NOMENCLATURE ARTICLE

The identities of three plants of unknown origin revealed by ancient paintings

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Abstract Archives and correspondences are often overlooked resources in assessing taxonomic and nomenclatural information and this sometimes affects taxonomic proposals. Here we show that unpublished illustrations not only can definitively help in identifying unresolved or poorly known names but can be themselves original material and sometimes must serve as types, avoiding neotypes or misleading synonymizations. We present the case of three names introduced by the Neapolitan botanist Michele Tenore (*Muscari strangwaysii*, Asparagaceae; *Pogostemon suavis* and *Salvia menthifolia*, Lamiaceae). They have been interpreted differently over time because herbarium specimens that constituted original material were not accurately searched for (*M. strangwaysii*) or were unavailable (*P. suavis*, *S. menthifolia*). Although these three names are currently synonymized (with *M. neglectum*, *P. cablin*, and *S. chamaedryoides*) we demonstrate that these synonymies are not correct, based on the detailed study of original nineteenth-century watercolour paintings, a re-examination of protologues and specimens preserved in the Botanical Garden of Naples (NAP). The watercolour paintings are crucial for application of the names, because diagnostic features often disappear with drying (*M. strangwaysii*), or because they are the only extant original material (*P. suavis*). In all three cases we introduce new typifications for the names and update the synonymy to *M. botryoides*, *P. heyneanus*, and *S. microphylla*, respectively.

Keywords Achille Bracco; botanical illustration; nomenclature; lectotype; patchouli

■ INTRODUCTION

Almost two centuries after the first photographs of algae and plants by Anna Atkins and William Fox Talbot were published (Hannavy, 2013), botanical illustrations remain an important tool for taxonomic studies (e.g., Ben-Ari, 1999; Hickman & al., 2017; Oxley & Bebbington, 2017). In the case of names published before the advent of modern photography, or where original material may be poorly preserved or not extant, botanical illustrations can prove particularly valuable and sometimes crucial (Del Guacchio & al., 2016a,b). There are reasons to prioritize herbarium specimens for the typification of plant names (Jarvis, 2007). Nonetheless, illustrations, which often accompany original descriptions, or are otherwise cited in protologues, are obvious source material when dealing with the taxonomic application of historical names (Clementi & Peruzzi, 2015). In fact, they are often irreplaceable for interpreting names that lack extant original specimens (Turland & al., 2018: Art. 9.12). Moreover, unlike dried plants preserved as herbarium specimens, illustrations are much less prone to issues of decay or unavailability. Typification based on the illustrations that are cited in, or directly accompany, protologues is frequent among taxonomists, especially when specimens are lacking (e.g., Jarvis, 2007; Del Guacchio & al., 2021), whereas uncited or unpublished illustrations are used much less frequently. Here, we focus on the need to consult archives and libraries to locate unpublished illustrations, whether cited or not by the original authors.

The Botanical Garden of Naples holds a valuable collection of nineteenth-century botanical illustrations, generally commissioned to accompany scientific publications or to depict plants cultivated in the Garden (Del Guacchio & al., 2022), which were often of exotic origin (Del Guacchio & al., 2016a,b, 2019). Such an archival and documentary purpose is also found in similar collections of other botanical institutes, such as the *Vélins* of the Jardin des Plantes in Paris (Heurtel, 2016). One hundred sixty-five plates are held by the Botanical Garden of Naples (see also De Luca, 2010), but it is estimated that at least as many plates have been lost or stolen over time (Natale, 2019). Except for four of them, prepared mainly in ink and pencil, the extant plates are watercolours of different sizes (reflecting different origins), often trimmed, but usually in the range of 27–36 × 46–51 cm, and probably mainly made between 1838 and 1873 (Natale, 2019; Del Guacchio & al., 2022).

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Michele Tenore, founder and first director of the Botanical Garden of Naples (Menale & De Luca, 2013; Natale, 2019), commissioned the first plates in the collection (dating to 1838–1855). Tenore, and subsequent directors, commissioned the plates from several artists, some of whom had already been hired to produce the illustrations of his *Flora Napolitana* (Natale, 2016). Among these artists, were Friedrich Dehnhardt and his son Alfredo, Giuseppe De Angelis, Salvatore Calyò, Michelangelo Valletta and, above all, Achille Bracco, probably a son of Tenore himself (Natale, 2019). Numerous plates were commissioned to support the description of new taxa published in the seed catalogues of the Garden (Del Guacchio & al., 2022) but as the catalogues were printed by the institution itself at low cost, they were never accompanied by published figures (e.g., Tenore, 1837, 1839, 1843, 1855). Sometimes, however, the figures were published later in academic journals, as in the case of the plates of "Dianthus vulturius" or "Vicia Barbazitae", both painted by Bracco and printed in black and white in Gussone & Tenore (1843), a few years after the corresponding protologues had been published in seed catalogues (Tenore, 1839). Therefore, while many illustrations were evidently commissioned, only few paintings were published in historical times; now they are all issued in De Luca & al. (2010) and similar works.

