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Survey of dry root rot of chickpea incidence in Marathwada region

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Abstract

Chickpea (*Cicer arietinum* L) is an important pulse crop of India popularly known as 'Gram'. In India, it is cultivated on nearly about 10.22 million ha. Area with an annual production of 09.88 metric tonnes and productivity of 967 kg/ha. The Marathwada region contributes the 6.58 lakh ha. Area with production of 06.64 lakh tonnes and productivity of 918 kg/ha., during *Rabi*. (Anonymous, 2014). Of the major fungal diseases infecting chickpea, dry root rot incited by *Rhizoctonia bataticola* (*taub*) Butl. Is one of the most destructive and wide spread disease which cause average yield losses of 05-50% (Anonymous, 2012). Keeping in view, economic importance of chickpea and losses incurred by dry root rot disease, present investigations on the aspects viz., survey against *R. bataticola* were undertaken during *Rabi*, 2014-15 at the Department of Plant Pathology, College of Agriculture, Badnapur.

A roving survey for recording chickpea dry root rot disease incidence was undertaken in Marathwada region. The highest disease incidence was observed in Latur district (23 per cent) and lowest in Aurangabad district (10.20 per cent).

Keywords: Chickpea, Dry root rot, survey

Introduction

The cultivated chickpea (*Cicer arietinum* L.) was one of the first grain legume to be domesticated in the old world. Chickpea is most probably originated in area of present day south eastern Turkey and adjoin Syeria.

The genus *Cicer* belongs to fay Leguminosae and sub family Papilionoidae. Chickpea has been well recognized as a valuable source of protein particularly in the developing countries, where majority of the populations depends on the low priced food for meeting it's dietary requirements nutritionally, chickpea is low in sodium, contains (21.1%), fats (4.5%), no cholesterol and overall an excellent source of both soluble and insoluble fiber, complex carbohydrates(61.5%), vitamins (especially B vitamins) and minerals (especially potassium, phosphorous, calcium, magnesium, copper, iron and zinc). Therefore, chickpea is an excellent heart healthy food that may be beneficial to the prevention of coronary and cardiovascular diseases and by reducing blood lipids also help some serious complications of diabetes.

Chickpea is grown in many tropical, sub-tropical and temperate regions of the world . Chickpea is mainly used for human consumption as well as animal feed. It is consumed as whole seed, dal, fried, boiled, salted or more generally cooked fresh green leaves generally used as vegetable. The grains also used as vegetable chole .Gram flour is mixed with wheat flour to improve the protein content of wheat flour and it is used for making missi roti . The flour of dehusked gram is called basen which widely used in making pakodas, kadi, and several snack foods.

In India chickpea is primarily grown as *Rabi* (post rainy) season crop on residual soil moisture. It ensures nutritional security besides being a rich source of protein and is also important in substantial agriculture as it improves physical, chemical and biological properties of soil by mixing atmospheric nitrogen symbiotically. Deep roots of pulse crop also open up the soil by increasing soil aeration and fit well in various cropping ecosystem and hence have got unique position in rainfed agriculture.

Chickpea is grown throughout the world. In India on large scale in Punjab, Haryana, Uttar Pradesh, Madhya Pradesh, Rajasthan, Andhra Pradesh, Karnataka, and Maharashtra it is mostly cultivated under rainfed condition in a variety of soil, varying in a residual moisture. In India area under chickpea was 10.22 M/ha with production 9.88 MT and productivity 967 kg/ha during 2014. In Maharashtra chick pea is grown under *rabi* season and it occupies area of 18.19 lakh ha with production 16.22 lakh ton and productivity 891 kg /ha during 2014. In marathwada region, total area under chickpea during 2014 was 6.58 lakh ha with production 6.64 lakh ton and productivity 918 kg/ha. (Anon 2014).

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susceptibility of the crop to different biotic and abiotic stress. Abiotic stress is basically due to insufficient moisture. regarding biotic stresses, diseases, insect pest, nematodes and parasitic weeds account major losses for example, extend of yield loss due to wilt and root rot disease is far more in the event of drought high temperature in the country. The chick pea crop is attacked by 172 pathogen viz as 67 fungi, 22 viruses, 3 bacteria, 80 nematodes and mycoplasma from all over the world (Nene *et al.*, 1996).

Chickpea dry root rot causing pathogen (*Rhizoctonia bataticola*) belongs to group of ubiquitous and diverse plant pathogens that occur widely in India as a root pathogen on different crops and also isolated from a different varieties of same host species. Natural population of this pathogen is diverse in terms of pathogenic variability and can be characterized in to pathotypes or races by means of biological typing.

