



PHYTOTAXA

215

Taxonomic revision of the *Limonium cancellatum* group (Plumbaginaceae) in Croatia

SANDRO BOGDANOVIĆ^{1,*} & SALVATORE BRULLO²

¹Department of Agricultural Botany, Faculty of Agriculture, University of Zagreb, Svetošimunska 25, 10000 Zagreb, Croatia;
e-mail: sbogdanovic@agr.hr

²Dipartimento di Scienze Biologiche, Geologiche ed Ambientali dell'Università, via A. Longo 19, 95125 Catania, Italy

* author for correspondence



Magnolia Press
Auckland, New Zealand

SANDRO BOGDANOVIĆ & SALVATORE BRULLO

Taxonomic revision of the *Limonium cancellatum* group (Plumbaginaceae) in Croatia
(*Phytotaxa* 215)

87 pp.; 30 cm.

19 June 2015

ISBN 978-1-77557-725-6 (paperback)

ISBN 978-1-77557-726-3 (Online edition)

FIRST PUBLISHED IN 2015 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: magnolia@mapress.com

<http://www.mapress.com/phytotaxa/>

© 2015 Magnolia Press

All rights reserved.

No part of this publication may be reproduced, stored, transmitted or disseminated, in any form, or by any means, without prior written permission from the publisher, to whom all requests to reproduce copyright material should be directed in writing.

This authorization does not extend to any other kind of copying, by any means, in any form, and for any purpose other than private research use.

ISSN 1179-3155 (Print edition)

ISSN 1179-3163 (Online edition)

Abstract

A taxonomic revision of the genus *Limonium* (Plumbaginaceae) in Croatia was carried out. In particular, the species belonging to *L. cancellatum* group are examined on morphological, nomenclatural, ecological and chorological grounds. The morphological study is based on herbarium materials and living plants. 26 species are recognized, of which 4 are well known in literature (*L. cancellatum*, *L. dictyophorum*, *L. vestitum* and *L. subanfractum*), while 21 species are described as new to science (*L. busianum*, *L. cazzae*, *L. croaticum*, *L. ginzbergeri*, *L. issaeum*, *L. istriacum*, *L. lagostanum*, *L. leprosorum*, *L. liberianum*, *L. liburnicum*, *L. lovricii*, *L. milovicii*, *L. omissae*, *L. pelagosae*, *L. pharosianum*, *L. pomoense*, *L. subnudum*, *L. tabulare*, *L. trinajsticii*, *L. velutinum* and *L. zankii*). A new combination (*L. brusnicense*) was also proposed. Description, iconography, type, nomenclatural data, etymology, ecology, distribution maps and taxonomical notes are given for each taxon. New somatic chromosome number was given for 4 species (*L. cancellatum*, *L. dictyophorum*, *L. lovricii* and *L. milovicii*). The phenetic tree clearly shows that the species are morphologically related and two main groups can be separated on the base of the hairiness. In order to allow a correct identification, a diagnostic key is provided.

Key words: Endemic, *Limonium*, new combination, new species, phenetic tree, systematics

Introduction

The genus *Limonium* Miller (1754: 1328) can be considered one of the most critical taxon in the Mediterranean area and it is still not well known in some countries. In the last decades, several taxonomical studies improved the knowledges on this genus by the descriptions of many new species for the science. In particular, taxonomic works were published for some Mediterranean territories, such as Balearic Islands (Llorens 1986, Erben 1993, Castro & Rosselló 2007), Corse (Arrigoni & Diana 1993, Erben 2007), Cyprus (Kouzali *et al.* 2012), Greece (Artelari 1984a, b, 1989, Artelari & Kamari 2000, Brullo & Guarino 2000, Artelari & Georgiou 2003, Georgakopoulou *et al.* 2006), Iberian peninsula (Erben 1978, 1993), Israel (Domina *et al.* 2006), Italy (Pignatti 1973, 1982a,b, Rizzotto 1984, 1999, Brullo *et al.* 1990), Lebanon (Domina *et al.* 2008, Domina & Raimondo 2012), Libya (Brullo 1978), Sardinia (Erben 1980, 1981, 2001, Arrigoni & Diana 1985, 1991, 1999, Arrigoni 1981, 2010, Mayer 1995), Sicily (Brullo 1980, 1981, 1988, Raimondo & Pignatti 1986, Raimondo 1993), Tunisia (Brullo & Erben 1989), Turkey (Bokhary & Edmondson 1982, Fazlıoğlu 2011).

The Croatian coast is characterized in having several islands and islets, where *Limonium* is not still well known. On the basis of the current knowledge (Trinajstić 1980, 1981, Lovrić 1981, 1988, 1995, Pavletić 1989, 1992, Bogdanović & Mitić 2003, Erben 2006, Pandža *et al.* 2007, Bogdanović *et al.* 2011, Nikolić 2013) the genus *Limonium* is represented in this territory by some species with widespread Mediterranean distribution, such as *L. bellidifolium* (Gouan 1764: 231) Dumortier (1827: 27), *L. virgatum* (Willdenow 1809: 336) Fourreau (1869: 141), *L. narbonense* Miller (1768), and by some endemic taxa belonging to *L. cancellatum* group: *L. cancellatum* (Bernhard ex Bertoloni 1837: 525) Kuntze (1891: 395), *L. dictyophorum* (Tausch 1824: 254) Degen (1937: 540), *L. subanfractum* Trinajstić (1980: 6), *L. vestitum* (C.E.Salmon 1923: 97) C.E.Salmon (1924: 62) subsp. *vestitum* and *L. vestitum* (C.E.Salmon) C.E.Salmon subsp. *brusnicense* Trinajstić (1980: 7).

A first examination of herbarium material and live plants allowed to observe a remarkable morphological variability (both vegetative and reproductive traits) within the populations previously attributed to *L. cancellatum* s.l. or *L. dictyophorum* s.l. The combination of character-states, that distinguishes this group from the other ones, is usually represented by habit intricate, stems numerous, articulate, prostrate to erect, many sterile branches (rarely few), inflorescence terminal, with branches curved, spikes not elongated (except sometime the terminal one) and spikelets small. As concerns the indumentum, the plants can be totally densely hairy or glabrous, sometimes subglabrous to sparsely hairy only in the stem. These evidence led us to carry out a detailed morphological study, with the main aim to verify their variability and also their ecological requirements and geographical distribution.

The results of this taxonomical revision regarding the species belonging to the *L. cancellatum* group occurring in Croatia are here presented: five of these taxa are known from literature, while twenty one are new to science.

Material and methods

Morphometric analysis

The morphological investigation was based on specimens collected in numerous localities of the coastal belt of Croatia, both mainland and insular areas, from Istria to the Albania border, as well as on herbarium material kept in BEO, BEOU, BM, BOLO, CAT, CNHM, FI, K, M, MSB, PAD, PRC, W, WU, ZA, ZAGR and ZAHO (acronyms according to Thiers 2013). The measurements were made on the dried specimens (plants flowered). At least 10 individuals are examined for each population. A total 65 populations were studied. The shape and the size of the spikelets were analyzed after brief boiling in water of dried material. Details of the inflorescence and the habit, as well as the colour and shape of the plant are also based on observation of living plants. The collection consists of about six hundred herbarium sheets, preserved in CAT and ZAGR. Ecology was observed during the field surveys. The phenetic analysis was performed by using 35 morphological characters (Tab. 1), of which 6 were coded as binary data, while the other 29 were coded as multistate (Tab. 2). The morphological dataset (Tab. 3) was processed (UPGMA cluster analysis) by the NTSYSpc package (Rohlf 2000).

*General remarks on the morphology in *Limonium**

The genus *Limonium* is characterized by peculiar morphological characters, most of them have a diagnostic value in the species circumscription (Erben 1978, 1993, Ingrouille 1984, Llorens 1986, Artelari & Georgiou 1999). The most important features are treated in the following handling, where their variability is examined in more detail.

In particular, the *L. cancellatum* group has the caudices more or less woody, simple or branched, densely or laxly covered by the leaves, often dry and persistent in the basal part of caudices; the leaves are rigid to soft, green, flat or revolute at the margin, glabrous to hairy, 1–5-nerved, smooth to tuberculate with the apex retuse to rounded, the shape spathulate, linear-spathulate or obovate-spathulate and arranged in basal rosettes or laxly distributed along the caudices (general size 10–80 × 1–20 mm). The stems are 5–50 cm tall, prostrate to erect, rigid to flexuous, fragile or not at nodes, with few to numerous sterile branches (branches diverging at an angle of 30–180°), with internodes 2–30 mm long, erect to recurved. The inflorescence is reticulate to pyramidal, sometimes diffuse, with spikes straight to curved, 5–80 mm long; the spikelets are laxly or densely arranged on the spikes (1–7-flowered), 2–11 per cm; the 3 bracts, the outer 1–2.5 mm long and 1.2–2 mm wide, glabrous to hairy, ovate to triangular-ovate (rarely semicircular), with acute, obtuse or apiculate apex (rarely acuminate), the middle bract 1.2–2.5 mm long and 0.9–2.1 mm wide, glabrous to hairy, ovate to elliptical (rarely hemielliptical or triangular-ovate), with bifid, rounded or obtuse apex (rarely acute), the inner bract 3–4.7 mm long and 1.6–2.9 mm wide, glabrous to hairy, oblong to ovate, with acute, rounded or obtuse apex (sometime acuminate); calyx 3–5.8 mm long, sparsely hairy to hairy on the tube, exerted 1–3 mm from the inner bract, with ribs reaching the base or almost the apex of the lobes, with lobes 0.5–1.3 mm long, semielliptical, ovate to triangular, with apex acute, obtuse, rounded, apiculate or cuspidate; the corolla is usually lilac.

Karyology

No caryological data are available for the Croatian species belonging to the group of *Limonium cancellatum*, with exception of *L. cancellatum* (Bogdanović *et al.* 2011). In order to verify their ploidy level, the populations of some species (*L. cancellatum*, *L. dictyophorum*, *L. lovricii* sp. nov., and *L. milovicii* sp. nov.) were investigated for indicative purposes.

Karyological analyses were performed on mitotic plates from root tip cells of seeds germinated in Petri dish, pre-treated for 3 h with 0.3% colchicine water solution at room temperature, fixed in Carnoy and stained according to the Feulgen technique. All metaphases were examined using the image analysis systems IKAROS 4.6 (Metasystem) and Zeiss Axiovision 5.1. In particular, only four species were examined, since the seed germination of other species (ca. 10) has not been successful. Unfortunately, it is to be considered that many of the field collections were carried out in early period, when the plants were not yet fructified, or very late when the seeds were already dispersed.

TABLE 1a. Diagnostic characters of the Croatian species belonging to *Limonium cancellatum* group.

	<i>L. cancellatum</i>	<i>L. weidmannii</i>	<i>L. subinflatum</i>	<i>L. verticillatum</i>	<i>L. pedunculatum</i>	<i>L. carzense</i>	<i>L. cordatum</i>	<i>L. lapidatum</i>	<i>L. stricklandii</i>	<i>L. businense</i>	<i>L. lividum</i>	<i>L. sankii</i>	<i>L. phaeodanum</i>
Plant indumentum													
Hair length (mm)	0.05-0.1	0.05-0.1	0.05	0.1	pubescent	velvety	pubescent	pubescent	pubescent	pubescent	pubescent	pubescent	pubescent
Leaf insertion	laxely	laxely	rosette	laxely	laxely	laxely	laxely	rosette	rosette	laxely	laxely	laxely	laxely
Leaf length (mm)	10-40	10-40	7-24(32)	8-21	15-80	7-55	7-30	8-30	8-30	13-40	7-35	11-35(40)	15-40(65)
Leaf width (mm)	3.5-5	3.4	1.5-5	3.8	5-16	2-10	1-6	2-7	1.5-2.5	2.5-9	1-3	3-10	3-9
Leaf veins	1	1	1	1	1-3, 2-secondary	1-3, 2-secondary	1	1	1	1	1	1	1-3
Stem number	numerous	numerous	numerous	numerous	numerous	1-3, 2-secondary	numerous	numerous	few	numerous	numerous	numerous	numerous
Stem type	prostrate-ascending	prostrate-ascending	prostrate-ascending	prostrate-ascending	erect to ascending	erect to ascending	prostrate-ascending	erect to ascending	erect	prostrate-ascending	prostrate-ascending	prostrate-ascending	prostrate-ascending
Stem surface	rugose	rugose	rugose	rugose	rugose	rugose	rugose	rugose	rugose	rugose	rugose	rugose	rugose
Sterile branches	numerous	numerous	numerous	few	numerous	numerous	numerous	numerous	few	numerous	numerous	numerous	numerous
Internode length (mm)	2-15	4-15	2-15(20)	2-10	3-15(25)	5-16	3-10	4-16	5-10	2-15	5-20	4-15	4-15
Spike length (mm)	5-35	10-50	5-20	10-40	10-35	10-50(80)	7-30	8-25	5-15	5-30	7-30	7-25	10-25
Spikelet length (mm)	5-6.5	4.8-5	4.5-6	5.8-6	5.5-6	5.5-6	5.5-6	4-5.3	5-6	5-6	4.5-5	5-5.6	5-5.6
Flower number	2-4	1-2	2-3	1-2	1-2	1-3	2-3	2	2-3	1(2)	3-5	3-5	2-3
Spikelets per cm	3-6	4-5	4-6	6-8	2-4	3-4	4-8	4-6	5-6	3-4	5-7	4-5	4-5
Outer bract length (mm)	1-5.2	1.8-2.3	1-1.5	1.7-2.1	1.6-2.1	1.5-1.8	1-1.6	1.5-1.7	1.2-1.5	1.8-2.3	1.2-1.4	1.2-1.6	1.8-2.2
Outer bract width (mm)	1.3-1.7	1.5-2.1	1.3-2	1.5-1.8	1.5-1.9	1.3-1.6	1.2-1.8	1.4-1.6	1.5-1.7	1.5-2	1.2-1.4	1.2-1.5	1.4-2
Outer bract shape	ovate	ovate	semicircular-ovate	ovate	ovate	ovate-triangular	ovato-triangular	ovate	widely ovate	ovate	ovate	ovate	ovate
Outer bract apex	obtusely	obtusely	obtusely	subobtusely	apiculate	apiculate	acute	obtusely	obtusely	obtusely	obtusely	obtusely	obtusely
Outer bract indumentum	hairy	hairy	hairy	hairy	hairy	hairy	hairy	hairy	hairy	hairy	hairy	hairy	hairy
Middle bract length (mm)	1.7-2	1.9-2.5	1.5-1.8	1.6-2	1.7-2.1	1.6-1.9	1.5-1.8	1.6-1.7	1.5-1.6	1.8-2.1	1.3-1.5	1.4-1.5	1.8-2
Middle bract width (mm)	1-1.2	1.5-2.1	1-1.3	1.2-1.3	1-1.3	1-1.2	1.2-1.6	1.3-1.5	1.2-1.5	1-1.3	1-1.1	0.9-1.1	1.2-1.3
Middle bract apex	bifid	obtusely	obtusely or rounded	bifid	bifid	bifid	obtusely	rounded	subrounded	bifid	obtusely	bifid	rounded
Inner bract length (mm)	3.5-3.8	4-4.4	3-3.6	3.3-3.9	3.7-4.5	3.5-3.7	3-4	3.2-3.5	3.5-3.6	3.8-4.2	2.7-3	3.3-4.1	3.5-4
Inner bract width (mm)	2.1-2.3	2.4-2.7	2.1-2.4	2.3-2.8	2.2-2.7	1.8-2	2.2-2.7	2.2-2.9	2.5-2.8	2.3-2.4	1.8-2.2	1.6-2.4	2.3-2.5
Inner bract indumentum	hairy	hairy	hairy	hairy	hairy	hairy	hairy	hairy	hairy	hairy	hairy	hairy	hairy
Inner bract apex	acute	acute	obtusely	acuminate	obtusely	obtusely	obtusely	obtusely	obtusely	apiculate	obtusely	acute	rounded
Inner bract margin	rounded-obtusely	0.3-0.4	0.2-0.3	0.2-0.3	0.3-0.4	0.2-0.3	0.3-0.4	0.3-0.5	0.2-0.3	0.2-0.3	0.15-0.2	0.1-0.2	0.4-0.5
Calyx length (mm)	4-5	4.5-5	3.8-4.5	4.5-5.4	4.6-4.7	4.5-4.7	3.5-4.5	3.7-4.3	4.4-2	5.2-5.4	3.7-4.2	4.3-5	4.5-4.6
Calyx tube	densely hairy	densely hairy	densely hairy	densely hairy	densely hairy	densely hairy	densely hairy	densely hairy	densely hairy	densely hairy	densely hairy	densely hairy	densely hairy
Calyx exertion (mm)	2-3	1.5-2	1.3-2	2.5-3	1.5-2	2.6-3	2.2-5	1-1.5	1.8-2	2-2.2	1.6-1.8	2-2.2	1.8-2
Ribs/lobes	middle part	middle part	base	middle part	almost apex	middle part	middle part	almost the apex	almost the apex	middle part	basal part	middle part	middle part
Calyx lobes length (mm)	0.7-0.8	0.8-1	0.6-0.8	1-1.1	1-1.1	0.8-0.9	0.8-1	0.5-0.9	0.9-1	1	0.8-0.9	0.6-0.7	0.9-1
Lobe shape	hemilipical	hemilipical	hemilipical	hemilipical	triangular	triangular-ovate	hemilipical	triangular-ovate	ovato-triangular	ovate	triangular-ovate	triangular-ovate	triangular-ovate
Lobe apex	rounded-obtusely	rounded	subobtusely	cuspidate	acute	acute	obtusely	subobtusely	acute	acute	acute	acute	acute

TABLE 1b. Diagnostic characters of the Croatian species belonging to *Limonium cancellatum* group.

	<i>L. mihaili</i>	<i>L. thursum</i>	<i>L. barbatum</i>	<i>L. rissum</i>	<i>L. onense</i>	<i>L. bisium</i>	<i>L. pomense</i>	<i>L. subadum</i>	<i>L. dioxyphorum</i>	<i>L. balduae</i>	<i>L. leprosum</i>	<i>L. ginsbergii</i>	<i>L. thungabadii</i>
Plant indumentum	pubescent	pubescent	pubescent	pubescent	pubescent	pubescent	pubescent	subglabrous	glabrous	glabrous	glabrous	glabrous	glabrous
Hair length (mm)	0.05-0.1	up to 0.1	0.1-0.2	0.1-0.2	0.02-0.05	0.1-0.15	0.1-0.2	0	0	0	0	0	0
Leaf length (mm)	12-35	6-25	6-35	8-35	10-35	7-30	12-40	15-50	15-35(50)	25-80	rosette	laxely	roset
Leaf insertion	laxely	laxely	laxely	laxely	laxely	laxely	laxely	laxely	laxely	laxely	rosette	laxely	roset
Leaf length (mm)	12-35	6-25	6-35	8-35	10-35	7-30	12-40	15-50	15-35(50)	25-80	12-40	10-40	7-20
Leaf width (mm)	3-6	2-5	2-5	2-6	3-6	3-5	6-14	2-8	5-10	4-20	1-5	3-6	1-5.4
Leaf veins	1	1	1	1	1	1	1(3)	1-3	1	1-3, 4 secondary	1	1	1
Stem number	numerous	numerous	numerous	numerous	numerous	numerous	few	numerous	numerous	few	numerous	numerous	numerous
Stem type	erect	erect to ascending	erect to ascending	prostrate to ascending	ascending to erect	prostrate to ascending	erect-ascending	prostrate-ascending	erect	erect	prostrate to ascending	ascending to erect	erect
Stem surface	rugose	rugose	rugose	rugose	rugose	rugose	rugose	rugose	striae	rough	minutely tuberculate	rugose	rugose
Sterile branches	numerous	numerous	numerous	numerous	numerous	numerous	few	numerous	numerous	numerous	numerous	numerous	numerous
Internode length (mm)	5-15	5-20	5-20	4-15	5-15	5-15	5-50	5-13	10-35(40)	5-20	5-20	5-20	2-30
Spike length (mm)	5-30	10-60	10-60	7-40	10-35	5-25	5-30	7-40	20-80	10-80	10-30	7-40(60)	6-30
Spikelet length (mm)	5-6	5.5-6.5	5.5-6.5	5.5-6	5.5-6	4.5-4.8	6-7	5.5-6	6-7	5.5-6	5.5-6	5.5-6	5-6
Flower number	(2)3-4	2-4	2-4	3-5	4-6	2-3	1-2	2-3	1-2	1-2	2-3	1-2	1-2
Spikelets per cm	3-4	3-5	3-5	3-5	3-5	5-6	4-5	4-5	2-4	2-3(4)	3-5	3-5	4-5
Outer bract length (mm)	1.3-1.8	1.2-1.5	1.2-1.3	1.2-1.3	1.3-1.5	1.1-1.3	1.5-2.5	1-1.5	1.4-1.6	1.3-1.5	1.2-1.5	1.2-2	1.2-1.5
Outer bract width (mm)	1.3-1.7	1.5-2	1.4-1.6	1.4-1.6	1.3-1.7	1.4-1.5	1.5-2.2	1.2-1.5	1.4-1.5	1.2-1.7	1.1-1.4	1.2-1.8	1.3-1.6
Outer bract shape	ovate	ovate-triangular	ovate-triangular	semicircular	triangular-ovate	widely ovate	ovate	ovate	ovate	triangular-ovate	triangular-ovate	triangular-ovate	triangular-ovate
Outer bract apex	obtusely	obtusely	obtusely	rounded	acute	obtusely	subobtusely	acute	acute	acute	acute	acute	acute
Outer bract indumentum	glabrous	glabrous	glabrous	sparsely hairy	glabrous	hairy	hairy	sparsely hairy	glabrous	glabrous	glabrous	glabrous	glabrous
Middle bract length (mm)	1.7-2.1	1.3-1.7	1.8-2.5	1.5-1.7	1.5-2	1.3-1.4	1.8-2.4	1.2-1.6	1.8-2.2	1.5-1.6	1.4-2	1.4-2.2	1.8-2.2
Middle bract width (mm)	1-1.3	1.2-1.5	1.2-1.5	1.1-1.2	1.1-1.4	1.2-1.5	1-1.5	1-1.1	1.4-1.7	1.1-1.2	1-1.6	1.2-1.5	1.4-1.8
Middle bract apex	bifid	bifid	bifid	obtusely	acute	obtusely	bifid	rounded	rounded	bifid	bifid to rounded	rounded	obtusely to rounded
Inner bract length (mm)	3.5-3.9	3.2-3.8	3.5-4.5	3.2-3.5	3.1-3.5	2.7-3	4-7	3.3-3.5	4.2-4.5	3.2-3.6	3.3-6	3.1-4	3.5-4
Inner bract width (mm)	2-2.3	2.1-2.5	2-2.5	2.2-2.4	2.2-2.4	2.2-2.4	2.3-2.5	2.2-2.5	2.5-2.7	2.2-2.4	2.2-2.7	2.2-2.6	2.2-2.7
Inner bract indumentum	hairy	hairy	hairy	sparsely hairy	glabrous	hairy	hairy	glabrous	glabrous	glabrous	glabrous	glabrous	glabrous
Inner bract apex	acute	obtusely	obtusely	obtusely	obtusely	obtusely	obtusely	rounded	subacute	subobtusely	subobtusely	obtusely to rounded	rounded
Inner bract margin	0.2-0.3	0.3-0.4	0.3-0.4	0.1-0.2	0.2-0.3	0.3-0.4	0.3	0.3-0.4	0.3-0.5	0.3	0.3-0.5	0.3-0.5	0.3-0.5
Calyx length (mm)	4.3-4.6	4-4.2	4-4.5	4-4.2	4.2-4.5	4-4.5	5.5-5.8	4.5-5	4.7-5.5	4-4.6	3.6-4.6	4-4.8	4-4.8
Calyx tube indumentum	densely hairy	densely hairy	densely hairy	densely hairy	densely hairy	densely hairy	densely hairy	sparsely hairy	densely hairy	sparsely hairy	sparsely hairy	sparsely hairy	sparsely hairy
Calyx exertion (mm)	1.5-2	1.8-2.2	1-1.5	2-2.5	2-2.5	1.4-1.8	1.8-2	2-2.2	2.2-2.5	1.8-2.3	2-2.5	1.5-2.2	1.4-2
Risiblobes	basal part	basal part	middle part	exceeding basal part	exceeding basal part	middle part	middle part	middle part	exceeding basal part	exceeding basal part	exceeding basal part	middle part	almost base
Calyx lobes length (mm)	0.6-0.7	0.7-0.8	0.7-0.8	0.8-0.9	0.8-0.9	0.7	1.2-1.3	1-1.2	0.6-0.7	0.8-0.9	0.6-0.7	0.7-0.9	0.8-0.9
Lobe shape	ovate-triangular	subelliptical to ovate	subelliptical to ovate	ovate-triangular	ovate-triangular	triangular	triangular	triangular	hemispherical	hemispherical	ovate-triangular	hemispherical	hemispherical
Lobe apex	acuminate	acute	acute	rounded	obtusely	acute	acute	acute	rounded	rounded	acute	rounded	rounded

TABLE 2. Morphological characters and character state code used for the phenetic analysis.

No.	Character	States
1	Plant indumentum	pubescent=0; velvety=0.25; subglabrous=0.5; glabrous=1
2	Hair length (mm)	0.1–0.25=0; 0.05–0.1=0.25; 0.02–0.05=0.5; 0=1
3	Leaf insertion	rosette=0; laxely=1
4	Max. leaf length (mm)	max 20–25=0; max 30–55=0.5; max 80=1
5	Max. leaf width (mm)	max 2.5–3=0; max 4–10=0.5; max 14–20=1
6	Leaf veins	1=0; 1–3(+2)=0.5; 1–5=1
7	Stem number	numerous=0; few=1
8	Stem type	erect=0; erect to ascending=0.5; prostrate to ascending=1
9	Stem surface	rugose=0; striate=0.25; rough=0.5; tuberculate=1
10	Sterile branches	numerous=0; few=1
11	Internodes length (mm)	max 10=0; max 13–20=0.5; max 25–50=1
12	Spike length (mm)	13–15=0; max 20–40=0.5; max 50–80=1
13	Spikelet length (mm)	4.8–5=0; 5.3–6=0.5; 6.5–7=1
14	Flower number	1–3=0; 3–5=0.5; max 6–7=1
15	Spikelets per cm	1–4=0; max 5–8=0.5; max 11=1
16	Outer bract length (mm)	max 1.3–1.6=0; max 1.7–1.8=0.5; max 2–2.5=1
17	Outer bract width (mm)	max 1.4–1.6=0; max 1.7–1.9=0.5; max 2–2.2=1
18	Outer bract shape	ovate=0; ovate-triangular=0.25; semicircular–ovate=0.5; semicircular=1
19	Outer bract apex	rounded=0; obtuse or subobtuse=0.25; acute=0.5; apiculate to acuminate=1
20	Outer bract indumentum	hairy=0; sparsely hairy=0.5; glabrous=1
21	Middle bract length (mm)	max 1.4–1.5=0; max 1.6–2=0.5; max 2.1–2.5=1
22	Middle bract width (mm)	max 1.1–1.3=0; max 1.4–1.8=0.5; max 2–2.1=1
23	Middle bract apex	bifid=0; acute=0.25; obtuse to subobtuse=0.5; rounded=1
24	Inner bract length (mm)	max 3=0; max 3.5–3.9=0.5; max 4–4.7=1
25	Inner bract width (mm)	max 2=0; max 2.2–2.7=0.5; max 2.8–2.9=1
26	Inner bract indumentum	hairy=0; sparsely hairy=0.5; glabrous=1
27	Inner bract apex	rounded to rounded–obtuse=0; obtuse or subobtuse=0.25; acute or subacute=0.5; apiculate to acuminate=1
28	Inner bract margin (mm)	0.1–0.2=0; 0.2–0.3=0.5; 0.3–0.5=1
29	Calyx length (mm)	max 4.5=0; max 4.6–5=0.5; max 5.4–5.8=1
30	Calyx tube indumentum	hairy=0; sparsely hairy=1
31	Calyx exertion (mm)	1–2=0; 2–3=1;
32	Ribs/lobes	basal part=0; middle part=0.5; almost apex=1
33	Calyx lobes length (mm)	0.5–1=0; 1–1.3=1
34	Lobe shape	hemielliptical=0; subelliptical to ovate=0.5; ovate–triangular to triangular=1
35	Lobe apex	rounded to rounded–obtuse=0; obtuse to subobtuse=0.25; acute=0.5; cuspidate to acuminate=1

TABLE 3. Data matrix for the 35 selected characters used for the phenetic analysis.

No.	<i>L. velutinum</i>	<i>L. velutinum</i>	<i>L. subanfractum</i>	<i>L. vestitum</i>	<i>L. pelagosae</i>	<i>L. cazae</i>	<i>L. croaticum</i>	<i>L. lagostanum</i>	<i>L. istriacum</i>	<i>L. brusnicense</i>	<i>L. lowicii</i>	<i>L. zankii</i>	<i>L. pharosianum</i>	<i>L. milovicii</i>	<i>L. liburnicum</i>	<i>L. libermanum</i>	<i>L. omisae</i>	<i>L. issaeum</i>	<i>L. bustanum</i>	<i>L. pomoense</i>	<i>L. subnudum</i>	<i>L. dictyophorum</i>	<i>L. tabulare</i>	<i>L. leprosorium</i>	<i>L. ginzbergeri</i>	<i>L. trinajsticii</i>
1	0	0.25	0	0	0	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	1	1	1	1	1
2	0	0.25	0.25	0	0	0	0.25	0	0	0	0.25	0.25	0.25	0.25	0	0	0.5	0	0	0	1	1	1	1	1	1
3	0	1	0	1	1	1	1	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0
4	0.5	0.5	0.5	0	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0
5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0	0.5	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	1	0.5	0.5	0.5
6	0	0	0	0	0	0.5	0.5	0	0	0	0	0	0.5	0	0	0	0	0	0	0	0.5	0.5	0	1	0	0
7	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
8	1	1	1	1	0.5	0.5	1	0.5	0	1	1	1	1	0	0.5	0.5	0.5	1	1	0.5	1	0	0	1	0.5	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0.5	1	0	0
10	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
11	0.5	0.5	0.5	0	1	0.5	0	0.5	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	1	0.5	0.5	0.5	1
12	0.5	1	0.5	0.5	0.5	1	0.5	0.5	0	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	1	1	0.5	1	0.5
13	1	0	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0	1	0.5	1	0.5	0.5	0.5	0.5
14	0.5	0	0	0	0	0	0	0	0	0	0.5	0.5	0	0.5	0	0.5	1	0.5	0	0	0	1	0	0	1	1
15	0.5	0.5	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0.5	0.5	0	1	0.5	0.5	0.5	0.5	0.5	0.5	0	0	0.5	0.5	0.5
16	1	1	0	1	1	0.5	0	0.5	0	1	0	0	1	0.5	0	1	0	0	0	1	0	0	0	0	0.5	0
17	0.5	1	1	0.5	1	0	0.5	0	0.5	1	0	0	1	0.5	0	1	0.5	0	0	1	0	0	0.5	1	0.5	0
18	0	0	0.5	0	0	0.25	0.25	0	0	0	0	0	0	0	0.25	0.25	0.25	1	0	0	0	0	0.25	0.25	0.25	0.25
19	0.25	0.25	0.25	0.25	1	1	0.5	0.25	1	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.5	0	0.25	0.25	0.5	0.5	0.5	0.5	0.5	1
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0.5	1	1	1	1	1
21	0.5	1	0.5	0.5	1	0.5	0.5	0.5	0.5	1	0	0	0.5	1	0.5	1	0.5	0.5	0	1	0.5	1	0.5	0.5	1	1
22	0	1	0	0	0	0	0.5	0.5	0.5	0	0	0	0	0	0.5	0.5	0.5	0	0.5	0.5	0	0.5	0	0.5	0.5	0
23	0	0.5	0.5	0	0	0	0.5	1	1	0	0.5	0	1	0	0	0	0.25	0.5	0	1	1	1	0	0	1	0
24	0.5	1	0.5	0.5	1	0.5	1	0.5	0.5	1	0	1	1	0.5	0.5	1	0.5	0.5	0	1	0.5	1	0.5	0.5	1	1
25	0.5	0.5	0.5	1	0.5	0	0.5	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	1	1	1	1	1
27	0	0.5	0.25	1	0.25	0.25	0.25	0.25	0.25	1	0.25	0.5	0	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0	0.5	0.25	0.25	0	0
28	0.5	1	0.5	0.5	1	0.5	1	1	0.5	0.5	0	0	1	0.5	1	1	0.5	0	1	0.5	1	1	0.5	1	1	1
29	0.5	0.5	0	1	0.5	0.5	0	0	0	1	0	0.5	0.5	0.5	0	0	0	0	0	1	0.5	1	0.5	0.5	0.5	0.5
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
31	1	0	0	1	0	1	1	0	0	1	0	1	0	0	1	0	1	1	0	0	1	1	1	1	1	0
32	0.5	0.5	0	0.5	1	0.5	0.5	1	1	0.5	0	0.5	0.5	0	0	0.5	0	0	0.5	0.5	0.5	0	0	0	0.5	0
33	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
34	0	0	0	0	1	1	0	1	1	0.5	1	1	1	1	1	0.5	1	0	1	1	1	0	0	1	0	0
35	0	0	0.25	1	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.25	0	0.5	0.5	0.5	0	0	0.5	0	0

Results

Key to the species of *Limonium cancellatum* group from Croatia

1. Plant glabrous or pubescent only on the stem 2
- Plant totally hairy-pubescent 7
2. Plant pubescent only on the stem and outer bract; calyx sparsely hairy on one side; calyx lobes 1–1.2 mm long *L. subnudum*
- Plant glabrous or slightly hairy at the stem base; calyx densely hairy; calyx lobes 0.6–0.9 mm long 3
3. Plant 15–20 cm tall; leaves in rosettes; leaves and stem sparsely tuberculate; calyx lobes ovate-triangular, acute at the apex *L. leprosorium*
- Plant 20–50 cm tall; leaves distributed along the caudices branches; leaves and stems rugose; calyx lobes hemi-elliptical, rounded at the apex 4
4. Inflorescence laxly diffuse; spikelets 3–7-flowered; inner bract 4.2–4.5 mm long; calyx 4.8–5.5 mm long *L. dictyophorum*
- Inflorescence densely reticulate; spikelets 1–2-flowered; inner bract 3.1–4 mm long; calyx 4–4.8 mm long 5
5. Leaves up to 20 mm wide and up to 8 cm long, 1–5-nerved; stems few, glabrous *L. tabulare*
- Leaves up to 6 mm wide and up to 4 cm long, always 1-nerved; stems numerous, slightly hairy at the base 6
6. Leaves in rosette, slightly rugose; middle bract ovate, 1.4–1.8 mm wide; calyx with hairy ribs *L. trinajsticii*
- Leaves distributed along the caudices branches, strongly rugose; middle bract oblong-elliptical, 1.2–1.5 mm wide; calyx with glabrous ribs *L. ginzbergeri*
7. Greatest leaves 3-nerved, sometimes with other 2 secondary veins 8

- All leaves 1-nerved (rarely 3-nerved) 10
- 8. Stem prostrate to ascending; spikelets 4–6 per cm, 5–5.5 mm long; outer bract obtuse at the apex; middle bract rounded at the apex; inner bract rounded at the apex *L. pharosianum*
- Stems erect to ascending; spikelets 2–4 per cm, 5.5–6 mm long; outer bract mucronate at the apex; middle bract bifid at the apex; inner bract obtuse at the apex 9
- 9. Caudices 3–10 cm long; inner bract 3.7–4.5 × 2.2–2.7 mm; calyx exerted 1.5–2 mm from the inner bract; calyx ribs reaching almost the apex of the lobes *L. pelagosae*
- Caudices 1–3 cm long; inner bract 3.5–3.7 × 1.8–2 mm; calyx exerted 2.6–3 mm from the inner bract; calyx ribs reaching the middle part of the lobes *L. cazzae*
- 10. Calyx 5–5.8 mm long; inner bract acuminate or apiculate at the apex 11
- Calyx 3.5–5 mm long; inner bract acute to obtuse at the apex 13
- 11. Stem solitary or few, erect to ascending; basal internode 2–5 cm long; inner bract 4–4.7 mm long, with apex obtuse; calyx 5.5–5.8 mm long *L. pomoense*
- Stem numerous, prostrate-ascending; basal internode 0.5–1.5 cm long; inner bract 3.3–4.2 mm long, with apex acuminate to mucronate; calyx 4.9–5.4 mm long 12
- 12. Leaves up to 21 mm long, rounded at the apex; sterile branches few; spikelets 6–8 per cm; inner bract ovate, 3.3–3.9 mm long; calyx exerted 2.5–3 mm from the inner bract *L. vestitum*
- Leaves up to 40 mm long, retuse at the apex; sterile branches numerous; spikelets 3–4 per cm; inner bract oblong, 3.9–4.2 mm long; calyx exerted 2–2.2 mm from the inner bract *L. brusicense*
- 13. Inflorescence usually pyramidal 14
- Inflorescence usually reticulate 15
- 14. Stems and sterile branches few; leaves 1.5–2.5 mm wide; spikelets 5–6 per cm; inner bract obovate to subrounded, 2.6–2.8 mm wide *L. istriacum*
- Stems sterile branches numerous; leaves 3–6 mm wide; spikelets 3–4 per cm; inner bract oblong, 2–2.3 mm wide *L. milovicii*
- 15. Inner bract up to 3 mm long 16
- Inner bract more than 3 mm long 17
- 16. Leaves 1–3 mm wide; inner bract oblong, with hyaline margin up to 0.2 mm wide; calyx lobes 0.8–0.9 mm long, with ribs reaching the basal part *L. lovricii*
- Leaves 3–5 mm wide; inner bract ovate, with hyaline margin up to 0.4 mm wide; calyx lobes 0.7 mm long, with ribs reaching the middle part *L. busianum*
- 17. Spikelets 8–11 per cm *L. liburnicum*
- Spikelets 3–6 per cm 18
- 18. Calyx lobe rounded 19
- Calyx lobe obtuse to acute 21
- 19. Outer bract semicircular, 1.2–1.3 mm long; inner bract sparsely hairy, 3.2–3.5 mm long *L. issaeum*
- Outer bract ovate, 1.5–2.3 mm long; inner bract densely hairy, more than 3.5 mm long 20
- 20. Leaves lanceolate-spathulate; spikelets 5–6.5 mm long, 2–4-flowered; inner bract 3.5–3.8 mm long, rounded to obtuse at the apex; calyx 2–3 mm exerted from the inner bract *L. cancellatum*
- Leaves linear-spathulate; spikelets 4.8–5 mm long, 1–2-flowered; inner bract 4–4.4 mm long, acute at the apex; calyx 1.5–2 mm exerted from the inner bract *L. velutinum*
- 21. Leaves up to 10 mm wide; middle bract 1.4–1.5 mm long; inner bract acute *L. zankii*
- Leaves up to 7 mm wide; middle bract more than 1.5 mm long; inner bract obtuse 22
- 22. Outer bract glabrous 23
- Outer bract densely hairy 24
- 23. Outer bract 1.8–2 mm long; inner bract hairy, up to 4.5 mm long; calyx exerted 1–1.5 mm from the inner bract *L. liberianum*
- Outer bract 1.3–1.5 mm long; inner bract glabrous, up to 3.5 mm long; calyx exerted 2–2.5 mm from the inner bract *L. omissae*
- 24. Internodes up to 10 mm long; outer bract acute; calyx exerted more than 2 mm from inner the bract *L. croaticum*
- Internodes up to 20 mm long; outer bract obtuse; calyx exerted 1–2 mm from the inner bract 25
- 25. Stems prostrate to ascending, minutely pubescent; inner bract oblong; calyx ribs reaching the basal part of the lobes *L. subanfractum*
- Stems erect to ascending, densely pubescent; inner bract ovate-subrounded; calyx ribs reaching almost the apex of the lobes *L. lagostanum*

Karyology

The examined taxa (*L. cancellatum*, *L. dictyophorum*, *L. lovricii* sp. nov., and *L. milovicii* sp. nov.) resulted all diploid with $2n=2x=18$. The same chromosome number occurs also in several other species belonging to this

group, distributed in neighbouring territories of the Adriatic and Ionian coasts. Among these there are: *L. diomedum* Brullo (1988: 11), *L. apulum* Brullo in Brullo *et al.* (1990: 75), *L. japygicum* (Groves 1877: 67) Pignatti (1971: 374), *L. lacinium* Arrigoni (1983: 227) which are localized in the Italian peninsula (Brullo 1988, Brullo *et al.* 1990, Tornadore *et al.* 1995) and many Greek endemics [e.g. *L. arcuatum* Artelari (1984a: 27), *L. cephalonicum* Artelari (1984a: 57), *L. pylium* Artelari (1984a: 37), *L. antipaxorum* Artelari (1984a: 32), *L. ithacense* Artelari (1984a: 47), *L. saracinatum* Artelari (1984a: 42), *L. coronense* Artelari (1984a: 71), *L. zacynthium* Artelari (1984b: 429), *L. phitosianum* Artelari (1984b: 430), *L. damboldtianum* Phitos & Artelari (1981: 18), *L. kardamylii* Artelari & Kamari (1995: 131) and *L. messeniaceum* Artelari & Kamari (2000: 45)] which are distributed on the Ionian islands and western coast of the Peloponnese (Artelari 1984a, 1984b, Artelari & Kamari 1986, 1995, 2000). All these species show a close morphological relationships with *L. cancellatum*, *L. dictyophorum* and allied Croatian *Limonium*, as well as in the the karyology. Therefore, we can hypothesize that all Croatian species of this group (like to those here investigated) are diploid with $2n=18$. The *Limonium* species with $2n=18$ are amphimict, displaying an allogamy (Baker 1966, Erben 1979). In fact, the sexual species of *Limonium* are characterized by heteromorphic populations with individuals showing a combination of papillate or cob-type stigma and finely reticulate or coarsely reticulate pollen. Only two combinations are self-compatible while the other two are self-incompatible. This mechanism is very important, because it allows the maintenance over time of the outcrossing, which often promotes slow and gradual speciation processes.

According to literature, the sexual species of the genus *Limonium* are usually less spread than those apomictic (Erben 1978, 1993, Artelari 1984a,b, Brullo & Pavone 1981, Brullo 1988, Artelari & Kamari 1986, 1995, Castro & Rosselló 2007). Several groups of diploid *Limonium* occur in the Mediterranean area, which are represented by species taxonomically well differentiated. Some groups with a limited distribution area follow

1. *L. minutum* group: it includes species from the Balearic islands [e.g. *L. minutum*, *L. pseudoebusitanum* Erben (1989: 409), *L. balearicum* (Pignatti 1955: 85) Brullo (1980: 133), *L. tenuicaule* Erben (1989: 366)] and southern France and Liguria (north-western Italy) [e.g. *L. cordatum* (Linnaeus. 1753: 275) Miller (1768: no. 10) and *L. pseudominutum* Erben (1988: 397)].
2. *L. acutifolium* group: it is distributed in Sardinia and Corsica, including the following species: *L. acutifolium*, *L. nymphaeum* Erben (1981: 494), *L. bosanum* Arrigoni & Diana (1985: 281), *L. tenuifolium* (Bertoloni ex Moris 1827: 8) Erben (1981: 505), *L. tharrosianum* Arrigoni & Diana (1985: 285), *L. bonifaciense* Arrigoni & Diana (1993: 638) and *L. obtusifolium* (Rouy 1908: 149) Erben (1978: 449).
3. *L. merxmuelleri* group: it is distributed in southern Sardinia and includes *L. merxmuelleri*, *L. oristanum* A. Mayer (1995: 68), *L. sulcitanum* Arrigoni (1981: 233), *L. tigulianum* Arrigoni & Diana (1991: 323), *L. retirameum* Greuter & Burdet in Greuter & Raus (1987: 451) and *L. caralitanum* Erben (2001: 57).
4. *L. multiforme* group: it is widespread in the Tyrrhenian area and is represented by *L. multiforme*, *L. planesiae* Pignatti (1982b: 52), *L. gorgonae* Pignatti (1982b: 51), *L. circaei* Pignatti (1982b: 50), *L. sommieranum* (Fiori) Arrigoni in Arrigoni & Di Tommaso (1981: 7), *L. dianium* Pignatti (1982b: 51), *L. ilvae* Pignatti (1982b: 51), *L. montis-christi* M. Rizzotto (1999: 269), *L. amynclaeum* Pignatti (1982b: 49), *L. protohermaeum* Arrigoni & Diana (1985: 277), *L. pontium* Pignatti (1971: 364), *L. cumanum* (Tenore 1824–1829: 351) Kuntze (1891: 395), *L. remotispiculum* (Lacaita 1884: 168) Pignatti (1971: 365) and *L. brutium* Brullo (1992: 109).
5. *L. bocconeii* group: it is distributed in Sicily and Malta and includes *L. bocconeii*, *L. syracusanum* Brullo (1980: 284), *L. tenuiculum* (Tineo ex Guss. 1832: 90) Pignatti (1971: 365), *L. zeraphae* Brullo (1980: 285) and *L. melitense* Brullo (1988: 13).
6. *L. dichotomum* group: it is distributed in Spain, Sardinia and Sicily, where it is represented by *L. dichotomum*, *L. calcarae* (Tod. ex Janka) Pignatti (1971: 364), *L. racemosum* (Lojacono) Diana (1978: 272), *L. multifurcatum* Erben (2001: 61) and *L. toletanum* Erben (1989: 331).

From the evolutionary and phylogenetic point of views, the diploid populations of *Limonium* fall into obligatorily allogamous sexual systems (allopatric speciation processes). However, as showed by extensive literature concerning the taxonomic approach to the genus *Limonium* (e.g., Erben 1979, Arrigoni & Diana 1999, Castro & Rosselló 2007), it is appropriate to treat both sexual and agamospermous taxa, although they are involved in entirely different reproductive and evolutionary mechanisms, as distinct species. In particular, the diploid species, which are considered more primitive, are always geographically well separated among them. Therefore, it

is possible to hypothesize that, especially if these species grow in very close stretches of coast, underwent certainly gradual processes of genomic changes. In addition, the morphological differences that have arisen in the population, have been preserved over time after geographic isolation.

