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TAXONOMIC DISPERSAL OF AUSTRALIAN *ERIGERON* (ASTERACEAE: ASTEREAE)

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ABSTRACT

The native Australian species previously treated as *Erigeron* are more closely related to other genera, necessitating the partition of these species into three new genera. Two of the species are members of the Australasian *Vittadinia* group and are segregated as **Iotasperma** *gen. nov.*, with the nomenclatural combination **I. sessilifolia** (F. Muell.) Nesom and the new name **I. australiensis** Nesom (based on *Erigeron ambiguus* F. Muell., *nom. illeg.*). The remaining species (except one) are closely related to *Lagenifera*: two of these are segregated as **Lagenithrix** *gen. nov.* with the new combinations **L. setosa** (Benth.) Nesom and **L. stellata** (J.D. Hook.) Nesom; **Lagenopappus** *gen. nov.* comprises several species not yet described and three species formally included with the new combinations **L. pappocromus** (Labill.) Nesom, **L. gunnii** (J.D. Hook.) Nesom, and **L. tasmanicus** (J.D. Hook.) Nesom. The phyletic identity of the Australian *Erigeron conyzoides* F. Muell. remains to be determined.

KEY WORDS: *Erigeron*, *Lagenifera*, Astereae, Asteraceae, Australia

In a review of the 7-10 native Australian species treated as *Erigeron* L., it is recognized here that all of them (with the possible exception of one) are closely related to generic groups primarily occurring in Australia but only distantly related to true *Erigeron*. *Erigeron* occurs in the New World and through much of the Old World, but there are no native species of *Erigeron* in the South Pacific or Australasian region (see also Nesom 1994b, in press). *Erigeron karwinskianus* DC. (sometimes identified as *E. mucronatus* DC.), a native of México, occurs widely through Australia as an adventive; a number of species of *Conyza* L. (sometimes identified as *Erigeron*) also are adventive in

Australia. The native Australian species under consideration are here treated among three new genera, described and discussed below in sequence. Species definitions within two of the new genera remain to be worked out in detail.

I. *Iotasperma*, a new genus of the *Vittadinia* group

Two Australian species treated as *Erigeron*, *E. ambiguus* F. Muell. and *E. sessilifolius* F. Muell., are morphologically disparate within *Erigeron*. The Australian plants have glandular leaves and stems, and numerous pistillate flowers in several series, with white, filiform, tightly coiling ligules. Most diagnostically, the achenes are obovate and flattened, with two broad, sclerified marginal ribs, the faces are without secondary nerves, densely strigose (with twin-hairs), and glandular, the glands concentrated near the apex and base but also scattered over the surface (these obscured by the strigose vestiture), and the pappus is formed of basally caducous bristles in a single series. The detailed and oft-reprinted illustration of *E. sessilifolius* by Black (1929) does not show the glandular vestiture.

In their glandular herbage, multiseriate pistillate flowers with filiform ligules, and glandular achenes, these two "*Erigerons*" resemble plants of the group of Australasian genera that includes *Vittadinia* A. Rich., *Camptacra* Burbidge, *Tetramolopium* Nees, *Peripleura* (Burbidge) Nesom, *Minuria* DC., *Kippistia* F. Muell., *Dimorphocoma* F. Muell. & R. Tate, *Elachanthus* F. Muell., *Ixiochlamys* Sond., and *Dichromochlamys* Dunlop. Relationships among these genera (the *Vittadinia* group) are discussed in separate papers (Nesom 1994a and in prep.). These two Australian "*Erigerons*" differ from all taxa within the *Vittadinia* group in their combination of shallowly cupulate heads, funnelform disc corollas, minute, elliptic-obovate, 2-ribbed achenes, and essentially uniseriate pappus. These plants are here formally distinguished as a separate genus, named for the minute achenes probably producing agamospermically initiated embryos (see below).

Iotasperma Nesom, *gen. nov.* (Figure 1). Type species: *Iotasperma australiensis* Nesom.

Inter *Vittadinia* A. Rich. et genera affinia distinctus capitulis vadose cupulatis, floribus radii seriebus 2-3 ligulis filiformibus circinnatis, floribus discii fertilibus bisexualibusque corollis infundibularibus, acheniis parvis obovatis glandulosi-strigosis costis marginalibus latis sed absque nervis facialibus, et pappo uniseriato setarum caducarum.

