

Compositae “miscellaneous small tribes”



Compositae “miscellaneous small tribes”: 17

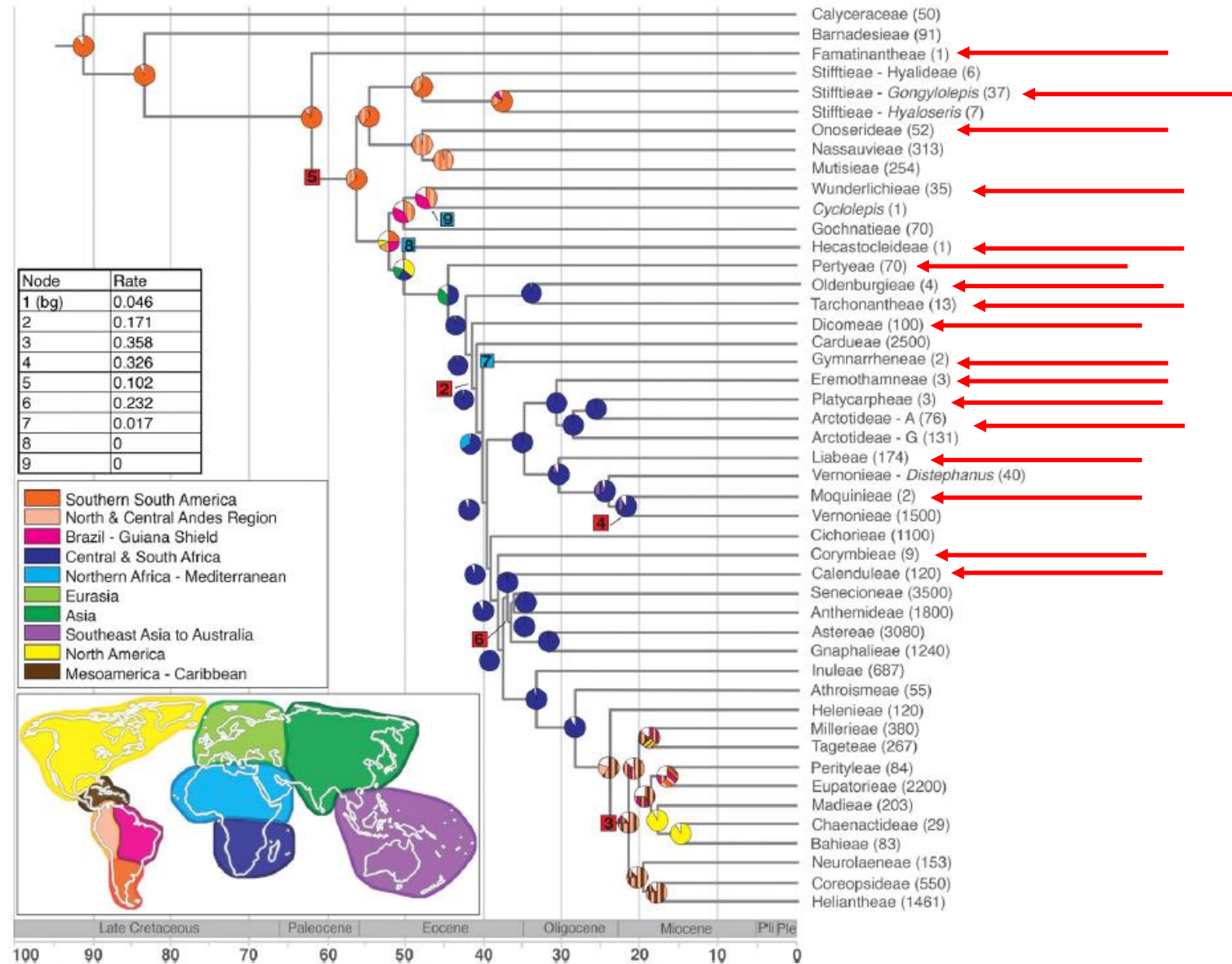


Fig. 3. Tribe-level chronogram and ancestral range estimates. Probabilities for ancestral ranges are illustrated in pie charts color coded by geographic regions on the world map. Diversification rate shifts are indicated on the phylogeny with numbered boxes corresponding to the table above the geographic legend. Rate shift increases in red and downshifts are blue boxes. Species numbers per tribe are indicated to the *Right* of tribe names.

Compositae “miscellaneous small tribes”: Famathinanthae



Famatinanthus, a New Andean Genus Segregated from *Aphyllocladus* (Asteraceae)

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Abstract—*Famatinanthus*, a new genus of Asteraceae (Mutisioideae, Onoserideae), is described and illustrated to accommodate one species from the Andes of Argentina, that was previously placed in *Aphyllocladus*, *A. decussatus*, as *Famatinanthus decussatus* comb. nov. The new genus is tentatively assigned to the tribe Onoserideae based on its shrubby habit, solitary radiate capitula, style rounded at the apex and dorsally papillose, and 2–3-seriate heteromorphic pappus. *Famatinanthus* is similar to *Aphyllocladus* but it is easily distinguished by the leafy, decussate branches with opposite leaves, multistoried T-trichomes, cream corollas, apiculate anther appendages, setuliferous achenes, terete stems, lack of secretory cavities, and pollen with a conspicuous mesoaperture and microechinate-rugulate exine. A key to the genera of the Onoserideae is presented. Affinities of the new genus with other genera of the tribes Gochnatieae, Hyalideae, and Stiffiteae are also discussed.

Keywords—Argentina, Asteraceae, La Rioja, Sierra de Famatina, taxonomy.

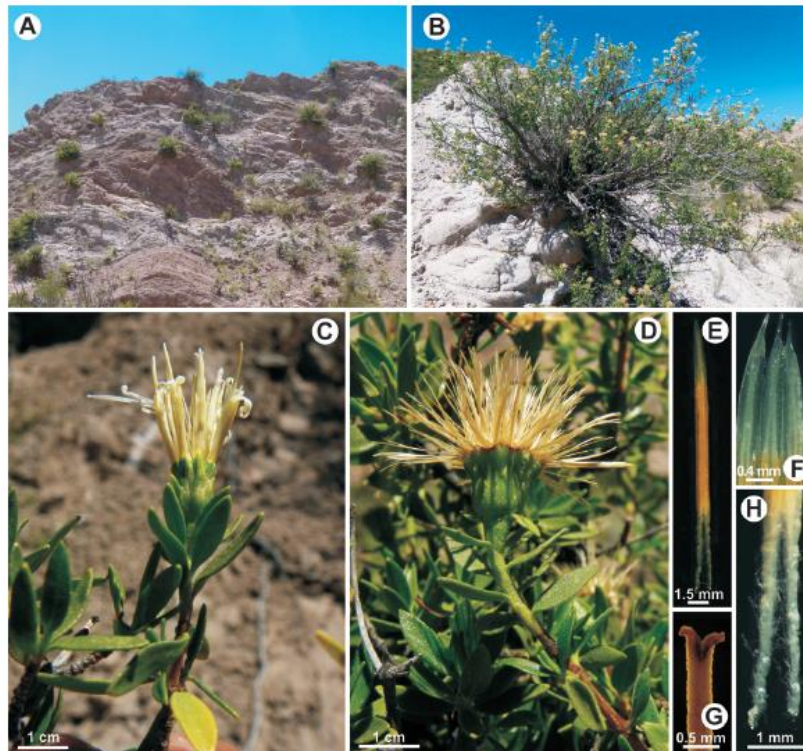


FIG. 1. *Famatinanthus*. A. Habitat in Sierra de Famatina. B. Plant. C. Capitulum. D. Capitulum with immature fruits. E. Anther. F. Apex of three anthers showing the apiculate apical appendages. G. Style apex. H. Anther tail, long pilose.

