Vessel elements in *Anthurium* spp. (Araceae)

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ABSTRACT :-

The presence of vessels in four species of *Anthurium* (Araceae) is described. They are uniformly present in the roots, they do occur in the stem and scape of one species. Occurrence of vessels in the stem and scape is recorded for the first time. Stem vessel elements are tracheid like and have porus pitmembrane.

The number of perforation plate in vessels of root, varies and their disposition may be oblique. The adjacent wall thickening may be spiral, scalariform pitted and scalariform.

Keywords :- Araceae- *Anthurium* Spp., Vessel elements

Introduction :-

Anatomical studies have been found to be useful in phylogenetic considerations. Vessels have originated independently both in dicotyledons and monocotyledons (Cheadle, 1953, 63) The earlier literature on the occurrence of vessels is chiefly that of Cheadle and associated (Cheadle, 1943, Cheadle & Tucker, 1961, Cheadle and Kosakai 1971. Shah etal 1967 studied the vessel members in the stem of *Dioscorea alata.* Vessels in Araceae is also studied by Carlquist and Schneider, 1998.

During the course of study on the vegetative anatomy of Araceae, the four species of *Anthurium* was analysed for the presence of vessels in different organs and result are presented in this paper No comprehensive accounts exists, while dealing with vessels of this family and therefore the present investigation has been undertaken.

Materials and methods :-

Material of four species of *Anthurium* (Araceae) listed in Table-1, was collected for the present investigation. Tissues were macerated using a mixture of $HN1O_3$ (10%), $K_2Cr_2O_7$ (10%) solution. The vessel elements were stained with aqueous safranine 1%, dehydrated and mounted in Canada balasm using routine procedure. (Johansen, 1940)

The vessel structure in species with aerial stem, root and scape has been studied. The plant species for this investigation are *Anthurium acaule* Schott, *A bakeri. Hook, A. regale,* Lind, *A. digitatum,* G.Don.

Observations :-

All the roots of plants studied revealed presence of vessels. Both the early and late metaxylem vessels, have been studied and documented. The early metaxylem vessel elements are generally longer and narrower. The bars for both the early and late metaxylem elements are given. When there is a significant variation the lower number of bars pertain to the late metaxylem elements.

The vessels most species were studied for the vessels in the scape, however, except *Anthurium digitatum* none of the studied species has vessels. No vessels are recorded in

Leaf, in any of the species studied. The observations regarding the size, shape, perforation of plates and adjacent wall thickening of the vessels are described as under :

1. *Anthurinum acaule* Schott **(Root)** -Vessel length between 2420 and 2860 µm, diameter 45 to 466.3 µm, end wall plate oblique, scalariform, bars 45-50, lateral wall thickening, Scalariform-pitted (fig. 1)

II) *Anthurium bakeri* Hook **(Root)** - Vessel length between 2475 and 2750 µm, diameter 86 to 89 µm, end wall plate oblique, scalariform, bars 60-80, lateral wall thickening, scalariform pitted (fig. 2)

III) *Anthurium regale Lind* **(Root)** - Vessel length, 1870 and 2310 µm, diameter between 32.4 and 35.1 µm, end wall plate- oblique, scalariform, bars 45-50, lateral wall thickening, Scalariform (fig. 3)

IV) *Anthurium digitatum* G.Don **Root**-Vessel length between 2040 and 2160 µm, diameter from 48-60 µm, end wall plate oblique multiperformate Scalariform, bars 89-90, lateral wall thickening, scalariform pitted, (fig. 4)

