

A taxonomic revision of *Crambe* section *Dendrocrambe* (Brassicaceae)

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As part of a recent revision of the genus *Crambe*, based on the morphological study of herbarium and cultivated material, the systematics of section *Dendrocrambe* DC. are reviewed here. Section *Dendrocrambe* (including monospecific section *Rhipocrambe* Svent.) is considered to comprise 14 species, all endemic to Macaronesian archipelagoes: 13 in the Canary Islands and one in the Madeira Islands. *Crambe feuilleei* A. Santos and *C. gomerae* subsp. *hirsuta* Prina are described here, *C. fruticosa* subsp. *pinnatifida* (Lowe) Prina & Mart.-Laborde is proposed as a new status, and a key for the identification of all taxa, as well as maps with localities of collection, are provided. © 2008 The Linnean Society of London, *Botanical Journal of the Linnean Society*, 2008, 156, 291–304.

ADDITIONAL KEYWORDS: Canary Islands – Cruciferae – endemism – Macaronesia – Madeira – systematics.

INTRODUCTION

The genus *Crambe* L., with *c.* 34 species (Prina, 2000a, b), is second only to *Brassica* in species richness within the tribe Brassiceae (Gómez-Campo, 1999). As confirmed by molecular phylogenies based on chloroplast DNA restriction fragment length polymorphism (Warwick & Black, 1997) and nucleotide sequences of the internal transcribed spacer (ITS) of nuclear ribosomal DNA (Francisco-Ortega *et al.*, 1999, 2002), *Crambe* is a monophyletic genus with an ample distribution in the Northern Hemisphere, from the Macaronesian archipelagoes to western China and northern India, and from the Arctic Polar Circle to approximately 5°S in Tanzania (Prina, 2000a).

The first infrageneric systematics of *Crambe* were provided by De Candolle (1821), who organized the genus into the sections *Sarcocrambe* DC., *Leptocrambe* DC., and *Dendrocrambe* DC., mainly on the basis of the structure of the lower segment of the fruit and the plant habit. The system was in accordance with the geographical distribution of *Crambe* species,

as those belonging to section *Sarcocrambe* grow in south-east Europe and Asia, those included in section *Leptocrambe* are Mediterranean or East African, and those of section *Dendrocrambe* are Macaronesian. Later authors, such as Prantl (1891) and Schulz (1919, 1936) mostly followed this system. More recently, Sventenius (1953) proposed the segregation of the monotypic new section *Rhipocrambe* Svent. from *Dendrocrambe*. A remarkable change was proposed later by Khalilov (1991a, b), who split section *Sarcocrambe* into the type section *Crambe* – following the designation of *C. maritima* L. as the type species of the genus by Green (1925) – and the new sections *Orientecrambe* I. I. Khalilov, *Flavocrambe* I. I. Khalilov, and *Astrocrambe* I. I. Khalilov, and proposed the subdivision of several sections into subsections.

The Candollean system, however, received modern support from phytochemical data published by Aguinalgalde & Gómez-Campo (1984), who found that the three sections were characterized by distinct flavonoid patterns. Furthermore, it has been more recently adopted by Prina (2000a, b) who, on morphological grounds, disregarded the infrageneric modifications proposed by Sventenius (1953) and Khalilov

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(1991a, b) because of the inconsistency of the diagnostic morphological characters of the sections and subsections proposed therein. Moreover, such a view is in accordance with the phylogenetic analysis of molecular data carried out by Francisco-Ortega *et al.* (1999).

Section *Dendrocrambe* is characterized by its woody stems, the upper segment of its fruits generally apiculate, and the gibbous filaments of its median stamens. Although initially comprising only two species, a number of Macaronesian species have been described and added to *C. fruticosa* L. f. and *C. strigosa* L'Hér. during the past two centuries, the most recent contributions being those of Prina & Bramwell (2000) and Prina & Marrero (2001). At present, section *Dendrocrambe* includes 14 species, all endemic to one (or more) islands of the Canary and Madeira archipelagoes. According to Francisco-Ortega *et al.* (2002), the phylogenetic relationships derived from ITS sequences of all species within section *Dendrocrambe* confirm the monophyly of the group as well as the congruency of molecular, morphological, and biogeographical patterns of variation of its species, indicating the absence of hybridization phenomena in the evolution of the group.

The latest taxonomic synopsis of the Macaronesian species of *Crambe* was published by Bramwell (1969a). It covered Canarian taxa, but lacked descriptions and a key, and necessarily did not include the new species and other taxonomic changes thereafter contributed by Bramwell (1973), Santos (1983), Prina & Bramwell (2000), and Prina & Marrero (2001). The recent field guide by Bramwell & Bramwell (2001) includes these changes and a key, but lacks complete descriptions, synonyms, types, etc. In the present paper, section *Dendrocrambe* is revised, all of its taxa are described, including one new species and two new subspecies, and a key for their identification is provided.

MATERIAL AND METHODS

This contribution is based on the morphological analyses of herbarium specimens kept in the following herbaria: B, LPA, MA, O, ORT, and RNG. In addition, morphological data for four species (*C. arborea* Webb ex H. Christ, *C. fruticosa* L.f., *C. pritzelii* Bolle, and *C. santosii* Bramwell) were provided by plants obtained from seeds kept at the Germplasm Bank of the Departamento de Biología Vegetal, Universidad Politécnica de Madrid (accession numbers: UPM-Germ 2010, 3621, 3591, and 4054, respectively) and cultivated in the experimental fields of the Escuela T. S. de Ingenieros Agrónomos, Madrid. In the maps provided, the filled circles represent the localities of collection of the examined material.

TAXONOMY

CRAMBE SECTION *DENDROCRAMBE* DC., *SYST. NAT.*
2: 656 (1821)

= Section *Rhipocrambe* Svent., *Bol. Inst. Nac. Invest. Agron.* 13 (28): 65–67 (1953).

Type species: *Crambe fruticosa* L. f., designated by Khalilov (1991b).

Nanophanerophytes, microphanerophytes, or chamaephytes to 3(4) m, profusely branched. Petals white. Filaments of median stamens generally recurved and gibbous towards their apex. Fruiting pedicels frequently tetragonous. Lower segment of the fruit underdeveloped and seedless, upper segment mostly tetracostate, rugose-reticulate, apiculate, the only seed sometimes adhering to the pericarp.

This section is entirely endemic to the Macaronesian region. It includes 13 species from the Canary Islands, each distributed in one or more of all the islands except Lanzarote, and one species from the Madeira Islands.

DESCRIPTION OF SPECIES

CRAMBE ARBOREA WEBB EX H. CHRIST, *BOT.*
JAHRB. SYST. 9: 93–94 (1887)

Type: 'Hab. Teneriffa ad montem Ladera de Güimar inter ramos Euphorbia canariensis a morsu caprarum tutata die 30 maii. 1846', E. Bourgeau, *Pl. Canar. n° 698* (FI-W, photo!).

= *C. strigosa* L'Hér. var. *arborea* (Webb ex H. Christ) O. E. Schulz in A. Engler, *Pflanzenr.* 70: 249 (1919).
= *C. arborea* var. *indivisa* Svent. *Index Seminum Hort. Acclimat. Pl. Arautapae* 1965: [33] (1966).

Type: 'Habitat in declivibus saxosis solato-apricis versus 400 m supra mare juxta oppidum Güimar (Tenerife), ubi reperta primum fuit 25 Martii 1944' (not seen).

Loosely branched microphanerophytes 1.5–3 m with serrate rugose, rough stems. Cauline leaves 5–12 × 2.5–3.5 cm, early caducous except for those on the uppermost nodes, shortly petiolate, blade shortly hirsute, from slightly incise to deeply lacinate-pinnatifid, with lobes 1.5–3 mm lat., linear, acute, entire or sometimes with one lateral tooth. Inflorescence with loose, glabrous, patent to ascendent branches; pedicels 2.8–3 mm, tetragonous, glabrous, narrowly winged; flowers in anthesis sparsely distributed along the distal one-third of branch length; sepals 2.8–3 mm, linear, glabrous; petal limb 3.5–4 × 1.5 mm, obovate, gradually tapering into a claw c. 1 mm; filaments of median stamens 2.3–2.5 mm, recurved, gibbous. Lower segment of the fruit 0.3 mm,

