

REVISIONARY TREATMENT OF THE GENUS *SINCLAIRIA*, INCLUDING
LIABELLUM (ASTERACEAE, LIABEAE)

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ABSTRACT

A revisionary study of the genus *Sinclairia* (including *Liabellum*) is rendered. It is composed of 23 species, all confined to México and Central America, except for *S. polyantha* which extends into Colombia in South America. Two subgenera are recognized: *Sinclairia* with 15 species and *Megaliabum* with 8 species. The latter subgenus contains 2 sections: *Megaliabum* with 3 species and *Liabellum* with 5 species. One new species, *S. hintoniorum* B. Turner, belonging to the section *Liabellum*, is described and illustrated, and a new variety of *S. hypoleuca*, *S. h. var. minor* B. Turner, is proposed. Keys to the species and distribution maps are provided and a diagram showing hypothetical relationships is presented.

KEY WORDS: Asteraceae, Liabeae, *Sinclairia*, *Liabellum*, México, Central America.

INTRODUCTION

Sinclairia is a wholly American genus of 23 species largely confined to tropical and subtropical regions of México and Central America. A single species (*S. polyantha*) just barely extends into Colombia. Prior to Rydberg's (1927) treatment, most of the species were placed in the large genus *Liabum*. Rydberg treated all of the species known to him, placing these in four genera: *Sinclairia*, *Sinclairiopsis*, *Megaliabum* and *Liabellum*.

Robinson (1983) provided an excellent overview of this complex, pointing out its relationship to *Liabum* and yet other genera of the tribe Liabeae. He placed the 29 species known to him in 2 genera, *Sinclairia* (25 spp) and *Liabellum* (4 spp); the former included Rydberg's genera, *Sinclairia*, *Sinclairiopsis* and *Megaliabum*; the latter included all of the species which Rydberg relegated to *Liabellum*. The present treatment places all of the species recognized by Rydberg (1927) and Robinson (1983) in the genus *Sinclairia*. I recognize two subgenera within the genus: *Sinclairia* and *Megaliabum*. The former contains

Rydberg's *Sinclairia* and *Sinclairiopsis*, the latter contains his *Megaliabum* and *Liabellum* (both of which I treat as sectional categories). My account differs from that of Robinson (1983) in that *Liabellum* and *Megaliabum* are treated as sections of *Sinclairia*, whereas Robinson positioned *Megaliabum* within his concept of *Sinclairia*, retaining *Liabellum* in the sense of Rydberg. The relationships of these several categories are shown in my Figure 1. Overall, I recognize but 23 species in the genus *Sinclairia*, 15 in subgenus *Sinclairia* and 8 in the subgenus *Megaliabum*.

CHROMOSOME NUMBERS

Chromosome counts are known for relatively few species of *Sinclairia* and these were summarized by Robinson *et al.* (1985). They gave the base chromosome number of *Sinclairia* as $x = 16$, but this is largely conjectural because the few counts reported are poorly documented. The numbers of only 3 species of *Sinclairia*, all belonging to the subgenus *Sinclairia*, have been reported. These are:

S. discolor $n = 17$ or 18 pairs

S. hypochlora $n = 15$ or 16 pairs

S. sublobata $n = 15, 16$ or 17 pairs.

Apparently the difficulty in establishing an accurate count for the genus relates to the presence of an exceptionally large chromosome "pair" at diakinesis in meiotic material. This "pair" might be a bivalent, tetravalent or perhaps a hexavalent. Most likely it is either a bivalent or tetravalent, making the base number $x = 15$ or 16.

GENERIC RELATIONSHIPS

Robinson (1983) has provided an admirable study of the generic relationships of the tribe Liabeae. He positioned *Sinclairia* (as conceived here) in the subtribe Liabinae, aligning it to the South American genera *Microliabum* and *Austroliabum* (cf. his figure 1, showing a suggested evolutionary scheme for the tribe). I am not able to improve upon his suggestions; my superficial examination of the genera concerned suggests the alignment is sound.

SPECIES RELATIONSHIPS

Sinclairia, with 23 species, nearly all of which are confined to México or Central America, appears to be a monophyletic group. Within this, three evolutionary lines can be recognized. I have recognized these as sectional groups: 1.) sect. *Sinclairia* with 15 species, these comprising subgenus *Sinclairia*; 2.) sect. *Megaliabum* with 3 species; and 3.) sect. *Liabellum* with 5 species. Sections *Megaliabum* and *Liabellum* have been positioned in the subgenus *Megaliabum*. Rydberg (1927) recognized these several sections as distinct genera

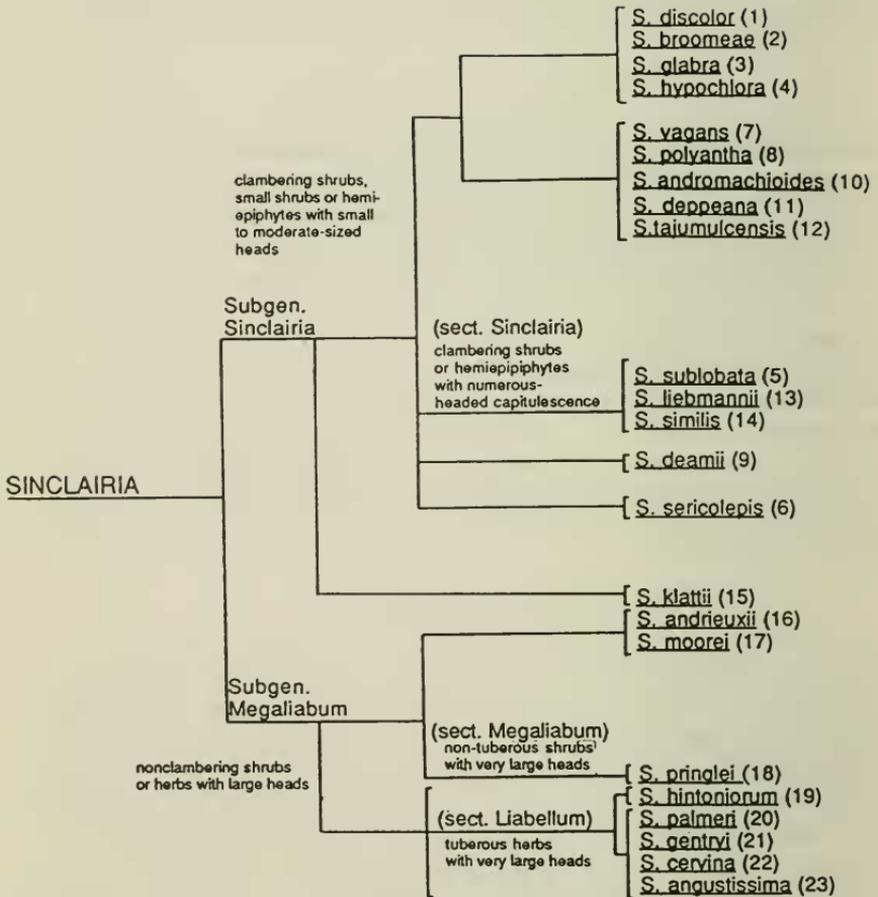


Fig. 1. Hypothetical relationships among species of *Sinclairia* (numbers in parenthesis refer to arrangement in text).

(plus the monotypic genus *Sinclairiopsis*, based upon *S. klattii*, which I position in the sect. *Sinclairia*). Robinson (1983), however, included the sect. *Megaliabum* in his concept of *Sinclairia*, but retained *Liabellum* as distinct. I tend to believe that *Megaliabum* stands, morphologically, somewhere between the largely clambering or hemiepiphytic sect. *Sinclairia* and the largely suffruticose or herbaceous sect. *Liabellum*. In total attributes the section *Megaliabum* appears closest to the section *Liabellum* and, therefore, I have included both of these in the subgenus *Megaliabum*. Their treatment as three subgenera within *Sinclairia* might be equally defensible but I have emphasized habit, capitulescence, involucre structure and biogeography in positioning *Megaliabum* with *Liabellum*. Robinson (1983) positioned the former within *Sinclairia* largely because of its habit (shrubby) and lack of tuber-like roots, *Liabellum* being strictly herbaceous with tuber-like roots. He also emphasized the mostly sessile leaves of the latter (vs petiolate in *Sinclairia*). My view of the relationships of the various species within these several sections is shown in Figure 1. Whether the newly described, *S. hintoniorum* has tuber-like roots or not is not known, but it appears to link the sect. *Megaliabum* to sect. *Liabellum* by yet other features (e.g. head size, achenial characters and suffruticose habit).

Clearly, the several sections recognized here are in much need of critical study, especially chromosomal and comparative DNA investigations. Until then, much that has been written about their relationships, one to the other, will remain speculative.

TAXONOMIC TREATMENT

Sinclairia Hook. & Arn., Bot. Beech. Voy. 433. 1841. TYPE SPECIES:
Sinclairia discolor Hook. & Arn.

Liabellum Rydb., N. Amer. Fl. 34:294. 1927. (not *Liabellum* Cabrera, 1954).

Megaliabum Rydb., N. Amer. Fl. 34:293. 1927.

Sinclairiopsis Rydb., N. Amer. Fl. 34:292. 1927.

Herbaceous or suffruticose perennials with tuber-like roots, 0.5-2.0 m high, soft wooded shrubs or small trees to 7 m high, clambering vines to 30 m high or hemiepiphytes (sprouting in trees but soon producing large aerial roots which make their way to the ground and become anchored). Leaves opposite, petiolate or not, usually simple, but often deeply lobed, 3 nervate from below, the undersurfaces usually densely white tomentose or arachnoid, rarely not. Heads turbicampanulate to campanulate, radiate or eradiate, very large and borne 1-15 in stiffly erect cymes (subgenus *Megaliabum*) or relatively small and numerous borne in divaricately branched, corymbose panicle or rarely in drooping subfasciculate corymbs. Involucres subturbinate to campanulate, 3-6 seriate, imbricate or subimbricate, gradate. Receptacle epaleate, plane to

somewhat convex, glabrous or rarely alveolate with pubescent ridges. Ray florets, when present, pistillate, fertile, the ligules yellow or rarely orange. Disk florets few to numerous, yellow, creamy white or orange, glabrous or sparsely pubescent without, the tube shorter than the poorly developed limbs, the lobes usually linear, 2-4 times as long as wide, but shorter than the throats. Anthers mostly yellow, the appendages lanceolate and acute to ovate rounded, tailed at the base, the filaments glabrous throughout. Style branches rather filiform, hispidulous like the upper shafts, merely recurving at maturity, the apices rounded. Achenes obpyramidal to prismatic, 8-10 ribbed, glabrous to densely pubescent, the carpodium a sclerose annulus; pappus 1-4 seriate, the inner series of 30 or more, white or tawny, persistent, bristles, the outer series of much shorter, readily deciduous, squamellae, these often differentiated as whitened scales. Base chromosome numbers, $x = 15, 16, 17$ or 18 .

KEY TO SPECIES

- 1. Involucres small (mostly 0.4-1.5 cm high; 0.5-1.0 cm wide), borne numerous in divaricately branched corymbose panicles or in drooping subfasciculate cymes Subgenus I. *Sinclairia*
- 1. Involucres large (mostly 1-3 cm high, 1-4 cm wide), borne 1-7 in stiffly erect terminal cymes, the peduncles mostly (1-)2-8 cm long Subgenus II. *Megaliabum*

I. SUBGENUS *SINCLAIRIA*

- 1. Heads arranged in drooping subfasciculate cymes, the ultimate peduncles mostly 2-5 cm long 15. *S. klattii*
- 1. Heads arranged in divaricately branched corymbose panicles (2)
 - 2. Leaves glabrous or green on both surfaces, not at all bicolored (3)
 - 2. Leaves bicolored, the lower surfaces dirty white or white beneath with a matted or arachnoid tomentum (4)
- 3. Involucres mostly 4-6 mm high; eastern Chiapas and Guatemala 4. *S. hypochlora*
- 3. Involucres mostly 7-10 mm high; central and northwestern México 3. *S. glabra*
 - 4. Leaf blades, at least some of them, with distinct basal lobes or flanges; involucral bracts with rather rigid acute tips; Sinaloa to Oaxaca along the Pacific slopes (5)

4. Leaf blades not noticeably lobed, if sublobate then the involucre bracts broadly acute, obtuse or rounded (6)
5. Involucres 8-9 mm high; florets 15-20 per head; peduncles with glandular hairs 14. *S. similis*
5. Involucres 5-8 mm high; florets 9-12 per head; peduncles without glandular hairs 13. *S. liebmannii*
6. Achenes evenly and moderately to densely pubescent throughout (7)
6. Achenes glabrous or nearly so, or else the upper portion moderately pubescent but the lower portion glabrous or nearly so, rarely somewhat sparsely atomiferous glandular throughout (12)
7. Involucres 12-15 mm high (8)
7. Involucres 4-9(-12) mm high (9)
8. Involucre bracts appressed, the apices acute; Guatemala 12. *S. tajumulcensis*
8. Involucre bracts loosely appressed apically, the apices obtuse or rounded; Veracruz, México 11. *S. deppeana*
9. Leaves densely brown villous beneath, not white tomentose; Veracruz, México 10. *S. andromachioides*
9. Leaves densely white tomentose or white arachnoid beneath (10)
10. Branches of capitulescence with spreading, subglandular or glandular, trichomes; these often intermixed with a low tomentum; ray florets absent 9. *S. deamii*
10. Branches of capitulescence tomentulose, arachnoid or subarachnoid, if spreading trichomes present then ray florets present or else the achenes glabrous or nearly so (11)
11. Inner involucre bracts glabrous or nearly so, the apices clearly rounded or broadly obtuse, without terminal apiculations; widespread 8. *S. polyantha*
11. Inner involucre bracts clearly pubescent (glabrate with age), the apices mostly acute and often with minute terminal apiculations; southwestern Guatemala and adjacent Chiapas 7. *S. vagans*
12. Involucres broadly campanulate, 8-12 mm wide at midsection, the bracts 30-40, closely and stiffly appressed; Veracruz 6. *S. sericolepis*

