Table 2 *Antiimplantation activity of* 1,4-*disubstituted*-3-[3'-(2'-*phenyl*-4'-*oxo-quinazolinyl*)]-2-*azetidinones, days of pregnancy*: = 5: *dose*: 10 *mg*

Comp. No.	Rats rendered infertile/ Rats treated	Implantation sites (mean ± S.E.)	Corpus luteum (mean ± S.E)	% Effectiveness Incidence	Rate
Control	0/6	10.7 ± 0.6	13.2 ± 0.8	—	—
1.	0/6	10.2 ± 0.9	12.9 ± 1.1	—	5.2
2.	2/6	4.5 ± 1.1	13.7 ± 1.0	33.3	58.2
3.	2/6	3.8 ± 1.0	13.1 ± 1.0	50.0	64.7
4.	0/6	9.2 ± 0.7	13.4 ± 0.7	—	14.5
5.	0/6	9.9 ± 0.9	12.7 ± 0.8	—	7.7
6.	0/6	10.2 ± 0.8	12.9 ± 0.9	—	5.1
7.	1/6	7.5 ± 1.0	13.3 ± 0.8	33.3	30.3
8.	2/6	4.8 ± 1.1	14.3 ± 1.1	33.3	55.4
9.	3/6	4.2 ± 1.0	13.5 ± 0.9	50.0	61.0

pounds tested for their antiimplantation activity was calculated in two terms;

(i) Incidence: The per cent effectiveness in terms of incidence of pregnancy was calculated as;

$$\frac{\text{Animals rendered infertile}}{\text{Total number of animals treated}} \times 100$$

(ii) Rate: The per cent effectiveness in terms of rate of pregnancy was calculated by comparing the mean number of implantation sites found in the treated animals to that of control.

The anti-implantation data thus determined are recorded in table 2.

Four compounds viz 2,3,8 and 9 were found to possess high antiimplantation activity in terms of incidence and pregnancy. All the four compounds possess a 4-chloro substituent on the phenyl ring joined with the nitrogen atom. Further, a nitrosubstituent in the phenyl ring attached with the –CH causes enhanced anti-implantation activity. Thus the compound No. 3 with a nitro-substituent was found 50% effective in terms of incidence of pregnancy and 64.7% effective in terms of pregnancy rate while compound No. 2 with a 4-OCH_3 substituent was only 33.3% effective in terms of incidence of pregnancy and 58.2% effectiveness in terms in the rate of pregnancy. All the four compounds with a 4-Cl substituent in the phenyl attached with the nitrogen were found to exhibit anti-implantation activity by more than 50% in terms of pregnancy rate and 33.3 to 50% in terms of the incidence of pregnancy. The remaining compounds had diminished antiimplantation activity.

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INSECT FEEDING STUDIES ON *MICROSORIUM MEMBRANACEUM* (DON) CHING AND THEIR RELATIONSHIPS

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REPORTS are scanty about the insect-fern relationships and their feeding studies. Field observations indicate that the ferns are rarely attacked by feeding insects[1] probably because ferns are biochemically much less versatile than angiosperms[2]. They lack definite flowers, colours and odours and are seldom attacked by the insects. Further, the ferns secrete secondary compounds like phenols and flavonoids which are injurious to these insects and thus these chemicals possibly