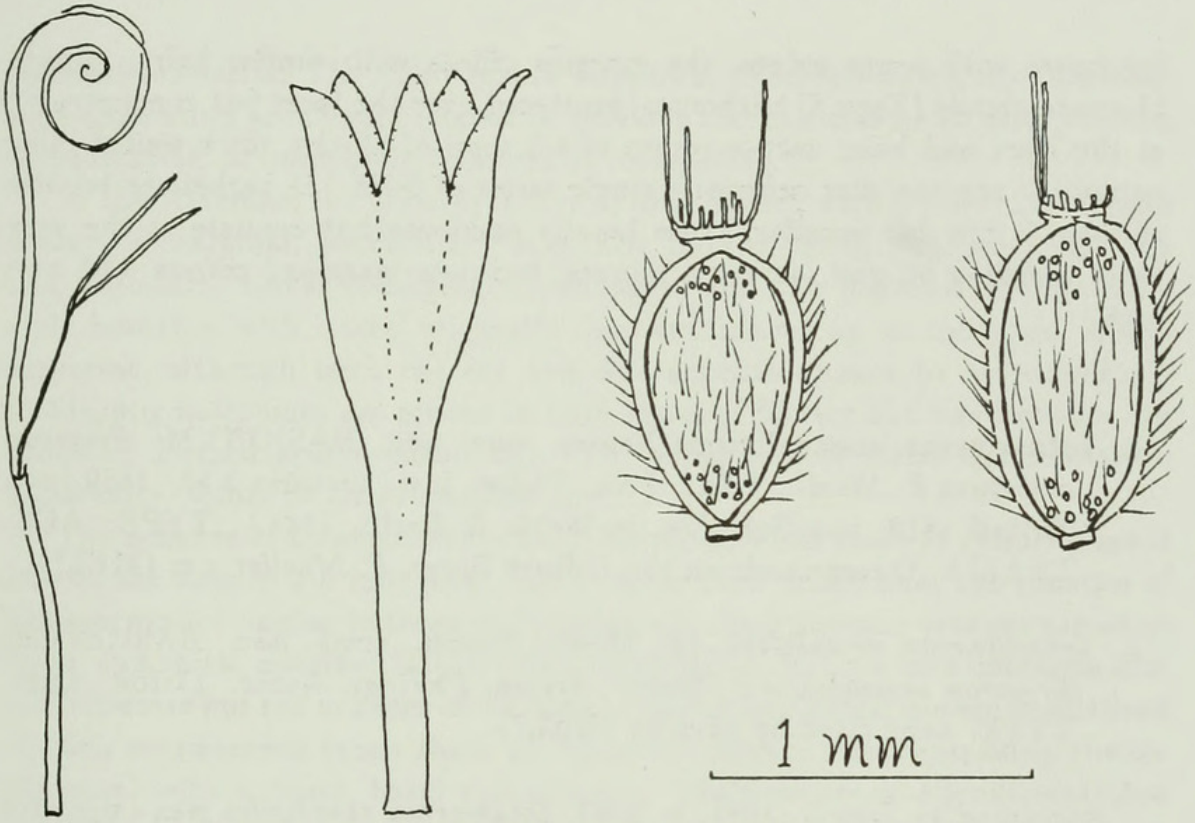

Figure 1. Flowers and achenes of *Iotasperma*: *I. australiensis* (*Maconochie 2459*-US).

Annual herbs from slender taproots, stems erect, 10-35 cm tall, few-branched on the upper half; leaves and stems moderately hispid-pilose and sparsely glandular. Leaves alternate, evenly distributed along the stems, 1-4(-5) cm long, 2-12 mm wide, reduced in size below the heads, oblanceolate-oblong, epetiolate, subclasping, entire or with 1-2 pairs of coarse teeth on the distal half. Heads shallowly cupulate, 8-12 mm wide (pressed), terminal on peduncles 1-3 cm long with reduced leaves, in a loose, corymboid capitulescence; phyllaries in ca. 2 series of equal length, 3-4 mm long, inserted on a broad, veined lamina, flat, narrowly elliptic-lanceolate with broad scarious margins, distinctly 3-veined, moderately stipitate-glandular, green, the inner basally indurate. Disc flowers apparently bisexual, the corollas 2.2-2.5 mm long, the linear tube about half the corolla length, abruptly opening into the obdeltate limb, 5 lobed, without orange venation; staminal filaments inserted at the tube-limb junction; style branches 0.2-0.3 mm long, without lines of stigmatic papillae; anther thecae with lanceolate apical appendages, not basally caudate. Pistillate flowers fertile, numerous in ca. (1-)2-3 series, with white to purplish, filiform (0.05 mm wide), tightly coiling ligules 1.0-1.5 mm long; style branches without lines of stigmatic papillae. Achenes obovate to broadly elliptic-obovate, 0.9-1.1 mm long, 0.5-0.6 mm wide, rounded at the apex, strongly flattened with a pair of broad, sclerified, glabrous lateral ribs, the faces densely strigose with Zwill-

ingshaare with acute apices, the margins ciliate with similar hairs, minute biseriate glands (Type C trichomes) scattered over the faces but concentrated at the apex and base; carpopodium of 4-5 rows of blocky, thick-walled cells; pappus of ray and disc achenes a single series of 6-10(-15) barbellate bristles as long as the disc corollas, these basally caducous but connate at the very base, breaking off and leaving a minute, laciniate-margined corona 0.05 mm high.

1. **Iotasperma australiensis** Nesom, *nom. nov.* BASIONYM: *Erigeron ambiguus* F. Muell., Trans. Proc. Philos. Inst. Victoria 3:58. 1859 [*non* Nuttall 1818; *non* Sch.-Bip. *in* Webb. & Berth. 1844.]. TYPE: AUSTRALIA. Queensland: on the Gilbert River, *F. Mueller s.n.* (MEL?).

2. **Iotasperma sessilifolia** (F. Muell.) Nesom, *comb. nov.* BASIONYM: *Erigeron sessilifolius* F. Muell., Fragm. Phytogr. Austr. 11:100. 1880. TYPE: none cited by Mueller (MEL?).

According to Jessop (1981, p. 376), *Iotasperma sessilifolia* was originally collected in tropical Northern Territory; it also is "known from 3 or 4 fragments collected in [South Australia] between 1889 and 1927. The differences between this species and the earlier *E. ambiguus* F. Muell. appear slight and require examination." Mueller, however, in the original description of *Erigeron sessilifolius*, provided a diagnosis comparing the two, and Hnatiuk (1990) has listed both species as accepted taxa, showing the distribution of *I. sessilifolia* in Northern Territory and South Australia and that of *I. australiensis* in Northern Territory and Queensland. The presence of *I. australiensis* in the Kimberly Region of West Australia is recorded by Wheeler *et al.* (1992). Cooke (1986) noted that *I. sessilifolia* occurs "on creek edges and waterholes" in South Australia, flowering January to July.

