

**THREE NEW SPECIES OF *KOANOPHYLLON* (ASTERACEAE:
EUPATORIEAE) FROM MEXICO****Billie L. Turner**Plant Resources Center
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Three new species of *Koanophyllon* are added to the Mexican Flora: **K. coixtlahuacum** B.L. Turner, from Oaxaca; **K. concordianum** B.L. Turner, from Sinaloa; and **K. revealii**, from Guerrero and Oaxaca. In addition, a new varietal combination is proposed: *K. solidaginoides*: var. **filicaulis** (Sch.-Bip. ex A. Gray) B.L. Turner, a widespread taxon in eastern Mexico. Distribution maps are provided, along with photoholotypes. The several taxa are keyed along with yet other Mexican taxa in the format of Turner's 1997 treatment of *Koanophyllon* in which 21 species were recognized; the current account brings this total to 24. *Phytologia* 91(2): 312-324 (August, 2009).

KEY WORDS: Asteraceae, Eupatorieae, *Koanophyllon*, Mexico.

Routine identification of Mexican Asteraceae has revealed the following novelties:

KOANOPHYLLON COIXTLAHUACUM B.L. Turner, **sp. nov.**
Fig. 1, **Map 1**

Koanophyllon richardsonii B.L. Turner similis sed differt laminis foliorum multo majoribus, capitulescentiis magis congestis, et receptaculis glabris (vs pubescentibus).

Shrubs 1-2 m high. **Mid-stems** minutely puberulent to glabrate. **Leaves** opposite throughout; blades broadly deltoid, 6-10 cm long, 4-7 cm wide, 3-nervate from the base, glandular-punctate beneath, sparsely hispidulous above, the margins irregularly serrate; petioles 2.0-3.5 cm

long. **Capitulescence** a terminal congested corymbose panicle of numerous heads, 3-6 cm high, 4-6 cm across, the ultimate peduncles 2-5 mm long. **Heads** ca 7 mm high. **Involucres** ca 4 mm long, composed of ca 11 slender, nearly glabrous, subequal bracts, their apices gradually attenuate. **Receptacles** ca 1 mm across, glabrous or nearly so. **Florets** 13-16 per head; corollas white, glabrous, ca 5 mm long, the lobes ca 0.5 mm long. **Achenes** 2.3-3.0 mm long, markedly hispidulous, especially along the ribs; pappus of ca 40 tawny-white bristles 4-5 mm long.

TYPE: **MEXICO. OAXACA: Mpio. Coixtlahuaca**, "Concepcion Buena Vista. Km 94.7 de la carretera Tehuacan-Oaxaca (cuota) y de este punto aproximadamente 2 horas a pie montana arriba hasta base de paredes verticales en la cima de cerro." 1680 m, (18 06 58.5 N, 97 19 47.1 W), 27 Oct 1996. *Jose L. Panero & Ismael Calzada 6760* (Holotype: TEX).

The present novelty, in habit and leaf shape, resembles a species of *Fleishmannia*, but it clearly belongs to *Koanophyllon*, where it finds no clear relatives. Panero identified the type as *K. gracilicaule*, which it superficially resembles.

The species is named for the Municipio Coixtlahuaca, from whence the type.

In my account of *Koanophyllon* for Mexico (Turner 1997), I treated all of the latter within a broadly circumscribed *Eupatorium*. I now follow the treatment of King and Robinson (1987). Below find a modified key to the Mexican species of *Koanophyllon*, including the three novelties described herein.

KOANOPHYLLUM CONCORDIANUM B.L. Turner, **sp. nov.**, Fig. 2., **Map 1**

Koanophyllon reyrobinsonii B.L. Turner similes sed differt foliis ovalibus (vs ovatis vel deltoideis ad medium latissimis et flosculis per capitulum paucioribus (4-5 vs 7 vel plures).

Perennial suffruticose herb or sprawling subshrub to 1 m (?) high. **Stems** densely pubescent with mostly upswept hairs. **Leaves** opposite, 5-7 cm long, 3-5 cm wide; petioles 3-6 mm long; blades oval, widest near the middle, 3-nervate from the base, nearly glabrous and atomiferous-glandular below, glabrous above, the margins pubescent, crenulate. **Capitulescence** a terminal corymbose panicle ca 15 cm high, 6-10 cm across, the ultimate peduncles 1-6 mm long, pubescent like the stems. **Involucres** 3-4 mm high, composed of 5-6 subequal, glandular-atomiferous bracts. **Receptacles** ca 0.5 mm across, pubescent. **Corollas** white, atomiferous-glandular, ca 2.5 mm long; tube ca 1.5 mm long; lobes 5, obtuse, ca 0.2 mm long. **Achenes** black, 5-ribbed, ca 1.5 mm long, appressed-pubescent; pappus of ca 30 persistent bristles ca 5 mm long.

