

# Studies in South American Amaranthaceae. IV

T. Myndel PEDERSEN

Estancia Santa Teresa, RA-3427 Mburucuyá, Argentina.

## KEY WORDS

Amaranthaceae,  
new taxa,  
taxonomy,  
systematic positions,  
nomenclature,  
South America.

## ABSTRACT

Various aspects of the taxonomy, systematic positions, and nomenclature of South American Amaranthaceae are discussed, including members of the following genera: *Alternanthera*, *Celosia*, *Gomphrena*, *Iresine*, *Pfaffia*, *Quaternella*, and *Trommsdorffia*. Eleven new species are described, as well as two new subspecies, five new varieties, and one new form. Twelve new combinations are made, one new name and one change of status proposed, and several species are re-assigned to genera, where they have not been placed recently. Keys are provided for several groups of closely related taxa, including the members of *Pfaffia* sect. *Pfaffia*.

## RÉSUMÉ

Divers aspects de la taxonomie, des positions systématiques et de la nomenclature des Amaranthaceae sud-américaines sont discutés, y compris ceux des représentants des genres *Alternanthera*, *Celosia*, *Gomphrena*, *Iresine*, *Pfaffia*, *Quaternella*, et *Trommsdorffia*. Onze nouvelles espèces, deux nouvelles sous-espèces, cinq nouvelles variétés et une nouvelle forme sont décrites. Douze nouvelles combinaisons sont établies, un nouveau nom et un changement de statut sont proposés, et plusieurs espèces sont réassignées à des genres dans lesquels elles n'avaient pas été placées récemment. Des clés de détermination sont données pour plusieurs groupes de taxons voisins, y compris pour ceux de *Pfaffia* sect. *Pfaffia*.

## MOTS CLÉS

Amaranthaceae,  
nouveaux taxons,  
taxonomie,  
positions systématiques,  
nomenclature,  
Amérique du Sud.

As with the previous papers in this series, the following notes are the results of studies preliminary to my treatment of the *Amaranthaceae* for various local "floras", and of my attempts to name material sent to me for identification. During recent years, specimens that could not with certainty be identified with any published description have increased to a considerable extent. In order to name them, it has been necessary to describe many of them as new taxa, some of which will no doubt be reduced to synonymy upon examination of types of dubious taxa. Until such a comprehensive revision can be made, however, it seems appropriate to name these entities to avoid an excessive accumulation of indeterminate material.

### 1. *Alternanthera collina* Pedersen, sp. nov.

*Planta erecta pedalis vel ultra, ramosa: caulis 0.1-*

*0.4 cm crassus, teres vel juventute sub-angulosus, novellis pilis 0.3-0.8 mm longis,  $\pm 5$ -articulatis, simplicibus, sed valde asperis, albis, antrorso-appressis vestitus, aetate glabrescens. Folia 3.5-9 cm longa, petiolo 0.5-1 longo annumerato, in foliis imis pro rata longiore, 1-6 cm lata, lato ovata, plerumque acuta acutiusculave, basi obtusa rotundatave, penninervia nerviorum secundariorum majorum paribus 3-5, utrinque pilos paucos vel perpauca gerentia. Flores in spicastris ovoideis ad 75 mm longe pedunculatis conferti, eae ut videtur in cyma dichotomica pauciramosa dispositae: bractea bracteolaeque scariosae, candidae, illa ad 1.5 mm longa, latissime ovata, obtusa rotundatave, uninervia, mucronata, glabra aut pilos paucos dorso gerens; hae bracteam longitudine aequantes sed angustiores, obtusae aut breviter acuminatae, uninerviae, mucronulatae, dorso pilis densissimis secus nervum vestitae. Perianthium pedicello brevi crasso insertum: tepala paene aequalia, tenaciter scariosa, 4-4.5 mm longa, oblonga, acuta, trinervia, mutica, pilosa. Stamina  $\pm 3$  mm longa antheris linearibus 1.5 mm longis, filamenta inferne connata, cum pseudostaminodiis aequilongis vel paullo longioribus, oblongis, acutis vel obtusis, sursum laciniatis alternantia. Germen... stylo ad 3 mm longo, crasso, stigmathe parvo munitum. Fructus (immaturus) 2 mm longus, oblongus. Semen (immatu-*

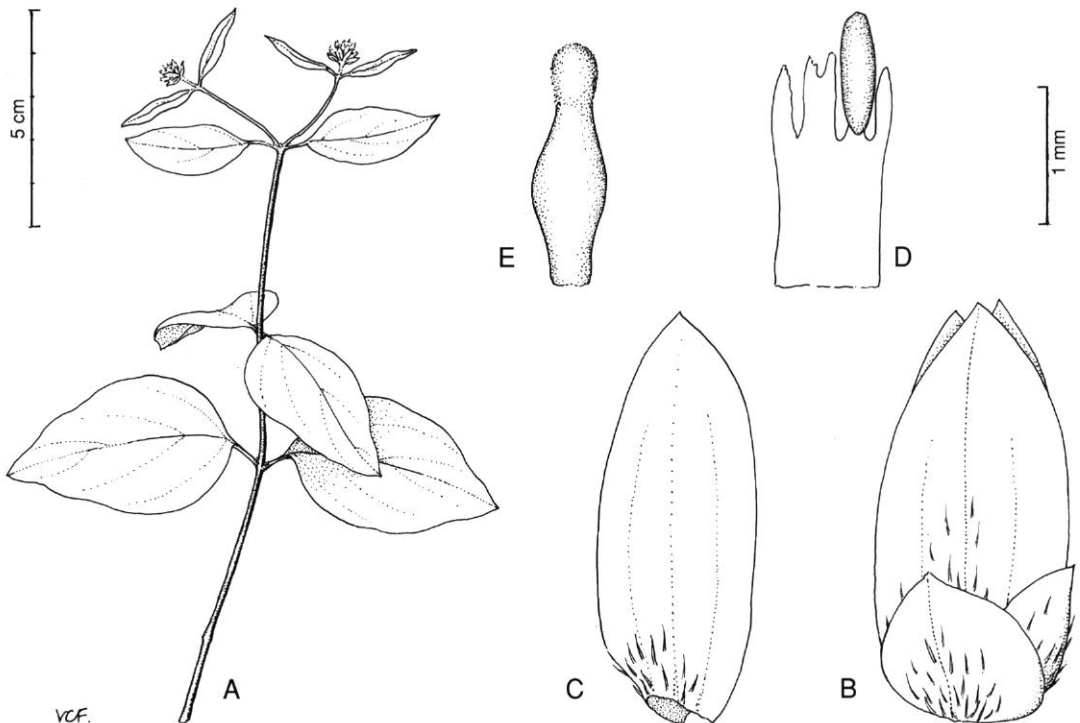


Fig. 1.—*Alternanthera collina* Pedersen: A, habit; B, flower; C, tepal, seen from back; D, androecium (in part deformed); E, gynoecium. (Pedersen 15396, C).

rum)  $\pm 1.8 \times 1 \times 1$  mm, oblongo-ovoideum, funiculo quarta parte infra apicem inserto.—Fig. 1.

TYPE.—Molina, Cozzani, Fortunato & Gómez 1833, Argentina, Prov. Santiago del Estero, dpt. Pellegrini: Remate, 19 May 1983 (holo-, BAB).

This species has to my knowledge only been collected twice, both times on the Cerro de Remate, a small limestone hill rising above the Chaco plain in the extreme North-West of the Province of Santiago del Estero, where I collected it on April 3rd, 1989, Pedersen 15396 (C). All the material is poor, with very few flowers. I have revisited the type locality twice, but not a single plant was seen either time.

## 2. *Alternanthera inaccessa* Pedersen, sp. nov.

*Fruticulus confertim ramosus teste collectoris vix pedalis: caulis 0.1-0.35 cm crassus, ad nodos parum incrassatus, novellus pilis ramosissimis 0.05-0.5 mm longis ochraceis mox deciduis densius vestitus. Folia sub-sessilia vel ad 0.2 cm longe petiolata, 1-3  $\times$  0.4-2.2 cm, valde diversiformia: late ovata, ovato-lanceolata vel oblongo-elliptica, acuta aut obtusa, basi plerumque rotundata vel sub-cordata, penninervia, mucronulata, ut caulis pilosa, sed pili magis brunnescentes, vetustiora plerumque supra sub-glabra. Flores in spicastris sessilibus ad initium floriendi globosis, aetate oblongis ad 15 mm longis, 5 mm crassis conferti: bractea scariosa, rufescens, nervo fusco, 2-2.5 mm longa,  $\pm 1$  mm lata, ovata, acuta, concava, uninervia, vix mucronulata, glabra; bracteolae ut bractea, 2.1-2.2 mm longae, asymmetricè ovatae, sursum falca-*

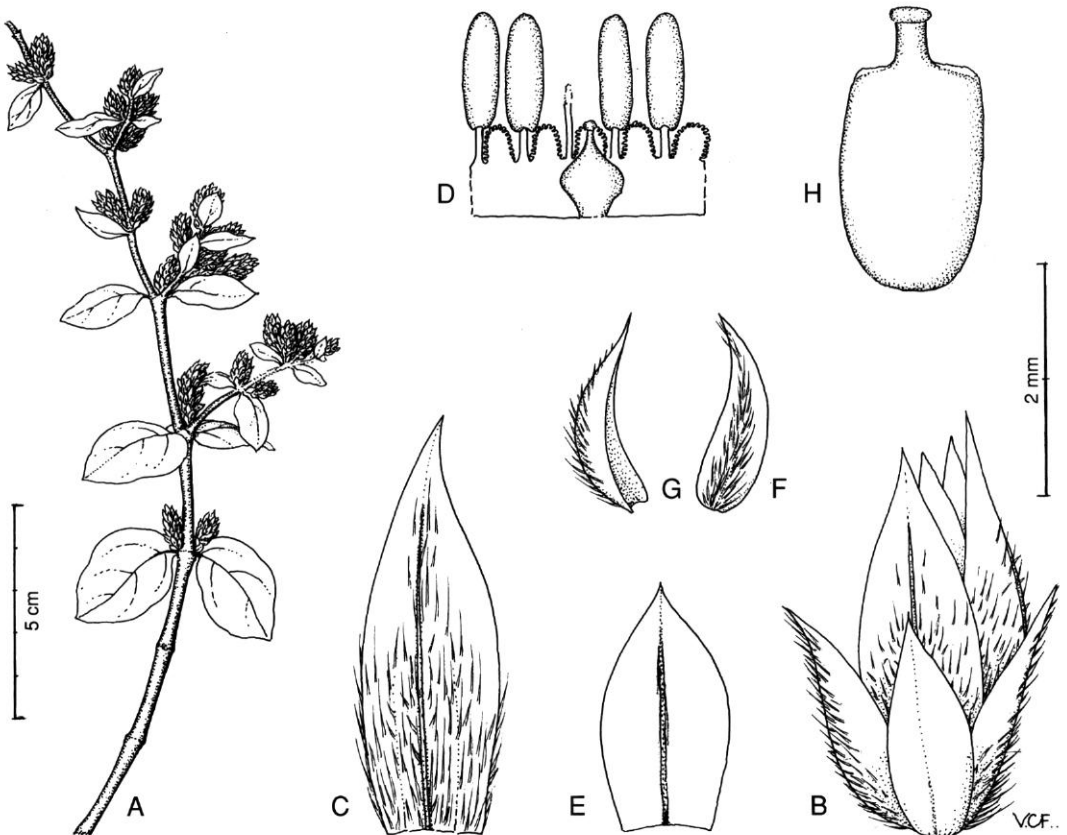


Fig. 2.—*Alternanthera inaccessa* Pedersen: A, habit; B, flower; C, tepal; D, androecium and gynoecium; E, bract; F, bractlet seen from back; G, bractlet seen from side; H, fruit. (Ramella 2846, C).

*tae, valde concavae, paene naviculares, uninerviae, mucronatae, pilis articulatis simplicibus ad 0.75 mm longis in carina dense vestitae; tepala diversiformia: duo abaxialia tenaciter scariosa, interius ad marginem obtectam membranaceo-marginatum,  $\pm 3.5$  mm longa, 1.3 mm lata, anguste ovata, acuminata, leviter concava, mucronata; adaxiale vix exterioribus aequilongum, 1.5 mm latum, planum, membranaceo-marginatum, praeterea ut abaxialia; duo interiora ad 3 mm longa, oblonga, valde concava, haud mucronata; omnia trinervia, dorso densius pilosa. Stamina ad 2 mm longa antheris linearibus 0.8-1 mm longis, filamentis ut videtur antheris dejectis accrescentibus, basi connatis, cum pseudonodiis ligulatis dimidio brevioribus integris vel subtiliter denticulatis alternantibus. Germen ca. 0.65 mm longum, turbinatum stylo ad 0.25 mm cum stigmatibus applanato-capitato ca. 0.2 mm longo. Fructus 1-1.2 mm longus oviformis vel ob-oviformis obscure alatus. Semen ca.  $1 \times 0.95 \times 0.75$  mm, globiforme, funiculo in vertice inserto. Embryo hippocrepiformis cotyledonibus concavis quam radícula duplo latioribus dimidio longioribus.—Fig. 2.*

TYPE.—*Ramella* 2846, Paraguay, dpt. Chaco: cerro Cnel. F. Cabrera (ex cerro Guaraní),  $19^{\circ}39'S$ ,  $61^{\circ}44'W$ , límite con Bolivia, punto oeste del cerro, 700 m, s.m., borde del acantillado, 23 Apr. 1989 (holo-, G; iso-, C).

This new species is related to *A. albida* (Moq.) Griseb., the leaves of which however are densely canescent, the flowers smaller and inflorescence rarely so markedly elongate, and the pseudostaminodia definitely lobulate or lacinate.

According to the collector (pers. comm.), the plant grew on a steep, rocky mountain side, in dense, impenetrable, spiny scrub, hence the name.

### 3. *Alternanthera malmeana* R.E. Fr.

Ark. Bot. 16: 15 (1920).—Type: *Malme II: 359*, Brazil, Rio Grande do Sul, Pedro Osorio (ex Piratiny) (holo-, S).

### 3b. *Alternanthera malmeana* R.E. Fr. var. *straminea* (Chod.) Pedersen, **comb. nov.**

*Telanthera rosea* (Morong) Chod. *e straminea* Chod., Bull. Herb. Boiss., ser. 2, 1: 433 (1901).—Type: *Hassler 4325*, Paraguay (holo-, G!).

*Alternanthera hirtula* (Mart.) Lopr. var. *robusta* Chod. subvar. *straminea* (Chod.) Chod., Bull. Soc. Bot.

Genève, ser. 2, 18: 277 (1926).

*Telanthera rosea* (Morong) Chod. *c pallens* Chod., Bull. Herb. Boiss., ser. 2, 1: 433 (1901).—Type: *Hassler 4939*, Paraguay (holo-, G!).

*Alternanthera hirtula* (Mart.) Lopr. var. *robusta* Chod. subvar. *pallens* Chod., Bull. Soc. Bot. Genève, ser. 2, 18: 278 (1926).

In his treatment of HASSLER's Paraguayan collections, CHODAT described a number of varieties referred, at first in 1901 to *Telanthera rosea*, then, realizing later that this is conspecific with *Alternanthera hirtula*, to that species as sub-varieties of *A. hirtula* var. *robusta*. Two of these are however better referred to *Alternanthera malmeana*, from which they appear to differ only slightly by their more abundant indument, proportionally narrower leaves, conspicuously longer floral bracts, and generally larger flowers. They were also identified as *A. malmeana* by Dr. MEARS on various annotation-slips, though apparently he never published this synonymy. The differences from typical *A. malmeana* seem to justify maintaining them apart as a variety of that species, while the very slight differences between the two varieties (or subvarieties) of CHODAT in my opinion do not justify recognition as distinct.

A recent specimen of *Alternanthera malmeana* (Pedersen 12584, C, CORD, CTES, G) collected at the type locality of the species, and very likely belonging to the same population as the original material collected by MALME, has underground, rhizome-like runners rooting and forming tubers at the nodes. I have not seen anything like this in the Paraguayan variety, but most collectors unfortunately do not bother to dig up the underground parts. Should this prove to be a distinguishing character, it might justify segregation at a higher level.

### 4. *Alternanthera micrantha* R.E. Fr.

Ark. Bot. 16: 14 (1920).—Type: *Dusén 17728*, Brazil (holo-, S!).

*Alternanthera rufescens* Suess., Mitteil. bot. Staatssamml. München 1: 3 (1950).—Type: *Huidobro 5438*, Argentine (holo-, M!; iso-, LIL!).

*Alternanthera micrantha* was based on a specimen from Rio Grande do Sul, Brazil, while the



type of *A. rufescens* comes from the Argentine province of Misiones, essentially from the same floristic region. I can not see any significant differences between the two specimens. Sessile flower-heads, to which SUESSENGUTH attached much importance in the recognition of *A. rufescens*, occur even in the type collection of *A. micrantha*; the reddish colour of the stem seems more influenced by outside conditions and appears not to be genetically fixed. As for the shape of the pseudostaminodia, they vary too much, even in flowers on the same specimen, to be of any use as a distinguishing character. Field observations indicate that this species is very common in southern Brazil and north-eastern Argentina.

**5. *Alternanthera pennelliana* Mears ex Pedersen, nom. nov.**

*Telanthera geniculata* S. Moore, Transact. Linn. Soc. London, Bot., ser. II, 4: 443 (1895).—*Alternanthera geniculata* (S. Moore) R.E. Fr., Ark. f. Bot. 16: 18 (1920), non Urb. (1912).—Type: *Spencer Moore 1093*, Brazil, Mato Grosso (holo-, BM!).  
*Alternanthera pennelliana* Mears, nom. in sched.

The combination *Alternanthera geniculata* not being available for the plant described by MOORE, Dr. MEARS has used *A. pennelliana* on his annotation slips, although I am not aware that it has ever been validly published.

**6. *Alternanthera philoxeroides* (Mart.) Griseb.**

Symbolae ad floram argentinam: 36 (1879).—*Bucholzia philoxeroides* Mart., Beitr. z. Kenntniss d. Amarantaceen: 137 (1825).—Type: *Sellow s.n.*, Uruguay, near Montevideo (lecto-, BR!). For year of publication see STAFLEU 1981.

*Telanthera philoxeroides* (Mart.) Moq.  $\beta$  *obtusifolia* Moq. in DC., Prodr. 13 (2): 363 (1849).—*Alternanthera philoxeroides* (Mart.) Griseb. var. *obtusifolia* (Moq.) Hicken, Apuntes Hist. Nat. 2: 94 (1910). For a complete synonymy of this species see MEARS (1977).

*Alternanthera philoxeroides* is native to the warmer parts of South America, and widely naturalized elsewhere. It varies considerably, as already

observed by MARTIUS (1825): 138: "*Varietas obtusifolia habitat in Monte Video: clar. Sellow. Var. acutifolia ad S. Pauli Civitatem locis udis. v. v.*" This variability has resulted in the description of a number of infra-specific taxa. In a previous paper (PEDERSEN 1967) I considered these mere chance variations caused by differences in the environment, and reduced them to synonymy. MEARS (1977) largely concurred, remarking (p. 15): "The specimens for f. *angustifolia* Suess. and var. *obtusifolia* Moq. might be recognized as formae, but I see no point now; they have no geographic significance". Since then, observations in the field, confirmed by the examination of numerous herbarium specimens, have convinced me that some of these taxa are not wholly worthless, their distinguishing characters appearing to be genetically fixed, and that in fact they do occupy definite areas.

**6b. *Alternanthera philoxeroides* (Mart.) Griseb. fa. *acutifolia* (Moq.) Pedersen, stat. nov.**

*Telanthera philoxeroides* (Mart.) Moq.  $\beta$  *acutifolia* Moq. in DC., Prodr. 13 (2): 363 (1849).—*Alternanthera philoxeroides* (Mart.) Griseb. var. *acutifolia* (Moq.) Hicken, Apuntes Hist. Nat. 2: 94 (1910).—Type: *Martius s.n.*, "habitat in aquaticis, inundatis ad fluv. Sapucahy" (lecto-, M).

In the opinion of MEARS (1977), which I share, MARTIUS did not intend to propose two new infra-specific taxa, but merely to draw attention to the variability of the species. However, the names he used were taken up by MOQUINTANDON, who produced formal descriptions of the two varieties, and they should thus be ascribed to him.

