

CONSIDERAÇÕES SOBRE AS CARACTERÍSTICAS MORFOLÓGICAS E
FILOGENÉTICAS DO CORMO DE *TRIMEZIA* (IRIDACEAE)

CONSIDERATIONS ON MORPHOLOGICAL AND PHYLOGENETIC
CHARACTERISTICS OF THE CORM OF *TRIMEZIA* (IRIDACEAE)

Ione A. Chueiri-Chiaretto⁽¹⁾ e Nanuza Luiza de Menezes⁽²⁾

SUMMARY - A morphological study of the underground system of *Trimezia* suggests the condition of a primitive corm.

RESUMO - É feito um estudo morfológico do sistema subterrâneo de *Trimezia* propondo-se, para esse órgão, a condição de cormo primitivo.

INTRODUCTION

The majority of the species of the family Iridaceae are perennial or annual herbs with a subterranean stem system of the cormous type, although some species have rhizomes woody aerial stems (Marloth 1975, Hutchinson 1973). According to Brook (1965), corms are considered specialized types of short rhizomes which develop vertically.

Lewis (1954), in her study of stems of South African representatives of the family verified the existence of morphological variations and considered some stems to be intermediate between corm and rhizome in the following genera: *Bobartia*, *Pillansia*, *Dierama*, *Ferraria* and *Hesperantha*. Of these, she cited *Bobartia* as the genus which presented the most primitive stem characteristic, and considered it to be a vertically-growing rhizome. In discussing the cause of this evolutionary process she noted that the genera with rhizomes possess perennial species growing in humid habitats, while the cormous genera possess annual species growing in arid regions. She thus supposed this evolutionary divergence to be related to climatic conditions. Lewis (l.c.), also noted that there had been few comparative studies of corms made in a taxonomic context and emphasized the importance of the correlation between morphological and floral characters in understanding relationships between tribes and genera.

Hutchinson (1973) made similar comments, suggesting that the bulb is the most highly evolved stem system in the Liliaceae and Amaryllidaceae, and the corm in the Iridaceae. According to Hutchinson the evolution of the corm has enabled the Iridaceae to colonize the more arid regions of the world, as in South Africa, where the majority of the native monocots have corms or bulbs.

- 1) Depto. de Ciências Biológicas e Tecnologia, Fundação Faculdade de Agronomia Luiz Meneghel - CP 261, 86360 Bandeirantes.
- 2) Depto. de Botânica, Instituto de Biociências, Universidade de São Paulo - CP 11461, 05421 São Paulo.

Morphological observation of various genera of Iridaceae have also been presented by Marloth (1915) in his studies of the flora of southern Africa. According to this author the tunics (cataphylls) are foliar structures showing variations of colour, consistency, size and disposition among the various species. According to Foster (1941), the arrangement of the tunics is a good taxonomic character. Thus in the genus *Geissorhiza* species may be distinguished according to whether the tunics are concentrically or imbricately arranged. Lewis (1954), corroborating this, noted that these tunics may be absent as in corms of *Pillansia* and *Ferraria*, but when present allow the recognition of genera or species from the characters of these organs alone.

A common feature associated with thickened subterranean systems is the presence of contractile roots. Various authors have noted the role of these roots in pulling the stem system deeper into the soil (Church 1919, Gravis 1926, Smith 1930, Thoday 1931, Pfeiffer 1931, Chan 1952, Chueiri 1977, Estelita-Teixeira 1978, Ruzin 1979, Wilson & Anderson 1979). The present study presents new observations concerning the characteristics of the subterranean system of species of *Trimezia*, native to the "campo rupestre" vegetation of the Serra do Cipó, Minas Gerais, Brazil.

MATERIAL

- Trimezia juncifolia* (Klatt) Benth. (leg. *Chueiri* 1, SPF 16.218).
T. lutea (Klatt) Fost. (leg. *Chueiri* 3, SPF 16.221).
T. speciosa Rav. (leg. *Chueiri* 2, SPF 16.219).
T. truncata Rav. (leg. *N. Menezes* 293, SPF 16.220).
T. aff. lutea (Klatt) Fost. (leg. *N. Menezes* s.n. SPF 16.222).