TYPE: **MEXICO. SINALOA: Mpio. de Concordia**, "El Capomito, Ejido Los Ciruelos, Comunidad La Guasima," (23 18 10 N, 105 56 12 W), tropical deciduous forest, 341 m, 7 Jan 2006, *A.L. Reina G. et al. 2006-122* (Holotype: TEX).

ADDITIONAL SPECIMEN EXAMINED: **MEXICO. SINALOA: Mpio. Concordia**, "La Cuesta Blanca, la Bajada de Campo Redondo, Comunidad La Guasima," ca 13.2 km NE Concordia, 393 m, 25 Nov 2008, *Reina G. 2008-661* (TEX).

This novelty is markedly distinct, having the pubescent receptacles of those taxa centering about *K. longifolium* and *K. reyrobinsonii*, but possessing the capitulescence and heads of *K. palmeri*, to which it is perhaps more closely related.

The species is named for the Municipio de Concordia, from whence the type.

KOANOPHYLLON REVEALII B.L. Turner, **sp. nov.**, Fig. 3, **Map 2**

Koanophyllon gracilicaule (Sch.-Bip. ex B.L. Rob.) King & H. Rob. similes sed differt capitulescentiis minoribus (6-12 mm altis 6-12 mm latis vs ca 20 cm altis 20 cm latis) pedunculis ultimis brevioribus (3-6 mm longis vs 8-15 mm) et setis pappi numerous (ca 40 vs 20).

Shrub or small tree 1-4 m high. **Mid-stems** purplish-brown, minutely hispidulous. **Leaves** opposite throughout; blades ovate to ovate-deltoid, 4-6 cm long, 2-4 cm wide, 3-nervate from the base, glandular-punctate, the margins crenulate; petioles 2-4 cm long. **Capitulescence** a terminal corymbose panicle, 6-12 cm high, 6-12 cm across, the ultimate peduncles hispidulous, mostly 3-6 mm long. **Heads** numerous, 6-7 mm high. **Receptacles** ca 1 mm across, glabrous or nearly so. **Involucre**s 3-4 seriate, imbricate, 1-4 mm long, densely brown-hispidulous throughout, linear-lanceolate, their apices abruptly acute. **Florets** ca 15 per head. **Corollas** white, glabrous, ca 4 mm long, the lobes deltoid, ca 0.5 mm long. **Achenes** ca 2 mm long, subglabrous to sparsely hispidulous; pappus of ca 40 tawny persistent bristles 3-4 mm long.

TYPE: **MEXICO. GUERRERO: Mpio. Atoyac de Alvarez**, "along the Millpillas-Atoyac road via Puerto del Gallo, about 48.5 miles northeast of Atoyac and 6.8 miles southwest of Puerto del Gallo, in mixed deciduous forest with scattered tree ferns on steep slopes," ca 6800 ft, 19 Oct 1975, *J.L. Reveal, K.M. Peterson, R.M. Harley & C.R. Broome 4346* (Holotype: TEX).

ADDITIONAL SPECIMENS EXAMINED: **MEXICO:**

GUERRERO. Mpio. Atoyac de Alvarez, "below Puerto El Gallo along road to Atoyac." 2255 m, 10 Oct 1986, *Breedlove 65118* (TEX); 38.5 km NE El Paraiso, rumbo a filo de Caballo, 7 Sep 1983, *Villasenor 555* (TEX).

OAXACA: Mpio. Santiago Juxtlahuaca, ca 5 km del poblado El Manzanal, 17 13 0.20 N, 38 04 33.7 W, 22 Aug 1996, *Calzada 21163* (TEX).

In my treatment of the *Koanophyllon* complex for Mexico (Turner 1997) I included the above collections within *K. gracilicaule* (to which it is clearly related). The latter is typified by material from Tlacolula, Oaxaca (GH!), first collected by Ehrenberg in 1839. *Koanophyllon revealii* differs from the latter in having much smaller capitulescences, with shorter ultimate peduncles, somewhat smaller heads, and pappus with more numerous bristles, as noted in the above diagnosis. Distribution of the two taxa is shown in Fig.4.