The forma *acutifolia* is the one most often seen throughout most of Brazil, and almost certainly that with which MARTIUS was most familiar. The type would have been the logical lectotype of the species, but for the fact that the only specimen mentioned in the protologue known to have been handled by MARTIUS himself belongs to the variety *obtusifolia* (Pedersen 1967; Mears 1977). Although I believe it distinct, the forma *acutifolia* scarcely merits recognition at higher rank, the

only difference from the forma *philoxeroides* being the shape of the leaves.

**6b\*. *Alternanthera philoxeroides* (Mart.)**

Griseb. fa. *acutifolia* (Moq.) Pedersen, subfa. *philoxerina* (Suess.) Pedersen, **comb. et stat. nov.**

*Alternanthera philoxerina* Suess., Feddes Repert. 35: 303 (1934).—Type: *Erik Asplund s.n.*, Brazil, Santos, 15 Sep. 1921 (holo-, S!).

I have very little faith in the value of this taxon, and am according it the lowest status admitted by the Code. I only recognize it provisionally because it appears to have a definite geographic range, being confined to the town of Santos and vicinity in Brazil, from where I have seen three collections: the type, a specimen from the nearby sea-side resort Praia Grande, *Rawitscher 7* (SP), and a collection of my own: Santos, waste ground in the port area, *Pedersen 11201* (C). In general aspect, the subfa. *philoxerina* is exactly similar to the subfa. *acutifolia*, the only difference being the sessile flower-heads. As all the flowers I have examined were deformed and had a sickly appearance, with the anthers generally empty, the ovary as far as I could see too, the plant may be sterile, which would account for its restricted geographical distribution.

**6c. *Alternanthera philoxeroides* fa. *angustifolia* Suess.**

Feddes Repert. 35: 303 (1934).—Type: *Hassler 2141*, Paraguay (holo-, B).

*Telanthera philoxeroides* var. *linearifolia* Chod., Bull. Herb. Boiss. 7, Append. 1: 64 (1899).—Type: *Hassler 1558*, Paraguay (holo-, G!).

*Alternanthera philoxeroides* var. *lancifolia* Chod., Bull. Soc. Bot. Genève, ser. 2, 18: 257 (1927).

This taxon does not merit higher status than forma, and at that level SUESSENGUTH's name takes priority over CHODAT's. No specimen is cited in the protologue as type of the var. *lancifolia*, although CHODAT occasionally has used the name on labels.

This is the form commonly encountered in

most of Argentine Mesopotamia, in at least part of the Chaco region, and in Paraguay.

**7. *Alternanthera praelonga* St.-Hil.**

Voyage dans le District des Diamans 2: 409 (1833).—*Telanthera praelonga* (St.-Hil.) Moq. in DC., Prodr. 13 (2): 369 (1849).

*Achyranthes praelonga* (St.-Hil.) Standl., Journ. Washington Acad. of Sciences 5: 74 (1915).—Type: *Saint-Hilaire B2 no. 67*, Brazil, Rio de Janeiro, on the beach at Cabo Frio (holo-, P!).

At its southern limit, *Alternanthera praelonga* presents a rather different aspect from the plant described by SAINT-HILAIRE. As this material is also remarkably homogenous, it is described as an admittedly very weak geographical variety.

**7b. *Alternanthera praelonga* var. *australis* Pedersen, var. nov.**

*A var. praelonga recedit foliis latioribus plerumque ovatis acutis vel obtusis saepe basi sub-cordatis villosis, floribus vulgo paullo majoribus. Characteres ceteri ut in var. praelonga.*

TYPE.—*Hatschbach 27220*, Brazil, Rio Grande do Sul, munic. Torres: Torres. Paredões de arenito a beira mar 15 Oct. 1971, "Flor alvecente" (holo-, MBM).

PARATYPES.—BRAZIL. State of Rio Grande do Sul, munic. Torres: *Karner Hagelund 7642*, Torres, Pé morro do farol, 3 Jan. 1974.—Vicinity of Torres: *Lindeman & de Haas 3780*, Coastal rock, 30 Dec. 1966, "Ascending; capitules yellowish white, anthers bright yellow" (U, W).—State of Santa Catarina, munic. Navegantes: *Krapovickas & Cristóbal 43515*, Gravatá. Em matorrals sobre las dunas costeras, 31 Jan. 1990, "Apoyante, inflorescencias blanco-amarillentas" (CTES).—The last specimen differs slightly, approaching the variety *praelonga*.

*Alternanthera praelonga* is closely related to *A. flavescens*, and further study may very likely show that the two can not be kept apart at specific level.

**8. *Alternanthera puberula* (Mart.) D. Dietr.**

Syn. plant. 1: 866 (1839).—*Brandesia puberula*

Mart., Beitr. z. Kenntniss d. Amarantaceen: 135 (1825), nomen.; Nova gen. spec. plant. Bras. 2: 27 (1826).—*Pfaffia puberula* (Mart.) Spreng., Cur. post. in syst. veg.: 106 (1827).—*Telanthera puberula* (Mart.) Moq. in DC., Prodr. 13 (2): 372 (1849).—*Achyranthes puberula* (Mart.) Standl., Journ. Washington Acad. Sciences 5: 74 (1915).—Type: *Martius s.n.*, Brazil, Rio de Janeiro Serra dos Orgãos (M).  
*Alternanthera subumbellata* Suess., Feddes Repert. 42: 55 (1937).—Type: *Fiebrig 5363*, Paraguay (holo-, Sl).

That *Alternanthera puberula* (Mart.) D. Dietr. and *A. subumbellata* Suess. are identical was stated by Dr. MEARS on his annotation slip on the type sheet of *A. subumbellata*, but this synonymy, with which I fully agree, has to my knowledge never been published.

Curiously enough, *Alternanthera puberula* has been wrongly synonymized with *A. brasiliana* (L.) Kuntze by KUNTZE (1891).

## 9. *Alternanthera ramosissima* (Mart.) Chod.

Bull. Herb. Boiss., ser. 2, 3: 355 (1903).—*Mogiphanes ramosissima* Mart., Nova gen. sp. plant. Bras. 2: 31 (1826).—Type: *Martius s.n.*, Brazil, Minas Gerais, Chapada (M!).

*Mogiphanes villosa* Mart., l.c.: 33 (1826).—Type: *Martius s.n.*, Brazil, São Paulo, prope Guaratinguetá (M!), non *Alternanthera villosa* H.B.K. (1818).

*Mogiphanes virgata* Schrad., Ind. sem. hort. Goett.: 4 (1834).—Type: cult. in Göttingen botanical Garden (GOET!).

*Telanthera moquinii* Webb ex Moq. in DC., Prodr. 13 (2): 379 (1849).—*Alternanthera moquinii* (Webb ex Moq.) Dusén, Arquiv. Mus. Nac. Rio de Janeiro 13: 63 (1903). Based on *Mogiphanes villosa* Mart.

*Telanthera brasiliana* (L.) Moq.  $\beta$  *villosa* Moq., l.c.: 382 (1849).—*Alternanthera brasiliana*  $\beta$  *villosa* (Moq.) O. Kuntze, Rev. gen. plant. 2: 538 (1891).—Type: *Blanchet 3881*, Brazil, Bahia (holo-, Pl!).

*Alternanthera virgata* (Schrad.) Suess, Feddes Repert. 35: 305 (1934), nom. inval.

For a complete synonymy, see MEARS (1977) under *A. brasiliana* var. *villosa*. SUESSENGUTH'S combination *Alternanthera virgata* is not valid, as he expressly states that in his opinion, though possibly distinct, the taxon does not deserve the rank of species.

*Mogiphanes ramosissima* and *M. villosa* were both described by MARTIUS from material that he collected in Brazil. The type collections (M) represent the extremes of variation of a widely distributed taxon, and as it was known to MARTIUS from these specimens and field observations, it would appear to have been perfectly justifiable to keep them apart, if not at specific level, at least as taxa of some lower rank. Characters separating the two would include the abundance, length, and colour of the indument, and the size of the flowers. However, the number of collections of this common and highly adaptable species have increased enormously since 1826 making it clear that the characters mentioned above are in no way correlated, making it necessary to unite them.

Such authentic material of *Mogiphanes virgata* Schrad. as I have seen, and plants grown from seed harvested in Göttingen, all clearly belongs to *A. ramosissima*.

*Telanthera brasiliana*  $\beta$  *villosa* appears to belong here, and not in *A. brasiliana*. OTTO KUNTZE'S combination *A. brasiliana*  $\beta$  *villosa* was used by MEARS (1977) for the taxon here considered a distinct species, suggesting that *A. moquinii* might be different. *Alternanthera brasiliana* and *A. ramosissima* are very closely related, and although there are specimens where reference to one or the other species is purely arbitrary, they usually are easily told apart, even with the naked eye. The bractlets in *A. brasiliana* equal or overtop the perianth, while in *A. ramosissima* they do not reach the tips of the tepals; moreover, their areas of distribution are not the same, justifying recognition at specific level. MEARS included *Mogiphanes diffusa* Mart. in synonymy under *A. brasiliana* var. *villosa*; in my opinion, it is closer to *A. brasiliana* sensu str., and may represent some of the doubtful or intermediate forms mentioned above.

With the typical variety, a total of three varieties of *A. ramosissima* are recognized.

## 9b. *Alternanthera ramosissima* (Mart.) Chod. var. *missionum* Pedersen, var. *nov.*

*Suffrutex decumbens, radicans, ramis ascendentibus a*

*var. ramosissima* recedit spicastris omnibus sessilibus vel brevissime (max. ad 12 mm longe) pedunculatis.

Caulis juventute pilis 0.3-1.5 mm longis antrorso-appressis ± densius vestitus, aetate glabrescens. Folia cum petiolo ad 0.5 cm longo 2-8 cm longa, 0.5-4.5 cm lata, ovata, acuta acuminatae, breviter mucronata, novella ut caulis pilosa, glabrescentia. Flores in spicastris oviformibus cylindraceute congesti, bracteis scariosis 3-4 mm longis acuminatis, mucronatis suffulti, bracteolis ut bracteis scariosis 4-5 mm longis, acuminatis, valde concavis, dorso anguste cristatis aut in nervo setosis, ad 1.35 mm longe pedicellati: tepala tenaciter scariosa, maturitate sub-carnosa, ad 4.5 mm longa, oblonga, acuta, pilosa vel sub-villosa; stamina post anthesin vix 3 mm longa antheris linearibus millimetralibus vel ultra; germen depresso-oboviforme cum stylo ad 0.3 mm. Utriculus ca. 2.3 mm, oblongus apice truncatus, juxta stylum persistentem gibbis duabus parvulis munitus.

TYPE.—Vanni, Ferrucci, López & Chiquisola 2784, Argentina, prov. Misiones, dpt. Iguazú: Cataratas del Iguazú, sendero de observación, Selva marginal, 7 Aug. 1991, "Apoyante, flores blanquecinas" (holo-, CTES).

PARATYPES.—ARGENTINA: Corn. Osten & Rojas 8290, prov. Misiones, dpt. Iguazú: am Yguazú Ufer, 11 Nov. 1915, "Kriechender Halbstrauch auf Felsen. Köpfe gelblich" (G); Lourteig 1116, same locality, 7 July 1945 (CTES); Hunziker 841, same locality, 18 July 1945, "Lugar húmedo, cerca salto de agua. Entre rocas. Poco frecuente" (CTES); Krapovickas 2442, same locality, 19-20 July 1945 (SI).

### 9c. *Alternanthera ramosissima* (Mart.) Chod.

*var. reptans* Pedersen, *var. nov.*

*A var. ramosissima* recedit caule humifuso vel rhizomate subterraneo late errante, radicante, ad nodos saepe incrassato, e quo ramuli floriferi vix 15 cm longi erecti oriuntur.

Caulis inter nodos 0.1-0.25 cm crassus (ramuli floriferi vix ad 0.15 cm), nodi tuberiformes ad 0.5 cm, pars supraterranea pilis simplicibus 1-1.5 mm longis patentibus dense vestita. Folia petiolo ca. 1/10 longitudinis 2-4 cm longa, 1-2.5 cm lata, late ovata, acuta aut plerumque obtusa, basi truncata, mucronata, pilis ± 0.7 mm longis utrinque dense vestita. Flores in spicastris solitariis terminalibus 80-115 mm pedunculatis oviformibus ad 12 mm diametro congesti: bractea 3-3.5 mm longa, ovata, acuta, vulgo dorso appresso-piloso; bracteolae 4.5-4.75 mm longae, acuminatae, crista ad 0.25 mm lata serrata dorso ornatae, pilosae; perianthium 0.5-1 mm pedicellatum, tepala 4.5-5 mm longa, oblonga anguste oblongo-ovatae, acuta, dorso pilis 0.3-0.4 mm longis vestita; stamina 2.5-2.7 mm longa antheris 1-1.2 mm longis, filamentis ad medium vel supra

connatis, cum pseudostaminodiis antheras superantibus apice laciniatis alternantibus; stylus cum stigmatibus ± 0.35 mm longus. Utriculus ad 2.2 mm longus ovoideus superne bigibbosus.—Fig. 3.

TYPE.—Pedersen 12663, Brazil, State of Sta. Catarina, munic. Laguna: near Laguna, cliffs by the sea, 9 Dec. 1979 (holo-, C).

PARATYPES.—BRAZIL: Hatschbach & Forero 40378, Sta. Catarina, munic. Imbituba: Nova Esperança. "Reptante, flores alvecentes. Nas dunas fixas"; Krapovickas & Cristóbal 39382, Sta. Catarina, munic. Laguna: Morro N.S. da Gloria, 24 Jan. 1984, "Ramos postrados hasta 2 m de largo. Flores blanco-amarillentas" (CTES).

*Alternanthera ramosissima* appears to be very closely related to *A. villosa* H.B.K., from which it appears to differ only by a far less abundant indument, often being almost glabrous, by its smaller flowers, and the well-developed crest on the bractlets. As the ranges of the two scarcely overlap, it is considered better to keep them distinct.

*A. villosa* was apparently misunderstood by MEARS, who on his annotation-slips referred material of *Alternanthera hirtula* (Mart.) Lopr. to it as a variety under the (apparently unpublished) combination *A. villosa* var. *cinnabarina*, which he ascribed to CHODAT. The two can be separated by the shape of the bractlets, which are much longer than the bract, are acuminate, almost navicular, and frequently crested in *A. villosa*, whereas in *A. hirtula* the bractlets are about the same length as the bract, broadly ovate, often obtuse or short-acuminate, and never have a crest.

### 10. *Alternanthera serpens* Pedersen, *sp. nov.*

Herba procumbens teste collectorum ad nodos radicans: radix non vidi. Caulis 0.08-0.2 cm crassus, teres, ad nodos incrassatus, in sicco caperatus, novellus pilis ± 0.3 mm longis vix ramosis albidis antrorsis vestitus, mox glaber. Folia opposita saepe inaequilonga, subsessilia, subamplexicaulia, 1-5.2 × 0.2-0.5 cm, anguste oblonga, utrinque acuta, uninervia nervis secundariis non notis, nervus in mucronem crassum ad 0.2-0.3 mm longum excurriens, novella sat dense pilis ut iis caulis vestita, mox glabra. Flores in spicastris sessilibus solitariis terminalibus aut spurie axillaribus globosis vel breviter cylin-

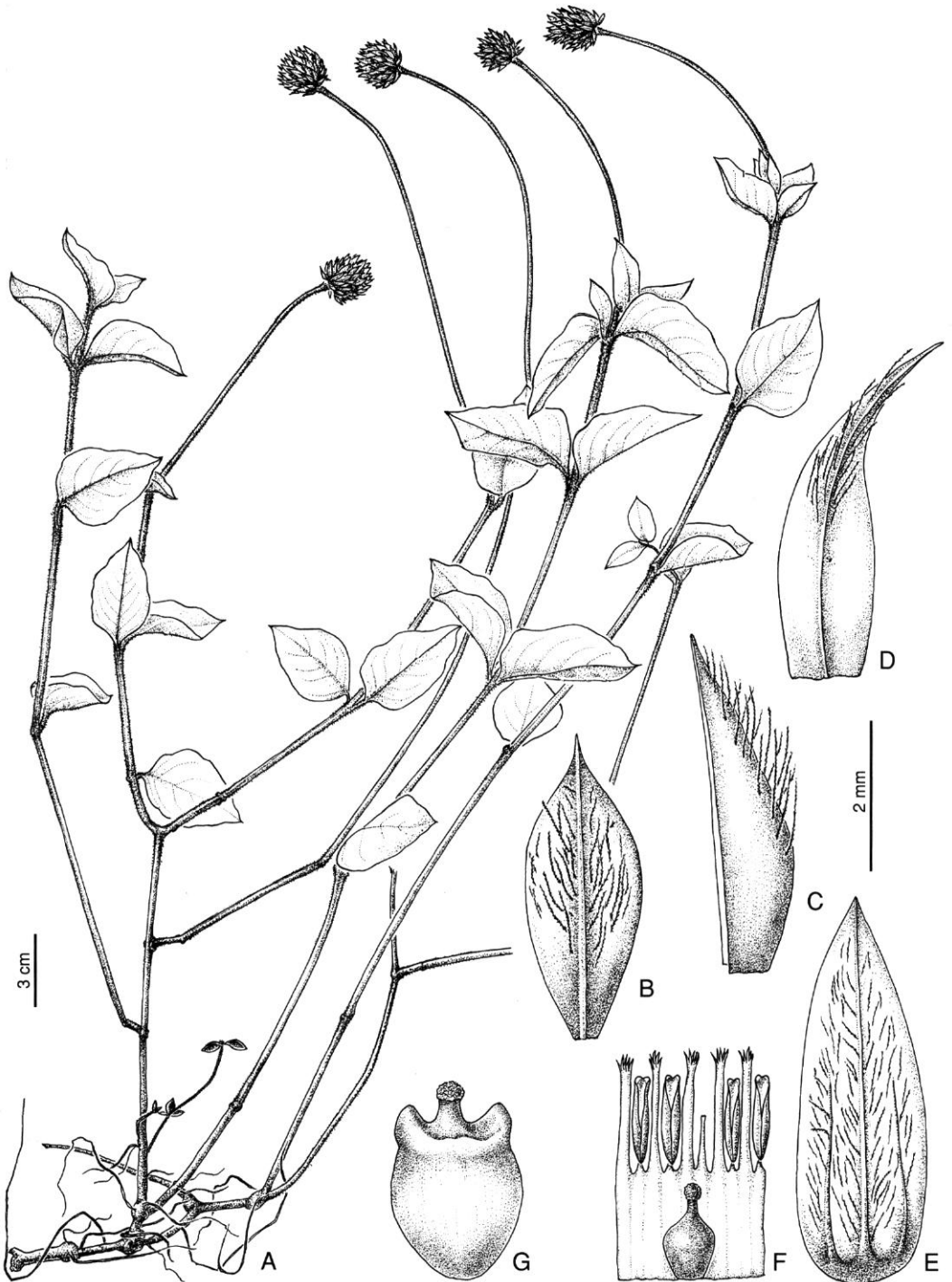


Fig. 3.—*Alternanthera ramosissima* var. *reptans* Pedersen: A, habit; B and C, bract; D, bractlet; E, tepal; F, androecium and gynoecium; G, fruit. (Pedersen 12663, C).