The relationships of *Iotasperma*

The nature of the relationship of *Iotasperma* to other genera of the *Vittadinia* group is obscure, but *Iotasperma* is comparable in various aspects to *Vittadinia*, *Peripleura*, and *Camptacra* and to *Ixiochlamys* and *Dichromochlamys*. Both of these generic groups include annuals, and leaves in both groups are morphologically similar to those of *Iotasperma*. In its relatively broad (vs. elongate) heads and funnelform (vs. narrowly tubular) disc corollas, *Iotasperma* is more similar to *Dichromochlamys* and *Ixiochlamys*. *Minuria* stands apart from the rest of the *Vittadinia* group, including *Iotasperma*, in its dimorphic pappus (on disc and ray achenes) with both bristles and scales, and consistently

sterile disc ovaries. The small genera *Kippistia*, *Dimorphocoma*, and *Elachanthus* apparently are closely related to *Minuria* and can also be eliminated from consideration as immediate relatives of *Iotasperma*.

In the Astereae, the style branches of disc flowers with fertile ovaries have a pair of marginal, functionally stigmatic lines of small papillae below the non-stigmatic, apical collecting appendages, and the pistillate flowers have style branches with lateral stigmatic lines continuous up to the apex. In *Iotasperma*, although both the ray and disc achenes appear to be completely fertile, stigmatic lines are absent in both types of flowers and the embryos are probably formed agamospermically. The same lack of stylar differentiation apparently occurs in *Dichromochlamys*.

The achenes of *Iotasperma* are ca. 1 mm long, while those in closely related genera are mostly 2-5 mm long. Apart from their small size, the achenes of *Iotasperma* are similar to those of *Peripleura* in their obovate outline, nerveless faces, and thick, sclerified lateral ribs. Thick lateral ribs are also characteristic of *Vittadinia* but the achenes of *Vittadinia* as well as *Camptacra* are specialized in their multinerved faces; those of *Vittadinia* have a basal extension (below the seed) with a dense, basal tuft of hairs. The achenes of *Ixiochlamys* have a filiform beak and those of *Dichromochlamys* produce a broad neck; there is also a definite tendency for apical constriction of the achenes in *Vittadinia* and *Peripleura* as well as *Minuria*. In rehydrated achenes of *Iotasperma*, a short neck is often evident, but in dried material it is not.

The pappus in genera of the *Vittadinia* group tends to be multiseriate (2-3 series of bristles); one or two of the pappus series may be reduced in length. Reduction in the number of bristles and number of pappus series occurs in *Camptacra* and *Peripleura*, where the pappus tends to be 1-seriate. Among other Australian genera of the *Vittadinia* group, the pappus of two species of *Ixiochlamys* also approaches the highly abbreviated, consistently 1-seriate pappus of *Iotasperma*.

Summary

The Australian species *Erigeron ambiguus* and *E. sessilifolius* are here segregated as the new genus *Iotasperma*. *Iotasperma* is a member of the Australasian *Vittadinia* group, but the nature of the intergeneric relationships within this group is obscure. *Iotasperma* resembles the Australian genera *Vittadinia*, *Camptacra*, and *Peripleura* in some features, but it is more similar to *Ixiochlamys* and *Dichromochlamys* in others.

II. *Lagenithrix*, a new genus related to *Lagenifera*

The treatment of the two Australian species *Erigeron setosus* Benth. and *E. stellatus* (J.D. Hook.) W.M. Curtis as *Erigeron* apparently has emphasized aspects of their rather generalized, *Erigeron*-like appearance, particularly their white rays and pappus of both ray and disc achenes of numerous, persistent, barbellate bristles. On closer examination, however, these species show features that are anomalous within *Erigeron* but that are characteristic of *Lagenifera* and related genera. Their achenes are glabrous or glabrate except for numerous glands near the apex, although the glands usually are not persistent at achene maturity. One of the species has functionally staminate disc flowers (the ovaries sterile) with mostly 4-merous corollas and the other has achenes slightly constricted into a short, thickened neck. Their putative relationship to *Erigeron* is hypothesized to be superficial and they are recognized here as a separate genus.

Lagenithrix Nesom, *gen. nov.* (Figures 2A, 2B). Type species: *Lagenithrix* (*Erigeron*) *setosa* (Benth.) Nesom.

> A *Lageniferae* Cass. ac *Myriacti* Less. similis sed habitu nano tagetiformanti, caulibus monocephalis scaposis, floribus disci ovariis sterilibus vel fertilibus, acheniis oblanceolati-oblongis ca. 2 mm longis collo brevi crasso, et pappo 1-2-seriato setarum barbellatarum persistentium dignoscenda.

