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ÁNGEL BAÑARES BAUDET, MANUEL V. MARRERO GÓMEZ & STEPHAN SCHOLZ

Taxonomic and nomenclatural notes on *Crassulaceae* of the Canary Islands, Spain

Abstract

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Aeonium decorum var. *alucense* and *Aichryson laxum* var. *latipetalum,* from eastern La Gomera and southern Tenerife, respectively, are described as varieties new to science and illustrated. New combinations in *Aeonium (A. arboreum* subsp. *holochrysum, A. canariense* subsp. *christii, A. canariense* subsp. *latifolium, A. canariense* subsp. *virgineum, A. lindleyi* subsp. *viscatum), Aichryson (A. tortuosum* var. *bethencourtianum)* and *Monanthes (M. minima* subsp. *adenoscepes)* are validated. *M. polyphylla* subsp. *amydros,* thought to be endemic to La Gomera, is also reported for the island of La Palma. Additional descriptive data for *M. wildpretii* are provided. Special attention is paid to the morphological characteristics that differentiate some closely related taxa.

Additional key words: *Aeonium, Aichryson, Monanthes,* taxonomy, chorology

Introduction

Praeger's (1932) study of Canarian *Crassulaceae* was updated by the monographs of the genera *Aeonium* Webb & Berthel. (Liu 1989) and *Monanthes* Haw. (Nyffeler 1992). *Aichryson* Webb & Berthel. was revised by Bramwell (1968) but this genus requires further study. The three genera also have been the focus of several papers regarding molecular phylogeny and evolution (see Mort & al. 2002 and references therein). Concluded from both molecular and morphological studies, *Greenovia* Webb & Berthel. has been widely accepted as a section of *Aeonium* (Mes 1995; Mort & al. 2002; Nyffeler 2003).

In the present study, we propose a number of taxonomic changes within the three genera, based on extensive studies of populations in the field and of herbarium material. We describe two varieties of *Aeonium decorum* Webb ex Bolle and *Aichryson laxum* (Haw.) Bramwell, respectively, to accommodate single isolated and morphologically deviating populations. We propose new combinations for four species of *Aeonium* that had been reduced to varietal rank by Liu (1989) and that we consider to be more appropriately recognized as subspecies. *Aichryson tortuosum* (Aiton) Webb & Berthel. and *A. bethencourtianum* Bolle were found by us to represent varieties, endemic to Lanzarote and Fuerteventura, respectively, of a single species, *A. tortuosum.*

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A comparative study of the morphological features of *Monanthes polyphylla* Haw., currently reported as endemic to Gran Canaria, Tenerife, La Palma (subsp. *polyphylla*) and La Gomera (subsp. *amydros* Nyffeler), has revealed that the plants from La Palma, also named *Sempervivum monanthes* var. *filicaule* Kuntze (1891) and later confusingly reported as *M.* cf. *subcrassicaule* (Kuntze) Praeger, are identical to *M. polyphylla* subsp. *amydros*. A comparison of the northern and southern populations of the Tenerife endemic *M. minima* Bolle with *M. adenoscepes* Svent. corroborated the conspecifity of the latter with *M. minima,* first stated by Nyffeler (2003), but revealed that it deserves recognition as a separate subspecies distributed in southern Tenerife. Re-evaluation of *M. wildpretii* Bañares & S. Scholz, which was also included in *M. minima* by Nyffeler (2003), produced new evidence for its status as a separate species.

Results

Aeonium arboreum subsp. ***holochrysum*** (H.-Y. Liu) Bañares, **comb. & stat. nov.**
≡ *Aeonium arboreum* var. *holochrysum* H. Y. Liu, Syst. Aeonium: 67. 1989 ≡ *Sempervivum urbicum* Lindl. in Bot. Reg. 7: t. 1741. 1835, non C. Sm. ex Hornem. 1819. – Lectotypus (designated by Liu 1989: 67): [icon] Lindley in Bot. Reg. 7: t. 1741. 1835.
= *Aeonium vestitum* Svent. in Addit. Fl. Canar.: 13. 1960.
[– *Aeonium holochrysum* auct., non Webb & Berthel.]

Remarks. – *Aeonium arboreum* subsp. *holochrysum* is mainly differentiated from subsp. *arboreum* (confined to Gran Canaria) and the closely related *A. korneliuslemsii* H. Y. Liu from Morocco by its glabrous sepals. After a detailed study in the distribution area of *A. holochrysum* (Tenerife, La Palma, La Gomera and El Hierro), Praeger (1932) concluded that the plant with pubescent calyx, described by Webb & Berthel. as *A. holochrysum,* as is also obvious from two sheets in the Webb herbarium (Liu 1989), does not belong to the taxon that has been identified with this name. Although the name *"holochrysum"* does not characterise the plants, it was taken up by Liu because of the wide use of the epithet, but treated as a new name and typified according to the established concept of the taxon.

Distribution. – Common on rocks and cliffs from sea level to altitudes of up to 1000 m in La Palma and to 1600 m in Tenerife, present in the northern zone of El Hierro (over Frontera, San Andrés) and rare on La Gomera, where the chorologic delimitation from *Aeonium arboreum* var. *rubrolineatum* (Svent.) H.-Y. Liu has not been sufficiently studied (see Voggenreiter 1973, 1974, 1999).

Representative specimens. – Tenerife: Masca, 2.2004, *Á. Bañares 46853* (ORT); S. José above La Rambla, 350 m, 24.1.1969, *D. Bramwell 584* (TFC); Valle de la Orotava, over roofs, 14.4.1949, *C. González 12388* (ORT); La Ladera - Agache, 6.3.1981, *O. Rodríguez & P. G. Cabrera 12805* (TFC); Buenavista, 24.5.1944, *E. R. Sventenius 12364* (ORT); Puerto de la Cruz, Montaña de la Horca, 1.4.1944, *E. R. Sventenius 12434* (ORT); ibid., 31.12.1944, *E. R. Sventenius 12390* (ORT); ibid., 3.1.1947, *E. R. Sventenius 12389* (ORT); ibid., 11.3.1949, *E. R. Sventenius 1446* (ORT); Puerto de la Cruz, Martiánez, 28.12.1944, *E. R. Sventenius 12391* (ORT); Masca, 13.6.1945, *E. R. Sventenius 12393* (ORT); Roque de Garachico, 26.6.1949, *E. R. Sventenius 23838* (ORT); Los Quemados (Masca), 14.1.1963, *E. R. Sventenius 12392* (ORT); Masca, Mocanito, 22.6.1966, *E. R. Sventenius 12394* (ORT). — La Palma: Velhoco, 12.1987, *F. Cabrera Rodríguez 25627* (TFC); Las Paredes, carr. hacia Barlovento, 2.7.1987, *A. Marrero & M. Jorge 12818* (LPA); Breña Alta, 5.5.1989, *A. Roca & A. Marrero 16507* (LPA); El Llanito, 6.5.1989, *A. Roca & A. Marrero 16551* (LPA); Los Galguitos, 6.8.1989, *A. Roca & A. Marrero 16546, 16547* (LPA); between Hacienda del Cura and Lomo Alto, 900 m, 23.5.1949, *E. R. Sventenius 3295* (ORT); Tenerra, 16.4.1962, *E. R. Sventenius 23838* (ORT). — El hierro: La Frontera, Fuente de los Tincos, 580 m, 4.5.1959, *E. R. Sventenius 18053* (ORT); La Frontera, El Rincón, 26.7.1968, *E. R. Sventenius 18050* (ORT); below Fuente de los Tincos, 7.4.1971, *E. R. Sventenius 18052* (ORT).