KEY TO THE TAXA OF SECTION *DENDROCRAMBE*

1. Upper segment of fruit slightly or not at all compressed, exalate, tetracostate, apiculate at apex forming a distinct stylar beak.....2
- 1'. Upper segment of fruit dorsiventrally compressed, winged, neither tetracostate nor apiculate.....*C. sventenii*
2. Fruiting pedicels bracteate.....*C. wildpretii*
- 2'. Fruiting pedicels ebracteate.....3
3. Cauline leaves auriculate, sessile to petiolate, blade mostly undivided.....4
- 3'. Cauline leaves not auriculate, petiolate, blade pinnatifid to lyrate-pinnatifid.....9
4. Plants glabrous, glaucescent.....*C. laevigata*
- 4'. Plants densely hairy.....5
5. Upper segment of fruit 1.8–2.0 mm.....*C. microcarpa*
- 5'. Upper segment of fruit 2.5–3.0 mm.....6
6. Petals 2.6–3.0 mm.....*C. scaberrima*
- 6'. Petals 3.5–7.0 mm.....7
7. Petals 3.5–4.0 mm.....8
- 7'. Petals 5.0–7.0 mm.....*C. feuilleei*
8. Pedicels and sepals glabrous.....*C. gomerae* subsp. *gomerae*
- 8'. Pedicels and sepals hirsute.....*C. gomerae* subsp. *hirsuta*
9. Leaf blade pinnatifid to pinnatisect, with (3–)4–5 pairs of lateral segments, the terminal segment of similar size.....10
- 9'. Leaf blade lyrate-pinnatifid, with 1(–2) pairs of lateral segments or rarely undivided, the terminal segment distinctly larger.....11
10. Leaf with segments acute at apex, the petiole not winged. Plants rough, not retamoid.....*C. arborea*
- 10'. Leaf with segments obtuse or rounded at apex, the petiole narrowly winged. Plants retamoid, not or slightly rough.....*C. scoparia*
- 11'. Leaves with sparse hairs inflate at base.....12
11. Leaves with hairs not inflate at base or glabrescent.....13
12. Leaves moderately thick, irregularly obtuse-dentate.....*C. fruticosa* subsp. *fruticosa*
- 12'. Leaves not thick, irregularly inciso-dentate with acute teeth, hirsute with ±dense, stiff hairs not inflate at base (in addition to sparse hairs of inflate base).....*C. fruticosa* subsp. *pinnatifida*
13. Leaf blade reduced to the terminal segment, the lateral ones absent or few and extremely small at base. Stem prickly.....14
- 13'. Leaf blade with one or more small lateral segments. Stem strigose.....15
14. Plants densely hairy. Leaf blade oblong-lanceolate, finely serrate at margin. Filaments of median stamens slightly gibbous.....*C. pritzelii*
- 14'. Plants sparsely hairy. Leaf blade obovate, deeply toothed at margin. Filaments of median stamens with a distinct tooth.....*C. tamadabensis*
15. Leaves up to 50 cm, more or less smooth when touched, glabrescent. Plants up to 4 m. Inflorescence rachis very slender, flexuose.....*C. santosii*
- 15'. Leaves 5–15 cm, rough, strigose. Plants 1–1.5 m. Inflorescence rachis stout, not flexuose.....*C. strigosa*

tetragonous; upper segment 1.8–2 mm, globose, tetracostate, rugose. Seed 1 mm, ovoid, tegument smooth.

Endemic to Tenerife Island (Fig. 1). It grows on basaltic cliffs at the east side near Güimar (Bramwell & Bramwell, 2001). This species shows some affinity with *C. strigosa* and *C. santosii* with regard to fruit shape, although it differs from them in leaf disposition and degree of division.

Specimens examined: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife, Tenerife Island: Güimar, 300 m, 22.viii.1944, *E. R. Sventenius* (ORT 1833); Güimar, 12.viii.1949, *E. R. Sventenius* (ORT 23634); ladera de Güimar, 30.vi.1967, *E. R. Sventenius* (ORT

23637); ladera S.E. de Güimar, 400 m, 1.v.1969, *D. Bramwell 1418 1 & 2* (RNG); ladera de Güimar, 400 m, 1.v.1969, *D. Bramwell 1420* (RNG); ladera de Güimar, 3.viii.1969, *D. Bramwell 2142* (RNG, LPA); ladera de Güimar, west of Altavista, 500 m, 8.xii.1976, *R. Elven 13667* (O); ladera de Güimar, Cueva de Las Palomas, 3.v.1987, *A. Marrero et al.* (LPA 10171); Iguete Candelaria, 19.iii.1997, *A. Santos* (ORT 34307, 34308).

Material studied in cultivation: UPM-Germ 2010 (seeds provided by Jardín de Aclimatación de La Orotava, Tenerife in 1971).

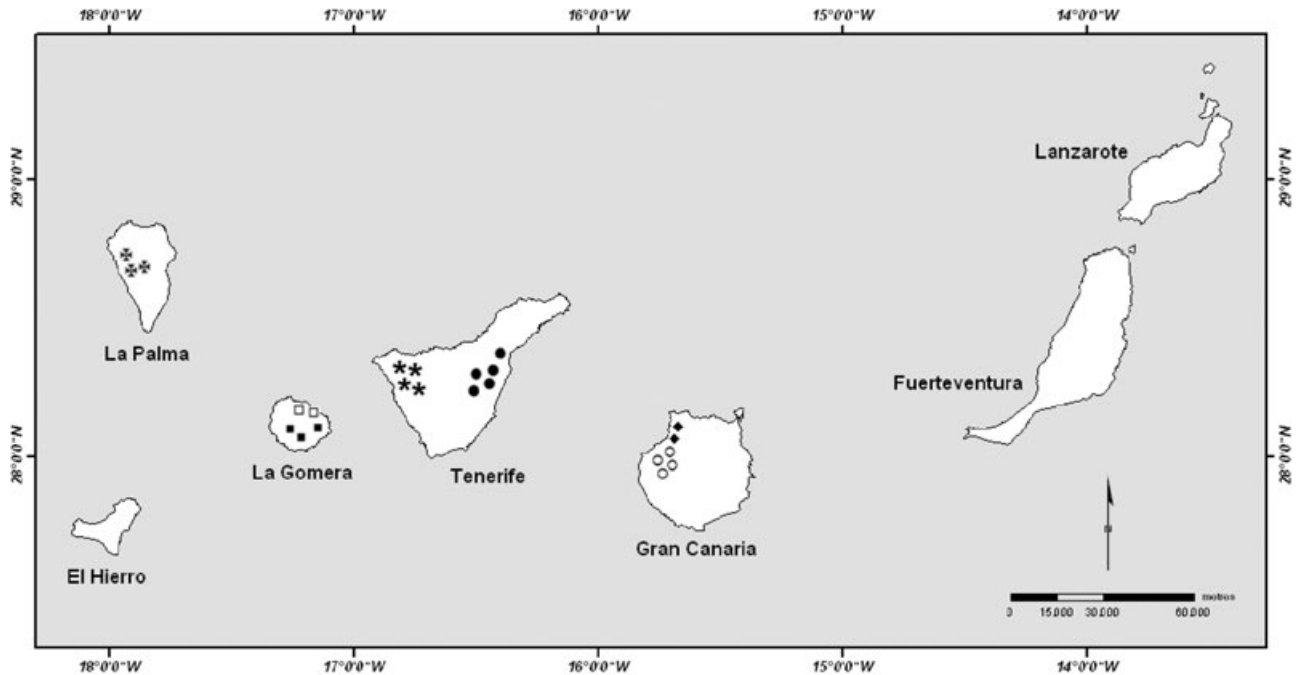


Figure 1. Checked localities of collection of *Crambe arborea* (●), *C. gomerae* subsp. *gomerae* (■), *C. gomerae* subsp. *hirsuta* (□), *C. laevigata* (*), *C. microcarpa* (✱), *C. scoparia* (○), and *C. tamadabensis* (◆).

Note: The degree of division of the leaf blade varies from slightly incise to deeply pinnatifid, even within individuals, as could be observed in the type and in cultivation. Therefore, var. *indivisa* Svent. should not be maintained.

CRAMBE FEUILLEEI* A. SANTOS, *SP. NOV.

Nanophanerophytum (0.5–)1.5–2(–3) m altum, caule primario lignoso; foliis elliptico-lanceolatis, indivisis vel plus minusve divis, etiam lyrato-pinnatifidis; petalis 5–7 × 2.4–4(–5) mm, albis; filamentis staminum medianorum recurvatis atque ad apicem gibbis; segmento inferiore fructus *c.* 1 mm longo, superiore autem 2.5 mm longo, quadricostato, foveolato apiculatoque.

Holotype: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife: El Hierro Island, Tábano, UTM 28RBR0271, 1200 m, 25.vi.1995, A. Santos (ORT 32266, isotypi: 32265, 32267), Figure 2.

Nanophanerophytes (0.5–)1.5–2(–3) m tall, with main woody stem up to 0.5–1.0 m and few (two to eight), glaucous, glabrous branches. Leaves deciduous, rosulate, one to two additional leaves along the stem, much reduced; petiole 4–6(–8) cm, with reddish lower face and glaucous, hispid upper face; blade of young leaves (12–)15–25(–36) × (7–)8–12(–22) cm, elliptical-lanceolate in outline, undivided to lyrate-

pinnatifid with one pair of small, falcate-roundish lateral segments or lobes, margin irregularly toothed, not cordate at base, hispid on both faces, the hairs more numerous on lower face and on nerves, the adult ones rhombic-lanceolate in outline. Inflorescence glabrous, glaucescent, with few, almost patent branches spanning 1.5–2.0 m across, forming large, showy panicles; flowers ebracteate, reddish at apex in bud; sepals (2–)2.5–3.0 × 1.0 mm, lanceolate, boat-shaped, green with white margins; petals 5–7 × 2.4–4(–5) mm, snow-white, limb oval, tapering into a claw 1.5–2 mm; filaments of median stamens recurved, gibbous towards their apex, anthers *c.* 1 mm, yellow. Lower segment of the (immature) fruit up to 1 mm; upper segment 2.5 mm, tetracostate, foveolate, apiculate.

