

A NEW *AMBROSIA* (ASTERACEAE) FROM THE BAJA CALIFORNIA PENINSULA, MEXICO.

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Abstract: *Ambrosia humi* León de la Luz and Rebman, *sp. nov.*, a member of the *Franseria* alliance, is here described and illustrated. This taxon is apparently endemic only to Mesa de Humí in the Sierra de La Giganta of Baja California Sur, Mexico. This new species is a subshrub with three-parted leaves that are gently scented and viscid when fresh, and it has a bur-like pistillate head, at maturity it is densely covered with strong, sharp, aculeate spines.

Key words: Compositae, *Franseria*, Sierra de La Giganta, plant diversity, floristics.

Resumen: Se describe e ilustra a *Ambrosia humi* León de la Luz y Rebman *sp. nov.*, un nuevo taxa de la primitiva alianza *Franseria*. Este nuevo taxón es aparentemente endémico de la Mesa de Humí, en la Sierra de La Giganta, en la península de Baja California, México. Se trata de una especie sub-arbustiva con hojas tri-partidas, pegajosas en fresco, ligeramente aromática, el fruto se encuentra densamente cubierto por fuertes y agudas espinas ligeramente curvadas.

Palabras clave: Compositae, *Franseria*, Sierra La Giganta, diversidad vegetal, florística.

The genus *Ambrosia* (Asteraceae) is composed of approximately 45 species (and some varieties) that are commonly called ragweeds or bursages. They grow naturally in the New World, but two species are found outside of the Americas in southern Europe and along the western coast of Africa (Lewalrée 1947). Most of the species are native to North America where some of them are considered harmful weeds because their pollen is an aeroallergen that causes hay fever. A large number of the *Ambrosia* species grow in desert and semi-desert conditions, some as secondary plants in ruderal or disturbed habitats. Payne (1964) and Payne *et al.* (1964) state that the center of origin and diversification for this genus is in the deserts of the southwestern United States and northwestern Mexico.

Payne (1964) combined the small genus *Ambrosia* L. with the more diverse *Franseria* Cav. because the proposed characters to differentiate them were weak; although he proposed that the “ambrosioid” assemblage of species was derived from the “franserioid” group. Recently, after a review of similarities and differences between *Hymenoclea* Torr. & A. Gray and *Ambrosia s. l.* and also using molecular

data on restriction sites in chloroplast DNA, both Miao *et al.* (1995) and Strother and Baldwin (2002) concluded that the two species of *Hymenoclea* are most closely allied to the franserioid members of *Ambrosia* and should be recognized in that genus.

According to Payne (1964) several morphological characteristics show relationships between species as well as general evolutionary progressions from primitive (franserioid) to more derived characters (ambrosioid). These tendencies include the following: growth habit, from shrubby to annual; leaves, from petiolated to sessile, from alternate to opposite, from pinnately-lobed to palmately-lobed or unlobed, from dense pubescence to less pubescent, and from coriaceous to membranaceous texture; staminate capitula, from stalked to sessile, from stalked capitulous forms with more than one head to one-headed and stalked; pistillate capitula, from several florets to a single floret per capitulum; bur ornamentation, from many scattered spines to few and localized ones, and from flat spines to terete.

Rydberg (1922) recognized 15 subgeneric groups among the *Ambrosia* and *Franseria* species, but such was not ac-

cepted by Payne (1964); instead, he recognized only four major subgeneric complexes as follows: a) The largest group comprises the majority of the franserioid species and is the more intricate in regard to evolutionary lines apparently leading from the least specialized shrubby species, such as *A. dumosa* (A. Gray) Payne, along at least four derivative pathways to ambrosioid species. b) A second and small group of derived taxa, made up of shrubby forms with mostly unlobed leaves having heavy glandular indumenta where *A. ambrosioides* (Cav.) Payne is a typical member. c) A third group of highly specialized perennial herbs and annuals is characterized by membranaceous, pinnately lobed leaves and small staminate and pistillate involucre, such as *A. artemisiifolia* L. d) A fourth group containing a sole derived species, *A. bidentata*, with sessile, unlobed leaves, one-flowered pistillate heads lacking many spines, and a highly specialized staminate involucre.

Geographically, the first group is located in the southwestern United States, the second in the less arid regions surrounding it, the third extends to northern and eastern North America, and the fourth group grows only in South America. This distribution pattern provides a picture of diversification and an outward spread from the proposed center of origin.

