

Original Research Article

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## Survey for the Incidence of Fusarium Wilt of Chickpea in Major Chickpea Growing Districts of Northern Karnataka, India

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### ABSTRACT

#### Keywords

Chickpea wilt,  
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Chickpea (*Cicer arietinum* L.) is one of the most important pulse crop grown all over India. Chickpea wilt caused by *Fusarium oxysporum* f. sp. *ciceri* is one of the major disease on chickpea in Northern Karnataka, which is soil and seed borne. Heavy inoculum in the soil and favorable environment condition results in the death of infected plant and therefore total yield loss. A random roving survey was carried out in major chickpea growing districts of Northern Karnataka, viz., Vijayapura, Bagalkote, Gadag and Kalburgi in 2017-18 to know the disease prevalence and its severity in various locations. Survey results revealed that Bagalkote district had high disease incidence with 27.19 per cent followed by Kalburgi district with 24.90 per cent.

### Introduction

Chickpea is (*Cicer arietinum* L.) is one of the most important and oldest pulse crop after beans and peas. Chickpea seeds contain an average of 23 per cent protein, 38-59 per cent carbohydrate, 4.8-5.5 per cent oil, 47 per cent starch, 5 per cent fat, 6 per cent crude fibre, 6 per cent soluble sugar and 3 per cent ash, minerals such as calcium (202 mg), phosphorous (312 mg), iron (10.2 mg), vitamin C (3.0 mg), calorific value (360 cal), small amounts of B complex, fibre (3.9 g) and moisture (9.8 g). There are two main commercial types of chickpea. The Desi type with smaller and darker coloured seeds which

may vary from yellow to black and the Kabuli type with large, smooth and light coloured seeds (Singh, 1985).

Chickpea crop is attacked by 172 pathogens (67 fungi, 22 viruses, 3 bacteria, 80 nematodes and phytoplasma) across the world (Nene *et al.*, 1996). Among all, only a few of them have the potential to devastate the crops. Some of the serious diseases in order of their importance are wilt, dry root rot, collar rot, colletotrichum blight, alternaria blight, rust and ascochyta blight caused by *Fusarium oxysporum* f. sp. *ciceri*, *Macrophomina phaseolina*, *Sclerotium rolfsii*, *Colletotrichum dematium*, *Alternaria alternata*, *Uromyces*

*ciceris-arietini* and *Ascochyta rabiei* respectively (Nene *et al.*, 1984).

Losses of chickpea from *Fusarium* wilt have been reported to vary from 10 to 15 per cent (Jalali and Chand., 1991; Trapero-Casas and Jimenez-Diaz., 1985) but losses of up to 70 per cent have been reported in some years in Northern India and Pakistan (Grewal and Pal., 1970). As a facultative saprophyte, *Fusarium oxysporum* f. sp. *ciceri* can survive in soil and on crop residues as chlamydospores for upto six years. The pathogen is also seed-borne and may therefore be spread by means of infected seed (Haware *et al.*, 1978). *Fusarium oxysporum* f. sp. *ciceri* is considered to be a major threat to chickpea production in India, Iran, Pakistan, Nepal, Burma, Spain and Tunisia (Jalali and Chand., 1991). In the current study, a random roving survey was carried out in major chickpea growing districts of Northern Karnataka, viz., Vijayapura, Bagalkote, Gadag and Kalburgi in 2017-18 to know the disease prevalence and its severity in various locations.

### Materials and Methods

Random roving method of survey was carried out to record the severity of *Fusarium* wilt in chickpea. The survey was conducted during rabi 2017-18, in major chickpea growing districts of Northern Karnataka viz., Vijayapura, Bagalkote, Kalburgi and Gadag, observations on disease incidence, severity as well as age of crop was noted down. Disease incidence was assessed by counting the number of plants showing wilting symptoms in three representative 75-100 plants randomly chosen in each field as mentioned by Smitha *et al.*, (2015). The disease incidence in the fields was assessed with the following formula.

$$\text{Per cent disease incidence} = \frac{\text{Number of plants infected}}{\text{Total number of plants observed}} \times 100$$

### Results and Discussion

A random roving survey for disease incidence was conducted in major chickpea growing areas of Northern Karnataka, viz, Vijayapura, Bagalkote, Kalburgi and Gadag, during Rabi 2017-18 to collect the diseased samples for further investigation in laboratory.

The disease incidence was assessed by counting the number of plants showing symptoms in 75-100 plants randomly chosen in the field assessed. The per cent incidence of *Fusarium* wilt was recorded.

The highest per cent disease incidence was recorded at Vajjala village of Bagalاکote district (51.25 %) and lowest was at Managooli village of Vijayapura district (9.11 %) (Table 1).

In Vijayapura district, the disease incidence ranged from 9.11 per cent (Mangooli) to 24.55 per cent (Basavana Bagevadi). In Bagalاکote district, the disease incidence ranged from 13.50 per cent (Anagawadi) to 51.25 per cent (Vajjala). In Gadag district the disease incidence ranged from 17.61 per cent (Kurligeri) to 23.21 per cent (Ron). In Kalburgi the disease incidence was ranged from 19.86 per cent (Jeratagi) to 29.33 per cent (Kotnur).

