

TILLANDSIA L. (BROMELIACEAE): ANATOMY AND ETHNO-PHARMACOLOGY

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Keywords: Argentina, medicinal plants, pampean province, pharmacognosy, *Tillandsia*

Abstract

This paper includes the study of *T. aëranthos* (Loisel) L.B. Sm., *T. bandensis* Baker, *T. recurvata* (L.) L., and *T. usneoides* (L.) L., used in popular medicine. These species are found in the east of Argentina, Uruguay and south of Rio Grande do Sul, Brazil. Common names, morphological and anatomical characteristics of the organs with medicinal properties, ethnobotany, illustration, and distribution are given for each species. On the basis of morphological and anatomical characters surveyed, a key to species of *Tillandsia* studied was elaborated. The key allows distinguishing the species in fragmented or entire samples.

1. Introduction

The genus *Tillandsia* comprises approximately 400 species distributed throughout the tropical, subtropical and temperate areas of the New World (Castellanos, 1945; Utley, 1994). In the Pampean province (Cabrera, 1976), five species are found (Cabrera, 1968), four of them used in popular medicine (Hieronymus, 1881; Matías González *et al.*, 1939; Martínez Crovetto, 1964, 1965; Toursarkissian, 1980; Mösbach, 1992; Velasco *et al.*, 1995). The purposes of this paper are: a) to study morphological and anatomical characteristics of roots, stems and leaves; b) to produce a key for identification of the species studied in fragmented or entire samples.

2. Materials and methods

Specimens of LP and LPAG herbaria (Holmgren *et al.*, 1990), and fresh material were studied. The morphological characters were examined with a Wild M8 stereoscopic microscope equipped with a camera lucid. Freehand transections of roots, stems and leaves, as well as epidermal peels were mounted in Prosen gum for a preliminary study. Later, they were stained with ethanol safranin (at 80%), and temporarily mounted in aqueous glycerine solution (at 90%). The anatomical characters were examined by means of a light microscope Leitz SM lux equipped with a camera lucid. Symbols are used in the drawings according to Metcalfe and Chalk (1950).

3. Results

3.1. Key to species of *Tillandsia* studied

1. Leaf sword-shaped (ensiform). Chlorenchyma with more than 12 vascular bundles. Trichomes (scales peltate) symmetrical.

1. *T. aëranthos*

1'. Leaf awl-shaped (subulate) or linear-shaped. Chlorenchyma with 10 vascular bundles. Trichomes (scales peltate) asymmetrical.

2 . Leaf awl-shaped. Leaf adaxial face hollow (concave). Chlorenchyma with 5-10 vascular bundles. Plants with root.

3 . Leaf adaxial face hollow (concave) with a central mound. Chlorenchyma with 5-10 vascular bundles. Root without ring of fibres. Endodermis inconspicuous. Stem with atactostele structure, without sclerenchymatous cells. Trichomes asymmetrical on the leaf sheath.

2. *T. bandensis*

3'. Leaf adaxial face hollow (concave) without a central mound. Chlorenchyma with 5 vascular bundles. Root with a ring of fibres in the cortex region. Endodermis with third Casparian thickening. Stem with sclerenchymatous cells as supporting tissue enclosing the vascular bundles. Trichomes asymmetrical never on the leaf sheath.

3. *T. recurvata*

2'. Leaf linear-shaped. Leaf adaxial face at level. Chlorenchyma with 3 vascular bundles. Plants without root.

4. *T. usneoides*

1. *Tillandsia aëranthos* (Loisel) L.B. Smith, *Lilloa* 9: 200. 1943. (Fig. 1)
"Clavel del aire"; "dâpiché nadagué"; "râpiché naragué" (tobas indigenous, Argentina); "kis(l)é aj-rakés"(vilelas indigenous, Argentina). Analeptic (CNS stimulant) according to Martínez Crovetto (1964); diuretic (Matías González *et al.*, 1939).

2. *Tillandsia bandensis* Baker, *Journ. Bot.* 25: 135. 1887. (Fig. 2)
"Clavel del aire"; "dâpiché nadagué"; "râpiché naragué" (tobas indigenous, Argentina); "kis(l)é aj-rakés"(vilelas indigenous, Argentina). Diuretic (Martínez Crovetto, 1964, 1965).