Herbaceous perennials from short, lignescent, fibrous-rooted stolons, commonly forming low mats, producing clusters of very small leaves at the stolon tips; stems and leaves sparsely to densely hispid-pilose with prominently cross-walled, uniseriate trichomes, glandular or eglandular. Leaves all basal, thick, oblanceolate to spatulate with a rounded apex, entire, with the petiole broadening slightly at the base, 3-nerved from the base, 4-18 mm long, 2-3 mm wide. Heads solitary, hemispheric, 5-12 mm in diameter, sessile or on bracteate scapes; phyllaries in 2-3 series of even length, narrowly oblong-lanceolate, 4-6 mm long, flat, 1-nerved, evenly herbaceous except for very narrow, scarious margins, often purple-tipped, minutely glandular, otherwise glabrous or the outer sparsely pilose; receptacles smooth, barely convex, epaleate. Disc flowers functionally staminate (*Lagenithrix stellata*) or bisexual (*L. setosa*); corollas 3.5-4.5 mm long, funnelform, the linear tube opening into an obtriangular limb 1/2-3/4 the length of the corolla, with 4-5 triangular-ovate lobes; apical appendages of the anthers lanceolate with rounded to acute apices; style branches with deltate collecting appendages (*L. setosa*) or stigmatic lines absent and collecting appendage not differentiated from lower part of style branches (*L.*

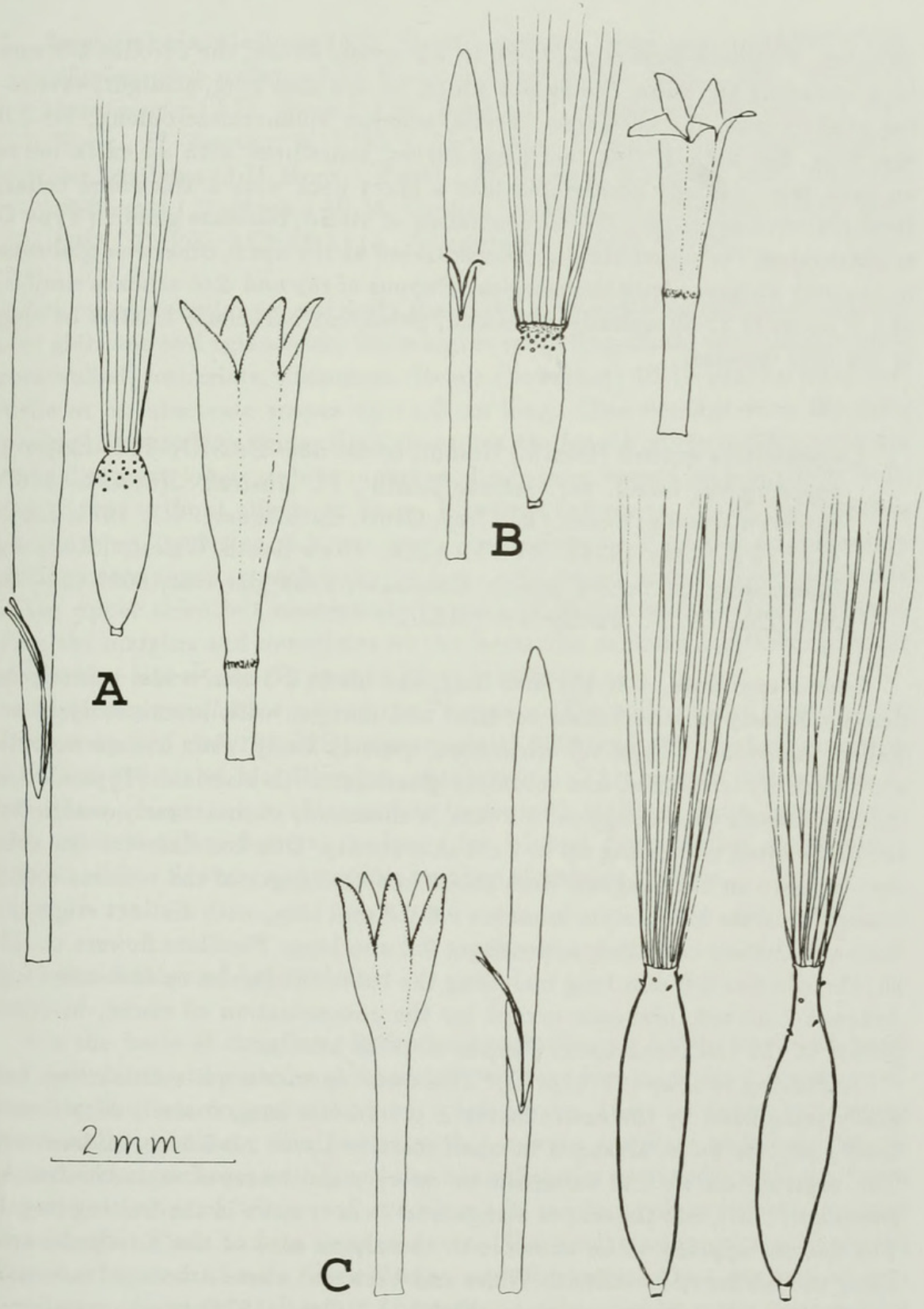

Figure 2. Flowers and achenes of *Lagenithrix* and *Lagenopappus*: A. *Lagenithrix setosa* (*Tindale 4056*-US); B. *Lagenithrix stellata* (*Ratkowsky 185*-MO); C. *Lagenopappus gunnii* (*Ratkowsky 1088*-MO).

stellata). Pistillate flowers ca. 25-36 in 1-2 series, fertile, the corollas 5-8 mm long including the tube, the ligules white, ca. 2-4 mm long, straight, extending slightly past the involucre. Fertile achenes oblanceolate-oblong, 1.8-3.0 mm long, flat with 2, thin, marginal nerves, sometimes with an extra nerve on each face, apically constricted into a short neck with a thickened collar, faces glabrous except for the concentration of viscid, biseriate glands (Type C trichomes) on the upper third or concentrated at the apex, otherwise glabrous or sparsely strigose along the margins. Pappus of ray and disc achenes similar, of 1-2 series of 12-35 apically attenuate, persistent barbellate bristles as long as the disc corollas.