12. Involucres turbocampanulate, 4-7 mm wide at midsection, the bracts 10-25, loosely or closely appressed(13)
13. Leaves, some of them, trullate or to some extent lobate or with basal flanges (rarely with merely large teeth); Guatemala to Nicaragua5. *S. sublobata*
13. Leaves ovate to elliptic, the margins unlobed and without basal flanges or teeth; Pacific slopes of México from Sinaloa to Oaxaca, or Gulf slopes of México and interior portions of Central America(14)
14. Ray florets absent; disk corollas orange or orange yellow; Pacific slopes of México, Sinaloa to Guerrero3. *S. glabra*
14. Ray florets present (rarely not); disk and ray corollas yellow(15)
15. Involucres 6-7 mm high, the inner bracts strictly appressed with acute or narrowly obtuse apices; disk florets 15-25; Pacific slopes of México, Jalisco to Guerrero2. *S. broomeae*
15. Involucres 8-15 mm high, the inner bracts usually somewhat loose and scarious above, the apices broadly obtuse or rounded; disk florets 10-15; Gulf slopes of México and Chiapas, southwards to Panamá1. *S. discolor*

II. SUBGENUS MEGALIABUM

1. Suffruticose branched herbs or soft wooded shrubs 1-4 m high, the stems arising (so far as known) from woody crowns, not forming tuber-like roots; leaves clearly petiolate, the petioles not winged, Sect. *Megaliabum*(2)
1. Perennial, rarely suffruticose, herbs 0.3-1.0(-2.0) m high with simple stems, the root system with prominent tuber-like structures (not known in *S. hintoniiorum*); leaves sessile or the petiole broadly winged to the base, Sect. *Liabellum*(4)
2. Ray florets absent; petioles mostly 0.2-0.8 cm long; Jalisco, México18. *S. pringlei*
2. Ray florets present; petioles mostly 2-5 cm long; Guerrero, México to Guatemala(3)
3. Ray florets 11-13; disk florets 25-35; outer involucral bracts mostly 2.5-3.0 mm wide; Guerrero, México17. *S. moorei*

3. Ray florets 21-34; disk florets 50+; outer involucre bracts mostly 1-2 mm wide; Oaxaca and Chiapas, México and adjacent Guatemala 16. *S. andrieuxii*
4. Leaves divided to the base, appearing whorled, the divisions narrowly linear, 1-3 mm wide 23. *S. angustissima*
4. Leaves entire or variously divided, but not as above, the divisions mostly 4-20 mm wide (5)
5. Leaves ovate elliptic, unlobed, confined to the very base 21. *S. gentryi*
5. Leaves obovate or variously parted, clearly cauline (6)
6. Suffruticose herbs 1-2 m high; achenes 5-6 mm long; pappus rusty red; México State 19. *S. hintoniorum*
6. Non suffruticose herbs 0.3-9.0 m high; achenes 3-4 mm long; pappus tawny white or yellowish white; Chihuahua to Michoacán (7)
7. Leaves scattered along the entire length of the stem; peduncles without glandular hairs; outer pappus undifferentiated or nearly so 22. *S. cervina*
7. Leaves mostly confined to the lower third of the stem; peduncles with glandular hairs; outer pappus of white scales 20. *S. palmeri*

I. SUBGENUS *Sinclairia* (species 1-15)

1. *Sinclairia discolor* Hook. & Arn., Bot. Beech. Voy. 433. 1841. *Liabum discolor* (Hook. & Arn.) Benth. & Hook. ex Hemsl., Biol. Centr. Amer. Bot. 2:232. 1881. TYPE: NICARAGUA. Realejo, *Sinclair s.n.* (HOLOTYPE: K; Phototype: GH!).

Liabum platylepis Sch.-Bip. ex Klatt, Leopoldina 23:146. 1887. *Sinclairia platylepis* (Sch.-Bip.) Rydb., N. Amer. Fl. 34:296. 1927. TYPE: MÉXICO. Veracruz: Mirador, w/o date, *C. Sartorius s.n.* ("in Linden! n. 1236") (LECTOTYPE: GH!; fragment of lectotype: GH!).

Clambering vines or hemiepiphytes. Leaves thin, strongly discolored, the undersurfaces densely white tomentose. Heads numerous in terminal, congested, mostly rounded, corymbose panicles. Involucres mostly 8-15 mm high, the inner bracts mostly scarious and obtuse or rounded at the apices, usually loose and recurved with age. Ray florets 5-8, the ligules 3-8 mm long. Disk florets 10-15, the corollas ca 8 mm long, the tube ca 4 mm long, the lobes glabrous or nearly so. Achenes 1.5-2.0 mm long, glabrous or a few hispid hairs

near the apex, the inner pappus tawny or tawny white, 6-9 mm long, the outer pappus of well defined scales ca 1 mm long; chromosome number, $n = 17$ or 18 pairs.

DISTRIBUTION (Figure 2): Southern México (Gulf slopes of Veracruz and Chiapas) to Panamá, montane rain forests, 1200-2400 m; Dec-Mar.

REPRESENTATIVE SPECIMENS: MÉXICO. Chiapas: Mpio. Siltepec, ridge above Siltepec, 2000-2400 m, 1 Feb 1982, *Breedlove 58311* (TEX); San Luis, 1300 m, 24 Jan 1945, *Matuda 5294* (LL); Mpio. Tuxtla Gutierrez, 19 km from Tuxtla Gutierrez on road to canyon El Sumidero, 1210 m, 11 Mar 1978, *Garcia 578* (F,TEX). Veracruz: Mpio. Los Reyes, ca 1600 m, 22 Mar 1976, *Torres W320* (F,XAL).

GUATEMALA. Alta Verapaz: Taitic, 1600 m, *Tuerckheim 2116* (GH,LL). Cortes: between Banaderos and Cusnco, 1400 m, 26 Mar 1963, *Molina 11456* (LL). GUATEMALA: Guatemala, 1465 m, 3 Feb 1907, *Kellerman 6277* (F,GH). Izabal: ca Lago Izabal, 500-600 m, 11 May 1966, *Jones 3366* (F). Quezaltenango: above Mujulia, ca 1800 m, 1 Feb 1941, *Standley 85651* (F). San Marcos: ca Aldea Fraternidad, 1800-2400 m, 10 Dec 1963, *Williams 26240* (F).

EL SALVADOR. San Salvador: Volcán de San Salvador, 1410-1800 m, 2 Feb 1946, *Carlson 442* (F). Santa Ana: Cerro Monte Cristo, 6000-6500 m, 17 Jan 1959, *Allen 7147* (F,GH,LL). Sonsonate: Cerro El Pilon, 1800 m, 23 Feb 1968, *Molina 21610* (F).

BELIZE. Toledo: Soloman Camp, 80-420 m, 5-12 Mar 1987, *Davidse 32036* (LL,MO); high ridge, Edwards Road, beyond Columbia, 20 Mar 1948, *Gentle 6479* (F,LL).

HONDURAS. Cortes: Montaña San Idalfonso, 1500 m, 27 Mar 1963, *Molina 11591* (F). Morazan: mountains above San Juancito, 1800 m, 20 Feb 1948, *Williams 1378* (GH); 24 Mar 1951, *Williams 17457* (GH). Ocotepeque: ca El Portillo, 2000 m, 23 Jan 1976, *Molina 31386* (F).

NICARAGUA. Granada: Volcán Mombacho, 9 Mar 1922, *Greenman 5792* (GH). Matagalpa: El Ocotal, 1300 m, 9 Mar 1967, *Molina 20431* (F).

COSTA RICA. San José: Cerro Zurquí, 1800-2000 m, 19 Feb 1978, *Almeda 3685* (F); La Palma, 5 Feb 1922, *Greenman 5499* (GH).

PANAMÁ. Goofy Lake to ca 8 mi S of Goofy, 26 Nov 1966, *Dwyer 7052* (GH).

A widespread species superficially similar to *S. polyantha* but the involucre bracts loose at maturity and the achenes glabrous or merely sparsely pubescent, especially just below the pappus.

2. *Sinclairia broomeae* H. Robins., Phytologia 33:287. 1976. TYPE: MÉXICO. Guerrero: "along the Milpillias-Atoyac road via Puerto del Gallo, about 47 miles southwest of México Highway 95, 16 miles southwest of Filo de Caballo and 10.4 miles southwest of Carrazal del Bravo, 12.4 miles north-east of Yerba Santa," 17 Oct 1975, *J.L. Reveal et al. 4267* (HOLOTYPE:

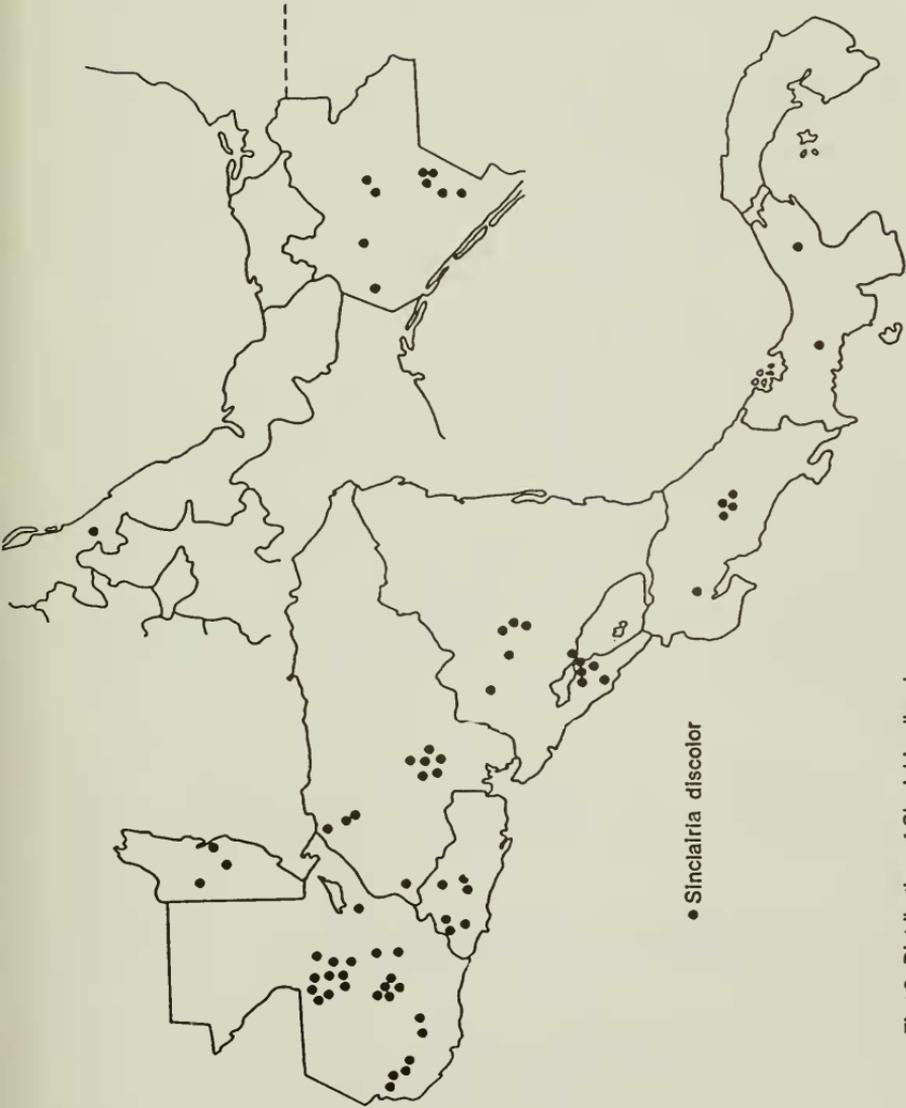


Fig. 2. Distribution of *Sinclairia discolor*.

US; Isotype: TEX!; Photoisotype: GH!).

Clambering shrubs and probably hemiepiphytic, occurring up to 40 m high in trees; leaves 12-16 cm long, 6-12 cm wide, thin, bicolored; petioles mostly 3-6 cm long; blades broadly ovate to subdeltoid, white tomentose beneath, the nerves brown, the margins minutely serrulate. Heads numerous in corymbose panicles, the ultimate peduncles 5-15 mm long. Involucres 6-7 mm high, turbocampanulate, the bracts appressed with mostly acute apices. Ray florets 5, the ligules 5-8 mm long, yellow. Disk florets 15-25, the corollas yellow, 8-10 mm long, the lobes ca 2 mm long. Achenes sparsely to densely pubescent above, glabrous below, 1.5-2.0 mm long, the inner pappus of tawny bristles ca 8 mm long, the outer pappus scales 1.2 mm long.

DISTRIBUTION (Figure 4): Jalisco (Sierra de Manantlan) and Guerrero, pine-oak cloud forests, 1800-2100; Oct-Dec.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Jalisco: Sierra Manantlan, Playa Las Joyas, 1900-1950 m, 21 Dec 1984, *Judziewicz & Cochrane 4798* (TEX,WIS) Sierra de Manantlan, 3 km S of Rincón de Manantlan, going to Las Joyas (crossing no. 4), 1850-2100 m, 11 Oct 1982, *Iltis et al. 28866* (TEX,WIS); Sierra Manantlan (19° 37', 104° 15'), 1980 m, 12 Nov 1985, *Vasquez 3764* (WIS); Las Joyas, Autlan, 1980 m, 12 Nov 1985, *Vasquez 3726* (WIS). Guerrero: Distr. Mina, Cerro Azul, 2550 m, 4 Dec 1939, *Hinton et al. 14951* (GH).

The species is closely related to *S. discolor* but is readily distinguished by its smaller involucres with appressed acute bracts. Recent collections have been obtained from the Sierra de Manantlan, as indicated in the above citations.