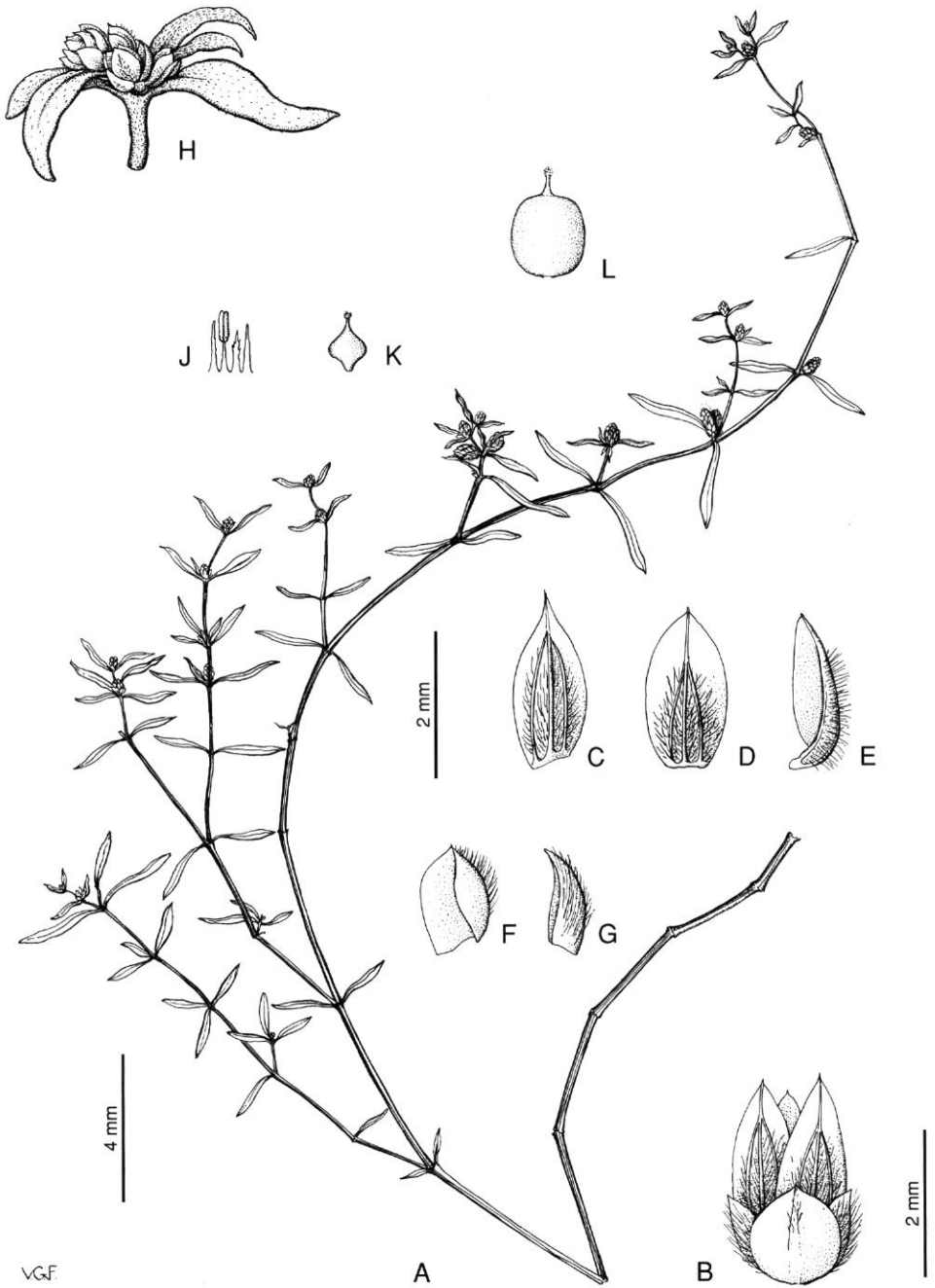


Fig. 4.—*Alternanthera serpens* Pedersen: **A**, habit; **B**, flower; **C**, outer abaxial tepal seen from back; **D**, adaxial tepal seen from back; **E**, inner tepal seen from side; **F**, side view of bract; **G**, side view of bractlet; **H**, flowering shoot; **J**, androecium; **K**, gynoecium; **L**, fruit. (Vanni et al. 2608, CTES).



*dricis ad 8 mm longis, ± 4.5 mm crassis bracteis florisque appressis conferti: bractea sat tenaciter scariosa, ca. 1.7 mm longa, 1.5 mm lata, orbicularis, apice rotundata vel obtusa, uninervia, breviter sed manifeste mucronata, glabra; bracteolae scariosae, ca. 1.5 mm longae, asymmetricae ovatae, obtusae, valde asymmetricae naviculares, uninerviae, tenuiter mucronatae, dorso hirsutae; tepala diversiformia: duo abaxilaria tenaciter scariosa, paene cartilaginea, margine membranacea, ± 2.5 mm longa, ovata, acuta, trinervia, mucronata, dorso hirsuta; adaxilare ca. 2.2 mm longum, praetera ut abaxilaria; duo interiora ca. 2 mm longa, latissime membranaceo marginata, ovata, subacuta, subcucullata, navicularia, trinervia, haud mucronata, dorso hirsuta; stamina ca. 1.5 mm longa antheris oblongis 0.8-0.9 longis post anthesin mox deciduis, filamentis ad basin connatis, cum staminodiis multo brevioribus oblongo-ovatis, acutis, dentatis alternantibus; germen ca. 0.65 mm longum, oboviforme stylo ca. 0.25 stigmati applanato ca. 0.2 mm longo. Fructus ca. 1 mm longus, compresso-globiformis, exalatus. Semen ca. 1 × 1 × 0.75 mm, funiculo vertice inserto. Embryo hippocrepiformis vel paene annularis cotyledonibus sat latioribus quam radícula duplo longioribus.—Fig. 4.*

TYPE.—Vanni, Radovancich & Schinini 2608, Paraguay, dpt. Boquerón: Colonia Fernheim, Estancia Laguna Porá, 21°45'S, 59°W, en campos con acumulaciones de sales, 1 Mar. 1991, "Con nudos radicantes; tallos rojizos, hojas verde glaucas, abundante" (holo-, CTES).

This species is of uncertain affinity, in aspect superficially like, and possibly related to *A. paronychoides* St.-Hil.

### 11. *Celosia corymbifera* Didr.

Index seminum in horto academico Hauniensi a. 1849 collectorum: 13 (1850).—Type: *Didrichsen s.n.*, Brazil, Petrópolis.

*Celosia cymosa* Seub., Mart. Fl. Bras. 5: 245 (1875).—Type: *Riedel 1355*, Brazil, Rio de Janeiro.

Thanks to the diligence and energy of Dr. Bertel HANSEN and Mr. SANDERMANN-OLSEN, the type of this forgotten and misunderstood species—according to the Index Kewensis of unknown origin—was found among the indeterminate material in C.

I have not seen the type of *Celosia cymosa*, but the description fits both the material so determined seen, and the specimen collected by *Didrichsen*.

### 12. *Gomphrena boliviana* Moq.

In DC., Prodr. 13 (2): 401 (1849); Hunziker, Kurtziana 6: 297 (1971).—Type: *culta in hort. Luxemb.* aug. 1836 (FI!).

#### 12b. *Gomphrena boliviana* var. *tarijensis* (R.E. Fr.) Pedersen, **comb. nov.**

*Gomphrena tarijensis* R.E. Fr., Ark. Bot. 16: 27 (1920).—Type: *Fries 1088*, Bolivia, Tarija (SI).

FRIES only knew *G. boliviana* from the description in DE CANDOLLE's Prodr. A misinterpretation of MOQUIN-TANDON's description led him to describe two new species, *Gomphrena lanceolata* (= *G. boliviana* fa. *robusta* (Hicken) Pedersen) and *G. tarijensis*, which, though possibly not identical with, certainly can not be kept apart from *G. boliviana* at specific level. The type of *Gomphrena tarijensis* hardly differs from material of *G. boliviana*, being of more compact growth, with shorter-stalked flower-heads, shorter involucre bracts, and shorter floral bract. As in my opinion more harm can be done by undue lumping than by excessive splitting, I am provisionally recognizing this taxon at varietal level.

### 13. *Gomphrena celosioides* Mart.

Beitr. z. Kenntniss d. Amarantaceen: 123 (1825).—Type: *Sellow s.n.*, Uruguay (BR!).

This rather weedy species is extremely common all over eastern sub-tropical and warm-temperate South America, and has during this century been introduced and naturalized in other continents. It belongs to a group of species characterized by flowers that are arranged in a usually solitary and long-pedunculate spike-like inflorescence with two or four foliaceous involucre bracts at base, mostly crested bractlets, and tepals frequently indurate at maturity. This group, to which *G. globosa* L., the type of the genus, belongs, extends from southern North America and Central America, apparently with a high diversity of species there, through Central and Southern Brazil, reaching its southernmost limit on the



shores of the River Plate. While a critical revision of this entire group would be desirable, this would fall beyond the aim of the present study. However, there have been some differences of opinion about the limits of several of the South American species, and much confusion with species that I do not regard as being very closely related, such as the Central American *G. serrata*, frequently cited in error, mostly under the synonym *G. decumbens* Jacq., from sub-tropical South America. For this reason I shall attempt to solve some of the problems involved.

### 13b. *Gomphrena celosioides* var. *hygrophila* (Mart.) Pedersen, **comb. nov.**

*Gomphrena hygrophila* Mart., Herb. Fl. Bras.: 306, no. 581 (1837).—*Xeraea hygrophila* (Mart.) Kuntze, Rev. gen. plant. 2: 545 (1891).—*Gomphrena desertorum* Mart. var. *hygrophila* (Mart.) Stuehl., Feddes Repert. 11: 161 (1912).—Type: *Martius s.n.*, Brazil, Mato Grosso (M!).

*Gomphrena mariae* S. Moore, Trans. Linn. Soc. London, Bot., ser. 2, 4: 444 (1895).—Type: *Moore 846*, Brazil, Mato Grosso (BM!).

*Gomphrena desertorum* var. *hygrophila* fa. *ramosissima* Stuehl., Feddes Repert. 11: 161 (1912).—Type: *Weddell s.n.*, Brazil, Mato Grosso (P, not seen).

Like the variety *celosioides* this is a rather weedy plant, common in western Brazil and adjacent Bolivia and Paraguay. MARTIUS considered it closely related to *G. desertorum* Mart. from north-eastern Brazil, which it resembles. For this reason STUEHLIK presumably referred it there as a variety, a treatment that has been followed by later students of the genus, e.g. HOLZHAMMER (1955-56), while SIQUEIRA (1992) considered the two identical. In my view, this variety is obviously more closely related to *G. celosioides*, with which it shares the continuous growth of the spike in flower, with the lower flowers maturing fruit and dropping off long before the apical flowers are open, a character that I have not observed in *G. desertorum*. In fact, *G. hygrophila* merges imperceptibly with *G. celosioides*, with the form *roseiflora* (Chod.) Pedersen being intermediate between the two. The best character separating them is the shape of the crest on the bractlets, which are narrow, usually dentate to almost lac-

inate, frequently obsolete or even wanting in the var. *celosioides*, and broad and nearly entire in the var. *hygrophila*.

*Gomphrena mariae* was synonymized by STUEHLIK (1912) with *G. serrata* L. (under the name *G. decumbens* Jacq.), a species to which I do not consider it closely related; this treatment was followed by HOLZHAMMER (1955-56).

### 13c. *Gomphrena celosioides* var. *fallax* (Seub.) Pedersen, **comb. nov.**

*Gomphrena fallax* Seub. in Mart. Fl. Bras. 5 (1): 220 (1875).—*Xeraea fallax* (Seub.) Kuntze, Rev. gen. plant. 2: 545 (1891).—*Gomphrena desertorum* var. *fallax* (Seub.) Holz., Mitteilungen bot. Staatssamml. München 14-15: 206 (1956).—Type: *Pohl 1851* (lecto-, M).

*Gomphrena fallax* was considered identical with *G. desertorum* Mart. by STUEHLIK (1912) and SIQUEIRA (1992). The continuous growth of the flowering spike shows that it is more closely related to *G. celosioides*. The excellent description given by SEUBERT emphasizes several distinctive characters: the broad, almost entire crest at the tips of the bractlets, the mostly very distinct, oblong green spot on the back of the tepals; the flowers are generally smaller than in *G. celosioides*, this being probably the character of least value. Provisionally, I am referring this taxon to *G. celosioides* as a very distinct variety. SEUBERT describes the flowers as white. I have seen specimens otherwise clearly belonging here, but according to the collector's field notes with pink or pinkish flowers. In view of the somewhat uncertain status of this taxon, I do not consider it practical for the present to describe these variants as distinct.

### 14. *Gomphrena desertorum* Mart.

Nova gen. sp. plant. Bras. 2: 3 (1826).—Type: *Martius 2793*, Brazil, Bahia (M!).  
*Gomphrena rodantha* Moq. in DC., Prodr. 13 (2): 414 (1849).—*Gomphrena desertorum* var. *rodantha* (Moq.) Stuehl., Feddes Repert. 11: 161 (1912).—Type: *Gardner s.n.*, Brazil, Goiás (G-DC).

*Gomphrena rodantha* was based on two GARDNER collections, no. 3963 and 3965; of the former collection I have seen the material in BM and K, but I have not seen material of the second number. While the GARDNER collection certainly looks very different from the type material of *G. desertorum*, (being a straggling, weedy plant rooting from the lower nodes, as opposed to the

trim MARTIUS specimen), the structure of the flowers and fruit appear to be identical, and as the differences in habit can be explained by differences in habitat, I agree with SIQUEIRA (1992) that the two can not be kept apart.

The following key can be used to distinguish the components of the *Gomphrena celosioides* complex and the species that are currently confused with it.

1. Tepals distinctly longer than bractlets ..... **G. mucronata** Seub.
- 1'. Tepals shorter than, or at most as long as bractlets ..... 2
2. Annual; spikes frequently in groups of 3; crest on back of bractlets laciniate, reaching almost from apex to base ..... **G. serrata** L.
- 2'. Perennial; spikes solitary; bractlets mostly crested on upper third, crest rarely reaching below the middle, dentate to almost entire ..... 3
3. Spikes 18-20 mm diameter, not growing appreciably in length during flowering; tepals 5.5-7.5 mm long; anthers 2-3 mm long, style very short (0.1 mm) and thick ..... **G. desertorum** Mart.
- 3'. Spikes smaller, 10-15 mm diameter, growing continuously in length during flowering; tepals 4-5.5 mm long; anthers 1 mm or less; style 0.3-0.5 mm long ..... **G. celosioides** Mart.
  - A. Crest on bractlets usually not more than 0.2-0.3 mm broad, dentate, or reduced to a row of teeth, or bractlets without crest ..... var. **celosioides**
    - A1. Flowers white or whitish ..... fa. **celosioides**
    - A2. Flowers yellow ..... fa. **aureiflora** (Chod.) Pedersen
    - A3. Flowers pink or purplish ..... fa. **roseiflora** (Chod.) Pedersen
  - A'. Crest on bractlets 0.5-1 mm or more broad, usually minutely serrulate or almost entire ..... B
  - B. Tepals  $\pm$  4 mm long, usually with a conspicuous green spot on back, 3 outer truncate and dentate or 2-fid at apex ..... var. **fallax** (Seub.) Pedersen
  - B'. Tepals 5-5.5 mm long, without any spot on back, all acute ..... var. **hygrophila** (Mart.) Pedersen

## 15. *Gomphrena elegans* Mart.

Nova gen. sp. plant. Bras. 2: 17 (1826).

The holotype can not be located. A specimen in M, purportedly collected by MARTIUS in the state of Bahia, corresponds to the traditional concept of the species, and is therefore designated as the lectotype.

### 15b. *Gomphrena elegans* var. **orientalis**

Pedersen, var. **nov.**

*A var. eleganti recedit statura humiliore caule omnino herbaceo foliis plerumque angustioribus lanceolatis utrinque acutis indumento depauperato, a var. persimili mesopotamica Pedersen foliorum forma tantum.*

TYPE.—Pedersen 16184, Rep. Oriental del Uruguay,

Dpt. Salto: near Termas del Arapey, Grassland on clay, 15 Jan. 1995 (holo-, C).

PARATYPES.—BRAZIL: Lindeman, Deiro & Gonçalves 7016, State of Rio Grande do Sul, municip. Bagé: Passo dos Enforcados, 73 km NE of Bagé. Wood on steep bank of Rio Camaquá, 5 Mar. 1981, "Herb, flowers white" (U); Pedersen 11663, Munic. Quaraí: Coxilha de Japejú, Roadside and grassland on medium dry ground, 27 Jan. 1977 (C); Pedersen 11394, Munic. Uruguaiana: Pindal, BR-290 km 529, where the road to Livramento turns off, Roadside, 8 Nov. 1976 (C); Pedersen 12553, Road from Uruguaiana to Quaraí, by the Arroio Garupá. Moist, loamy soil, mainly where protected by low shrubs or coarse grass, 27 Nov. 1979 (C).—URUGUAY: Pedersen 13897, dpt. Artigas: near Baltazar Brum, on the bank of a little stream, 22 Mar. 1984 (C); Rosengurt B-7203, Yuquerí, río Cuareim, en rastrojo, 5 Feb. 1958 (C).

This taxon could be considered a narrow-leaved form of the variety *mesopotamica* Pedersen from

northern Entre Ríos and southern Corrientes in the Argentine, and my no. 12553 was originally determined as such. They are recognized as distinct, however, because the variety *orientalis* appears to be restricted to Northern Uruguay and the South of the Brazilian State of Rio Grande do Sul, and also because all the material cited above is so remarkably similar. I have named the variety for the full name of the country where the type was collected, República Oriental del Uruguay.

### 16. *Gomphrena martiana* Gill. ex Moq.

In DC., Prodr. 13 (2): 400 (1849).—Type: *Gillies s.n.*, Argentine, Prov. San Luis (holo-, K!).

#### *Gomphrena martiana* var. *martiana* fa. *martiana*

*Gomphrena martiana* var. *microcephala* Suess., Mitteil. Bot. Staatssamml. München 1: 5 (1950).—Type: *Malvarez 444*, Argentine, prov. Salta (holo-, M!).

The flowers of the type of *Gomphrena martiana* var. *microcephala* are similar to those of the type of the species, and I consider any difference in size of the flower-heads of no taxonomic significance. The tepals of the type are hairy, and it should thus be placed in the form *martiana*, as opposed to the fa. *austrina* Pedersen which has glabrous tepals.

### 16b. *Gomphrena martiana* var. *glutinosa* (R.E. Fr.) Pedersen, **comb. nov.**

*Gomphrena glutinosa* R.E. Fr., Ark. Bot. 16: 28 (1920).—Type: *Fries 1669*, Bolivia, Gran Chaco (S!).

When FRIES described *Gomphrena glutinosa*, he only knew *G. martiana* from the description. The description of *G. glutinosa* fits *G. martiana* very well, including the peculiar filaments with divergent lateral lobes, which so captivated his attention, the only salient difference being the glandular leaves of the former, which is not suffi-

cient to justify recognition at the species level.

This variety reaches far into the Chaco region of Paraguay and Bolivia, and seems in many places to be more common than the typical variety.

### 17. *Gomphrena mucronata* Moq.

In DC., Prodr. 13 (2): 413 (1849).—*Gomphrena desertorum* var. *mucronata* (Moq.) Stuhl., Feddes Repert. 11: 161 (1912).—Type: *Lund s.n.*, Brazil, São Paulo (holo-, not seen; three isotypes in C!).

*Gomphrena desertorum* var. *mucronata* fa. *ramosissima* Stuhl., Feddes Repert. 11: 162 (1912). Based on two specimens from Brazil, a *Martius* specimen from Minas Gerais, and *Riedel 2229* from Rio Grande, of which latter I have seen a duplicate in C.

Both in vegetative features, including very narrow, usually densely hairy, conspicuously mucronate leaves, and in floral structure the tepals being distinctly longer than the bractlets, the hairs at their base straight, not woolly, and the stamens exceptionally long-exserted at maturity (top part with anthers mostly lost in herbarium specimens), this species differs markedly from both *G. desertorum* and *G. celosioides*, and is worthy of recognition.

From the description, and from the specimen seen, I consider the form *ramosissima* Stuhl. worthless.

### 18. *Gomphrena paraguayensis* Chod.

Bull. Herb. Boiss., ser. 2, 1: 432 (1901), description only, no material cited; l.c. 3: 388 (1903).—*Gomphrena elegans* Mart. var. *paraguayensis* (Chod.) Holz., Mitteil. Bot. Staatssamml. München 2: 223 (1956).—Type: *Hassler 4110*, Paraguay (lecto-, G!, here designated).

*Gomphrena elegans* Mart. var. *gracilior* Chod., Bull. Herb. Boiss., ser. 2, 3: 388 (1903).—Type: *Hassler 3202*, Paraguay (G!).

*Gomphrena elegans* Mart. fa. *microcephala* Suess., Mitteil. Bot. Staatssamml. München 1: 5 (1950).—*Gomphrena elegans* Mart. var. *microcephala* (Suess.) Holz., Mitteil. Bot. Staatssamml. München 2: 223 (1956).—Type: *Schwindt 632*, Argentine, Prov. Misiones (holo-, M!; iso-, LIL!).

