lations. A higher percentage of nitrogen was found in the nodules of infected plants. Similar findings were also reported by Tu *et al.*[11] and Rajagopalan and Raju[9] in SMV infected soybean and in *Dolichos* enation mosaic virus infected *Dolichos lab lab,* respectively. It is believed that this higher nitrogen percentage in the nodules is due to insufficient utilization of nitrogen by infected plants. Arhar mosaic virus reduced the total nitrogen value of plants. According to Orlob and Arny[10] this decrease is due to the inhibition of protein synthesis or increased rate of degradation of proteins in infected plants.

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EFFECT OF SOME MYCOTOXINS ON THE INFECTIVITY OF TOBACCO MOSAIC AND TOBACCO RING SPOT VIRUSES

ALTHOUGH plant virus inhibitors have been found in a number of species of higher plants and fungi, relatively few have been characterized chemically[1,2,10]. In the earlier studies Rao and Raychaudhuri[6], Sharma and Raychaudhuri[8], used the crude culture filtrates of *Trichothecium roseum* and *Aspergillus niger* respectively and reported that they are inhibitory to Potato virus X. Recently Kang *et al.*[4] reported that the culture filtrate of *Aspergillus flavus,* containing aflatoxins, inhibited the infectivity of vegetable marrow mosaic virus upto 70 to 80%. Subbarayudu *et al.*[9] reported the effect of aflatoxins on cowpea mosaic virus infectivity.

With the end in view, we have isolated aflatoxins from the culture filtrates of *Aspergillus flavus* and separated by the method of Pons *et al.*[5]. Citrinin was extracted from the culture filtrate of *Penicillium citrinum*[7]. The T-2 toxin was obtained as a gift from Dr. O. Shottwell. The toxin solutions were prepared by dissolving a known amount of toxin in chloroform, to which later distilled water was added. After evaporating the chloroform, 500 and 1000 ppm toxin solution were prepared.

In the present studies, *Nicotiana tabacum* var. *xanthi-nc* was used as a local lesion host for tobacco mosaic virus (Johnson's No. 1 strain) and *Vigna sinensis* Savi for tobacco ring spot virus (Brinjal isolate). For testing the effect of these toxins, the standard inocula for these two viruses were prepared by communiting young infected leaves. The sap was filtered through double layered muslin cloth and diluted with distilled water to have 1 : 5 dilution which gave countable discrete local lesions on the above hosts. Different concentrations of each toxin were mixed with equal quantity of the virus inocula and incubated for 1 hr at room temperature (32° C). For control treatment, distilled water, from which chloroform was evaporated, was added to the virus inoculum, instead of toxin solution. After one hour incubation the inoculations were made by using half leaf method with inoculum wet cotton wad on the leaves previously dusted with celite. All the experiments were replicated three times and two independent experiments were conducted to confirm the results. The data obtained in both the experiments were averaged and presented in Table I.

It is quite obvious from the data given in the table that aflatoxins (B_1, B_2, G_1 and G_2), citrinin and T-2 toxin have inhibitory effect on tobacco mosaic virus and on tobacco ring spot virus. Aflatoxins, citrinin and T-2 toxin both at 500 and 1000 ppm inhibited the local lesion production of both the viruses and the percentage of inhibition ranged between 62·5 to 100% for TMV and 59·7 to 98·7% for TRSV respectively. In 1972, Kang *et al.*[4] reported 70 to 80% inhibition of vegetable marrow mosaic virus, with the culture filtrate of *Aspergillus flavus* containing aflatoxins. Citrinin also markedly inhibited local lesion formation on *Nicotiana glutinosa* leaves infected with TMV[11]. Earlier Rao and Raychaudhuri[6], Sharma and Raychaudhuri[8] used only the crude culture filtrate of fungus without isolating the actual inhibitory substance. But in the present studies the toxins were isolated and the studies reveal that the inhibitory substance present in the crude culture filtrate of these fungi may be aflatoxins in the case

TABLE I

Effect of mycotoxins on the inhibition of local lesions

Treatment	Concentration of mycotoxin	% inhibition of TMV	% inhibition of TRSV
Control	*a*	0(96)	0(77)
Aflatoxin B_1	*a*	62·5	59·7
	b	77·0	68·8
B_2	*a*	83·3	84·4
	b	87·5	87·0
G_1	*a*	70·8	72·7
	b	81·2	80·5
G_2	*a*	80·2	76·6
	b	85·4	81·8
Citrinin	*a*	75·0	74·0
	b	83·3	84·4
T-2 Toxin	*a*	97·9	97·4
	b	100·0	98·7

a: represents 500 ppm and *b*: 1000 ppm.
Figures in parenthesis are actual number of local lesions.

of *Aspergillus flavus* and citrinin in *Penicillium citrinum*, which greatly decreased the infectivity of the viruses under study.

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TUBER ROT OF *CYCAS BEDDOMI* DYER. CAUSED BY *FUSARIUM EQUISETI* (CORDA) SACC.

IN the rainy season (August to November) of 1971, a tuber rot of *Cycas beddomi* Dyer., an ornamental plant with feathery and evergreen leaves, was observed in Shri Venkateswara University botanical graden. It is an endemic plant occurring only in Seshachalam Hills (1000–3000′ msl), Andhra Pradesh, India (Gamble and Fischer, 1956). Its occurrence in any other part of the world has not been so far reported. In the subsequent year also a high mortality (76%) of the plants was observed.

The initial manifestation of the disease is yellowing of the leaves in an ascending order. In the early stages of the disease development, the freshly sprouting foliage showed small scale-like brown leaflets (Fig. 1 C) and in later stages almost devoid of leaflets. As the disease progressed, the growth of the terminal bud is checked. When such plants were pulled up, they were found to be almost devoid of corolloid roots. The infected roots become brownish with almost discoloured vascular roots become brownish with almost discoloured vascular bundles in the initial stages and subsequently the entire ground tissue degenerated leaving tracheids encircled by a thick tubular sheath (Fig. 1 A). The rotting progressed from the lower side of the tuber towards terminal bud. In severe cases the entire ground tissue of the tuber including the terminal bud became rotten leaving fibres and tracheids (Fig. 1 B).

Almost all isolations from infected roots and tuber yielded the fungus, *Fusarium*. Isolations from rhizosphere soil carried out according to the method of Warcup (1950) gave *Fusarium* as the principal fungus. The fungus was purified by single spore isolation.

The organism grows luxuriently on Potato dextrose agar (PDA) and Czapek-Dox agar; cottony with light brown to dull-pink substratum; both sterile and fertile hyphae are irregularly septate and 3–6 μ thick. Chlamydospores are mainly intercalary;