Endemic to El Hierro Island (Fig. 3), and so far known from a few localities (Laderas de Jinama, Pie de Risco, Zabagú, Tibataje) within the 'Parque Rural de Frontera'. The plant grows on basaltic walls of fayal-brezal forests and upland shrub vegetation. The epithet is dedicated to the French astronomer and naturalist Louis Feuillée, a priest of the Order of Minims commissioned to the Canary Islands in 1724 to establish the El Hierro zero meridian, who also described and illustrated several Canarian plants. Although sometimes confused in the past with *C. strigosa* (Bornmüller, 1903; Bramwell & Bramwell, 2001), the new species seems to be more closely related to *C. microcarpa*, *C. gomerae*, or *C. scaberrima* on



Figure 2. Holotype of *Crambe feuilleei*.

the basis of its hispid leaves and few-branched inflorescences.

Additional specimens examined: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife, El Hierro Island: Sobre Frontera, 24.vii.1968, *E. Sventenius* (ORT 18243); Tábano, 4.vi.1993, *A. Santos* (ORT 32089); Tábano, 25.vi.1995, *A. Santos* (ORT 32265, 32266, 32267, 32268 y 32269); Tábano, 6.ii.1996, *A. Santos, J. Francisco-Ortega & S. C. Kim* (ORT 32523); Tábano, 1.viii.1996, *A. Santos* (ORT 34478); Tábano, 8.vi.2001, *A. Santos* (ORT 36647, 36648); Fuente de Tincos 600 m, 11.v.1949, *E. Sventenius* (ORT 18246); Fuente de Tincos, 29.vii.1969, *E. Sventenius* (ORT 18244); Fuente de Tincos, 650 m, 8.iv.1958, *E. Sventenius* (ORT 18245); Fuente de Tincos, 8.vi.2001, *A. Santos* (ORT 36645); El Golfo, 700 m, 24.vii.1968, *E. Sventenius* (ORT 18242).

CRAMBE FRUTICOSA L. F., *SUPPL. PL.* 299 (1781)

Type: 'Madaeae in rupibus altissimus iuxta Pico. Masson' (not seen).

subsp. fruticosa

= *C. fruticosa* var. *brevifolia* Lowe, *Man. fl. Madeira* 1: 40 (1868).

Type: 'Sea cliffs; Mad. at Paul do Mar above the waterfall, at Ponta de Pargo &c.: Porto Santo on the rocky summit of Pico d'Anna Ferreira' (syntypes, not seen).

= *C. fruticosa* var. *sublaevis* O. E. Schulz, in A. Engler, *Pflanzenr.* 70: 247 (1919).

Type: 'Madeira (N. H. Mason), an Felsen bei S. Vicente (G. Mandon, Pl. mad. n. 18- im Mai blühend und fruchtend)' (not seen).

Chamaephytes 0.7–1.5 m. Cauline leaves moderately thick, waxy; petiole 1.5–2 cm; blade 7–9 × 4–5 cm, ovate in outline, lyrate-pinnatifid, with sparsely scattered hairs of inflat base, terminal segment slightly cordate at base, irregularly obtuse-dentate, lateral segments 0–2, very small; upper leaves with shorter petiole, blade 3–4 cm. Inflorescence ample and loose; pedicels 2–2.5 mm, terete, glabrous; lateral sepals ±2–2.5 mm, subsaccate at base, median sepals 2.8 mm, hooded, all glabrous; petal limb 4–4.5 × 1.5–1.8 mm, oblong-obovate, gradually tapering into a claw c. 1 mm; filaments of median stamens 2.2–2.3 mm, recurved, gibbous towards their apex. Lower segment of the fruit 0.5–0.8 mm, tetracostate; upper segment 3–3.5 mm, ovoid, slightly dorsiventrally compressed, with four narrowly winged ribs, rugose-reticulate, apiculate. Seed ovoid, tegument smooth.

Endemic to the northern half of Madeira and Porto Santo Islands (Fig. 4). The leaves of *C. fruticosa* resemble, to some extent, those of *C. sventenii* in shape and degree of division, whereas, in fruit morphology, *C. fruticosa* seems to be more closely related to *C. wildpretii*.

Specimens examined: PORTUGAL, Madeira, Madeira Island: Faja do Mar, 5.iii.1998, *P. Sunding* (O); between Sao Vicente and Seixal, near Ribeira dos Caimbos, 250 m, 27.vi.1978, *O. Rustan 523* (O). Porto Santo Island: Pico de Ana Ferreira, 280 m, 12.vii.1978, *O. Rustan 694* (O).

Material studied in cultivation: UPM-Germ 3621 (seeds collected in Madeira, near Sao Vicente).

subsp. pinnatifida (Lowe) Prina & Mart.-Laborde, *stat. nov.*

= *C. fruticosa* var. *pinnatifida* Lowe, *Man. fl. Madeira* 1: 39 (1868) (basionym).

Type: 'Dry sunny rocks and cliffs on the S. coast, as on the edge of Cabo Girao or of Pico de Facho beyond Camera de Lobos; more rarely in ravines, as nearly at

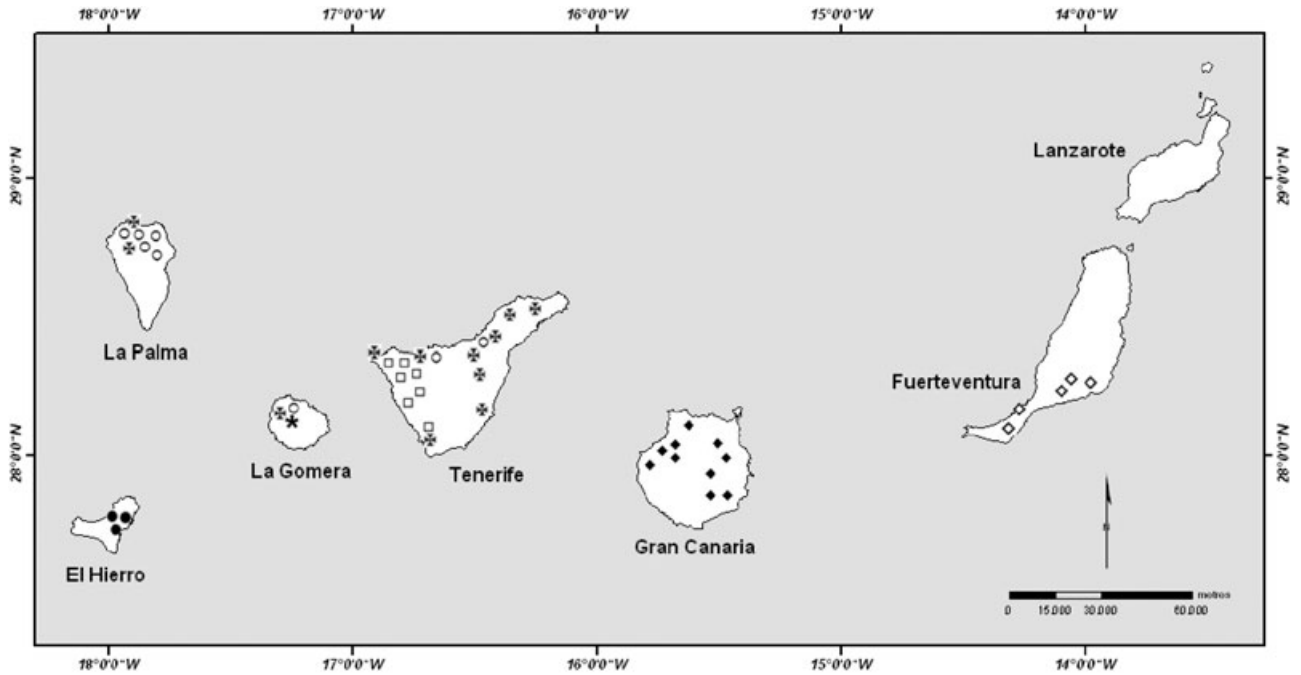


Figure 3. Checked localities of collection of *Crambe feuilleei* (●), *C. pritzelii* (◆), *C. santosii* (○), *C. scaberrima* (□), *C. strigosa* (*), *C. sventenii* (◇), and *C. wildpretii* (*).

