

## BOTANIST LUIS NÉE AND THE NOMENCLATURAL TYPE OF THE COSMOPOLITAN COMMON REED, *PHRAGMITES AUSTRALIS* (POACEAE)

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**ABSTRACT:** The lectotypification of the Cavanillesian name *Arundo australis* is discussed. The designation of the nomenclatural type was based on a specimen preserved in the Cavanilles herbarium kept in the Royal Botanic Garden of Madrid and collected by Luis Née in Botanical Bay during the Malaspina Expedition (1789-1794). The lectotype of the name *Phragmites pumilus* is also designated. This species was described by Willkomm and currently the name is treated as a heterotypic synonym of *Phragmites australis*. **Keywords:** *Arundo australis*; Cavanilles; lectotype; nomenclature; Malaspina Expedition; *Phragmites pumilus*.

**RESUMEN:** El botánico Luis Née y el tipo nomenclatural de *Phragmites australis* (Poaceae). Se discute la lectotipificación del nombre cavanillesiano *Arundo australis*. La designación del tipo nomenclatural se basó en un ejemplar conservado en el herbario de Cavanilles conservado en el Real Jardín Botánico de Madrid y recogido por Luis Née en la Bahía Botánica durante la Expedición Malaspina (1789-1794). También se designa el lectotipo del nombre *Phragmites pumilus*. Esta especie fue descrita por Willkomm y actualmente el nombre se trata como sinónimo heterotípico de *Phragmites australis*. **Palabras clave:** *Arundo australis*; Cavanilles; lectotipo; nomenclatura; Expedición Malaspina; *Phragmites pumilus*.

### INTRODUCTION

*Phragmites australis* (Cav.) Trin. ex Steud. (Common Reed) (Poaceae-Arundinoideae) is one of the most widespread plant species in the world, occurring on all continents except Antarctica. This species (s.l.) is a perennial reed that grows from elongated rhizomes or stolons; 1-6 meters tall, forms dense stands which include both live and standing dead stems from previous year's growth (CLAYTON & al., 2006).

*Phragmites australis* is a widespread, morphologically highly variable wetland species (CLAYTON, 1967; HASLAM, 1972). A large number of intra-specific varieties have been described, which seem to be merely local variants, and therefore of no taxonomic value (CLAYTON, 1967). Taxonomic differences between and within *Phragmites* species have been described in CLAYTON (1967), GORDON-GRAY & WARD (1971), HOCKING & al. (1983), TSVELEV (1984), VELDKAMP (1992), and GREUTER & SCHOLZ (1996).

*Phragmites australis* is a hardy species that can survive and proliferate in a wide range of environmental conditions, but prefers the wetland-upland interface (AVERS & al., 2014). It grows on most soil textures from fine clay to sandy loams and is somewhat tolerant of saline or alkaline conditions (ISSG, 2011) and so it is often found at the upper edges of estuaries and on other wetlands (such as grazing marshes) that are occasionally inundated by the sea. It is most often found on disturbed sites with altered hydrology, sedimentation, and nutrient enrichment. *Phragmites* can tolerate anoxic conditions, and high salinity in soils, and a wide range of pH from 3.9-8.6 (FOFONOFF & al., 2015). *Phragmites* can also tolerate a wide range of temperatures, but shoots are killed off by severe frost events (HASLAM, 1972). Below ground, introduced *Phragmites* forms a dense network of roots and rhizomes

that can extend downward over a meter (SWEARINGEN & SALTONSTALL 2010). Along rivers and coastal shorelines, fragments of rhizomes transported from distant infested sites can settle in new spots and become rooted (SWEARINGEN & SALTONSTALL, 2010).

A large range in euploid number has been found in this species (between  $3x$ – $12x$ , except for  $5x$  and  $9x$ , with  $x = 12$ ). In Europe tetraploids are dominant, whereas octoploids predominate in Asia. Aneuploids also occur regularly in *P. australis*, and differences in chromosome numbers have been observed even within clones. In North America the 'native' *P. australis* is considered to be  $3x$ ,  $4x$ , or  $6x$ , whereas the supposedly 'invading' more aggressive European plants are thought to be  $4x$  (CHAMBERS & al., 1999). However, the recent discovery of octoploids (KELLER, 2000) shows that variation in ploidy levels has been underestimated on this continent. CONNOR & al. (1998) have suggested that  $8x$  plants are either native to New Zealand or introduced from Australia, and that  $4x$  plants might be introduced from Europe.

