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## Surveys for incidence of collar rot of groundnut in North Eastern parts of Karnataka

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**Abstract**

A field survey was carried out during *kharif* 2018-19, to assess the incidence of collar rot in Hyderabad-Karnataka region. In Raichur district, maximum incidence was observed in Kurdi village of Manvi taluk, Masarkal and Kottadoddi village of Deodurga taluk with an incidence of 20.00 per cent, respectively and least incidence was recorded in Chandrabanda village of Raichur taluk (12.00%). In Koppal district maximum disease incidence of 25.00 per cent was recorded in Myadineri village of Yalburga taluk followed by Hyati village of Koppal taluk (22.00 per cent) and lowest incidence was observed in Ganganala village of Kushtagi taluk (11.00%). In Ballari district maximum disease incidence of 22.00 per cent was recorded in Siruguppa local followed by Mudenur village of Siruguppa taluk and lowest incidence was observed in Hagari Bommanahalli (10.00%). In Yadgir district maximum disease incidence of 23.00 per cent was recorded in Gurmitkal village of Yadgir taluk followed by Kolar village of Shahapur taluk (17.83 per cent) and lowest incidence was observed in Darnapura village and Yadgir local of Yadgir taluk (10.00%, respectively).

**Keywords:** Groundnut, survey, *Aspergillus niger* and per cent disease incidence

**Introduction**

Groundnut or peanut (*Arachis hypogaea* L.), is a very important legume crop of tropical and sub tropical areas of the world, described in 1753 by Linnaeus (Pattee and Young, 1982) [7]. It is originated from Brazil in South America and was introduced in India by the Portuguese traders in the middle of sixteenth century. In India, it is one of the most important oilseed crops in terms of production among oilseeds and is rightly called as the 'king of oilseeds'. It is sixth most important oilseed crop in the world. There by ranked second largest producer of groundnut after China.

On an average, groundnut seed contains 45 per cent of oil and 26 per cent of protein and its kernels are relished either as snack, roasted or salted or raw form or also in the form of peanut butter. India exports groundnut kernels, shells, hand-picked groundnut and in the form of oil cake. Its haulms and leaves serve as rich source of cattle feed and raw material for preparation of silage. It plays an important role in the dietary requirements of resources for poor woman and children. Its shells are used as fuel and as the filler in animal feeds and fertilizers. They are also used in making cardboards. Cultivation of groundnut helps to improve soil fertility, as it leaves behind a substantial amount of nitrogen in the soil.

Groundnut is infected by several soil borne pathogens causing diseases like collar rot, *Sclerotium* wilt and dry root rot etc., which limit the yield considerably. These diseases largely account for the death of the seedlings. Collar rot caused by *A. niger* van Teigham is one of the most important disease of groundnut which is more extensive in the *kharif* than the *rabi* and summer seasons and causes more damage in sandy loam and medium black soil. Annual world yield loss caused by collar rot is more than 10 per cent (Pande and Rao, 2000) [6] and is more prevalent in soils with low moisture content and high temperature, approximately 30 °C (Kishore *et al.*, 2007) [5]. Keeping this in view, an attempt was made to conduct a roving survey was conducted in four districts of North Eastern Karnataka regions *viz.*, Raichur, Ballari, Koppal and Yadgir during *kharif* 2018-19.

**Material and Methods**

A roving survey was carried out to assess the incidence of collar rot disease of groundnut. The survey was conducted during *kharif* 2018-19 in four talukas of Raichur district (Deodurga, Manvi, Lingasugur, Raichur, three talukas of Koppal district (Koppal, Kushtagi, Yalburga), three talukas of Yadgir district (Yadgir, Shahapur, Shorapur) and four talukas of Ballari (Siruguppa, HB Halli, Kudligi, Hoovinahadagali) of North Eastern Karnataka to know the

incidence of collar rot disease of groundnut in the farmer's field. In each district, three to four major groundnut growing talukas were selected and in each taluk three to five villages were surveyed comprising two to three fields in each village. For recording the disease, five spots in each field and 100 plants at each spot were selected randomly. The total number of plants present and number of plants showing collar rot symptoms due to *A. niger* at each spot were counted and recorded. Later, the per cent collar rot incidence in these locations was calculated using following formula.

