

Typification of the name *Celosia nitida* (Amaranthaceae) and first record for the State of Sonora, Mexico

Manuel Higinio Sandoval Ortega¹ , Silvia Zumaya Mendoza² 

Key words: epitype, flora of Sonora, Jamaica.

Ključne besede: epitip, flora Sonore, Jamajka.

Corresponding author:
Silvia Zumaya Mendoza
E-mail:
sumaya@ciencias.unam.mx

Received: 2. 10. 2024
Accepted: 4. 11. 2024



Abstract

A lectotype and epitype of the name *Celosia nitida* (Amaranthaceae s.s.) are designated and this taxon is reported for the first time for the flora of Sonora, Mexico.

Izveček

Določili smo lektotip in epitip imena *Celosia nitida* (Amaranthaceae s.s.), poleg tega poročamo o prvem nahajališču te vrste v flori Sonore (Mehika).

Introduction

The family Amaranthaceae Juss. (including Chenopodiaceae Vent.; APG IV, 2016) is distributed across all continents except Antarctica and comprises 183 genera and 2050 to 2500 species (Hernandez-Ledesma et al. 2015, POWO, 2024). Several species (especially belonging to Amaranthaceae s.s.) are used as ornamental or edible plants and are able to escape from cultivation (as alien species) causing ecological, economical, and social impacts in many countries of the world (see e.g., Iamónico, 2023; Das, 2016).

It is one of the most diverse families of flowering plants represented in Mexico, with 33 genera and around 211 species (Villaseñor, 2016). In addition, it is a group of plants with economic, nutritional, and cultural importance in the country, since many wild and other domesticated taxa are used as a source of food, or as medicinal and/or ornamental plants (Sandoval-Ortega et al., 2023; Sandoval-Ortega & Siqueiros-Delgado, 2019).

Concerning the State of Sonora, 73 Amaranthaceae taxa have been recorded (Van Devender et al., 2010, 2014, 2015), but the genus *Celosia* L. was not reported.

1 Universidad de Sonora, DICTUS, Herbario USON. Niños Héroes, entre Rosales y Pino Suárez, Col. Centro, Hermosillo, Sonora, México.

2 Universidad Nacional Autónoma de México, Facultad de Ciencias, Ciudad Universitaria, Coyoacán, Ciudad de México, México.

Materials and methods

During a routine collection trip in the municipality of Tepache, Sonora, in September 2022, plants identifiable as belonging to *Celosia* were collected.

The material was herbarized following the methodology proposed by Engelmann (1986) and deposited at the Herbarium of the University of Sonora (USON). Plants were identified using specialized literature (Robertson, 2003; Standley, 1917; Zumaya-Mendoza & Sánchez-del Pino, 2015).

Additionally, it was compared with images of specimens from the herbaria RSA, F, FLAS, UADY (acronyms according to Thiers, 2024 [continuously updated]), through the portal “Red de Herbarios Mexicanos” (available at: <https://herbanwmex.net/>). Likewise, the specimens deposited in the MEXU and FCME herbaria were examined by the authors.

After reviewing the literature and herbarium specimens, the name *Celosia nitida* was typified. Articles of the *International Code of Nomenclature for algae, fungi, and plants* cited throughout the text follow the Shenzhen Code (hereafter as “*ICN*”; Turland & al., 2018).



Figure 1: Specimen of *Celosia nitida* collected in the Tepache municipality, Sonora, deposited at USON (barcode USON32388).

Slika 1: Primerek vrste *Celosia nitida*, nabran v občini Tepache, Sonora, shranjen v herbariju USON (črtna koda USON32388).

Using the information obtained in the field and from the consulted herbarium material, a morphological description of the genus and species was prepared, with photographs of important structures for its identification, as well as a distribution map of *C. nitida* in Mexico using the QGIS v. 2.28.4 program (QGIS Development Team, 2017).

Results and discussion

Celosia L., Sp. Pl. 1: 205. 1753.

