WHAT IS *SAMBUCUS MEXICANA* (ADOXACEAE)?

Alan T. Whittemore

US National Arboretum
3501 New York Ave NE
Washington, DC 20002-1958 U.S.A.
Alan.Whittemore@ars.usda.gov

ABSTRACT

Inconsistent application of the name *Sambucus mexicana* C. Presl ex DC. has resulted in confusion in the literature and in herbaria. In order to determine the correct application of the name, Presl's original material (a Haenke collection, made on the Malaspina Expedition) was located and characterized. It matches plants from the area around Monterey, California, where Haenke did much collecting, and clearly differs from *Sambucus* taxa in other parts of North America. The name *S. mexicana* must be applied to plants from California and adjacent areas, as has been done by most authors, not to plants from central Mexico, as in a few recent references. A lectotype is designated for the species.

Key Words: Elder, lectotypification, Haenke

RESUMEN

La aplicación inconsistente del nombre *Sambucus mexicana* C. Presl ex DC. ha dado como resultado confusiones en la literatura botánica y en herbarios. Con el objetivo de determinar la correcta aplicación del nombre, el material original de Presl (una colección de Haenke, realizada en la expedición en Malaspina) fue localizado y caracterizado. Se juntan plantas del área de alrededor de Monterey, California, donde Haenke hizo una amplia recolección y en la que se diferencia claramente de otros taxones de *Sambucus* de otras partes de Norte América. El nombre de *S. mexicana* debe ser aplicado a aquellas plantas de California y áreas adyacentes, como ya ha hecho la mayoría de autores, y no a aquellas plantas del centro de México, como se ha realizado en algunas referencias recientes. Se designa un leptotipo para la especie.

INTRODUCTION

The genus *Sambucus* L. is a group of trees, shrubs, and perennial herbs, distributed worldwide in temperate habitats, and in mountains in the tropics. The group is taxonomically difficult, and the number of species recognized worldwide varies greatly from author to author (Applequist 2015).

The oldest name described from the Pacific side of North America is *Sambucus mexicana* C. Presl ex DC. (1830), which was based on a Haenke collection, with the collection locality given only as "Mexico." This name has been widely applied to a species of the western United States and northernmost Mexico (Jepson 1923–1925; McMinn 1959; Munz & Keck 1959; Abrams & Ferris 1960; Kearney & Peebles 1960; Shreve & Wiggins 1964; Munz 1974; Elias 1980; Wiggins 1980; Dempster 1993; Stuart & Sawyer 2001). However, some authors have applied it to plants found in central Mexico and southward (Sanchez 1968; Nash 1976; Arreguin 1985); different authors have used the name for two different neotropical taxa (see below). More recently, Bolli (1994) applied the name *S. mexicana* to tropical Mexican plants but specifically stated that he had not seen the type. Despite this, Bell (2017) and Felger et al. (2001) have followed his interpretation.

The continued use of this name for several different taxa is a serious source of confusion in this already confusing genus, and it has been made worse by authors changing previous usages without first examining the type specimen. In the course of treating Adoxaceae for the *Flora of Oregon*, it became clear that progress toward a widely acceptable taxonomy of the genus will not be possible until the original material has been clearly identified so that usage of the name can be fixed.

MATERIALS AND METHODS

In order to fix the correct use of the name and allow a stable nomenclature to develop, the type material was examined and compared with herbarium specimens from the central Mexican highlands and the area around Monterey, California—the two areas where Haenke could have collected the type. In order to assess variation in *Sambucus* in regions where Haenke collected, blue-fruited *Sambucus* from throughout temperate and

tropical North America were examined at several herbaria (CAS, JEPS, MO, NA, UC, US), including several hundred specimens from the western United States and 245 specimens from Mexico, Central America, and the West Indies.

RESULTS AND DISCUSSION

Candolle's protologue for *S. mexicana* gives a brief, vague description that could apply to several *Sambucus* species with flat-topped, 5-rayed inflorescences. The protologue cites one collection, Mexico in hb. Haenke. Haenke's Mexican collections were made as part of the Malaspina expedition, which visited North America in 1790–1792, a time when Spanish authorities considered Mexico to include all the Pacific coast of North America north of Guatemala. The expedition spent time ashore at Acapulco, Guerrero; Monterey, California; and Nootka Sound, Vancouver Island; and explored the coastline of southern Alaska. While in Acapulco, Haenke travelled to Mexico City and collected plants in the vicinity of Mexico City. Since there are no *Sambucus* spp. in the vicinity of Acapulco, and since Nootka Sound and the southern Alaska coast have only *S. racemosa* var. *arborescens* (Torr. & A. Gray) A. Gray (a taxon with a paniculate inflorescence that does not fit Candolle's description at all), the type must have come from either Monterey, California, or the central Mexican highlands near Mexico City.

