APPENDIX

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CONTROL OF CHIKU FRUIT ROTS BY LEAF EXTRACTS OF CERTAIN MEDICINAL PLANTS

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ABSTRACT

A study was undertaken to minimize the huge economic losses incurred by *Phomopsis* sp. and *Aspergillus niger* van. Tiegh, causing soft rot of Chiku (*Achras Sapota* L.) and an attempt has been made to control them *in vitro*.

INTRODUCTION

Search for antimicrobial substances in tissues of higher plants has been initiated recently (Appleton and Tensey 1975; Misra & Dixit 1976, 1977; Arya 1988). A number of plants have been reported to possess antifungal substances in their leaves (Sekhawat & Prasad, 1971; Khanna and Chandra, 1972; Tripathi and Dixit, 1981 and Dixit *et al.*, 1983). The present paper deals with the effect of aqueous leaf extracts of six common Indian medicinal plants on the percentage spore inhibition of *Phomopsis* sp. and *A. niger* responsible for soft rot of chiku.

MATERIAL AND METHODS

Leaves of four medicinal plants viz. *Calotropis procera* (Ait) R. Br., *Crataeva religiosa* L., *Aegle marmelos* Corr., *Eucalyptus occidentalis* Skeels, and complete plant parts of *Orobanchae aegyptiaca* Pers. and *Cuscuta reflexa* Roxb. were collected and brought to the laboratory on the same day. After washing in tap water then distilled water 500 g of fresh leaves/plant material were crushed with the help of pestle morter to yield 100 ml filtrate in each case. It was passed through a double layered cheese cloth and then a filter paper. Filtrates were centrifuged for half an hour at 2000 rpm. Before use, filtrates were diluted to required concentration viz. 25, 50 and 75 % by adding distilled water.

Two fungal pathogens, *Phomopsis* sp and *Aspergillus niger* were maintained on PDA spants and well sporalatory cultures (15 days old) were used for further studies. Hoffman's

(1860) hanging drop technique was used for the study of spore germination. Observations were made after 12 h incubation at 25±2°C. Percentage inhibition of fungal spore germination was calculated with the help of following formula :

$$\frac{NC - NT}{NC} \times 100$$

where NC=Average No. of fungal spore germination in control and NT=Average No. of fungal spore germination in treatment.

OBSERVATIONS AND DISCUSSION

Results of *in vitro* studies are recorded in Table I It is evident from the table I that the aqueous extracts of all the 6 medicinal plants reduced percentage spore germination of both the pathogens. Extract of *Orobanchae aegyptiaca* was most effective It gave the 50% spore inhibition of *Phomopsis* sp. and 52.9% in *Aspergillus niger*. However *Eucalyptus occidentalis* extract gave 72.2% spore inhibition in *Phomopsis* sp. Author (1988) reported 83 33% spore inhibition in *P. psidii* and 78.82% in *P. viticola* against *Eucalyptus* leaves. *Orobanchae, Calotropsis* and *Cuscuta* gave 50% spore inhibition in *Phomopsis* sp. Extracts of *Orobanchae, Eucalyptus* and *Cuscuta* were effective against *A. niger* and gave 52.9, 43.3 and 41.1% inhibition respectively.

Further trials, particularly *in vivo* should be done to observe the effect of plant extracts of *Orobanchae* and *Eucalyptus* and then only recommendations can be made to control the fruit rot of chiku caused by the two pathogens, *Phomopsis* sp. and *A. niger*. Author (1988) has recommended use of *Eucalyptus* leaf extracts against *Phomopsis* rots of grapes and guava.