3. *Sinclairia glabra* (Hemsl.) Rydb., N. Amer. Fl. 34:297. 1927. *Liabum glabrum* Hemsl., Biol. Centr. Amer., Bot. 2:232. 1881. TYPE: MÉXICO. Morelos: Cuernavaca, Iturbide, 1865, *Bourgeau 1401* (HOLOTYPE: K; Isotypes: P,F!,GH!; Photoisotypes: F!,LL!).

Shrubs or small trees to 6 m high. Leaves 10-22 cm long, 3-8 cm wide; petioles 3-6 cm long; blades mostly ovate, with acute bases, the undersurfaces glabrous or nearly so. The margins serrulate. Heads discoid, numerous in rather congested terminal corymbose panicles, 2-3 times as long as wide, the capitulescence usually without leafy inclusions. Involucres campanulate, 7-9 mm high, the bracts appressed, glabrous with ciliate margins, the inner series obtuse or rounded at the apices. Ray florets absent. Disk florets 14-20 per head, glabrous, 8-10 mm long. Achenes 1.5-2.0 mm long, glabrous or sparsely pubescent above, rarely a few glandular hairs, the pappus of numerous tawny bristles 6-8 mm long, the outer scales ca 0.5 mm long.

I recognize 3 allopatric regional varieties under this taxon, as keyed below. The above description applies to the var. *glabra*; all of the varieties

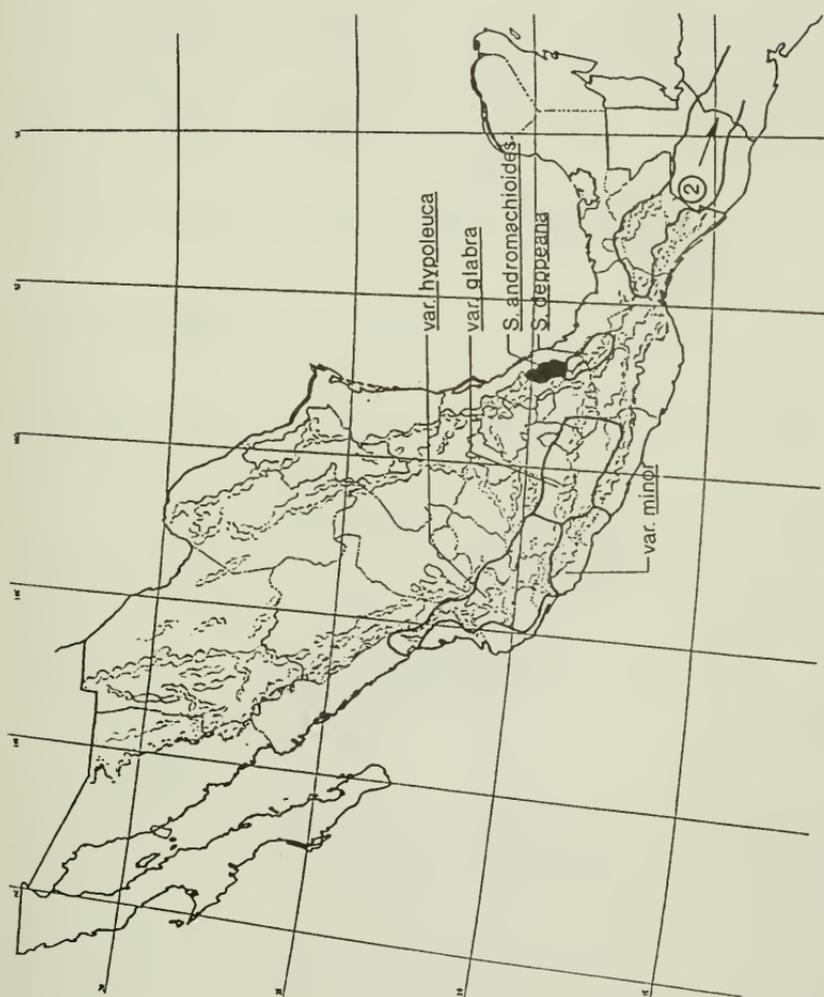


Fig. 3. General distribution of *Sinclairia glabra* and its varieties (the related *S. sublobatus* indicated by 2), *S. andromachioides* and *S. deppeana*.

intergrade in regions of contact. Williams (1976) expanded *S. glabra* so as to include *S. sublobatus*, a species of Central America and southernmost México which has usually bicolored lobed leaves, strictly yellow corollas and heads arranged in both axillary and terminal corymbs, the entire capitulescence being leafy within at anthesis. *Sinclairia glabra* has orange or orange yellow, mostly longer, corollas, unlobed leaves and a strictly terminal capitulescence (without leafy inclusions).

Key to varieties (see Figure 3 for distributions).

1. Leaves not bicolored, glabrous beneath; corollas mostly 8-10 mm long; E Michoacán, México, Morelos and NE Guerrero var. *glabra*
1. Leaves bicolored, variously white tomentose or arachnoid pubescent beneath; corollas 6-15 mm long; Sinaloa to central Michoacán and NW Guerrero (2)
 2. Involucres mostly 7-8 mm high; corollas 9-14 mm long; pappus bristles yellow-white or pale tawny; Sinaloa to Colima and northern Michoacán var. *hypoleuca*
 2. Involucres mostly 5-6 mm high; corollas 6-8 mm long; pappus bristles rusty tawny; S Michoacán and NW Guerrero var. *minor*

S. glabra var. *glabra*. For nomenclature and synonymy, see above.

DISTRIBUTION: E Michoacán, México, Morelos and NE Guerrero, tropical deciduous and oak forests, 300-1700 m; Oct-Dec. As described above; intergrades between var. *glabra* and var. *hypoleuca* occur, as noted by McVaugh (1984).

REPRESENTATIVE SPECIMENS: MÉXICO. México: Distr. Temascaltepec, Vigas, 17 Nov 1932, *Hinton 2627* (GH). Morelos: barrancas near Cuernavaca, 5000 ft, 7 Nov 1895, *Pringle 6182* (F,GH). Michoacán: Zitacuaro, 24 Oct 1938, *Hinton 19401* (GH). Guerrero: Distr. Aldama, Temisco, 310 m, 12 Nov 1937, *Mezía 8797* (F,GH,LL).

S. glabra var. *hypoleuca* (Greenm.) B. Turner, comb. nov. Based on: *Libanum glabrum* var. *hypoleucum* Greenm., Proc. Amer. Acad. Arts 32:294. 1987. *Sinclairia hypoleuca* (Greenm.) Rydb., N. Amer. Fl. 34:297. 1927. TYPE: MÉXICO. Jalisco: canyons near Guadalajara, 8 Dec 1988, C.G. Pringle 2169 (LECTOTYPE: GH!, as selected by McVaugh in *Flora Novo-Galiciana* 12:578. 1984).

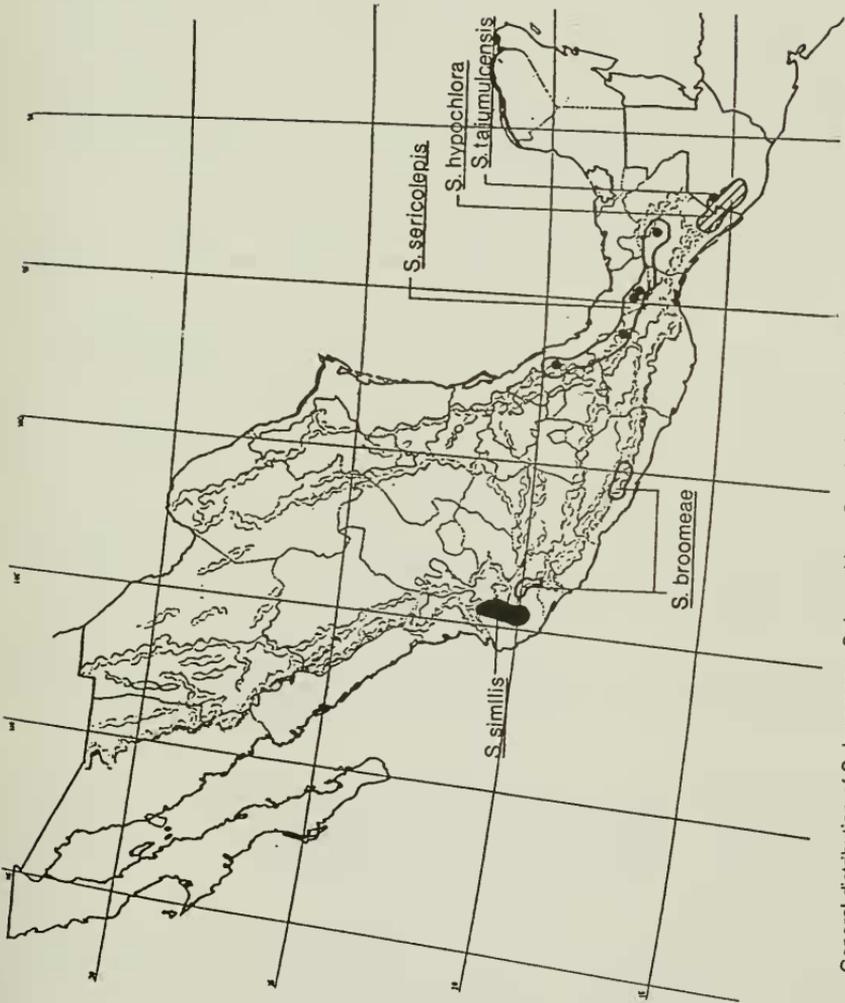


Fig. 4. General distribution of *S. broomeae*, *S. hypochlora*, *S. sericolepis*, *S. similis*, and *S. talumulgensis*.

DISTRIBUTION: S Sinaloa, Nayarit, Jalisco, Colima and N Michoacán, tropical deciduous or pine-oak forests, 1000-2000 m, Oct-Dec.

My circumscription of this taxon is essentially the same as that of McVaugh (1984), who also recognized its probable intergradation with var. *glabra*.

REPRESENTATIVE SPECIMENS: MÉXICO. Sinaloa: 9 mi E of Chupoderas, 2600 ft, 22 Nov 1969, *Breckon 990* (LL). Nayarit: 9 mi N of Compostela, 1000-1200 m, 13 Nov 1959, *McVaugh & Koelz 557* (LL). Jalisco: 15 mi N of Talpa, 20 Oct 1983, *Ayers 277* (TEX). Colima: 18 road mi NE of Colima, 3600 ft, 30 Oct 1962, *Cronquist* (TEX). Michoacán: 5 mi N of Cotiga, 6000-6200 ft, 5-9 Oct 1961, *King & Soderstrom 4685* (TEX).

S. glabra var. *minor* B. Turner, var. nov. TYPE: MÉXICO. Michoacán: Distr. Coalcoman, Aguila, 17 Nov 1941, *G.B. Hinton et al. 16161* (HOLOTYPE: LL!).

S. hypoleucae var. *hypoleucae* sed involucris minoribus (5-6 mm altis vs 7-8 mm) et corollis brevioribus (6-8 mm longis vs 9-14 mm) differt.

DISTRIBUTION: S Michoacán and adjacent E Guerrero, Pacific slopes in tropical deciduous forests, 600-1400 m; Oct-Dec.

The taxon differs from the var. *glabra* in possessing smaller involucre with mostly narrowly obtuse or acute involucre bracts, heads with fewer florets, leaves tomentose beneath and pappus bristles rusty tawny.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Michoacán: Distr. Coalcoman, Puerto Las Cruces, 1340 m, 28 Oct 1938, *Hinton 12467* (GH,LL); S. Naranjillo, 1360 m, 26 Nov 1938, *Hinton 12678* (GH,LL). Guerrero: Distr. Montes de Ocas., San Antonio, 16 Dec 1937, *Hinton et al. 11682* (GH,LL).

4. *Sinclairia hypochlora* (S.F. Blake) Rydb., N. Amer. Fl. 34:301. 1927.
Liabum hypochlorum S.F. Blake, Contr. Gray Herb., n.s. 53:27. 1918.
TYPE: GUATEMALA. Retalhuleu: San Felipe, wet places, 13 Jan 1917, *E.W.D. Holway 709* (HOLOTYPE: GH!).

Clambering shrubs or vines to 15 m high, probably also hemiepiphytic upon occasion. Leaves not bicolored, 10-25 cm long, 6-10 cm wide; petioles 2-5 cm long; blades ovate to elliptic ovate, glabrous on both surfaces, or nearly so, minutely glandular punctate, the margins minutely denticulate. Heads radiate, numerous in broad terminal and subterminal corymbose panicles, the ultimate peduncles mostly 2-5 mm long. Involucre 4-5 mm high, the bracts pubescent 2-3 seriate, rather stiffly appressed and acute at the apices. Receptacles with markedly pubescent alveolae. Ray florets 5-8, the ligules 1-3 mm long, 0.5-1.0 mm wide, yellow. Disk florets 5-7, the corollas yellow, 7-8 mm long, glabrous. Achenes ca 2.5 mm long, pubescent throughout, the pappus

of numerous yellowish bristles 6-7 mm long, the outer scales ca 0.5 mm long; chromosome number, $n = 15$ or 16 pairs.

DISTRIBUTION (Figure 4): Guatemala and adjacent Chiapas, montane cloud forests, 500-900 m; Nov-Jan.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Chiapas: Mt. Ovan-do, ca Escuintla, 14 Nov 1945, *Matuda 6194* (LL); Jalapa, Triunfo, 6 Nov 1948, *Matuda 18461* (F).

GUATEMALA. Quezaltenango: Colomba, 3000 ft, 29 Dec 1934, *Skutch 2031* (AA,F,GH,LL). Retalhuleu: San Felipe, 12 Jan 1917, *Holway s.n.* (GH). Schitepequez: Volcán Zunil, 2 Feb 1940, *Steyermark 35429* (F).