Three sheets of *Sambucus* collected by Haenke and annotated as *S. mexicana* by Presl have been located. These must be regarded as the surviving original material. A specimen at HAL (HAL 0114185, http://herbarium.univie.ac.at/database/detail.php?ID=300434) is labelled "Sambucus mexicana Presl" "Haenke" and "Mexico" in Presl's handwriting; a specimen at MO (5257790, http://www.tropicos.org/Image/100247838) is labelled "Sambucus mexicana Presl" and "Mexico" in Presl's handwriting, but the collector's name is not given; and a specimen at PRC (PRC 455008, http://plants.jstor.org/stable/10.5555/al.ap.specimen.prc455008), the most ample of the three sheets, bears only the annotation "Sambucus mexicana Presl" in Presl's handwriting. (All three of these specimens bear additional modern annotations, which are not relevant for determining type status.) The specimen MO 5257790 was examined, and high-quality images of HAL 0114185 and PRC 455008 were seen.

The plant material on these three sheets is essentially identical. The leaves are pinnately 7-foliolate, the leaflets are lanceolate to lance-oblong, the largest leaflets are 37–45 × 13–18 mm, leaflet bases are obtuse or broadly acute, and their apices are acute. Leaflet margins are finely serrulate from base to apex, with sharp forward-pointing teeth spaced 1(–2) mm apart and less than 0.5 mm deep. Most of the leaflets in the dry specimens are folded lengthwise along the midrib. Each sheet has one old, broken infructescence with no fruit remaining. These infructescences are umbelliform, with 5 equal rays from the base, and they are quite small, the longest ray of the infructescence being 27–42 mm long.

The specimen PRC 455008 is by far the most ample of these specimens, having two twigs with many leaves in good condition, and one intact infructescence; therefore, PRC 455008 is here designated as the lectotype of *Sambucus mexicana* C. Presl ex DC., Prodr. 4:322. 1830. The other two specimens annotated by Presl as *S. mexicana* (HAL 0114185 and MO 5257790) are probable isotypes.

A fourth specimen, PRC455009 (http://plants.jstor.org/stable/10.5555/al.ap.specimen.prc455009), may be a duplicate of this material, but the only annotations identifying it as *S. mexicana* are modern, so it cannot be proven to be original material. The only annotation in Presl's handwriting says, "Ad Acapulco in Mexico legit Haenke." The locality on this specimen, Acapulco, is problematic, since no *Sambucus* species occur anywhere in the vicinity of that city. However, Haenke's specimens were not labelled until long after his death, and many labels have erroneous localities (Sterling 1997). This specimen is similar to the other three, with the morphology of the Monterey plant, not anything that might have been collected in central Mexico.

Plants with the morphology of Presl's original material of *S. mexicana* are common in the area around Monterey, California, but *Sambucus* collections from central Mexico clearly differ from these plants.

Sanchez (1968) and Arreguin (1985) have applied the name *S. mexicana* to the native *Sambucus* of the Valley of Mexico, but plants from this region differ from the type of *S. mexicana* in the much larger leaflets

(95–123 × 37–51 mm) that are lanceolate to narrowly elliptical, with the leaflet base rounded or broadly rounded-obtuse and the apex slenderly acute or acuminate, the leaflets pressed flat and never folded along the midrib, and the much larger inflorescence (longest rays 94–133 mm long). Most of these specimens have the rachis glabrous or pubescent only in the adaxial groove; the leaflets lanceolate to narrowly elliptical, evenly long-tapered to a narrowly acute apex; margins finely and sharply serrulate, with teeth 0.4–0.7 mm deep and 1–2 mm apart. Specimens with this morphology have been seen from Mexico (Chiapas, DF, Hidalgo, Jalisco, Mexico, Morelos, Oaxaca, Veracruz) and Central America (Guatemala, El Salvador, Costa Rica, Panama); these plants are a good match for the type of *S. oreopola* Donn. Sm. (*Tonduz 4223*, US 00130219!). However, some central Mexican specimens display a different morphology, with the rachis hispid, the leaflets broadly elliptical or oblong, abruptly contracted to a relatively short acumen, and margins coarsely serrate, with strong sharp teeth (1–)1.5–2.5 mm deep, 2–4 mm apart. Plants with this morphology have been seen only from Mexico (Chiapas, Oaxaca, Puebla, Tlaxcala, Veracruz) and Guatemala. The taxonomy of *Sambucus* in central and southern Mexico and Central America is badly in need of further investigation, but none of the plants found here resembles the type of *S. mexicana*.

