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RESEARCH PAPER

Survey for the chickpea phyllody incidence in northern Karnataka

NIKHIL S. REVADI AND GURUPADA BALOL

Department of Plant Pathology, College of Agriculture, Dharwad
University of Agricultural Sciences, Dharwad - 580 005, Karnataka, India
E-mail: nikhilrevadi58@gmail.com

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Abstract: Among many diseases affecting chickpea, phyllody was considered as minor disease but in recent years incidence of the disease is gradually increasing in northern Karnataka. It has peculiar symptoms like reduction in the leaf size, stunting of plant, reduction in internodal length, floral malformation (phyllody), reduced pod size and the shriveled seeds. A roving survey was carried out to know the incidence of the chickpea phyllody in the northern parts of Karnataka *viz.,* Bagalkot, Belagavi, Dharwad, Kalaburgi, Gadag, Vijayapura, districts during *rabi*, 2019. The district wise disease incidence was in the range of 2.41 - 5.35 per cent and the highest incidence was recorded in Vijayapura (5.35 %) followed by Kalaburgi (5.07 %), Dharwad (4.16 %), Belagavi (3.27 %), Bagalkot (3.15 %) and lowest incidence was recorded in Gadag (2.41 %).

Key words: Chickpea, Incidence, Phyllody, Survey

Introduction

Chickpea belongs to the family "Fabaceae" (Leguminosae) which includes important plants such as peas, beans, acacia, clover, alfalfa and peanuts and many more. Most pulses are often cultivated as rotation crops with cereals like sorghum, wheat, bajra *etc.*, so that it helps in management of nitrogen deficiency as they are natural nitrogen fixers. It is grown in many tropical, subtropical and warm-temperate regions in the world. Kabuli type of gram is cultivated in temperate conditions whereas the desi type of gram is cultivated in the semi-arid tropical conditions (Muehlbauer and Singh, 1987).

In the course of 2017-18, chickpea production was around 11.23 million tonnes in India, which is nearly 46 per cent of the overall pulses production (23.95 mt). Among chickpea growing states Maharashtra, Madhya Pradesh, Uttar Pradesh, Rajasthan, Karnataka, Andhra Pradesh, Bihar, Jharkhand and Chhattisgarh present more than 95 per cent to the total pulses production (Dixit *et al.*, 2019). Various biotic and abiotic stresses responsible for the reduction of yield and yield stability of chickpea (Millan *et al*., 2006).

Chickpea phyllody was first reported from Tamil Nadu in 1959 (Ghanekar *et al*., 1988) which has peculiar symptoms like reduction in the leaf size, stunting of plant, reduction in internodal length, floral malformation (phyllody), reduced pod size and the seeds are shriveled, undersized and discoloured (Plate 1) (Akhtar *et al*., 2008). Phytoplasma is associated with the disease and it is transmitted through grafting and insects. Leafhopper (*Orosius orientalis*) is successful in transmission of disease (Akhtar *et al*., 2009 and Gurupad *et al*., 2019). Phytoplasma disease symptoms were observed on chickpea growing fields in Kurnool (Vijay Kumar Naik *et al.,* 2018).

District, Andhra Pradesh, India Among many diseases affecting chickpea, phyllody was considered as minor disease but in recent years incidence of the disease is gradually increasing and becoming new threat for the cultivation of chickpea. Therefore the present study of survey was carried out to know the status of chickpea phylludy disease in northern Karnataka.

Material and methods

The roving survey was conducted during *rabi* season 2019 to know the incidence of chickpea phyllody. Six major chickpea growing areas of Karnataka *viz.*, Bagalkot, Belagavi, Dharwad, Gulbarga, Gadag, Vijayapura, districts. In each village five fields were selected and the per cent of disease incidence was assessed by recording the number of plants showing disease symptoms and the total number of plants examined by using the formula.

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

Results and discussion

A roving survey was carried out to know the incidence of the chickpea phyllody in the northern parts of Karnataka viz.,