Type (designated by Hitchcock, 1929: 135): *Celosia argentea* L.

Herbs or subshrubs, annual or perennial. Stems erect to ascending, glabrous or pubescent with simple trichomes. Leaves alternate, petiolate; leaf blades lanceolate, ovate, elliptic or trullate. Inflorescences terminal and/or axillary, spikes or panicles, pedunculated or sessile; bract 1, bracteoles 2, not crested. Flowers bisexual, tepals 3–5, subequal, filaments fused in a basal cup, pseudostaminodes absent, ovary subglobose, style 1 stigmas 2–3. Fruit pyxidium. Seeds 2–numerous, lenticular, testa glossy.

Genus with around 46 species distributed in America, Asia and Africa (POWO, 2024), 3 in Mexico (Zumaya-Mendoza & Sánchez-del Pino, 2015).

Celosia nitida Vahl, Symb. Bot. 2: 44. 1791.

Lectotype (**designated here**): — Illustration of *Amaranthus fruticosus erectus, spica viridi laxa et strigosa*, Sloane (1707), Tab. 91.

Epitype (**designated here**): — JAMAICA, 1687-1689, *Sloane s.n.* (BM000588968, available at: <https://plants.jstor.org/stable/10.5555/al.ap.specimen.bm000588968>).

Herbs or subshrubs, perennial. Stems ascending, sometimes supported by neighboring vegetation, up to 2 m long, glabrous. Petioles 0.5–2 cm long, leaf-blades trullate, ovate or lanceolate, 3–7 cm long and 1–5 cm wide, base attenuate, oblique or truncate, margin entire, apex acute to acuminate (Figure 1). Inflorescence lax panicles or solitary spikes; bract ovate, 1.2–1.5 mm long, apex acute; bracteoles broadly ovate, slightly longer than the bract, apex acute (Figure 2C and D). Tepals ovate-elliptic, 5–7 mm long by 2–3 mm wide, sclerous, margins scarious, apex acute, green to whitish or reddish (Figure 2A and D), ovary ca. 2 mm diameter (Figure 2B), stigmas 3. Pyxidium ovoid, 4–5 mm long and ca. 3 mm wide (Figure 2E). Seeds (18)20–24, ca. 1 mm diameter, testa glossy, reddish brown.

Distribution: Species distributed from the south of the United States (Texas and Florida) to South America (Venezuela) and the Caribbean (POWO, 2024). In Mexico, it had been recorded for the States of Campeche, Nuevo