In this paper, the nomenclature of the Common Reed is discussed. The lectotype of the name *Phragmites australis* is analyzed and a detailed description of the original specimens is provided. In addition, *Phragmites pumilus* was cited as a species present in the Valencian flora (Spain); the protologue of this name is also discussed and a lectotype is designated. *Phragmites pumilus* can be treated as a heterotypic synonym of *Ph. australis*.

### BACKGROUND AND THE LECTOTYPE OF THE NAME *ARUNDO AUSTRALIS*

Linnaeus describes *Arundo phragmites* (LINNAEUS, 1753), however, the epithet of this name is unavailable in the genus *Phragmites* due to the tautonym rule (Art. 23.4

ICN) (TURLAND & al., 2018). TURLAND (1995: 419) proposed for rejection the name *Cenchrus frutescens* L. (1753: 1050) to maintain current usage of *P. australis*, and the proposal was accepted (see Special. Comm. in Taxon 47: 863. 1998; Gen. Comm. in Taxon 48: 376. 1999).

For many years this species had been known as *P. communis* Trin., a nomen novum based on *A. phragmites*, until attention was drawn by GREUTER (1967: 176) and CLAYTON (1968: 168-169) to Cavanilles's earlier specific epithet. In these works, the correct name of the Common Reed, usually called *Phragmites communis* Trin. was claimed as *P. australis* (Cav.) Trin. ex Steudel.

CAVANILLES (1799: 100) described *Arundo australis* providing a polynomial "ARUNDO australis calicibus quinque floris: panicula sublaxa: glumis fuscis", followed by a complete description of the species in Spanish. The protologue includes as locality "Se cría en el agua y á la orilla del rio, que está como media legua antes de llegar a la Bahía Botánica viniendo de Jackson. Allí la cogió en Abril Don Luis Née" [It breeds in the water and on the river bank, which is about half a league before reaching Botanical Bay coming from Jackson. There it was collected in April by Don Luis Née].

Luis Née [sometimes written as "Née"] (1734 [Le Perray-en-Yvelines, France]-1807 [Madrid, Spain]) was a French botanist, later naturalized Spaniard; who participated in the Malaspina expedition in La Descubierta and La Atrevida, 1789-1794 (MALASPINA & al., 1992; NÉE & MUÑOZ GARMENDIA, 1992; GALERA, 2016). The herbarium of Née is preserved at MA, and duplicates are at B, C, DS, F, FI, KIEL, MPU, NY, SEV (STAFLEU & COWAN, 1981; MUÑOZ GARMENDIA, 1992). Botanist Luis Née collected and described numerous new plants during the Malaspina Expedition. The notes made by the expedition's botanist, Luis Née, while he was at Port Jackson in 1793 were published in 1799, where *Phragmites australis* is described (CAVANILLES, 1799).

The Malaspina Expedition (1789-1794) was a five-year maritime scientific exploration commanded by Alejandro Malaspina and José de Bustamante y Guerra (VAUGHAN & al., 1977; CUTTER, 1991; MALASPINA & al., 1992). The expedition was financed by the Spanish government and originally pursued strictly scientific objectives, much like the voyages of James Cook and Jean-François de Galaup, Count of La Pérouse. Unfortunately, most of the expedition's reports and collections were kept unpublished and did not see the light of day until the late 19th century.

The expedition carried on board the elite of astronomers and surveyors of the Spanish Navy, headed by Juan Gutiérrez de la Concha, with the young Felipe Bauza as cartographer. Also on board were many scientists and artists, such as painting master José del Pozo, artists José Guío, Fernando Brambila and Giovanni Ravenet, cartoonist and columnist Tomás de Suria, botanists Luis Née, Antonio Pineda and Thaddäus Haenke, and many others (VAUGHAN & al., 1977; MALASPINA & al., 1992).

