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FLORAL ANATOMY OF *PITTOSPORUM*[1]

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ABSTRACT

The floral anatomy of four species of *Pittosporum* viz. *P. bicolor* Hook., *P. cornifolium* A. Cunn., *P. crassifolium* Soland and *P. eugenioides* A. Cunn. has been studied. The sepals are 3-traced. The petals are 1-traced in *P. bicolor* and *P. eugenioides* and 3-traced in the rest; in the latter there is adnation between the sepal midribs and petal lateral traces. The stamens are 1-traced and carpels are 3-traced. The adnation between traces of different floral parts has preceded their external fusion. Judging from the position of the ventral bundles, the placentation is interpreted as parietal or anatomically parietal. The basal peripheral portion of the ovary, which simulates the disc is devoid of any vasculature.

INTRODUCTION

The floral anatomy of Pittosporaceae is little known except for the work of Saunders (1939) and more recent work of Schaeppi (1971), Narayana and Radhakrishnaiah (1976, 1978, 1979, 1980, 1981) and Radhakrishnaiah and Narayana (1977, 1978). The present paper deals with the floral anatomy of four species of *Pittosporum* viz. *P. bicolor* Hook., *P. cornifolium* A. Cunn., *P. crassifoloium* Soland, and *P. eugenioides* A. Cunn.

MATERIAL AND METHODS

The material was fixed in F. A. A. Customary procedures of dehydration, infiltration, and embedding were followed. Serial microtome sections cut at a thickness of 8-10 µm, were stained using crystal violet and erythrosin combination.

OBSERVATIONS

Flower :

The flower is pentamerous (except the gynoecium) tetracyclic and hypogynous (Fig. 1). However, tetramery in the calyx of *P. bicolor* and hexamery in the corolla of *P. cornifolium* (Figs. 22, 23) have been noticed in some flowers. There is slight basal connation of perianth parts in different species (Figs. 5, 21). The bi-or tri-carpellary syncarpous gynoecium is chambered at the base and unilocular towards the apex (Figs. 7, 8, 14, 22, 23, 27, 28, 33, 34).

Floral anatomy : In *P. crassifolium* amd *P. eugenioides* five sepal traces, as they emerge out trifurcate demarcating the midrib and the lateral traces (Figs. 24, 25, 29, 30). In *P. bicolor* (tetramerous flowers) for two of the four sepals, the lateral traces arise conjointly with

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the the midrib and for the remaining two, one lateral trace arises conjointly with the midrib, while the other arises independently (Figs. 2, 3). In *P. bicolor* (pentamerous flowers) for one sepal two lateral traces arise conjointly with the midrib; for two sepals they arise independently, and for the remaining two sepals one lateral trace arises conjointly with the midrib while the other arises independently (Fig. 10). In *P. cornifolium*, for three sepals, the midrib and lateral traces arise independently, for the fourth sepal both the laterals arise conjointly with the midrib and for the fifth sepal one lateral trace arises conjointly with the midrib, while the other arises independently (Figs. 15-17).

In *P. cornifoloium* and *P. crassifolloium* the sepal traces as they emerge out undergo tangential division and the bundles thus cut off towrds innerside divide radially to demarcate the lateral traces of adjacent petals (Figs. 15-17, 25).

After the demarcation of the sepal traces the main stele organises into a ring of ten or eleven bundles in *P bicolor*, *P. crassifolium* and *P. cornifolium* and these give off branches towards inside (Figs. 3, 11, 16, 17, 24). In *P eugenioides* five sepal traces and five petal traces arise in close succession and the latter give off branches as they emerge out (Figs. 31, 32). In all the taxa, the branches thus given off to the centre finally resolve into two or three pairs of ventral bundles (Figs. 3-7, 11-14, 16-22, 24-27, 33).