Later authors have without exception chosen not to recognize *G. paraguayensis* at the specific

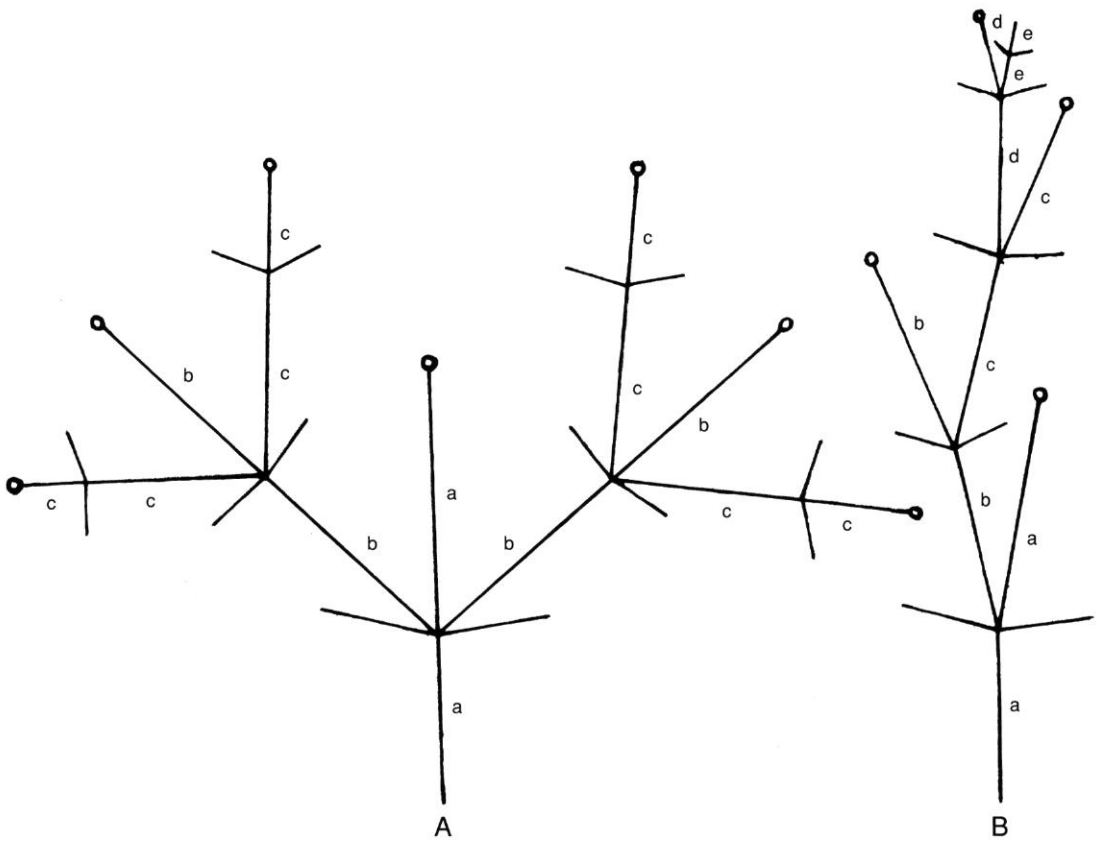


Fig. 5.—Plan of inflorescence: **A**, *Gomphrena elegans* Mart.; **B**, *Gomphrena paraguayensis* Chod. Successive shoot generations marked a-b-c-d-e.

level. HOLZHAMMER recognized all three taxa, reducing *G. paraguayensis* to a variety of *G. elegans*, and elevating (perhaps unconsciously?—no reasons given!) SUESSENGUTH's *fa. microcephala* to varietal rank.

There is good evidence to support keeping *G. paraguayensis* distinct from *G. elegans* at specific level. In *G. elegans* (Fig. 5A) the flower-heads, when not solitary and terminal, are grouped in a dichotomous cyme with leafy, upwards much reduced prophylls; in *G. paraguayensis* (Fig. 5B) they are grouped in a zig-zag shaped structure, with normally only one of the two prophylls of a flower-head supporting an axillary head. Moreover, the flowers of *G. paraguayensis* are dis-

tinctly smaller, though otherwise not much different from those of *G. elegans*, and the leaves more densely hairy, manifestly tomentose beneath. Finally, the two are ecologically distinct, *G. elegans* being typically a river-side plant, growing on low, frequently flooded ground, where it may form low thickets, up to 1 m or more high of entangled, often softly woody branches, whereas *G. paraguayensis* is mostly found on higher ground, in not too dense woodland or rough grassland and scrub; though provided with a woody stock, the flowering shoots are herbaceous throughout.

A very similar plant is found in the drier parts of the Chaco.

**18b. *Gomphrena paraguayensis* Chod. subsp. *chacoensis* Pedersen, subsp. nov.**

*A subsp. paraguayensi recedit praecipue caule foliisque haud tomentosis, sed pilis vix vel brevissime ramosis exiliter vestitis.*

*Teste collectoris herba perennis ad 60 cm alta intricate ramosa. Radix deest. Caulis novellus pilis perpaucis 0.2-0.25 mm longis 2-4-septatis ad septum imum saepe brevissime verticillato-ramosis vestitus, mox glaber. Folia (in specimine suppetanti pro parte maxima manca) eis ssp. paraguayensis similia, sed indumento depauperato, utrinque exiliter pilosa tantum, pili paginae inferioris parce verticillato-ramosi. Flores in spicastris globosis pedunculatis congesti, hae ut in ssp. paraguayensi in cyma flexuosa dispositae: bractea floris 1.6-1.8 mm longa, ovata, acuta, pilosa; bracteolae 1.85-2 mm longae, ovato-orbiculares obtusae acutiussulae: tepala 3-3.5 mm longa, acuta, basi dorsi pilis longis crispis vestita, sursum pilosiuscula; stamina post anthesin ad 2.6 mm longa antheris large millimetralibus; germen ad 0.6 mm longum, turbinatum, stylo ad 0.2 mm stigmatate bilobo ca. 0.35 mm longo. Utriculus ca. 1 mm longus, oboviformis.*

TYPE.—Brunner 1224, Paraguay, dpt. Chaco: Parque Nacional Defensores del Chaco, alrededores de Madrejón, 20°40'S, 59°50'W. Bosque seco y spinoso de hasta 15 m de altura. Suelo arcilloso con poco drenaje, relieve plano. Agua permanente en tajamares. Lugar húmedo, 17 Feb. 1985. "Hierba de hasta 60 cm de altura, quebradiza. Inflorescencias blancas" (holo-, G).

This plant is known only from the type collection. In general aspect, it is very similar to *Gomphrena paraguayensis*, differing mainly in the nature of the indument. Although the material at hand is insufficient to form a definite opinion on its status, the remote locality, and the very thinly hairy leaves, as opposed to the white-tomentose underside of those of the subsp. *paraguayensis*, have prompted me to describe it as a distinct subspecies.

**19. *Gomphrena pohlii* Moq.**

In DC., Prodr. 13 (2): 403 (1849).—Type: *Pohl* 2957, Brazil (holo-, W, presumably lost; iso-, P!).

**19b. *Gomphrena pohlii* var. *hassleri* (Chod.) Pedersen, comb. et stat. nov.**

*Gomphrena hassleri* Chod., Bull. Herb. Boiss., ser. 2,

1: 432 (1901).—Type: *Hassler* 5816, Paraguay (holo-, G!).

The differences between the two varieties of *Gomphrena pohlii* are admittedly very slight, and the two have been combined by SIQUEIRA (1992). The leaves of *G. pohlii* var. *pohlii* are broadly ovate to nearly orbicular, rounded at apex, the larger ones 9-nerved, while in var. *hassleri* the leaves are narrower, oblong or oblong-elliptic, generally acute, and mostly penninerved. The inflorescence is more or less the same in both varieties, possibly the hypsophylls in var. *hassleri* tend to be more reduced. While the bractlets of the flowers in the typical variety are entirely devoid of a crest (for this reason, many authors have, wrongly in my opinion, placed this taxon in the section *Gomphrenula* Seub.), there is nearly always a narrow crest on the back of the bractlets of the variety *hassleri*, from slightly below the tip to around the middle. The two entities are usually fairly easily told apart at sight, and I believe that they are best distinguished at varietal level, as their ranges apparently do not overlap: *G. pohlii* var. *pohlii* extends over central-south Brazil, as far west as the State of Mato Grosso, while the var. *hassleri* is mainly found in northern Paraguay, penetrating a little into the South of Mato Grosso do Sul.

**20. *Gomphrena spissa* Pedersen, sp. nov.**

*Herba verisimiliter annua confertim ramosa ut videtur decumbens ramis ad 10 cm longis. Radix tenuis ad 0.2 cm crassa parce ramosa ultra 7 cm longa aliquam torta. Caulis 0.1-0.25 cm crassus, teres, ± dense pilis 1-1.5 mm longis simplicibus, patentibus aut ± antrorsis vestitus. Folia 2-3 cm longa petiolo ad 0.5 cm annunato, 0.5-1 cm lata, elliptica, oblonga lanceolatae, raro obovata, acuta, in petiolum sensim angustata, obsolete penninervia, ad 0.5 mm longe mucronata, utrinque pilosa. Flores in spicastris brevipedunculatis vel subsessilibus congesti, hae solitariae vel saepe ternae aut interdum plures in capitulis bracteis foliaceis eis aliquot longioribus involucriatis dispositae: bractea floris scariosa ca. 3 mm longa, ovata, acuta, uninervia, mucronata, glabra; bracteolae ut bractea scariosae, ca. 5.7 mm longae, anguste ovatae, acutae acuminatae, valde concavae, superne paene naviculares, uninerviae, haud mucronatae, glabrae; tepala tenaciter scariosa, 3.5-4 mm longa, exteriora tres plerumque quam interiora duo sat longiora, multo latiora, haec plicata, videntur acuta, sed*

re vera vulgo apice paullo decurtata, omnia trinervia, haud mucronata, dorso ad medium usque villosa; stamina antheris ca. 1 mm longis includentibus ca. 3.5 mm longa filamentorum tres partes inferiores connatae cupulam urceolatam ore constrictam efficientes, duo partes superiores liberae, apice breviter trilobulata, lobulo antherifero quam lateralibus semiorbiculatis vulgo paullo longiore; germen ca. 0.5 mm longum, ovoideum, stylo ad 0.2 mm stigmatique bipartito ad 0.7 mm longo instructum, ovulo supra medium loculi inserto. Fructus ad

2 mm longus 1.5 mm latus, late ovoideus perianthio inferne ad maturitatem cartilagineo inclusus. Semen ca. 1.5 × 1.4 × 1 mm, compresso-ovoideum, avellaneum, funiculo paullo infra apicem inserto. Embryo hippocrepicus foliis paullo latioribus quam radícula dimidio longioribus.—Fig. 6.

TYPE.—Brooke 5248, Bolivia, dpt. Oruro, Aguas de Castillos (suburb of Oruro), 12000 ft., on plain, 1 Mar. 1949 (holo-, BM).

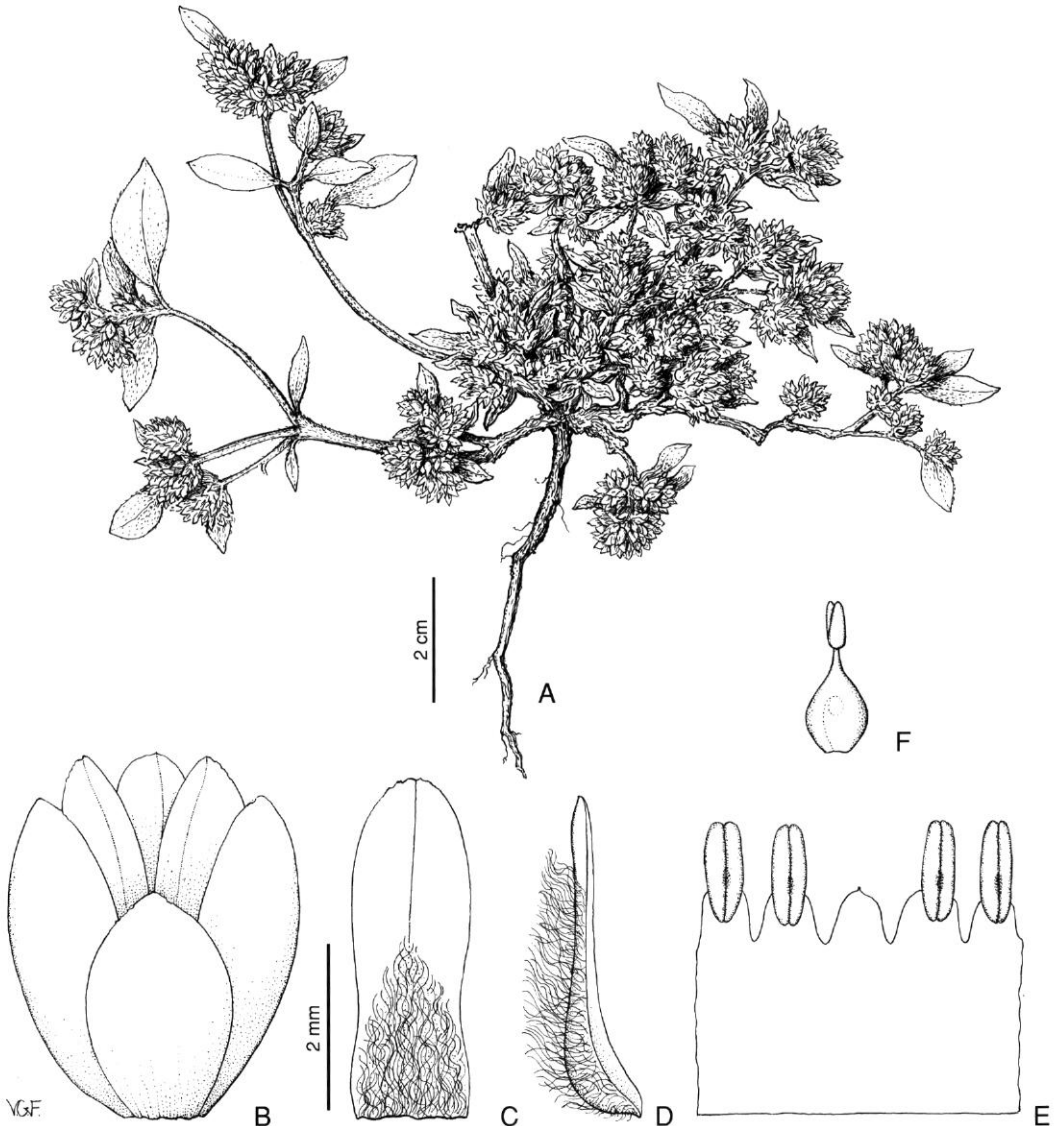


Fig. 6.—*Gomphrena spissa* Pedersen: A, habit; B, flower within its bract and bractlets; C, outer tepal, seen from back; D, inner tepal, seen from side; E, androecium; F, gynoecium. (Brooke 5248, BM).



PARATYPES.—BOLIVIA: *Asplund 3178*, dpt. Oruro, prov. Cercado: Oruro, ca. 3700 m, 29 Mar. 1921 (UPS); *Asplund 3230*, Prov. Challapata: ca. 3750 m, 30 Mar. 1921 (UPS).

This species, with *G. boliviana*, *G. martiana*, and *G. platycephala*, forms a natural group, characterized by being annual, often weedy plants of sprawling habit, with scant indument, flowers fairly large with indurate tepals at maturity, grouped in long-pedunculate composite heads surrounded by

an involucre of leafy bracts. They have bractlets without a crest, 3-nerved tepals, filaments free for about half their length, very shortly or not at all lobulate at apex, ovary with a short style and long, bipartite stigma. They are all found in the mainly arid and semi-arid regions of central South America from a little N of the Tropic of Capricorn to extreme northern Patagonia. The species of this group known at present can be distinguished by the following key:

1. Tepals mostly obtuse; inflorescence mostly composed of three or more distinct spikes grouped in a dense, dichotomic cyme or loose head ..... **G. spissa** Pedersen
- 1'. Tepals acute; inflorescence condensed in a head composed of sessile or sub-sessile spikes .....
2. Involucral bracts 2-3, rarely more, two of them conspicuously longer than the third, much longer than the sub-sessile spikes borne in their axils; bracts, bractlets, and tepals scarious, often almost pellucid ..... **G. platycephala** R.E. Fr.
- 2'. Involucral bracts usually 5 or more, not conspicuously unequal; heads dense, all spikes sessile; bracts, bractlets, and tepals rather papery, not pellucid .....
3. Floral bract very short, less than one-half as long as the bractlets ..... **G. martiana** Gill. ex Moq.
  - A. Plant not glandular ..... var. **martiana**
    - A1. Tepals hairy ..... fa. **martiana**
    - A2. Tepals glabrous ..... fa. **austriana** Pedersen
  - A'. Plant glandular ..... var. **glutinosa** (R.E. Fr.) Pedersen
- 3'. Floral bract more than one-half to almost as long as the bractlets ..... **G. boliviana** Moq.
  - A. Involucral bracts usually much longer than flower-head; floral bract nearly as long as bractlets .... var. **boliviana**
    - A1. Tepals all hairy ..... fa. **boliviana**
    - A2. Two inner tepals densely hairy on back, three outer glabrous, or inner abaxial ± hairy on covered side ..... fa. **robusta** (Hicken) Pedersen
    - A3. All tepals glabrous ..... fa. **leiantha** Pedersen
  - A'. Involucral bracts scarcely surpassing flower-head; floral bract usually about two-thirds as long as bractlets ..... var. **tarijensis** (R.E. Fr.) Pedersen

## 21. *Gomphrena tomentosa* (Griseb.) R.E. Fr.

Ark. Bot. 16: 31 (1920).—*Gossypianthus tomentosus* Griseb., Symb. fl. arg.: 35 (1879).—Type: *Lorentz & Hieronymus s.n.*, Argentine, Prov. Catamarca (holo-, GOET!).

dpt. Taff: Infiernillo (± 3000 m), about 5 km W of the summit, dry slopes with numerous shrublets, on loose sand or gravel, 26 Mar. 1989 (holo-, C; iso-, CTES, MBM).

PARATYPE.—*Olrog s.n.*, Argentine, Prov. Tucumán, dpt. Taff, Jan. 1956 (S).

## 21b. *Gomphrena tomentosa* var. **monticola**

Pedersen, var. **nov.**

*Herba perennis radice palari foliis basi rosulatis e quorum axillis rami foliati florigeri oriuntur, a var. tomentosa recedit statura minore, foliis basalibus diu persistentibus (in var. tomentosa plerumque fugaces, in herbariis absentia), necnon et praecipue tepalis dorso calvis insigniter umbrino maculatis maturitate fructus induratis.*

TYPE.—*Pedersen 15343*, Argentina, Prov. Tucumán,

The more slender habit, long-persistent basal leaves, and in particular the brown, glabrous spot on the back of the tepals, which are indurate at maturity, all justify the segregation of this entity, at least at varietal rank.