CLAYTON (1968) indicated "Dr. E. Paunero has kindly examined the type of *A. australis* at Madrid and has sent me a fragment of it, from which it can be confirmed that *A. australis* is indeed conspecific with *Phragmites communis*". Clearly, Clayton is referring to herbarium MA, where is preserved the Cavanilles personal herbarium. However, in the Cavanilles herbarium there are two specimens that are part

of the original material used by Cavanilles to describe his species (barcodes MA 229804 and MA 475323) (see below). Unfortunately, as Clayton indicated unspecified type material in the "herbarium of Madrid" (i.e., at MA), this author did not typify the name. On the other hand, BOR (1970: 352) indicated unspecified type material at MA "Cavanilles (MA)". In this sense, in the herbarium of the Royal Botanic Garden of Madrid (MA) there are two relevant specimens for the typification of this name (MA 229804 and MA 475323, see below).

However, if the specimens MA 229804 and MA 475323 are part of the same gathering, Bor's indication (maybe also Clayton's indication in 1968?) certainly satisfies the Art. 7.10 and 7.11 of the ICN (see TURLAND & al., 2018) and constitutes an effective lectotype designation, because he clearly indicate the "type element" mentioned in the Art. 7.11 ("... if the type element is clearly indicated ...") since an element can be considered as "...a single specimen or gathering...or illustration..." as indicated in the Art. 40.3 of the ICN. However, the lectotypification proposed by these authors may be further narrowed to a single specimen by a "second-step" lectotypification according to Art. 9.17 of the ICN.



Figure 1. Portrait of botanist Luis Née, unknown author, miniature. Naval Museum, Madrid.

GARILLETI (1993: 47-49) indicated that there are two relevant specimens in the Royal Botanic Garden of Madrid, MA 229804 and MA 475323, and as the "Material tipo" [type material] the specimen MA 475323. Garilleti's use of the word 'tipo' could thus potentially be corrected to 'lectotype', but GARILLETI (1993) clearly stated in the introduction to his work that he did not intend to designate any lectotypes for Cavanilles's names in there, so this

typification cannot be accepted. He wrote: “Nuestro objetivo ha sido estudiar el herbario de A.J. Cavanilles, en ningún caso se ha concretado una lectotipificación de sus táxones” [Our aim was to study the herbarium of A. J. Cavanilles, in no case has lectotipification of his taxa been attempted] (GARILLETI 1993: 5; GARILLETI, pers. comm.). Because of this statement, many subsequent authors interpreted Garilleti’s citation of the “type material” in his publication as not constituting an effective typification (e.g., KNAPP 2007; BUIRA & al. 2015; IAMONICO & VALDÉS 2017; FERRER GALLEGO 2021). Because the word “type” was associated by Garilleti with over 1000 taxon names and their correspondig specimens, if those were to be interpreted as inadvertent lecto- or neotypifications, it would have been very disruptive to nomenclature. Therefore, we follow the established practice and consider that no effective designation of type specimens took place in Garilleti’s work.

Finally, the type of *Arundo australis* was designated by Probatova (in TZVELEV & PROBATOVA, 2019: 464-465). This author indicated “(lectotypus I (?Bor, 1970: 352): ‘Cavanilles’ (MA); lectotypus II (Probatova, hic designatus; F. Bellot, M. E. Ron, 1972, in herb.): ‘Ex Nova Hollandia, Botany Bay..., N[ée]’ (MA475323, c ?)”.

The sheet MA 475323 bears a specimen, a stem with leaves and the inflorescence, and five separate leaves. The sheet contains also an original label handwritten by Cavanilles and Née “Arundo [by Cavanilles] australis / Anales fasc. 2. [by Née] / Ex nova-hollandia. Botany Bay [by Cavanilles] / en el río junto a la Bahía vinién- / do de Jackson. N. d. [Née dedit] [handwritten by Née]” (image available at <https://imagenes.rjb.csic.es/herbarioV/visorVCat.php?img=MA-01-00475323>).

On the other hand, the sheet barcoded MA 229804 bears a specimen, a stem with leaves and the inflorescence, and a handwritten label annotated as “Arundo [by Cavanilles] australis / Cav. Anales de / Ci. nat. / C.h. Bah. botánica” (image available at <https://imagenes.rjb.csic.es/herbarioV/visorVCat.php?img=MA-01-00229804>). It lacks Cavanilles labels and references to its collector, however the locality “Bah. botánica [Bahía botánica] coincide with that indicated in the protologue.

