

New species of *Erodium* (Geraniaceae), *Onosma* (Boraginaceae) and *Centaurea* (Asteraceae) from northern Greece

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Abstract. Three new species, *Erodium hartvigianum*, *Onosma kittanae* and *Centaurea johnseniana*, all presumably endemic to Greece, are described and illustrated. The material was collected by the authors, together with other botanical colleagues, between the years 2000 and 2002 in connection with further floristic investigations in the northern parts of the country and reveals that the supply of new taxa for the area shows no signs of diminishing.

Key words: *Erodium hartvigianum*, *Onosma kittanae*, *Centaurea johnseniana*, new species, Greece

Erodium hartvigianum STRID & KIT TAN, sp. nov. Fig. 1.

Erodium perenne, dioicum, foliis basalibus irregulariter pinnatis usque pinnatisectis paribus majoribus 4–7 et minoribus interjectis nonnullis, affine *E. absinthoidis* specierumque affinium, a qua differt petalis citrinis et foliorum segmentis latioribus.

Dioecious perennial herb forming lax clumps, with a woody vertical taproot and a short, stout, gnarled and blackish woody stock. Stems 15–30 cm tall, ascending to suberect, moderately branched, terete, 3–4 mm diam. in lower part, patent-pubescent with short glandular hairs and fewer, longer eglandular ones. Leaves mostly basal, forming a rather lax rosette, 7–15 cm long and 1.5–3.5 (–4.5) cm broad; petiole shorter than or equalling lamina, patently glandular-pubescent; lamina lanceolate-oblong, irregularly pinnate to pinnatisect with 4–7 pairs of major leaflets and some smaller intercalary ones, green or slightly greyish-green, sparsely to moderately glandular- and eglandular-pubescent on both surfaces. Leaflets flat, obovate, 10–16 × 5–7 (–9) mm, bilobed (sometimes resembling leaves of *Quercus frainetto*); ultimate teeth ovate, subobtusate. Cauline leaves few, reduced and subsessile. Stem with 1–4 peduncles, 3–5 cm long in flower, straight and up to 8 cm in fruit, indumentum as in stem. Inflorescence (3-)4–7-flowered, umbellate, bracteate; bracts 4–7, ovate, c. 2.5 mm long, scarious, aristate, long-ciliate. Pedicels 2–3.5 cm in flower, up to 5 cm in fruit, straight, diverging at an acute angle, patently glandular-pubescent with a mixture of long and very short hairs. Flowers regular or slightly irregular, 5-merous, unisexual. Sepals ovate to broadly oblong, 5–8 mm, ± scarious between the green veins, sparsely glandular- and eglandular-pubescent with some long, straight bristles on veins, aristate with terminal awn 0.8–2 mm. Petals obovate, 9–12 mm, lemon-yellow. Stamens 5, antisepalous, with yellow anthers 1.5–2 mm; staminodes 5. Stigmas 5, filiform. Mericarp narrowly turbinate, 7–10 (–12) mm, sharply acute at the lower end, brown,

