

**PACIFIGERON (ASTERACEAE: ASTEREA), A NEW GENUS FROM THE
POLYNESIAN ISLAND OF RAPA**

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ABSTRACT

The species originally described as *Erigeron rapensis* F. Brown from the southeastern Polynesian island of Rapa is here separated as a new monotypic genus, **Pacifigeron**, with the new combination **Pacifigeron rapensis**. It is placed in the subtribe Hinterhuberinae of the Astereae, where it is most similar to genera of the Australasian *Celmisia* group.

KEY WORDS: *Pacifigeron*, Hinterhuberinae, Astereae, Asteraceae, Rapa

A species of shrubby daisies originally described as *Erigeron rapensis* F. Brown (Brown 1935) from the southeastern Polynesian island of Rapa (French Oceania) has proved to be distantly related to *Erigeron* L. and more similar to genera of the Australasian "*Celmisia* group" (as detailed below).

Pacifigeron Nesom, *gen. nov.* (Figure 1). Type species: *Pacifigeron* (*Erigeron*) *rapensis* (F. Brown) Nesom.

Fruticuli usque ad 1 m alti; folia ad apices caulium conferta, late obovata vel spathulata integra coriacea ad maturitatem glabra, venatio ad basim parallela; capitula subsessilia 2-5 in fasciculis terminalibus; phyllaria valde 3-nervata; flosculi pistillati 1(-2)-seriati ligulis brevis albis; corollae radii ac disci antrorse pilosae; ovaria flosculorum disci sterilia; achenia fertilia fusiformia subteretia (parum compressa) sparsim strigosa eglandulosa nervis 9-11 vascularibus; pappus setarum 30-45 barbellatarum 1-seriatarum imprimis compositus serie breva exteriori setarum. Ex affinitate *Celmisiae*

