The floral anatomy of *Trichopus zeylanicus* Gaertn.

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Abstract. The floral anatomy of *Trichopus zeylanicus* Gaertn. is described in detail. The inferior ovary is considered to be an appendicular structure. The union of the filaments with the style to develop a short column and the vascular supply to the tepals are considered as important features in support of the separate treatment of *Trichopus*. Both the perianth whorls are anatomically similar and are best described as tepals.

Keywords. Floral anatomy; *Trichopus zeylanicus*.

1. Introduction

Evidence from vegetative anatomy (Ayensu 1966, 1972) and cytology (Ramachandran 1968) has been brought forth to suggest the separation of the genus *Trichopus* Gaertn. from the Dioscoreaceae and its treatment as a distinct family, the Trichopodaceae. The present paper is an attempt to find out features of floral morphology and anatomy of the genus which are of taxonomic importance.

2. Materials and methods

The flowering material was collected from the campus of Kerala University and fixed in FAA. Serial transverse sections of the paraffin-embedded material (7μ to 12μ thick) were stained in crystal violet using erythrosin as a counter stain.

3. Observations

The pedicel contains a ring of six vascular bundles (figure 1). These bundles increase in size, become interconnected and develop a ring of vascular tissue (figure 2). Six compound cords emerge out from this ring (figure 2). Three of them, in the posterior and antero-lateral positions, are the P-IS bundles (perianth and inner staminal strands), while the alternating three, in the postero-lateral and anterior positions, represent the P-OS-D (perianth, outer staminal, and the carpellary dorsal bundles) bundles (figures 3-4). The remaining vascular tissue resolves into the six carpellary ventrals.
Figures 1-10. Serial transactions of the flower from the base upwards (details in text). A-Cr- anther crest; D-carpellary dorsal; N-nectary; OS- outer staminal strand; P-IS- perianth-cum-inner staminal bundle; P-OS-D- perianth-cum-outer staminal-cum-carpellary dorsal bundle; PL- placental bundle; SC-stylar canal; STT-staminal strand.
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The ovary is inferior. It is trilocular at its base (figure 4). The ovules are arranged in a single row in each loculus (figures 4-5) and are two per carpel. The carpellary ventrals of adjacent carpels are lodged at the inner ends of the septa and these bear traces to the ovules of adjacent carpels (figure 5). Upwards, the ovary becomes unilocular (figure 5). The ovarian loculus is continued into the style as a triradiate stylar canal (figures 6-8) which is lined with transmitting tissue. The carpellary ventrals continue up to the top of the ovary (figures 6-7). The nectaries in this plant are represented by three glandular clefts developed at the base of the style (figure 8) and, in position, are comparable with septal glands. They open higher up in the style splitting it into three segments (figures 9-10).

The carpellary dorsals separate out first from the compound cords followed quickly by the six staminal strands (figure 7). The perianth strands increase in size and merge laterally and branch into the perianth members thus:

(i) six median bundles of the perianth members
(ii) two bundles each on either side of the median bundles extending into a perianth member, and
(iii) a bundle which bifurcates and extends into the margins of adjacent perianth members (figure 7).

Thus, each perianth member receives five bundles. The end traces may divide once to increase the number of bundles to seven (figure 8). The sepals and the petals are sub-equal and are shortly united at the base.

The filaments are short and adnate to the top of the ovary and the base of the style (figure 8). The staminal strands extend outwards unbranched into the filaments and the connective (figures 8-9). The connective is produced above the level of the anther as a short non-vascular crest (figure 10). The anthers are latrorse-intorse and two-celled (figures 8-9). The stamens are of the same length.

The carpellary dorsals extend unbranched into the style and end just beneath the bifid stigmatic lobes (figures 9-10).

4. Discussion

Vascular anatomy of the flower presents features of morphological and taxonomic significance. The outer floral whorls are adnate to the ovary up to its tip as revealed by the fusion of the strands of different floral whorls forming compound cords traversing the inferior ovary wall. The present authors, therefore, regard the inferior ovary as appendicular in nature.

The stamens are described generally as inserted on the perianth (Hooker 1894; Hutchinson 1959; Rao 1955). The present study demonstrates that the filaments are united with the base of the style and together form a short column. Lindley (1832) appears to have noticed this first which prompted him to erroneously align Trichopus with Aristolochia and Asarum (cf. Ayensu 1972). A more prominent column is observed in the Apostasiaceae (Rao 1969) and an extreme development of the same occurs in the orchids (Swamy 1948). That it occurs in the present genus is significant as will be seen later.

In the tribe Aloinae of Liliaceae adnation of the stamens with the ovary is very much marked and involves fusion of even all the filaments with the ovary and of
some with the style as well (Markandeya 1978; Vaikos 1974; Vaikos and Markandeya 1976). It is significant that the trend towards development of a column is initiated in the primitive lilies thought to be the antecedents of many petaloid monocoty-
ledonous taxa.

The origin of the vascular supply to the two perianth whorls is similar and each of them receives five strands. Anatomically both the whorls are alike. They are better described as tepals.

Although septal nectaries are described as present in Dioscoreaceae (cf. Cronquist 1968), observations by the present writers on the species of Dioscorea, Tamus and the present plant reveal that they are not of the typical type in that they are not located within the septa. Glandular clefts are developed at the top of the ovary or the base of the style. The latter condition is observed in the present plant. The glandular clefts continue into the style for some length and then open to split it into three segments.

4.1. Taxonomic position

The genus Trichopus is included in Dioscoreaceae by Bentham and Hooker (1883). Knuth (1930) treats it under the tribe Stenomerideae of Dioscoreaceae, while Burkill (1960) considers it under Para-dioscoreeae. Hutchinson (1959) separates the genus from Dioscoreaceae and along with Avetra erects a new family, the Trichopodaceae.

Ayensu (1966, 1972), from anatomical evidence, considers that Trichopus is best treated distinct from the dioseoreas and as a unigeneric family, the Trichopodaceae. Ramachandran (1968) agrees with the separation of Trichopus from Dioscoreaceae in the light of cytological evidence; in Dioscorea, n = 10, while in Trichopus, n = 14.

The presence of a column distinguishes Trichopus from Dioscoreaceae. The number of perianth traces is yet another feature of taxonomic distinction; Dioscorea and Tamus have one-traced tepals, while Trichopus has them five-traced. The present authors support the separate treatment given to the genus.

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*Original not seen*