
American *Cynanchum* (Asclepiadaceae)—A Preliminary Infrageneric Classification

Sigrid Liede

Abteilung Spezielle Botanik, Universität Ulm, 89069 Ulm, Germany

ABSTRACT. A subdivision of American *Cynanchum* at the sectional level is suggested and is understood to comprise the following: *C.* sect. *Cynanchum* (also found in the Old World), *C.* sect. *Formosum*, *C.* sect. *Macbridea*, *C.* sect. *Microphyllum*, *C.* sect. *Telminostelma*, *C.* sect. *Roulinia*, and *C.* sect. *Mellichampia*. The identity of *Dicarpophora* is clarified and the position of *Telminostelma* is discussed. Four new combinations are proposed: *Cynanchum mazzuchii* (Spegazzini) Liede, *Cynanchum brasiliense* (Morillo) Liede, *Cynanchum gentryi* (Morillo) Liede, and *Cynanchum gilbertii* Liede (replaces *Metalepis prevostiae* Morillo). *Orthosia* is recognized as distinct from *Cynanchum*. A checklist of species and their sectional affinities is given and poorly understood taxa are highlighted.

The large genus *Cynanchum* (ca. 400 species) is distributed worldwide, with centers of distribution in Madagascar, southern China, and the northeastern Andes. Following the exclusion of *Vincetoxicum* Wolf, the ca. 150 Old World species of the genus, though highly diverse in many characters, form a well delimited group and can be accommodated in two sections (Liede, 1996). Here, species delimitation is usually easy, and most species, except for some Madagascan endemics, are relatively widespread and frequent.

In contrast, the New World species are taxonomically extremely difficult: most of them constitute narrow endemics; species delimitation is difficult because characters are rather cryptic; and Woodson (1941), based only on North American material, united morphologically distinct taxa with *Cynanchum*, especially the equally diverse and difficult genus *Metastelma*. Numerous workers have described new species galore without following any clearcut concept of the genus. In a previous paper, Liede and Meve (1997) attempted to exclude obvious misfits from *Cynanchum*; the present paper provides a framework against which future descriptions can be compared, so that, in the end, a complete revision of the American members of the genus will be possible.

So far, only one group of American species has

been treated at this level, *Cynanchum* subg. *Mellichampia* Sundell (Sundell, 1981). Sundell (1981) described four sections in this subgenus, two of which, sect. *Roulinia* (Decaisne) Sundell and sect. *Mellichampia* (A. Gray ex S. Watson) Sundell, are well delimited and are almost certainly "true" members of *Cynanchum*. The position of the monotypic section *Ampelamus* (Rafinesque) Sundell cannot be ascertained at present. Its only member, *C. laeve* (Michaux) Persoon, deviates from all other members of the genus by its entirely free corona lobes and clear latex. Because a comparison of morphological characters alone is insufficient to determine the position of this aberrant taxon, I am arguing for the conservative view not to change its current placement (Sundell, 1981), even though a re-establishment of the genus *Ampelamus* Rafinesque to me would seem the more adequate expression for its status. The fourth section, *Metalepis* (Grisebach) Sundell, deserves a more thorough discussion (see below).

During my seven years of study of the genus *Cynanchum*, the question of delimitation of natural groups in the New World has taken a major part of my efforts. While some of the herbaria holding type material proved remarkably unresponsive to my repeated requests for material, nevertheless I have been able to study most species consulting original material. Drawings showing detailed floral structure were available for a few species only and have been used to determine the position of a species if no original material could be borrowed. Although my studies are incomplete, I am able to provide an annotated checklist-type survey of the New World *Cynanchum*, so that future researchers will find a useful framework for their studies. Because I am hesitant as to the relationships between the groups delimited here, sectional rank is attributed to all of them. Known heterotypic synonymy is indicated; however, gradually increasing collections are likely to expose still more taxa as merely representative of the extremes of a gradient. To account for the preliminary character of this paper, the number of new combinations has been kept as low as

possible. In particular, the new combinations resulting from *Orthosia* (incl. *Amphistelma*) considered as a genus well distinct from *Cynanchum* have not been carried through, awaiting an in-depth revision.

MATERIALS AND METHODS

More than 500 specimens from the holdings of AAU, B, BM, CTES, G, GA, GB, L, LIL, LPB, M, MO, MPU, P, S, SGO, SI, UC, and USZ have been studied. Dried material was supplemented by my own collections of living and spirit material from Argentina, Bolivia, Chile, Mexico, and the United States.

KEY TO THE SECTIONS OF *CYNANCHUM* AND FREQUENTLY
CONFUSED GENERA IN THE NEW WORLD

1. Leaves ovate, at least 5 cm long, with cordate to deeply cordate leaf bases 2
- 1'. Leaves either linear or ovate, if ovate, then much smaller than 5 cm (except *C. goertsianum* and *C. morrenioides*), leaf bases not deeply cordate 5
2. Stipule-like leaflets absent, inflorescences axillary, complex, dichasial, follicles, as far as known, ovoid-fusiform, thick-walled (one per flower) *C. sect. Telminostelma*
- 2'. Stipule-like leaflets regularly present, inflorescences "extra-axillary," simple, dichasial or bostrychoid, follicles, as far as known, fusiform or elongated, thin-walled (one or two per flower) 3
3. Plants regularly forming two follicles per flower, follicles elongated, three-angled in cross section, inflorescences dichasial, corona highly connate *C. sect. Formosum*
- 3'. Plants only occasionally forming two follicles per flower, follicles fusiform, circular in cross section, inflorescences bostrychoid, corona connate for not more than 1/2 of its length 4
4. Stems and leaves softly pubescent, corollas small, greenish or whitish, styler heads papillate (except *C. ligulatum*) *C. sect. Mellichampia*
- 4'. Stems and leaves glabrous, corollas large, purplish, styler heads flat, depressed *C. sect. Roulinia*
5. Corolla bearded, corona of five staminal lobes not laterally fused 6
- 5'. Corolla glabrous or with trichomes, but not bearded, corona of staminal parts fused for at least 1/4 of corona length 7
6. Staminal corona parts simple *Metastelma*
- 6'. Staminal corona parts with an adaxial ligule (sometimes rather small) *Ditassa*
7. Follicles regularly two per flower, narrowly oblong; inflorescences frequently axillary, staminal parts of the corona frequently tridentate with prominent median tooth 8
- 7'. Follicles regularly one per flower, fusiform, inflorescences extra-axillary, staminal parts of the corona not tridentate 9
8. Inflorescences complex, bostrychoid, corona highly connate, or frequently with a ring of

