

DAHLIA CAMPANULATA AND *D. CUSPIDATA* (ASTERACEAE, COREOPSIDEAE):
TWO NEW SPECIES FROM MEXICO

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ABSTRACT

Dahlia campanulata and *D. cuspidata* (Asteraceae, Coreopsidae), two new species from the Mexican states of Oaxaca and Hidalgo, respectively, are described and illustrated. *Dahlia campanulata* is distinguished by its exceptionally large, pendulous, and campanulate flower heads; leaf petioles with enlarged clasping bases that are much thicker than in any other species of *Dahlia*; and enormous tubers that exceed 0.5 m in length. *Dahlia cuspidata* is distinguished by its large outer involucral bracts and cuspidate leaflets, particularly at the terminal end of the rachis and those at the ends of the lateral rachillae; the terminal leaflet on mature leaves is often much more rounded (versus elliptic) than the lateral leaflets.

Key words: Asteraceae, Coreopsidae, *Dahlia*, Heliantheae sensu lato, Hidalgo, Mexico, Oaxaca.

RESUMEN

Se describen e ilustran *Dahlia campanulata* y *D. cuspidata* (Asteraceae, Coreopsidae), dos nuevas especies de los estados mexicanos de Oaxaca e Hidalgo respectivamente. *Dahlia campanulata* se distingue porque las cabezuelas de las flores son excepcionalmente grandes, campanuladas y péndulas, las bases de los pecíolos son alargadas y amplexicaules, mucho más gruesas que en cualquier otra especie; los tubérculos son enormes y exceden 0.5 m de largo. *Dahlia cuspidata* se distingue por sus brácteas involucrales externas grandes y sus folíolos cuspidados, especialmente el que remata el

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raquis y los que rematan las raquillas laterales; el folíolo terminal de las hojas maduras es frecuentemente mucho más redondo (en vez de elíptico) que los folíolos laterales.

Palabras clave: Asteraceae, Coreoideae, *Dahlia*, Heliantheae sensu lato, Hidalgo, México, Oaxaca.

We encountered several undescribed species as part of an extensive 8 700 km field trip through Mexico. The purpose of this trip was to collect material from wild populations of *Dahlia* to expand natural history information and for cytological and molecular analyses of the genus. Two of the new species are described here; one species was found in the state of Oaxaca and the other in the state of Hidalgo. *Dahlia campanulata* grows in the vicinity of Huajuapán de León and San Marcos, Oaxaca, along sunny roadcuts in zones of woody Solanaceae, acacias, and other semi-arid deciduous scrub species at elevations of about 2 000 m. The Hidalgo species, *Dahlia cuspidata*, inhabits rocky roadcuts in a zone of *Pinus*, *Quercus*, and *Arbutus*, near the town of Nicolás Flores. Plants were growing in sunny or mostly sunny locations at 2 600 m elevation.

Dahlia campanulata D.E. Saar, P.D. Sørensen, & J.P. Hjerting sp. nov. Fig. 1.

Herba perennis 1.3-2.5 m alta. Folia pinnata usque tripinnata, usque ad 60 cm longa. Capitula pendula, numerosa usque ad 20 cm diam. Flores radii corollis ligulatis dilute roseis. Chromosomatum numerus: $n = 16$.

Perennial from tuberous rootstock, one to three erect herbaceous canes reaching 2.5 m, stems deeply 4-grooved, internodes solid; median leaves up to 60 cm long including petiole, tripinnate with stipels at most rachis nodes, becoming bipinnate to merely pinnate without stipels to simple at the base of the flowering portion, pinnules opposite on rachilla, primary pinnae 7-11, leaflet margins ciliolate, petioles solid; heads pendulous, up to 20 cm in diameter including rays (when flattened to one plane), rays light roseate pink, darker toward center (base), veins slightly darker, outer involucre bracts spreading at right angles to the axis of the head at anthesis, flowering beginning in September (in 1995); cypselae black, 12.0-14.5 mm long and 1.6-2.0 mm wide. Chromosome number: $n = 16$.

Habitat: zone of *Acacia* spp. and other semi-arid deciduous scrub species with *Ipomoea* and shrubby Solanaceae; clay-filled crevices of rocky, SSE-facing slopes. Elev. 1 950 m.

