Int.J.Curr.Microbiol.App.Sci (2018) *7*(3): 3795-3803

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 7 Number 03 (2018)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2018.703.440

Survey for the Incidence of Chilli Anthracnose and Fruit Rot Disease in Major Chilli Growing Areas of Telangana, India

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Keywords

Chilli anthracnose and fruit rot, Survey, Per cent disease incidence, Telangana

Article Info

Accepted:
04 February 2018
Available Online:
10 March 2018

A B S T R A C T

Chilli anthracnose and fruit rot disease incidence was assessed in four major chilli growing districts of Telangana. Per cent disease incidence was calculated as the proportion of plants showing symptoms, out of the total number of plants. Highest (54.63) mean per cent incidence was observed in Warangal district while the lowest (35.54) mean per cent incidence was observed in Rangareddy district. Among the different mandals surveyed in Telangana, highest incidence (56.76 %) was recorded in Zaffernagar mandal of Warangal district in a range of 58.80 % (Thidugu village) to 51.80 % (Sagaram village) while least incidence (32.80 %) was observed in Maheshwaram mandal of Rangareddy district.within a range of 29.60 % (Maheswaram village) to 37.50 % (Kollapadkal village).

Introduction

Chilli (*Capsicum annuum* L.) is the most important spice crop in the world. Indian chilli is considered to be world famous for two important commercial qualities such as colour due to pigment Capsanthin and pungency levels due to Capsaicin. Chilli is affected by many diseases and there is huge differences between the countries in terms of production perr unit area. These differences across differences are primarily due to several reasons that include both biotic and abiotic factors. Anthracnose and fruit rot disease is the most important disease which results in crop losses 10 % to 80 % in different parts of (Poonpolgul and Kumphai, 2007). The anthracnose or fruit rot of chilli caused by *Colletotrichum capsici* (Syd.) Butler and Bisby cause huge losses in India. Yield losses

of 66-84 % (Thind and Jhooty, 1985), 30-76 % (Sujathabai, 1992), 8-27 % (Datar, 1995), 12-15 % (Kannan *et al.*, 1998), 10-60 % (Pandey and Pandey, 2003), 10-54 % (Lakshmesha *et al.*, 2005) and 21-47 %. Rajput (2011) were reported from different parts of India. Survey for incidence of plant diseases is an important step in the management of plant diseases which helps in identifying the pathogens and diseases prevalent in a particular crop and area, intensity of the disease and losses caused by them. It is very much necessary for understanding the disease and devising necessary management strategies. Hence, the present study is undertaken to know the status of disease in major chilli growing areas of Telangana.

Materials and Methods

Roving survey was conducted in different chilli growing areas of Telangana during *Kharif* 2014-15. The districts surveyed were Warangal, Karimnagar, Khammam and Rangareddy in Telangana (Figure 1). In each district, five mandals and in each mandal four villages were selected. In each village, four fields were selected for the study.

Observations were recorded in four one meter square areas randomly in each field by walking diagonally starting from South west corner. Chilli anthracnose in observed fields was expressed as Per cent Disease Incidence (PDI).

$$\text{Percent disease incidence} = \frac{\text{No. of plants infected with dieback and fruit rot}}{\text{Total number of plants}} \times 100$$

The maximum disease grade observed in majority of the fields in a village was recorded as per 0-9 disease rating scale (Kamble *et al.*, 2015) given below.

The maximum disease grade observed in majority of the fields observed in a village was also recorded as per 0-9 disease rating scale as given by Kamble *et al.*, (2015).

Scale	Disease on plants
0	No symptoms on leaf or branch or fruit.
1	Small Irregular brown spots covering 1 % or less area of leaf or branch or fruit.
3	brown dirty pin head spots covering 1-10 % area of leaf or branch or fruit
5	Dark brown dirty black spots with blackish margin covering 11-25 % area of leaf or branch or fruit.
7	Dark brown circular or irregular spots with blackish covering 26-50 % area of leaf or branch or fruit.
9	Dark brown circular or irregular spots with blackish covering 51 % and above area of leaf or branch or fruit.

Results and Discussion

Among the districts surveyed In Telangana, highest (54.63 %) mean disease incidence of andthracnose and fruit rot of chilli was recorded in Warangal district. Among the mandals of Warangal district surveyed, the disease incidence was almost uniform with incidence range of 52.20 to 56.76. Highest (56.76 %) incidence was recorded in Zaffernagar mandal and lowest (52.20 %) in Mangapeta mandal while Govindaraopeta, Eturunagaram and Wardhannapeta mandals recorded the mean incidence of 52.64, 55.00 and 56.56 per cent respectively. When the incidence in 25 villages across 5 mandals was observed, lowest (44.60 %) incidence was recorded in Bussapur village of Govindaraopeta mandal while Rangapur village of the same mandal recorded highest (60.40 %) incidence. Among the different fields surveyed in the villages, highest disease grade (9) was observed in majority of the

fields surveyed (Table 1).