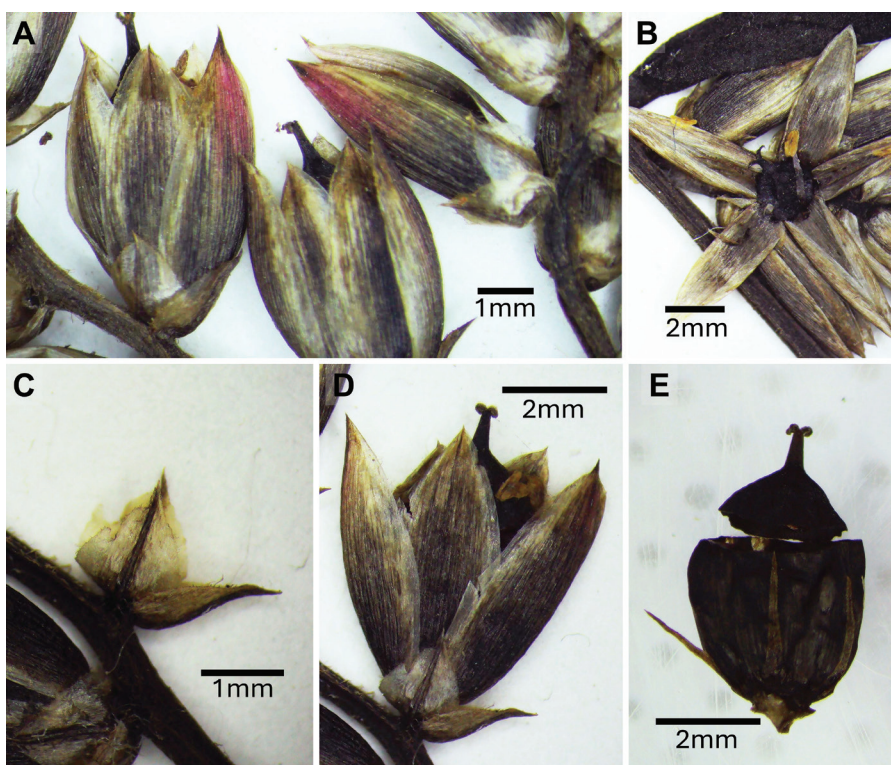
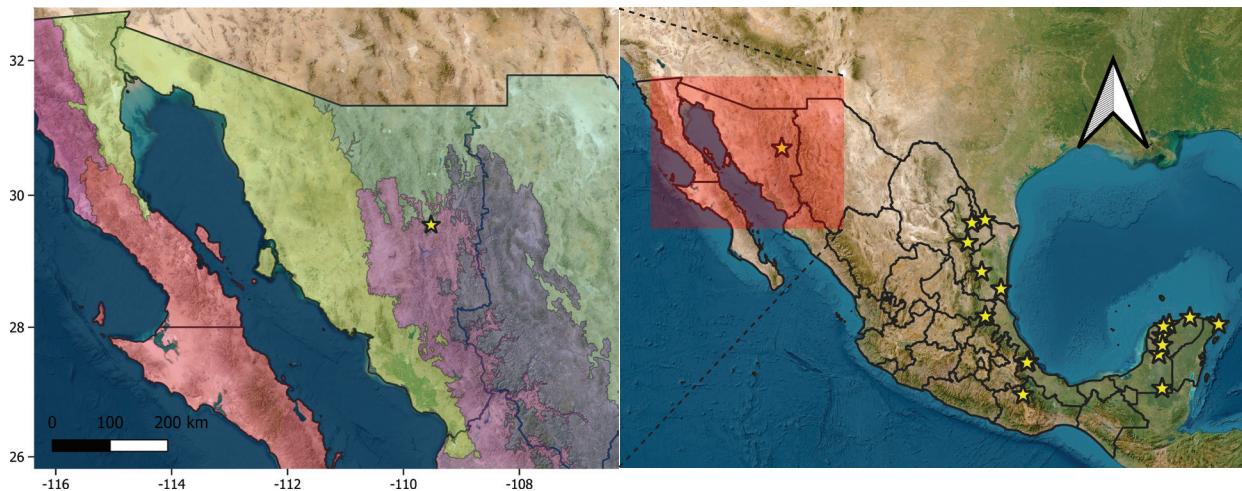


Figure 2: Details of *Celosia nitida* structures. A = flowers with reddish tepals. B = open flower with ovary and stamens. C = bract and bracteoles. D = flower with mature pyxidium. E = mature pyxidium.

Slika 2: Podrobnosti struktur vrste *Celosia nitida*. A = cvetovi z rdečkastimi perigonovimi listi. B = odprti cvet s plodnico in prašniki. C = krovni list in predlisti. D = cvet z zrelo glavico s pokrovcem. E = zrelo glavica s pokrovcem.



BIOGEOGRAPHIC PROVINCES

- Baja Californian province
- Californian province
- Chihuahuan Desert province
- Pacific Lowlands province
- Sierra Madre Occidental province
- Sonoran province

★ *Celosia nitida*

Figure 3: Distribution map of *Celosia nitida* Vahl in México.

Slika 3: Zemljevid razširjenosti vrste *Celosia nitida* Vahl v Mehiki.