This species would appear to be but a populational form of *S. vagans*, or vice versa, but differs, in addition to its glabrous foliage, by having smaller rays and very pubescent alveolate ridges on the receptacle and corollas lobes nearly glabrous. In addition, *S. vagans* appears to occur mostly at higher elevations (2000-2500 m vs 500-1000 m).

In addition to the type itself, *Holway* (cited above without number) apparently collected a rayless form of this plant with weakly arachnoid tomentose leaves and peculiar glandular achenes. This is perhaps a hybrid or hybrid derivative with yet another species, possibly *S. sublobatus*, which has rayless heads and occurs with or near *S. hypochlora*.

5. *Sinclairia sublobata* (B.L. Robins.) Rydb., N. Amer. Fl. 34:297. 1927. *Liabum sublobatum* B.L. Robins., Proc. Amer. Acad. Arts 32:294. 1897. TYPE: GUATEMALA. Solola: San Lucas Toliman, 5100 ft, 2 Feb 1915, *E. W. D. Holway 179* (HOLOTYPE: GH!).

Sinclairia brachypus Rydb., N. Amer. Fl. 34:299. 1927. TYPE: GUATEMALA. Chiquimula: Volcán Ipala, 1700 m, Jan 1907, *H. Pittier 1886* (HOLOTYPE: US; Isotype: F!).

Slender erect shrubs or small trees to 12 m high. Leaves 10-20 cm long, 5-18 cm wide, probably deciduous shortly after flowering; petioles mostly 3-6 cm long; blades trullate to broadly ovate or somewhat subcordate, usually thickened with age, bicolored (a dense tomentum beneath but rarely only weakly arachnoid and not totally bicolored), 3 nervate, the basal portion to some extent with acute lobes or flanges (sometimes merely large teeth). Heads discoid, numerous in both terminal and axillary somewhat divaricate corymbs, the entire capitulescence therefore a leafy arrangement, the ultimate peduncles mostly 1-8 mm long. Involucres mostly 7-9 mm high, the bracts mostly appressed through maturity, the inner bracts with apices obtuse or rounded. Ray florets absent. Disk florets 8-10, the corollas yellow, glabrous, 7-9 mm long, the tube ca 3 mm long, grading into the throat, the lobes ca 2 mm long. Achenes 3-4 mm long, sparsely pubescent above, mostly glabrous below, the pappus of numerous, yellow white or tawny, bristles 6-7 mm long, the outer series of

short scales ca 1 mm long, these well differentiated; chromosome number, $n = 15$ or 16 pairs.

DISTRIBUTION (Figure 5): Southernmost México, Guatemala, Honduras, El Salvador and Nicaragua, mostly Pacific slopes along barrancas on dry slopes and ridges, 200-1800 m; Dec-Mar.

REPRESENTATIVE SPECIMENS: MÉXICO. Oaxaca: Mpio. Sta. Maria Chimalapa, 4 km NE of Santa Maria, 170 m, 7 Mar 1984, *Wendt 4300* (CHAPA, TEX); 4 km N of Sta. Santa Maria, 300 m, 26 Feb 1925, *Hernández 916* (CHAPA, TEX). Chiapas: Mpio. Tenejapa, pokolum, 520 m, 18 Mar 1985, *Breedlove 9435* (LL); Mpio. Vajalon, Rancho Carmen, 25 Mar 1984, *Ton 7471* (MEXU, TEX).

GUATEMALA. Alta Verapaz: between San Cristobal and Chixoy, 1200-1300 m, 19 Feb 1942, *Steyermark 43896* (F,GH). Chimaltenango: ca Sibaja, ca 1050 m, 6 Jan 1939, *Standley 62256* (F,GH). Guatemala: ca Guatemala, 1465 m, 1 Jan 1907, *Kellerman 6298* (F). Retalhuleu: ca Retalhuleu, 240 m, *Standley 88799* (F,GH). Sacatepequez: ca Santa Maria, 5500 ft, 28 Jan 1937, *Hunnewell 14909* (GH). SANTA ROSA: Carrizal, 5000 ft, Jan 1893, *Heyde & Lux 4225* (GH).

HONDURAS. Morazan: Choluteca: ca San Marcos, 12 Jan 1949, *Standley 15717* (F). Cuesta La Moroloa, 1300 m, 15 Feb 1951, *Molina 3896* (F,GH). Sonsonate: Cerro Verde, 4 Feb 1959, *Allen 7223* (F).

EL SALVADOR. Ahuachapin: ca Apaneca, 24 Jan 1947, *Standley 3002* (F). Chalatenango: between San Ignacio and Citala, 1500-3000 ft, 19 Nov 1958, *Allen 7103* (F,GH). San Salvador: ca Tonacatepeque, 30 Dec 1921, *Standley 19530* (GH). Sonsonate: ca Sonsonate, 220-300 m, 18 Mar 1922, *Standley 22265* (GH).

NICARAGUA. Esteli: El Zacaton, 1400 m, 11 Feb 1984, *Moreno 22687* (F). Managua: Sierra de Managua, *Garnier 21* (F). Matagalpa: 5-10 km W of Matagalpa, 600-700 m, 3 Jan 1963, *Williams 23820* (F,LL). Ocotepeque: 15.1 m E of Santa Fe, 1460 m, 28 Jan 1987, *Croat 63834* (TEX).

Because of its lobed leaves, capitulescence and floral details, this species appears related to *S. liebmanni* of México. The latter, however, has smaller leaves, smaller involucre with acute involucre bracts and creamy white corollas (vs bright yellow). Occasional plants of *S. sublobata* possess weakly bicolored leaves (the tomentum beneath being mostly erased with age); these have been often identified as *S. glabra*, a species with unlobed leaves which is confined to central and northwestern México. The latter taxon has orange or orange yellow corollas (vs yellow) and a mostly leafless capitulescence.

6. *Sinclairia sericolepis* (Hemsl.) Rydb., N. Amer. Fl. 34:294. 1927. *Liabum sericolepis* Hemsl., Biol. Centr. Amer., Bot. 2:232. 1881. TYPE: MÉXICO. Veracruz: Valley of Cordoba, 10 Mar 1865, *Bourgeau 2177* (HOLOTYPE: K; Isotype: P; fragment of isotype: F!; Photoholotype:



Fig. 5. Distribution of *Sinclairia klattii* (○) and *S. subolata* (●).

GH!; Photoisotypes: F!,GH!).

Clambering shrub or small tree to 3 m high. Leaves bicolor, 8-25 cm long, 3-9 cm wide; petioles 1-5 cm long; blades ovate to elliptic ovate, white tomentose beneath, drying blackish above, the margins minutely serrulate to nearly entire. Heads eradiate, numerous in stiffly branching, terminal, corymbose, panicles, the ultimate peduncles mostly 3-12 mm long. Involucre campanulate, 8-10 mm high, 8-12 mm wide, the bracts 4-5 seriate, gradate, closely appressed, the apices decidedly acute. Ray florets absent. Disk florets 18-22 per head, the corollas ca 8 mm long, glabrous, the tube ca 4 mm long, grading into the throat, the lobes linear, ca 1.5 mm long. Achenes ca 2 mm long, glabrous below, hirsute-pubescent below the apex, often densely so, the pappus of numerous dirty white or tawny bristles 8-9 mm long, the outer series of short linear scales but not differentiated.

DISTRIBUTION (Figure 4): Veracruz, Oaxaca and Chiapas, tropical rain forests, 100-700 m; Mar-Apr.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Chiapas: Mpio. Ocozacoantla de Espinosa, SW site of Presa de Malposa, 2200 ft, 2 Mar 1968, *Ton 3808* (F,LL). Oaxaca: ca Valle Nacional, 22 Mar 1964, *Quintero 648* (TEX). Veracruz: Mpio. Hidalgotitlan, 4 km from Hermanos Cedillo, 150 m, 10 Apr, 1975, *Ortiz 106* (F); 10.3 km E of La Laguna, 140 m, 24 Mar 1981, *Wendt 3049* (CHAPA,TEX).

A very distinct species, not easily confused with another, although the leaves and habit are similar to *S. discolor*.

7. *Sinclairia vagans* (S.F. Blake) H. Robins. & Bret., *Phytologia* 28:62. 1974.
Liabum vagans S.F. Blake, *Brittonia* 2:354. 1937. TYPE: GUATEMALA.
Quiche: "Thicket on mountainside along Nebaj-Aguacatan trail," 2470 m, 12 Dec 1934, *A.F. Skutch 1919* (HOLOTYPE: AA!; Isotypes: F!,LL!).

The holotype is without collection data, but the isotype, collection of which Blake also annotated, gives the site as published. Clambering shrubs or small trees to 5 m high, probably also hemiepiphytic. Leaves 12-22 cm long, bicolor, 8-15 cm wide; petioles 3-6 cm long; blades broadly ovate, 3 nerved, densely white tomentose beneath, drying blackish above, the margins minutely serrulate. Heads radiate, numerous in terminal corymbose rounded panicles, the ultimate peduncles mostly 3-6 mm long. Involucre mostly 5-7 mm long, the bracts appressed through maturity, those of the inner series mostly pubescent, acute or narrowly obtuse, often with a small apical apiculation. Ray florets 5-8, the ligules yellow, 6-9 mm long. Disk florets 4-6, the corollas yellow, glabrous except for puberulent tufts at the apex of each lobe, 7-8 mm long, the tube ca 3 mm long, the lobes 1.5-2.0 mm long. Achenes ca 2 mm long, pubescent throughout, the pappus of numerous yellowish white or

tawny bristles 5-7 mm long, the outer series of small linear scales 1.0-1.5 mm long.

DISTRIBUTION (Figure 6): Southeastern Chiapas and adjacent Guatemala in montane rain forests, 2000-2700 m; Nov-Jan.

ADDITIONAL SPECIMENS EXAMINED: GUATEMALA. Chimaltenango: above Las Calderas, 2250-2400 m, 16 Dec 1940, *Standley 80193* (F). Jalapa: ca Soledad, 2000-2400 m, 4 Dec 1939, *Steiermark 32612* (F,GH). Guatemala: Volcán de Pacaya, 1800-2300 m, 20 Dec 1940, *Standley 80633* (F). Quezaltenango: Volcán Santa María, 8000-11,500 ft, 24 Jan 1896, *Nelson 3722* (F,GH). San Marcos: 6 km N of San Marcos, 2700 m, 13 Dec 1963, *Williams 25855* (F).

MÉXICO. Chiapas: Mpio. Siltepec, ridge above Siltepec, 2000-2400 m, 18 Jan 1973, *Breedlove 31848* (TEX); 26 Nov 1981, *Breedlove 55917* (TEX). Mpio. Motozintla de Mendoza, SW side of Cerro Mozotal, 2100 m, 23 Nov 1988, *Breedlove 55800* (TEX).

A weakly differentiated species, closely related to the widespread *S. polyantha*, but the latter occurring at mostly lower elevations and having inner involucral bracts mostly glabrous, scarious at the apex and becoming loose and somewhat recurved at maturity. *Sinclairia hypochlora*, with glabrous leaves, also appears very closely related and is perhaps but a populational form of *S. vagans*.

8. *Sinclairia polyantha* (Klatt) Rydb., N. Amer. Fl. 34:299. 1927. *Liabum polyanthum* Klatt, Bull. Bot. Belg. 31:209. 1892. TYPE: COSTA RICA: forests near General, Jan 1891, *Pittier 4319* (HOLOTYPE: C; Isotype: F!).

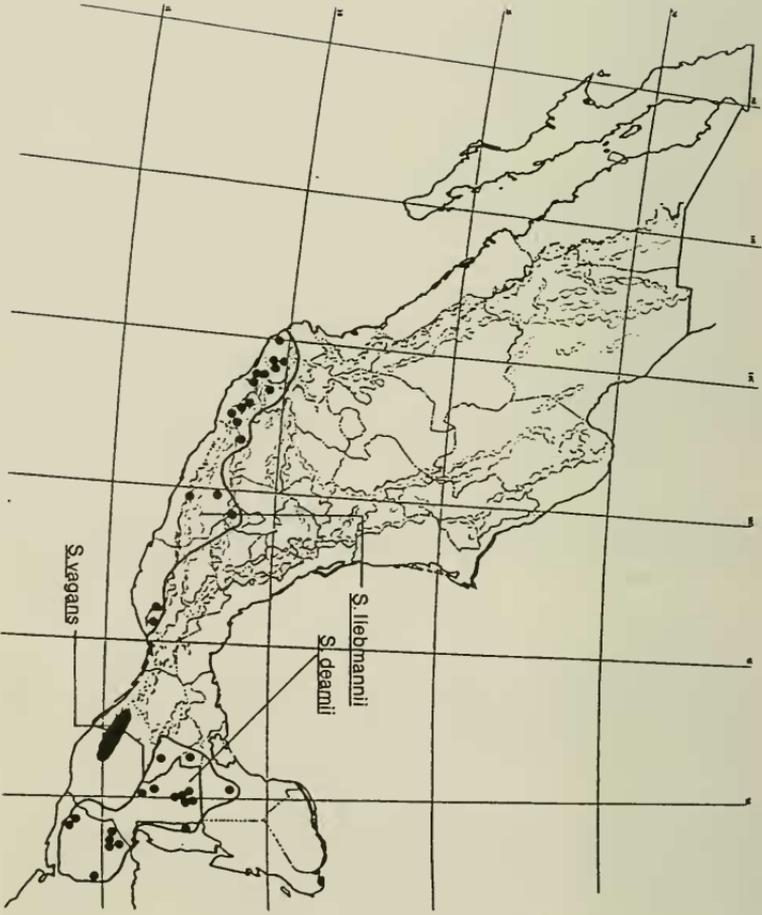
Liabum tonduzii B.L. Robins., Proc. Boston Soc. Nat. Hist. 31:270. 1904. *Sinclairia tonduzii* (B.L. Robins.) Rydb., N. Amer. Fl. 34:299. 1927. TYPE: COSTA RICA. San José: banks of Río Virillo, San José, Jan 1896, *Tonduz 9859* (LECTOTYPE, selected here: GH!; Isolectotype: F!).

