

Original Research Article

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## Survey for the Severity of Powdery Mildew in Sunflower in Major Districts of North Eastern Karnataka, India

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### ABSTRACT

#### Keywords

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Sunflower (*Helianthus annuus* L.) is an important oil seed crop belonging to Asteraceae family and ranks third after groundnut and soybean. Powdery mildew of sunflower is caused by *Golovinomyces cichoracearum* (DC.) V. P. Heluta is one of the most important diseases causing economic yield loss in recent years. To identify hot spots for powdery mildew of sunflower a roving survey was carried out during *rabi* 2015 in two taluks each from Ballari, Koppal and Raichur districts of North Eastern Karnataka. Among the three districts surveyed, powdery mildew disease was severely observed in Koppal district with maximum mean per cent disease index (PDI) of 62.35 followed by Raichur with mean PDI of 50.65 and minimum mean PDI of 38.32 recorded in Ballari district. Among all the villages surveyed, maximum mean PDI (69.77) recorded in Bisarahalli village of Koppal taluk, whereas least mean PDI (31.54) recorded in Hampasagara-2 village of Hagaribommanahalli taluk.

### Introduction

Sunflower (*Helianthus annuus* L.) known as “Golden Girl of American Agriculture”, belongs to the family Asteraceae (Compositae). It is one of the most important oilseed crops in India and grown in an area of 0.56 million ha with a production of 0.42 m tonnes. Presently Karnataka is the leading state in India contributing 64 and 52 per cent of total area and production respectively.

It is the second important oilseed crop after groundnut in the state having an area of 0.36 million hectares with production of 0.22 million tonnes. However, productivity (597 kg ha<sup>-1</sup>) is lesser than the national average of 752 kg ha<sup>-1</sup> (Anon., 2016).

Though crop is grown in vast climatic conditions, it is known to be hampered by a large number of fungal and viral diseases. Among them, powdery mildew caused by *Golovinomyces cichoracearum* (DC.) V. P. Heluta is one of the important diseases causing economic yield loss in recent years. The loss due to powdery mildew is proportionate to the diseases intensity and varies considerably depending on the stage of the plant growth at which disease occurs (Dinesh *et al.*, 2010). It is quite essential to undertake survey and surveillance of the disease in every year which helps us to know the rhythmic changes in regional severity and status of the disease. Hence, in this study, a

roving survey has been made to document the disease severity in major districts of North Eastern Karnataka, India.

### **Materials and Methods**

A roving survey was taken up to record the severity of powdery mildew of sunflower were in Raichur, Koppala and Ballari districts of Karnataka during *rabi* 2015-16.

In each district two taluks, in each taluk two villages and in each village five farmers' fields were selected and disease severity was recorded. From each field, ten plants were randomly selected and powdery mildew severity was assessed by following 0-9 scale (0- No symptoms, 1- Small white specks on the leaf covering 1% or less of the area, 3- Small powdery patches covering 1-10% of the leaf area, 5- Powdery lesions enlarged covering 11-25% of the leaf area, 7- Powdery patches irregular in size covering 26-50 % of leaf area and 9- White powdery growth covering more than 50% leaf area (Mayee and Datar, 1986) through visual observation. The recorded grade values were converted into per cent disease index (PDI) by using following formula proposed by Wheeler (1969).

$$\text{PDI} = \left( \frac{\text{Sum of individual disease ratings}}{\text{Total number of leaves observed}} \right) \times \left( \frac{100}{\text{Maximum disease grade}} \right)$$

### **Results and Discussion**

Survey on powdery mildew of sunflower was carried out in three districts of North eastern Karnataka during *rabi* 2015. From the survey data (Table 1) it is self-explanatory that, disease severity varied across locations. However, mean maximum per cent disease index (PDI) was recorded in Koppal district (62.35) followed by Raichur district (50.65). Whereas, minimum mean PDI was observed in Ballari district (38.32).