Taxonomic treatment

The cluster analysis shows two well separated groups (Fig. 1), the first one (A) including the species with glabrous or subglabrous habit (*L. dictyophorum*, *L. subnudum*, *L. leprosorum*, *L. ginzbergeri*, *L. trinajsticii* and *L. tabulare*), the second group (B) including all the species with more or less dense indumentum. Further subgroups are not clearly highlighted in the graph, showing a morphological affinity between the taxa. However, the taxa falling in group A and B are morphologically similar, especially for their indumentum, but well distinguishable for some diacritic features chiefly concerning the habit, leaf size and shape, inflorescences, spikelets size, calyx. etc.

The species are listed in alphabetical order. For each taxon, the type, the main synonyms, a detailed description, the etymology, the distribution and ecology, a list of examined specimens and an original iconography are given. The chromosome numbers it is reported for the investigated species.

1. *Limonium brusnicense* (Trinajstić) Bogdanović & Brullo, *comb. & stat. nov.*

Bas.: *Limonium vestitum* (C.E.Salmon 1923: 97) C.E.Salmon subsp. *brusnicense* Trinajstić (1980: 7).

Type:—CROATIA. **Central Dalmatia:** Parva insula vulcanica Brusnik, prope insula Svetac in parte centrali maris Adriatici, 6 June 1964, *Trinajstić 6737* (holotype ZA!) (Figs. 2, 31).

Description:—Plant perennial, 15–25 cm tall, densely pubescent (hairs up to 0.2 mm long), with robust tap-root. Caudices branched, 1–5 cm long, densely covered by leaves. Leaves rigid, rugose, pubescent, green, 13–40 mm long, 2.5–9 mm wide, spatulate, revolute at the margin, 1-nerved, gradually tapering into a long petiole, slightly retuse at the apex. Stems numerous, prostrate to ascending, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 90–150°, internodes 2–15 mm long, right to curved. Inflorescence reticulate, branched; spikes 5–30 mm long, straight to curved. Spikelets 5–6 mm long, 1(–2) flowered, 3–4 per cm; outer bract 1.8–2.3 mm long, 1.5–2 mm wide, ovate, obtuse, totally hairy, narrowly membranous, and central part fleshy, acuminate; middle bract 1.8–2.1 mm long, 1–1.3 mm wide, oblong, bifid at the apex, membranous, totally hairy; inner bract 3.9–4.2 mm long, 2.3–2.4 mm wide, oblong, apiculate, with margin membranous, glabrous, 0.2–0.3 mm wide, and central part fleshy, densely hairy, 1.6–1.8 mm wide, acuminate, forming a triangular tip, 0.6–0.8 mm long, almost reaching the upper margin. Calyx 5.2–5.4 mm long, exserted 2–2.2 mm from the inner bract, hairy, with ribs densely hairy, reaching the middle part of the lobes; calyx lobes, ovate, glabrous, 1 × 0.65–0.8 mm, acute. Corolla lilac.

Etymology:—The epithet is named after Brusnik islet.

Distribution and ecology:—It is very common in the volcanic islet of Brusnik (Fig. 29H) from Vis archipelago (Central Dalmatia), where it occurs in the rocky clefts.

Additional specimens examined:—CROATIA. **Central Dalmatia:** Dalmatien, Melisello oestlich von Lissa, 21 May 1901, *Ginzberger s.n.* (W!); Dalmatien, Insel Melisello (Brusnik) westl. v. Lissa, 21 May 1901, *Ginzberger s.n.* (W!, WU!); Scoglio Melisello (Brusnik) westl. v. Lissa, 25 July 1914, *Ginzberger s.n.* (W!, WU!); Dalmatien, Melisello cocoll. v. Lissa, 23 August 1907, *Galvagni s.n.* (W!); Scoglio Mellisello b. St. Andrea m. Lissam, 19 July 1908, *Teyber s.n.* (WU!); Am Scoglio Melisella in ... kleinen Hafen, 25 May 1876, *Spreitzenhofer s.n.* (WU!); Dalmatien, Insel Melisello (Brusnik) Auf Felsen, an einzelnen Stellen massenhaft, 21 May 1901, *Ginzberger s.n.* (WU!); Scoglio Mellisello, 29 July 1905, *Degen s.n.* (FI!); otočić Brusnik, 6 June 1964, *Trinajstić 6736* (ZA!); otočić Brusnik, 6 June 1964, *Trinajstić 6738* (ZA!); o. Brusnik, 6 June 1979, *Trinajstić 12.476* (ZA!); Isola vulcanica di Brusnik, Dalmazia centrale, 27 May 2005, *Bogdanović s.n.* (CAT!, ZA!, ZAGR!); Flora Dalmatica, Scoglio Mellisello, 29 July 1905, *Degen s.n.* (BEOU!, K!).

2. *Limonium busianum* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Central Dalmatia:** Dalmazia, isola di Biševo, Mezoporat, iznad Modre špilje, 22 July 2007, *Bogdanović s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 3, 32).

Diagnosis:—*Planta pubescens, dense foliosa apice caudicularum, foliis linearia-spathulatis, retusis apice, revolutis margine, 1-nerviis, scapis prostratis vel adscendentibus, flexuosis, ramis sterilibus paucis, inflorescentia pauciramosa, bractea inferiore ovata, obtusa, bractea superiore ovata, obtusa, calice tubo dense piloso, nerviis pilosis, lobis triangularibus, acutis.*

Description:—Plant perennial, 10–30 cm tall, hairy (hairs up to 0.1–0.15 mm long), with robust tap-root. Caudices branched, 1–5(–7) cm long, densely covered by leaves in the upper part. Leaves rigid, rugose, hairy, green, 7–30 mm long, 3–5 mm wide, linear-spathulate, retuse at the apex, revolute at the margin, 1-nerved, gradually tapering into a long petiole. Stems numerous, prostrate to ascending, rugose, with few sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 70–140(–180)°, internodes 5–13 mm long, right to curved. Inflorescence reticulate, branched from the base; spikes 5–25 mm long, straight to curved. Spikelets 4.5–4.8 mm long, 2–3 flowered, 5–6 per cm; outer bract 1.1–1.3 mm long, 1.4–1.5 mm wide, widely ovate, obtuse, hairy, margin narrowly membranous, and central part fleshy, acuminate; middle bract 1.3–1.4 mm long, 1.2–1.5 mm wide, ovate, obtuse, membranous, hairy on the veins and between them; inner bract 2.7–3 mm long, 2.2–2.4 mm wide, ovate, obtuse, with margin membranous, glabrous, 0.3–0.4 mm wide, and central part fleshy, densely hairy, 1.4–1.8 mm wide, acuminate, forming a triangular tip, 0.4–0.5 mm long, no reaching the upper margin. Calyx 4–4.5 mm long, exserted 1.4–1.8 mm from the inner bract, densely hairy in the tube and ribs; ribs reaching the middle part of the lobes; calyx lobes triangular, 0.7 × 0.5–0.6 mm, acute. Corolla lilac.

Etymology:—From “Busi” old name of Biševo island.

Distribution and ecology:—This species grows on the calcareous rocky coast and cliffs. It is circumscribed to Biševo (Fig. 29G), small island of Vis archipelago (C. Dalmatia).

Additional specimens examined (Paratypes):—CROATIA. **Central Dalmatia:** Insel Busi, auf dem Felsen der “Blauen Grotte”, 20 July 1914, *Ginzgerber s.n.* (WU!); Dalmatien, Insel Busi, 19 May 1905, *Kindt s.n.* (WU!); o. Biševo, Mezoporat, stijene iznad Modre špilje, 25 August 1970, *Pavletić s.n.* (ZA!); Insula Biševo, in valle Trešjavac, in congeriebus lapidosis, solo calcareo, exp. W–SW, cca 15–20 m s.m., 26 July 1981, *Korica s.n.* (ZA!); o. Biševo, Sarbunara, stijene uz more, 16 August 1972, *Pavletić s.n.* (ZA!).

3. *Limonium cancellatum* (Bernh. ex Bertol.) Kuntze (1891: 395)

Bas.: *Statice cancellata* Bernh. ex Bertol. (1837: 525).

Type:—CROATIA. **Kvarner:** Fiume, forte *St. cordata* varietas, 1814, *Bernhardi* (Lectotype: BOLO-BERTOL!, designated by Bogdanović *et al.* 2011); epitype: CROATIA. In rupibus ad mare adriaticum Kantrida. Prope Fiume, 14 September 1871, *A.M. Smith s.n.* (WU!, designated by Bogdanović *et al.* 2011) (Figs. 4, 33).

≡ *Statice minuta* var. *cancellata* (Bernh. ex Bertol.) Fiori in Fiori & Paoletti (1902: 332).

Description:—Plant perennial, 8–40 cm tall, densely pubescent (hairs up to 0.2 mm long), with robust tap-root. Caudices branched, 1–5 cm long, with dense leaf rosettes at the apex. Leaves rigid, rugose, densely pubescent, green, 10–30 mm long, 3.5–5 mm wide, spathulate, slightly retuse at the apex, revolute at the margin, 1-nerved, gradually tapering into a long petiole. Stems numerous, prostrate to ascending, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 70–130(–180)°, internodes 2–15 mm long, right to curved. Inflorescence reticulate, branched from the base; spikes 5–35 mm long, straight to curved. Spikelets 5–6.5 mm long, 2–4 flowered, 3–6 per cm; outer bract 1.2–2 mm long, 1.3–1.7 mm wide, ovate, obtuse, with margin glabrous, narrowly membranous, and central part fleshy, densely hairy, acuminate; middle bract 1.7–2 mm long, 1–1.2 mm wide, oblong, bifid at the apex, membranous, hairy at the base and veins; inner bract 3.2–3.8 mm long, 2.1–2.3 mm wide, oblong, rounded to obtuse, with margin membranous, glabrous, 0.2–0.3 mm wide, and central part fleshy, densely hairy, 1.7–2 mm wide, acuminate, forming a triangular tip, 0.3–0.5 mm long, no reaching the upper margin. Calyx 4–5 mm long, exserted 2–3 mm from the inner bract, densely hairy in the tube, with 5 totally hairy ribs, reaching the middle part of the lobes; calyx lobes 0.7–0.8 × 0.7–0.9 mm, hemielliptical, rounded. Corolla lilac. Chromosome number 2n=18.

Etymology:—The epithet is referred to “cancellatum” namely latticed.

Distribution and ecology:—This species is widespread in the North Adriatic calcareous rocky coasts (Fig. 28A), where it occurs in Istria, Rijeka Gulf, Quarner islands (Veli and Mali Lošinj, Sušac, Unije, Cres, Krk, Sv. Grgur, Plavnik) and North Dalmatian islands (Silba).

Additional specimens examined:—CROATIA. **Istria:** Küstenland, Cap Promontore bei Pola, 5 June 1911,

Wettstein s.n. (W!); Durch Veruda bei Pola auf dem Felsen am Manner-Knacker, August, *Kerner s.n.* (W!); Istrien, Italien, Strandfelsen von Scoglio figarola grande bei Rovigno, 2 July 1937, *Wagner s.n.* (WU!); Fiume: in rupibus calcar. littoreis prope Torpedine, August 1898, *Evers s.n.* (WU!); Istria, Isola Veglia, 27 August 1878, *Marchesetti s.n.* (FI!, K!); Istrien, felsiger Meeresstrand bei Pola, Kalk 2 m, 28 August 1875, *Freyn s.n.* (FI!); Istrien, Umgebung von Pola, felsiger Meeresstrand bei Promontore, 9 August 1874, *Freyn s.n.* (FI!); Istria, Parenzo, September 1921, *Marchesetti s.n.* (FI!); Istria, Scoglio Veruda presso Pola, 14 September 1921, *Vatova s.n.* (FI!); Istria a Parenzo sugli scogli della spiaggia, 1896, *Calegari s.n.* (FI!); Istria, Pola, canale di Vruda, 14 September 1881, *Sintenis s.n.* (FI!); Istria, Isola Panisoli piccolo, June 1879, *Marchesetti s.n.* (FI!); Istria, Parenzo, August 1888, *Marchesetti s.n.* (FI!); Istria, lido presso S. Felice non lungi da Rovigno, 19 April 1872, *Marchesetti s.n.* (FI!); Seestrand bei Veruda, Pola, 24 July 1899, *Untchj s.n.* (FI!); Istria, valle Tavole, sullo scoglio Regota presso Parenzo, July 1922, *Vatova s.n.* (FI!); Istria, scogliere presso il mare, Veruda (Pola), 27 September 1921, *Vatova s.n.* (FI!); Istria, scoglio Veruda presso Pola, sulle scogliere lungo il mare, 14 September 1921, *Vatova s.n.* (FI!); Istria: Pola: Scoglio Veiuda, 14 September 1921, *Vatova s.n.* (K!); Trimiero, Istrien, 1856, *Braig s.n.* (ZA!); Istra, područje Poreča, južno od mjesnog kupališta, na obalnim vapnenačkim grebenima, 27 June 1950, *Horvatić s.n.* (ZA!); Pola, am Canale di Veruda, 25 July 1900, *Gugler s.n.* (M!); Poreč (Jugoslavija, Istrie) sur falaises et rochers de la côte exposes au sud, 9 August 1972, *Van der Veken 9670* (M!); An Klippen bei Rovinj, October 1976, *Nowotny s.n.* (M!); Istrien, Isola Figarolo, bei Rovinj, Felsen am Meer, 19 April 1955, *Podlech s.n.* (M!); in rupibus maritimis Istria et Dalmatia, *Visiani s.n.* (BOLO-BERTOL!); in rupibus maritimis Istria, *Biasoletto s.n.* (BOLO-BERTOL!); ex insula Brioni, Istria, initio julii 1837, *Tommasini s.n.* (BOLO-BERTOL!); raccolta nello scoglio Fenolego, presso il Capo di Promontorio all'estremità meridionale dell'Istria, 25 July, *Tommasini s.n.* (BOLO-BERTOL!); raccolto nell'isolotto Fenolego, 26 July, *Tommasini s.n.* (BOLO-BERTOL!); Pola ad mare, 19 June 1867, *Sheta s.n.* (K!); in rupestribus ad mare Istria australis, *Tommasini s.n.* (K!); Istria: Arfera, rup. marit., 28 May 1866, *Pichler s.n.* (K!); Flora of Istria, S. of Parenzo, sea-shore, among rocks, 18 August 1922, *Turill 998* (K!); Istria, April 1826, *Müller s.n.* (K!); Istria, Rt Kamenjak, presso Premantura, litorale roccioso, 10 November 2006, *Bogdanović, Brullo & Giusso s.n.* (CAT!, ZA!, ZAGR!); Istria, Premantura, 9 October 2004, *Bogdanović s.n.* (CAT!, ZA!, ZAGR!); Istria, Rovigno, Zlatni rt, litorale roccioso, dintorni dell'albergo Eden, 10 November 2006, *Bogdanović, Brullo & Giusso s.n.* (CAT!, ZA!, ZAGR!); Istria, Veštar, presso Rovigno, litorale roccioso, dopo il campeggio Paradis, 10 November 2006, *Bogdanović, Brullo & Giusso s.n.* (CAT!, ZA!, ZAGR!); Istria, punta Verudela, presso Pola, litorale roccioso, 10 November 2006, *Bogdanović, Brullo & Giusso s.n.* (CAT!, ZA!, ZAGR!); **Kvarner**: Isola di Lošinj, cala di Javorna, vicino al paese di Veli Lošinj, Kvarner, 16 July 2006, *Bogdanović s.n.* (CAT!, ZA!, ZAGR!); Isola di Lošinj, Artatore, Kvarner, 16 July 2006, *Bogdanović s.n.* (CAT!, ZA!, ZAGR!); Isola di Sv. Grgur, Kvarner, 31 July 2005, *Bogdanović s.n.* (CAT!, ZA!, ZAGR!); Veglia, *Bilimek s.n.* (W!); Fiume, *Noë s.n.* (WU!); Insel Lussin, Lussin grande, 4 September 1907, *Galvagni s.n.* (WU!); Lussin piccolo, Cigale, 17 May 1889, *Rechinger s.n.* (WU!); Insel Sansego, Strand, 11 September 1907, *Galvagni s.n.* (WU!); Lussingrande, 3 November 1943, *Stefani s.n.* (FI!); Istria, ad littora maris prope Flumen, August 1872, *Rham s.n.* (FI!, K!); Bei Fiume, August 1971, *Romi s.n.* (FI!); Veglia–porto della città, September 1872, *Marchesetti s.n.* (FI!); Isola di Cherso, Cherso, sulle falde del monte, 16 July 1942, *Vatova s.n.* (FI!); Isola d'Arbe, Punta Forigne, fra i sassi lungo la costa, 20 July 1942, *Vatova s.n.* (FI!); Dal Porto I. Martino sull'isola di Lussino, September 1841, *Sendtner s.n.* (PAD!); da Punta sull'isola di Cherso, 12 September 1841, *Sendtner s.n.* (PAD!); hab. ex Dalmati a Bertholl., 1838, *Berenger s.n.* (PAD!); Hrv. Primorje, 1928, *Horvat s.n.* (ZAHO!); Flora lussinensis, Krivice, 1 July 1893, *Haračić s.n.* (ZA!); Flora lussinensis, Canidole gr., 10 July 1890, *Haračić s.n.* (ZA!); Flora lussinensis, Vele Srakane, 18 May 1912, *Haračić s.n.* (ZA!); Otok Krk, obalni grebeni kod Sv. Sidra, 18 June 1938, *Horvatić s.n.* (ZA!); Privlaka, 16 June 1889, *Haračić s.n.* (ZA!); Flora lussinensis, Scoglio V siri, 22 May 1892, *Haračić s.n.* (ZA!); Flora lussinensis, Sansego Ins., 25 May 1890, *Haračić s.n.* (ZA!); Unije, Valletta di Mišnjak, 10 July 1912, *Haračić s.n.* (ZA!); Sršćica (Kostrena, Sv. Barbara), Rijeka, obalni grebeni, 30 April 1953, *Horvatić s.n.* (ZA!); Hrvatsko Primorje, Sv. Barbara, 23 October 1950, *Horvat s.n.* (ZAHO!); Kornat (kraj Plavnika), 6 October 1927, *Horvatić s.n.* (ZA!); Flora lussinensis, Unie, Vrulje, 3 July 1912, *Haračić s.n.* (ZA!); Prevlaka, 10 September 189?, *Šloser s.n.* (ZA!); školj Kornat (kraj Plavnika), 6 October 1924, *Horvatić s.n.* (ZA!); Ad littora maris in Kraljevica, 14 June 1876, *Vukotinović s.n.* (ZA!); Dalmatia, *Grubišić s.n.* ex herbario Rossi 27.571 (ZA!); Na pećinah uz more kod Bakarca, 15 October 1877, *Hirc s.n.* (ZA!); Plavnik, uz obalu mora (Tenki), 19 October 1927, *Horvatić s.n.* (ZA!); Po pećinah prama Bakarcu, *Hirc s.n.* (ZA!); Cherso bei Fiume, October 1856, *Braig s.n.* (ZA!); Crikvenica, September 1939, *Bošnjak s.n.* (ZA!); Plavnik JI obala, 19 October 1924,

Horvatić s.n. (ZA!); Nerezine, morski žal, 30 August 1903, *Vukotinović s.n.* (ZA!); Istrien, Fiume. Auf Felsen am Meere unweit der Torpedofabrik, 19 July 1881, *Untiki s.n.* (M!); Veglia, *Bilimak s.n.* (M!); Fiume, in litore maris, *Kovats s.n.* (M!); Prope Fiume, in rupestribus ad Cala rossa, August 1839, *Noe s.n.* (M!); Fiume, Litt. cr., August 1873. *Rossi s.n.* (M!); Figarole grande, 4 June 1936, *Vareschi s.n.* (M!); Auf der Insel Lossino in Quarnero. *Tommasini s.n.* (M!); Fiume, *Haes s.n.* (K!); In maritimis ad Flumen, July, *Sailler et Bauer s.n.* (K!). **Northern Dalmatia:** Isola di Silba, Dalmazia nord, 2 August 2005, *Bogdanović s.n.* (CAT!, ZA!, ZAGR!); Scoglieni Pettini bei Premuda, Südwest-Seite der nordwestl. Scoglieni, 17 May 1911, *Ginzberger & Teyber s.n.* (W!); In Dalmat. *Petter s.n.* (ZA!); Norddalmatien Meeresfelsen bei der Fähre an der Strasse von Obrovac nach Zadar, 2 August 1960. *Podlech 6552* (MSB!); Norddalmatien. An der Brücke von Jasenice in Richtung Zadar. 6 August 1960, *Merxmüller & Wiedmann 13584* (M!); Südöstlich Zadar, felsige Küste bei Sukošan, 18 June 1980, *Erben 365* (M!); Ex rupestribus maritimis Illyriae juxta Zara, 28. September 1854, *Ball s.n.* (K!); Zara, Dalmatia, *Ball s.n.* (K!).

4. *Limonium cazzae* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Central Dalmatia:** Isola di Sušac, Dalmazia, 29 July 2006, *Bogdanović s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 5, 34).

Diagnosis:—*Planta pubescens, dense foliosa apice caudicularum, foliis spathulatis, 1–3-nerviis, scapis erectis vel adscendentibus, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore ovato-triangulari, apiculata, bractea superiore oblongo-ovata, obtusa, calice tubo dense piloso, lobis triangulari-ovatis, acutis.*

Description:—Plant perennial, 14–35 cm tall, velvety with hairs 0.1–0.25 mm long, with robust tap-root. Caudices branched, 1–3 cm long, densely covered by leaves. Leaves rigid, rugose, velvety, green, 7–55 mm long, 2–10 mm wide, spathulate, retuse, revolute at the margin, 1–3-nerved, sometimes with 2 secondary nerves, gradually tapering into a long petiole. Stems numerous, robust, erect to ascending, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 90–180°, internodes 5–16 mm long, right to curved. Inflorescence reticulate, branched from the base; spikes 1–5(–8) cm long, straight to curved. Spikelets 5.5–6 mm long, 1–3 flowered, 3–4 per cm; outer bract 1.5–1.8 mm long, 1.3–1.6 mm wide, ovate-triangular, apiculate, totally hairy, with margin narrowly membranous, central part fleshy, acuminate; middle bract 1.6–1.9 mm long, 1–1.2 mm wide, oblong, bifid at the apex, membranous, hairy at the base and in the veins; inner bract 3.5–3.7 mm long, 1.8–2 mm wide, oblong-ovate, obtuse, margin membranous, glabrous, 0.2–0.3 mm wide, and central part fleshy, densely hairy, 1.4–1.6 mm wide, apiculate, forming a triangular tip, 0.6–0.8 mm long, reaching the upper margin. Calyx 4.5–4.7 mm long, exerted 2.6–3 mm from the inner bract, densely hairy, with 5 totally hairy ribs, reaching almost the middle part of the lobes; calyx lobes 0.8–0.9 × 0.8–0.9 mm, triangular-ovate, acute. Corolla lilac.

Etymology:—From “Cazza” the old name of Sušac island.

Distribution and ecology:—The species is exclusive of Sušac island (Fig. 29L) in the Lastovo archipelago (South Dalmatia). It grows on the calcareous rocky coasts and cliffs, where it is quite rare due to intensive goat grazing.

Additional specimens examined (Paratype):—CROATIA. **Central Dalmatia:** Insel Cazza, Strand am Valle Dugo, 26 July 1914, *Ginzberger s.n.* (WU!).

5. *Limonium croaticum* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Northern Dalmatia:** Isola di Ugljan, Mala Lamjana, Dalmazia, 27 August 2006, *Liber s.n.* (holotype CAT!; isotypes: CAT!, ZAGR!) (Figs. 6, 35).

Diagnosis:—*Planta dense pubescens, dense foliosa apice caudicularum, foliis spathulatis, retusis apice, revolutis margine, 1-nervis, scapis plurimis, prostratis vel adscendentibus, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore ovato-triangulari, acuta, bractea superiore oblongo-ovata, obtusa, calice tubo dense piloso, lobis hemiellipticis, obtusis.*

Description:—Plant perennial, 10–20 cm tall, densely pubescent (hairs 0.05–0.1 mm long), with robust tap-root. Caudices branched, 1–5 cm long, and covered by leaves in the upper part. Leaves rigid, rugose, densely

pubescent, green, 7–30 mm long, 1–6 mm wide, spatulate, retuse at the apex, revolute at the margin, 1-nerved, gradually tapering into a long petiole. Stems numerous, prostrate to ascending, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 60–180°, internodes 3–10 mm long, right to curved. Inflorescence reticulate, branched from the base; spikes 7–30 mm long, straight to curved. Spikelets 5.5–6 mm long, 2–3 flowered, 4–6 per cm; outer bract 1–1.6 mm long, 1.2–1.8 mm wide, triangular-ovate, acute, with margin narrowly membranous, partially hairy, and central part fleshy, densely hairy, shortly apiculate; middle bract 1.5–1.8 mm long, 1.2–1.6 mm wide, triangular-ovate, obtuse at the apex, membranous, hairy in the central part and veins; inner bract 3–4 mm long, 2.2–2.7 mm wide, oblong-ovate, obtuse, with margin membranous, glabrous, 0.3–0.4 mm wide, and central part fleshy, densely hairy, 1.5–2.2 mm wide, acuminate, forming a triangular tip, 0.6–0.9 mm long, almost reaching the upper margin. Calyx 3.5–4.5 mm long, exserted 2–2.5 mm from the inner bract, tube densely hairy, with 5 totally hairy ribs, reaching the middle part of the lobes; calyx lobes 0.8–1 × 0.8–1 mm, hemielliptical, obtuse. Corolla lilac.

Etymology:—The epithet is named after Croatia.

Distribution and ecology:—This species has been collected in some calcareous islands of North Dalmatia, as Ugljan, Kaprije and Rab, but probably it occurs in some other neighbouring islands (Fig. 28E). It grows along the narrow costal belt between the shoreline and the maquis, in halophilous community.

Additional specimens examined (Paratype):—CROATIA. **Northern Dalmatia:** Isola di Kaprije, arcipelago di Šibenik, Dalmazia, 10 August 2005, *Nikolić s.n.* (CAT!, ZAGR!); Isola di Rab, cala di Frkanj, nord Dalmazia, 1 August 2005, *Bogdanović s.n.* (CAT!, ZAGR!); Dalmatien, Scoglio “Dolin” bei Arbe, Spritzzone an der Pta. Dolin, 28 May 1912, *Morton 889* (WU!); Insel Arbe, Flyschfelsen bei der Pta. Stolac (Halbins. Loparo), 5 January 1913, *Morton 316* (WU!); Insel Arbe, Nordostabsturz der Tignarossa: Felsenheide östlich von Spez.–Kastenguste 408, 30 May 1912, *Morton 887* (WU!); Insel Arbe, Spritzzone am Nordende der Insel, 20 April 1912, *Morton 890* (WU!); Insel Arbe, Nordostabsturz der Tignarossa: Kalkfelsen Herbulb der Seg. Njivica, 26 July 1912, *Morton 313* (WU!); Insel Arbe, Nordostabsturz der Tignarossa: Ober dem Seg. Njivica, 30 May 1912, *Morton 317* (WU!); Insel Arbe, Spritzzone an der Pta. Gavranica, 4 January 1913, *Morton 315* (WU!); Insel Arbe, Spritzzone an der Westküste der Insel in der Valle Malovica, 18 July 1911, *Morton 891* (WU!); Rab, zaljev Sv. Eufemije, July 1940, *Domac s.n.* (ZA!); Insel Kaprije beim, Brackwasserzone beim Ort Kaprije, Cult. 10 August 1976, *Wanner s.n.* (M!); Dalmatien, Insel Smokvica Vela, Südseite, 30 September 1982, cult., *Wanner s.n.* (M!).

6. *Limonium dictyophorum* (Tausch 1824: 254) Degen (1937: 540)

Bas.: *Statice dictyophora* Tausch (1824: 254).

Type:—CROATIA. **Eastern Dalmatia:** manu Tausch (lectotype PRC!, designated by Erben 1980) (Figs. 7, 36).

= *Statice anfracta* C.E.Salmon (1922: 345).

Type:—CROATIA. Dalmatien, Küste bei Cannosa n.w. von Ragusa, October 1906, *Ginzberger & Wettstein s.n.* (holotype WU!).

≡ *Limonium anfractum* (C.E.Salmon) C.E.Salmon (1924: 336).

Description:—Plant perennial, 20–50 cm tall, glabrous, with robust tap-root. Caudices branched, 1–4 cm long, and covered by leaves in the upper part. Leaves rigid, rugose, glabrous, green, 1.5–3.5(–5) cm long, 5–10 mm wide, spatulate to linear-spatulate, revolute at the margin, 1-nerved, tapering into a long petiole, retuse at the apex. Stems numerous, erect, robust, striate, glabrous, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 50–110°, internodes 1–3.5(–4) cm long, right to curved. Inflorescence erect, lax, diffuse, branched; spikes 2–8 cm long, straight to curved. Spikelets 6–7 mm long, 3–7-flowered, 2–4 per cm; outer bract 1.4–1.6 mm long, 1.4–1.5 mm wide, ovate, acute, narrowly membranous, glabrous, with central part fleshy, acuminate; middle bract 1.8–2.2 mm long, 1.4–1.7 mm wide, hemielliptical, rounded at the apex, membranous, glabrous; inner bract 4.2–4.5 mm long, 2.5–2.7 mm wide, ovate-oblong, subacute, with margin membranous, glabrous, 0.3–0.5 mm wide, with central part fleshy, glabrous, 1.6–1.9 mm wide, long apiculate, forming a triangular tip, 0.8–1 mm long, no reaching the upper margin. Calyx 4.8–5.5 mm long, exserted 2.2–2.5 mm from the inner bract, tube hairy, ribs slightly exceeding the base of the lobes; calyx lobes, hemielliptical, 0.6–0.7 × 0.6–0.7 mm, rounded. Corolla lilac. Chromosome number 2n=18.

Etymology:—The epithet is referred to Greek “diction phoros” namely bearing net.

Distribution and ecology:—This species is widespread in the southern Dalmatia between Klek and Prevlaka,

as well as on some calcareous islands (Korčula, Mljet, Sv. Andrija, Bobara, Mrkan, Šipan, Lokrum and Lopud) (Fig. 30F). Other populations occurs also in Montenegro and probably in Albania. It is very common in the halophilous community, occurring along the costal belt in contact towards the inland with garigues and maquis.

Additional specimens examined:—CROATIA. **Southern Dalmatia:** Kroatien, Dalmatien, Cavtat, Badestrand an Felsen, July 1963, *Fitz s.n.* (W!); Dalmatien, Insel Lacroma bei Ragusa, 26 July 1929, *Ronniger s.n.* (W!); Ragusa, 27 August 1905, *Schneider s.n.* (W!); Dalmatien; Cavtat, Meeresfelsen, Kalk, July 1963, *Fitz s.n.* (W!); Dalmatien, felseninsel Pettini di Ragusa. Auf dem Scoglio nahe der Landsturmsinsel, 28 July 1929, *Ronniger s.n.* (W!); Felsiger Meeresstrand auf der insel Lacroma (Lokrum) bei Ragusa (Dubrovnik), Dalmatien, 10 June 1923, *Zerny s.n.* (W!); Dalmatien. Trsteno, Felsen am Landingerplatz, 27 July 1929, *Ronniger s.n.* (W!); Dalmatien: Insel Lacroma bei Ragusa, Standfelsen beim Kloster, 8 June 1904, *Ginzberger s.n.* (W!); Dalmatien: Scoglieni im Gebiet von Ragusa oder Ragusa vecchia (Nature Angabe: verloren gegangen), July–August 1908, *Galvagni s.n.* (W!); Ragusa, 21 June 1868, *Pichler s.n.* (W!); Montenegro Lovcen, 5 June 1867, *Huter s.n.* (W!); Dalmatien: Scoglieni “Pettini” zur Dubrovnik (Ragusa); Gruž (Gravosa); felsiger Nordhang der größten (mittleren) Scoglio; Kalk, 28 August 1929, *Ginzberger s.n.* (WU!); In fastis ad littoras maris Ragusa, June 1871, *Grimburg s.n.* (WU!); Dalmazia, Ragusa, 14 July 1888, *Gelmi s.n.* (WU!); Ragusa, Dalmatien, s.d., *Boller s.n.* (WU!); auf rinner ... Korčula, Dalmatien, 11 August 1928, *Cammerloher s.n.* (WU!); Dalmatien, Cattaro: Strandfelsen der Bucht von Traste, July 1902, *Vierhapper 7* (WU!); Süddalmatien: “Pettini di Ragusa” Scoglieni an der SW-Spitze von Lapad bei Ragusa, Nordhang, Kalkstein. 6 April 1926, *Ginzberger s.n.* (WU!); Dalmatien, Felsen am Lanidringo platz von Cannosa nordwestl. von Ragusa, June 1904, *Ginzberger 1* (WU!); Flora exiccata Crnegorae, in rupestribus maritimis ad Pristan Bar, 1 July 1890, *Baldacci s.n.* (FI!); Dalmazia, Peninsula Lapad, 26 June 1910, *Peterfi s.n.* (FI!); Dubrovnik, Dalmazia meridionale, sotto albergo Neptun, litorale roccioso, 6 November 2006, *Brullo, Bogdanović & Giusso s.n.* (CAT!, ZAGR!); Trsteno, sotto l’arboreto, Dalmazia meridionale, litorale roccioso, 6 November 2006, *Brullo, Bogdanović & Giusso s.n.* (CAT!, ZAGR!); Trsteno, Dalmazia, 23 November 2004, *Bogdanović s.n.* (CAT!, ZAGR!); Prevlaka, Dalmazia meridionale, litorale roccioso, 6 November 2006, *Brullo, Bogdanović & Giusso s.n.* (CAT!, ZAGR!); Isola di Sv. Andrija vicino a Lopud, Sud Dalmazia, 16 June 2005, *Kovačić s.n.* (CAT!, ZAGR!); Srebreno, pored obale mora, 16 July 1937, *Djelić 16619* (BEO!); Srebreno, pored obale mora, 16 July 1937, *Djelić 16620* (BEO!); In rupibus ad mare Lapad pr. Dubrovnik, 13 August 1946, *Greibenščiner 16621* (BEO!); Cavtat, 29 August 1937, *Rajevski 16628* (BEO!); Lapad, May 1914, *Mihanović 16629* (BEO!); Am Meer bei Ragusa, September 1888, *Adamović s.n.* (BEOU!); grebeni pored otočića Bobare kod Cavtata, pukotine stijena uz more, 10 August 1979, *Hećimović s.n.* (ZA!); Trsteno, obalni grebeni uz more, 8 August 1981, *Hećimović s.n.* (ZA!); Vitaljina (selo kod Igala), obalni grebeni uz more, 12 October 1981, *Hećimović s.n.* (ZA!); Duboka (uvala i selo kod Kleka), obalni grebeni uz more, 10 November 1981, *Hećimović s.n.* (ZA!); Mrkan, otočić kod Cavtata, pukotine stijena uz more, 20 June 1979, *Hećimović s.n.* (ZA!); Lokrum kod Dubrovnika, 26 September 1930, *Lochingg s.n.* (ZA!); Lokrum, pukotine stijena uz more, 5 August 1979, *Hećimović s.n.* (ZA!); Otok Šipan: Kaludrica, uz more, u as. *Limonietum anfracti*, 25 August 1979, *Hećimović s.n.* (ZA!); Bobara, otočić kod Cavtata, pukotine stijena uz more, 8 August 1979, *Hećimović s.n.* (ZA!); In maritimis Gravosae, 1808, *Vodipić s.n.* (ZA!); Montenegro, Budva, Felsküste, 14 July 1973, *Heinrich s.n.* (M!); Monte Negro, an der Bucht südlich Rodovići, 1 September 1977, *Krach s.n.* (M!); Küstenfelsen bei Budva, 2 m, 31 May / 10 June 1938, *Freudenberger 13586* (M!); Felsen, Ragusa, 22 July 1932, *Gross s.n.* (M!); Süd-Dalmatien, Pettini di Ragusa, Scoglieni an der SW-Spitze von Lapad bei Ragusa, Nordhang, Kalkstein, 6 April 1926, *Ginzberger s.n.* (BM!); Southern Dalmatia, Cannosa near Ragusa, June 1904, *Ginzberger s.n.* (BM!); Southern Dalmatia: Cannosa near Ragusa, November 1906, *Ginzberger & Wettstain s.n.* (BM!); Souther Dalmatia: Bay of Traste near Cattaro, July 1902, *Vierhapper s.n.* (BM!); maritime limestone rocks outside the city wall Dubrovnik (Ragusa), 26 June 1953, *Dennis 139* (K!); In rupestribus maritimis ad Pristan-Bar, July 1890, *Baldacci s.n.* (K!); Dalmatia, in rupibus, ad mare insula Lokrum, pr. urb. Dubrovnik, 14 August 1937, *Crebenehikoff s.n.* (K!); Dalmatia, Gravosa; ad litorem, July 1910, *Krieger s.n.* (K!).

7. *Limonium ginzbergeri* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Southern Dalmatia:** Isola di Glavat, Vrhovnjaci, arcipelago di Lastovo, 28 July 2006, *Bogdanović s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 8, 37).

Diagnosis:—*Planta glabra, dense foliosa apice caudicularum, foliis rigidis, valde rugosis, spathulatis, retusis vel*

rotundatis apice, revolutis margine, 1-nerviis (nervo medio pinnato), scapis plurimis, erectis vel adscendentibus, rugosis, laeviter hispidis inferne, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad laeviter curvatis, bractea inferiore ovato-triangulari, acuta, glabra, bractea superiore elliptico-ovata, obtusa vel rotundata, calice tubo sparsim piloso, lobis hemiellipticis, rotundatis.

Description:—Plant perennial, 20–40 cm tall, glabrous, with robust tap-root. Caudices branched, 1–5 cm long, densely covered by leaves. Leaves rigid, strongly rugose, glabrous, green, 1–4 cm long, 3–6 mm wide, spathulate, revolute at the margin, 1-nerved (with midrib pinnate), tapering into a long petiole, retuse to rounded at the apex. Stems numerous, ascending to erect, rugose, slightly hispid below, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 30–180°, internodes 5–20 mm long, right to curved. Inflorescence reticulate, branched; spikes 7–40(–60) mm long, straight to slightly curved. Spikelets 5–6.2 mm long, 1–2-flowered, 3–5 per cm; outer bract 1.2–2 mm long, 1.2–1.8 mm wide, triangular-ovate, acute, narrowly membranous, glabrous, with central part fleshy, acuminate; middle bract 1.4–2.2 mm long, 1.2–1.5 mm wide, oblong-elliptic, rounded at the apex, membranous, glabrous; inner bract 3.1–4 mm long, 2.2–2.6 mm wide, glabrous, elliptical-ovate, obtuse to rounded, with margin membranous, 0.3–0.5 mm wide, with central part fleshy, glabrous, 1.3–2 mm wide, acuminate, forming a triangular tip, 0.6–0.9 mm long, no reaching the upper margin. Calyx 4–4.8 mm long, exerted 1.5–2.2 mm from the inner bract, sparsely hairy in the tube, ribs reaching the middle part of the lobes; calyx lobes elliptical, rounded, 0.7–0.9 × 0.7–0.8 mm. Corolla lilac.

Etymology:—This species is dedicated to A. Ginzberger, an Austrian botanist who studied the Dalmatian flora.

Distribution and ecology:—This is a very rare species circumscribed only to a few islets, as Smokvica and Sapljun, from Lastovo archipelago in southern Dalmatia (Fig. 30E). It colonized the calcareous rocky clefts directly exposed to sea aerosol, where it grows together with other halophytes.

Additional specimens examined (Paratypes):—CROATIA. **Southern Dalmatia:** Scoglio di Smokvica, Vrhovnjaci, arcipelago di Lastovo, sud Dalmazia, 28 July 2006, *Bogdanović s.n.* (CAT!, ZAGR!); Isola di Sapljun, Lastovnjaci, Lastovo, Sud Dalmazia, 28 July 2006, *Bogdanović s.n.* (CAT!, ZAGR!).

8. *Limonium issaeum* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Central Dalmatia:** Isola di Vis, Komiza, Dalmazia centrale, a ovest della spiaggia principale, 200 m presso Bile stine, 30 August 2006, *Bogdanović s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Fig 9, 38).

Diagnosis:—*Planta pubescens, dense foliosa apice caudicularum, foliis rugosis, spathulatis, retusis, revolutis margine, 1-nerviis, scapis plurimis, prostratis vel adscendentibus, rugosis, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore hemicircularis, sparsim pilosa, bractea superiore oblongo-ovata, obtusa, calice tubo piloso, lobis hemiellipticis, rotundatis.*

Description:—Plant perennial, 15–20 cm tall, hairy (hairs 0.1–0.2 mm long), with robust tap-root. Caudices branched, 2–5 cm long, densely covered by leaves in the upper part. Leaves rigid, rugose, sparsely pubescent, green, 8–35 mm long, 2–6 mm wide, spathulate, revolute at the margin, 1-nerved, tapering into a long petiole, retuse at the apex. Stems numerous, prostrate to ascending, rugose, hairy, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 60–180°, internodes 4–15 mm long, right to curved. Inflorescence reticulate, branched; spikes 7–40 mm long, straight to curved. Spikelets 5.5–6 mm long, 3–5-flowered, 3–5 per cm; outer bract 1.2–1.3 mm long, 1.4–1.6 mm wide, semicircular, rounded, with margin narrowly membranous, glabrous, and central part fleshy, sparsely hairy, acuminate; middle bract 1.5–1.7 mm long, 1.1–1.2 mm wide, triangular-ovate, obtuse, membranous, hairy on the veins and in the upper part; inner bract 3.2–3.5 mm long, 2.1–2.3 mm wide, oblong-ovate, obtuse, with margin membranous, glabrous, 0.1–0.2 mm wide, with central part fleshy, sparsely hairy, 1.7–1.9 mm wide, acuminate, forming a triangular tip, 0.5–0.8 mm long, no reaching the upper margin. Calyx 4–4.2 mm long, exerted 2–2.5 mm from the inner bract, tube hairy, ribs hairy, slightly exceeding the basal part of the lobe; calyx lobes, hemielliptical, rounded, 0.7–0.8 × 0.7–0.8 mm. Corolla lilac.

Etymology:—From “Issa” the old name of Vis island.

Distribution and ecology:—This species occurs on the island of Vis in Central Dalmatia (Fig. 29F), where it is localized in the south–western coast. It grows on places characterized by volcanic rocks, conglomerates, limestones mixed with clay soils. Usually, it is a member of halophilous communities.

Additional specimens examined (Paratypes):—CROATIA. **Central Dalmatia:** Scoglian an d. Nord westspitze v. Lissa: Veli Barjak. 30 July 1914, *Ginzberger s.n.* (WU!); Scoglio Kamik an der Nordküste von Lissa (beim Porto Chiave), 29 July 1914, *Ginzberger s.n.* (WU!); Isola di Vis, Komiža, punta Knežerat, 27 May 2011, *Bogdanović, Brullo & Giusso s.n.* (CAT!, ZAGR!); Isola di Vis, punta Knežica, 27 May 2011, *Bogdanović, Brullo & Giusso s.n.* (CAT!, ZAGR!).

9. *Limonium istriacum* Bogdanović & Brullo, sp. nov.

Type:—CROATIA. **Istria:** In maritimis prope Salvore. Istria (Austria). August 1881, *Marchesetti 1455*, sub *Statice cancellata* Bernh. (holotype ZA!; isotypes BOLO!, CAT!, FI!, M!) (Figs. 10, 39).

Diagnosis:—*Planta dense pubescens, rosulis foliorum apice caudicularum, foliis rugosis, spathulatis, retusis apice, revolutis margine, 1-nerviis, scapis paucis, erectis, rugosis, ramis sterilibus paucis, brevibus, inflorescentia pyramidata, pauciramosa, spicis rectis ad curvatis, bractea inferiore late ovata, obtusa ad laeviter apiculata, bractea superiore obovato-subrotundata, obtusa, calice tubo piloso, lobis ovato-triangularibus, acutis.*

Description:—Plant perennial, 5–25 cm tall, densely pubescent (hairs up to 0.1–0.2 mm long), with robust tap-root. Caudices 1–3 cm long, branched, with leaf rosettes at the apex. Leaves rigid, rugose, pubescent, green, 8–30 mm long, 1.5–2.5 mm wide, spathulate, revolute at the margin, 1-nerved, gradually tapering into a long petiole, retuse at the apex. Stems few, rather scattered, erect, rugose, pubescent, with few short sterile branches, simple or slightly branched, flexuous, fragile at nodes, diverging at the angle of 40–110(–140)°, internodes 5–10 mm long, right to curved. Inflorescence poor, pyramidal, few branched; spikes 5–15 mm long, straight to curved. Spikelets 5–5.5 mm long, 2–3-flowered, 5–8 per cm; outer bract 1.2–1.8 mm long, 1.5–1.7 mm wide, widely-ovate, obtuse to slightly apiculate, with margin narrowly membranous, glabrous, and central part fleshy, acuminate, hairy; middle bract 1.5–1.6 mm long, 1.2–1.5 mm wide, ovate, subrounded, membranous, densely hairy on the veins; inner bract 3–4 mm long, 2.6–2.8 mm wide, obovate-subrounded, obtuse, with margin membranous, glabrous, 0.2–0.3 mm wide, and central part fleshy, densely hairy, 2–2.2 mm wide, acuminate, forming a triangular tip, 0.4–0.5 mm long, not reaching the upper margin. Calyx 4–4.5 mm long, exserted 1.8–2 mm from the inner bract, tube hairy, with ribs densely hairy, almost reaching the lobe apex; calyx lobes ovate-triangular, glabrous, 0.9–1 × 0.6–0.7 mm, acute. Corolla lilac.

Etymology:—The epithet is named after Istria peninsula.

Distribution and ecology:—This species is known only from a short stretch of the northern Istrian coast near Savudrija (Salvore) from Trieste to Umag (Fig. 28B). Recently, it was not found probably due to the touristic human activity which have completely modified all coastal belt.

Additional specimens examined (Paratypes):—CROATIA. **Istria:** Litorale austriacum. In rimis scopulorum ad mare prope Salvore in ditone oppidi Umago, substr. calce hippuritico; 1–2 m alt., s.d., *Marchesetti s.n.* (K!, WU!); Istria, Salvore, July 1882, *Marchesetti s.n.* (FI!, M!); Istria, Salvore, August 1881, *Marchesetti s.n.* (FI!); In der Klippen zwischen Umago u. Salvore, 22 July 1909, *Engelhardt s.n.* (M!).

10. *Limonium lagostanum* Bogdanović & Brullo, sp. nov.

Type:—CROATIA. **Southern Dalmatia:** Isola di Lastovo, Skrivena luka, Sud Dalmazia, 28 July 2006, *Bogdanović s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 11, 40).

