Loasoideae in Eastern South America and on Hispaniola: Names, Types and a Key

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Abstract:
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A synopsis of the Loasoideae of eastern South American and Carribean Loasoideae is presented. All names are listed and typified and the valid names selected. Four genera, *Cajophora*, *Blumenbachia*, *Loasa* and *Klaprothia* are currently recognized in the region. They fall into a total of 14 species. Illustrations of the rarely illustrated taxa and a key to all know taxa are provided.

Zusammenfassung:
Der Artikel bietet einen Überblick über die Loasoideae des östlichen Südamerika und der Karibik. Alle Namen werden aufgeführt und typifiziert und die gültigen Namen werden übernommen. Vier Gattungen, *Cajophora*, *Blumenbachia*, *Loasa* und *Klaprothia* sind augenblicklich aus der Region bekannt. Sie umfassen insgesamt 14 Arten. Die selten abgebildeten Taxa werden mit Zeichnungen vorgestellt und ein Schlüssel für alle bekannten Arten wird vorgeschlagen.

Introduction

The Brazilian and Caribbean representatives of Loasaceae/Loasoideae are closely related, or, to put it differently, the only species of *Loasa* on Sto Domingo is closely related only to a Brazilian group in the genus. It is therefore convenient to treat these 14 species of Loasoideae together.

Taxonomically this is not a very problematical group in South American Loasoideae. Nevertheless, the last key to Brazilian Loasaceae was published as long ago as 1889 (URBAN 1889). Neither have new keys been provided to include the taxa published since, nor has a lectotypification been suggested for the taxa which require it. This paper is going to provide both. It is a preliminary to an on-going study of South American Loasoideae, the ultimate end of which is a revision of the entire subfamily and a generic rearrangement.

This paper adopts the generic limits of GILG (1894) and URBAN & GILG (1900) as the most recent and generally accepted subdivision for Loasoideae rather than the delimitation of URBAN (1889).

Thus there are four genera of Loasoideae in this region: The first genus is represented with only one species: *Klaprothia fasciculata* (K.Presl) Poston has been recently typified and illustrated and will not be discussed here. It is a widespread weed of tropical South and Central America and of some Caribbean and Pacific Island.

The other three genera, *Blumenbachia* Schrad., *Loasa* Adans. and *Cajophora* K.Presl are readily distinguished both vegetatively and by fruit characters. *Cajophora* has its centre of diversity very clearly in the central and south central Andes (central Peru to Bolivia), but two of the six sections of the genus, comprising 3 of the approximately 50 species are retricted to eastern South America. *Loasa* has two distinctive centers of diversity with more than 60 species each: The most important one is Chile, followed by the Andes between central Peru and Colombia. We find a total of only 6 very peculiar species species of *Loasa* in eastern Brazil and one on Hispaniola. The small genus *Blumenbachia* with its only four species has a very different distributional pattern: It ranges from Argentina over Uruguay into southern Brazil. One species, *B. catarinensis*, is endemic to southern Brazil.

Key to the genera (eastern South American members only)

1 Flowers tetramerous, less than 5 mm in diameter, fruit twisted, clavate, less than 5 mm in diameter ***Klaprothia fasciculata***
– Flowers pentamerous, 1 cm or more in diameter, fruit twisted or straight, more than 1 cm in diameter 2
2 Inflorescences with 6–40 flowers, always ebracteate or bracts linear and very small; fruit straight 3. ***Loasa***
– Inflorescences always with foliose, sometimes widely ovate bracts, or flowers apparently axillary, fruit always twisted 3
3 Flowers borne singly in the leaf axils; inferior ovary with two linear bracts at it base; fruit a globose capsule with spongiose parenchyma in its walls 1. ***Blumenbachia***
– Flowers in terminal or apparently lateral inflorescences (displaced) with 2–20 flowers; fruit without spongiose parenchyma in its walls; elliptical in outline 4
4 Flowers in terminal cymoid inflorescence; leaves ovate, pinnatisect with pinnate venation 2a. ***Cajophora*** sect. ***Bicallosae***
– Flowers in lateral dichasia (morphologically terminal but overtopped by branch from one subtending leaf), leaves subcircular to reniform, subpalmately lobed, with three leaf veins from base, lateral ones forked about 1–2 cm from base 2b. ***Cajophora*** sect.***Gripidea***

1. ***Blumenbachia*** Schrad., Goett. Gel. Anz. 3(171): 1706. 1825 ≡ *Blumenbachia* Schrad. sect. *Blumenbachia* Urban. In Martius 1889: 213. Type species: *Blumenbachia insignis* Schrad.