3. *Tillandsia recurvata* (L.) Linnaeus, *Sp. Pl.* ed. 2, 410. 1762. (Fig. 3)
"Clavel del aire". Cordial (psycho-stimulant) according to Toursarkissian (1980).

4. *Tillandsia usneoides* (L.) Linnaeus, *Sp. Pl.* ed. 2, 411. 1762. (Fig. 4)
"Barba de monte", "barba de tabaquilla", "barba de viejo"; "barba de velho"; "barba de pau" (Brazil); "Barbón", "peluca" (Chile); "cabello de ángel"; "graybeard", "spanish moss" (U.S.A.); "payún-mamëll" (mapuches indigenous, Argentina). Antihæmorrhoids, astringent, choleric (Hieronymus, 1882; Jacobs *et al.*, 1958; Burlage, 1968; Fong *et al.*, 1972; Smolenski *et al.*, 1973; Toursarkissian, 1980; Mösbach, 1992; Velasco *et al.*, 1995); hypoglycemic (Mc Laughlin, 1996).

4. Acknowledgments

We thank to Curators of the herbaria LP and LPAG. Thanks are also due to M.A. Migoya who prepared the figures and anonymous reviewers for useful comments. This work was supported by Programa de Incentivos. Decreto 2427/93, Secretaría de Políticas Universitarias del Ministerio de Educación, Argentina.

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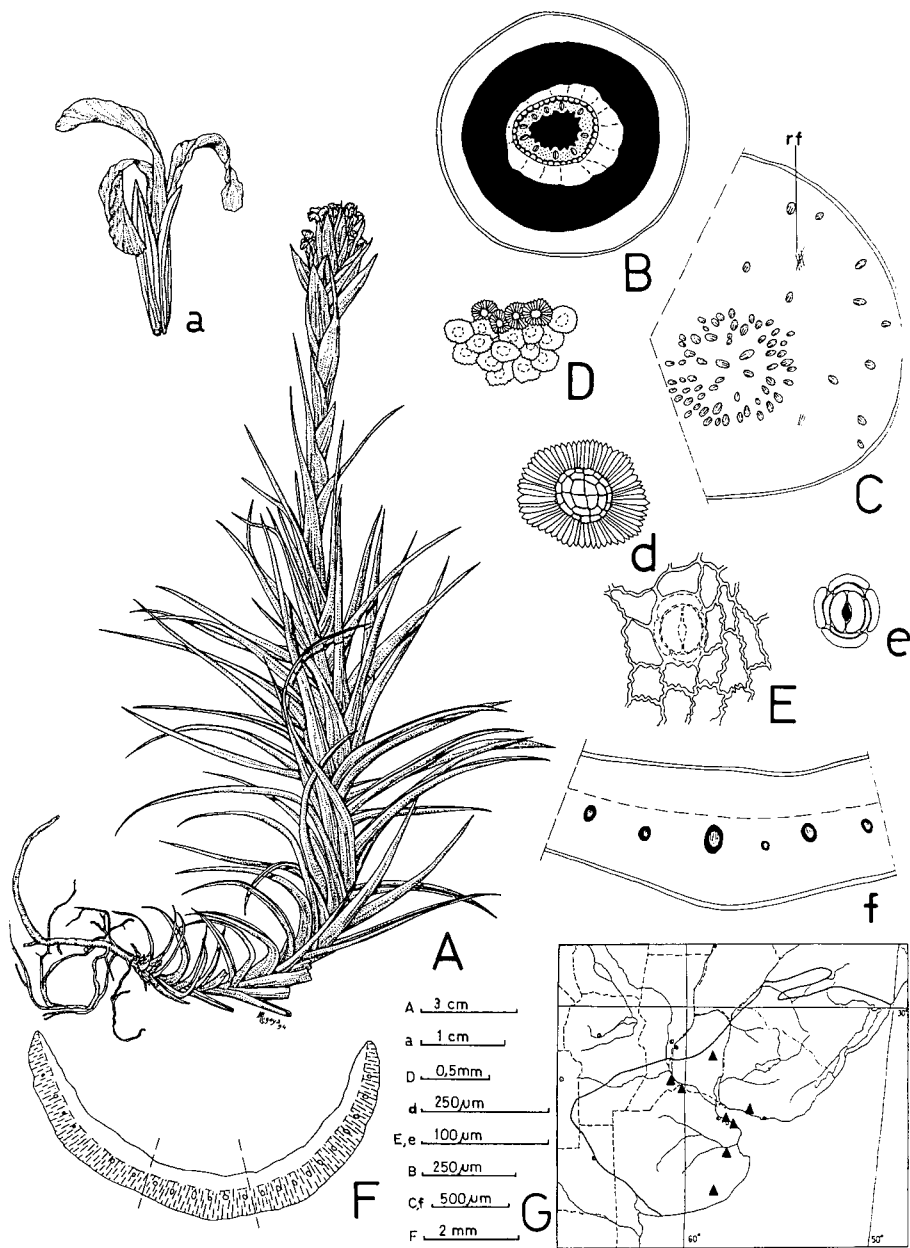