Being soil borne in a nature it is very difficult to control this pathogen .Use of resistant cultivar is more effective strategy for sustainable chickpea cultivation. Despite of several resistant varieties are available, yield losses due to root rot are more. Ahmed and Mohammed (1986) reported losses due to dry root rot in gram to extend of 70.8% at full podding and 48.9% at pre-harvest stage. It indicates that use of resistant varieties is not soul control measure against dry root rot of chick pea. Therefore, two or more control must be tried in

combination with resistant variety from sustainable production.

Materials and Method

A field survey of chickpea dry root rot disease was conducted in eight district of Marathwada region during the month of December and February, 2014-16 to record occurrence and distribution of chickpea dry root rot disease. On an average 10 farmer's field of chickpea in each district were visited and the percent dry root rot disease incidence was recorded by counting total chickpea plant in 1x1m² area and total dry root rot infected plants in that area. Chickpea plants showing typical symptoms were collected in separate paper bags and brought to the laboratory for investigations. The intensity of disease was noted by counting at least 400 plants in each field. Observation on dry root rot intensity was recorded as, the symptoms expressed as straw colored plant like dry grass at pod formation, black rotted roots, shredding of bark and root broken easily, minute dark black sclerotial bodies on root surface and in the pith region.

The per cent disease incidence was calculated by using 0-9 disease rating scale(AICRP Scale). On an average ten villages of each district were surveyed for dry root rot severity, chickpea cultivar and disease incidences recorded are presented in below table.

List of Chickpea growers in Marathwada region

Sr. No	Name of farmer	District	Village	Stage of crop	Variety
1	Prabhakar Pawar	Aurangabad	Pandhari	Podding	Vijay
2	Ganesh Pawar		Goaltagaon	Podding	Vijay
3	Appasaheb Jadhav		Itkheda	Flowering	LocalS
4	Sainath Jadhav		Karmad	Podding	BDN 797
5	Devidas Kite		Bokudjalgaon	Flowering	Digvijay
6	Pandurang Pawar		Lasur	Podding	Virat
7	Uttam Madake		Chaukha	Podding	Vijay
8	Sanjay Tupe		Shendra	Podding	Virat
12	Maruti Totare	Nanded	Naigaon	Flowering	local
13	Khandu Totare		Vishnupuri	Flowering	Local
14	Rama Totare		Takalgao	Flowering	Divvijay
15	Ekhnath Totare		Ardhapur	Podding	Vijay
16	Dattatraya Gaikwad		Dabad	Podding	Vijay
17	Ashokrao Rodage	Parbhani	Parbhani	Podding	BDN 797
18	Pratap Rodage		Pokharni	Podding	BDN 797
19	Shivaji Rodage		Assola	Podding	Virat
20	Suresh Rodage		Purna	Podding	Local
21	Bhaskar Rodage		Manwat	Flowering	vijay
22	Sachin Kadam		Gunj	Flowering	Digvijay
23	Shriram Khandare		Dharasur	Flowering	Local
24	Ganeshrao Deshmukh		Daithna	Flowering	Digvijay
25	Ramesh Bhopale	Jalana	Kandhar	Podding	Digvijay
26	Rameshvar Kankhar		Badnapur	Podding	Virat
27	Baban Jadhav		Assola	Podding	Vijay
28	Ganesh Bhopale		Kondi	Podding	BDN-797
29	Ambadas Kanhere		Ranjni	Podding	Local
30	Ramesh Lahane		Sawewadi	Podding	Local
31	Prabhakar Joshi		Viduli	Podding	Digvijay
32	Appasaheb Kanhere		Jaypur	Podding	Virat
33	Sanjivani Pandule	Beed	Bhavthana	Flowering	Local
34	Sagar Pandule		Bardapur	Podding	Virat
35	Asurba Mutkule		Anandgao	Podding	Digvijay
36	Vijay Pokale		Ladegao	Podding	Vijay
37	Ajinath Pandule		Kumbephal	Podding	Vijay
38	Ashabai Pandule		Jaygao	Podding	BDN-797
39	Rahul Jagatap		Jirewadi	Podding	Vijay
40	Shivajirao Mane	Latur	Sai	Flowering	Vijay
41	Vasantarao patil		Arvi	Flowering	Vijay

