

Recension of the Mexican species of *Hymenostephium* (Asteraceae: Heliantheae)

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ABSTRACT

Eight species of ***Hymenostephium*** are recognized as occurring in Mexico: a widespread, highly variable, ***H. cordatum*** (including *H. brandegianum*); ***H. gracillimum***, localized, shoreline endemic of Oaxaca and Chiapas; ***H. hintonii***, montane endemic of Michoacan and Guerrero; ***H. superaxillare***, localized taxon from southern Chihuahua and closely adjacent Durango; ***H. tenuis***, widespread montane taxon occurring along the Pacific slopes from Nayarit to Chiapas; ***H. uniseratum***, montane areas of central Mexico; ***H. websteri***, very localized endemic of southern Nayarit and closely adjacent Jalisco; and ***H. woronowii***, a very localized endemic of Uruapan, Michoacan and vicinity. Keys to the taxa are provided, along with maps showing their distribution. Published on-line: www.phytologia.org *Phytologia* 95(1): 1-9 (Feb. 1, 2013).

KEY WORDS: Asteraceae, Heliantheae, Mexico, *Hymenostephium*, *Viguiera*

The present contribution was stimulated by the recent account of derived lineages within the tribe Heliantheae (Schilling and Panero 2002; 2011, as cited below). The treatment follows the format adopted for my on-going Comps of Mexico (*Phytologia* Memoirs 1, 6, 12, 14, 15; etc.).

HYMENOSTEPHIUM Benth.

Garcilassa Poepp.

Haplocalymma Blake

Viguiera sect. *Diplostichis*

Annual or perennial herbs. Leaves mostly opposite, without resin dots upon surfaces; blades ovate, elliptic to lanceolate, the blades variously serrate; petioles present, rarely not. Heads campanulate, rarely cylindrical, relatively small, mostly in terminal cymose panicles or, less often, single on elongate ultimate peduncles. Involucral bracts 1-3 seriate, few to numerous. Receptacles convex, rarely conic, paleate. Ray florets 5-21, neuter, sterile, rarely absent; ligules yellow, rarely white. Disc florets 10-numerous; corollas yellow. Achenes ovoid, glabrous or appressed-pubescent; pappus of two-awned scales, between these 2-4 short scales, or pappus absent. Base chromosome numbers, $x = 12$ and 17 .

Blake, S.F. 1918. A revision of the genus *Viguiera*. *Contr. Gray Herb.* II. 54: 1-205.

Kiel, D.J., M.A. Luckow and D.J. Pinkava 1988. Chromosome studies in Asteraceae from the United States, Mexico, the West Indies and South America. *Amer. J. Bot.* 75: 652-668.

McVaugh, R. 1984. *Viguiera*, in *Flora Novo-Galiciana* 12: 1039-1080.

Robinson, H. 1977. Studies in the Heliantheae (Asteraceae). VII. Notes on genus and species limits in the genus *Viguiera*. *Phytologia* 36: 201-215.

Schilling, E.E. and J.L. Panero. 2002. A revised classification of subtribe Helianthinae (Asteraceae: Heliantheae). *Bot. J. Linn. Soc.* 140: 65-76.

Schilling, E.E. and J.L. Panero. 2011. A revised classification of subtribe Helianthinae (Asteraceae: Heliantheae) II. Derived lineages. *Bot. J. Linn. Soc.*: 167: 311-331.

Strother, J.L. 1999. *Viguiera*, in *Fl. Chiapas*, pt 5, Heliantheae: 141-145.

Strother, J.L. and J.L. Panero. 2001. Chromosome studies: Mexican Compositae. *Amer. J. Bot.* 88: 499-502.

Turner, B.L. 1990. New species, names, and combinations in Mexican Asteraceae. *Phytologia* 68: 14-19.
 Turner, B.L., M. Powell and R.M. King. 1962. Chromosome numbers in the Compositae. VI. Additional Mexican and Guatemalan species. *Rhodora* 64: 251-271.