Sinclairia pittieri Rydb., N. Amer. Fl. 34:300. 1927. TYPE: COSTA RICA. Alajuela: ca Alajuelita, Dec 1894, *Pittier 9093* (HOLOTYPE US; Isotypes F!,GH!)

Liabum dimidium Blake, J. Washington Acad. Sci. 22:385. 1932. *Sinclairia dimidia* (Blake) H. Robins. & Bret., Phytologia 28:61. 1974. TYPE: GUATEMALA. Peten: Tikal, 12-15 Apr 1931, *Bartlett 12602* (HOLOTYPE US; isotypes, F!,GH!,LL!,TEX!).

Clambering shrubs or woody vines to 30 m high. Leaves ovate to broadly elliptic, bicolored, 10-20 cm long, 3-14 cm wide; petioles 2-5 cm long; blades

Fig. 6 General description of *S. deamii*, *S. liebmannii* and *S. vavilovii*.



densely white tomentose beneath, the margins serrulate to nearly entire. Heads radiate, numerous in terminal corymbose panicles, the ultimate peduncles mostly 0-10 mm long. Involucres 6-9(-12) mm high, the bracts usually appressed through maturity, obtuse or rounded at the apices and mostly glabrous, rarely pubescent. Ray florets 5-8, the ligules yellow, 3-6 mm long. Disk florets 10-15 per head, the corollas yellow, glabrous, 6-8 mm long, the tubes 1-2 mm long, the lobes ca 1 mm long. Achenes 1.5-2.5 mm long, densely pubescent throughout, the pappus of numerous bristles 5-7 mm long, the outer scales few, poorly developed or seemingly absent.

DISTRIBUTION (Figure 7): Veracruz, Oaxaca and adjacent Chiapas along the Gulf slopes, southwards to Panamá and Colombia, tropical and montane rain forests, 100-1600 m; Jan-Apr.

REPRESENTATIVE SPECIMENS: MÉXICO. Oaxaca: Belleville, 23 Feb 1910, *Orcutt 3064* (F); 49 mi N of Ixtlan de Juárez, 1450 m, 10 Jan 1982, *Bacon 1754* (F). Veracruz: Mpio. Catemaco, Cerro de Buena Vista, ca Catemaco, ca 300 m, 12 Feb 1975, *Calzada 1744* (LL,MEXU); Mpio. Hidalgotitlan, 30 km E of La Laguna, 100 m, 26 Feb 1981, *Wendt 2933* (CHAPA,TEX); Mpio. San Andres Tuxtla, Volcán San Martin Tuxtla, 1630 m, 15 Feb 1972, *Beaman 5725* (F); Mpio. Zongolica, Nacaxtla, ca 1050 m, 25 Feb 1976, *Torres W-137* (TEX,XAL).

GUATEMALA. Dept. Izabal: Río Duke, 1-3 m, 16 Apr 1940, *Steyermark 39559* (F). Dept. Peten: San Diego, 13 Apr 1935, *Aguilar 517* (LL); Lacandon, 16 Mar 1962, *Contreras 3534* (LL); Tikal, 24 Mar 1959, *Lundell 15784* (LL); Aguada Las Cucas, 5 Mar 1961, *Lundell 16901* (LL).

BELIZE. Toledo District: ca river beyond Columbia, 3 Feb 1947, *Gentle 6154* (LL); Temesh River, 28 Feb, 1945, *Gentle 5239* (F,LL); Cero Hills, 25 Mar 1950, *Gentle 7007* (F,LL).

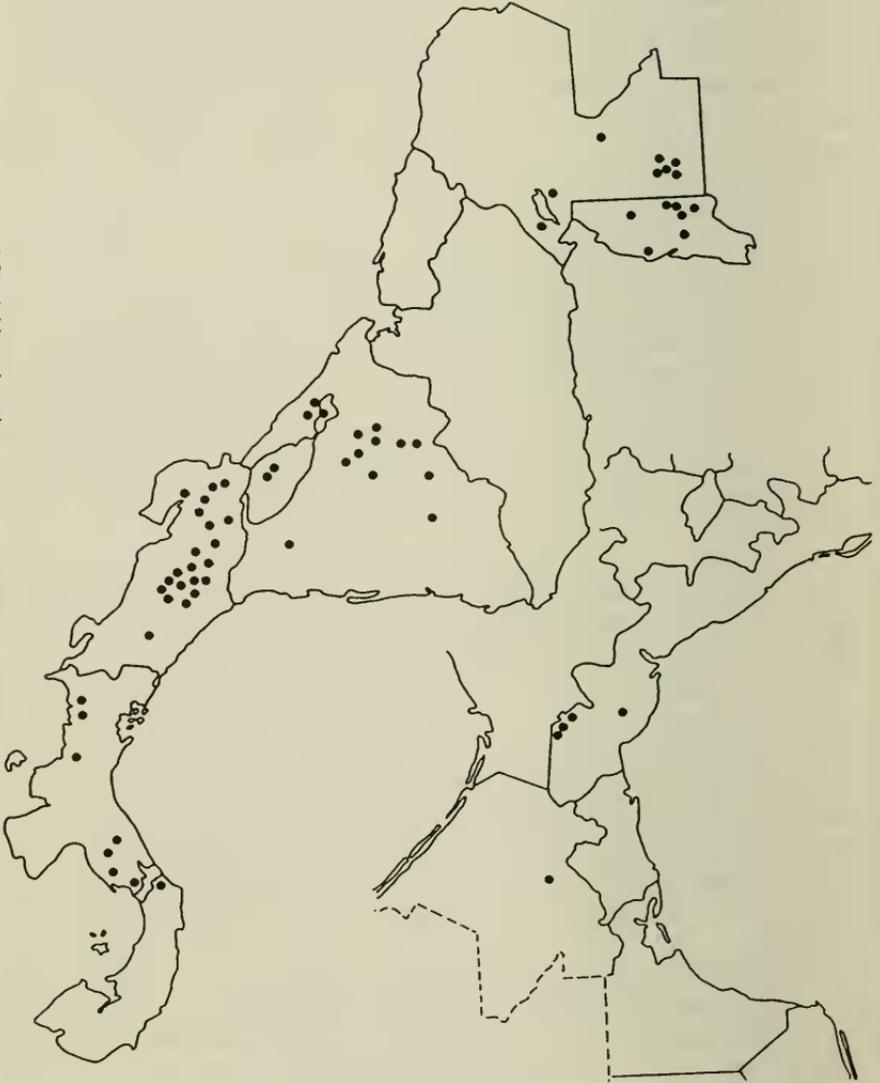
NICARAGUA. Boaco: Cerro Membachito, ca 900 m, 8 Feb 1983, *Grijalva 2263* (F). Jinotega: NE of Wiwili, 13 Mar 1980, *Araqistan 1814* (F). Managua: Sierra de Managua, 1932, *Garnier A489* (LL). Matagalpa: Los Angeles, 900 m, 1 Mar. 1983, *Moreno 21049* (F). Rivis: Isla Ometepe, 21 Feb 1983, *Moreno 19875* (F). Zelaya: Cerro Walawas, 100-268 m, 16 Mar 1978, *Stevens 7423* (F).

COSTA RICA. Alajuela: ca La Laguna, 1200 m, 19 Feb 1966, *Molina 17514* (GH). Guanacaste: El Silencio, Tilaran, 900 m, 12 Feb 1963, *Jiménez s.n.* (F). Punta Arenas: Río Esquinos, ca 100 ft, 8 Dec 1949, *Allen 5437* (AA,F). San José: Las Nubes, 6000 ft, 24 Jan 1940, *Hunnewell 17038* (GH); ca El General, 1035 m, Feb 1939, *Skutch 4137* (LL).

PANAMÁ. Chiriqui: ca New Switzerland, 1800-2000 m, 6 Jan 1939, *Allen 1415* (GH). Coclé: ca El Valle de Anton, ca 1000 m, 2 Dec 1941, *Allen 2866* (GH). Panamá: Cerro Campana, 17 Aug 1960, *Ebinger 935* (F).

COLOMBIA: Dept. Caldas: La Selva, 1600-1900 m, 8 Jan 1946, *von Sneidern 5246* (F).

Fig. 7. Distribution of *Sinclairia polyantha*.



A widespread variable species but not readily divisible into regional variants. It is, nevertheless, easily recognized by a combination of characters, including densely pubescent achenes, rayed heads, involucre bracts which are mostly appressed at maturity and bicolored, nearly entire leaves, the upper surface of which darkens appreciably upon drying. Vegetatively it superficially resembles *S. discolor* but the latter is readily recognized by its glabrous achenes (or nearly so).

9. *Sinclairia deamii* (B.L. Robins. & Bartl.) Rydb., N. Amer. Fl. 34:299. 1927. *Liabum deamii* B.L. Robins. & Bartl., Proc. Amer. Acad. Arts 43:60. 1907. TYPE: GUATEMALA. Tacapa: Gualan, 420 ft, Jan 1905, C.C. Deam 194 (HOLOTYPE: GH!; Isotype: F!).

Liabum subglandulare S.F. Blake, Contr. U.S. Natl. Herb. 24:31. 1922. *Sinclairia subglandularis* (S.F. Blake) Rydb., N. Amer. Fl. 34:298. 1927. TYPE: HONDURAS. Copan: "Hacienda La Zumbadora," between El Paraiso and La Florida, 13 May 1919, S.F. Blake 7386 (HOLOTYPE: US).

Clambering shrubs or slender trees to 15 m high, probably also hemiepiphytic. Leaves bicolored, 10-20 cm long, 6-12 cm wide, deciduous at the time of, or soon after, flowering; petioles 3-4 cm long; blades broadly ovate, white tomentose beneath, moderately blackening upon drying, the margins minutely serrulate. Heads eradiate in numerous terminal or subterminal, congested, corymbose panicles, the ultimate peduncles mostly 1-3 mm long, the branches brown tomentose or glandular hirsute, or both. Involucres mostly 4-5 mm long, the bracts 2-3 seriate, ovate, pubescent, the apices mostly obtuse. Ray florets absent. Disk florets mostly 5, the corollas pale yellow or creamy white, ca 7 cm long, glabrous except for the hispid tufted apices of the lobes, the lobes ca 2 mm long. Achenes 2-3 mm long, densely pubescent throughout, the pappus of numerous dirty white or tawny bristles 6-8 mm long, the outer scales narrow, 1.5-2.0 mm long.

DISTRIBUTION (Figure 6): Lowland tropical forests of northern Guatemala and adjacent México, Belize, Honduras and El Salvador 100-700 m; Feb-Mar.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Campeche: Tuxtepec, 23 Mar 1932, Lundell 1437 (F). Chiapas: Mpio. Copainala, 60 km NW of Soyala, 550 m, 13 Mar 1973, Breedlove 34048 (F,LL). Tabasco: Mpio. Tenosique, ca puentes Boca del Cerro, 270 m, 11 May 1984, Cowan 4692 (TEX).

BELIZE. El Cayo: El Cayo, 13 Apr 1931, Bartlett 12934 (F,GH,LL); hillside, Camp 6, 23 Mar 1938, Gentle 2395 (GH,LL).

GUATEMALA. Alta Verapaz: Pantin, ca 600 m, 5 Apr 1939, Standley 70872 (F). Peten: ca La Libertad, 9 Mar 1935, Aguilar 484 (LL); Remate, 14 Mar 1960, Contreras 662 (LL); Lake Peter Itza, 28 Mar 1961, Contreras

2063 (LL); Quexil, 7 Feb 1970, *Contreras 9615* (LL); Tikal, Mar 1961, *Ibarra 1* (LL); Tikal, on ruins, 3 Mar 1961, *Lundell 16843* (LL).

EL SALVADOR. Santa Ana: ca Santa Ana, 655-800 m, 8 Jan 1922, *Standley 19695* (GH). La Libertad: W of Santa Teda, 750 m, 19 Jan 1946, *Carlson 174* (F).

HONDURAS: Comayagua: Comayagua, ca 500 m, 20 Feb 1933, *Edwards P568* (AA). Cortes: San Pedro Sula, 21 Feb 1987, *Thieme 5332* (F). Santa Barbara: Quebrado de Limones, 150 m, 17 Apr 1947, *Standley 7541* (F).

A very distinct taxon, largely confined to lowland tropical rainforests, easily recognized by its small involucre (3-5 mm high), sessile heads, each with 5 pale yellow florets, the lobes of which have tufts of hispid hairs. Blake described forms with mostly glandular hairs as *L. subglandulare*. Williams (1976) correctly submerged this under the present species, as did Robinson (1983).

10. *Sinclairia andromachioides* (Less.) Sch.-Bip. ex Rydb., N. Amer. Fl. 34:298. 1927. *Vernonia andromachioides* Less., Linnaea 6:397. 1831. *Liabum andromachioides* (Less.) Hemsl., Biol. Centr. Amer., Bot. 2:231. 1881. TYPE: MÉXICO. Veracruz: forests ca Misantla, w/o date, *Schiede 1234* (HOLOTYPE: B; Photoholotypes: F!,GH!).

Clambering shrubs or hemiepiphytes. Leaves mostly 10-25 cm long, 6-18 cm wide; petioles 1-4 cm long; blades broadly ovate to ovate elliptic, not markedly bicolored, if at all, the lower surface decidedly brownish or dingy puberulent or tomentose, 3 nervate from above the base, the margins entire. Heads discoid, numerous in terminal corymbose panicles. Involucre 5-7 mm high, 3 seriate, the bracts gradate, the inner series glabrous with obtuse or rounded apices. Ray florets absent. Disk florets 15-25, the corollas yellow, 5-6 mm long, the tube ca 2.5 mm long, the lobes ca 1.5 mm long. Achenes ca 1.5 mm long, pubescent throughout, or nearly so; the pappus of numerous tawny bristles, the inner series 5-6 mm long, the outer scales similar to the inner but ca 0.7 mm long.