- fused staminal and interstaminal parts in addition to free staminal parts *Tassadia*
- 8'. Inflorescences simple, sciadioid, corona basally connate, free staminal parts never present *Orthosia*
9. Branching pattern at least basally distinctly dichasial *C. sect. Microphyllum*
- 9'. Branching pattern monochasial 10
10. Leaves ovate, corona highly connate *C. sect. Cynanchum*
- 10'. Leaves linear, corona connate for 1/3 of its length or absent *C. sect. Macbridea*

ANNOTATED CHECKLIST (COMPARE TABLE 1)

Cynanchum sect. **Cynanchum**

A number of species, particularly from southern South America, do not display any characters differentiating them from the smaller members of the genus in South Africa. As those are attributed to the typical section, their South American counterparts should also be included there.

Small (usually less than 1 m tall, with exception of *C. goertsianum* Morillo), predominantly herbaceous twiners, more rarely shrublets with or without twining apical shoots, leaves small (less than 5 cm long, often not exceeding 1 cm, with exception of *C. goertsianum* Morillo), leaf bases only slightly cordate, more frequently rounded or acute, inflorescences extra-axillary, the corolla lobes adaxially either glabrous or with widely spaced, conical, verrucose trichomes, corona consisting of highly fused staminal and interstaminal parts; follicles one per flower, obclavate; seeds usually ovate, winged, smooth or sculptured.

With the exception of the Brazilian *C. morrenioides*, which bears a strong resemblance to some Madagascan species with its strongly centrifugal anther wings and the main corona lobes opposite the corolla lobes (compare, e.g., *C. danguyanum* Choux), and the aberrant *C. goertsianum* from the Guianas, all species originate from southern Argentina and Chile.

- C. acutifolium* (Philippi) Reiche
- C. boerhavifolium* Hooker & Arnott
- C. bulligerum* (Spegazzini) Macloskie
- C. descolei* T. Meyer
- C. diemii* T. Meyer
- C. goertsianum* Morillo
- C. hickenii* Malme
- C. lancifolium* Hooker & Arnott (incl. *Cynoctonum nemorosum* Philippi)
- C. morrenioides* Goyder
- C. myrtifolium* Hooker & Arnott
- C. nummulariaefolium* Hooker & Arnott (incl. *C. mucronatum* (Decaisne) Reiche, *C. chilense* (Philippi) Malme, *C. nanum* Skottsberg)

Table 1. American *Cynanchum* and genera confused with it.

	<i>Cynanchum</i> sect. <i>Cynanchum</i> (New World)	<i>Cynanchum</i> sect. <i>Formosum</i>	<i>Cynanchum</i> sect. <i>Macbridea</i>	<i>Cynanchum</i> sect. <i>Mellichampia</i> sensu Sundell (1981)	<i>Cynanchum</i> sect. <i>Microphyllum</i>
Branching pattern	monochasial	monochasial	monochasial	monochasial	dichasial
Adventitious buds	absent	absent	absent	absent	present
Shoots	basally woody, herbaceous	basally woody, herbaceous	green	basally woody, herbaceous	green, ridged
Stipules	absent	present	absent	present	absent
Leaf arrangement	decussate	decussate	decussate	decussate	distichous
Leaf shape	ovate	ovate	linear	ovate	ovate
Leaf bases	obtuse	deeply cordate	acute to acuminate	deeply cordate	rounded to slightly cordate
Inflorescence position	extra-axillary	extra-axillary	extra-axillary	extra-axillary	extra-axillary
Inflorescence structure	simple, bostrychoid	simple, dichasial	simple, sciadioid	simple, bostrychoid	simple, sciadioid
Petal length	2–4 mm	6–8 mm	5 mm	5–10 mm	4 mm
Corolla, adaxially	glabrous or with sparse verrucose trichomes	glabrous	glabrous or with short trichomes	glabrous or with short trichomes	glabrous or with short trichomes
Corona	C(is), highly connate	C(is), highly connate	C(is), connate for ca. 1/3 or absent	C(is), connate for ca. 1/3 of length	C(is), basally connate
Follicles per flower	1	2	1	1	1
Follicle shape	fusiform, ± circular in cross section	elongated, three- angled in cross section	fusiform, ± circular in cross section	fusiform, ± circular in cross section	fusiform, ± circular in cross section
Seed shape and structure	ovate; smooth/ tuberculate winged or wingless	ovate; smooth, winged	ovate; smooth/ tuberculate	ovate; tuberculate, winged or wingless	ovate; smooth

C. pachyphyllum (Decaisne) K. Schumann
C. patagonicum (Philippi) Malme
C. undulatum (Decaisne) K. Schumann
C. viride (Philippi) Reiche

Cynanchum sect. **Formosum** Liede, sect. nov.
TYPE: *Cynanchum formosum* N. E. Brown,
Kew Bull. 1895: 112. 1895.

Dicarpophora Spegazzini, Physis (Buenos Aires) 8: 269.
1926. TYPE: *Dicarpophora mazzuchii* Spegazzini.

Lianae foliis alte cordatis, inflorescentiis extra-axillari-
bus, multifloris, partibus coronae staminalibus interstam-

inalibusque late connatis, folliculis duplicibus, oblongi-
formibus, triangularibus in diametro.