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Aeonium canariense subsp. ***christii*** (Burchard) Bañares, **comb. nov.**
≡ *Sempervivum christii* Praeger in Trans. Bot. Soc. Edinburgh 29: 204. 1925, non Wolf 1889 ≡ *Sempervivum canariense* subsp. *christii* Burchard in Biblioth. Bot. 98: 128. 1929 ≡ *Aeonium palmense* Webb ex Christ in Bot. Jahrb. Syst. 9: 112. 1888 ≡ *Sempervivum palmense* (Webb ex Christ) Christ, Bot. Jahrb. Syst. 9: 161. 1888, non Christ 1888 ≡ *Aeonium canariense* var. *palmense* (Webb ex Christ) H. Y. Liu in Syst. Aeonium: 57. 1989. – Lectotypus (designated by Liu 1989: 57): Spain, Canary Islands, La Palma (FI; isolectotypus: FI).
= *Aeonium longithyrsum* (Burchard) Svent. in Index Seminum Hortus Acclim. Pl. Arautap.: 45. 1969.

Remarks. – We consider this and the following two taxa for their morphological features and geographical distribution better recognized at subspecies than at varietal rank.

Distribution. – Abundant within forests and on humid walls in northern La Palma and El Hierro, ranging from almost sea level to 900 m (see Voggenreiter 1973; Santos 1983).

Representative specimens. – La Palma: Near Puntallana, 6.2004, *Á. Bañares 46858* (TFC); Velhoco, 5.1988, *F. Cabrera Rodríguez 25563* (TFC); Barranco del Jorado, Tijarafe, 600 m, 30.6.1987, *A. Marrero & M. Jorge 12792, 12799* (LPA); Tigalate, 30.6.1987, *A. Marrero & A. Roca 12794, 12795* (LPA); Cuesta de Jinamar (ex hort J.B.C.), 5.1989, *A. Roca 16550* (LPA); Barranco Fernando Porto, Garafía, 6.5.1989, *A. Roca & A. Marrero 16539, 16540* (LPA); Los Galguitos, 6.5.1987, *A. Roca & A. Marrero 16543, 16544, 16545* (LPA); Barranco de las Angustias, south slopes, 8.7.1944, *E. R. Sventenius 3302* (ORT); Barranco de las Angustias, close to the channel, 21.4.1962, *E. R. Sventenius 3301* (ORT). — El Hierro: Pozo de la Salud, Sabinosa, 50 m, 14.7.1987, *A. Marrero & A. Roca 12849, 12859* (LPA); laderas de Sabinosa, 12.7.1987, *A. Marrero 12845, 12846, 12847, 12848* (LPA); riscos de Bascos (mirador), 14.7.1987, *A. Marrero & A. Roca 12796* (LPA); ladera baja de Jinamar, Frontera, 400 m, 14.7.1987 *A. Roca & A. Marrero 12796, 12797, 12851, 12852* (LPA).

Aeonium canariense subsp. ***latifolium*** (Burchard) Bañares, **comb. nov.**
≡ *Sempervivum canariense* subsp. *latifolium* Burchard in Biblioth. Bot. 98: 128. 1929. – Lectotypus (designated here by Bañares): [icon] Burchard in Biblioth. Bot. 98: t. 19. 1929.
= *Aeonium canariense* var. *subplanum* (Praeger) H. Y. Liu in Syst. Aeonium: 59. 1989 ≡ *Aeonium subplanum* Praeger in J. Bot. 66: 221. 1928.

Distribution. – Abundant within the forest and on humid walls located on the northern slopes of La Gomera and sporadically in cool southern hillsides, ranging from almost sea level to 1000 m (see Voggenreiter 1999).

Representative specimens. – La Gomera: Fuente de la Araña, El Bailadero, 5.2006, *Á. Bañares 46856* (TFC); Agulo, 7.5.1945, *E. R. Sventenius 5648* (ORT); cumbre de Las Carboneras, Hermigua, 18.5.1945, *E. R. Sventenius 5649* (ORT); Barranco del Cabrito, Risco Bermejo, 750 m, 18.5.1958, *E. R. Sventenius 5650* (ORT); Vallehermoso, Ancón del Carnero, 23.5.1969, *E. R. Sventenius 5670* (ORT).

Aeonium canariense subsp. ***virgineum*** (Webb ex Christ) Bañares, **comb. nov.**
≡ *Aeonium virgineum* Webb ex Christ in Bot. Jahrb. Syst. 9: 111. 1888 ≡ *Sempervivum canariense* subsp. *virgineum* (Webb ex Christ) Burchard in Biblioth. Bot. 98: 127. 1929 ≡ *Aeonium canariense* var. *virgineum* (Webb ex Christ) H. Y. Liu in Syst. Aeonium: 60. 1989. – Lectotypus (designated by Liu 1989: 60): Spain, Canary Islands, Gran Canaria, "Barranco de la Virgen", 3.1846, *E. Bourgeau 356* (FI; isolectotypi: BM, CGE, E, F, G, GH, K, LE, MO, WRSL).

Distribution. – Abundant on rocks and hillsides in northern and western Gran Canaria, from almost sea level to 1000 m (see Suárez 1994).

Representative specimens. – Gran Canaria: Cuesta de Silva, 5.2006, *Á. Bañares 46857* (TFC); Moya, 1.4.1969, *D. Bramwell 11069* (LPA); pr. opidulum Cabo Verde, 250 m, 4.4.1980, *J. Fernández*

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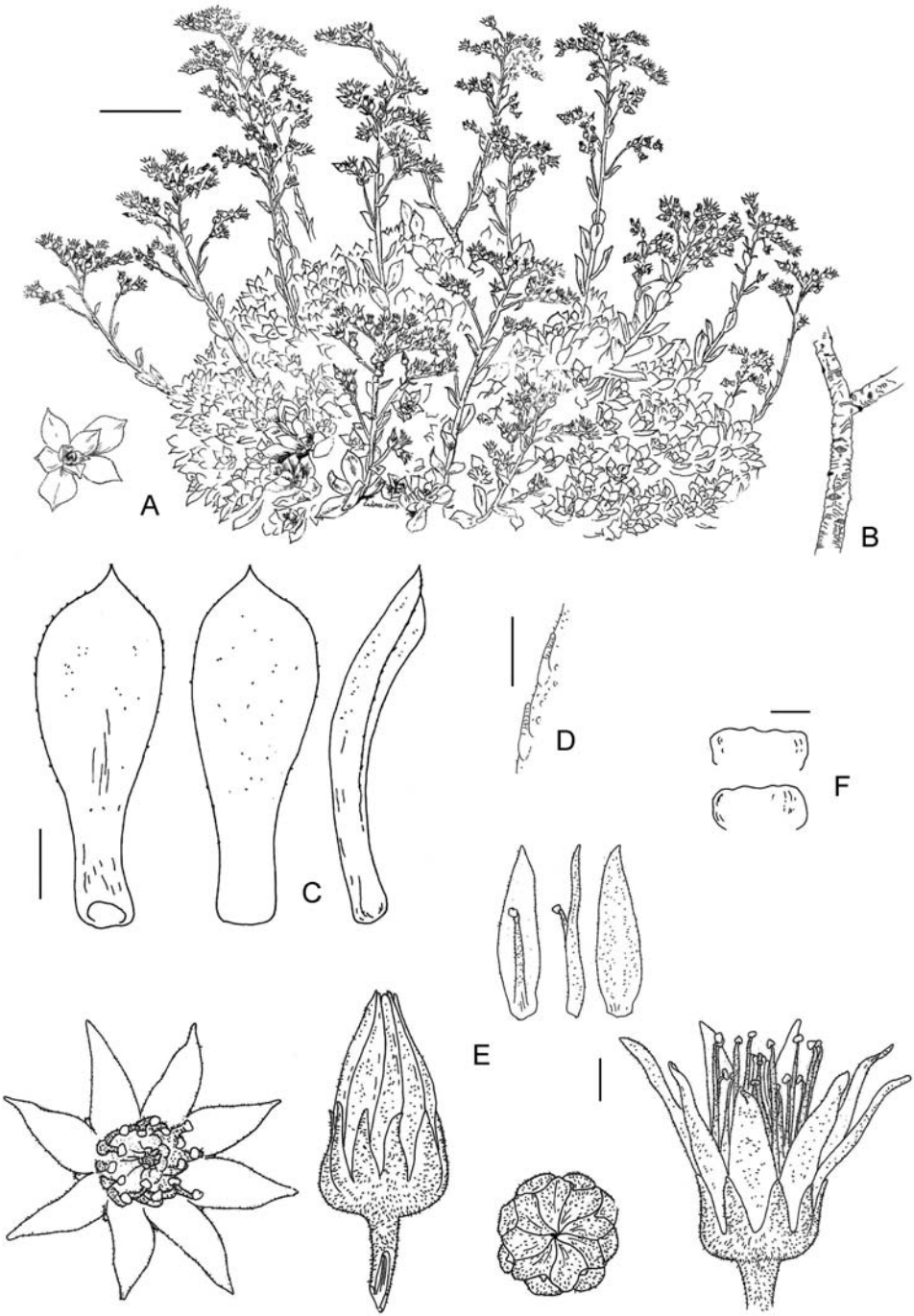