Here, we aim to resolve the taxonomic affinities of three names published by Tenore (1839, 1847, 1854), all of unknown geographical origin, and all supported by illustrations in the collection of the Botanical Garden of Naples. These names (*Muscari strangwaysii* Ten., Asparagaceae; *Pogostemon suavis* Ten. and *Salvia menthifolia* Ten., Lamiaceae) are currently considered synonyms of *M. neglectum* Guss. ex Ten. & Sangiovanni (a geophyte widespread from the Mediterranean to western Asia; for the correct name, see Böhnert & Del Guacchio, 2023), *P. cablin* (Blanco) Benth. (a perennial or subshrub native to Sri Lanka, Malesia, and Papua New Guinea), and *S. chamaedryoides* Cav. (a suffruticose chamaephyte endemic to Mexico) (POWO, 2023).

■ MATERIALS AND METHODS

We studied the relevant literature on the names *Muscari strangwaysii*, *Pogostemon suavis*, and *Salvia menthifolia*, including their protologues. Herbarium specimens were examined primarily at NAP, where Tenore's collections are located, and in other herbaria associated with Tenore, also taking into account Stafleu & Cowan (1986) (*B, BOLO, FI, *G, *P, PAD, PI, RO, *TU, *W, *WU; asterisk = searched online). Additional information was obtained from the historical catalogues of the Botanical Garden of Naples, mainly Tenore (1845) and Pasquale (1867), and from the documents kept in the same institution, all of which are still little known. We also searched for possible synonyms in Hassler (1994–), Plants of the World Online (POWO, 2023) and The Plant List (TPL, 2013). The articles cited in the text follow Turland & al. (2018; hereafter "*ICN*").

■ RESULTS AND DISCUSSION

***Muscari strangwaysii*. —** "*Muscari strangwaysii*" was first published in a seed list of the Garden (Tenore, 1837), but not validly so because no diagnosis or description was provided (*ICN* Art. 38.1). In the protologue, Tenore (1839: 11) provided a short description in Latin, a direct reference to Tenore (1837), as well as information on the flowering time and a diagnosis to distinguish the new species from *M. botryoides* (L.) Mill. and "*M. racemosum* Willd." (i.e., *M. racemosum* (L.) Medik., nom. illeg. = *M. neglectum*). The only detail about the origin of *M. strangwaysii* is that in the protologue Tenore dedicated the plant to his friend William T.H. Fox-Strangways, 4th Earl of Ilchester (1795–1865), a nobleman involved in art collecting, geology, and botany, and uncle of the aforementioned Fox Talbot (Desmond, 1994). As a British diplomat, Fox-Strangways travelled to several places, including Naples (Boase, 1897) where he met Tenore in 1831 or earlier (Tenore, 1831: 89, [556]), as well as Byzantium (modern Istanbul, in European Türkiye), from where he sent bulbs to Tenore (1839). While possible, it cannot be ascertained that the bulbs, sent by Fox-Strangways and later named after him, were collected near Istanbul.

Tenore (1845) later listed *Muscari strangwaysii* (as '*Strangwaisii*') as a European plant, possibly from Crimea (see below). It was accepted by Endlicher (1842), Heynhold (1846), and Kunth (1843), who placed the taxon in *Botryanthus*. Grisebach (1846) applied the name to a population found in the cemetery of Scutari (today Üsküdar, a district of Istanbul). Later, Heldreich (1878) discussed in detail the relationship in his description of *M. mordoanum* Heldr. from Türkiye, presently treated as another synonym of *M. neglectum* in POWO (2023). To establish the identity of *M. strangwaysii*, Heldreich (1878) corresponded with Vincenzo Cesati, the director of the Botanical Garden of Naples. Cesati found no original material in Tenore's herbarium and suggested to Heldreich that the name should be disregarded. However, Cesati did locate a sheet of *M. strangwaysii* in Gussone's herbarium and sent a sample to Heldreich together with a transcription of the taxonomic note written by Gussone on his label (see below). Heldreich agreed with Gussone in considering *M. strangwaysii* as almost identical to *M. botryoides*. However, he wondered whether the plant kept by Gussone was the type. Independently, Boissier (1882) came to a similar conclusion and considered *M. strangwaysii* a synonym of *M. botryoides*. Boissier (1882: 295, 297) added that the plant reported by Grisebach (1846) as *M. strangwaysii* should be considered *M. racemosum* var. *brachyanthum* Boiss. (an unresolved name, possibly a synonym of *M. neglectum*), while he misapplied Tenore's name to *M. polyanthum* Boiss. (= *M. armeniacum* H.J.Veitch). In the same year, Nyman (1882) erroneously reported *M. strangwaysii* as a variety of *Botryanthus lelievrei* (Boreau) Jord. & Fourr., but, following the opinion of Boissier (1882), combined it under *B. vulgaris* Kunth (cf. also Nyman, 1890). *Botryanthus lelievrei* and *B. vulgaris* are regarded as conspecific with *M. botryoides* (POWO, 2023). It is therefore

not clear why Jackson (1894) listed *M. strangwaysii* as conspecific with *M. neglectum* (under the name *M. racemosum*), a suggestion accepted by Govaerts (2009) and likely the reason *M. strangwaysii* is currently treated as a synonym of *M. neglectum* in all major plant taxonomic databases (e.g., Hassler, 1994–; POWO, 2023).