The taxa currently recognized in this genus are very closely related and differ largely in the length of the peduncle, in the degree of leaf dissection and in overall size. The flowers of all four species are indistinguishable. Their floral scales are rectangular, have a bright red back and three papillose filaments near their base.

1 Pedicel much shorter than petiole of subtending leaf ***B. latifolia***
– Pedicel longer than petiole of subtending leaf 2
2 Plant decumbent; leaves trifoliolate, rarely longer than 3–4 cm ***B. catarinensis***
– Plant erect from decumbent base, leafes palmately divided and then further dissected, lobes deeply serrate or pinatisect 3
3 Sepals narrowly lanceolate, entire ***B. insignis***
– Sepals ovate, with serrate margin ***B. hieronymi***

Blumenbachia insignis Schrad., Gött. Gel. Anz. 3(171): 1706. 1825. Lectotype: "Ex Horto Gottingensis, *Schrader*" (G-DC!).
= *Loasa palmata* Sprengel, Syst. 2: 601. 1831. Lectotype (here designated): "Monte Video, *Sello*, anno 1825" (K!).
= *Blumenbachia palmata* Cambess. In St. Hilaire, Fl. Bras. Merid. 2: 208. 1829. Lectotype (here designated): *St. Hilaire cat. nr. 2042 bis* (P!; iso: P!, P!, as designated on sheets).
= *Blumenbachia multifida* Hook.f., Bot. Mag. 64: Tab. 3599. 1860. Holotype: Argentina. Buenos Aires. Pampas of Buenos Aires, *Tweedie s.n.* (K!).
– *Blumenbachia parviflora* Gillies ex Hook. et. Arn. In Hooker & Arnott, Bot. Misc. 3: 327. 1836. Nomen nudum.

Fig. 1 a–c.
Illustrations: SCHRADER 1827: 6, tab. 1; HOOKER 1860: Tab. 3599; PEREZ-MOREAU & CRESPO 1988: Fig. 157 a, b; CABRERA 1965: Fig 77 a–d.

Typification of *B. insignis* is not quite simple, as the description was explicitly based on cultivated plants. However, there is a specimen in G-DC with a label stating that the plant was sent by Schrader and came from the Botanischer Garten in Göttingen. This is here chosen as a lectotype. It also corresponds very well to the plate, which was published by SCHRADER in 1827 (and is not, therefore, part of the protologue). Both *Loasa palmata* Spreng. and *B. palmata* Cambess. can be shown to be identical to *B. insignis*. Incidentally, the type specimens of both these species also came from Uruguay, so they even refer to the same form of *B. insignis*: *Blumenbachia insignis* in its typical form has rather shallowly lobed leaf lobes, is sparsely urticant and seems to be a trailing rather than erect plant. What was described as *B. multifida* by Hooker is more densely setose, has deeply dissected leaves and is a strictly erect herb from a decumbent base. There is, however, sufficient morphological overlap in western Uruguay and Buenos Aires in Argentina to follow URBAN (1889: 212–213) in reducing *B. multifida* to syonymy: There are no hard characters to distinguish the two.

Central Argentina–southern Brazil.

Blumenbachia hieronymi Urban, Eichl. Bot. Jahrb. 3: 249. 1884. Lectotype (here designated): Cult. in Berlin, semina misit Hieronymus, legit *Urban* anno 1884 (Z!).

Illustration: Fig. 1 d–i.

B. hieronymi was also described from cultivation. As herbarium material that may have been in B has perished a specimen preserved at Z is here selected as the lectotype.

B. hieronymi is very close to *B. insignis* and differs only in its wider sepals and wider leaf lobes. It seems to be restricted to a narrow area in Córdoba, but I have only seen two collections from the wild. Field studies would be required to verify the actual taxonomic level appropriate.

Argentina: Córdoba.

Blumenbachia latifolia Cambess. In St. Hilarie, Fl. Bras. Merid. 2: 209, tab 118. 1829. Lectotype: Tab. 118, l.c. Epitype: Brazil. Sao Paulo, *St. Hilaire 1064* (P!).
– *Blumenbachia urens* (Vell.) Urban. In Martius, Fl. Bras. 13(3): 213, tab. 57. 1889. Basionym: *Loasa urens* Vell., Flora Fluminensis 5: 212, tab. 98a. 1831. Lectotype: Tab. 98a, l.c. Nom. illeg. (non *Loasa urens* Jacq., Obs. Bot. 2: 15. 1784).

