

Unraveling the story behind the Linnaean basionym of *Bouchea prismatica*: Revised typification of the name *Verbena prismatica*

Pablo Moroni & Nataly O’Leary

Instituto de Botánica Darwinion (ANCEFN-CONICET), Labardén 200, CC 22, B1642HYD, San Isidro, Buenos Aires, Argentina

Author for correspondence: Pablo Moroni, pmoroni@darwin.edu.ar

ORCID PM, <http://orcid.org/0000-0001-5306-476X>; NO, <http://orcid.org/0000-0001-7414-3416>

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Abstract The typification of the Linnaean name *Verbena prismatica* is revised. A previous neotypification is investigated and it is shown that the choice of Moldenke (Herb. Linn. No. 35.3) must be superseded since a sheet comprising original material has been located in the Linnaean collection at S. The protologue is shown to have comprised a mixture of two elements, one corresponding to *Salvia occidentalis* and to the traditional concept of *V. prismatica* (i.e., *Bouchea prismatica*). A lectotype is selected that preserves the current application of the name to a species of *Bouchea*.

Keywords *Bouchea*; lectotype; Linnaean name; Verbenaceae

■ INTRODUCTION

Bouchea Cham. (Chamisso, 1832) is a New World genus with about 10 species widely distributed in tropical and subtropical zones, ranging from southern North America and the Caribbean to northern Argentina in South America (Moldenke, 1940a; Troncoso, 1974; Múlgura & al., 2012). The genus is characterized by its flowers, which are subtended by a bract and two bractlets, the presence of only four stamens with connective tissue surpassing the theca (O’Leary & al., 2012), and a fruiting-calyx not fully enclosing the fruit (Múlgura & al., 2012).

Bouchea prismatica (L.) Kuntze is the most variable species of the genus, which has led to the publication of several varieties as well as species-level taxa that are currently considered heterotypic synonyms (Grenzebach, 1926; Moldenke, 1940b; Moroni, in prep.). It is widely distributed from Mexico to Central America and the Caribbean (Howard, 1989; Méndez Santos, 2003).

As part of a taxonomic revision of *Bouchea*, Moldenke (1940b) neotypified the basionym of this name, *Verbena prismatica* L., because no original material could be traced at the time of his revision. That earlier neotypification is revisited here since original material has recently been located in the Linnaean herbarium at S. As a result, a lectotype is designated and the earlier neotypification is superseded.

■ HISTORICAL BACKGROUND

In the first edition of *Species plantarum*, Linnaeus (1753: 19) published the name *Verbena prismatica*, along with thirteen other names in the genus *Verbena* L. He grouped them into two “sections”, each section including seven names: “*Diandrae dispermae*”, characterized by plants having two stamens, and

“*Tetrandrae, Tetraspermae*”, characterized by plants having four stamens. *Verbena prismatica* was included in the section “*Diandrae dispermae*”, with one synonym cited from Sloane’s *Catalogus plantarum* (1696: 64).

Since Linnaeus (1753) explicitly stated that *V. prismatica* had two stamens, the species was subsequently placed in different genera defined by the presence of only two stamens. For instance, Patrick Browne (1756: 117) regarded it as a synonym of the polynomial “*Salvia spicata repens*”, and later Swartz (1788: 14) described *Salvia occidentalis* Sw. citing Brown’s “*Salvia I. Brown. jam. 117*” as a synonym. Then, Lamarck (1791: 59) transferred the species to the genus *Zappania* Scop., and Vahl (1805: 209) to the genus *Stachytarpheta* Vahl.

In a quite different approach, Otto Kuntze (1891: 502) transferred the species to the genus *Bouchea*, whose androecium is characterized by the presence of four stamens instead of two (O’Leary & al., 2012). Kuntze (1891) asserted that the element cited by Linnaeus from Sloane’s *Catalogus plantarum* (1696) was a mistake, thus excluding the Sloane element from the concept of *V. prismatica*. By extension, it follows that Kuntze clearly believed that the citation of two stamens in the protologue was an error based on this mistake. During the period between the publication of *V. prismatica* and Kuntze’s combination in 1891 a novel species of *Bouchea* was described by Chamisso (1832), *B. ehrenbergii* Cham., which was regarded by Kuntze (1891: 502) as a heterotypic synonym of *B. prismatica*. Subsequent authors (Britton & Millspaugh, 1920; Grenzebach, 1926; Moldenke, 1940b; MacBride, 1960; Nash & Nee, 1984) followed Kuntze’s concept of this taxon with the exception of Urban (1921: 595), who very clearly noted that *V. prismatica* had been described as a plant having only two stamens. However, Urban did not solve the problem, and instead treated Kuntze’s exclusion of the Sloane element as description of a new name through exclusion of the type, despite the fact