## 22. *Gomphrena triceps* Pedersen, sp. **nov.**

*Herba manifeste perennis humilis radice palari caudice ramoso ut videtur humo obiecto e quo rami decumbentes*



ad 20 cm longi oriuntur: folia 1-4 cm longa, elliptica oblanceolata, acuta, superne parce, subtus copiosius villosa. Flores in spicastris densis plerumque ternis basi bracteis foliaceis duabus involucri: bractea floris scariosa, 3-3.5 mm longa, ovata, acuta, brevissime mucronata;

bracteolae ut bractea, 5-6 mm longae, naviculares, apice sub-falcatae, summa tertia parte dorsi crista denticulata  $\pm 0.25$  mm lata munitae; tepala tenaciter scariosa, maturitate inferne cartilaginea, 6-7 mm longa, quam bracteolae longiora, linearia, acuta, exteriora tria plana,

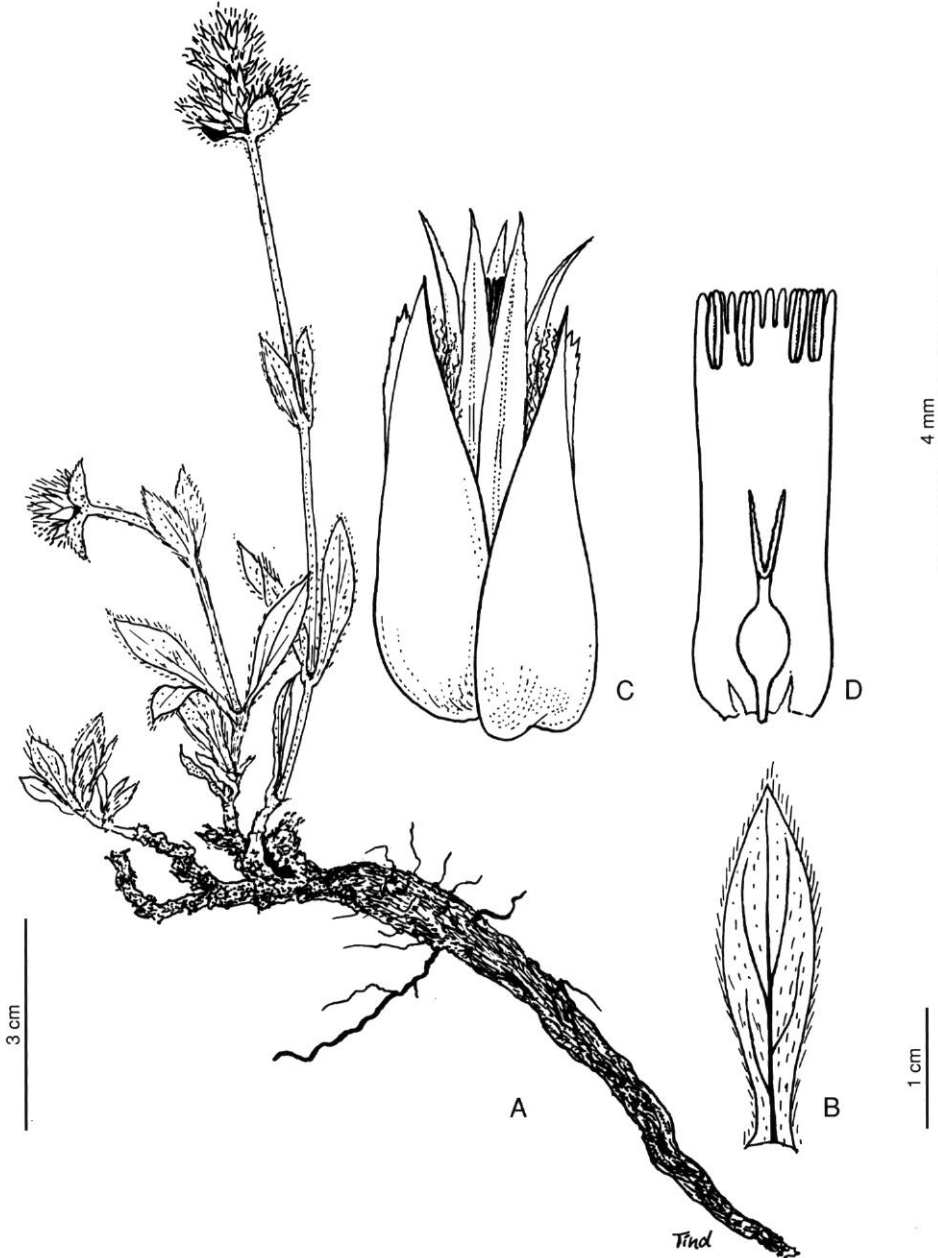


Fig. 7.—*Gomphrena triceps* Pedersen: A, habit; B, leaf; C, flower within its bractlets; D, androecium and gynoecium. (Pedersen 11616, C).

*duo interiora concava inferne ventriculosaque, omnia uninervia, exteriora tria basi in dorso lanata, sursum glabra, duorum interiorum dorsi duabus partibus inferioribus lana brunnea obtectis, summis tribus glabris; stamina apices tepalorum vix attingentia, antheris ca. 1 mm longis munita, filamentis ad fundus antherarum connatis, trifidis, lobulo antherifero brevissimo, laterali-bus verticibus antherarum aequantibus.; germen stylo ca. 0.5 mm longo stigmatique ca. 1 mm instructum. Utriculus ovoideus apice truncato. Semen ca. 2 × 1.5 × 1 mm, compresso-ovoideum, castaneum.—Fig. 7.*

TYPE.—Pedersen 11616, R.O. del Uruguay, dpt. Tacuarembó, ROU-5 km 276, grassland on clay, mostly on rather low ground, wet after a heavy rain, 23 Jan. 1977 (holo-, C).

In general aspect, this plant is remarkably similar to *G. celosioides*, and at first I assumed that it was a form of that species. In particular because of the tepals exceeding the bractlets, a character emphasized by HOLZHAMMER (1955-56) and other authors, in the end I have come to the conclusion that its nearest relatives are to be sought within the *G. pulchella* group.

### 23. *Iresine latifolia* (Mart. & Gal.) Hook. f.

In Benth. & Hook. f., Gen. plant. 3: 42 (1880).—*Gomphrena latifolia* Mart. & Gal., Bull. Acad. Roy. Bruxelles 10 (4): 9 (1843).—Type: Galeotti 520, Mexico, Oaxaca.

*Achyranthes calea* Ibañez, La Naturaleza 4: 76 (1878).—*Iresine calea* (Ibañez) Standl., Contrib. U. S. Nat. Herb. 18: 94 (1916).—Type: La Naturaleza 4, Tab. 3.

MOQUIN-TANDON in DC., Prodr. 13' (2): 351 (1849) cites "*Iresine latifolia* D. Dietr. syn. pl. I, p. 870, n. 5.", and again l.c.: 349 writes "*I. latifolia* D. Dietr. = *Alternanthera pulverulenta*". Because of this apparent anterior homonym, STANDLEY applied another name, making the combination under *Iresine* based on a somewhat dubious species described by IBAÑEZ. This substitution is, however, unnecessary: DIETRICH makes no mention of *Iresine latifolia* on the page indicated, nor have I found that name used anywhere else by DIETRICH or others. The possibility to use the name *Iresine latifolia* for this

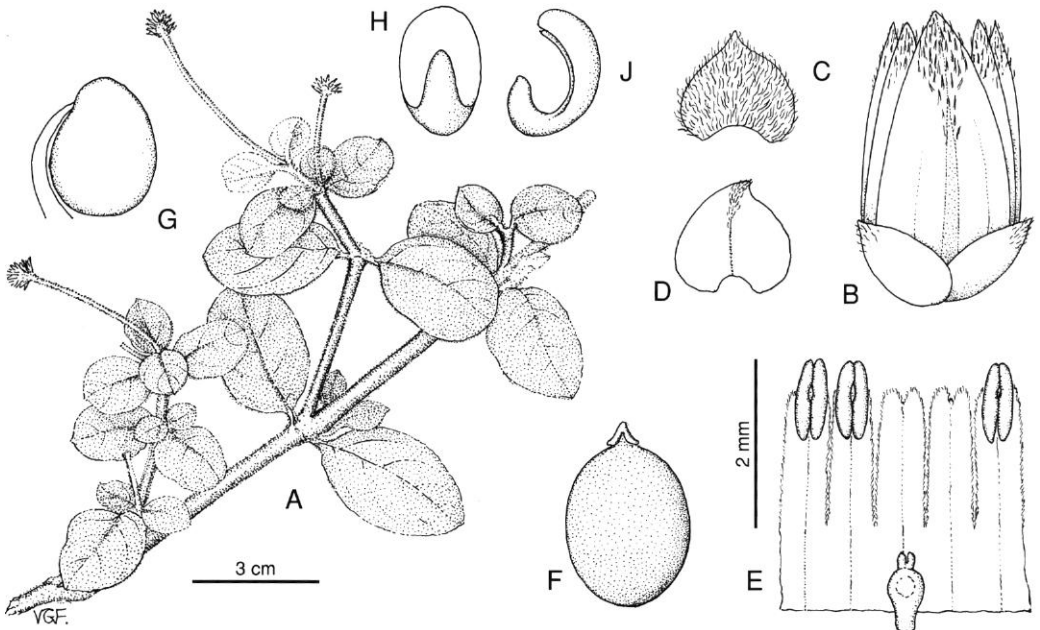


Fig. 8.—*Pflaffia minarum* Pedersen: A, habit; B, flower; C, bract; D, bractlet; E, androecium and gynoecium; F, fruit; G, seed; H and J, embryo. (*Arbo et al.* 4291, CTES).

well-known Central American plant is all the more welcome, as STANDLEY admits never having been able fully to interpret IBAÑEZ' description, and based his identification on the elimination of all other possibilities.

#### 24. *Pfaffia minarum* Pedersen, *sp. nov.*

*Frutex vel suffrutex metralis ramosus internodiis 3-4 cm longis; caulis ad 0.4 cm crassus, teres vel novelli quadrangulares, grisaceo-tomentosus. Folia sub-sessilia, 2-4 × 1.5-2.5 cm, late ovata vel late elliptica, apice rotundata, basi saepe sub-cordata, penninervia, mutica, supra hirsuta, subtus ut caulis tomentosa. Flores in spicastro 20-60 mm longe pedunculatis oviformibus aetate elongatis, terminalibus spurie axillaribusve, solitariis aut 2-3-fasciculatis congesti, alabastra suprema spicastrae clausa dum inferiora maturitate diu dejecta sint: bractea ca. 1.3 mm longa, late ovata, modice acuminata, 1-nervia, mucronata, ferrugineo-lanata; bracteolae quam bractea aequilongae, orbiculato-cordatae, obtusae vel breviter acuminatae, valde concavae, 1-nerviae, oblique mucronatae, in vertice pilosiusculae; tepala ad 3 mm longa, oblonga anguste triangulariave, duo interiora quam tria exteriora angustiora paullo brevioraque, 3-nervia, mutica, dorso breviter pilosa, teste collectoris in vivo cremea (in sicco potius purpureo-violaceis ad 0.9 longis filamentis inferne ad medium connatis, sursum angustatis margine fimbriatis apice breviter 2-3 lobulatis, lobulus antherifer brevissimus, laterales vertices antherarum large non attingentes; germen stigmatibus subglobato munitum. Fructus (immaturus) oviformis, vertice sub-acutus.—Fig. 8.*

TYPE.—*Arbo, Mello-Silva, Schinini & Souza 4291, Brazil, Minas Gerais, mun. Conceição: 8 km SW de Conceição do Mato Dentro camino a Cardeal Mota 19°4'S, 43°27'W, 600 m. Borde de selva marginal con afloramientos rocosos, 17 May 1990. "Hierba 1 m alt, ramas flexuosas, inflorescencias blancas" (holo-, CTES; iso-, C).*

PARATYPE.—*Hatschbach, Smith & Ayensu 28884, Brazil, Minas Gerais, mun. Conceição do Mato Dentro: Rio S. Antonio, 18 Jan. 1972 (herb. PEDERSEN).*

Very closely related to *P. townsendii* Pedersen, differing mainly in the shape of the leaves, and the smaller flowers.

#### 25. *Pfaffia ninae* Pedersen, *sp. nov.*

*Herba perennis radice palare percrasso vel tuberiforme*

*caudiceque subligioso, subterraneo, breve, ramoso, e quo rami herbacei annui florigeri 15-30 cm alti 2-4 nodi vix ramosi oriuntur.*

*Caulis 0.15-0.175 crassus pilis 2-3 mm longis antrorse appressis spisse vestitus. Folia sessilia aut ima ad 0.2-0.25 cm longe petiolata, 1.6-6.2 × 1.1-3.15 cm, obovato-orbicularia late ovata, obtusa, raro acutiuscula, penninervia, utrinque nervis tribus secundi ordinis, plerumque breviter mucronata, hirsuta. Flores in spicastro terminalibus aut rarissime axillaribus 160-245 mm longe pedunculatis oviformibus ad 13-15 mm crassis congesti: bractea scariosa ad 4 mm longa anguste ovata ovato-lanceolata, acuta, concava, uninervia, vix mucronata, apice pilosa, decidua; bracteolae ut bractea, 3.4-3.7 mm longae, triangulares vel ovatae, acuminatae, sub-falcatae, concavae, uninerviae, mucronatae, summo dorso hirsutiores, cum perianthio vel antea deciduae; tepala quam bractea bracteolaeque magis tenaciter scariosa, 5.5-6 mm longa, 0.7-1 mm lata, tria exteriora quam duo interiora majora, oblonga, acuta, trinervia, mutica, dorso inferne pilis longis inferioras partes duas ad tres obtectantibus vestitae, superiorae tres-quinque partes densius appresso-pilosa, intus glabra; stamina post anthesin ad 5 mm longa antheris anguste oblongis 1.7-2 mm longis, filamentis inferne ad 1.5 mm longe connatis margine fimbriatis 3-lobulatis, lobulus antherifer dentiformis quam laterales in laciniis dissectas antheras superantes multo brevior; germen ad 1.5 mm longum elongato-oboviforme stigmatibus sessile depresso-pulviniforme emarginato. Utriculus large 5 mm longus, oviformis. Semen hepaticum, ca. 2.5 × 1.5 × 1.5 mm, oviforme, funiculo latere duabus tertiae partibus supra basin inserto. Embryo unciformis cotyledonibus valde concavis quam radícula duplo longioribus quadruplo latioribus.—Fig. 9.*

TYPE.—*Pedersen 16266, R.O. del Uruguay, dpt. Artigas: road (ROU-30) from Artigas to Tranqueras km 194. Stony grassland with some scrub, mainly along the road, 27 Jan. 1995 (holo-, C; iso-, CTES).*

This species is probably related to *P. tuberosa* (Spreng.) Hicken, but has spikes that are usually solitary, only exceptionally accompanied by a pair of lateral spikes (seen in a poor quality specimen with no flower-heads left) in the axils of much-reduced leaves. The flowers of *P. ninae* are larger, the bracts and bractlets a different shape; seen from a distance it is superficially similar to *P. gnaphaloides* (L. f.) Mart.

I dedicate this species to my wife who first saw it and, recognizing it as something unknown, in her enthusiasm trod on a loose stone, fell, and broke her arm.

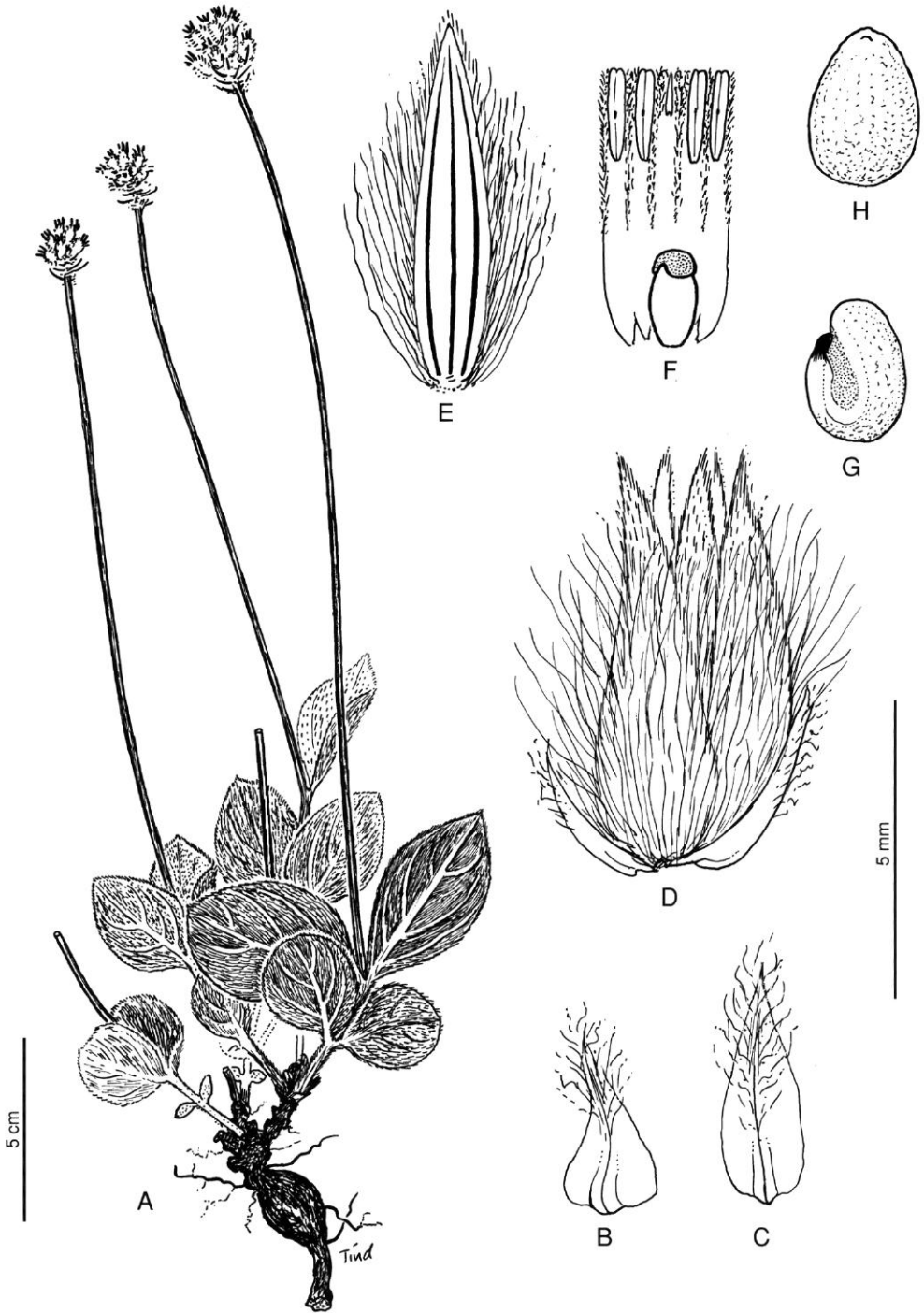


Fig. 9.—*Paffia ninae* Pedersen: A, habit; B, bract, seen from back; C, bractlet, seen from back; D, flower within its bractlets; E, tepal, inside view; F, androecium and gynoecium; G, seed; H, fruit. (Pedersen 16266, C).

## 26. *Pfaffia rotundifolia* Pedersen, sp. nov.

*Herba perennis caudice lignoso vel suffrutex ad 40 cm vel altior. Caulis 0.12-0.26 cm crassus, ad nodos parum incrassatus et juventute in vivo supra eos tumidus, pilis hyalinis 1-5.5 mm longis 5-11-articulatis simplicibus patentibus cum aliis brevioribus antrorso-appressis vestitus. Folia 2.5-6 × 1.8-5.5 cm cum petiolo decima pars toti, ovato-orbicularia, penninervia, mucronata, utrinque villosa. Flores in spicastro terminalibus, solitariis, 70-185 mm pedunculatis, hemisphaericis, 13-15 mm diametro congesti: bractea bracteolaeque floris scariosae, illa 2-2.3 mm longa, ovata, acuminata, mucronata, pilosa, hae ad 2.8 mm longae, ovatae, acutae modice acuminatae, valde concavae, mucrone longo obliquo desinentes, dorso in nervo pilosae, cum perianthio maturitate deciduae; tepala scariosa, 4.5-5 mm longa, tria exteriora quam duo interiora majora, oblonga anguste oblongo-ovatae, acuta, trinervia, mutica, imo dorso pilis longissimis duas tertias partes obtegentibus, sursum appresse-pilosa, intus basi cincinno insignito ornata; stamina large 3.5 mm longa antheris anguste oblongis ad 1.5 mm filamentis fimbriatis ad tertiam partem connatis vertice breviter trilobulatis, lobulus antherifer subfimbriatus quam laterales in laciniis capillares soluti plerumque longior; germen ad 1 mm longum graciliter oboviforme cum stigmatate sessili emarginato: ovulum summo loculo insertum. Fructus ignotus.*—Fig. 10.

TYPE.—Daly, Nee, Saldía, Hinojo & Villegas 6290, Bolivia, dpt. Santa Cruz, prov. Chiquitos: Serranía de Santiago, 5 km East-North-East of Santiago de Chiquitos, ca. 18°19'S, 58°35'W, 700-800 m. Mostly open vegetation on a steep slope, with many suffrutices, some trailing vines, and occasional patches of low branching, gnarled trees to 8 m tall, 21 Nov. 1988, "Herb, inflorescences white, occasional" (holo-, C).

This species is probably related to *P. acutifolia* (Moq.) Stützer from North-Central Brazil, *P. elata* R.E. Fr. from Mato Grosso, *P. fruticulosa* Suessg. from Bolivia and northern Paraguay, possibly also to *P. tuberculosa* Pedersen from Bahia; with all these species it shares the presence of a tuft of hairs on the inside of the tepals, a character not seen in other species of the genus *Pfaffia*. From *P. acutifolia* and *P. fruticulosa* it differs mainly in the shape of the leaves, from *P. elata* in its much smaller size, smaller flowers, and always distinctly petiolate leaves; *P. tuberculosa* is a small, decumbent herb, in aspect very different from its possible larger, often suffrutescent relatives.