Blake (1918, p. 6), in his monographic treatment of **Viguiera**, prepared a key to the latter and presumed allies; in this he recognized **Hymenostephium** as a distinct genus of several species, most of its taxa having a pappus of two awns, between these several membranous scales. Schilling and Panero (2002, 2010), using DNA data, retained the genus, noting that it contained ca 26 species distributed from Mexico to Central and South America. In my forthcoming treatment of **Hymenostephium** for Mexico, I recognize 7 species, as follows:

Key to species

1. Tap-rooted annuals, or erect, simple-stemmed, perennials, 20-80 cm high.....(4)
1. Suffruticose herbs, or recumbent shrubs 1-4 m high.....(2)
2. Heads relatively small, 4-5 mm high, 2-3 mm wide (rays excluded); disc florets 5-10; leaves glabrous, or nearly so; oak forests, Mic, Gue.....**H. hintonii**
2. Heads relatively large, 4-7 mm high, 4-10 mm wide; disc florets mostly 12 or more; leaves variously pubescent.....(3)
3. Involucres 8-10 mm across; ray florets 11-13; s Chi, n Sin.....**H. superaxillare**
3. Involucres 4-6 mm across; ray florets 5-8; widespread.....**H. cordatum**
- 4(1). Perennial herbs 20-80 cm high, arising from a corm-like base; achenes pubescent, epappose; Nay, Jal.....**H. websteri**
4. Annual herbs 20-80 cm high, arising from slender tap-roots; achenes otherwise.....(5)
5. Outer involucral bracts mostly in 1-2 series, grading into the inner bracts.....(7)
5. Outer involucral bracts elliptic-ovate, exactly 5, in a single whorl.....(6)
6. Leaves mostly 1-2 cm long, 0.2-0.8 cm wide; involucres ca 2 mm high; Mic.....**H. woronowii**
6. Leaves mostly 3-6 cm long, 1-4 cm wide; involucres 4-5 mm high; Mex, Mor, Gue....**H. uniseratum**
7. Involucres 2-4 mm high; achenes glabrous; Mic.....**H. woronowii**
7. Involucres 4-12 mm high; achenes pubescent.....(8)
8. Leaves sessile or nearly.....**H. tenuis**
8. Leaves with well-defined petioles 3-15 mm long; Pacific shore lines, se Oax, sw Cps.**H. gracillimum**

HYMENOSTEPHIUM CORDATUM (Hook. & Arn.) Blake, *J. Bot.* 53: 268. 1915.

Aspilia hispida Brandegee

Gymnolomia ehrenbergiana Klatt

Gymnolomia guatemalensis (Rob. & Greenm.) Blake

Gymnolomia microcephala Less.

Gymnolomia microcephala var. *guatemalensis* (Rob. & Greenm.) Rob. & Greenm.

Gymnolomia patens A. Gray

Gymnolomia patens var. *abbreviata* Rob. & Greenm.

Gymnolomia patens var. *brachypoda* Rob. & Greenm.

Gymnolomia patens var. *guatemalensis* Rob. & Greenm.

Gymnolomia patens var. *macrophylla* Rob. & Greenm.

Hymenostephium brandegei (Blake) Schill. & Panero
Hymenostephium mexicanum Benth.
Hymenostephium pilosulum Blake
Montanoa thomasi Klatt
Viguiera brandegei Blake
Viguiera cordata (Hook. & Arn.) D'Arcy
Wedelia cordata Hook. & Arn.

Mostly Gulf and Pacific slopes, Nue, Sin, Dur, San, Hid, Nay, Jal, Col, Mic, Mex, Pue, Ver, Gue, Oax, Cps and Guatemala southwards, tropical deciduous and evergreen montane forests, 600-2100 m; Aug-Jan. **Map 1**

Perennial suffruticose herbs 1-3 m high or clambering, weak-stemmed, shrubs or vines, often to 5 m high when draped upon small trees. **Leaves** mostly opposite, sometimes, however, markedly alternate along upper stems, very variable as to size, shape and vestiture, but mostly broadly ovate, 3-nervate, 5-10 cm long, 2-6 cm wide, the margins dentate; petioles mostly 1-2 cm long. **Capitulescence** a terminal or axillary aggregation of 3-8 heads, the peduncles 1-8 cm long. **Heads** radiate, mostly narrowly campanulate, arranged in loose or congested, terminal corymbs, the ultimate peduncles quite short or rarely up to 8 cm long; involucre narrowly or broadly campanulate, 2-3 seriate, 4-6 mm high and as wide, the bracts graduate to subequal, usually blackish. **Receptacle** convex, paleate. **Ray florets** 5-8, neuter, the ligules yellow, 5-15 mm long. **Disc florets yellow**, very variable in number, 10-numerous. **Achenes** 2-3 mm long, glabrous or pubescent, epappose or a few vestigial scales. **Chromosome numbers**, $n = 34$ and 46 , based on $x = 17$ Strother & Panero 2001).