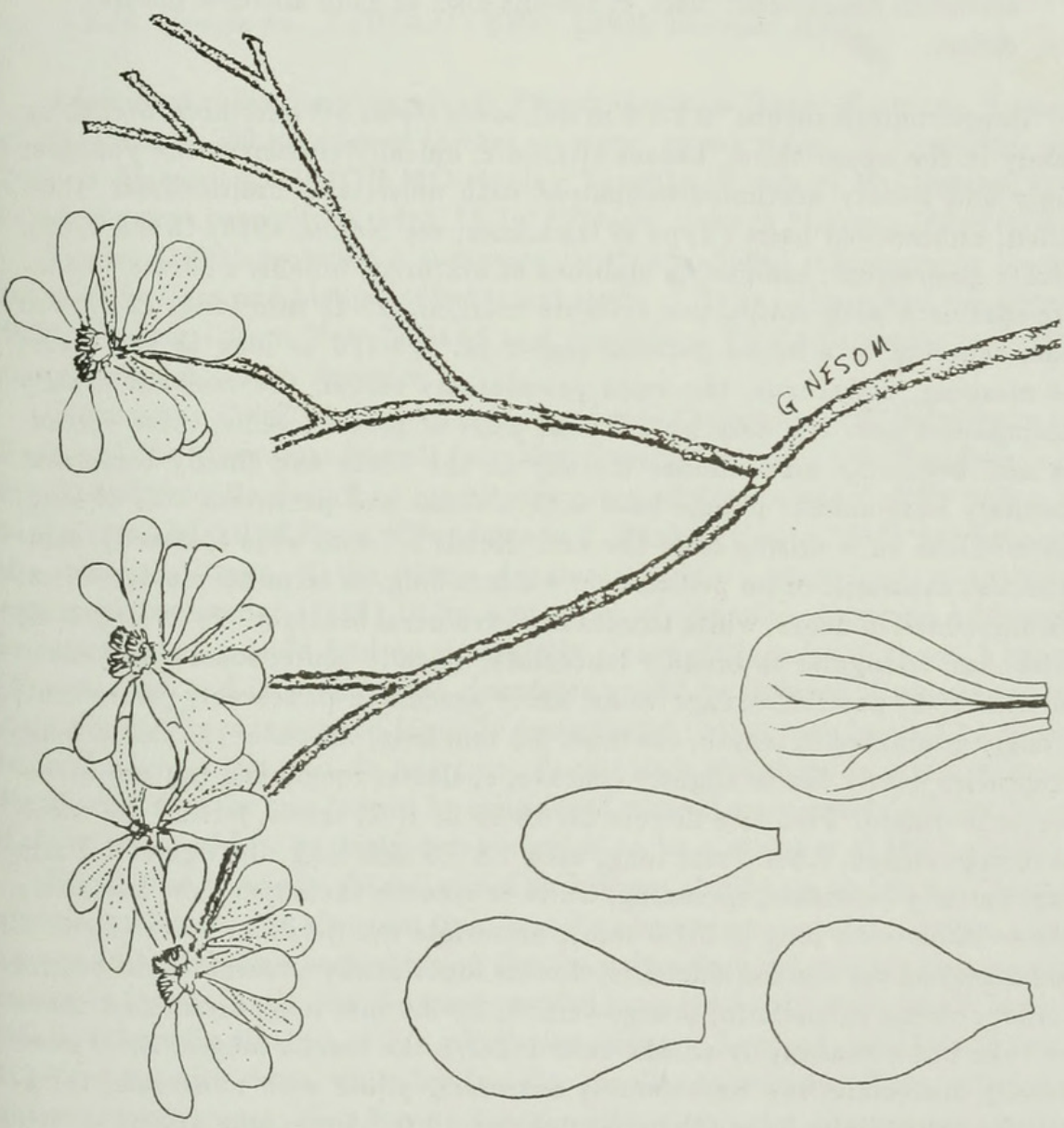


Figure 1. *Pacifigeron rapensis*. Habit and leaf variation, showing pattern of venation.

Cass. et generum affinium sed capitulis parvis subsessilibus in fasciculis terminalibus, antheris extensionem basalem carentibus, ovariis sterilibus flosculorum disci, et corollis disci ac radii antrorse pilosis differt.

"Round-topped shrubs" 0.2-1.0 m tall, lower stems 5-8 mm thick, branching mainly in the upper third. Leaves alternate, apically clustered, the youngest thinly and loosely arachnoid-tomentose with uniseriate, multicellular, thin-walled, unbranched hairs (Type B trichomes; see Nesom 1976; Given 1969), quickly glabrescent, completely glabrous at maturity, broadly obovate to obovate-spatulate with entire, non-revolute margins, 20-45 mm long, 12-27 mm wide, tapering to a broad petiolar region ca. $1/5$ - $1/6$ as long as the blade, not clasping, coriaceous, the veins prominently raised, the midvein usually accompanied near the base by 2 lateral pairs of parallel veins, these spreading and becoming more diffuse distally in the blade and finally somewhat obscurely anastomose; petiole base with a dense and persistent tuft of long, white-villous hairs arising from the axil. Heads 5-7 mm wide (pressed), campanulate, subsessile or on pedicels ca. 1-2 mm long, in terminal clusters of ca. 2-5, imbedded in dense, white tomentum; involucre bracts ca. 18-24 in 2-3(-4) series, flat, triangular to broadly lanceolate, apically acute, somewhat yellowish with 3(-5) parallel, orange veins, finely arachnoid-pubescent, glabrescent, strongly graduated in length, the inner 4-5 mm long, the outer ca. half as long; receptacles nearly flat to slightly concave, epaleate, roughened but not alveolate or foveolate. Pistillate flowers ca. 18-26 in 1(-2) series, fertile, the corollas orange-veined, 2.8-4.0 mm long, tube 1.8-2.5 mm long, the ligules 1-2 mm long, apically 3-dentate, spreading, white or creamy, the upper tube antrorsely pilose-villous with long (0.5-1.0 mm), uniseriate multicellular hairs (Type A trichomes) on the abaxial side. Disc flowers functionally staminate, the ovaries sterile; corollas funnelform, orange-veined, 2.0-3.0 mm long, broadened above the tube but not abruptly so, the tube $1/2$ - $2/5$ the corolla length, the 5 lobes broadly lanceolate, the limb densely antrorsely pilose with uniseriate, thick-walled, multicellular hairs (Type A trichomes) 1.0-1.5 mm long arising mostly from the lower limb and extending above the corolla; style branches 0.4-0.6 mm long, hairy from base to tip, stigmatic lines absent; anthers basally attenuate, the base not tailed or caudate, apical appendage rounded. Mature achenes fusiform, slightly compressed, 2-3 mm long, 0.8-1.0 mm wide, the surface dark brown, with 9-11 raised, vascularized, longitudinal, more or less equally spaced nerves, these distinctively orange-resinous in immature achenes but not obviously so at maturity, sparsely invested with scattered, short Zwillingshaare, eglandular; carpodium a depressed cylinder of 3-4 rows of sclerified cells. Pappus similar in ray and disc, of 30-45 barbellate bristles about as long as the corollas, with a short, outer series of setae 0.3-0.8 mm long.