Diagnosis:—*Planta pubescens, densis rosulis foliorum apice caudicularum, foliis rugosis, spathulatis, retusis apice, revolutis margine, 1-nerviis, scapis numerosis, erectis ad adscendentibus, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore ovata, obtusa dense pubescente, bractea superiore obovato-subrotundata, late obtusa, calice tubo dense piloso, lobis ovato-triangularis, subobtusis.*

Description:—Plant perennial, 15–35 cm tall, pubescent, (hairs 0.1–0.15 mm long), with robust tap-root. Caudices branched, 2–5 cm long, with dense leaf rosettes at the apex. Leaves rigid, rugose, pubescent, green, 13–35 mm long, 2–7 mm wide, spathulate, retuse, revolute at the margin, 1-nerved, gradually tapering into a long petiole. Stems numerous, erect to ascending, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 60–180°, internodes 4–16 mm long, right to curved. Inflorescence

reticulate, branched from the base; spikes 8–25 mm long, straight to curved. Spikelets 5–5.5 mm long, 2-flowered, 4–6 per cm; outer bract 1.5–1.7 mm long, 1.4–1.6 mm wide, ovate, obtuse, with margin narrowly membranous, glabrous and central part fleshy, acuminate, densely hairy; middle bract 1.6–1.7 mm long, 1.3–1.5 mm wide, ovate, rounded at the apex, membranous, hairy on the veins; inner bract 3.2–3.5 mm long, 2.7–2.9 mm wide, obovate-subrounded, widely obtuse, margin membranous, glabrous, 0.3–0.5 mm wide, with central part fleshy, 1.8–2 mm wide, densely hairy, apiculate, forming a triangular tip, 0.4–0.5 mm long, not reaching the upper margin. Calyx 3.7–4.3 mm long, exerted 1–1.5 mm from the inner bract, tube densely hairy, with 5 totally hairy ribs, reaching almost the upper part of the lobes; calyx lobes $0.5\text{--}0.9 \times 0.6\text{--}0.7$ mm, triangular-ovate, glabrous, subobtusate. Corolla lilac.

Etymology:—From “Lagosta” the old name of Lastovo island.

Distribution and ecology:—This species is exclusive of the island of Lastovo and some neighbouring islets (Kopište and Bijelac), where it is very rare (Fig. 29M). It grows in the narrow belt between the shoreline and the pinewoods, forming halophilous communities.

Additional specimens examined (Paratypes):—CROATIA. **Southern Dalmatia:** Insel Lagosta, Strand bei Porto rosso unterhalb d. geschlossenen Vegetation, 28 August 1914, *Ginzberger s.n.* (W!); Scoglieni westl. v. Lagosta: Bielac, 26 July 1914, *Ginzberger s.n.* (W!); Southern Dalmatia, on the rock „Bielac“ near the island of Lagosta (Nr. 22 on the map), 26 July 1914, *Ginzberger s.n.* (K!); Dalmazia, Isola di Kopište, vicino a Lastovo, 29 July 2006, *Bogdanović s.n.* (CAT!, ZAGR!).

11. *Limonium leprosum* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Southern Dalmatia:** Scoglio Gubavac, vicino a Lumbarda, Lorčula, Sud Dalmazia, 27 July 2006, *Bogdanović s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 12, 41).

Diagnosis:—*Planta glabra, rosulis foliorum apice caudicularum, foliis rugosis, tuberculatis, interdum laeviter hispida, lineari-spathulatis, retusis, revolutis margine, 1-nerviis, scapis plurimis, prostratis ad adscendentibus, rugoso-scabris, laeviter hispidis inferne, ramis sterilibus numerosis, inflorescentia laxe reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore ovato-triangulari, acuta, bractea superiore oblongo-ovata, subobtusata, calice tubo sparsim piloso, lobis ovato-triangularibus, acutis.*

Description:—Plant perennial, 15–20 cm tall, glabrous, with robust tap-root. Caudices branched, 1–3.5 cm long, with leaf rosettes at the apex. Leaves rigid, rugose, tuberculate, glabrous, sometimes slightly hispid, green, 1.2–4 cm long, 1–5 mm wide, linear-spathulate, revolute at the margin, 1-nerved, tapering into a long petiole, retuse at the apex. Stems numerous, prostrate to ascending, striate-rough, minutely tuberculate, slightly hispid below, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of $50\text{--}110\text{--}180^\circ$, internodes 5–20 mm long, right to curved. Inflorescence lax reticulate, branched; spikes 1–3 cm long, straight to curved. Spikelets 5–6 mm long, 1–3-flowered, 3–5 per cm; outer bract 1.2–1.5 mm long, 1.1–1.4 mm wide, triangular-ovate, acute, narrowly membranous, glabrous, with central part fleshy, acuminate; middle bract 1.4–2 mm long, 1–1.6 mm wide, hemielliptical, bifid to rounded at the apex, membranous, glabrous; inner bract 3–3.6 mm long, 2–2.7 mm wide, glabrous, oblong-ovate, subobtusate, with margin membranous, 0.3–0.5 mm wide, with central part fleshy, glabrous, 1.4–1.6 mm wide, acuminate, forming a triangular tip, 0.4–0.7 mm long, almost reaching the upper margin. Calyx 3.6–4.8 mm long, exerted 2–2.5 mm from the inner bract, tube sparsely hairy, ribs slightly exceeding the base of the lobes; calyx lobes ovate-triangular, acute, $0.6\text{--}0.7 \times 0.5\text{--}0.7$ mm. Corolla lilac.

Etymology:—The epithet is referred to “leprosus”, latin name of leprous, Gubavac in Croatian language.

Distribution and ecology:—This species occurs in some localities of central and southern Dalmatian coast and adjacent islands (Fig. 30B). In particular, it was found near Makarska, Pelješac peninsula and island of Korčula included some nearby islets. It grows along the calcareous rocky coast, mainly in very broad tracts, where it is a member of halophilous communities.

Additional specimens examined (Paratypes):—CROATIA. **Central Dalmatia:** Strandfelsen b. Makarska, June 1913, *Teyber s.n.* (W!); Strandfelsen b. Makarska, July 1919, *Teyber s.n.* (W!); Macarsca, Dalmatien, 20 August 1873, *s.l.* (W!); Makarska, Dalmazia centrale, dopo il parcheggio, litorale roccioso, 5 November 2006, *Brullo, Bogdanović & Giusso s.n.* (CAT!, ZAGR!); Drašnice, dopo Podgora, Dalmazia centrale, litorale roccioso, 5 November 2006, *Brullo, Bogdanović & Giusso s.n.* (CAT!, ZAGR!); Dalmatien, Makarska, August 1957,

Friedrich 13585 (M!); near Makarska, August–October 1934, *Marija Josipović* 74 (K!). **Southern Dalmatia:** Scoglio Dvije Sestrice, vicino a Orebić, Sud Dalmazia, 27 July 2006, *Bogdanović s.n.* (CAT!, ZAGR!); Rt Osičac, penisola Pelješac, sud Dalmazia, 27 July 2006, *Bogdanović s.n.* (CAT!, ZAGR!); Süddalmatien, östl. Scoglio Stuppa südl. von Orebić, 17 April 1930, *Widder s.n.* (M!).

12. *Limonium liberianum* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Northern Dalmatia:** Isola di Pašman, Ždrelac, Dalmazia, 28 August 2006, *Liber s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 13, 42).

Diagnosis:—*Planta dense pubescens, dense foliosa secus partem superiorem caudicularum, foliis rugosis, spathulatis, rotundatis, revolutis margine, 1-nerviis, scapis numerosis, erectis ad adscendentibus, rugosis, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore ovato-triangulari, acuta, bractea superiore oblongo-ovata, obtusa ad subacuta, calice tubo dense piloso, lobis subellipticis ad ovatis, acutis.*

Description:—Plant perennial, 15–35 cm tall, densely pubescent (hairs 0.1–0.2 mm long), with robust tap-root. Caudices branched, 1–5 cm long, and covered by leaves in the upper part. Leaves rigid, rugose, densely hairy, green, 6–35 mm long, 2–5 mm wide, spathulate, rounded at the apex, revolute at the margin, 1-nerved, gradually tapering into a long petiole. Stems numerous, erect to ascending, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 70–180°, internodes 5–20 mm long, right to curved. Inflorescence reticulate, branched from the base; spikes 10–60 mm long, straight to curved. Spikelets 5.5–6.5 mm long, 2–4 flowered, 3–5 per cm; outer bract 1.8–2 mm long, 1.5–2 mm wide, triangular-ovate, acute, sparsely hairy, margin narrowly membranous, and central part fleshy, long apiculate; middle bract 1.8–2.5 mm long, 1.2–1.5 mm wide, oblong, bifid at the apex, membranous, hairy in the central part and veins; inner bract 3.5–4.5 mm long, 2–2.5 mm wide, oblong-ovate, obtuse to subacute, with margin membranous, glabrous, 0.3–0.4 mm wide, and central part fleshy, densely hairy, sometimes glabrous at the base, 1.5–2 mm wide, acuminate, forming a triangular tip, 0.4–0.5 mm long, almost reaching the upper margin. Calyx 4–4.5 mm long, exerted 1–1.5 mm from the inner bract, tube densely hairy, with 5 totally hairy ribs, reaching the middle part of the lobes; calyx lobes 0.7–0.8 × 0.6–0.8 mm, subelliptical to ovate, acute. Corolla lilac.

Etymology:—This species is dedicated to Z. Liber, Croatian botanist from University of Zagreb, who collected this plant.

Distribution and ecology:—This species is frequent in some islands of northern Dalmatia (Pašman, Zlarin, and Dugi otok), where it grows along calcareous rocky coast and cliffs (Fig. 28F). It grows in the belt between the shoreline and the pinewoods or maquis, in halophilous communities.

Additional specimens examined (Paratypes):—CROATIA. **Northern Dalmatia:** Isola di Pašman, vicino al paese Pašman, 27 August 2006, *Liber s.n.* (CAT!, ZAGR!); Isola di Zlarin, presso la punta Klepac, Dalmazia, 27 August 2006, *Liber s.n.* (CAT!, ZAGR!); Dalmazia, Dugi otok, Park Prirode Telašića, Jezero Mir, uz obalu jezera, 01 October 2007, *Bogdanović & Jelaska s.n.* (CAT!, ZAGR!), Dalmazia, Dugi otok, Park Prirode Telašića, Uvala Lojišće, uz obalu mora, 01 October 2007, *Bogdanović & Jelaska s.n.* (CAT!, ZAGR!).

13. *Limonium liburnicum* Lovrić ex Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Kvarner:** Isola di Krk, Rt Škuljica, Kvarner, 30 July 2005, *Bogdanović s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 14, 43).

Diagnosis:—*Planta pubescens, densis rosulis foliorum apice caudicularum, foliis rugosis, spathulatis ad obovato-spathulatis, retusis, revolutis margine, 1-nervis, scapis numerosis, erectis ad adscendentibus, rugosis, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore ovato-triangulari, obtusa, bractea superiore oblongo-ovata, obtusa, calice tubo dense piloso, lobis ovato-triangularibus, acutis.*

Description:—Plant perennial, 15–30 cm tall, pubescent (hairs up to 0.1 mm long), with robust tap-root. Caudices branched, 1–1.5 cm long, with dense leaf rosettes at the apex. Leaves rigid, rugose, pubescent, green, 8–25 mm long, 2–5 mm wide, spathulate to obovate-spathulate, retuse, revolute at the margin, 1-nerved, gradually

tapering into a long petiole. Stems numerous, erect to ascending, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 70–180°, internodes 3–20 mm long, right to curved. Inflorescence reticulate, branched from the base; spikes 6–20 mm long, straight to curved. Spikelets 5–5.5 mm long, 2–3 flowered, 8–11 per cm; outer bract 1.2–1.5 mm long, 1.3–1.6 mm wide, ovate-triangular, obtuse, with margin narrowly membranous, glabrous, central part fleshy, hairy, acuminate; middle bract 1.3–1.7 mm long, 1–1.5 mm wide, oblong, bifid at the apex, membranous, totally hairy; inner bract 3.2–3.8 mm long, 2.1–2.5 mm wide, oblong-ovate, obtuse, with margin membranous, glabrous, 0.3–0.4 mm wide, and central part fleshy, densely hairy, 1.6–2 mm wide, apiculate, forming a triangular tip, 0.4–0.6 mm long, no reaching the upper margin. Calyx 4–4.2 mm long, exserted 1.8–2.2 mm from the inner bract, densely hairy, with 5 totally hairy ribs, reaching almost the base of the lobes; calyx lobes 0.7×0.8 mm, triangular-ovate, acute. Corolla lilac.

Etymology:—From “Liburnia” old name of Kvarner region. The epithet “*liburnicum*” was given to this species by Lovrić (1975, 1988) as *nomen nudum*.

Distribution and ecology:—This species is known only from the islands of Krk and Sv. Grgur (probably also on the island of Cres) in the Kvarner archipelago (N Adriatic) (Fig. 28D). It grows in the high calcareous windswept cliffs, together with other halophilous species and chasmophytes.

Additional specimens examined (Paratypes):—CROATIA. **Kvarner:** Isola di Krk, Bunculuka, Kvarner, 15 July 2006, *Bogdanović s.n.* (CAT!, ZAGR!); Ins. Scoglio di St. Giorgio, 9 July 1888, *Poscharsky s.n.* (ZA!).

14. *Limonium lovricii* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Kvarner:** Croatia, Sabinj, presso Senj, Quarnero, litorale roccioso, 9 November 2006, *Brullo, Bogdanović & Giusso s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 15, 44).

Diagnosis:—*Planta dense pubescens, dense foliosa secus partem superiorem caudicularum, foliis rugosis, linearispathulatis, leviter retusis, revolutis margine, 1-nervis, scapis numerosis, prostratis ad adscendentibus, rugosis, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore ovata, obtusa, bractea superiore oblonga, obtusa, calice tubo dense piloso, lobis ovato-triangularibus, acutis.*

Description:—Plant perennial, 8–40 cm tall, densely pubescent (hairs 0.05–0.1 mm long), with robust taproot. Caudices branched, 1–6 cm long, densely covered by leaves in the upper part. Leaves rigid, rugose, densely pubescent, green, 7–35 mm long, 1–3 mm wide, linear-spathulate, slightly retuse at the apex, revolute at the margin, 1-nerved, gradually tapering into a long petiole. Stems numerous, prostrate to ascending, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 70–140(–180)°, internodes 5–20 mm long, right to curved. Inflorescence reticulate, branched from the base; spikes 7–30 mm long, straight to curved. Spikelets 4.5–5 mm long, 3–5-flowered, 5–7 per cm; outer bract 1.2–1.4 mm long, 1.2–1.4 mm wide, ovate, obtuse, with margin glabrous, narrowly membranous, and central part fleshy, densely hairy, acuminate; middle bract 1.3–1.5 mm long, 1–1.1 mm wide, ovate, obtuse at the apex, membranous, hairy in the central part and veins; inner bract 2.7–3 mm long, 1.8–2.2 mm wide, oblong, obtuse, with margin membranous, glabrous, 0.15–0.2 mm wide, and central part fleshy, densely hairy, 1.4–1.8 mm wide, acuminate, forming a triangular tip, 0.3 mm long, reaching the upper margin. Calyx 3.7–4.2 mm long, exserted 1.6–1.8 mm from the inner bract, densely hairy in the tube, with 5 totally hairy ribs, slightly exceeding the base of the lobes; calyx lobes $0.8\text{--}0.9 \times 0.7\text{--}0.8$ mm, triangular-ovate, acute. Corolla lilac. Chromosome number $2n=18$.

Etymology:—This species is dedicated to A. Ž. Lovrić, a Croatian botanist who studied the Kvarner flora.

Distribution and ecology:—This species occurs along the coast between Crikvenica and Senj (southern Kvarner) and in the south-eastern part of the Krk island (Fig. 28C) It grows on windswept limestones slopes, where it occupies a narrow belt near the sea.

Additional specimens examined (Paratypes):—CROATIA. **Kvarner:** Croatia, 1 km a nord di Senj, Quarnero, litorale roccioso, 09 November 2006, *Brullo, Bogdanović & Giusso s.n.* (CAT!, ZAGR!); otok Krk, Šilo, 29 April 1947, *Horvat s.n.* (ZAHO!); Sjevni Velebit-Primorje, Zavratinica, 12 June 1938, *Horvat s.n.* (ZAHO!); In litt. croat. ad Jablanac, 6 July 1896, *Rossi 11.518* (ZA!); Lit. croat. In valle Dumboko pr. Novi, 18 June 1924, *Rossi 27.567* (ZA!); In rupibus ad Spasovac pone Senj, 4 December 1886, *Rossi 4622* (ZA!); In rupibus ad Selce in litt. croat., 8 October 1891, *Rossi 7657* (ZA!); Lit. croat., Sv. Lucija ad Novi, 23 May 1914, *Rossi 27.566* (ZA!); Lit. croat., In ... Klenovica ad Jablanac, 10 June 1913, *Rossi 27.570* (ZA!); Lit. croat., Ad Jablanac, 16 July 1907, *Rossi 11.578* (ZA!); Lit. croat., Školj Sv. Jurja ad Sv. Juraj, 6 June 1913, *Rossi 27.569* (ZA!); Senj, July 1873, *Hirc*

s.n. (ZA!); In rupibus ad Spasovac prope Senj, in litt. croat, 6 October 1891, *Rossi s.n.* (M!); Am Meersstrande beim Hafen Crkvenica Kroatien, 13 August 1908, *Filarzky s.n.* (M!).

15. *Limonium milovicii* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Central Dalmatia:** Zaglavice, presso Sevid, Dalmazia centrale, litorale roccioso, 7 November 2006, *Brullo, Bogdanović & Giusso s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 16, 45).

Diagnosis:—*Planta dense pubescens, dense foliosa secus partem superiorem caudicularum, foliis rugosis, spathulatis ad lineari-spathulatis, retusis, revolutis margine, 1-nervis, scapis numerosis, erectis, rugosis, ramis sterilibus numerosis, inflorescentia laxa pyramidata, ramosa, spicis rectis ad curvatis, bractea inferiore ovata, obtusa, bractea superiore oblonga, acuta, calice tubo piloso, lobis ovato-triangularibus, acuminatis.*

Description:—Plant perennial, 13–25(–35) cm tall, densely pubescent (hairs up to 0.05–0.1 mm long), with robust tap-root. Caudices 1–4 cm long, with contract branched, and densely covered by leaves in the upper part. Leaves rigid, rugose, pubescent, green, 12–35 mm long, 3–6 mm wide, spathulate to linear-spathulate, revolute at the margin, 1-nerved, gradually tapering into a long petiole, retuse at the apex. Stems numerous, erect, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 40–70(–110)°, internodes 5–15 mm long, right to curved. Inflorescence lax, pyramidate, branched; spikes 5–30 mm long, straight to curved. Spikelets 5–6 mm long, 1–4-flowered, 3–7 per cm; outer bract 1.3–1.8 mm long, 1.3–1.7 mm wide, ovate, obtuse, with margin narrowly membranous, glabrous, and central part fleshy, acuminate, hairy; middle bract 1.7–2.1 mm long, 1–1.3 mm wide, oblong, shortly bifid at the apex, membranous, densely hairy on the veins; inner bract 3–3.9 mm long, 2–2.3 mm wide, oblong, acute, with margin membranous, glabrous, 0.2–0.3 mm wide, and central part fleshy, densely hairy, 1.4–1.6 mm wide, acuminate, forming a triangular tip, 0.6–0.8 mm long, almost reaching the upper margin. Calyx 3.8–4.6 mm long, exserted 1.5–2 mm from the inner bract, tube hairy, with ribs densely hairy, reaching the basal part of the lobes; calyx lobes, ovate-triangular, glabrous, 0.6–0.7 × 0.8–0.9 mm, acuminate. Corolla lilac. Chromosome number 2n=18.

Etymology:—This species is dedicated to M. Milović, Croatian botanist from Šibenik, who collected some specimens of this plant.

Distribution and ecology:—This species occurs in Central Dalmatia, along the costal belt between Šibenik and Split (Fig. 29A). It is localized in the calcareous rocky places near the sea, where it is a member of halophilous vegetation.

Additional specimens examined (Paratypes):—CROATIA. **Central Dalmatia:** Isola di Čiovo, Movarštica, Dalmazia centrale, litorale roccioso, 05 November 2006, *Brullo, Bogdanović & Giusso s.n.* (CAT!, ZAGR!); Sevid, Dalmazia, 07 November 2006., *Bogdanović & Dujmović s.n.* (CAT!, ZAGR!); litorale roccioso 1 km a nord di Primošten, 07 November 2006, *Brullo, Bogdanović & Giusso s.n.* (CAT!, ZAGR!); Spalato, Bačvice, Dalmazia centrale, litorale roccioso, 05 November 2006, *Brullo, Bogdanović & Giusso s.n.* (CAT!, ZAGR!); Dalmatia. Ad rupes litoris in latere septentrionali montis Marian prope Spalatum, s.d., *Pichler s.n.* (K!, W!, WU!); Dalmatien: Spalato am Meeresstrande, 18 May 1905, *Kindt s.n.* (W!); Dalmatien: Strand von Spalato beim Friedhofe, 23 July 1904, *Stadlmann s.n.* (W!); Dalmatien, Küste bei Spalato, 18 May 1905, *Kindt s.n.* (W!); Dalmatia, in rupib. proxim maris ad Spalato, July 1870, *Pichler s.n.* (K, W); Dalmatien, Mte Marian, 15 July 1868, *Pichler s.n.* (K!, WU!); Dalmazia, Spalato, 18 July 1888, *Gelmi s.n.* (WU!); Split, otok Čiovo, 21 September 1947, *Horvat s.n.* (ZAHO!); Split, u blizini želj. stanice, obalni grebeni uz more, 5 November 1981, *Hećimović s.n.* (ZA!); Šibenik, Smričnjak, uz more, 3 July 1982, *Milović s.n.* (ZA!); Šibenik, Batižele, procjep u stijeni, uz more, 14 June 1996, *Milović s.n.* (ZA!); Split: zapadna obala Marjana, 20 August 1939, *Linardić s.n.* (ZA!); Spalato, *Sendtner s.n.* (M!); Prov. Split, Kalkfelsen an der Küste bei Split, 29 August 1965, *Düll s.n.* (M!); Spalato et alibi, *Biasoletto s.n.* (BOLO-BERTOL!); Dalm. am Manum bei Spalato, June 1872, *Pichler s.n.* (K!); Dalmatien, auf Felsen am Meere am Mte. Marian bei Spalato, August 1880, *Pichler s.n.* (K!); Dalmatia, Spalato, 15 July 1868, *Pichler s.n.* (K!).

16. *Limonium omissae* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Central Dalmatia:** Omiš, Dalmazia centrale, litorale roccioso, 5 November 2006, *Brullo, Bogdanović & Giusso s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 17, 46).

Diagnosis:—*Planta minute puberula, dense foliosum secus caudiculas, foliis rugosis, sparsim pubescentis, spathulatis ad linear-spathulatis, retusis, revolutis margine, 1-nervis, rare 2-nervis, scapis numerosis, erectis ad adscendentibus, rugosis, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore ovato-triangulari, acuta, bractea superiore oblongo-ovata, obtusa, calice tubo piloso, lobis ovato-triangularibus, obtusis.*

Description:—Plant perennial, 20–40 cm tall, minutely puberulous (hairs 0.02–0.05 mm long), with robust tap-root. Caudices branched, 4–6 cm long, densely covered by leaves. Leaves rigid, rugose, sparsely pubescent, green, 1–3.5 cm long, 3–6 mm wide, spathulate to linear-spathulate, revolute at the margin, 1-nerved, rarely 2-nerved, with secondary veins, tapering into a long petiole, retuse at the apex. Stems numerous, ascending to erect, rugose, minutely puberulous, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 80–130(–180)°, internodes 5–15 mm long, right to curved. Inflorescence reticulate, branched; spikes 1–3.5 cm long, straight to curved. Spikelets 5.5–6 mm long, 4–6-flowered, 4–5 per cm; outer bract 1.3–1.5 mm long, 1.3–1.7 mm wide, triangular-ovate, acute, with margin narrowly membranous, glabrous and central part fleshy, hairy, acuminate; middle bract 1.5–2 mm long, 1.1–1.4 mm wide, ovate, acute at the apex, membranous, hairy on the veins and central part; inner bract 3.1–3.5 mm long, 2.2–2.4 mm wide, oblong-ovate, obtuse, with margin membranous, glabrous, 0.2–0.3 mm wide, with central part fleshy, minutely puberulous, 1.8–2 mm wide, acuminate, forming a triangular tip, 0.5–0.6 mm long, non reaching the upper margin. Calyx 4.2–4.5 mm long, exserted 2–2.5 mm from the inner bract, tube hairy, ribs hairy, slightly exceeding the basal part of the lobe; calyx lobes, ovate-triangular, obtuse, 0.8–0.9 × 0.6–0.9 mm. Corolla lilac.

Etymology:—From “Omissa” the old name of Omiš town.

Distribution and ecology:—This species is circumscribed to short stretch of coast between Omiš and Živogošće (central Dalmatia) (Fig. 29B). Due to human activity in this area the natural habitats are strongly disturbed and therefore the halophilous communities characterized by this plant are very rare.

Additional specimens examined (Paratypes):—CROATIA. **Central Dalmatia:** Živogošće, obalni grebeni uz more, 5 November 1981, *Hećimović s.n.* (ZA!); Tra Ruskamen e Mediči, Dalmazia centrale, litorale roccioso, *Brullo, Bogdanović & Giusso s.n.*, 5 November 2006 (CAT!, ZAGR!).

17. *Limonium pelagosae* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Central Dalmatia:** Isola di Pelagosa Grande (Vela Palagruža), Dalmazia centrale, 13 June 2005, *Boršić s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 18, 47).

Diagnosis:—*Planta pubescens, dense foliosum secus caudiculas, foliis rugosis, spathulatis, retusis, revolutis margine, 1–3-nervis, interdum 5-nervis, scapis numerosis, robustis, erectis ad adscendentibus, rugosis, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore ovata, apiculata, bractea superiore ovata, obtusa, calice tubo dense piloso, lobis triangularibus, acutis.*

Description:—Plant perennial, 12–33 cm tall, pubescent (hairs up to 0.2 mm long), with robust tap-root. Caudices branched, 3–10 cm long, densely covered by leaves. Leaves rigid, rugose, pubescent, green, 1.5–8 cm long, 5–16 mm wide, spathulate, revolute at the margin, 1–3-nerved, sometimes with 2 secondary nerves, gradually tapering into a long petiole, retuse at the apex. Stems numerous, robust, erect to ascending, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 70–180°, internodes 3–15(–25) mm long, right to curved. Inflorescence reticulate, branched from the base.; spikes 10–35 mm long, straight to curved. Spikelets 5.5–6 mm long, 1–2 flowered, 2–4 per cm; outer bract 1.6–2.1 mm long, 1.5–1.9 mm wide, ovate, apiculate, totally hairy, with margin narrowly membranous, central part fleshy, acuminate; middle bract 1.7–2.1 mm long, 1–1.3 mm wide, oblong, bifid at the apex, membranous, hairy in the veins and between them; inner bract 3.7–4.5 mm long, 2.2–2.7 mm wide, ovate, obtuse, margin membranous, glabrous, 0.3–0.4 mm wide, and central part fleshy, densely hairy, 1.6–2 mm wide, apiculate, forming a triangular tip, 0.6–0.7 mm long, no reaching the upper margin. Calyx 4.6–4.7 mm long, exserted 1.5–2 mm from the inner bract, tube densely hairy, with 5 totally hairy ribs, reaching almost the apex of the lobes; calyx lobes 1–1.1 × 0.7–0.8 mm, triangular, acute. Corolla lilac.

Etymology:—From “Pelagosa” the old name of Palagruža island.

Distribution and ecology:—This species occurs in Palagruža archipelago in central Adriatic (Fig. 29N), where it grows near the sea, at the base of the calcareous step slopes. Usually, it is a member of halophilous communities, which are replaced in the rupestrian sites by a chasmophilous vegetation.

Additional specimens examined (Paratypes):—CROATIA. **Central Dalmatia:** Dalmatien, Insel Pelagosa piccola, 7 June 1901, *Ginzberger s.n.* (W!); Dalmatien, Insel Pelagosa grande, 2 May 1895, *Ginzberger s.n.* (WU!); Dalmazia, Is. Pelagosa, July 1877, *Marchesetti s.n.* (FI!); Dalmazia, Is. Pelagosa, July 1882, *Marchesetti s.n.* (FI!); Dalmazia, Is. Pelagosa, 25 September 1876, *Marchesetti s.n.* (FI!); Is. Pelagosa, 20 July 1877, *Marchesetti s.n.* (PAD!); Dalmatinsko pomorje, Palagruža Velika, 26 May 1911, *Babić s.n.* (ZA!); in the little island „Pelagosa piccola“ in the middle of the Adria, 7 June 1901, *Ginzberger s.n.* (K!); Vela Palagruža, stijene uz obalu, 28 April 2008, *Bogdanović, Boršić & Nikolić s.n.* (ZAGR!).

18. *Limonium pharosianum* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Central Dalmatia:** Isola di Hvar, Jelsa, Dalmazia centrale, 10 August 2005, *Bogdanović & Dujmović s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 19, 48).

Diagnosis:—*Planta pubescens, dense foliosa secus partem superiorem caudicularum, foliis rugosis, spathulatis, rotundatis ad leviter retusis, revolutis margine, 1–3-nervis, scapis numerosis, prostratis ad adscendentibus, rugosis, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore ovata, obtusa, bractea superiore oblongo-ovata, rotundata, calice tubo piloso, lobis ovato-triangularibus, acutis.*

Description:—Plant perennial, 15–30 cm tall, pubescent (hairs 0.05–0.1 mm long), with robust tap-root. Caudices branched, 2–5 cm long, densely covered by leaves in the upper part. Leaves rigid, rugose, hairy, green, 1.5–4(–5.5) cm long, 3–9 mm wide, spathulate, revolute at the margin, 1–3-nerved, tapering into a long petiole, rounded to slightly retuse at the apex. Stems numerous, prostrate to ascending, rugose, hairy, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 50–180°, internodes 4–15 mm long, right to curved. Inflorescence reticulate, branched; spikes 1–2.5 cm long, straight to curved. Spikelets 5–5.5 mm long, 2–3-flowered, 4–5 per cm; outer bract 1.8–2.2 mm long, 1.4–2 mm wide, ovate, obtuse, with the margin narrowly membranous, glabrous, and central part fleshy, hairy, acuminate; middle bract 1.8–2 mm long, 1.2–1.3 mm wide, hemielliptical, rounded, membranous, hairy on the nerves; inner bract 3.5–4 mm long, 2.3–2.5 mm wide, oblong-ovate, rounded, with margin membranous, glabrous, 0.4–0.5 mm wide, with central part fleshy, hairy, 1.5–1.6 mm wide, acuminate, forming a triangular tip, 0.7–0.8 mm long, not reaching the upper margin. Calyx 4–4.6 mm long, exserted 1.8–2 mm from the inner bract, hairy in the tube, with ribs hairy, reaching the middle part of the lobe; calyx lobes, triangular-ovate, acute, 0.9–1 × 0.7–0.8 mm. Corolla lilac.

Etymology:—From “Pharos” old name of Hvar island.

Distribution and ecology:—This species is localized in the northern part of Hvar, island of Central Dalmatia (Fig 29D). Here, it is a member of halophilous communities, covering wide calcareous surfaces in contact towards inland with subhalophilous shrubby vegetation.

Additional specimens examined (Paratypes):—CROATIA. **Central Dalmatia:** Pharia, in rupestribus maritimis, estate, *Botteri s.n.* (WU!); Dalmatia, Lesina, *Botteri s.n.* (M!); Milna, uz more, 13 August 1974, *V. Beloti s.n.* (CNHM!); Lesina, 1873, *Ressmann s.n.* (K!); Lesina, *Botteri s.n.* (K!).

19. *Limonium pomoense* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Central Dalmatia:** Croazia, isola di Pomo (Jabuka), litorale roccioso, 27 April 2008, *Bogdanović, Boršić & Nikolić s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 20, 49).

Diagnosis:—*Planta pulvinata, dense pubescens, dense foliosum secus caudiculas, foliis rugosis, spathulatis, rotundatis, revolutis margine, 1(–3)-nervis, scapis solitariis vel paucis, erectis ad adscendentibus, rugosis, ramis sterilibus paucis, inflorescentia dense reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore ovata, subobtusata, bractea superiore elliptico-obovata, obtusa, calice tubo dense piloso, lobis triangularibus, acutis.*

Description:—Plant perennial, pulvinate, 10–30 cm tall, densely pubescent (hairs up to 0.1–0.2 mm long), with robust tap-root. Caudices branched, 4–10 cm long, densely covered by leaves. Leaves rigid, rugose, erect or erect-ascending, pubescent, green, 12–40 mm long, 6–14 mm wide, spathulate, revolute at the margin, 1(–3)-nerved, gradually tapering into a long petiole, rounded at the apex. Stems solitary or few, erect to ascending, rugose, with a few sterile branches, flexuous, fragile at nodes, very branched in upper part, diverging at the angle of 60–120°, basal internode 2–5 cm, upper internodes 0.5–2 cm long, right to curved. Inflorescence densely reticulate,

very branched; spikes 5–30 mm long, straight to curved. Spikelets 6–7 mm long, 1–2 flowered, 4–5 per cm; outer bract 1.5–2.5 mm long, 1.5–2.2 mm wide, ovate, subobtusate, totally hairy, margin widely membranous, with central part fleshy, long acuminate; middle bract 1.8–2.4 mm long, 1–1.5 mm wide, oblong, bifid at the apex, membranous, totally hairy; inner bract totally hairy, 4–4.7 mm long, 2.3–2.5 mm wide, elliptical-obovate, obtuse, with margin membranous, 0.3 mm wide, and central part fleshy, 1.8–2 mm wide, acuminate, forming a triangular tip, 0.5–0.7 mm long, almost reaching the upper margin. Calyx 5.5–5.8 mm long, exerted 1.8–2 mm from the inner bract, tube and ribs densely hairy, ribs reaching the middle part of the lobes; calyx lobes $1.2\text{--}1.3 \times 0.7\text{--}0.8$ mm, triangular, acute. Corolla lilac.

Etymology:—From “Pomo” the old name of Jabuka island.

Distribution and ecology:—The species is localized in the volcanic island of Jabuka (Vis archipelago), where it grows in the lower ledges of the cliffs (Fig. 29K). It is a member of halophilous communities, which are replaced in the vertical surfaces by a chasmophilous vegetation.

Additional specimens examined (Paratypes):—CROATIA. **Central Dalmatia:** Flora Croatica, o. Jabuka, 7 June 1964, *Trinajstić 6776* (CNHM!); Otok Jabuka, sjeveroistočne strme padine, 13 June 2009, *Bogdanović s.n.* (ZAGR!); Flora Dalmatica, Scoglio Pomo, 30 July 1905, *Degen s.n.* (BM!); Scoglio Pomo, 3.u.9 June 1911, *Ginzberger & Teyber s.n.* (WU!); Scoglio Pomo, 21 July 1914, *Ginzberger s.n.* (WU!); Dalmatien, Scoglio Pomo westlich von Lissa, 1 June 1911, *Camerlaker s.n.* (WU!).

20. *Limonium subanfractum* Trinajstić (1980: 6)

Type:—CROATIA. **Central Dalmatia:** Parva insula Zanak prope insulam Vis, Dalmatia, Croatia, 1 August 1972, *Durbešić 12481* (holotype ZA!) (Figs. 21, 50).

Description:—Plant perennial, 15–25 cm tall, minutely pubescent (hairs up to 0.05 mm long), with robust tap-root. Caudices branched, 1–5 cm long, with dense leaf rosettes at the apex. Leaves rigid, rugose, pubescent, green, 7–24(–32) mm long, 1.5–5 mm wide, spatulate to linear-spatulate, revolute at the margin, 1-nerved, gradually tapering into a petiole, retuse at the apex. Stems numerous, prostrate to ascending, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of $90\text{--}180^\circ$, internodes 2–15(–20) mm long, right to curved. Inflorescence reticulate, branched from the base; spikes 5–20 mm long, straight to curved. Spikelets 4.5–5 mm long, 2–3 flowered, 4–6 per cm; outer bract 1–1.5 mm long, 1.3–2 mm wide, semicircular-ovate, obtuse, with margin narrowly membranous, glabrous, central part fleshy, densely puberulent, acuminate; middle bract 1.5–1.8 mm long, 1–1.3 mm wide, oblong, obtuse to rounded at the apex, membranous, puberulent in the central part and veins; inner bract 3–3.5 mm long, 2.1–2.4 mm wide, oblong, obtuse, margin membranous, glabrous, 0.2–0.3 mm wide, and central part fleshy, densely hairy, 1.5–2 mm wide, forming a triangular tip, 0.4–0.6 mm long, no reaching the upper margin. Calyx 3.8–4.5 mm long, exerted 1.3–2 mm from the inner bract, tube densely hairy, with 5 totally hairy ribs, reaching the base of the lobes; calyx lobes $0.6\text{--}0.8 \times 0.6\text{--}0.8$ mm, hemielliptical, subobtusate. Corolla lilac.

Etymology:—The epithet is referred to the habit similar to that one of *Limonium anfractum* (= *L. dictyophorum*).

Distribution and ecology:—This species was found in some islands of central Dalmatia, such as Šolta, Šćedro, Vis and Pakleni islets (Fig. 29E). It is localized only in short stretch of the coast, where it grows on the flat calcareous surfaces near the sea in halophilous communities.

Additional specimens examined:—CROATIA. **Central Dalmatia:** Isola di Šolta, Dalmazia centrale, 10 August 2005, *Nikolić s.n.* (CAT!, ZAGR!), Isola di Šćedro, cala di Tufera, Dalmazia centrale, 26 July 2006, *Bogdanović s.n.* (CAT!, ZAGR!); Scogli an der Bucht südöstlich von Lissa: Zenka (Mali Parsanj), 29 July 1914, *Ginzberger s.n.* (WU!); Scoglio Zanak, Isola di Vis, Dalmazia centrale, 20 August 2006, *Bogdanović s.n.* (CAT!, ZAGR!); Scoglio di Dobri, Pakleni otoci, archipelago di Hvar, 26 July 2006, *Bogdanović s.n.* (CAT!, ZAGR!); otok Vis, Srebrna, 11 October 1936, *Dvoržak s.n.* (ZAHO!); o. Vis, 8 June 1936, *Dvoržak s.n.* (ZAHO!); o. Vis, grebeni uz more, zaljev Pretišćina, 2 September 1951, *Domac s.n.* (ZA!); Isola di Vis, Milna, 29 May 2011, *Bogdanović, Brullo & Giusso s.n.* (CAT!, ZAGR!); Isola di Vis, baia Mala Smricevica, 30 May 2011, *Bogdanović, Brullo & Giusso s.n.* (CAT!, ZAGR!); Isola di Vis, baia Smokovica, 30 May 2011, *Bogdanović, Brullo & Giusso s.n.* (CAT!, ZAGR!); Isola di Vis, Rukavac, 30 May 2011, *Bogdanović, Brullo & Giusso s.n.* (CAT!, ZAGR!); Isola di Vis, baia Stončica, 31 May 2011, *Bogdanović, Brullo & Giusso s.n.* (CAT!, ZAGR!).

21. *Limonium subnudum* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Southern Dalmatia:** Isola di Lastovo, uvala Zaklopatica, Dalmazia, 12 August 2005, *Bogdanović s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 22, 51).

Diagnosis:—*Planta perennis, dense foliosa secus partem superiorem caudicularum, foliis rugosis, glabris, spathulatis, retusis, revolutis margine, 1–3-nervis, scapis numerosis, prostratis ad adscendentibus, rugosis, sparsim puberulis, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore hemielliptica, rotundata, glabra, bractea superiore glabra, oblongo-ovata, rotundata, calice tubo secundo sparsim piloso, lobis triangularibus, acutis.*

Description:—Plant perennial, 15–35 cm tall, with robust tap-root. Caudices branched, 2–10 cm long, densely covered by leaves in the upper part. Leaves rigid, rugose, glabrous, green, 1.5–5 cm long, 2–8 mm wide, spathulate, revolute at the margin, 1–3-nerved, tapering into a long petiole, retuse at the apex. Stems numerous, prostrate to ascending, rugose, sparsely puberulous, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 50–180°, internodes 4–15 mm long, right to curved. Inflorescence reticulate, branched; spikes 0.7–4 cm long, straight to curved. Spikelets 5.5–6 mm long, 2–3-flowered, 4–5 per cm; outer bract 1–1.5 mm long, 1.2–1.5 mm wide, ovate, acute, narrowly membranous, with central part fleshy, sparsely hairy, acuminate; middle bract 1.2–1.6 mm long, 1–1.1 mm wide, hemielliptical, rounded, membranous, glabrous; inner bract glabrous, 3.3–3.5 mm long, 2.2–2.5 mm wide, oblong-ovate, rounded, with margin membranous, glabrous, 0.3–0.4 mm wide, with central part fleshy, 1.6–1.8 mm wide, acuminate, forming a triangular tip, 0.6–0.8 mm long, not reaching the upper margin. Calyx 4.5–5 mm long, exerted 2–2.2 mm from the inner bract, tube sparsely hairy on one side, ribs glabrous, reaching almost the middle part of the lobe; calyx lobes, triangular, acute, 1–1.2 × 0.6–0.7 mm. Corolla lilac.

Etymology:—The epithet is referred to latin “subnudus” namely covered by few hairs.

Distribution and ecology:—This species is circumscribed to north-western part of the Lastovo island in southern Dalmatia (Fig. 30D). It grows on the calcareous step slopes near the sea in contact with *Quercus ilex* maquis. Here, it is a member of halophilous community.

Additional specimens examined (Paratypes):—CROATIA. **Southern Dalmatia:** Scoglieni westl. v. Lagosta, Veli Kutevjar (Rutevinjak), 27 July 1914, *Ginzberger s.n.* (W!); Scoglieni westl. v. Lagosta, Pod Mrčaru (Pod Marchiara), 29 July 1914, *Ginzberger s.n.* (WU!); Southern Dalmatia, on the little island „Veli Rutenjak“ near the island Lagosta (Nr. 29 on the map), 27 July 1914, *Ginzberger s.n.* (K!).

22. *Limonium tabulare* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Southern Dalmatia:** Scoglio Pločica, a nord di Vela Luka, Korčula, Sud Dalmazia, 27 July 2006, *Bogdanović s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 23, 52).

Diagnosis:—*Planta glabra, dense foliosum secus caudiculas, foliis rugosis, spathulatis, retusis, revolutis margine, 1–5-nervis, interdum 9-nervis, scapis paucis, robustis, scabris, erectis, glabris, ramis sterilibus numerosis, inflorescentia erecta, reticulata, ramosa, spicis rectis ad curvatis, bractea inferiore ovato-triangulari, acuta, glabra, bractea superiore glabra, ovata, subobtusata, calice tubo sparsim piloso base, lobis hemiellipticis, rotundatis.*

Description:—Plant perennial, 40–50 cm tall, robust, glabrous, with robust tap-root. Caudices branched, 2–5 cm long, densely covered by leaves. Leaves rigid, rugose, glabrous, green, 2.5–8 cm long, 4–20 mm wide, spathulate, revolute at the margin, 1–5-nerved, sometimes with 4 secondary nerves, tapering into a long petiole, retuse at the apex. Stems few, erect, robust, rough, glabrous, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 50–140(–180)°, internodes 5–20 mm long, right to curved. Inflorescence erect, reticulate, branched; spikes 1–8 cm long, straight to curved. Spikelets 5–5.5 mm long, 1–2-flowered, 2–3(–4) per cm; outer bract 1.3–1.5 mm long, 1.2–1.7 mm wide, triangular-ovate, acute, narrowly membranous, glabrous, with central part fleshy, acuminate; middle bract 1.5–1.6 mm long, 1.1–1.2 mm wide, ovate-triangular, bifid at the apex, membranous, glabrous; inner bract 3.2–3.6 mm long, 2.2–2.4 mm wide, glabrous, ovate, subobtusate, with margin membranous, 0.3 mm wide, with central part fleshy, glabrous, 1.6–1.8 mm wide, acuminate, forming a triangular tip, 0.6–0.9 mm long, almost reaching the upper margin. Calyx 4–4.6 mm

long, exerted 1.8–2.3 mm from the inner bract, sparsely hairy at the base, ribs glabrous, slightly exceeding the base of the lobes; calyx lobes, hemielliptical, $0.8\text{--}0.9 \times 0.8$ mm, rounded. Corolla lilac.

Etymology:—The epithet is referred to “Tabula”, latin name of Pločica Croatian islet.

Distribution and ecology:—This species is exclusive of the Pločica islet near Korčula (southern Dalmatia) (Fig. 30C). It is frequent in the vertical slopes of the calcareous rocky coast, where it is a member of a halophilous community.

23. *Limonium trinajsticii* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Central Dalmatia:** Isola di Brač, Pučišća, Dalmazia centrale, 7 August 2005, *Bogdanović s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 24, 53).

Diagnosis:—*Planta glabra, dense foliosa secus partem superiorem caudicularum, foliis rugosis, spathulatis, retusis ad rotundatis, revolutis margine, 1-nervis, scapis numerosis, erectis, rigidis, scabris, ramis sterilibus numerosis, inflorescentia erecta, reticulata, ramosa, spicis rectis, bractea inferiore ovato-triangulari, subobtusata, glabra, bractea superiore glabra, rotundata, calice tubo piloso base, lobis hemiellipticis, rotundatis.*

Description:—Plant perennial, 21–50 cm tall, rigid, glabrous, with robust tap-root. Caudices branched, 1–4 cm long, covered by leaves in the upper part. Leaves rigid, rugose, glabrous, green, 7–20 mm long, 1.5–4 mm wide, spathulate, revolute at the margin, 1-nerved, tapering into a long petiole, slightly retuse to rounded at the apex. Stems numerous, erect, rigid, rough, glabrous, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 80–180°, internodes 2–30 mm long, right to slightly curved. Inflorescence erect, reticulate, branched; spikes 0.6–3 cm long, straight. Spikelets 5–6 mm long, 1–2-flowered, 4–5 per cm; outer bract 1.2–1.5 mm long, 1.3–1.6 mm wide, triangular-ovate, subobtusate, membranous at margin, glabrous, with central part fleshy, acuminate; middle bract 1.8–2.2 mm long, 1.4–1.8 mm wide, ovate, obtuse to rounded at the apex, membranous, glabrous; inner bract 3.5–4 mm long, 2.2–2.7 mm wide, glabrous, oblong, rounded, with margin membranous, 0.3–0.5 mm wide, with central part fleshy, glabrous, 1.5–1.8 mm wide, acuminate, forming a triangular tip, 0.4–0.7 mm long, almost reaching the upper margin. Calyx 4.4–4.6 mm long, exerted 1.4–2 mm from the inner bract, tube base and ribs densely hairy, ribs exceeding the base of the lobes; calyx lobes, hemielliptical, $0.8\text{--}0.9 \times 0.7\text{--}0.8$ mm, rounded. Corolla lilac.

