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A NEW WILT DISEASE OF MAIDA CHHAL (*LITSEA GLUTINOSA*) IN CENTRAL INDIA

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ABSTRACT

A new wilt disease of *Litsea glutinosa* caused by *Fusarium solani* in nursery at Jabalpur, Madhya Pradesh is reported. The average disease occurrence is 7.94% and it can be control by application of 0.1% ridomil.

KEYWORD: *Litsea glutinosa, nursery disease, Fusarium solani, Ridomil, wilt disease.*

INTRODUCTION

Litsea glutinosa (Lour.) C.B. Robinson is an important medicinal plant. It is a medium sized evergreen tree, up to 25m high and 1.5m in girth and found throughout India as mixed primary and secondary forests mainly on the banks of streams. The tree occurs up to an altitude of 1400m in the Himalayas (Handa et al., 2006). It is a native of North West Himalaya, Indo-Gangetic Plains, eastern Himalaya (Arunachal Pradesh, Sikkim and Darjeeling district of West Bengal), Assam, Central India, Arid Zone, North Western Ghats and Northern West Coast, South Western Ghats, Southern West coast, Lakshadweep, Deccan, Easter Ghats, Coromandel Coats and Andaman and Nicodar Island. The bark of *L. glutinosa*, is one of the most popular of native drugs, is considered capable of relieving pain, arousing sexual power and good for stomach in treatment of diarrohea and dysentery, fractured limbs and some other disease (Kritikar and Basu, 1981). *L. glutinosa* has been investigated as a source of essential oils, arabinoxylans and other components with antiseptic properties (Prusti *et al.*, 2008; Qin Wen Hui *et al.*, 2012). Every part of it is credited with its specific medicinal properties. The plant was reported as red listed plant and considered as critically endangered in the state of Andhra Pradesh, India (Reddy and Reddy 2008) and as endangered species in Philippines. The

species is critically endangered due to its indiscriminate collection as raw material for pharmaceutical industry (Shah et al., 2013). Fungal diseases are a serious problem in forest regeneration and some time fungi can cause heavy mortality in nurseries (Rai and Mamatha, 2005). Maida chhal is an endangered species so its conservation it is necessary to raise seedlings in nursery for its large scale plantation.

The seedling in nursery beds as well as in polythene containers suffer from many disease (Sehgal, 1983) causing mortality and affecting the health and vigorous of plants, there by seriously distributing plantation programmes (Harsh et al., 1992). Wilt disease is very common in forest nurseries particular in dry climate as in central India. Wilt disease symptom started from the tip of the plant and along the margin of the leaves. Subsequently it advanced downward causing defoliation and eventual death of seedling. The plant showed yellowing of primary leaves followed by sudden wilting and drying of seedling within a few days. *Fusarium* spp., *Macrophomina phaseolina*, *Rhizoctonia solani* state of *Thanetephorus cucumaris* and *Verticillum* spp., are most responsible for this disease. Tree species are susceptible when congenial condition for infection exists and the incidence of disease ranged between 10-20 percent in various nurseries and young plantations (Bakshi, 1976; Harsh and Gupta 1993).

The present note reports a new wilt disease of *Litsea glutinosa* caused by *Fusarium solani* in nursery from India.

MATERIALS AND METHODS

Study area

Tropical Forest Research Institute, Jabalpur is situated between 23°5'37" to 23°6'10"N latitude and 79°59'49" to 79°59'42"E longitude. The area falls under basaltic landscape and the soil texture is more than 55% clay content. (Totey and Gupta, 1993)

Collection of sample

The sample was collected from nursery of forest biotechnology and genetic division, TFRI. Maida Chhal plant saplings were raised at nursery. These saplings were kept under green agro-shade house and provided with sprinkler misting system. Numbers of wilted seedlings in each row were counted.