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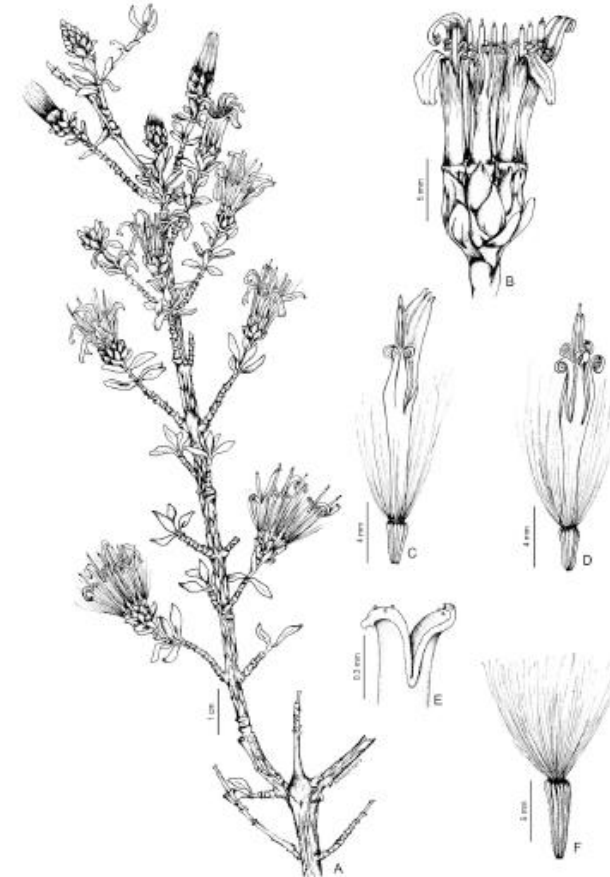


FIG. 5. *Famatinanthus decussatus* (A–E: Barboza et al. 2006; F: Freire et al. 2014). A. Flowering branch. B. Capitulum. C. Magnified flower. D. Disk floret. E. Style apex. F. Achene.

Compositae “miscellaneous small tribes”: Famathinanthae



Resolution of deep nodes yields an improved backbone phylogeny and a new basal lineage to study early evolution of Asteraceae



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ABSTRACT

A backbone phylogeny that fully resolves all subfamily and deeper nodes of Asteraceae was constructed using 14 chloroplast DNA loci. The recently named genus *Famathinanthus* was found to be sister to the Mutisioideae–Asterioideae clade that represents more than 99% of Asteraceae and was found to have the two chloroplast inversions present in all Asteraceae except the nine genera of Barnadesioideae. A monotypic subfamily Famathinanthoideae and tribe Famathinanthae are named herein as new. Relationships among the basal lineages of the family were resolved with strong support in the Bayesian analysis as (Barnadesioideae (Famathinanthoideae (Mutisioideae (Stiffioideae (Wunderlichioideae–Asterioideae))). Ancestral state reconstruction of ten morphological characters at the root node of the Asteraceae showed that the ancestral sunflower would have had a woody habit, alternate leaves, solitary capitulescences, epaleate receptacles, smooth styles, smooth to microechinate pollen surface sculpturing, white to yellow corollas, and insect-mediated pollination. Herbaceous habit, echinate pollen surface, pubescent styles, and cymose capitulescences were reconstructed for backbone nodes of the phylogeny corresponding to clades that evolved shortly after Asteraceae dispersed out of South America. No support was found for discoid capitula, multiseriate involucre or bird pollination as the ancestral character condition for any node. Using this more resolved phylogenetic tree, the recently described *Ragumrayun cura* + *Mutisipollis telleria* fossil should be associated to a more derived node than previously suggested when time calibrating phylogenies of Asteraceae.

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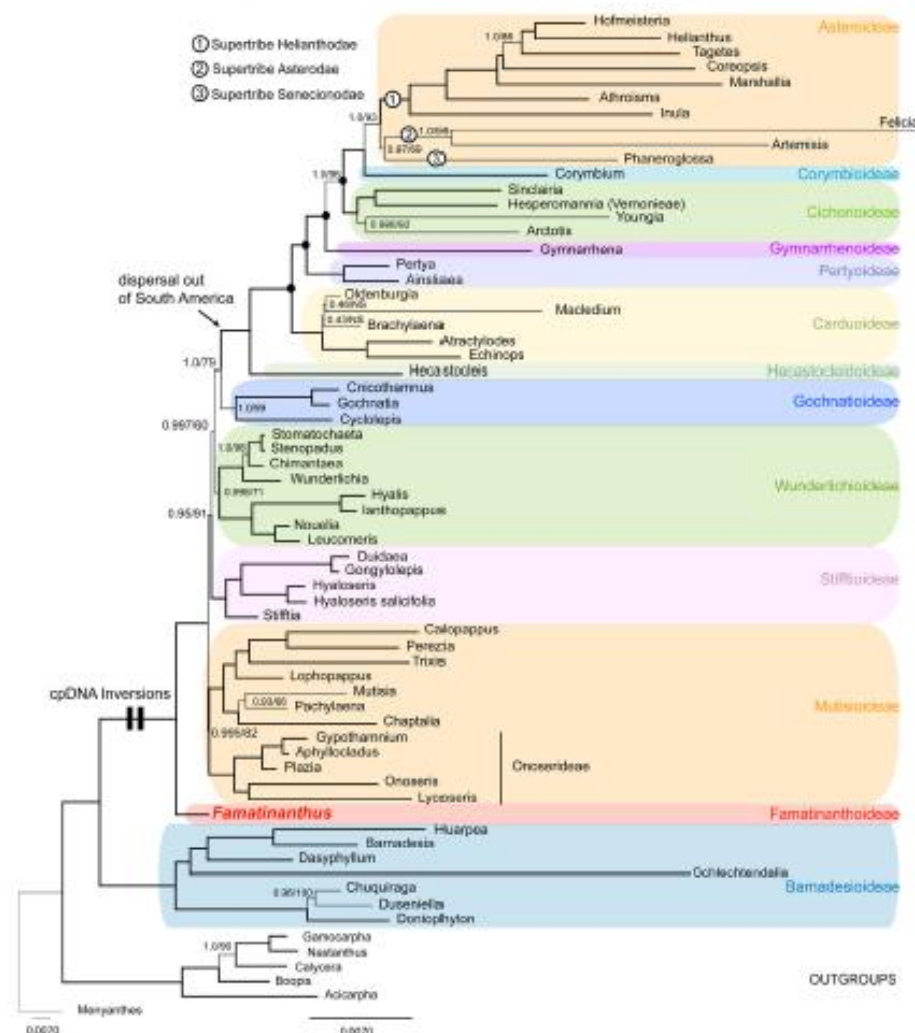
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Fig. 1. Representative species of the basal lineages of the Asteraceae. A. Barnadesioideae: 1. *Barnadesia odorata*; Barnadesioideae: B and C. *Famathinanthus decoratus*, capitulum; habit. Mutisioideae: D. Tribe Onoserioideae: *Aphyllanthus epheleoides*; E. Tribe Mutisioideae: *Mutisia acuminata*; F. Tribe Nassauvioideae: *Inula serotina*; Barnadesioideae: G. Tribe Hyaloceroideae: *Hyaloceros argenteus*; Gochnatioideae: H. *Gochnathium*; Anematoideae: Stiffioideae: I. *Hyalesteris andaluziana*; Carduoideae: J. Tribe Diopsisae: *Mutisifolium zeyheri* (Photo credits: A. Lisse/Agencia, B. Gloria E. Barboza, C. Juan J. Cantero, D. G.H. Fernando O. Zúñiga, E. Julia A. Groggi, F. Victor Sotelo, L. C. Aguilera, J. Jose L. Panero).