There is a relevant sheet preserved at SEV, with code SEV-H10433, the sheet bears two fragment stems, one fragment with a leaf and the other one with leaves and an inflorescence. The sheet bears a handwritten label annotated as “Arundo australis / Anales / B.B. [Bahía Botánica (Botany Bay)]. This specimen could be original material. According to MUÑOZ GARMENDIA (1992), Née sent herbarium specimens to Boutelou, and they are kept at SEV.

In conclusion, the specimen collected by L. Née preserved at MA 475323 is undoubtedly original material used by Cavanilles to describe his *Arundo australis*. The specimen match with the current concept and use of the name. It is the effective type designated of the name.

*Arundo australis* Cav., Anales Hist. Nat. 1: 100. 1799

≡ *Phragmites australis* (Cav.) Trin. ex Steud., Nomencl. Bot., ed. 2, 2: 324. 1841

**Lectotype** (“second-step” lectotypification?) designated by Probatova in Tzvelev & Probatova in Zlaki Rossii / Grasses of Russia: 464-465. 2019): [Australia, New South Wales] Botany Bay, Port Jackson, *L. Née s.n.*, s.d., MA (barcode MA-01-00475323) (fig. 2).  
= *Phragmites pumilus* Willk., Strand-Steppengeb. Iber. Hal-

bins.: 157-158. 1852 [*pumila*]

**Lectotype** (designated here): [SPAIN], Granada “Hab. in graminosis humidis salsis prope balnea mineralia oppidi Lanjarón in regno granatensi, ubi d. 23. Sept. anni 1844 florentem legi.”, a complete description in Latin, and a comment “*Phr. gigantea*, a me prope Granatam eodem anno lecta, cujus formam macramé plantam nostrum esse cl. Kunke opinatus est, differ spiculis semper 7-floris, flore infimo masculo (saepe monandro) vel neutro, proximo femineo vel hermaphrodite, ceteres 5 hermaphroditis, pilis rhacheos paleis brevioribus; *Ph. communis* var. *flavescens* spiculis floribusque multo minoribus. Ab utraque specie nostra numilitate, foliis canaliculatis subconvolutis brevibus primo intuitu distinguitur”. The protologue also includes the name “*Ph. gigantea* Kunze in Flora 1846, p. 691. non Gay”.

### Typification of the name *Phragmites pumilus*

WILLKOMM’s protologue (1852: 157-158) of *Phragmites pumilus* (‘pumila’ in the protologue), numbered “323” consists of a diagnosis in Latin, followed by the provenance “Hab. in humidis salsis graminosis prope balnea Lanjarón in regno granatensi, ubi d. 23. Sept. anni 1844 florentem legi.”, a complete description in Latin, and a comment “*Phr. gigantea*, a me prope Granatam eodem anno lecta, cujus formam macramé plantam nostrum esse cl. Kunke opinatus est, differ spiculis semper 7-floris, flore infimo masculo (saepe monandro) vel neutro, proximo femineo vel hermaphrodite, ceteres 5 hermaphroditis, pilis rhacheos paleis brevioribus; *Ph. communis* var. *flavescens* spiculis floribusque multo minoribus. Ab utraque specie nostra numilitate, foliis canaliculatis subconvolutis brevibus primo intuitu distinguitur”. The protologue also includes the name “*Ph. gigantea* Kunze in Flora 1846, p. 691. non Gay”.

Among the original material used by Willkomm to describe his species, I have found two relevant specimens preserved at COI and K. The sheet in the Willkomm herbarium at COI (Herbarium of University of Coimbra, Portugal), with barcode COI00034808, bears a stem with leaves and another stem with the inflorescence. The sheet also bear an original label handwritten by Willkomm, annotated as “H.M. Willkommii iter hispanicum / (Phragmites gigantea. Gay / va. angustifolia. Willk.) / pl. exsicc. N° 398. / Hab. in graminosis humidis salsis prope balnea / mineralia oppidi Lanjarón. / Phragmites pumila n.sp.! / Altitud: 2200! / Nom. vulgare: Cañota / Legi die 23 mensis Sept. 1844.” (fig. 3).