The results of the survey in Karimnagar district of Telangana revealed the mean disease incidence of anthracnose as 43.97 per cent. In, Karimnagar district, the results of survey revealed uniform disease incidence across the mandals surveyed. Among the different mandals surveyed, lowest incidence (41.52 %) was recorded in Kataram while Mahadevpur recorded the highest (45.76 %) incidence. Other mandals surveyed, Manthani, Mutharam, Malhar recorded the incidences of 43.36, 43.92, 45.28 per cent respectively. Among the different villages surveyed in these mandals, Garepalli village of Kataram mandal recorded the lowest (28.00 %) incidence while Gaddalapalli village of Mutharam mandal recorded the highest (58.40 %) incidence. In Majority of the villages surveyed, disease grade of 7 was most commonly observed (Table 2).

Survey for disease incidence of anthracnose and fruit rot in chilli in Khammam district revealed that the mean disease incidence in the district is 40.30 per cent. Highest (43.93 %) incidence was recorded in Tirumalapalem mandal where as Bhadrachalam mandal recorded least (36.12 %) incidence. Other mandals, Konijerla, Tallada, Khammam recorded the incidences of 37.32, 41.44, 42.68 per cent respectively. Among the different villages surveyed lowest incidence of 28.00 per cent was recorded in Medidepalli village of Tirumalapalem mandal where as Mohammadapuram of the same mandal recorded highest incidence of 58.40 per cent. In majority of the fields surveyed the disease grade observed is 7 (Table 3).

Among the districts surveyed in Telangana, the incidence of anthracnose and fruit rot of chilli is relatively lower in Ranga Reddy district when compared to other districts surveyed. Mean disease incidence recorded in Ranga Reddy was 35.54 per cent. The disease incidence in 5 mandals was between 32.80 (Maheswaram mandal) and 39.92 (Chevella mandal). Among the other mandals, Shamshabad mandal recorded the incidence of 33.32 per cent whilee Ibrahimpatnam mandal and Shankarpally mandals recorded the incidences of 35.36 and 36.28 per cent respectively (Table.4).

Among the different villages surveyed, Peddagolconda village of Shamshabad mandal recorded lowest incidence of 28.80 per cent while Ibrahimpalli of Chevella mandal recorded highest incidence of 47.80 per cent. Disease grades observed in different fields surveyed were between 5 and 7 (Table 4). Chilli crop in Warangal, occupies an area of nearly 50 per cent of the total area in Telangana. Warangal chapata, a unique chilli variety which is highly susceptible to *C. capsici* is grown only in this district. Traditional chilli growing belt coupled with highly susceptible variety in major area might be contributing to the high incidence (54.63 %) of the disease. In, Karimnagar district, chilli is not the major crop but the areas where chillies are grown were well distributed. Ideally disease incidence could have been less here but incidence of 43.97 per cent was observed. This might be due to the localized build up of inoculum due to continuous cultivation in the same fields. In case of Khammam, (40.60 %) the lower incidence might be due to more cultivation of Teja type of varieties and isolated pockets of chilli growing areas interspersed with other crops. The least incidence in Ranga Reddy district is might be due to non regular cultivation of chilli in the same fields and in most cases grown for green chillies, in highly localized pockets in smaller areas. This might be the reason for low inoculum build up and incidence in the fields.

The present results of this study were similar to the range of disease incidence reported by different other workers during surveys made

by them. Ekbote (2002) conducted a survey in Haveri district of Karnatak and reported the that fruit rot caused by *C. capsici* was the most prevalent disease with and average PDI of 36.40 with highest mean PDI of 42.00 and lowest PDI of 41.00.

Sharma *et al.,* (2011) also, surveyed in Himachal Pradesh in 2007 and 2008 and reported the disease incidence range of 12.50-45.00 per cent. Anamika *et al.,* (2012) conducted survey to assess the incidence of anthracnose of chilli in five locations in Rewa Province of Fiji and reported fruit rot incidence of 55.50 to 71.10 % with an average incidence as 63.70 %.