1. **Lagenithrix setosa** (Benth.) Nesom, *comb. nov.* BASIONYM: *Erigeron pappocromus* Labill. var. *setosus* Benth., *Fl. Austral.* 3(5):494. 1867. *Erigeron setosus* (Benth.) M. Gray, Contr. Herb. Austr. 6:1. 1974. LECTOTYPE (Gray 1974): AUSTRALIA. [New South Wales]: [Munyong Mountains], in vertice montis Kosciusko, locis glareosis, 6000-6500 ft, Jan 1855, *Dr. F. Mueller s.n.* (MEL).

Leaves spatulate, 4-8(-15) mm long, the blade 2-3 mm wide, sparsely to densely, loosely hirsute-villous on faces and margins with prominently cross-walled, uniseriate (Type A) trichomes, sparsely hairy with minute uniseriate (Type B) trichomes, and minutely glandular with biseriate (Type C) trichomes. Heads (flowering) ca. 5-8 mm in diameter, at first nearly sessile but the scape often elongating up to 7 cm at maturity. Disc corollas with the tube opening into an obtriangular limb about half the length of the corolla, with 5 triangular-ovate lobes; style branches 0.6-0.8 mm long, with distinct stigmatic lines and deltate collecting appendages 0.2 mm long. Pistillate flowers ca. 25-35, the corollas 4-6 mm long including the tube, the ligules ca. 2-3 mm long. Achenes 2-nerved, glabrous except for the concentration of viscid, biseriate glands at the thickened apex. Pappus of 12-15 bristles.

According to Gray (1974, p. 1), "This dwarf species is quite distinctive, and easily recognized by the entire leaves ± 0.7-1.5 cm long, coarsely hispid with bristly septate hairs, arranged in small rosettes about 1.5-3.5 cm in diameter. The capitula are at first subsessile or on very short scapes as mentioned by Bentham [1867], but the scapes elongate to 7 cm or more in the fruiting stage." The species appears to be endemic to the alpine area of the Kosciusko area along the border of New South Wales and Victoria, where it occurs "mainly in the *Plantago-Neopaxia* short alpine herbfield." Gray (1974) cited a number of collections of this species; the collection I have examined (*Tindale 4056*-US) was collected "near a creek, marginal to short alpine herbfield" on 19 Jan 1975; the plants were intermixed with lichens and mosses.

2. **Lagenithrix stellata** (J.D. Hook.) Nesom, *comb. nov.* BASIONYM: *Haplopappus stellatus* J.D. Hook., London J. Bot. 6:112. 1847. *Erigeron tasmanicus* (J.D. Hook.) J.D. Hook. var. *stellatus* (J.D. Hook.) J.D. Hook., *Fl. Tasman.* 3(1):183, t. 46A. 1856. *Erigeron pappocromus* Labill. var. *stellatus* (J.D. Hook.) Benth., *Fl. Austral.* 3(5):494. 1867. *Erigeron stellatus* (J.D. Hook.) W.M. Curtis, *Student's Fl. Tasman.* 2:312, 463. 1963. TYPE: AUSTRALIA. "mountains," *Gunn 279* (K).

Leaves oblanceolate or narrowly spatulate, 8-18 mm long, 2-3 mm wide, the faces glabrous and eglandular, the margins spreading-ciliate with prominently cross-walled, uniseriate trichomes. Heads (flowering) 10-12 mm in diameter, sessile or on bracteate scapes up to 3 cm long. Disc corollas with the tube opening into an obtriangular limb about 3/4 the length of the corolla, with 4-5 triangular-ovate lobes; style branches ca. 1 mm long, evenly long-papillate from base to tip, without stigmatic lines. Pistillate flowers ca. 28-36, the corollas 6-8 mm long, ligules ca. 3-5 mm long. Fertile achenes 2-nerved or commonly with an extra nerve on each face, the faces with viscid, sessile, biseriate glands on the upper third but concentrated at the thickened apex, sparsely strigose along the margins and sometimes on the faces; disc achenes lengthening to full mature size but sterile. Pappus of 30-35 bristles.

Lagenithrix stellata is endemic to Tasmania. The collections I have studied (*Ratkowsky 957* and *185*, MO) were made at 4300 and 4800 feet elevation on Mt. Field West and Mt. Olympus, respectively. This species differs from *L. setosa* in its larger, more oblanceolate leaves with glabrous faces, larger heads with more pistillate flowers, tendency for 4-lobed disc corollas, functionally staminate disc flowers, and greater number of pappus bristles.

