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VESSELS IN ORCHIDACEAE

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VESSELS are of rare occurrence in the stems or rhizomes of Orchids. However, they have been reported to occur in the roots of a number of taxa which may have scalariform perforation plates or simple perforation plates with scalariform thickenings^{1,3}.

Tracheid-like vessels or vascular tracheids⁴ in the stems or leafy shoots of both epiphytic and terrestrial orchids have been observed in *Aerides odoratum* Lour., *Arundina graminifolia* Hochr., *Epipactis helborne* Crantz., *Habenaria arctina* Hook. f., *H. marginata* Colebr., *H. pectinata* D. Don, *Herminium lanceum* Vujk., *Luisia zeylanica* Lindl., *Rhynchostylis*

retusa Bl., *Vanda cristata* Lindl., *V. roxburghii* Br. and *Zeuxine strateumatica* Schlechter.

The vessels have small to very long oblique end walls and multiple scalariform perforation plates (figures A-C). They show remarkable variations in their length and diameter. They range from 376 (*Luisia*) to 4385 μ (*Arundina*) in length and 4.5 (*H. pectinata*) to 68.4 μ (*Epipactis*) in diameter. The vessels have usually elliptical pits arranged in one to three alternate or opposite rows (figures A,D). Occasionally they may have partly scalariform thickenings and elliptical pits or scalariform thickenings only in *Habenaria* (Figures C,E).