Illustrations: URBAN 1889: Tab. 57; SANTOS & FROMM 1985: Est. 2; CABRERA 1965: Fig 77 e–j.

Blumenbachia urens is the commonly used name of the taxon. For formal reasons, however, the name *B. latifolia* Cambess. has priority.

This is a highly variable taxon with regards to size and the name *B. latifolia* is rather unfortunate, as the St. Hilaire specimens really are atypically large. Yet the species is readily recognized by its very short pedicels, which never exceed the petiole. It seems that the plant frequently produces underdeveloped, possibly autogamous flowers, but studies on its floral biology are still wanting.

Central Argentina–south-eastern Brazil.

Blumenbachia catharinensis Urb. & Gilg, Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 71(1): 355. 1900. Lectotype: Brazil. Sta Catarina: Along creeks near the camp in the Serra do Oratorio, *Ule 1486* (HBG!; iso: B+, photo G!).

Fig. 1 j, k.
Illustration: SANTOS & FROMM 1985: Est. 3.

Urban & Gilg saw both the set of Ule's collections in B and HBG. While the set in B perished, the set in HBG is still in existence.

B. catarinensis is the smallest of the four species, growing in very moist situations. It is a weak, decumbent or pendent herb. It shows an odd combination of the trifoliolate leaves of *B. latifolia* with the long pedicels of *B. insignis*, but is in all parts much smaller than any of the two.

South-eastern Brazil.

2. *Cajophora* K.Presl. Type species: *Cajophora contorta* (Desr.) Presl

2a. *Cajophora* K.Presl sect. ***Bicallosae*** Urb. & Gilg. In Engler & Prantl, Nat. Pflanzenfam. 3(6a): 119. 1894 ≡ *Blumenbachia* Schrad. sect. *Cajophora* Urb. In Martius, Flora Brasiliensis 13(3): 213. 1889. Type species (here designated): *Cajophora arechavaletae* (Urb.) Urb. & Gilg.

C. arechavaletae is here selected as type species, as it matches the sections circumscription more closely than the other species, *C. stenocarpa* (see WEIGEND 1997). Sect. *Bicallosae* is thus monotypical and restricted to Uruguay and southern Brazil. Its flowers and fruits are closely matched by other species of *Cajophora*, and it is isolated primarily by its atypical vegetative habit.

Cajophora arechavaletae (Urb.) Urb. & Gilg., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 76(1): 335. 1900. Basionym: *Blumenbachia arechavaletae* Urb. In Martius, Fl. Bras. 13(3): 217. Lectotype: Uruguay, Montevideo, Mount Sta Lucia, in sandy ground, *Arechavaleta 3425* (ZT; iso: P, ZT, as designated on sheets).

Fig. 2 a–h.

This is a rarely collected and very odd representative of *Cajopora*. It also is the only species from Uruguay.

2b. ***Cajophora*** K.Presl sect. ***Gripidea*** Urb. ≡ *Blumenbachia* Schrad. sect. *Gripidea* Urb. In Martius, Fl. Bras. 13(3): 218. 1889.
= *Cajophora* K.Presl sect. *Bialatae* Urb. & Gilg. In Engler & Prantl, Nat. Pflanzenfam. 3(6a): 119. 1894. Type species: *Cajophora scabra* (Miers) Urb. & Gilg.

The sectional name which Urban & Gilg chose when removing the group from *Blumenbachia* into *Cajophora* has to be replaced by the older sectional name *Gripidea*.

The two species currently recognized in this section are very similar to each other. However, as Santos & Trinta described, the trichome cover of the ovaries is a rather reliable character in most specimens. Thorough field studies would be necessary to really evaluate the adequate taxonomic level.

1 Ovary densely covered with trichomes and setae, capsule elliptical ***C. eichleri***
– Ovary densely covered with very short trichomes and without setae, capsule narrowly eliptical ***C. scabra***

Cajophora scabra (Miers) Urb. & Gilg. In Engler & Prantl, Nat. Pflanzenfam. 3(6a): 121. 1893 ≡ *Blumenbachia scabra* (Miers) Urb. In Martius, Fl. Bras. 13(3): 219, tab. 16. 1889. Basionym: *Gripidea scabra* Miers, Trans. Linn. Soc. Bot. 25: 235, tab. 28. 1866. Holotype: Brazil. Sao Paulo: Corvo, between Curitiba and Paranagua, *Weir 465* (K!; iso: US!).