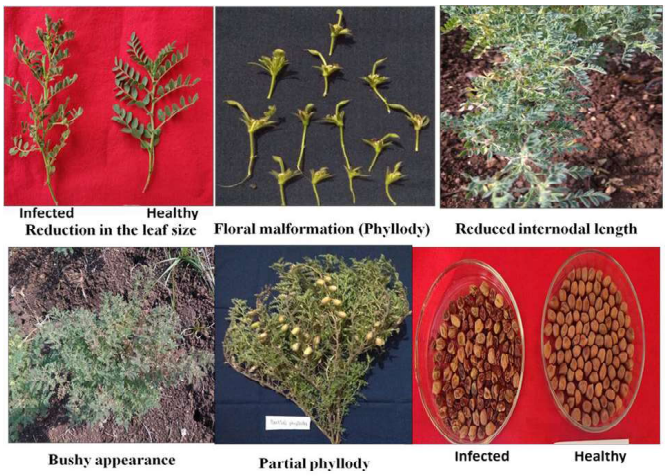

Plate 1. Different symptoms of chickpea phyllody disease

Bagalkot, Belagavi, Dharwad, Kalaburgi, Gadag, Vijayapura, districts during *rabi*, 2019. The symptoms like reduction in the leaf size, stunting of plant, reduction in internodal length, floral malformation (phyllody), reduced pod size and the seeds were shriveled, undersized and discolored were observed in the fields.

The highest disease of 6.88 per cent was noticed in Sannur and kumatgi tanda villages of Kalaburgi and Vijayapura districts respectively and least incidence of 0.6 per cent was noticed in Belavatagi, Hirekoppa and Hulkund villages of Dharwad, Gadag and Belagavi districts, respectively. The district wise disease incidence was in the range of 2.41-5.35 per cent and the highest incidence was recorded in Vijayapura (5.35 %) followed by Kalaburgi (5.07 %), Dharwad (4.16 %), Belagavi (3.27 %), Bagalkot (3.15 %) and lowest incidence was recorded in Gadag (2.41 %). The taluk and district wise disease incidence is presented in Table 1.

Among the different taluks of Bagalkot district, highest incidence of 4.20 per cent was recorded in Jamkahandi taluk followed by 3.13 per cent in Hunugund taluk and the lowest incidence of 2.13 per cent was recorded in Bilagi taluk. Among the different taluks of Belagavi district, highest incidence of 6.19 per cent was registered in Bailhongal taluk along with 2.36 per cent incidence in Gokak taluk and the lowest incidence of 1.28 percent was registered in Saundatti taluk (Table 1). Among the different taluks of Dharwad district, highest incidence of 5.24 per cent was registered in Hubballi taluk along with 3.80 per cent incidence in Dharwad taluk and the lowest incidence of 3.45 percent was registered in Navalgund taluk. Among the different taluks of Kalaburgi district, highest incidence of 5.35 per cent was registered in Kalaburgi taluk along with 5.01 per cent incidence in Sedam taluk and the lowest incidence of 4.87 per cent was registered in Jewargi taluk. Among the different taluks of Gadag district, highest incidence of 3.41 per cent was registered in Gadag taluk along with 2.21 per cent incidence in Rona taluk and the lowest incidence of 1.62 per cent was registered in Naragund taluk. Among the different taluks of Vijayapura district, highest incidence of 5.40 per cent was registered in Vijayapura taluk along with 5.07 per cent incidence in Mudebihal taluk and the lowest incidence of 4.79 per cent was registered in Basavana bagewadi taluk (Table 1). The results were analogous with the findings of Pallavi (2009), Akhtar *et al.* (2009) in chickpea and Kumar (2010) in periwinkle.

Table 1. Average incidence of chickpea phyllody in various taluks of northern Karnataka

District Taluk	Incidence range	Incidence average
	Bagalkot	
Bilagi	0-4.20	2.13
Hunagund	2.43-4.53	3.13
Jamakhandi	2.20-6.09	4.20
Average		3.15
	Belagavi	
Bailahongal	5.60-6.65	6.19
Gokak	0.6-4.20	2.36
Saudatti	0-2.20	1.28
Average		3.27
	Dharwad	
Dharwad	0.73-6.09	3.80
Navalagund	0.6-4.20	3.45
Hubballi	0.2-2.0	5.24
Average		4.16
	Kalaburgi	
Kalaburgi	3.66-6.88	5.35
Jewargi	4.20-6.20	4.87
Sedam	4.20-6.53	5.01
Average		5.07
	Gadag	
Naragund	0-4.28	1.62
Gadag	2.2-4.53	3.41
Rona	0-4.22	2.21
Average		2.41
	Vijayapura	
Vijayapura	5.60-6.88	5.40
Basavana bagewadi	4.20-5.53	4.79
Mudebihal	4.24-6.65	5.07
Average		5.35

Conclusion

Results clearly revealed that there is an increase in the incidence of phyllody in recent years, it was noticeable that the severe incidence was seen in the hot climate districts like Vijayapura and Kalaburgi and mild incidence was recorded in other districts. The variation in the incidence of disease in different regions might be due to the difference in climatic conditions and the survival and multiplication of vector in warm and dry climatic areas.

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