Nash (1976) has applied the name *S. mexicana* to yet another taxon—she treats *S. mexicana* as the oldest name for a plant known by several names in the literature. The plant Nash describes is widespread around the Caribbean and eastern Gulf of Mexico, where authors have called it *S. simpsonii* (Gooding et al. 1965; Adams 1972; Little et al. 1974), *S. canadensis* var. *laciniata* A. Gray (D'Arcy 1973), or simply *S. canadensis* (Liogier 1985, 1995; Howard 1989; Nicolson et al. 1991; Solomon 2001). This plant differs from the type of *S. mexicana* in having larger leaflets (62–90 × 21–34 mm) abruptly contracted to a long, slender, usually entire acumen, their margins with fewer, more remote teeth (teeth (2–)3–6 mm apart), and larger inflorescences (longest ray of inflorescence (45–)50–97 mm long). It is doubtful that Haenke could have seen this taxon anyway—although it is widespread in Central America and the West Indies, the only Mexican specimens I have seen have come from southern Veracruz, Tabasco, and Yucatan, outside the area visited by Haenke. The taxonomic status of these plants needs to be investigated. Some specimens from the eastern United States (including the Florida type specimens of *S. canadensis* var. *laciniata* and *S. simpsonii*) are rather similar to the neotropical material, but the range of variation in blue-fruited elders in the eastern United States is very different from the range seen in the neotropics, and neotropical specimens usually differ in having fewer, more remote teeth that are often confined to the distal half of the terminal leaflet (exclusive of the long, entire acumen). The type of *Aralia sololensis* Donn. Sm. (Guatemala, *Kellerman 5828*, US 00037057!) also belongs to this species. Resolving the correct name for this taxon will require a better understanding of the genus *Sambucus* in temperate North America. Current works treat all of the blue-fruited elders of temperate eastern North America as one species, *S. canadensis*, but they are quite variable (Applequist 2015). Blue-fruited elders in the eastern United States tend to be soboliferous and more or less colonial, spreading via woody underground runners, very different from western elders. These aspects of the growth form need to be documented for the Mexican taxa, since such data are very seldom clearly recorded on herbarium labels, and such variation is not captured in herbarium specimens consisting of only an inflorescence and a few of the uppermost leaves. Fieldwork is needed to document the distribution of different growth forms and possible correlation with other characters.

There are also taxonomic questions surrounding the blue-fruited elders of temperate western North America. The type of *S. mexicana* represents a morphology that is common at low elevation in hot and dry climates in western and southern California, southern Utah, Nevada, Arizona, New Mexico, Sonora, and Chihuahua. Farther north, and southward at higher elevations, blue-fruited elders with quite a distinct morphology, often called *S. cerulea* Raf., are found from British Columbia east to Montana, and south in the mountains to Durango and Nuevo Leon. *Sambucus mexicana* and *S. cerulea* were traditionally treated as distinct species (Munz & Keck 1959; Abrams & Ferris 1960; Munz 1974; Elias 1980), but where these two taxa meet at medium elevations in eastern and southern California, Nevada, and Arizona intermediates are found over large areas, and in recent publications they have often been considered conspecific (Dempster 1993; Bolli 1994; Stuart & Sawyer 2001; Bell 2017). It is unknown whether these intermediates represent primary

intergradation, or hybridization following secondary contact. Since these two taxa maintain their identities over very large areas, but intergrade extensively where they come in contact, it seems best to recognize them as *S. mexicana* subsp. *mexicana* and *S. mexicana* subsp. *cerulea* (Raf.) A.E. Murray, respectively (Whittemore in press).

CONCLUSIONS

The name *Sambucus mexicana* is correct in the sense in which it has been most widely used, in the sense of Abrams and Ferris (1960), Dempster (1993), Elias (1980), Jepson (1923–1925), Kearney and Peebles (1960), McMinn (1959), Munz and Keck (1959), Munz (1974), Shreve and Wiggins (1964), Stuart and Sawyer (2001), and Wiggins (1980). The neotropical taxa that were called *S. mexicana* by Arreguin (1985), Nash (1976), and Sanchez (1968) will need other names.

ACKNOWLEDGMENTS

I thank the curators of the herbaria listed for access to their collections, and Bruce Baldwin and Stephen Meyers for helpful suggestions.

REFERENCES

Abrams, L. & R.S. Ferris. 1960. An illustrated flora of the Pacific states: Washington, Oregon, & California. Vol. 4, Bignoniaceae to Compositae. Stanford University Press, Stanford, California, U.S.A.

Adams, C.D. 1972. *Sambucus*. In: Flowering plants of Jamaica. University of the West Indies, Mona, Jamaica. Pp. 697–698.

Applequist, W.L. 2015. A brief review of recent controversies in the taxonomy and nomenclature of *Sambucus nigra* sensu lato. Acta Hort. 1061:25–33.