Pacifigeron rapensis (F. Brown) Nesom, *comb. nov.* BASIONYM: *Erigeron rapensis* F. Brown, Bernice P. Bishop Museum Bull. 130:338. 1935.
TYPE: [French Oceania,] Rapa, [27°35' S, 144°17' W], 400 m, 1921, E.H. Quayle no. X (HOLOTYPE: BISH; Isotype: BISH!).

Additional collections examined: French Oceania. Rapa: Kaimaru, S ridge of Mt. Perahu, 500 m, edge of thicket on steep, mossy ridge, 13 July 1934, *St. John & Maireau 15516* (GH,MO-sterile); Taratika, E side of Mt. Perahu, 500 m, wind-swept precipitous ridge, 15 Jul 1934, *St. John & Maireau 15562* (GH).

Lander (1989) provided a summary (with associated references to literature) of the flora and history of botanical study of Rapa. The island lies about 4000 kilometers from New Zealand and more than 7000 kilometers from the closest point in South America.

Operanthus Sherff (Asteraceae: Heliantheae: Coreopsidinae) is endemic to Rapa and the Marquesas Islands (northern French Oceania), but *Pacifigeron* is the second recently described monotypic genus of Asteraceae strictly endemic to the small island of Rapa. *Olearia rapa* F. Brown (Brown 1935) has become the sole constituent of the genus *Apostates* Lander, which was tentatively suggested by Lander (1989) to be a member of the tribe Astereae, although he noted that he could find no potentially close relatives for it there. I agree (Nesom 1993 and in prep.) that *Apostates* would be isolated if placed in the Astereae and have suggested (equally tentatively) that it may instead be closer to the Inuleae sensu lato. In any case, *Apostates* is dissimilar in many ways to *Pacifigeron* and the two cannot be considered more than remotely related, even if *Apostates* could be securely demonstrated to be a member of the Astereae.

Pacifigeron is briefly characterized as follows: shrubs up to 1 m tall; leaves alternate, clustered at the stem tips, broadly obovate to spatulate, entire, coriaceous, initially thinly tomentose on the abaxial surface but quickly glabrescent except in the leaf axils, the venation parallel from the base; heads small, in terminal, subsessile clusters of 2-5; phyllaries strongly 3-veined; pistillate flowers 1(2-)-seriate with short, white ligules; disc corollas antrorsely villous with long uniseriate trichomes; disc flowers functionally staminate, the ovaries sterile; fertile achenes fusiform, subterete (slightly compressed), with 9-11 raised, vascularized nerves, very sparsely short-strigose, eglandular; and pappus of 30-45 barbellate bristles in 1 series, with a short, outer series of setae or bristles.