Figure 1 - *Tillandsia aëranthos* (Loisel) L. M. Sm. A: plant; a: flower; B: root transection; C: stem transection; rf: raphidios; D: indumentum; d: trichome, scales peltate in superficial view; E: epidermis abaxial; e: stomata; F: leaf blade transection; f: enlarged view of middle leaf blade transection; G: distribution (Cabrera 2358, LP; Cabrera y Fabris 17166, LP).

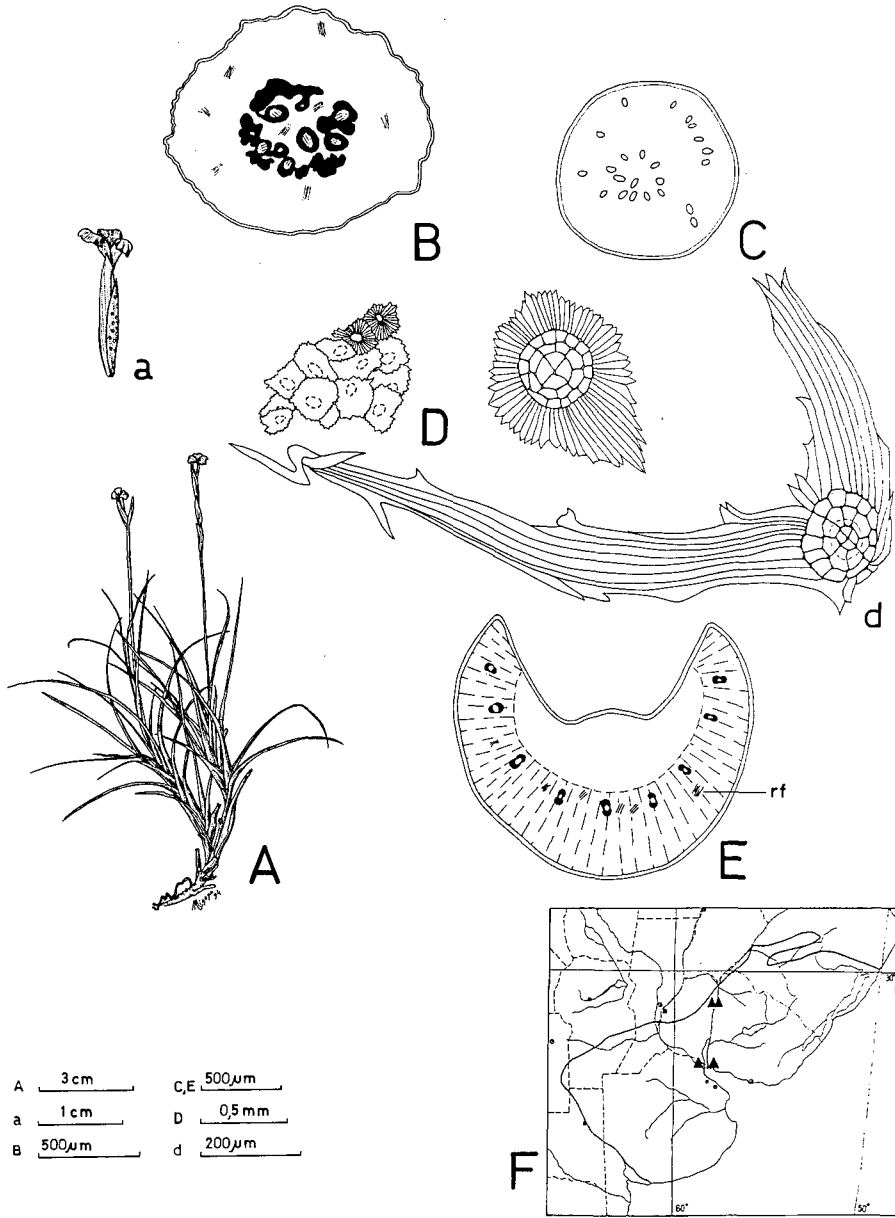


Figure 2 - *Tillandsia bandensis* Baker. A: plant; a: flower; B: root