Plants large twiners (5 m tall or taller), leaves
ovate, basally deeply cordate, with “stipules”; in-
florescences constituting richly branched bostry-
choid cymes, flowers large (to 1 cm diam.), corolla
lobes glabrous, corona consisting of highly fused
staminal and interstaminal parts, overtopping the
gynostegium, follicles always two per flower, three-
angled, seeds smooth, winged. This small but con-
spicuous group of species is restricted to the Andes
of Ecuador and Peru.

Table 1. Continued.

<i>Cynanchum</i> sect. <i>Roulinia</i> sensu Sundell (1981)	<i>Cynanchum</i> sect. <i>Telminostelma</i>	<i>Ditassa</i>	<i>Metastelma</i>	<i>Orthosia</i>	<i>Tassadia</i>
monochasial	monochasial	monochasial	monochasial	dichasial	monochasial
absent	absent	absent	absent	absent	absent
basally woody, herbaceous	basally woody, herbaceous	wiry, brown	wiry, brown	green, ridged	brown, woody
present	absent	absent	absent	absent	absent
decussate	decussate	decussate	decussate	decussate or dis- tichous	decussate or dis- tichous
ovate	ovate	ovate to obovate	ovate to obovate	ovate, linear or absent	ovate
deeply cordate	cordate to deep- ly cordate	obtuse or acute	obtuse	rounded	rounded
extra-axillary	axillary	extra-axillary	extra-axillary	extra-axillary- axillary	extra-axillary- axillary
simple, bostry- choid	complex, dicha- sial	simple, sciadioid- dal	simple, sciadioid- dal	simple, sciadioid- dal	complex, bostry- choid
4–7 mm	1.5–3 mm length ≥ width	1–4 mm	1–4 mm	1–2 mm	2–3 mm
sparse or with short and long trichomes in the sinus	with short tri- chomes	bearded, rarely glabrous	bearded, rarely glabrous	glabrous	glabrous or with short and long trichomes
C(is), connate for ca. 1/3 of length	C(is), highly connate, often Ci dominant	double Cs	simple Cs	C(is), basally connate	C(is), highly connate, or C(is) + Cs
1	1	2	2	2	2
fusiform, ± circu- lar in cross- section	ovoid-fusiform, thick, ± cir- cular in cross- section	fusiform	fusiform, ± cir- cular in cross- section	elongated, ± cir- cular in cross- section	elongated, ± cir- cular in cross- section, with basal hump
ovate; tubercu- late, winged or wingless	?????	ovate; smooth, winged	ovate; smooth, winged	cymbiform; smooth or tu- berculate, wingless or apically winged	cymbiform; smooth or tu- berculate, wingless or apically winged

Cynanchum mazzuchii (Spegazzini) Liede, comb. nov. Basionym: *Dicarpophora mazzuchii* Spegazzini, Physis (Buenos Aires) 8: 270. 1926. TYPE: Bolivia. Tupiza: Cult. in horto Domini O. Reyes, Mar. et May 1926, *Mazzuchi s.n.* (lectotype, designated here, photograph Physis 8: 271. 1926).

The type specimen of the monotypic genus *Dicarpophora* has not been traced, despite an intense search in LP and LPS, where Spegazzini's material is usually kept. B also does not possess a specimen. Correspondence between J. Fontella Pereira and E.

de la Sota indicates that the specimen has been missing at least since 1983. However, the photograph of the type accompanying the original diagnosis shows all the typical features of a plant of the *C. formosum* affinity. The type collection originates from a garden in Bolivia; no other material of this section has been found in Bolivia. However, I have found *C. formosum* in the vicinity of a garden in Chile (Liede & Conrad 3061, MSUN, ULM), and it has probably been more widely cultivated because of its showy, sweetly scented flowers. While it is therefore very likely that *C. mazzuchii* is a synonym

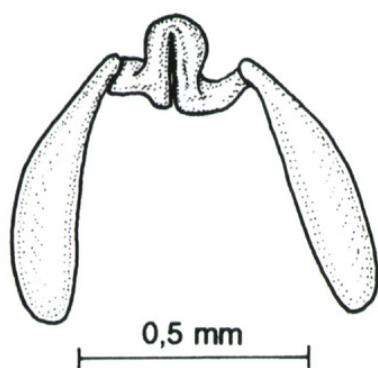


Figure 1. *Cynanchum tarmense* Schlechter. Pollinarium (from Becker & Terrones 223, USZ, drawn by U. Meve).

of *C. formosum*, the photograph of the type is insufficient to determine details of flower structure and confirm this suspicion.

C. canoi Morillo

C. formosum N. E. Brown (incl. *C. ecuadorensis* Schlechter, *C. eurystephanum* Malme)

C. longirostrum (K. Schumann) W. D. Stevens

C. tarmense Schlechter (Fig. 1)

C. tiaratum Malme

Cynanchum sect. **Macbridea** (Rafinesque) Liede, sect. et stat. nov. Basionym: *Macbridea* Rafinesque, Amer. Monthly Mag. & Crit. Rev. 3: 99. 1818. TYPE: *M. maritima* (Elliott) Rafinesque.

Seutera Reichenbach, Consp. Regn. Veg. 131. 1828. Nom. illeg. for *Lyonia* Elliott, Sketch Bot. S. Carolina 1: 316. 1817. Nom. rej.

Pattalias S. Watson, Proc. Amer. Acad. Arts 24: 60. 1889. TYPE: *Pattalias palmeri* S. Watson.

Tylodontia Grisebach, Cat. Pl. Cub. 175. 1866. TYPE: *Tylodontia cubensis* Grisebach, Cat. Pl. Cub. 175, nom. nov. for *Astephanus grisebachii* M. Gomez, Perianth 276. 1894.

Plants herbaceous, twining, leaves lanceolate to linear, inflorescences extra-axillary, sciadioid, corolla abaxially glabrous, corona absent or consisting of basally fused staminal and interstaminal parts, with only staminal lobes differentiated, but these exceeding the gynostegium, anther wings centrifugal, stylar head conical, fruits single, fusiform, seeds winged or wingless, smooth or, more frequently, sculptured with tubercles.