Table.1 Incidence of chilli anthracnose in Warangal district of Telangana

S. No	Mandal	Village	Per cent disease incidence	Maximum disease grade	Mean per cent incidence
1	Mangapeta	Komatipalle	50.60	7	52.20
		Cherupalle	54.40	5	
		Thimmampet	53.00	5	
		Mallur	52.60	9	
		Kamalapuram	50.40	9	
2	Govindraopeta	Dammakkapalle	52.40	7	52.64
		Chalwai	51.40	7	
		Bussapur	44.60	9	
		Rangapur	60.40	7	
		Motlagudem	54.40	9	
3	Wardhannapeta	Dammannapet	58.40	5	56.56
		Divitipalle	59.60	5	
		Dc thanda	53.60	7	
		Ramavaram	57.40	5	
		Kothapalle	53.80	9	
4	Zaffernagar	Thimmampet	58.40	7	56.76
		Konaichelam	56.80	7	
		Thidugu	58.80	9	
		Sagaram	51.80	5	
		Zaffergadh	58.00	5	
5	Eturunagaram	Teegalvai	53.80	7	55.00
		Chintagudem	57.40	9	
		Shapalle	59.00	7	
		Koratpalle (D)	51.40	5	
		Medaram	53.40	9	
	Mean incidence in the district				54.63

Table.2 Incidence of chilli anthracnose in Karimnagar district of Telangana

S. No	Mandal	Village	Per cent disease incidence	Maximum disease grade	Mean per cent incidence
1	Mutharam	Pegdapalle	33.60	5	43.92
		Yetnaram	37.40	5	
		Singampalle	43.40	7	
		Gaddalapalle	58.40	7	
		Kankunoor	46.80	7	
2	Madhavpur	Annaram	46.80	7	45.76
		Enkapalli	48.40	7	
		Bommapur	51.80	7	
		Kudurupalli	38.00	5	
		Dammur	43.80	7	
3	Kataram	Morepalle	47.40	7	41.52
		Bopparam	38.80	7	
		Chidnepalle	42.40	7	
		Nallagunta	51.00	7	
		Garepalle	28.00	5	
4	Manthani	Mallepalle	44.00	7	43.36
		Angulur(d)	47.00	7	
		Vilochavaram	43.40	7	
		Khanapur	48.40	7	
		Khansaibpeta	34.00	5	
5	Malhar	Edlapalli	38.40	5	45.28
		Malharrao	48.00	7	
		Peddathundla	51.80	7	
		Mallaram	39.60	5	
		Kondampet	48.60	7	
	Mean incidence in the district				43.97

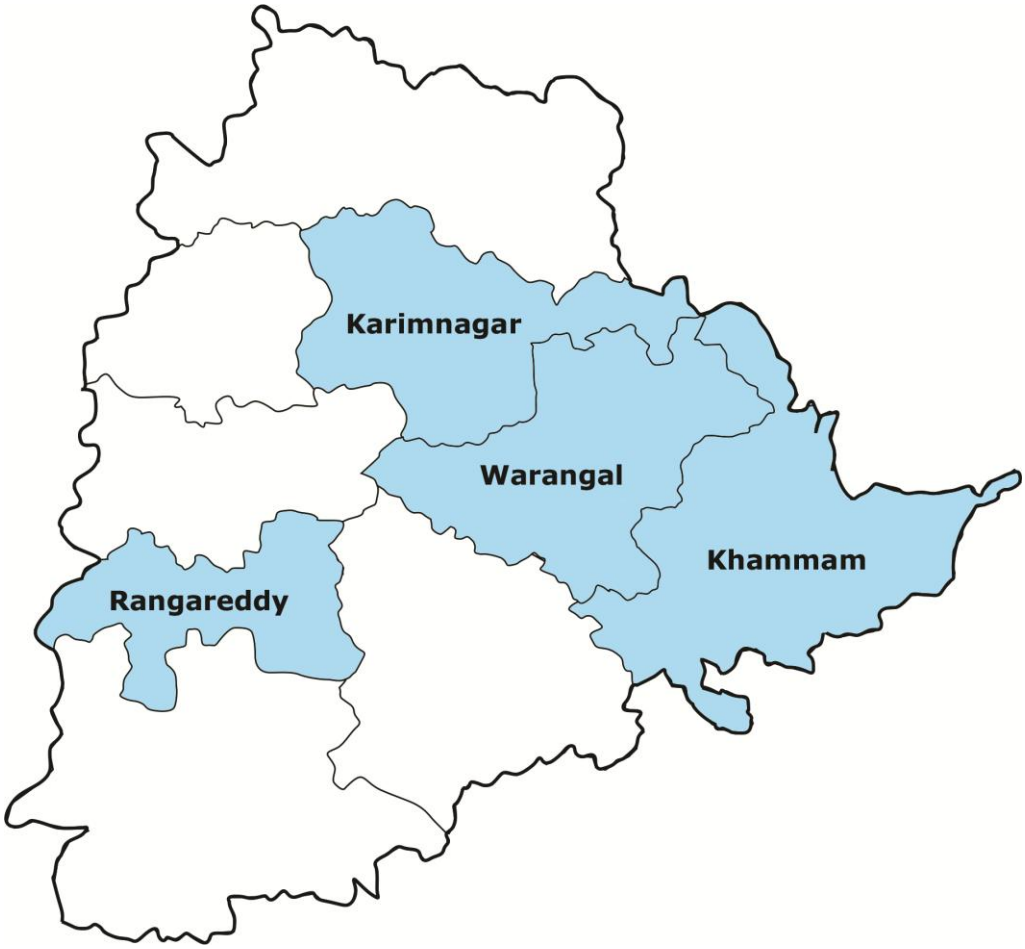
Table.3 Incidence of chilli anthracnose in Khammam district of Telangana