Fig. 1. *Aeonium decorum* var. *alucense* – A: plant and rosette; B: bark; C: rosette leaves; D: leaf margin with unicellular trichomes; E: flowers, petals and stamens; F: nectaries. – Scale bars: A = 4 cm; C = 5 mm; D = 1 mm; E = 2 mm; F = 0.3 mm; drawings after the holotype.

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Casas 20738 (TFC); Carpinteros, 700 m, 30.4.1988, *A. Marrero 16608, 16609, 16610* (LPA); Barranco Oscuro, 30.6.1987, *A. Marrero 12790, 12791* (LPA); Barranco del Palo (Goyedra), 650 m, 20.4.1988, *A. Marrero & R. Febles 17636, 17637* (LPA); Azuaje, 230°N, 240 m, 10.5.1988, *A. Roca & A. Marrero 16604, 16605* (LPA); Andén Verde, 19.4.1988, *A. Roca & A. Marrero 16611, 16612, 16613* (LPA); Hoya de Pineda, 295°N, 650 m, 27.4.1988, *A. Roca & A. Marrero 16599, 16600, 16601, 16602* (LPA); Ladera frente al Cenobio Valerón, 10°N, 140 m, 10.5.1988, *A. Roca & A. Marrero 16607* (LPA); Montaña del Cedro (Aldea de San Nicolás), 600 m, 16.5.1950, *E. R. Sventenius 1455* (ORT).

Aeonium decorum var. ***alucense*** Bañares & M. V. Marrero, **var. nov.**
Holotypus: Spain, Canary Islands, La Gomera, "Aluce-Avalo", 300 m, 5.2002, *Á. Bañares & M. V. Marrero 46850* (TFC). – Fig. 1.

A varietate typica rosulis minoribus (2.5-5 cm diametro), ramis 0.3 cm diametro, foliis obovatis vel oblanceolatis, 1.5-2.5(-3) × 0.6-1.3 cm et inflorescentia ramificata, 7-11 cm longis differt.

Perennial subshrub, up to 20 cm tall, very densely branched; branches thin, c. 0.3 cm in diameter, tortuous, ascending or pendant, with adventitious roots and rough scaly bark. *Rosettes* with ascending or spreading leaves, 2.5-5 cm in diameter when leaves are spreading. *Leaves* obovate to oblanceolate, 1.5-2.5(-3) × 0.6-1.3 cm, green with reddish tinge especially on the margin, puberulent with multicellular trichomes, acuminate and mucronate; margin ciliate with 0.8 mm long unicellular trichomes. *Inflorescence* dense, 7-11 × 5-7 cm, simple or dichotomously branched from the base or in the upper half; *peduncle* pubescent, 2-4(-5) cm long, with 5-13 small lanceolate bracts and 5-7 flowers. *Flowers* 7-8-merous; *calyx* pubescent, segments acute, 3-3.5 × 1.6-1.8 mm; *petals* pinkish white, lanceolate, 8-9 × 2.3-2.6 mm, abaxially puberulent; *stamens* puberulent, the antisepalous ones 6-7 mm, the antipetalous ones 4-5 mm long, anthers whitish to faint yellow; *nectaries* quadrate, 1 × 0.5 mm; *carpels* with ovaries 2.3-2.8 × 1.3 mm; *styles* c. 3.5 mm long. – Flowering March to May.

Remarks. – The diagnostic differences between the new taxon and the type variety are given in Table 1. Populations are found isolated from the type variety, which is widely distributed in southern La Gomera and rare on western Tenerife (Masca). Most plants are growing on a unique geological substrate (salic domes, phonolites) and in an extremely arid climate, close to other local endemics such as *Helichrysum alucense* García Casanova & al., and the sole population of *Aeonium sedifolium* (Webb ex Bolle) Pit. & Proust on La Gomera (García 1990; García & al. 1994). *A. decorum* var. *alucense* maintains its particular morphology, when growing together, ex situ, with the typical variety under identical conditions.

Distribution. – Common in a relatively small area in northeastern La Gomera (from Avalo to Aluce) (UTM-Hayford/Pico de las Nieves: 28RBS929124; 28RBS928126), from 200 to 330 m (Fig. 7), associated with xerophytic species in N and E-SE exposition (*Euphorbia balsamifera* Aiton subsp. *balsamifera, Neochamaelea pulverulenta* (Vent.) Erdtman, *Tetrapogon villosus* Desf.) on dry rocks and walls, especially salic domes (phonolites).

Table 1. Differential characters of the varieties of *Aeonium decorum*.

	var. *decorum*	var. *alucense*
Habit	up to 50 cm tall, branched, branches up to 0.8 cm in diam.	up to 20 cm tall, densely branched, branches c. 0.3 cm in diam.
Leaves	2.5-5(-7) × 1-1.5(-2) cm	1.5-2.5(-3) × 0.6-1.3 cm
Inflorescence	lax, simple, 15-30 × 8-20 cm, peduncles to 20 cm, with 10-15 flowers	dense, simple or dichotomously branched, 7-11 × 5-7 cm, peduncles 2-4(-5) cm, with 5-7 flowers