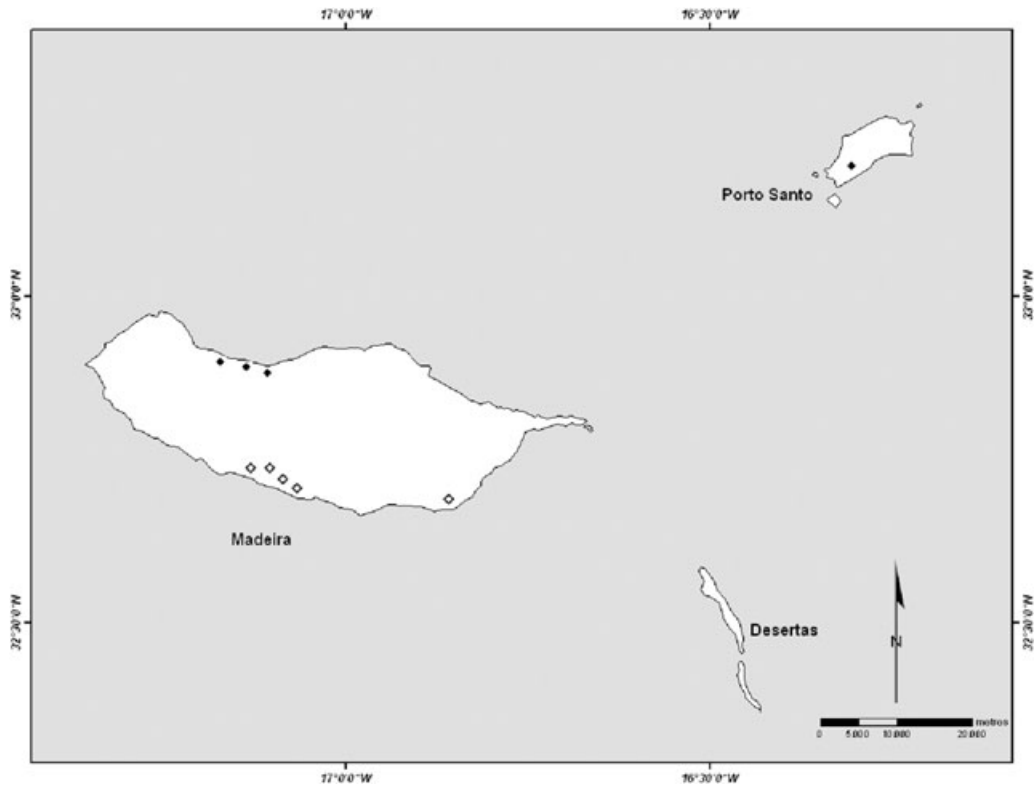


Figure 4. Checked localities of collection of *Crambe fruticosa* subsp. *fruticosa* (◆) and *C. fruticosa* subsp. *pinnatifida* (◇).

the bottom of the Cural das Freiras down the Voltas on the high rocks to the right of the road above the Church' (syntypes, not seen).

= *C. fruticosa* var. *asperrima* O. E. Schulz in A. Engler, *Pflanzenr.* **70**: 247 (1919).

Type: 'Auf dem Bergrücken westlich von der Ribeira de Santa Cruz c. 333 m ü. M. (L. Kny- im Mai blühend)' (not seen).

Plants hirsute on stems and leaves with ±dense, stiff hairs not inflate at base, in addition to sparse hairs of inflate base. Leaves not thick, lyrate-pinnatifid, the terminal segment pinnatilobed, the lobes irregularly inciso-dentate with acute teeth.

Endemic to the southern half of the island of Madeira (Fig. 4).

Specimens examined: PORTUGAL, Madeira, Madeira Island: Cabo Girao, 500 m, 19.v.1978, *O. Rustan* 107 (O); Ribeira Brava, 160 m, en matorrales, 28.vi.2000, *C. Navarro* 3127 (MA 655128); Ribeira Brava, vi.1977 (LPA 10794); Ribeira Brava, 8.iv.1990, *T. Ouren* 41319 (O); Ribeira Brava, 21.iv.1966, *K. Lems* 1549 (RNG); north of Ribeira Brava, 16.v.1968, *J. Lid* (O); Faja do Cerejo, north of Ribeira Brava, 80 m, 23.v.1978, *O. Rustan* 187 (O); Ribeira do Porto Novo, 2.vii.1962, *E. R. Sventenius* (ORT 827); Faja dos Padres, 400 m, matorral seco y pedregoso, 28.ii.2004, *Castroviejo, Paiva, Rico & Sequeira* 17402 (MA 714510).

Note: Lowe (1868) included the binomials *Myagrimum scabrosum* Buch and *Myagrimum scabridum* Sol. in the synonymy of his var. *pinnatifida*. The first is a *nomen nudum* originally appearing in a mere list of plant names (Buch, 1825: 195). Similarly, the latter is another *nomen nudum*, apparently written *in sched.* by Solander.

CRAMBE GOMERAE WEBB EX H. CHRIST SUBSP.
GOMERAE, *BOT. JAHRB. SYST.* **9**: 93 (1887)

Type: 'Gomera ad rupes el Risco de Tagamiche 5 Ap. 1845 (Bourg.)' (the specimen *Bourgeau* 697, FI-W, collected at the *locus classicus* on April 15th 1845, is the closest-to-the-type material that could be found; it only differs from the specimen mentioned by Christ in the date, 15th instead of 5th, which might well be a typographic mistake).

= *C. strigosa* L'Hér. var. *sessilifolia sensu* O. E. Schulz in A. Engler, *Pflanzenr.* **70**: 249 (1919), *pro parte quoad specimina insulae Gomeræ*.

Nanophanerophytes 0.80–1.5 m, with angled stems provided with hirsute, retrorse trichomes, glabrous on the inflorescence. Cauline leaves 10–15 × 4–5 cm, sessile to subsessile, ovate-elliptical, indivise to lyrate-pinnatifid, finely erose-dentate; upper leaves

similar, smaller. Inflorescence paniculate, ample, with frequently bracteate branches; bracts 10–15 × 0.5–1.5 mm, sessile, linear, acute, hispid; pedicels 5–7 mm, filiform; sepals 3–3.5 × c. 1.5 mm, oblong, glabrous, narrowly white-margined; petal limb 3.0–3.5 × 2.5 mm, elliptical, abruptly narrowed into a short claw c. 0.5 mm; filaments of median stamens 2.1–2.3 mm, slightly gibbous towards their apex; anthers sagittate at base. Lower segment of the fruit 1–1.2 mm, terete; upper segment 2.2–2.5 mm, globose, conical at its apex. Seed ovoid, integument finely reticulate.

Endemic to the laurisilva forests in the east of La Gomera Island (Fig. 1).

Specimens examined: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife, La Gomera Island: Los Corrales, south of Benchijigua, 740 m, 9.iv.1957, *I. Jorstad* (O); carretera de San Sebastián a Benchijigua, 100–800 m, 11.iii.1973, *A. Aldridge* 1192 (RNG); Barranco de la Villa, 500 m, 27.vi.1969, *D. Bramwell* 2269 (RNG); Barranco de la Villa, près de San Sebastián de La Gomera au Barro de Las Lajas, falaise là où le sentier du monte Agando coupe le ruisseau, 600–700 m, 25.iii.1976, *J. Vivant* (MA 301983); San Sebastián de La Gomera, Ermita de Las Nieves, cerca de Roque de Agando, 900 m, 8.v.1997, *Panero et al.* 7083 (MA 599669); Roque de Agando, 1000 m, 27.vi.1969, *D. Bramwell* 1995 (RNG); Roque de Agando, 22.iv.1987, *P. Maza et al.* (LPA 14294); Roque de Agando, 1000 m, 12.iv.1990, *Castroviejo et al.* (MA 531339); Roque de Agando, 27.iii.1980, *H. Edvarsen & R. Elven* 20400 (O); Risco Serradero (Seima), 550 m, 19.v.1958, *E. R. Sventenius* (ORT 4888); Barranco de la Rosa del Agua, 3.v.1968, *E. R. Sventenius* (ORT 4882); Igualero, Chipude, 1300 m, 19.v.1945, *E. R. Sventenius* (ORT 1835, 1836); Tagamiche, 900 m, 18.iii.1966, *K. Lems* 7290 (RNG); Adrupes El Risco de Tagamiche, 15.iv.1845, *E. Bourgeau*, *Pl. Canar. n° 697* (FI-W, photo).

Note: Bornmüller (1903) based his *C. strigosa* var. *sessilifolia* only on plants collected in Güimar (Tenerife), but Schulz (1919) enlarged the circumscription of Bornmüller's variety by including materials from both Tenerife and La Gomera Islands. The plants from the latter, however, are more likely to belong to *C. gomeræ*, rather than to *C. scaberrima*, a morphologically related, although distinct, species, of which Bornmüller's name is a synonym. On the basis of leaf and inflorescence morphology, *C. gomeræ* seems to be related also to *C. microcarpa* and *C. feuilleei*.

subsp. hirsuta Prina, *subsp. nova*

A typo differt caulis striatis ad basim cum pilis rigidis; foliis caulinis ellipticis, indivisis, plerumque

auriculatis, sessilibus vel breviter petiolatis, laminis ellipticis, breviter serrato-dentatis, hirsutis; sepalis et pedicellis cum pilis densis hirsutis.

Holotype: Spain, Canary Islands, Prov. Santa Cruz de Tenerife: La Gomera Island, carretera de San Sebastián de La Gomera a Hermigua, km 11 550 m, 17.iv.1984, *Montelongo et al.* (LPA 10189; LPA 10179 & 10188 isotypes).

Nanophanerophytes 0.7–1 m tall. Stem striate, hirsute at base. Cauline leaves 8–12 × 4–7 cm, mostly auriculate, sessile to shortly petiolate, blade elliptical, shortly serrate-dentate, hirsute. Pedicels and sepals densely hirsute.