Endlicher (1842) cultivated plants under the name *Muscari strangwaysii* at the Botanical Garden of the University of Vienna in 1842, apparently from material sent by Tenore. Unfortunately, our search for relevant herbarium specimens connected to this name in Vienna was unsuccessful. However, living or dried material from Naples reached not only Vienna, but also other European botanical gardens (e.g., TU385299, which, in our opinion, was probably sent by Tenore himself). Furthermore, Boissier (1882) explicitly stated that he had seen specimens of *M. strangwaysii* made from plants cultivated at the Botanical Garden of Naples.

At NAP, we located two relevant specimens associated with the name *Muscari strangwaysii*. NAP0000871, from the Gussone Generale collection, includes three flowering individuals (one with dissected flowers) and two handwritten labels from Gussone. The first is the "representative label", i.e., a label including general information about nomenclature and distribution of a taxon, as well as description and taxonomic notes, normally associated by Gussone to the specimen he considered to be the most representative (see Santangelo & al., 2017): "*Muscari Strangwaysii* Ten. cat. ort. 1845 p. 48 [i.e., a reference to Tenore, 1845] | In Oriente [= In the East]". The other label contains taxonomic notes that are difficult to read: "*Muscari Strangwaysii* Ten. | Omnia ut *M. botryoide*; sed corollae | potius campanulatae quam […]-globosae, fauce [?] | latior, denticuli minus rotundati, […] | filamenta aequalia cyanea glabrescen[?], germen vi- | rescens profunde sulcatum ovatum stylo albo | aequali" (transl.: *Muscari strangwaysii* Ten. | All as in *M. botryoides*, but with corollas rather campanulate than […]-globose, mouth [?] | wider, lobes less rounded, […] | stamen filaments of the same length, sky-blue and glabrescent, ovary greenish, | deeply grooved and with white style equaling in length). The second specimen (NAP0000872, Fig. 1 herein) was found in Tenore's herbarium, despite Cesati's statement reported by Heldreich (1878: 52): "I therefore wrote to Prof. Cesati in Naples, who kindly informed me that neither in his herbarium nor anywhere else was an original specimen, nor a description or illustration, nor any trace of Tenore's plant to be found, and hence this Muscari"; transl. from German). It includes one individual with an emerging scape and another at anthesis; the sheet bears a handwritten label by Tenore: "*Muscari Strangwaysii* | Ten. | Crimea? | *H.* [= *Hyacinthus*?] *patens* Strangw. [i.e., an unpublished name]". Shadows on the sheet (in the form of plant outlines) indicate that other plants had been mounted on the same sheet. The shape of at least one of these outlines is identical to the individual present on one sheet of Cesati's herbarium at RO. The annotations on the label in NAP0000872 include the name under which William T.H. Fox-Strangways sent bulbs to Tenore, and this demonstrates that Tenore must have based his description also on these plants. Therefore, NAP0000872 must be regarded as original material for the name. A revision label by Pierfelice Ravenna identifies the specimen as *M. botryoides*.

The illustration commissioned by Tenore of "Muscari Strangwaysii" is a watercolour on paper (ca. 26.5 × 40.0 cm) made by Achille Bracco in 1839 (Natale, 2019; Fig. 2 herein). While not particularly elaborate, it depicts a flowering plant with a bulb and an enlarged detail of the pistil. In the drawing the stamens are inaccurate, since in *Muscari* they are epipetalous and not inserted at the base of the ovary (Davis & Stuart, 1984). The watercolour is well preserved with brilliant colours but was roughly trimmed to fit the paper backing. The plate was produced before the publication of the protologue, although there is no date on the copy. This can be determined because by order of the Bourbon minister, the illustrations could only be paid for after an assessment by the director of the "Accademia delle Belle Arti", at that time the architect Antonio Niccolini (Natale, 2019). This is recorded in the accounts of the Botanical Garden from this period (now housed