$$\text{Disease incidence (\%)} = \frac{\text{Number of plants infected}}{\text{Total number of plants observed}} \times 100$$

**Table 1:** The per cent disease incidence was assessed by using 0-5 scale (Rohtas, 2014) [8] as described below.

Scale	Disease Reaction	Disease Incidence (%)
0	Immune	0
1	Resistant	≤ 10
2	Moderately Resistant	10-20
3	Moderately Susceptible	20-40
4	Susceptible	40-60
5	Highly Susceptible	> 60

## Results and Discussion

Roving survey was carried out during *kharif* season of 2018-19 in groundnut growing areas of Raichur, Koppal, Yadgir and Ballari districts of North Eastern Karnataka to know the incidence of collar rot diseases of groundnut in the farmer's field. The groundnut stem showing typical symptoms of collar rot were collected and isolation of the fungus was done by standard tissue isolation method as described in 'Materials and Methods'. The mean per cent disease incidence (PDI) recorded at various locations is presented in Table 2 and 2.

In Raichur district, maximum incidence was observed in Kurdi village of Manvi taluk, Masarkal and Kottadoddi village of Deodurga taluk with an incidence of 20.00 per cent, respectively and least incidence was recorded in Chandrabanda village of Raichur taluk (12.00%). In Koppal district maximum disease incidence of 25.00 per cent was recorded in Myadineri village of Yalburga taluk followed by Hyati village of Koppal taluk (22.00%) and lowest incidence was observed in Ganganala village of Kushtagi taluk (11.00%). In Ballari district maximum disease incidence of 22.00 per cent was recorded in Siruguppa local followed by

Mudenu village of siruguppa taluk, Kadalabalu village of Hagari bommanahalli and Halageri village of Huvinahadagali about 20.00 per cent incidence and lowest incidence was observed in Hagari bommanahalli (10.00%). In Yadgir district maximum disease incidence of 23.00 per cent was recorded in Gurmitkal village of Yadgir taluk followed by Kolar village of Shahapur taluk about 17.83 per cent incidence and lowest incidence was observed in Darmapura village and Yadgir local of Yadgir taluk (10.00%).

Among all different taluks surveyed in Raichur district, maximum incidence of disease was observed in Deodurga taluk (17.50%) followed by Lingasugur taluk (16.66%) and least incidence was recorded in Raichur taluk (14.75%). In Koppal district, maximum disease incidence was noticed in Yalburga taluk (19.25%) followed by Koppal taluk (18.75%) and least incidence was observed in Kustagi taluk (13.20%). In Ballari district, Siraguppa taluk recorded maximum disease incidence (18.75%) followed by HB halli and Hoovinahadagali (16.00%) and least incidence was observed in Kudligi (15.50%). In Yadgir district, highest disease incidence was observed in Shahapur (17.83%) followed by Shorapura taluk (16.33%) and least incidence was observed in Yadgir taluk (15.25%).

Among all the districts maximum disease incidence was noticed in Koppal district (17.06%) followed by Ballari district (16.56%) and least incidence was recorded in Raichur district (16.22%) (Table 3).

Further incidence of this disease was more in ensuing crop season, because of the soil borne nature of this disease. Similarly in Koppal district monocropping of groundnut is in practiced over a large area resulting in high incidence of collar rot. Therefore, in areas where groundnut monocropping was practiced, comprehensive strategies are to be implemented in managing these soil borne diseases.

In the present study differences in collar rot incidence was observed in respect of different soil types. The results in (Table 2) showed that sandy soils recorded maximum collar rot incidence compared to clay soils and it was observed that incidence of diseases was more in *Kharif* season compared to *Rabi* season. Higher incidence of the disease might be attributed to the less competitive saprophytic ability of the pathogen at higher moisture holding capacity associated with black soils. The results were supported by Gibson (1953) [4], Chohan (1969) [3], Shreedevi (2017) [9], Pande and Rao (2000) [6] and Ainsworth *et al.* (1964) [1].