TABLE I

Effect of leaf extracts on percentage spore inhibition of *Phomopsis* sp. and *A. niger*

Leaf Extracts	Concentration %	Percentage spore inhibition	
		Phomopsis sp.	*A. niger*
1. *Orobanchae aegyptiaca*	25	16.6	16.4
	50	44.4	44.4
	75	50.0	52 9
2. *Calotropis procera*	25	05 5	16.4
	50	16.6	16.4
	75	50.0	27.0
3. *Cuscuta reflexa*	25	44.4	16.4
	50	44.4	27.0
	75	50.0	41.1
4. *Crataeva religiosa*	25	11.1	9.4
	50	21.1	11.1
	75	42.2	20.0
5. *Aegle marmelos*	25	16.6	9.4
	50	28.8	16.6
	75	44.4	17.6
6. *Eucalyptus occidentalis*	25	44.4	33.3
	50	60.0	37.8
	75	72.2	43.3

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CONTROL OF *PHOMA* AND *BOTRYODIPLODIA* ROTS OF MANGO

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Key words : Mango, *Phoma, Botryodiplodia,* Derosol, Bavistan, Delan

Authors observed *Phoma multirostrata* Dorenbosch & Boerema affecting ripe mangoes in market and storage. The symptoms include characteristic sunken brown coloured spots which gradually covered the whole fruit. Numerous small pin-head like fruiting bodies (pycnidia) were observed on the surface of the fruit in advanced stages. Fruits of *Carica papaya* L., *Litchi chinensis* Gaertn., *Musa paradisiaca* L., *Psidium guajava* L., *Prunus domestica* L. and *Pyrus malus* L. were found susceptible to this organism.

Arya et al. (1986) reported occurrence of this fungus on plum *(Prunus domestica* L.) from Allahabad. But its occurrence on mango fruit is new to science (Tandon & Chandra, 1963; Bilgrami et al., 1979, 1981).

Botryodiplodia theobromae Pat. (IMI no. 316671) is a severe pathogen of fruits. Its presence on mango was first reported by Gupta & Pandey (1965). Authors obtained some infected fruits from an orchard in Pratap Gunj, Baroda in June 1989. Since no effective control measures are available to control these two diseases, an effort was made to apply 4 fungicides *in vitro* and *in vivo*.

Table 1. Percentage control of *Phoma* (P) and *Botryodiplodia* (B) rot of mango.

Fungicides	Conc. (ppm)	P	B
Bavistin	250	20	5
	500	50	40
	750	75	50
Derosol	250	20	20
	500	75	50
	750	95	75
Delan	500	5	2
	750	25	20
	1000	50	40

Four fungicides, *i.e.* Bavistin (2–(methoxy carbamoyl)–benzimidazole), Derosol (carbendazim 50 W.P.), Delan (Dithianon (2, 3—dicarbonitrile—1, 4—dithianthra quinone) and Fytolan (copper oxychloride) were tried *in vitro* by poisoned food technique (Nene & Thapliyal, 1979).

On the basis of *in vitro* studies 3 suitable concentrations of 3 fungicides were tried *in vivo* and the results are summarized in Table 1. For this purpose 20 fresh fruits of Hapus

variety were maintained per treatment. The fruits were dipped in the fungicidal solutions for 10 min and were inoculated after 24 h by pinprick method (Lal et al., 1982).

Table 1 clearly depicts that all the three systemic fungicides tried were significantly effective in controlling the disease. However, Derosol was most effective in controlling 95% and 75% of the two diseases at 750 ppm concentration. Delan was least effective controlling 50% rot of *Phoma* and 40% of *Botryodiplodia* at 1000 ppm concentration The treated fruits at all the above concentrations neither showed any internal or external phytotoxic symptoms nor any change was observed in the taste as compared to control fruits. The use of Bavistin at 1000 ppm was earlier recommended for the *Thielaviopsis* rot of tomato (Lal et al., 1982), *Ceratocystis* rot of pineapple (Jamaluddin et al., 1975) and *Aspergillus* rot of guava (Arya et al., 1981), Delan also controlled 80% disease of guava caused by *Aspergillus* at 1250 ppm (Arya et al., 1981).