RESULTS

The species of the genus *Trimezia* are herbaceous (Figure 1), with cylindrical leaves and a thickened subterranean stem (Figures 1 - 7). This stem system is characterized by an elongated axis (Figure 2) surrounded by dry fibrous cataphylls (c) of a chestnut brown colour. The cataphylls have an equitant phyllotaxis (Figures 3 - 7), i.e. each is completely enclosed by the subsequent one.

The root system is adventitious (Figures 2 - 7, r). The roots emerge from the nodal region below the outermost cataphylls and their surfaces have the rugose appearance characteristic of contractile roots. Figure 2 shows the prolongation of the stem axis below the level of insertion of the roots, and above this can be seen the scars corresponding to the nodes. Figures 3 - 7 show the progressive elongation of this lower stem axis.

A more detailed analysis of this stem elongation demonstrates the progressive acropetal disintegration of the stem towards the region where the roots are inserted. The underground system maintains the same relative position relative to the soil surface through the different stages of its development as is shown in figures 3 - 7.

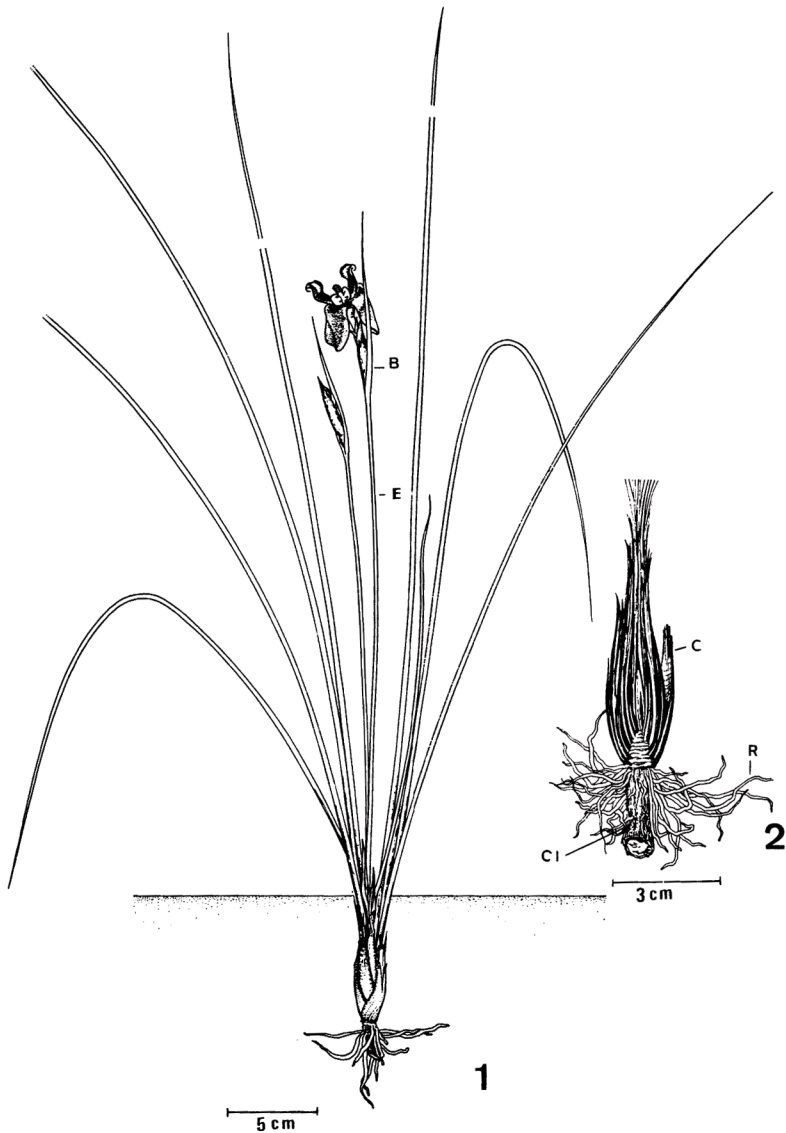


Fig. 1 and 2 - *Trimezia juncifolia*. Fig. 1 - General aspect. Fig. 2 - Underground system without some cataphylls. (B - bract; C - cataphyll; CI - inactive old stem; E - floral scape; R - adventitious root).