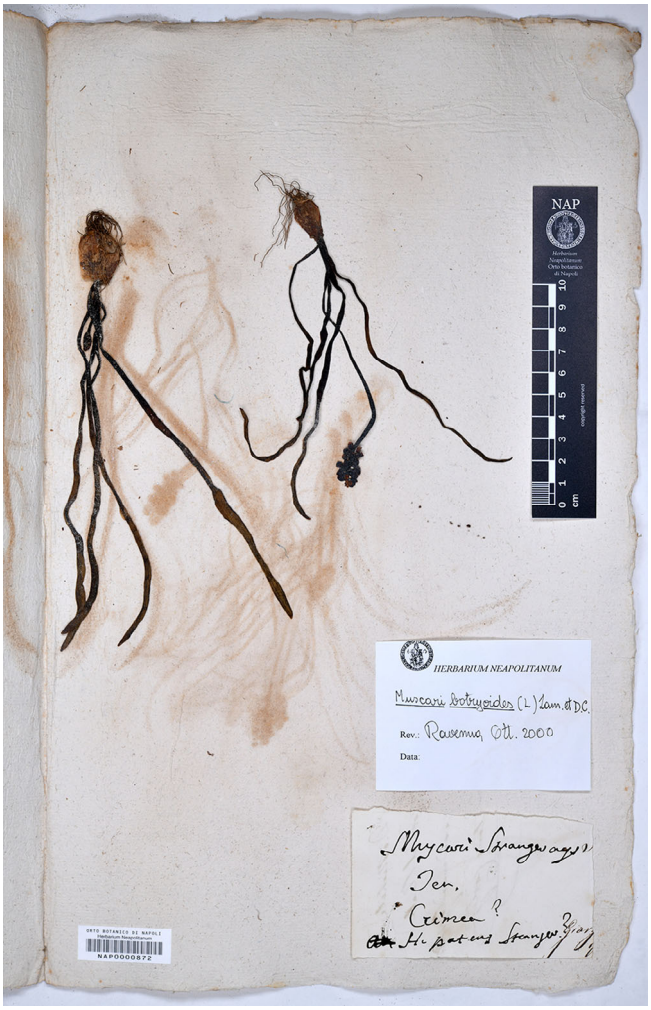


Fig. 1. Lectotype of *Muscari strangwaysii* (NAP, barcode NAP0000872, by permission of the Director).

in its library; Fig. 3). The plate was evaluated and paid for on 3 December 1839, but it must have been prepared in the spring of 1839 or earlier, during the flowering season of the plant (May, according to Tenore, 1839). Therefore, the plate, which was undoubtedly made under Tenore's direct supervision, represents original material of *M. strangwaysii*.

Examination of the two NAP specimens and of the plate allows us to definitively exclude any identification with *Muscari neglectum*. It is important to note that, in this case, despite the presence of original specimens, a decisive contribution to unambiguous identification has been provided by the plate. In fact, dried material of *Muscari* can be very difficult to identify (see also Davis & Stuart, 1980) and, in our case, the plate supports relevant information about colour of flowers and shape of fresh leaves. In all the elements of original material, the inflorescence is about twice longer than wide, rather lax and sparsely flowered; corollas ovoid or campanulate-oblong, sometimes sub-globose, cylindrical or pyriform, shouldered, only rarely longer than wide, scarcely constricted, with white revolute teeth and pedicel as long or shorter than corolla, patent or deflexed; the leaves are 3 or 4, broadly linear, erect or arcuate, shorter to slightly longer than scape, intact at flowering time; the bulb is brown or dark brown with no evident offset. In the paintings, fertile flowers are blue, darker along the groves, and sterile flowers somewhat paler; the leaves are deeply canaliculate and hooded at apex; in the specimens, the fully opened corollas are about 4 mm long. In contrast, *M. neglectum* has elongated and dark fertile flowers, much paler sterile flowers, proliferating bulbs, and more numerous and narrower leaves among other characters (e.g., Davis & Stuart, 1980).

Instead of being conspecific with *Muscari neglectum*, the characters outlined above suggest that *M. strangwaysii* should be treated as a synonym of *M. botryoides*, as already suggested by Heldreich (1878) and Boissier (1882). This concurs with the identification of original material by Pierfelice Ravenna (in sched.). These scholars all examined



Fig. 2. Plate "Muscari Strangwaysii" (Plate Collection of the Botanical Garden of Naples, by permission of the Director).