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Compositae “miscellaneous small tribes”: Onoserideae



- Herbs and shrubs, sometimes dioecious
- Capitula mostly solitary
- Ray florets pistillate with bilabiate corollas
- Disc florets with corollas 5-lobed; pappus 2-4-seriate

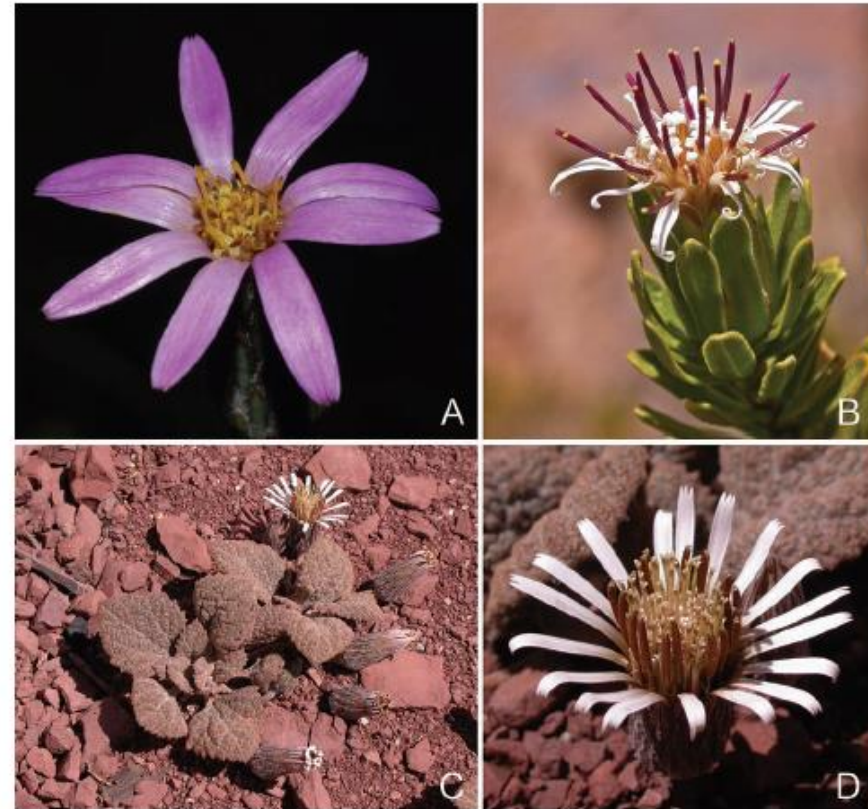


Fig. 14.2. Photographs of some members of the *Onoseris* clade. A *Onoseris weberbaueri* Ferreyra; B *Plazia daphnoides* Wedd.; C, D *Urmenetea atacamenis* Phil. [Photographs, J.M. Bonifacino.]

- 6 genera, 52 species
- South Mexico to South America (Southern, Centre-western Brazil, Andes)



Lycoseris boliviana



Onoseris brasiliensis

Compositae “miscellaneous small tribes”: Stifftieae/Hyalideae



- Marginal florets bilabiate; central florets tubulate, deep lobed; anther apical appendages apiculate; glabrous style; pappus 2-3-seriate
- 4 genera, 6 species
- South America (*Hyalis* - 2 spp. & *Ianthopappus* - 1 sp.) & Asia (*Leucomeris* - 2 spp. & *Nouelia* - 1 sp.)



Ianthopappus corymbosus (1 sp.)

Compositae “miscellaneous small tribes”: Stifftieae/*Gongylolepis* clade



***Gongylolepis* & allies:** *Achnopogon* (2 spp.), *Duidaea* (4 spp.), *Eurydochus* (1 sp., 1 no BR), *Glossarion* (2 spp.), *Gongylolepis* (14 spp.), *Neblinaea* (1 sp.), *Quelchia* (4 spp.), *Salcedoa* (1 sp.)

- Trees, shrubs; leaves alternate
- Heads variable (discoid, radiate)
- Bracts imbricate sometimes subequal
- Pappus setae multiseriate or few-seriate
- **Corollas zygomorphic or bilabiate, 2 cleft innerlip often much coiled**
- **Anther thecae with spurs (calcarate), long with free or fused tails (caudate)**
- **Styles bifid and dorsally smooth**, otherwise various
- Pollen prolate, microechinate, echinate, or nearly psilate
- Predominantly Guiana Shield

***Stifftia*:** 5 spp./Brazil e 1 sp. French Guyana

- Leaves alternate
- Heads discoid
- Bracts multiseriate, subimbricate
- **Pappus showy (white, yellow, red); 100 bristles in 4-5 series**
- Corollas actinomorphic; **lobes rolled**
- Anther thecae with spurs (calcarate) with long, smooth to sometimes papillose tails (caudate);
- **Styles glabrous**, shallowly divided; apex rounded to shortly acute
- Pollen prolate, minutely spinulose
- 5 species in Brazil, 1 in French Guiana



Fig. 12.2. **A** *Gongylolepis janaensis* (Aristeg., Maguire & Steyerf.) V.M. Badillo (Venezuela: Cerro Coro Coro); **B** *Gongylolepis huachamacari* Maguire (Venezuela: Neblina; Funk 6725); **C** *Stifftia drysantha* Mikán var. *flavicans* Toledo ex Dedecca (Brazil); **D, E** *Stifftia fruticosa* (Vell.) D.J.N. Hind & Semir (Brazil); **F** *Quelchia ericaulis* Maguire, Steyerf. & Wurdack (Venezuela: Chimantá massif). [Photographs: A, F, O. Huber; B, V.A. Funk; C–E, G. Lewis.]

Compositae “miscellaneous small tribes”: Stifftieae - *Hyaloseris* clade



1 genus, 6 spp.

- Shrubs; leaves crowded at apex, capitula ligulate
- South-central South America: Bolivia & Argentina



Fig. 12.3. **A** *Hyaloseris cinerea* (Grieseb.) Grieseb. (Argentina, La Rioja, near Chilecito); **B** *Duidaea rubriceps* S.F. Blake (Venezuela: Duida; Fernández et al. 8010); **C** *Neblinaea promontorium* Maguire & Wurdack (Venezuela: Neblina); **D** *Duidaea marahuacensis* Steyerf. (Venezuela: Duida; Fernández et al. 8194); **E** *Achnopogon vigatus* Maguire, Steyerf. & Wurdack (Venezuela, Chimantá massif). [Photographs: A, J.M. Bonifacino; B–D, V.A. Funk; E, O. Huber.]

Compositae “miscellaneous small tribes”: Wunderlichieae



- Woody, trees, shrubs, subshrubs; leaves alternate
- Heads discoid; bracts imbricate or subimbricate
- **Corollas actinomorphic w/5 equal lobes deeply cut**
- Anther thecae with spurs (calcarate), tailed (caudate), tails free to fused
- **Styles smooth & dorsally papillose or dorsally rugulose to papillose much below bifurcation**
- **Pappus of multiseriate bristles or setae**
- Pollen prolate and psilate, spinulose, or short echinate
- Mainly Guiana Shield and Brazil but a few in Colombia and Ecuador

4 genera, 35 spp.

Stenopadus (3 spp., 1 endemic)

Stomatochaeta condensata (1 sp.)