This new taxon was first collected by Annetta M. Carter (1908-1990) during her last botanical exploration to the Sierra de La Giganta (Baja California Sur, Mexico) in March of 1973. The specimen (*A. Carter* 5736) remained undescribed for several years in the University of California at Berkeley Herbarium (UC 1593991) until Dr. John Strother kindly directed our attention to it and generously encouraged us to describe it, especially due to our recent, binational, floristic research in several areas of the Sierra de La Giganta (León de la Luz *et al.*, 2008).

Ambrosia humi León de la Luz et Rebman sp. nov. Figure 1, Figure 2 A-G

Planta monoica perennis, suffruticosa, ad 60 cm alta. Foliis alternis, petiolatis, petiolis usque ad 5 cm longis, in caulem aliquantum decurrentibus; lamina trisecta, margine lobulata, sectione centrali grandiore, duobus lobis duas divisiones simulantibus, 8 cm longa, 6 cm lata, deltato-triangularis, supra canescens, venis principalibus prominentibus, glandulari-tomentosa, infra quam supra minus tomentosa, margine aliquantum revolutis. Capitula staminata in racemis spiciformibus, unaquaque 15-20 floribus, pedunculis 4-6 mm longis; involucrem patelliforme 8-9 mm diam, atroviride, sparse hispidulum, 7-8 lobis triangularibus; paleae receptaculares lineari-spathulatae, villosae, 4 mm longae; corolla infundibuliformis, 4-5 mm longa, ad anthesin purpurea, postea luteola, 5 lobis; stamina monadelphica, antheris magnitudinibus dissimilioribus, incurvatis; pistillum vestigiale. Capitula pistillata in glomerulis axillaribus infra racemis staminatis, 4-5 floribus, uno solum fertili, spinosis; invo-

lucrum numerosis bracteis coalescentibus, spinis puberulis in fructu immaturo. Fructus maturus sphaericus, 15-18 mm diam, 60-80 spinis robustis, 3-4 mm longis, aculeatis, basi cavitate, sublignosis, atrantibus ubi pubescentia cadenti. Caules glandulares, in vivo viscati, in sicco laccati.

Subshrub to 60 cm tall. **Stems** viscid-sticky when fresh that remains as shiny shellac when dry. **Leaves** alternate, petioles up to 5 cm long with decurrent blade tissue to stem, leaf blades up to 8 cm long and 6 cm wide, deltate-triangular in outline, deeply three-divided and each division lobed, the central division the largest with two bigger basal lobes and often additional smaller lobes, abaxial surface canescent with main veins prominent, more glandular-tomentose than adaxial side, blade margin slightly revolute. **Plants monoecious** with **staminate heads** arranged in terminal spiciform racemes, each with 10-12 heads, each head with 15-20 flowers, head peduncles 4-6 mm, involucre saucer-shaped and 8-9 mm in diameter, dark green, sparsely hispidulous, 7-8 triangular lobes; receptacular paleae linear-spatulate, villous, 3-3.5 mm long; corollas funnelform 4-5 mm long, purple at anthesis, later yellowish, five toothed, filaments monodelphus; anthers distinct, inwardly curved; pistil vestigial; **pistillate heads** 2-4 in axillary clusters below staminate racemes, each head with 4-6 flowers, but only one fertile, bur-like, involucre of numerous bracts fused together, with puberulent and stalker glandular hairs 3-4 mm long, **fruiting involucre** round, 15-18 mm in diameter, bearing 60-80 strong, sharp, aculeate spines, each pitted at base and puberulent when young but glabrous and darkening with age, somewhat woody at maturity.

TYPE: México, Baja California Sur: Mesa de Humí, Municipio of La Paz, 25.01136 N, -110.94598 W at 780 m, crasi-caulescent scrubland, 14 January 2008. **Miguel Domínguez León** 4009. (Holotype: HCIB 23216; Isotypes SD 195540, to deliver to UC, MEXU, and IEB. Paratype, México, Baja California Sur: Mesa de Humí, Municipio of La Paz, 19 March 1973, 750 m, A. Carter 5736, UC 1593991).