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A new report of *Aspergillus* on computer floppy disc

(Aspergillus / computer floppy disc)

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ABSTRACT Occurrence of Aspergilli is very common But report of *A. tamarii* Kita on computer floppy disc is new to the science

During a screening of fungi from unnatural habitats in July 1988, authors came across with a fungal mycelial growth on computer floppy discs. The fungus was isolated on PDA slants and subsequent cultures were maintained on Czapek Dox agar medium. Morphological characters were studied. Stalks arising from submerged hyphae, up to 1-2 mm in length, increasing in diameter towards the apex. Terminal vesical 35-60 μm, head 300 to 350 μm in diameter, phialids in two series. Conidia globose 5-10 μm in diameter. These measurements are slightly bigger than that described[1]. The culture was sent to CMI Kew and has been identified as *A. tamarii* Kita (IMI No. 334062).

A. tamarii is a saprophytic fungus occurring widely[2-5]. Floppy discs were obtained from moisture proof containers marketed by Kores India Ltd, Bombay (Profeel Sentinel Ltd.). Presence of *A. tamarii* on computer floppy disc is a new report to the science.

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SEED MYCOFLORA OF PIGEON PEA

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The seed mycoflora of pigeon pea was studied in freshly harvested one year old seeds. A total of 14 species of fungi were isolated using blotter method and deuteromycetous fungi and species of *Aspergillus* dominated

Pigeon pea (*Cajanus cajan* (L.) Millsp.) is an important pulse crop and is grown almost in every state. The present investigation was carried to study the seed mycoflora of pigeon pea.

Seed samples of three varieties, DPPA 85–5, LRG 30 and ICP 2376 were obtained from The Directorate of Pulses Research, ICAR, Kalyanpur, Kanpur and that of one variety from the local market. The seed samples were stored in glass bottles at room temperature. The seed mycoflora was studied using standard blotter method as recommended by International Seed Testing Association (1966). Results were recorded after eight days of incubation. The fungi were isolated on agar slants. The mycoflora of freshly harvested seeds from the plants raised from the seeds of the above mentioned four varieties was also determined. The percentage incidence of dominant mycoflora was calculated by the following formula :

$$\text{Percentage incidence} = \frac{\text{Number of seeds bearing fungal colonies}}{\text{Total number of seeds examined}} \times 100$$

Percentage occurrence of seed mycoflora of one year old seeds is recorded in Table 1. A total of nine species were identified of which LRG variety harboured

TABLE 1 Percentage occurrence of seed mycoflora on one year old seeds of *Cajanus cajan.*

Fungi	Varieties			
	D P P A	L R G	I C P	Local variety
Phycomycetes				
Mucor sp.	3	2	4	5
Rhizopus nigricans	3	–	–	5
Ascomycetes				
Aspergillus niger	3	4	5	10
Aspergillus fumigatus	4	5	9	2
Chaetomium sp.	–	2	–	3
Fungi imperfecti				
Alternaria alternata	–	–	–	10
Drechslera sp.	3	–	–	2
Fusarium sp.	–	–	4	2
Macrophomina phaseolina	–	–	2	–
Total 9 species	16	13	24	39

four and local variety eight. *Rhizopus nigricans* and *Drechslera* sp. were present on the seeds of DPPA and local varieties and *Macrophomina phaseolina* was confined to ICP variety. Members of Fungi imperfecti were altogether absent on LRG variety seeds. Gowda and Sullia (1987) reported that 96–98% of seeds of cowpea and soybean were infected by fungi but in the present study only 39% seeds of local variety were infected.

In freshly harvested seeds a total of 10 species of fungi were identified (Table 2). Of these, seven species were recorded from ICP and only five from the rest of the three varieties. *Aspergillus fumigatus* and *A. niger* were recorded on all the four varieties. *Fusarium pallidoroseum* observed on LRG variety is the first report from India.