Etymology:—This species is dedicated to I. Trinajstić, Croatian botanist from University of Zagreb.

Distribution and ecology:—This species occurs in the Brač island (central Dalmatia) (Fig. 30A). It grows in the narrow belt between the shoreline and the pinewoods, within halophilous communities.

Additional specimens examined (Paratype):—CROATIA. **Central Dalmatia:** Brač Dalmatien, Insel Brač, Klippen am Meer. 10 June 1975, *Fitz s.n.* (W!);

24. *Limonium velutinum* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Central Dalmatia:** Dalmazia, Baško polje, roccie vicino al mare, 6 June 2007, *Bogdanović & Alegro s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 25, 54).

Diagnosis:—*Planta velutina, dense foliosa secus partem superiorem caudicularum, foliis rugosis, pubescentis, lineari-spathulatis, laeviter retusis, revolutis margine, 1-nervis, scapis numerosis, prostratis ad adscendentibus, rugosis, ramis sterilibus numerosis, inflorescentia laxa, reticulata, ramosa, spicis rectis, bractea inferiore ovata, obtusa, bractea superiore oblongo-ovata, acuta, calice tubo piloso, lobis hemiellipticis, rotundatis.*

Description:—Plant perennial, 10–40 cm tall, velvety (hairs 0.05–0.1 mm long), with robust tap-root. Caudices branched, 1–6 cm long, densely covered by leaves in the upper part. Leaves rugose, pubescent, green, 10–40 mm long, 3–4 mm wide, linear-spathulate, revolute at the margin, 1-nerved, gradually tapering into a long petiole, slightly retuse at the apex. Stems numerous, prostrate to ascending, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 70–150°, internodes 4–15 mm long, right to curved. Inflorescence lax, reticulate, branched; spikes 10–50 mm long, straight to curved. Spikelets 4.8–5 mm long, 1–2-flowered, 4–5 per cm; outer bract 1.8–2.3 mm long, 1.5–2.1 mm wide, ovate, obtuse, with margin narrowly membranous, hairy, and central part fleshy, acuminate, densely hairy; middle bract 1.9–2.5 mm long, 1.2–1.5 mm wide, ovate, obtuse at the apex, membranous, hairy on the veins; inner bract 4–4.4 mm long, 2.4–2.7

mm wide, oblong-ovate, acute, with margin membranous, glabrous, 0.3–0.4 mm wide, and central part fleshy, densely hairy, 1.8–2 mm wide, acuminate, forming a triangular tip, 0.7–1 mm long, not reaching the upper margin. Calyx 4.5–5 mm long, exserted 1.5–2 mm from the inner bract, tube and ribs hairy, ribs reaching the middle part of the lobes; calyx lobes hemielliptical, rounded, $0.8-1 \times 0.7-0.8$ mm. Corolla lilac.

Etymology:—The epithet is referred to latin “velutinus” namely velvety.

Distribution and ecology:—This species was collected near Baško polje, village of central Dalmatia (Fig. 29C). It grows along the calcareous rocky coast represented by a very narrow belt, within halophilous communities.

25. *Limonium vestitum* (C.E.Salmon) C.E.Salmon (1924: 62)

Bas.: *Statice vestita* C.E.Salmon (1923: 97).

Type:—CROATIA. **Central Dalmatia:** Scoglio Kamik westl. von Lissa. 5 June 1911, *Ginzberger & Teyber s.n.* (lectotype WU!, designated by Mitić *et al.* 2003) (Figs. 26, 55).

Description:—Plant perennial, pulvinate, 6–25 cm tall, densely pubescent (hairs up to 0.1 mm long), with robust tap-root. Caudices branched, 3–10 cm long, densely covered by leaves. Leaves rigid, rugose, patent, pubescent, green, 8–21 mm long, 3–8 mm wide, spatulate, revolute at the margin, 1-nerved, gradually tapering into a short petiole, rounded at the apex. Stems numerous, prostrate to ascending, rugose, with a few sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 60–140°, internodes 2–10 mm long, right to curved. Inflorescence densely reticulate, branched from the base; spikes 10–40 mm long, straight to slightly curved. Spikelets 5.8–6 mm long, 1–2 flowered, 6–8 per cm; outer bract 1.7–2.1 mm long, 1.5–1.8 mm wide, ovate, subobtusate, totally hairy, margin narrowly membranous, and central part fleshy, long acuminate; middle bract 1.8–2 mm long, 1.2–1.3 mm wide, oblong, bifid at the apex, membranous, totally hairy; inner bract 3.3–3.9 mm long, 2.3–2.8 mm wide, ovate, acuminate, with margin membranous, glabrous, 0.2–0.3 mm wide, and central part fleshy, densely hairy, 2–2.1 mm wide, acuminate, forming a triangular tip, 1–1.2 mm long, reaching the upper margin. Calyx 5–5.4 mm long, exserted 2.5–3 mm from the inner bract, tube and ribs densely hairy, ribs reaching the middle part of the lobes; calyx lobes $1-1.1 \times 0.8-0.9$ mm, hemielliptical, cuspidate. Corolla lilac.

Etymology:—The epithet is referred to latin “vestitum” namely clothed, because this plant is covered by hairs.

Distribution and ecology:—This species is localized on the Kamik islet in Svetac archipelago (central Dalmatia) (Fig. 29J). It colonizes the calcareous step slopes together with other halophytes.

Additional specimens examined:—CROATIA. **Central Dalmatia:** Scoglio Kamik westl. von Lissa. 5 June 1911, *Ginzberger & Teyber s.n.* (W!); Scoglio Kamik westl. v. Lissa: In angefüllten Vertiefungen. 25 July 1914, *Ginzberger s.n.* (WU!); Školj Kamik, 7 June 1964, *Trinajstić 6761* (ZA!); Isola di Kamik, a ovest di St. Andrea (Svetac) Dalmazia centrale, 27 May 2005, *Bogdanović s.n.* (CAT!, ZAGR!).

26. *Limonium zankii* Bogdanović & Brullo, *sp. nov.*

Type:—CROATIA. **Central Dalmatia:** Dalmazia, isola di Svetac (St. Andrea), 26 July 2007, *Bogdanović s.n.* (holotype CAT!; isotypes CAT!, ZAGR!) (Figs. 27, 56).

Diagnosis:—*Planta dense pubescens, dense foliosa secus partem superiorem caudicularum, foliis rugosis, spatulatis, retusis, revolutis margine, 1-nervis, scapis numerosis, prostratis ad adscendentibus, rugosis, ramis sterilibus numerosis, inflorescentia reticulata, ramosa, spicis rectis ad curvis, bractea inferiore ovata, obtusa, bractea superiore oblonga, acuta, calice tubo piloso, lobis ovato-triangularibus, acutis.*

Description:—Plant perennial, 10–30 cm tall, densely pubescent (hairs 0.05–0.15 mm long), with robust tap-root. Caudices branched, 3–8 cm long, densely covered by leaves in the upper part. Leaves rigid, rugose, pubescent, green, 11–35(–40) mm long, 3–10 mm wide, spatulate, revolute at the margin, 1-nerved, gradually tapering into a long petiole, retuse at the apex. Stems numerous, prostrate to ascending, rugose, with numerous sterile branches, flexuous, fragile at nodes, very branched, diverging at the angle of 60–180°, internodes 4–15 mm long, right to curved. Inflorescence reticulate, branched; spikes 7–25 mm long, straight to curved. Spikelets 5.5–6 mm long, 3–5-flowered, 4–6 per cm; outer bract 1.2–1.5 mm long, 1.2–1.5 mm wide, ovate, obtuse, with margin narrowly membranous, glabrous, and central part fleshy, acuminate, densely hairy; middle bract 1.4–1.5 mm long,

0.9–1.1 mm wide, ovate, bifid at the apex, membranous, hairy; inner bract 3.3–4.0 mm long, 1.6–2.4 mm wide, oblong, acute, with margin membranous, glabrous, 0.1–0.2 mm wide, and central part fleshy, densely hairy, 1.3–2 mm wide, acuminate, forming a triangular tip, 0.6–0.8 mm long, almost reaching the upper margin. Calyx 4.5–5 mm long, exerted 2–2.5 mm from the inner bract, tube hairy, with ribs densely hairy, reaching the middle part of the lobes; calyx lobes, triangular-ovate, glabrous, 0.6–0.7 × 0.7–0.8 mm, acute. Corolla lilac.

Etymology:—This species is dedicated to Zanki family, which are the owner of the Svetac island.

Distribution and ecology:—This species is exclusive of the Svetac island in the Vis archipelago (central Dalmatia) (Fig. 29I). It is frequent in the calcareous slopes and the cliffs, mainly near the sea, where it grows in halophilous communities.

Additional specimens examined:—CROATIA. **Central Dalmatia:** Dalmatien, Strand v. S. Andraea b. Lissa, 23 August 1907, *Galvagni s.n.* (W!); Insel San Andrea westl. von Lissa, Felsterrain am Meer westl. v. Punta Bucatova, 6/9 June 1911, *Ginzberger & Teyber s.n.* (WU!); Insel San Andrea westl. v. Lissa, Nordseite, zwischen Punta Bucatova und Punta Trepino, 25 July 1914, *Ginzberger s.n.* (WU!); Scoglio San Andrea, 27 May 1879, *Spreitzenhofer s.n.* (WU!); Insel San Andrea westl. v. Lissa: Bei der Kapelle oberhalb Porto Slatina, 25 July 1914, *Ginzberger s.n.* (WU!); o. Svetac, August 1977, *Trinajstić 12.480* (ZA!); o. Svetac, 1 May 1977, *Trinajstić 12.477* (ZA!); o. Svetac, 1 May 1977, *Trinajstić 12.478* (ZA!); Insula Svetac, in valle Slatina, in declivibus rupestribus, solo calcareo, exp. W, cca 10–20 m s.m., 17 September 1981, *Korica s.n.* (ZA!); Insula Svetac, in loco Pod borići, in declivibus saxosis, solo calcareo, exp. S, cca 15–20 m s.m., 16 September 1981, *Korica s.n.* (ZA!); Insula Svetac, in valle Kozje stijene, in locis praeruptis lapidosis, solo calcareo, exp. S, cca 10–20 m s.m., 19 September 1981, *Korica s.n.* (ZA!); Insula Svetac, in valle Donje voje, in locis praeruptis lapidosis et umbrosis, exp. W, cca 20–25 m s.m., 17 September 1981, *Korica s.n.* (ZA!).

Acknowledgements

We thank the colleagues, friends, collaborators and all people who have helped us with this work. In particular, we are grateful to Zdravka Dujmović, Antun Alegro, Igor Borsić, Mario Šiljeg, Mirko Ruščić and Sven Jelaska from Zagreb, Sneža Vuksanović from Montenegro, and Gianpietro Giusso del Galdo from Catania, who had come with us on a field trips. Besides, thanks go to Milenko Milović, Marija Pandža, Sanja Kovačić, Toni Nikolić, Zlatko Liber and Dalibor Vladović who had made available its herbarium materials. This study was financially supported by the projects no. 119-1191193-1227 and 119-1191193-1327 of the Ministry of Science, Education and Sports (Zagreb, Croatia) coordinated by Toni Nikolić, Zlatko Liber and Božena Mitić and by the project (ex 60%) on “Taxonomic investigation on the Mediterranean flora” from Catania University (Italy) coordinated by Salvatore Brullo. One of the authors (S. Bogdanović) wishes to thank his father for accompanied him by boat in numerous tours of the islands and islets of Dalmatian archipelagos. Many thanks also to the curators of the following herbaria for the loan of the herbarium materials, or allowed us to study specimens in their care: BEO, BEOU, BM, BOLO, CAT, CNHM, FI, K, M, MSB, PAD, PRC, W, WU, ZA, ZAGR and ZAHO. A scholarship from the Ministry of Science, Education and Sports (Croatia) and the Ministry of Foreign Affairs (Italy) allowed to a six months stay in Catania. For graphical assistance thanks to Gordan Gledec.

References

- Arrigoni, P.V. (1981) Le piante endemiche della Sardegna: 84–90. *Bolletino della Società Sarda di Scienze Naturali* 20: 233–268.
- Arrigoni, P.V. (1983) *Limonium lacinium* (Plumbaginaceae), specie nuova della Calabria. *Bolletino della Società Sarda di Scienze Naturali* 22: 227–229.
- Arrigoni, P.V. (2010) *Flora dell'Isola di Sardegna* 2. Carlo Delfino, Sassari, pp. 623.
- Arrigoni, P.V. & Diana, S. (1985) Le piante endemiche della Sardegna: 167–174. *Bolletino della Società Sarda di Scienze Naturali* 24: 273–309.
- Arrigoni, P.V. & Diana, S. (1993) Contribution à la connaissance du genre *Limonium* en Corse. *Candollea* 48: 631–677.
- Arrigoni, P.V. & Diana, S. (1991) Le piante endemiche della Sardegna: 200–201. *Bolletino della Società Sarda di Scienze Naturali* 28: 317–327.
- Arrigoni, P.V. & Diana, S. (1999) Karyology, chorology and bioecology of the genus *Limonium* (Plumbaginaceae) in Sardinia.

- Plant Biosystems* 133: 67–71.
<http://dx.doi.org/10.1080/11263509909381533>
- Arrigoni, P.V. & Di Tommaso, P.L. (1981) *Carta della vegetazione dell'isola di Giannutri (Provincia di Grosseto)*. Quaderni C.N.R. Roma, pp. 1–9.
- Artelari, R. (1984a) The genus *Limonium* (Plumbaginaceae) in the Ionian area. *Botanika Chronika* 4 (1–2): 17–39.
- Artelari, R. (1984b) Two new species of *Limonium* (Plumbaginaceae) from Zakynthos island (Greece). *Mitteilungen der Botanischen Staatssammlung München* 20: 429–440.
- Artelari, R. (1989) Biosystematic study of the genus *Limonium* (Plumbaginaceae) in the Aegean area (Greece). I. Some *Limonium* species from the Kikladhes islands. *Willdenowia* 18: 399–408.
- Artelari, R. & Georgiou, O. (1999) Two new species of *Limonium* (Plumbaginaceae) from the island of Kithira (Greece). *Botanical Journal of the Linnean Society* 131: 399–415.
<http://dx.doi.org/10.1111/j.1095-8339.1999.tb01522.x>
- Artelari, R. & Georgiou, O. (2003) Biosystematic study of the genus *Limonium* (Plumbaginaceae) in the Aegean area, Greece. III. *Limonium* on the islands Kithira and Antikithira and the surrounding islets. *Nordic Journal of Botany* 22 (4): 483–500.
<http://dx.doi.org/10.1111/j.1756-1051.2002.tb01402.x>
- Artelari, R. & Kamari, G. (1986) A karyological study of ten *Limonium* species (Plumbaginaceae) endemic in the Ionian area, Greece. *Willdenowia* 15: 497–513.
- Artelari, R. & Kamari, G. (1995) *Limonium kardamylii* (Plumbaginaceae), a new species from S Peloponnisos (Greece). *Phyton (Horn, Austria)* 35: 131–137.
- Artelari, R. & Kamari, G. (2000) *Limonium messeniaceum* (Plumbaginaceae), a new species from S. Peloponnisos (Greece). *Botanika Chronika* 13: 45–49.
- Baker, H.G. (1966) The evolution, functioning and breakdown of hetromorphic incompatibility systems I. The Plumbaginaceae. *Evolution* 20: 349–368.
<http://dx.doi.org/10.2307/2406601>
- Bertoloni, A. (1837) *Flora Italica sistens plantas in Italia et in insulis circumstantibus sponte nascentes* 3. Typographeo Richardi Masii, Bononiae, 637 pp.
<http://dx.doi.org/10.5962/bhl.title.6611>
- Bogdanović, S., Brullo, S. & Mitić, B. (2011) Lectotypification of *Statice cancellata* Bernh. ex Bertol. (Plumbaginaceae). *Phyton (Horn, Austria)* 51 (1): 69–76.
- Bogdanović, S. & Mitić, B. (2003) Distribuzione delle specie del genere *Limonium* Miller (Plumbaginaceae) nella costa croata e sulle isole. In: Chiatante, D. (Ed.) *98° Congresso della Società Botanica Italiana*. T. & C. Office Automation, Catania, 225 pp.
- Bokhari, M.H. & Edmonson, J.R. (1982) *Limonium* Miller. In: Davis, P.H. (Ed.) *Flora of Turkey and the East Aegean Islands* 7. Edinburgh University Press, Edinburgh, pp. 465–476.
- Briquet, J. (1955) *Prodrome de la Flore Corse* 3 (2). Chevalier, Paris, 265 pp.
<http://dx.doi.org/10.5962/bhl.title.9641>
- Brullo, S. (1978) Il genere *Limonium* Miller in Cirenaica. *Webbia* 33 (1): 137–158.
<http://dx.doi.org/10.1080/00837792.1978.10670114>
- Brullo, S. (1980) Taxonomic and nomenclatural notes on the genus *Limonium* in Sicily. *Botaniska Notiser* 133 (3): 281–293.
- Brullo, S. (1988) Miscellaneous notes on the genus *Limonium* (Plumbaginaceae). *Willdenowia* 17: 11–18.
- Brullo, S. (1992) *Limonium brutium*, a new species from S. Italy. *Flora Mediterranea* 2: 109–112.
- Brullo, S. & Erben, M. (1989) The genus *Limonium* (Plumbaginaceae) in Tunisia. *Mitteilungen der Botanischen Staatssammlung München* 28: 419–500.
- Brullo, S. & Guarino, R. (2000) Contribution to the knowledge of flora and vegetation of Krissi islet (Crete, SE Mediterranean sea). *Flora Mediterranea* 10: 265–282.
- Brullo, S., Guglielmo, A. & Terrasi, M.C. (1990) Osservazioni citotassonomiche su alcune specie di *Limonium* dell'Italia meridionale (1). *Giornale Botanico Italiano* 124 (1): 75.
- Brullo, S. & Pavone, P. (1981) Chromosome numbers in the Sicilian species of *Limonium* Miller (Plumbaginaceae). *Anales del Jardín Botánico de Madrid* 37: 535–555.
- Castro, M. & Rosselló, J.A. (2007) Karyology of *Limonium* (Plumbaginaceae) species from the Balearic Islands and the western Iberian Peninsula. *Botanical Journal of the Linnean Society* 155 (2): 257–272.
<http://dx.doi.org/10.1111/j.1095-8339.2007.00703.x>
- Chazelles, M. de (1790) *Supplement au Dictionnaire des Jardiniers* 2. Claude Lamort, Metz, 758 pp.
- Degen, A. (1937) *Flora Velebitica* 2. Verlag der Ungar, Akademie der Wissenschaften, Budapest, 540 pp.
- Diana Corrias, S. (1978) Le piante endemiche della Sardegna: 29–32. *Bolletino della Società Sarda di Scienze Naturali* 17: 267–288.
- Domina, G., Danin, A. & Raimondo, F.M. (2006) A new species of *Limonium* (Plumbaginaceae) from Israel. *Flora Mediterranea* 16: 133–138.
- Domina, G., Erben, M. & Raimondo, F.M. (2008) Two new species of *Limonium* (Plumbaginaceae) from Lebanon. *Flora Mediterranea* 18: 333–339.
- Domina, G. & Raimondo, F.M. (2012) *Limonium cedrorum* sp. nov. (Plumbaginaceae) from Lebanon. *Nordic Botanical*

- Journal* 30: 1–4.
<http://dx.doi.org/10.1111/j.1756-1051.2012.01396.x>
- Dumortier, B.C.J. (1827) *Florula belgica, Operis majoris Prodrum. Staminacia*. Typis J. Casterman, Tornaci Nerviorum, 172 pp.
- Erben, M. (1978) Die Gattung *Limonium* im südwestmediterranen Raum. *Mitteilungen der Botanischen Staatssammlung München* 14: 361–631.
- Erben, M. (1979) Karyotype differentiation and its consequences in Mediterranean *Limonium*. *Webbia* 34 (1): 409–417.
<http://dx.doi.org/10.1080/00837792.1979.10670178>
- Erben, M. (1980) Bemerkungen zur taxonomie der Gattung *Limonium* I. *Mitteilungen der Botanischen Staatssammlung München* 16: 547–563.
- Erben, M. (1981) Bemerkungen zur Taxonomie der Gattung *Limonium* II. *Mitteilungen der Botanischen Staatssammlung München* 17: 485–510.
- Erben, M. (1988) Bemerkungen zur Taxonomie der Gattung *Limonium* IV. *Mitteilungen der Botanischen Staatssammlung München* 27: 381–406.
- Erben, M. (1989) Bemerkungen zur Taxonomie der Gattung *Limonium* V. *Mitteilungen der Botanischen Staatssammlung München* 28: 313–417.
- Erben, M. (1993) *Limonium* Miller. In: Castroviejo, S., Aedo, C., Cirujano, S., Laínz, M., Montserrat, P., Morales, R., Munoz Garmendia, F., Navarro, C., Paiva, J. & Soriano C. (Eds.) *Flora Iberica* 3. Real Jardín Botánico, CSIC, Madrid, pp. 2–143.
- Erben, M. (2001) Bemerkungen zur Taxonomie der Gattung *Limonium* VII. *Sendtnera* 7: 53–84.
- Erben, M. (2006) *Limonium* Mill. In: Starmühler, W. (Ed.) *Vorarbeiten zu einer „Flora von Istrien“ Teil IX. Carinthia II* 196/116: 549–551.
- Erben, M. (2007) *Limonium* Mill.-Statice. In: Jeanmonod, D. & Gamisans, J. (Eds.) *Flora Corsica*. Édisud, Aix-en-Provence, pp. 371–378.
- Fazlıoğlu, F. (2011) *A phenetics study for infrageneric grouping of Limonium Mill. genus (Plumbaginaceae) in Turkey*. Middle East Technical University of Ankara, Turkey, 96 pp.
- Fiori, A. (1902) Plumbaginaceae. In: Fiori, A. & Paoletti, G. (Eds.) *Flora analitica d'Italia* 2. Tipografia del Seminario, Padova. pp. 326–335.
- Fourreau, M. (1869) Catalogue des plantes du Cours du Rhone. *Annales de la Société Linnéenne de Lyon* 2: 89–200.
<http://dx.doi.org/10.5962/bhl.title.12050>
- Georgakopoulou, A., Manousou, R., Artelari, R. & Georgiou, O. (2006) Breeding system and cytology in Greek populations of five *Limonium* species (Plumbaginaceae). *Willdenowia* 36: 741–750.
<http://dx.doi.org/10.3372/wi.36.36209>
- Greuter, W. & Raus, T. (1987) Med-Chechklist Notulae, 14. *Willdenowia* 16: 439–452.
- Gussone, G. (1832) *Supplementum ad Florae Siculae Prodrum*, 1. Regia Typographia, Neapoli, 166 pp.
- Ingrouille, M.J. (1984) A taxometric analysis of *Limonium* (Plumbaginaceae) in Western Europe. *Plant Systematics and Evolution* 147: 103–118.
<http://dx.doi.org/10.1007/bf00984583>
- Kouzali, I., Artelari, R. & Georgiou, O. (2012) Breeding systems and cytology in Cyprian populations of six *Limonium* species (Plumbaginaceae). *Willdenowia* 42: 307–313.
<http://dx.doi.org/10.3372/wi.42.42217>
- Kuntze, O. (1891) *Revisio generum plantarum vascularium omnium* 2. Felix, Leipzig, 1011 pp.
- Lacaita, C. (1884) Nuova specie di *Statice* italiana. *Nuovo Giornale Botanico Italiano* 16: 168–169.
- Linnaeus, C. (1753) *Specie Plantarum* 1. Laurentii Salvii, Stockholm, 560 pp.
- Llorens, L. (1986) Revisión sistemático-taximétrica del género *Limonium* Miller en la isla de Mallorca. *Lazaroa* 8: 11–68.
- Lovrić, A.Ž. (1975) *Bora salt storms and biocenoses of the Senj Archipelago*. Institute of Botany, University of Zagreb, 54 pp.
- Lovrić, A.Ž. (1981) The Adriatic endemics (Introduction). *Rapports CIESM, ser. Insulaire* 9 (27): 63–64.
- Lovrić, A.Ž. (1988) Endemism of *Limonium* (Statice) in Yugoslav halophytic vegetation. *Rapport Commission International Mer Méditerranée* 31: 56.
- Lovrić, A.Ž. (1995) *Eolski kserobiomi od Jadrana do Irana (Taksonomske i biocenološke osobitosti olujnih obala i primorskih vrhova duž Taurodinarskog velekrasa)*. University of Zagreb, Zagreb, 460 pp.
- Mayer, A. (1995) Comparative study of coastal vegetation of Sardinia (Italy) and Crete (Greece) with respect to the effects of human influence. *Libri Botanici* 15: 1–264.
- Miller, P. (1754) *The Gardeners Dictionary, Abridgment, ed. 4*. 2. Printed by the author, London.
- Miller, P. (1768) *The Gardeners Dictionary ed. 8*. Printed by the author, London.
- Mitić, B., Bogdanović, S. & Vršek, I. (2003) Typification of the *Limonium vestitum* (C.E.Salmon) C.E.Salmon species (Plumbaginaceae). In: Besendorfer, V. & Kopjar, N. (Eds.) *8th Croatian Biological Congress with international participation - Proceeding of Abstracts*. Hrvatsko biološko društvo, Zagreb, pp. 149–150.
- Moris, G.G. (1827) *Stirpium sardoarum elenchus* 2. Ex Typis Regiis, Calari, 12 pp.
- Nikolić, T. (Ed.) (2013) *Flora Croatica database*. University of Zagreb, Department of Botany, Zagreb. Available from <http://hirc.botanic.hr/fcd/search.aspx/> February 2013 (accessed 15 January 2013)
- Pandža, M., Franjić, J., Škvorc, Ž. & Idžojtić, M. (2007) Syntaxonomical and synchorological analysis of the *Crithmo-*

- Limonietea* Br.–Br. 1947 on the Eastern Adriatic coast. *Periodicum Biologorum* 109: 61–66.
- Pavletić, Z. (1989) Vegetation of the class *Crithmo-Limonietea* in the Adriatic Littoral of Yugoslavia. *Colloques Phytosociologiques* 19: 395–400.
- Pavletić, Z. (1990) Sintaksonomska i sinkorološka analiza vegetacije razreda *Crithmo-Limonietea* Br.–Bl. 1947. u Hrvatskom primorju. *Acta Botanica Croatica* 51: 89–94.
- Phitos, D. & Artelari, R. (1981) A new species of *Limonium* from Kefallinia (Greece). *Botanika Chronika* 1: 18–21.
- Pignatti, S. (1955) Studi sulla flora e vegetazione dell'isola di Mallorca (Baleari). *Archivio Botanico (Forlì)* 31: 66–100.
- Pignatti, S. (1971) Studi sui *Limonium* VIII. In: Heywood, V.H. (Ed.) *Notulae systematicae ad Floram Europaeam spectantes*, no. 11. *Botanical Journal of the Linnean Society* 64: 361–370.
- Pignatti, S. (1982a) *Flora d'Italia* 2. Edagricole, Bologna, 732 pp.
- Pignatti, S. (1982b) New species of *Limonium* from Italy and Tunisia. *Webbia* 36: 47–56.
<http://dx.doi.org/10.1080/00837792.1982.10670239>
- Raimondo, F.M. (1993) *Limonium optima*, a new species from central Sicily. *Flora Mediterranea* 3: 13–18.
- Raimondo, F.M. & Pignatti, S. (1986) Una nuova specie di *Limonium* (Plumbaginaceae) della Sicilia. *Webbia* 39: 417–421.
<http://dx.doi.org/10.1080/00837792.1986.10670381>
- Rizzotto, M. (1984) A systematic study of the *Limonium* populations of the Tuscan peninsular coast. *Webbia* 37: 259–275.
<http://dx.doi.org/10.1080/00837792.1984.10670279>
- Rizzotto, M. (1999) Research on the genus *Limonium* (Plumbaginaceae) in the Tuscan Archipelago (Italy). *Webbia* 53: 241–282.
<http://dx.doi.org/10.1080/00837792.1999.10670663>
- Rohlf, F.J. (2000) *NTSYSpc Numerical Taxonomy and Multivariate Analysis System*, vers. 2.1. Exeter Software, New York.
- Rouy, G.C. (1908) *Flore de France* 10. Fils d'Émile Deyrolle, Paris, 404 pp.
- Salmon, C.E. (1922) Notes on *Statice*. XIV. *Statice anfracta*, sp. nov. (Plate 565). *Journal of Botany (London)* 60: 344–346.
- Salmon, C.E. (1923) Notes on *Statice*. XV. *Statice vestita*, sp. nov. (Plate 567). *Journal of Botany (London)* 61: 96–99.
- Salmon, C.E. (1924) Short notes. *Statice* v. *Limonium*. *Journal of Botany (London)* 62: 335–336.
- Tenore, M. (1824–1829) *Flora Napolitana*, 3. Stamperia Francese, Napoli, 412 pp.
- Tausch, I.F. (1824) *Sylloge plantarum novarum itemque minus cognitarum* 2. Typis Tiouae C.E. Brenck, Ratisbonae, 292 pp.
- Tornadore, N., Marchiori, S., Marcucci, R. & Medagli, P. (1995) Ricerche biosistematiche, floristiche e conservazionistiche su alcuni taxa significativi del Salento meridionale (Puglia-Italia). *Bollettino Società Sarda di Scienze Naturali* 30: 337–350.
- Thiers, B. (2013) Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. Available from: <http://sweetgum.nybg.org/ih/> (accessed 15 January 2013)
- Trinajstić, I. (1980) Taxa nova et combinationes novae in flora Jugoslaviae. *Supplementum ad Floram analyticam Jugoslaviae* 7: 1–13.
- Trinajstić, I. (1981) *Analitička flora Jugoslavije* 1 (7). Sveučilišna naklada Liber, Zagreb, 21 pp.

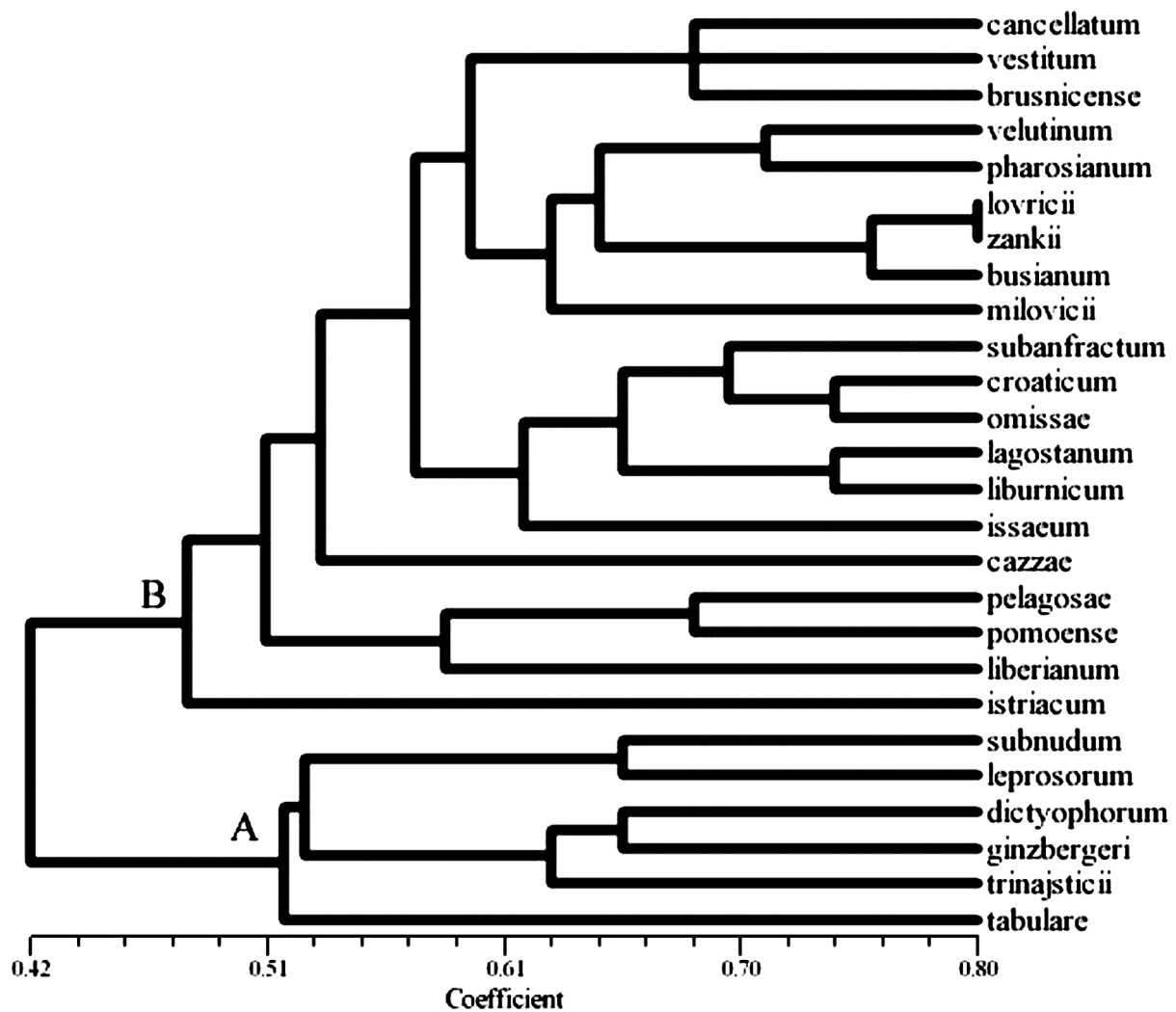


FIGURE 1. UPGMA phenogram based on 35 morphological characters of the investigated species of *Limonium cancellatum* group from Croatia.

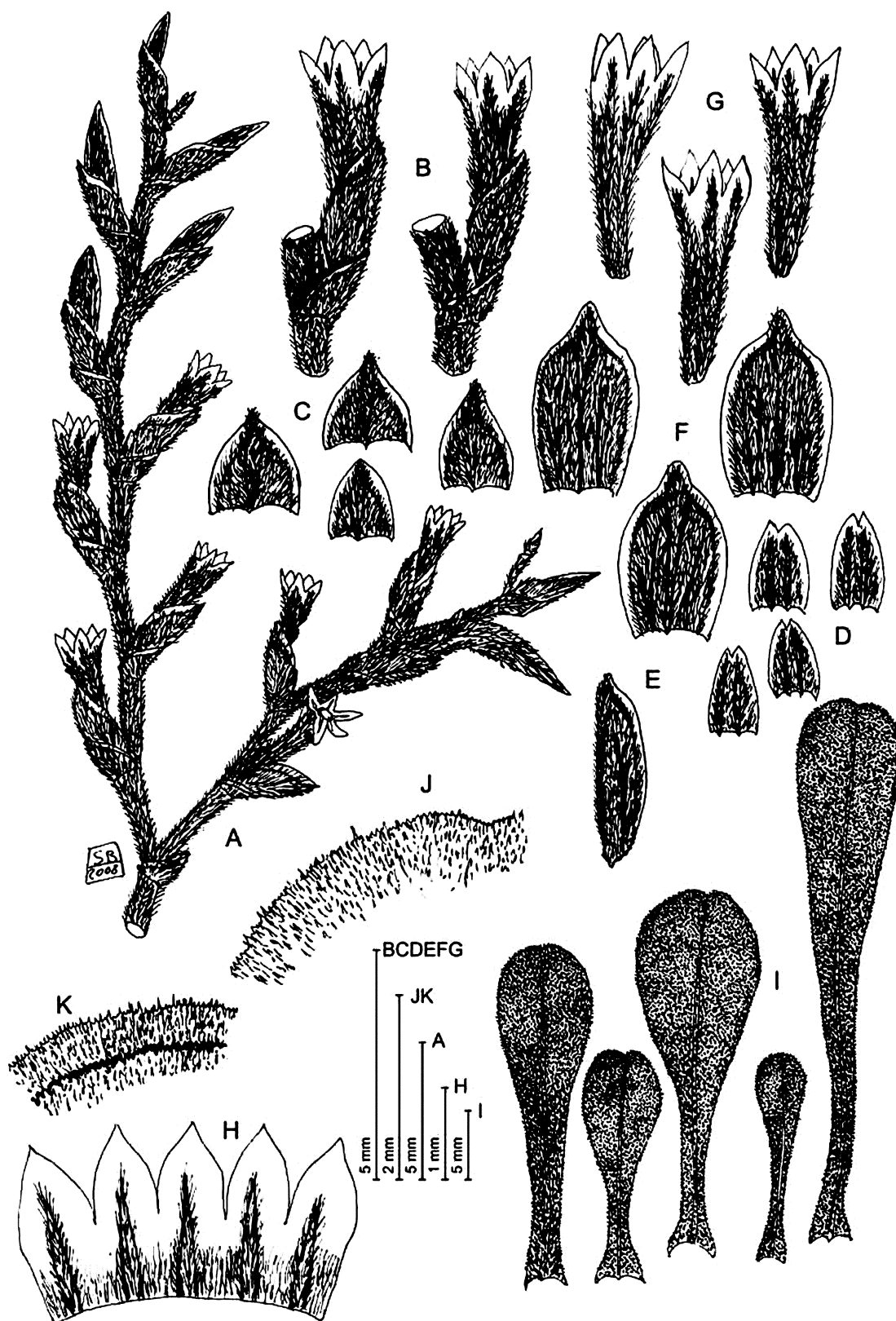


FIGURE 2. *Limonium brusnicense*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bract (lateral view). **F.** Inner bracts (dorsal view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Bogdanović s.n.*, CAT).

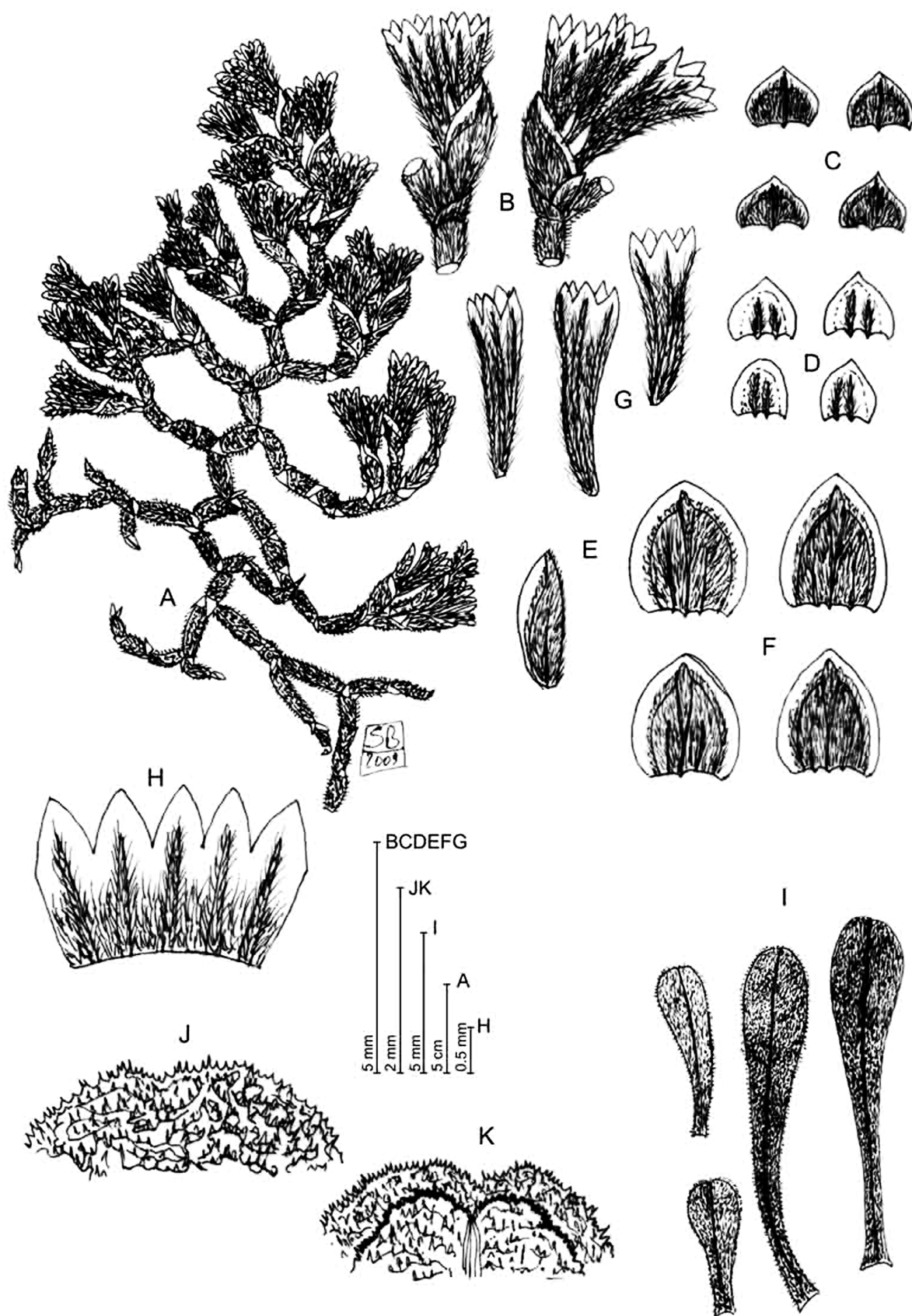


FIGURE 3. *Limonium busianum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bract (lateral view). **F.** Inner bracts (dorsal view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Bogdanović s.n.* type CAT).

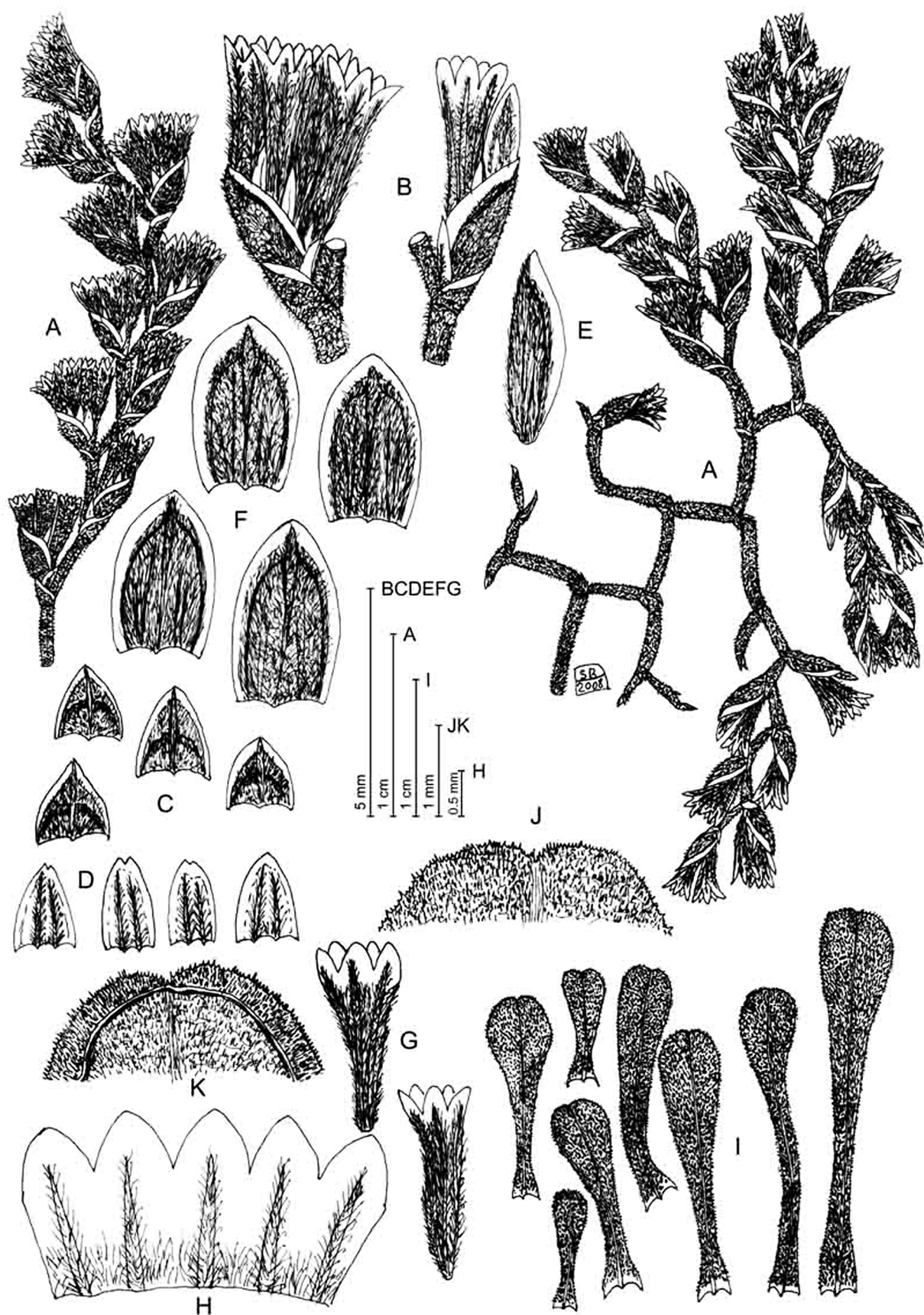


FIGURE 4. *Limonium cancellatum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bract (lateral view). **F.** Inner bracts (dorsal view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on Brullo. Bogdanović & Giusso s.n., CAT).