Wunderlichia (5 spp. endemics)



Fig. 12.4. A, B *Wunderlichia mirabilis* Riedel (Brazil: Minas Gerais, Serra do Cipó; Roque 1622); C *Wunderlichia senaei* Blaz. (Brazil: Minas Gerais, Diamantina; Roque 1649); D *Stomatochaeta acuminata* Pruski, habit only (Venezuela: Chimantá massif); E *Stomatochaeta cymbifolia* (S.F. Blake) Maguire & Wurdack (Venezuela: Chimantá massif). [Photographs: A–C, N. Roque; D, E, O. Huber]

Compositae “miscellaneous small tribes”: Hecastocleideae



- Shrubs; leaves alternate, with **spines**
- **Heads with 1-flower, actinomorphic, deeply divided**
- Bracts imbricate; **heads surrounded by white or green spiny bracts**
- Anther thecae with spurs and slightly fimbriate tails
- Styles slender, glabrous, branches very short, apex rounded
- **Pappus of 6 unequal scales sometimes fused**
- Pollen psilate, oblong
- USA: Mts in Nevada and around Death Valley



Hecastocleis shockleyi



Fig. 16.1. *Hecastocleis shockleyi* A. Gray. **A** Red Pass, high point on the road to Titus Canyon, Death Valley, California, USA, *Hecastocleis* in the foreground; **B** habit; **C** close up of florets, involucre tightly appressed to single-flowered heads and bracts (greenish); **D** close up of several single-flowered heads, corollas deeply lobed, pink turning white, bracts whitish. [Photographs, V.A. Funk of Funk et al. 12487–12488.]

Compositae “miscellaneous small tribes”: Pertyeae



- 5 genera, 70 spp., Asia (*Ainsliaea*, *Catamixis*, *Macroclinidium*, *Myriphois* & *Pertya*)
- Leaves 3-nerved; capitula homogamous, uniflorous or pauciflorous; corollas zygomorphic

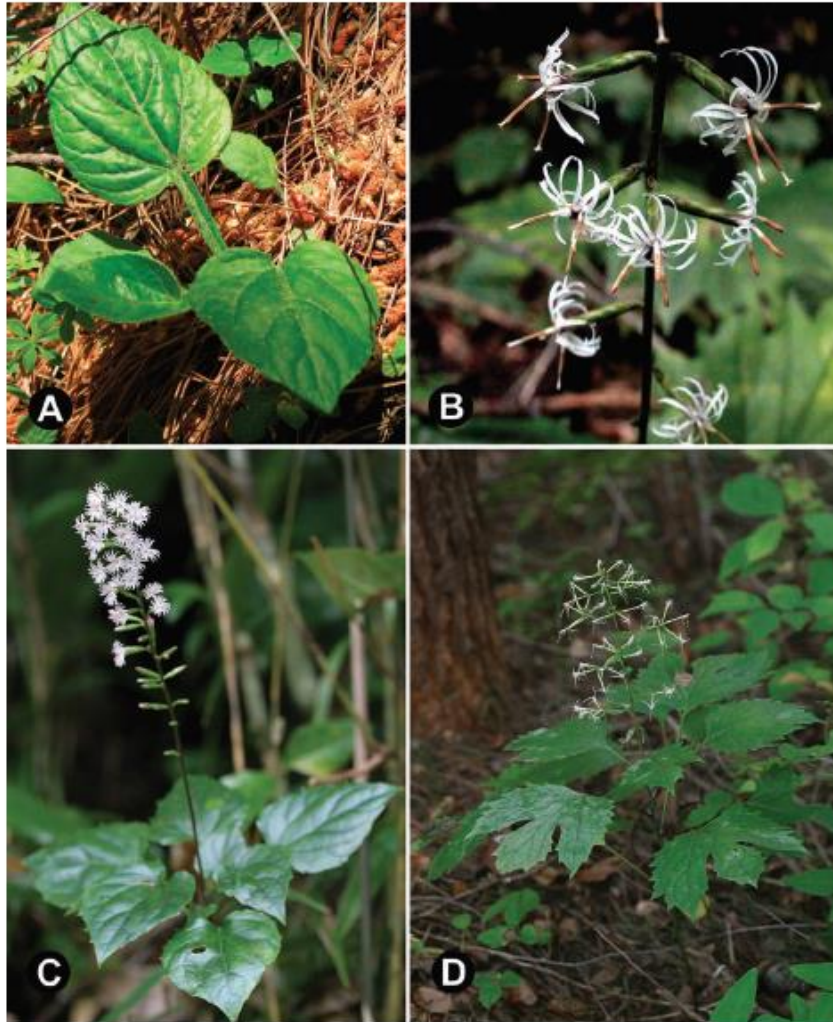


Fig. 21.1. **A** *Ainsliaea latifolia* (D. Don) Sch.Bip., China, Yunnan, habit; **B** *A. acerifolia* Sch.Bip. var. *subapoda* Nakai, Japan, capitula; **C** *A. macroclinidioides* Hayata, habit; **D** *Macroclinidium trilobum* (Makino) Makino. [Photographs: A, S. Freire; B, Shu Suehiro; C, M. Toguchi, Ocean Exposition Commemorative Park Management Foundation; D from http://www.plantsindex.com/plantsindex/demo_html/demo_db/result58860.htm.]



Fig. 21.2. **A, B** *Pertya phylloides* Jeffrey, China, Yunnan: **A** habit; **B** leafy branch. **C, D** *Pertya ovata* Maxim.: **C** capitula in fruiting; **D** habit. [Photographs: A, B, S. Freire; C, S. Aoki from <http://aoki2.si.gunma-u.ac.jp/BotanicalGarden/HTMLs/kouyabouki.html>; D from <http://commons.wikimedia.org> sub *Pertya scandens*.]

Compositae “miscellaneous small tribes”: Oldenburgieae



- 1 genus, 4 spp.
- Cape flora from South Africa
- Shrubs or subshrubs, homogamous capitula, 80-1000 florets, tubular



Oldenburgia grandis



Fig. 19.2. *Oldenburgia*. **A, E** *Oldenburgia grandis* (Thunb.) Baill., habit and habitat (South Africa); **B, C** *Oldenburgia grandis* (Thunb.) Baill., showing early (C) and late (B) flowering stages (garden in Waiuku, New Zealand); **D** *Oldenburgia papilionum* DC. (South Africa, Western Cape Province). [Photographs: A, E, S. Proches; B, C, Serenithyme; D, S. Ortiz.]

Compositae “miscellaneous small tribes”: Tarchonantheae



- 2 genera: *Brachylaena* (11 spp.) & *Tarchonanthus* (2-6 spp.)
- Africa
- Shrubs, aromatic, dioecious, capitula homogamous, 30-90 florets
- *Bachylaena discolor* introduced in Brazil



Bachylaena discolor



Fig. 18.3. *Brachylaena* and *Tarchonanthus*. A, B *Brachylaena transvaalensis* Hutch. ex Phillips & Schweick (South Africa, Gautang; Koekemoer and Funk 1970); C *Tarchonanthus camphorosus* L. (Namibia); D-F *Tarchonanthus camphorosus* L. (South Africa, Northern Cape; Koekemoer and Funk 1967) [Photographs: A, B, D-F, V.A. Funk; C, C.A. Mannheimer.]

Compositae “miscellaneous small tribes”: Dicomeae



- 8 genera, 100 spp., mostly from tropical Africa
- Involucre multiseriate, capitula discoid, florets bisexual, corolla lobed



Fig. 17.7. *Maledium* and *Pleiotaxis*. **A** *Maledium zeyheri* (Sond.) S. Ortiz (South Africa, Gauteng: Funk and Koekemoer 12431); **B** *Maledium plantaginifolium* (O. Hoffm.) S. Ortiz (Angola: S. Ortiz et al. 879); **C** *Maledium plantaginifolium* (O. Hoffm.) S. Ortiz (Angola: S. Ortiz et al. 879); **D** *Pleiotaxis rugosa* O. Hoffm. (Angola: S. Ortiz et al. 840). [Photographs: A, V.A. Funk; B, S. Ortiz; C, J. Rodríguez-Oubiña; D, R. Carbajal.]