The relationships of *Lagenithrix*

On the basis of their low, herbaceous-stoloniferous habit, leaves all basal and spatulate to obovate or oblanceolate, solitary heads on short scapes, multiseriate pistillate flowers with short, white ligules, their tendency to produce functionally staminate disc flowers with 4-merous corollas, and their flat, 2-nerved, oblong achenes with glandular but otherwise essentially glabrous faces, these two species of "*Erigeron*" are placed in the immediate phyletic vicinity of *Lagenifera* Cass. and its close relatives. The Australasian genera *Keysseria* Lauerb., *Myriactis* Less., *Piora* Koster, and *Solenogyne* Cass., as well as several others, are closely related to *Lagenifera*, as observed by many systematists (*e.g.*, Bentham 1973; Cabrera 1966; Koster 1966; Drury 1974; Adams 1979; Zhang & Bremer 1993); a broader commentary on this whole group follows in a separate paper (Nesom in prep.), and another related genus from New Caledonia is newly described in the present volume (Nesom 1994c). *Lagenithrix*

setosus and *L. stellatus* differ from all of these genera in their production of a persistent pappus, otherwise they surely would have been earlier recognized as close relatives of *Lagenifera*. Species of the *Lagenifera* group are epappose except for these two pappose "lagenoids" and those of the genus *Lagenopappus* (described below), and the presence of a pappus in these species must be interpreted as a primitive feature of retention. Although there is a recurrent evolutionary tendency in the Astereae for the loss of pappus bristles, they occur in all other generic groups potentially related to *Lagenifera* (Nesom in prep.).

Among the epappose members of the *Lagenifera* group, plants of *Solenogyne*, *Lagenifera*, and *Myriactis* tend to be low, stoloniferous herbs. Of these, *Lagenifera* and *Solenogyne* occur in Australia and produce scapose, unbranched stems with solitary heads (vs. leafy stems with a few-headed capitulescence in *Myriactis*, which is primarily southeast Asian and Malesian). The achenes of *Lagenopappus* resemble those of *Solenogyne* in their lack of a filiform neck or beak and lack of persistent apical glands; the achenes of *Lagenithrix* are smaller and somewhat differently shaped but they have a persistently glandular, thickened apical area that apparently is homologous with the beak of *Lagenifera*. Thus, despite the similarity between the two groups of "pappose lagenoids," particularly in their prominently ligulate pistillate corollas and pappose achenes, their relationships may lie in different directions rather than most closely with each other, although the interpretation of relationships among these genera is complex. In any case, the two species of *Lagenithrix* are distinct from all others within the *Lagenifera* group.

Summary

The Australian species identified as *Erigeron setosus* (New South Wales) and *E. stellatus* (Tasmania) resemble *Lagenifera* and *Myriactis* in their stoloniferous habit, obovate to spatulate basal leaves, tendency to produce 4-merous disc corollas and sterile disc ovaries, and in their short white ligules and fertile achenes that are glabrous except for the concentration of viscid glands on the short, thickened neck. These two species appear to be most similar to *Lagenifera*, from which they differ in their dwarf, mat-forming habit, smaller, erostrate achenes, and pappus of persistent bristles, and they are here set apart as the new genus *Lagenithrix*.

III. *Lagenopappus*, a new genus of the *Lagenifera* group

The traditional generic placement of *Erigeron pappocromus* Labill. and closely related taxa, like that of *E. setosus* and *E. stellatus* (above), has emphasized the occurrence of pappose achenes. With the observation of achenial

glands and other features that are more similar to Australian genera than to true *Erigeron*, it has become apparent that these few species should be placed in a separate genus.

Lagenopappus Nesom, *gen. nov.* (Figure 2C).

> *Lageniferae* Cass. similis sed differt floribus discii ovariis fertilibus, acheniis rostrum filiformem vel collum carentibus, glandibus acheniorum celeriter deciduis, et pappo setis numerosis persistentibusque.

Type species: *Lagenopappus* (*Erigeron*) *pappocromus* (Labill.) Nesom.

> *Pappochroma* Rafin., *Fl. Tellur.* 2:48. 1836. Type species: *Pappochroma uniflora* Rafin. [*nom. nov. illeg.*] (= *Erigeron pappocromus* Labill. = *Lagenopappus pappocromus* [Labill]. Nesom). "*Pappochroma*" as a generic name was tautonymic at its inception and is illegitimate.

Herbaceous perennials from short, fibrous-rooted stolons, producing clusters of ascending leaves at the stolon tips, commonly forming colonies; stems and leaves sparsely to densely pubescent to hispid-pilose with uniseriate trichomes, stipitate-glandular or eglandular. Leaves all basal, obovate to spatulate, 1-4(-7) cm long, 4-15 mm wide, entire or mucronulate to crenate on the distal third, reticulate-nerved but only the central vein conspicuous. Heads solitary, short-cylindric, 8-12 mm (pressed) in diameter, on bracteate scapes 4-15 cm tall; phyllaries in ca. 3 series of nearly equal length, narrowly oblong-lanceolate with an acuminate apex, 1-nerved, flat or slightly keeled with a raised midvein, evenly herbaceous, tips and distal margins often purple or the outer completely purple; receptacles smooth, barely convex, epaleate. Disc flowers bisexual, fertile, few in number relative to the pistillate flowers; corollas 3.5-4.5 mm long, funnelform, the linear tube abruptly but only slightly opening into a tubular limb 1/2-5/8 the length of the corolla, with 5 triangular lobes; apical appendages of the anthers lanceolate with rounded to acute apices; style branches 0.8-1.0 mm long, with triangular-lanceolate collecting appendages occupying ca. 1/2-1/3 of the style branch length, the stigmatic lines poorly defined in *Lagenopappus gunnii* (J.D. Hook.) Nesom. Pistillate flowers ca. 60-120 in 3-4 series, fertile, the corollas 5-7 mm long including the tube, the ligules white, ca. (3-)6-12 mm long, 0.1-0.4 mm wide, straight, extending slightly past the involucre. Achenes 3-7 mm long, flat with 2, thin, marginal nerves, narrowly oblong to oblong-oblanceolate, commonly with a short and broad but distinctive neck, the formation of the neck apparently

variable even within a single head, the faces yellowish-tan or sometimes purple, glandular near the apex with viscid, sessile, biseriate glands but these quickly deciduous and usually not evident on the mature achenes, otherwise glabrous. Pappus of ray and disc achenes 1(-2) series of 35-50 apically attenuate, persistent, barbellate bristles of even length, as long as the disc corollas.