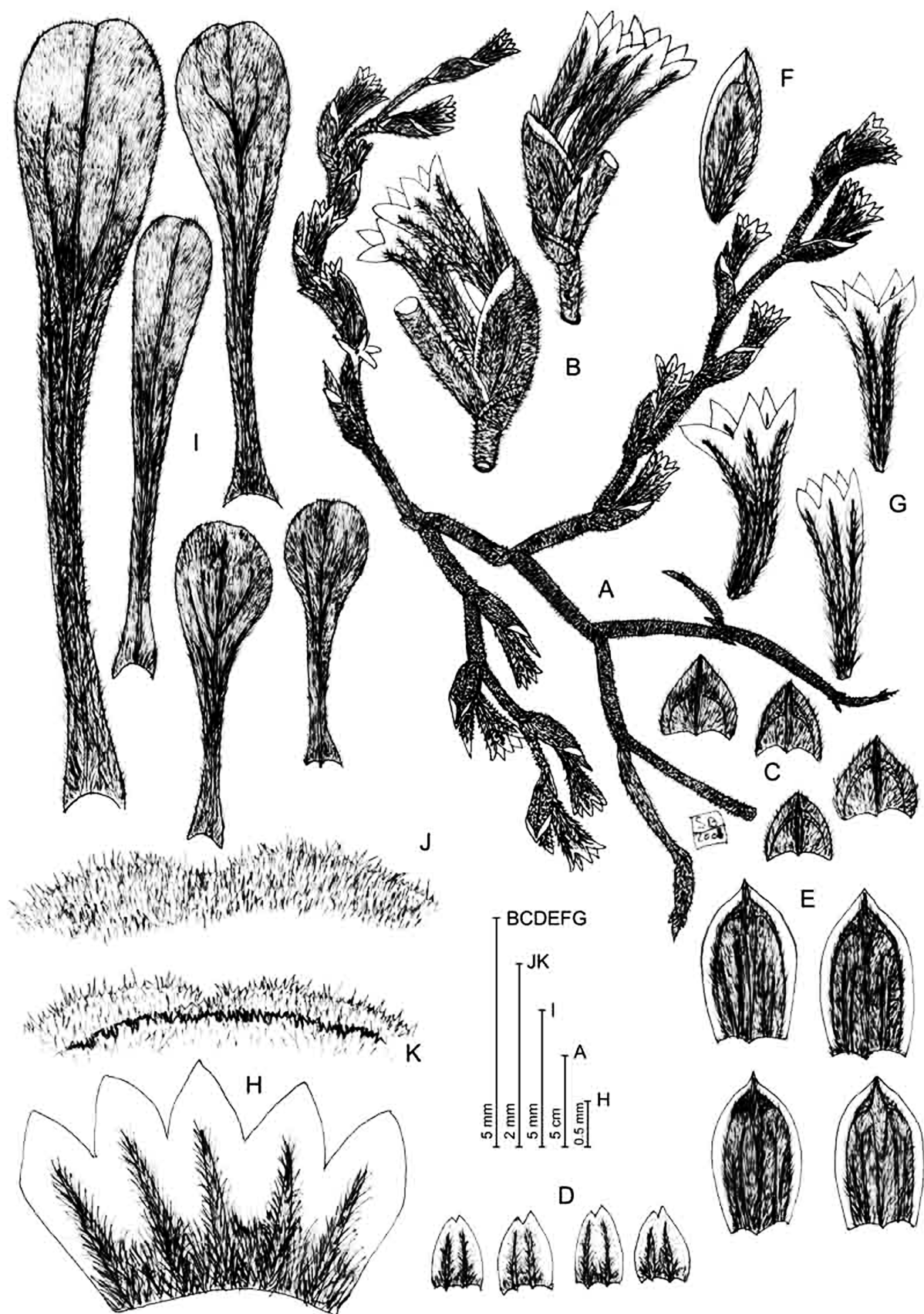


FIGURE 5. *Limonium cazzae*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bracts (dorsal view). **F.** Inner bract (lateral view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Bogdanović s.n.* type CAT).

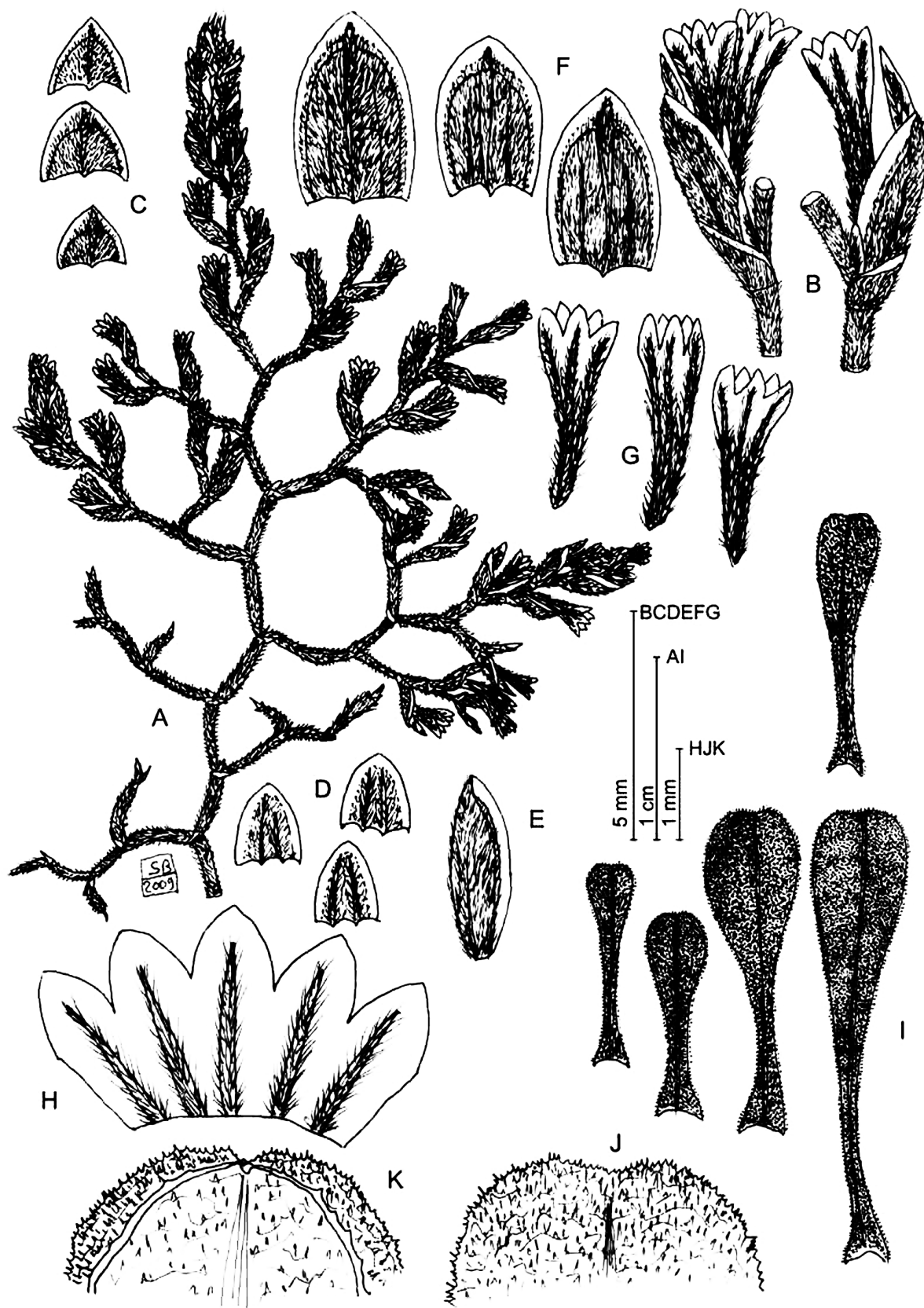


FIGURE 6. *Limonium croaticum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bract (lateral view). **F.** Inner bracts (dorsal view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Liber s.n.*, type CAT).

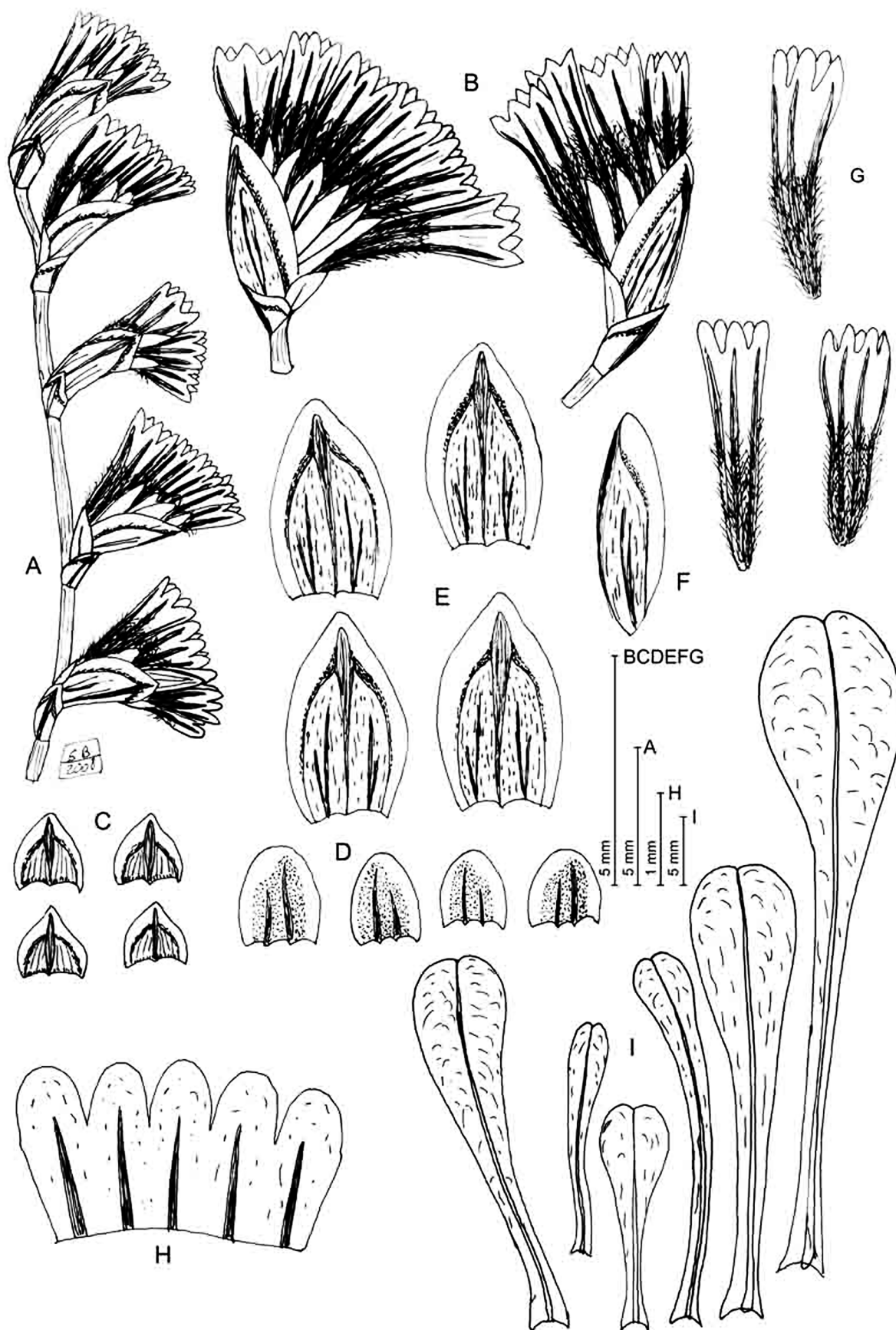


FIGURE 7. *Limonium dictyophorum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bracts (dorsal view). **F.** Inner bract (lateral view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves (Illustration by Salvatore Brullo based on *Brullo, Bogdanović & Giusso s.n. CAT*).

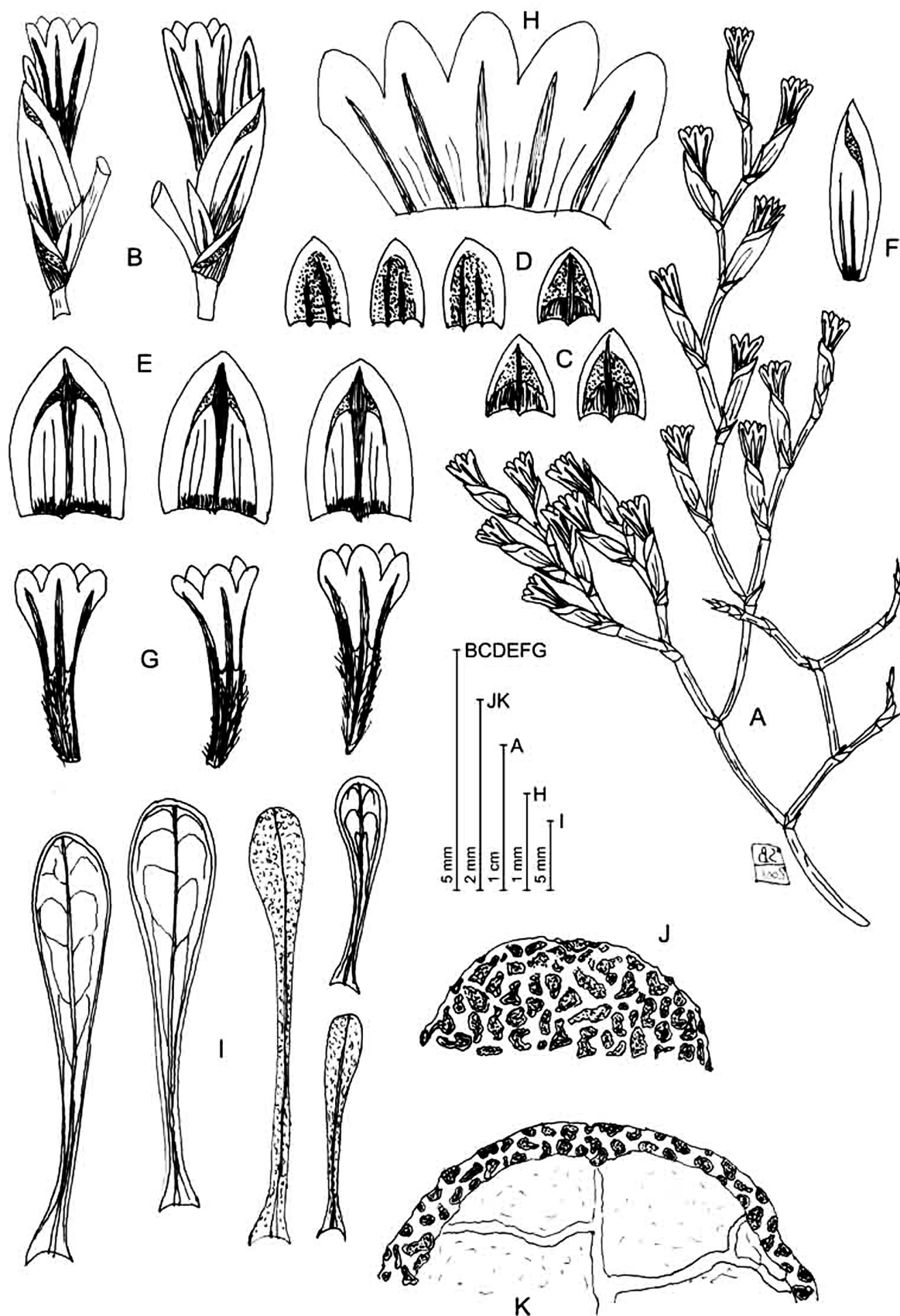


FIGURE 8. *Limonium ginzbergeri*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bracts (dorsal view). **F.** Inner bract (lateral view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf adaxial face. **K.** Leaf abaxial face (Illustration by Salvatore Brullo based on Bogdanović *s.n.*-type CAT).

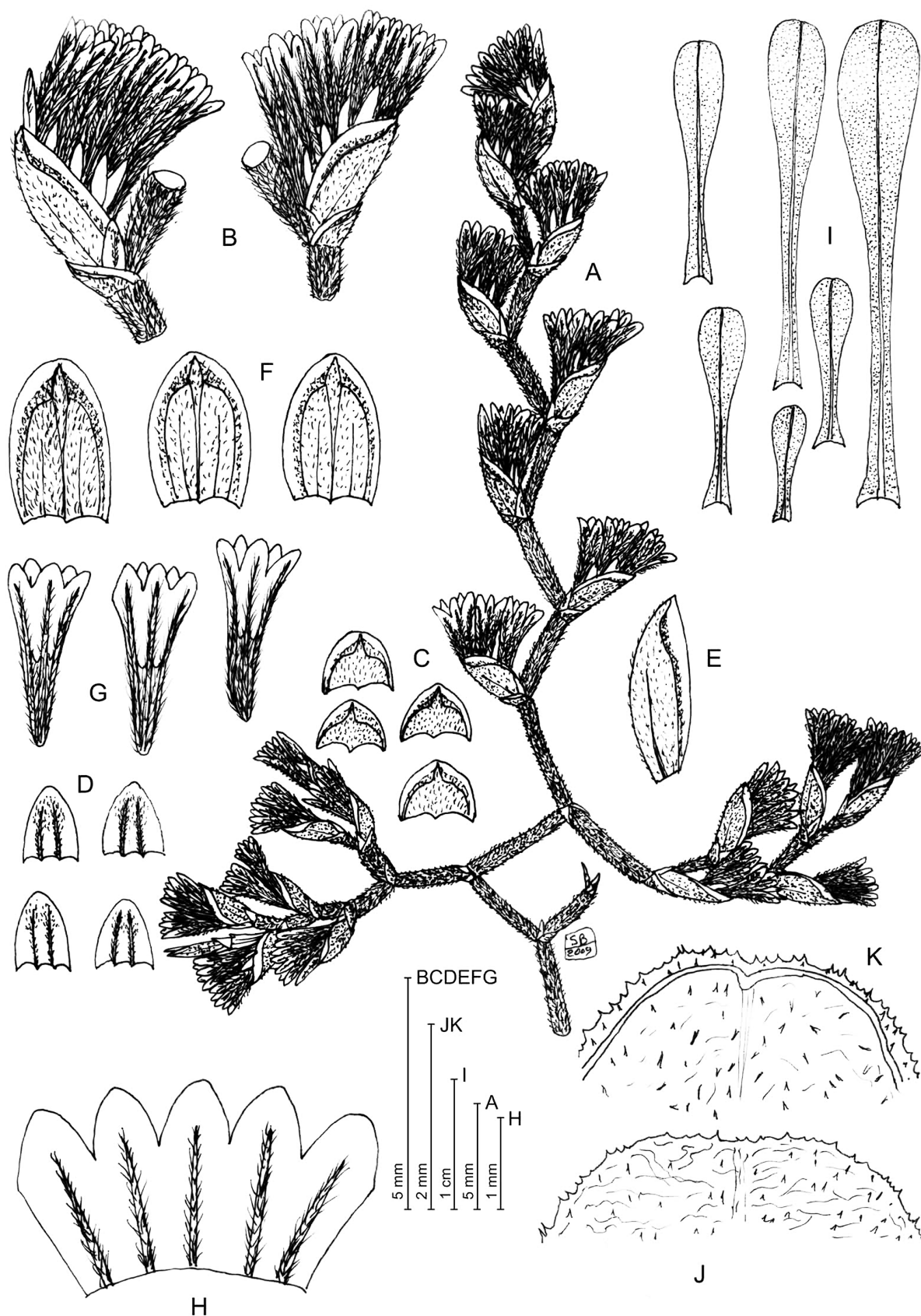


FIGURE 9. *Limonium issaeum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bract (lateral view). **F.** Inner bracts (dorsal view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Bogdanović s.n.* type CAT).

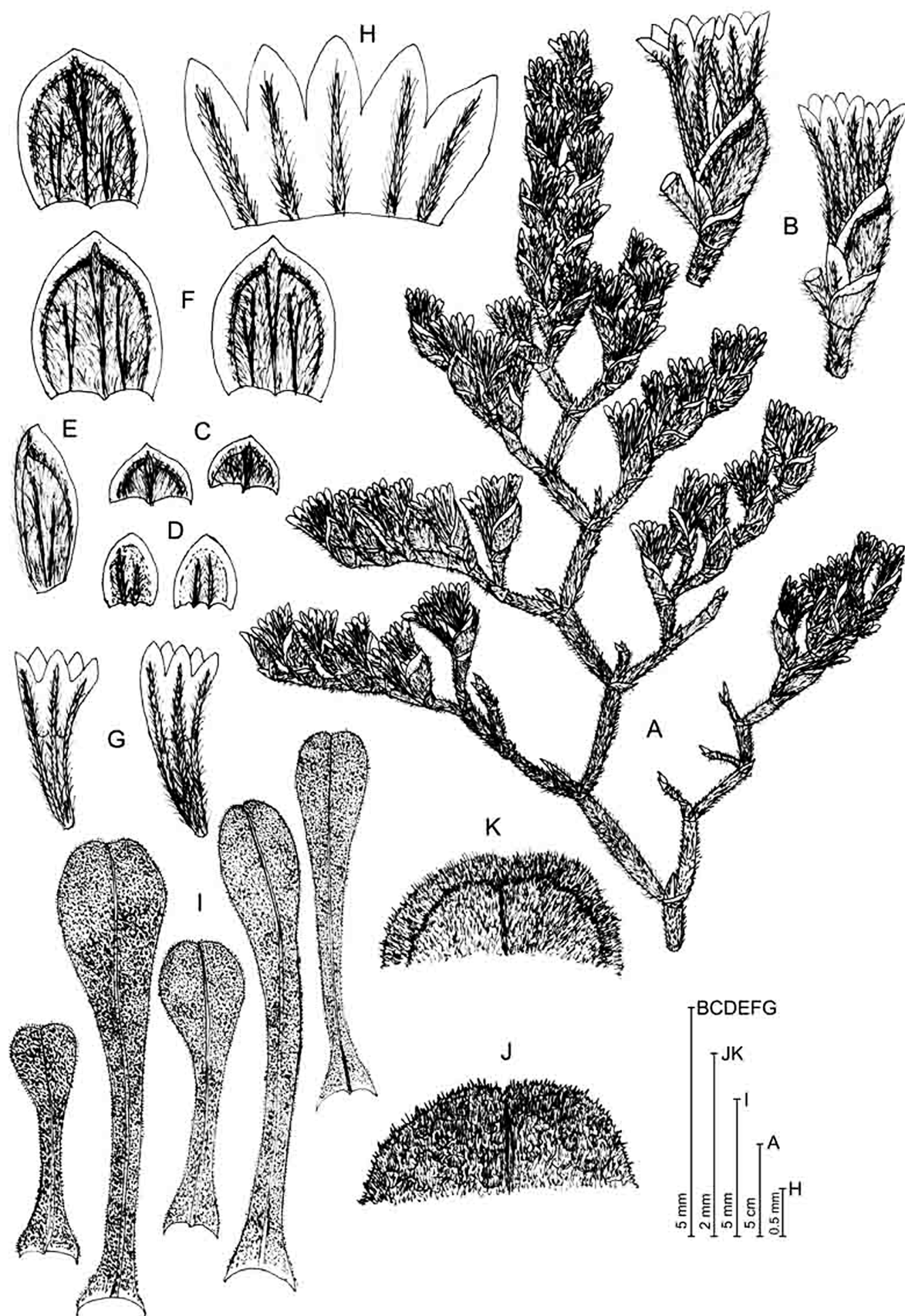


FIGURE 10. *Limonium istriacum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bract (lateral view). **F.** Inner bracts (dorsal view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Marchesetti 1455*. type CAT).

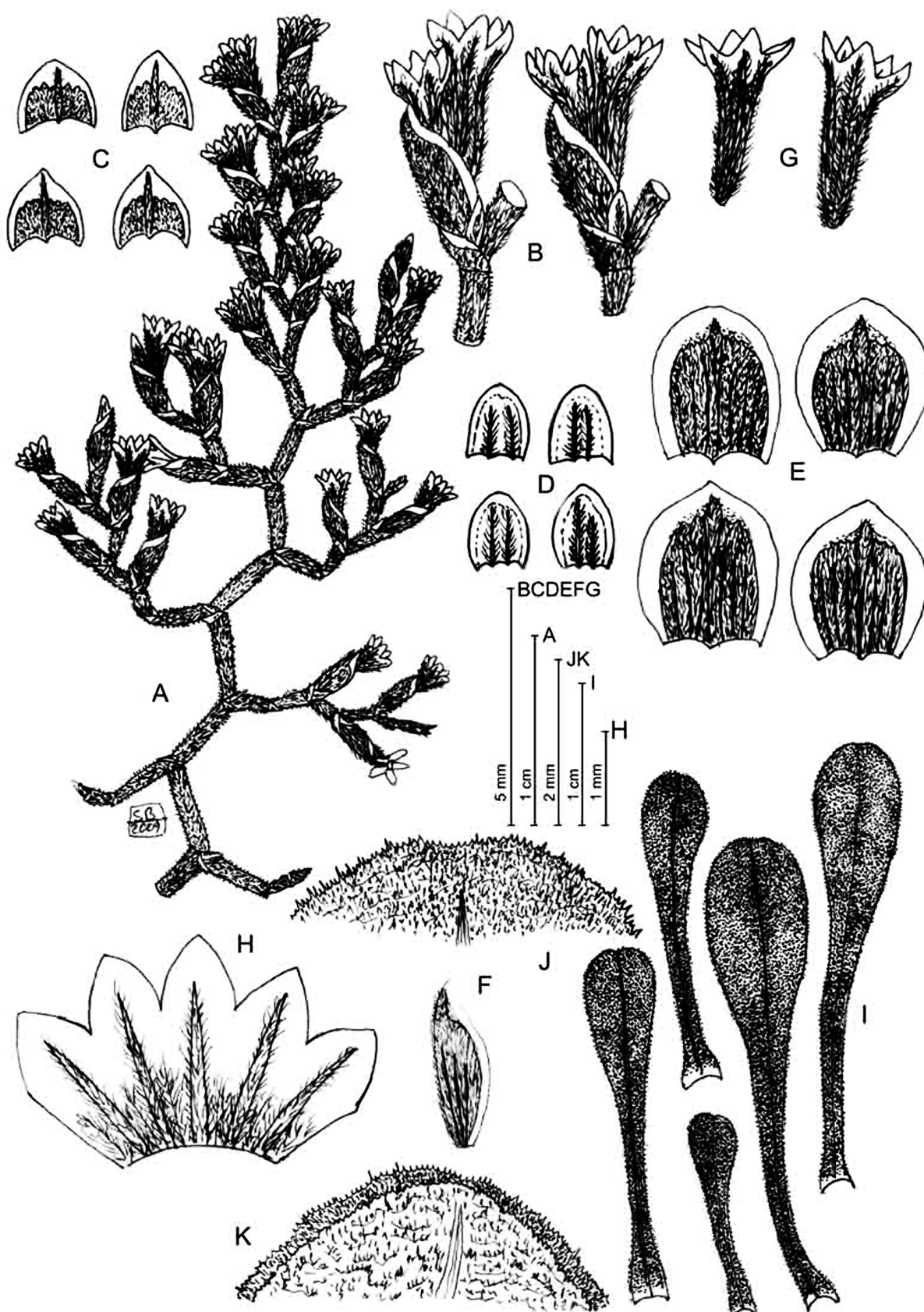


FIGURE 11. *Limonium lagostanum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bracts (dorsal view). **F.** Inner bract (lateral view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face). (Illustration by Salvatore Brullo based on *Bogdanović s.n.*, type CAT).

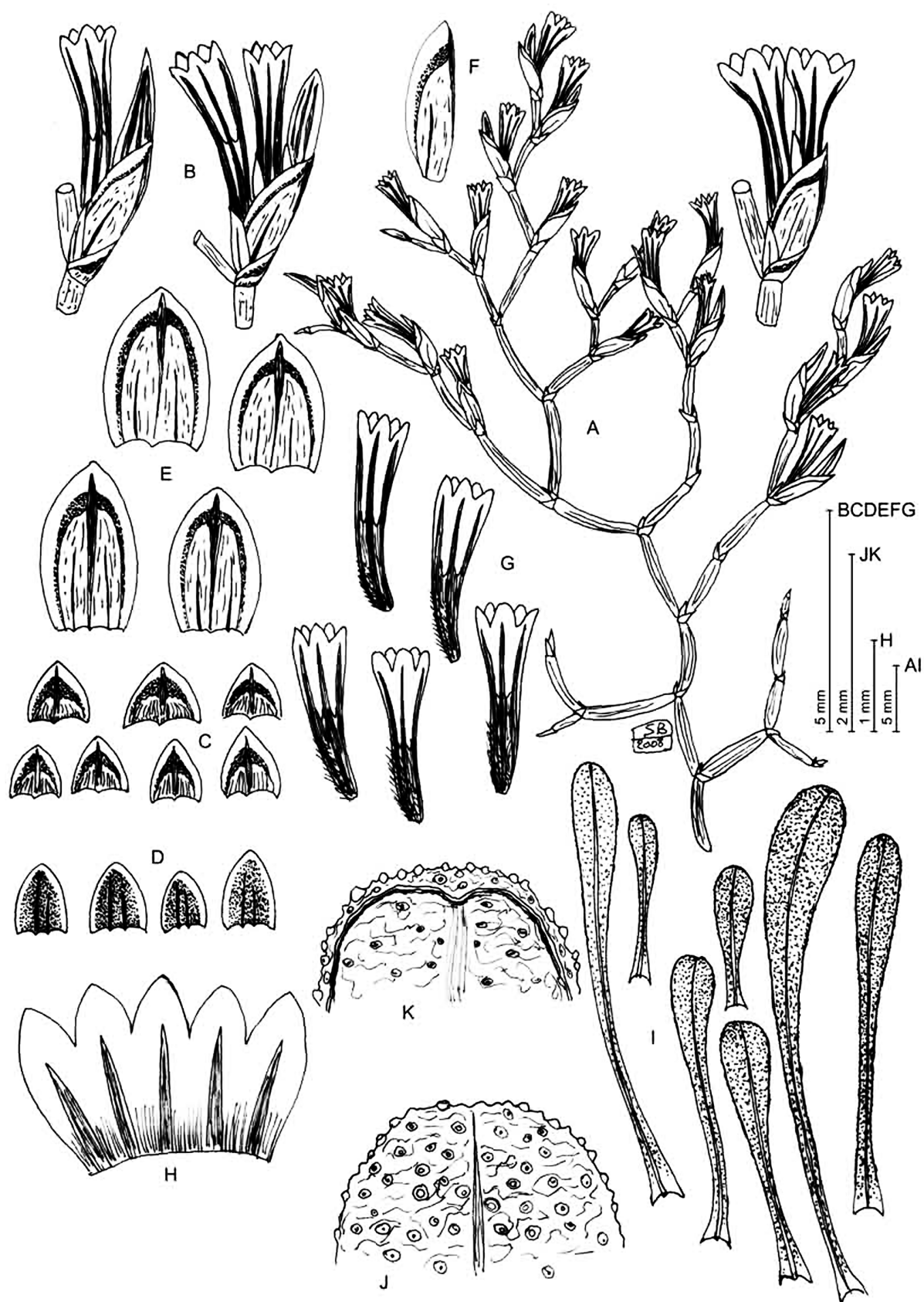


FIGURE 12. *Limonium leprosorum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bracts (dorsal view). **F.** Inner bract (lateral view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf adaxial face. **K.** Leaf abaxial face (Illustration by Salvatore Brullo based on *Bogdanović s.n.* type CAT).

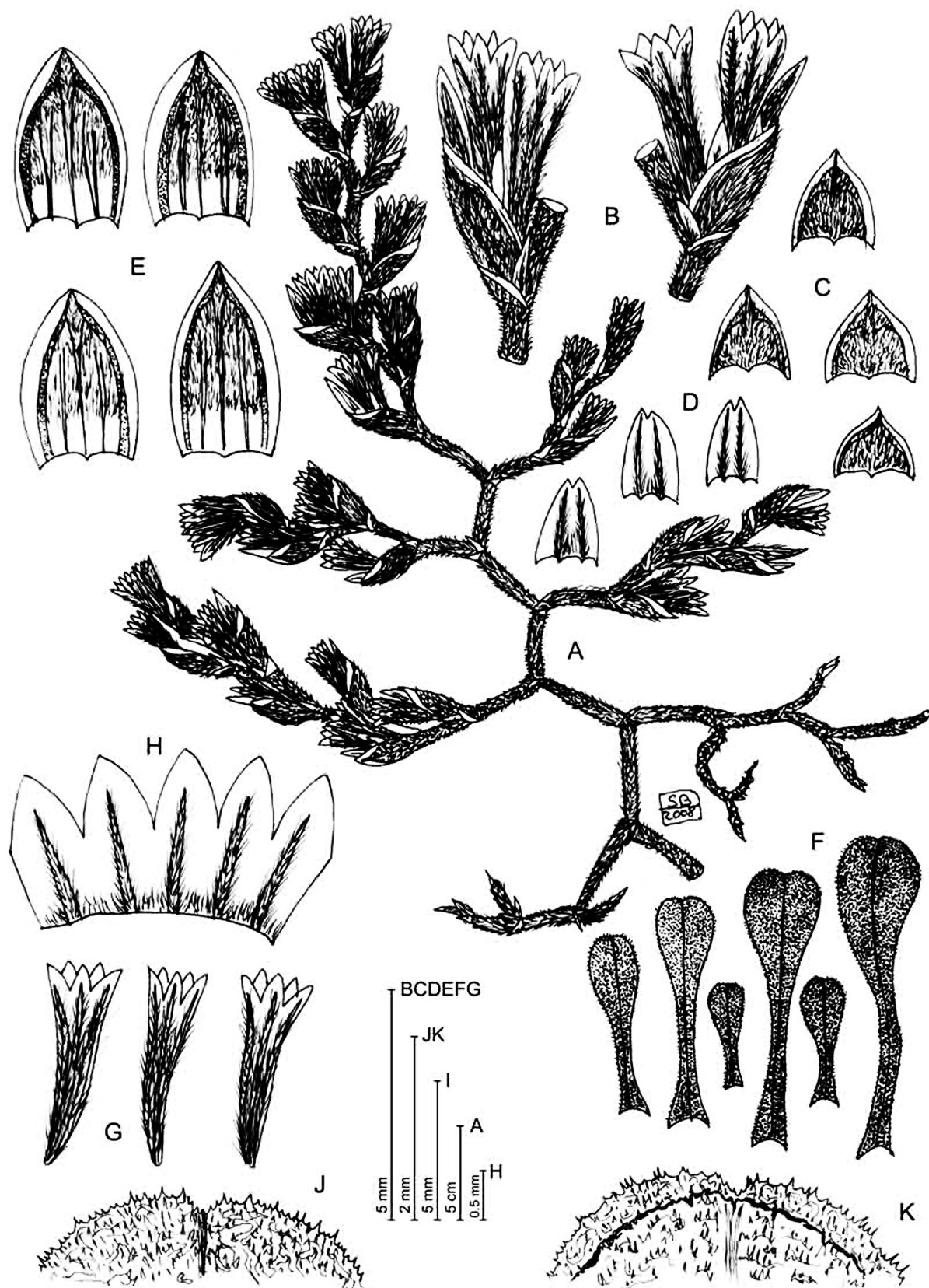


FIGURE 13. *Limonium liberianum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bracts (dorsal view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Liber s.n.* type CAT).

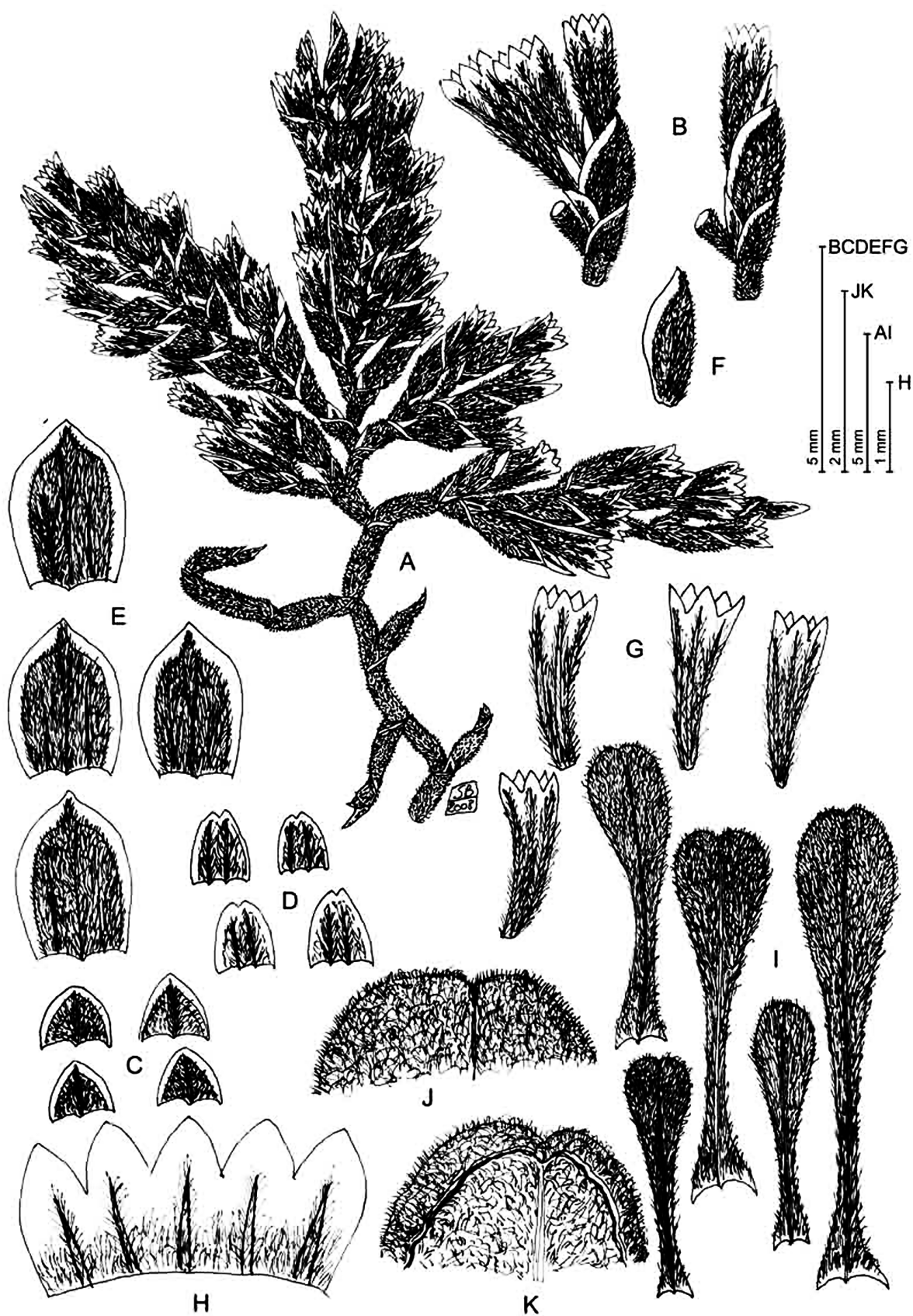


FIGURE 14. *Limonium liburnicum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bracts (dorsal view). **F.** Inner bract (lateral view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face). (Illustration by Salvatore Brullo based on *Bogdanović s.n.*, type CAT).

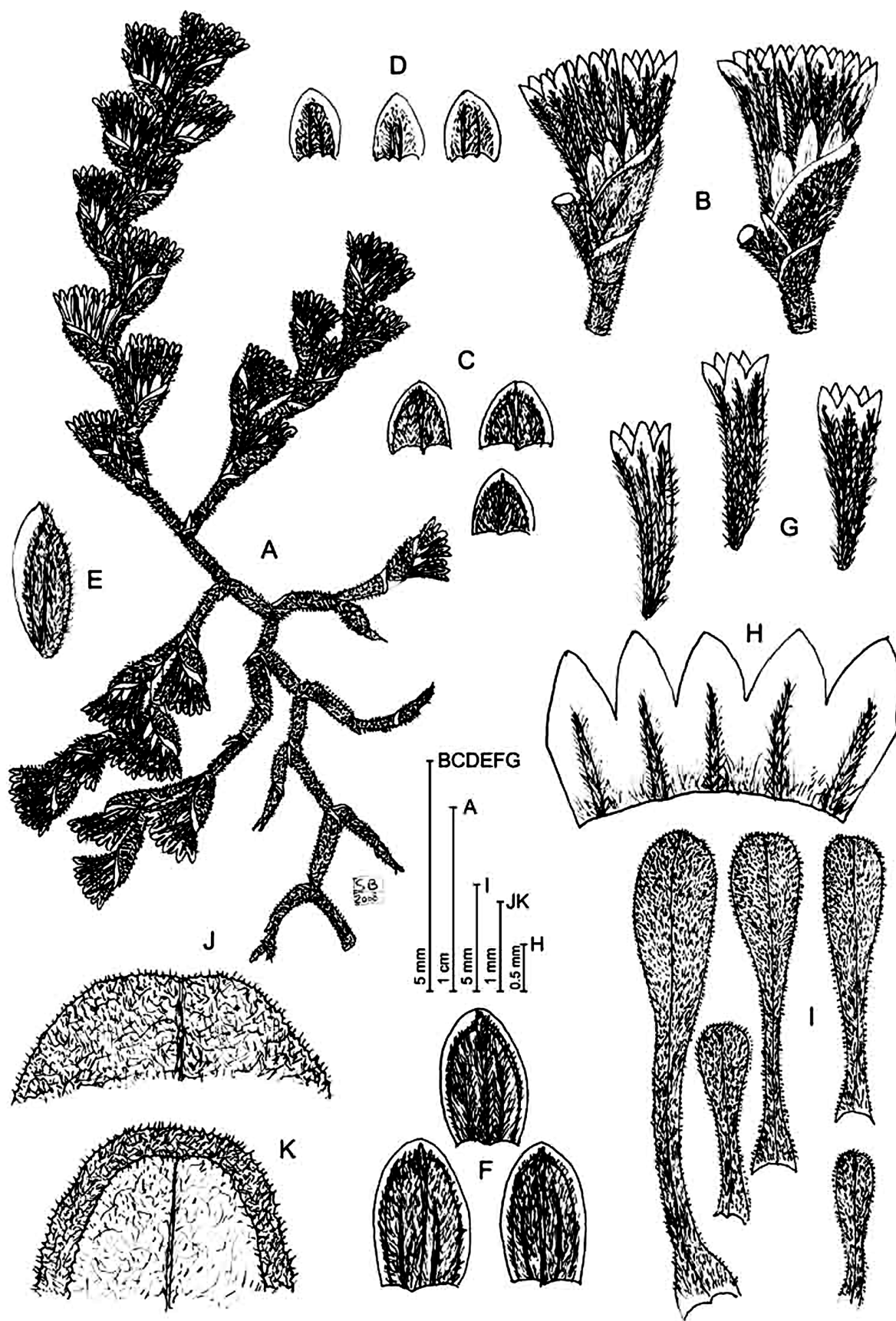


FIGURE 15. *Limonium lovricii*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bract (lateral view). **F.** Inner bracts (dorsal view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on Brullo, Bogdanović & Giusso s.n., type CAT).

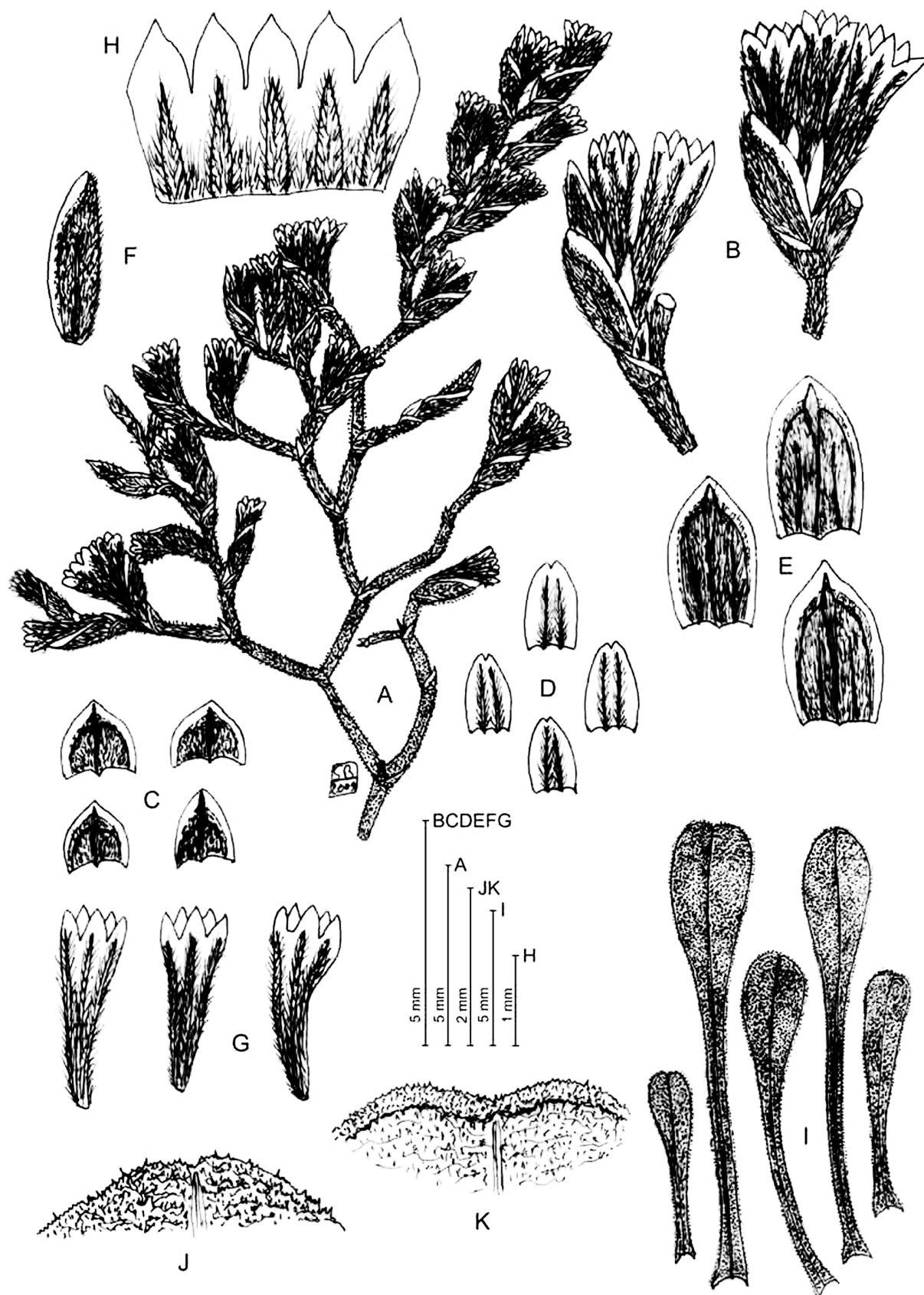


FIGURE 16. *Limonium milovicii*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bracts (dorsal view). **F.** Inner bract (lateral view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Brullo. Bogdanović & Giusso s.n.*, type CAT).