So far only one population known, from a laurisilva forest area north-west of San Sebastián de La Gomera (Fig. 1).

Note: Trichomes on pedicels and sepals are rare in the genus. So far, they have only been observed in this subspecies of *C. gomerae*, and in two other species from Central Asia, belonging to the type section of the genus.

CRAMBE LAEVIGATA DC. EX H. CHRIST, *BOT. JAHRB. SYST.* **9**: 94 (1887)

Type: ‘Hab. in Insulis Canariensibus (Brouss.)’ (not seen).

= *C. strigosa* L’Hér. var. *glabrata* DC., *Syst. nat.* **2**: 657 (1821).

Type: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife, ‘Tenerife, en el barranco de Masca, *Broussonet misit Cavanilles*’ (MA 47059!).

Chamaephytes 40–50 cm, glabrous. Cauline leaves 12.5–13 × 5–7 cm, sessile, obovate, undivided, irregularly dentate, with large and small alternating teeth, glabrous, the median nerve whitish, very conspicuous. Inflorescence an ample raceme; pedicels 2.5 mm, up to 4.5 mm when fruiting, tetragonous, glabrous; sepals 2.9–3 × 1.6 mm, glabrous, median nerve conspicuous, margin white; petal limb 4.5 × 2.5 mm, oblong-ovate, abruptly narrowed into a claw 0.5–0.7 mm; median stamens 2.5 mm, recurved, gibbous towards their apex. Lower segment of the fruit 0.5 mm, terete; upper segment 2 × 1.5–1.8 mm, globose, apiculate, tetracostate, rugose-reticulate.

Endemic to west Tenerife (Fig. 1), where it is common in Valle de Masca, the only known locality (Bramwell & Bramwell, 2001).

Specimens examined: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife, Tenerife Island: Masca, 20.iv.1945, *E. R. Sventenius* (ORT 23642); Masca, 22.v.1946, *E. R. Sventenius* (ORT 23644); Barranco de

Masca, entre Santiago y Teno Alto, 23.vii.1956, *K. Lems 2876* (RNG); Valle de Masca, 400 m, 19.iv.1971, *D. Bramwell & Humphries 3470* (RNG); Masca 10.iv.1974, *R. Acebes* (O ex TFC).

CRAMBE MICROCARPA A. SANTOS, *VEGETACIÓN Y FLORA DE LA PALMA*: 167 (1983)

Type: ‘Ex insula Palma, regione austro occidentali in convallis Fernando Porto, 14.vi.74, A. Santos, n. 2193. In Herb. ORT conservatus’ (not seen).

Nanophanerophytes 60–150 cm. Stems few branched, striate, with short, retrorse prickles, glabrous above. Cauline leaves 5–11 × 2–5 cm, in part auriculate, sessile to shortly petiolate, blade sub-rhombic to elliptical-lanceolate, acute at apex, irregularly inciso-dentate, covered with short, rough hairs. Inflorescence scarcely branched; pedicels 3.5–5 mm, slightly tetracostate, glabrous; sepals 2–2.3 mm, oblong, glabrous, sometimes reddish at apex; petals 4–5 × 1.5–2.3 mm, limb oblong-obovate, abruptly narrowed into a claw c. 0.8 mm; filaments of median stamens 2.3–2.4 mm, straight. Lower segment of the fruit c. 0.5 mm, subterete, slightly tetracostate; upper segment 1.6–2.0 × 1.5–1.7 mm, subglobose, apiculate, distinctly tetracostate, rugose-reticulate. Seed c. 2.4 mm, globose, finely rugose.

Endemic to La Palma Island (Fig. 1), where it grows on abrupt rocks between 300 and 1600 m (Santos, 1983). This species seems to be related to *C. feuilleei*, on the basis of its hispid leaves and few-branched inflorescences.

Specimens examined: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife, La Palma Island: El Paso, Roque de Vegenado, 21.vi.1968, *E. R. Sventenius* (ORT 3557); Monte Vegenado, 26.vi.1972, *E. R. Sventenius* (LPA 10816); Barranco de Torre, 20.vi.1968, *E. R. Sventenius* (ORT 3558); Garafia, Barranco Fernando Porto, 4.vii.1987, *A. Marrero et al.* (LPA 10160); Garafia, Barranco Fernando Porto, 900 m, 24.iv.1997, *A. Santos & J. Francisco Ortega* (ORT 34314).

CRAMBE PRITZELII BOLLE IN A. BRAUN, *APPEND. PL. NOV. HORT. BOT. BEROL.* **1861**: 10 (1862)

Type: SPAIN, Canary Islands, Prov. Las Palmas, Gran Canaria: ‘cumbre del Saucillo, Los Roques supra Tenteniguada’ *C. Bolle* (B!).

= *C. vieraeana* Webb ex H. Christ, *Bot. Jahrb. Syst.* **9**: 93 (1887).

Type: ‘Hab. Canaria mont. Saucillo (Despr.) Tenteniguada (Bourg.)’ *pro syn.*

= *C. strigosa sensu* O. E. Schulz in A. Engler, *Pflanzenr.* **70**: 248 (1919), *pro parte*.

Nanophanerophytes 1–1.5 m. Stems multicostate, much lignified at base, rough and prickly above, unarmed towards the inflorescence. Basal and cauline leaves with petiole (1.5–)3.5–4 cm, hirsute, and blade (6–)9–12(–15) × 3–5 cm, ovate to ovate-lanceolate, acuminate at apex, irregularly toothed, with antrorse, pricking hairs mainly on nerves and margin. Inflorescence paniculate, ample, with patent to erect branches; pedicels 3–4 mm, erect, glabrous, tetracostate; flowers densely crowded at apex; sepals glabrous, whitish at apex; petal limb 3 × 2 mm, oblong, abruptly narrowed into a claw *c.* 1.5 mm; filaments of median stamens recurved, slightly gibbous towards their apex. Lower segment of the fruit 0.25–0.30 mm; upper segment 3–3.2 mm, ampulliform, distinctly tetracostate, rugose-reticulate, with apicule *c.* 0.5 mm. Seed 2.5–3 mm, ovoid, slightly compressed, surrounded by a funicle 3.5–4 mm.

Endemic to Gran Canaria Island (Fig. 3), where it grows in forest areas along its north coast, from Lentiscal to Agaete and Los Tilos de Moya, between 400 and 800 m (Bramwell & Bramwell, 2001). Leaf morphology suggests some affinity of this species with *C. tamadabensis*.

Specimens examined: SPAIN, Canary Islands, Prov. Las Palmas, Gran Canaria Island: Aldea Blanca, cordillera de Las Fuentecillas, 8.v.1974, *J. Alonso* (LPA 10168); slopes above Baños de Agaete, 500 m, 21.iii.1966, *P. Sunding* (O); Baños de Agaete, 650 m, 21.iii.1966, *G. Kunkel* 8876 (B); Valle de Agaete, región de Los Baños, 400 m, 29.iii.1969, *D. Bramwell* 1157 1 & 2 (RNG); Agaete, Los Berrazales, 600 m, 8.v.1967, *G. Kunkel* 11028 (B); Berrazales, in the bottom of the Agaete valley, north-west slope of Montaña Gorda, 600 m, 8.iii.1978, *L. Borgen et al.* 2830 (O); Valle de Agaete, San Pedro, 19.vi.1999, *A. Marrero & A. Prina* 234 (LPA 18656, MA 626721); Arucas, 300 m, 31.iii.1964, *F. Markgraf* (B); Barranco de las Angosturas, 12.vi.1971, *E. R. Sventenius* (LPA 10176, 10194, 10802, 10803); Barranco de Azuaje (Barranco de la Virgen), 300–400 m, 22.iii.1971, *L. Borgen* 450 (O); Barranco de la Virgen near Cambalud, 300 m, 23.iv.1973, *A. Aldridge* 1582 (RNG); Caldera de Banjama, south side, 300 m, 27.iii.1960, *J. Lid* (O); Barranco de Guayadeque, Caidero del Riscado, 900 m, 9.v.1963, *E. R. Sventenius* (ORT 7514); Barranco de Guayadeque, 1200 m, *A. Marrero et al.* (LPA 10191); Barranco de Guayadeque, 19.v.1997, *A. Santos* (ORT 33812); slopes above San Felipe, facing towards Barranco Calabozo, 150–200 m, 24.iii.1966, *P. Sunding* (O); slope above San Felipe, *c.* 180 m, 11.iii.1967, *L. Borgen* 109 (O); San Nicolás Tolentino, Artajeve, 15.iii.1973, *E. R. Sventenius* (LPA 10817); Cuesta de Silva, 23.v.1933, *E. Asplund* (B); Los Tilos de Moya, 500 m, 22.iv.1971,

G. Kunkel 3591 (MA); Los Tilos de Moya, 600 m, 27.iii.1971, *Humphries* 3137 (RNG); Los Tilos de Moya, Barranco del Pagador, 18.vi.1999, *A. Prina & A. Marrero* (LPA 18655, MA 626707); Convalle de Santa Brígida, 22.iv.1855, *E. Bourgeau* 1263, *Pl. Canar. ex itinere secundo 1885* (MA 161355 1 & 2); slope Cabo Verde ad 150 m, in dumosis, 4.iv.1980, *Fdez. Casas* 3010 (MA); Tafira Alta, Monte Lentiscal, 500 m, 28.iii.1969, *D. Bramwell* 1097 (RNG); Tenteniguada, 1100 m, 30.v.1959, *E. R. Sventenius* (ORT 7510); Tenteniguada, 1100 m, 12.iii.1969, *P. Sunding* 2259 (O); Tenteniguada, 29.v.1974; *J. Alonso* (LPA 10805, 10806).