León, Oaxaca, Quintana Roo, San Luis Potosí, Tamaulipas, Veracruz, and Yucatán (Zumaya-Mendoza & Sánchez-del Pino, 2015) and is reported for the first time here for Sonora (Figure 3), where it has been recorded in the municipality of Tepache, at 600 m a.s.l., in riparian vegetation, in a site with elements of subtropical vegetation such as *Ceiba aesculifolia* (Kunth) Britten & Baker f., *Esenbeckia hartmanii* B.L.Rob. & Fernald, and *Ficus pertusa* L.f., in a transition site between the biogeographic provinces Chihuahuan Desert and Pacific Lowlands (*sensu* Morrone et al., 2017).

Notes on the type of *Celosia nitida*: The protologue of *Celosia nitida* (Vahl, 1791: 44) consists of a short diagnosis (“*foliis ovato-deltoidibus attenuatis, spicis terminalibus ramosis floribus distinctis, caule suffruticoso*”) and a detailed description; the provenance (“*Habitat in India Occidentali*”) and a collector (“*Dn Martfelt*”) was reported and it represent a syntype citation (Art. 9.6 of *ICN*); further the citation “*Amaranthus fruticosus erectus, spica viridi laxa & strigosa*. Sloane (1707: 142), Tab. 91” is given, referring to a Sloane’s (1707) illustration which can be considered as part of the original material for *C. nitida*.

The herbarium and types specimens of Martin Vahl (Henrichsen) are preserved in C (HUH-Index of Botanists 2023), where we traced the following four specimens of *C. nitida*: C10005373 (available at: <https://plants.jstor.org/stable/10.5555/al.ap.specimen.c10005373>), C10005372 (<https://plants.jstor.org/stable/10.5555/>

[al.ap.specimen.c10005372](https://plants.jstor.org/stable/10.5555/al.ap.specimen.c10005372)), C10005375 (<https://plants.jstor.org/stable/10.5555/al.ap.specimen.c10005375>) and C10005371 (<https://plants.jstor.org/stable/10.5555/al.ap.specimen.c10005371>). However, although there is evidence that some of this material was verified by Vahl (see annotations on the back of sheets C10005373, C10005372, C10005371), none of them includes the collection data and Martfelt as collector. Consequently, these C specimens cannot be considered for the lectotypification purpose.

Vahl’s additional material is deposited at B-Willd., BM, CGE, E, FR, G-DC, GOET, H-SOL, H, LD, M, P and UPS (HUH-Index of Botanists, 2024). But, after a digital search through different portals (E herbarium, 2024; JACQ consortium, 2024; JSTOR 2024; Natural History Museum, 2024; P herbarium, 2024) and contacting the curators of B-Willd., BM, E, H, LD and UPS, no material was found that matches the protologue of *C. nitida*.

Thus, the illustration of “*Amaranthus fruticosus erectus, spica viridi laxa & strigosa*” (Figure 4) on plate 91 in Sloane (1707: 142) is designated here as the lectotype of *C. nitida* (see Art. 9.3 & 9.4 of *ICN*).

The plates in Sloane (1707) were engraved by Michael van der Gucht from drawings made for Sloane by the Rev. Garret Moore (in Jamaica) and Kickius (in London), many are dated 1700 and 1701. These Illustrations are now deposited mainly in the Sloane Herbarium at the Natural History Museum with others in the Royal Col-

Tab. 91.



Figure 4: Plate 91 from Sloane (1707).
Left: Illustration of “*Blitum album majus scandens*”. Right: Illustration of “*Amaranthus fruticosus erectus, spica viridi laxa et strigosa*”.
Slika 4: Slika 91 iz Sloane (1707).
Levo: ilustracija “*Blitum album majus scandens*”. Desno: ilustracija “*Amaranthus fruticosus erectus, spica viridi laxa et strigosa*”.

lection, at Badminton and at the BM (see: <https://www.britishmuseum.org/collection/term/BIOG33747>). The original illustration of “*Amaranthus fruticosus erectus, spica viridi laxa et strigosa*” is now deposited at BM (BM000588967, available at <https://plants.jstor.org/stable/10.5555/al.ap.specimen.bm000588967>). However, this illustration is schematic and ambiguous in terms of diagnostic characters, like size and shape of tepals, bracts and bracteoles and does not show the number of styles, so it is necessary to designate an epitype (see Art. 9.9 of the ICN).

