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Evaluation of different plant leaf extracts against *Myrothecium roridum* causing leaf spot of soybean under *in vitro* conditions

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Abstract
Myrothecium leaf spot of soybean caused by *Myrothecium roridum*. Myrothecium leaf spot of soybean is occurring in almost all the major soybean growing areas of India causing about 30 per cent yield loss. Initial symptoms of the disease appear as small round or oval, brown spots with dark brown margin on leaves in the infected plant. Since it is an economically important disease, management of the disease plays crucial role. Poisoned food technique was employed for the evaluation of different plant leaf extract in the laboratory. The five medicinal plant species *viz.*, Neem, Karanj, Datura, Ashok, and Besharam were used for antifungal activity. Mancozeb was used as check fungicide. All extract of plants leaf were significantly superior in reducing the radial growth over control. The per cent inhibition in growth of *M. roridum* was ranged from (48.46 to 84.04%) at 10 DAI. The maximum inhibition in growth at 10 DAI was recorded in the extract of Karanj (84.04%). The minimum inhibition by Besharam (48.46%) and Neem (68.65).The per cent growth inhibition of 15 DAI by different plant leaf extract ranged between (43.83 to 81.96%). The maximum radial growth inhibition was recorded in plant extract of Karanj (81.96%) least by Besharam (43.83%) and Neem (63.52 %). Percent growth inhibition indicated that there was maximum inhibition in growth of *M. roridum* in Karanj, Mancozeb, Ashok, Datura and Neem and least in Besharam.

Keywords: Myrothecium leaf spot, soybean, *Myrothecium roridum*, fungicides

Introduction
Soybean (*Glycine max.* L. Merril) belonging to family Leguminaceae is designated as miracle bean established its potential as an industrially vital and viable oilseed crop in many areas of India. Leaf spot of soybean caused by *Myrothecium roridum* Tode ex. Fries is an important disease, which occurred in epidemic proportion entailing into colossal losses to soybean crop in Madhya Pradesh (Shrivastava and Khan, 1994, Singh and Shrivastava, 1994) [3, 4]. Myrothecium leaf spot of soybean is occurring in almost all the major soybean growing areas of India causing about 30 per cent yield loss (Shrivastava and Khan 1994) [3]. The disease severity of myrothecium leaf spot soybean was in the range of 35 to 45 % and disease incidence of myrothecium leaf spot soybean was in the range of 30 to 55 % (Singh and Shrivastava, 1994) [3]. *Myrothecium roridum* is ordinary soil fungi, and survive in this environment as saprophytes in decaying plant tissues (Ellis, 1971) [1]. Initial symptoms of the disease appear as small round or oval, brown spots with dark brown margin on leaves in the infected plant. Since it is an economically important disease, management of the disease plays crucial role. Talukdar *et al*., (2013) [5] found antifungal property of Karanj (*P.pinnatale)* plant extract under *in-vitro* condition and inhibition of mycelial growth of *M.roridum* by 92.28 per cent. Similarly Maya and Thippanna (2015) [2] also found antifungal property of Karanj (*P.pinnata)* (karanj plant leaf present Karanjin toxic for fungu) plant extract under *in-vitro* condition and *inhibition* of mycelial growth of *A.solani* by 68.92 per cent**.**

Material and Methods
Experimental site
The laboratory experiment was carried out at Department of Plant Pathology, IGAU, Raipur (C.G.).

Isolation of test fungus
The fresh infected leaves of soybean plant samples were cut into small pieces, surface sterilized with 0.1% mercuric chloride ($HgCl_2$) solution followed by three washing with sterile distilled water and placing in moist chamber than after 1 to 2 days fungal mycelium growth were seen than finally small bits of fungus kept on the previously poured and solidified potato dextrose agar medium in Petri plates for isolation of the pathogen. The plates were incubated at 25°C in BOD incubator.

In vitro bioefficacy evolution of plant leaf extracts
Antifungal activity of different plant leaf extracts were studied under *in-vitro* condition taking plant leaf extract, Potato dextrose agar medium. The five medicinal plant species *viz.*, Neem, Karanj, Datura, Ashok, and Besharam were used for antifungal activity. Mancozeb was used as check fungicide.