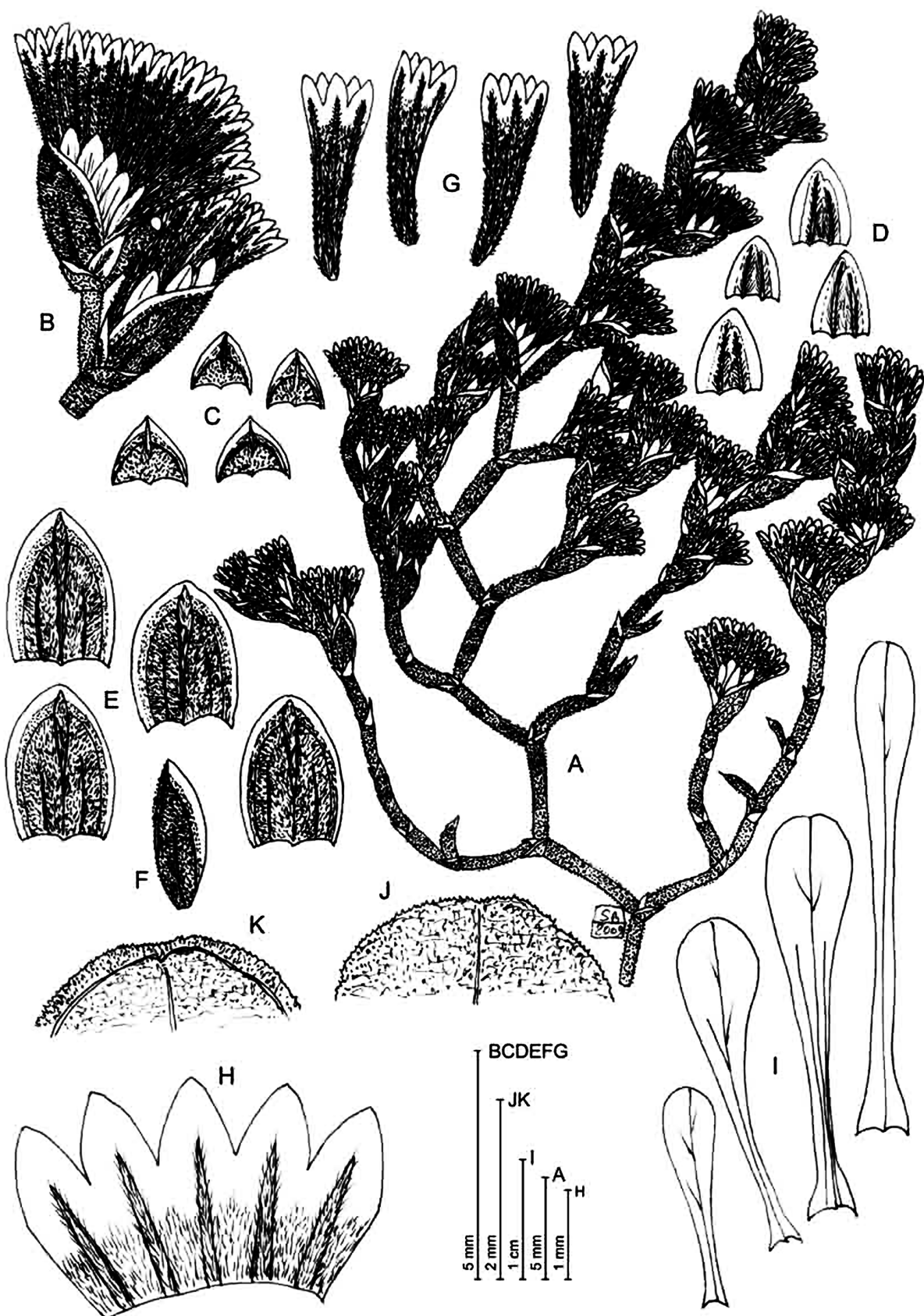


FIGURE 17. *Limonium omissae*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bracts (dorsal view). **F.** Inner bract (lateral view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on Brullo, Bogdanović & Giusso s.n., type CAT).

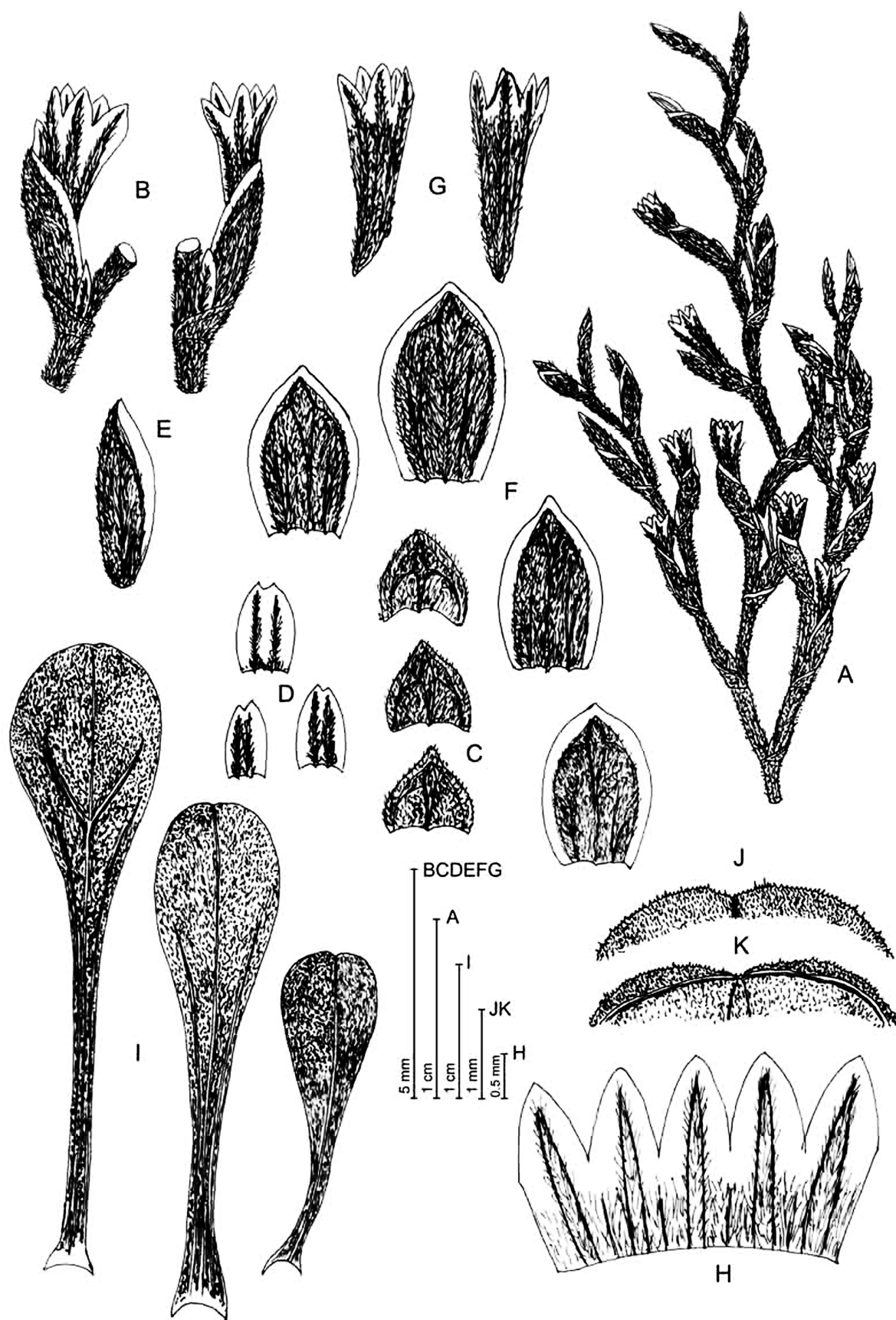


FIGURE 18. *Limonium pelagosae*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bract (lateral view). **F.** Inner bracts (dorsal view). **G.** Calyxes. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on Boršić *s.n.*, type CAT).

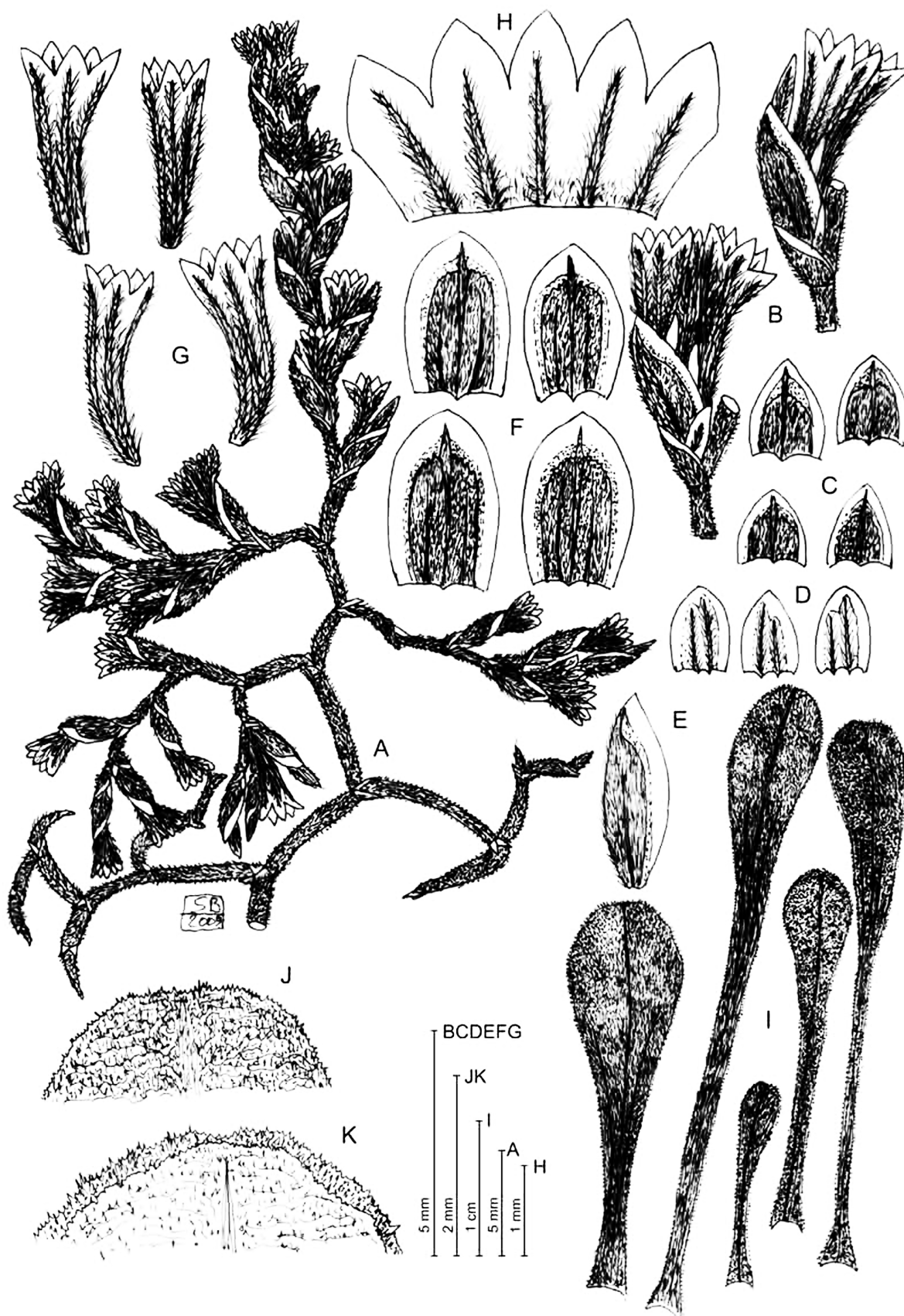


FIGURE 19. *Limonium pharosianum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bract (lateral view). **F.** Inner bracts (dorsal view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Bogdanović & Dujmović s.n.*, type CAT).

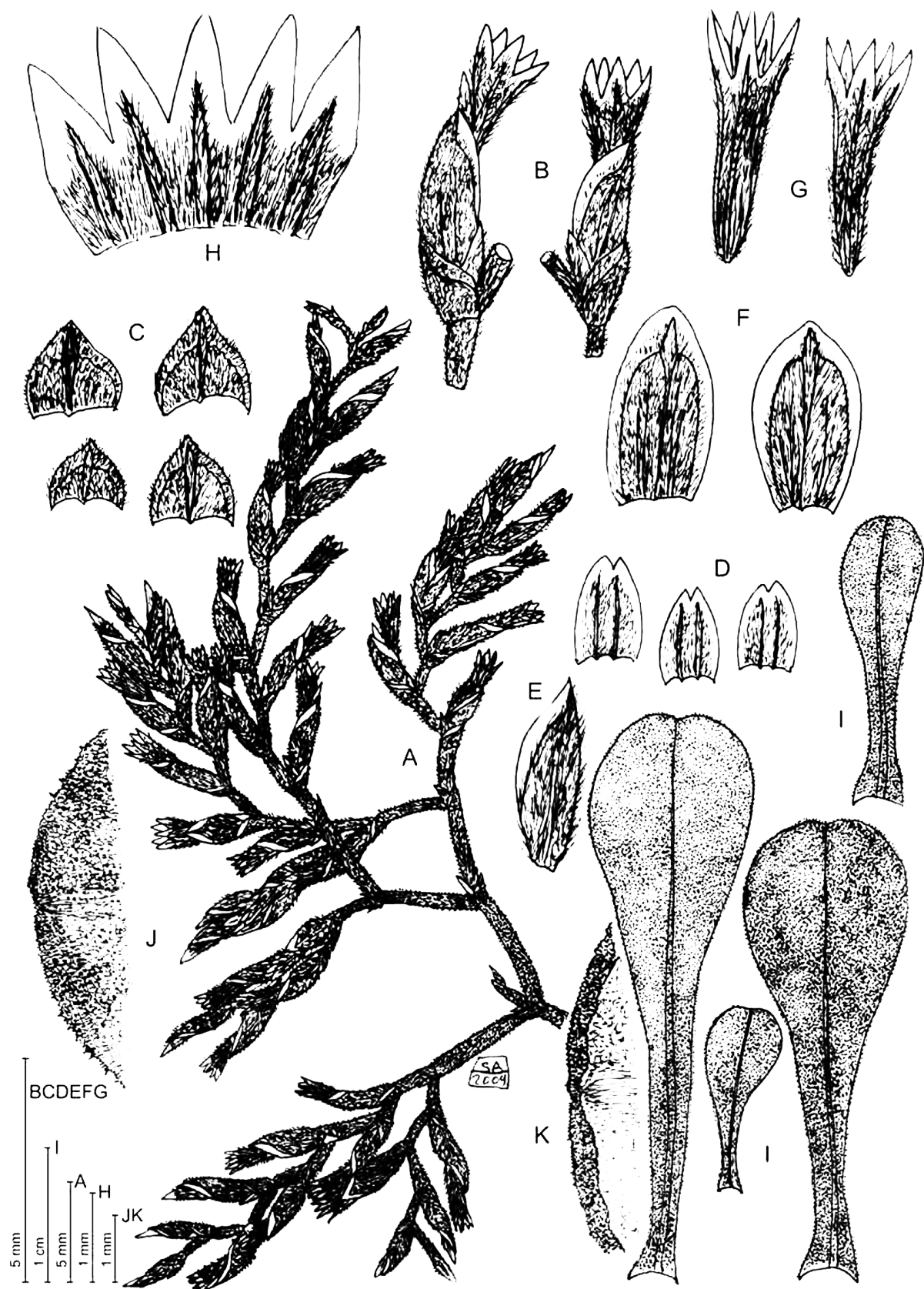


FIGURE 20. *Limonium pomoense*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bract (lateral view). **F.** Inner bracts (dorsal view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on Bogdanović. Boršić & Nikolić s.n., type CAT).

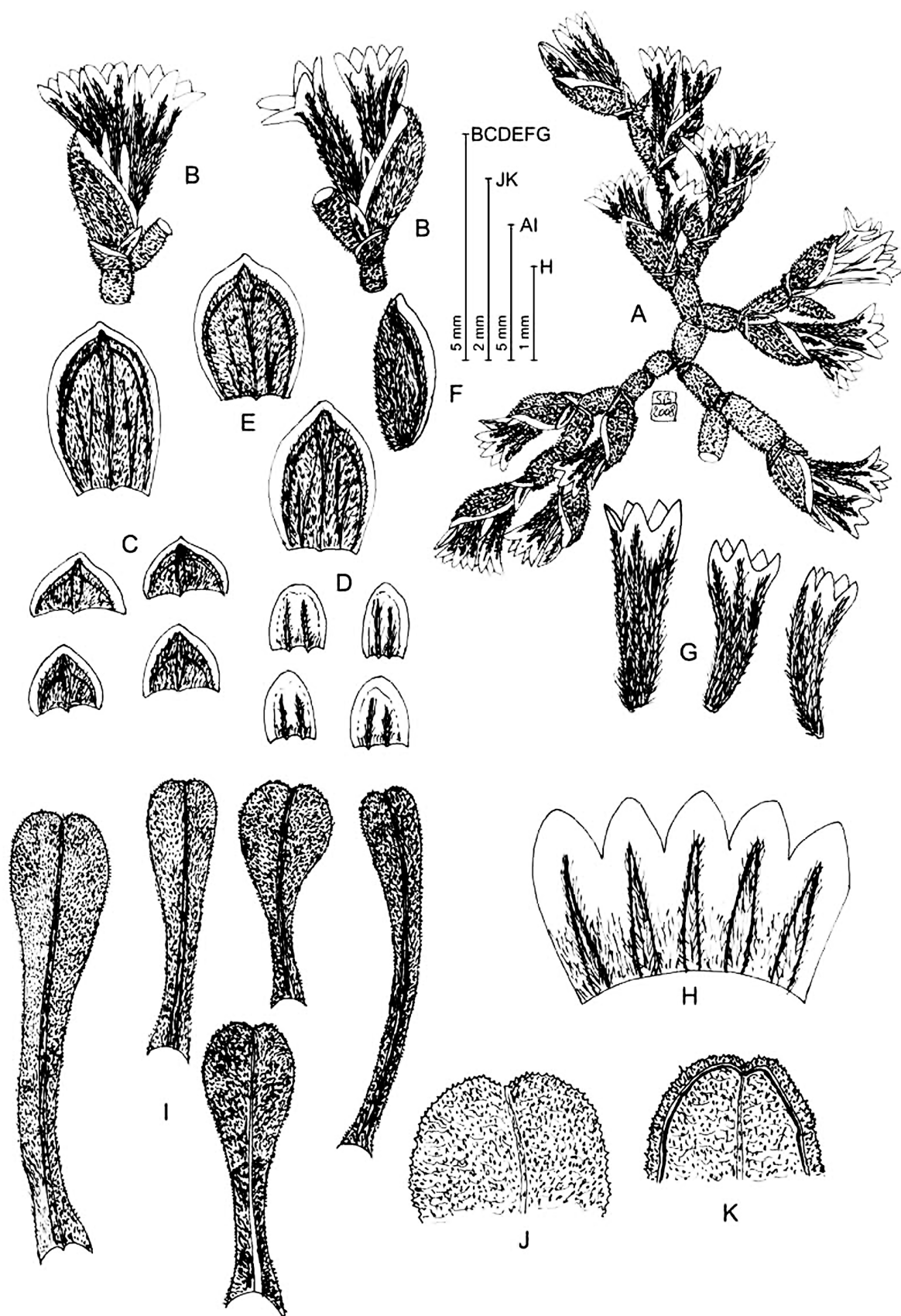


FIGURE 21. *Limonium subanfractum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bracts (dorsal view). **F.** Inner bract (lateral view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Bogdanović s.n.*, ZA).

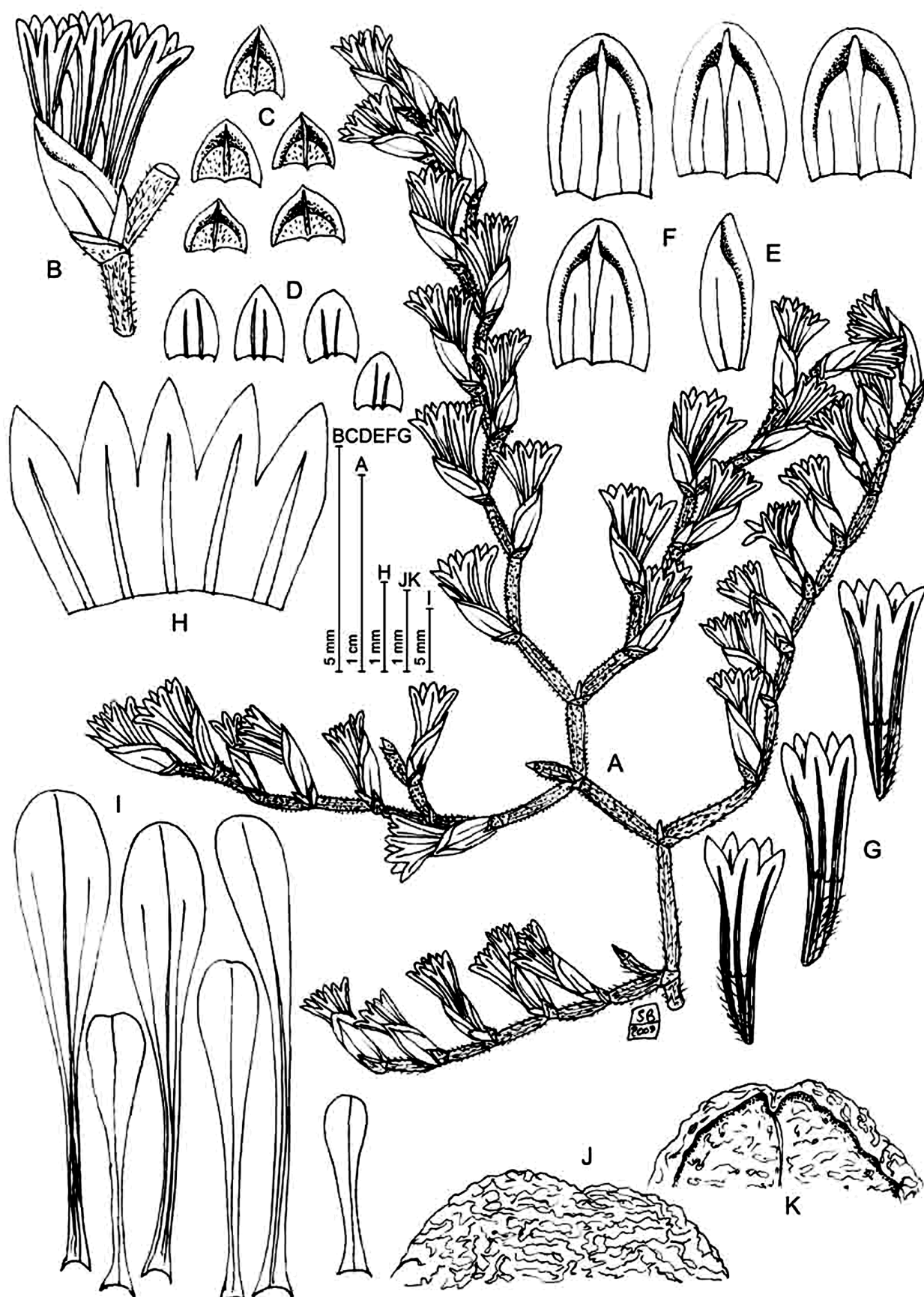


FIGURE 22. *Limonium subnudum*. A. Inflorescence branches. B. Spikelets. C. Outer bracts. D. Middle bracts. E. Inner bract (lateral view). F. Inner bracts (dorsal view). G. Calyces. H. Calyx lobes. I. Leaves. J. Leaf adaxial face. K. Leaf abaxial face (Illustration by Salvatore Brullo based on *Bogdanović s.n.* type CAT).

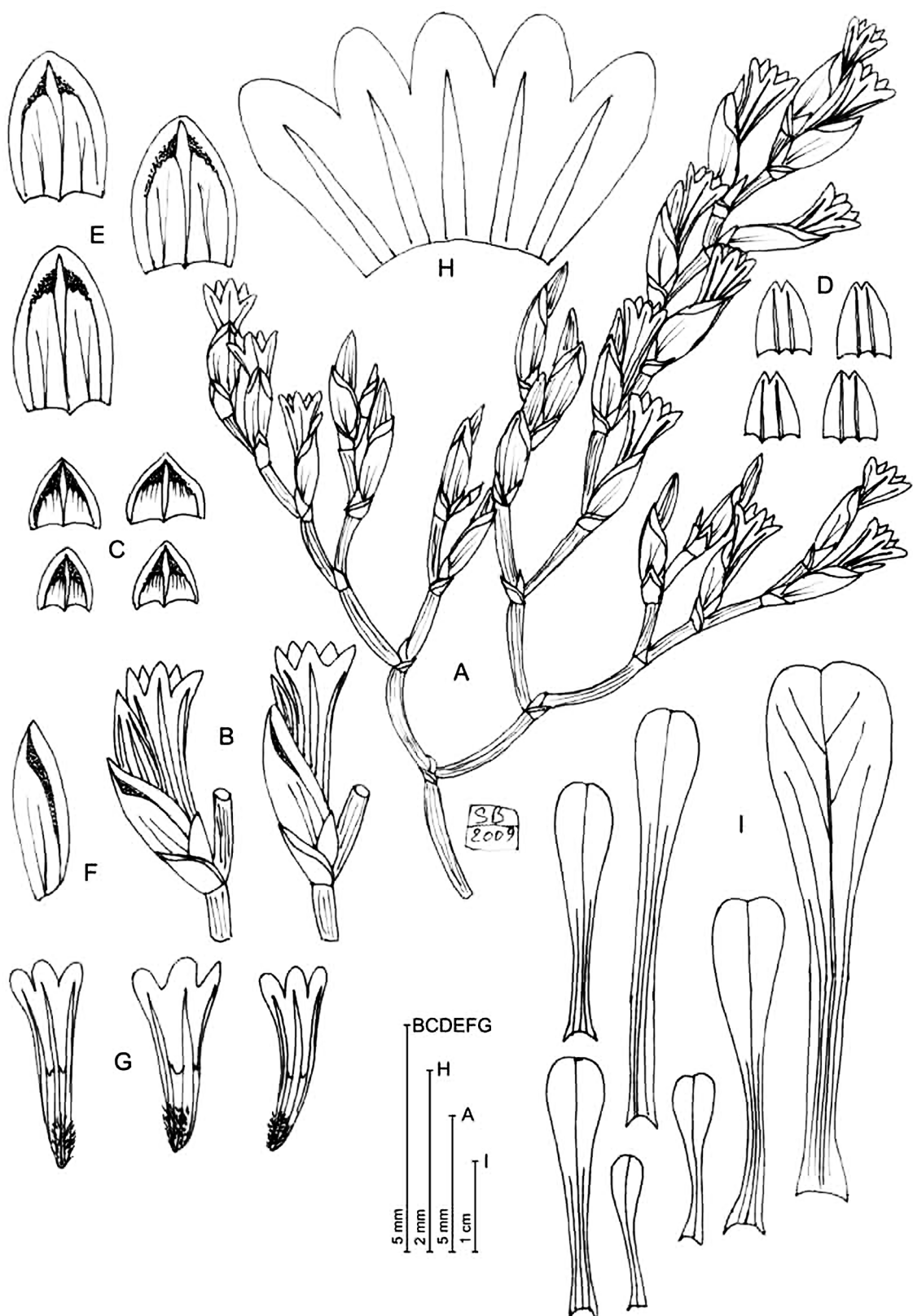


FIGURE 23. *Limonium tabulare*. A. Inflorescence branches. B. Spikelets. C. Outer bracts. D. Middle bracts. E. Inner bracts (dorsal view). F. Inner bract (lateral view). G. Calyces. H. Calyx lobes. I. Leaves (Illustration by Salvatore Brullo based on Bogdanović s.n. type CAT).

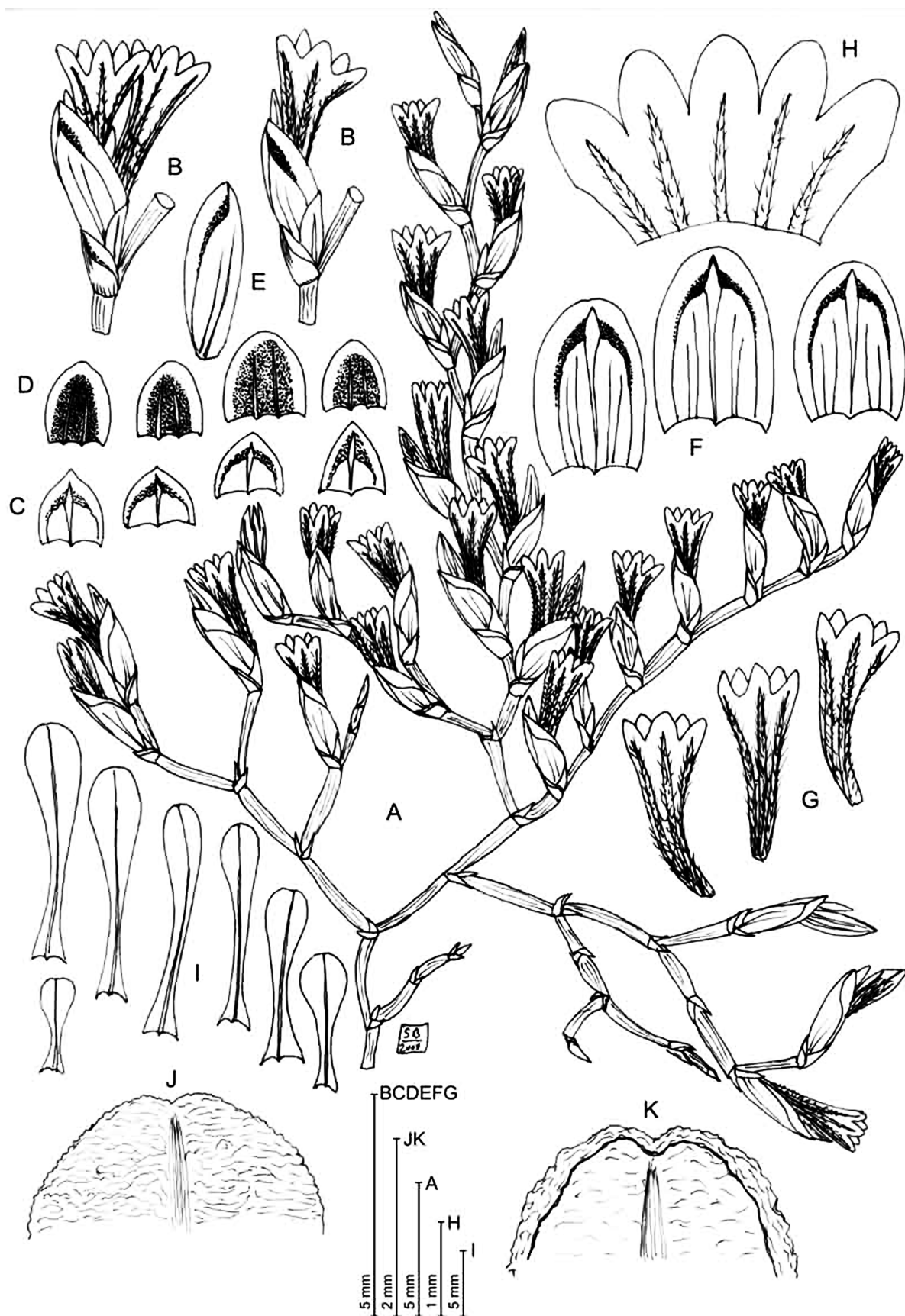


FIGURE 24. *Limonium trinajsticii*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bract (lateral view). **F.** Inner bracts (dorsal view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf adaxial face. **K.** Leaf abaxial face (Illustration by Salvatore Brullo based on *Bogdanović s.n.* type CAT).

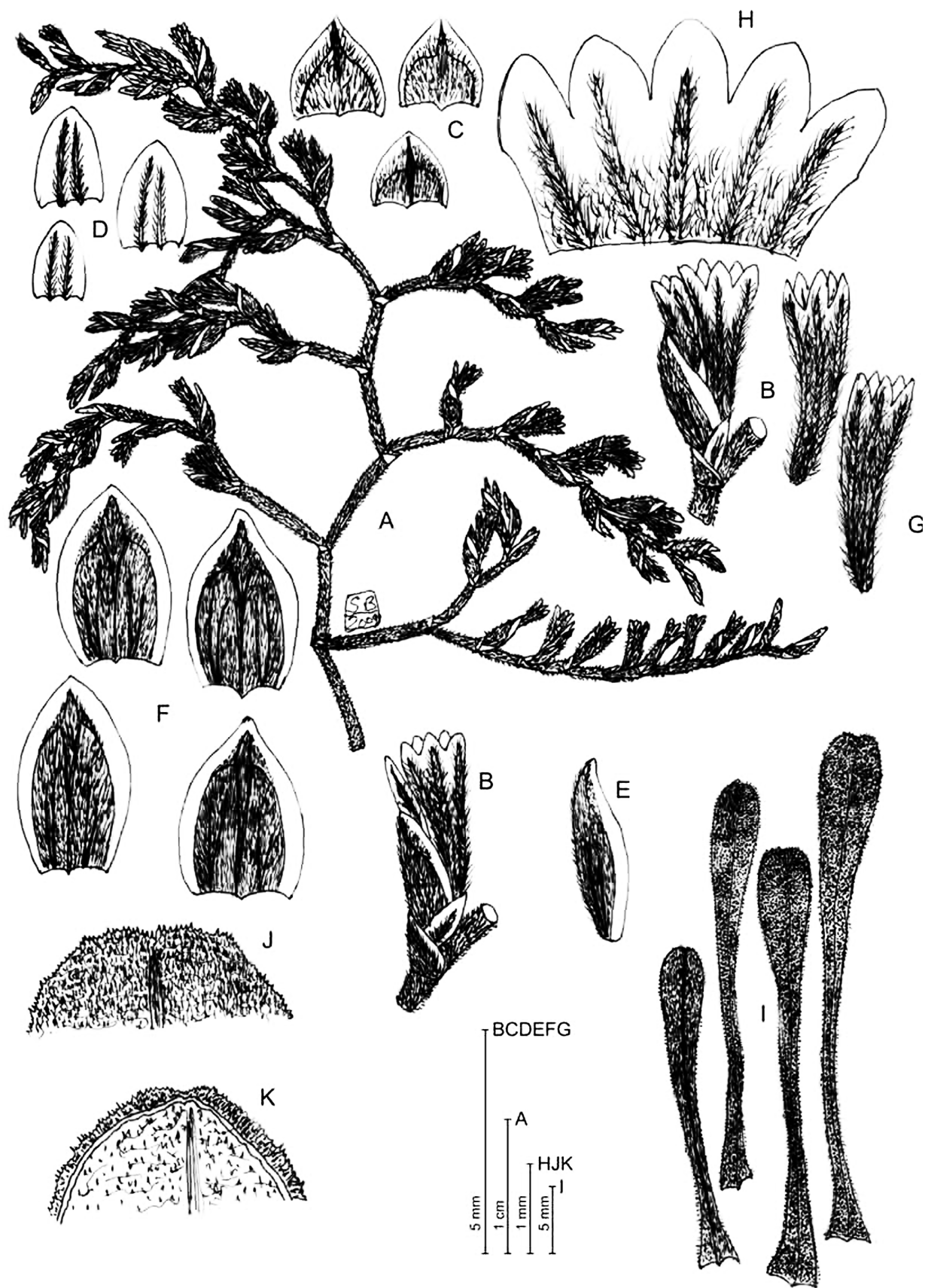


FIGURE 25. *Limonium velutinum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bract (lateral view). **F.** Inner bracts (dorsal view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Bogdanović & Alegro s.n.*, type CAT).

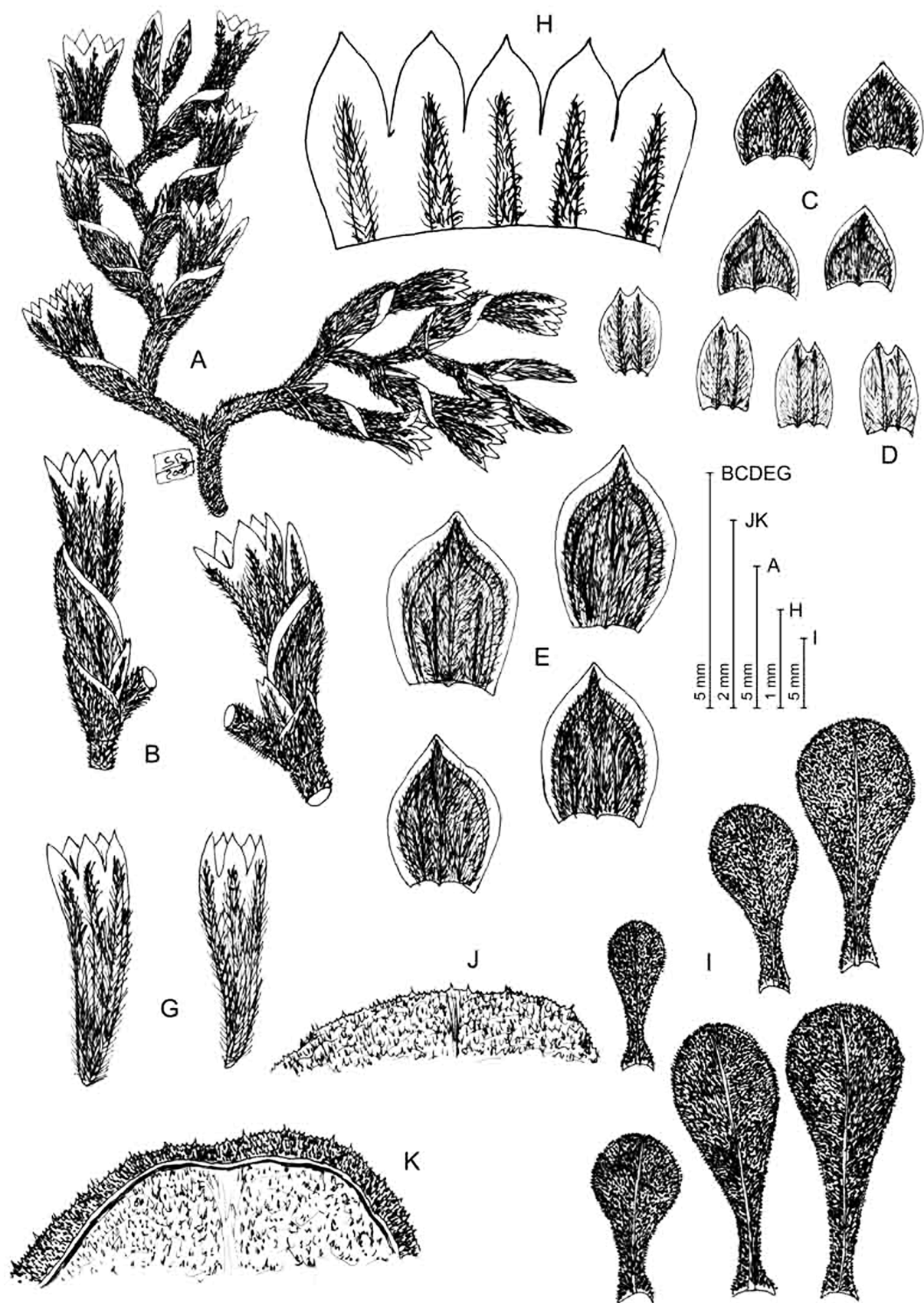


FIGURE 26. *Limonium vestitum*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bracts (dorsal view). **G.** Calyxes. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Bogdanović s.n.*, CAT).

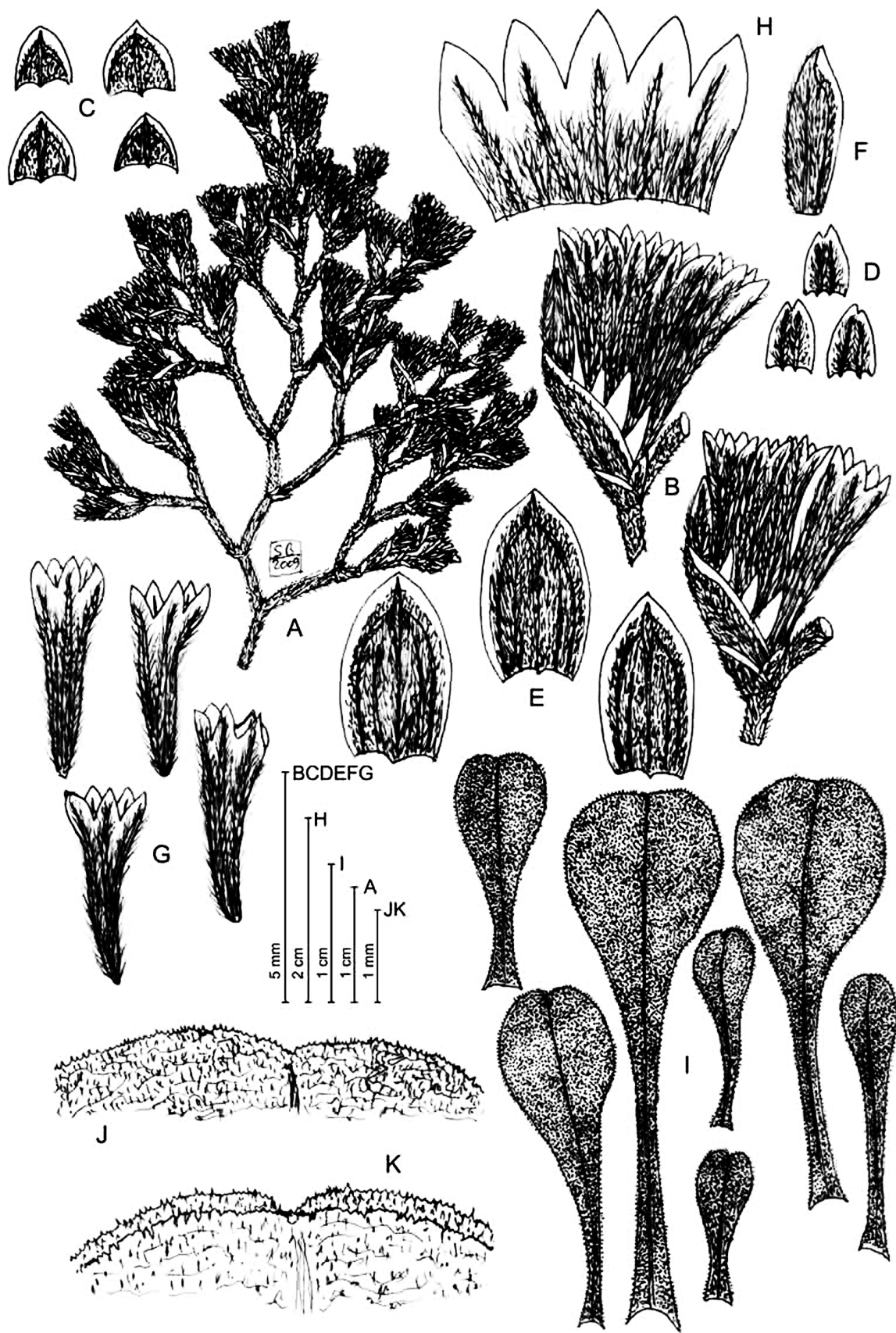


FIGURE 27. *Limonium zankii*. **A.** Inflorescence branches. **B.** Spikelets. **C.** Outer bracts. **D.** Middle bracts. **E.** Inner bracts (dorsal view). **F.** Inner bract (lateral view). **G.** Calyces. **H.** Calyx lobes. **I.** Leaves. **J.** Leaf indumentum (adaxial face). **K.** Leaf indumentum (abaxial face) (Illustration by Salvatore Brullo based on *Bogdanović s.n.*, type CAT).

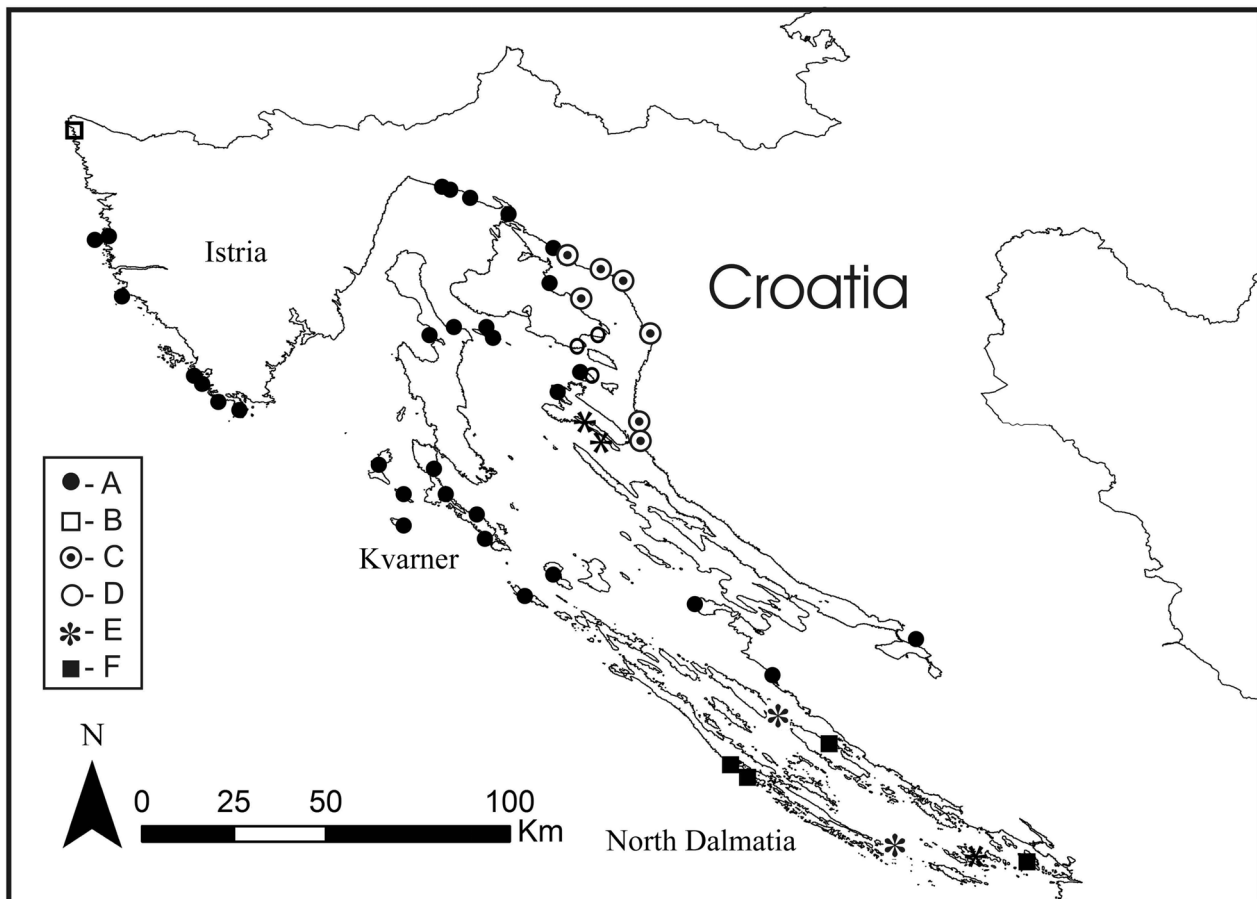


FIGURE 28. Geographical distribution of *Limonium cancellatum* (A), *L. istriacum* (B), *L. lovricii* (C), *L. liburnicum* (D), *L. croaticum* (E) and *L. liberianum* (F).