Among the plants collected by Sloane during his trip to Jamaica between 1687 and 1689 and deposited in BM is a specimen of *C. nitida* (BM000588968, available at: <https://plants.jstor.org/stable/10.5555/al.ap.specimen.bm000588968>), the fragment at the top right (Figure 2) evidently served as the basis for the elaboration of the illustration in Tab. 91 of Sloane (1707). This specimen is designated here as an epitype since it contains reproductive structures, was collected in the Antilles, served as the

basis for the figure cited in the protologue (Vahl 1791) and is consistent with the current species concept in *Celosia* (e.g. Robertson, 2003; Standley, 1917; Zumaya-Mendoza & Sánchez-del Pino, 2015).

EXAMINED SPECIMENS: MÉXICO, Campeche, Calakmul, A 2 km al W de Calakmul, 25 Nov. 1997, *Martínez S. E. 29930* (MEXU: 975442); Hopelchén, Finca San Nicolas en la carretera Xpijuil a Chetuma, a 5 km de Xpijuil, 02 Feb. 2004, *Duno de Stefano R. 1886* (MEXU: 1362657). **Nuevo León,** Cerralvo, Sierra de Picachos, Rancho el 30, Cañón el Gallo, 12 Nov. 1994, *Villareal J.A. 8013* (MEXU: 667287); Montemorelos, San Vicente, 4 km aguas abajo de Montemorelos, 15 Oct. 1983, *Sánchez Silva R. 443* (MEXU: 591209). **Oaxaca,** San Juan Bautista Cuicatlán, Barranca de Agua amarilla, a 3.1 km al SW de San José el Chilar, 4 Oct. 2002, *Cruz Espinosa C.A. 1374* (MEXU: 1060766). **Quintana Roo,** A 500 m al N del Parque Natural El Garrafón, en Isla Mujeres, 08 Jan. 1986, *Cabrera E. 10465* (MEXU:




Figure 5: Epitype of *Celosia nitida* Vahl, designated here, BM000588968.

Slika 5: Epitip vrste *Celosia nitida* Vahl, določen v tem članku, BM000588968.

512668). **San Luis Potosí**, San Antonio, Tanchanhuil, 19 Sep. 1978, *Alcorn J.B.* 1733 (MEXU: 406536). **Sonora**, Tepache, Río Tepache, 16 Sep. 2022, *Sandoval-Ortega M.H. s.n.* (USON: 32388). **Tamaulipas**, Aldama, Sierra de Tamaulipas, región of Rancho Las Yucas, ca. 40 km NNW of Aldama, 07 Oct. 1957, *Dressler R. L.* 2275 (MEXU: 11878); Camargo, 3 km al Norte de Comales, borde de la cortina de la presa Marte R. Gómez, 15 Nov. 1995, *González Medrano F.* 17611 (MEXU: 556155); Victoria, 15 km al NE de Cd. Victoria Camino V. Gro-Victoria, 24 Sep. 1985, *Yañez M.* 552 (MEXU: 806240). **Veracruz**, Emiliano Zapata, 28 Oct. 1975, *Ventura A. F.* 12033 (MEXU: 347032); Apazapan, 1 km E del poblado, en las faldas del Río Jalcomulco, 10 Oct. 1991,

