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Survey of brinjal collar rot disease incidence in major brinjal growing areas of Tamil Nadu

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Abstract
The survey was conducted in the year 2019-20 to study the collar rot disease incidence in major brinjal grown areas of Tamil Nadu and to study the morphological character of *Sclerotium rolfsii*. The collar rot symptoms were identified and the sample were collected. Total 20 isolates were collected from different localities. It was conducted in the different localities of different district and plant disease incidence was calculated and hence morphological character of *Sclerotium rolfsii* was studied. The disease incidence recorded highest was in Kaveripattinam of Krishnagiri district which is 36.16 percent and followed by Vanur of Villupuram district which is 33.46 percent. The least disease incidence recorded was 7.73 percent in Kottur village of Theni district. The mycelium growth and no of sclerotia observed from different isolates were varied. The highest mycelium growth observed was 90mm and the least mycelium growth observed was 57mm.

Keywords: brinjal, collar rot, *Sclerotium rolfsii*

Introduction
Brinjal is one of the most important vegetable crop grown in all the parts of the country. The largest producer of brinjal in the world is china followed by India, which cover an area of 730.4 (000, ha), production of 12800.8 (000, MT) with an average annual production of 17.5 million tonnes per ha. In India it is widely grown in West Bengal, Madhya Pradesh, Andhra Pradesh, Tamil Nadu, Maharashtra, Haryana and Assam. Brinjals are grown in kharif as well as Rabi season and it is also grown in the month of march. There are lots of different varieties of brinjal varying in shape, size and colour grown in different parts of India. It has been found that wild varieties of brinjal are still found in northeast part of India which is bitter in taste. Brinjal is warm season crop and requires a long warm growing season. Brinjal are good source of calcium, iron and vitamins.

In brinjal crop there are lots of disease which are caused by Bacteria, Fungi and Virus, one the most important disease is collar rot which has increased the yield losses of the fruit. The crop is attacked by a number of fungal species which have adverse affect on its quality and yield and hence decrease its yield as well as quality (Rao 1969; Vyas et. al.,1978;1981) [6]. Collar rot may reduce the fruit yield upto 30-50% (Siddique *et al*., 2016) [8]. It has been reported by Rangaswami (1972) [5] that more than ten diseases have been found on brinjal from this country. Among them brinjal collar rot is most common disease caused by *Sclerotium rolfsii*.

Sclerotium rolfsii is a soil borne pathogen and during the favourable condition it become active. This disease found to be severe in the tropical and subtropical region where temperature will be high which favours the growth of pathogen. It has wide variety of host and especially severe on the legumes, solanaceous crops and other vegetables. It infect the seeds, seedlings and mature plants. The infected plants shows wilting symptoms and fan like white colour mycelium can be seen in the collar region and near by soil. After the germination, *Sclerotium rolfsii* produce enzymes like pectinolytic and cellulolytic, which helps to kill and disintegrate the host tissues, starting a new infection (Le. 2011) [4]. The roundish and white colour sclerotia are produced on the mycelium and later on it turns to black brownish colour. The matured sclerotia are like mustard seeds. *Sclerotium rolfsii* can survive for prolonged duration by producing sclerotia.

Material and Methods
Survey
The field survey was conducted in the major brinjal grown districts of Tamil Nadu in the year 2019-2020. The climate is mainly Tropical and temperatures have known to rise almost as high as 40°C in Tamil Nadu. Survey was done randomly and from each districts some villages were selected randomly and percent disease incidence was calculated using the following formula:

$$PDI = \frac{\text{Number of plants affected}}{\text{Total no of plants observed}} X100$$

Preparation of Media
PDA (Potato dextrose agar) medium for *Sclerotium rolfsii*
500 ml of water was taken in 1ltr beaker and 200g washed, peeled and sliced potatoes were added into the beaker. Potatoes were gently boiled for 30 minutes until they become soft and penetrated by glass rod. The extract were filtered through muslin cloth in a beaker. 20g of Dextrose were added to the potato extract and in another beaker 500ml of water was taken and heated. 20g of Agar was added bit by bit to the hot water to dissolve it well and it was mixed with potato extract. Distilled water was added to bring the volume upto 1000ml and 200ml were poured into the each conical flasks which were plugged with non absorbent cotton and it was sterilise at 121°C, 15 lbs pressure for 15 minutes in an autoclave.