Table 1

Name of Plant	Botanical Name
Neem	*Azadirachta indica*
Karanj	*Pongamia pinnata*
Datura	*Datura stramonium*
Ashok	*Saraca indica*
Besram	*Ipomoea carnea*

Twenty gm leaf of each plant was taken in 100 ml of water and boiled till the softening of the leaf and then extract was filtered. 2gm of dextrose and 2gm agar-agar were mixed in filtrated leaf extract, the volume was make up to 100 ml and then sterilization was done by autoclaving at 15 lbs for 20 minutes. To avoid bacterial contamination, a little amount of streptomycin sulphate was added at the time of pouring of media. In each Petri plate 20 ml medium was poured in

sterilized Petri plates and allowed to solidify. PDA without extract served as control. A five mm disc from seven days old culture of the test pathogen (isolate Mr20) by the help of sterilized cork borer and was placed at the center of medium, three replications were kept in each treatment along with a control. The inoculated Petri plates were then incubated at 25°C and observation was recorded at 10 and 15 days after inoculation.

Calculated the percent inhibition by using followed formula:

$$\text{Inhibition (\%)} = \text{C-T/C} \times 100$$

Whereas
C = Diameter of fungus colony (mm) in control plate,
T = Diameter of fungus colony (mm) in treated plate.

Result

Efficacy of different plant leaf extracts on inhibition of radial growth of *Myrothecium roridum*

The data on efficacy of various plant leaf extracts on inhibition of radial growth of *Myrothecium roridum* was recorded and presented in Table 2., Fig.1and Plate 1. It is clear from the data that all extract of plants leaf were significantly superior in reducing the radial growth over control. The per cent inhibition in growth of *M. roridum* was ranged from (48.46 to 84.04%) at 10 DAI. The maximum inhibition in growth at 10 DAI was recorded in the extract of Karanj (84.04%) followed by fungicide Mancozeb (83.84), Ashok (83.78%), and Datura (83.21%) and statistically at par with each other. The minimum inhibition by Besharam (48.46%) and Neem (68.65).The per cent growth inhibition of 15 DAI by different plant leaf extract ranged between (43.83 to 81.96%). The maximum radial growth inhibition was recorded in plant extract of Karanj (81.96%) followed by fungicide Mancozeb (80.82%), Ashok (76.96%) and Datura (72.59%) and least by Besharam (43.83%) and Neem (63.52 %). Percent growth inhibition indicated that there was maximum inhibition in growth of *M. roridum* in Karanj, Mancozeb, Ashok, Datura and Neem and least in Besharam. Talukdar *et al*., (2013) [5] found antifungal property of Karanj (*P. pinnatale)* plant extract under *in-vitro* condition and inhibition of mycelial growth of *M.roridum* by 92.28 per cent. Similarly Maya and Thippanna (2015) [2] also found antifungal property of Karanj (*P.pinnata)* (karanj plant leaf present Karanjin toxic for fungus) plant extract under *in-vitro* condition and *inhibition* of mycelial growth of *A.solani* by 68.92 per cent.

Table 1: Efficacy of different plant leaf extracts on inhibition of radial growth of *Myrothecium roridum* under *in vitro* condition

S. N.	Plant Extracts	Radial growth (mm)			
		10 DAI**		15 DAI**	
		Growth (mm)	Inhibition (%)	Growth (mm)	Inhibition (%)
1	Neem	20.37	68.65	31.06	63.52
2	Datura	10.92	83.21	23.03	72.59
3	Ashok	10.57	83.78	19.62	76.96
4	Karanj	10.37	84.04	15.36	81.96
5	Besharam	33.50	48.46	47.83	43.83
6	Mancozeb check)	10.50	83.84	16.33	80.82
7	Control	65.00		85.16	
	SE(m)±	0.583		1.347	
	C.D. (5%)	1.785		4.124	

