered powdery mildew specks covering 1 per cent or less leaf area.
3	Small powdery lesions covering 1-10 per cent of leaf area.
5	Powdery lesions enlarged covering 11-25 per cent of leaf area.
7	Powdery lesions coalesce to form big patches covering 26-50 per cent leaf area.
9	Big powdery patches covering 51 per cent or more of leaf area and defoliation occur

Per cent Disease Index (PDI) was calculated by using formula given by Wheeler (1969).

$$PDI = \frac{\text{Sum of individual disease ratings}}{\text{Total no. of leaves graded}} \times \frac{100}{\text{Maximum Disease grade}}$$

RESULTS AND DISCUSSIONS

Survey on powdery mildew of cucumber was carried out in three districts of North eastern Karnataka during 2017-18. From the survey data (Table 1) it is revealed that, disease severity varied across locations. However, mean maximum per cent disease index (PDI) was recorded in Raichur district (36.61) followed by Yadagiri district (34.83). Whereas, minimum mean PDI was observed in Kalaburgi district (30.31). Among the three taluks surveyed in Raichur district, maximum mean PDI was noticed in Raichur taluk (43.60) and minimum PDI was observed in Devadurga taluk (26.23). Maximum disease severity was noticed in Palakamdoddi village (55.66) of Raichur taluk and minimum severity of the disease was observed in Kopper village (18.44) of Devadurga taluk.

In Yadagiri district, maximum disease severity was noticed in Rukmapur village (46.17) of Shorapur taluk whereas, minimum severity was observed in Arkera village (28.52) of Yadagiri taluk. Maximum and minimum mean powdery mildew PDI of 37.09 and 33.14 was observed in Shorapur and Yadagiri taluks respectively.

In Kalaburgi district, maximum disease severity was observed in Muoga (K) village (46.86) of Aland taluk whereas, minimum severity was observed Tengli village (21.10) of Chittapur taluk. Among the three taluks surveyed in Kalaburgi district, maximum mean powdery mildew PDI was noticed in Aland taluk (38.45) and minimum PDI was observed in Chittapur taluk (25.34).

Among all the villages surveyed, maximum mean PDI recorded in Palakamdoddi (55.66) and Manchilapur (52.86) villages of Raichur taluk fallowed by Muoga (K) (46.86) village of Aland taluk during 2017-18.

This clearly indicates that the disease severity and development of powdery mildew

depends on factors like location, stage of the crop, cultural practices adopted, inoculums chain due to continues cultivation of same crop and susceptibility of the cultivars grown. Apart from this it also depends on congenial conditions prevailing in that area for disease development.

The highest severity of powdery mildew in Raichur (36.61 %) and Yadagiri (34.83 %) may be due to the temperature, relative humidity, leaf wetness period, morning dew and sunshine hours prevailed during the crop period, which was favourable for the powdery mildew development and spread. Similar types of observations were made by Cheah *et al.*[6] while working with pea powdery mildew.

Prevalence of higher disease intensity in these areas may be due to congenial climatic conditions like relative humidity, cool temperature and susceptible genotypes which might have influenced inoculum multiplication, varied temperature regimes and water content of conidia supported spore germination and infection process of the fungus *E. cichoracearum.* The results are in confirmation with observation of several investigators[11,9,4,5,2]. Results are also in line with Chaudhary *et al.*[7] who reported that, capsicum powdery mildew disease severity was differ between the locations of Himachal Pradesh.

If the age of the crop coincides with favourable weather parameters, development of the disease will be very fast and cause a severe loss. Minimum rainfall, cooler nights and high day temperatures were enough for disease development. Wide variation (13-15 ^{0}C) in the maximum and minimum temperature and day and night relative humidity (39.9-51.7 %) increases powdery mildew intensity as it was noticed in black gram[12].

Powdery mildew thrives in moderate/high temperatures (25 to 35 ^{0}C) and high humidity (90 %) without rainfall or overhead irrigation. Powdery mildew can be a persistent and devastating disease since a severe epidemic will decrease photosynthesis, increase respiration and transpiration, impair vegetative and fruit growth and ultimately reduce yields and fruit quality[1].

Table 1: Severity of powdery mildew of cucumber in different districts of North Eastern Karnataka during 2017-18

District	Taluk	Village	PDI	Mean incidence in taluk	Mean incidence in district
Raichur	Raichur	Palakamdoddi	55.66	**43.60**	**36.61**
		Yapaladinni	40.16		
		Manchilapur	52.86		
		Kalmala	35.12		
		Sidrampur	31.29		
		Chandrabanda	46.66		
	Devadurga	Devargudda	34.32	**26.23**	
		Kopper	18.44		
		Kotigud	28.52		
		Yatgal	26.48		
		Yamanahal	23.42		
	Lingasugur	Halbhavi	42.28	**40.02**	
		Bhupur	39.35		
		Gundasagar	40.25		
		Neeralkera	38.21		
	Aland	Kadaganchi	41.16	**38.45**	
		Muoga (K)	46.86		
		Hipparaga	38.78		
		Nellore	33.29		
		Lad chincholi	32.17		
		Sedam	28.27		

Kalaburgi	Sedam	Kodla	29.23	**28.05**	**30.31**
		Batagera	27.82		
		Mudhol	26.39		
		Handerki	28.56		
	Chittapur	Satnoor	26.28	**25.34**	
		Nalwar	24.13		
		Madbol	29.85		
		Tengli	21.10		
Yadagiri	Shorapur	Kavadimatti	36.79	**37.09**	**34.83**
		Rangampet	34.56		
		Kakkera	36.12		
		Rukmapur	46.17		
		Hunasagi	30.15		
		Devarakeri	38.79		
	Shahapur	Shahapur	30.12	**34.28**	
		Chamanal	43.59		
		Danda solapur	29.45		
		Hukanal	38.12		
		Khanapur	30.12		
	Yadagiri	Kotagera	32.22	**33.14**	
		Belgera	30.19		
		Hattikuni	39.25		
		Arkera	28.52		
		Chandrapur	35.52		

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