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## Survey for the *Septoria* leaf spot of chrysanthemum in Northern parts of Karnataka

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### Abstract

Chrysanthemum (*Dendranthema grandiflora*), is one among the three best merchandisable multi use flower crops facing challenges in production by, weather uncertainties, insects and diseases outbreaks. *Septoria* leaf spot (SLS) a common disease inflicts considerable qualitative and quantitative losses. The current research was conducted to ascertain the severity of SLS in Northern parts of Karnataka. A total of 118 chrysanthemum fields were surveyed in 8 districts during 2019-21 and 2020-21 years were randomly assessed for SLS disease. The mean severity of SLS in Northern parts of Karnataka during the assessment years indicated that, maximum disease severity of 75.00 percent was observed in Doni village of Gadag district followed by Muradi (70.50 PDI) and Nelzeri (69.60 PDI) villages of Koppal district. Moderate disease severity was recorded in Yaragatti (47.50 PDI) followed by Yarazavi (50.50 PDI) villages of Belgavi district and Halagapura (51.50 PDI) village of Vijayanagara district. Whereas, lowest disease severity was observed in Sambra (39.60 PDI) village of Belgavi district followed by Hallekate (43.50 PDI) village of Ballari district. The present findings confirmed the importance of SLS in Northern parts of Karnataka.

**Keywords:** Chrysanthemum, *Septoria*, severity

### 1. Introduction

Chrysanthemum (*Dendranthema grandiflora*) is among the major multi use flower crops. In Karnataka Chitradurga, Tumkur, Kolar, Bengaluru, Chikkaballapur and Doddaballapur are the major growing districts and it is grown mainly for loose flower purpose with leading area of 0.10 lakh hectare and production of 1310.20 lakh tonnes (Anon, 2021)<sup>[1]</sup>. Chrysanthemum flower yield is hampered by multi-faced abiotic and biotic factors. Of biotic factors *Septoria* leaf spot is major threat to flower yield causing serious economic losses. Hence the present investigation was under taken to record the severity of *Septoria* leaf spot in Northern parts of Karnataka.

### 2. Material and methods

#### 2.1 Survey area

Survey for *Septoria* leaf spot of chrysanthemum was conducted in major chrysanthemum growing districts of North Karnataka viz., Kalaburagi, Koppal, Ballari, Vijayanagara, Gadag, Dharwad, Belgavi and Yadgir during 2019-20 and 2020-21 (Fig.1). Disease scoring was done on 10 randomly selected plants and percent disease index was calculated by using following formula proposed by Wheeler (1969)<sup>[3]</sup>.

$$\text{Percent Disease Index (PDI)} = \frac{\text{Sum of the individual disease ratings}}{\text{Total number of ratings}} \times \frac{100}{\text{Maximum disease grade}}$$

#### 2.2 Symptoms

Observations pertaining to the symptoms of *Septoria* leaf spot on foliage such as initially, small water-soaked circular spots appear on upper surface of older leaves of the infected plants were recorded. As the disease progresses centre of these spots turns to gray colour and margins with dark brown colour. In the tan centres of spots, there are some readily visible dark brown, tiny dots like structures appear which are known as pycnidia. After appearance of many spots, the affected leaves turns yellow in colour and then turn brown, become shrivelled and ultimately drop off (Plate 1).

Henry and George (1963) [4] reported the first symptom of *Septoria* leaf spot on chrysanthemum appears as small chlorotic spots on the leaf blades. Under favorable moisture and humid conditions these spots become dark in a few days and gradually enlarge to form black, circular or elliptical lesions of less than 1 cm in diameter. These lesions usually exhibit distinct margins and are sometimes surrounded by narrow chlorotic halos. They are visible on both surfaces of the leaf, but are considerably more conspicuous on the adaxial surface. Numerous embedded black pycnidia were observed on the adaxial surface of a lesion. The spots caused by *Septoria obesa* were large circular to irregular in shape, brown and speckled with numerous pycnidia, whereas spots produced by *S. chrysanthemella* were small, darker colored and usually show fewer pycnidia (Punithalingam 1964) [5].

disease observed during the growing season across the surveyed area (Table 1). Across the survey districts, SLS severity ranged between 43.75 to 63.87 percent. The highest mean severity (63.87 PDI) was recorded in Gadag district this was followed by Koppal (61.66 PDI) district. Moderate mean severity of 56.63, 56.24 and 56.04 PDI was observed in Dharwad, Kalaburagi and Vijayanagara district respectively, whereas Ballari district showed least mean severity of 43.75 PDI (Table 2). Vanitha (2003) [2] reported 41 to 45 percent severity of SLS of chrysanthemum in Nauni locality of Solan district during the years 2001 and 2002 respectively. The highest disease severity in some locations could be due to favourable weather conditions for disease onset, development and spread. Lowest disease on places could be attributed to balanced dose of fungicides, sanitation, wide spacing besides rapid disposal of debris of chrysanthemum crop.

