J. Indian bot. Soc. Vol 69 (1990) 67-69

SEED MYCOFLORA FROM INDIAN LOTS OF *PARTHENIUM ARGENTATUM* GRAY

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Parthenium argentatum (Guayule) has attained considerable attention in recent years because of its potential as an alternative source of natural rubber. Seed mycoflora of three selected lines (C-244, ARIZ-101 and UCR-1) was studied. Twelve species of fungi: *Alternaria tenuis, Curvularia clavata, C. ovidea, C. pallescence, Curvularia sp. Drechslera tetramera, Fusarium moniliforme, Fusarium solani, Aspergillus niger, Staphyllotrichum sp., Mucor mucedo and Rhizophus stolonifer* were isolated. Seeds of UCR-1 showed the least incidence of parasitic fungi. Heavy infestation of *Curvularia and Fusarium* species suggests that these may be the cause of heavy seedling mortality. Bordeaux mixture was quite effective in the elimination of fungi from the seeds.

Key words: *Parthenium argentatum* (guayule), seed mycoflora, resistant varieties.

Guaylule (*Parthenium argentatum* - Asteraceae), a dominant shrub of the Chihuahuan desert of Mexico has in recent years received considerable attention because of its potential as an alternative source of natural rubber. The rubber produced by guayale compares with that of *Hevea* in its physical and chemical properties viz. its high elasticity, resilience, tachiness and low heat build up (Laiding, 1981). The shrub was used extensively in U.S.A. and Mexico during World War II but subsequently the efforts were abandoned because of easy accessibility of synthetic rubber (Siddiqui *et al.*, 1982). However guayule is being reconsidered because of bleak prospects of continuous availability of petro crude and worldwide imbalance of demand-supply of natural rubber.

The shrub has been intorduced in India and research work for its improvement and cultivation is being carried out at many centres under an All India Co-ordinated Project. problems like seedling mortality, secondary infection in nursery as well as in the fields have been encountered during the establishment of this crop. Seeding mortality has also been reported by Naqvi & Hanson (1980) and Miyamoto (1986). Reports of disease taking a heavy toll have been received from many centres associated with guayule research in India (Srivastava *et al.*, 1985). *Fusarium* was assigned as the causal organism by Goyal *et al.* (1987) while Verma (1987) found *Rhizoctonia* associated with the infection. A high rate of seedling mortality was observed by us in certain varieties grown in Ajmer (Rajasthan) particularly during humid months of July through October.

Guayule seeds have been introduced from Mexico and USA and have crossed interstate boundaries in India as they are frequently exchanged between various centres. No work has been done on seed borne mycoflora of guayule seeds. The objective of the present investigation is to study the seed mycoflora of the selected guayule lines.

METERIALS AND METHODS

There are more than 45 lines presently being investigated at various centres in India. Mycoflora for the present study was isolated from three promising lines of guayule (C-244, ARIZ-101 and UCR-1). C-244 originally came from University of California, Davis (Schafter Station), ARIZ-101 from Tuscon, Arizona and UCR-1 from Riverside, California. The last named variety is considered to be a resistant variety (Jan West, personal communication). Seeds were cleared from their attachments of florets and bracts, soaked in water for two hours, washed in sterilized water and were analysed for mycoflora by standard Blotter Technique (Anonymous, 1966). This techinique has been reported to be better than agar plate method (Ram Nath *et al.*, 1970; Agarwal *et al.*, 1972). The fungi growing out of seeds were transferred to Potato Dextrose Agar slants and examined further. The second group of seeds were surface sterilized for 2-3 minutes using 1% sodium hypochlorite and were washed thoroughly in sterilized water. The third set of seeds were treated in Bordeaux mixture (5 lb lime: 5 lb copper sulphate : 50 gallons water) for 2 hours, washed thoroughly in sterilized water and analysed for seed borne fungi. Four replicates were maintained in each case. Results presented are as percentage incidence of fungi.

RESULTS AND DISCUSSION

As many as twelve species of fungi: *Alternaria tenuis, Curvularia clavata, C. ovoidea, C. pallescence,*

Table 1: Percentage incidence of seed mycoflora on *Parthenium argentatum*.

Fungi	UCR-1			"ARIZ-101"			C-244		
	Untreated	Pretreated		Untreated	Pretreated		Untreated	Pretreated	
		Sodium Hypochlorite	Bordeaux Mixture		Sodium hyjpochlorite	Bordeaux Mixture		Soduim hypochlorite	Bordeaux Mixture
Alternaria tenuis Auct.	42	13	-	44	33	-	44	13	-
Curvularia clavata (Jain)	33	11	-	41	23	-	42	21	-
C. ovoidea Hiro & Watan	17	-	-	21	12	-	31	29	-
C. pallescence Boed.	-	-	-	38	11	-	33	-	-
Curvularia Sp.	16	15	-	42	24	-	21	12	-
Drechslera tetramera McKinney	12	9	-	31	13	-	41	8	-
Fusarium moniliforme Sherb.	33	21	-	41	31	-	45	41	-
F. solani (Mart.) Sqcc.	23	11	-	34	21	-	26	21	-
Aspergillus niger van Tieghem	32	-	-	35	12	-	32	13	-
Staphyllotrichum Sp.	28	12	-	31	-	-	28	9	-
Mucor mucedo (L.) Fres.	34	-	-	21	13	-	21	21	-
Rhizophus stolonifer (Ehr.) Lind	35	11	-	30	-	-	32	-	-

Curvularia sp., *Drechslera tetramera*, *Fusarium moniliforme*, *Fusarium solani*, *Aspergillus niger*, *Staphyllotrichum* sp., *Mucor mucedo*, *Rhizophus stolonifer* were detected from the guayule seeds of three varieties investigated (Table 1). Seeds of UCR-1 variety hosted only eleven fungi and the same was reduced to eight with sodium hypochlorite treatment, out of which *Curvularia* sp. and *F. moniliforme* had more than 20% infestation. On the contrary, 10 fungi persisted after sodium hypochlorite treatment on the seeds of both ARIZ-101 and C-244. UCR-1 variety thus showed the least incidence of parasitic fungi particularly *Curvularia ovoidea*, *C. pallescence a* and *Drechslera tetramera* and relatively low incidence of *Curvularia clavata*, *Fusarium moniliforme* and *Fusaium solani*. This variety can be further selected to get a disease resistant variety as it appears to be quite promising. Heavy infestation of species of *Curvularia and Fusarium* suggest that these may be the cause of heavy seedling mortality

Bordeaux mixture is effective in the elimination of fungi on the three varieties. Except for sporadic occurrence, no fugus could be isolated from Bordeaux mixture treated seeds. Earlier workers have used various fungicides like Agallol, Cerasan, Aureofungin, Dithane M-45 (Dharam Vir *et al.*, 1971).

It is evident from these studies that the seeds of *Parthenium argentatum* stored and used in India carry several fungi associated with them and may result in different levels of seedling mortalities under field conditions. As the seeds of guayule are frequently being exchanged between various states, the following recommendations are proposed :

(1) Seed samples be analysed for mycoflora whenever introduced, even from another state. Once the plants have acclamatized in local condition, seeds should be frequently tested for seed borne fungi.

(2) Stored seeds should be treated with appropriate fungicides.

(3) Disease resistant varieties like UCR-1 should be further selected and used for cultivation.

We thank Department of Science and Technology for financial assistance under 'All India Coordinated Project on Guayule' and Dr. B.L. Jain of University of Rajasthan, Jaipur for help in the identification of species.

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