Arreguin S., M. de L. 1985. *Sambucus*. In: J. Rzedowski & J.C. de Rzedowski. Flora fanerogamica del Valle de Mexico. Vol. II. Dicotyledonae (Euphorbiaceae–Compositae). Instituto Polytechnico Nacional, Mexico D.F. Pp. 404–405.

Bell, C.D. 2017. *Sambucus*. In: Jepson Flora Project, eds. Jepson eFlora. http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=10321. Accessed 14 Sep 2017.

Bolli, R. 1994. Revision of the genus *Sambucus*. Diss. Bot. 223. J. Cramer, Berlin, Germany.

D'Arcy, W.G. 1973. *Sambucus*. In: Flora of Panama. Ann. Missouri Bot. Gard. 60:159–163.

Dempster, L.T. 1993. *Sambucus*. In: J.C. Hickman, ed. The Jepson manual: Higher plants of California. University of California Press, Berkeley, California, U.S.A. Pp. 474–475.

Elias, T.S. 1980. The complete trees of North America. Van Nostrand Reinhold Co., New York, U.S.A.

Felger, R.S., M.B. Johnson, & M.F. Wilson. 2001. The trees of Sonora, Mexico. Oxford University Press, New York, U.S.A.

Gooding, E.G.B., A.R. Loveless, & G.R. Proctor. 1965. Flora of Barbados. H.M. Stationery Office, London, U.K.

Howard, R. 1989. *Sambucus*. In: Flora of the Lesser Antilles: Leeward and Windward islands, vol. 6. Arnold Arboretum, Harvard University, Jamaica Plain, Massachusetts, U.S.A. Pp. 473–474.

Jepson, W.L. 1923–1925. A manual of the flowering plants of California. Associated Students Store, University of California, Berkeley, California, U.S.A.

Kearney, T.H. & R.H. Peebles. 1960. Arizona flora. University of California Press, Berkeley, California, U.S.A.

Liogier, A.H. 1985. Descriptive flora of Puerto Rico and adjacent islands. Editorial de la Universidad de Puerto Rico, Río Piedras, Puerto Rico.

Liogier, A.H. 1995. *Sambucus*. In: La Flora de la Española vol. 7. Universidad Central del Est, San Pedro de Macorís, R.D. Pp. 200–202.

Little, E.L., R.O. Woodbury, & F.H. Wadworth. 1974. Trees of Puerto Rico and the Virgin Islands. 2nd volume. USDA Forest Service, Agricultural Handbook 449. U.S. Dept. of Agriculture, Washington, D.C., U.S.A.

McMinn, H. 1959. An illustrated manual of Pacific Coast trees. Ed. 2. University of California Press, Berkeley, California, U.S.A.

Munz, P.A. & D.D. Keck. 1959. A California flora. University of California Press, Berkeley, California, U.S.A.

Munz, P.A. 1974. A flora of southern California. University of California Press, Berkeley, California, U.S.A.

Nash, D.L. 1976. *Sambucus*. In: Flora of Guatemala, vol. 6. Fieldiana, Bot. 24(part XI no. 4):278–282.

Nicolson, D.H., R.A. DeFilipps, A.C. Nicolson, et al. 1991. *Sambucus*. In: Flora of Dominica, Part 2: Dicotyledoneae. Smithsonian Contrib. Bot. 77:63.

Sanchez S., O. 1968. La flora del Valle de Mexico. Editorial Herrero, S.A., Mexico D.F.

Shreve, F. & I.L. Wiggins. 1964. Vegetation and flora of the Sonoran Desert. Stanford University Press, Stanford, California, U.S.A.

Sterling, K.B. 1997. Thaddeus Peregrinus Xavierus (Tadeo, Tedeas) Haenke. In: K.B. Sterling, R.P. Harmond, G.A. Cevasco, & L.F. Hammond, eds. Biographical dictionary of American and Canadian naturalists and environmentalists. Greenwood Press, Westport, Connecticut, U.S.A. Pp. 335–338.

Stuart, J.D. & J.O. Sawyer. 2001. Trees and shrubs of California. University of California Press, Berkeley, California, U.S.A.

Solomon, J. 2001. *Sambucus*. In: W.D. Stevens, C. Ulloa U., A. Pool, & O.M. Montiel, eds. Flora de Nicaragua, vol. 1. Missouri Botanical Garden Press, St. Louis, Missouri, U.S.A. Pp. 585–586.

Whittemore, A.T. In press. Adoxaceae. In: S.C. Meyers, T. Jaster, K.E. Mitchell, & L.K. Hardison, eds., Flora of Oregon. Volume 2. Botanical Research Institute of Texas Press, Fort Worth, Texas, U.S.A.

Wiggins, I.L. 1980. Flora of Baja California. Stanford University Press, Stanford, California, U.S.A.