TABLE 2. Percentage occurrence of seed mycoflora on freshly harvested seeds of *Cajanus cajan.*

Fungi	Varieties			
	DPPA	LRG	ICP	Local variety
Phycomycetes				
Mucor sp.	10	–	–	6
Ascomycetes				
Aspergillus fumigatus	3	6	8	10
Aspergillus niger	3	5	4	6
Aspergillus sp	–	–	3	–
Aspergillus sp.	–	–	3	–
Chaetomium sp	–	–	3	–
Fungi imperfecti				
Alternaria sp	6	7	6	8
Cladosporium sp	–	–	–	2
Phoma sp.	3	3	2	–
Fusarium pallidoroseum	–	4	–	–
Total 10 species	25	25	29	32

The blotter and agar plate methods are commonly applied in routine seed health testing programme. In the present study only blotter method was employed since this method is considered more suitable than the agar plate method (Sinha and Khare 1978, Gowda and Sullia 1987). One of the drawbacks of agar plate method is that the overgrowth of fast growing surface borne saprophytes such as species of *Aspergillus*, *Mucor* and *Rhizopus* over other slow-growing fungal species which were masked (Gowda and Sullia 1987).

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STUDIES ON THE RHIZOSPHERE MICROFLORA OF PIGEONPEA I—QUALITATIVE AND QUANTITATIVE INCIDENCE OF MICRO-ORGANISMS

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Key words · Rhizosphere microflora, pigeonpea, incidence

ABSTRACT

The number of fungi isolated from the rhizosphere was less or same that in non-rhizosphere soil Except LRG variety the non-rhizosphere as well as 3 other variety showed the predominance of *Aspergillus* and *Penicillium* species. A total of 13 species including 4 of *Aspergillus*, 2 of *Penicillium* and 1 each of *Mucor*, *Rhizopus*, *Choanephora*, *Fusarium*, *Alternaria*, *Helminthosporium*, *Phoma*, *Macrophomina* were isolated from non-rhizosphere soil. Rhizosphere mycoflora of DPPA variety harboured only 4 fungi, 2 species of *Aspergillus* and 1 each of *Rhizopus* and *Penicillium*

INTRODUCTION

The suitability of a soil for a crop depends not only on its chemical and physical properties but also on its living phase *viz.*, microbial population. The microorganisms especially those present in the rhizosphere region influence the health of the vegetation grown in that soil.

In recent years rhizosphere microflora of many crop plants have been studied with an aim to envolve plant treatments resulting in enhanced activity of specific antagonists of pathogens inciting soil-borne diseases (Mehrotra & Kakkar, 1972). Pigeonpea enjoys the popularity of being one of the most valuable pulse crop in the country, grown in almost every part with suitable irrigation facilities. The crop is subjected to a number of soil-borne diseases, the most common being wilt disease caused by *Fusarium udum* Study of rhizosphere microflora would be helpful in working out various cultural methods of controlling these diseases. The present paper reports the rhizosphere microflora of 4 different variety of *Cajanus cajan*.

MATERIALS AND METHODS

Seeds of pigeonpea variety DPPA 85–5, LRG 30, ICP 2376 were procured from Pulse Directorate, Kanpur and one local variety. These were grown in 4 different plots in the Botanical Gardens, Baroda. The plants were harvested at an interval of 20 days upto a period of 4 months. The average length of the roots and shoot as well as their fresh and dry weights were estimated taking measurements of five plants into account.

Soil dilution and plate counts method (Timonin, 1940) was used for qualitative and

quantitative analyses of the microflora in the rhizosphere. Roots of five plants with adhering soil were transferred to weighed flask containing 100 ml of sterilized distilled water. After thorough shaking, the roots were removed from the flask and suitable dilutions of soil suspension were prepared. One ml of required dilution (1 : 10,000 for fungi and 1 : 100,000 for bacteria) was poured in sterilized petriplate containing 10 ml of PDA. The plates were incubated at 25 ± 1°C and were examined after 4 days of fungi and 7 days for bacteria. The fungal and bacterial colonies were counted taking 5 replicates of three petriplates. Occurrence of bacteria and actinomycetes and total number of fungi per gram of oven dry rhizosphere soil is recorded in Table 2.

RESULTS AND DISCUSSION

Table 1 reveals that after 20 days of plant growth, maximum development of root was in local variety and best shoot growth was in DPPA variety. Minimum growth of shoot and root was observed in ICP variety. There was no direct correlation between root and shoot growth.

Table 1. Average root and shoot growth of *Cajanus cajan* after 20 days of sowing.