Fig. 17.6. *Dicoma*. **A** *Dicoma schinzii* O. Hoffm. (Namibia: Funk and Koekemoer 12702); **B, E** *Dicoma capensis* Less. (Namibia: Funk and Koekemoer 12664); **C** *Dicoma elegans* Welw. ex O. Hoffm. (Angola: S. Ortiz et al. 881); **D** *Dicoma welwitschii* O. Hoffm. (Angola: S. Ortiz et al. 861); **F** *Dicoma welwitschii* O. Hoffm. (Angola: S. Ortiz et al. 866). [Photographs: A, B, E, V.A. Funk; C, D, R. Carbajal; F, S. Ortiz.]

Compositae “miscellaneous small tribes”: Gymnarrheneae



- Annual herbs
- Middle Eastern deserts
- Two types of capitula
- Plants germinated from different fruit types differs in size, morphology, physiology and ecology



Gymnarrhena micrantha

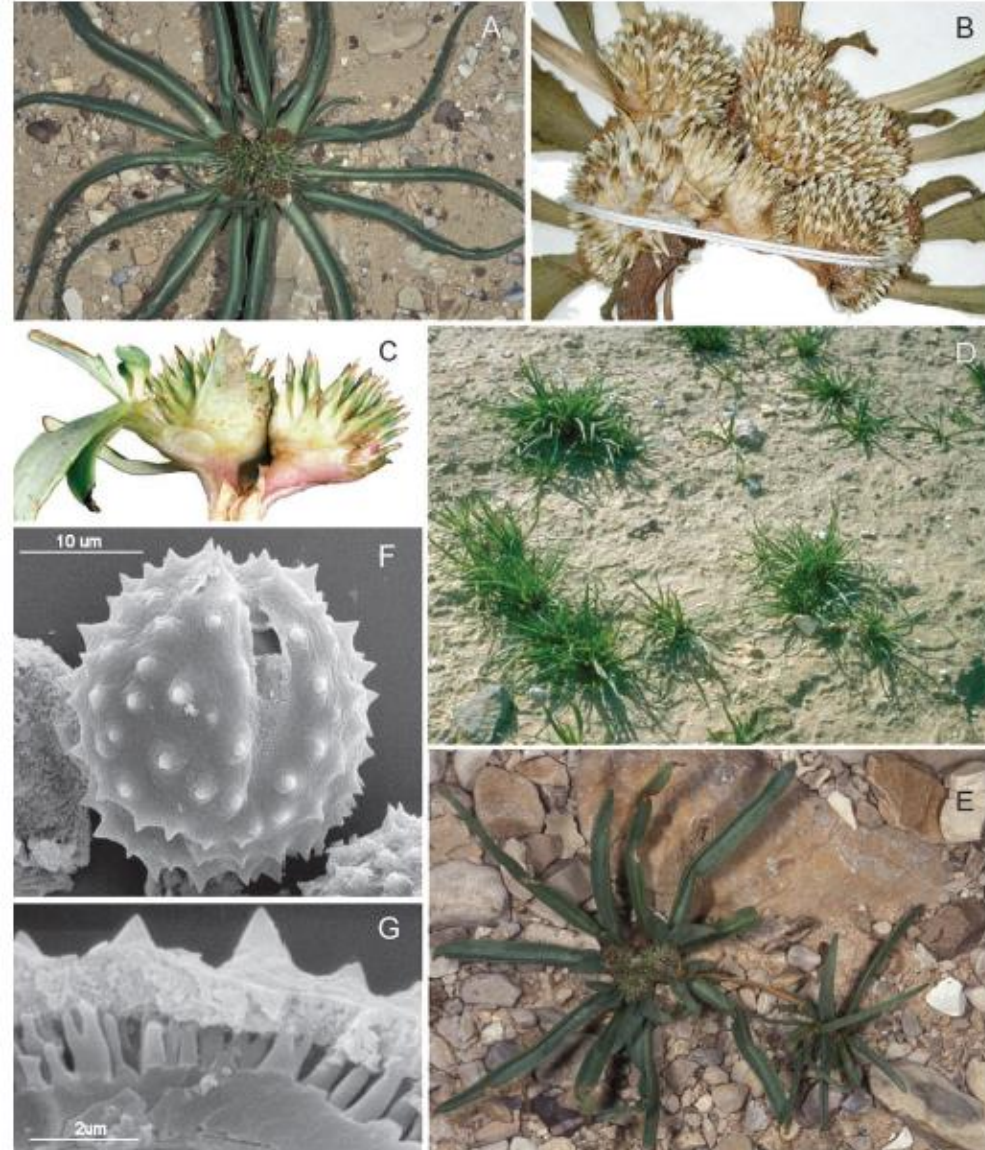


Fig. 22.1. *Gymnarrhena micrantha* Desf. **A, D, E** habit showing rocky substrate and clustered heads; **B** clustered above-ground heads with green (fading to brown) and white bracts; **C** subterranean heads; **D** population showing grass-like growth form; **F, G** pollen showing polar view and a broken grain. [Photographs: A, D, E, O. Fragman-Sapir taken in the Jerusalem Botanical Gardens; B, herbarium specimen, *Mandeville 157*, US; C, underground head, with permission from Brown and B ser (2005); F, G, SEM's, H. Robinson.]

Compositae “miscellaneous small tribes”: Eremothamneae



- 2 genera, 3 spp.
- Style arms slender, sweeping trichomes long, compressed and divided into 2-3 cells
- Pollen with two types of spines (perforated and cavate)
- Involucral bracts multiseriate, papyraceous and apiculate
- Western cape of South Africa

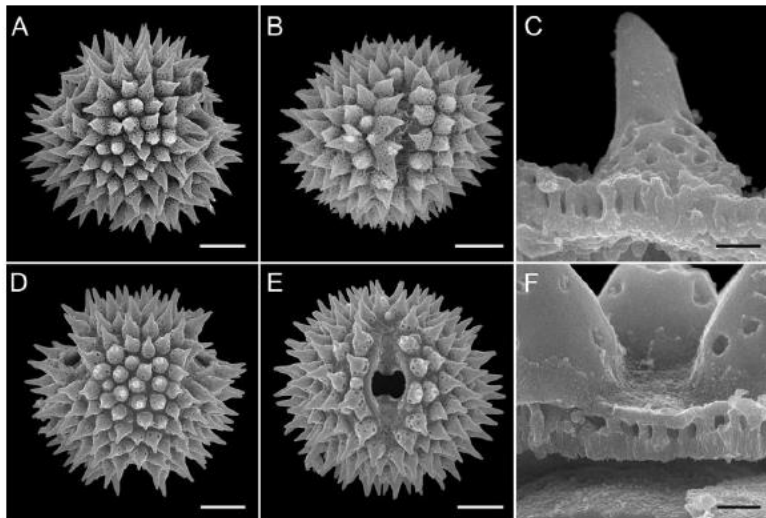


Fig. 26.4. Pollen. **A–C** *Eremothamnus marlothianus* O. Hoffm.; **D–F** *Hoplophyllum spinosum* (L.f.) DC. The pollen grain structure is unique in the family but obviously shared between the two genera. Scale bars for A, B, D, E = 10 μ m; scale bars for C, F = 1 μ m. [Photographs: A–C, J.J. Skvarla, *Geiss and Vauuren* 710, PRE; D–F, J.J. Skvarla, *Koekemoer* 2045, PRE.]