Fig. 1 e 2 - *Trimezia juncifolia*. Fig. 1 - Aspecto geral. Fig. 2 - Sistema subterrâneo do qual foram removidos alguns catáfilos. (B - bráctea; C - catáfilo; CI - porção velha e inativa do caule; E - escapo floral; R - raízes adventícias).

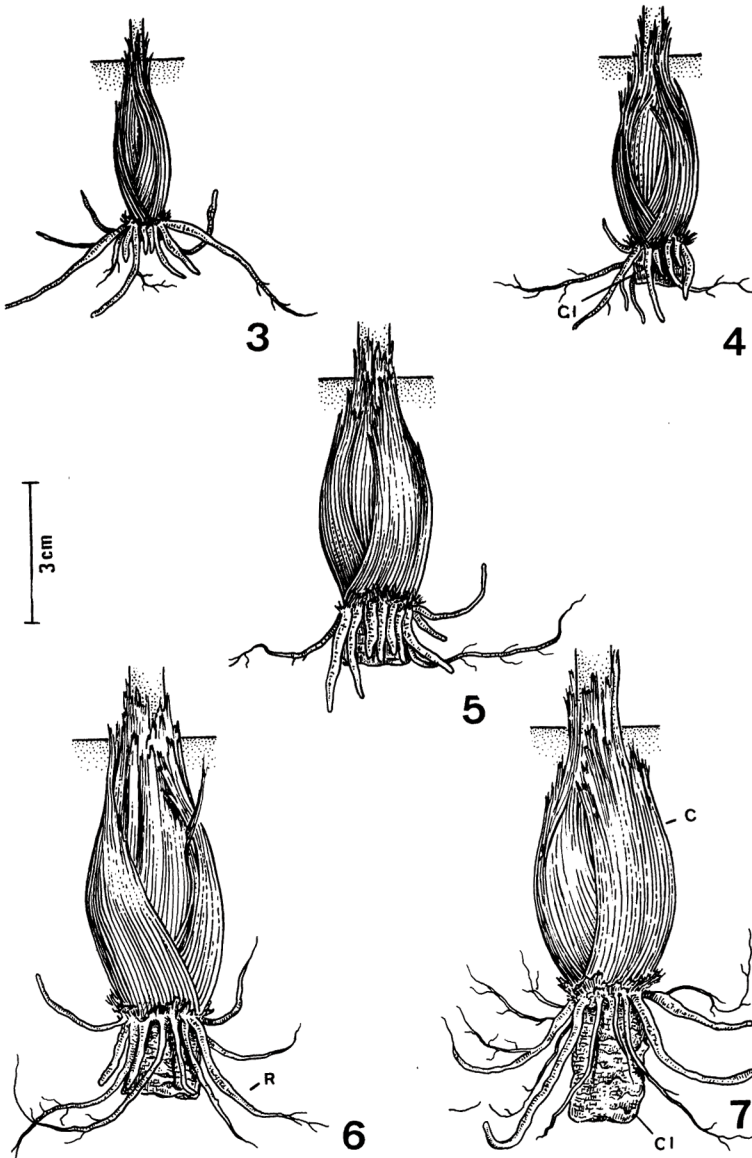


Fig. 3-7 - *Trimezia speciosa*. Successive stages of corm development. (C - cataphyll; CI - inactive old stem; R - adventitious root).

Fig. 3-7 - *Trimezia speciosa*. Fases sucessivas do desenvolvimento do cormo. (C - catáfilo; CI - porção velha e inativa do caule; R - raiz adventícea).

DISCUSSION

The presence of a prolongation of the stem axis below the level of root insertion was the feature that initially caught our attention. The presence of contractile roots suggests that the older parts of the stem axis are being gradually pulled deeper into the soil, thus allowing the leaves and apical meristem to maintain the same position relative to the soil surface.