Isolation and identification of the pathogen
The pathogen was isolated from the infected collar or stem region of brinjal plants showing the typical symptoms of

collar rot disease caused by *Sclerotium rolfsii.* The infected collar portions were cut into small pieces which consist of both infected and healthy portions. These pieces were surface sterilised with 0.1% of mercuric chloride and washed in three changes of sterile water and blot dry on a clean sterile filter paper to remove the sterilant. Aseptically transfer the pieces into petridish which was already poured with 20ml of potato dextrose agar medium. Inoculated plates was incubated at 25°C for 3-5 days and the growth of fungus was observed periodically. After 3 days mycelial growth was observed and from this colony growth, a portion from the periphery having single hyphen tip was separated and transferred to the petriplates which contain medium to get pure culture. The identification of pathogen was confirmed by the morphological character.

Maintenance and preservation of culture

The cultures of *Sclerotium rolfsii* were maintained on PDA plates and PDA slants. Sub culturing was done periodically to maintain the cultures.

Results and Discussion

Field survey

The field survey was conducted in the year 2019-20 to study the disease severity of brinjal collar rot and morphological character of *Sclerotium rolfsii*. A regular field visit was conducted to the brinjal growing areas during the survey and it was found that in some region it was suffered from a severe disease known as collar rot. The symptoms of collar rot was seen on the some of the plant with subsequent drying of the leaves and white colour mycelium on the affected plants and near by soil surface. The affected plants showed wilting symptoms. When the disease plant was uprooted there were lots of sclerotia seen on the collar region and hence the same symptoms was confirmed by the Rao (1969) [6].

Isolation

The isolation was done by the methods described above in the material and methods. Different isolates were collected from different locations of Tamil Nadu. Total 20 isolates were done from different locations of Tamil Nadu among the 20 isolate it has been found that disease incidence was highest in Kaveripattinam village of Krishnagiri district that is 36.16 percent and the least disease incidence was found in Kottur village of Theni district that is 7.73 percent. The different isolates were confirmed by their morphological character. The data of percent disease incidence survey carried out during the year 2019-20 are given below in the Table no 1.

Table 1: Survey on the disease incidence of brinjal collar rot in Tamil Nadu

Sl. no	Isolate no	Location	District	Disease incidence (%)	Variety	Soil type
1	Sr-1	Esanatham	Karur	23.86	PLR1	Red soil
2	Sr-2	Kulithalai	Karur	12.63	CO2	Sandy loam
3	Sr-3	Shivapuri	Cuddalore	22.43	Annamalai	Clay loam
4	Sr-4	Vallampadugai	Cuddalore	26.06	PLR1	Clay loam
5	Sr-5	Pochampalli	Krishnagiri	13.83	PKM1	Sandy loam
6	Sr-6	Kaveripattinam	Krishnagiri	36.16	CO1	Clay loam
7	Sr-7	Melur	Madurai	16.36	MDU1	Clay loam
8	Sr-8	Vadipatti	Madurai	28.30	PKM1	Red soil and black soil
9	Sr-9	Gingee	Villupuram	9.76	CO1	Red and sandy loam
10	Sr-10	Vanur	Villupuram	33.46	PLR1	Clay loam
11	Sr-11	Vellappallam	Nagapattinam	32.20	PLR1	Black soil
12	Sr-12	Pushpavanam	Nagapattinam	30.00	PKM1	Black sandy soil
13	Sr-13	R.Vellodu	Dindigul	24.50	CO1	Red sandy soil
14	Sr-14	Ottanchatram	Dindigul	19.43	PLR1	Black cotton soil
15	Sr-15	Vedasandur	Dindigul	25.53	CO2	Black cotton soil
16	Sr-16	Papparapatti	Salem	11.73	CO1	Black loam
17	Sr-17	Chinnanur	Salem	8.76	PKM1	Red soil
18	Sr-18	Govindanagaram	Theni	21.96	PKM1	Sandy loam
19	Sr-19	Kottur	Theni	07.73	PKM1	Red loam
20	Sr-20	Periyakulam	Theni	16.46	PKM1	Red loam and clay
C.D				7.538		
SE (m)				2.623		