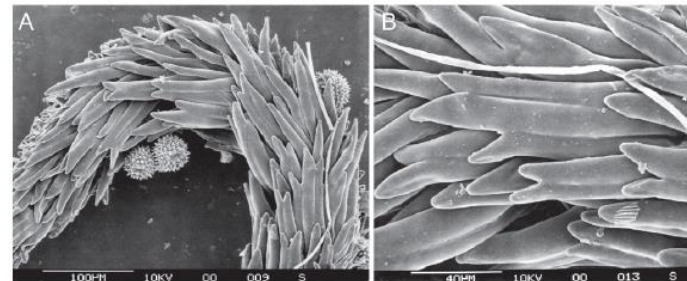


Fig. 26.3. Sweeping hairs. **A, B** *Hoplophyllum spinosum* (L.f.) DC. (B detail from A). Note the slender style branches bearing comparatively long sweeping hairs that are divided longitudinally into two or three cells. [Photographs: H. Robinson; *Barker* 9757, US.]



Fig. 26.1. *Eremothamnus marlothianus* O. Hoffm. **A** habit, note prostrate shrubby nature and dry rocky, sandy habitat; **B** flowering heads during a year (2006) of unusually high rainfall, note the large number of florets; **C** flowering heads during a year (2007) of low rainfall, note the small number of florets. [Photographs: A, B, C. Mannheimer; C, V.A Funk, *Funk* 12684; all from the same population.]

Compositae “miscellaneous small tribes”: Platycarpeae



- 2 genera, 3 spp.
- Secondary capitula
- Unique pollen complex columnar morphology
- South Africa

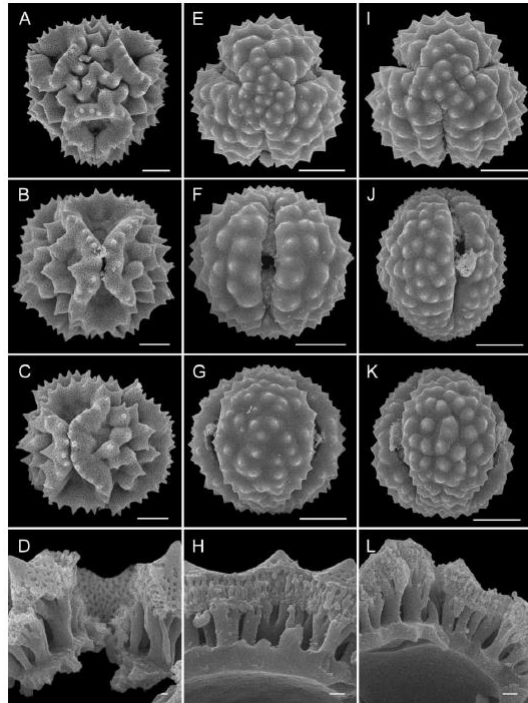


Fig. 29.2. Scanning electron micrographs of *Platycarpeae* pollen. **A–D** *Platycarpha glomerata* Less.; **E–H** *Platycarphella parviflora* (S. Moore) V.A. Funk & H. Rob.; **I–L** *Platycarphella carlinoides* (Oliv. & Hiern.) V.A. Funk & H. Rob. **A, E, I** polar view; **B, F, J** apertural view; **C, G, K** lateral view; **D, H, L** fractured grains. Scale bars: whole grains = 10 μ m; fractured grains = 1 μ m.



Fig. 29.1. Species of *Platycarpeae*. **A** *Platycarpha glomerata* Less., note the spiny leaves, large primary and secondary heads (3–10 cm in diam., this one is 8 cm), and the long styles; **B** *Platycarphella carlinoides* (Oliv. & Hiern.) V.A. Funk & H. Rob., note the leaves flat on the ground and the large secondary head (2–10 cm in diam., this one 10 cm) with many small primary heads; **C** *Platycarphella parviflora* (S. Moore) V.A. Funk & H. Rob., note the small size of the plant, small secondary heads (1–2 cm diam., this one 2 cm), and the entire leaves. [Photographs: A, B, M. Koekemoer; C, V.A. Funk.]

Compositae “miscellaneous small tribes”: Arctotideae



- 17 genera, 215 spp.
- Radiate capitula
- Style with a ring of trichomes
- Pappus paleaceous
- South Africa and Australia



Fig. 25.8. Gorteriinae: *Didelta*, *Gazania*. **A** *Didelta carnosia* Ait. var. *tomentosa* (Less.) Roessler (Namibia: *Funk and Koekemoer 12685*); this collection was found growing on large sand dunes west of Lüderitz, Namibia; the leaves were covered with tomentum; this species has dark tips on the disc corollas, the head fragments into 3–5 parts, and each part has dark, stiff hairs; the heads of this plant had five parts. **B** *Didelta carnosia* Ait. var. *carnosia* (South Africa, Northern Cape: *Funk and Koekemoer 12648*);

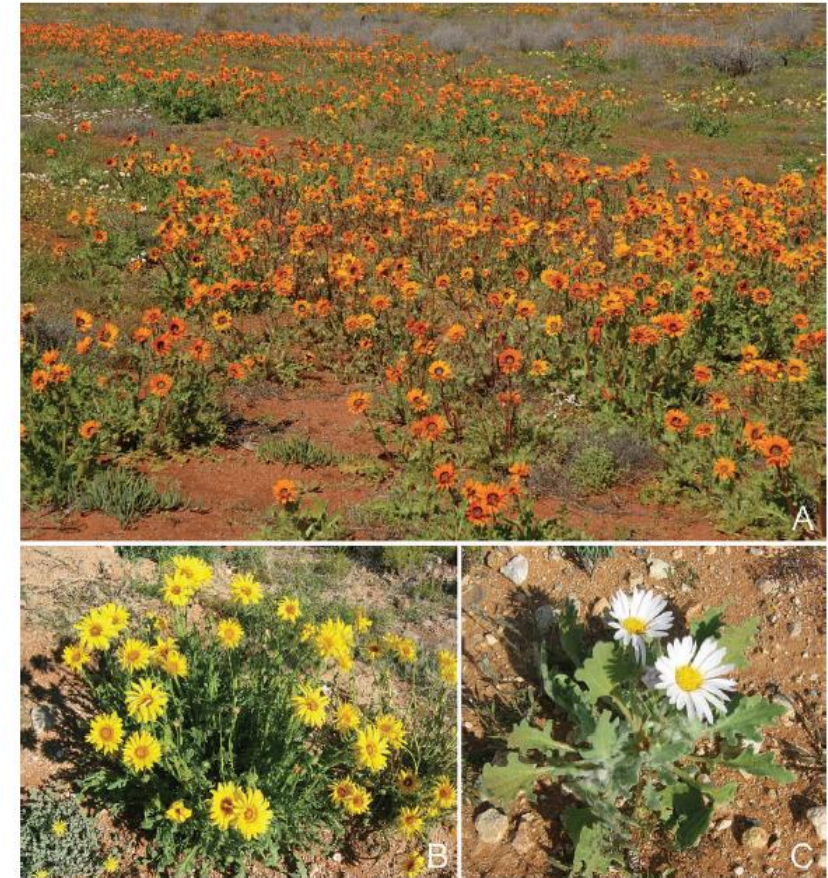
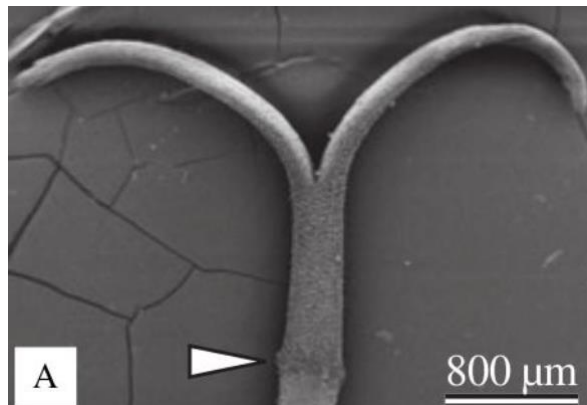


Fig. 25.2. Arctotidinae: *Arctotis* (continued). **A** *Arctotis fastuosa* Jacq. (South Africa, Northern Cape: *Funk and Koekemoer 12646*); *Arctotis* is one of the major components of the spectacular spring flower displays in the winter-rainfall region of southern Africa. **B** *Arctotis* sp. (Namibia). **C** *A. leiocarpa* Harv. (Namibia). [Photographs: A, V.A. Funk; B, C, C.A. Mannheimer.]