Fig. 3 c, d.
Illustration: URBAN 1889: 56; SANTOS & FROMM 1985: Est. 5.

Brazil: Paraná, Sao Paulo, Sta Catarina.

Cajophora eichleri Urb. & Gilg. In Engler & Prantl, Nat. Pflanzenfam. 3(6a): 121. 1893. Basionym: *Blumenbachia eichleri* Urb. In Martius, Fl. Bras. 13(3): 218, tab. 55. 1889. Holotype: Brazil. Sta Catarina: In Velha near Blumenau, *Schenk 175* (B+). Lectotype: Tab. 55, l.c.
= *Cajophora scabra* (Miers) Urb. & Gilg var. *schenkiana* Urb. & Gilg., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 76(1): 243. 1900. Basionym: *Blumenbachia scabra* (Miers) Urb. var. *schenkiana* Urb. In Martius, Fl. Bras. 13(3): 219. 1889. Holotype: Brazil. Sta Catarina. Serra do Mar, Joinvile, *Schenk 1255* (B+). Neotype (here designated): Brazil. Sta Catarina. Esta. Dona Francisca, Joinvile, 550 m, *Reitz & Klein 5600* (US! ; iso: NY!).
– *Blumenbachia aspera* (Vell.) Urb. In Martius, Fl. Bras. 13(3): 221. 1889 ≡ *Gripidea asperata* Miers, Trans. Linn. Soc. Bot. 25: 235. 1866. Basionym: *Mentzelia aspera* Vell. Flora Fluminensis 5: 224, tab. 96. 1825. Lectotype: Tab. 96, l.c. Nom. illeg. (non *Mentzelia aspera* L., Sp. pl. 1: 516. 1753).

Illustration: URBAN 1889: Tab. 55; SANTOS & FROMM 1985: Est. 4.

Brazil: Paraná, Sta Catarina, Rio Grande do Sul.

3. ***Loasa*** Adans. Type species: *Loasa acanthifolia* Desr.

In eastern Brazil and on Sto Domingo a small group of *Loasas* is found, all of which share important characters, such as ebracteate inflorescences (bracteate in all other *Loasas*), small white flowers, very short, globose, sometimes semisuperior capsules and tuberculate seeds.

Three series have been described: *Parviflorae* Urb. & Gilg, *Corymbosae* Urb. & Gilg and *Pusillae* Urb. & Gilg. While the latter two include only one species each (*L. uleana* and *L. rostrata* respectively), the series *Parviflorae* includes the remaining four. I feel that *L. parviflora* stands quite apart from the rest and that *L. plumierii* is actually rather isolated both florally and carpologically. Brazilian members of *Loasa* thus fall into 5 distinctive groups, i.e. only two of them, *L. rupestris* and *L. gilgiana* are closely related. But the relationships within the Loasoideae, both infrageneric and suprageneric, will be discussed in detail in a future paper.

1 Leaves subcircular in outline, 15–25 cm long and wide, strictly opposite and equal; inflorescences repeatedly dichasial, with numerous flowers ***L. uleana***
– Leaves elliptical or oblong, considerably longer than wide, rarely exceeding 10–15 cm in length, leaves alternate, rarely in very unequal pairs (one leaf 3–10 times larger than the other, only *L. rostrata*); inflorescences simple or branched, but never dichasial with terminal flowers in node, often monochasial 2
2 Inflorescences alternating with two foliage leaves 3
– Inflorescences in axil of foliage leaf or terminal 4
3 Fruit a burr (i.e. practically indehiscent and densely covered with tack-shaped trichomes); dorsal filaments of floral scales and the two staminodia of each complex with well developed, but sterile anthers at their apices, only 3–5 stamina per fascicle ***L. plumierii***
– Fruit opening with apical valves and covered with scabrid trichomes; dorsal filaments of floral scales and the two staminodia in each complex without sterile anthers, filiform, 7–10 stamina per fascicle ***L. parviflora***
4 Inflorescences apparently axillary, foliose; fruit long beaked ***L. rostrata***
– Inflorescence terminal, with long, leafless stalk; fruit globose 5
5 Inflorescence stalk not thickened at base; leaf veins numerous, parallel, all ending in teeth, margin shallowly and regularly lobulate ***L. gilgiana***
– Infloresecence stalk abruptly thickened at base; leaf veins in 2–4 pairs, divergent, upper ones not ending in teeth, margin irregularly serrate and lobate ***L. rupestris***

