



Deciphering the Neotropical *Bignonia binata* species complex (Bignoniaceae)

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Abstract

Bignonia is a genus of 28 species of Neotropical lianas. Most species are clearly characterized by morphological features, monophyletic and narrowly distributed. However *Bignonia binata* is polymorphic, polyphyletic and broadly distributed, from Mexico to Argentina. A detailed morphological survey of *B. binata* in the light of geographical and ecological data in its current circumscription recovered two clearly distinct morphological groups of plants. One group is found in Argentina, Paraguay and the Atlantic forest of Brazil, and characterized by non-winged stems, usually terminal inflorescences, usually non-glandular calyces, pantoaperturate pollen, narrowly elliptic fruits, and 1-winged seeds. The second group occurs in Central America and Amazonia and is characterized by winged young stems, usually axillary inflorescences, glandular calyces, inaperturate pollen, widely elliptic to circular fruits, and wingless seeds. The first group of plants corresponds to *B. binata* and the second group is recognized as another species, *B. noterophila*. Synonyms, morphology, distributions, and ecology are detailed for these newly circumscribed species. Lectotypes are designated for *B. noterophila* and several synonyms: *Adenocalymma ocositense*, *Arrabidaea schumanniana*, and *Petastoma laurifolium*.

Keywords: Neotropical flora, Palynology, Species delimitation, Species complex

Introduction

Bignonia Linnaeus (1753: 622) is a monophyletic lineage that was recently re-circumscribed (Lohmann & Taylor 2014) to now also include nine previously accepted genera: *Clytostoma* Miers ex Bureau (1868: 353), *Cydista* Miers (1863: 191), *Macranthisiphon* Bureau ex Schumann (1894: 219), *Mussatia* Bureau ex Baillon (1891 [1888]: 32), *Osmhydrophora* Rodrigues (1891: 49), *Phryganocydia* Mart. ex Bureau (1872: 18), *Potamogonos* Sandwith (1937: 220), *Roentgenia* Urban (1916: 747) and *Saritaea* Dugand (1945: 262). Under the new circumscription, *Bignonia* is characterized by eight phloem wedges in the stems (easily seen in cross-section), usually 2-foliolate leaves with simple tendrils, and opaque seed wings (Lohmann & Taylor 2014). While most species of *Bignonia* are morphologically well defined and narrowly distributed, *B. binata* Thunberg (1821: 35) as it has been recognized is polymorphic and very broadly distributed, ranging from Mexico to northern Argentina (Gentry 2009).

Thunberg (1821) described *B. binata* based on a collection made by Freyreiss, from an unknown locality somewhere in southeastern Brazil. The identity of *B. binata* was not clear at that time and the name was seldom used. More than two decades later, de Candolle described *Bignonia noterophila* Mart. ex Candolle (1845: 148) based on a collection from Martius made in the flooded forests of Pará in northern Brazil. *Bignonia noterophila* was later transferred into *Clytostoma* by Bureau and Schumann (1896), who recognized a more widely distributed *Clytostoma noterophilum* (Mart. ex DC.) Bureau & Schumann (1896: 153) that ranged from French Guiana to Rio Grande do Sul, in southern Brazil. Their circumscription of *C. noterophilum* led to the recognition of a morphologically variable taxon that occupied many different habitats beyond just flooded forests. Sandwith (1937) later analyzed Thunberg's original collection of *B. binata* and realized that this was an earlier name for the plants included in *C. noterophilum*. He therefore published the combination *Clytostoma binatum* (Thunb.) Sandwith (1937: 231) and placed *B. noterophila*, *B. umbellulata* Candolle (1845: 148), and *B. purpurea* Lodd. ex Hooker (1869: t. 5800) as synonyms. Following the broad circumscription of Sandwith (1937), additional species were later also included within the circumscription of *B. binata* by subsequent workers (e.g., Gentry 1973; Macbride 1961; Standley & Williams 1974). More recently, *Clytostoma* was synonymized under *Bignonia* and *Bignonia binata* became again the accepted name for this broadly circumscribed species (Lohmann & Taylor 2014).