Castillo C. G. (MEXU: 732136). **Yucatán**, Abalá, 15 km al S del poblado de Yaxcopoil, a lo largo de la carretera Mérida-Muna, 7 Nov. 2001, *Carnevali G.* 6443 (MEXU: 1238128); Dzemul, 5-6 km de Dzemul, carretera de Dzemul a Xtampu, 12 Nov. 2003, *Duno de Stefano R.* 1848 (MEXU: 1362655); Mérida, Ruinas de Dzibilchaltun, 20 km al N de la Ciudad de Merida, carretera para progreso, 4 Nov. 1980, *Calzada J.I.* 06485 (MEXU: 826299); San Felipe, 1 km al norte del rancho “Chinalco”, reserva ecológica de Dzilam, 7 Sep. 2010, *Tun J.C.* 373 (MEXU: 916300); Santa Elena, En los alrededores de la Zona Arqueológica de Sayil por la carretera Uxmal-Oxkutzkab, 25 Dec. 1985, *Cabrera E.* 10355 (MEXU: 948209).

ORCID iDs

 Manuel Higinio Sandoval Ortega  <https://orcid.org/0000-0003-1396-9024>

 Silvia Zumaya Mendoza  <https://orcid.org/0000-0003-0337-4924>

References

APG IV (2016). An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. *Botanical Journal of the Linnean Society*, 181(1): 1–20. <https://doi.org/10.1111/boj.12385>

Das, S. (2016). *Amaranthus: A Promising Crop of Future*. Springer Nature. <https://doi.org/10.1007/978-981-10-1469-7>

E herbarium (October, 2024). Royal Botanic Garden Edinburgh, Herbarium Catalogue. Available at: <https://data.rbge.org.uk/search/herbarium/>

Engelmann, G. (1986). Instructions for the collection and preservation of botanical specimens. *Annals of the Missouri Botanical Garden*, 73: 504–507.

Hernández-Ledesma, P., Berendsohn, W. G., Borsch, T., Von Mering, S., Akhiani, H., Arias, S., Castañeda-Noa, I., Eggl, U., Eriksson, R., Flores-Olivera, H., Fuentes-Bazán, S., Kadereit, G., Klak, C., Korotkova, N., Nyffeler, R., Ocampo, G., Ochoterena, H., Sánchez, B., Schlumpberger, B. O., & Uotila, P. (2015). A taxonomic backbone for the global synthesis of species diversity in the angiosperm order Caryophyllales. *Willdenowia*, 45(3): 281–383.

Hitchcock, A. S. (1929). *Nomenclature. Proposals by British Botanists*. Wyman & Sons.

HUH-Index of Botanists (September, 2024). *Harvard University Herbaria & Libraries, Index of Botanist*. Available from: https://kiki.huh.harvard.edu/databases/botanist_index.html

Iamónico D. (2023). Nomenclature Survey of the Genus *Amaranthus* (Amaranthaceae): 12. Questions about *Amaranthus caudatus*. *Plants*, 12: 1566. <https://doi.org/10.3390/plants12071566>

JACQ consortium (October, 2024). Virtual Herbaria Website. Available from: <https://www.jacq.org/>

JSTOR (October, 2024) JSTOR Global Plants. Available from: <https://plants.jstor.org/>

Morrone, J., Escalante, T., & Rodríguez-Tapia, G. (2017). Mexican biogeographic provinces: maps and shapefiles. *Zootaxa*, 4277(2): 277–279. <https://doi.org/http://dx.doi.org/10.11646/zootaxa.4277.2.8>

Natural History Museum (October, 2024). Herbarium Data Portal. Available from: <https://data.nhm.ac.uk/>

P herbarium (October, 2024) Muséum national d'Histoire naturelle, Vascular Plants. Paris. Available from: <https://science.mnhn.fr/institution/mnhn/collection/p/list>

POWO (2024). *Plants of the World Online*. Royal Botanic Gardens, Kew. <http://www.plantsoftheworldonline.org/>

QGIS Development Team. (2017). *Quantum GIS Geographic Information System*. Quantum GIS Development Team. Open Source Geospatial Foundation Project. Austria.