transection; C: stem transection; D: indumentum; d: trichomes scales peltate in superficial view; E: leaf blade transection; rf: raphidios; F: distribution (Cabrera 1634, LP; Krapovickas and Cristóbal 14545, LP)

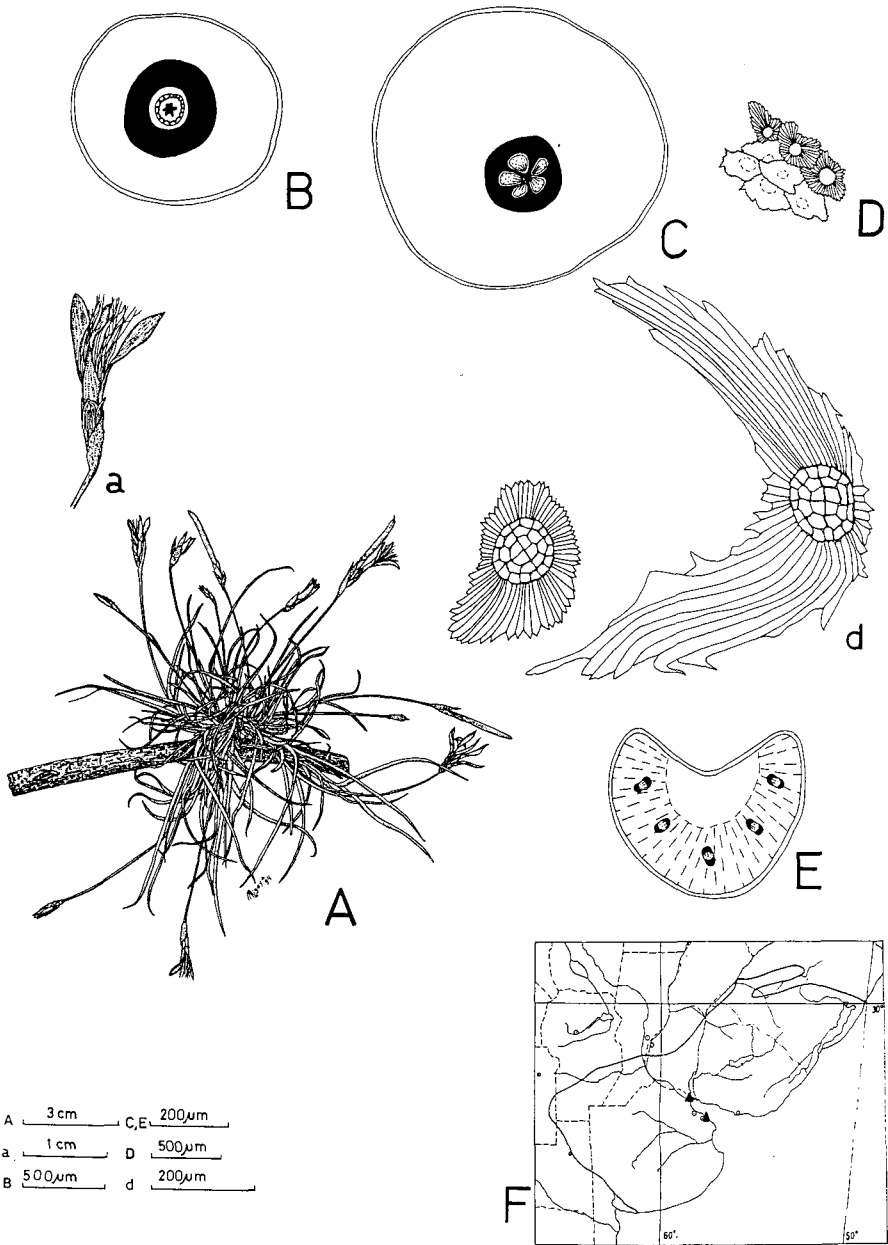


Figure 3 - *Tillandsia recurvata* (L.) L. A: plant; a: flower; B: root transection; C: stem transection; D: indumentum; d: trichomes scales peltate in superficial view; E: leaf blade transection; F: distribution (Cabrera 1612/2171, LP).