42	Ambadas Nade		Kasarkheda	Flowering	Virat
43	Vivek Shelke		Janwal	Podding	Virat
45	Babasaheb Hudage		Sugaon	Podding	Virat
47	Ravasaheb Patil		Garsoli	Podding	Digvijay
49	Shakarao Sabade		Halli	Podding	Virat
50	Sadashiv futane	Osmanabad	Ter	Flowering	vijay
51	Mamasaheb futane		Upla	Flowering	Vijay
52	Vishal Bhore		Chinchola	Podding	Vijay
53	Sudhir Sagare		Songiri	Podding	Vijay
54	Mahadeo Rote		Ramwadgao	Podding	Virat
55	Bhanudas Tate	Hingoli	Salesuea	Podding	Virat
56	Vinod Tate		Hiwara	Podding	Virat
57	Gajanan Tate		Nandkheda	Podding	Local
58	Rohidas Mhase		Purna	Podding	Local
59	Ramesh Deokate		Hatta	Podding	Vijay

Results and Discussion

A survey for the incidence of dry root rot of chickpea *R. bataticola* 59 was carried out at farmers chickpea crop fields comparing different Eight of Marathwada region of the Maharashtra state during *Rabi*, 2015-16. The chickpea fields were surveyed at maturity stage under rainfed condition.

Status of dry root rot in Marathwada

Data presented in table 1 showed that incidence of dry root rot at maturity stage in Marathwada region varied from 06.02-25.02 per cent. The highly prone area of dry root rot of

chickpea were Amla (25.02%), followed by Hallihandarguli (24.30%), Borgaon (23.90%), Garsoli (23.60%), Jaypur (23.10%) and Sugaon (23.00%). The least incidence of disease was noticed in Dabad (06.02%), as compared to other locations survey.

District-wise seasonal incidence

Results revealed that during *Rabi*, 2015-16 average of dry root rot incidence in the eight districts surveyed was ranged from 10.20 (Aurangabad) to 23.00 per cent (Latur).

Table 1: District-wise incidence of chickpea Dry root rot disease during *Rabi*, 2015-16

Districts	Tahsils	Villages	Chickpea varieties	Incidence (%)
Jalna	Badnapur	Kandhar	Digvijay	20.10
		Badnapur	Virat	20.90
		Assola	Vijay	21.25
	Partur	Kondi	BDN-797	21.40
		Ranjni	Local	21.70
		Sawewadi	Local	22.23
	Mantha	Viduli	Digvijay	22.80
Jaypur		Virat	23.10	
Average				21.68
Beed	Ambajogai	Bhavthana	Local	14.20
		Bardapur	Virat	14.90
	Kaij	Anandgaon	Digvijay	15.00
		Ladegaon	Vijay	15.35
		Kumbephal	Vijay	16.23
	Parli	Jaygao	BDN-797	16.80
		Jirewadi	Virat	17.00
Average				15.64
Latur	Latur	Sai	Vijay	20.00
		Arvi	Vijay	22.50
		Kasarkheda	Vijay	21.40
	Chakur	Janawal	Virat	22.90
		Sugaon	Virat	23.00
	Renapur	Garsoli	Virat	23.60
		Borgaon	Digvijay	23.90
	Ahamadpur	Hallihandarguli	Virat	24.30
		Amla	Digvijay	25.02
Average				23.00
Hingoli	Hingoli	Salesura	Virat	11.70
		Hiwara	Virat	12.00
		Nandkheda	Vijay	12.80
	Vasmat	Purna	Vijay	13.20
		Hatta	Vijay	13.82
		Adgaon	Vijay	14.02
	Aundha	Aundha	Local	14.45
Average				13.14
Osmanabad	Osmanabad	Ter	Vijay	10.01
		Upla	Vijay	11.17
	Bhoom	Chinchola	Vijay	12.18

	Kalamb	Songiri	Vijay	13.13
		Ramwadgao	Virat	13.60
		Charatha	Virat	13.99
		Tandalwadi	Virat	14.20
Average				12.62
Nanded	Nanded	Naigao	Local	14.00
		Vishnupuri	Local	14.40
		Takalgao	Digvijay	14.90
	Ardhapur	Ardhapur	Vijay	15.20
		Dabad	Virat	06.02
Average				14.90
Parbhani	Parbhani	Parbhani	BDN-797	16.60
		Pokharni	BDN-797	17.00
		Assola	Virat	17.30
	Purna	Purna	Local	17.80
	Manvat	Ambejao	Vijay	18.00
		Gunj	Digvijay	18.02
	Gangakhed	Dharasur	Local	18.64
		Daithana	Digvijay	19.00
	Average			
Aurangabad	Aurangabad	Pandhari	Vijay	09.00
		Goaltgaon	Vijay	09.08
		Itkheda	BDN-797	09.09
		Karmad	Digvijay	10.00
	Paithan	Bokudjalgaon	Virat	10.04
	Vaijapur	Lasur	Vijay	10.20
	Sillod	Chaukha	Virat	11.50
	Chikhalthana	Shendra	Local	11.20
Average				10.20
Overall Average	Total locations (59)			16.12

However, the chickpea crop grown in the district of Latur was found to be infected with maximum with an average of 23.00 per cent. This was followed by the districts viz., Jalna (21.68%), Parbhani (17.79%), Beed (15.64%), Nanded (14.90%), Hingoli (13.14%), Osmanabad (12.62%) and Aurangabad (10.20%).