DISTRIBUTION (Figure 2): Known only from Veracruz, montane cloud forests in barrancas bordering streams along the eastern slopes of Pico de Orizaba and Cofre de Perote, ca 1200 m; Jan-May.

ADDITIONAL SPECIMENS EXAMINED: Veracruz: Orizaba, w/o date, *Botteri s.n.* (F,GH); valle de Cordoba, Feb 1866, *Bourgeau 1848* (GH); Fortin, Feb 1883, *Kerber 277* (GH); Mirador, Feb 1843, *Liebmann 399* (F,GH); ca Orizaba, 23 Jan 1895, *Pringle 5905* (GH); Zacuapan, Jan 1908, *Purpus 2942* (GH); Zacuapan, May 1919, *Purpus 8162* (GH); Zacuapan, Mar 1932, *Purpus 14233* (AA,F); w/o locality, May 1935, *Purpus 16452* (LL); Orizaba, Oct 1855, *Schaffner 368* (GH).

The species is closely related to the widespread *S. polyantha* but can be distinguished by its faintly, if at all, bicolored leaves and smaller involucre

(5-7 mm high vs 7-9 mm). The two taxa apparently do not coexist. It seems noteworthy that *S. andromachioides* has not been collected for over 50 years, suggesting that many of the original populations have been destroyed, probably for the cultivation of coffee.

11. *Sinclairia deppeana* (Less.) Rydb., N. Amer. Fl. 34:300. 1927. *Andromachia deppeana* Less., Linnaea 6:401. 1831. *Liabum deppeana* (Less.) Hemsl., Biol. Centr. Amer., Bot. 2:232. 1881. TYPE: MEXICO. Veracruz. Cuesta Grande del Jalacingo, Dec 1819, *Schiede 1239* (HOLOTYPE: B; Photoholotypes: F!,GH!).

Clambering shrubs, small trees, or hemiepiphytes to 5 m high. Leaves bicolorous, 12-26 cm long, 6-14 cm wide; petioles 4-10 cm long; blades broadly ovate to broadly elliptic, densely white tomentose beneath, drying blackish above, the margins minutely serrulate to nearly entire. Heads radiate, few to numerous in terminal, rounded, corymbose panicles, the ultimate peduncles stiffly divaricate, mostly 1-2 cm long. Involucres mostly 12-15 mm high, 3-4 seriate, unequally gradate, the inner bracts mostly glabrous with broadly rounded apices, these becoming loose and somewhat squarrose with age. Ray florets mostly 8, the ligules yellow, 8-12 mm long. Disk florets 15-20, the corollas yellow, 8-10 mm long, glabrous except for puberulent tufts on the lobes, the tubes ca 3 mm long, the lobes ca 1.5 mm long. Achenes 1.5-2.0 mm long, pubescent throughout, the pappus of numerous yellowish white bristles 9-11 mm long, the outer scales ca 0.5 mm long.

DISTRIBUTION (Figure 2): Veracruz and Oaxaca along the Gulf slopes in pine-oak montane cloud forests, 1300-2500 m; Oct-Feb.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Oaxaca: 70-75 km S of Tuxtepec on road to Oaxaca City, 1370 m, 5 Jan 1982, *Breedlove 56749* (TEX); 35 mi E of Teotitlan, 1650 m, 22 Feb 1979, *Croat 48249* (F). Veracruz: Mpio. Orizaba, Orizaba, w/o date, *Botteri 1197* (F); Mpio. Tatatila, between Tatalita and Escalona, 14 Feb 1986, *Chazaro 3972* (TEX,WIS,XAL); Mpio. Xico, between Tonalco and Oxtlapa, 2500 m, 8 Oct 1986, *Chazaro 4028B* (TEX,WIS,XAL); between Xico and Buena Vista, 2000 m, 25 Dec 1987, *Chazaro B. 1988* (WIS); Mpio. Zongolica, Nacaxtla, ca 1050 m, *Torres W141* (TEX,XAL); Mpio. Acajete, Plan de Cedeno, 1740 m, 10 Dec 1971, *Ventura 4677* (MEXU,TEX); Mpio. Yecuatla, El Cajon, 1380 m, 14 Dec 1971, *Ventura 4701* (MEXU,TEX).

The species appears to be a very large headed form of *S. discolor*, but it is readily distinguished from the latter by a number of characters including much larger, broader involucral bracts and pubescent achenes.

12. *Sinclairia tajumulcensis* (Standl. & Steyerl.) H. Robins. & Bret. Phytologia 28:62. 1974. *Liabum tajumulcense* Standl. & Steyerl., Publ.

Field Mus. Nat. Hist., Chicago, Bot. Ser. 23:27. 1943. TYPE: GUATEMALA. San Marcos: moist thicket bordering stream, barrancas SW of Tajumulcom, 2300-2500 m, Feb 1940, J.A. Steyermark 36543 (HOLOTYPE: F!).

Clambering shrub or small tree 4-5 m high. Leaves unknown, presumably deciduous shortly after anthesis. Heads numerous in congested, somewhat pyramidal, corymbose panicles, the ultimate peduncles 3-10 mm long. Involucres campanulate, 4-5 seriate, 14-17 mm high, 18-22 mm wide, the bracts gradate, linear lanceolate, acuminate, densely tomentulose or lanuginose. Ray florets absent. Disk florets 20-40, the corollas yellow, 10-12 mm long. Achenes ca 4-5 mm long, densely pubescent throughout, the inner pappus of 30-40 bristles 10-12 mm long, the outer pappus of numerous narrow scales 1.0-1.5 mm long, similar in color to the inner bristles. A very distinctive species, known only by the type collection (Figure 4).

13. *Sinclairia liebmannii* (Klatt) Sch.-Bip. ex Rydb., N. Amer. Fl. 34:300. 1917. *Liabum liebmannii* Klatt, Leopoldina 23:146. 1887. TYPE: MÉXICO. Oaxaca: "Bartolo," 1842, F.M. Liebmann 357 (HOLOTYPE: C; possible fragment of holotype: GH!). Liebmann apparently collected type material at San Bartolo, Oaxaca, in 1842, along the main route between México City and Tehuantepec. Sousa (1979) showed the main route between these cities, which was traversed some 8 years earlier by the collector Andrieux. McVaugh (1972) noted that Liebmann collected in Oaxaca along the Pacific Coast during the year concerned. There is but little question that the packet material I examined at GH, cited above, belongs to what previously has been called *S. caducifolia* and is probable fragmentary type material of it *S. liebmannii*.

Vernonia hypoleuca DC., Prod. 5:27. 1836. *Liabum hypoleucum* (DC.) S.F. Blake, Proc. Biol. Soc. Washington 39:144. 1926.

Sinclairia blakei H. Robins. & Bret., Phytologia 28:60. 1974. [not *Sinclairia hypoleuca* (Greenm.) Rydb.] TYPE: MÉXICO. Guerrero(?): between Acapulco and México City, Nov 1790-Dec 1791, Haenke s.n. (LECTO-TYPE: G-DC, microfiche!).

Liabum caducifolium B.L. Robins. & Bartl., Proc. Amer. Acad. Arts 43:59. 1907. *Sinclairia caducifolia* (B.L. Robins. & Bartl.) Rydb., N. Amer. Fl. 34:299. 1927. TYPE: MÉXICO. Guerrero: Acapulco and vicinity, Oct 1894-Mar 1895, E. Palmer 245 (HOLOTYPE: GH!; Isotype: F!).

Slender, often arching, sometimes clambering shrubs or small trees to 10 m high which become deciduous at the time of, or soon after, flowering. Stems

slender and whip like above, but 5-7 cm thick below. Leaves 6-15 cm long, 3-12 cm wide, bicolored; petioles 1-4 cm long; blades mostly to some extent triangular with basal lobes or flanges, 3 nervate, white tomentose beneath, the margins weakly serrulate to nearly entire. Heads eradiate, numerous in rather stiffly branched corymbose panicles. The ultimate peduncles 3-8 mm long, at first loosely arachnoid but soon glabrate. Involucres 5-8 mm high, 2-3 seriate, gradate, the bracts 15-20, closely appressed with acute apices. Ray florets absent. Disk florets 6-12, the corollas glabrous, creamy white or pale yellow, 8-12 mm long, the tubes 3-4 mm long, grading into an ill defined tubular throat, the lobes ca 2 mm long. Achenes 3-4 mm long, moderately pubescent, more so above, the pappus of yellowish white or tawny bristles 7-9 mm long, the outer scales 1-2 mm long, scarcely differentiated.

DISTRIBUTION (Figure 6): Jalisco to Oaxaca along the Pacific slopes in tropical deciduous forests, 50-1200 m; Oct-Dec.

REPRESENTATIVE SPECIMENS: MÉXICO. Colima: 13 mi N of Santiago, 200-300 m, 10 Dec 1959, *McVaugh 1642* (LL,MICH). Jalisco: 6 mi SW of Pihuamo, 2200 ft, 29 Oct 1962, *Cronquist 9764* (GH,NY,TEX). Guerrero: Taxco, 16 Jan 1936, *Abbott 43* (GH). Michoacán: 10 km SE of Aquila, 50 m, 24 Nov 1963, *Feddema 2725* (MICH,TEX). Morelos: Cuernavaca, 3 Jan 1899, *Deam 7* (F,GH). Oaxaca: Mpio. Jalapa del Marques, Cerro de la Huerta, 620 m, 17 Nov 1978, *Koch 78331* (CHAPA,TEX).

This fairly common species is noteworthy for its caducous leaves which drop soon after flowering commences. Unfortunately, the specific name long applied to this species by most workers, including *McVaugh* (1984), must be replaced by the earlier specific name, *Liabum liebmannii*, as noted above.

Sinclairia liebmannii appears most closely related to the largely Central American species, *S. sublobata*, both possessing similar, usually lobed, rather thick leaves which tend to drop shortly after flowering. The latter can be distinguished by its larger heads with obtuse involucral bracts and generally larger, less deltoid, leaf blades.

Liabum adenotrichum is positioned in synonymy here with some trepidation. The only plant known (the type) appears to be a hybrid derivative, perhaps a backcross from *S. klattii* into *S. liebmannii*. Both of the latter occur in the region of the type of *L. adenotrichum*. Most of the characters are those of *S. liebmannii*, but the larger heads with a few glands and the somewhat drooping capitulescence strongly suggest that an influx of genes from *S. klattii* has occurred.

14. *Sinclairia similis* (*McVaugh*) H. Robins. & Bret., *Phytologia* 28:62. 1974.
Liabum similis *McVaugh*, *Contr. Univ. Michigan Herb.* 9:468. 1972.
TYPE: MÉXICO. Nayarit: "Shaded places in pockets of trees (notably *Bursera* spp.) on rough lava flow at the base of Volcán Ceboruco," ca 6 mi NW of Ahuacatlan, 3200 ft, 4 Oct 1962, *A. Cronquist 9602*

(MICH,TEX!).

Slender arching shrubs 3-4 m high. Leaves 10-20 cm long, 6-10 cm wide; petioles 3-9 cm long; blades broadly ovate to deltoid, bicolored, white tomentulose beneath, 3 nervate from the base, the margins irregularly serrate. Heads eradiate, numerous in terminal corymbose panicles, the ultimate peduncles mostly 5-20 mm long. Involucres turbocampanulate, 8-10 mm high, 3-4 seriate, the bracts appressed at first, but squarrose with age, narrowly ovate, appressed pubescent, the apices acute. Ray florets absent. Disk florets 15-20, the corollas white, glabrous, 9-11 mm long, the tubes 2-3 mm long, gradually passing into the throat, the lobes 2-3 mm long. Achenes 3.5-5.0 mm long, sparsely short pilose, the pappus of tawny white bristles 7-9 mm long, the outer scales not much differentiated, 0.5-1.0 mm long.

DISTRIBUTION (Figure 4): Nayarit and adjacent Jalisco, mostly tropical deciduous forests along the Pacific slopes, 0-1000 m; Oct-Nov.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Jalisco: 3 km SE of Puerto Vallarta, ca 50 m, 12 Nov 1963, *Feddema 2507* (MICH,TEX).

This taxon is known by only 2 collections, cited above. It is clearly related to *S. liebmannii*, but is amply distinct, as noted by McVaugh (1984), who provides an excellent illustration of the species.

15. *Sinclairia klattii* (B.L. Robins. & Greenm.) H. Robins. & Bret., *Phytologia* 28:61. 1974. *Liabum klattii* B.L. Robins. & Greenm., *Amer. J. Sci.*, ser. 3, 1:156. 1895. *Sinclairiopsis klattii* (B.L. Robins. & Greenm.) Rydb., *N. Amer. Fl.* 34:293. 1927. TYPE. MÉXICO. Oaxaca: Monte Alban, 6000 ft, 24 Nov 1894, *C.G. Pringle 6059* (HOLOTYPE: GH!; Isotypes: GH!).

Shrubs or small trees 2-5 m high, leafless when in flower. Leaves 10-18 cm long, 6-11 cm wide; petioles 3-7 cm long; blades broadly ovate, bicolored, dingy white tomentose beneath, the margins denticulate. Heads eradiate, mostly 10-30 in both terminal and axillary pendant clusters, the ultimate peduncles glandular pubescent and arachnoid tomentose, mostly 3-25 mm long. Involucres 15-17 mm high, narrowly campanulate, 2-3 seriate, the bracts lanceolate, 2-4 nervate, glandular pubescent, the apices narrowly acuminate. Ray florets absent. Disk florets 18-30, the corollas yellow, pubescent, tubular throughout or nearly so, 13-16 mm long, the lobes ca 3 mm long, decidedly hispid on the apices. Achenes 2-3 mm long, densely pubescent throughout, the pappus of numerous tawny bristles mostly 8-17 mm long, the outer series of similar, but very short scales.