Compositae “miscellaneous small tribes”: Liabeae



- 18 genera, 190 spp.
- Leaves generally opposite, latex
- Mostly yellow florets
- Pollen echinate
- From Mexico to the Andes in South America

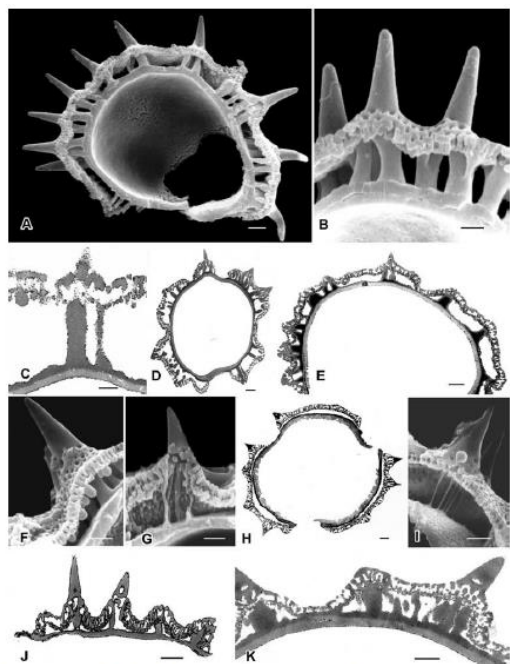


Fig. 27.11. A, B *Cacosmia rugosa* Kunth; C, D *Ferreyranthus rugosus* (Ferreira) H. Rob. & Brettell; E *Liabum solidagineum* Less.; F *Sinclairia polyantha* Rydb.; G *Pseudoseris discolor* (Muschl.) H. Rob. & Brettell; H *Panephelus asperifolius* (Muschl.) H. Rob. & Brettell; I *Philglossa peruviana* DC.; J *Chryactinium acule* (Kunth) Wedd.; K *Munozia lanceolata* Ruiz & Pav. Scale bars for A, D, E, H-K = 2 µm; for B, C, F, G = 1 µm.

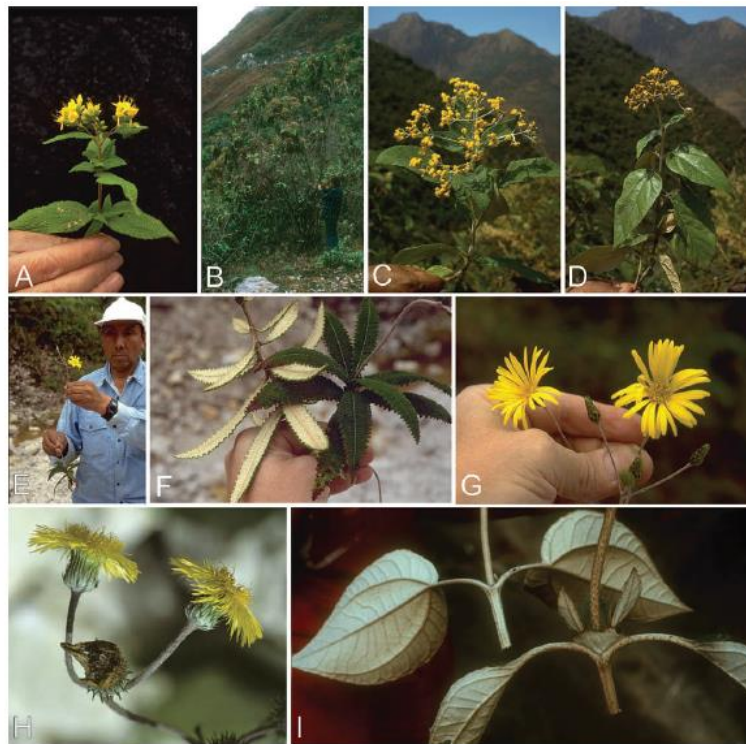


Fig. 27.3. A *Cacosmia rugosa* Kunth, a subshrub with bullate leaves and capitula with 5–6 ray florets; B *Ferreyranthus excelsus* (Poepp. & Endl.) H. Rob. & Brettell, a weak tree to 6 m tall with radiate capitula; C *F. verbascifolia* (Kunth) H. Rob. & Brettell, a large shrub with bullate leaves; D *Liabum solidagineum* (Kunth) Less., a large shrub with smooth leaves; E *Dillandia subumbellata* (Rusby) V.A. Funk & H. Rob., a weak herb with scandent habit with long peduncles and few capitula; F *D. subumbellata*, bullate upper leaf surfaces and densely tomentose lower surface; G *D. subumbellata*, capitula with ca. 40 ray florets; H *Liabum barahonense* Urban, capitula with nearly 50–75 ray florets with filiform limbs; I *L. amplexicaule* showing interpetiolar pseudostipular foliar tissue.



Fig. 27.6. A *Pseudoseris discolor* (Muschl.) H. Rob. & Brettell, habit and habitat; B *P. discolor*, capitulum (photographs of Quipuscoa 3338, Sandia, Puno, Peru); C *Pseudoseris szyszyliczii* (Hieron.) H. Rob. & Brettell capitulum (Dillon et al. 6485); D *Microliabum candidum* (Griseb.) H. Rob. capitulum; E *M. polymnioides* (R.E. Fries) H. Rob. illustrating interpetiolar pseudostipules and white latex from cut stem. [Photographs: D, E, D. Gutiérrez.]

Compositae “miscellaneous small tribes”: Moquinieae



- 2 genera, 2 spp.
- Style with short arms
- Pollen equinate, not lofate, nor caveate
- Eastern Brazil (Bahia and Minas Gerais states)

