



Original Article

Foliar anatomy of *Viola maculata* growing in Parque Nacional Los Alerces, Chubut, Patagonia, Argentina



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ABSTRACT

Viola maculata Cav., Violaceae, grows in the underwood along the Los Andes mountain system from Neuquén to Tierra del Fuego and Islas Malvinas. It is also known as *violeta amarilla* or as *pilundeu*, and is used in popular medicine by the Mapuches as stimulant, in dermatology, and as a lavage in eye diseases. The aim of this work is to examine the morpho-anatomical traits of the leaves and petiole of *V. maculata* (collected at Parque Nacional Los Alerces, Patagonia, Argentina). Cross sections and scanning electron microscopy of leaves blade and petiole showed a simple organization with simple unicellular trichomes and cells containing tannins, and crystals of calcium oxalate mainly in the spongy parenchyma. As *V. maculata* is used in traditional medicine, the specification of the anatomical characters is relevant to describe the species.

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Introduction

Viola is the largest genus of the Violaceae family mostly constituted by shrubs or herbs. Some authors, based in a phylogeny-based revision of the genus, have suggested the worldwide existence of two subgenera and sixteen sections (Yousefi et al., 2012; Mehrvarz and Marcussen, 2013). Numerous anatomical studies have been published on the genus *Viola* (Metcalf and Chalk, 1950; Rubin and Paolillo, 1978; Akarsu, 1989; Dinç and Yildirimli, 2007). In Argentina, there are nineteen species of Violaceae, two of them exotic and naturalized (Mehrvarz and Marcussen, 2013). Among them *Viola maculata* Cav., commonly known as *pilundeu* or *violeta amarilla* or *oreja de ratón*, grows in the underwood along the Los Andes mountain system from Neuquén to Tierra del Fuego and Islas Malvinas. Cusato and Rossow (1991) have cited *V. maculata* as part of the native flora from Parque Nacional Lago Puelo. *V. maculata* is a perennial herb up to 3–25 cm, with rootstock and stolons, pubescent or hairless. Leaves are up to 6–65 × 3–55 mm, ovate or lanceolate, pubescent or hairless, crenate. Petioles are 0.5–20 cm long, in general pubescent. Stipules are serrate, 2–12 mm. Peduncle is 2–25 cm long, pubescent or hairless. Flowers are not fragrant. Sepals are ovate, narrowly triangular or lanceolate, 2–8 mm, pubescent, exceptionally hairless. Petals are yellow, occasionally with reddish or brownish lines, the lowest petal is

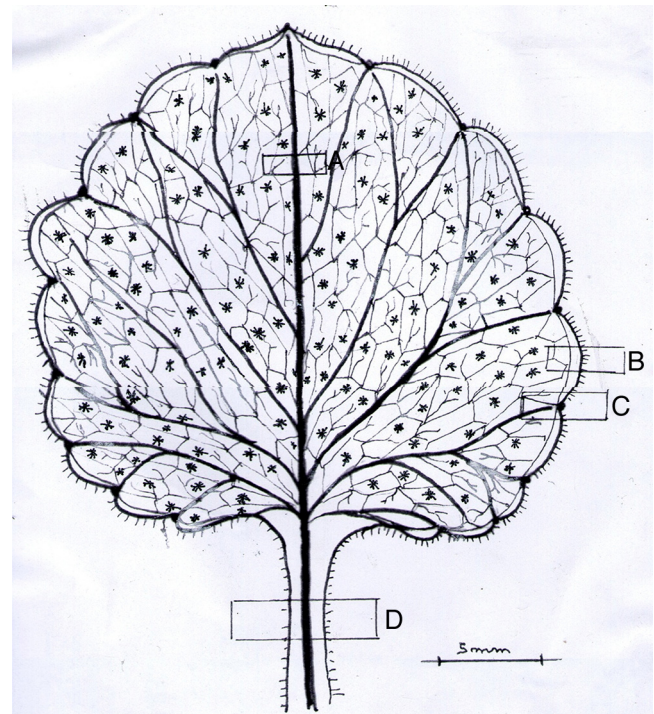


Fig. 1. Clarified leaf, surface view: A: central bundle; B: leaf margin; C: lateral bundle; D: petiole.

