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Short Communication
Flowering of *Guadua trinii* (Poaceae, Bambusoideae, Bambuseae)

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Abstract

Flowering in bamboo is an unusual event. Documenting flowering individuals or populations provides valuable information about bamboo life cycles. *Guadua trinii* is endemic to northeastern Argentina, southern Brazil, Paraguay and Uruguay. We here report the flowering of this species in native and cultivated stands in Argentina and confirm its flowering cycle to be of 30–33 years.

Key words: bamboo, lifecycle, Taquaruçu.

Resumo

Floração em bambu é um evento incomum. A documentação de indivíduos ou populações em florescimento fornece informações importantes sobre os ciclos de vida do bambu. *Guadua trinii* é endêmica do nordeste da Argentina, sul do Brasil, Paraguai e Uruguai. Aqui relatamos o florescimento dessa espécie em agregados nativos e cultivados na Argentina, além da confirmação de seu ciclo de floração por 30–33 anos.

Palavras-chave: bambu, ciclo da vida, Taquaruçu.

Bamboos have an extremely wide range of global distribution that occurs in the tropical, subtropical and temperate regions from sea level to 4,000 m (Judziewicz *et al*. 1999). Wherever bamboos constitute an important component of the forest, they have profound effects on the dynamics and structure of plant communities (Holz & Veblen 2006; Campanello *et al*. 2007; Caccia *et al*. 2009), and also on the population dynamics of animal species that rely on bamboos for refuge or feeding (Piudo *et al*. 2005; Gallardo *et al*. 2008; Areta *et al*. 2009, 2016; Piudo & Monteverde 2016).

The most interesting aspect of bamboo biology is their flowering habit. The species that are the most intriguing are those that fall between a state of constant vegetative growth and constant flowering to manifest a cyclic pattern of flowering after long periods of vegetative growth. The flowering cycle of the woody bamboos varies a great deal, from 3 to 120 year intervals (Janzen 1976). The phenomenon of mass flowering is the synchronized flowering at long intervals by a large population (Ramanayake 2006). A more or less fixed, species-specific periodicity to the phenomenon has been described over at least two generations in very few species (Kawamura 1927; Seifriz 1950; Parodi 1955; Janzen 1976; Isagi *et al*. 2004; Carvalho *et al*. 2013). Little was known about the intervals between successive mass flowering events of native American bamboos (Parodi 1955; Vega & Cámara Hernández 2008), until Guerreiro (2014) gathered information from herbarium specimens to reconstruct flowering dates and then estimate flowering cycles of 16 species of woody bamboos native to southern South America.

Any record of a bamboo flowering event, being an individual clump or at a population level, provides valuable information about bamboo life cycles. Regarding this, we recorded the flowering of several clumps of *Guadua trinii* (Nees) Nees *ex* Rupr., a woody bamboo species native to northeastern Argentina, southern Brazil, Paraguay and Uruguay. It is found on riversides in the Atlantic forest in dense, almost impenetrable clumps; its scabrous culms are characteristic (Lizarazu *et al*. 2013; Rúgolo & Guerreiro 2016). It

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has been reported its use to build huts, in the paper industry and to make musical instruments (Smith *et al*. 1981; Keller 2010; Vega & Rúgolo 2016). A thorough description and an illustration of *G. trinii* can be found in Lizarazu & Vega (2012) and Vega & Rúgolo (2016). In this communication, we report the flowering of *G. trinii* in natural and cultivated stands in Argentina and confirm its life span.

Periodical phenological observations led to the record of flowering clumps of natural and cultivated stands of *G. trinii.* All these flowering events were photographed and documented in herbarium specimens kept at BAA and CTES (Thiers, continuously updated).

Flowering of a *G. trinii* cultivated stand was recorded in November 2017 at the Lucien Hauman Botanical Garden of the School of Agronomy of the University of Buenos Aires. *Guadua trinii* has been

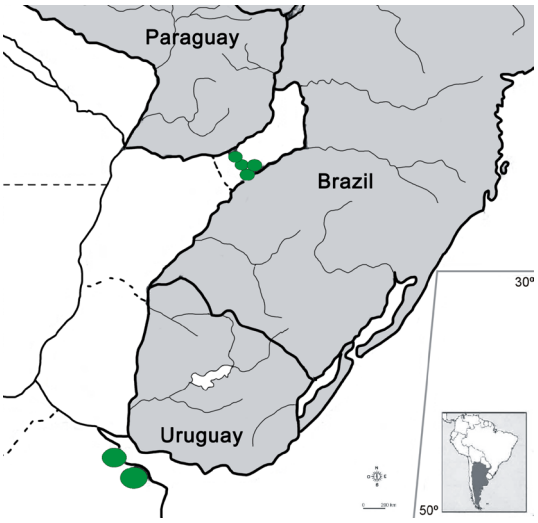

Figure 1 – Map showing the areas where *Guadua trinii* flowering events were recently recorded.

Figure 2 – a-d. *Guadua trinii* – a,b. pseudospikelets; c. flowering culms of a natural stand; d. seedlings and florets. Photos: a,b: Andrea S. Vega; c,d: Ana María Molina.

cultivated there for almost 100 years. Seedlings were brought in 1923 by Prof. Lorenzo R. Parodi, a well-known agrostologist, after a flowering event of a natural stand in northern Buenos Aires province, and placed in the Botanical Garden, where they developed vigorously. Then, after 30 years of vegetative growth, Parodi (1955) reported flowering, fructification and death of those clumps, but also regeneration through germination and seedling production. Since then, it has flowered and died cyclically in a 30–33 year period, along with individuals in natural stands occurring far away, perpetuating itself and showing one of the most intriguing phenomenon in bamboo biology.

At the same time, flowering of *G. trinii* was observed in a natural stand of Ribera Norte Nature Reserve, a protected area in northern Buenos Aires province, the southernmost part of its natural distribution (C. Larsen, pers. comm.). Soon after, massive flowering events were recorded in Misiones province, particularly in the southern departments of the province: Candelaria, L. N. Alem, San Javier and Oberá (Keller, pers. comm.; Fig. 1). However, there are still many natural populations of *G. trinii* not showing signs of entering a reproductive phase, especially in the northernmost part of Misiones province (A. Mantese, pers. comm.). These populations may be expected to flower in the coming months, since a single flowering event can last up to 2 years (Parodi 1955; Lizarazu *et al*. 2013).

During its reproductive stage, *G. trinii* clumps were almost leafless, with a high production of pseudospikelets (Fig. 2a,b). At caryopsis maturity, the whole clump turned to a stramineous colour (Fig. 2c). Caryopses formation and seedling development were also recorded (Fig. 2d).

Material examined: ARGENTINA. BUENOS AIRES: Cultivado en el Jardín Botánico de la Facultad de Agronomía, 15.IX.2017, fl., *A. S. Vega 28* (BAA). MISIONES: Leandro N. Alem, ruta 14 km. 642, antes de la gran plantación de pinos, 21.X.2017, fl., *A. M. Molina s.n.* (BAA); San Javier, 27º50'52''S 55º14'8''W, selva en bajo, caña leñosa, 16.VIII.2017, fl., *H. Keller & J. L. Rojas 13619* (CTES).

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