Distribution and ecology. This new species is known only from Mesa de Humí, in the Municipio de La Paz, Baja California Sur, México. The population grows only on the summit of the mesa (760 to 820 m in elevation), where the landscape is dominated by volcanoclastic rocks of the Comondu Formation from the Miocene where plants grow in a shallow, clayey soil. Estimated surface of the mesa is approximately 1,000 hectares. Vegetation is dominated by succulent plants such as *Agave sobria* Brandegee, *Myrtillocactus cochal* (Orcutt) Britt. et Rose, *Stenocereus thurberi* (Engelm.) Gibson et Horak var. *thurberi*, *Opuntia taponia* Engelm., *Ferocactus rectispinus* (Engelm.) N.P. Taylor, *Jatropha vernicosa* Brandegee, and *Fouquieria diguetii* (Tiegheem) I. M. Jhtn.. Other common non-succulent plants



Figure 1. *Ambrosia humi* León de la Luz et Rebman. A. Plant in bloom (14 Jan 2008). B. Fruiting plant (20 March 2009). C. Habitat in the rocky Mesa de Humí.

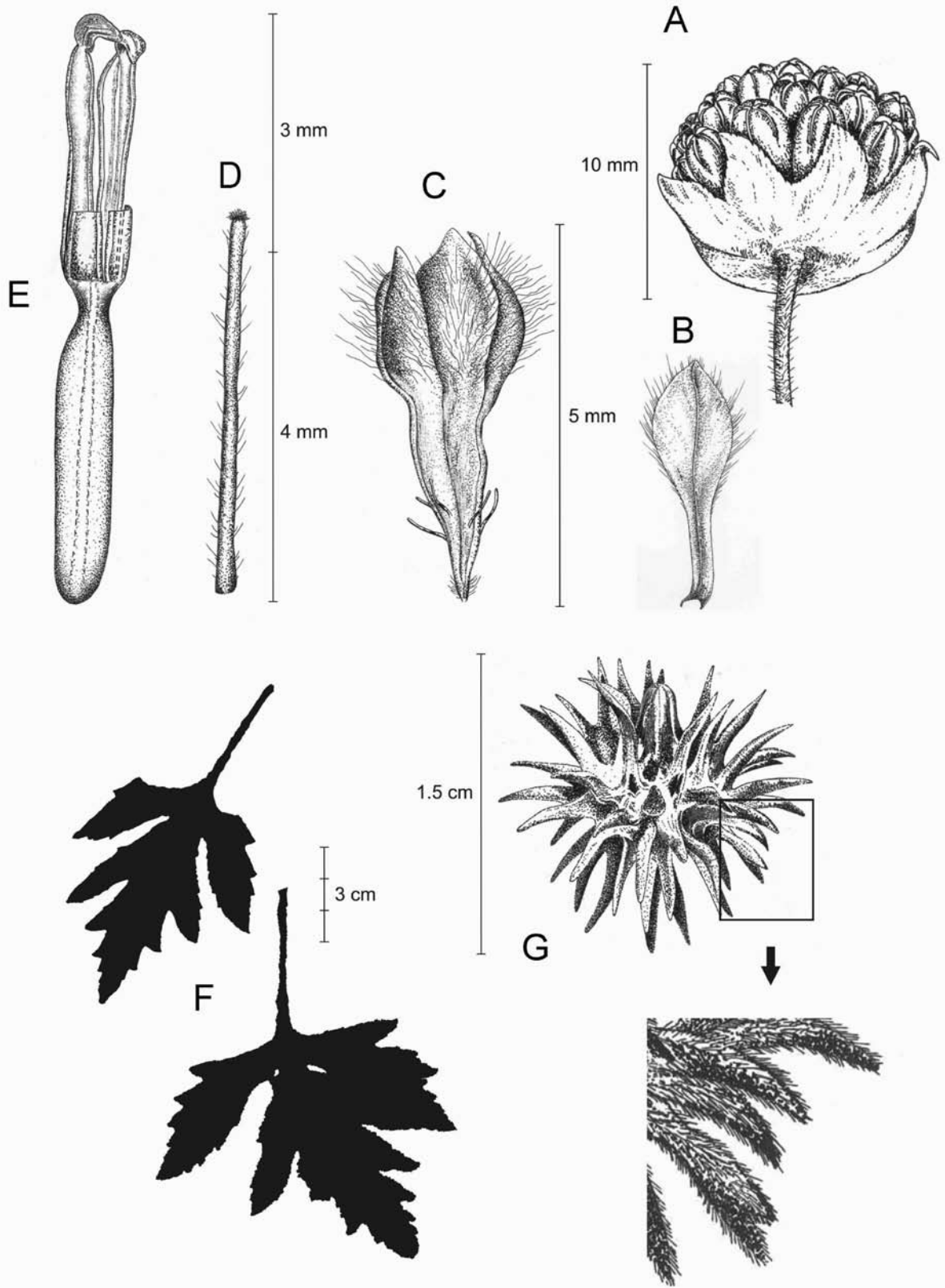


Figure 2. Illustrations for *Ambrosia humi* León de la Luz et Rebman. A. staminate head and involucre detail. B. receptacle paleae in the staminate head. C. staminate flower and details. D. vestigial style in a staminate flower. E. staminate flower showing details of anthers and monadelphous filaments. F. form of leaves with dark outline. G. mature fruit and details of spines on a young fruit.