Type: Oaxaca, at K-35.5, SE of Huajuapán de León, along Mex 190, 6 Sep. 1995, J.P. Hjerting, D.E. Saar, & P.D. Sørensen (95-68) (holotype, MEXU; isotypes, C, DEK, F, IEB, MO, TEX).

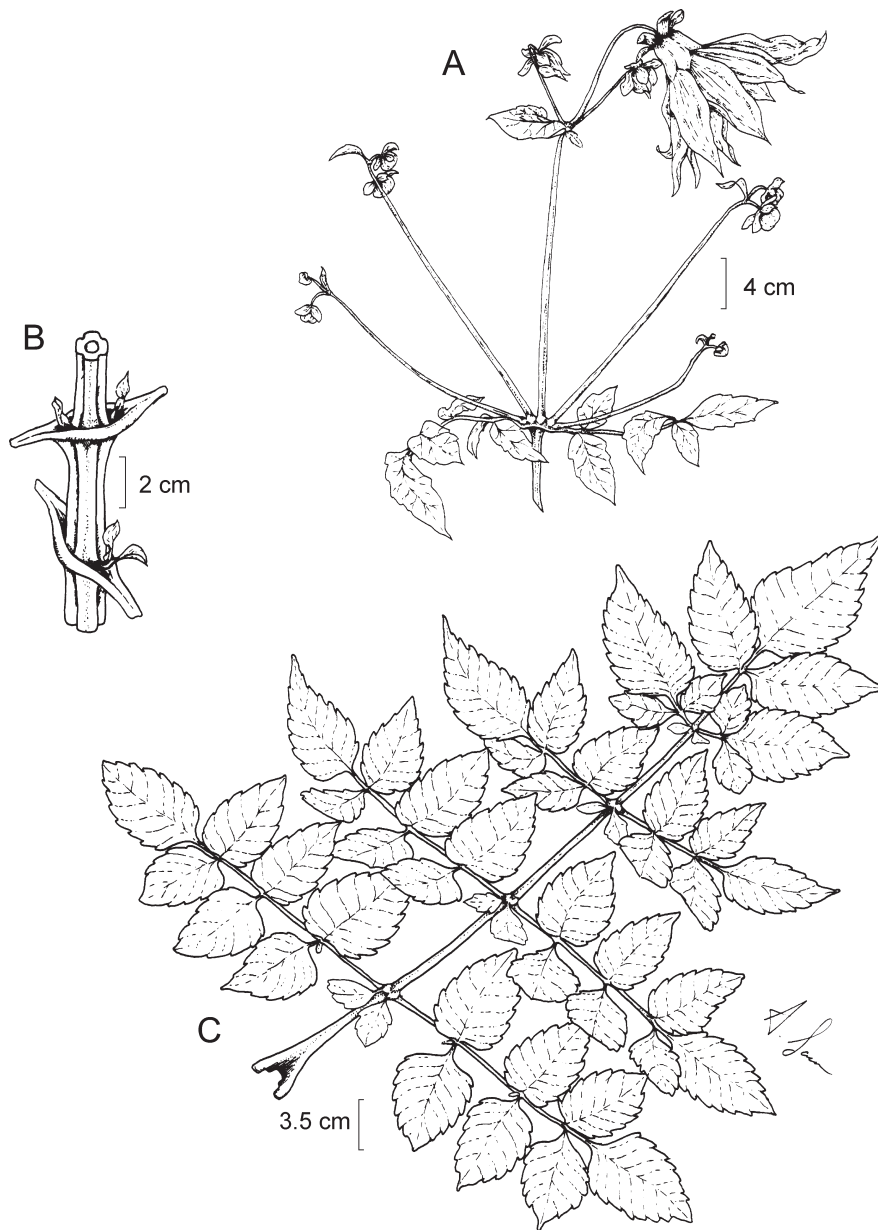


Fig 1. *Dahlia campanulata*. A. flowering portion; B. median stem; C. median leaf (distance between nodes on rachis varies with sun exposure). Drawn from type specimens and photographs. Distance between rachis nodes varies with soil nutrients and/or amount of sunlight.