This is an exceedingly variable species, especially in habit, foliage, vestiture, capitulescence, involucre characters and chromosome numbers. Numerous specific names have been proposed for the many forms and populations, but I think the complex is so variable as to preclude even meaningful varietal breakdown. I can, however, discern a broad morphological assemblage along the Pacific slopes from Sin to Oax that has smaller heads with mostly greenish involucre bracts and generally smaller rays, but such forms intergrade completely with the more typical forms which have larger heads (involucre 4-8 mm wide), longer rays (mostly 8-15 mm long) and generally broader, more pubescent leaves.

I have retained the anomalous **H. hintonii**, as did Schilling and Panero (2002); McVaugh (1984), however, treated this as a questionable synonym of his var. **websteri**, and in time it might also fall within the fabric of **H. cordata**, but available collections, what with their small, few-flowered, heads, nearly glabrous leaves and restricted geography, suggest that it is worthy of formal recognition.

Schilling and Panero (2002) recognized *H. brandegei* as a distinct species, but Strother (1999) treated it as a synonym of **H. cordata**; after examination of a photograph of an isotype (MO) of the taxon concerned, I agree with Strother's appraisal.

As aptly noted by McVaugh, the entire complex is in need of more detailed field and experimental study.

HYMENOSTEPHIUM GRACILLIMUM (Brandegee) Schill. & Panero, Bot. J. Linn. Soc. 40: 65. 2002.

Viguiera gracillima Brandegee

Oax and Cps, shore line habitats, 5-100 m; Sep-Nov. **Map 2**

Annual, tap-rooted, herbs, 20-80 cm high. **Leaves** opposite below, alternate above, 2-8 cm long, 1-4 cm wide; petioles 1-3 cm long; blades variously ovate, the margins serrate, hispid-strigose above and below. **Capitulescence** an axillary arrangement of 1-4 heads on slender ultimate peduncles, 2-4 cm long. **Heads** 4-5 mm high; involucre 2-seriate, the bracts ca 9, lanceolate. **Ray florets** 5, neuter; ligules yellow, 2-5 mm long. **Disc florets** yellow, ca 20 per head. **Achenes** ca 3 mm long, appressed-pilose, the pappus awns 2-4 mm long, the intervening scales ca 1.5 mm long.

The species is seemingly confined to the Pacific shore lines in southeastern Oax, barely extending into closely adjacent Cps (Arriago, *Mell 2185*, LL), this not accounted for by Strother (1999).

HYMENOSTEPHIUM HINTONII (H. Rob.) Schill. & Panero, Bot. J. Linn. Soc. 140: 74. 2002.

Viguiera hintonii H. Rob.

Mic and Gue, oak woodlands, 600-1000 m; Feb-Jul. **Map 3**

Suffruticose perennial, reclining herbs or shrubs, 1-2 m high. **Leaves** 3-8 cm long, 1-3 cm wide; petioles 0.3-1.5 cm long; blades ovate-lanceolate, glabrous above and below, or nearly so, 3-nervate from the base, the margins remotely serrate. **Capitulescence** a terminal, lax, cymose panicle of 2-10 heads, the ultimate peduncles 1-10 mm long. **Involucres** 4-5 mm high, 2-3 mm wide; bracts ovate-lanceolate, imbricate, minutely pubescent. **Receptacle** convex; pales, 3.0-3.5 mm long, ca 1.5 mm wide. **Ray florets** 5, neuter; ligules yellow, 3-6 mm long, 2-3 mm wide. **Disc florets** 5-10, yellow; corolla ca 3.0 mm long; throat ca 2 mm long; lobes ca 0.5 mm long. **Achenes** ca 2.5 mm long, 0.8-1.0 wide, appressed-pubescent; pappus absent.

This taxon is distinguished from **H. cordata** by a combination of characters (glabrous, remotely serrate, leaves; relatively small heads; epappose achenes). Robinson (1977) provided a photograph of the holotype.

McVaugh (1984) placed **H. hintonii** in synonymy (albeit questionably) within his concept of *H. cordata* var. *websteri*. Indeed, **H. hintonii** appears to be closest to **H. websteri**, sharing the epappose pubescent achenes of the latter, but having smaller heads and the habit of **H. cordata**.

HYMENOSTEPHIUM SUPERAXILLARE Blake, Proc. Biol. Soc. Washington 37: 57. 1924.

