deter the insect's attack on ferns[3,4]. On the contrary the present authors have collected a fairly large number of insect-eaten leaves of *Microsorium membranaceum* which are damaged by insects at their larval stages, especially in autumn. On the other hand Hendricks[5] has mentioned that certain chemicals do attract some kinds of insects to reproduce on the leaves of these plants and utilize the leaves for their food.

The insect-eaten leaves of *M. membranaceum* (figure 1A) were collected from Darjeeling, where its plants were growing as an epiphyte on the tree trunks of *Cryptomeria japonica*. The caterpillars (figure 1B) were caught alive from the leaves of *M. membranaceum*, while they were feeding the foliage leaves and their sori. The faecal pellets were collected and a dilute suspension in water was made and these were examined under microscope, which yielded the undigested remains of cuticles, epidermal cells, trichomes, hairs, vascular elements, spores, walls of sporangia and annulus (figures 1D–H). The faecal pellets were usually elliptical (figure 1C). The size of faecal pellets ranges from 2–3 mm in length and 1–2 mm in width and are grayish in colour with heterogeneous composition. Some of the caterpillars were also fixed in FAA and were dissected out to study the materials from their gut region. Some of the caterpillars were allowed to feed upon the young foliage leaves of *Microsorium* and the caterpillars died soon. The caterpillars belong to suborder Orthoptera and are 6 to 8 mm long.

The present results show that the faecal pellets present on the leaf surface of *Microsorium* belong to the same caterpillar, which damaged the foliage crowns of plants. Further, it can be concluded that the insects attack ferns mainly for their food, shelter, dispersal of spores and for their reproduction. Such studies are rather limited in pteridophytes[6–9].

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A PSEUDOSTEMROT OF BANANA DUE TO *ERWINIA CHRYSANTHEMI* PV *PARADISIACA*

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WITH the introduction of Giant Governor cultivar of dwarf bananas (*Musa cavendishii*) in West Bengal during sixties, newer disease problems like sigatoka due to *Cercospora musae* and bunchytop of banana due possibly to a virus have increased their incidence intensities to a great extent particularly in the districts on the eastern bank of the Ganga river.

A bacterial soft rot disease occurring on the pseudostem and corm of Giant Governor cultivar of Cavendish banana has been detected extensively for the first time in India in the year 1983 in the orchards of Mondouri Farm of the Viswavidyalaya. A survey undertaken in this regard revealed that the disease has been prevalent in Karimpur area of Nadia district for some time and has spread to many other villages through seed (corm) materials.

The disease generally appeared at all these places at the primary stage of establishment of the plantations, thereby causing a terrible setback to the establishment of new Giant Governor orchards.

Symptoms appeared on the leaves turning pale to yellowish, lusterless withering very slowly. On closer examination, characteristic rotting of the pseudostem was visible inside bracts of the leaves. The rotting progressed upward in the pseudostem destroying the leaf bases and sometimes decaying the growing plant. The rotting involved both parenchymatous and vascular tissues resulting in a mashy soft tissue. The rotting proceeded downward also resulting in gallies rotting on the surface of the rhizome and sometimes reaching deep inside. Rotten tissues often emitted disagreeable odour.

The causal bacterium isolated in pure culture on PDA following dilution technique was found to be

Erwinia chrysanthemi pv *paradisiaca*. The bacterium produced convex, slight to moderately irregular, undulate pale creame colonies on NA at 27°C. The bacterium was gram-negative, 0.7×1.65 mm size, motile, showing a positive pectate degradation, indole and acetoin production. The bacterium produced acid and gas from glucose and only acid from lactose and maltose. It also produced acid from D(−) arabinose and D(+) raffinose and utilized tartarate but failed to liquify gelatin. It failed to utilize D(−) mannitol and D(−) sorbitol. The bacterium was a facultative anaerobic one. On inoculation with bacterial suspension of 3×10^7 cells/ml by injection, the disease symptoms on healthy bananas were produced successfully within 14 days. The identification of bacterium was thus confirmed[1-2].

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ROLE OF RHIZOPLANE FUNGI ON THE PRODUCTION OF PHYTOALEXIN LIKE SUBSTANCES AGAINST *RHIZOCTONIA BATATICOLA* IN GROUNDNUT

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ASSOCIATION of several fungi on the rhizoplane (viz root surface of various plants) has been reported[1-3] and it has been found that the reciprocal relationship between the rhizoplane mycoflora and plant root system holds good. The present work has been carried out to understand the role of rhizoplane mycoflora on the production of phytoalexin-like substances in groundnut roots for the inhibition of *Rhizoctonia bataticola*, the dry root rot and seed rot pathogen.

The rhizoplane fungi was isolated by the serial root washing technique[2]. For this, roots of groundnut plants var SB-11 grown for 15 days in the experimental field were used. In pathogenicity tests of rhizoplane fungi; healthy seeds of groundnut var SB-11 were treated with fungal spore/mycelial suspensions separately and were sown in the pots containing sterile soil.

Production of phytoalexin-like substances was studied by using roots of groundnut var SB-11 grown for 15 days in the experimental plots. The roots were carefully removed from the soil, washed with sterile-distilled water, treated with 0.1% $HgCl_2$ solution for 2 min and then rewashed thoroughly with sterile-distilled water. The roots were cut into 4 cm long pieces and were incubated with drops (2 drops per piece) of spore suspensions of the rhizoplane fungi individually. The root pieces with the drops of sterile-distilled water served as control. After 24 hr of incubation at room temperature, the root pieces were washed two to three times with sterile-distilled water and were homogenized for the preparation of root extracts using 10 g of roots with 100 ml sterile-distilled water. The extracts were filtered finally through Seitze filter, and the filtrate concentrated 10 times. Anti-fungal activity of the concentrated extracts was studied against *R. bataticola*, by growing it on agar plates containing the root extract (5 ml/plate). The growth of *R. bataticola* without root extract was the control. On the 7th day of incubation the radial growth of the colonies was recorded.

It is clear from the results given in table 1 that out of seven rhizoplane fungi isolated, the root rot was caused significantly only by *R. bataticola* and *Penicillium funiculosum* while all the seven caused seed rot nearly to the same degree.

It is interesting to note (table 2) that the growth of *R. bataticola* was significantly inhibited by the extracts of groundnut roots incubated with spore suspensions of *Fusarium semitectum*, *Penicillium funiculosum*, *A. niger* and *R. bataticola*. However such inhibition was not seen when the spore suspensions of *F. oxysporum* and *Rhizopus stolonifer* were used.

Inhibitory nature of groundnut root extracts due to the association of different rhizoplane fungi might be a biochemical response of the host against its root

Table 1 *Pathogenicity of rhizoplane fungi against groundnut*

Species	% seed rot	% root rot
R. stolonifer	7	3
A. niger	14	2
P. funiculosum	20	10
Phoma sp	8	0
F. oxysporum	10	0
F. semitectum	12	0
R. bataticola	30	20