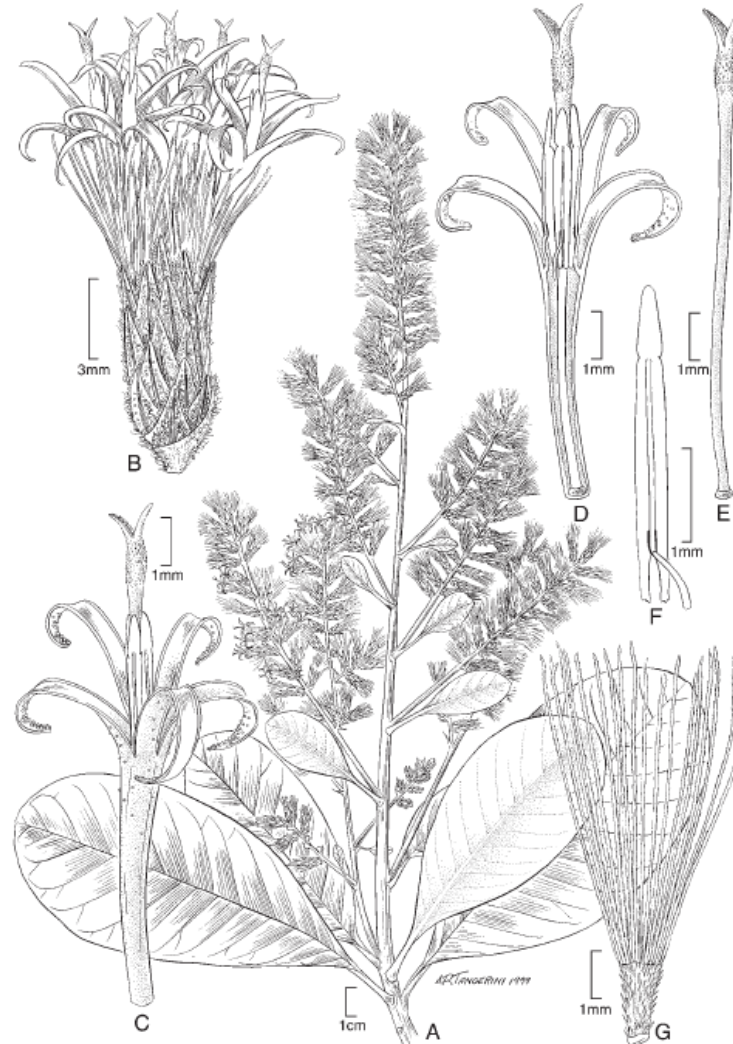


Fig. 30.1. *Moquinia racemosa* (Spreng.) DC. **A** habit; **B** head; **C** corolla, showing tips of anthers and style; note deeply divided lobes; **D** corolla in long section, one lobe removed, showing anthers and style; **E** style, showing basal node, swollen upper shaft, showing scabrid surface consisting of short sweeping hairs on upper shaft and backs of lobes, and undivided stigmatic surface inside of branches; **F** anther, showing long calcarate and shortly tailed bases, and apical appendage; **G** achene with setulae and capillary pappus. [Drawing by Alice Tangerini.]



Fig. 30.2. *Moquinia racemosa* (Spreng.) DC. (Brazil, Bahia, Morro do Chapéu). **A** inflorescence; **B** inflorescence showing flowers; **C** leaves. [Photographs, N. Roque.]

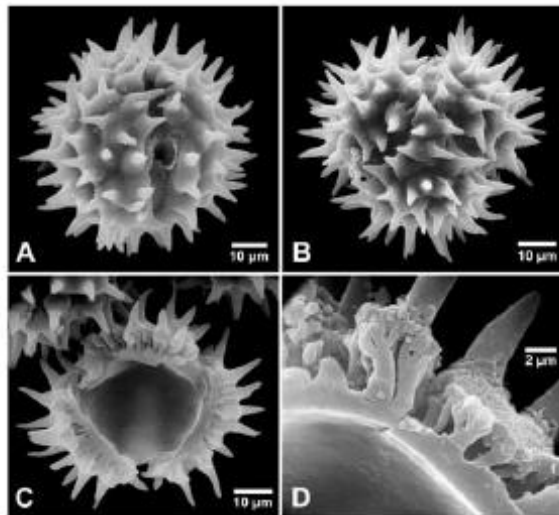


Fig. 30.4. SEM of *Pseudostiffia kingii* H. Rob. pollen (R.M. King et al. 8145, Brazil). **A** colpar view; **B** polar view; **C** cross section of pollen grain; **D** broken grain showing irregularly distributed bacula.

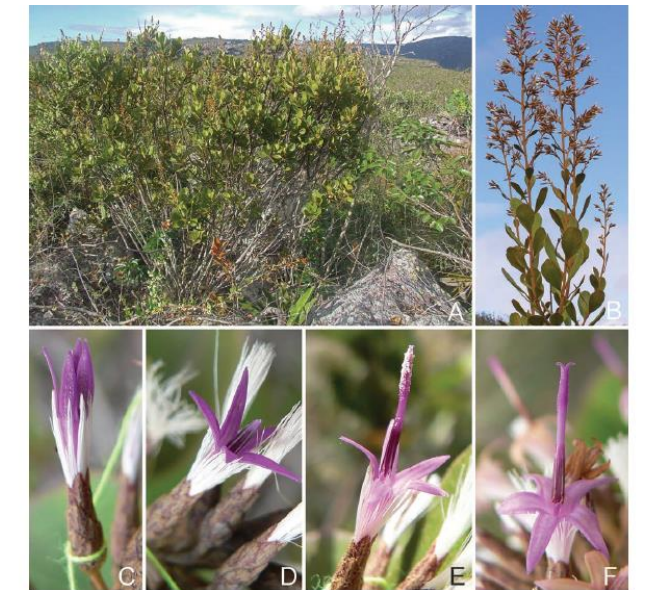


Fig. 30.3. *Pseudostiffia kingii* H. Rob. (Brazil, Bahia, Mucugê). **A** habit; **B** inflorescence architecture; the series of photos in **C-F** show the development of the male and female flowers (J.H. Souza, pers. comm., unpub.). [Photographs: A, B, J.H. Souza; C-F, A. Morse.]

Compositae “miscellaneous small tribes”: Corymbieae



- 1 genus, 9 spp.
- Hairy rhizomes, leaves with parallel venation
- 2 involucre bracts
- Capitula uniflorous
- Ovary long and hairy
- South Africa



Fig. 32.1. *Corymbium glabrum* L. var. *glabrum*. Note the narrow leaves with parallel veins, the densely hirsute ovary, and the single floret per head. [Illustration (as *C. nervosum* Thunb.) by Ethel Dixie and Joseph Pohl in Marloth (1932: pl. 55).]



Fig. 32.2. *Corymbium*. Note the single-flowered heads and grass-like leaves. **A, B** *C. glabrum* L. (South Africa); **C** *C. laxum* Compt. subsp. *laxum* (South Africa, Cedarberg Tafelberg); **D** *C. africanum* L. (South Africa). [Photographs: A, B, N. Bergh; C, B. Nordenstam, *Nordenstam 9607*; D, J. Manning.]

Compositae “miscellaneous small tribes”: Calenduleae



12 genera, 120 spp.

Mostly Mediterranean Africa, Europe and Middle East

Capitula radiate

Pappus absent

Anthers caudate

Subapical wreath of trichomes in the basis of style Arms

Heterocarpy

Unusual fruit adaptations



Fig. 35.2. **A** *Calendula officinalis* L. (cultivated, Uruguay); **B** *Dimorphotheca ecklonis* DC. (cultivated, Uruguay); **C** *Dimorphotheca sinuata* DC. (Namibia); **D** *Tripteris glabrata* (Thunb.) Harv. (South Africa: Namaqualand). [Photographs: A, B, J.M. Bonifacino; C, C.A. Mannheimer; D, V.A. Funk.]

Compositae “miscellaneous small tribes”: Calenduleae



Fig. 35.3. Fruits of Calenduleae. **A** fruiting capitulum of *Calendula officinalis* L. (cultivated, Uruguay); **B** worm-like achenes of *Calendula officinalis* (cultivated, Uruguay); **C** drupaceous achenes of *Chrysanthemoides monilifera* (L.) T. Norl. (South Africa: Eastern Cape); **D** Silvereye (*Zosterops lateralis* Latham) feeding on *Chrysanthemoides monilifera* achenes (Australia: New South Wales, Newcastle, introduced); **E** fruiting capitulum of *Monoculus monstrosus* (Burm. f.) B. Nord. (South Africa: Western Cape, Hondeklipbaai); achenes trilobate, unifenestrate; **F** trilobate trifenestrate achenes of *Tripteris glabrata* (Thunb.) Harv. (South Africa: Western Cape, Riethuis). [Photographs: A, B, J.M. Bonifacino; C, R. McKenzie; D, M. Kibby; E, F, M. Koekemoer.]



Fig. 35.4. **A** display from winter rainfall area with *Dimorphotheca pinnata* (Thunb.) Harv. (white) and *Gazania lichtensteinii* Less. (tribe Arctotideae, yellow) (South Africa: Northern Cape, Tankwa Karoo National Park); **B** display with *Dimorphotheca pinnata* (South Africa: Northern Cape, Tankwa Karoo National Park); **C** blooming display with *Dimorphotheca pinnatis* (L.) Moench (South Africa: Namaqualand). [Photographs: A, B, M. Koekemoer; C, V.A. Funk.]



Compositae “miscellaneous small tribes”

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