As pointed out before (Liede & Meve, 1997), this small section, which is restricted to North America and the Caribbean, cannot be included in *Metastelma*, even though it shares with *Metastelma* the linear leaf shape and the extra-axillary sciadioid inflorescences. However, the species in which the corona is not entirely absent possess the defining character for *Cynanchum*, a corona of fused sta-

minal and interstaminal parts, and all species lack the most reliable character of *Metastelma*, the bearded corolla lobes.

C. angustifolium Persoon

C. grisebachii (M. Gomez) Woodson

C. mulegensis Wiggins

C. palmeri (S. Watson) S. F. Blake

C. peninsulare S. F. Blake

C. utahense (Engelmann) Woodson

C. wrightianum Alain (nom. nov. for *Astephanus urceolatus* Grisebach)

Cynanchum sect. **Microphyllum** Liede, sect. nov.

TYPE: *Cynanchum microphyllum* Kunth, in Humboldt & Bonpland, Nov. Gen. Sp. Pl. 3: 204, t. 236. 1818. TYPE: Ecuador. Prope Pasto, Nov, Bonpland s.n. (holotype, P).

Lianae herbaceae, dichasiale ramificantes, saepe gemmis adventitiis, inflorescentiis extra-axillaribus, floribus minutibus, partibus coronae staminalibus interstaminalibus breve connatis, folliculis singulis, obclavatis.

Plants with a pronouncedly dichasial branching pattern, frequently with adventitious branches and ridged, green shoots. Leaves small (normally not exceeding 1 cm length), shortly petiolate, basally obtuse or very slightly cordate, inflorescences extra-axillary, mostly sciadioid, corolla lobes mostly glabrous, rarely with verrucose trichomes (*C. lutey-nii*), corona of connate staminal and interstaminal parts, only staminal parts differentiated, gynostegium sessile or stipitate, fruits single, obclavate, seeds rather elongate, slightly sculptured.

The delimitation of this difficult section against *Orthosia* is not yet fully understood, as both groups share a dichasial branching pattern, the frequent occurrence of ridged green stems, and an often distichous arrangement of leaves. However, *Orthosia* possesses two characteristic narrowly oblong fruits containing cymbiform seeds, a combination characterizing *Tassadia*, while section *Microphyllum* shares with most other sections of *Cynanchum* a single fusiform follicle containing ovate seeds. Also, inflorescences in *Orthosia*, as in *Tassadia*, are predominantly secondarily axillary (see Liede & Weberling, 1995) while those in section *Microphyllum*, like in most sections of *Cynanchum*, are strictly extra-axillary. Description of inflorescence position has been frequently found to be incorrect in the protologues and needs careful reassessment.

In Ecuador, two members of section *Microphyllum*, *C. brachyphyllum* (with stipitate gynostegium) and *C. velutinum* (with sessile gynostegium), display a dense yellowish indumentum on all vegetative plant parts, a very rare character in the Cy-

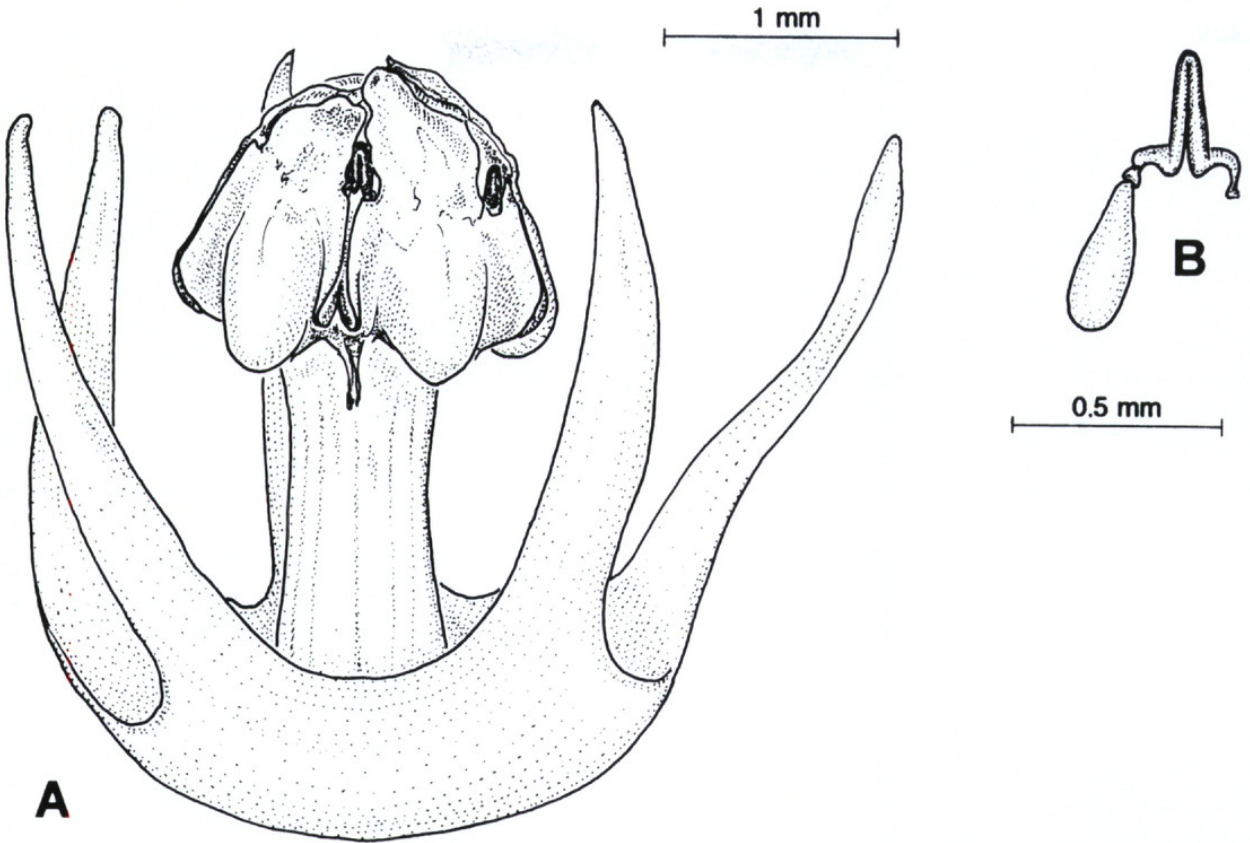


Figure 2. *Cynanchum brachyphyllum* K. Schumann. —A. Corona with gynostegium. —B. Pollinarium. (From Sodiro 107/12, G, drawn by U. Meve.)