* Means of three replications,
** Days after inoculation

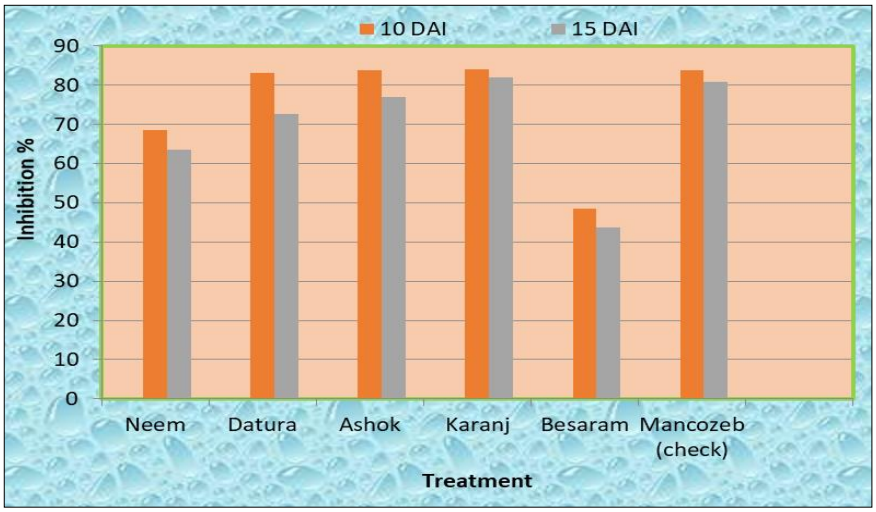

Fig 1: *In-vitro* efficacy of different medicinal plant leaf extracts on inhibition of radial growth of *Myrothecium roridum*

Plate 1: Efficacy of different plant leaf extracts on inhibition of radial growth of *Myrothecium roridum* under *in vitro* condition

Table 1: Effect of different fungicides on radial growth of Myrothecium roridum 50ppm and 100ppm

S. N.	Fungicides	Radial growth (mm)							
		10 DAI**(50ppm)		15 DAI		10 DAI (100ppm)		15 DAI	
		G(mm)*	I (%)	G(mm)*	I (%)	G(mm)*	I (%)	G(mm)*	I (%)
1	Mencozeb	22.66	62.23	29.33	63.33	11.33	81.11	22.00	73.70
2	Hexaconazole	20.00	66.66	25.00	68.75	10.00	83.33	20.00	76.09
3	Propiconazole	0.00	100.00	0.000	100.00	0.00	100.00	0.00	100.00
4	Tebuconazole	10.00	83.33	12.00	85.12	8.00	86.66	9.00	89.24
5	Pyraclostrobin	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00
6	Fluxapyroxad	21.33	64.45	27.33	66.11	11.00	82.71	21.66	74.10
7	Control	60.00		80.66		60.000		83.66	
	CD (5%)	1.726		1.158		0.668		2.471	
	SE(m)	0.563		0.378		0.218		0.807	

* Means of three replications ** Days after inoculation, G- Growth, I- Inhibition

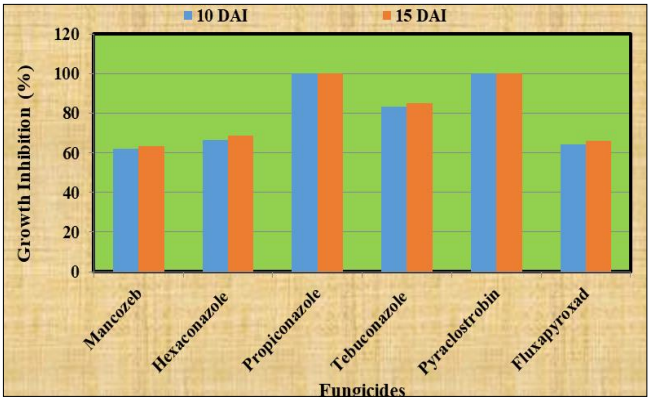

Fig 1: Effect of different fungicides on radial growth of *Myrothecium roridum* (50ppm)