DISTRIBUTION (Figure 5): Veracruz and adjacent Oaxaca, mostly barrancas in tropical deciduous forests, 200-1500 m; Nov-Mar.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Oaxaca: 8-10 mi N of Oaxaca, along highway 175, 31 Jan 1960, *King 2499* (TEX); Estacion

Almoloyas, 800 m, 3 Mar 1907, *Conzatti 1751* (GH). Veracruz: Mcpio. Acultzingo, 3 km W of Acultzingo, ca 5000 ft, 26 Mar 1970, *Long 3279* (F); Mcpio. E. Zapata, Plan del Río, 210 m, 14 Feb 1973, *Hernández 1838* (F); Mcpio. Naolinco, 6 km ESE of San Antonio Paso del Toro, 650 m, 14 Jan 1984, *Nee 28816* (F,TEX,XAL); Zacuapan, barranca de Tenampa, Feb 1910, *Purpus 4336* (GH); Zacuapan, Feb 1914, *Purpus 7048* (GH).

II. SUBGENUS *MEGALIABUM* (species 16-23).

Sect. *Megaliabum* (species 16-18).

Sinclairia subgenus *Megaliabum* (Rydb.) B. Turner, stat. nov. Based upon: *Megaliabum* Rydb., N. Amer. Fl. 34:293. 1927. TYPE SPECIES: *Vernonia andrieuxii* DC., Prod. 5:16. 1836.

16. *Sinclairia andrieuxii* (DC.) H. Robins. & Bret., Phytologia 28:60. 1974. *Vernonia andrieuxii* DC., Prod. 5:16. 1836. *Liabum andrieuxii* (DC.) Hemsl., Biol. Centr. Amer., Bot. 2:231. 1881. *Megaliabum andrieuxii* (DC.) Rydb., N. Amer. Fl. 34:293. 1927. TYPE: MÉXICO. Oaxaca: between Tehuantepec and the river "Guaracoalcos" [Coatzacoalcos], Sep 1834, *G. Andrieux 269* (HOLOTYPE: G-DC, microfiche!; Photoholotype: F!).

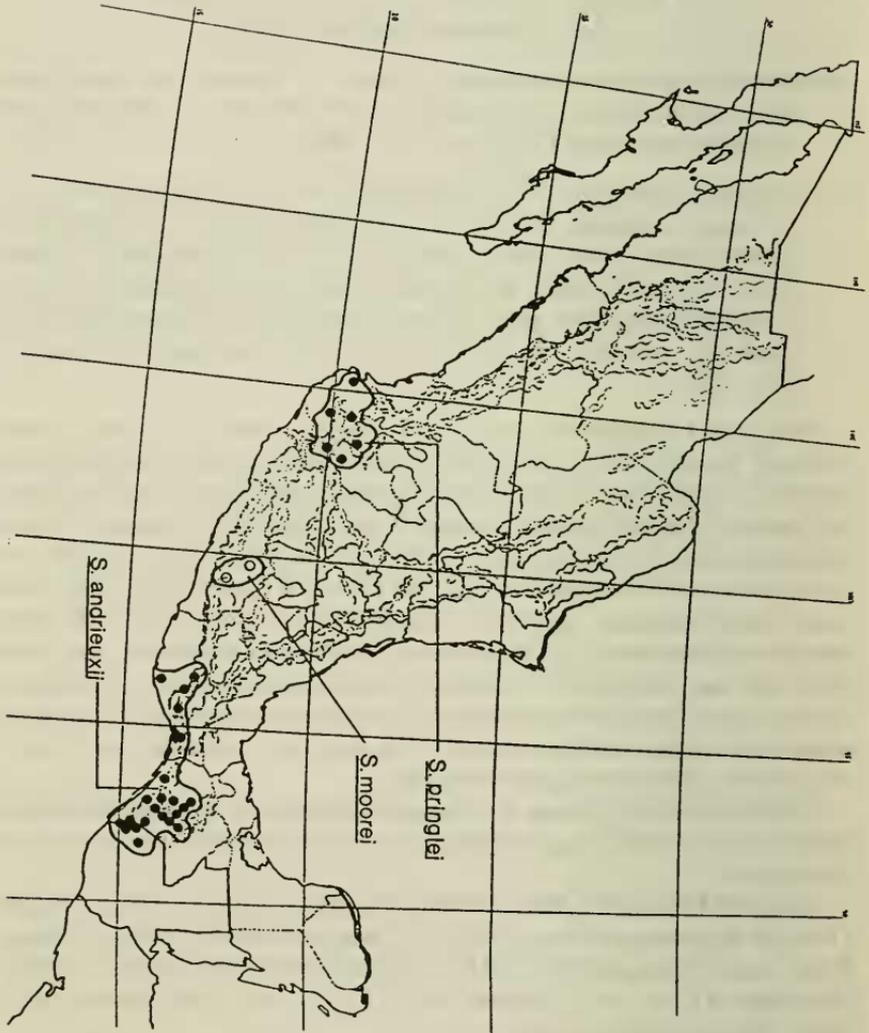
Stiffly erect suffruticose herbs or soft wooded shrubs 1-3 m high. Leaves bicolored, mostly 10-25 cm long, 6-14 cm wide; petioles 1.5-7.0 cm long; blades deltoid to subcordate, 3 nervate, the lower surfaces densely white tomentose, the margins irregularly serrate to rarely lobed. Heads 1-4, very large, radiate, arranged in strict terminal cymes, the ultimate peduncles mostly 2-6 cm long. Involucres broadly campanulate, 2-3 cm high, 3-4 cm wide, 4-6 seriate, the bracts linear lanceolate, tomentose throughout. Ray florets 21-34, the ligules orange or yellow orange, 15-25 mm long. Disk florets numerous, the corollas 15-18 mm long, the tubes 6-7 mm long, the lobes 3-5 mm long. Achenes 3.5-5.0 mm long, densely white pubescent throughout, the pappus of numerous, tawny to purplish, bristles mostly 1-2 cm long, the outermost series shorter but scarcely differentiated from the inner.

DISTRIBUTION (Figure 8): Oaxaca, Chiapas and adjacent Guatemala, mostly Pacific slopes along barrancas in tropical deciduous forests, 300-1500 m; Jul-Nov.

REPRESENTATIVE SPECIMENS: MÉXICO. Chiapas: Mcpio. Arriaga, 13 km N of Arriaga, 830 m, 4 Oct 1972, *Breedlove 28286* (CAS,LL); Siltepec, 3 Nov 1940, *Matuda 4108* (F,GH,LL). Oaxaca: Mcpio. Pochutla, 8 km NE of Chacalapa, 24 Nov 1977, *Delgado 692* (TEX); 37 mi SE of Oaxaca, 13 Oct 1962, *Cronquist* (GH,NY,TEX).

GUATEMALA. Huehuetenango: on rocky cliff along River Selegua, 47 km from Huehuetenango, 1400 m, 20 Nov 1967, *Molina 21411* (F,GH); NW of Cuilco, Cerro Chiquihui, 17 Aug 1942, *Steyermark 50776* (F).

Fig. 8. Distribution of *Sinclairia* (Sect. *Megalabum*).



This is a common species in Chiapas. Most all field collectors have described the species as having orange or orange yellow corollas.

17. *Sinclairia moorei* (H. Robins. & Bret.) H. Robins. & Bret., *Phytologia* 28:61. 1974. *Liabum moorei* H. Robins. & Bret., *Phytologia* 27:252. 1973. TYPE: MÉXICO. Guerrero: 36-38 km from Iguala on road to Teloapan, streamsides and slopes by Río de los Sabinos near Los Sabinos, 5 Nov 1949, *H.E. Moore, Jr. 5518* (HOLOTYPE: US; Isotype: GH!).

Erect suffruticose herbs or shrubs to 3 m high. Leaves bicolor, 10-12 cm long, 6-8 cm wide; petioles 2-3 cm long; blades broadly ovate, white tomentose beneath, the margins minutely serrulate to nearly entire. Heads radiate, 2-5 in strict terminal cymes, the ultimate peduncles 1-3 cm long. Involucres campanulate, 20-22 mm high, 24-30 mm wide, the bracts 4-5 seriate, gradate, densely tomentose throughout. Ray florets 11-13, the ligules yellow, ca 20 mm long. Disk florets 25-32, the corollas yellow, 18-20 mm long. Achenes 3.5-4.5 mm long, densely pubescent throughout, the pappus of numerous bristles in 2-3 series.

ADDITIONAL SPECIMEN EXAMINED (Figure 8): MÉXICO. Guerrero: few miles W of Chilpancingo on dirt road towards Omiltemi, 16 Oct 1976, *Stuessy & Gardner 4218* (WIS).

The species appears to stand somewhere between *S. andrieuzii* and *S. pringlei*, but closer to the former, as noted by its authors.

18. *Sinclairia pringlei* (B.L. Robins. & Greenm.) H. Robins. & Bret., *Phytologia* 28:61. 1974. *Liabum pringlei* B.L. Robins. & Greenm., *Proc. Amer. Acad. Arts* 32:49. 1896. *Megaliabum pringlei* (B.L. Robins. & Greenm.) Rydb., *N. Amer. Fl.* 34:294. 1927. TYPE: MÉXICO. Jalisco: "rocky slopes, mountains near Lake Chapala," 7000 ft, 18 Oct 1895, *C.G. Pringle 6214* (published, in error, as 6215) (HOLOTYPE: GH!; Isotype: F!).

Suffruticose perennial herbs or soft wooded shrubs 1-2 m high. Leaves bicolor, mostly 8-15 cm long, 5-12 cm wide; petioles 0.3-0.8 cm long; blades ovate to somewhat deltoid, 3 nervate, dirty white tomentose beneath, the margins irregularly serrate to denticulate. Heads 3-12, eradiate, arranged in strict terminal cymes, the ultimate peduncles mostly 1-4 cm long. Involucres 15-20 mm high, 25-35 mm wide, 3-5 seriate, the bracts ovate lanceolate, 3-5 mm wide, often squarrose with age. Ray florets absent. Disk florets 70-80, the corollas 10-12 mm long, glabrous, creamy white, the tubes 2-3 mm long, grading into the throat, the lobes 3-4 mm long. Achenes 3.5-5.0 mm long, densely pubescent throughout (rarely sparsely so), the pappus bristles tawny, 10-12 mm long, the outer scales well defined, 0.5-1.5 mm long.

Fig. 9. Distribution of *Sinclairia* (Sect. *Labelium*).



DISTRIBUTION (Figure 8): Jalisco, Pacific slopes in tropical deciduous or oak forests, 1500-2000 m; Aug-Nov.

REPRESENTATIVE SPECIMENS: MÉXICO. Jalisco: ca 25 mi SW Guadalajara, 1650 m, 1 Oct 1952, *McVaugh 13300* (MICH,TEX); mountains N of Autlan, 1500-1650 m, 5 Oct 1960, *McVaugh 19913* (MICH,TEX); hills of Etzatlan, 6000 ft, *Pringle 10824* (F,LL,TEX,WIS); 8.7 mi W of Atenquillo, 30 Sep 1984, *Sundberg 2951* (TEX).

This species is closely related to *S. andrieuxii* and was positioned with that taxon in the segregate genus *Megaliabum* by Rydberg (1927), which would presumably also include the recently described *Sinclairia moorei*. All of these stand somewhere "between" the subgenera *Liabellum* and *Sinclairia* and constitute the principal reason for the submergence of the former within the latter.

Sect. *LIABELLUM* (species 19-23).

Sinclairia Sect. *Liabellum* (Rydb.) B. Turner, status nov. Based on: *Liabellum* Rydb., N. Amer. Fl. 34:294. 1927. (TYPE SPECIES: *Liabum palmeri* A. Gray)

19. *Sinclairia hintoniorum* B. Turner, sp. nov. (Figure 10.). TYPE: MÉXICO. México: Distr. Temascaltepec, Chorrera, hill, 23 Sep 1935, *G.B. Hinton et al. 8482* (HOLOTYPE: LL!; Isotype: GH!).

Liabum palmeri (A. Gray) Rydb. similis sed differt plantis robustis 1-2 m altis herbaceis sed aliquantum suffruticosis, capitulis majoribus, acheniis majoribus (5-6 mm longis vs 3-4 mm), et pappo setis porphyreis serie exteriori et interiori similari.

Stiffly erect suffruticose herb to 2 m high (according to label data). Stems purplish, pubescent throughout with glandular trichomes. Leaves (only the uppermost examined) deeply 3 lobed, the lobes in turn 3 lobed, densely tomentose below, 5-9 cm long, 3-7 cm wide. Heads 5-30 in a strict terminal cyme, the ultimate peduncles thick, mostly 2-9 cm long. Involucres broadly campanulate to hemispheric, 15-20 cm high, the bracts 3-4 seriate, linear lanceolate, both appressed sericeous and glandular pubescent. Receptacle convex, decidedly pubescent, 6-9 mm across. Florets 50-60 per head, the corollas yellow, 15-16 mm long, the lobes ca 5 mm long, a few hairs at the apices. Achenes 4-5 sided, with 10-12 ribs, 5-6 mm long, appressed pilose, the pappus bristles rusty brown in 3-4 series, the inner series about 15 mm long, the outer series similar to those of the inner, but shorter (3-8 mm long).

The type locality is at ca 18° 52' N, 100° 11' W (Hinton & Rzedowski 1975).