**Table 2:** Survey for collar rot incidence in different districts of North Eastern Karnataka during 2018-19.

District	Taluk	Village	Season	Variety	Crop situation	Soil type	Period of survey (DAS)	Collar rot (%)
Raichur	Raichur	Raichur	<i>Kharif</i>	KRG1	Irrigated	Red	15	16.00
		Jammaladinni	<i>Kharif</i>	KRG1	Irrigated	Red	15-20	18.00
		Chandrabanda	<i>Rabi</i>	TMV-2	Rainfed	Red	30-35	12.00
		Yapaladinni	<i>Rabi</i>	TMV-2	Rainfed	Black	25-30	13.00
	Manvi	Korvi	<i>Kharif</i>	TMV-2	Irrigated	Red	15-20	18.00
		Kallur	<i>Rabi</i>	Local	Rainfed	Black	20-30	13.00
		Kasbecamp	<i>Kharif</i>	Local	Irrigated	Red	15-20	15.00
		Kurdi	<i>Rabi</i>	Local	Rainfed	Red	20-25	20.00
		Seekal	<i>Kharif</i>	TMV-2	Irrigated	Black	30-35	14.00
	Lingasugur	Santhekallur	<i>Kharif</i>	TMV-2	Irrigated	Red	20-25	16.00
		Karadkal	<i>Kharif</i>	TMV-2	Irrigated	Red	25	16.00
		Kuppigudda	<i>Kharif</i>	TMV-2	Irrigated	Red	25-30	18.00
	Deodurga	Masarkal	<i>Kharif</i>	TMV-2	Rainfed	Red	15-20	20.00
		Gabbur	<i>Kharif</i>	TMV-2	Irrigated	Red	15-20	18.00
		Piligunda	<i>Rabi</i>	TMV-2	Irrigated	Red	20	18.00
		Arakera	<i>Rabi</i>	TMV-2	Irrigated	Black	15-20	13.00
		Sasvigeri	<i>Rabi</i>	Local	Irrigated	Black	15-20	16.00
Kottadoddi		<i>Rabi</i>	Local	Irrigated	Red	15-20	20.00	