In the herbarium K (Herbarium of the Royal Botanical Gardens of Kew), there is a duplicate of this specimen, barcoded K000859965. The specimen is a well-preserved stem, with leaves and the inflorescence, and is accompanied by two labels, one label was handwritten by Willkomm and is annotated with the same information as the sheet at COI, and a second is a revision label from 1862.

Finally, there is a specimen collected by Willkomm in Alicante (Elche), barcoded COI00034811, and identified as “*Phragmites pumila*”. The specimen is a vegetative stem, and the sheet bears also a handwritten label of Willkomm, annotated as “(Plant. gall. hisp. n. 60.) / Herbarium Willkomm. / Phragmites pumila Willk. / In declivibus argillosis aridis ad vallecule / Rambla de Elche in rego Valentino copiose / Legi d. 22 Maji 1873” (Fig. 4). This material is post-1844 and therefore it cannot be treated as original material of *Phragmites pumilus*.

In conclusion, the specimens COI00034808 and K 000859965 are eligible to serve as the lectotype, I designate as the lectotype of the name *Phragmites pumilus* the specimen at COI; this specimen is consistent with the traditional concept of the species and the current use of the name as a heterotypic synonym of *Phragmites australis*.

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**Figure 2.** Lectotype of *Arundo australis* Cav. (MA 01-00475323). (Image by courtesy of the herbarium MA, reproduced with permission).



**Figure 3.** Lectotype of *Phragmites pumilus* Willk. (COI 00034808). (Image by courtesy of the herbarium COI, reproduced with permission).



**Figure 4.** Specimen collected in Elche (Alicante) by Willkomm in 1873, and identified as *Phragmites pumilus* (COI 00034811). (Image by courtesy of the herbarium COI, reproduced with permission).



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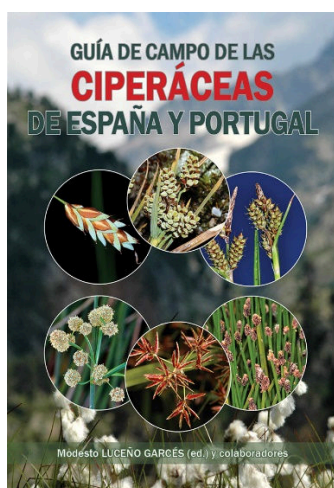
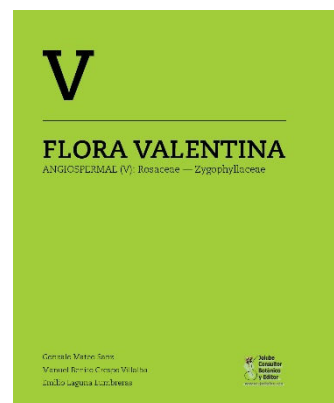
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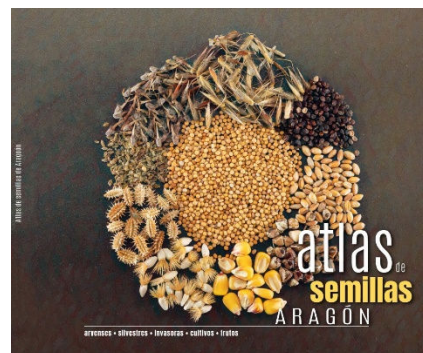
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Con referencias a Portugal y Andorra



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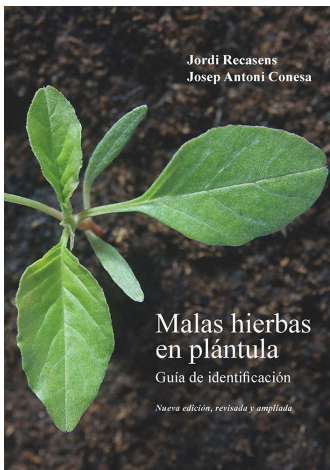
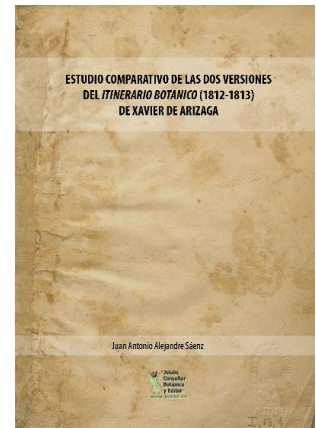
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