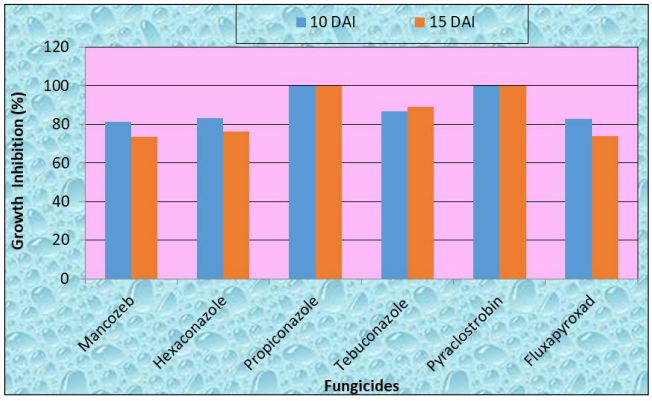

Fig 2: Effect of different fungicides on radial growth of *Myrothecium roridum* (100ppm)

Plate 2: Effect of different fungicides on radial growth of *Myrothecium roridum* (50ppm)

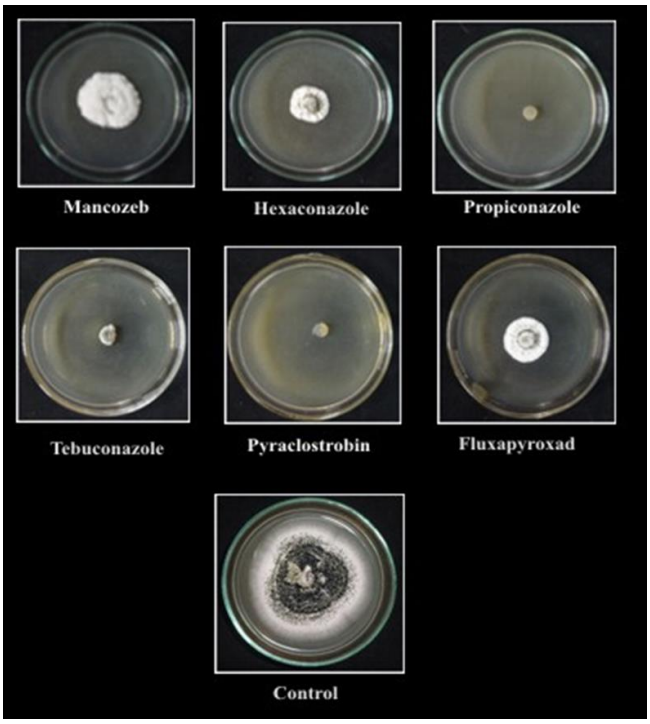

Plate 3: Effect of different fungicides on radial growth of *Myrothecium roridum* (100ppm)

Conclusions

The present study in evaluation of fungicides against *Myrothecium roridum* causing leaf spot of Soybean under *in vitro* conditions result showed Percent growth inhibition indicated that there was maximum inhibition in growth of *M. roridum* in Karanj,Mancozeb,Ashok,Datura and Neem and least in Besharam. in reducing mycelia growth of *M.roridu* under lab conditions.

References

1. Ellis MB. Dematiaceous Hyphomycetes. Kew. CMI, 1971.
2. Maya C, Thippanna M. In vitro antifungal evaluation of various botanical extracts against early blight disease (Alternaria solani) of tomato. I.J.S.N. 2015; 6(2):264-267.
3. Shrivastava SK, Khan SU. Impact of host age at infection time on the severity of Myrothecium leaf spot disease of soybean. Indian Phytopatho. 1994; 47(2):190-191.
4. Singh SM,. Shrivastava SK. Screening of soybean varieties against leaf spot disease caused by Myrotheciumroridum. Indian Journal of Mycology and Plant Pathology. 1994; 24(3):222.
5. Talukdar D, Dantre RK, Verma KP. Management of myrothecium leaf spot of soyabean. Indian Journal of Plant Protection. 2013; 41(1):105-107.