A second population (J.P. Hjerting, D.E. Saar, & P.D. Sørensen 95-74) was located on 6 Sep. 1995, at K-33.6, SW of San Marcos, along Oaxaca State Route 15, Huajuapán de León - Juxtlahuaca. Plants were growing in a zone of mimosoid scrub, aborescent *Solanum* and nearby *Fouquieria*, along rocky roadcuts in full sun, at an elevation of 2 000 m. Only the first few flower heads had opened.

The specific epithet, *campanulata*, draws attention to the unique bell-shaped capitula. When the inner and outer involucral bracts of garden-grown plants were removed just prior to ligule extension and elongation, the ultimate position of the ligules resembled flower heads with bracts that were not altered. Apparently, the mechanism for this unique ligule position lies within the ray florets themselves or the receptacle.

There are three other distinguishing features for *D. campanulata*. Although the plants are not particularly large for the genus, the diameter of the capitulum is up to 5.5 cm wider than the next largest species, *D. spectabilis*. Leaf petioles have enlarged, clasping bases that are more developed and much thicker than in any other species of *Dahlia* (Fig 1B). The tubers are enormous, exceeding 0.5 m in length.

Combined molecular data from the internal and external transcribed spacer regions (ITS and ETS, respectively) of nuclear ribosomal DNA show strong support (86% bootstrap) for placing *Dahlia campanulata* in a pectinate clade that includes the "tree dahlias" (*D. imperialis*, *D. excelsa*, and *D. tenuicaulis*), *D. rudis*, *D. apiculata*, *D. macdougallii*, and *D. neglecta* (Saar et al., 2003). Within this clade, the ETS data set, taken alone, indicates that *D. imperialis* is the sister taxon to *D. campanulata*, although bootstrap support is very low (61%). *Dahlia campanulata* most closely resembles *D. imperialis*, the most notable differences being the campanulate flower heads, enlarged leaf bases, generally smaller leaves, and herbaceous habit of *D. campanulata*.

Dahlia cuspidata D.E. Saar, P.D. Sørensen, & J.P. Hjerting sp. nov. Fig. 2.

Herba perennis 0.8-1.2 m alta. Folia pinnata vel bipinnata. Capitula numerosa 8-11.5 cm diam.; squamis exterioribus involucri reflexis sub anthesi, anguste spatulatis vel oblongis, 18-24 mm longis, 3.5-6.5 mm latis. Flores radii corollis ligulatis lavandulis.

Perennial from tuberous rootstock, one to four erect herbaceous canes to 1.2 m, stems terete, glabrous and sometimes glaucous or slightly pubescent, internodes hollow; median leaves 23-29 cm long including petiole, bipinnate with stipels frequently at the first and/or second rachis node, becoming pinnate without stipels to simple at the base of the flowering portion, petioles solid, pinnules opposite on rachilla, primary pinnae 5, leaflets coarsely ciliolate dentate with cuspidate tips and attenuate to slightly oblique at the base; flowering heads 8.0-11.5 cm in diameter