Material studied in cultivation: UPM-Germ 3591 (seeds collected in Roques de Tenteniguada, Gran Canaria, in 1974).

CRAMBE SANTOSII BRAMWELL, *BOT. MACARONÉS. IV*
Ci. **22:** 111 (1995)

= *C. strigosa* var. *gigantea* Ceballos & Ortuño, *Bol. Inst. Forest. Invest. Exp.* **18(33):** 11 (1947) (basionym). *Type:* ‘En la isla de La Palma, monte “El Canal”, de San Andrés y Sauces . . .’ (not seen).

= *Crambe gigantea* (Ceballos y Ortuño) Bramwell, *Cuad. Bot. Canaria* **7:** 7 (1969).

Type: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife: La Palma Island, Los Tilos, 700 m, in laurel forest, 6.vi.1969, *D. Bramwell* 1813 (RNG!, lectotype designated *in herb* by D. Bramwell), *nom. illeg., non C. gigantea* Kitaibel ex Janka in *Oesterr. Bot. Zeitschr.* **21:** 4 (1871).

Microphanerophytes 2.5–4 m. Stems slightly strigose, glabrous above. Lower cauline leaves (12–)25(–45) cm, sparsely hairy; petiole 3–5 cm; blade lyrate-pinnatifid with terminal segment 18–25(–40) × 12–15(–20) cm, ovate-elliptical, slightly acuminate, and (0–)1–2 lateral segments 1–2 × 0.5–1.5 cm, subdeltoid; median cauline leaves similar, smaller, more frequently reduced to the terminal segment. Inflorescence very loose, ample, pendulous, with thin, distinctly flexuose rachis forming open angles with pedicels at each node; sepals 1.2–1.3 mm, scarious at margin, glabrous, pinkish; petals 2.3–2.5 × 1.5–1.8 mm, limb obovate, abruptly narrowed into a claw ±0.9–1.2 mm; filaments of median stamens 2.2–2.5 mm, markedly recurved, slightly gibbous. Lower segment of the fruit *c.* 0.6 mm, tetragonous; upper segment 2.6–3 × 2–2.5 mm, globose, tetracostate, with two ribs frequently more distinct than the other two, finely rugoso-reticulate, with a short distal apicule.

This species grows in shady and wet places of laurisilva forests in Los Tilos, Barlovento, and El Paso areas of north-east La Palma Island (Bramwell, 1969b), in the Vallehermoso area in the north of La Gomera Island, and in the Icod region of the north of Tenerife Island (Fig. 3). This plant was originally described as a variety of *C. strigosa*, to which it is similar in many respects. Notwithstanding, they differ in a few traits, mainly in height as well as in leaf size and roughness, which led Bramwell (1969b) to raise the variety to species level, under the name *C. gigantea*. The latter, however, turned out to be a later homonym of *C. gigantea* Kitaibel ex Janka (now considered a synonym of *C. maritima* L., a species belonging to the type section of the genus), and the epithet had to be substituted. The species also shows some affinity with *C. arborea* with regard to fruit shape.

Specimens examined: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife, La Gomera Island: Enchereda, 17.iv.1984, *Montelongo et al.* (LPA 10180); Vallehermoso, meseta de Vallehermoso, c. 850 m, 22.vi.1999, A. Herrero 28RBS7515 y 28RBS7516 (MA); Vallehermoso, montaña La Zarza, cerca de Don Pedro, 800 m, A. Marrero (LPA 18658). La Palma Island: Barranco de la Galga, 700 m, 27.iv.1962, *E. R. Sventenius* (ORT 3562); Las Mimbreras, 14.xi.1977, *R. Elven* 20399 1 & 2 (O); Barranco de Los Hombres, Garafia, 800 m, 2.vii.1987, *M. Jorge et al.* (LPA 10158); Los Sauces, Barranco del Agua, 27.v.1840, *P 240* (LE); Los Sauces, Barranco del Agua, bridge, 400 m, 3.iii.1954, *J. Lid* (b) (O); Los Sauces, Barranco del Agua, near bridge n°. 1 of camino, 300 m, 3.iii.1954, *J. Lid* (2) (O); Prope Los Sauces, ad 500 m, 14.iv.1980, *Fdez. Casas 3073* (MA 224328, RNG); Roque Niquiomo, 30.vi.1972, *E. R. Sventenius* (LPA 10796); Barranco del Río, west of Barlovento, 28°48'N–14°08'W, 800 m, 18.iv.1977, *Jarvis et al.* 365 (RNG). Tenerife Island: La Matanza, vii.1905, *C. Sobrado* (MA 47070); Icod, vii.1905, *C. Sobrado* (MA 47071 1 & 2); Icod de los Vinos, 600 m, 20.iv.1969, *D. Bramwell 1362* (RNG).

Material studied in cultivation: UPM-Germ 4054 (seeds collected in Los Tilos, La Palma Island, in 1975).

CRAMBE SCABERRIMA WEBB EX BRAMWELL, *CUAD. BOT. CANARIA* 17: 20 (1973)

Type: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife, Tenerife Island: 'Güimar, in rupestribus apricis, 18/6/1855, *H. de la Perraudiere & E. Bourgeau 1264*, *Pl. Canar. ex itinere secundo 1885'* (isotypes LE!, MA 161352 1! & 2!, FI-W photo!).

= *C. strigosa* L'Hér. var. *sessilifolia* Bornm., *Bot. Jahrb. Syst.* 33(3): 425 (1904).

Type: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife, Tenerife Island: 'Guimar, Bco Arafo, in faucibus c. 700 m s.m.', Bornmüller 2041 (not seen).

= *C. strigosa* L'Hér. var. *sessilifolia sensu* O. E. Schulz, in A. Engler, *Pflanzenr.* 70: 249. 1919, *pro parte quoad specimina insulae Teneriffae* (see 'Note' under *C. gomerae*).

Chamaephytes 0.8–1 m. Stems terete, erect, glabrous, foliose only at base. Cauline leaves sessile or with petiole (0.5–)3–4 cm; blade (4–)6–12(–15) × (2–)4–6(–8) cm, oblong-ovate, undivided and irregularly toothed in sessile leaves, otherwise rarely lyrate-pinnatifid with one to two vestigial lateral segments, shortly decurrent on the petiole. Inflorescence stout, erect, few branched; pedicels 4.5–5 mm, terete, glabrous; sepals 2.3–2.5 × 0.7–0.8 mm, oblong, glabrous, the median ones slightly hooded; petal limb 1.8–2 × 1.3–1.5 mm, oblong-obovate, gradually tapering into a claw 0.8–1 mm; filaments of median stamens almost straight, gibbous. Lower segment of the fruit 1–1.5 mm, subcylindrical; upper segment 3 × 2.5 mm, globose, slightly tetracostate, rugose-reticulate, ended in a thin apicule. Seed c. 1.8–2 mm, ovoid, tegument finely reticulate.

Endemic to Tenerife Island (Fig. 3), generally uncommon, only abundant in Teno massif (Bramwell & Bramwell, 2001). On the basis of leaf morphology and the few-branched inflorescences, this species seems to be related to *C. feuilleei*.

Specimens examined: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife, Tenerife Island: Adeje, barranco hacia levante, bifurcación a la izquierda, 1.iv.1970, *E. R. Sventenius* (ORT 23667); Adeje bei Ifonche Oberkante des Barranco de Infierno, 1000 m, 17.v.1997, *Th. Raus* (B); 2–4 km from Buenavista in the direction of Teno, 100–200 m, 1.iv.1971, *L. Borgen 648* (O); Buenavista, iv.1973, *Gómez-Campo et al. 2196* (MA); Buena Vista, Barranco Caboco-Galería, 200 m, 19.v.1996, A. Santos (ORT 33025); Buena Vista del Norte, km 3–4 de la carretera Buena Vista-Punta Teno, 300 m, 2.v.1997, *Panero et al. 6981* (MA 59504); Ladera del Bieho, east of El Retamar, 900 m, 23.xi.1997, *R. Elven 20403* (O); Masca, Roque Juan López, 24.iii.1965, *E. R. Sventenius* (ORT 23665); Risco de Malpaís, Tamaimo, 450 m, 23.ii.1969, *D. Bramwell 782* (RNG); Santiago de Teide, above Tamaimo, 700 m, 20.ii.1984, *R. Elven 20835* (O); Valle de Santiago, hoyo de Malpaís, c. Tamaimo, 450 m, 4.iv.1971, *C. Humphries 3261* (RNG); Montañas de Teno, Roque del Fraile, 20.iv.1948, *E. R. Sventenius* (ORT 1837); Montañas de Teno, Roque del Fraile, 150 m, 13.ii.1969, *D. Bramwell 681* (RNG); Barranco

del Fraile, Guia de Isora, 500 m, 26.v.1969, *D. Bramwell 1878a & b* (RNG); Montañas de Teno, Roque del Fraile, 100 m, 20.vi.1969, *D. Bramwell 1749* (LPA, RNG); north-west coast, Los Frailes, Pta. de Tierra Mala, 200 m, 9.xii.1976, *R. Elven 13045 & 13491* (O); Teno, Los Frailes, 150 m, 23.xi.1975, *R. Elven 13189* (O); Punta de Teno, 100 m, 8.iv.1976, *V. Heywood & D. Moore 10* (RNG); Punta de Teno, 28°21'N–13°13'W, 50 m, 12.v.1977, *C. Jarvis 659* (RNG); Teno, El Fraile, 150 m, 15.iii.1978, *R. Elven 20402* (O); Teno, El Fraile, 6.iv.1978, *P. Sunding 4053* (O); Los Frailes near Buenavista, 100 m, 23.iii.1980, *Edvarsen et al. 20401* (O); Teno, Roque del Fraile, 11.iv.1984, *Montelongo et al.* (LPA 10181).