Viguiera superaxillaris (Blake) B.L. Turner

Viguiera vorobikae B.L. Turner

s Chi and n Sin, pine-oak forests, 600-2000 m; Oct-Nov. **Map 1**

Shrub 1-3 m high. **Leaves** ovate, 7-12 cm long, 3-5 cm wide; petioles 1-2 cm long; blades scabrous-pubescent above and below, the margins crenulo-dentate. **Capitulescence** of 2-3 terminal heads, the ultimate peduncles scabrous-pubescent, 3-7 cm long. **Involucres** hemispheric, 3-4 seriate, 5-6 mm high, 8-10 mm across; bracts ovate-lanceolate, subequal, the outer series somewhat foliaceous and reflexed. **Ray florets** 11-13, neuter; corollas yellow, the ligules 8-12 mm long, 3-5 mm wide. **Disc florets** numerous, yellow, ca 4 mm long; tube ca 1 mm long, the limb ca 3 mm long. **Anthers** brown, ca 2 mm long, the filaments glabrous. **Achenes** black, epappose, 2.5-2.8 mm long, ca 1 mm wide.

As noted by Blake in his original description, "This species has the largest heads of any known **Hymenostephium**, and is further distinguished by its phyllaries, which are broader than in any other species and do not have the attenuate or very narrowly acuminate tips found in practically all the others." He aptly notes that it appears nearest the epappose forms of **H. cordatum**. My description of *Viguiera vorobikae* was based upon specimens clearly referable to **Hymenostephium superaxillaris**, the error corrected soon after its needless description (Turner 1990).

HYMENOSTEPHIUM TENUIS (A. Gray) Schill. & Panero, Bot. J. Linn. Soc. 140: 74. 2002.

Viguiera tenuis A. Gray

Viguiera tenuis var. *alba* Rose

Sin, Nay, Jal, Col, Mic, Mex, Mor, Gue, Oax, Cps and Guatemala southwards, tropical deciduous and pine-oak forests, 400-2000 m; Oct-Dec. **Map 4**

Erect, tap-rooted, annuals to 80 cm high. **Leaves** ovate to ovate-lanceolate, mostly 3-6 cm long, 0.8-2.5 cm wide, sessile, 3-nervate from the base, the margins entire to remotely serrate, sparsely

pubescent above and below. **Heads** radiate or rarely not (in Cps), mostly few and terminal on slender peduncles 5-20 cm long; involucre campanulate, 2-3 seriate, 6-8 mm high, 4-10 mm wide, the bracts linear-lanceolate, mostly subequal. **Ray florets** 5-21 (rarely absent), the ligules 4-8 mm long, yellow, rarely white. **Disk florets** 20-80; corollas yellow, 4-5 mm long; tubes ca 1 mm long. **Achenes** obovate, black, mostly 2-3 mm long, appressed-pubescent, the pappus of 2 awns 3-6 mm long, the intervening scales 0.8-1.6 mm long. **Chromosome number**, $n = 12$ pairs.

A rather commonly encountered, variable, species but easily recognized by its erect, annual, habit, long slender peduncles and sessile leaves.

Populational systems from along the Pacific slopes of Chiapas, so far as known, all possess rayless heads, as noted by Strother (1999), and generally somewhat longer ultimate peduncles.

HYMENOSTEPHIUM UNISERATUM Schill. & Panero, Bot. J. Linn. Soc. 140: 74. 2002.

Haplocalymma microcephalum (Greenm.) Blake

Viguiera microcephala Greenm.,

non *Hymenostephium microcephalum* (Less.) Blake

Mic, Mex, Mor, Pue and Gue, tropical deciduous forests, 300-1600 m; Oct-Nov. **Map 5**

Erect annual herbs to 1 m high. **Leaves** mostly alternate throughout, the lower-most opposite, 6-9 cm long, 3-5 cm wide; petioles 1-4 cm long; blades broadly ovate to deltoid, 3-nervate from the base, the margins coarsely dentate to nearly entire. **Capitulescence** a terminal or axillary, few-headed cyme of 1-12 heads, the ultimate peduncles mostly 0.2-1.0 cm long. **Heads** 4-5 mm high; involucre 1-2 seriate, the outer series of bracts 5, ovate-apiculate, in a single series; receptacle convex. **Ray florets** 5, neuter, the ligules yellow, 3-5 mm long. **Disk florets** yellow, 10-20 per head. **Achenes** ca 2 mm long, pubescent, the pappus awns ca 3 mm long, readily deciduous, the intervening scales ca 1 mm long. **Chromosome number**, $n = 12$ pairs (Kiel et al. 1988).