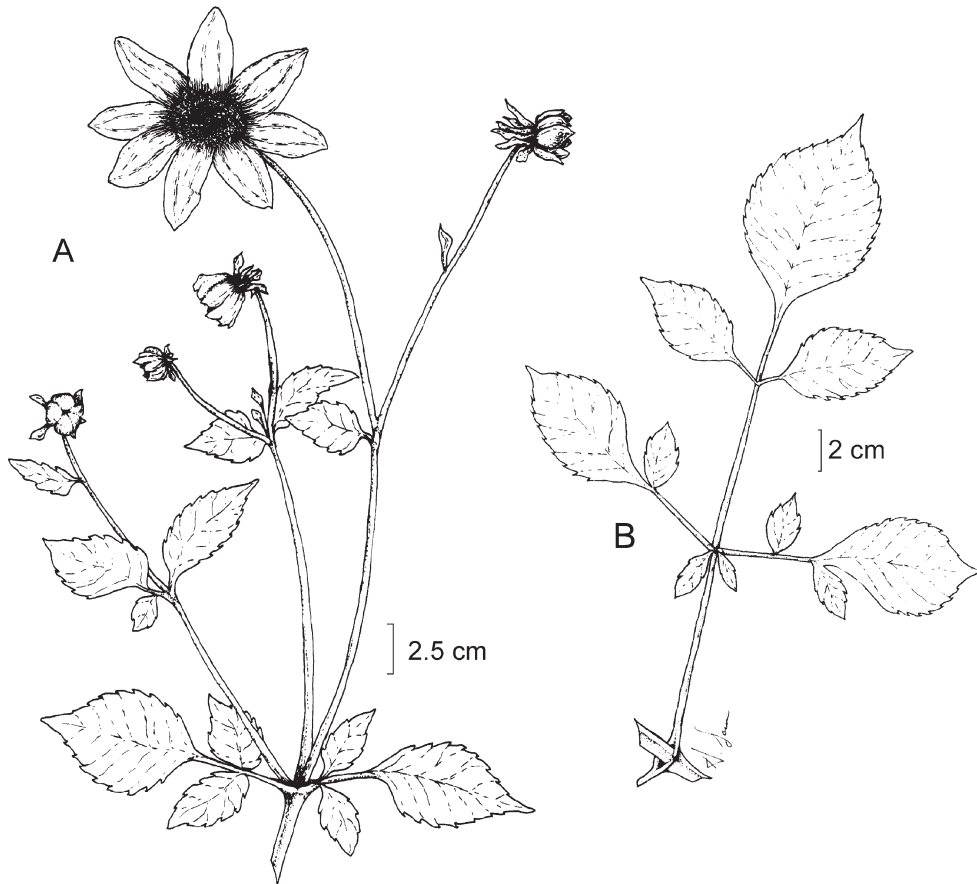


Fig. 2. *Dahlia cuspidata*. A. flowering portion; B. median leaf. Drawn from type specimens and photographs.

including ray florets, ligules lavender to light lavender, some plants with a slight blush of yellow at the ligule base, veins slightly darker, outer involucral bracts reflexed at anthesis and exceptionally large (18-24 mm long by 3.5-6.5 mm wide), oblanceolate to spatulate; flowering beginning in August or late July (in 1995); cypselae black.

Habitat: zone of *Pinus*, *Quercus*, and *Arbutus*; rocky roadcuts, WSW-facing slopes. Elev. 2 600 m.

Type: Hidalgo, 6.3 km E on gravel road, Las Trancas - Nicolás Flores, to a corner, then 1.3 km NE on a road to Puerto de Piedra, 12 Sep. 1995, *J.P. Hjerting*,

D.E. Saar, & P.D. Sørensen (95-100) (holotype, MEXU; isotypes, C, DEK, F, IEB, MO, TEX).

The type locality is roughly the same location visited by JPH (Hj 7136) in 1984, when only seeds were collected. The two most diagnostic characters of *Dahlia cuspidata* are the large outer involucral bracts and the cuspidate leaflets, particularly at the terminal end of the rachis and those at the ends of the lateral rachillae. The terminal leaflet on mature leaves is often much more rounded (versus elliptic), its width approaching 80% of the length. Only *D. rudis* has larger outer involucral bracts (15-25 mm x 4-10 mm) than *D. cuspidata* (18-24 mm x 3.5-6.5 mm), although in three other species their length is similar. *Dahlia rudis* can be distinguished from *D. cuspidata* by the former's pubescent (versus glabrous) adaxial leaflet surfaces, attenuate leaflet tips, and rhizomatous habit, as evidenced by canes growing from the ground in rows (versus singly or in clumps). The three other species, *D. foeniculifolia*, *D. hintonii*, and *D. spectabilis*, have maximum bract lengths of 18, 20, and 21 mm, respectively, none of them has cuspidate leaflet tips or other similar morphological features.

The combined ITS and ETS data sets indicate that *Dahlia brevis* is most closely related to *D. cuspidata*, but bootstrap support is minimal (Saar et al., 2003). There are few morphological similarities.

With the recognition of these two species, the genus *Dahlia* encompasses 35 known species. This total does not include the cultivated forms often called *D. variabilis* or occasionally *D. pinnata* (see Hansen and Hjerting, 1996, for clarification of the latter Latin binomial).

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