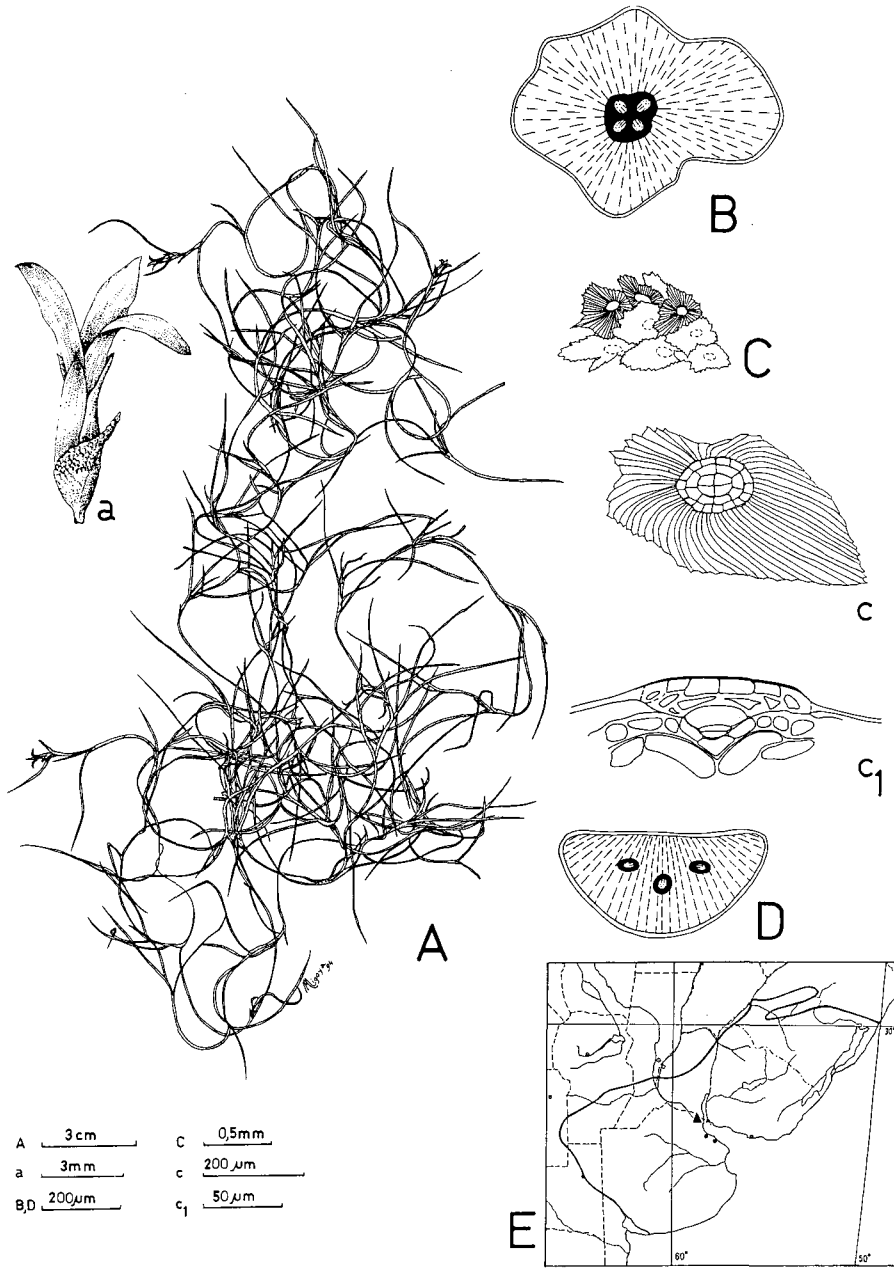


Figure 4 - *Tillandsia usneoides* (L.) L. A: plant; a: flower; B: stem transection; C: indumentum; c: trichome scales peltate in superficial view; c₁: trichome scales peltate in longisection; D: leaf blade transection; E: distribution (Bayón 250, LPAG; Cabrera 1635/7685, LP).