Loasa parviflora Schrad. ex DC., Prodr. Syst. Nat. 3: 342. 1828. Lectotype: "Brasilia" (G-DC!), probably collected by Sello and belonging to one collection with "Rio de Janeiro, on rock by the ...(?) of the Aequeduct, 16th of February 1815", *Sello s.n.* (BM!).
= *Loasa brasiliensis* Colla, Herb. pedem. 2: 451. 1834. Holotype: Brazil. Rio de Janeiro, *Martius s.n.* anno 1827 (Turin!; iso: E!).

Illustration: URBAN 1889: Tab. 54.

It is unproblematical to choose the specimen at G-DC as the lectotype. There are, however, numerous collections by Sello in diverse herbaria and it is not possible to determine which ones belong to the same set and could be considered as isotypes. There does not seem to be any material at Göttingen.

This species is the only relatively widespread *Loasa* in Brazil and there is weak character differentiation between the northern and the southern forms of the species. *L. parviflora* is unmistakeble as its inflorescences seem to arise freely from the stem and alternate with two foliage leaves. This growth pattern is only shared by *Loasa plumierii* from Hispaniola.

Brazil: Rio de Janeiro to Bahia.

Loasa rupestris Gardner, Ic. Pl. 7: Tab. 5158. 1844. Lectotype: Brazil. Bahia: Between Cachoeiras & Maramleiro, *Gardner 2413* (BM!; iso: CGE!, OXF!).

Illustration: GARDNER 1844: Tab. 5158.

Differs from *L. parviflora* by its terminal inflorescences, which are overtopped by a new branch arising from the uppermost foliage leaves in the following season. This character is shared by *L. gilgiana*, which, however, has numerous parallel leaf veins and a shallowly serrate (not lobed) leaf margin.

Brazil: Bahia to Ceará.

Loasa gilgiana Urb., Bot. Jahrb. Syst. 42: 231. 1909. Holotype: Brazil. Bahia: Rocks near Maracás, 1000 m, *Ule 6973* (B+, photo F!, neg. nr. 10193; iso: HBG!).

A label reading "Typus" can be seen on the photograph of the B specimen so in this particular case a type was designated by Urban and the HBG specimen is an isotype. Apparently a very narrowly endemic species restricted to the region where the type came from. It is clearly more closely related to *L. rupestris* than to any other species.

Brazil: Bahia, Maracás region.

Loasa rostrata Urb. In Martius, Fl. Bras. 13(3): 208. 1889. Lectotype (here designated): Brazil. Goyaz: In clefts of limestone rocks at Lapí near Arrayas, *Gardner 3746* (BM!; iso: CGE!, G!, photo F!, neg. nr. 24174, OXF!).

Fig. 3.

The type set consists of tiny plants barely 5 cm tall, which prompted the series name *Pusillae* Urb. & Gilg. There now are a few more recent collections which show that the species can grow up to 35 cm tall. The inflorescences at first glance seem to be axillary in this species, but are actually terminal with only one axillary bud developing into the new main axis. The more than half superior capsules which open with three long protracted valves make the species unmistakeable.

Brazil: Goyaz, Minas Gerais.

Loasa uleana Urb. & Gilg, Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 76(1): 255. Lectotype: Brazil. Rio de Janeiro. Serra do Itatiaia, 1500 m, *Ule 3713* (HBG; iso: B+, photo F!, neg. nr. 10222).

Fig. 4

L. uleana remains amongst the most enigmatic of *Loasas*. It was only collected once by Ule at the end of the last century. The type specimen lacks mature fruit and thus only flower characters are known. The plant has strictly opposite leaves, as so many Andean *Loasas* but altogether unlike the other Brazilian members of *Loasa*, which have alternate leaves. The inflorescence is terminal, very dense and multiply dichasial. This prompted URBAN & GILG (1900: 255) to found a separate series "*Corymbosae*" for it.

Brazil: Rio de Janeiro, Serra do Itatiaia.

Loasa plumierii Urb., Ber. D. Bot. Ges. 28: 515. 1910. Lectotype (here designated): Sto Domingo. Cantana, forests rich in undergrowth near Tireo & Jajo, 1200 m, *v. Türckheim* (BR!; iso: B+).