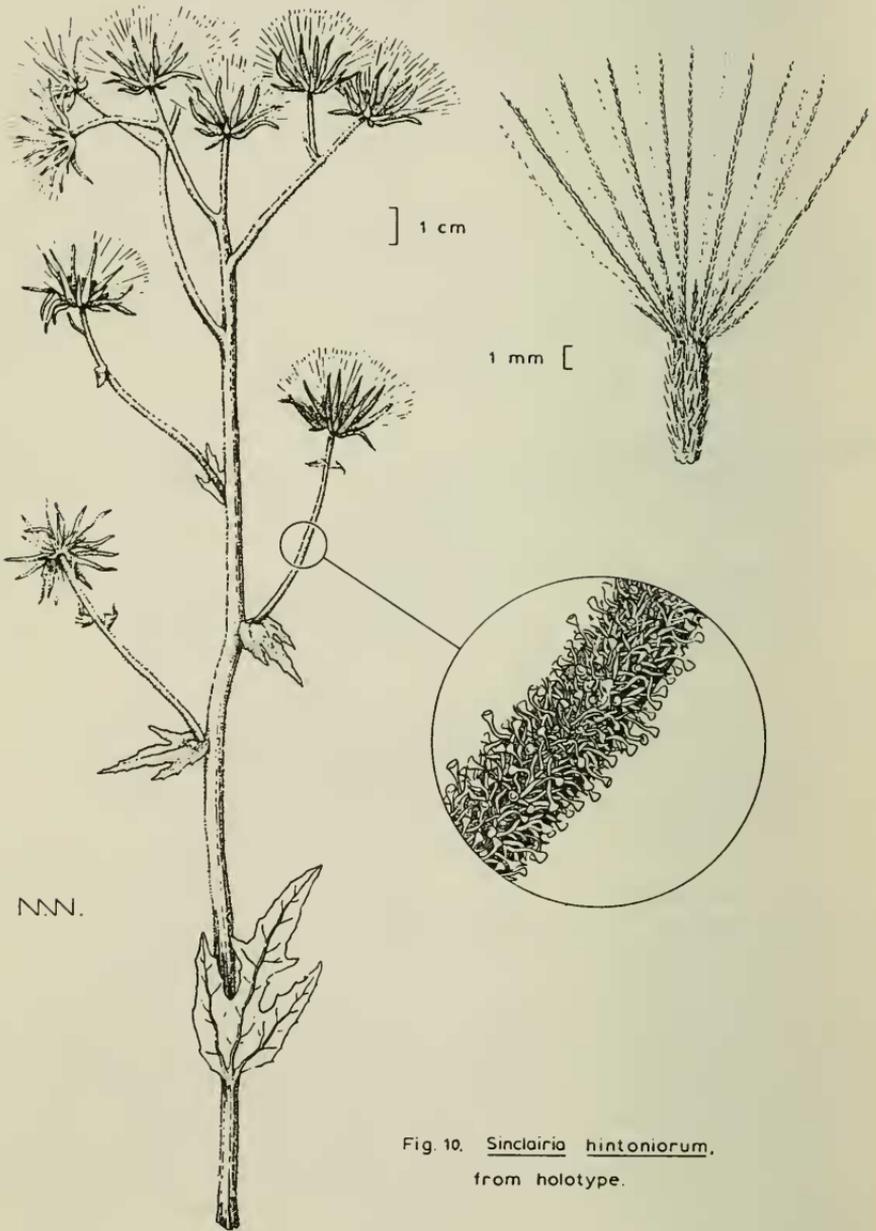


Fig. 10. *Sinclairia hintoniorum*,
from holotype.

DISTRIBUTION (Figure 9): Known only from the type locality, as described above, having been collected on two different dates at that site.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. México. Distr. Temascaltepec, Charreua, 1230 m, 10 Sep 1932. *G.B. Hinton 2038* (F,GH).

The species is superficially similar to *S. palmeri*, but differs markedly from that species in its robust habit (ca 2 m high vs 30-75 cm) very large heads with more numerous florets, larger achenes (5-6 mm vs 3-4 mm long) with pappus rusty brown, the outermost series similar to those of the inner, not differentiated into short, flattened, scales. While not noted on the collectors' label, it is likely that the stems arise from subterranean tuber-like roots as in the other species of sect. *Liabellum*.

It is a pleasure to name this taxon for the remarkable Hinton family, constituting three generations of plant collectors in México: George (father), Jaime (son) and George (grandson), the latter two individuals still actively collecting out of their hacienda near Cerro Potosí, Nuevo León.

20. *Sinclairia palmeri* (A. Gray) B. Turner, comb. nov. BASIONYM: *Liabum palmeri* A. Gray, Proc. Amer. Acad. Arts 22:432. 1887. *Liabellum palmeri* (A. Gray) Rydb., N. Amer. Fl. 34:294. 1927. TYPE: MÉXICO. Jalisco: Río Blanco, 1886, *E. Palmer 586* (HOLOTYPE: GH!).

Herbaceous perennials 30-90 cm high, the stems leafy and crowded below, arising from well defined tuber-like roots. Leaves mostly 8-16 cm long, largely confined to the lower portion of the stems, deeply 3 lobed to pinnately dissected, the divisions mostly 5-20 mm wide, the undersurfaces densely white tomentose, the margins serrulate to nearly entire; petioles 2-8 cm long, winged throughout. Heads 1-10, arranged in rather strict terminal cymes, the ultimate peduncles 2-10 cm long, both arachnoid and densely stipitate glandular. Involucre turbocampanulate to campanulate, 15-20 mm high, 3-4 seriate, the bracts subimbricate, linear lanceolate, both tomentose and stipitate glandular. Ray florets absent. Disk florets 30-40, the corollas yellow, sparsely pubescent, ca 15 mm long, the lobes ca 4 mm long. Achenes obpyramidal, 2.5-3.0 mm long, densely appressed sericeous, the inner pappus bristles 10-15 mm long, tawny white, the outermost pappus composed of white scales 1.0-1.5 mm long.

DISTRIBUTION (Figure 9): Chihuahua, Sinaloa, Durango, Zacatecas, Nayarit and Jalisco, pine-oak woodlands, grassy hillsides and open rocky places, 1500-2700 m; Sep-Nov.

REPRESENTATIVE SPECIMENS: MÉXICO. Chihuahua: 4 mi SW of Matamoros, 6000-6300 ft, 4 Oct 1959, *Correll 22738* (LL); Sierra Chinatu, San Juan, 8900 ft, 8 Oct 1959, *Correll 22921-A* (LL). Durango: Canyon Cantero, Sierra Gamon, ca 2000 m, 21 Sep 1948, *Gentry 8365* (GH); ca 50 km W of Cd. Durango, 2550 m, 27 Sep 1962, *McVaugh 21655* (LL); 41 mi WSW of Cd. Durango, 27 Sep 1984, *Sundberg 2891* (TEX). Jalisco: 8-10 km SE

of El Mortero, 2450 m, 5 Nov 1963, *Feddema 2479* (TEX); ca Guadalajara, 7 Dec 1888, *Pringle 2127* (GH); W of Bolanos, 15-17 Sep 1897, *Rose 2983* (GH); Michoacán: 9 mi W of Cd. Hidalgo, 24 Sep 1984, *Spooner 2561* (TEX). Zacatecas: ca 1 km S of Valparaiso, 2000-2400 m, 11 Sep 1966, *Anderson 3603* (GH).

21. *Sinclairia gentryi* (H. Robins.) B. Turner, comb. nov. BASIONYM: *Liabellum gentryi* H. Robins., *Phytologia* 41:46. 1978. TYPE: MÉXICO. Nayarit: Arroyo del Obispo, 31 mi SE of Tepic, canyon with running stream in oak woodlands, on rocks, 2 Aug 1951, *H.S. Gentry 11030* (HOLOTYPE: DUKE; Isotype: ARIZ!; Photoholotype: TEX!).

Small, scapose, perennials 15-30 cm high, the 2-3 pairs of leaves all basal and seemingly opposite. Leaves bicolored, broadly ovate to ovate elliptic, 8-12 cm long, 3-6 cm wide, weakly 3 nervate to pinnately veined, the margins serrulate to nearly entire, the undersurfaces white tomentose. Heads 2-3 on a naked scape, the ultimate peduncles 2-8 cm long, both tomentose and stipitate glandular. Involucres campanulate, 10-14 mm high, 12-16 mm wide, the involucral bracts subimbricate, 3-4 seriate, linear lanceolate, both tomentose and stipitate glandular. Ray florets absent. Disk florets 20-30, the corollas yellow, ca 12 mm long, sparsely pubescent below, the lobes ca 3.5 mm long. Achenes obpyramidal, ca 2 mm long, densely appressed sericeous, the pappus of numerous tawny white bristles in 2-3 series, the inner series ca 8 mm long, the outer series similar to those of the inner, but 1-2 mm long.

DISTRIBUTION (Figure 9): Known only from the type locality, as described above.

The species is closely related to *S. palmeri* and was treated as synonymous with that species by McVaugh (1984). It differs, however, in a number of features, as noted by H. Robinson in his original description, including, scapose habit, unlobed leaves, larger heads, longer pappus bristles, the outer series of which are essentially like those of the inner, except as to size (*S. palmeri* has an outer series of white, scales, quite unlike the inner bristles). The species is known only by type material. Robinson did not have access to the isotype (ARIZ); while clearly a different plant, it retains all of the features found in the holotype.

22. *Sinclairia cervina* (B.L. Robins.) B. Turner, comb. nov. BASIONYM: *Liabum cervinum* B.L. Robins., *Proc. Amer. Acad. Arts* 29:317. 1894. *Liabellum cervinum* (B.L. Robins.) Rydb., *N. Amer. Fl.* 34:294. 1927. TYPE: MÉXICO. Jalisco: "Bluffs of barrancas, San Marcos," 9 Jun 1893, *C.G. Pringle 4398* (HOLOTYPE: GH!; Isotypes: F!, MU!).

Perennial herbs 50-80 cm high, the stems leafy throughout and arising from tuber-like roots. Leaves mostly 10-18 cm long, 3-10 cm wide, deeply tripartite, the divisions often again lobed, the ultimate divisions mostly 3-10 mm

wide with entire or irregularly serrate margins, arachnoid tomentose beneath. Heads 3-7 in strict terminal cymes, the ultimate peduncles 2-5 cm long, white tomentose or with scattered eglandular trichomes. Involucres turbinate, 16-22 mm high, 3-4 seriate, the bracts mostly 2.5-3.0 mm wide at midsection, densely appressed pubescent. Ray florets absent. Disk florets 50-60, the corollas yellow, or reportedly white, 15-20 mm long, the lobes 4-6 mm long. Achenes 2.5-3.0 mm long, densely appressed sericeous, the inner pappus bristles 12-14 mm long, tawny, the outer scales 1-3 mm long, not strongly differentiated.

DISTRIBUTION (Figure 9): Southern Sinaloa, Nayarit and Jalisco, oak woodlands and grassy areas, 1000-2000 m; May-Aug.

23. *Sinclairia angustissima* (A. Gray) B. Turner, comb. nov. BASIONYM: *Liabum angustissimum* A. Gray in S. Wats., Proc. Amer. Acad. Arts 22:432. 1887. *Liabellum angustissimum* (A. Gray) Rydb., N. Amer. Fl. 34:295. 1927. TYPE: MÉXICO. Jalisco: "Guadalajara," Jul 1886, E. Palmer 215 (HOLOTYPE: GH!).

Perennial herbs 15-45 cm high, the stems leafy throughout and arising from tuber-like roots. Leaves tripartite to the base (rarely not), appearing ternate, the divisions entire, mostly 1-3 mm wide, 3-10 cm long, bicolored, the lower surfaces densely white tomentose. Heads 1 or 2 at the apices of solitary stems, the ultimate peduncles 2.5 cm long, white tomentose or glandular pubescent, or both. Ray florets absent. Disk florets 30-40, the corollas yellow, 12-14 mm long, the lobes 3-4 mm long. Achenes ca 2.5 mm long, appressed sericeous, the inner pappus bristles tawny white, 8-10 mm long, the outer bristles not well differentiated, 0.5-1.0 mm long.

DISTRIBUTION (Figure 9): Endemic to Nayarit and Jalisco, hillsides and along bluffs of barrancas, 1500-2000 m; Jul-Aug.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. JALISCO: hillsides near Guadalajara, 2 Jul 1889, Pringle 2501 (F,GH); bluffs of the barranca of Guadalajara, 4500 ft, 18 Jul 1902, Pringle 9934 (F,GH,LL). NAYARIT: Santa Gertrudis, 8 Aug 1897, Rose 3406 (GH).

The species appears to be a small version of *Sinclairia cervina* but the leaves are nearly always parted to the base and the divisions are narrowly linear, giving the appearance of whorled leaves. The heads are also smaller with fewer involucre bracts. McVaugh (1984) notes that *S. angustissima*, *S. cervina* and *S. palmeri* are closely related, all occurring in the basin of the Río Santiago. Nevertheless, from the relatively few collections known, each appears to retain their distinct characters and intergrades between them have not been discerned. *Sinclairia cervina* apparently has not been collected since 1902.

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LITERATURE CITED

- Hinton, J. & J. Rzedowski. 1975. George B. Hinton, Explorador Botánico en el Sudoeste de México. An. Escuela Nac. Cien. Biol. 21:1-114.
- McVaugh, R. 1972. Botanical exploration in Nueva Galiciana from 1790 to the present time. Contr. Univ. Michigan Herb. 9:205-358.
- . 1984. *Liabum*, in *Flora Novo-Galiciana* 12:576-584.
- Robinson, H. 1983. A generic review of the tribe Liabeae (Asteraceae). Smithsonian Contr. Bot. 54:1-69.
- , A.M. Powell, R.M. King, & J.F. Weedon. 1985. Chromosome numbers in Compositae, XI:Liabeae. Ann. Missouri Bot. Gard. 72:469-479.
- Rydberg, P.A. 1927. Liabeae, in N. Amer. Fl. 34:289-360.
- Sousa, S.M. 1979. Itinerario botánico de Andrieux in Mexico. Taxon 28:97-102.