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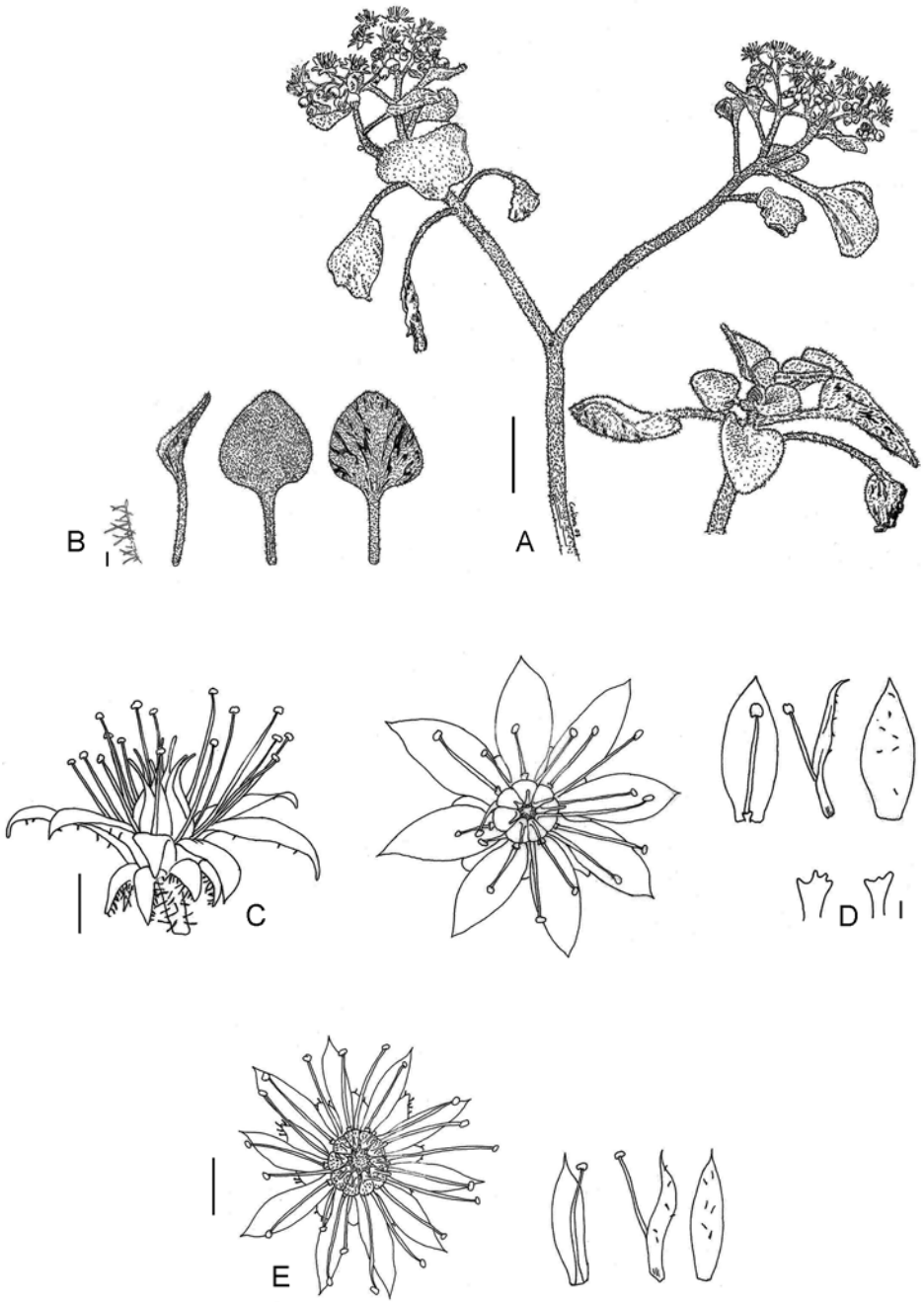

Fig. 2. A-D. *Aichryson laxum* var. *latipetalum,* A: plants and rosette leaves; B: leaf margin; C: flowers, petals and stamens; D: nectaries. – E: *A. laxum* var. *laxum,* flower, petals and stamens. – Scale bars: A = 3 cm; B = 0.5 mm; C, E = 2 mm; D = 0.2 mm; A-D after the holotype, E after *Bañares, Acevedo & Marrero 43449* (TFC).

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Aeonium lindleyi subsp. ***viscatum*** (Bolle) Bañares, **comb. nov.**
≡ *Aeonium viscatum* Bolle in Bonplandia 7: 241. 1859 ≡ *Sempervivum viscatum* (Bolle) Christ in Bot. Jahrb. Syst. 9: 117. 1888 ≡ *Sempervivum tortuosum* var. *viscatum* (Bolle) Kuntze in Revis. Gen. Pl. 1: 232. 1891 ≡ *Aeonium lindleyi* var. *viscatum* (Bolle) H. Y. Liu in Syst. Aeonium: 41. 1989. – Lectotypus (designated by Liu 1989: 41): Spain, Canary Islands, La Gomera, Hermigua, "Barranco de San Sebastián", 9.4.1845, *E. Bourgeau 736* (FI; isolectotypus: G).

Remarks. – We consider this taxon for its morphological features and geographical distribution better recognized as a subspecies.

Distribution. – Locally abundant on dry rocks and walls from sea level to 800 m in northern and eastern La Gomera, around San Sebastian, from Hermigua to Vallehermoso (see Voggenreiter 1999).

Representative specimens. – La Gomera: Near Agulo, 7.2004, *Á. Bañares 46854* (TFC); Uteza, 10.5.1975, *M. Fernández Galván 26011* (ORT); sine loco, 27.6.1946, *E. R. Sventenius 7176* (ORT); Barranco de Haragán, 500 m, 3.7.1952, *E. R. Sventenius 5655* (ORT); Barranco de La Laja, 300 m, 2.8.1952, *E. R. Sventenius 5654* (ORT); hillsides over San Sebastián, road from la Villa to the tunnel, 6.6.1970, *E. R. Sventenius 5634* (ORT).

Aichryson laxum var. ***latipetalum*** Bañares & M. V. Marrero, **var. nov.**
Holotypus: Spain, Canary Islands, Tenerife, "Barranco de Añavingo", 950 m, 6.2003, *Á. Bañares & M. V. Marrero 46860* (TFC). – Fig. 2.

A varietate typica floribus 7-9-meris et petalis elipticis, 4-5.5 × 1.7-2 mm differt.

It differs from the type variety by the 7-9-merous (instead of 9-12-merous) flowers, the elliptic and 1.7-2 mm wide (instead of linear-lanceolate and 0.9-1.1 mm wide) petals and the abaxially glabrous to glabrate carpels.

Remarks. – Praeger (1929: 462) mentioned this interesting plant from Añavingo and also reported the above characters differentiating it from typical *Aichryson laxum*. The morphological peculiarities of this taxon are maintained in ex situ cultivation. The evident isolation of the ravine where the population maintains its unique morphology led us segregate it as a new variety. The type variety is a widespread taxon in the Canaries and also present in the lower and more exposed parts of Añavingo (c. 600 m), outside the area of var. *latipetalum,* as well as in nearby ravines in southern Tenerife (Barranco de Badajoz, Barranco del Agua). Praeger collected also *A. porphyrogennetos* Bolle in Añavingo (Praeger 1929) but the presence of this endemic of Gran Canaria has not been confirmed by later authors (Bramwell 1969; Bañares 2002); it is clearly distinguished from our new variety by its divaricate (not dichotomous) branches, the leaves with the lamina broadest in the middle, the apex not emarginate and the margin protuberantly papillose, the lax and elongated inflorescence with sessile to subsessile leaves and the aristate petals (apiculus up to 1 mm). The hybrids *A. laxum* × *punctatum* and *A. laxum* × *porphyrogennetos,* also mentioned by Praeger (1929) for Añavingo, differ from the new variety, too, but were not found by us.

