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Survey for the severity of purple blotch of onion in major onion growing districts of Karnataka

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Abstract

Onion (*Allium cepa* L.) is the oldest known important vegetable crop mainly grow for commercial and domestic purpose. Several factors which lower the productivity of onion in India has been identified. Among the biotic factors hindering the production, purple blotch caused by *Alternaria porri* (Ellis) Ciferri is a major limiting factor in terms of yield. In order to know the amount of loss caused by the pathogen an intensive roving survey was carried out during *kharif* 2017 and 2018 in major onion growing areas of Karnataka. The districts surveyed, in both the years revealed the mean maximum severity in Gadag followed by Chitradurga district.

Keywords: onion, purple blotch, survey, Karnataka

Introduction

Onion (*Allium cepa* L.) is the oldest known important vegetable crop of the family Alliaceae which is been globally cultivated, in 175 countries for around 5000 years (Mehta, 2017) [2]. Onion is regarded as “Queen of kitchen” due to its highly valued flavor, aroma, unique taste, making the crop an important ingredient in all types of dishes. There is a lot of demand for Indian onion in the world, Apart from meeting the domestic requirements of the country 15.00-18.00 lakh tonnes is being exported to the neighboring countries viz., Bangladesh, Malaysia, Sri Lanka, Arab countries and Nepal this in turn fetch a worth of 3088.82 crores (Anon., 2018) [1].

India ranks second in area 12.85 lakh ha with a production of 232 lakh tonnes and productivity of 18.1 tonnes/ha. Onion is the most important vegetable crop grown in the states of Maharashtra, Madhya Pradesh, Karnataka, Gujarat, Rajasthan, Bihar, Haryana, Andhra Pradesh, Tamil Nadu and West Bengal. Karnataka is the third leading producer of onion in India. It contributes 14.94 per cent to the total onion production in the country next to Maharashtra (25.02%) and Madhya Pradesh (18.04%) respectively (Anon., 2018) [1]. In Karnataka, onion occupies an area of 0.19 m ha with a production of 25.66 lakh tonnes and productivity of 13.3 tonnes/ha. However, the bulk of the total production is from northern Karnataka viz., Bagalkot, Belagavi, Bellary, Chitradurga, Dharwad, Gadag, Haveri and Vijayapura.

However, in spite of the increase in area planted, the production is estimated to be 4.5 per cent lower as compared to the previous years (Anon., 2018) [1]. Poor yielding short day genotypes, susceptibility of genotypes to major pests and diseases, improper and inadequate use of production technologies continues to affect the production in almost all places where onions are grown. Several factors which lower the productivity of onion in India have been identified. Among the various biotic factors hindering the production, purple blotch caused by *Alternaria porri* (Ellis) Ciferri is a major limiting factor in terms of yield reduction. Losses under field conditions varied from 30 to 100 per cent. The disease may reach epidemic state during the favourable conditions of high relative humidity (80-90%) and optimum temperature (25 °C) Shahanaz *et al.* (2007) [5]. So by considering, the economic importance of onion and reduction in its production due to purple blotch disease survey was undertaken in major onion growing districts of Karnataka in order to identify hot spots for the disease.

Material and Methods

Intensive roving survey was conducted to know the severity of purple blotch disease in ten major onion growing areas viz., Bagalkot, Belagavi, Bellary, Chitradurga, Davangere, Dharwad, Gadag, Haveri, Koppal and Vijayapura districts of Karnataka during *kharif* 2017-18 and 2018-19.

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A total of 30 talukas of ten different districts were surveyed during the study the plants were randomly examined and were scored for disease severity at physiological maturity stage of the crop as per the severity scale given by Sharma (1986).

Scale	Description
0	No disease symptoms
1	A few spots towards tip covering 10 per cent leaf area
2	Several dark purplish brown patch covering up to 20 per cent leaf area
3	Several patches with paler outer zone covering up to 40 per cent leaf area
4	Leaf streaks covering up to 75 per cent leaf area or breaking of the leaves from center
5	Complete drying of the leaves or breaking of the leaves from center

Percent disease severity was calculated as per the formula given by Wheeler (1969) [7].

$$\text{Per cent disease Index (PDI)} = \frac{\text{Sum of individual ratings}}{\text{Total no. of leaves observed}} \times \frac{100}{\text{Max. grade}}$$

Results and Discussions

Roving survey was conducted to collect the information regarding the severity of the purple blotch disease, its distribution in different agro climatic eco system and also to find out the prevalence and diversity of the pathogen in different onion growing districts of Karnataka during *kharif* 2017-18 and 2018-19. This information is necessarily needed to find out the extense of damage caused by the pathogen thereby, to come out with best management strategies to overcome the disease in future. With this background the present study was taken up by conducting the roving survey in different districts of Karnataka viz., Bagalkot, Belagavi, Bellary, Chitradurga, Davangere, Dharwad, Gadag, Haveri, Koppal and Vijayapura, where the onion was grown predominantly for commercial purpose.