that *V. prismatica* remained untypified at the time. Thus Urban (1921: 595) recognized *B. ehrenbergii* as a validly published name and treated *B. “prismatica Kuntze”* as a synonym that he considered to be based on a specimen collected by Kuntze in “La Guayra”, Venezuela, in 1874 (NY barcode 02286711 [digital image!]).

■ PREVIOUS TYPIIFICATION

Moldenke (1940b) was the first author to discuss at length the typification of the name *Verbena prismatica*. He asserted on behalf of Carl Epling, as Kuntze (1891) had previously done, that the element cited by Linnaeus from Sloane’s *Catalogus plantarum* (1696) was a remarkable mistake and likewise the characterization of the species as having two stamens was an error (Moldenke, 1940b). Since Sloane’s original material from Jamaica was extant in the Sloane Herbarium at BM, Moldenke had the chance to identify the pertinent specimen (BM barcode BM000589604 [digital image!]) as *Salvia occidentalis* (Moldenke, 1940b). This material was recently studied concerning the androecium, a key feature to resolve its identity, and the presence of only two stamens was verified (R. Prakash & J. Wajer, pers. comm.).

Based on his conclusion, Moldenke cited Herb. Linn. No. 35.3 (LINN) as the type of *V. prismatica*. Moldenke’s choice in selecting this specimen as the type matches Kuntze’s species concept of *V. prismatica* (i.e., *Bouchea prismatica*) in having four stamens instead of two. This sheet, which was collected by Patrick Browne in Jamaica, has been housed with the LINN herbarium since the time when Linnaeus purchased the bulk of Browne’s collections in 1758 (Savage, 1945), therefore it almost certainly cannot be original material of *V. prismatica* which was described earlier in 1753.

Sixty-one years later, Moldenke’s typification was reinterpreted by Méndez Santos & Cafferty (2001), who claimed that his designation should be treated as a correctable error from lectotype to neotype since the specimen he selected as the type did not comprise original material. Further, those authors indicated that original material of *V. prismatica* could not be traced in the Linnaean herbarium at LINN or at the other Linnaean-linked herbaria. An epitype was also selected by those authors, since the specimen selected by Moldenke was considered unsuitable to be assigned with confidence to one of the infraspecific taxa recognized by Grenzebach (1926) under *B. prismatica*. Although the specimen selected as the neotype of *V. prismatica* agrees with the current usage of the name, the typification must be revised because original material has recently been discovered at S.

■ TYPIIFICATION

The protologue of *Verbena prismatica* (Linnaeus, 1753: 19) gives the diagnostic phrase-name: “VERBENA diandra, spicis laxis, calycibus alternis prismaticis truncatis aristatis, foliis ovatis obtusis”, and cites one synonym from Sloane’s

Catalogus plantarum (1696). The provenance of the species was given as “Habitat in Jamaica”. Therefore, the elements in the protologue to take into consideration are: the Linnaean diagnosis, the phrase-name and the citation of the synonym from Sloane (1696).

The diagnostic phrase-name coined by Linnaeus is quite detailed when compared with that which had been provided by Sloane (1696: 64): “*Verbena minima Chamædryos folio. Ad ripas fluvij Cobre dicti infra urbem St. Jago de la Vega repetitur. Verbenæ aut scorodoniæ affinis anomala flore albido, calice aspero, allij odore. Guiney hen weed. In sylvis umbrosis oritur.*” Thus, based on the Linnaean diagnosis it seems plausible that Linnaeus based his description on studied material rather than only on the description provided by Sloane.

In the Linnaean herbarium at the Swedish Museum of Natural History (S) there is a specimen annotated “*prismatica 4*” by Linnaeus (“4” being the species number for *Verbena prismatica* in *Species plantarum*). It was also annotated “*Verbena diandra, spicis laxis, calycibus alternis prismaticis truncatis aristatis, foliis ovatis obtusis. Linn. Spec. plant. 19. 4.*” by Daniel Solander on the reverse of the sheet. Although Lindman (1908, 1910) published a catalogue of the Linnaean herbarium at S, this material was not included in that list.