Pacifigeron cannot be considered to be a close relative of *Erigeron*. The latter has narrowly tubular disc corollas, with a short, abruptly differentiated tube, usually somewhat indurate at the tube-throat junction; disc flowers consistently bisexual and fertile; leaves not coriaceous; Type A, B, and C trichomes all usually present on individuals; and achenes oblong, flat, and 2-nerved (except for one North American group). The greatest diversity of *Erigeron* lies in North America (Nesom 1989), but distinctive elements of the genus, as well as its probable closest relatives, occur in South America (Nesom in press). The

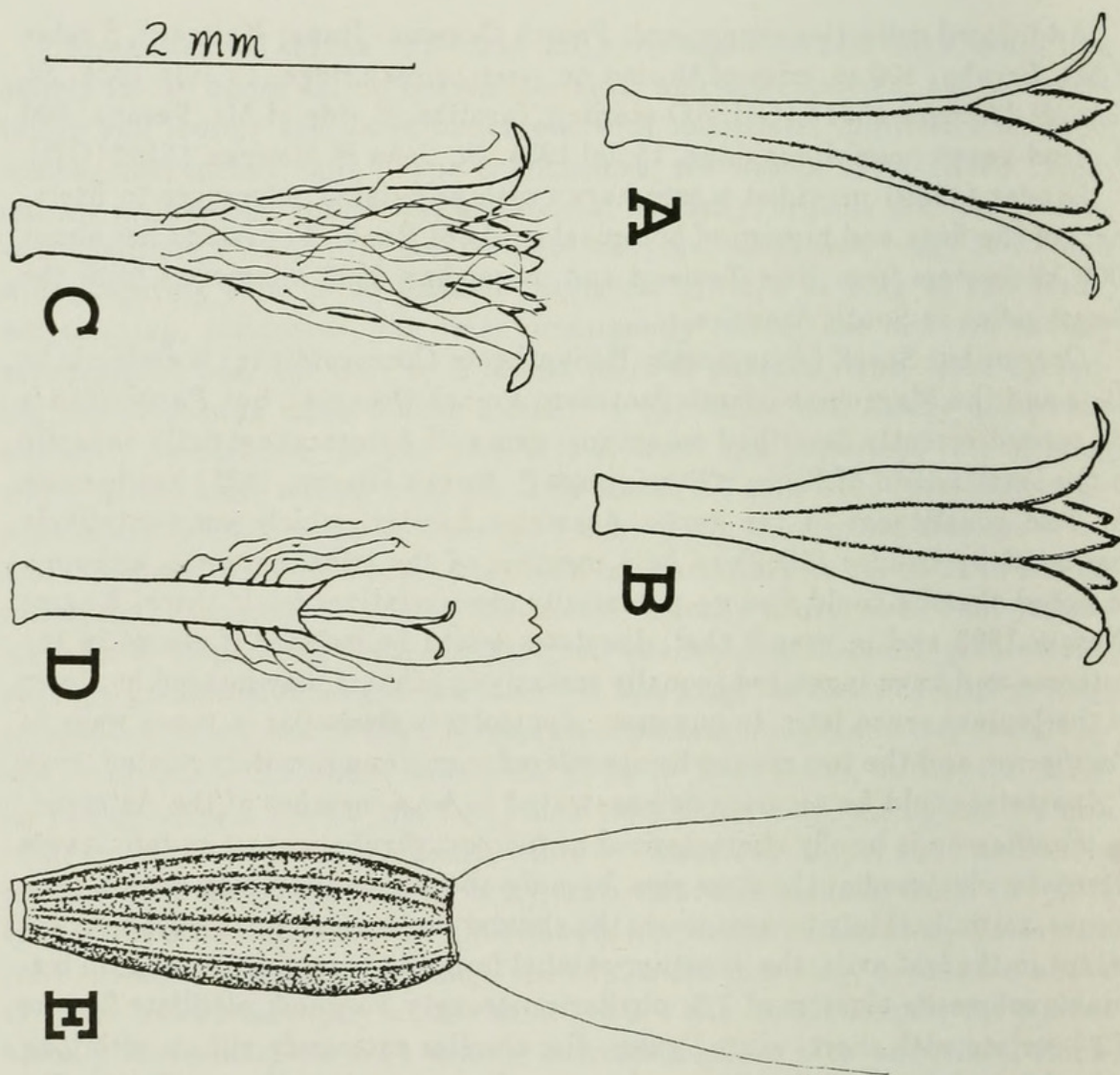


Figure 2. Corollas and achene of *Pacifigeron rapensis*. A and B. Disc corollas, vestiture not shown. C. Disc corolla with characteristic vestiture. D. Ray corolla. E. Fertile achene, full pappus not shown.

genus does not occur natively in the South Pacific or the Australasian region (Nesom 1994).