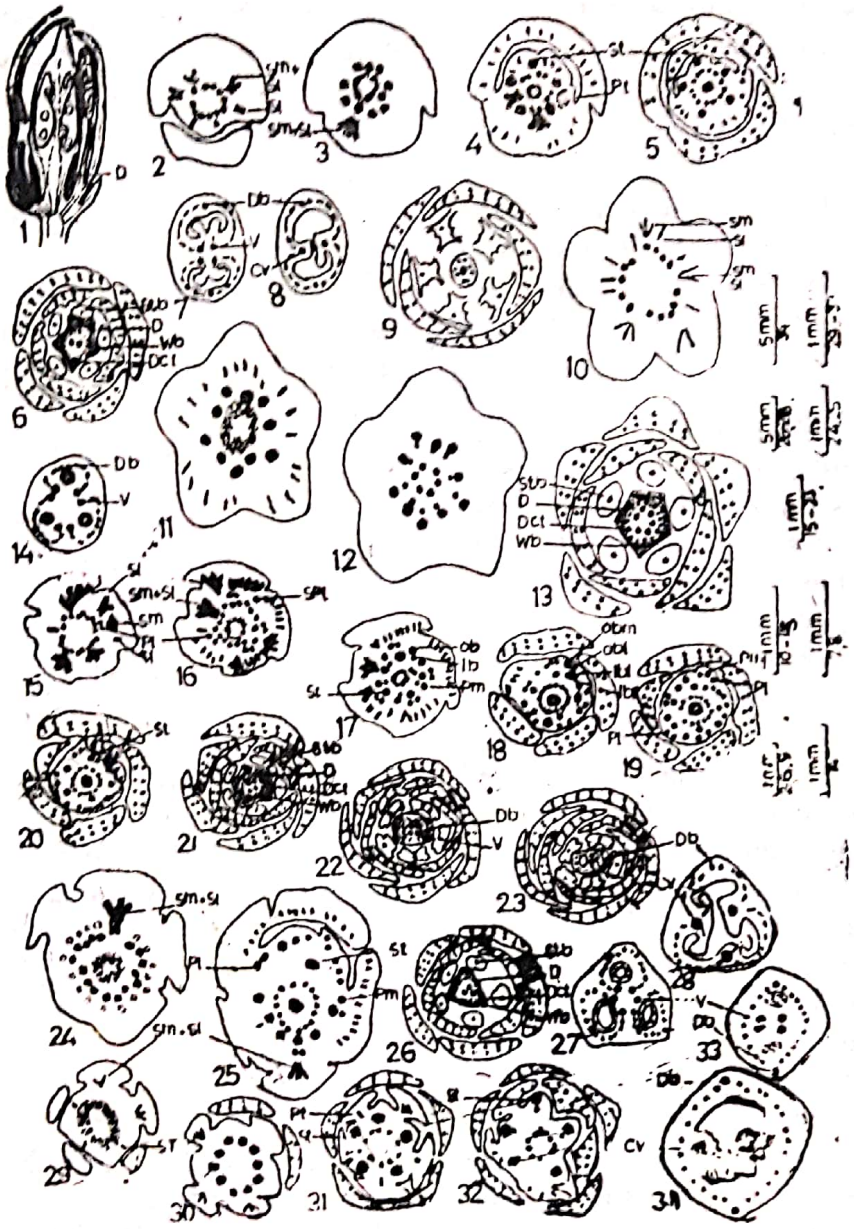
Five of the bundles of the main stele on the sepal radii funtion as staminal traces and the alternating five as petal trace in *P. bicolor* and *P. crassifoloium* (Figs. 4, 5, 12, 25).

The ovary wall supply is organised by the branches given off by emerging petal and staminal traces in *P. crassifolium* (Figs. 25, 26); from staminal traces alone in *P. eugenioides* (Figs. 32, 33); by the petal traces in tetramerous flowers of *P. bicolor* (Figs, 4, 5); five of the six petal traces in *P. cornifolium* (Figs. 17, 18) and stelar bundles in pentamerous flowers of *P. bicolor* (Figs. 12, 13). At about the level of separation of stamens the dorsal bundles become distinguishable from among the bundles that supply the ovary wall (Figs. 6, 13, 21, 26, 33). They undergo radial splitting at a higher level.

In *P. cornifolium*, where there is hexamerous corolla, the behaviour of the fifth and the sixth petal traces is noteworthy. The trace for the sixth petal divides tangentially and the inner of the two bundles again divides tangentially. Of the two bundles thus formed as a result of second division, the outer functions of the second lateral trace of the fifth petal (the first lateral trace of it arises conjointly with the sepal midrib), while the inner one enters a staminal filament. The outer bundle formed as a result of the first tangential division, divides radially forming a midrib and a lateral trace of ths sixth petal (Figs. 16-22). The other lateral trace of the sixth petal arises conjointly with the lateral trace of the adjacent petal.