nanchum alliance. All species of this section, except for *C. filisepalum* from Costa Rica, live in the Ecuadorian, Peruvian, and Colombian Andes, and, as far as known, at altitudes between 3000 and 4000 m.

- C. bifidum* Liede & Meve
- C. brachyphyllum* K. Schumann (Fig. 2)
- C. chimboracense* Morillo
- C. filisepalum* (Standley) L. O. Williams
- C. intricatum* K. Schumann
- C. longecalycinum* Morillo
- C. luteynii* Morillo
- C. microphyllum* Kunth
- C. veleziae* Morillo
- C. velutinum* Morillo

Cynanchum sect. **Telminostelma** (E. Fournier) Liede, sect. et stat. nov. Basionym: *Telminostelma* E. Fournier in Martius, Fl. Brasil. 6(4): 218. 1885. TYPE: *Telminostelma roulinioides* E. Fournier.

Plants large twiners (5 m tall or taller), leaves large to very large, ovate, basally broadly cordate, inflorescences axillary, frequently richly, at least basally dichasially branched, many-flowered, corolla lobes glabrous or with trichomes, corona of

basally fused staminal and interstaminal parts, either might be differentiated, gynostegium sessile or stipitate, pollinaria characteristically with long translator arms, stylar head flat, fruits, as far as known, very large and thick-walled.

The species of this section are found in Central and northern South America. All species seem to be rare, and most of them are known from a few collections only. This section is particularly interesting for its strong resemblance to Gonolobeae genera, and its thorough study might shed light on the origins of the subtribe Gonolobinae.

This section is taxonomically particularly difficult. Sundell (1981) described *Cynanchum* sect. *Metalepis* (Grisebach) Sundell, based on *Metalepis cubense* Grisebach. Morillo (1991), without considering Sundell's work, recognized the genus *Metalepis*, described several new species, and published two new combinations. At the same time as Sundell, however, Fontella and Schwarz (1981) transferred *Metalepis* to the Gonolobeae following the study of the isosyntype of *M. cubense* (Wright 2799), a placement independently suggested by Liede and Albers (1994). Sundell admits to not having seen the type of his new

section. The other species placed in section *Metalepis* by Sundell (1981), *C. ekmannii* (Malme) Sundell, is recognized as *Asclepiadeae* by Fontella and Schwarz (1981). From this history it emerges that both section *Metalepis* (Grisebach) Sundell and the new descriptions and combinations of Morillo (1991) need correction.

Fontella and Schwarz (1981) suggested placing the remaining species of section *Metalepis* together with the species of section *Roulinia* (Decaisne) Sundell and *Mellichampia* (A. Gray ex S. Watson) Sundell into the genus *Telminostelma* E. Fournier. The type of *Telminostelma*, *T. roulinioides* E. Fournier, constitutes a synonym of *Roulinia parviflora* Decaisne (*C. contrapetalum* Sundell). This species, excluded from subgenus *Mellichampia* by Sundell (1981), is characterized by a corona of fused staminal and interstaminal parts, with the lobes, however, in interstaminal position. The same feature is clearly shown in the drawing of *Metalepis prevostiae* Morillo, even though Morillo (1991) does not even mention this peculiarity in the text. Such a shift in the position of the main corona lobes, although uncommon and problematically functional, is by no means absent in *Cynanchum* (e.g., the *C. lineare* N. E. Brown and *C. danguyanum* Choux groups in Madagascar). Therefore, it is insufficient for the delimitation of an independent genus. *Cynanchum ekmannii*, *C. contrapetalum*, and the species subsumed under *Metalepis* by Morillo (1991) form a well-delimited group of species, which, however, cannot be regarded as an independent genus unless the same status were granted to *Mellichampia* and *Roulinia* as well. As such a split seems undesirable at present, it is suggested here to delimit this group of species as a section under *Cynanchum*. It needs to be mentioned, though, that the inclusion of section *Mellichampia* and section *Roulinia* in a genus *Telminostelma* as suggested by Fontella and Schwarz (1981) seems equally undesirable at present, because section *Roulinia*, in particular, is morphologically quite similar to members of section *Cynanchum* from Africa and Asia. As a corollary to the present discussion it might be noted that the new combination *T. foetidum* (Cavanilles) Fontella & E. A. Schwarz unites *C. foetidum* (Cavanilles) Kunth and *C. montevidense* Sprengel, two very different species from Central and South America, respectively.

Cynanchum brasiliense (Morillo) Liede, comb. nov. Basionym: *Metalepis brasiliense* Morillo, *Ernstia* 1(2): 54. 1991. TYPE: Brazil. Rio de Janeiro: 1876, *Glaziou* 7763 (holotype, C; isotype, LE).

Cynanchum gentryi (Morillo) Liede, comb. nov. Basionym: *Metalepis gentryi* Morillo, *Ernstia* 1(2): 54. 1991. TYPE: Ecuador. Los Ríos: between Mocachi and Palenque, on Estero Peña fiel, 70 m, Jan. 1981, *Gentry* 30991 (holotype, MO; isotype, GB).