Variety-wise seasonal incidence

In eight districts of the Marathwada region surveyed, about 5 different chickpea varieties were grown by the farmers. The results obtained on variety wise incidence of dry root rot are presented in the (Table 2).

Table 2: Variety-wise incidence of chickpea dry root rot disease in the major districts of Marathwada during Rabi, 2015-16

Varieties	No. of locations	Av. Incidence (%)
Vijay	19	14.70
Virat	17	16.50
Digvijay	09	18.76
Local	09	16.51
BDN-797	05	16.34

During Rabi, 2015-16 in Marathwada region the average dry root rot disease incidence on the chickpea varieties grown was ranged from 14.70 (Vijay) to 18.76 (Digvijay) per cent. However, maximum average dry root rot incidence (18.76%) was recorded on Digvijay cultivar. This was followed by the varieties viz., Local (16.51%), virat (16.50%), Vijay (14.70%) and BDN-797 (16.34%).

The results revealed that the per cent disease incidence varied from location to location and variety to variety. However, the dry root rot disease was reported found in almost all the chickpea fields surveyed. The overall average disease incidence was more in Latur district as compared to other districts surveyed. Crop grown in light to medium type of soil and moisture stress at pod filling stage. The result of present

finding are Tariq Hussain *et al.* (1997), Wakocha (2000) who stated that, the disease incidence of dry root rot Soybean was significantly low when the soil moisture was 60-70% but it was 0.5% at 10-20% soil moisture. Pandey *et al.* (2010), the unpredictable moisture stress and higher temperature in central and Southern parts of India. Probable condition for dry root rot. Date (2015) conducted survey for recording dry root rot incidence of 15.75% ranged from 10.12 to 23.14%. District wise incidence of disease was Maximum in Latur (23.14%) followed by Jalna (22.2%).

Such variation in incidence and wide spread nature of chickpea have been reported by earlier worker like Maheshwari *et al.* (1983), Sharma *et al.* (1983), Pandey and Singh (1990), Srivastava *et al.* (2002), Manjunatha *et al.* (2011) and Ghosh *et al.* (2013).

Conclusions

A roving survey for recording chickpea dry root rot disease incidence was undertaken in Marathwada region. The highest disease incidence was observed in Latur district (23 per cent) and lowest in Aurangabad district (10.20 per cent).

- *R.bataticola* is one of the most destructive pathogen causing dry root rot diseases in Chickpea and there by inflicting accountable yield losses.
- Survey report in Marathwada region showed that the dry root rot of Chickpea was severe during Rabi season in dry land soil.

References

1. Ahmed Q, Mohamad A. Losses in yield due to *Rhizoctonia* root rot of Chickpea in Bihar. *Indian phytopath.* 1986; 39:590-592.
2. Anonymous. ICRISAT Information bulletin, 2014.
3. Date YA. Study of Investigation of dry root rot of chickpea incited by *R.bataticola*. M.Sc (Agri) thesis submitted to VNMKV, Parbhani, 2014.

4. Manjuntha SV, Naik MK, Khan MF, Goswami RS. Evaluation of biocontrol agents for management of dry root rot of chickpea, caused by *Macrophomina phaseolina*. Crop prot. 2013; 45:147-150.
5. Nene YL. Opportunities for research on diseases of pulse crops. Indian phytopath. 1996; 38:1-10.
6. Pandey G, Singh RB. Survey of root rot diseases of Chickpea in Allahabad region. Curr. Nematode. 1990; 1(1):77-78.
7. Sharma BL, Gupta RN, Gupta JS. Studies on survey of wilt and root rot incidence of *Cicer arietinum* in northern region of Madhya Pradesh. Indian Phytopath. 1983; 36(1):82-84.
8. Shrivastava SN, Tripathi RC. Management of sugarbeet seedling diseases complex by combination of fungicides. Indian phytopath. 1998; 51(1):75-77.