S. No	Mandal	Village	Per cent disease incidence	Maximum disease grade	Mean per cent incidence
1	Khammam	Thirthala	38.80	5	42.68
		Daredu	42.40	7	
		Kamanchikal	51.00	7	
		Mallemadugu	38.80	5	
		Gollapadu	42.40	7	
2	Tallada	Pinapaka	48.00	7	41.44
		Telagaram	43.40	7	
		Mittapalle	44.60	7	
		Ramanujavaram	38.40	5	
		Laxmipuram	32.80	5	
3	Konijerla	Thummalapalle	42.60	7	37.32
		Gubbagurthy	29.60	5	
		Singaraipalem	33.60	5	
		S.Venkatapuram	37.40	5	
		Mallupalle	43.40	7	
4	Thirumala palem	Mohammadapuram	58.40	7	43.96
		Medidepalle	28.00	5	
		Beerolu	44.00	7	
		Thalla cheruvu	47.00	7	
		Thettelapadu	42.40	7	
5	Bhadrachalam	Lingalapalle	28.40	5	36.12
		Ramagopalapuram	43.40	7	
		Pattucheera	48.00	7	
		Buruguvai	31.00	5	
		Laxmipuram	29.80	5	
	Mean incidence in the district				40.30

Table.4 Incidence of chilli anthracnose in Rangareddy district of Telangana

S. No	Mandal	Village	Per cent disease incidence	Maximum disease grade	Mean per cent incidence
1	Ibrahimpatnam	Raiplou	28.40	5	35.36
		Dandumylaram	35.40	7	
		Polkampalli	33.00	7	
		Yeliminedu	41.40	7	
		Kappapahad	38.60	7	
2	Chevella	Chevella	37.00	5	39.92
		Aloor	42.40	7	
		Ibrahimpalli	47.80	7	
		Khanapur	39.00	7	
		Basthepur	33.40	5	
3	Shankarpally	Shankarpally	33.00	5	36.28
		Sankepalli	38.00	5	
		Hussainpur	35.00	7	
		Yelwarthy	37.00	5	
		Fatehpur	38.40	7	
4	Shamshabad	Pedda golconda	28.80	7	33.32
		Chinna golconda	37.00	7	
		Narkhuda	30.40	5	
		Palamakola	41.40	7	
		Shamshabad	29.00	5	
5	Maheswaram	Lemoor	31.00	5	32.80
		Imamguda	33.00	7	
		Rachloor	32.90	7	
		Kollapadkal	37.50	5	
		Maheswaram	29.60	7	
	Mean incidence in the district				35.54

Fig.1 Map showing the districts surveyed in Telangana



Sattar *et al.*, (2016) conducted a field survey in five major chilli growing districts of Pakistan and reported the disease incidence range between 37.00 and 85.10 per cent. In the present study, it was concluded that the disease incidence was highly varied among the surveyed locations. Chilli growing in Warangal district is highly prone to the disease compared with other surveyed districts.

Acknowledgements

This work is supported by way of deputation for doctoral studies by Sri Konda Laxman Telangana Horticultural University and financial and professional assistance is gratefully acknowledged**.**

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How to cite this article:

Venkata Ramesh, K., R. Sarada Jayalakshmi Devi, K. Gopal, B. K. M. Lakshmi, T. Murali Krishna and Ravindra Reddy, B. 2018. Survey for the Incidence of Chilli Anthracnose and Fruit Rot Disease in Major Chilli Growing Areas of Telangana, India. *Int.J.Curr.Microbiol.App.Sci.* 7(03): 3795-3803. doi: https://doi.org/10.20546/ijcmas.2018.703.440