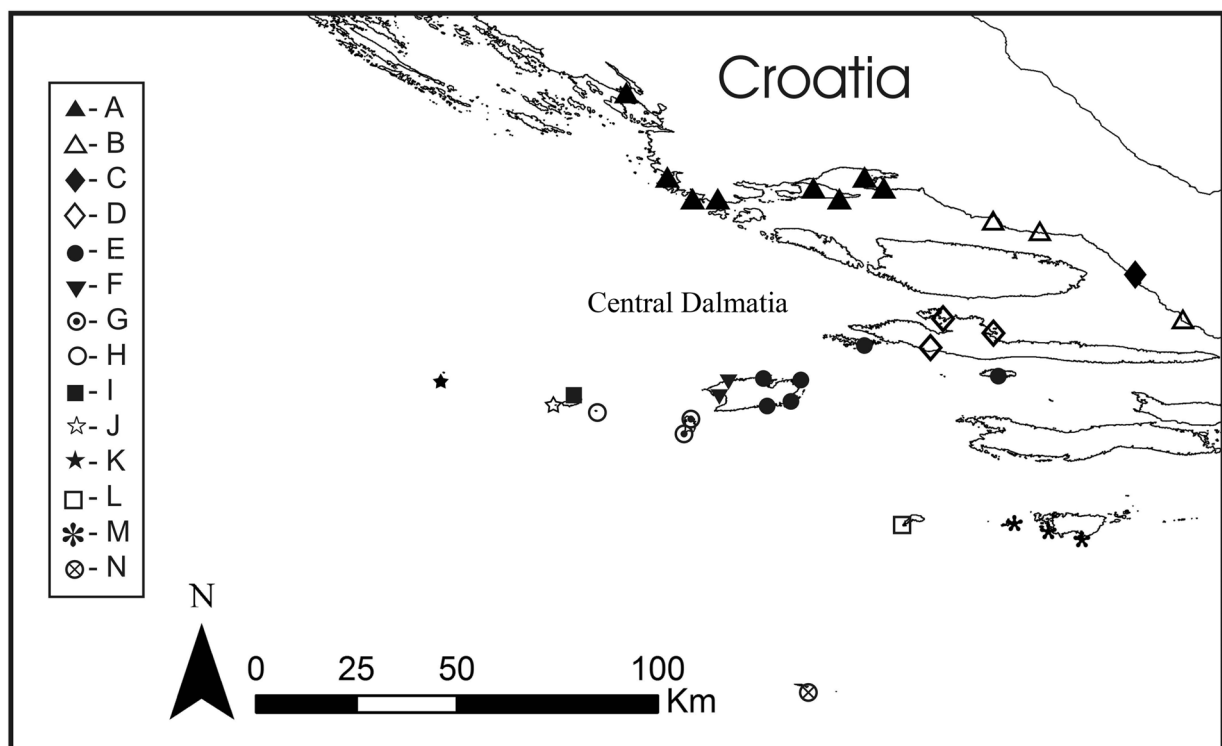


FIGURE 29. Geographical distribution of *Limonium milovicii* (A), *L. omissae* (B), *L. velutinum* (C), *L. pharosianum* (D), *L. subanfractum* (E), *L. issaeum* (F), *L. busianum* (G), *L. brusnicense* (H), *L. zankii* (I), *L. vestitum* (J), *L. pomoense* (K), *L. cazzae* (L), *L. lagostanum* (M) and *L. pelagosae* (N).

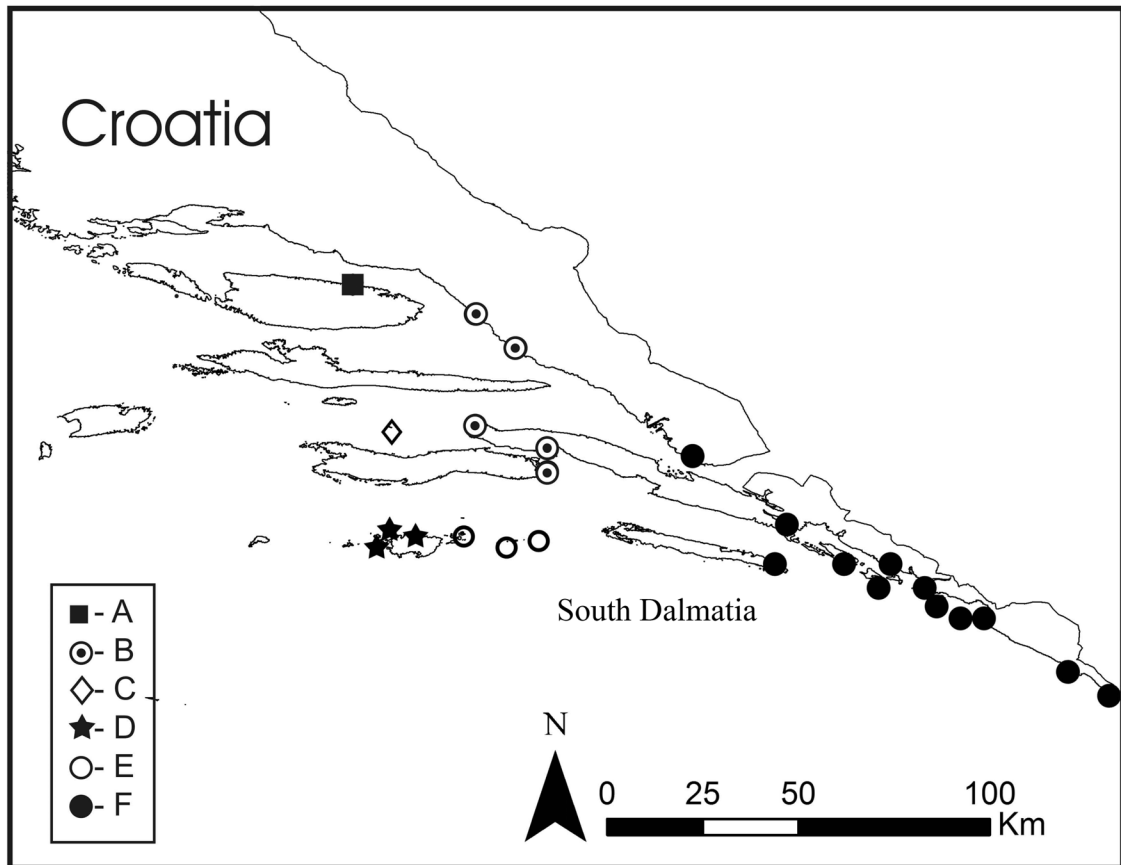


FIGURE 30. Geographical distribution of *Limonium trinajsticii* (A), *L. leprosorum* (B), *L. tabularae* (C), *L. subnudum* (D), *L. ginzbergeri* (E) and *L. dictyophorum* (F).

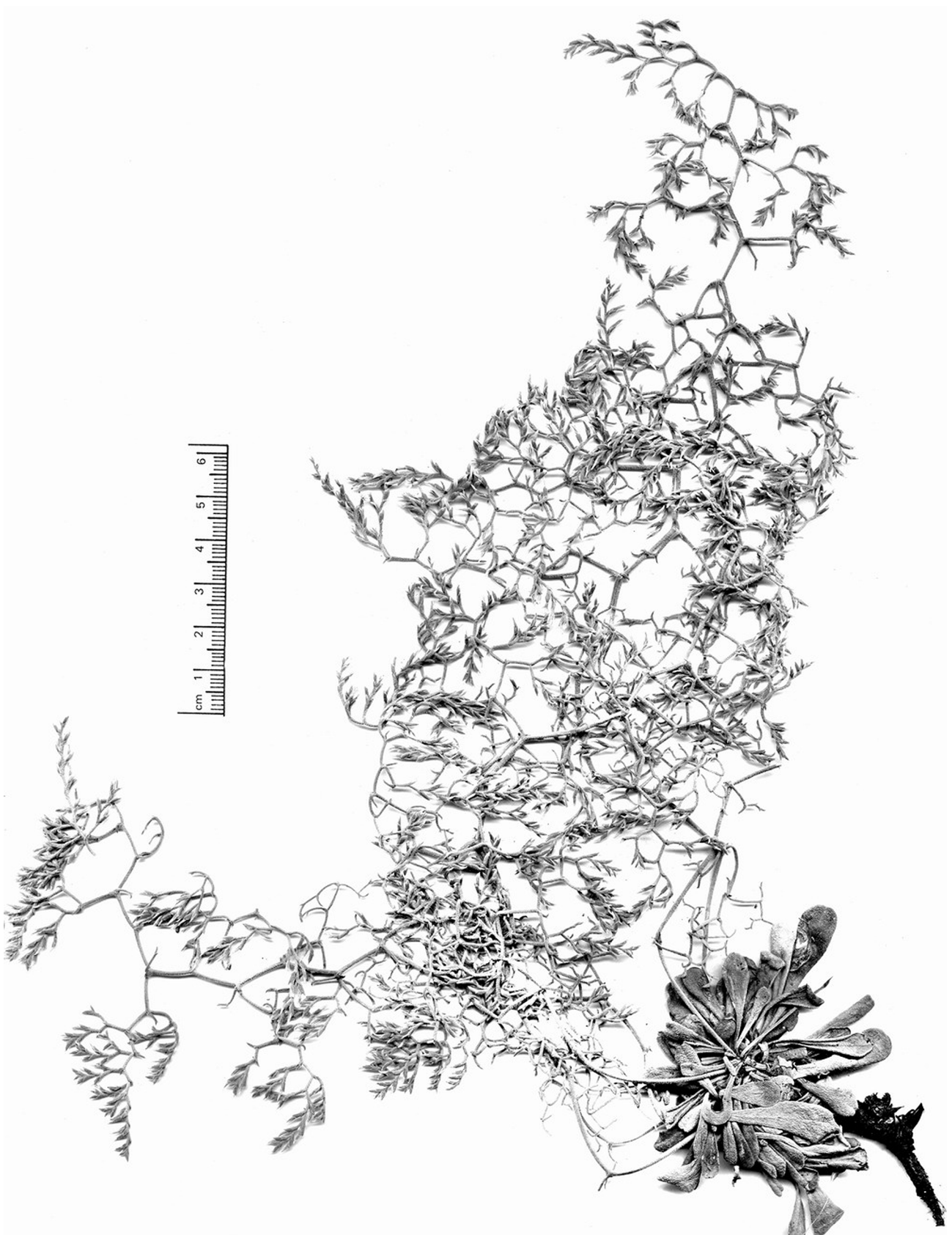


FIGURE 31. Habit of *Limonium brusnicense* from Brusnik. *Bogdanović s.n.* (CAT).

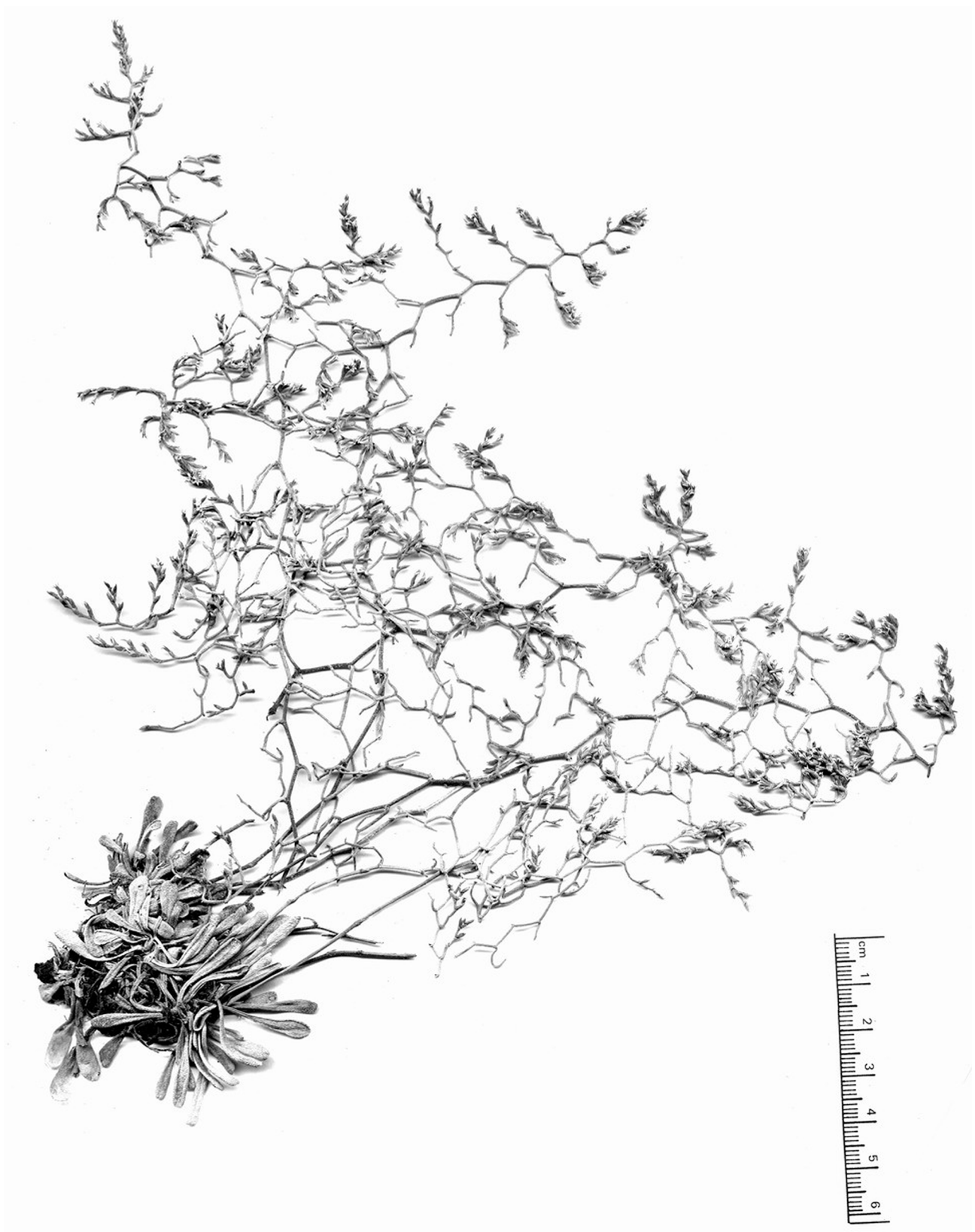


FIGURE 32. Habit of *Limonium busianum* from holotype. Bogdanović s.n. (CAT).

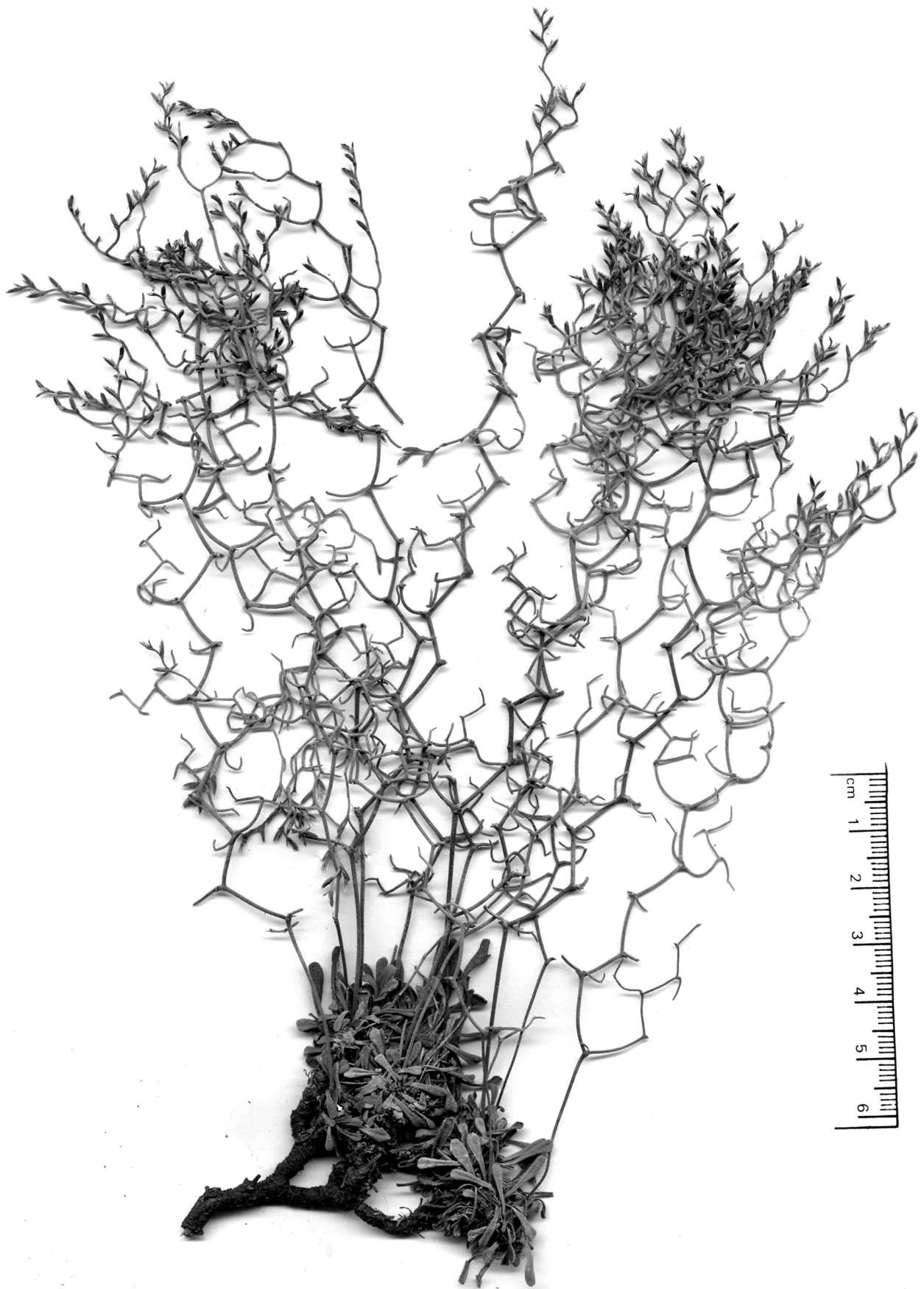


FIGURE 33. Habit of *Limonium cancellatum* from epitype. *Smith s.n.* (WU).

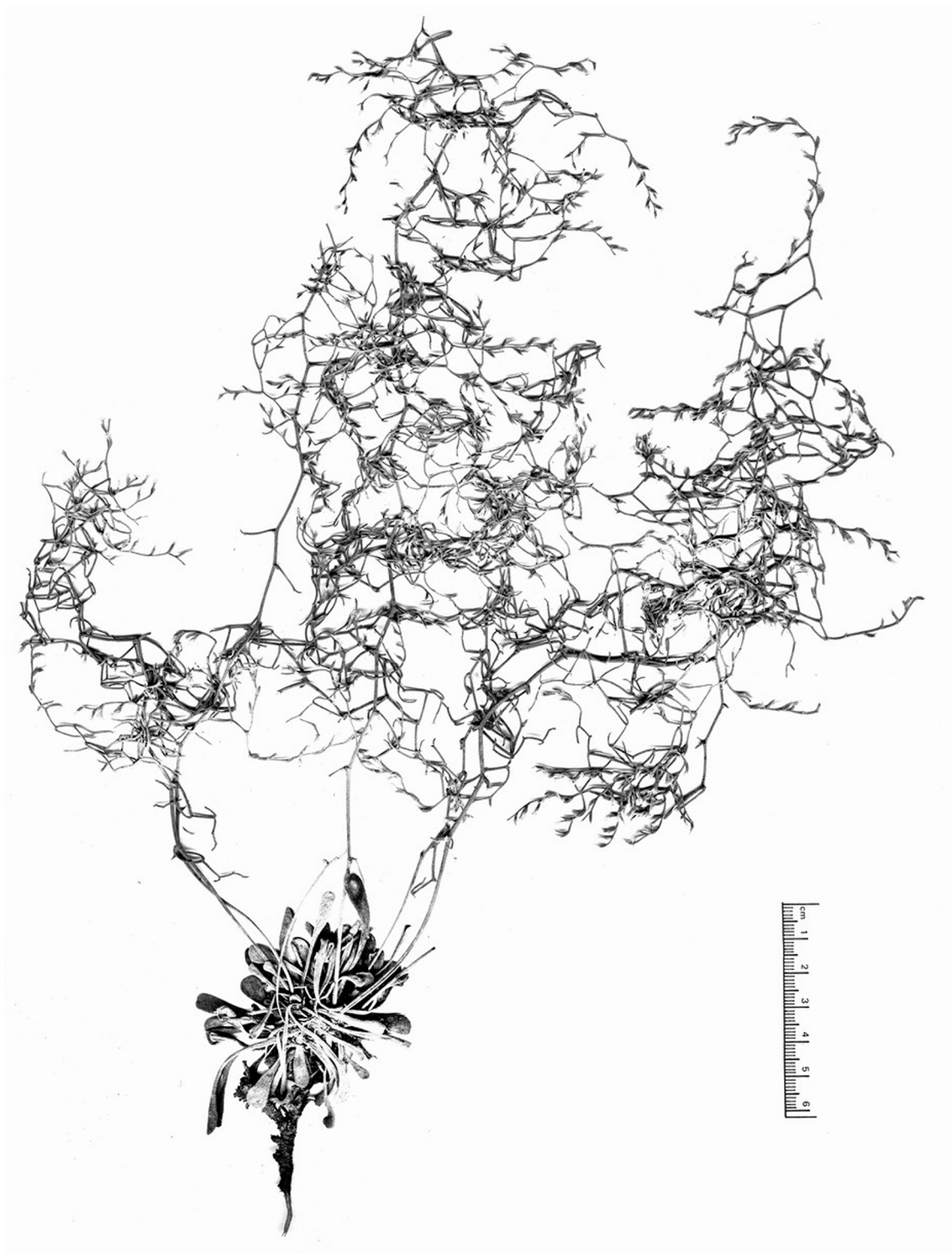


FIGURE 34. Habit of *Limonium cazzae* from holotype. Bogdanović s.n. (CAT).



FIGURE 35. Habit of *Limonium croaticum* from holotype. *Liber s.n.* (CAT).

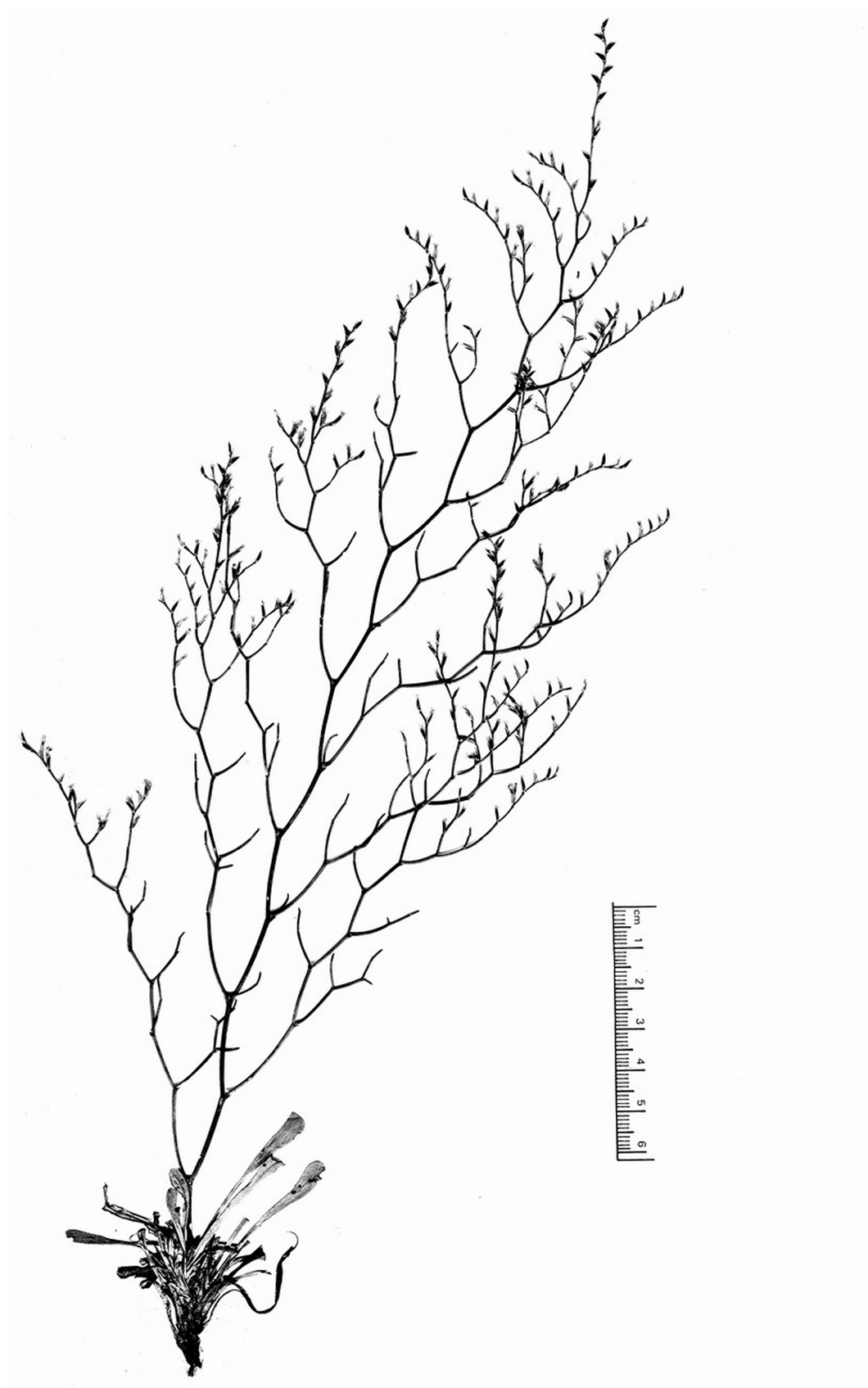


FIGURE 36. Habit of *Limonium dictyophorum* from Trsteno. Brullo. Bogdanović & Giusso s.n. (CAT).

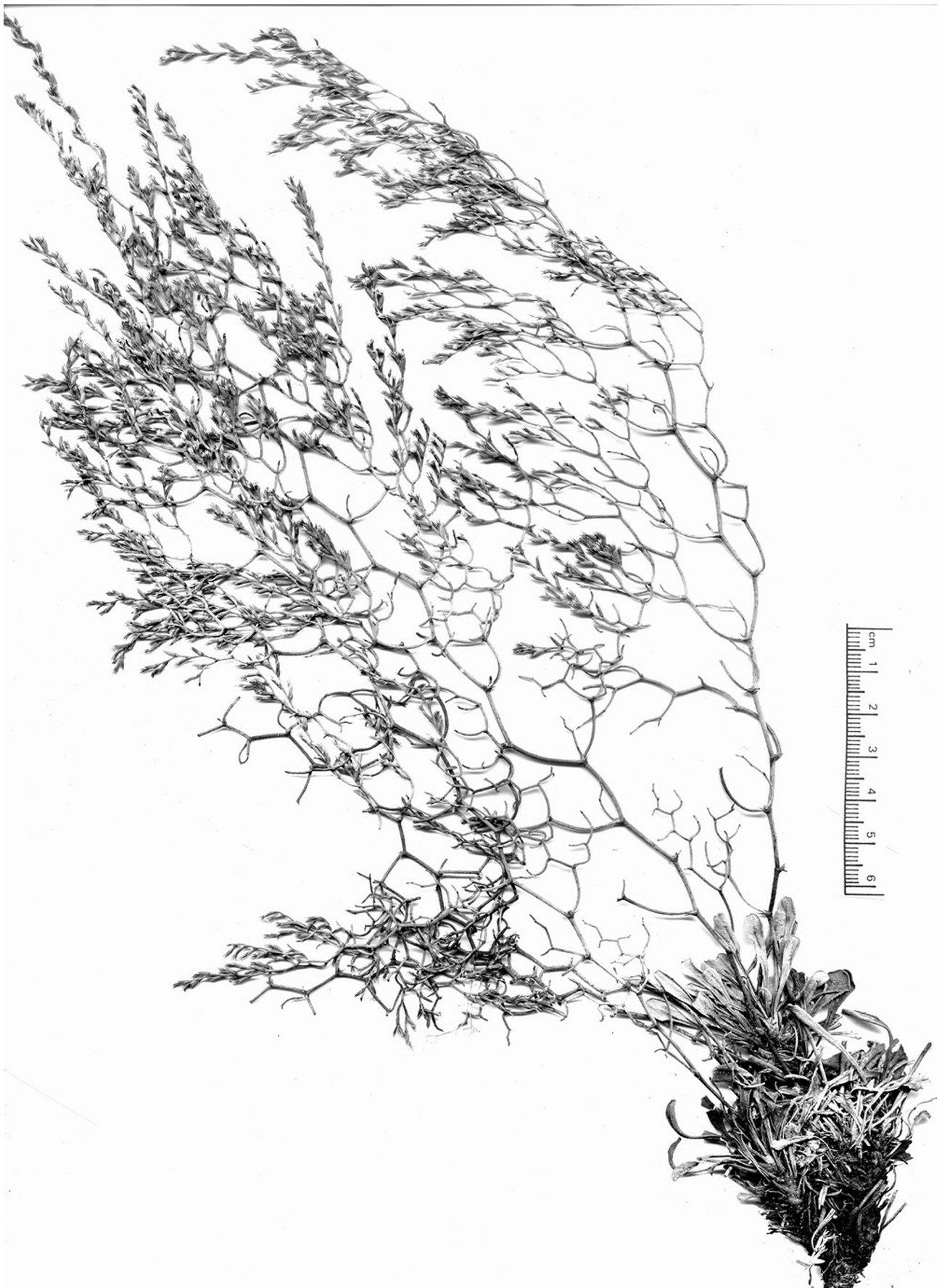


FIGURE 37. Habit of *Limonium ginzbergeri* from holotype. Bogdanović s.n. (CAT).

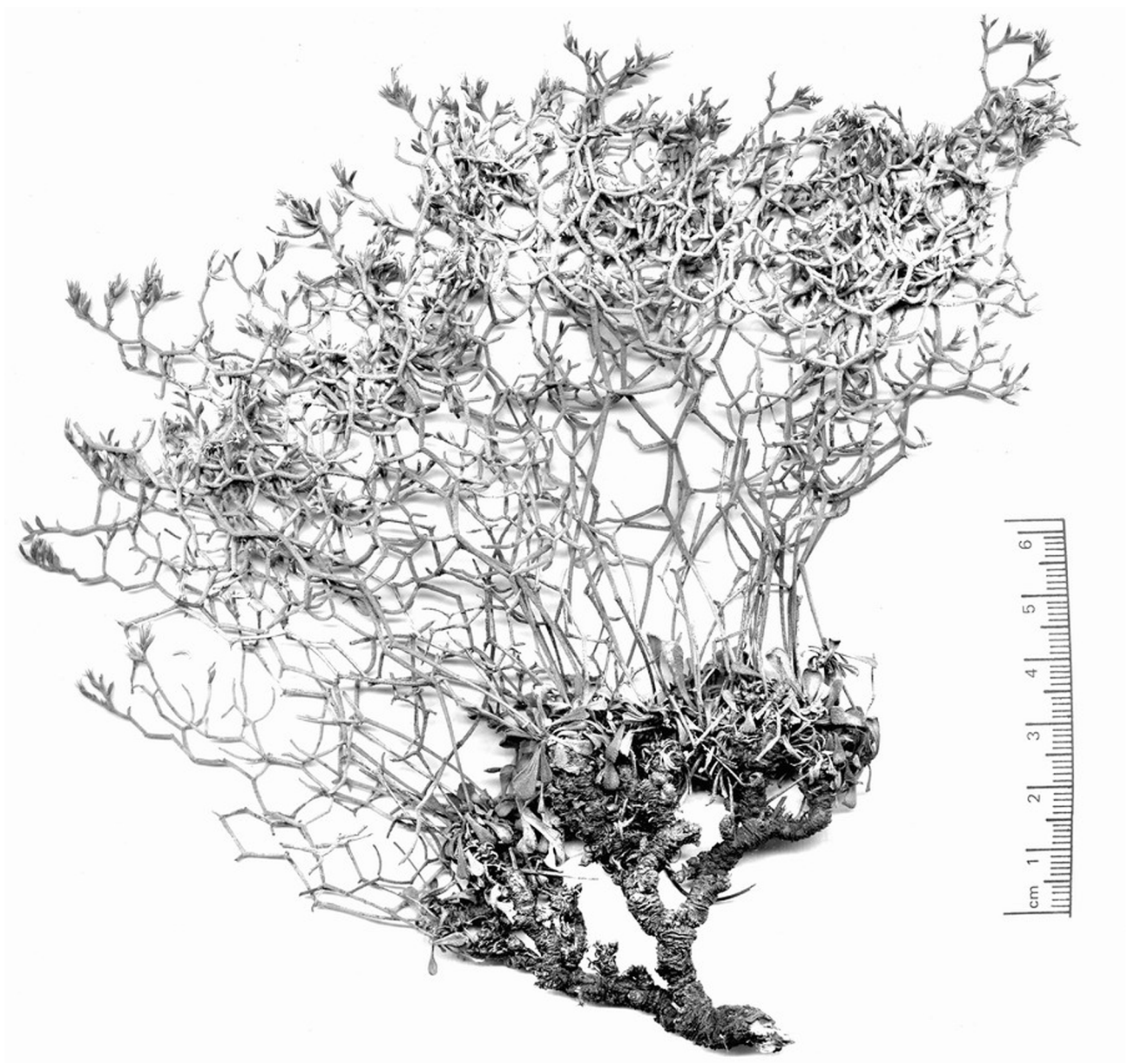


FIGURE 38. Habit of *Limonium issaeum* from holotype. *Bogdanović s.n.* (CAT).

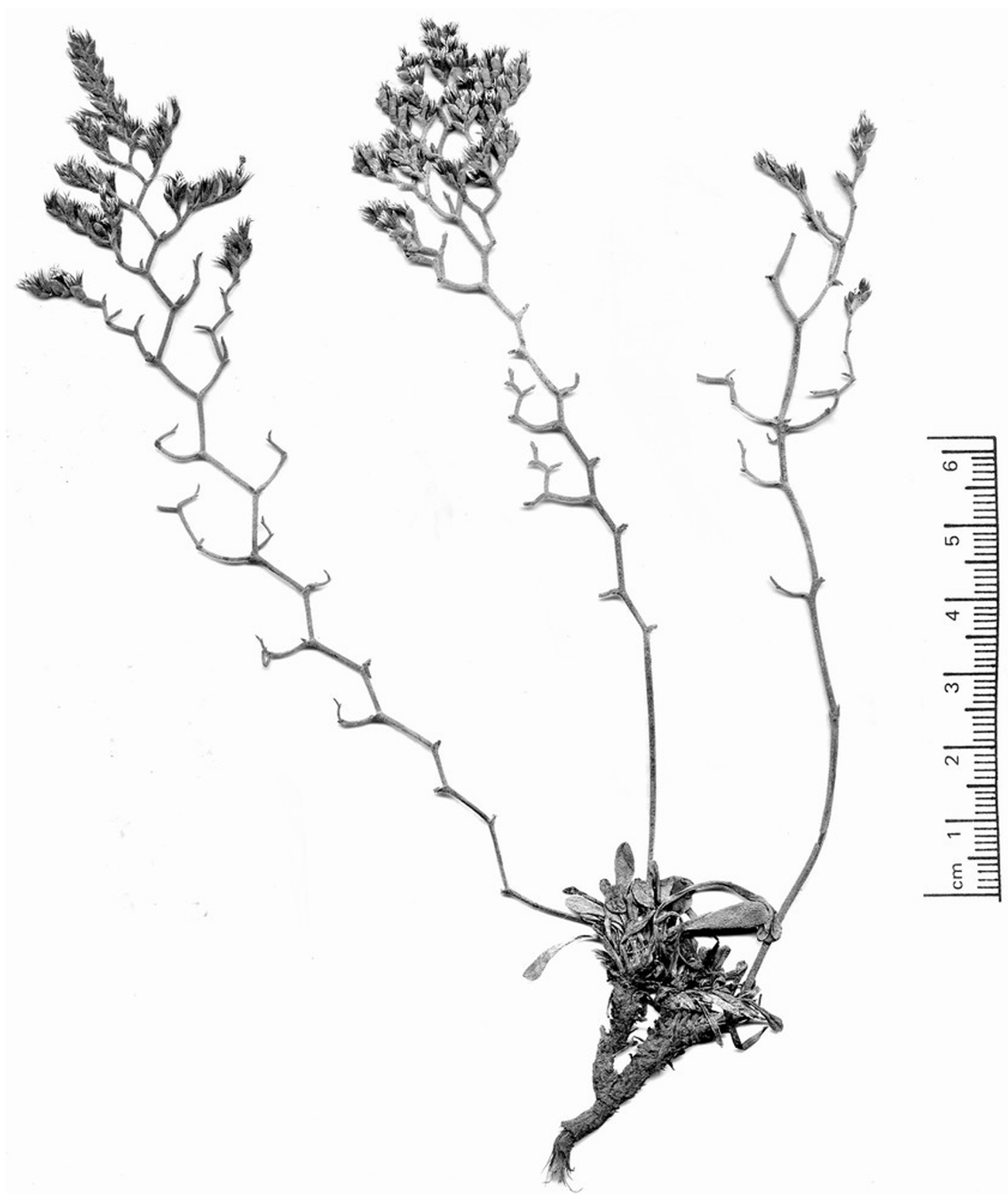


FIGURE 39. Habit of *Limonium istriacum* from holotype. *Marchesetti 1455* (CAT).

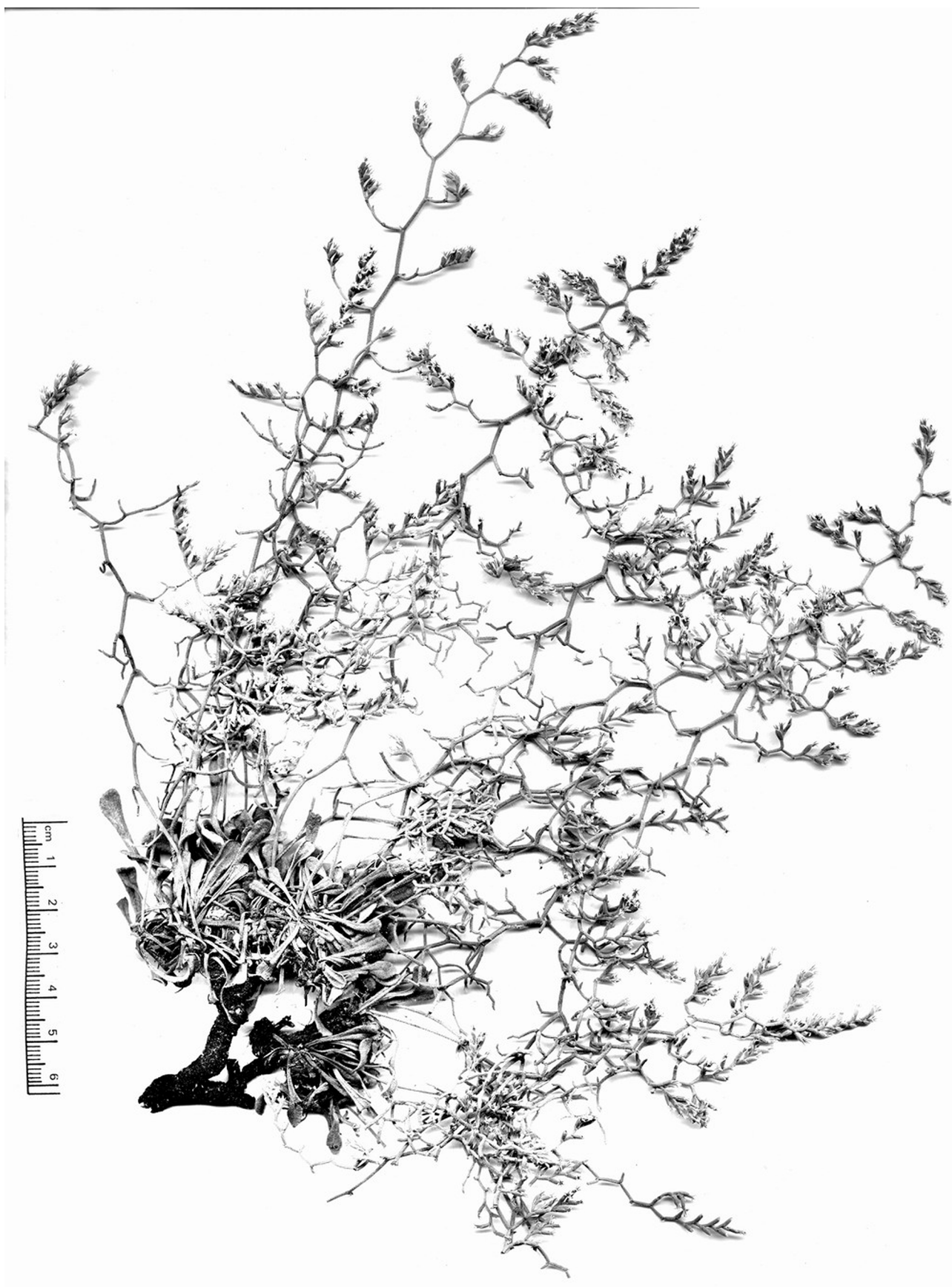


FIGURE 40. Habit of *Limonium lagostanum* from holotype. Bogdanović s.n. (CAT).

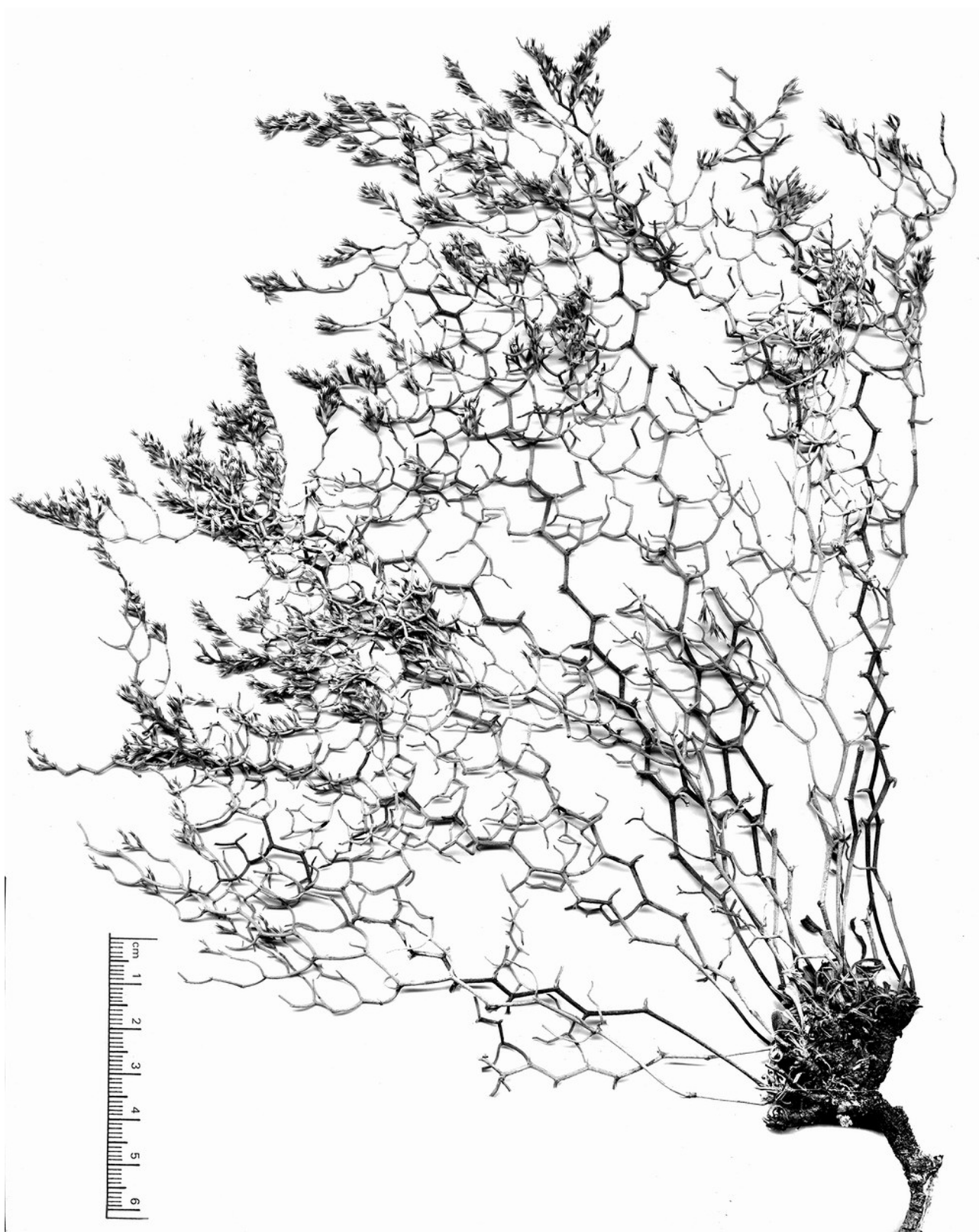


FIGURE 41. Habit of *Limonium leprosorum* from holotype. Bogdanović s.n. (CAT).