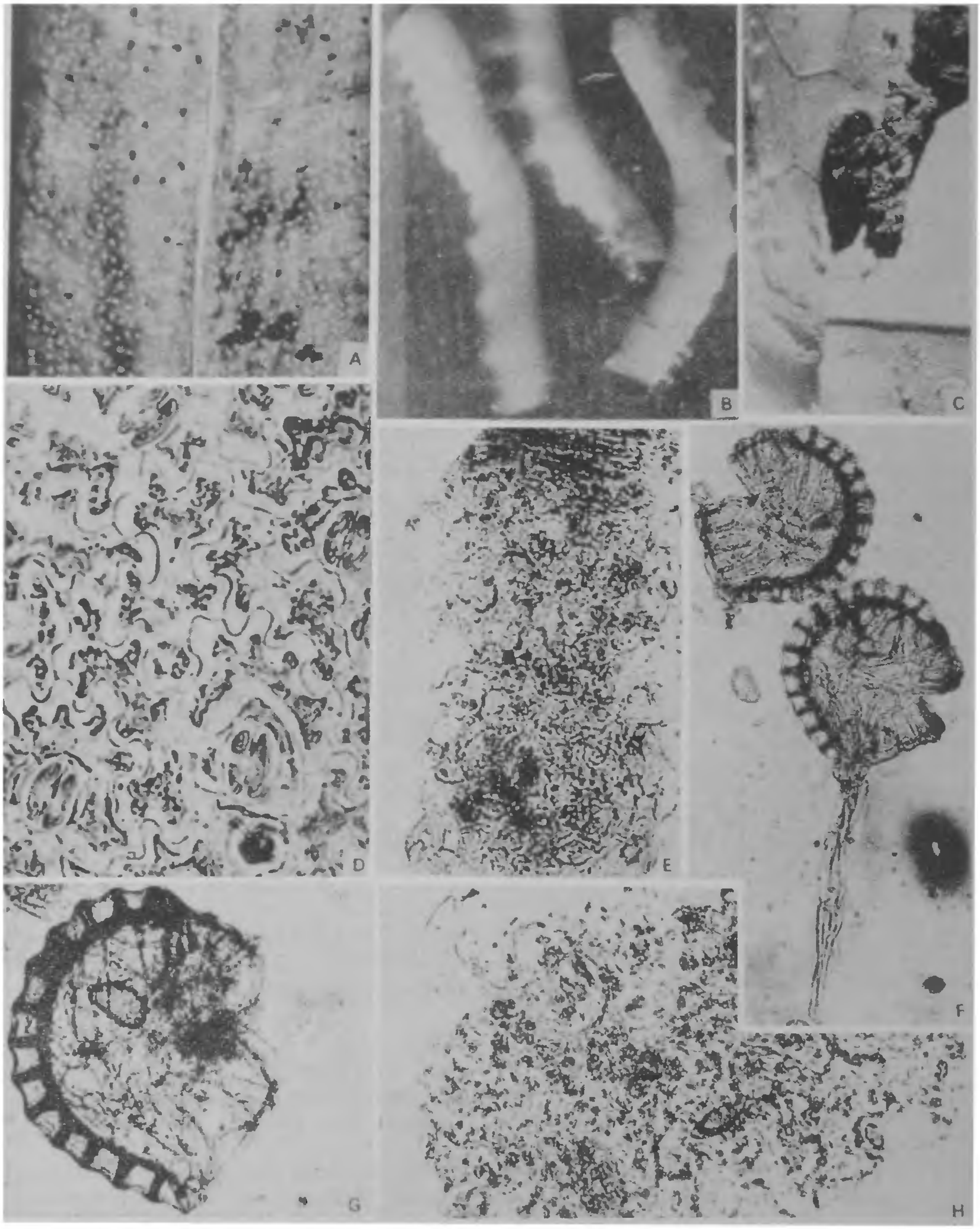

Figure 1. A–H. *Microsorium membranaceum*. **A.** Portion of insect eaten leaf of *M. membranaceum* (× 0.5). **B.** Caterpillars, which damaged the leaf (× 8). **C.** Faecal pellets of caterpillars lying on the ventral surface of the leaf (× 10). **D.** Lower epidermis of the leaf showing sinuous-walled cells with stomata (× 250). **E, H, G.** Fragments of undigested upper and lower cuticles with epidermis, sporangia and vascular strands respectively recovered from faecal pellets as well as from gut region of caterpillars. (**E** × 250; **H** × 300; **G** × 200). **F.** Enlarged sporangia showing stalk (× 100).

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