Pacifigeron is placed here in the subtribe *Hinterhuberinae* Cuatr., based on its shrubby habit, tomentose vestiture of thin hairs, with persistent tufts of villous hair in the leaf axils, large and coriaceous leaves, and achenes with numerous, vascularized veins. This subtribe has a pan-temperate distribution in the Southern Hemisphere, with representatives in Madagascar, South Africa, South America, and Australasia (Nesom 1993 and in prep.). Within the *Hinterhuberinae*, *Pacifigeron* is most similar to taxa of the *Celmisia* group: (*Celmisia* Cass., *Pleurophyllum* Hook., *Damnamentia* Given, *Pachystegia* Cheeseman, and some species of *Olearia* Moench, see below). These species are primarily distributed in New Zealand but some occur in Australia and small islands south of New Zealand. They are characterized by a combination of subterete, multinerved, and eglandular achenes and parallel-veined leaves tomentose with simple hairs (branching hairs occur among Australian taxa of *Olearia*), as well as a mix of other characters that occur less regularly among the species: reduced ligules in *Pleurophyllum*; markedly short Zwillings-haare on achenes of the *Olearia chathamica* Kirk group (see below); and a subshrubby habit, with leaves produced in terminal clusters, in sect. *Lignosae* of *Celmisia*.

Primarily, however, plants of the *Celmisia* group are herbaceous with leaves in a basal rosette, and they consistently produce large heads (mostly [1-]2-4[-5] cm wide) that are solitary and long-pedunculate, or racemose in *Pleurophyllum*. *Pacifigeron* differs from all taxa of the *Celmisia* group in its combination of small, sessile heads in terminal clusters, anthers without any form of basal extension, sterile disc ovaries, and densely antrorsely pilose disc and ray corollas.

Drury (1968) and Given (1973) both have suggested that two species of New Zealand *Olearia* (*O. colensoi* J.D. Hook. and *O. lyalii* J.D. Hook.) with large heads in a raceme are congeneric with *Pleurophyllum*, where a similar capitulescence occurs. The evolutionary origin of the characteristic monocephalous condition of *Celmisia* probably was from similar, racemose, ancestral stock through suppression of the lateral floral buds, as implied by Given (1973), who noted that some species of *Celmisia* occasionally produce heads below the terminal one in the axils of scape bracts. One other group of *Olearia* species (including *O. chathamica*, *O. oporina* [Forst.] J.D. Hook., and several others) also has been noted by both Drury and Given to be of generic-level status and closely related to *Celmisia*. These species complete what is referred to here as "the *Celmisia* group." It also seems likely that some, but not all, of the Australian species of *Olearia* may belong here. Given (1973) provisionally included *Erigeron pappocroma* Labill. as a member of the *Celmisia* group, but an alternative, widely divergent position for this species has been proposed by Nesom (1994). Reports of high levels of polyploidy (mostly 12-ploid,

based on $x=9$) in the species of the *Celmisia* group support a hypothesis that they are closely interrelated (see summary in Nesom 1992), and in the present interpretation, *Pacifigeron* is predicted to have a similar level of ploidy.

The species of the South American genus *Diplostephium* Kunth (Hinterhuberinae, but not part of the *Celmisia* group) are similar to *Pacifigeron* in a number of features: shrubby habit, coriaceous leaves, heads sometimes terminal and sessile, disc ovaries sterile, ligules often reduced, and corollas densely invested with Type A trichomes in some species (e.g., *D. crassifolium* Cuatr.). In *Diplostephium*, however, the achenes are flattened, usually with glandular surfaces and usually with only 3-5 nerves, the disc corollas have a longer tube and more deeply cut limb, and the leaves are consistently pinnately veined. The direction of closest relationship of *Pacifigeron* appears to lie toward the Australasian region rather than South America.

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