Distribution. – Locally common in a deep, long ravine in southern Tenerife (Barranco de Añavingo, also called Barranco del Espigón de Tea) from 800 m (UTM Hayford/Pico de las Nieves: 28RCS585363) to 1050 m, on steep, rocky ground (Fig. 7).

Additional specimen examined. – Tenerife: Barranco de Añavingo, 6.2002, *Á. Bañares & M. V. Marrero 46862* (TFC).

Aichryson tortuosum var. ***bethencourtianum*** (Bolle) Bañares & S. Scholz, **comb. nov.**
≡ *Aichryson bethencourtianum* Bolle in Bonplandia 7: 243. 1859 ≡ *Sempervivum bethencourtianum* (Bolle) Christ in Bot. Jahrb. Syst. 9: 161. 1888 ≡ *Macrobia bethencourtiana* (Bolle) G. Kunkel in Cuad. Bot. Canaria 28: 36. 1977. – Typus: Canary Islands, Fuerteventura, *E. Bourgeau 737* (FI).

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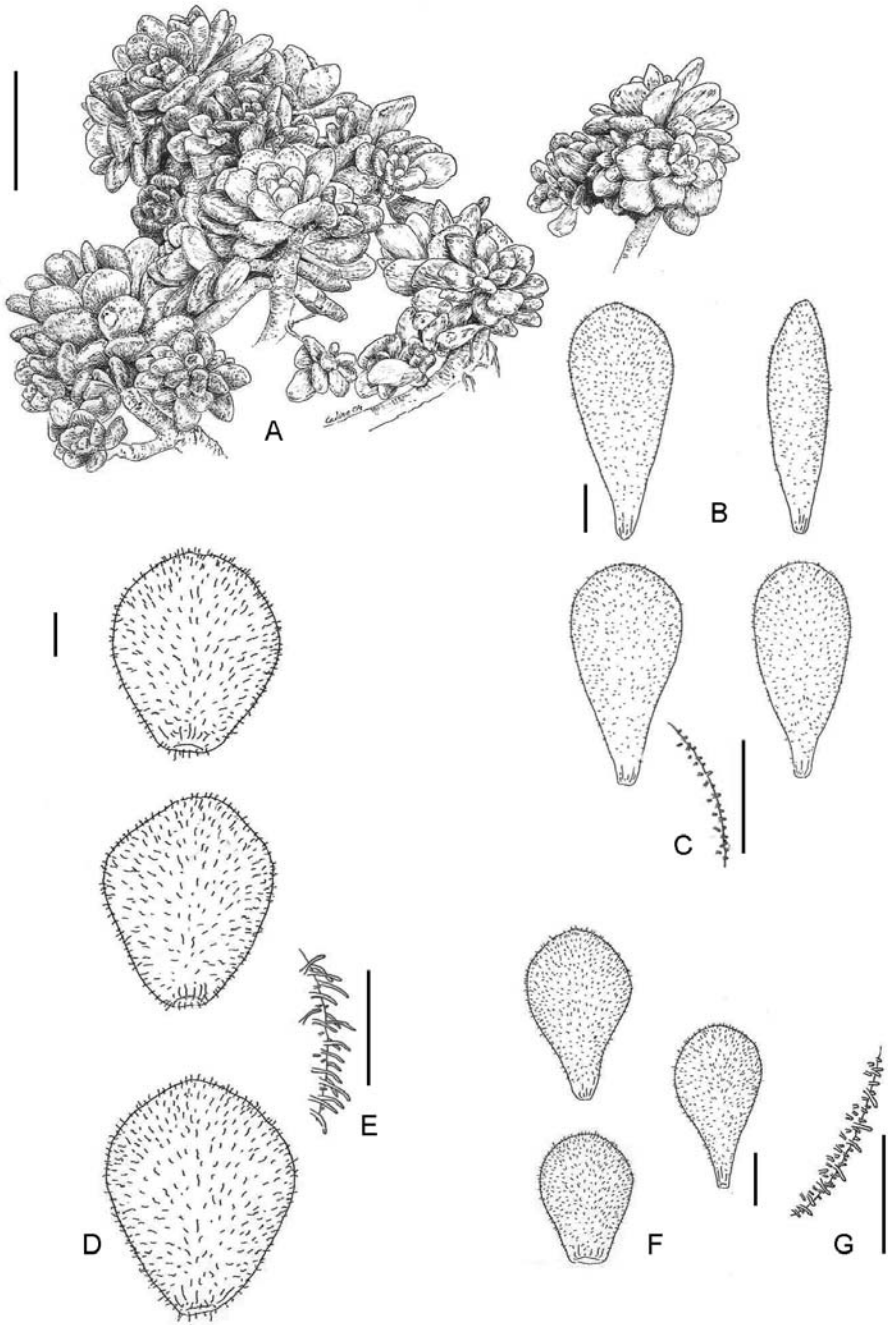

Fig. 3. A-C: *Aichryson tortuosum* var. *tortuosum,* A: plant; B: rosette leaves; C: leaf margin [after *Bañares 46866* (TFC)]. – D-G: *A. tortuosum* var. *bethencourtianum*, D-E: rosette leaves and leaf margin from Jandía Peninsula [after *Bañares & S. Scholz 46869* (TFC)]; F-G: rosette leaves and leaf margin from Montaña de la Muda [after *Bañares & S. Scholz 46868* (TFC)]. – Scale bars: A = 1.5 cm; B-G = 2 mm.

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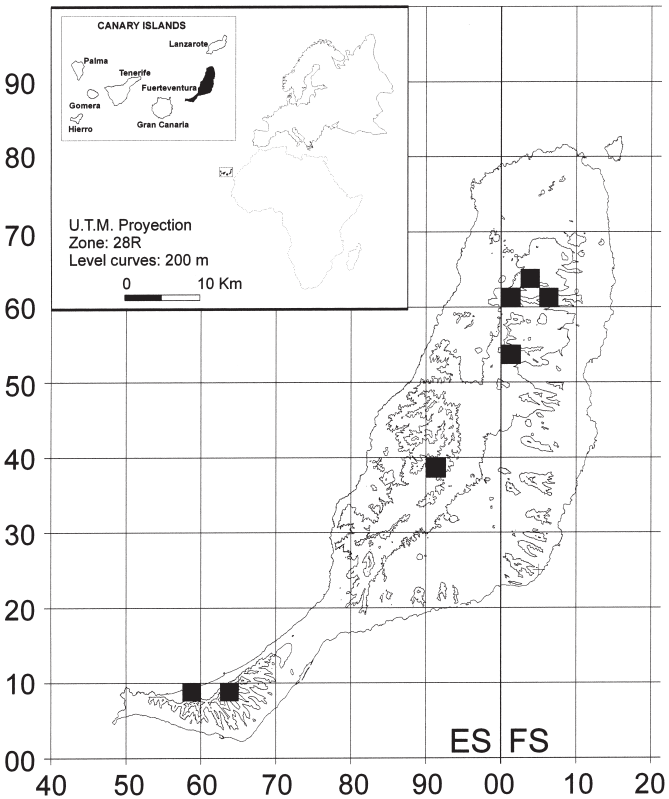

Fig. 4. Distribution of *Aichryson tortuosum* var. *bethencourtianum*.