Cynanchum gilbertii Liede, nom. et comb. nov. Replaced name: *Metalepis prevostiae* Morillo, *Ernstia* 1(2): 55. 1991. TYPE: French Guyana. Cayenne: Bord de la piste, route de l'Est, km 58, July 1979, *Prevost* 715 (holotype, CAY; isotypes, MY, VEN).

C. albiflorum (Urban) Woodson
C. brasiliense (Morillo) Liede
C. contrapetalum Sundell
C. ekmannii (Malme) Sundell
C. gentryi (Morillo) Liede
C. gilbertii Liede
C. haughtii Woodson
C. marsdenioides Woodson
C. peraffine Woodson
C. subpaniculatum Woodson

Cynanchum* sect. *Roulinia (see Sundell, 1981)

Cynanchum* sect. *Mellichampia (see Sundell, 1981)

Orthosia Decaisne in Candolle, *Prodr.* 8: 526. 1844. TYPE: *Orthosia congesta* (Vellozo) Decaisne.

Amphistelma Grisebach, *Fl. Brit. W. I.*: 417. 1862. TYPE: *Amphistelma leptoclodon* (Decaisne) Grisebach.

Plants forming herbaceous, large, twining tangles, usually dichasially branched, shoots green, ridged, leaves ovate, usually apically acute, basally rounded, inflorescences extra-axillary to axillary, flowers small (usually less than 5 mm diam.), often dark colored, corolla lobes usually glabrous (occasionally with short conical trichomes), corona of basally fused staminal and interstaminal parts, only staminal parts differentiated and normally either tridentate or with a prominent central tooth, follicles two per flower, elongate, seeds very long-ovate, cymbiform, (almost) smooth, only apically winged. Widespread from the Caribbean to northern Argentina.

A particularly large and difficult assemblage is formed by the species that have been—or could be—attributed to *Orthosia* and *Amphistelma*. While *Orthosia* is usually easily recognizable by its axillary inflorescences, this character is not prominent in *Amphistelma*. However, intermediates between extra-axillary and axillary inflorescences have been found occasionally in American *Cynanchum* (sect.

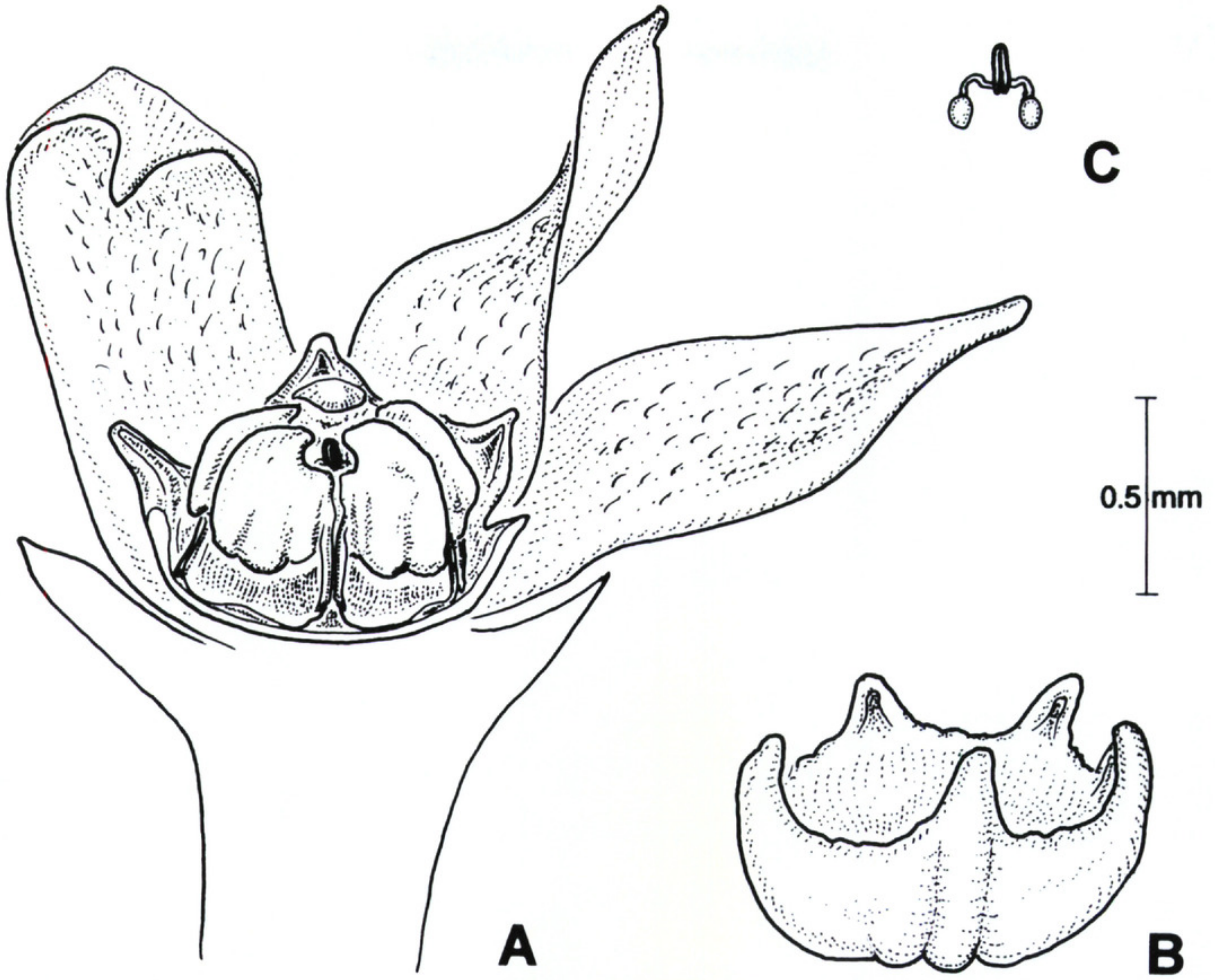


Figure 3. *Cynanchum purpureiflorum* Morillo. —A. Flower. —B. Corona. —C. Pollinarium. (From Steyermark & Dunsterville 98448, US, drawn by U. Meve.)