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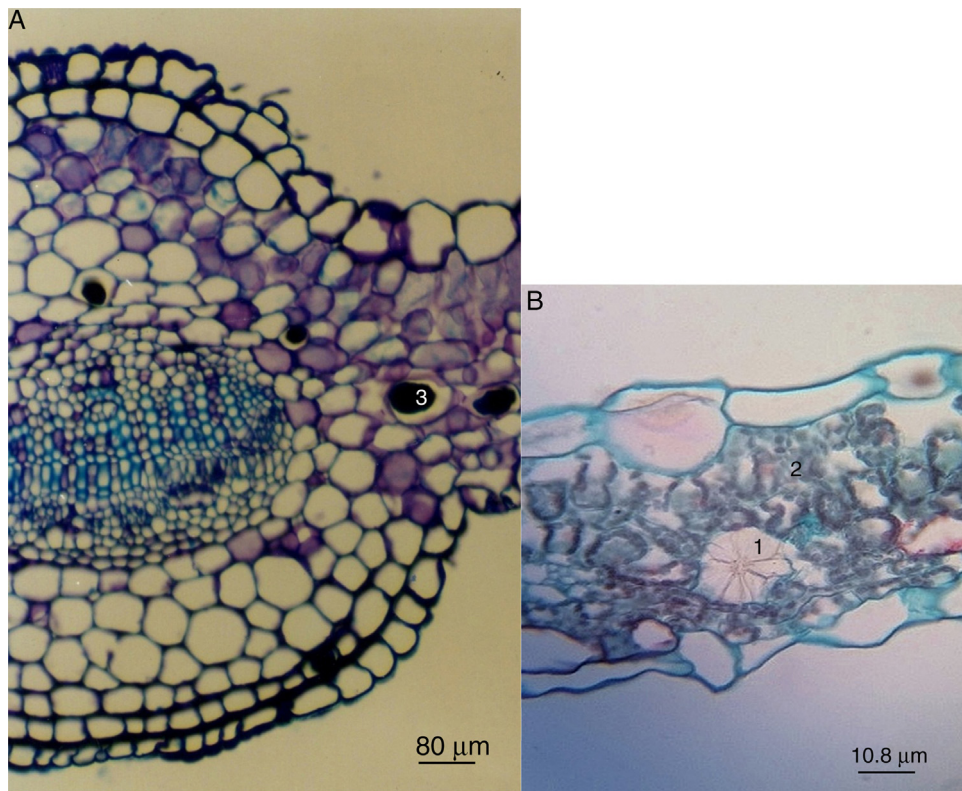


Fig. 2. (A) Cross section of *Viola maculata* Cav. leaf, central bundle with xylem, phloem and a parenchymatic bundle sheath surrounding them. (B) Cross section of leaf margin, detail showing calcium oxalate crystals (1), parenchyma with chloroplasts (2), and cells with tannins (3).

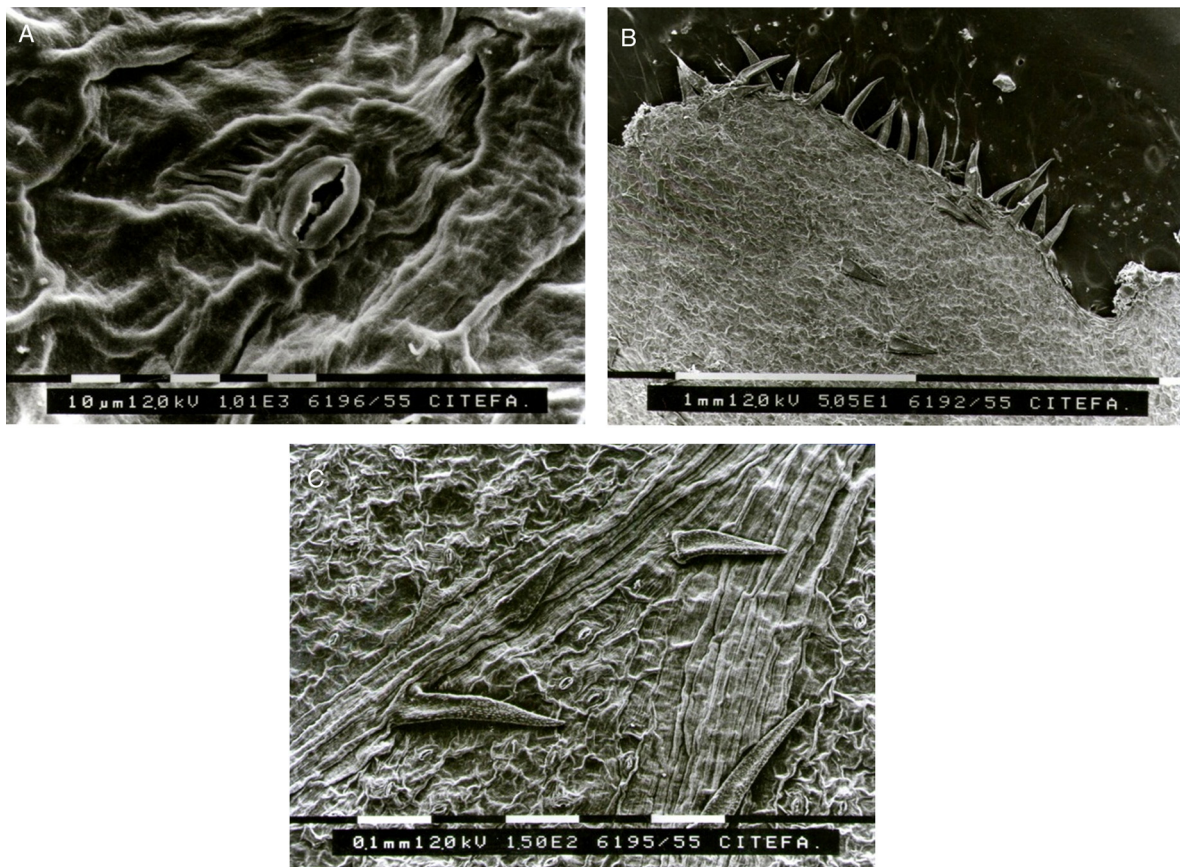


Fig. 3. Electronic scanning microscope: (A) stomata, (B) simple hair and stomata, and (C) simple hair in the leaf margin.

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