Parameters	Local var.	DPPA 85–5	ICP2376	LRG 39
Root				
Length	11.00	10.00	9.5	7 0
Fresh wt g	0 19	0 11	0.14	0 11
Dry wt g	0 04	0.04	0.04	0.03
Shoot :				
Length	22.00	28.5	20 5	23.0
Fresh wt.	1 18	1.64	1.39	1 32
Dry wt	0 25	0.42	0 41	0.35
Leaf :	10–12	12–16	15–18	15–18

Table 2. Relative proportion* of different microorganisms isolated from non-rhizosphere and rhizospheres of 4 different varieties of *Cajanus cajan*

Microorganisms	NR	DPPA	LRG	ICP	Local
Bacteria	+	+	+	+	+
Actinomycetes	+	+	+	+	+
Fungi					
Mucor	18 0	—	6 0	12 0	20.0
Rhizopus nigricans	6 0	3 0	18 0	20 0	10 0
Choanephora cucurbitarum	—	—	10 0	—	—
Aspergillus niger	20 0	42.6	—	10 0	20 0
Aspergillus fumigatus	10 0	22.0	—	10 0	5.0
Aspergillus sp	8 0	—	—	10 5	20.0
Aspergillus sp.	—	—	—	12 5	12 5
Penicillium sp 1	12.0	22 0	12.5	5 0	—
Penicillium sp. 2	—	—	10.0	—	—
Fusarium udum	2.6	—	—	—	3.0
Alternaria sp	4 0	—	15 0	15.0	—
Helminthosporium	6 0	—	15 0	—	6 0
Phoma sp	4 0	—	2 0	5 0	—
Macrophomina sp	—	—	2 0	—	—
Others	9 4	10 4	9 5	0 5	3 5

*Percentage in total population of fungi + Presence, — Absence

Out of 13 fungi (4 *Aspergillus* & 2 *Penicillium*) only one *Rhizopus* was present in non-rhizosphere as well as rhizosphere soil of 4 different varieties 3 genera belonged to Zygomycetes, 2 of Ascomycetes and 5 of Deutromycetes.

An analysis of the results indicates that the number and quality of fungi present in the rhizosphere soil always differed from those present in the non-rhizosphere soil Similar observations have been made by Timonin (1941), Manoharachary et al (1977) and Chandra & Raizada (1982). Furthermore

Aspergillus was completely absent from LRG variety DPPA variety harboured only 4 fungi : *Rhizopus*, 2 *Aspergillus*, *Penicillium* Percentage occurrence of these fungi varied in different varieties. These differences may be safely attributed to the rhizosphere effect. Both rhizosphere and non-rhizosphere soils showed the pre-dominance of *Aspergillus* and *Penicillium* Similar results have been obtained by a number of other workers

It is well known that root exudates have a direct influence on the micropopulation in rhizosphere (Sadasivan, 1960; Schroth & Hildebrand, 1964; Rovira, 1965). Thus in the present study qualitative and quantitative changes in the rhizosphere microflora may be attributed to the alteration in the pattern of root exudates of the four varieties of *Cajanus cajan*, *i e.* DPPA 85-5, LRG 30, ICP 2376 and local variety.

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Variation in seed germination of pigeonpea following treatment with fungal metabolites

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Keywords : Seed germination, Pigeonpea, Seed mycoflora, *Aspergillus, Fusarium, Rhizopus*

Pigeonpea, being the major protein source among pulses, constitutes an important crop in various states of India. However, information about the seed mycoflora and effect of fungal metabolites on seed germination of pigeonpea are scanty (1-3). In the present communication, we report the seed mycoflora and effect of metabolites of 4 different fungi on seed germination of pigeonpea

Seed samples of three varieties, i.e , DPPA 85-5, LRG 30 and ICP 2376 were obtained from Directorate of Pulses Research, ICAR, Kalyanpur, Kanpur (UP). One variety was procured from the local market Seed mycoflora of all the four varieties was studied using standard blotter method (4). The percentage incidence of the fungi isolated was calculated.