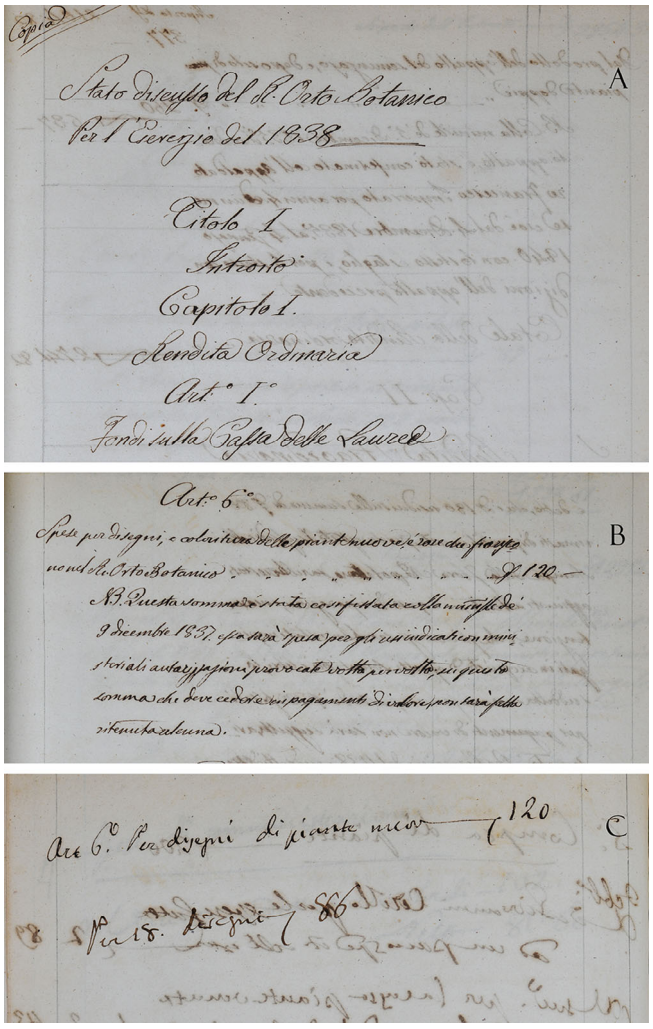


Fig. 3. Ledger of income and expenses of the Botanical Garden of Naples relative to 1839. This is the first record of the annual expenses for the illustrations (120 ducats), after the approval of a special fund devoted to them, granted by the Minister of Internal Affairs, Nicola Santangelo, on 24 July 1837. The event is recalled here (Archive of the Botanical Garden of Naples, by permission of the Director). **A**, First page of the ledger; **B**, Passage with the mention of the illustrations; **C**, Note on the expenses for the illustrations, handwritten by Tenore.

original material of the name (cf. Govaerts, 2009). Gussone also noted (on the label of NAP0000871) that the plant was almost identical to *M. botryoides*, but differed slightly in having more campanulate flowers, with a wider mouth and less ovate lobes, and in other less important floral details (see the label transcribed above). We here adopted a broad circumscription of *M. botryoides* (e.g., Davis & Stuart, 1984; Dimopoulos & al., 2013; POWO, 2023) that treats the various infraspecific taxa as included in the variability of this widely distributed species (e.g., Garbari, 1984; Kerguélen, 1999; PFI, 2023; Raab-Straube, 2023). Accordingly, *M. strangwaysii* should be treated as a synonym of *M. botryoides*.

If *Muscari kerneri* (Marches.) Soldano, *M. botryoides* subsp. *longifolium* (Rigo) Garbari, and *M. lelievrei* Boreau are kept separate from *M. botryoides*, none of them can be identified with *M. strangwaysii*, especially in relation to leaf shape and raceme density. *Muscari armeniacum* is another widespread and variable species that resembles *M. strangwaysii* (especially for the wide orifice), but its flowers are distinctly longer than wide, weakly shouldered, more numerous and usually organized in dense, pyramidal racemes (Davis & Stuart, 1984). Several new species of *Muscari* subg. *Muscari* have been described from Türkiye in recent years (see, e.g., Eker, 2019a,b and references therein; Uysal & al., 2022), and presumably further taxonomic novelties in the group as well as alternative taxonomic assessments are to be expected (see Böhnert & al., 2023). Among these new taxa, *M. fatmacereniae* Eker shares various characters with *M. strangwaysii*, such as the flowers that are more oblong than the typical *M. botryoides*, but these are very constricted, the raceme is notably bicoloured, and the leaves are thinner and narrow (Eker, 2019b).

Note that the putative homonym "*Muscari strangwaysii* Kotschy ex Baker; J. Linn. Soc., Bot. 11: 417 (1871)" (Hassler, 1994–) does not exist: it is a misapplied name used by Kotschy for no. 73 of his series "Iter cilicico-kurdicum".

Muscari botryoides (L.) Mill., Gard. Dict., ed. 8 [unpaginated]: *Muscari* no. 1. 1768 ('*botryoide*') ≡ *Hyacinthus botryoides* L., Sp. Pl.: 318. 1753 ≡ *Eubotrys arvensis* Raf., Autik. Bot.: 124. 1840, nom. illeg. (*ICN* Art. 51.1 and 51.2(e)) ≡ *Botryanthus vulgaris* Kunth, Enum. Pl. 4: 311. 1843, nom. illeg. (*ICN* Art. 51.1 and 51.2(e)) – Lectotype (designated by Stearn in Ann. Mus. Goulandris 8: 206. 1990): Herb. Linnaeus No. 438.16 (LINN [digital image!]).

= *Muscari strangwaysii* Ten., Index Seminum (Naples) 1839: 11. 1839 ('*Stangwaysii*', *ICN* Art. 60.1) ≡ *Botryanthus lelievrei* var. *strangwaysii* (Ten.) Nyman, Consp. Fl. Eur.: 734. 1882 ('*Lelievrii* var. *M. Strangwaisii*') – **Lectotype (designated here):** "*Muscari Strangwaysii* Ten. | Crimea? | *H. patens* Strangw.?", s.d., [*W.T.H. Strangways*] *s.n.* (NAP barcode NAP0000872!).

– "*Muscari strangwaysii*" Ten., Index Seminum (Naples) 1837: 5. 1837, nom. nud. (*ICN* Art. 38.1).

– "*Botryphile botryoides*" Salisb., Gen. Pl.: 25. 1866, not validly published (*ICN* Art. 35.2).

Notes. – Miller (1768) did not cite explicitly the basionym of *Muscari botryoides*, but see Art. 41.4 of the *ICN*; for the correct epithet, see Art. 60.1 of the *ICN*).