A very distinct taxon, not readily confused with another. As noted by Schilling and Panero (2002), "The epithet refers to the single row of involucral bracts, which is the distinguishing feature of the species." According to Blake, however, in his original description of *H. woronowii*, he refers to its principal generic character [within *Haplocalymma*] "as an involucre composed of only 5 phyllaries in a single series."

HYMENOSTEPHIUM WEBSTERI (B.L. Turner) Schill. & Panero, Bot. J. Lin. Soc. 140: 74. 2002.

Hymenostephium kingii (McVaugh) Schill. & Panero

Viguiera cordata var. *websteri* (B.L. Turner) McVaugh

Viguiera kingii McVaugh

Viguiera websteri B.L. Turner

Nay and Jal, 1000-1800 m; Aug-Mar. **Map 3**

Perennial, stiffly erect, herbs 30-80 cm high, arising from a corm-like tap root. **Leaves** mostly 4-7 cm long, 2-4 cm wide; petioles 2-6 mm long; blades broadly lanceolate, the margins serrate, sparsely pubescent above and below. **Capitulescence** a terminal array of 3-10 divergent heads, the ultimate peduncles 2-5 cm long. **Involucre** 5-12 mm high, 4-12 mm wide. **Ray florets** 8, neuter; ligules yellow, 8-10 mm long. **Disk florets** 20-50 per head; corollas yellow ca 5 mm long; throat ca 3-4 mm long. **Achenes** black, 3-4 mm long, 1.0-1.3 mm wide, appressed pubescent, somewhat obtusely 4-angled; pappus absent. **Chromosome number**, $n = 17$ pairs (Turner, Powell and King 1962).

This is a rarely encountered, very distinct species, known to me by only five collections: the Type (Nay, 25 km S of Tepec), and *McVaugh 16599* (Type of *H. kingii*, MICH !), *Panero 2229* (LL); *Carrillo-Reyes 2922* (TEX), all collected in the vicinity of Tepec, Nayarit; *Breedlove 60633* (CAS) [Jal, Mpio. Atenguillo, 15 km NW of Los Volcanes, 1890 m, Nov 1983].

The taxon is readily distinguished from its closest cohort, **H. cordata**, by its smaller habit and corm-like roots, larger involucre, and diploid chromosome number (vs polyploid).

McVaugh (1984) inexplicably treated *H. kingii* as distinct from **H. websteri**; at least I can find no characters that might distinguish between them; he also provided an excellent sketch of **H. websteri** (based upon the type specimen of *H. kingii*). Schilling and Panero (2002; 2011), however, recognized both *H. kingii* and **H. websteri** as distinct species.

HYMENOSTEPHIUM WORONOWII (Blake) Schill. & Panero, Bot. J. Linn. Soc. 140: 74. 2002.

Haplocalymma woronowii Blake

Viguiera woronowii (Blake) H. Rob.

Known only from Mic, Uruapan and vicinity, pine-oak forests, 1600-1700 m; Aug-Jan. **Map 6**

Annual, slender-stemmed, herbs to 50 cm high. **Leaves** opposite below, alternate in the inflorescence, 2-3 cm long, 1.0-1.5 cm wide; blades lanceolate, hirsute-pilose on both surfaces, the margins serrate; petioles 1-2 mm long. **Inflorescence** a terminal cymose panicle of 4-10 heads, 4-8 cm wide, 4-5 cm high, the ultimate peduncles mostly 2-6 cm long. **Heads** relatively small, 5-6 mm across (the rays excluded), 2-4 mm high. **Involucre** reportedly uniseriate (on the type) to biseriate, the phyllaries lanceolate, ca 1 mm wide. **Receptacle** conical, ca 1.5 mm high, 1 mm wide; pales broadly lanceolate, ca 2.5 mm long, their apices acute. **Ray florets** 5, neuter, reportedly yellow; ligules 5-7 mm long, 4-5 mm wide. **Disk florets** ca 20 per head; corollas ca 2.3 mm long; throat ca 1.5 mm long. **Achenes** glabrous, epappose, ca 1 mm long.

In the transfer of *Haplocalymma woronowii* into **Viguiera**, Robinson (1977) called attention to the anomalous conical receptacle of this taxon, which is its most distinguishing feature. Additionally, it has very small (ca 1 mm long) epappose, glabrous, achenes and smaller disc florets, with shorter throats, than other members of the **Hymenostephium** complex.

ACKNOWLEDGEMENTS

My long time companion, Jana Kos, edited the paper and provided helpful input. The dot maps are based upon specimens at LL-TEX, and those called to the fore by various published works.

LITERATURE CITED [cf. references, above]