CRAMBE SCOPARIA SVENT., *BOL. INST. NAC. INVEST. AGRON.* **13(28)**: 65–67 (1953)

Type: ‘Canaria Magna; supra pagum S. Nicolai, in monte Cedri ad 600 m supra mare, ubi legi cum flore die 14 martii et cum fructu die 16 maji 1950. Habitat in parietibus saxosis, abruptis et umbrosis. Valde rara’ (not seen).

Nanophanerophytes with stems strongly lignified at base and green, much branched above. Cauline leaves few, early caducous; petiole 1.5–2 cm; blade 3–8 × 4–5 cm, to elliptical-lanceolate, obovate or ovate in outline, narrowly decurrent on the petiole, irregularly divided into three to five blunt, sparsely dentate lateral segments, sparsely hairy. Inflorescence very loose, pendulous, profusely branched; pedicels *c.* 5 mm, narrowly four-winged; sepals 2–2.5 × 1–1.5 mm, subequal, glabrous, glaucous, narrowly white-margined; petal limb 3 × 2–2.1 mm, oblong, abruptly narrowed into a claw 1–1.5 mm; filaments of median stamens 2.1–2.3 mm, slightly gibbous towards their apex. Lower segment of the fruit 0.5–0.8 mm, prismatic; upper segment 3 × 1.3–1.5 mm, ellipsoid-globose, tetracostate with median ribs somewhat more prominent, rugose-reticulate, distal apicule *c.* 1.5 mm.

Rock plant endemic to central and west Gran Canaria Island (Fig. 1), where it grows in the San Nicolás Tolentino and Barranco de Tejada areas (Bramwell & Bramwell, 2001). The most developed specimens grow in grooves and shelves located on cliffs of difficult access. Those growing at lower sites are eaten by goats. Local people call them ‘col del risco’ (i.e. cliff kale). Although its leaves are more or less divided, as those of *C. arborea*, *C. scoparia* has a very distinct, retamoid habit and its morphological affinities are difficult to assess.

Specimens examined: SPAIN, Canary Islands, Prov. Las Palmas, Gran Canaria Island: San Nicolás (loc. cl.), 24.iv.1960, *E. R. Sventenius* (ORT 7523); San Nicolás, 21.vi.1971, *E. R. Sventenius* (LPA 10147);

Valle de San Nicolás de Tolentino, carretera hacia Tazártico, a medio trayecto, 16.vi.1972, *E. R. Sventenius* (LPA 10812); San Nicolás de Tolentino, peñón del Amo, 300 m, 28.v.1987, *A. Marrero et al.* (LPA 10151); San Nicolás de Tolentino, peñón del Amo, 21.vi.1999, *A. Marrero & A. Prina 235* (LPA 18657, MA 626720); San Nicolás de Tolentino, matorrales en carretera de Las Presas, 18.v.1997, *A. Santos* (ORT 34199); San Nicolás de Tolentino, El Viso, 600 m, 27.v.1987, *A. Marrero et al.* (LPA 10152); Barranco de Tejada, 800 m, 9.iv.1960, *J. Lid* (O); without locality, without date, *E. R. Sventenius* (ORT 7520).

CRAMBE STRIGOSA L’HÉR., *STIRP. NOV.* **6**: 151, TAB. LXXII (1785)

Type: ‘Habitat in nivariâ. Masson’ (not seen).

= *Myagrurn arborescens* Jacq., *Icon. pl. rar.* **1**: tab 120 (1781)!

= *Crambe scabra* Lam., *Encycl.* **2**: 163 (1786).

Type: ‘Cette arbrisseau est cultivé au Jardin du Roi; je le crois originaire d’Afrique’ (not seen).

Nanophanerophytes 1–1.5 m with scabrous stems and leaves. Cauline leaves with petiole 2.5–5 cm; blade elliptical or ovate in outline, lyrate-pinnatifid with terminal segment 7–10 × 6–8 cm, oblong-ovate, acute, irregularly crenate-dentate, and zero to two lateral segments 0.5–1.5(–2) cm, deltoid-ovate, acute. Inflorescence paniculate, loose; pedicels 4–5 mm, tetracostate, glabrous; sepals 2.2–2.3 × 0.8–1 mm, oblong, obtuse, glabrous, green-hyaline; petals 5.5–6 × 2 mm, limb obovate, obtuse, gradually tapering into a short claw; filaments of median stamens 2.5 mm, recurved, gibbous, much widened towards their base. Lower segment of the fruit 0.6 mm, terete or slightly angled, very rarely provided with an aborted ovule; upper segment 2.5–3 × 2–2.5 mm, ovoid-globose, slightly tetracostate, rugose-reticulate.

This species grows in Tenerife, La Gomera, and La Palma Islands (Fig. 3). This species is closely related to *C. santosii* and also shows some affinity with *C. arborea* with regard to fruit shape.

Specimens examined: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife, La Gomera Island: Barranco de Vallehermoso, 800 m, 1.vii.1969, *D. Bramwell 2055* (RNG). Isla de La Palma: Barranco Gallegos, 700 m, 23.iv.1962, *E. R. Sventenius* (ORT 3563); Barranco Gallegos, 26.vi.1986, *Montelongo et al.* (LPA 10799); Barranco Gallegos, barlovento, 800 m, 1.vii.1987, *M. Jorge et al.* (LPA 10156, 10157); Los Sauces, Barranco de Los Tilos, *c.* 700 m, 14.iv.1971, *Humphries et al. 3408* (RNG). Tenerife Island: Monte de Los Silos, 700 m, 8.v.1933, *E. Asplund 1162* (B, O); Barranco del Agua de Los Silos, 30.iv.1935, *Cuatrecasas 534* (MA 190910, MAF 62502); Barranco del Agua de Los Silos,

1100 m, 5.vii.1956, *K. Lems 2753 a & b* (RNG); Barranco del Agua de Los Silos, 300 m, 17.iv.1969, *D. Bramwell 1320* (RNG); Barranco del Agua de Los Silos, 23.iv.1969, *E. R. Sventenius* (ORT 23679); Barranco del Agua, Adeje, 29.vi.1984, *A. Marrero et al.* (LPA); Alto del Camello, east of Portela Alta, 960 m, 21.ii.1984, *R. Elven 20836* (O); Sierra de Anaga, 19.iv.1959, *Bellot & Casaseca* (MA 191066); Sierra de Anaga, Cruz de Taganana, 100 m, 2.vii.1969, without collector (MA 275219); Sierra de Anaga, Cruz de Taganana, 900 m, 16.viii.1954, *K. Lems 2191* (RNG ex Univ. Michigan); Sierra de Anaga, Cruz de Taganana, 1000 m, 7.ii.1969, *D. Bramwell 644* (LPA 10809, RNG, MA 196951); Sierra de Anaga, vueltas de Taganana, 12.iv.1971, *D. Bramwell & Humphries 3393* (RNG); Sierra de Anaga, lado S, valle de San Andrés, carretera a Taganana, 30.i.1973, *A. Aldridge 638* (RNG); Sierra de Anaga, east side of Paso, 850 m, 29.xi.1975, *R. Elven 13378* (O); Sierra de Anaga, Cabexo de Arbelo, El Mesón, 370 m, 4.iv.1987, *R. Elven & A. Sortlandn* (O); Baxamar, ad rupes madidas, 26.iii.1855, *H. de la Perraudiere, Bourgeau, Pl. Canar. ex itinere secundo 1855* (MA 161354 1 & 2); Barranco de Dornajito, near La Orotava, 900 m, 30.iii.1974, *P. Sunding 3296* (O); Barranco del Drago, 550 m, 19.iv.1957, *J. Lid* (O); Monte Guerra, 460–530 m, 19.iii.1974, *P. Sunding 2999* (O); Monte Guerra, above the road near ‘Mirador’, 525 m, 21.ii.1978, *L. Borgen 2543* (O); Monte Guerra, 580–610 m, 25.iii.1981, *R. Elven 20398* (O); Valle de Masca, without date, *Broussonet* (MA 47072); La Matanza, Barranco Cabrera, 17.iv.1948, *E. R. Sventenius* (ORT 23677); Las Mesas, north-west Santa Cruz, 590 m, 26.iii.1954, *J. Lid* (O); Las Mesas, north-west Santa Cruz, 580 m, 20.iv.1960, *J. Lid* (O); Lomo de Pedro Gil, 1600 m, 15.iv.1969, *D. Bramwell 1297* (RNG); Los Órganos de Agua Manza, 1400 m, v.1969, *D. Bramwell 1472* (RNG); Montaña Quemada, 700 m, 31.iii.1979, *Pérez de Paz & Valdéz Bermejo 507* (MA 233467); Barranco San Antonio, 15.v.1944, *E. R. Sventenius* (ORT 1839); Santa Cruz de Tenerife, casa forestal, sobre carretera La Laguna-Chamorga, 900 m, 4.v.1997, *Panero & al 7028* (MA 595619); Tegueste, 6.iii.1855, *H. de la Perraudiere, Bourgeau, Pl. Canar. ex itinere secundo 1855* (MA 161353); Punta de Teno, 1000 m, 5.xii.1977, *D. Moore 2906* (RNG); Teno, Gebirge Teno Alto, 1000 m, 9.iv.1987, *S. Rilke 916* (B); Santa Ursula, Barranco de la Cruz, 700 m, 10.v.1933, *E. Asplund 1210* (B).