The culture filtrates of 4 fungi, viz., *Aspergillus niger, A. fumigatus Fusarium udum* and *Rhizopus nigricans*, isolated from local variety and grown in Richard's medium for 15 days, were obtained using Whatman No. 1 filter paper. Seeds of all varieties were separately soaked in each culture filtrate for 12 h and allowed to germinate in presterilized petri plates containing sterile filter papers. Adequate moisture was

TABLE 1 · Per cent occurrence of mycoflora of *Cajanus cajan* after harvest in 1989

Fungi	*Cajanus cajan* variety			
	DPPA	LRG	ICP	Local
Zygomycotina				
Mucor sp	10	—	—	2
Rhizopus nigricans	—	—	—	4
Ascomycotina				
Aspergillus fumigatus	3	6	8	10
A niger	3	5	4	6
Aspergillus sp 1	—	—	3	—
Aspergillus sp 2	—	—	3	—
Chaetomium sp	—	—	3	—
Deuteromycotina				
Alternaria sp	6	7	6	6
Cladosporium sp	—	—	—	2
Phoma sp.	3	3	2	—
Fusarium udum	—	—	—	2
F pallidoroseum	—	4	—	—
Total 12 spp	25	25	29	32

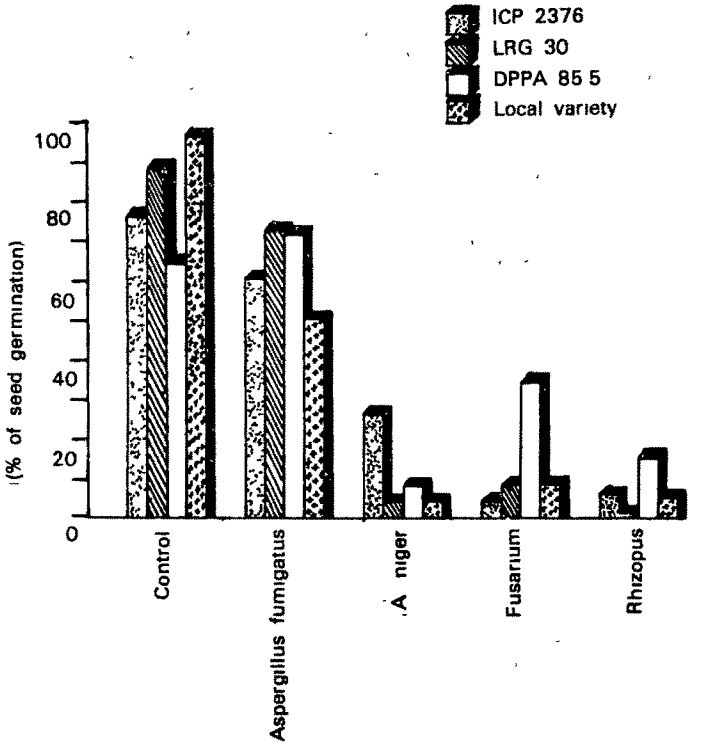

Fig 1 . Effect of culture filtrate on seed germination

maintained by adding sterile distilled water. One hundred seeds of each variety were taken for each assay and percentage germination was calculated after 5 days.

Percentage occurrence of each fungu recorded in Table 1 reveals that altogether 12 spp. were isolated from seeds of *C. cajan*. *Aspergillus niger* and *A. fumigatus* were present in all the four varieties while *Rhizopus nigricans*, *Cladosporium* sp. and *Fusarium udum* were associated with local variety only.

It is evident (Fig. 1) that the culture filtrates of *Rhizopus nigricans* showed maximum inhibitory effect (except DPPA 85-5 variety) and that of *A. fumigatus* exhibited the least effect on germination percentage of seeds of pigeonpea. The germination of seeds of DPPA variety proved resistant while that of LRG variety proved susceptible to the treatments. Culture filtrates of *F. udum*, *R. nigricans* and *A. niger* inhibited the seed germination in all the varieties. Kulkarni and Deshpande (5) also recorded reduced germination of *Arachis hypogea*, *Helianthus annuus* and *Carthamus tinctorius* due to fungal metabolites. Contrary to our findings, they also observed increased germination when sequential treatment with more than one filtrate was given to *Carthamus* seeds.