Roulinia; Liede & Weberling, 1995), so that this character cannot be used as “the” generic character of *Orthosia*. Nevertheless, both groups are characterized by a tendency toward leaf reduction, staminal corona lobes with a pointed central tooth, twinned follicles with almost the same diameter over their entire length, and cymbiform, only apically winged, smooth seeds. To my understanding, *Orthosia* including *Amphistelma* thus forms a natural group of species not closely related to *Cynanchum*. In contrast, corona structure and fruit and seed morphology suggest that *Orthosia* represents a sister genus to *Tassadia* Decaisne. This placement is reflected by Fontella and Schwarz (1982), who placed one of the most prominent *Orthosia* species, *O. melantha* Malme of southwestern South America, in *Tassadia*. However, the characteristic inflorescence structure and the usually double corona separate *Tassadia* from *Orthosia*. On the other hand, delimitation of some *Orthosia* against species of *Cynanchum* sect. *Microphyllum* is difficult in many cases, especially if the material does not show flowers, fruits, and seeds. Furthermore, I ex-

pect a high degree of synonymy among these taxa, because *Orthosia* species seem to be by far more widespread than their *Cynanchum* counterparts. For these reasons, and in order not to upset the already difficult nomenclature of American *Cynanchinae*, the numerous new combinations necessary if *Orthosia* is recognized as a genus are not performed here. Rather, a checklist of existing names and of species presently included in other genera is presented to create a basis for a future revision of this difficult group.

Orthosia arenosa Decaisne

O. bahiensis Schlechter

O. congesta (Vellozo) Decaisne (incl. *O. decaisnei* E. Fournier, *O. urceolata* E. Fournier)

O. dusenii (Malme) Fontella

O. ecuadoriensis Schlechter

O. eichleri E. Fournier

O. grandis Handel-Mazzetti

O. itatiaiensis Malme

O. kunthii Decaisne (incl. *A. graminifolium* Grisebach, *C. lanceolatum* Kunth, *C. bonplandianum*

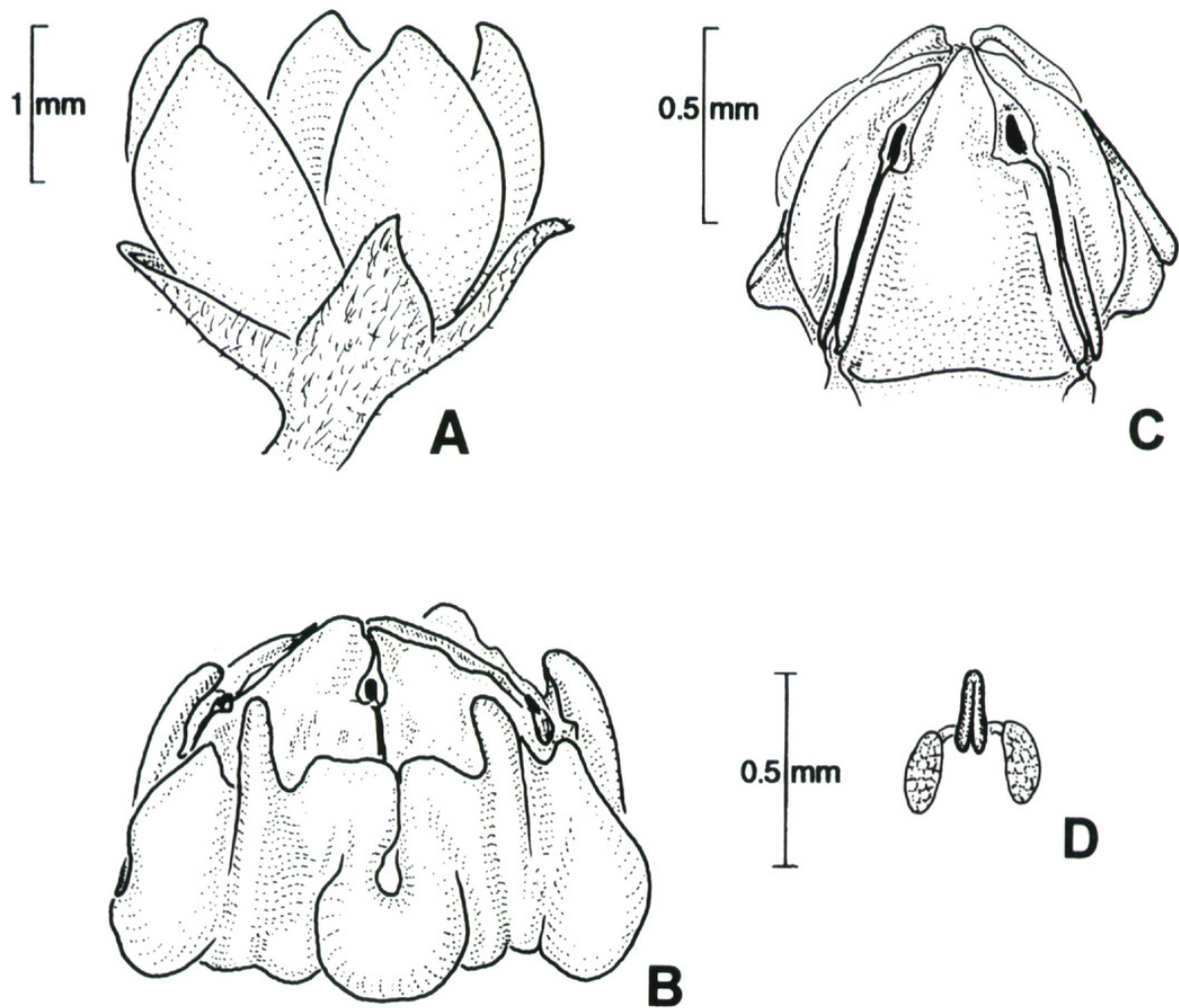


Figure 4. *Cynanchum wurdackii* Morillo. —A. Flower. —B. Gynostegium with corona. —C. Gynostegium. —D. Pollinarium. (From Erikson 59107, AAU, drawn by U. Meve.)