Illustration: LIOGIER 1981: Fig. 76.

Florally *L. plumierii* is amongst the most primitive Loasoideae. It has free, though sterile anthers at the tip of all five elements of each staminodial complex. It is restricted to Hispaniola and the only member of Loasoideae/Loaseae on any Caribbean Island.

Haiti, Domenican Republic.

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Fig. 1: *Blumenbachia insignis* (*Sparre 235*): a habit; b bract; c sepal. *B. hieronymi*, cult. at M: d leaf; e flower; f sepal; g petal; h scale, lateral view; i staminode. *B. catarinensis* (*Smith & Klein 7832*): j habit; k sepal.

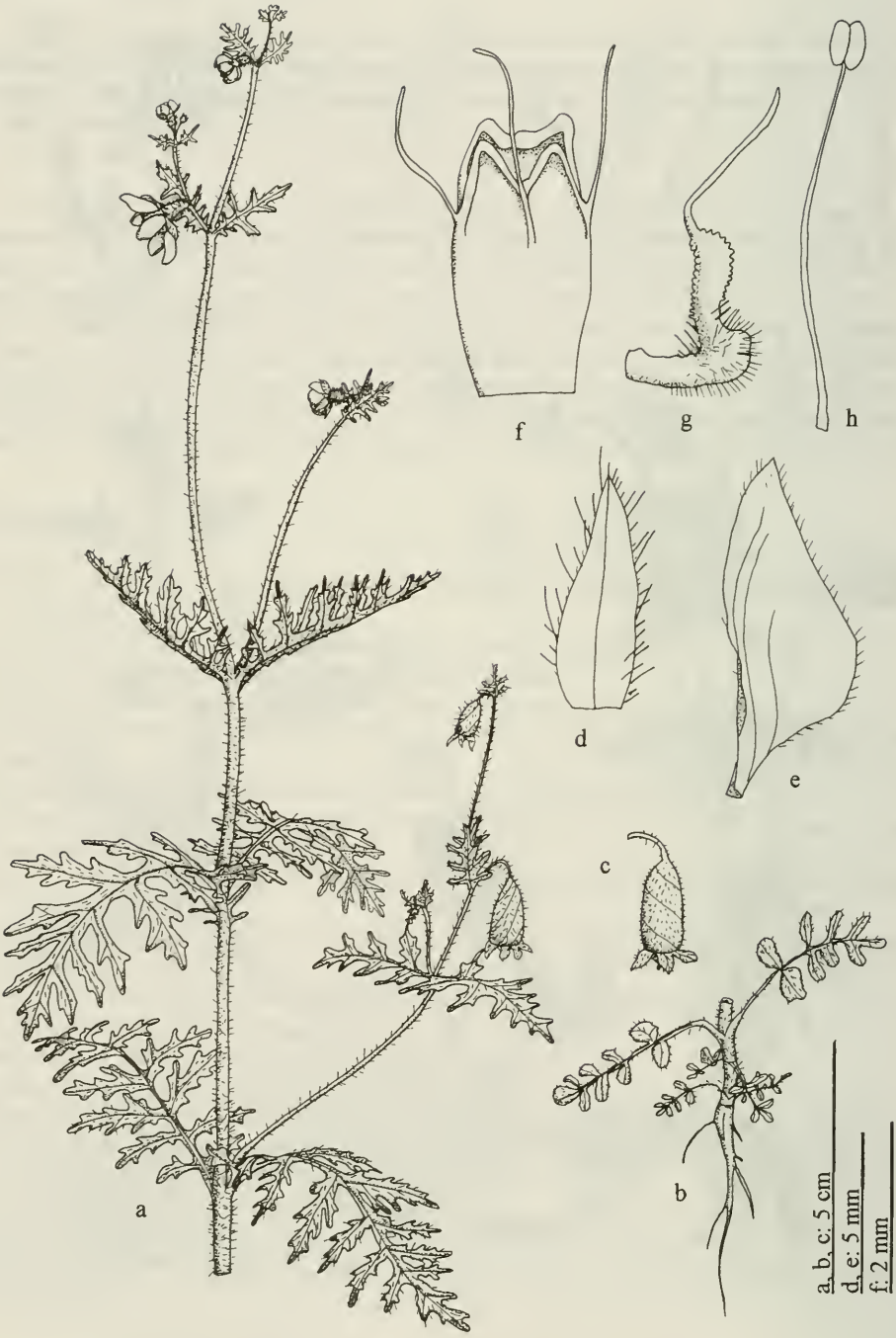

Fig. 2: *Cajophora arechavaletae* (*Arechavaleta 3425*): a habit; b root; c fruit; d sepal; e petal; f scale, dorsal view; g staminode; h stamen.