A NEW *AMBROSIA* (ASTERACEAE) FROM THE BAJA CALIFORNIA PENINSULA, MEXICO.

Table 1. Relevant characteristics of the Baja California peninsula species of *Ambrosia* (including *Franseria*)

Species	Leaves	Growth habit	Leaf indumentum	Pistillate heads	Spines on fruit	Staminate involucre	Staminate heads
<i>A. acuminata</i> (Brandegee) Payne	pinnately shrub, divided	suffrutescent	nearly glabrous	1 florets	5-8 curved	saucer-shaped	15-20 florets
<i>A. ambrosioides</i> (Cav.) Payne	entire, dentate	shrub	hirsutulous & gland-dotted	4-5 florets	60-80+ hooked	saucer-shaped	40-60+ florets
<i>A. artemisifolia</i> L.	1-2 pinnatifid	herbaceous	sparsely pilosulous to strigillose, gland-dotted	1 floret	3-5 conical, subulate	shallowly cup-shaped	12-20 florets
<i>A. bryantii</i> (Curran) Payne	tripinnatifid	shrub	nearly glabrous	1-2 florets	4-7 straight subulate	campanulate	25-30 florets
<i>A. camphorata</i> (Greene) Payne	bipinnatifid	subshrub	tomentose glandular	2-3 florets	6-10 straight conical	saucer-shaped	15-20 florets
<i>A. carduacea</i> (Greene) Payne	simple, 3-7 lobed	shrub	cineraceous puberulent	2-3 florets	7-12 hooked at tip	rotate	25-40 florets
<i>A. chamissonis</i> (Lessing) Greene	entire, 1-2 pinnately lobed	herbaceous, suffrutescent	strigillose to sericeous	1 floret	10-15, straight, stoutly conic or flattened	shallowly cup-shaped	8-50 florets
<i>A. chenopodiifolia</i> (Benth.) Payne	simple, dentate	shrub	tomentose, more beneath	2 florets	15-20+ straight to hooked, subulate, lanate	cup-shaped	12-20+ florets
<i>A. confertiflora</i> DC.	2-4 pinnately divided	herbaceous	strigillose to sericeous, gland dotted	1-2 florets	5-12+ hooked	cup-shaped	5-20+ florets
<i>A. cordifolia</i> (A.Gray) Payne	simple, dentate to 3 lobed	shrub	tomentose to glabrate, gland-dotted	2 florets	8-20+ straight or curved, tomentulose & glandular	cup-shaped	8-30+ florets
<i>A. deltoidea</i> (Torrey) Payne	simple, dentate	shrub	tomentulose glandular	2-3 florets	20-30+ usually straight, subulate and flattened at base, stipitate-glandular	cup-shaped	12-30+ florets
<i>A. divaricata</i> (Brandegee) Payne	3-5 lobed, dentate	subshrub	canescent puberulent	2 florets	25-30 conical subulate, pilulous	rotate	7-10 florets
<i>A. dumosa</i> (A.Gray) Payne	2-3 pinnatifid	shrub	densely strigillose canescent	1-2 florets	12-25+ straight, subulate & flattened at base	shallowly cup-shaped	8-15+ florets
<i>A. flexuosa</i> (A. Gray) Payne	entire, dentate	subshrub	canescent puberulent	2-3 florets	10-20 straight flattened	rotate	15-20 florets
<i>A. ilicifolia</i> (A. Gray) Payne	simple, dentate	shrub	hirtellous & stipitate glandular	2 florets	40-50+ straight or hooked, subulate, stipitate-glandular	saucer-shaped	20-40+ florets
<i>A. magdalenae</i> (Brandegee) Payne	bipinnatifid	subshrub	strigose puberulent	2 florets	20-40 subterete	shallowly saucer-shaped	25-30 florets
<i>A. pumila</i> (Nutt.) A. Gray	2-3 pinnately divided	herbaceous	silky canescent	2 florets	0 or 1-5 straight, stout conic, strigillose	broadly cup-shaped	8-25+ florets
<i>A. psilostachya</i> DC.	pinnately toothed to pinnatifid	herbaceous	hirsutulous to strigose, gland-dotted	1 floret	0 or 1-6 straight, stout conic to needle-like	broadly obconic	5-15+ florets, small
<i>A. humi</i> León de la Luz and Rebman	3 sected lobed	subshrub	tomentose, more beneath, glandular	4-6 florets	60-80 conical sharp, puberulent	saucer-shaped	15-20 florets

Table 2. Some relevant characteristics of the Baja California peninsula species of *Ambrosia* (formerly *Hymenoclea*).

