

A single layer of velamen cells has been observed by me in the subterranean roots of the terrestrial orchid *Spiranthes australis* Lindl., material of which was collected from Dacca in the year 1943. Sections of these roots revealed the existence of isolated cells of the epidermal layer showing reticulate thickenings with perforations characteristic of velamen cells (Fig. 1). That these cells are modified epidermal cells was evident from the fact that the root hairs were also seen to originate from them although later they became cut off from the epidermis by the formation of a partition wall (Fig. 2).

A very prominent endotrophic mycorrhiza is present in the cortex (Fig. 3), the fungal hyphae making their way through the root hairs. Whether this triple occurrence of a cortical mycorrhiza, a piliferous layer and velamen cells is an adaptation to dry conditions, as supposed by Lakshminarayana and Venkateswarlu, is open to question as the material of *Spiranthes* came from a wet marsh.

I am indebted to Prof. P. Maheshwari for providing the material and helping me in my observations.

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ON PYRILLA INFESTATION AND VARIETAL RESISTANCE IN SUGARCANE

PYRILLA, as a pest, is of major economic importance in certain parts of this sub-continent, e.g., the Punjabs, and the western

irrigated tract of the Uttar Pradesh. In Bihar, however, its occurrence is sporadic and it is, therefore, reckoned among minor insect pests, except in some factory-areas where it appears to be endemic. From annual pest survey carried out at harvest, it was found that only in four out of 29 factory-zones, its average infestation during three years (1944-45 to 1946-47) exceeded 10 per cent., the highest being 14.58 per cent. of the remaining 25 reserve areas, it was below 5 per cent. in 17 of them (Khanna, 1948).

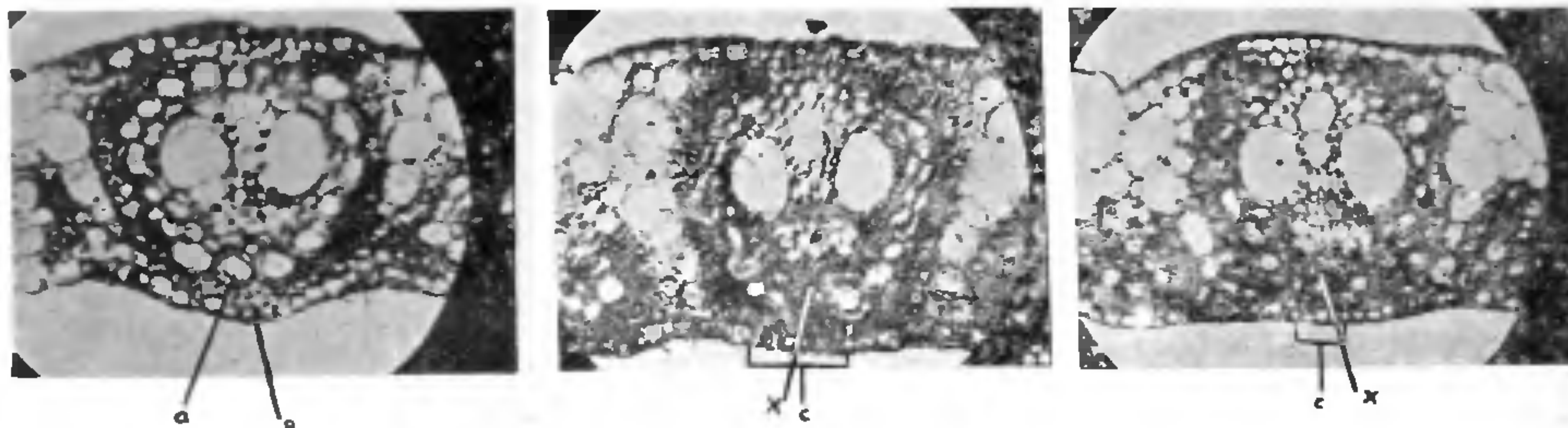
That some varieties were more susceptible to its attacks than others would admit of no doubt. Detailed observations on pyrilla infestation taken at Motipur (Muzaffarpur District) in 1948-49 (Table I) showed that varieties were significantly different from one another in this respect. Thus the percentage of leaves having egg-masses and the average number of egg-masses per infested leaf were lowest in B.O. 3 and were significantly different at 1 per cent. level respectively from the corresponding highest figure in B.O. 11 and B.O. 24. Differences between the latter two varieties in respect of both of them were not significant even at 5 per cent. level. It may therefore be stated that B.O. 3 was the least susceptible to pyrilla attack and B.O. 11 and B.O. 24 the most. Elsewhere also, this differential behaviour on the part of the host has been noted (Gupta, 1948 and Singh, 1949).