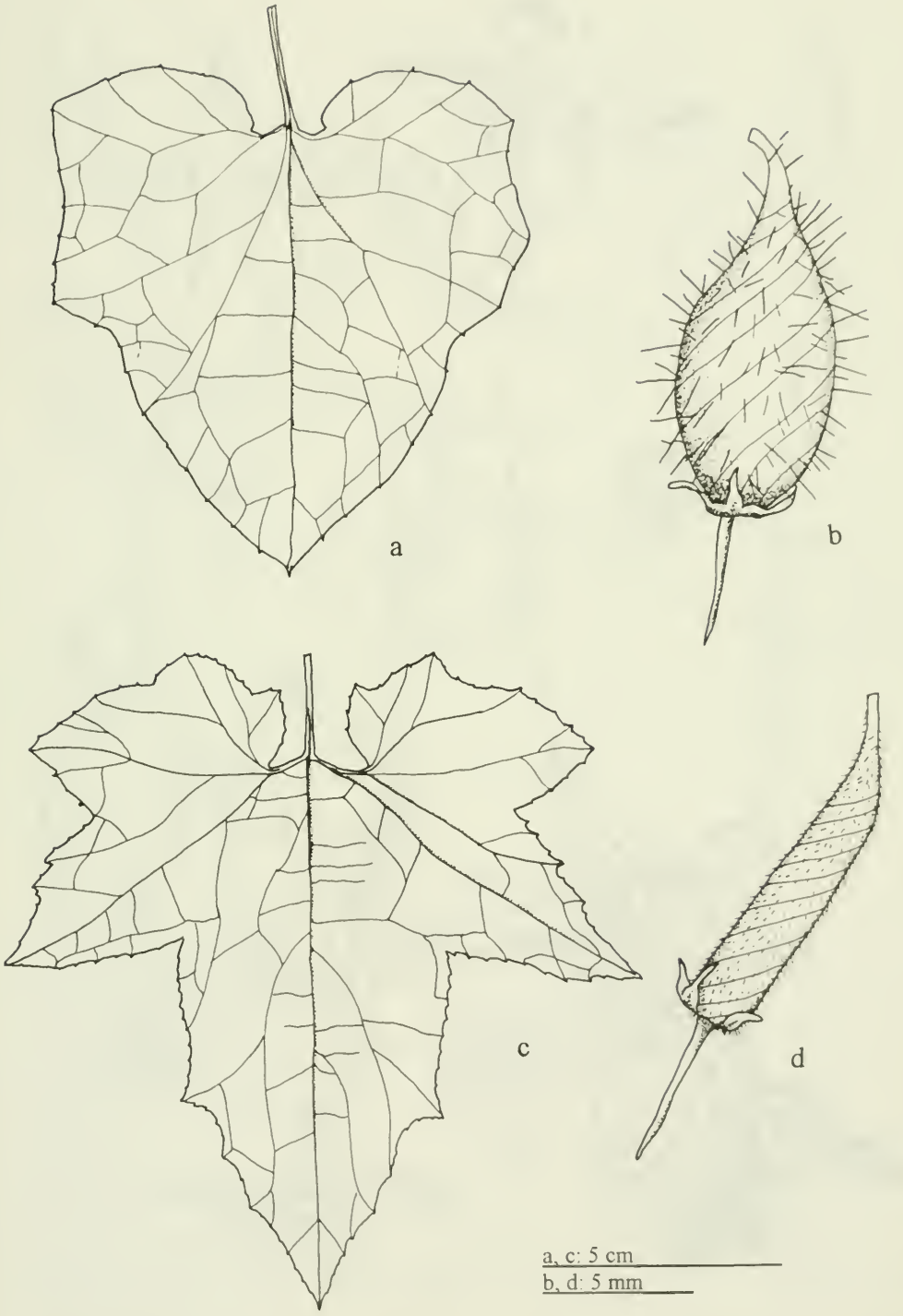

Fig. 3: *Cajophora eichleri* (*Hatschbach 41572*): a leaf; b fruit. *C. scabra* (*Hatschbach 16334*): c leaf; d fruit.