### 3. Results and Discussion

*Septoria* leaf spot was found to be the most destructive



**Fig 1:** Location map of selected districts of North Karnataka to record the severity of *Septoria* leaf spot of chrysanthemum

**Table 1:** Status of *Septoria* leaf spot of chrysanthemum in Northern parts of Karnataka during 2019-20 and 2020-21

Sl. No.	District	Taluk	Village	Per cent disease index		
				2019-20	2020-21	Mean
1.	Kalaburagi	Kalaburagi	Azadpur	55.00	69.50	62.25
			Malgathi	49.20	57.20	53.20
			Taj Sultanpur	51.50	55.00	53.25
2.	Koppal	Koppal	Tankanakal	49.00	46.00	47.50
			Kushtagi	Hiremannapur	57.00	75.00
		Gangavathi	Yeradona	55.00	72.50	63.75
			Nelzeri	58.00	81.20	69.60
		Yelburga	Bhairnaikanahalli	59.00	77.00	68.00
			Muradi	61.00	80.00	70.50
3.	Ballari	Ballari	Yattinabudihal	39.33	48.67	44.00
		Siruguppa	Hallekate	42.00	45.00	43.50
4.	Vijayanagara	Hoovina Hadagali	Mudenuur	49.00	57.00	53.00
			Dasarahalli Tanda	64.67	72.00	68.34
		Harapanahalli	Shrungarathota	62.50	54.00	58.25
			Madapura	57.50	62.80	60.15
		Hagaribommanahalli	Halagapura	49.00	54.00	51.50
			Madur	46.00	44.00	45.00
			Doni	71.50	78.50	75.00
5.	Gadag	Mundargi	Shingatarayanakeri	59.33	66.66	63.00
			Lakkundi	57.20	73.20	65.20
		Gadag	Mulgund	60.00	65.00	62.50
			Laxmeshwar	52.00	72.00	62.00
		Shirahatti	Hosur	49.00	62.00	55.50
			Mangalagatti	58.33	61.67	60.00
6.	Dharwad	Dharwad	Kurabagatti	54.40	57.20	55.80
			Hubli	Devargudihal	48.00	58.00
		Kalghatgi	Jodalli	52.00	66.00	59.00
7.	Belgaum	Belgaum	Sambra	39.60	39.60	39.60
			Ramdurg	42.50	47.00	44.75
		Chikodi	Bambalwad	46.80	64.40	55.60
			Mudalgi	50.80	61.60	56.20
		Gokak	Hanamapur	43.33	50.67	47.00
			Hukeri	Yargatti	45.50	49.50
		Savadatti	Yarazavi	41.00	60.00	50.50
			Budigoppa	45.67	58.67	52.17
			Nugganatti	44.00	49.00	46.50
8.	Yadgir	Shahpura	Aralhalli	46.00	48.00	47.00

**Table 2:** Taluk and district wise severity of *Septoria* leaf spot of chrysanthemum during 2019-20 and 2020-21

Sl. No.	District	Taluk	Per cent disease index		
			2019-20	2020-21	Mean
1.	Kalaburagi	Kalaburagi	51.90	60.57	56.23
District mean			51.90	60.57	56.24
2.	Koppal	Koppal	49.00	46.00	47.50
		Kushtagi	57.00	75.00	66.00
		Gangavathi	55.00	72.50	63.75
		Yelburga	59.33	79.40	69.37
District mean			55.08	68.23	61.66
3.	Ballari	Ballari	39.33	48.67	44.00
		Siruguppa	42.00	45.00	43.50
District mean			40.66	46.8	43.75
4.	Vijayanagara	Hoovina Hadagali	56.83	64.50	60.67
		Harapanahalli	60.00	58.40	59.20
		Hagaribommanahalli	47.50	49.00	48.25
District mean			54.78	57.30	56.04
5.	Gadag	Mundargi	65.42	72.58	69.00
		Gadag	58.60	69.10	63.85
		Shirahatti	50.50	67.00	58.75
District mean			58.17	69.57	63.87
6.	Dharwad	Dharwad	56.36	59.43	57.90
		Hubli	48.00	58.00	53.00
		Kalghatgi	52.00	66.00	59.00
District mean			52.12	61.14	56.63
7.	Belgaum	Belgaum	41.05	43.05	42.18
		Chikodi	46.80	64.60	55.70
		Gokak	47.07	56.13	51.60
		Hukeri	45.50	49.50	47.50
		Savadatti	43.56	55.89	49.73
District mean			44.79	53.84	49.32
8.	Yadgir	Shahpura	46.00	48.00	47.00
District mean			46.00	48.00	47.00



**Initial necrotic spot**

**Dark brown spots**



**Coalesce of spots and yellowing of leaf**

**Complete drying of leaf**

**Plate 1:** Symptoms of *Septoria* leaf spot on chrysanthemum



**Koppal**



**Gadag**

**Plate 2:** Severity of *Septoria* leaf spot of chrysanthemum in Koppal and Gadag district

#### 4. Conclusion

The survey conducted across the locations revealed the maximum disease severity of *Septoria* leaf spot in Gadag district whereas Ballari district has recorded the minimum disease severity

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