Among the districts covered under survey, maximum disease incidence was recorded in Bagalاکote district (27.19 %) followed by Kalburgi district (24.90 %) whereas minimum disease incidence was recorded in Vijayapura district (16.48) (Table 2, Fig. 1).

The mean disease incidence of irrigated and rainfed areas at taluka level is depicted in Table 2. Under irrigated condition the least disease incidence was in Kalburgi taluka (27.49 per cent) of Kalburgi district and highest disease incidence was in Hunagunda

(50.55) Taluka of Bagalakote district. In case of rainfed condition highest wilt incidence was in Jewargi Taluka of Kalburgi district (22.31 per cent) and lowest wilt incidence was seen in Vijayapura taluka of Vijayapura district (13.29 per cent). Hence as a whole it depicts that the disease incidence in different location varied with respect to its

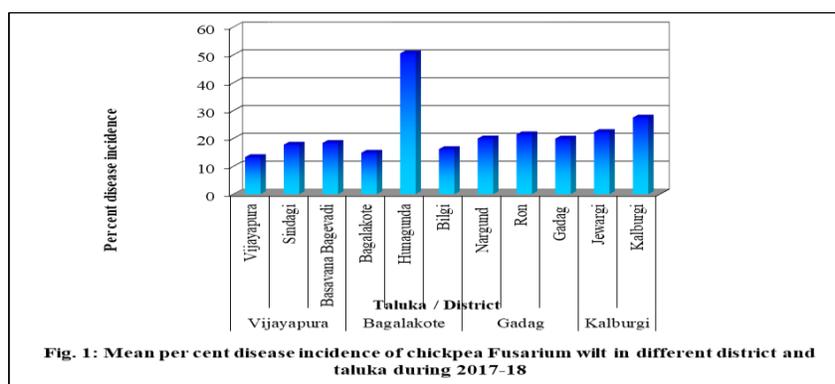
geographical condition, agroclimatic condition, stage of the crop *etc.* In rainfed condition the average disease incidence was 18.24 per cent and in irrigated condition it was 39.02 per cent. The disease incidence was severe in the later stages of the crop and the wilt incidence varied from 16.48 per cent to 27.19 per cent.

**Table.1** Incidence of *Fusarium* wilt of chickpea in Northern districts of Karnataka during 2017-18

District	Taluka	Village name	Stage of the crop	Crop grown condition	Per cent disease incidence
Vijayapura	Vijayapura	Hittinahalli	Flowering	Rainfed	17.47
		Managooli	Podding	Rainfed	9.11
	Sindagi	Chikkarugi	Vegetative	Rainfed	16.36
		Aheri	Podding	Rainfed	19.20
	Basavana Bagevadi	Basavana Bagevadi	Podding	Rainfed	24.55
		Golasangi	Flowering	Rainfed	12.21
Bagalkote	Bagalkote	Simikeri	Podding	Rainfed	14.51
		Shirur	Pre Flowering	Rainfed	15.25
	Hunagunda	Hunagunda	Flowering	Irrigated	49.85
		Vajjala	Pre Flowering	Irrigated	51.25
	Bilgi	Anagawadi	Vegetative	Rainfed	13.50
		Badangadi	Pre Flowering	Rainfed	18.80
Gadag	Nargund	Kurligeri	Flowering	Rainfed	17.61
		Banahatti	Flowering	Rainfed	22.35
	Ron	Ron	Podding	Rainfed	23.21
		Naregal	Podding	Rainfed	19.75
	Gadag	Hulkoti	Podding	Rainfed	19.63
		Binkadakatti	Podding	Rainfed	20.21
Kalburgi	Jewargi	Jeratagi	Podding	Rainfed	19.86
		Moratagi	Flowering	Rainfed	24.77
	Kalburgi	Kalburgi	Podding	Irrigated	25.65
		Kotnur	Podding	Irrigated	29.33

**Table.2** Mean per cent disease incidence of *Fusarium* wilt of chickpea in different district and taluka during 2017-18

Sl.No.	District	Taluka	Rainfed	Irrigated	Taluka	District
1	Vijayapura	Vijayapura	13.29	-	13.29	16.48
		Sindagi	17.78	-	17.78	
		Basavana Bagevadi	18.38	-	18.38	
2	Bagalkote	Bagalkote	14.88	-	14.88	27.19
		Hunagunda	-	50.55	50.55	
		Bilgi	16.15	-	16.15	
3	Gadag	Nargund	19.98	-	19.98	20.46
		Ron	21.48	-	21.48	
		Gadag	19.92	-	19.92	
4	Kalburgi	Jewargi	22.31	-	22.31	24.90
		Kalburgi		27.49	27.49	
Mean disease incidence (%)			18.24	39.02		



The data with respect to wilt incidence in different places depicted that, the disease incidence varied from place to place due to varied agroclimatic conditions, cropping pattern, crop stage and cultural practices followed. Among the districts covered in the survey, highest disease incidence was observed in Bagalakote district with 27.19 per cent, followed by Kalburgi district with 24.90 per cent and the lowest disease incidence was noticed in Vijayapura district with 16.48 per cent wilt incidence.

Further, from the study of disease incidence in the different districts it was found that, the disease incidence was highest during the reproductive stage of the crop. The wilt

incidence was prevalent more in reproductive phase of the crop as the nutrients drain to the reproductive part of the plant and due to imbalance supply of nutrients in the stem and root region (Ravichandran, 2015).

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