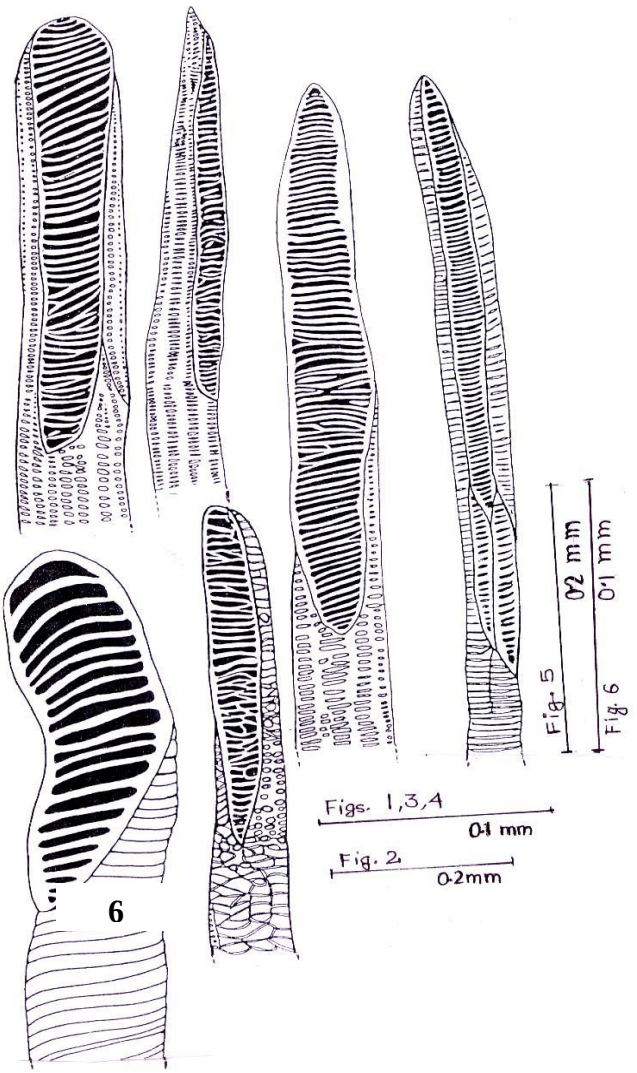
Stem – Vessel length 900 um, diameter 65 um, perforation plate oblique, scalariform 20-50, lateral wall thickening, spiral scalariform, (fig.5)

Scape :- Vessel length between 265 and 284 µm, diameter 22-24 µm, end wall plate oblique, scalariform, bars 20-40, lateral wall thickening is spiral often interconnected (fig.6)

Table-I :- showing size vessels, diameter, and position and no of bars of perforation plates.

Sr. No	Name of Species	Size of the Vessels (µm)				Perforation Plate		Adjacent wall thickening
		Early metaxylem		Late metaxylem		Position	No. of Bars	
		L	D	L	D			
1	Anthurium acaule (root)	2860	45	2420	46.3	Oblique	45-50	Sc-p
2	A. bakeri (root)	2750	86	2475	89	Oblique	60-80	Sc-p
3	A. regale (root)	2310	32.4	1870	35.1	Oblique	45-50	Sc
4	A. digitatum (root)	2160	48	2040	60	Oblique	80-90	Sc-p
5	A. digitatum (stem)	-	-	900	65	Oblique	20-50	Sp-Sc
6	A. digitatum (Scape)	284	22	265	24	Oblique	20-40	Sp

L-length, D- diameter, Sp- Simplepitted, Sc- Scalariform, P- Pitted



Figs – 1-6- Vessles showing variations in size, shape, and dispositional number of plantes 1) *A. acaule* (late) root, 2) *A bakeri* (root), 3) *A. regale* (root), 4) *A. digitatum* (root), 5) *A. digitatum* (stem), 6) *A digitatum* (scape)

Discussion & Conclusion:-

The vessels occur uniformly in the root of all the studied species. The shape also in variable. It may be tubular to cylindrical. The highest number in the range mentioned in Table-I, generally is for early metaxylem vessels. The lower number is for the late metaxylem vessel elements. It will be seen that the early metaxylem vessels are generally longer than the late metaxylem element. By far the longest vessel elements, which are also comparatively narrow are observed in *A. acaule.*

In most species there is a wide range of length between early and late elements e.g. *Anthurium acaule, A. bakeri, A. regale.* Its is only in regard to the lateral wall thickening its, scalariform in *A. regale* and scalariform pitted in *A. acaule, A. digitatum, A. bakeri.*

Taking the number of a parameter of bars on the perforation plate as a parameter of specialization, it would be seen that a reduction in the number of bars is not synchronous with the other two parameters e.g. length and diameter of the vessel. (Zade, 1992)

The vessels are absent in the stem of *A. acaule, A. bakeri, A. regale.* The plant species were studied for the vessels in the scape, however except *A. digitatum* none of the studied species has vessels. No vessels are recorded in the leaf, in any of the species studied.

In spite of the fact that the vessels arose first in the root (Cheadle and Kosakai, 1971) it is not necessarily they are that those of the stem should show a lower degree if specialization with respect to parameters of evolutionary consequences.

The present study thus clearly demostrates the presence of vessels in the aerial stem and scape of some aroids studied here (Zade, 1987, 1992) They are not restricted to the root as known so far.

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