The species is named for James L. Reveal, Systematist extraordinare, still kicking up nomenclatural novelties and academic miscellany at the age of eighty. Bravo! May he dance on.

KOANOPHYLLON SOLIDAGINOIDES (H.B.K.) King & H. Rob.,
Phytologia 22: 151. 1972. **Map 3**
Eupatorium solidaginoides H.B.K.

Weak-stemmed, arching or clambering, shrubs 1-3 m high; stems striate, densely puberulent; leaves 6-10 cm long, 2-5 cm wide; petioles mostly 1.5-4.0 cm long; blades deltoid to decidedly cordate, 3(5)-nervate from at or near the base, densely minutely glandular-punctate beneath, glabrous except along the major veins, the margins crenulate to dentate; heads white, numerous in both terminal and axillary, loose or congested, corymbose racemes, the ultimate peduncles 2-10 mm long; florets 10-15 per head; achenes ca 2 mm long, the pappus of 40-50 bristles 2.5-3.0 mm long.

A widespread, highly variable, species but readily distinguished by its weak clambering stems and cordate leaves (rarely deltoid).

Two varieties are recognized in the complex for Mexico, as follows:

Ultimate peduncles 3-7 mm long; heads 5-7 mm high; eastern Mexico.....var. **filicaulis**
Ultimate peduncles 1-3 mm long; heads 4-5 mm high; western Cps.....var. **solidaginoides**

var. filicaulis (A. Gray) B.L. Turner, **comb. & stat. nov.** Map 3.
Koanophyllon solidaginoides **var. filicaulis** (Sch.-Bip. ex A. Gray) B.L. Turner, **comb. & stat. nov.** Based upon *Eupatorium filicaule* Sch.-Bip ex A. Gray, Proc. Amer. Acad. Arts 21: 384. 1886.

San, Ver, Oax, Cps and Guatemala southwards, in barrancas of montane cloud forests 20-2600 m; Nov-Feb.

In Mexico, the two varieties are quite distinct; in Central America, however, they appear to intergrade, especially in northern Guatemala (numerous specimens in and about Tikal, LL-TEX), hence my treatment of these at the varietal level.

var. **solidaginoides** Map 3.

The type of this taxon is from Ecuador. In Mexico, it is known only from Chiapas, the latter populations easily recognized from the typical var. by its much shorter ultimate peduncles and smaller heads. *Eupatorium solidaginoides* var. *armourii* B.L. Rob. (photoholotype FM!) from Palenque, Chiapas appears to be a form of this taxon having markedly deltoid leaves and somewhat larger heads. Additional field studies might show the name concerned worthy of recognition.

Key to Mexican species of Koanophyllon

- 1. Leaves 3-parted or trifoliolate on mid-stems (a few leaves simple along the upper stems).....**K. tripartitum**
- 1. Leaves all simple.....(2)
 - 2. Leaves pinnately veined.....**K. pittieri**
 - 2. Leaves with 3-5 principal veins from, or near, the base.....(3)
- 3. Heads arranged in ball-like clusters, the involucre with only 1 or 2 florets.....**K. monanthum**
- 3. Heads not as above, the involucre with 4 or more florets.....(4)
 - 4. Pappus about 0.5 mm long or less; heads in congested, spike-like, capitulescences, the ultimate peduncles mostly 0-1 mm long; Cps.....**K. ravenii**
 - 4. Pappus 2-7 mm long; heads in mostly open or loosely arranged capitulescences, the ultimate peduncles mostly 2-10 mm long.....(5)