Species	Branches	Leaves	Indumentum on branches	Wings of fruits	Diameter of fruits
<i>A. monogyra</i> (Torr. & A. Gray) Strother & Baldwin	Prominently striate-ridged	Filiform, nearly terete, 2 - 10 cm long	Puberulent and resinous-glutinous	In a single equatorial whorl	4 - 6 mm
<i>A. salsola</i> (Torr. & A. Gray) Strother & Baldwin	Finely puberulent, scarcely striate	Filiform, sub-terete, 5 - 35 cm long	Sparcely and finely puberulent	Arranged in several series	8 - 10 mm

are *Prosopis palmeri* S. Wats. and *Ruellia californica* (Rose) I. M. Jhtn. subsp. *peninsularis* (Rose) T. F. Daniel. In respect to the herbaceous or suffrutescent plant species, *Ambrosia humi* is undoubtedly one of the most common and dominant species of this area.

Phenology: Flowering during winter months, fruiting in march.

Etymology. The specific epithet for this new taxon is from “hum?” a Pericú indian name for the place where it occurs.

Conservation. Population of this taxon is rather common on this mesa and does not seem to be endangered at this moment since the area is difficult to access for humans, and is relatively inaccessible to big herbivores such as horses and cattle, and goats do not seem to find the plants palatable.

Discussion

Ambrosia humi has some resemblance to *A. camphorata* (Greene) Payne in respect to inflorescence, fruit type, and leaf pubescence. *A. camphorata* grows sporadically in western Sonora and southern Sonora, but is widespread on the Baja California peninsula where it exhibits great variability in leaf pubescence and pistillate head morphology. Table 1 and 2 show general morphological features for 20 *Ambrosia* species (also the former *Franseria* and *Hymenoclea*) that grow naturally on the Baja California peninsula and in northwestern Mexico, including this new taxon. Morphological data was taken from Shreve and Wiggins (1964), Wiggins (1980), Payne (1964), Strother (2006), and from our voucher specimens of the new species. In the group classification scheme according to Payne (1964), this new taxon should be incorporated into “group 1”, i.e., that basal group of franserioid species geographically located on the southwestern United States and adjacent areas.

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Literature cited

- León de la Luz J.L., Rebman J., Domínguez-León M. and Domínguez-Cadena R. 2008. The vascular flora and floristic relationship of the Sierra de La Giganta in Baja California Sur, México. *Revista Mexicana de Biodiversidad* **79**:29-65
- Lawalrée A. 1947. Les *Ambrosia* adventice en Europe occidentale. *Bulletin Jardin. Botanique des Bruxelles* **18**:306-315.
- Miao B., Turner B., Simpson B., and Mabry T. 1995. Chloroplast DNA studies of the genera *Ambrosia* s. l. and *Hymenoclea* (Asteraceae): systematic implications. *Plant Systematic and Evolution* **194**:241-255.
- Payne, W.W. 1964. A re-evaluation of the genus *Ambrosia* (Compositae). *Journal of the Arnold Arboretum*. **45**:401-438.
- Payne W.W., Raven P.H., and Kyhos D.W. 1964. Chromosome numbers in Compositae. IV Ambrosieae. *American Journal of Botany* **51**: 419-424.
- Rydberg P.A. 1922. Ambrosiaceae. *North American Flora* **33**: 3-44.
- Shreve F. and Wiggins I.L. 1964. *Vegetation and Flora of the Sonoran Desert, Vol 1*. Stanford University Press. Stanford, Cal.
- Strother, J.L. 2006. *Ambrosia*. En: *Flora of North America Editorial Committee eds. Flora of North America: North of Mexico vol 21 Magnoliophyta: Asteridae, Part 8: Asteraceae, Part 3* pp. 10-18. Oxford University Press. USA.
- Strother, J.L. and Baldwin, B.G. 2002. *Hymenoclea* are ambrosias (Compositae). *Madroño* **49**: 143-144.
- Wiggins, I.L. 1980. *Flora of Baja California*. Stanford University Press. Stanford.

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