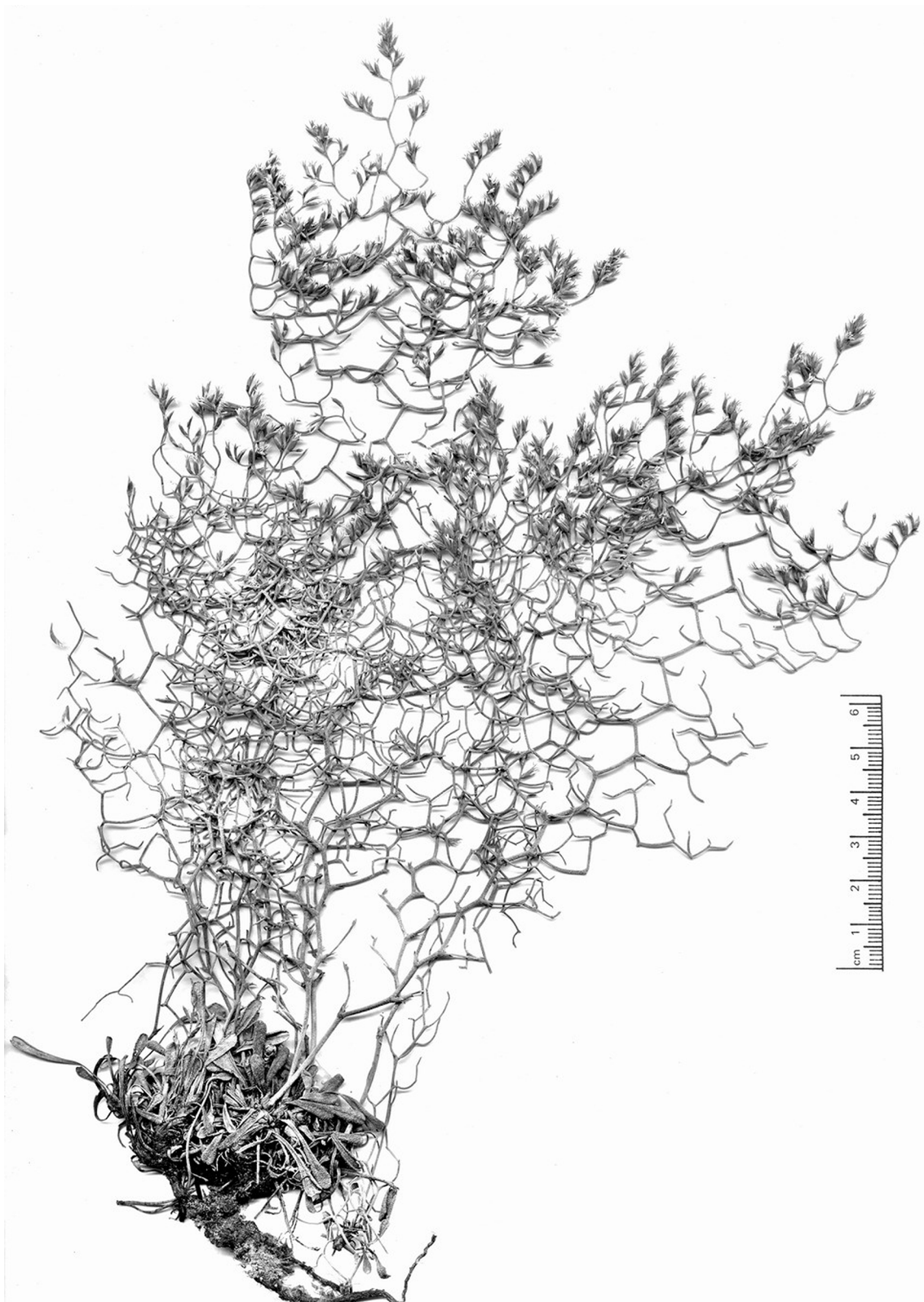


FIGURE 42. Habit of *Limonium liberianum* from holotype. *Liber s.n.* (CAT).



FIGURE 43. Habit of *Limonium liburnicum* from holotype. Bogdanović s.n. (CAT).

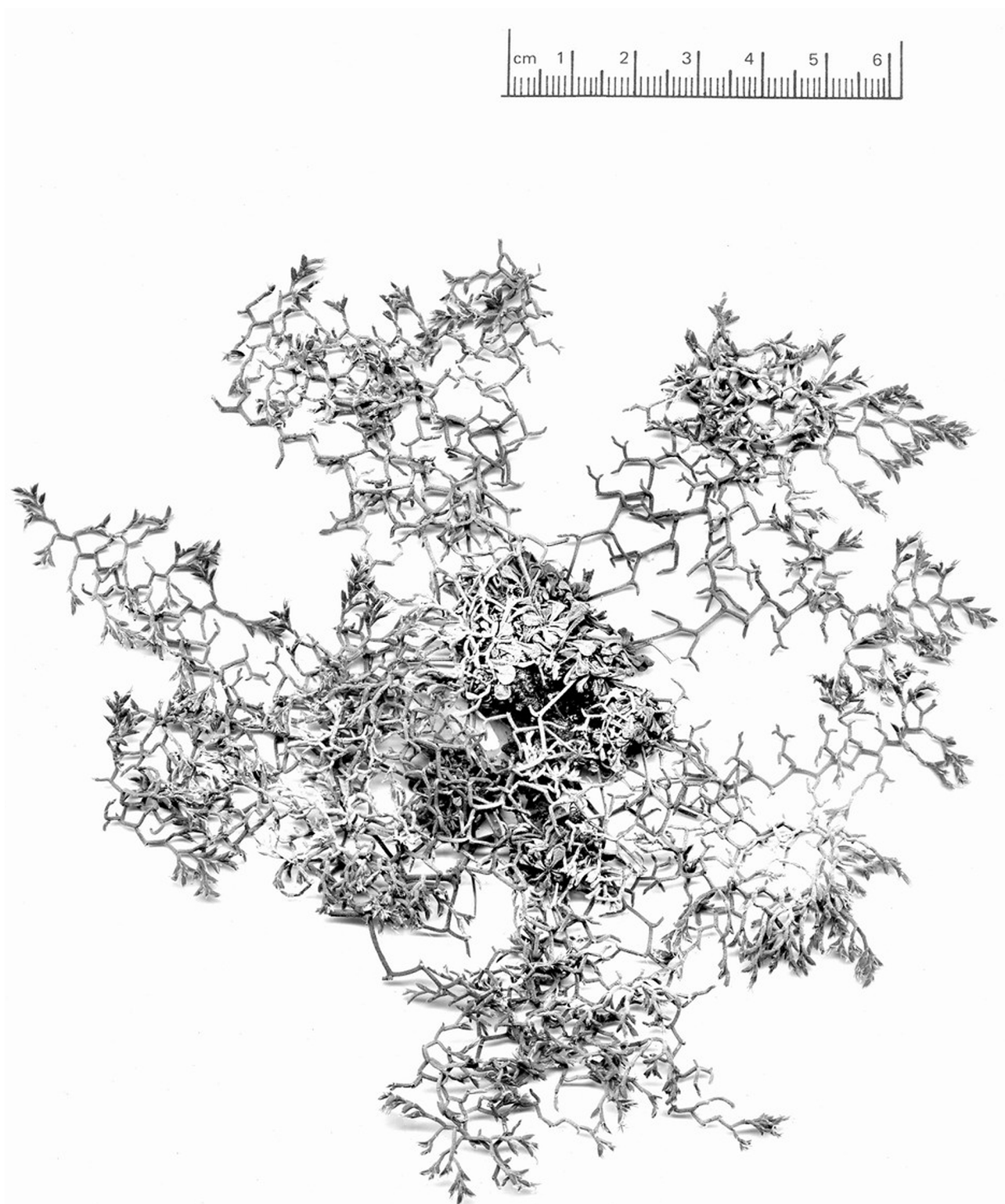


FIGURE 44. Habit of *Limonium lovricii* from holotype. *Brullo. Bogdanović & Giusso s.n. (CAT).*

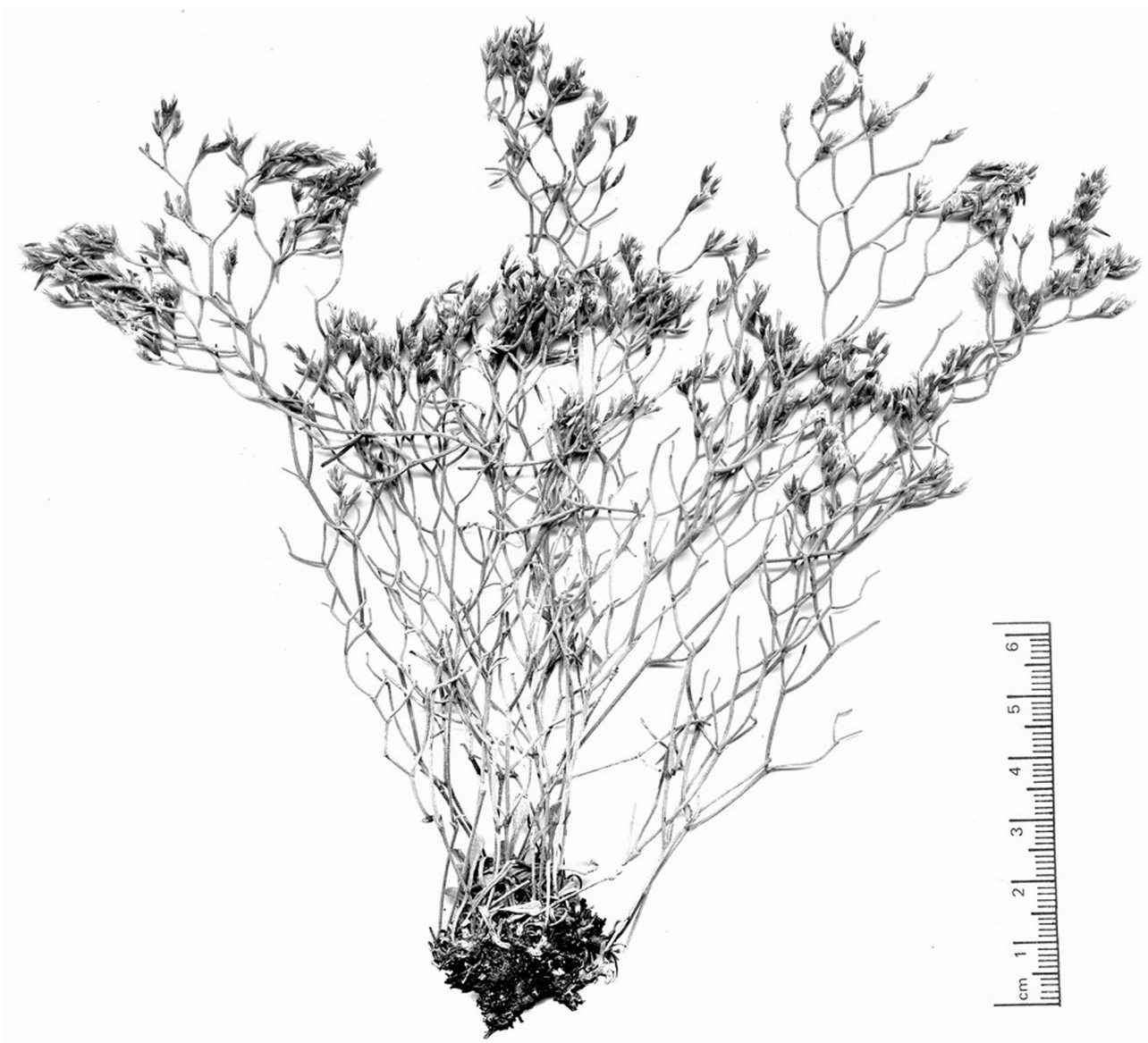


FIGURE 45. Habit of *Limonium milovicii* from holotype. Brullo. Bogdanović & Giusso s.n. (CAT).

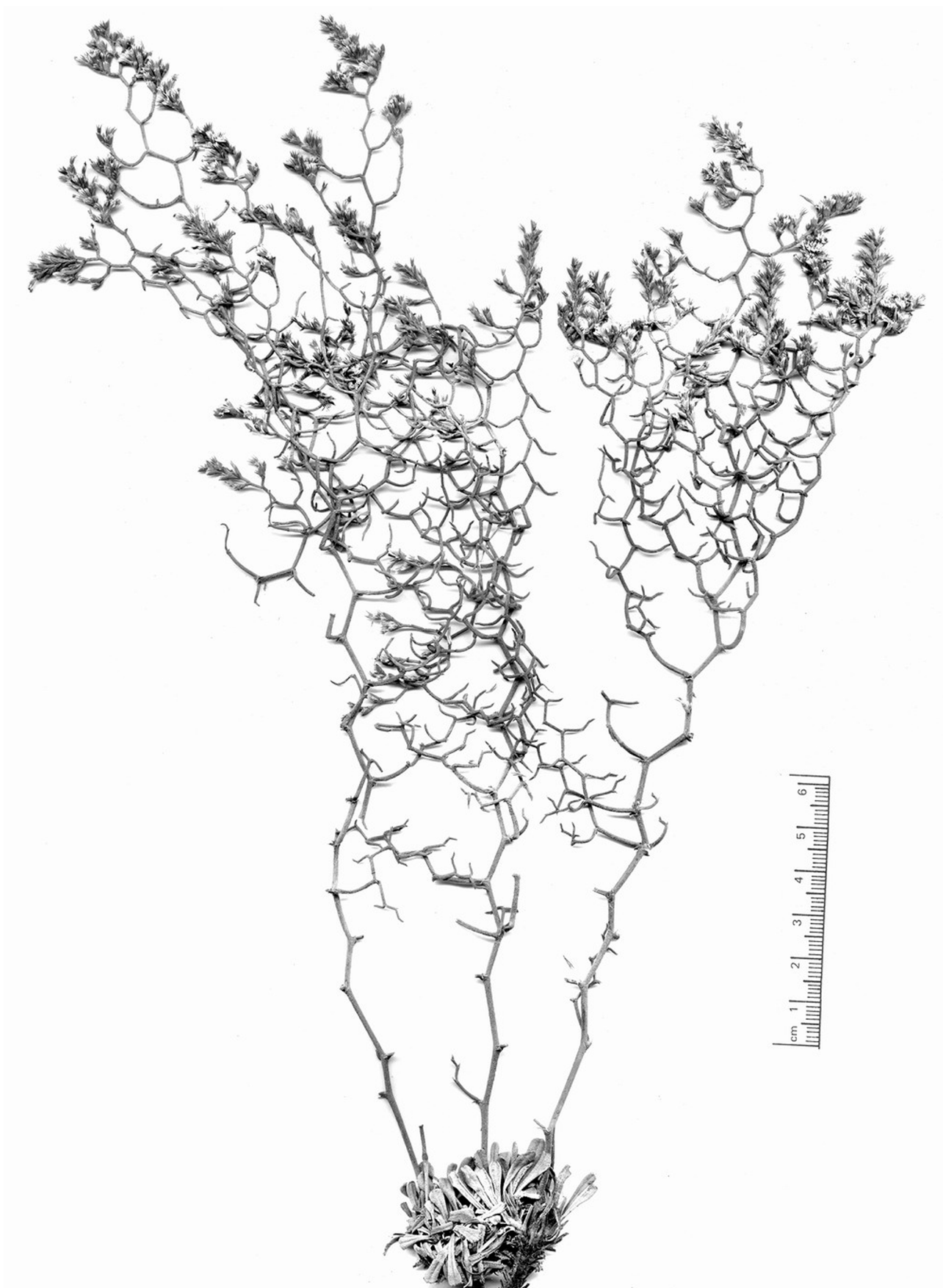


FIGURE 46. Habit of *Limonium omissae* from holotype. Brullo, Bogdanović & Giusso s.n. (CAT).

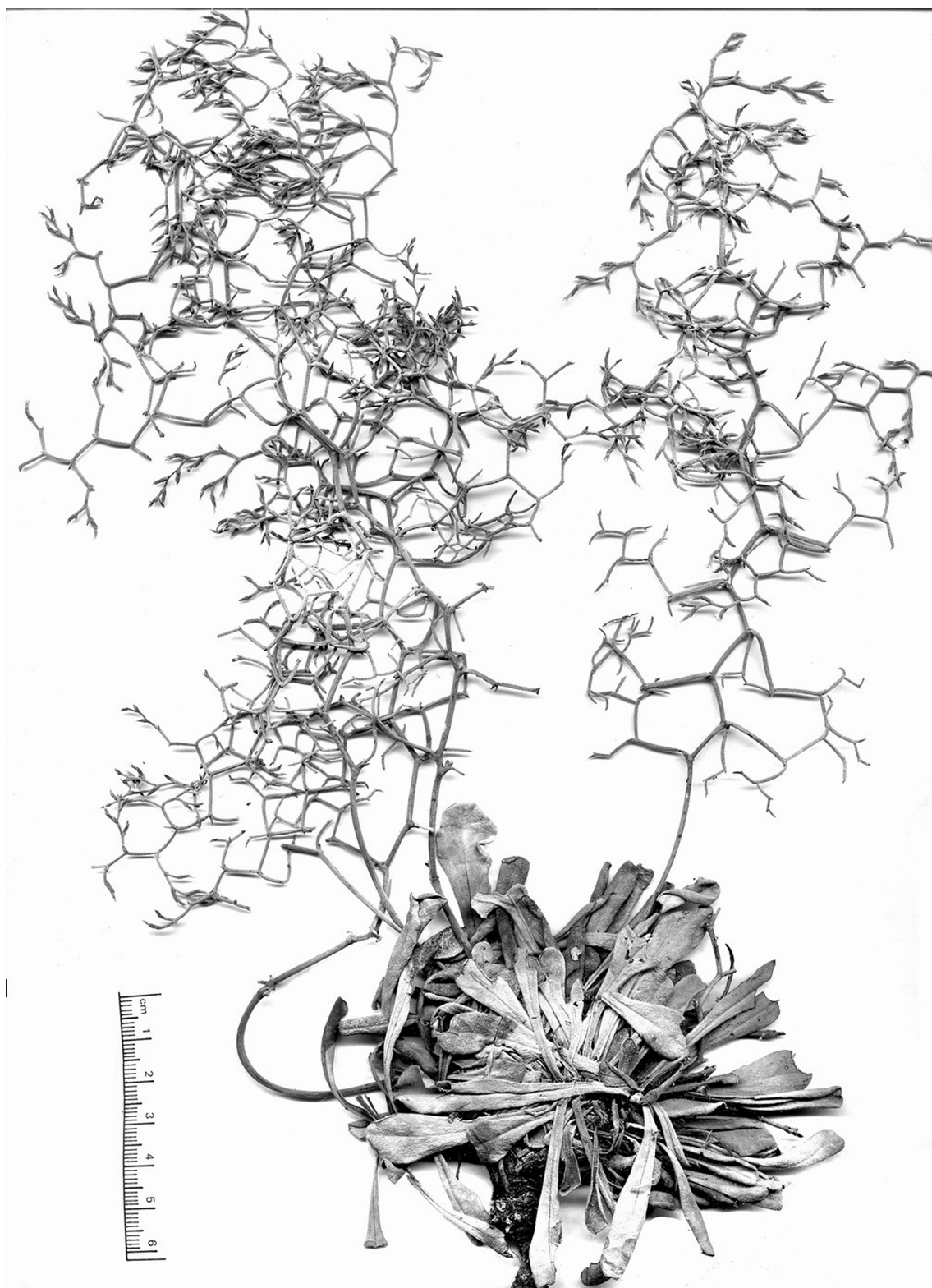


FIGURE 47. Habit of *Limonium pelagosae* from holotype. Boršić s.n. (CAT).

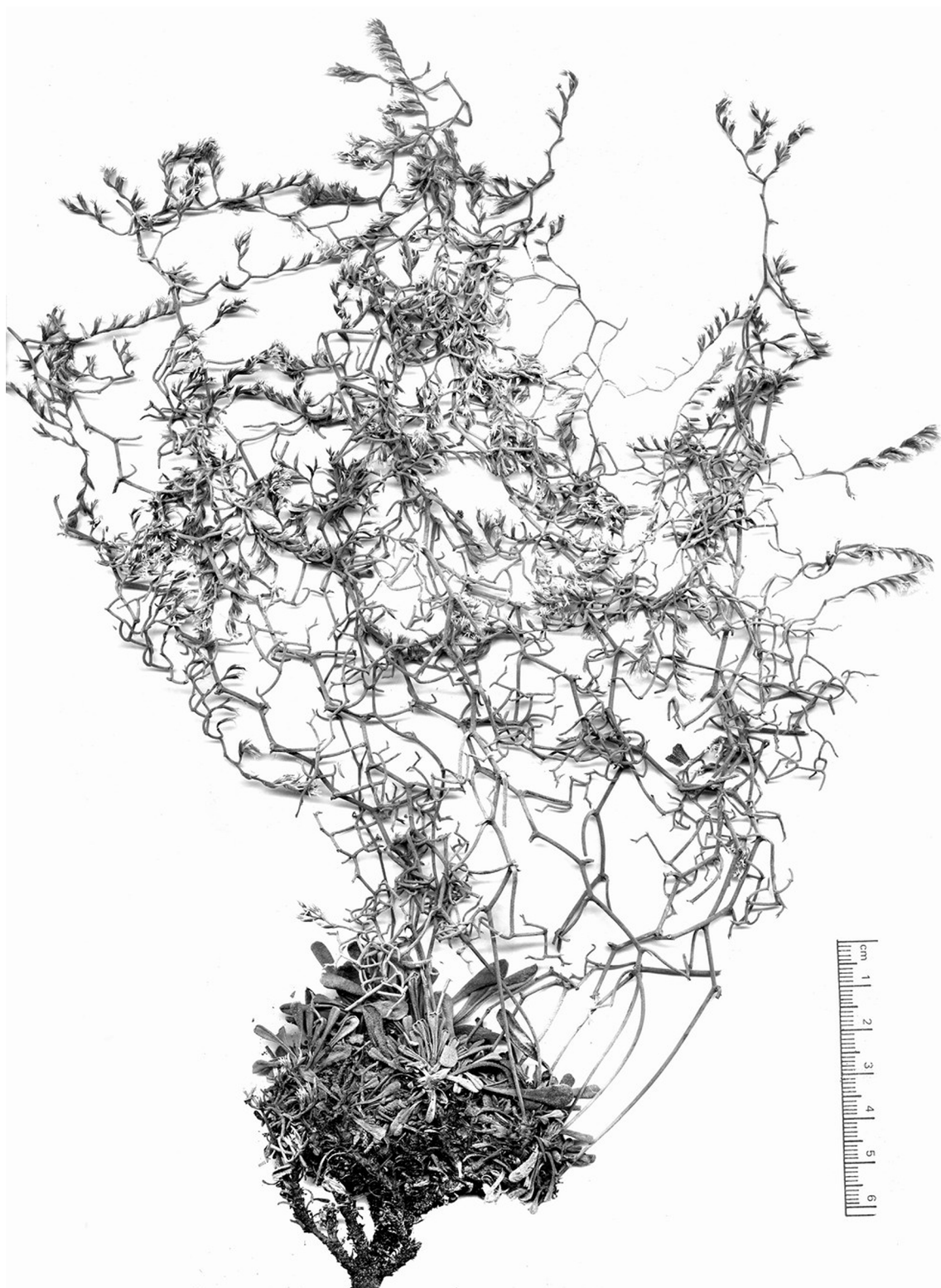


FIGURE 48. Habit of *Limonium pharosianum* from holotype. Bogdanović & Dujmović s.n. (CAT).



FIGURE 49. Habit of *Limonium pomoense* from holotype. Bogdanović. Boršić & Nikolić s.n. (CAT).

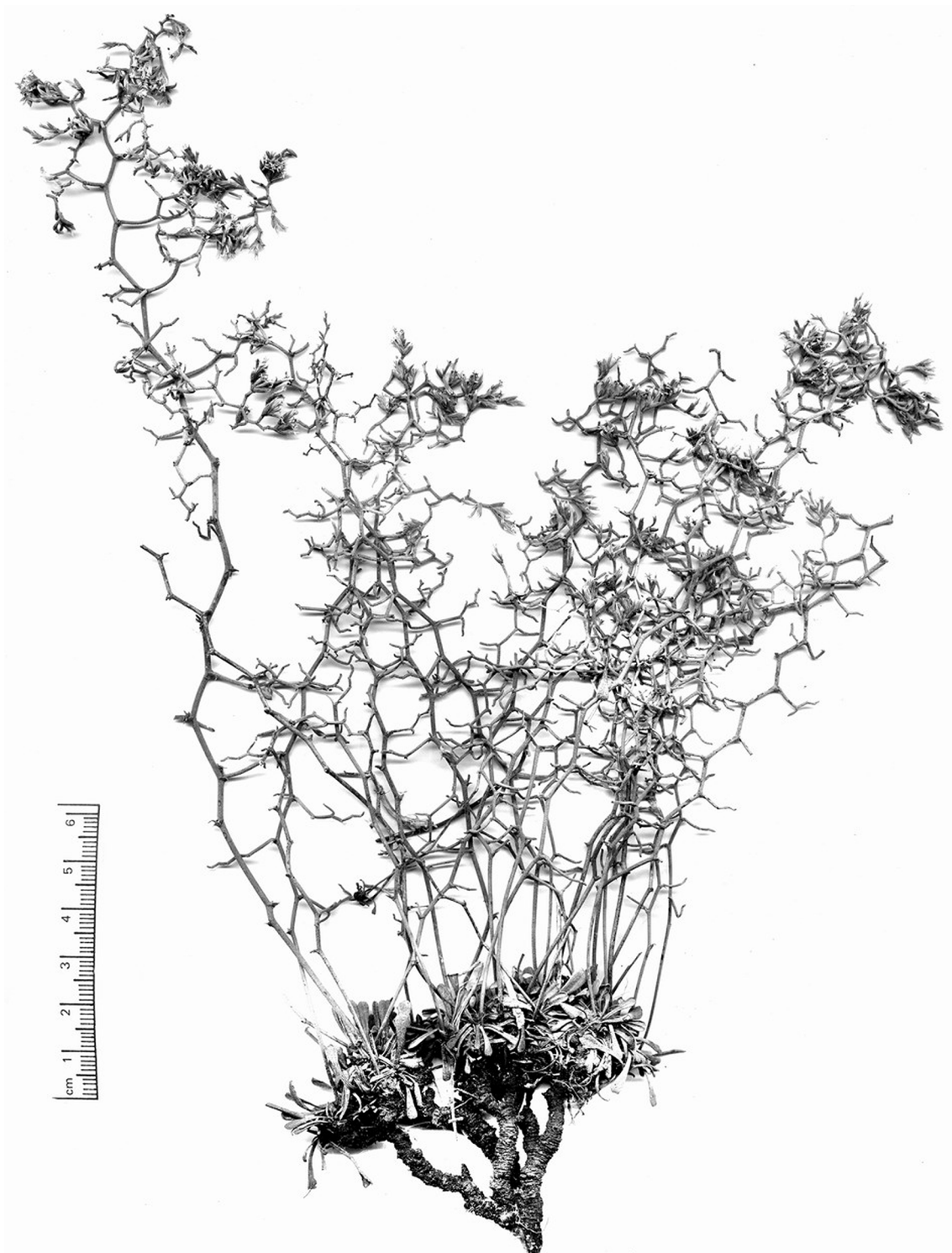


FIGURE 50. Habit of *Limonium subanfractum* from Zanak, Bogdanović s.n. (CAT).

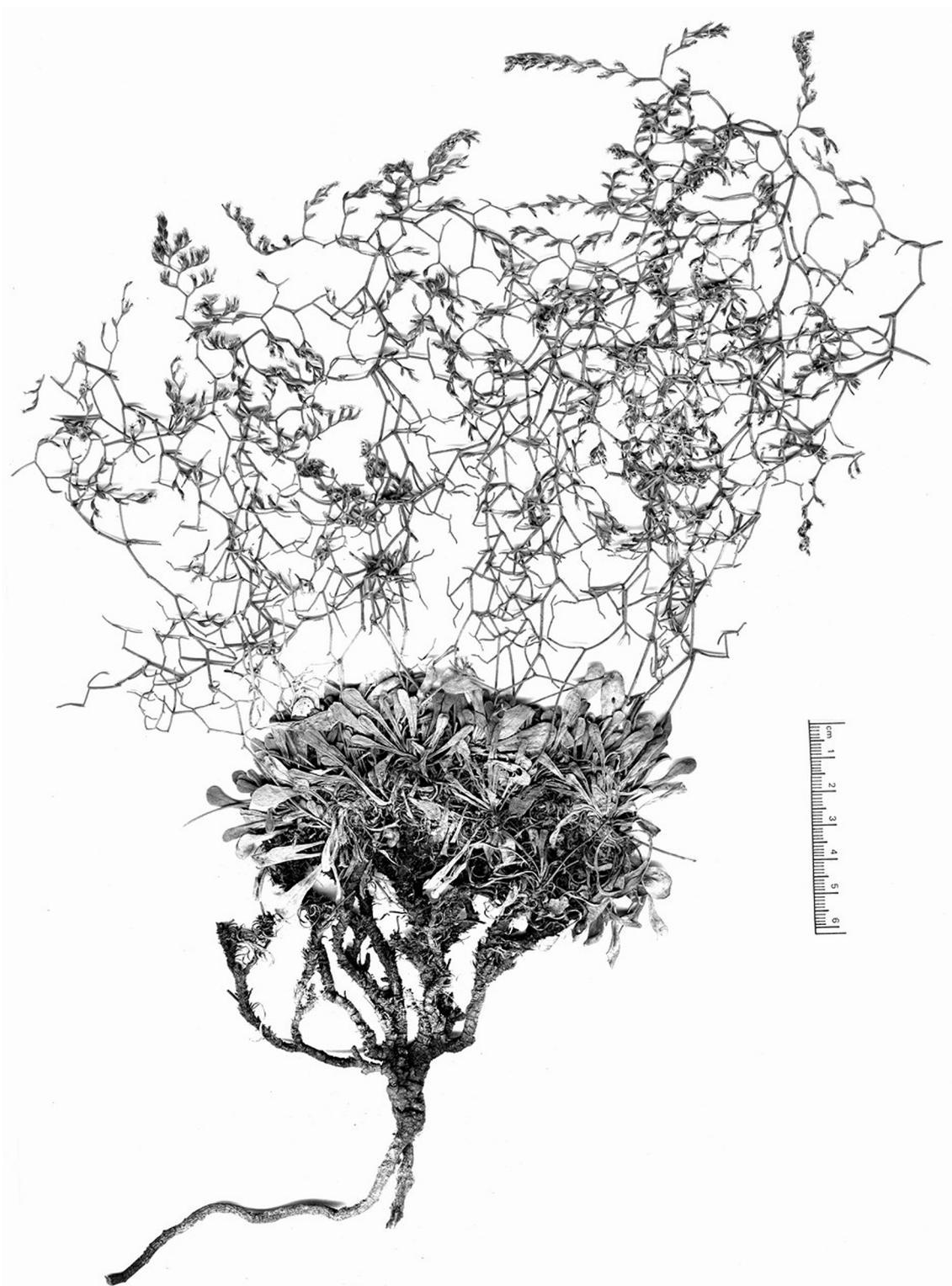


FIGURE 51. Habit of *Limonium subnudum* from holotype. Bogdanović s.n. (CAT).

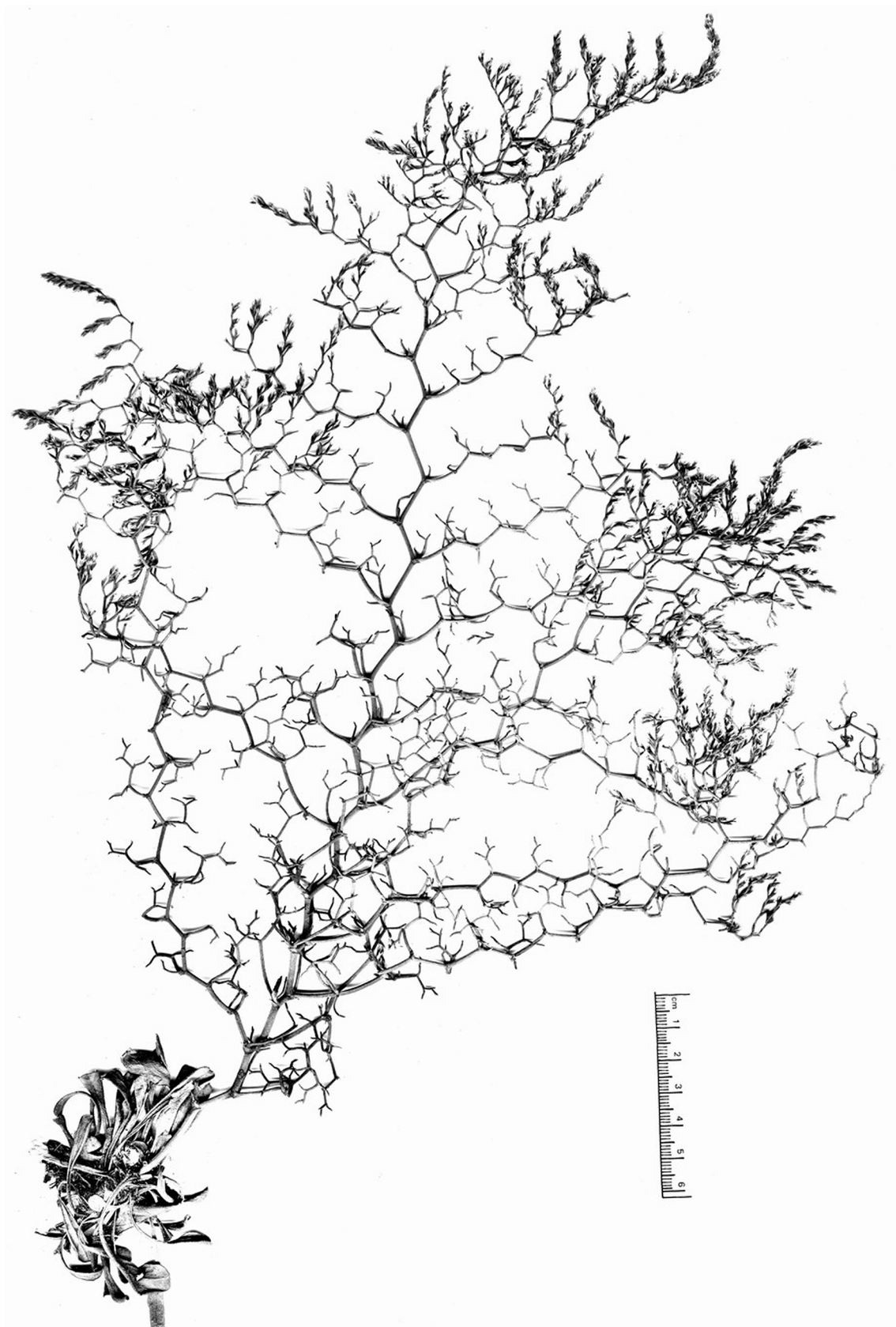


FIGURE 52. Habit of *Limonium tabulare* from holotype, Bogdanović s.n. (CAT).



FIGURE 53. Habit of *Limonium trinajsticii* from holotype. Bogdanović s.n. CAT).

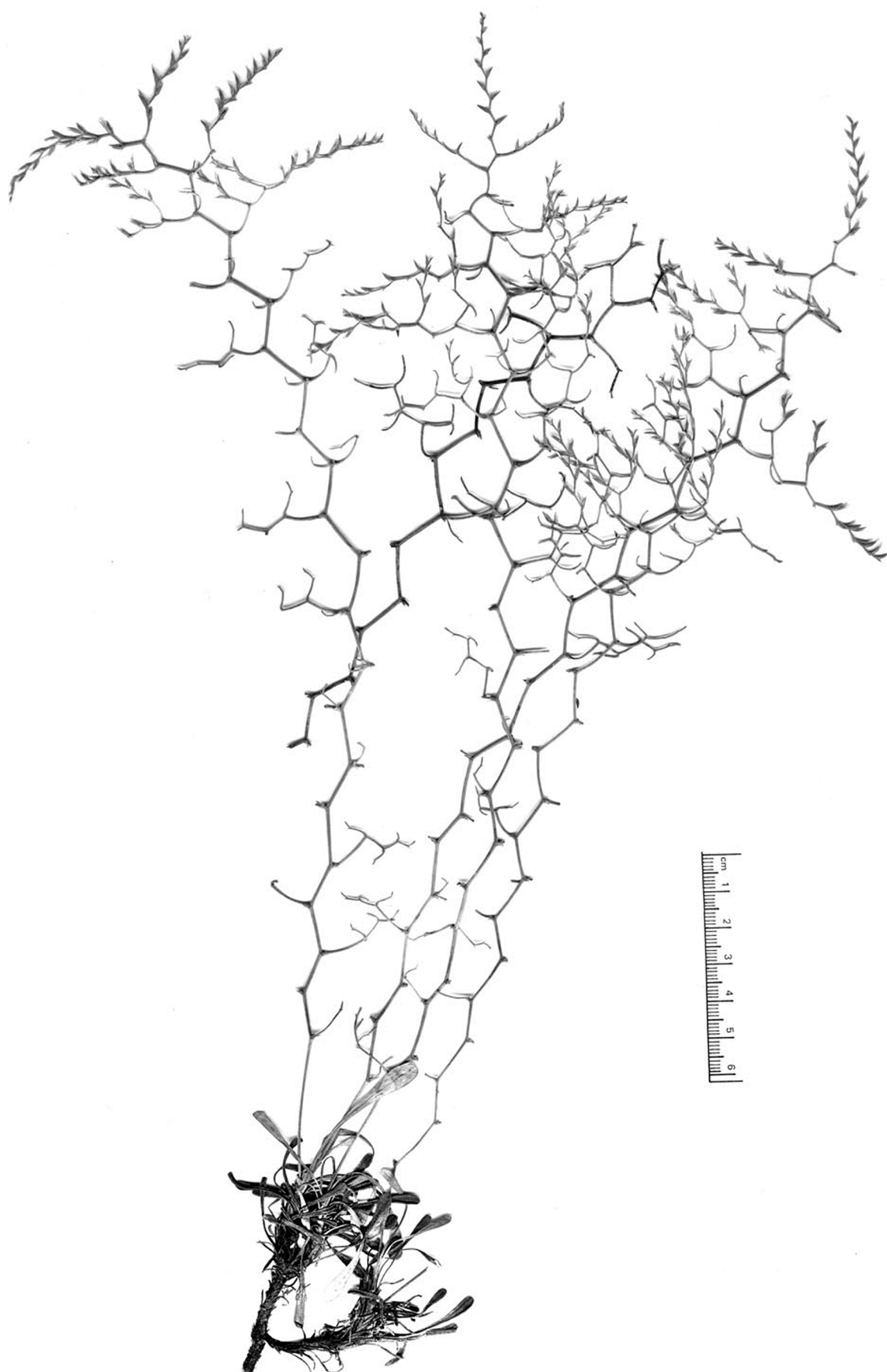


FIGURE 54. Habit of *Limonium velutinum* from holotype. Bogdanović & Alegro s.n. (CAT).

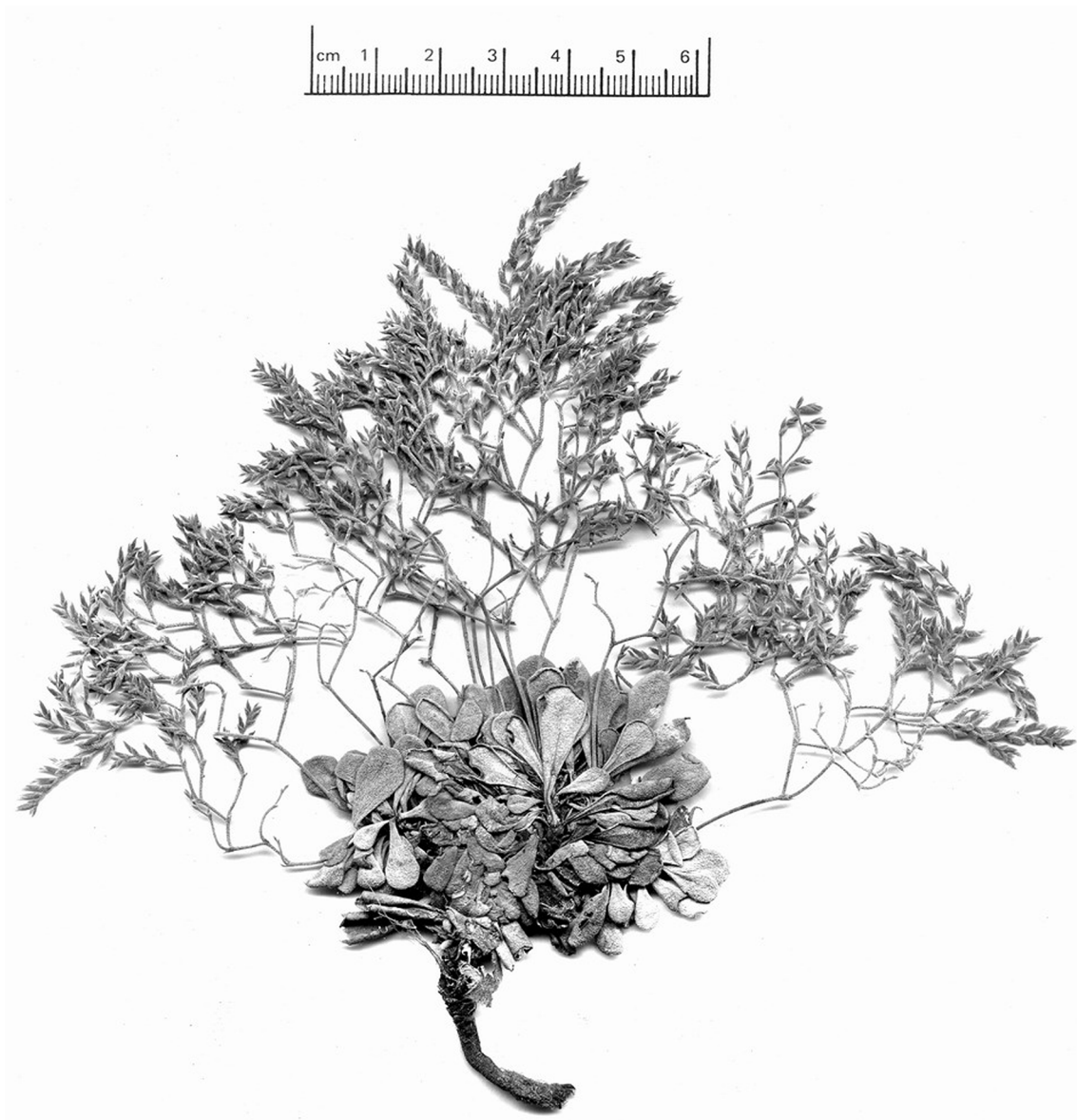


FIGURE 55. Habit of *Limonium vestitum* from Kamik. Bogdanović s.n. (CAT).

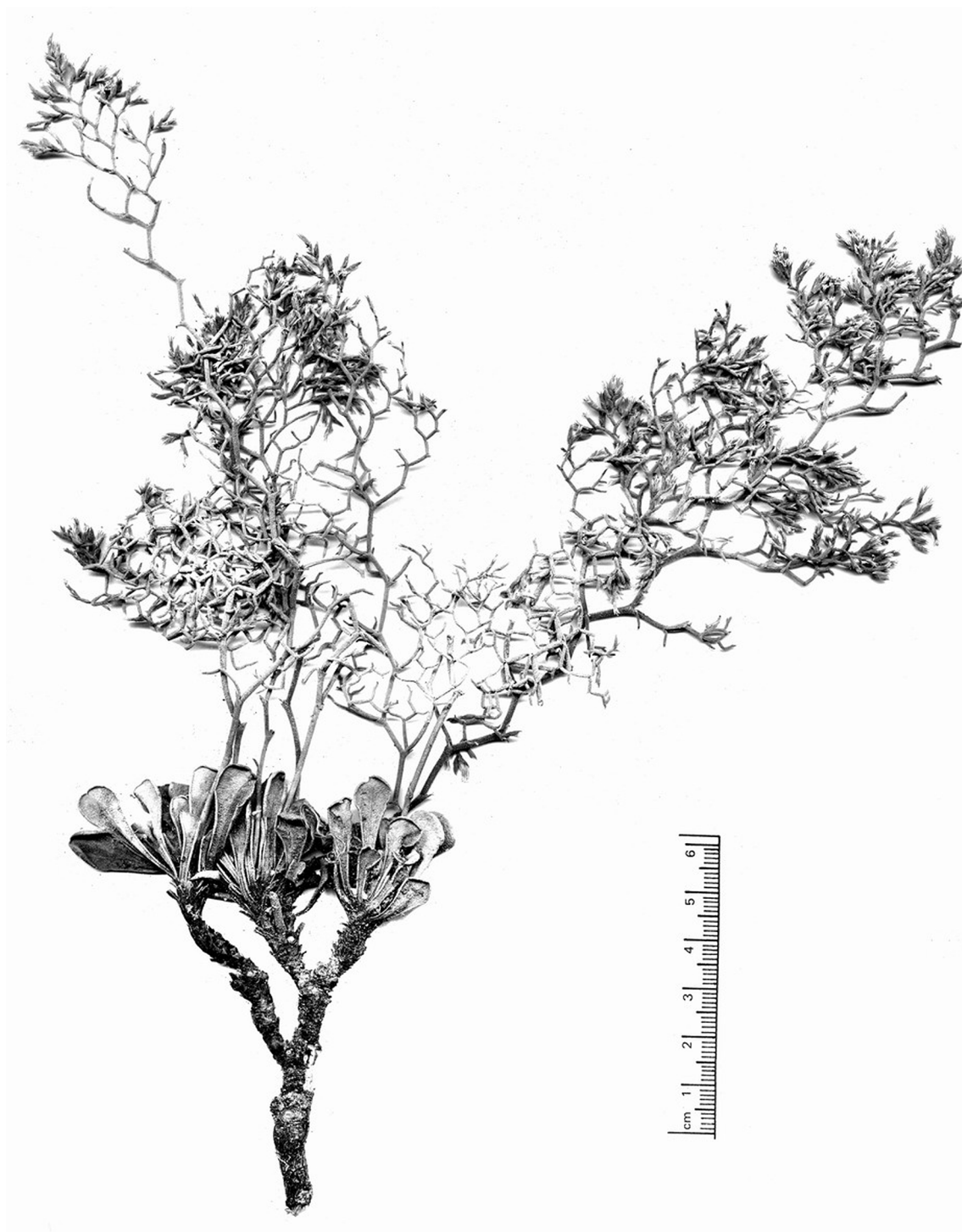


FIGURE 56. Habit of *Limonium zankii* from holotype, Bogdanović s.n. (CAT).