Identification of pathogen

Diagnosis and identification of causal organism were done in laboratory. The pathogen was cultured in perti dish using sterilized potato dextrose agar (PDA) medium inoculated with surface sterilized diseased bits of tender roots. After 5 days of incubation at 28±2°C, whitish wooly growth of fungal colony appeared in petri dish. The pathogen is deposited in the mycology herbarium under Acc. No. 3839 and culture is deposit in TFRI, Jabalpur under Acc. No. TFC 62. The pathogen was identified after cultural and microscopic study and by consulting literature (Booth, 1971; Verma et al., 2008).

Pathogenicity test

The pathogenicity was proved as per Koch's postulates by inoculating the healthy seedlings with fungal spore suspension. The spore suspension of pathogen was prepared (4×10^3cfu/ml) from 15d-old culture and each replicate of 30 healthy seedling having 6-8 cm height was poured on the soil with 25 ml of fungal spore suspension. The same pathogen was re-isolated from inoculated affected seedlings in pure form and identified as *Fusarium solani*.

Control

Ridomil (Ridomil Gold, Make, Syngenta) 0.1% was applied at fortnightly interval and watering schedule was also monitored to avoid extra moisture in and around root zone seedlings.

RESULT AND DISCUSSION

The causal organism of Maida chhal wilt disease was identified as *Fusarium solani* as follows:

Mycelium striate, sparse, floccose, grey white agar develops brownish pinkish discoloration. Micro-conidia develop abundantly after 2-3 days, aseptate hyaline 8-15 x 3-5 µm phialide 40-70 x 2.5-3 µm. macroconidia develop after 4-7 days from short multibranched conidiophores, which may form sporodochia, fusoid, 1-3 septate, 22-40 x 4-9 µm. Chlamydospore develop after 7-14 days, globase oval, smooth rough walled terminal or intercalary fig no. 1-4.

The occurrence of the disease ranges from 5% to 10% with an average 7.94% (Table 1). The disease was controlled by application of ridomil (0.1%) was also monitoring the watering schedule to avoid extra moisture.

Fusarium oxysporum has been reported on several tree seeds where it causes seed decay, germination reduction and seedling wilt (Ali and Sharma, 1996). Singh et al., (2002, 2003), Soni et al. (2005) recorded 8-15 percent incidence of wilt disease in *Dalbergia sissoo, Tectona grandis*, *Gmelina arborea* and *Buchnania lanzan* seedling. A comprehensive list of root diseases of forest tree species caused by *Fusarium* spp. in India is presented in Table 2. On perusal of the table it confirm that wilt of *Litsea glutinosa* caused by *Fusarium solani* is not reported so far, therefore, it is reported as new record from India.

Table 1: Occurrence of wilt disease in nursery

Bed/ group No.	Total number of seedlings examined	Wilt affected seedlings	Disease %
1.	100	10	10
2.	80	8	10
3.	100	5	5
4.	70	4	5.71
5.	100	9	9
Avg.	90	7.2	7.94

Table 2: An account of diseases of forest tree species caused by *Fusarium* spp. in India

S. No.	Name of Pathogen	Disease	Tree species	Locality	Reference
1.	*Fusarium oxysporum*	Wilt	*Acacia nilotica, Bambusa arundinacea, Dalbergia sissoo*	Jabalpur, Madhya Pradesh, MP	Harsh et al., (1992)
			Dendrocalamus strictus Eucalyptus sp.,	Jabalpur, MP	Jamaluddin et al., 1997
			Gmelina arborea	Jabalpur, MP	Singh et al. (2003)
			Hardwickia binata	Nagavala, Mysore, Karnataka	Rai and Mamatha, 2005
		Post emergence wilt	*Eucalyptus* sp.,	Bhopal, Indore, Gwalior, MP	Harsh and Gupta, 1993
		Seedling wilt	*Emblica officinalis*	Jabalpur, MP	Harsh and Gupta, 1993
		Post emergence wilt	*Dendrocalamus strictus*	Bamandehi, Seoni, Gwalior, MP	
		Post emergence damping off and wilt	*Dalbergia sissoo*	Bhopal, Bilaspur, Chhindwara, Gwalier, Indore, Jabalpur, Mandla, Morena, Narsinghpur, Panna, Raipur, Raisen, Seoni, MP	Harsha and Gupta, 1993
			Acacia nilotica		