5. Leaves with petioles 1-4 mm long, the blades appearing to clasp;
Ver.....**K. pseudoperfoliatum**
5. Leaves with petioles 3-40 mm long, the blades not appearing to
clasp.....(6)
6. Petioles mostly 12-40 mm long.....(7)
6. Petioles mostly 2-15(20) mm long.....(14)
7. Heads 8-10 mm high; achenes densely pubescent with soft
appressed hairs; Baja Calif.....**K. peninsularis**
7. Heads 4-7 mm high; achenes glandular or sparsely hispid; not in
Baja Calif.....(8)
8. Heads 4-5 mm high.....(12)
8. Heads 6-8 mm high.....(9)
9. Receptacles glabrous or nearly so; Gue, Oax, Cps.....(11)
9. Receptacles pubescent; Tam to Hid.....(10)
10. Leaves cordate; achenes hispid; Nue.....**K. hintoniorum**
10. Leaves ovate, obtuse or truncate at base; achenes to some
degree glandular-pubescent.....**K. richardsonii**
11. Involucral bracts densely pubescent, abruptly
acute.....**K. revealii**
11. Involucral bracts sparsely pubescent, if at all, gradually
attenuate.....**K. coaxtlahuacum**
12. Capitulescence of axillary or terminal spike-like branches, the
heads arranged in tight or loose interrupted corymbs
.....**K. solidaginoides**
12. Capitulescence not as above, terminal and leafy in pyramidal
corymbose panicles.....(13)
13. Blades of leaf pubescent above and below, (rarely glabrate);
corollas 2.5-3.3 mm long; involucral bracts sharply acute;
Chi, Sin.....**K. sinaloense**
13. Blades of leaf glabrous or nearly so; corollas ca 3.5 mm long;
involucral bracts broadly acute; San, Ver, Gue, Oax
.....**K. gracilicaule**

- 14(6). Receptacle glabrous.....(17)
14. Receptacle decidedly pubescent, rarely not; Sin, Nue, Tam, San, Hid.....(15)
15. Leaves oval, widest near the middle; florets 4-5 per head; Sin.....**K. concordianum**
15. Leaves ovate to triangular, widest near the base; florets 6-15 per head.....(16)
- 16 . Blades of leaf uniformly pubescent beneath; petioles mostly 7-15 mm long; corollas ca 2 mm long..... **K. longifolium**
16. Blades of leaf sparsely pubescent along the major veins; petioles mostly 3-6(8) mm long; corollas 2.5-3.0 mm long**K. reyrobinsonii**
17. Suffruticose herbs or arching, weak, shrubs, 0.5-3.0 m high; older stems not white; foliage to some degree pubescent.....(19)
17. Tree-like shrubs, small trees or woody vines, 2-10 m high; older stems white; foliage glabrous.....(18)
18. Woody vines; capitulescence pyramidal, axillary; leaf blades elliptic, 15-20 cm long; Gue..... **K. guerreroanum**
18. Shrubs or trees; capitulescence corymbose or pyramidal, terminal; leaf blades ovate-elliptic, 6-15 mm long; widespread**K. albicaule**
19. Leaf blades densely pubescent above and beneath; San**K. rzedowskii**
19. Leaf blades not densely pubescent except along the veins beneath; widespread.....(20)
20. Leaf blades variously lanceolate, ovate, or deltoid, but not clearly cordate or subcordate.....(22)
20. Leaf blades neatly cordate or subcordate.....(21)
21. Involucral bracts rigid with narrowly acute (acicular) apices, not at all scarious; Nue..... **K. galeanum**
21. Involucral bracts not rigid, scarious marginally, the apices obtuse or rounded; widespread but not in Nue**K. solidaginoides**

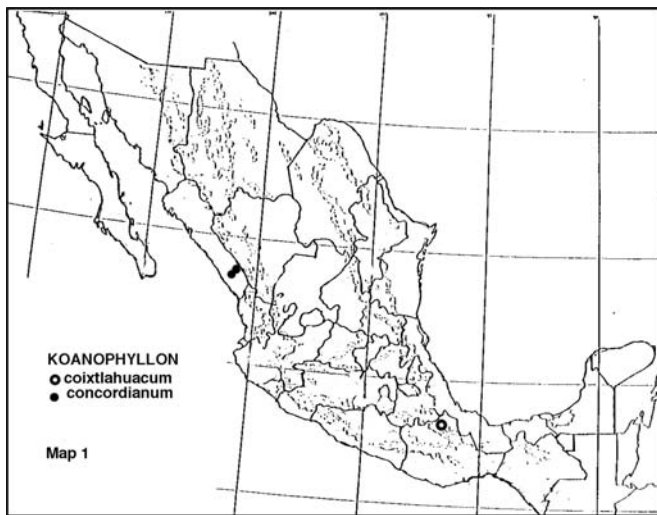
22. Leaves often alternate above, the blades epunctate beneath; e Chi, Coa, Dur, Zac.....**K. solidaginifolium**
22. Leaves opposite throughout, the blades glandular-punctate beneath; Son, w Chi, Dur, Jal, Col, Mic.....(23)
23. Heads 7-9 mm high; Cps.....**K. coulteri**
23. Heads 4-6 mm high; w Chi, Sin, Dur, Nay, Jal, Col, Mic, Gue
.....**K. palmeri**