Mean								16.22
Koppal	Koppal	Hyati	<i>Kharif</i>	DSG1	Rainfed	Red	15-25	22.00
		Koppal local	<i>Kharif</i>	TMV-2	Rainfed	Red	20-25	18.00
		Halagera	<i>Kharif</i>	TMV-2	Irrigated	Red	15-20	16.00
		Bhairapur	<i>Kharif</i>	DSG1	Rainfed	Red	25	19.00
	Kushtagi	Tavaragera	<i>Rabi</i>	TMV2	Rainfed	Red	20	13.00
		Kustagi local	<i>Rabi</i>	Local	Rainfed	Red sandy	25-30	12.00
		Ganganala	<i>Rabi</i>	TMV-2	Rainfed	Red	30	11.00
		Turvihal	<i>Rabi</i>	Local	Rainfed	Red sandy	20	15.00
	Yalburga	Lingadalli	<i>Rabi</i>	TMV2	Rainfed	Red	20-25	15.00
		Kamalapur	<i>Kharif</i>	DSG1	Rainfed	Red sandy	15-20	16.00
		Myadneri	<i>Kharif</i>	DSG1	Rainfed	Red sandy	15-20	25.00
		Narsapur	<i>Kharif</i>	JL24	Rainfed	Red	15-20	20.00
	Uppaladinni	<i>Kharif</i>	JL24	Rainfed	Red	25-30	16.00	
Mean								17.06
Ballari	Sirguppa	Sirguppa local	<i>Kharif</i>	Local	Rainfed	Red sandy	15-20	22.00
		Mudenur	<i>Kharif</i>	Local	Rainfed	Red sandy	15-20	20.00
		Dasapur	<i>Kharif</i>	K6	Rainfed	Red sandy	20	18.00
		Beerahalli	<i>Kharif</i>	Local	Irrigated	Red sandy	15-25	15.00
	Kudligi	Kudligi	<i>Rabi</i>	Local	Irrigated	Red sandy	25-30	19.00
		Hosahalli	<i>Rabi</i>	TMV-2	Rainfed	Red sandy	18-20	15.00
		Bevoor	<i>Rabi</i>	TMV-2	Rainfed	Red sandy	20	15.00
		Sivapura	<i>Rabi</i>	Local	Rainfed	Red sandy	25-30	13.00
	H. B. Halli	H. B. Halli local	<i>Kharif</i>	K6	Rainfed	Red	30	10.00
		Darmapura	<i>Kharif</i>	Local	Irrigated	Red	15-20	18.00
		Kadalabalu	<i>Kharif</i>	K6	Rainfed	Red	15-20	20.00
	Huvina hadagali	Itagi	<i>Rabi</i>	Local	Rainfed	Red	25-30	13.00
		Halageri	<i>Rabi</i>	Local	Irrigated	Red	15-20	20.00
		Hadagali local	<i>Kharif</i>	Local	Rainfed	Red	15-20	15.00
	Mean							
Yadagir	Shahapur	Shahapur	<i>Kharif</i>	TMV-2	Rainfed	Red	15-25	19.00
		Rastapur	<i>Kharif</i>	Local	Irrigated	Red	15-20	16.00
		Kolur	<i>Kharif</i>	DSG-1	Rainfed	Red sandy	15-25	21.00
		Markel	<i>Kharif</i>	Local	Rainfed	Red	25	15.00
		Hattigudur	<i>Kharif</i>	Local	Rainfed	Red sandy	30	18.00
		Bheemaranagudi	<i>Kharif</i>	Local	Rainfed	Red	15-20	18.00
	Shorapur	Shorapur	<i>Kharif</i>	TMV-2	Irrigated	Red	25-30	16.00
		Kembavi	<i>Kharif</i>	Local	Rainfed	Red sandy	20-30	18.00
		Lakshmipura	<i>Kharif</i>	Local	Rainfed	Black	25	15.00
	Yadgiri	Gurmitkal	<i>Kharif</i>	TMV-2	Rainfed	Red loamy	30	23.00
		Darmapur	<i>Kharif</i>	Local	Rainfed	Red loamy	15-25	10.00
		Yadgir local	<i>Kharif</i>	DSG1	Rainfed	Red sandy	20	10.00
Siddapur		<i>Kharif</i>	Local	Rainfed	Red sandy	15-20	18.00	
Mean								16.47

**Table 3:** Incidence of collar rot of groundnut in North Eastern districts of Karnataka during 2018-19.

District	Taluk	Mean PDI (Taluk)	Mean PDI (District)
Raichur	Raichur	14.75	16.22
	Deodurga	17.50	
	Manvi	16.00	
	Lingasugur	16.66	
Koppal	Koppal	18.75	17.06
	Kustagi	13.20	
	Yalburga	19.25	
Ballari	Siruguppa	18.75	16.56
	Kudligi	15.50	
	HB halli	16.00	
	Hoovina hadagali	16.00	
Yadgir	Shahapur	17.83	16.47
	Shorapur	16.33	
	Yadgiri	15.25	

### Conclusion

Survey results showed that collar rot disease was more in sandy soils compared to clay soils and it was observed that incidence of diseases was more in *Kharif* season compared to

*Rabi* season. Highest incidence of collar rot was observed in Koppal district (17.06%) followed by Ballari district (16.56%) and least incidence was recorded in Raichur district (16.22%). Maximum incidence was recorded at Myadineri village of Yalburga taluk, Koppal district about 25 per cent, where the crop was grown in *Kharif* season under rainfed conditions which was comparatively higher than *Rabi* season. The present study revealed that there was a difference in disease incidence between the locations and different varieties.

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