2.	*Fusarium pallidoroseum*	Wilt	*Dendrocalamus strictus*	Jabalpur, MP	Jamaluddin et al., 1997
			Albizia lebbek	Paryat, Jabalpur, Motinala, Mandla, Temor, MP	Harsh and Gupta, 1993
		Post emergence wilt	*Leucaena leucocephala*	Jabalpur, Panna, Morena, MP	
3.	*Fusarium moniliforme*	Wilt	*Tectona grandis*	Jabalpur, Seoni, MP	Jamaluddin et al., 1997
			Azadirachta indica	Jabalpur, MP	
		Seedling wilt	*Azadirachta indica*	Bamandehi, Seoni, MP	Harsh and Gupta, 1993
			Cassia fistula	Jabalpur, MP	
4.	*Fusarium acuminatum*	Wilt	*Azadirachta indica, Dalbergia sissoo, Emblica officinalis, Pongamia pinnata*	Jabalpur, MP	Jamaluddin et al., 1997
		Post emergence/ Dumping off	*Moringa pterygosperma*		
		Seedling wilt	*Holoptelia integrifolia*	Shyampur, Narsinghpur, MP	Harsh and Gupta, 1993
5.	*Fusarium solani*	Root rot/Wilt	*Azadirachta indica*	Kerala	Sankaran et al. (1986)
		Post emergence wilt	*Pinus caribea, Pinus roxburghii*	Seoni	Harsh and Gupta, 1993
		Wilt	*Dalbergia sissoo, Azadirachta indica*	Jabalpur, MP	Jamaluddin et al., 1997
			Emblica officinalis		Soni and Verma, 2010
		Seedling wilt	*Santalum album*	Seoni, MP	Harsh and Gupta, 1993
		Leaf blight disease	*Terminalia catappa*	Manasagango, Mysore, Karnataka	Rai and Mamatha, 2005
		Root rot and seedling blight	*Azadirachta indica*		Rai and Mamatha, 2005
		Wilt	*Albizia falcataria, Eucalyptus camaldulensis, Paraserianthus falcataria*	Kerala	Sharma and Sankaran,1985; Kumar and Vishwanath, 1993; Sankaran and Sharma, 1996
		Leaf blight	*Azadirachta indica*	Mysore, Manasagangotri, Karnataka	Bhanumathi and Rai
		Seedling blight and root rot	*Azadirachta indica*	Dehradun, Uttarakhand	Shukla,1992
6.	*Fusarium equiseti*	Post emergence damping off	*Boswelia serrata*	Jabalpur, M.P.	Harsh and Gupta, 1993

7.	*Fusarium udum*	Seedling wilt	*Cleistanthus collinus*	Bamandehi, Seoni, MP	Harsh and Gupta, 1993
8.	*Fusarium* spp.	Post emergence wilt	*Putranjiva roxburghii*	Chhindwara, MP	Harsh and Gupta, 1993
			Acacia auriculiformis	Jabalpur, M.P.	
		Seedling wilt	*Acacia Senegal*		
			Cassia glauca		
			Cassia siamea	Paryat, Jabalpur, M.P.	
			Albizia procera	Kalpi, Mandla, MP	
			Delonix regia	Shyampur, Narsinghpur, MP	
			Greviltea pteridifolia	Amarkantak, Jabalpur, MP	
			Peltophorum pterocarpum	Jabalpur, Panna, MP	
		Leaf spot	*Anacardium occidentale*	Shimoga, Karnataka	Shivanna, 2005
9.	*Fusarium lateritium*	Wilt	*Syzygium eumini*	Gwalior, Jabalpur, MP	Harsh and Gupta, 1993

Figures (1-4) Wilt disease of *Litsea glutinosa* seedlings in nursery, (1-2) affected seedlings showing wilt symptoms caused by *Fusarium solani*, (3) pure culture of *Fusarium solani*, (4) mycelium conidia and chlamyspore, micro and macro conidia of the pathogen.

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