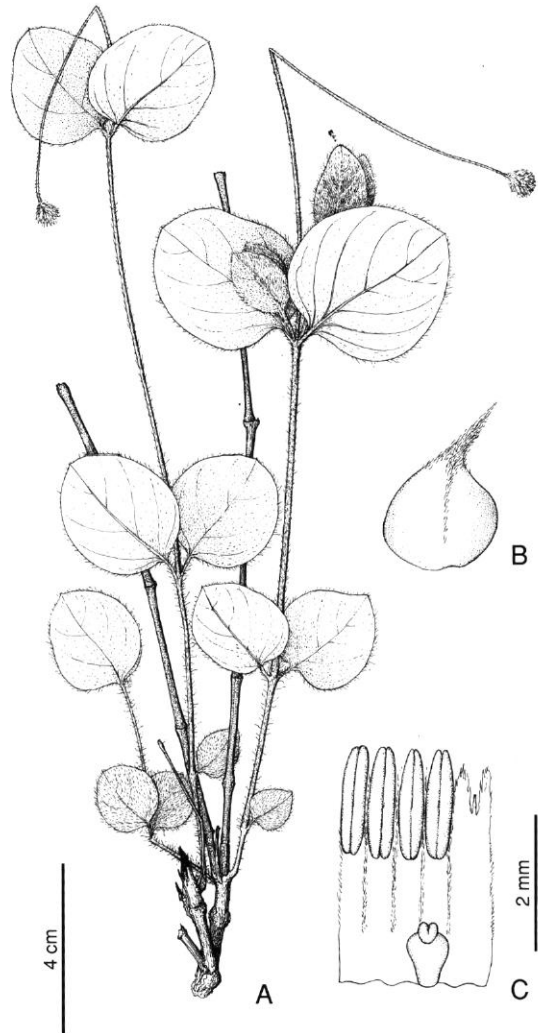


Fig. 10.—*Pfaffia rotundifolia* Pedersen: A, habit; B, bractlet; C, androecium and gynoecium. (Daly et al. 6290, C).

## 27. *Pfaffia sarcophylla* Pedersen, sp. nov.

*Herba manifeste perennis, erecta, vix metralis: radix deest. Caulis ut videtur sub-succulentus, in sicco caperatus, glaber praeter anulum pilosum ad nodos. Folia succosa carnosave, inferiora ad 0.4 cm petiolata, superiora sessilia, 3-8.5 × 0.5-2 cm, oblonga, plerumque acuta,*

*penninervia*, *haud mucronata*, *glaberrima*. Flores in spicatis axe lanuginoso per anthesin ad 40 mm aucto congesti, floribus imis maturitate fructuum deciduis dum

*gemmis apicalibus vix evolutis*, *spicastrae 30-60 mm pedunculatis in dichasiis bis-ter vel ultra furcatis dispositae*: *bractea scariosa*,  $\pm 2$  mm longa, *ovata*, *acuta*, *conca-*

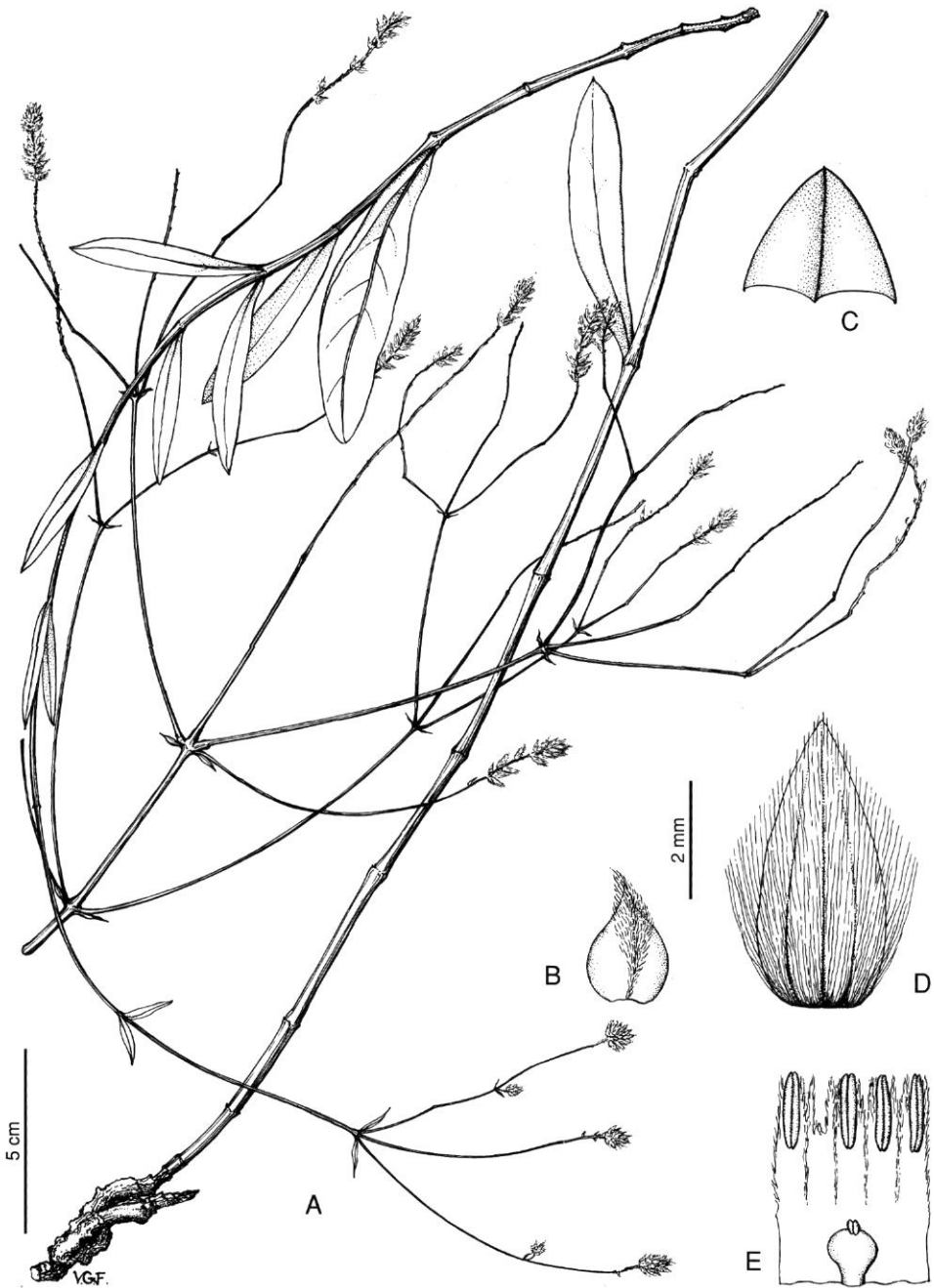


Fig. 11.—*Ptafia sarcophylla* Pedersen: **A**, habit; **B**, bractlet, seen from back; **C**, prophyll of composite inflorescence; **D**, outer tepal, back view; **E**, androecium and gynoecium. (BRASPEX-234, C).



*va, uninervia, vix mucronata, glabra tenuiter pilosave, tardius decidua; bracteolae sat tenuiter scariosae, dispares, 1.75-2 mm longae, 1.5-2 mm latae, late ovatae, acutae modice acuminatae et tum apice saepe sub-falcatatae, valde concavae, uninerviae, muticae, dorso pilosae, cum perianthio deciduae; tepala tenaciter scariosa sub-carnosave, 3.5-4 mm longa, oblonga, acuta, trinervia, mutica, villosa; stamina post anthesin 2.75-3.3 mm longa antheris 1.2-1.3 mm longis, filamenta ad tertiam inferiorem partem connata, longe ciliata, apice trilobulata lobulis lateralibus apicem antherarum attingentibus, antherifero breviter dentiforme multo longioribus; germen ± 1 mm longum, gracillime oboviforme, paene claviforme stigmate sessili depresso minime emarginato. Fructus absque stigmate persistenti ca. 2.6 mm longus, oviformis, subtiliter reticulatus. Semen ca. 2.4 × 1.5 × 1.5 mm, oviforme, profunde emarginatum latere ad duas partes supra basin ubi funiculus insertus est. Embryo unifornis cotyledonibus crasse concavis quam radícula triplo longioribus latioribusque.*— Fig. 11.

TYPE.—Reeves, Baker & Dias Ferreira BRASPEX-234, Brazil, Goiás, mun. Niquelândia: southernmost ultramafic hill of Tocantim complex, 800 m, herbfield in gully and lower part of fultslope. Rocky serpentine slope, 29 Apr. 1988. "Robust, erect, fleshy herb, woody at base, upper stem fleshy. White perianth with green streaks. Flower 5-lobed, filaments fused centrally, anthers free. Nickel accumulator" (holo-, C).

PARATYPES.—BRAZIL, Goiás, mun. Niquelândia: Macedo 3658, Macido, 26 July 1952, "Arbusto da Serra. Amarelas" (S); Brooks, Reeves, Baker & Dias Ferreira BRASPEX-164, Macido, ca. 15 km N of Niquelândia, 14°8'S, 48°23'W, S-facing hill slope, stable peridotite/dunite based scree & flat area below, ca. 500-800 m E of nickel workings, ca. 1000 m, campo, on hillside, 21 Apr. 1988, "Robust, erect, fleshy herb, woody at base, upper stem fleshy, flowers in terminal spikes, white perianth with green streaks, flower 5-lobed, filaments fused centrally, anthers free" (C); Brooks & Reeves TMEX-559, Macido, in the middle of Tocantim ultramafic complex, 12 km SSE of Macido near Ponte Alta, 4.9 km down southward running track along ridge, 14°25'S, 48°25'W, 1000 m, pyroxenite-peridotite, 20 June 1990, "Cfr. 501" (K); Brooks & Reeves TMEX-653, Macido, in the middle of Tocantim ultramafic complex, 0.7 km along South Ridge Road near excavation, 14°23'S, 48°25'W, 1000 m, peridotite-dunite, 22 June 1990, "Cfr. 501. One of the few plants colonizing metal-rich excavated areas. Appears to hyperaccumulate nickel (4)" (K); Brooks, Reeves & Dias Ferreira TMEX-501, southernmost ultramafic outcrop of the Tocantins complex, about 3 km from Niquelândia, 14°27'S, 48°26'W, 800 m, approx. half way up hill pyroxenite-peridotite, 15 June 1990, "Herb 50-150 cm white flowers, sprawling fleshy leaves, woody

base (4)" [Tropical Metallophyte Expedition] (K).

This species is related to *P. tuberosa* (Spreng.) Hicken, from which it differs by its larger size, profusely branched inflorescence, fleshy leaves and stem, and by being almost completely glabrous.

## 28. *Pfaffia tuberculosa* Pedersen, sp. nov.

*Herba certe perennis, humilis, diffuse ramosa internodiis 0.5-3.3 cm longis: radix palaris incrassata tuberculam ad 1 cm crassam efficiens. Caulis 0.1-0.2 cm crassus, teres, juventute densius pilis 0.75-1.5 mm longis ± patentibus vestitus, glabrescens. Folia 1-2.5 × 0.5-1 cm, vix vel breviter petiolata, elliptica aut late lanceolata, penninervia, mucronata, supra pilis ca. 1 mm longis sat dense vestita, subtus praecipue in nervis densius pilosa sub-tomentosave. Flores in spicastris solitariis terminalibus 15-55 mm pedunculatis globosis 10-12 mm diametro congesti: bractea tenuiter scariosa, pellucida, ca. 2.2 mm longa, 1.3 mm lata, ovata, acuminata, concava, uninervia, mucronata, dorso pilosa, persistens; bracteolae ut bractea, ca. 3 mm longae, ovato-cordatae, breviter acuminatae, valde concavae, uninerviae, oblique mucronatae, dorso in nervo pilosae, cum perianthio deciduae; tepala tenaciter scariosa, haud pellucida, 4.5-5 mm longa, ± 1 mm lata, oblonga anguste oblongo-ovatae, acuta, trinervia, mutica, imo dorso pilis longis undulatis duas partes inferiores obtegentibus, tertia pars suprema pilis brevioribus dense appressis vestita, intus basi cincinno ornata; stamina post anthesin ± 4.25 mm longa antheris luteis anguste oblongis ad 1.75 mm filamentorum tres partes inferiores connatae, quinque superiores laxius cohaerentes margine ciliatae, apice trilobata lobulo antherifero linearis lateralibus duplo longioribus in laciniis capillares solutis; germen vix 1 mm longum, claviforme, cum stigmate sessili profunde emarginato ad 0.2 mm longo. Utriculus absque stigmate persistente vix 2 mm longus, ca. 1.5 mm latus, oviformis. Semen ca. 1.7 × 1.5 × 1 mm, oviforme, funiculo latere paulum infra apicem inserto, hic emarginatum, coffeatum, ad umbilicum atro-fuscum. Embryo paene annularis cotyledonibus incurvatis quam radícula duplo longioribus.*— Fig. 12.

TYPE.—Harley, Stannard, Pirani & Furlan 27180, Brazil, State of Bahia, municip. Paramirim: 4 km da cidade na estrada para Agua Quente, 13°26'S, 42°14'W, 640 m. Caatinga/campo rupestre. Solo arenoso entre pedras, perto do rio, em solo arenoso, pedregoso, 14 Dec. 1988, "Erva com sistema subterrâneo espesso. Flores brancas" (holo-, K).

This is the only collection I have seen of this



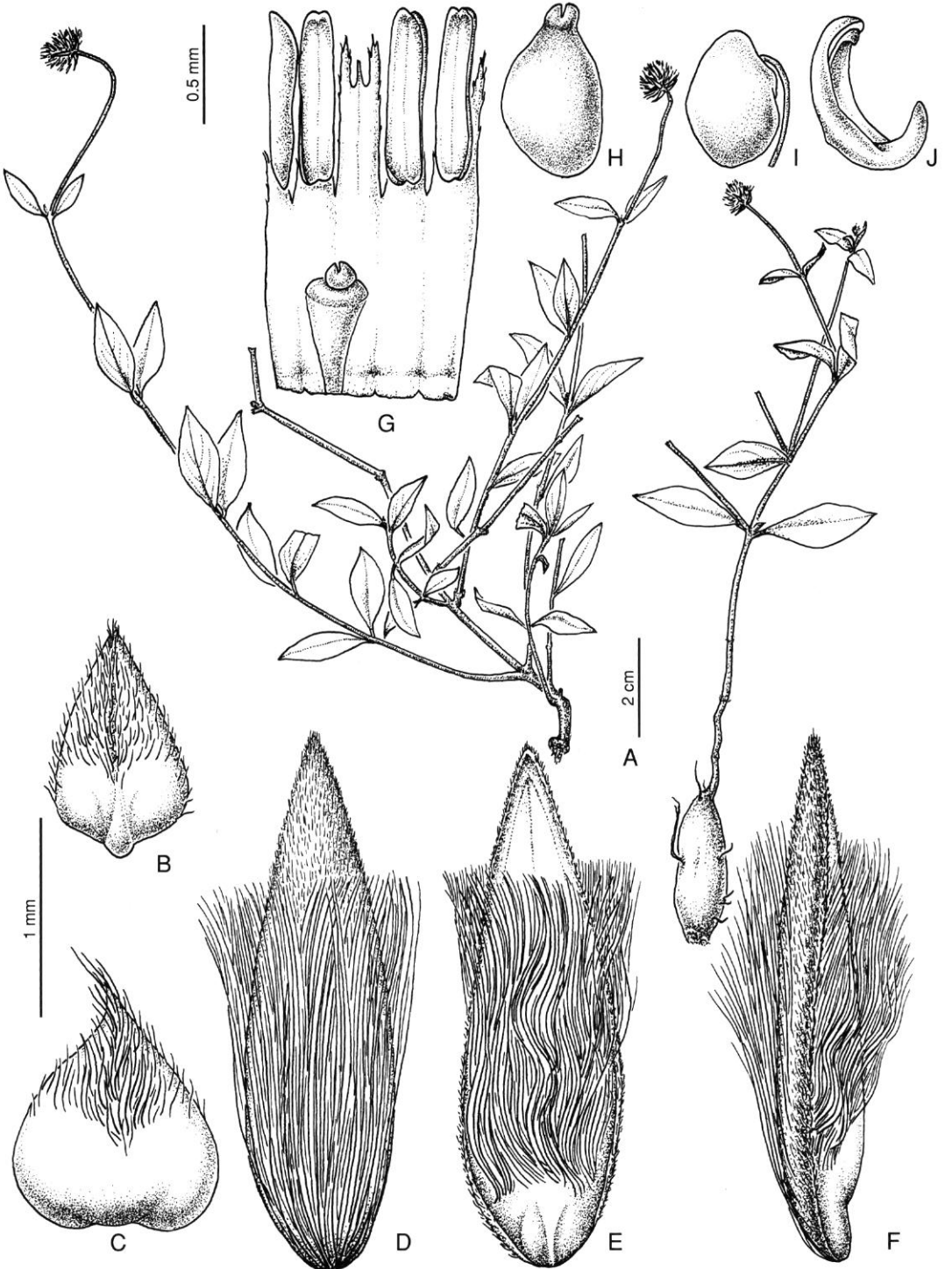


Fig. 12.—*Pfaffia tuberculosa* Pedersen: A, habit; B, bract, seen from back; C, bractlet, seen from back; D, tepal, seen from outside; E, inside view of same; F, side view of same; G, androecium and gynoecium; H, fruit; I, seed; J, embryo. (Harley et al. 27180, K).

species. The tuft of hairs on the inner surface of the tepals is a character shared with *Pfaffia acutifolia* (Moq.) Stützer, *P. elata* R.E. Fr., *P. fruticulosa* Suess., and *P. rotundifolia* Pedersen, species found mainly in West-Central Brazil, Paraguay, and Bolivia. I do not know whether this feature has any systematic significance; if so, it would suggest that this little herb from eastern Brazil is a relative of these large, often suffrutescent plants.

## 29. *Pfaffia tuberosa* (Spreng.) Hicken

Apuntes Hist. Natural 2: 93 (1910).—*Gomphrena tuberosa* Spreng., C. Linn. Syst. vag., ed. 16, 1: 823 (1825).—Type: *Sellow s.n.*, Montevideo (not seen).

### 29a. *Pfaffia tuberosa* subsp. *tuberosa* fa. *rubella* Pedersen, fa. nov.

*A. fa. tuberosa recedit floribus rubescentibus.*

TYPE.—Pedersen 15575, Argentina, prov. Corrientes, dpt. Curuzú Cuatiá: Highroad RA-14, near the bridge on the Arroyo Timbó. Grassland by the roadside, 18 Nov. 1990, "flowers a faint pinkish" (holo-, C).

PARATYPES.—ARGENTINE: *Schinini, Cáceres & Quarin 21692*, Prov. Corrientes, dpt. Curuzú Cuatiá: 4 km E de Curuzú Cuatiá, ao. Curuzú Cuatiá, Paso de las Niñas. En campo, 12 Nov. 1981, "Erecta, flores rosadas" (CTES); *Pedersen 15640*, Prov. Entre Ríos, dpt. Federación: estancia Buena Esperanza, 27 Feb. 1991 (C).—URUGUAY: *Pedersen 13891*, dpt. Artigas: near Masoller, rough grassland, shallow soil on rocky ground, 2 Mar. 1984, "flowers pink" (C); *Pedersen 15646*, dpt. Salto: Highroad ROU-31, by the bridge on the R. Itapebí, Roadside, 1 Mar. 1991 (C).

The formal recognition of colour variants is justifiably not much esteemed by taxonomists, especially as colour tends to disappear with drying. My only reason for giving this form a name is that it has a very restricted distribution in comparison with the fa. *tuberosa*, apparently occurring only in the South-East of the Argentine province of Corrientes, North-East of the province of Entre Ríos, and north-western Uruguay.