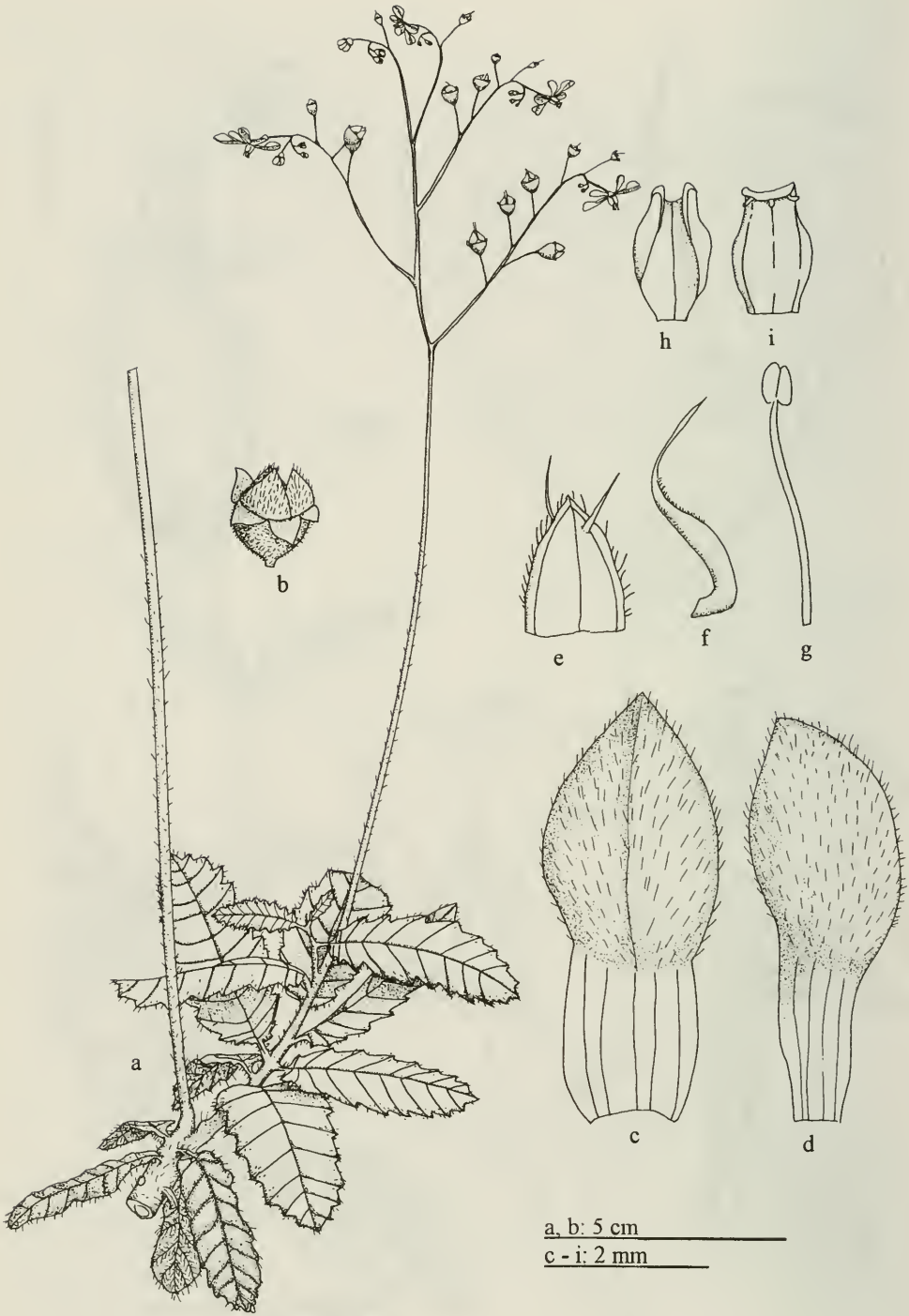

Fig. 4: *Loasa gilgiana* (*Dos Santos & Mayo 298*): a habit; b fruit; c petal dorsal; d petal lateral; e sepal; f staminode; g stamen; h scale ventral; i dorsal.

Fig. 5: *Loasa rostrata* (*Andersson 9219*): a habit; b fruit; c sepal; d petal; e scale dorsal; f staminode; g stamen.

Fig. 6: *Loasa uleana* (*Ule 3713*): a habit; b sepal; c petal; d scale dorsal; e staminode; f stamen.