Among the two taluks surveyed in Raichur district, maximum mean PDI was noticed in Raichur taluk (51.66) and minimum PDI was observed in Lingasagur taluk (49.65). Maximum disease severity was noticed in Kalmala village (54.55) of Raichur taluk at flowering stage and minimum severity of the disease was observed in Sarjapura village (47.10) of Lingasgur taluk at flowering stage.

In Koppal district, maximum disease severity was noticed in Bisarahalli village (69.77) of Koppal taluk during heading stage, whereas, minimum severity was observed in Tevalugera village (51.04) of Kushtagi taluk at flowering stage of the crop. Mean powdery mildew PDI of 69.15 and 55.56 was observed in Koppal and Kushtagi talukas respectively.

In Ballari district, maximum disease severity was observed in Sovinahalli village (42. 88) of Hadagali taluk during heading stage whereas, minimum severity was observed in Hampasagara-II village (31.54) of Hagaribommanahalli taluk at vegetative stage of the crop. Among the two taluks surveyed in Ballari district, maximum mean powdery mildew PDI was noticed in Hadagali taluk (41.88) and minimum PDI was observed in Hagaribommanahalli taluk (35.76).

Among all the villages surveyed, maximum mean PDI recorded in Bisarahalli (69.77) and Betageri (68.54) villages of Koppal taluk followed by Gunigera (60.09) village of Kushtagi taluk during *rabi* 2015.

This may be due to susceptibility of the cultivar and favourable environmental condition like temperature and less amount of rainfall experienced in Koppal and Kushtagi taluks during the period of survey. The climatic conditions like cool temperature and low relative humidity prevailed during the crop growth favoured the increased inoculum level.

**Table.1** Survey for powdery mildew of sunflower in North Eastern districts of Karnataka during *rabi* 2015

District	Taluks	Villages	Stage of the crop	Irrigated (I)/ Rainfed (R)	PDI	Mean Per cent Disease Index	
						Taluk	District
Raichur	Raichur	Malayabad	Flowering	R	48.77	51.66	50.65
		Kalmala	Flowering	I	54.55		
	Lingasgur	Chikkahesarur	Flowering	R	52.21	49.65	
		Sarjapura	Flowering	R	47.10		
Koppal	Koppal	Bisarahalli	Heading	I	69.77	69.15	62.35
		Betageri	Heading	I	68.54		
	Kushtagi	Tevalugera	Flowering	R	51.04	55.56	
		Gunigera	Flowering	R	60.09		
Ballari	Hagaribommanahalli	Salmoorahalli	Flowering	R	39.99	35.76	38.32
		Hampasagara-II	Vegetative	I	31.54		
	Hadagali	Sovinahalli	Heading	I	42.88	41.88	
		Pashchimakalvi tanda	Flowering	R	40.88		

The powdery mildew severity was quite high in the fields with dense population and under the shade of the trees. Similar observations were made by Kolte (1985) and opined that cool temperature and low relative humidity was reported to cause severe epidemics of powdery mildew of sunflower. Severity of the disease more where crop was grown under irrigated condition compared to rainfed. Similar observation was made by Band *et al.*, (2008), Dinesh *et al.*, (2010) and Akhileswari *et al.*, (2012).

The high level of disease prevalence in Koppal (62.95%) and Raichur (50.65%) districts may be due to mono-cropping of sunflower by the farmers. The sunflower crop was cultivated in *kharif*, *rabi* and summer season with assured irrigation and also found the weed hosts in and around sunflower fields in majority of the areas surveyed in these districts.

This helps for continuous survivability of the pathogen. Many farmers were growing sunflower irrespective of season. Hence, we noticed disease in most all stages of the crop in the farmer's field. This situation leads to air borne spread of inoculum.

Continuous cultivation of same crop over the season and years will help for increased inoculum level to such an extent that the epidemic will be a common phenomenon (Chaube and Singh, 2001; Dinesh *et al.*, 2010 and Akhileswari *et al.*, 2012).

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