### 29b. *Pfaffia tuberosa* subsp. *goiana* Pedersen, subsp. nov.

*Herba perennis metralis vel ultra caule nisi inflorescentia dichotome ramosa simplice a subsp. tuberosa recedit statura majora praesertim spicastris majoribus.*

*Radix praeter radices adventicias filiformes nonnullas ignota. Caulis teres, ad nodos incrassatus, pilis 2-4 mm longis simplicibus patentibus sat dense vestitus. Folia in specimine typico desunt, sed planta manifeste in vivo foliata, in specimine altero (Heringer 8956) aliqua manca adsunt: ut videtur sessilia, 2-3.7 × 0.2-1 cm, oblonga oblongo-oblanco-lata, verisimiliter plerumque acuta, penninervia paribus plus minusve tribus nervorum secundariorum majorum, modice hirsuta. Flores in spicastris globosis 14-16 mm diametro 35-95 mm pedunculatis cyma dichotoma bis(-ter) ramificante dispositis congesti: bractea floris 3-3.2 mm longa anguste ovata acuta uninervia mucronata exigue pilosa; bracteolae 1.7-1.8 mm longae late ovatae, breviter acuminatae, valde concavae, uninerviae, breviter mucronatae, sursum dorso pilosae; Tepala 4.5-5 mm longa, oblonga, acuta, trinervia, mutica, dorso basi pilis longis duas partes inferiores obtegentibus copiose vestita, pars una summa appresse pilosa, intus glabra: stamina post anthesin perianthium aequantia antheris ad 1.5 mm longis filamentis vix ad medium connatis fimbriatis apice trilobatis lobulo antherifer subnullo, lateralibus oblongis, laciniatis, apices antherarum vix attingentibus; germen claviforme ad 1.2 mm longum stigmatem sessili emarginato. Fructus in typo ab insectis esus, adest in specimine Heringeriano: ca. 2 mm longus, oviformis. Semen ca. 1.7 × 1 × 1 mm, oblongum, funiculo latere ± quarta pars infra apicem inserto. Embryo unciniformis foliis incumbentibus latissimis planis radice quadruplo longioribus.*

TYPE.—Oldenburger & Mecenas 1531, Brazil, Federal Distr., Brasília, University Campus. Cerrado, red, dusty latosol, 23 Sep. 1975 (holo-, U).

PARATYPE.—Heringer 8956, Brasil, Distr. Federal, Brasília, Plano Piloto, Cerrado, 5 May 1962, "Planta pequena, flor branca" (herb. PEDERSEN).

The following specimen also seems to belong here: *Gates & Eastbrook 107*, Brazil, Goiás, mun. Alto Paraíso: Chapada dos Veadeiros, 4 km NE of road, 16 km by road N of Alto Paraíso, 14°S, 47°W, rocky outcrop, sandy soil, 3 Feb. 1979 (herb. PEDERSEN).

The poor and scarce material is insufficient to judge exactly what status to accord this taxon. Though undoubtedly closely related to *Pfaffia tuberosa*, the large flower-heads make it impos-

sible to identify this new taxon with that species. The isolated occurrence of the subspecies described here—about 800 km remote from the nearest station of typical *P. tuberosa*—further justifies its provisional treatment as a subspecies, until more material becomes available. It should, however, be noted that another probable, as yet undescribed variant of *P. tuberosa* is found in the

same region, and that the related *P. sarcophylla* grows about 150 km to the North-West of Brasilia.

The following provisional key to the genus *Pfaffia* sect. *Pfaffia* (= genus *Pfaffia* Mart. *sensu str.*) should facilitate the identification of the new taxa:

1. Upright, sparsely branched perennial herbs or subshrubs, leafless, or with reduced, 1-nerved leaves without visible secondary nerves ..... 2
- 1'. Perennial herbs, subshrubs or low shrubs with normally well-developed, penninerved leaves ..... 5
2. Leaves 0.5-2.5 cm long, lower ones ovate or lanceolate, upper ones linear or linear-lanceolate; flower-heads terminal, solitary, or grouped in a terminal, once (-twice)-branched dichotomic cyme ..... **hirtula** Mart.
- 2'. Leaves up to 0.6 cm long, or if longer, then linear, appressed to the stem; flower-heads terminal, solitary, or axillary ..... 3
3. Leaves 0.5-1.5 cm long, linear, persistent; flower-heads terminal, solitary, globose, 12-15 mm diam. .... **P. nudicaulis** Suess.
- 3'. Leaves less than 1 cm long, linear or narrowly triangular, soon deciduous; flower-heads smaller,  $\pm$  10 mm diam., terminal and axillary ..... 4
4. Flower-heads pedunculate, solitary, 10-11 mm diam. .... **P. denudata** (Moq.) O. Kuntze
- 4'. Flower-heads sessile, often in fascicles, globose or elongate  $\pm$  7 mm diam. .... **P. aphylla** Suess.
5. Flower-heads grouped in a well-defined dichotomic inflorescence with much reduced bracts ..... 6
- 5'. Flower-heads solitary, terminal or apparently axillary, rarely in pseudo-axillary fascicles ..... 12
6. Flowering shoots herbaceous throughout, apart from the inflorescence unbranched, or only branched at base; inner surface of tepals completely glabrous ..... 7
- 6'. More or less freely branching herbs or subshrubs; inner surface of tepals with a tuft of hairs at base ..... 10
7. Leaves herbaceous, thin, more or less hairy ..... 8
- 7'. Leaves fleshy, glabrous ..... **P. sarcophylla** Pedersen
8. Flower-heads 9-12 mm diam.; tepals 3-4,5(-5) mm long ..... **P. tuberosa** (Spreng.) Hicken subsp. **tuberosa**
  - A. Flowers white ..... fa. **tuberosa**
  - B. Flowers pink ..... fa. **rubella** Pedersen
- 8'. Flower-heads 13-16 mm diam.; tepals 4,5-6 mm long ..... 9
9. Leaves narrow, oblong or lance-oblong, 4-10 times as long as broad, mostly acute; inflorescence normally branched. Central Brazil (Goiás, Federal District) ..... **P. tuberosa** subsp. **goiana** Pedersen
- 9'. Leaves broad, ovate or orbicular-ovate, 2-3 times as long as broad, mostly obtuse; inflorescence rarely branched. Uruguay ..... **P. ninae** Pedersen
10. Very large perennial herb or subshrub, 2 m or more high; leaves sessile or short-stalked, broadly elliptic or ovate to almost orbicular, uppermost acutish, otherwise rounded or obtuse at apex, rounded or subcordate at base ..... **P. elata** R.E. Fr.
- 10'. Plants smaller, to about 1 m; leaves mostly petiolate, ovate or lanceolate, mostly acute at both ends ..... 11
11. Floral bract 3-4 mm long, bractlets 3.8-4.5 mm, tepals (4.5)-5-7 mm ..... **P. acutifolia** (Moq.) Stützer
- 11'. Floral bract 1.7-2.7 mm, bractlets 2-3 mm, tepals 3.5-4(-5) mm long ..... **P. fruticulosa** Suess.
12. Lower surface of leaves densely white-, greyish- or yellowish-tomentose ..... 13
- 12'. Leaves glabrous or more or less densely hairy, not tomentose underneath ..... 18
13. Freely branching subshrubs or shrubs 0.5-1 m high ..... 14
- 13'. 10-20 cm high perennials, mostly only branched at the base ..... 15
14. Leaves broadly ovate-oblong or elliptic-oblong, apex obtuse or rounded; flower-heads occasionally in pseudo-axillary fascicles of two or three; tepals  $\pm$  3 mm long; ..... **P. minarum** Pedersen
- 14'. Leaves ovate or elliptic, acute; flower-heads never in fascicles; tepals 4-6 mm long ..... **P. townsendii** Pedersen
15. Flower-heads sessile or short-pedunculate (up to 10 mm) ..... **P. eriophylla** (Mart.) Pedersen
- 15'. Flower-heads normally long-pedunculate (50-200 mm or more) ..... 16
16. Tepals 5-7 mm long, Central Brazil ..... **P. sericantha** (Mart.) Pedersen
- 16'. Tepals 3.5-4.5(-5.5) mm long ..... 17
17. Leaves ovate, lanceolate or elliptic-oblong, flat. Extreme southern Brazil, Chaco region, Argentina, Uruguay ..... **P. gnaphaloides** (L. f.) Mart.

- 17'. Leaves narrowly oblong or linear, margin often revolute. Central Brazil to Paraguay, Bolivia, and extreme north-eastern Argentine ..... **P. helichrysoides** (Moq.) O. Kuntze
18. Tepals glabrous throughout ..... **P. glabrata** Mart.
- 18'. Tepals hairy on outer surface ..... 19
19. Inner surface of tepals with a tuft of hairs at base ..... 20
- 19'. Inner surface of tepals completely glabrous ..... 21
20. Low shrub or subshrub; leaves broadly ovate to orbicular, apex rounded. Bolivia ..... **P. rotundifolia** Pedersen
- 20'. Decumbent, much branched perennial; leaves ovate, acute. Brazil (Bahia) ..... **P. tuberculosa** Pedersen
21. Plant velvety throughout; flower-heads terminal and in the axils of the uppermost, scarcely reduced leaves ..... **P. velutina** Mart.
- 21'. Plant more or less densely hairy, but scarcely velvety; flower-heads terminal, exceptionally borne also in the axils of much-reduced leaves ..... 22
22. Leaves broadly ovate or orbicular; flower-heads occasionally axillary, dense, not elongate in age ..... **P. ninae** Pedersen
- 22'. Leaves narrower, lanceolate or narrowly elliptic; flower-heads never axillary, lax, elongate in age ..... 23
23. Stem and leaves densely hairy. Central and south-eastern Brazil ..... **P. jubata** Mart.
- 23'. Stem and leaves thinly appressed-pilose. Paraguay, Bolivia, western Brazil (Mato Grosso do Sul), extreme north-eastern Argentine ..... **P. gleasonii** Suss.

### QUATERNELLA Pedersen

Bull. Mus. Natl. Hist. Nat., B, Adansonia 12: 92 (1990).

When this genus was described, only a single species was known, represented by one collection. New material now makes it possible to describe an additional species, and a further species is transferred from *Pfaffia*. While the flowers of *Q. confusa*, the original species, are tetramerous, both of the new taxa added have pentamerous flowers, which unfortunately renders the generic name inappropriate.

### 30. *Quaternella ephedroides* Pedersen, sp. nov.

*Frutex sub-aphyllus intricata ramosus teste collectorum ad 1.5 m altus: caulis 0.13-? cm crassus, teres, ad nodos incrassatus, costatus, pilis hyalinis 1-1.5 mm longis 5-7-articulatis simplicibus nitentibus sursum spectantibus vix appressis vestitus. Folia (unum tantum adest) verisimiliter omnia sessilia, 1 cm longa, 0.25 cm lata, anguste oblongo-lanceolata, acuta, uninervia, mucronata, supra pilis brevibus asperrimis albidis sparse vestita, subtus spisse longiusque appresso-pilosa. Flores in spicastro sessilibus aut breviter (ad 5 mm ?) pedunculatis, terminalibus axillaribusque axe villosa 20(+)-florigeris congesti: bractea scariosa, parum pellucida, ovata, paene acuminata, concava, uninervia, mucronulata, dorso pilosa, persistens; bracteolae ut bractea, vix 2 mm longa, latissime ovato-cordatae, concavae, uninerviae, vix mucronatae, dorso hirsutae, cum perianthio deciduae; tepala ut*

*bractea bracteolaeque, aut paullo magis tenacia, 3-3.5 mm longa, tria exteriora ad 1.1 mm lata, anguste oblongo-ovata, parum concava, tri-quinquennervia, duo interiora ± 0.8 mm lata, oblonga, magis concava, trinervia, omnia acuta, mutica, dorso densissime appresso-pilosa, intus glaberrima; stamina post anthesin large 3 mm longa antheris oblongis 1.1-1.2 mm, filamentis paene ad tertiam partem supra basin connata duobus partibus liberis margine ciliatis, apice tridentata, dens antheriger lateralibus ± longitudine aequans; germen (novellum) ca. 0.6 mm longum, breviter stipitatum, potius oboviforme, ad stylum ca. 0.2 mm longum stigmatum bipartito ramis crassis obtusis angustatum, ovulum magnum medio loculi insertum. Utriculus sub-sessilis absque stylo stigmatum persistentibus ad 1.3 mm longus, late oviformis, paene globosus. Semen ca. 1 × 1 × 0.7 mm, potius oboviforme, superne truncatum, ad umbilicum profunde emarginatum, funiculus latere paullo sub apicem insertus. Embryo ignotus.—Fig. 13.*

TYPE.—*Arbo* 5416, Brazil, Bahia, mun. Morro do Chapéu: morrão al S de Morro do Chapéu, 11°35'S, 41°13'W, ca. 1050 m. Carrasco con elementos de cerrado. Suelo pedregoso, 28 Nov. 1992. "Arbusto muy ramoso 1.5 m" (holo-, SPF; iso-, CTES).

PARATYPE.—*Arbo*, Mello-Silva, Schinini & Souza 4534, Brazil, Minas Gerais, mun. Buenópolis: Curimatai, 40 km E de BR-135, entre Buenópolis y Joaquim Felício, 17°51'S, 43°58'W, 600 m, Cerradão, borde de arroyo, entre rocas, 21 May 1990. "Ramas apoyantes entrelazadas. Inflorescencia blanca" (CTES, SPF).

While the floral characters of this species are those of the genus, the tangled mass of leafless

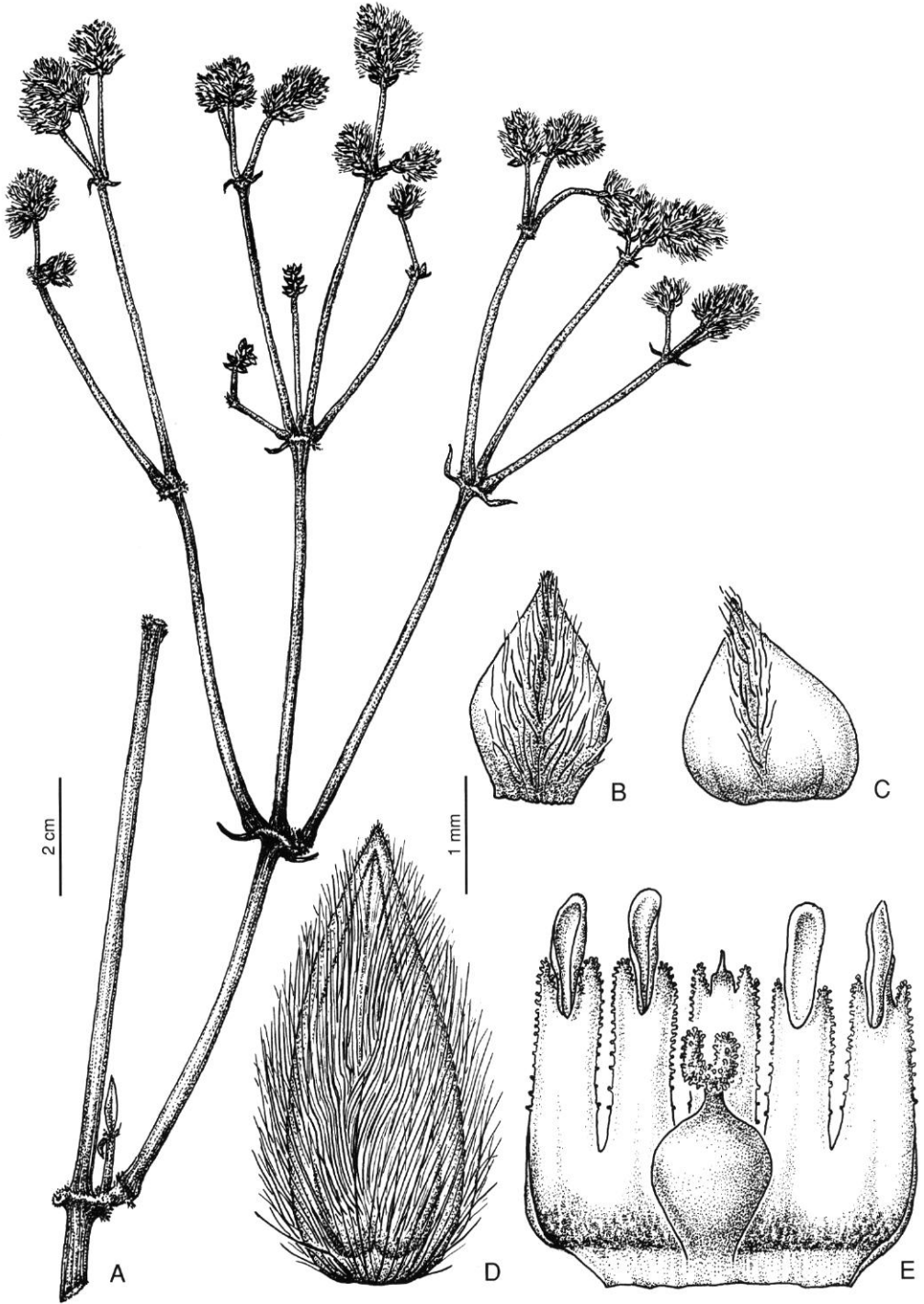


Fig. 13.—*Quaternella ephedroides* Pedersen: A, habit; B, bract; C, bractlet; D, tepal; E, androecium and gynoecium. (Arbo et al. 4534, CTES).



branches makes it very different in aspect from the two other known species of *Quaternella*.

**31. *Quaternella glabratoides* (Suess.) Pedersen, comb. nov.**

*Pfaffia glabratoides* Suess., Feddes Repert. 35: 330 (1934).—*Gomphrena glabratoides* (Suess.) Siqueira, Pesquisas. Botânica 43: 184 (1992).—Type: *Dusén s.n.*, Brazil, Paraná, Iraty (holo-, S!; iso-, Z!).

Described by SUESSENGUTH as an aberrant species of *Pfaffia*, I find the androecium and gynoecium of this species identical to those of *Q. confusa*. SIQUEIRA referred it to *Gomphrena*, from which it differs in the structure of the androecium.

**TROMMSDORFFIA** Mart.

Beitr. z. Kenntnis d. Amarantaceen: 130 (1825), Nova gen. sp. plant. Bras. 2: 40 (1826), non *Trommsdorffia* (1800) nor *Trommsdorffia* Blume (1826).

The type of the genus *Trommsdorffia* is the type specimen of *T. aurata* Mart., collected by MARTIUS in Brazilian Amazonia. In all, MARTIUS referred four species to this genus, which was accepted by BAILLON (1887), but by very few other authors. ENDLICHER (1837) transferred it to *Alternanthera* as a section, and this was accepted by MOQUIN-TANDON (1849) and SEUBERT (1875), while DIETRICH (1839) merged it with *Iresine*, and HOOKER (1880) placed it in *Hebanthe* as a section. Most later authors, such as KUNTZE (1891), SCHINZ (1893, 1934), CHODAT (1901), CHODAT & REHFOUS (1927), STANDLEY (1917, 1937), FRIES (1920), SUESSENGUTH (1934), and ELIASSON (1987) have followed DIETRICH, placing *Trommsdorffia* in *Iresine*, generally recognizing it as a section of that genus.

Recent studies (BORSCH 1995) have shown that while *Trommsdorffia* has gomphrenoid pollen, the remaining species of *Iresine* in the traditional sense have amaranthoid pollen. The maintenance of *Trommsdorffia* with *Iresine* thus becomes

impossible, considering the importance now attributed to pollen characters for the systematics of the *Amaranthaceae*. In the opinion of BORSCH (1995), *Trommsdorffia* should instead be placed in *Pfaffia*, an interpretation which I can not accept. Traditionally, the systematics of the *Gomphrenoideae* have largely been based on characters of the androecium, probably because the genera key out very easily using these features. Although the uncritical application of this system has led to some questionable results, such as the placement of *Trommsdorffia* in *Alternanthera*—a solution which I believe no-one would contemplate to-day—the system is both practical and probably reflects the true affinities of the genera. The androecia of *Pfaffia* and *Trommsdorffia* are, however, very different. The filaments in *Pfaffia* are connate below, usually from about one-fourth to half their length, mostly fairly broad, with their margins fimbriate (excluding the distinct genus *Hebanthe*), and generally more or less distinctly 3-lobulate at the apex, without inter-staminate appendages (“pseudostaminodia”). In *Trommsdorffia* by contrast the filaments are linear, with margins entire, and are united at the base forming a very shallow cup, and nearly always alternating with pseudostaminodia usually of a very distinct type, peculiar to this group. The gynoecium also differs between the two genera. In *Pfaffia* (excluding *Hebanthe*) the ovary is slenderly obovoid or claviform, with a sessile, mostly only emarginate stigma, the ovule inserted uppermost in the locule, while in *Trommsdorffia* the ovary is more or less globose, generally with a distinct, though very short style, the stigma 2-lobed, and the ovule inserted near the centre of the locule. The habit is also different between the genera: species of *Pfaffia* (excluding *Hebanthe*) are low, perennial herbs, subshrubs or shrubs, while those of *Trommsdorffia*, as far as known are leaning or climbing shrubs. A character of less importance is the presence of branched hairs in some species of *Trommsdorffia*; these are unknown in *Pfaffia*. *Trommsdorffia* shares the last two characters with *Hebanthe*, but the floral characters, in particular the presence of Pseudostaminodia and the 2-lobed stigma, set it apart from that genus. The distinctly 2-lobed stigma also precludes inclusion of *Trommsdorffia* with *Alternanthera*, which has a

capitate stigma, while the presence of Pseudostaminodia precludes its inclusion in *Gomphrena*, *Pseudogomphrena*, or *Quaternella* (the so-called Pseudostaminodia in *Pseudogomphrena* R.E. Fr. in fact result from the fusion of the lobed filaments beyond the insertion of the anthers, a character also found in some species of *Gomphrena*, e.g. *G. phaeotricha* Pedersen). In view of these differences, *Trommsdorffia* is best reinstated as a distinct genus.