The sheet located at S would be appropriate for typification purposes if it could be established that Linnaeus studied it. The leaves of the specimen are poorly preserved and the racemes contain a number of incompletely preserved flowers wherein the number of stamens cannot be ascertained with certainty. Nonetheless, Linnaeus’s detailed description concerning the inflorescence and calyx morphology correspond well with the material and it is not in direct conflict with the protologue. The specimen has lax racemes with alternate flowers, whose calyces are prismatic, truncated and aristate at the apex due to the presence of long teeth. All these features agree with the Linnaean phrase-name and allow us to undoubtedly identify the specimen as *Verbena prismatica* in its current usage (i.e., *Bouchea prismatica*) as adopted by the major published Floras and taxonomic treatments (Britton & Millspaugh, 1920; Grenzebach, 1926; Moldenke, 1940b; MacBride, 1960; Nash & Nee, 1984). Moreover, the presence of the annotation “*prismatica 4*” strongly suggests that Linnaeus did study this sheet when compiling his work before 1753 (Jarvis, 2007: 46–47).

As the diagnosis coined by Linnaeus corresponds well to the specimen kept at S, it is clear that he had in mind a mixture of elements (the *Salvia* element and the *Bouchea* element) when describing this species since Sloane’s description, which refers to a fragrant plant with rough calyces, does not conform to either the phrase-name given by Linnaeus or the specimen at S. However, both features do agree with the current identity of the Sloane’s element, i.e., *S. occidentalis*, which is characterized by having a pungent odor (Standley, 1928; Klitgaard, 2012) and by calyces endowed with hooks or sticky trichomes (Zona, 2017), to which Sloane likely referred by using the adjective “rough” (aspero).

It is worth mentioning that the sheet housed at S was also annotated “Pluk[enet]. phyt[ographia]. 70. f. 1.” by Linnaeus on the reverse. We initially set aside this reference to Plukenet

(1691: t. LXX fig. 1), since it was not included in the synonymy of *Verbena prismatica*. However, tracing the history of the name through the editions of *Species plantarum* allowed us to untangle its meaning and by means of this, the mixture of elements that Linnaeus had in mind when describing the species. In the second edition of *Species plantarum*, Linnaeus (1762: 27–28) repeated his phrase-name and in addition to it, gave a new synonym cited from Plukenet (1696: 382) together with the corresponding plate (1691: t. LXX fig. 1): “*Verbena Scutellariae*

s. *Cassidæ folio dispermos Americana*”, and also cited a new reference concerning the polynomial of Sloane: “*hist 1. p. 172. t. 107. f. 2*” (Sloane, 1707). The Plukenet illustration, which comprises one plant without flowers, is not adequate enough to identify to species with certainty.

One more piece of evidence is Linnaeus’s manuscript of *Species plantarum*, dated ca. 1746, which contains a sketch of the *Verbena* treatment (Fig. 1). Despite the lack of epithets, Linnaeus described under number 5 what was later to become