Another important feature is the nature of the axial organ itself. The stem system of *Trimezia* may be viewed as either a rhizome which grows vertically or an elongated corm. Whatever terminology is adopted, it must be recognized that this structure is transitional between a rhizome and a corm in their typical forms,

A typical rhizome may be characterized as follows: a) it is a stem system characteristic of perennial herbs; b) it grows parallel to the soil surface, i.e. has horizontal growth; c) it continually forms new leaves; d) it forms roots at all or nearly all the nodes; e) it has continuous growth; f) it does not show morphological evidence of well-defined growth periods. A typical corm, on the other hand, is a) a stem system characteristic of annual herbs; b) it grows vertically; c) it exhibits periods without the formation of leaves or aerial organs; d) it forms roots only on the basal nodes; e) it exhibits growth by stages; f) shows clear morphological evidence of well-defined periods of growth (with a single organ).

The stem system of *Trimezia* can thus be seen to conflict with these characterizations, specifically in features b, c, d, e, in the case of rhizomes, and a, e, and f in the case of corms.

Marloth's (1915) and Lewis's (1954) description of *Bobartia* as having a highly evolved, vertically growing stem appears similar in many respects to the situation described here in *Trimezia*. We prefer, however, to regard the stem system of *Trimezia* as a rather primitive corm. During the dry season all the aerial parts of the plant in this genus disappear, the growth period beginning with the appearance of the leaves. Despite this quiescent period, however, there is no morphological evidence to demonstrate the delimitation of these growth periods.

Acknowledgement - The authors wish to thank Simon Mayo and Dr. P. Rudall for providing useful suggestions and the English translation.

REFERENCES

- BROOK, A.J. 1965. *The living plant*. Aldine Publishing Co., Chicago.
- CHAN, T-T. 1952. The development of the *Narcissus* plant. *Daffodil Tulip Yb.* 17: 72-100.
- CHUEIRI, I.A. 1977. *Estudos morfo-anatômicos de espécies de Tripezia Salisb. ex Herb. (Iridaceae), com especial referência ao sistema subterrâneo*. Dissertação de Mestrado, Instituto de Biociências, Universidade de São Paulo.
- CHURCH, M.B. 1919. The development and structure of the bulb in *Cooperia drumondii*. *Bull. Torrey bot. Club* 46: 337-362.
- ESTELITIA-TEIXEIRA, M.E. 1978. Desenvolvimento anatômico do sistema subterrâneo de *Oxalis latifolia* Kunth (Oxalidaceae) - II - Sistema radicular. *Bolm. Botânica, Univ. S. Paulo* 6: 27 - 38.
- FOSTER, R.C. 1941. I. Studies in the Iridaceae. II. A revision of *Geissorhiza* Ker-Gawl. *Contr. Gray Herb. Harv.* 135: 1-78.
- GRAVIS, A. 1926. Contribution a l'etude anatomique du raccourcissement des racines. *Bull. Acad. r. Belg. Cl. Sci.* 12: 48-62.
- HUTCHINSON, J. 1973. *The families of flowering plants*. Clarendon Press, Oxford.
- LEWIS, G.J. 1954. Some aspects of the morphology, phylogeny and taxonomy of the South African Iridaceae. *Ann. S. Afr. Mus.* 40: 15-113.
- MARLOTH, R. 1915. Iridaceae. *The flora of South Africa* 4: 131-161.
- PFEIFFER, N.E. 1931. A morphological study of *Gladiolus*. *Contr. Boyce Thomson Inst. Pl. Res.* 3: 173-195.
- RUZIN, S.E. 1979. Root contraction in *Freesia* (Iridaceae). *Am. J. Bot.* 66: 522-31.
- SMITH, F.H. 1930. The corm and contractile roots of *Brodiaea lactea*. *Am. J. Bot.* 17: 916-927.
- THODAY, D. 1931. Mechanism of root - contraction in *Brodiaea lactea*. *Pl. Physiol., Lancaster* 6: 721-725.
- WILSON, K. & ANDERSON, G.J.H. 1979. Further observations on root contraction. *Ann. Bot.* 43: 665-75.