The stamens are single traced. However in *P. cornifolium* one of the five stamens receives an additional vascular supply derived from a petal trace (21, 22).

The ovary is chambered at the base and unilocular above. There is heterocarpellary pairing of ventral bundles followed by their fusion in the different regions of the ovary (Figs. 7, 8, 14, 22, 23, 27, 28, 33, 34). These give off ovular traces and also branches into the



Figs. 1-9. *Pittocporum bicolor* (tetramerous flowers). Figs. 10-14. *P. bicolor* (pentamerous flowers). Figs. 15-23. *P. cornifoloium*. Figs. 24-28. *P. crassifolium*. Figs. 29-34. *P. eugenioides*.

Fig. 1. Diagramatic longitudinal section flower showing the course of vascular bundles in different floral parts. Figs. 2-34. Serial transverse sections of the flower buds showing the origin and distribution of traces to the different floral parts.

ABBREVIATIONS Cv=Common ventral bundles. D="Disc". Db=Dorsal bundle. Dct=Dorsal carpellary trace. ib=inner bundle. ibl=lateral trace of the fifth petal. ibs=Trace for the 'sixth' stamen. Ob=outder bundle. Obl=petal lateral trace of the sixth petal. Obm=petal midrib trace of the sixth petal. pl=petal lateral trace. pm=petal midrib trace. Sl=xsepal lateral trace. Sm=sepal midrib trace. Sm+sl=sepal midrib trade and sepal lateral trace. Spt=petal trace for the sixth petal. St=staminal trace. ST=Sepal trace. St. b=staminal bundle. V=ventral bundle. Wb=Wall bundle.

wall of the ovary (Figs. 7, 8, 14, 22, 23, 27, 28, 36). The common ventral bundles undergo splitting in the style. The style is vascularised by the dorsal bundles. the ventral bundles in *P. bicolor* (Fig. 9) and also by a few branches of the latter in the rest.

The basal peripheral portion of the ovary is glandular with deep staining cells and vacuolated cytoplasm. This region is devoid of vasculature (Figs. 6, 13, 21, 26).

DISCUSSION

The apparently simple flowers of *Pittosporum* exhibit diversity in the origin and distribution of traces to the calyx and gynoecium.

The sepals are three traced. In the organisation of the sepal traces, *P. bicolor* and *P. cornifolium* are similar to *P. floribundum* (Radhakrishnaiah and Narayana, 1977). It may be pointed out that in these taxa connation of sepal traces is not completely stabilized. In the conjoint origin of sepal median and lateral traces, *P. crassifolium,* and *P. eugenioides* resemble certain other taxa of the family reported earlier (Narayana and Radhakrishnaiah, 1976, 1978, 1980).

The petals and stamens are single traced. However, the former in *P. cornifolium* and *P. crassifoloium* are three traced with adnation between petal midrib and sepal lateral traces. This indicates that the fusion between perianther traces has preceded their external fusion.

The carpels are three-traced. The organisation of gynoecial vasculature shows interesting variations. It is organised from the branches given off towards the centre by the bundles in the thalamus and by those given off by the emerging petal and staminal traces, in pentamerous flowers of *P. bicolor* and *P. eugenioides* respectively; It is organised partly from the stelar bundles and partly from the emerging petal (*P. cornifolium* and tetramerous flowers of *P. bicolor*) or petal and staminal traces in *P. crassifolium*. All these situations are reported earlier in different taxa of the family. (Narayana and Radhakrishnaiah, 1976, 1978, 1979, 1980, 1981).

There is thus anatomical evidence of adnation between traces supplying the gynoecium, petals and stamens though there is no external fusion of parts. It may also be pointed out that there is a tendency towards epigyny in the family and that adnation of traces has preceded the fusion of floral parts.

Judging from the position of the ventral bundles the placentation can be interpreted as anatomically parietal in *P. bicolor* (tetramerous flowers) and parietal in the rest. This is consistant with Puri's (1952) interpretation.

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