

Zeitschrift: Candollea : journal international de botanique systématique = international journal of systematic botany

Herausgeber: Conservatoire et Jardin botaniques de la Ville de Genève

Band: 18 (1962-1963)

Artikel: Notulae morphologicae : I. The floral vascular supply in Linum usitatissimum L.

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DOI: <https://doi.org/10.5169/seals-880371>

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Notulae morphologicae

I. The floral vascular supply in *Linum usitatissimum* L.

by

C. E. B. BONNER and Mrs. Y. K. DANG

The genus *Linum* is the largest of those included in the family Linaceae and is composed of some 90 species (RENDLE 1925). The flowers are regular and pentamerous with a quincuncial calyx followed by a whorl of alternating petals, which are imbricate and twisted in the bud. The filaments of the stamens are united at the base to form a ring on the outside of which are nectar-secreting glands. Five fertile stamens are opposite the sepals whilst five teeth, which can be regarded as staminodes are situated opposite the petals. The ovary is composed of five antepetalous carpels. It becomes ten chambered in the lower half, however, due to the ingrowth of a false septum from the dorsal suture of each carpel.

The Linaceae are members of the Geraniales and have particular affinity to the Geraniaceae and the Oxalidaceae. HUTCHINSON (1959) however places the Linaceae in the Malpighiales, situated between the Malvales and the Euphorbiales of his division Lignosae. The Geraniales being placed in his Herbaceae.

Materials and Methods.

Fresh material, cultivated in the botanic gardens of Geneva were used for this study.

The flowers were immersed in chloral-lactophenol containing a few drops Gentian violet and hydrochloric acid (see VAUTIER 1949). The material was ready for examination under a binocular dissecting microscope seven days later.

Description.

The floral vascular supply of *Linum usitatissimum* L. is fairly straightforward. The pedicel contains five vascular cords each of which divides at

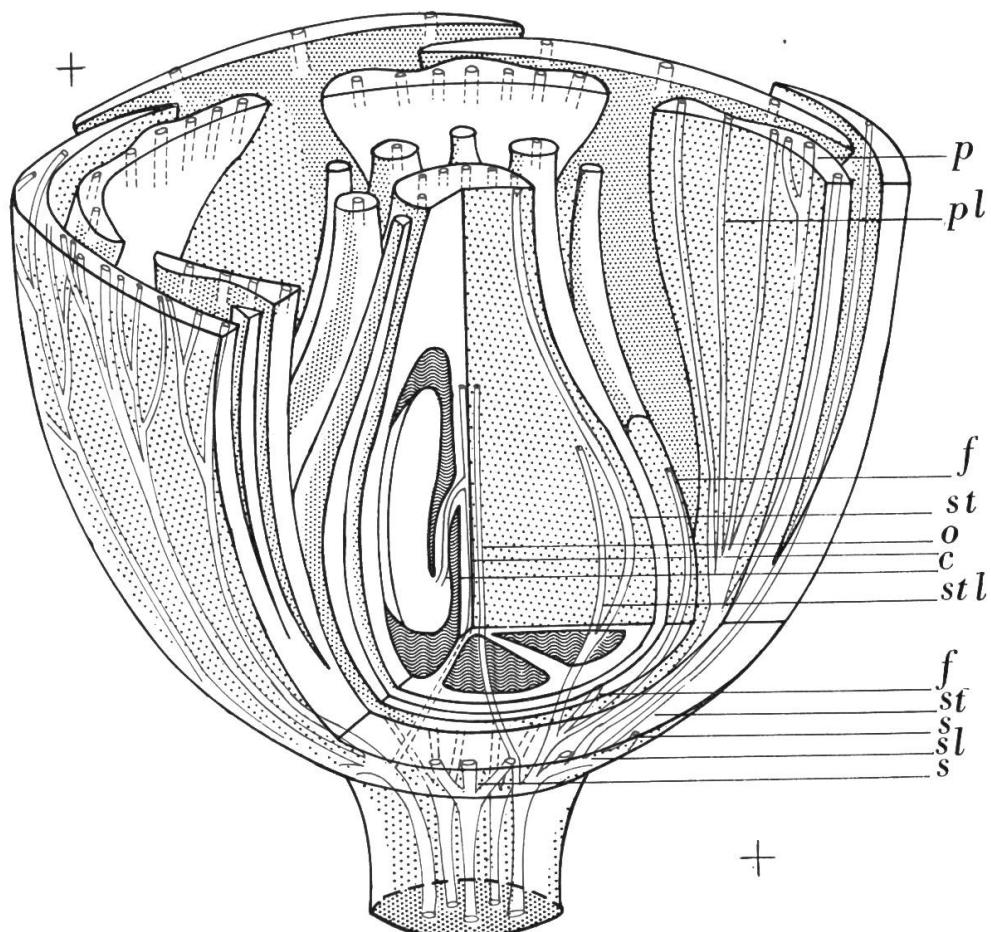


FIG. 64. — Reconstruction of a flower of *Linum usitatissimum* L. cut to display the floral vascular supply.

the base of the flower to form five equivalent vascular series. Each vascular cord in the pedicel divides as follows:

1. A first branch towards the exterior which almost immediately splits into three. The central branch becomes a sepal midrib (*s*) whilst the other two form the sepal laterals (*sl*), a small branch leaves each lateral to join a similar one from the neighbouring system. A complete ring is thus formed at the base of the whorl of sepals. At the point of junction of each pair of these branches arise two thin strands which become the marginals of neighbouring sepals.
2. A second branch to the exterior, and for a short distance adnate to the first, divides fan-wise to form midrib (*p*) and lateral (*pl*) to the petals.
3. A small pair of strands (*f*) arise next, going each to a stamen or a staminode. The latter remain short and do not go much above the ring formed by the fused bases of the filaments.

4. A pair of strands, the innermost of each series, one of which remains in the ovary wall becoming the carpel midrib (*st*) opposite the false septum. The other is the placental strand (*o*) which gives off branches (*c*) to the funicles of the ovules and dies out before reaching the base of the style. The former remains in the ovary wall and eventually runs up to the stigma. At the base of the ovary a small trace (*stl*) leaves this strand and ascends the ovary within the tissues of the false septum. Lateral strands are also formed from the base of the midrib strands.

From the general picture of the floral vascular system the following comments can be made:

- a)* The flower is truly pentamerous with a perfectly regular vascular supply.
- b)* The perianth is composed of two independent whorls, a calyx and a corolla. There are no commisurals between petals and sepals.
- c)* The staminodes are genuine sterile stamens equipped with a reduced vascular supply and not "non vascular" (SAUNDERS 1937: 77), corresponding to that of their fertile neighbours.
- d)* The gynecium is of some interest as it presents a maximum of reduction relative to the other floral whorls. The overall picture of the ovary wall, with ten main strands (5 midribs and 5 laterals) plus the small strands in the base of each false septum might suggest the presence of a vestigial inner whorl of carpels. The "laterals" being in reality their reduced midrib strands whilst the small traces in the false septa might represent the vestigial marginals the false septa being all that is left of the *laminae* of the carpillary leaf. As regards the vascular supply, the combined effects of adnation & fusion of their own system to those of the outer whorl of fertile carpels combined with the probable reduction of the degree of development of their own vascularisation, would cause them to be almost indistinguishable as separate morphological entities. This cannot be put forward as more than a vague hypothesis at this stage, to be born in mind when more extensive work is undertaken on the family.

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