1. **Lagenopappus pappocromus** (Labill.) Nesom, *comb. nov.* BASIONYM: *Erigeron pappocromus* Labill., *Nov. Holland. Pl. Specimen* 2:47, t. 193. 1806. *Erigeron phlogotrichus* Sprengel, *Syst. Veget.* (ed. 16) 3:520. 1826 [*nom. nov. illeg.*]. *Haplopappus pappocromus* (Labill.) J.D. Hook., London J. Bot. 6:111. 1847. *Erigeron pappocromus* Labill. var. *billardierei* Benth. [*nom. nov.*], *Fl. Austral.* 3(5):494. 1867. TYPE: AUSTRALIA. "in capite Van-Diemen" [Tasmania, Recherche Bay], *Labillardiere s.n.* (LINN). Upon Bentham's decision to recognize varieties within *Erigeron pappocromus*, he used variety *billardierei* (*nom. nov.*) to refer to the typical element of the species (which should have been simply var. *pappocromus*).

2. **Lagenopappus gunnii** (J.D. Hook.) Nesom, *comb. nov.* BASIONYM: *Haplopappus gunnii* J.D. Hook., London J. Bot. 6:111. 1847. *Erigeron gunnii* (J.D. Hook.) F. Muell. *ex* J.D. Hook., *Fl. Tasman.* 1:183, t. 46B. 1856. *Erigeron pappocromus* Labill. var. *gunnii* (J.D. Hook.) Benth., *Fl. Austral.* 3(5):494. 1867. TYPE: AUSTRALIA. Tasmania: Mt. Wellington, *Gunn 1151* (K).

   Haplopappus bellidioides J.D. Hook., London J. Bot. 6:112. 1847. BASIONYM: *Erigeron gunnii* (J.D. Hook.) F. Muell. *ex* J.D. Hook. var. *bellidioides* J.D. Hook., *Fl. Tasman.* 1:183. 1856. TYPE: AUSTRALIA. Tasmania: Middlesex plains, *Gunn 692* (K).

3. **Lagenopappus tasmanicus** (J.D. Hook.) Nesom, *comb. nov.* BASIONYM: *Haplopappus tasmanicus* J.D. Hook., London J. Bot. 6:110. 1847. *Erigeron tasmanicus* (J.D. Hook.) J.D. Hook., *Fl. Tasman.* 1:183, t. 46A. 1856. *Erigeron pappocromus* Labill. var. *oblongatus* Benth., [*nom. et stat. nov.*], *Fl. Austral.* 3(5):494. 1867. TYPE: AUSTRALIA. Tasmania: Mt. Wellington, *Gunn 1150* (K). It is not clear that Bentham's proposed substitution of *E. pappocromus* var. *oblongatus* for *E. tasmanicus* can be taken as legitimate.

Curtis (1963, p. 312) noted that the Tasmanian taxa of the *Erigeron pappocromus* complex "seem to be connected by intermediates" and she treated them as varieties of a single species. Among the relatively few Tasmanian

specimens I have studied, however, the taxa appear to be distinct. Without the direction of a much-needed revision of this complex (see below), three of the taxa are tentatively treated here at specific rank. *Lagenopappus gunnii* has obovate, epetiolate or short-petiolate leaves with crenate-serrate margins and stipitate-glandular vestiture. *Lagenopappus pappocromus* and *L. tasmanicus*, in contrast, are characterized by spatulate, long-petiolate leaves; leaves of the latter are short-pubescent, while those of the former are smaller and glabrous.

Costin *et al.* (1979, p. 364) noted that "The taxonomy of this polymorphic species [= *Erigeron pappocromus*] has not been fully worked out ..." and there apparently are several taxa yet undescribed. Jacobs & Pickard (1981) listed the occurrence of *Erigeron* "sp. A" and "sp. B" (both "aff. pappocromus") and Porteners (1992) identified two species from New South Wales as simply "species A" and "species B." Modifications will certainly be made in the taxonomy of *Lagenopappus*, perhaps even in that proposed here.

The relationships of *Lagenopappus*

Apparently the only botanist to question the generic placement of *Erigeron pappocromus* has been Given (1973, p. 793), who noted that it is linked to *Celmisia* Cass. and closely related genera by "several attributes." He did not specify the nature of the putative similarity, and his provisional suggestion regarding the relationships of *E. pappocromus* is not supported here.

Lagenopappus is similar to *Lagenifera* and *Myriactis* in its monocephalous, scapose stems arising from a basal rosette of leaves, its flat, herbaceous, often purpling phyllaries, multiseriate pistillate flowers, and apically glandular but otherwise glabrous achenes with a distinct tendency to form a short neck. Analogous variation in leaf shape (obovate to spatulate) occurs in the two genera, and some plants of *Lagenopappus* are closely similar in habit and overall appearance to species of *Lagenifera* (compare, for example, *Lagenopappus gunnii* with *Lagenifera huegelii* Benth. and *L. stipitata* [Labill.] Druce). *Lagenopappus*, however, differs from both *Lagenifera* and *Myriactis* in its oblong achenes with quickly deciduous glands (vs. persistent glands), pappus of persistent bristles (vs. epappose), short-cylindric heads (vs. hemispheric), and ligules that remain straight or nearly so (vs. tightly coiling). The achenial glands, which are significant in the interpretation of the relationships of *Lagenopappus*, can be found by carefully opening relatively young capitula, but they also can be seen on mature achenes, although there they tend to be fragile and easily caducous.