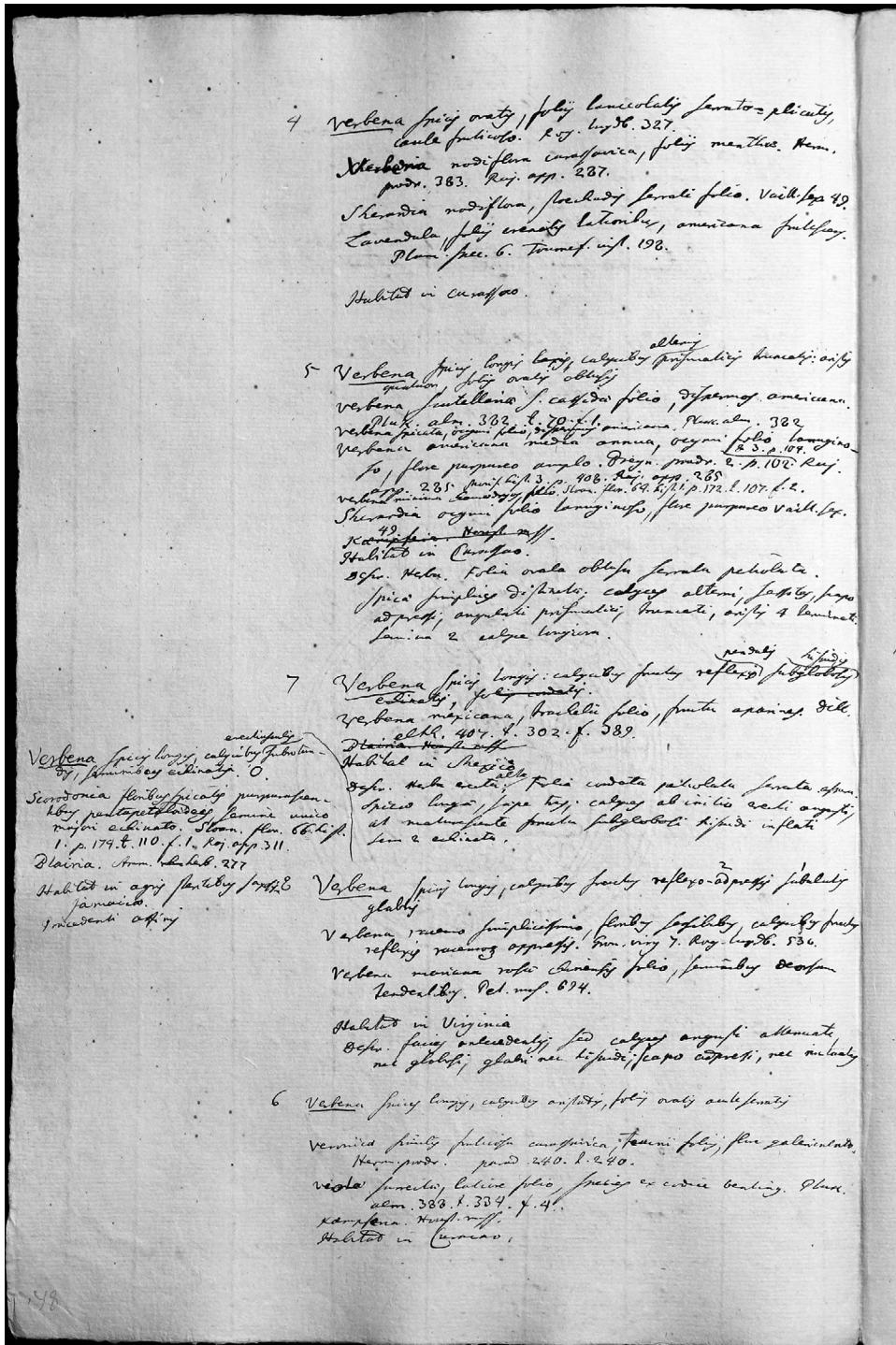
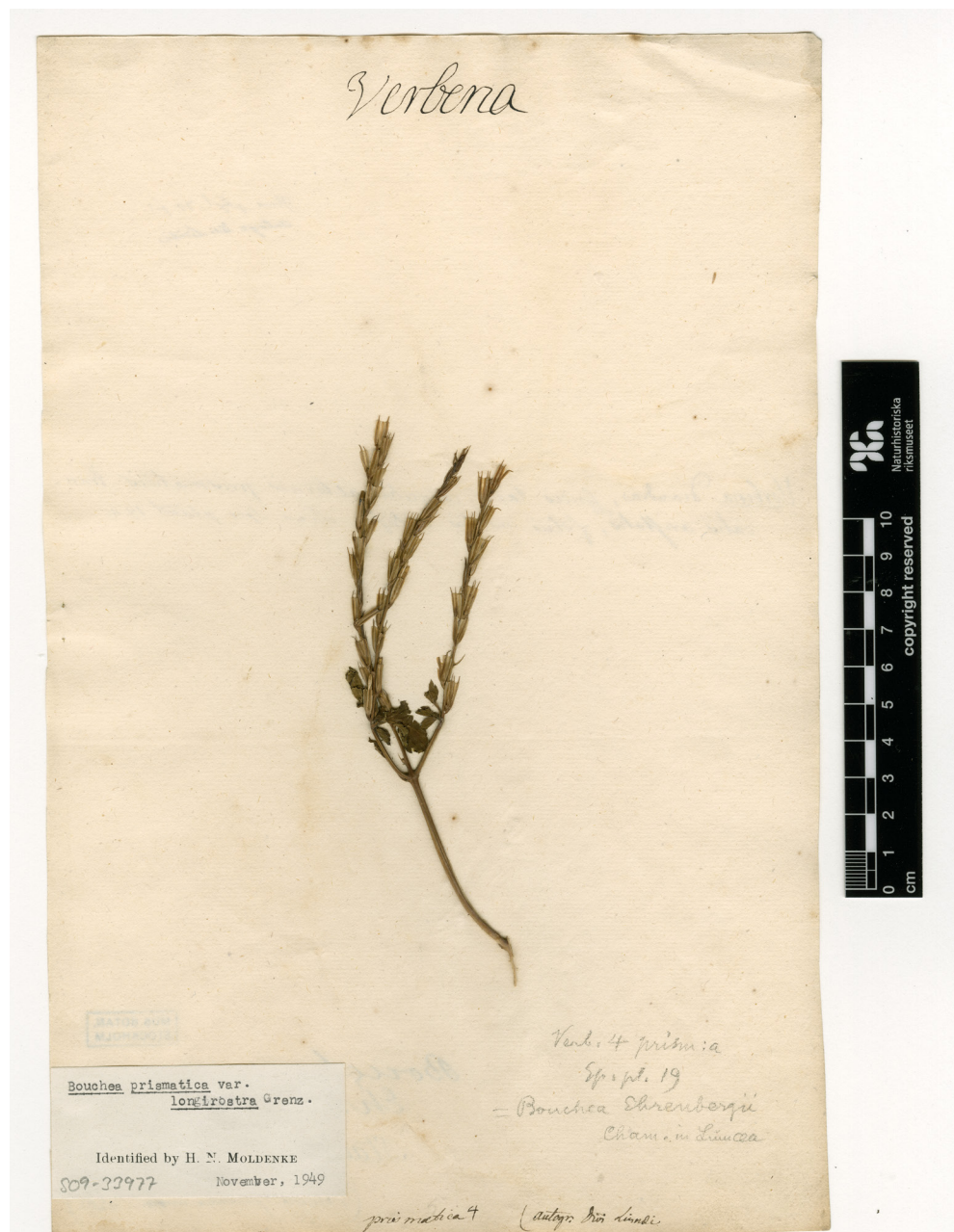