For an illustration of the lectotype of *Muscari strangwaysii*, see Fig. 1.

***Pogostemon suavis*. —** Tenore (1847: 53) explained that in his time, Neapolitan perfumers used a delicious essence called Path-couli, which he believed was likely extracted from a Chinese plant. When he visited the nursery of the brothers Cels in Paris, he recognized the same scent in a sterile plant of unknown origin (Tenore, 1847: 53). On his return to Naples, he cultivated the plant, but further efforts to identify it were unsuccessful (Tenore, 1847: 53). In the meantime, he heard that the "famous Pat-chouli" was flowering in the Jardin des Plantes in Paris and that it was classified as a *Pogostemon* (Tenore, 1847: 53). Moreover, he was also evidently informed the plant was very similar to *P. plectranthoides* Desf., a species also of unknown native range (Tenore, 1847). It was under this latter name that the plant cultivated in Naples appeared in the catalogue of the Garden (Tenore, 1845).

When the plant had finally flowered, Tenore (1847) described it as a new species, *Pogostemon suavis*. Tenore based this conclusion mainly on the monographic works of Bentham (1833, 1844). The individual cultivated in the Botanical Garden of Naples was also remarkable for a floral anomaly (duplication of the style), first noticed by Achille Bracco when he produced the illustration of it commissioned by Tenore. By coincidence, George Bentham visited the Garden at the time and Tenore showed him the plant with the floral anomalies (Tenore, 1847: 55–56). Bentham's opinion was not reported by Tenore (1847), but it can be deduced from Bentham (1848) wherein he mentioned *P. suavis* as a taxon worthy of further study to be compared with *P. parviflorus* Benth. and *P. heyneanus* Benth. Much confusion was then caused by the description of "Patchouly" by Pellettier-Sautelet (1844), based on plants grown in Orléans (France). The publication of *P. patchouly* Pellet.-Saut. was overlooked by both Tenore and Bentham, but ironically was pointed out by Saint-Hilaire (1848) in the same volume of the *Giornale Botanico Italiano* in which Tenore published *P. suavis*.

Tenore was not completely convinced of this synonymy, because he listed the plant again as "*Pogostemon suavis* (*P. patschiuli* [sic!]) Ten." (Pasquale & Tenore, 1848). Hooker (1849a,b) reduced *P. suavis* to a synonym of *P. patchouly*, and *P. heyneanus* to a variety of it. On the contrary, Hooker (1885) identified *P. heyneanus* with *P. patchouly*, but recognized *P. suavis* as a distinct variety of *P. patchouly*. In contrast, according to Jackson (1894), followed by TPL (2013), both *P. patchouly* and *P. suavis* would be synonyms of *P. heyneanus*. Prain (1898) interpreted *P. patchouly* as a cultivar of *P. heyneanus*, and *P. suavis* as identical to *P. cablin* (Blanco) Benth.; this treatment was followed, for example, by Duthie (1911). Later (Anonymous, 1908) *P. suavis* and *P. patchouly* were considered identical to *P. cablin*, a view adopted by Merrill (1912) and, more recently, by Yao & al. (2015) and POWO (2023).

Merrill (1912) added that the plant referred to by Hooker (1885) as "*P. patchouli*" was actually *P. heyneanus*, creating an inextricable confusion. A somewhat "intermediate" solution was adopted by Bhatti & Ingrouille (1997), who included *P. suavis* pro parte in *P. heyneanus*, and pro parte in *P. cablin*.

Yao & al. (2015: 4), citing the protologue, gave the origin of *Pogostemon suavis* as China and listed the type as "FI?, not traced". However, Tenore (1847: 56) only doubtfully indicated it as a Chinese plant ("Habitat China?") and we did not locate any specimen supporting this. Fortunately, a plate of *P. suavis* is preserved. It measures approx. 35.5 × 45.5 cm and was made by Bracco (Natale, 2019). In the protologue, Tenore (1847: 55) provided valuable details on the work of Bracco and the other painters he commissioned; he also explicitly stated that the plate was original material for the name, since it had been made before the publication of the protologue, and the validating description was also based on it. This coincides perfectly with the date of Niccolini's evaluation of the plate on 22 September 1847 (Natale, 2019). The painting (Fig. 4) depicts a flowering stem with enlarged details of bracteoles, calyces and flowers, with particular attention to the deeply bifid or dimidiate style. As was common practice, a scale was not included, but based on our experience, the dimensions are probably larger than life. Given the absence of extant specimens, the plate is the obligate choice for the lectotypification, since it is the only existing original material for the name (*ICN* Art. 9.12).



Fig. 4. Lectotype of *Pogostemon suavis* (Plate Collection of the Botanical Garden of Naples, by permission of the Director).