The name *Trommsdorffia* has been used by two other authors: BERNHARDI (1800) for a segregate of *Hypochoeris*, and BLUME (1826) for a genus of *Gentianaceae*. The name *Trommsdorffia* Bernh. was, however, not validly published according to Art. 34. 1 (d) of the International Code of Botanical Nomenclature (GREUTER 1994). Moreover, no generic description was provided by BERNHARDI, and no reasons were given for taking the species *Hypochoeris maculata* L. out of *Hypochoeris*. The new genus was only identified by the combination *Trommsdorffia maculata*, citing *Hypochoeris maculata* L. in synonymy, and by the germanized name "Trommsdorffie".

As LINNÉ (1753) included several species under *Hypochoeris*, not even an indirect reference was made to a previously published generic description.

*Trommsdorffia* Bernh. has been used at least twice by modern authors, by SOJÁK (1972) and by DÓSTAL (1984); in both cases the name figures in lists of new combinations considered necessary, apparently with no attempt to justify the use of it

*Trommsdorffia* Blume appeared on page 762 of Bijdr. fl. Nederl. Indië; according to STAFLEU (1976), this page became available to the public during 1826, while the pre-print of Martius' Beitr. z. Kenntnis d. Amarantac. came out in 1825 (STAFLEU 1981) and so clearly antedates publication of BLUME's generic name.

While a revision of *Trommsdorffia* Mart. lies beyond the scope of this study, and would require a revision of *Iresine* as well, I feel familiar enough with the following taxa to establish the synonymies and new combinations given below.

### 32. *Trommsdorffia argentata* Mart.

Beitr. z. Kenntnis d. Amarantac.: 130 (1825).—*Iresine argentata* (Mart.) D. Dietr., Syn. Plant 1: 870 (1839).—*Alternanthera argentata* (Mart.) Moq. in DC., Prodr. 13 (2): 352 (1849).—Type: *Bertero s.n.*, Puerto Rico (herb. SCHULTES, not located).  
*Trommsdorffia aurata* Mart., Beitr. z. Kenntnis d. Amarantac.: 130 (1825), nomen; Nova gen. Sp. plant. Bras. 2: 41, tab. 139 (1826).—*Iresine aurata* (Mart.) D. Dietr., Syn. plant. 1: 870 (1839).—*Alternanthera aurata* (Mart.) Moq. in DC., Prodr. 12 (2): 353 (1849).—*Pfaffia aurata* (Mart.) Borsch, Novon 5: 230 (1995).—*Iresine dysdicta* Spreng. in L., Syst. veg., ed. 16, Cur. post.: 104 (1827), based on *Trommsdorffia aurata* Mart.—Type: *Martius s.n.*, Brazil (holo-, M!).  
*Iresine hassleriana* Chod., Bull. Herb. Boiss., ser. 2, 3: 390 (1903).—Type: *Hassler 3429*, Central Paraguay (holo-, G!; iso-, P!, S!).

In the opinion of MEARS, as indicated on his annotation-slips in M and elsewhere, but apparently never published, *Trommsdorffia aurata* Mart. is not distinct from *T. argentata* Mart. I have seen the holotype of the former in M; unfortunately, I have been unable to locate the specimen in herb. SCHULTES, collected by BERTERO in Puerto Rico, on which MARTIUS based *T. argentata*. It should be in M, but was not to be found, nor could it be located in BR (Thomas BORSCH, pers. comm.). I have, however, seen what I believe to be a duplicate in TO, and on this basis agree with MEARS that the two can not be kept separate. Attempts have been made to do so on the basis of indument and shape of leaves, but both characters are too variable to be of any use in this case.

The same applies to *Iresine hassleriana* Chod., originally referred by CHODAT to *Alternanthera aurata* (Mart.) Moq. There are two specimens of this collection in G, and duplicates in P and S, which all come well within the range of variability of *T. argentata*.

*Trommsdorffia argentata* differs from *T. canescens* (Humb. & Bonpl. ex Willd.) Mart. (treated immediately below) on minor points, such as having leaves and stem that are less hairy, becoming glabrous or nearly so in age, and tepals that are glabrous or at most with a tuft of short hairs at the tip, whereas in the latter the leaves are more densely and persistently hairy, and the back of the tepals are uniformly hairy.



**33. *Trommsdorffia canescens*** (Humb. & Bonpl. ex Willd.) Mart.

Beitr. z. Kenntniss. d. Amarantac.: 131 (1825).—*Iresine canescens* Humb. & Bonpl. ex Willd. in L., Sp. pl., ed. 4, 4 (2): 765 (1825).—Type: *Humboldt & Bonpland 5493*, Colombia (P!).  
*Alternanthera dubia* H.B.K., Nova gen. sp. plant. 2: 209 (1818). *Iresine canescens* Humb. & Bonpl. cited in synonymy.

According to MOQUIN-TANDON (1849), the specimen in P described by [HUMBOLDT and?] BONPLAND and labelled *Iresine canescens* is not identical with the specimen in WILLDENOW's herbarium, on which his description in the 4th edition of the Species Plantarum is based. This interpretation appears, however, to be incorrect, as noted by MEARS on his annotation slip on the specimen in P. After consulting a photograph of the WILLDENOW specimen, which is annotated "*Trommsdorffia canescens* Mart." by the author himself, I concur with MEARS. MOQUIN-TANDON referred the P specimen to *Alternanthera* [*Trommsdorffia*] *argentata* (Mart.) Moq. As indicated above, the two are very similar and might be considered conspecific. He attributed the name *Iresine canescens* solely to BONPLAND, but as the handwriting of HUMBOLDT (A. LOURTEIG, pers. comm.) is also found on the sheet, there is reason to believe that name and description were a joint effort of the two.

**34. *Trommsdorffia cardenasii*** (Standl.) Pedersen, **comb. nov.**

*Iresine cardenasii* Standl., Field Mus. Publ. Bot. 17: 241 (1937).—Type: *Cárdenas 3210*, Bolivia (holo-, F, not seen; iso-, M!).

The description, mentioning feminine flowers, seems to indicate that the flowers are unisexual, in which case the species would probably be a true *Iresine*. The flowers of the specimen examined by me are, however, clearly bisexual and typical for the genus *Trommsdorffia*.

**35. *Trommsdorffia costaricensis*** (Standl.) Pedersen, **comb. nov.**

*Iresine costaricensis* Standl., Contrib. U. S. Nat. Herb 18: 94 (1916).—*Pfaffia costaricensis* (Standl.) Borsch, Novon 5: 230 (1995).—Type: *Tonduz 13183*, Costa Rica (holo-, US, not seen; iso-, G!, K!).

The isotypes seen in G and K confirm the opinion of BORSCH that the species is misplaced in *Iresine*. As *Trommsdorffia* is better considered a genus distinct from *Pfaffia*, the above combination is needed.

**36. *Trommsdorffia macrophylla*** (R.E. Fr.) Pedersen, **comb. nov.**

*Iresine macrophylla* R.E. Fr., Ark. Bot. 16: 41 (1920).—*Iresine hassleriana* var. *macrophylla* (R.E. Fr.) Suess, Feddes Repert. 35: 321 (1934).—Type: *Malme I.920*, Paraguay, ad R. Pilcomayo (holo-, S!).  
*Iresine guaranitica* Chod., Bull. Soc. Bot. Genève, ser. 2, 18: 289 (1927).—Type: *Rojas ex-Hassler 10577*, Paraguay (holo-, G!).

The type material of both *Iresine macrophylla* and *I. guaranitica* are clearly conspecific and belong in *Trommsdorffia*.

Curiously enough, both CHODAT and SUESSENGUTH, in discussing the validity of *Iresine macrophylla* R.E. Fr., compared it with *I. hassleriana* Chod., which I consider identical with *Trommsdorffia argentata* Mart., and not with *I. guaranitica*.

**37. *Trommsdorffia pulverulenta*** Mart.

Beitr. z. Kenntniss d. Amarantac.: 131 (1825).—*Illecebrum pulverulentum* (Mart.) Spreng. in L., Syst. veg., ed. 16, Curae post.: 103 (1827).—*Iresine pulverulenta* (Mart.) D. Dietr., Syn. plant. 1: 870 (1839).—*Alternanthera pulverulenta* (Mart.) Moq. in DC., Prodr. 13 (2): 351 (1849).—Type: *Haenke s.n.*, Perú (holo-, M!).

**38. *Trommsdorffia weberbaueri*** (Suess.) Pedersen, **comb. nov.**

*Iresine weberbaueri* Suess., Feddes Repert. 35: 323

(1934).—Syntypes: *Weberbauer 7022* (B, GH, not seen) and *4752* (B, not seen), both collected in Peruvian Amazonia.

Although I have not seen any of the syntypes cited by SUESSENGUTH, the description places this species in the genus *Trommsdorffia*.

### Acknowledgements

In the course of these studies, the following herbaria have been visited: B, BA, BAB, BM, BR, C, CORD, CTES, FI, G, GOET, K, LIL, LP, MBM, P, S, TO, UPS, W, Z; material has been had on loan from several of these, and from H, SPF and U. I wish to express my thanks to the Directors and staff of these institutes for the help received. I am grateful to an anonymous reviewer for a careful review of the English and for suggestions on several nomenclatorial matters. Very special thanks are due to Dr. Alicia LOURTEIG, Paris, for reading the manuscript, and for valuable practical assistance.

### REFERENCES

- BAILLON H. 1887.—Chenopodiaceae: 130-217, *Histoire des Plantes* 9. Hachette et Cie., Paris.
- BERNHARDI J.J. 1800.—*Systematisches Verzeichniß der Pflanzen welche in der Gegend um Erfurt gefunden werden* 1. Hoyer und Rudolphi, Erfurt.
- BLUME C.L. 1825-26.—*Bijdragen tot de flora van Nederlandsch Indië*. Batavia.
- BORSCH T. 1995.—Three New Combinations in *Pfaffia* (Amaranthaceae) from the New World Tropics. *Novon* 5: 230-233.
- CHODAT R. 1901.—Plantae Hasslerianae I. Amaranthaceae. *Bull. Herb. Boissier*, ser. 2, 1: 395-442.
- CHODAT R. & REHFOUS L. 1927.—La végétation du Paraguay XIV. Amaranthacées. *Bull. Soc. Bot. Genève*, ser. 2, 18: 246-294.
- DIETRICH D. 1839.—*Synopsis plantarum seu enumeratio systematica plantarum plerumque adhuc cognitatum cum differentiis specificis et synonymis selectis ad modum Persoonii elaborata*. Bernh. Frieder. Voigt, Weimar.
- ELIASSON U. 1987.—Amaranthaceae, in HARLING, GUNNAR & LENNART ANDERSSON (eds.), *Flora of Ecuador* 28.
- ENDLICHER S. 1837.—Amaranthaceae: 300-304. *Genera plantarum* 4. Wien.
- DÓSTAL J. 1984.—Notes to the nomenclature of the Czechoslovak flora. *Folia Mus. Rerum Nat. Bohemiae Occid.*, Bot. 21.
- FRIES R.E. 1920a.—Zur Kenntnis der Süd- und Zentralamerikanischen Amaranthaceenflora. *Ark. Bot.* 16 (12).
- FRIES R.E. 1920b.—Revision der von Glaziou in Brasilien gesammelten Amaranthaceen. *Ark. Bot.* 16 (13).
- GREUTER W. et al. 1994.—*International Code of Botanical Nomenclature*. Koeltz Scientific Books, Königstein.
- HOLZHAMMER E. 1955-56.—Die amerikanischen Arten der Gattung *Gomphrena*. I, *Mitt. Bot. Staatssamml. München* 2: 85-114 (1955); II, *ibid.*: 178-257 (1955).
- HOOKE J.D. 1880.—Amaranthaceae: 20-43, in BENTHAM & HOOKER f., *Genera plantarum* 3. Reeve & Co., London.
- KUNTZE O. 1891.—*Revisio generum plantarum vascularium omnium atque cellularium multarum...* Arthur Felix, Leipzig.
- LINNÉ C. VON 1753.—*Species plantarum*. Stockholm.
- LINNÉ C. VON 1754.—*Genera plantarum*, ed. 5. Stockholm.
- MEARS J.A. 1977.—The Nomenclature and Type Collections of the Widespread Species of *Alternanthera* (Amaranthaceae). *Proc. Acad. Nat. Sci. Philadelphia* 129: 1-21.
- MOQUIN-TANDON A. 1849.—Amaranthaceae: 231-424, in A.P. & A. DE CANDOLLE, *Prodromus systematis naturalis regni vegetabilis* 13 (2), Paris.
- PEDERSEN T.M. 1967.—Studies in South American Amaranthaceae. *Darwiniana* 14: 430-462.
- SCHINZ H. 1893.—Amaranthaceae: 91-118, in ENGLER & PRANTL, *Die natürlichen Pflanzenfamilien* 3 (1a), Leipzig.
- SCHINZ H. 1934.—Amaranthaceae: 7-85, in ENGLER & PRANTL, *Die natürlichen Pflanzenfamilien* 2. Auflage 16c, Leipzig.
- SEUBERT M. 1875.—Amaranthaceae. *Mart. Fl. Bras.* 5: 165-264.
- SIQUEIRA J.C. DE 1992.—O gênero *Gomphrena* L. (Amaranthaceae) no Brasil. *Pesquisas, Bot.* 43: 5-197.
- SOJÁK J. 1972.—Nomenklatorické poznámky (Phanerogamae). *Casopis Národního Muzea*, odd. přírodovedny: 127-134.
- STAFLEU F. 1976.—*Taxonomic Literature*, ed. 2, 1. Bohn, Scheltema & Holkema, Utrecht.
- STAFLEU F. 1981.—*Taxonomic Literature*, ed. 2., 3. Bohn, Scheltema & Holkema, Utrecht.
- STANDLEY P.C. 1917.—Amaranthaceae: 95-169. *North American Flora* 21 (2).
- STANDLEY P.C. 1937.—Amaranthaceae: 479-518, in MACBRIDE J.F., *Flora of Perú* 2 (2). *Field Mus. Nat. Hist. Publ.* 13 (No. 379).
- STUCHLIK J. 1912.—Zur Synonymik der Gattung *Gomphrena* II. *Feddes Repert.* 11: 151-162.
- SUESSENGUTH K. 1934.—Neue und kritische Amaranthaceen aus Süd- und Mittelamerika. *Feddes Repert.* 35: 298-337.

## ALPHABETICAL LIST OF SYNONYMS

- Achyranthes calea* Ibañez = 23  
*Achyranthes praelonga* (St.-Hil.) Standl. = 7  
*Achyranthes puberula* (Mart.) Standl. = 8  
*Alternanthera argentata* (Mart.) Moq. = 32  
*Alternanthera aurata* (Mart.) Moq. = 32  
*Alternanthera brasiliensis*  $\beta$  *villosa* (Moq.) Kuntze = 9  
*Alternanthera dubia* H.B.K. = 32  
*Alternanthera geniculata* (S. Moore) R.E. Fr. = 5  
*Alternanthera hirtula* (Mart.) Lopr. var. *robusta* Chod. subvar. *pallens* (Chod.) Chod. = 3b  
*Alternanthera hirtula* (Mart.) Lopr. var. *robusta* Chod. subvar. *straminea* (Chod.) Chod. = 3b.  
*Alternanthera moquinii* (Webb. ex Moq.) Dusén = 9  
*Alternanthera philoxerina* Suess. = 6b\*  
*Alternanthera philoxeroides* var. *acutifolia* (Moq.) Hicken = 6b  
*Alternanthera philoxeroides* var. *lancifolia* Chod. = 6c  
*Alternanthera philoxeroides* var. *obtusifolia* (Moq.) Hicken = 6  
*Alternanthera pulverulenta* (Mart.) Moq. = 37  
*Alternanthera rufescens* Suess. = 4  
*Alternanthera subumbellata* Suess. = 8  
[*Alternanthera virgata* (Schrad.) Suess.] = 9  
*Bucholzia philoxeroides* Mart. = 6  
*Celosia cymosa* Seub. = 11  
*Gomphrena desertorum* var. *fallax* (Seub.) Holz. = 13c  
*Gomphrena desertorum* var. *hygrophila* (Mart.) Stuhl. = 13b  
*Gomphrena desertorum* var. *hygrophila* fa. *ramosissima* Stuhl. = 13b  
*Gomphrena desertorum* var. *mucronata* (Moq.) Stuhl. = 17  
*Gomphrena desertorum* var. *mucronata* fa. *ramosissima* Stuhl. = 17  
*Gomphrena desertorum* var. *rodantha* (Moq.) Stuhl. = 14  
*Gomphrena elegans* Mart. var. *gracilior* Chod. = 18  
*Gomphrena elegans* Mart. fa. *microcephala* Suess. = 18  
*Gomphrena elegans* Mart. var. *microcephala* (Suess.) Holz. = 18  
*Gomphrena elegans* Mart. var. *paraguayensis* (Chod.) Holz. = 18  
*Gomphrena fallax* Seub. = 13c  
*Gomphrena glabratooides* (Suess.) Siqueira = 31  
*Gomphrena glutinosa* R.E. Fr. = 16b  
*Gomphrena hassleri* Chod. = 19b  
*Gomphrena hygrophila* Mart. = 13b  
*Gomphrena latifolia* Mart. & Gal. = 23  
*Gomphrena mariae* S. Moore = 13b  
*Gomphrena martiana* var. *microcephala* Suess. = 16  
*Gomphrena rodantha* Moq. = 14  
*Gomphrena tarijensis* R.E. Fr. = 12b  
*Illecebrum pulverulentum* (Mart.) Spreng. = 37  
*Iresine argentata* (Mart.) D. Dietr. = 32  
*Iresine aurata* (Mart.) D. Dietr. = 32  
*Iresine calea* (Ibañez) Standl. = 23  
*Iresine canescens* Humb. & Bonpl. ex Willd. = 33  
*Iresine cardenasii* Standl. = 34  
*Iresine costaricensis* Standl. = 35  
*Iresine dysdicta* Spreng. = 32  
*Iresine guaranitica* Chod. = 36  
*Iresine hassleriana* Chod. = 32  
*Iresine hassleriana* var. *macrophylla* (R.E. Fr.) Suess. = 36  
*Iresine macrophylla* R.E. Fr. = 36  
*Iresine pulverulenta* (Mart.) D. Dietr. = 37  
*Iresine weberbaueri* Suess. = 38  
*Mogiphanes ramosissima* Mart. = 9  
*Mogiphanes villosa* Mart. = 9  
*Mogiphanes virgata* Schrad. = 9  
*Pfaffia aurata* (Mart.) Borsch = 32  
*Pfaffia costaricensis* (Standl.) Borsch = 35  
*Pfaffia glabratooides* Suess. = 31  
*Pfaffia puberula* (Mart.) Spreng. = 8  
*Telanthera brasiliensis* (L.) Moq.  $\beta$  *villosa* Moq. = 9  
*Telanthera geniculata* S. Moore = 5  
*Telanthera moquinii* Webb. ex Moq. = 9  
*Telanthera philoxeroides* (Mart.) Moq.  $\beta$  *acutifolia* Moq. = 6b  
*Telanthera philoxeroides* (Mart.) Moq. var. *linearifolia* Chod. = 6c  
*Telanthera philoxeroides* (Mart.) Moq.  $\beta$  *obtusifolia* Moq. = 6  
*Telanthera praelonga* (St.-Hil.) Moq. = 7  
*Telanthera puberula* (Mart.) Moq. = 8  
*Telanthera rosea* (Morong) Chod. c *pallens* Chod. = 3b  
*Telanthera rosea* (Morong) Chod. e *straminea* Chod. = 3b  
*Trommsdorffia aurata* Mart. = 32  
*Xeraea fallax* (Seub.) Kuntze = 13c  
*Xeraea hygrophila* (Mart.) Kuntze = 13b

Manuscript received 28 October 1996;  
 revised version accepted 25 August 1997.