Severity of purple blotch during *kharif* 2017-18

Among the taluks, maximum disease index of (57.67%) was noticed from Nargund taluk followed by Gadag rural taluk (54.85%) of Gadag district and the least PDI was noticed in Davangere and Channagiri taluk of Davangere district (26.55 and 29.65) respectively (Table 1). Among the districts surveyed the mean maximum severity was observed in Gadag district (54.72%) followed by Chitradurga district (50.59%) whereas, severity of the disease was observed to be less (29.40%) in Davangere district (Table 2).

Severity of purple blotch during *kharif* 2018-19

Among the taluks, Nargund taluk of Gadag district and Molkalmuru taluk of Chitradurga district recorded the highest disease severity of 60.78 and 59.81 per cent respectively and the least disease severity (27.58%) was recorded in Davangere taluk of Davangere district (Table 1). Among the district surveyed, the mean maximum disease severity was observed in Gadag (57.10%) followed by Chitradurga (54.00%) and Dharwad (53.20%). While, the mean minimum severity (30.44%) was observed in Davangere (Table 2).

The mean disease severity between the different taluks presented in Table 1 indicated that disease severity between two years was found to be maximum in Nargund taluk of

Gadag district (59.22%) and Molkalmuru taluk of Chitradurga district (56.52%). While, the least severity was observed in all the three taluks of Davangere district, Channagiri (31.25%), Davangere (27.06%) and Jagaluru (31.45%).

In both the years the disease was found to be maximum in Gadag district (55.91%) followed by Chitradurga district (52.29%). However the least severity was noticed in Davangere district (29.92%) Table 2.

The mean disease severity between the different districts depicted in Table 2 showed that the mean maximum disease severity was highest during 2018-19, (45.92 PDI) as compared to that survey carried out during 2017-18 (44.38 PDI). The variation in the disease pattern might be due to the presence of congenial weather conditions favorable for the development of the pathogen, continuous mono cropping and also using the susceptible genotype Nasik red. This might have aggravated the pathogen for its multiplication thereby enhancing the inoculum load and causing the severity under congenial conditions. The obtained results were in accordance with the survey conducted by Pramodkumar (2007) [4] who conducted a roving survey in northern parts of Karnataka and recorded the highest severity for the purple blotch disease in Gadag district. While, the least was recorded in Haveri district. Pradnyarani (2013) [3] while recording the severity of purple blotch observed the highest and least severity in Belagavi district alone.

Table 1: On farm severity of purple blotch of onion in different talukas during *kharif* 2017-18 and 2018-19

District	Taluk	Percent disease index (PDI)		
		<i>Kharif</i>		
		2017-18	2018-19	Mean
Bagalkot	Bilgi	49.05	51.00	50.02
	Jamkhandi	44.62	46.92	45.77
	Mudhol	43.47	48.50	45.98
Belagavi	Bailhongal	52.18	50.63	51.40
	Gokak	46.98	53.12	50.05
	Saundatti	49.71	48.72	49.21
Bellary	Hadagali	39.87	36.70	38.28
	Kudligi	43.46	39.51	41.48
	Siruguppa	42.58	42.72	42.65
Chitradurga	Challakere	46.82	49.90	48.36
	Hosadurga	51.73	52.30	52.01
	Molkalmuru	53.23	59.81	56.52
Davangere	Channagiri	29.65	32.86	31.25
	Davangere	26.55	27.58	27.06
	Jagaluru	32.01	30.90	31.45
Dharwad	Dharwad	47.56	50.88	49.22
	Kundagol	45.12	51.02	48.07
	Navalgund	52.90	57.70	55.30
Gadag	Gadag rural	54.85	56.35	55.60
	Nargund	57.67	60.78	59.22
	Rona	51.66	54.19	52.92
Haveri	Byadgi	35.91	36.91	36.41
	Haveri	39.36	34.20	36.78
	Rannibennur	32.13	38.54	35.33
Koppal	Koppal	48.33	46.51	47.42
	Kustagi	51.51	48.60	50.05
	Yelburga	44.80	50.22	47.51
Vijayapura	Basavanabagewadi	38.86	40.10	39.48
	Sindagi	42.90	42.44	42.67
	Vijayapura	36.11	37.96	37.03
Mean		44.38	45.92	45.15



Fig 1: Survey for severity of purple blotch of onion at different districts of Karnataka during kharif 2017-18 and 2018-19

Table 2: Severity of purple blotch of onion in different districts of Karnataka

District	Percent disease index (PDI)		
	Kharif		
	2017-18	2018-19	Mean
Bagalkot	45.71	48.80	47.25
Belagavi	49.62	50.82	50.22
Bellary	41.97	39.64	40.80
Chitradurga	50.59	54.00	52.29
Davangere	29.40	30.44	29.92
Dharwad	48.52	53.20	50.86
Gadag	54.72	57.10	55.91
Haveri	35.80	36.55	36.17
Koppal	48.21	48.44	48.32
Vijayapura	39.29	40.16	39.72
Mean	44.38	45.92	45.14

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