To assess the taxonomic identity of the plant described by Tenore (1847), one must also consider the identities of those cultivated in Orléans (Pellettier-Sautelet, 1844), and at Kew Gardens, which were illustrated by Hooker (1849a,b) and later again discussed by Hooker (1885) (see also Anonymous, 1908). Hooker (1849a,b) indicated that the plant was donated by George Bentham's wife and initially provided to her by Tenore (Hooker, 1849a). Evidently, it was derived from the only individual cultivated at the Botanical Garden of Naples (not "Palermo" as Hooker [1885] erroneously stated), which was shown to Bentham during his visit (Tenore, 1847). Although not mentioned in the text, and not clearly shown in the enlarged details of the plate, many flowers of the main figure published by Hooker (1849b) show an exaggeratedly bifid style (see also Yao & al., 2015: figs. 1, 3, 5, 6, 8, 9, 11, 12, 14, 15, 17, 18). This can be interpreted as the anomaly that occurred in the flowers of the plant grown in Naples. The only clear difference between the plate published by Hooker (1849b) and Bracco's is the more developed inflorescence of the former, which could be related to different phenological states of the plants depicted in the two illustrations. Hence, Hooker (1885) was correct in identifying the Kew plant as *Pogostemon suavis* and in distinguishing it from *P. patchouly.*

The illustration accompanying the protologue of *Pogostemon patchouly* (Pellettier-Sautelet, 1844) seems to be the only original material preserved, as no specimen was found at ORM (Vladimir Jecmenica, pers. comm.). Its identification, supported by the original description, easily leads to *P. cablin* due to the following characteristics: shrub with leaves opposite and petiolate, inflorescence with more than two lateral branches, corolla exserted and calyx 6 mm long (Bhatti & Ingrouille, 1997; Yao & al., 2015).

This implies that Hooker (1885) effectively confused the true patchouli or *Pogostemon patchouly* (= *P. cablin*) with the false patchouli *P. heyneanus*, which may not be closely related despite morphological similarity (Yuan & al., 2022). We find that the putative diagnostic characters, such as the shape of the leaves and the inflorescence (Bhatti & Ingrouille, 1997) are very variable; while the calyx teeth are acute and glabrescent in *P. cablin*, but subulate-lanceolate and villous in *P. heyneanus*. The latter features allow the recognition of *P. heyneanus* in the illustrations of Tenore (1847) and Hooker (1849b) and hence the lectotype of *P. suavis* is conspecific with *P. heyneanus*.

Pogostemon heyneanus Benth. in Wallich, Pl. Asiat. Rar. 1 (2): 31. 1830 ('*P. heyneanum*', *ICN* Art. 62.2(a)) – Lectotype (designated by Bhatti & Ingrouille in Bull. Nat. Hist. Mus. London, Bot. 27: 94. 1997, as "type", cf. *ICN* Art. 7.11): Ceylon, s.d., [*J.*] *Macrae s.n.* [included in N. Wallich's

Catalogue no. 1532] (K barcode K000509678 [digital image!]).

= *Pogostemon suavis* Ten. in Giorn. Bot. Ital. 2: 56. 1847 ≡ *Pogostemon patchouly* var. *suavis* (Ten.) Hook.f., Fl. Brit. India 4(12): 634. 1885 – **Lectotype (designated here):** [unpublished illustration] "Pogostemon suavis", unnumbered plate preserved at the Botanical Garden of Naples.

Note. – For an image of the lectotype of *Pogostemon suavis*, see Fig. 4.

Salvia menthifolia. — *Salvia menthifolia* was validly published in one of the few works by Tenore (1854) published in a French journal, again consisting of annotations to a seed catalogue issued by the Garden (Tenore, 1855). Based on the protologue (Tenore, 1854), this plant was cultivated in the Garden under the erroneous name *S. chamaedryoides* Cav., from which it differed mainly in the colour of its flowers, which are red instead of blue. However, *S. menthifolia* and *S. chamaedryoides* are considered synonyms in POWO (2023). Tenore (1854) gave no further information as to the identity of *S. menthifolia*, although interestingly he may have been particularly fond of this species, as his colleagues at the Academy (i.e., Accademia degli Aspiranti Naturalisti) and his students decorated his tomb with its flowers (Anonymous, 1861). Among them, there was Pasquale (1867, 1881), who later stated that *S. menthifolia* should be referred to as *S. grahamii* Benth., i.e., *S. microphylla* Kunth according to POWO (2023). To justify this, Pasquale (1867) cited the unpublished plate in the Garden collections, in one of the rare citations of the plates after Tenore's time. Curiously, the little-known name *S. menthifolia* appeared sporadically in medical papers, where its correct identity could be particularly useful (e.g., Fiore & al., 2012), as well as in nursery catalogues (https://www.bio-gaertner.de/pflanzen/Ziersalbeiarten).

Salvia menthifolia was published by a Latin description and a diagnosis to distinguish the new species from *S. chamaedryoides* (Tenore, 1854: 379). However, Tenore did not provide a native range or iconography. The validating diagnosis was reproduced unchanged in Tenore (1855). This latter catalogue, printed in a Spartan typography without any date of publication, contains annotations with the same description of the name given in Tenore (1854). In fact, the French article is identical to the notes in Tenore (1855). This might suggest that the two publications are alternative versions. Nevertheless, Tenore (1855) gave the year 1855 only in the title. Considering that the seed catalogues were printed at the end of the corresponding year (e.g., Tenore, 1837, 1839) or at the beginning of the following year (Tenore, 1843), and that the second volume of the *Annales des sciences naturelle* reports the date 1854 throughout (e.g., frontispiece, p. 83, 110, 164, 187, 109, etc.), Tenore (1854) was likely printed first.