ACKNOWLEDGEMENTS

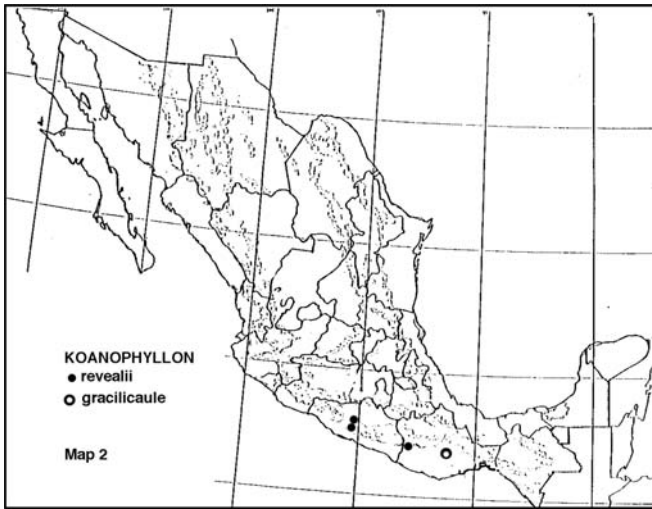
As always, I am grateful to my long-time colleague, Guy Nesom, for the Latin diagnoses and helpful editorial comments. The Field Museum provided selected types, for which I am grateful.

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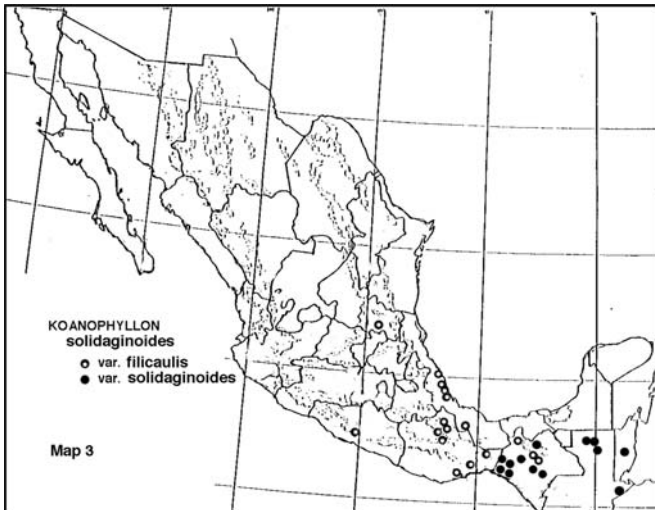
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Map 1. Distributions of *K. coixtlahuacum* and *K. concordianum*.



Map 2. Distributions of *K. gracilicaule* and *K. revealii*.



Map 3. Distributions of *K. solidaginoides* var. *filicaulis* and var. *solidaginoides*.



Fig.1. Holotype of *Koanophyllon coixtlahuacum*.