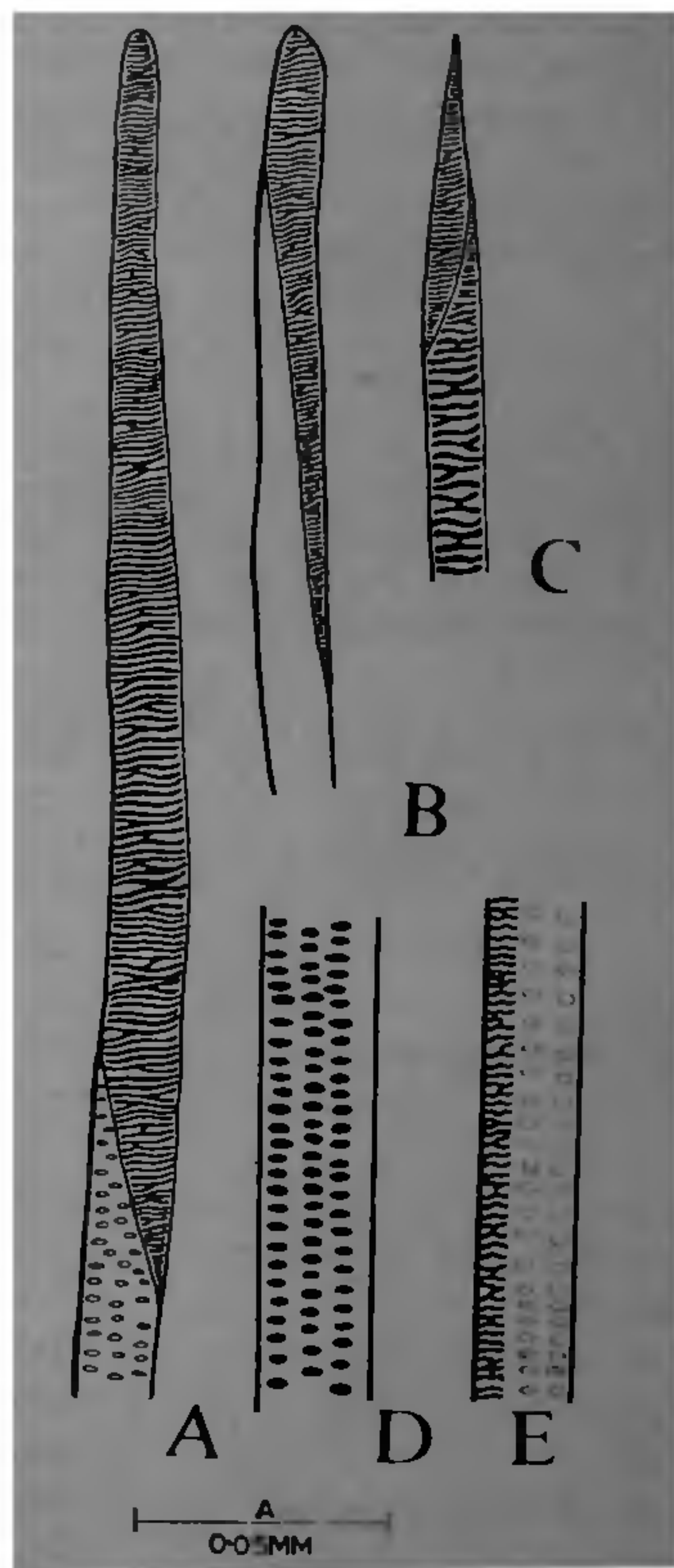


Figure A-E A. Vessel from the stem of *Arundina graminifolia* showing long oblique end wall. B,C. Vessels from the stems of *Rhynchostylis retusa* and *Habenaria pectinata* respectively. D, E. Parts of vessels from the stems of *Aerides odoratum* and *Vanda cristata* respectively.

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A NEW IMMUNOGENIC STRAIN: *MYCOBACTERIUM MARINUM* (SATO) AGAINST *M. ULCERANS* CHALLENGE IN MICE AND RAT EXPERIMENTS

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NECROTISING skin ulcers¹ of man caused by *Mycobacterium ulcerans* infection, originally limited to Congolese region has now attained global importance. This disease entity in human beings may still be counted as a newly recognized disease since many physicians are unfamiliar with it. Increasing incidence involving widespread areas of the world indicates that it is more common than had been originally thought. Although this disease has not been reported from this subcontinent the atmosphere for the growth of pathogen is conducive. The treatment and prophylaxis of the disease have not yet been perfected. BCG vaccination response is limited² in preventing the disease. It is of interest to search for some immunogenic strain against this infection for vaccine production either alone or in combination with BCG. The purpose of this

communication is to report such an immunogenic strain *M. marinum* (SA10) which has been found to be effective in protecting *M. ulcerans* infection in rat and mice in several experiments.

In a general screening programme against this infection, several species of atypical mycobacteria were tested (table 1) on 1 mg dose of moist weight (approx. 10^9 bacilli) subcutaneously (s/c) and challenged with 1.5 mg moist weight (approx. 10^{13} bacilli) in 0.03 ml of *M. ulcerans* in the left foot pad s/c after 21 days of vaccination. The mycobacterial strains were homogenized in 0.05% tween saline (few drops) and suspended in a solution of disodium hydrogen phosphate of pH 8.7, and given in appropriate quantities. The thickness of both the feet (inoculated and uninoculated) were measured by Vernier Calipers and the difference in thickness was considered as the degree of inflammation due to *M. ulcerans* infection which formed the index of foot pad inflammation. The degree of protection (as envisaged by decreased inflammatory response) afforded by the strain of *M. marinum* was appreciable and statistically significant (table 1). Other strains could not afford any protection and were therefore not studied.

TABLE 2

Protective response of M. marinum against intravenous challenge in mice. (5mg dose/mouse)

Mycobacterial strain	No. of mice/group	Mean survival Time in days	P. value
<i>M. marinum</i>	9	72.5 ± 10.09	0.001
Control	10	35.1 ± 5.9	-

TABLE 1

Protective response of M. Marinum in comparison to other species of mycobacteria in rat foot-pad

Mycobacterial strain	Index of foot pad inflammation in mm ± S.E.			Decrease in foot pad inflammation (%)
	15th day	88th day	176th day	
B.C.G.	0.8 ± 0.16	0.6 ± 0.17	0.5 ± 0.09	38
<i>M. tuberculosis</i> strain H37Ra	0.9 ± 0.17	1.2 ± 0.2	0.8 ± 0.11	11
<i>M. marinum</i>	0.7 ± 0.13	0.2 ± 0.35	0.1 ± 0.04	80
Gause	1.1 ± 0.23	0.8 ± 0.13	0.8 ± 0.16	27
Bostrom	1.3 ± 0.07	1.2 ± 0.33	0.8 ± 0.27	38
Kirschberg	0.7 ± 0.21	0.9 ± 0.39	0.7 ± 0.15	0
Tubingen 71	1.2 ± 0.09	0.5 ± 0.09	0.7 ± 0.12	42
<i>M. lepraemurium</i> M.57	1.1 ± 0.16	1.0 ± 0.53	0.6 ± 0.18	45
Control	0.8 ± 0.12	1.2 ± 0.27	0.6 ± 0.13	25