Remarks. – Its confusion with the Lanzarote endemic *Aichryson tortuosum* in northern and central areas of Fuerteventura are surely related to the compactness of the plants in those stations, which differs from the generally loose and erect habit of *A. bethencourtianum* in its type locality (Jandía). *A. bethencourtianum* has traditionally been differentiated from *A. tortuosum* by its broader, orbicular, basally sometimes shortly narrowed and more densely pubescent leaves with hairs to 0.6-0.7 mm (*A. tortuosum* has typically cuneate leaves, with very short hairs, to 0.2-0.3 mm). The calyx has also hairs to 1 mm (instead of up to 0.5 mm in *A. tortuosum*). Our studies of northern and central populations in Fuerteventura revealed that the pubescence of the leaves are shorter than in the original location, almost transitional to the Lanzarote endemic, probably due to its strong dependence on environmental factors. However, because the shape of the leaves differentiates the two taxa, we propose their recognition as varieties (Fig. 3).

Distribution. – Rare on walls and rocks facing windward in several localities of Fuerteventura. Traditionally, it was only reported from its type locality in the Jandía peninsula (southern Fuerteventura). However, Bolle's taxon was also identified by us in some northern (near La Oliva in "Morro Tabaiba", "Morro de los Rincones" and "Montaña de la Muda", also along crags over Tefía and La Fortaleza) and central (Riscos del Carnicero) areas on this island above 400 m (Fig. 4), where it has been reported as *Aichryson tortuosum* (Praeger 1932; Bramwell 1968; Kunkel 1977; Sventenius in shed., see representative specimens).

Representative specimens. – FUERTEVENTURA: Montaña de la Muda, 7.2004, *Á. Bañares & S. Scholz 46868* (TFC); Fuente del Culantrillo, Jandía, 7.2004, *Á. Bañares & S. Scholz 46869* (TFC);

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Pico del Fraile, 23.10.2003, *S. Scholz 46382* (TFC); La Oliva, 25.6.1950, *E. R. Sventenius 21533* (ORT); Cofete, 500 m, 2.4.1957, *E. R. Sventenius 21530* (ORT); Rincón de Tetir, La Fortaleza, 21.5.1966, *E. R. Sventenius 21531* (ORT).

Monanthes minima subsp. ***adenoscepes*** (Svent.) Bañares, **comb. nov.**
≡ *Monanthes adenoscepes* Svent. in Addit. Fl. Canar. 1: 18. 1960. – Typus: Canary Islands, Tenerife, above "Güimar", 250 m, 27.8.1956, *Carlos González Martín s.n.* (searched for but not located at ORT where most of the herbarium specimens of Sventenius are deposited).

Remarks. – The diagnostic differences between subsp. *adenoscepes* and the type subspecies are presented in Table 2 and Fig. 5. Nyffeler (1992) considered *Monanthes adenoscepes* as conspecific with *M. minima*. However, comparison of both taxa at inter- and intrapopulation level from their isolated type localities (*M. minima* from the "Anaga region" of northern Tenerife and *M. adenoscepes* from "Ladera de Güimar" in southern Tenerife) and the study of the original material (see Representative specimens) led us to consider *M. adenoscepes* as a separate subspecies. Furthermore, plants of both taxa maintain their characteristics after a long time of cultivation.

Distribution. – Locally common on the relatively humid and underexposed slopes of rocks and walls found in Tenerife's southern lowlands (from Ladera de Güimar to Granadilla) from 30 to 550 m (see Bañares & Scholz 1990).

Representative specimens. – M. minima subsp. *minima:* TENERIFE: Santa Cruz de Tenerife, oberer Valle Seco. 1856, *Bolle s.n.* (B! holotypus); Barranco de Bufadero, 3.1988, *Á. Bañares 27455* (TFC); Barranco de Bufadero (sobre María Jiménez), 3.1997, *Á. Bañares 39.566* (TFC).
M. minima subsp. *adenoscepes:* TENERIFE: Ladera de Güimar, 5.1998, *Á. Bañares 46861* (TFC); Ladera de Güimar, 350 m, 3.2001, *Á. Bañares 46863* (TFC); La Ladera (c. camino real), 19.3.1984, *O. Rodríguez 28001* (TFC).

Monanthes polyphylla subsp. ***amydros*** Nyffeler in Bradleya 10: 73. 1992
[– *Monanthes amydros* Svent. in Addit. Fl. Canar. 1: 16. 1960, nom. inval., Art. 37.1]
Holotypus: Gomera, Degollada de la Cumbre, rocks NW of the N portal of tunnel (road San Sebastian to Hermigua), 630 m, 22.3.1990, *Nyffeler152* (Z; isotypi: ORT!, ZSS)
= *Sempervivum monanthes* var. *filicaule* Kuntze in Revis. Gen. Pl. 1: 231. 1891. – Lectotypus (designated by Nyffeler 1992: 73): Canary Islands, La Palma, "Barranco del Carmen", 10.1888, *Kuntze s.n.* (NY; isolectotypus: K).

Remarks. – Nyffeler (1992) reported *Monanthes polyphylla* subsp. *polyphylla* for Gran Canaria, Tenerife and La Palma, and subsp. *amydros* for La Gomera. This author suggested that the ambiguous name *M. subcrassicaulis* (Kuntze) Praeger, identified as synonymous with *M. muralis* (Webb ex Bolle) Hook. f., was improperly assigned by several authors to specimens of *M. polyphylla* subsp. *amydros* from La Gomera and to intermediates (most probably hybrids) between *M. polyphylla* subsp. *polyphylla* and *M. muralis* in La Palma. Later, Nyffeler (2003: 186) questioned the presence of *M. polyphylla* subsp. *polyphylla* on La Palma.

Our study of plants from several locations in La Palma and La Gomera revealed the occurrence of *Monanthes polyphylla* subsp. *amydros* on both La Palma and La Gomera, whereas subsp. *polyphylla* is not present on La Palma. *M. subcrassicaulis* from those islands (Praeger 1932; Sventenius in sched., see Representative specimens) corresponds to subsp. *amydros*. Plants of subsp. *amydros* on La Palma are found outside the range of other representatives of the genus, along some eastern ravines above 600 m (Barranco del Carmen, Barranco de la Madera, Barranco de Río) and several northern and central locations (common inside Taburiente National Park at Roque de los Cuervos and La Cumbrecita). Our examination of plants collected in the type locality of *Sempervivum monanthes* var. *filicaule* Kuntze (La Palma, Barranco del Carmen) also revealed that Kuntze's plant corresponds to *M. polyphylla* subsp. *amydros. M. polyphylla* subsp. *polyphylla* is confined to Gran Canaria and Tenerife, or probably only to Tenerife, since on Gran Canaria it

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Table 2. Differential characters of the subspecies of *Monanthes minima* and of *M. wildpretii*.