Robertson, K. R. (2003). *Celosia* (Amaranthaceae). In: Flora of North America Editorial Committee (eds.). *Flora of North America North of Mexico (Magnoliophyta: Caryophyllidae, part 1), vol. 4* (pp. 407–409). Oxford University Press.

Sandoval-Ortega, M. H., De Loera-Ávila, E. E., Martínez-Calderón, V. M., & Zumaya-Mendoza, S. G. (2023). Plantas silvestres comestibles del estado de Aguascalientes, México, sus formas de consumo y comercialización. *Polibotánica*, 55: 213–230. <https://doi.org/10.18387/polibotanica.55.14>

Sandoval-Ortega, M. H., & Siqueiros-Delgado, M. E. (2019). Plantas útiles de la familia Amaranthaceae en el estado de Aguascalientes, México. *TECNOCENCIA Chihuahuana*, 13(1): 40–49. <https://doi.org/10.54167/tch.v13i1.324>

Sloane, H. (1707). *A voyage to the islands Madera, Barbados, Nieves, S. Christophers and Jamaica, Vol. 1*. B.M. <https://doi.org/10.5962/bhl.title.642>

Standley, P. C. (1917). Amaranthaceae. In: N. L. Britton, W. A. Merrill & J. H. Barnhart (eds.). *North American Flora, vol. 21(2)* (pp. 95–169). The New York Botanical Garden.

Thiers, B. (2024 [continuously updated]). *Index Herbariorum*. A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. Available from <http://sweetgum.nybg.org/science/ih>

Turland, N. J., Wiersema, J. H., Barrie, F. R., Greuter, W., Hawksworth, D. L., Herendeen, P. S., Knapp, S., Kusber, W.-H., Li, D.-Z., Marhold, K., May, T. W., McNeill, J., Monro, A. M., Prado, J., Price, M. J., & Smith, G. F. (eds.) (2018). International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code). Adopted by the Nineteenth International Botanical Congress, Shenzhen, China, July 2017. *Regnum Vegetabile*, 159: 1–254. <https://doi.org/10.12705/Code.2018>

Vahl, M. (1791). *Symbolae Botanicae, Pars Secunda*. Excudebant Nicolaus Möller et Filius, Aulæ Regiæ Typographi, Hauniae, 108 pp. <https://bibdigital.rjb.csic.es/records/item/9751-symbolae-botanicae-pars-secunda>

Van Devender, T. R., Felger, R. S., Fishbein M., F. Molina-Freaner, J. J., & Sánchez-Escalante y Reina-Guerrero, A. L. (2010). Biodiversidad de las plantas vasculares. In F. Molina-F., & T. R. Van Devender (eds.), *Diversidad Biológica del Estado de Sonora* (pp. 229–261). Universidad Nacional Autónoma de México.

Van Devender, T. R., Reina-Guerrero, A. L., Delgado-Zamora, D., Carnahan, S. D., Anderson, J. L., Hansen, K., Sánchez-Escalante, J. J., & Ferguson, G. M. (2015). Additions to the flora of Sonora, Mexico. II. *Phytoneuron* 2015-8: 1–6.

Van Devender, T. R., Reina-Guerrero, A. L., Flesch, A. D., Jacobs, S., & Wilson, M. F. (2014). Additions to the flora of Sonora, Mexico. *Phytoneuron* 2014-76: 1–8.

Villaseñor, J. L. (2016). Checklist of the native vascular plants of Mexico. *Revista Mexicana de Biodiversidad*, 87(3): 559–902. <https://doi.org/10.1016/j.rmb.2016.06.017>

Zumaya-Mendoza, S., & Sánchez-del Pino, I. (2015). Amaranthaceae. In: R. Medina-Lemos (ed.), *Flora del Valle de Tehuacán-Cuicatlán, Fascículo 133* (pp. 1–63). Universidad Nacional Autónoma de México Instituto de Biología.