No corresponding specimen for this name has been found. At PI there is a sheet gathered by Michele Guadagno (PI No. 039298) that includes material identified as *Salvia menthifolia*, presumably collected at Naples between 1885 and 1930 and merely testifying the use of the name at that time to indicate cultivated plants of *S. microphylla*. Similar plants still grow "semi-spontaneously" in the Botanical Garden of Naples. The plate "Salvia menthaefolia", of unknown date, was made by Bracco and measures about 32.5 × 48.0 cm (Natale, 2019) (Fig. 5). Relevant morphological details are clearly visible in Bracco's painting: the inflorescence is racemose, the calyx is campanulate with the upper lobe undivided; the corollas are scarlet, with the upper lip bulging and the lower lip with two equaling lateral teeth and the central lobe emarginate; the bracts have the shape (and presumably the size) of the leaves, which are ovate-subcordate with crenate margins; the stamens are included. Despite the plate lacks a scale and internal details of the corolla (the papillae in the tube would be diagnostic), the above mentioned features allow the identification of the plant as *S. microphylla*, a well-known ornamental species native to Arizona (U.S.A.), Guatemala, and Mexico (Fernald, 1900; Epling, 1939; Standley & Williams, 1973; Compton, 2000; González-Gallegos & al., 2014; Martínez-Ambriz & al., 2019; POWO, 2023). According to Pasquale (1867), who first proposed the synonymy, the only



Fig. 5. Neotype of *Salvia menthifolia* (Plate Collection of the Botanical Garden of Naples, by permission of the Director).

slight difference between *S. menthifolia* and *S. microphylla* (= *S. grahamii* in Pasquale, 1867) was the shape of the bracts, which in *S. menthifolia* were slightly acuminate but similar to those of the branches. However, this character is fully within in the variability of *S. microphylla* (Standley & Williams, 1973; Calderón de Rzedowski & Rzedowski, 2005; González-Gallegos & al., 2014). Therefore, the identity of *S. menthifolia* as a synonym of *S. microphylla* is certain.

In the absence of any precise documentation regarding the date of the plate (D. Natale, pers. comm.), it cannot be considered original material; nevertheless, it is preferable to any modern specimen for the purposes of typification, since it was made under Tenore's supervision and with his approval. Hence it is here selected as neotype.

Salvia microphylla Kunth in Humboldt & al., Nov. Gen. Sp. 2 (8), ed. qu.: 295; ed. fol.: 239. 1818, non Sessé & Moc., Fl. Mexic.: 9. 1893, nom. illeg. (*ICN* Art. 53.1) – Lectotype (designated by Epling in Feddes Repert. Spec. Nov. Regni Veg. Beih. 110: 277. 1939, as "typus"): "XII. *Salvia*", South America ("Habitat in America meridionali"), s.d., [*F.W.H.A. von*] *Humboldt* [*& A.J.A. Bonpland*] *s.n.* (B barcode B -W 00515 -01 0 [digital image!]; isolectotype: P 2D-barcode P00670431 [digital image!]).

= *Salvia menthifolia* Ten. in Ann. Sci. Nat., Bot., sér. 4, 2: 379. 1854 ('*S. menthaefolia*', *ICN* Art. 60.10) – **Neotype (designated here):** [unpublished illustration] "Salvia menthaefolia", unnumbered plate preserved at the Botanical Garden of Naples.

Note. – As far as we can determine, the first author indicating a type for the name *Salvia microphylla* was Epling (1939), who wrote "typum in herb. Mus. Berolin. vidi" (I saw the type at the Herbarium of the Museum in Berlin [B]: a statement that was sufficient at the time as a lectotype designation (*ICN* Art. 7.11) and did not require further action, due to the existence of only one voucher at B. In this regard, despite the statement by González-Gallegos & al. (2014), the lectotype is still extant, as Humboldt's specimens at B are kept in the Willdenow Herbarium, which survived the fatal fire of Berlin during the Second World War (Stafleu & Cowan, 1979: 363). Finally, it should be noted that on the lectotype only the name "Humboldt" is given, but here, according to Curators Herbarium B (2000–), both Humboldt and Bonpland are credited as collectors; however, the protologue suggests that the plant was collected by Bonpland alone ("ex Bonpland").

For an illustration of the neotype of *Salvia menthifolia*, see Fig. 5.

■ AUTHOR CONTRIBUTIONS

EDG conceived the idea of the work and wrote the first draft of the manuscript. TB edited the taxonomic treatment of *Muscari* and revised the second draft, including the English language throughout. GS cured the iconography and the archivistic research. ODC searched for relevant literature. PC wrote the second draft of the manuscript and supervised the work.

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