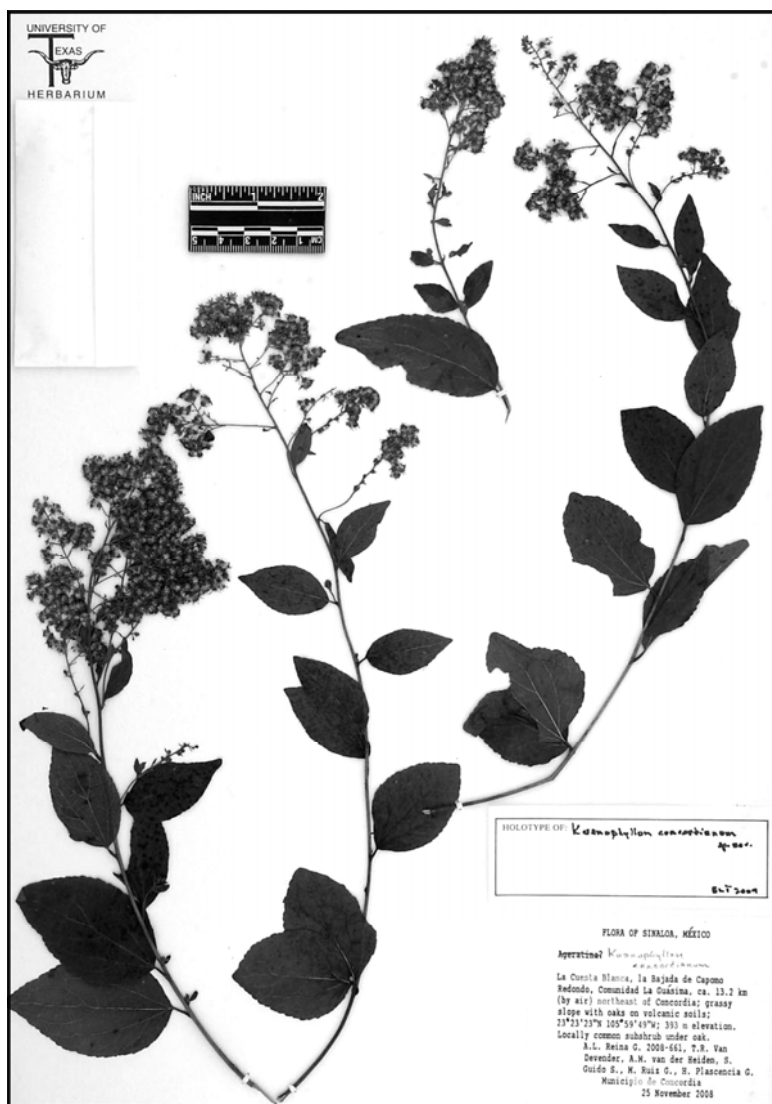


Fig. 2. Holotype of *Koanophyllon concordianum*.

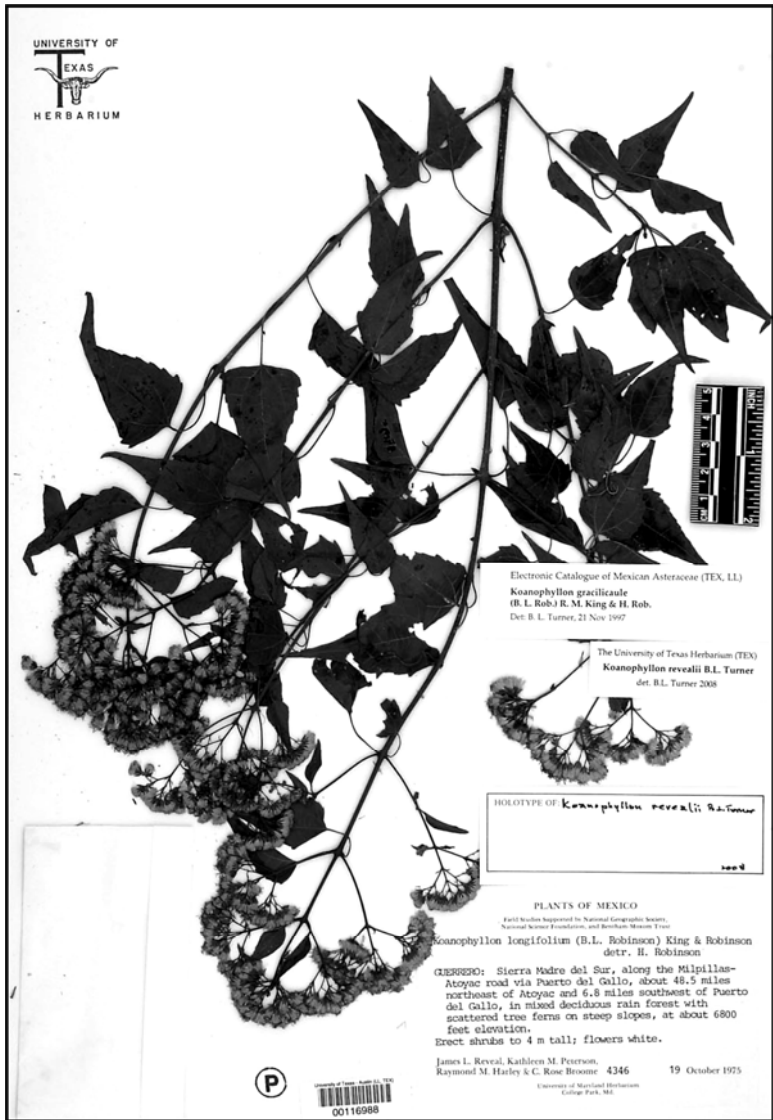


Fig. 3. Holotype of *Koanophyllon revealii*.