	M. minima subsp. *minima*	*M. minima* subsp. *adenoscepes*	*M. wildpretii*
Rosettes	single, very rarely offsetting, lax, with 60-80 leaves, 20-40 mm in diam.	single, very rarely offsetting, dense, with 70-85 leaves, 15-25 mm in diam.	abundantly offsetting, dense, with 100-120 leaves, 10-20 mm in diam.
Axes	cylindrical	cylindrical	globular
Leaves	spathulate, 10-20 mm long, apex rounded (to 4 mm wide), attenuate towards base, densely glandular-pubescent, slightly papillose	spathulate, 10-15 mm long, apex rounded to subrhomboidal (2-2.5 mm wide), abruptly contracted into a filiform base, densely glandular-pubescent, slightly papillose	oblanceolate, 5-8(-10) mm long, apex acute (1-2.5 mm wide), attenuate towards base, glandular-pubescent, prominently and abundantly papillose
Calyx	slightly papillose, segments ovate, concave, 1.2-1.5 mm wide	slightly papillose, segments lanceolate, 0.8-1 mm wide	prominently and abundantly papillose, segments lanceolate, 1-1.5 mm wide

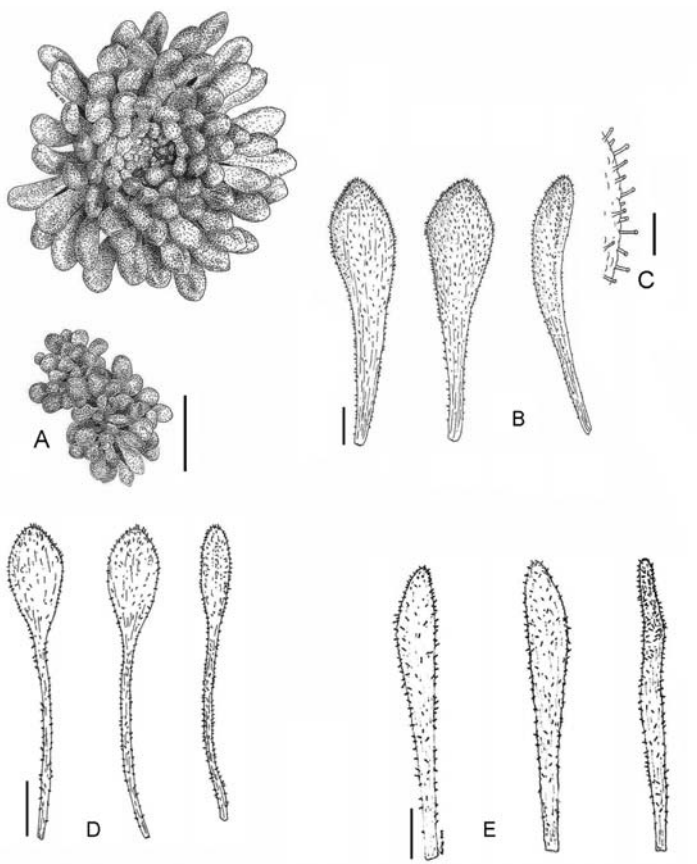

Fig. 5. A-C: *Monanthes minima* subsp. *minima*, A: plants; B: rosette leaves; C: leaf margin [after *Bañares 46851* (TFC)]. – D: *M. minima* subsp. *adenoscepes*, rosette leaves [after *Bañares 46863* (TFC)]. – E: *M. wildpretii,* rosette leaves [after *Bañares 46849* (TFC)]. – Scale bars: A = 1.5 cm; B, D-E = 2 mm; C = 1 mm.

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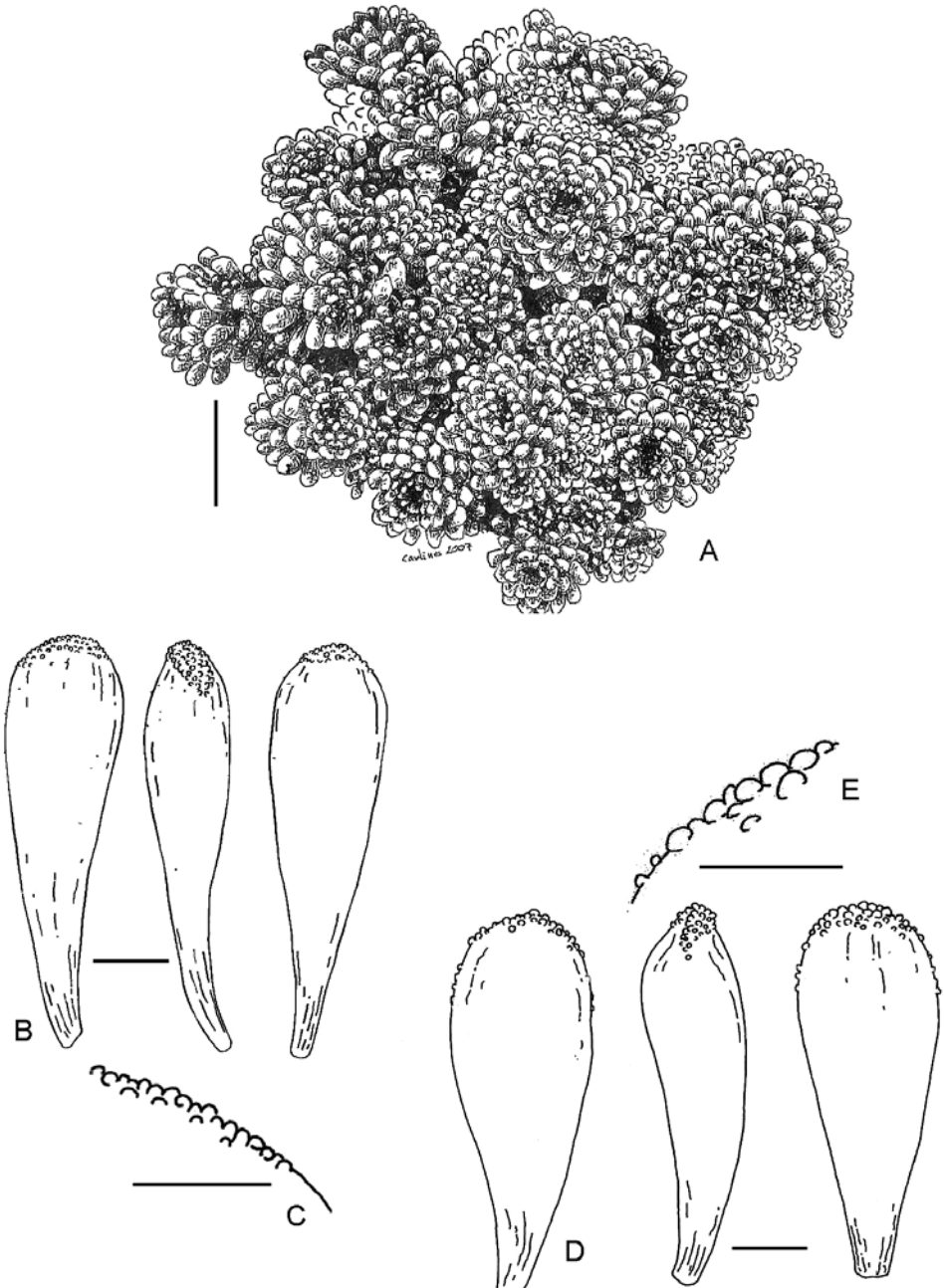

Fig. 6. A-C: *Monanthes polyphylla* subsp. *polyphylla,* A: plant; B: rosette leaves; C: leaf papillae [after *Bañares 43448* (TFC)]. – D-E: *M. polyphylla* subsp. *amydros,* D: rosette leaves; E: leaf papillae [after *Bañares 46864* (TFC)]. – Scale bars: A = 1 cm; B-D = 1.5 mm; C-E = 1 mm.

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Table 3. Differential characters of the subspecies of *Monanthes polyphylla*.

	subsp. *polyphylla*	subsp. *amydros*
Rosettes	leaves densely arranged, laterally hemispheric, 6-10 mm in diam.	leaves laxly arranged, laterally cylindrical to obovate, 7-15(-20) mm in diam.
Axes	to 1 mm in diam.	to 2 mm in diam.
Leaves	oblanceolate to narrowly obovate, 2 mm wide, apex truncate or rounded, papillae to 0.1 mm in diam., at leaf apex only	obovate to narrowly obovate, to 3(-4) mm wide, apex acute to subacute, papillae to 0.2(-0.3) mm in diam., at apex and margins

may have been extinct since 30 years (Kunkel 1977) as our search for *M. polyphylla* in Gran Canaria was in vain, too (Fig. 7).