Cultural character

All the isolates collected from different locality of Tamil Nadu were grown in potato dextrose agar medium. The fan shape, white colour mycelium growth was observed in all the 20 isolates, which were grown on the PDA. The growth of the mycelium was so fast in the PDA medium and it covers all the petriplate fully and in the upper lid also. The plates were fully covered with mycelium in fourth day. The mycelium growth reading was taken subsequently in 24hr, 48hr, 72 hr and 96 hr. The highest mycelium growth 90mm was observed in the isolate no 5, 9 and 14. The least mycelium growth 57 mm was observed in the isolate no 1. Initially white and roundish sclerotia was produced in the mycelium and later on it turns to black brownish colour. The sclerotia like mustard seed was observed after 15 days. The number of sclerotia varied from74-213. The highest number of sclerotia was seen in the isolate number 2 from Kulithalai village of Karur district.

The least number of sclerotia was seen in the isolate number 15 from Vedasandur village of Dindigul district. The data of the morphological character of *Sclerotium rolfsii* are given below in the Table no 2.

Table 2: Cultural character of *Sclerotium rolfsii*

Isolates no	Mycelium growth (mm)				Number of sclerotia (15 DAI)
	24 Hr	48 hr	72 Hr	96 Hr	
Sr-1	5	12	24	57	104
Sr-2	8	20	33	77	213
Sr-3	13	33	55	86	164
Sr-4	5	23	42	68	87
Sr-5	24	42	60	90	142
Sr-6	20	42	63	84	118
Sr-7	16	35	58	86	182
Sr-8	7	12	46	65	155
Sr-9	22	46	68	90	209
Sr-10	20	38	57	82	113
Sr-11	16	32	55	79	92
Sr-12	14	29	44	68	123
Sr-13	22	46	65	86	109
Sr-14	28	47	68	90	189
Sr-15	19	32	55	84	74
Sr-16	12	29	46	72	121
Sr-17	20	42	68	87	106
Sr-18	13	35	52	73	142
Sr-19	17	32	58	75	205
Sr-20	15	28	45	69	119
C.D	8.106	16.055	24.173	17.904	77.588
SE(m)	2.825	5.597	8.426	6.241	27.046

Conclusion

I would like to conclude from my survey that have been taken during the 2019-20 that collar rot is major disease causing the loss of the yield. It have been found that in many localities of Tamil Nadu its been threat to the farmers. Survey results indicated that the percent disease incidence was highest in Kaveripattinam village of Krishnagiri district followed by Vanur village of Villupuram district.

References

1. Agrios GN. Plant pathology. Fifth Edition. Elsevier Academic Press. California, USA, 2005, 210.
2. Dasgupta B. Diseases of plantation crops spices, eggplant and beetle vine, 2000, 133-137.
3. Jadon KS, Tiwari P. "Pathogen physiology and management of Brinjal collar rot caused by *Sclerotium rolfsii*." Annals of Plant Protection Sciences,2011:19(1):113-117.
4. Le CN. Diversity and biological control of *Sclerotium rolfsii*, causal agent of stem rot of groundnut, 2011, 152.
5. Rangaswami G. Diseases of crop plants in India. Prentice hall of India Pvt. Ltd., New Delhi, 1972, 520.
6. Rao Madhava P. Foot and root-rot of brinjal caused by *Sclerotium rolfsii* in Vijayawada. Indian phytopath,1969:22:414-415.
7. Sarma B, Singh U, Singh K. "Variability in Indian isolates of *Sclerotium rolfsii*." Mycologia,2002:94(6):1051-1058.
8. Siddique MNA, Ahmmed ANF, Mazumder MGH, Khaiyam M, Islam MR. "Evaluation of some fungicides and bio-agents against *Sclerotium rolfsii* and foot and root rot disease of eggplant (*Solanum melongena* L.)." The Agriculturists,2016:14(1):92-97.
9. Singh B, Singh S, Yadav S. "Some important plant pathogenic disease of brinjal (*Solanum melongena* L.) and their management." Plant Pathology Journal (Faisalabad),2014:13(3):208-213.
10. Yaqub F, Shahzad S. Pathogeneicity of *Sclerotium rolfsii* on different crops and effect of inoculum density on colonization of mungbean and sunflower roots. Pakistan Journal of Botany,2005:37(1):175-180.