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Effect of fungicides on mycoflora of chickpea seeds

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Keywords · Fungicides, Chickpea, Seeds mycoflora

Chickpea (*Cicer arietinum* L.) forms an important constituent of vegetarian diet and is widely grown legume crop in Indian subcontinent The seeds, when stored, are affected by large number of seed-borne fungi adversely affecting quality of seeds (1, 2) or when sown in the field causing seed and seedling rot and wilt at various stages of plant growth which directly influence the quality and yield of the crop. *Fusarium oxysporum* f. sp. *ciceri*, a seed (3) and soil-borne (7) fungus of chickpea is very common and widely

TABLE 1 Effect of fungicides on seed mycoflora of chickpea

Fungi isolated	Control	Benlate (%)		Captan (%)		Vitavax (%)		Plantvax (%)	
	(JG-1263)	0 1	0 2	0 1	0 2	0 1	0 2	0 1	0 2
Alternaria alternata	2 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Aspergillus niger	3 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Botrytis cinerea	11 0	4 5	2 7	8 2	7 7	6 5	3 5	6 7	3 0
Colletotrichum dematium	5 5	2 2	1 2	4.7	3.5	3.0	2 0	3 5	4 2
Fusarium oxysporum f sp *ciceri*	12 5	0 2	0 0	3 5	3 2	3 2	1 0	2 0	0 0
Macrophomina phaseolina	9 7	3 7	1 0	8 5	6 7	4 2	2 5	4 7	0 0
Pellicularia sp	1 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Rhizoctonia solani	3 2	0 0	0 0	1 0	0 5	0 0	0 0	0 5	0 0
Sclerotium rolfsii	3 0	0 0	0 0	1 5	1 5	1 2	0 0	1 5	1 0
Rhizopus nigricans	5 2	2 0	0 0	4 5	1 0	4 2	1 0	3 5	0 0
Sterile mycelium (white colony)	4 0	1 2	0 5	1 0	0 0	2 0	0 0	0 0	0 5
Per cent germination	67	91	93	89	79	82	86	83	94

Figure in table shows the per cent frequency of fungi

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CHEMICAL CONTROL OF *PHOMOPSIS* ROT OF CHIKU

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ABSTRACT

Phomopsis sapotae Lal et Rai, is a severe pathogen of chiku fruit. Of the 4 systemic fungicides tested *in vivo* to control the disease, use of Bavistin and Calixin at 1500 ppm is recommended.

INTRODUCTION

Phomopsis, a Coelomycetous fungus infects a large number of fruits in orchards and markets. Tandon (1967) found a *Phomopsis* species on chicku, Lal & Rai (1980) and named it *P. sapotae*. Recently, the authors have also reported this fungus from various markets of Baroda (Arya & Mathew, 1990). Since no chemical control is reported for soft-rot of chiku caused by *P.sapotae*, an attempt has been made here to control the disease by four systemic fungicides.

MATERIALS AND METHODS

Pure culture of *P. sapotae* was maintained on PDA slants. Four systemic fungicides, *viz.* Bavistin, Calixin, Derosal and Kitazin were selected and healthy and just ripe chiku fruits variety 'Kalipatti', were used for the experiment. Fruits were first disinfected with 90% alcohol then injured by pin-prick method. Injured fruits were sprayed with a spore suspension of the pathogen and after 24 h of incubation they were dipped for 10 min in 500, 1000 and 1500 ppm of fungicidal solutions (post-inoculation treatment). In another set of experiment (pre-inoculation treatment), fruits were first dipped in the above fungicidal solutions and after 24 h incubation, they were inoculated with the pathogen as above. In the control series, inoculated fruits were dipped in sterilized distilled water. Five fruits were taken for each treatment. Control as well as treated fruits were incubated at room temperature 25 ± 2°C for a week.

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