The obvious difference between these varieties is that B.O. 3 has shorter and narrower leaves than those of B.O. 11 and B.O. 24 and that the leaves of B.O. 3 form a greater obtuse angle of divergence with the stalk than those of B.O. 24. In B.O. 3 and B.O. 11, they are stiffly held up in air fan-like while in B.O. 24

TABLE I

Infestation of sugarcane varieties by pyrilla and their leaf characters

Variety	Infestation			Leaf characters			
	Percentage of affected leaves	Egg-masses per affected leaves	Eggs per egg mass	Length in cm.	Maximum width in cm.	Area in sq. cm.	Angle of divergence between stalk and sixth leaf
B.O. 10	38.55	4.36	32.97	127.34	4.00	457.01	151.63
Co 453	50.07	4.34	34.88	119.41	3.71	406.99	150.90
B.O. 3	26.93	2.66	33.88	116.72	3.62	277.40	156.27
B.O. 24	45.61	5.30	32.73	107.42	4.20	399.75	150.32
B.O. 11	50.07	3.99	31.85	128.53	5.05	532.47	155.51
General mean	41.55	3.99	33.55	119.88	4.12	414.72	152.93
S.E.	9.06	1.13	4.97	..	..	40.8	0.99
C.D. at 5%	10.67	1.33	5.86	..	..	113.13	3.02
C.D. at 1%	14.38	1.79	..	..	..	148.69	3.97



T. S. of Lamina. Fig. 1, B.O. 11; Fig. 2, B.O. 3; Fig. 3, B.O. 24. The vascular bundle in B.O. 11 is surrounded by a layer of parenchymatous cells (*a*), thus separating the vascular sheath and the sclerenchymatous rib (*r*) below it. In B.O. 3, on the other hand, it is interrupted at X where a protective covering (*c*) is formed over phloem, the tissue tapped by *pyrilla* for its nutrition. In B.O. 24, the protective covering, though present, is much smaller and thinner than that found in B.O. 3, ($\times 250$).

they are more or less drooping. As a result, the micro-climate within the crop of these varieties is bound to be different. Although observations on temperature and humidity could not be taken, it is obvious that the micro-climatic conditions in a broad-leaved variety would be more congenial to shade—and humidity-loving *pyrilla* than in that having comparatively narrow and short leaves, because the atmosphere, in the former being less strongly insolated, the temperature remains low and humidity does not fall.

Apart from these gross differences in the morphology of leaf, the varieties differ in its anatomical structure as well. The vascular bundles in the lamina of B.O. 11 are more or less completely surrounded by a layer of large thin-walled parenchymatous cells (Fig. 1). Consequently the vascular sheath and the sclerenchymatous rib below it, do not form a protective covering similar to that found in B.O. 3 (Fig. 2) over phloem, the tissue tapped by *pyrilla* for its nutrition. Thus in the latter variety there are 4-6 layers of sclerenchymatous cells as against 2-3 in the former between the dorsal epidermis and phloem which therefore is better protected in B.O. 3 than in B.O. 11. Although the sclerenchymatous shield over phloem is present in B.O. 24 also, it is much smaller and thinner than that of B.O. 3 (Fig. 3).

Further work on the problem is in progress.
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AN AUTOTETRAPLOID IN THE PEARL MILLET

THE germinated seeds and seedlings of *Pennisetum typhoides* Stapf. and Hub., were treated with colchicine both as an aqueous solution and as an emulsion in lanolin. The concentrations of the solution varied from 0.01 to 1.0 per cent. and at durations from 3 hours to 48 hours. In



FIG. 1. Induced 4 \times plant ($1/5$ nat. size)

all these attempts seedling mortality was very high, the roots having failed to develop further. Whenever adult plants were obtained they were found to be invariably unaffected. Techniques