The diagnostic differences between subsp. *amydros* and the type subspecies are presented in Table 3 and Fig. 6, see also Nyffeler 1992: 74.

Distribution. – Locally common on humid and shady walls and rocks, from 200 to 900 m in northern and eastern La Gomera, and ranging from almost sea level to 1500 m in La Palma (Fig. 7).

Representative specimens. – La Palma: La Cumbrecita, 6.2002, *Á. Bañares 46859* (TFC); Barranco del Carmen, 3.2005, *Á. Bañares 46864* (TFC); Barlovento, Gallegos, 300 m, 21.7.2003, *B. Navarro, J. Naranjo & B. Vilches 20454* (LPA); La Galga, 500 m, 25.10.1945, *E. R. Sventenius 25108* (ORT); Barranco Torre a Tamagayo, 19.6.1968, *E. R. Sventenius 3984* (ORT); El Paso, 19.6.1968, *E. R. Sventenius 3986* (ORT); c. Fuente de la Hiedra, 19.6.1968, *E. R. Sventenius 3992* (ORT); Barranco Torre at the level of El Paso, 19.6.1968, *E. R. Sventenius 3993* (ORT). — La Gomera: La Carbonera, Hermigua, 6.1999, *Á. Bañares 39571* (TFC); La Carbonera, Hermigua, 6.2007, *Á. Bañares 46855* (TFC); Tamargada, 300 m, 7.1979, *M. Fernández 26779* (ORT); cañada de Hurona, 5.1976, *M. Fernández 26375* (ORT); Hermigua, 7.5.1962, *Jose M. Fernández 5902* (ORT); Abalo, Cruz del Capitán, 11.4.1981., *B. Méndez & J. R. Acebes 13589* (TFC); Hermigua, 200 m, 18.4.1945, *E. R. Sventenius 5899* (ORT); Barranco Caviño, 200 m, 15.5.1945, *E. R. Sventenius 5900* (ORT); Roque Aluce, 1.5.1968, *E. R. Sventenius 5901* (ORT); Barranco de la Rosa del Agua, 3.5.1968, *E. R. Sventenius 5903* (ORT); Barranco Mahona, Haragán, 650 m, 12.10.1956, *E. R. Sventenius 5906* (ORT); Arguamul, 700 m, 23.5.1958, *E. R. Sventenius 5907* (ORT); Barranco del Cabrito, 200 m, 19.5.1958, *E. R. Sventenius 5908* (ORT); Taguluche del Norte, El Rincón, 7.6.1970, *E. R. Sventenius 5909* (ORT); Picacho de Haragán, 2.5.1968, *E. R. Sventenius 5910* (ORT).

Monanthes wildpretii Bañares & S. Scholz in Stud. Bot. 9: 129. 1990
Holotypus: Tenerife, cercanías de Chinamada, 700 m, 5.1988, *Ángel Bañares 27454* (TFC).

Herbaceous perennial up to 2 cm tall, with abundant offsetting rosettes forming dense mats. *Rosettes* dense, 1-2 cm in diameter, with 100-120 leaves. *Axes* globular. *Leaves* 5-8(-10) × 1-2 (-2.5) mm, oblanceolate, attenuate to the base, apex acute (never rounded), glandular-pubescent, prominently papillose. *Inflorescence* simple, lateral and ascendant, with spreading leaves similar to that of the rosettes and small lanceolate bracts; pedicels pubescent. *Flowers* 4-5 mm in diameter; *calyx* pubescent, segments subovate to lanceolate 2-3 × 1-1.5 mm, densely papillose; *petals* lanceolate, acute, puberulent abaxially; *nectaries* cuneate, bilobate, with margin fimbriate; *carpels* glabrous to glabrate, papillose.

Remarks. – On the basis of the original description Nyffeler (1992) regards this taxon as conspecific with *Monanthes minima,* suggesting that its deviating characteristics cannot be regarded as a basis for specific delimitation. However, our study of the holotype of the latter species (Santa Cruz de Tenerife. Oberer Valle Seco. 1856. *Bolle s.n.,* B!) confirmed that *M. wildpretii* in fact is a distinct, geographically isolated species. Our revision of the morphological variation at inter- and intrapopulation level and the cultivation of both taxa revealed important differences in leaf morphology,

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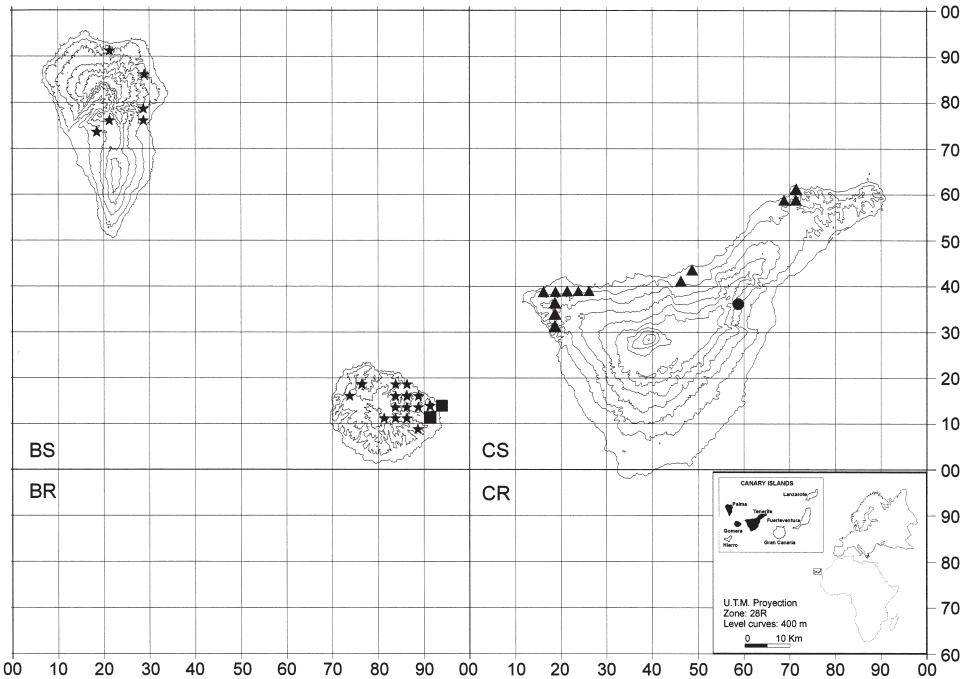

Fig. 7. Distribution of *Aeonium decorum* var. *alucense* (■), *Aichryson laxum* var. *latipetalum* (●), *Monanthes polyphylla* subsp. *amydros* (★) and *M. polyphylla* subsp. *polyphylla* (▲).

abundance of papillae, rosette density, and axes and calyx morphology. *M. wildpretii* differs from Bolle's plant by its strongly ramified and dense habit, smaller and denser rosettes, globular axes (as in *M. brachycaulos* (Webb & Berthel.) Lowe, and the oblanceolate, smaller, less pubescent, prominently and abundantly papillose and apically acute leaves (Fig. 5E, Table 2).

Distribution. – A single population is known on humid rocky walls around potential laurel forest communities, on the northern slopes of Anaga, Tenerife (c. Chinamada) at 700 m (Bañares & Scholz 1990; Bañares & al. 2003).

Additional specimen examined. – Tenerife: Near Chinamada, 5.2005, *Á. Bañares 46849* (TFC).

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