Note: Some specimens from Los Silos and Monte Guerra areas are distinctly less hairy, with smoother stems. The leaves are sometimes larger than usual for the species, with the terminal segment 13–18 cm. Although these features put them closer to *C. santosii*, they lack the characteristic flexuose rachis of the latter, and are therefore kept within *C. strigosa*.

CRAMBE SVENTENII PETTERSON EX BRAMWELL & SUNDING, *CUAD. BOT. CANARIA* 17: 20 (1973)

Type: SPAIN, Canary Islands, Prov. Las Palmas, Fuerteventura Island: ‘Península Handia, costa septentrional. Rocas basálticas, soleadas y secas, bastante escasa’, 5.vi.1957, *E. R. Sventenius* (holotype RNG!).

= *C. sventenii* Petterson, *Index Seminum Hort. Acclimat. Pl. Arautapae* (1951), *nomen nudum*.

Chamaephytes 50–70 cm, much branched from the base, glabrous. Cauline leaves with petiole 3–3.5 cm; blade 3–7 × 2–5 cm, oblong-elliptical in outline, lyrate-pinnatifid, with terminal segment 3–4 × 2–5 cm, oblong-ovate, pinnatifid to pinnatipartite, crenate-dentate, and one to two lateral segments, much reduced, subdeltoid; upper cauline leaves shortly petiolate to sessile, elliptical-lanceolate to linear. Inflorescence ample, paniculate; pedicels 5–5.5 mm, filiform; sepals 2.5 × 1.8 mm, oblong; petals 4–5 × 2–2.8 mm, limb oblong-elliptical, abruptly narrowed into a claw c. 0.4 mm; filaments of median stamens 3 mm, gibbous. Lower segment of the fruit 0.8–1 mm, terete; upper segment 4.5–5 × 2.5 mm, ovoid, slightly compressed, with two lateral wings, smooth between wings.

Rock plant endemic to Fuerteventura Island (Fig. 3), where it has been found exclusively on the Jandia Peninsula. It shows several morphological affinities with *C. fruticosa*, mainly regarding leaf shape and degree of division, although its compressed, non-apiculate fruits are very distinct.

Specimens examined: SPAIN, Canary Islands, Prov. Las Palmas, Fuerteventura Island: Loc. cl., rocas basálticas soleadas y secas, 5.iv.1957, *E. R. Sventenius* (ORT 22062); Castillo, 9.iii.1949, *B. Petterson* (ORT 1828); Montaña Cardones, en riscos, 26.v.1979, *A. Santos & M. Fernández 5304* (MA, ORT); Montaña de Las Colinas, north-west of Gran Tarajal, 24.ii.1986, *B. Navarro et al.* (LPA 13736); El Morro, prox. a El Vigán, 19.vi.1987, *A. Marrero et al.* (LPA 10154); Montaña Vigán, north-east of Gran Tarajal, south-west top ab 420 m, 16.ii.1971, *P. Sunding 2431–1, 2, 3* (O, RNG); Montaña Vigán, xii.1980, *B. Navarro et al.* (LPA 10810).

CRAMBE TAMADABENSIS A. PRINA & A. MARRERO, *ANALES JARD. BOT. MADRID* 58(2): 246 (2001)

Type: SPAIN, Canary Islands, Prov. Las Palmas, Gran Canaria Island: Tamadaba, Faneque, 14.v.1985, *A. Marrero* (holotype LPA 10202!).

Chamaephytes with costate stems provided with patent to slightly antrorse prickles scattered along the ribs. Cauline leaves with petiole 3–3.5 cm, prickly,

grooved; blade 12–14 × 7.5–8 cm, obovate, undivided, irregularly toothed, sparsely hispid along nerves and margin. Inflorescence somewhat contracted, glabrous, with ascendent to suberect branches slightly winged towards their apex; pedicels 4–6 mm, subappressed, narrowly winged, glabrous; sepals 2.2 × 0.9–1 mm, oblong, glabrous, narrowly white marginated; petal limb 4.5 × 2–2.3 mm, oblong-obovate, gradually tapering into a claw *c.* 1 mm; filaments of median stamens 2.1–2.2 mm, recurved, gibbous towards their apex. Lower segment of the fruit 0.5 × 0.3 mm, tetragonous; upper segment 2.2–2.4 × 0.8–1 mm, ellipsoid, tetragonous, with a narrow wing along each rib, rugose-reticulate, apiculate. Seed ovoid to globose, tegument smooth.

Endemic to north-west Gran Canaria Island (Fig. 1), where it grows in the *Pinus canariensis* undergrowth on cliffs and screes of Faneque in Tamadaba, and in *Euphorbia balsamifera* shrubland of Mount Amagro. It seems more closely related, on the basis of leaf morphology, to *C. pritzelii* than to any other species.

Specimens examined: SPAIN, Canary Islands, Prov. Las Palmas, Gran Canaria Island: Tamadaba, Faneque, 14.iv.1985, A. Marrero (LPA 10183, 10185, 10186, 10198, 10200, 10201, 10202, paratypes); Tamadaba, Faneque, 18.vi.1999, A. Marrero & A. Prina 231 (MA 626717, paratype); Tamadaba, Faneque, 14.iv.1985, A. Marrero (LPA 10199); Tamadaba, Faneque, 12.vi.1984, A. Marrero (LPA 10203); Tamadaba, Faneque, 18.vi.1999, A. Marrero & A. Prina 232 (MA 626716), 233 (MA 626718); Galdar, Montaña de Amagro, 400 m, 9.ii.1999, B. Navarro (LPA 18654); Galdar, Montaña de Amagro, 450 m, 9.ii.1999, B. Navarro, A. Prina & A. Marrero (LPA 18652); Galdar, Montaña de Amagro, 450 m, 9.ii.1999, B. Navarro, A. Prina & A. Marrero (LPA 18653, MA 626719); Guayedra, Barranco del Palo, 550–600 m, subiendo al pie de los riscos, 20.iv.1998, R. Febles (LPA 15864).

CRAMBE WILDPRETHII A. PRINA & D. BRAMWELL,
ANN. BOT. FENN. **37**(4): 301 (2000)

Type: SPAIN, Canary Islands, Prov. Santa Cruz de Tenerife: La Gomera Island, 'Epina, cliff of Lomo de Carretón', 850 m, 2.vii.1969, D. Bramwell 2074 (holotype RNG!).

Chamaephytes 50–60 cm. Stems glabrous with conspicuous leaf scars on its base. Cauline leaves 8–12 × 1.5–4 cm, sometimes slightly auriculate, sessile to shortly petiolate, elliptical to oblanceolate, inciso-dentate, with short, rough hairs very dense along nerves, more sparse elsewhere on the blade. Inflorescence dense, much branched; pedicels 3.5–

5 mm, glabrous, slightly tetragonous, each carrying a linear, toothed, frequently mucronate bract; sepals 2–2.3 mm, oblong, glabrous; petal limb 2.5–3 × 1.5–1.7 mm, obovate, gradually tapering into a claw *c.* 0.5 mm; filaments of median stamens 2–2.2 mm, almost straight, gibbous towards their apex; anthers 0.8 mm, oblong. Lower segment of the fruit 0.5–0.6 mm, tetragonous, narrowed towards its base; upper segment 2.5–3 × 1.5–1.8 mm globose, slightly tetracostate, finely rugose-reticulate between ribs, with distal apicule *c.* 0.5–0.7 mm. Seed ovoid, tegument smooth.

Endemic to the laurisilva forest of the north of La Gomera Island (Fig. 3), where it is only known from the type locality. The fruit morphology suggests some affinities of this species with *C. fruticosa*.

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