

Efficacy of plant extracts on *Sclerotium rolfsii*, the seedling blight of tea

Indramani Bhagat

Department of Botany

Post Graduate Campus, Tribhuvan University, Biratnagar, Nepal

E-mail: indramani@ntc.net.np.

Key words: *Azadirachta indica*, *Catharanthus roseus*, *Sclerotium rolfsii*

The fungus *Sclerotium rolfsii* is one of the most destructive diseases in tea growing areas of the world. Effective and efficient management of cash crop disease is generally achieved by the use of synthetic pesticides. These pesticides are known to pollute the environment, soil and water causing deleterious effects on human health and biosphere. A search for an environmentally safe and economically viable strategy for the control of the disease has led to an increased use of plant based products in agriculture. Hence, in the present investigation, efficacy of antifungal effect of *Azadirachta indica* and *Catharanthus roseus* were tested *in vitro* against *S. rolfsii*.

Fresh and chopped plant sample (100g) was taken in a beaker containing water (100 ml) and boiled at 80°C for 10 min in a hot water bath (Awuah, 1989). The material was homogenized for 5 min, filtered through muslin cloth and filtrate was centrifuged at 5000 rpm for 50 min. The clear supernatant was collected. This was considered as 100% basic stock. The petriplates containing the basic stock were inoculated with a 4 mm diameter culture disc taken from the advancing region of *S. rolfsii* grown on DPA. PDA plates without plant extracts but inoculated with *S. rolfsii* served as control. The plates were than incubated at 28±2°C. The colony diameter of the fungus was measured after 3 days of inoculation. In another experimental set up sclerotial germination tests were performed by direct contact on sterile filter paper kept in sterile Petri plates. Filter papers were soaked with plant extracts separately and on each soaked filter paper a minimum of 20 sclerotia was placed with at least three replicates. These were allowed to germinate for 24-48 h and finally percentage germination and diameter of mycelial growth were measured over control.

The results revealed that both the plant extracts were inhibitory to the mycelial growth of *S. rolfsii* (Table 1). However extract of *A. indica* were superior upon *C. roseus in vitro*. Presence of plant extract affected the normal growth and sclerotial germination of the test pathogen. It was also observed that as the concentration of extracts increased in the medium the effectiveness of extracts also increased and maximum growth inhibition was recorded at 100% concentration in both plant extracts.

Table 1. Efficacy of antifungal effect of different plant extracts on *Sclerotium rolfsii*

Plant	Part	Diameter of fungal mycelia (cm)			
		Control	10%	50%	100%
<i>Azadirachta indica</i>	Leaf	9.2	7.3	7	3
<i>Catharanthus roseus</i>	Leaf	9.2	6.5	6	4

Greater inhibition in the germination of sclerotia was noticed with *C. roseus* than *A. indica* in relation to distilled water control. Leaf extracts of *Lantana camara* followed by *Azadirachta indica* and *Acalypha indica* were found to be equally effective in inhibiting the growth of *F. solani* *in vitro*. Similar observation was observed by Sharma and Bohra (2003) in the investigation carried in laboratory and in the field to study the effect of extracts of three medicinal plants species for their antifungal activity against cumin wilt pathogen. Evaluation of plant extracts against *Rhizoctonia solani* incitant of black scurf disease in potato was investigated by Shinde and Patel (2004). It was observed that garlic extract at 10% concentration showed a complete inhibition of growth (100%). Investigation on the effects of aqueous leaf extracts on neem in inducing resistance against the leaf stripe pathogen by barley, *Drechslera graminis* (Paul & Sharma, 2002) had also been reported. Raghavendra *et al.* (2002) reported the fungal toxic properties of *Prosopis juliflora* against eight species of *Fusarium*, three species of *Drechslera* and one species of *Alternaria*. Antifungal properties of extracts of *Prosopis juliflora*, *Cassia* species have also been reported by Ganesan (1993). Leaf, flower, stem and root extracts of *Vinca rosea* were antifungal to *S. rolfsii*, *Fusarium oxysporum* and *Aspergillus niger* (Narain & Satapathy, 1997). The result of present study can be needed to isolate and characteristics the antifungal moieties in the promising plant extracts for practical disease control.

Acknowledgement

The author is grateful to University Grants Commission, Nepal for the financial support.

References

- Awuah, R.T. 1989. Fungitoxic effects of extracts from some West African plants. *Ann. Appl. Boil.* **115**: 451-453.
- Ganesan, T. 1993. Fungitoxic effect of wild plant leaf extracts. *Geobios.* **20**: 264-266.
- Narain, A.F. & J.N. Satapathy. 1997. Antifungal characteristics of *Vinca rosea* extracts. *Indian Phytopath.* **30**: 36-40.
- Paul, P.K. & P.D.Sharma. 2002. *Azadirachta indica* leaf extract induces resistance in barley against leaf stripe disease. *Physiol. Mol. Plant Pathol.* **61**: 3-13.
- Raghavendra, M.P., S. Satish & K.A. Raveesha. 2002. *Prosopis juliflora* Swartz. : A potential plant for the management of fungal diseases of crops. In: *Asian Cong. Mycol. Pl. Pathol., Indian Soc. Mycol. Pl. Pathol.* University of Mysore (Abst.) Oct. 1-4. 136p.
- Sharma, S. & A. Bohra. 2003. Effects of some medicinal plants of *Fusarium oxysporum* var. *cumini*. *J. Mycol. Pl. Pathol.* **33**: 323-324.
- Shinde, G.R. & R.L. Patel. 2004. Evaluation of plant extracts against *Rhizoctonia solani* incitant of black scurf disease in potato. *J. Mycol. Pl. Pathol.* **34**: 284-288.