Roemer & Schultes, *Metastelma angustifolium* Turczaninow, *C. wigginsii* Shinners)

- O. latipes* Malme
- O. loandensis* Fontella & Valente
- O. mollis* Schlechter
- O. multiflora* E. Fournier
- O. paniculata* Klotzsch
- O. serpyllifolia* (Kunth) Decaisne
- O. stenophylla* Schlechter
- O. suberosa* Decaisne
- O. tarmensis* Schlechter
- O. thymifolia* Schlechter
- O. tomentosa* (E. Fournier) Malme
- O. trianaei* Schlechter
- O. umbrosa* Decaisne
- Amphistelma atrorubens* Schlechter
- A. ephedroides* Grisebach
- A. ferrugineum* E. Fournier
- A. filiforme* Grisebach
- A. leptocladon* (Decaisne) Schlechter
- A. parviflorum* E. Fournier
- A. pearcei* Rusby

- A. riedelii* E. Fournier
- A. scoparium* Nuttall
- A. selloanum* E. Fournier
- Cynanchum balslevii* Morillo
- C. beckii* Morillo
- C. bonariense* (Decaisne) T. Meyer
- C. campii* Morillo
- C. carmensemiliae* Morillo
- C. cassythoides* Suessenguth
- C. dombeyanum* (Decaisne) Morillo
- C. dorrii* Morillo
- C. ellemannii* Morillo
- C. fernandezii* Morillo
- C. funale* Poiret
- C. glaberrimum* L. O. Williams
- C. isidrensis* Morillo
- C. meridense* Morillo
- C. miserum* L. O. Williams
- C. pichinchense* K. Schumann
- C. purpureiflorum* Morillo (Fig. 3)
- C. samuelsonii* Malme
- C. sepium* (Decaisne) Standley

C. sodiroi K. Schumann
C. stannardii Morillo
C. stenospira Schlechter
C. tamense Morillo
C. trifurcatum (Grisebach) Lillo
C. wurdackii Morillo (Fig. 4)
Metastelma pubescens (Greenman) W. D. Stevens
M. rariflorum Schlechter
M. retinaculatum Schlechter
M. rubens (L. O. Williams) W. D. Stevens
Tassadia subulata (Vellozo) Fontella & E. A. Schwarz [incl. *O. melantha* (Decaisne) Malme]

UNCERTAIN SPECIES

For some species, the affinity could not be determined with certainty, mostly due to lacking or incomplete material. These species include:

C. cardozoi Morillo
C. caudigerum R. W. Holm
C. confusum R. W. Holm
C. ekmanii Alain (nom. and comb. nov. for *Astephanus schlechterianus* Urban; non *C. ekmannii* (Malme) Sundell)
C. erikseniae Morillo
C. fasciculiflorum Morillo
C. granatense (Baillon) Morillo
C. guanchezii Morillo
C. leucophellum Diels
C. mariquitense Mutis
C. microphyllum Rafinesque
C. pallidum Sessé & Moçño
C. robertii (S. Moore) Malme
C. rusbyi Malme
C. tabascence Sessé & Moçño
C. trollii Liede & Meve ined.
C. unguiculatum Ruiz & Pavón
C. uniflorum Sessé & Moçño

C. violator R. W. Holm

EXCLUDED SPECIES

Cynanchum harlingii Morillo probably represents a species of *Blepharodon* close to *B. mucronatum* Decaisne.

C. jenmanni Morillo belongs to the subtribe Gonolobinae.

C. sarcostemma Lillo

Acknowledgments. For long-term loan of specimens, I owe gratitude to the directors of the institutions listed in Materials and Methods. The DFG has supported my Asclepiadaceae work financially (grants LI 496/1–4).

Literature Cited

- Fontella, J. P. & E. A. Schwarz. 1981. Estudos em Asclepiadaceae 12: Considerações sobre os gêneros *Roulinia* Decne. (non Brongn.) e *Rouliniella* Vail. Bol. Mus. Bot. Munic. 45: 1–11.
- & ———. 1982. Contribuição ao estudo das Asclepiadaceae Brasilieras, XVII. Novos sinônimos e novas combinações. Bol. Mus. Bot. Munic. 57: 1–8.
- Liede, S. 1996. *Cynanchum*–*Rhodostegiella*–*Vincetoxicum*–*Tylophora*: New considerations on an old problem. Taxon 45: 193–211.
- & F. Albers. 1994. Tribal disposition of Asclepiadaceae genera. Taxon 43: 201–231.
- & U. Meve. 1997. Some clarifications, new species, and new combinations in American Cynanchinae (Asclepiadaceae). Novon 7: 38–45.
- & F. Weberling. 1995. Inflorescence structure in Asclepiadaceae. Pl. Syst. Evol. 197: 99–109.
- Morillo, G. N. 1991. Three new species and two new combinations in *Metalepis* Griseb. (Asclepiadaceae). Ernstia 1(2): 53–60.
- Sundell, E. 1981. The New World species of *Cynanchum* subgenus *Mellichampia* (Asclepiadaceae). Evolutionary Monographs 5: 1–62.
- Woodson, R. E. 1941. The North American Asclepiadaceae. Ann. Missouri Bot. Gard. 28: 193–244.



Liede, Sigrid. 1997. "American Cynanchum (Asclepiadaceae)---A preliminary infrageneric classification." *Novon a journal of botanical nomenclature from the Missouri Botanical Garden* 7, 172–181. <https://doi.org/10.2307/3392191>.

View This Item Online: <https://www.biodiversitylibrary.org/item/14667>

DOI: <https://doi.org/10.2307/3392191>

Permalink: <https://www.biodiversitylibrary.org/partpdf/27009>

Holding Institution

Missouri Botanical Garden, Peter H. Raven Library

Sponsored by

Missouri Botanical Garden

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.