

NODAL AND PETIOLAR ORGANIZATION IN FAMILY SOLANACEAE: A COMPARATIVE ANALYSIS

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ABSTRACT

The present communication reports our findings on the organization of the node and petiole in some species of family Solanaceae. At the node the vascular elements show a unilacunar, one-stranded condition. On the other hand, in the petiolar region bundles are arranged in a semi-circular manner. The number of leaf traces entering the foliar base varies within the same plant. This variation is important from a phylogenetic and systematic point of view.

INTRODUCTION

Solanaceae is a small family of great economic value having 85 genera and about 2,200 species of which 38 genera are found in India. The plants are distributed in temperate as well as tropical regions. BAILEY (1956) described the trace relationship at nodes which is considered to be of phylogenetic importance and, therefore, nodal anatomy has received considerable attention with the systematists in unravelling the phylogeny of angiosperms. In recent years, Scrophulariaceae has been subjected to a detailed nodal anatomical study by VARGHESE (1969) and KUMAR *et al.* (1980) but no parallel attempt has been made in other families including Solanaceae.

The present study dealing with the nodal and petiolar anatomy of six species has been undertaken to supplement our knowledge of the taxonomy of Solanaceae using anatomical features, as one of the criteria.

MATERIAL AND METHODS

Fresh samples of vegetative shoot portion with petiole of the following species were collected from the F. R. I. Campus at New Forest.

<i>Family</i>	<i>Name of the taxa</i>	<i>Local name/Common name</i>
Solanaceae	<i>Capsicum annum</i> Linn.	Chillies
	<i>Cestrum nocturnum</i>	Raat ki Rani
	<i>Lycopersicum esculentum</i> Linn.	Tomato
	<i>Solanum melongena</i> Linn.	Brinjal
	<i>Solanum nigrum</i> Linn.	Black night shade
	<i>Solanum tuberosum</i> Linn.	Potato

The material was fixed in formalin-aceto-alcohol (F.A.A). Hand sections from nodes and petiolar portion were obtained, dehydrated through gradual ascending series of alcohol after staining with safranin-fast green continuation and mounted in canada balsam.



Figs. 1-13. *Nodal and petiolar organization in Solanaceae.*

Fig. 1. L.S. stem portion showing uni-stranded condition.

Figs. 2, 4, 6, 8, 10, 13. T.S. node showing unilacunar one stranded situation in *C. annum*, *C. nocturnum*, *Lycopersicum esculentum*, *S. melongena*, *Solanum. nigrum*, *S. tuberosum*.

Figs. 5, 7. T.S. petiole showing a single vascular trace in *Cestrum nocturnum*, *L. esculentum*.

Fig. 3. T.S. petiole showing two vascular traces condition in *Capsicum annum*.

Fig. 9. T.S. petiole showing three vascular traces with two small side traces in *S. melongena*.

Figs. 11, 12. T.S. petiole showing the vascular strand with two side traces in *S. nigrum* and *S. tuberosum*.

OBSERVATIONS

In *Capsicum annum*, *Cestrum nocturnum*, *Lycopersicum esculentum*, *Solanum melongena*, *Solanum nigrum*, *Solanum tuberosum* (Figs. 2, 4, 6, 8, 10, 13), there is a unilacunar node with a single stranded condition in *C. nocturnum* two side traces are also seen passing into the leaf bract. In *Capsicum annum* (Fig. 2), the single strand splits into two traces in the petiole. In both *C. nocturnum* and *L. esculentum* (Figs. 5, 7), a single vascular strand arises from the stele of stem and later splits into three main vascular and two side traces in the petiole of lamina, the three main vascular laminar traces pass up to the laminar apex. Both *S. nigrum* and *S. tuberosum* exhibit (Figs. 11, 12) splitting of the vascular strand into two side traces and the movement of the main vascular trace right up to the laminar end.

CONCLUSION

KUMAR *et al.* (1980) reported unilacunar node in various tribes of the Scrophulariaceae. Our study on nodal and petiolar organization of the various tribes of Solanaceae shows a uniformly unilacunar node at vegetative shoot portion. This feature is useful from a phylogenetic and systematic point of view. In some species, the unilacunar vascular strand of nodal organization splits in petiolar region into one main trace and two side small traces (e. g. *S. nigrum* and *S. tuberosum*). In *Capsicum annum* the vascular strand divides into two but in *S. melongena* the vascular strand splits into three main traces and two small, side traces. This indicates that the uni-to multi-lacunar condition at the petiolar region has originated in the petiole of the lamina from the unilacunar one-stranded node.

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