Within the domain of relationship of the pappose species here placed in *Lagenopappus* and *Lagenithrix*, it might appear that only a single genus is represented. There are a number of significant differences between the two groups of species, however, and it is not clear that they are even most closely

related to each other, their similarities apparently plesiomorphic in nature. Further, the differences are nearly coordinate with those among the closely related (and interrelated) epappose genera *Lagenifera*, *Myriactis*, *Keysseria*, *Piora*, and *Sclenogyne*. A study of this whole group may be required to establish the generic boundaries more definitively. As treated here, *Lagenopappus* and *Lagenithrix* are separated by the following contrasts:

1. Rosettes strongly and persistently interconnected, forming low mats; heads hemispheric, sessile or on scapes up to 7 cm long; leaves 4-18 mm long, 2-3 mm wide, basally 3-nervate; achenes 1.8-3.0 mm long, oblanceolate-oblong with a thickened, persistently sessile-glandular, apical collar; disc flowers with fertile or sterile ovaries; pistillate flowers ca. 25-36 in 1-2 series, the corollas with white ligules 2-4 mm long. ..... *Lagenithrix*

1. Rosettes often occurring in clumps of several individuals, but not forming low mats; heads short-cylindric, on scapes 4-15 cm long; leaves 10-40(-70) mm long, 4-15 mm wide, basally 1-nervate; achenes 3-7 mm long, narrowly oblong to oblong-oblanceolate, commonly with a short, broad, and unthickened but distinctive neck, with quickly deciduous short-stipitate glands on the apical portions; disc flowers with fertile ovaries; pistillate flowers ca. 60-120 in 3-4 series, the corollas with white to pink or purplish ligules (3-)6-12 mm long. ..... *Lagenopappus*

Summary

Three species of the complex identified as *Erigeron pappocromus* sensu lato are here segregated as the new genus *Lagenopappus*. *Lagenopappus* appears to be most closely related to *Lagenifera*, *Myriactis*, and *Solenogyne* but is distinctive in its combination of solitary heads on scapose stems, completely fertile disc flowers with 5-lobed corollas, pappose achenes with only a broad, barely formed neck, and caducous achenial glands.

IV. Australian taxa of ambiguous identity or excluded from *Erigeron*

1. *Erigeron conyzoides* F. Muell., Trans. & Proc. Philos. Soc. Victoria 1:105. 1855. TYPE: AUSTRALIA. [New South Wales]: on the sources of the Murray and Snowy Rivers, 4000-5000 ft, *F. Mueller* (MEL, see comments below by Willis 1972).

In his account of the flora of Victoria, Willis (1972, p. 681) noted that "The only presumptive Victorian specimen of *E. conyzoides* extant in Melbourne Herbarium is labelled 'Snowy River (towards the mouth)' and was collected by Mueller in Feb.-Mar. 1854. Since this species is otherwise exclusively montane to subalpine (4-5000 ft.) in N.S.W., it would appear that some erroneous transposition of field labels had occurred, and the species is deliberately omitted from this handbook." More recent treatments, however, have recorded the presence of this species in both New South Wales and Victoria.

The numerous heads in a corymboid-paniculate capitulescence and numerous pistillate flowers in several series (the outer with filiform ligules, the inner tubular with reduced ligules) suggested to Bentham (1867) that *Erigeron conyzoides* should be placed near *Conyza bonariensis* (L.) Cronq. I have not seen specimens of *E. conyzoides*, but (as described and pictured in literature) the large heads (10-20 mm in diameter, with phyllaries 4-8 mm long) with ligules 6-8 mm long and large achenes (ca. 2.5 mm long) would be unusual in *Conyza*. Numerous species of *Conyza* occur as adventives in Australia, but no one since Bentham has suggested that *E. conyzoides* be placed with those species. The habit (perennials 4-8 dm tall) and capitulescence of *E. conyzoides* would be similarly unusual in *Erigeron*.

Excluded from *Erigeron*:

2. *Erigeron candollei* F. Muell. = *Minuria denticulata* (DC.) Benth.

3. *Erigeron decurrens* DC. = *Streptoglossa decurrens* (DC.) Dunlop.

4. *Erigeron minurioides* Benth. = *Felicia tenella* (L.) DC. (see Willis 1972).

5. *Erigeron brachycomoides* (F. Muell.) Boerl. = *Camptacra brachycomoides* (F. Muell.) Burbidge.

6. *Erigeron liatroides* Turcz. = *Streptoglossa liatroides* (Turcz.) Dunlop.

7. *Erigeron trilobus* Sonder = *Vittadinia australis* A. Rich.

8. *Erigeron vittadinia* F. Muell., *Fragm. Phytogr. Austr.* 5:87. 1865. TYPE: "Australia, e plagis Australiae orientalis Tropicae, etc." as cited in Chapman (1991). Apparently a "*nomen nudum*," published as a passing reference to a herbarium name.

9. *Conyza* (*Erigeron*) *canadensis* (L.) Cronq. and *Conyza* (*Erigeron*) *bonariensis* (L.) Cronq. (including *Erigeron crispus* Pourret -see Black 1929, and various other synonyms) are now treated within the genus *Conyza* (e.g., Everett 1992) among the numerous adventive species of that genus that occur in Australia.

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