Fig. 1. Account of *Verbena L.* species in Linnaeus’s manuscript of *Species plantarum*. *Verbena prismatica* was based on no. 5 (image by permission of the Linnean Society of London).

V. prismatica. The synonymy includes five elements instead of the sole one published in the first edition of his work. In this manuscript Linnaeus referred to polynomials from Plukenet (1691: t. LXX fig. 1, 1696: 328), Breyne (1739: 104), Ray (1704: 285), Morison (1699: 408) and Sloane (1696: 64, 1707: 172), Vaillant (1718: 49). It is somewhat intriguing that Linnaeus included only one of all these synonyms in the first edition of *Species plantarum* and that he only cited one of the two works of Sloane. Nevertheless, this preliminary synonymy reaffirms the mixture of elements, whereas the phrase-name coined by Linnaeus in the manuscript is almost the same as that published in the first edition of *Species plantarum* (“longis” is the only word excluded and not published) and was not taken from any of these pre-Linnaean polynomials.

In light of the evidence presented above, the logical conclusion is that the specimen at S was studied by Linnaeus as the basis for his diagnosis and is therefore original material. Since the specimen has no fertile whorls, it is not in conflict with the statement “diandra” in the protologue which has generated so much controversy over time. Given the mixture of elements included in the original description, it raises the question of what additional material was seen by Linnaeus when preparing his diagnosis, given specifically that Sloane’s works (1696, 1707) did not include features regarding the androecium. Nevertheless on the basis of the protologue and all the information that support the fact that Linnaeus studied the specimen now deposited at S, it is here selected as the lectotype of *Verbena prismatica* (Fig. 2). This new designation

Fig. 2. Lectotype of the name *Verbena prismatica* L. (S; <http://herbarium.nrm.se/specimens/S09-33977/image/691525>) (image by permission of the Naturhistoriska riksmuseet, Stockholm).



agrees with the traditional and current usage of the name since Kuntze’s combination in 1891.

Verbena prismatica L., Sp. Pl.: 19. 1753 ≡ *Bouchea prismatica* (L.) Kuntze, Revis. Gen. Pl. 2: 502. 1891 – **Lectotype (designated here)**: Herb. Linn., IDC 7.17 (S-LINN No. S09-33977 [digital image!]).

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