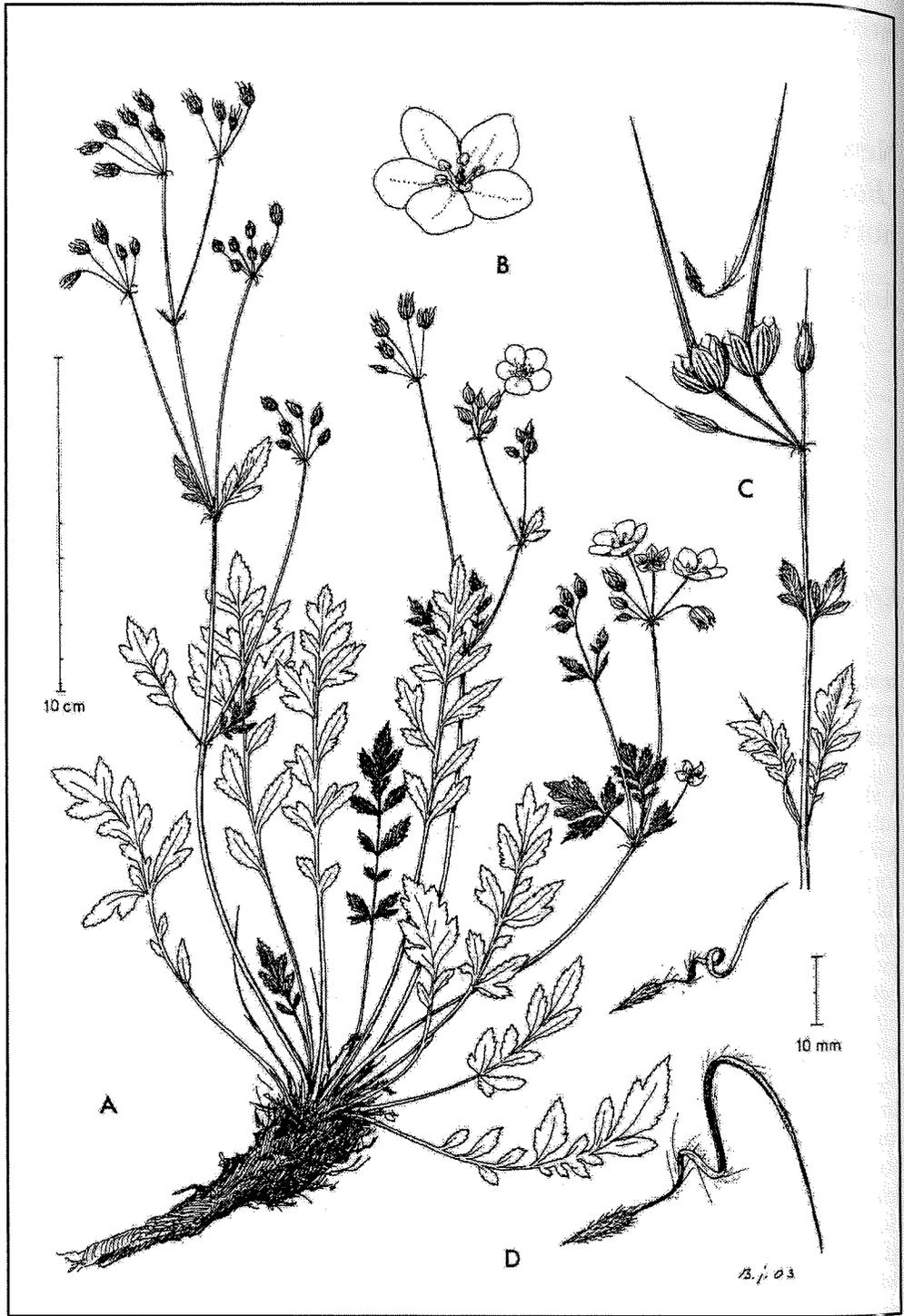


Fig. 1. *Erodium hartvigianum*: A, habit; B, staminate flower; C, fruiting branch; D, mericarp

densely pilose with straight, white, erecto-patent 1 mm hairs; foveoles inconspicuous, glandular, without a furrow. Beak of mericarp 55–80 mm; lower half relatively stout, flattened, with a line of long straight white hairs on inner side, spirally twisted in 2–4 turns at maturity; upper half of beak slender, falcate, with shorter hairs.

Flowering from April to beginning of June; fruiting in late May and June.

Type: Greece, Nomos Kozanis, Eparchia Voiou. South side of Mt Siniatsiko, between Siatista and Galatini, 1100–1150 m. Rocky, deforested limestone slopes and road embankments, 40° 17' N, 21° 33' E, 31 May 2001 (flowering and fruiting). Strid (with Kit Tan, G. Vold & P. Lassen) 52518 (holo. GB; iso. ATH, C, G, LD, herb. Kit).

Other specimens examined: In the same area, near Agia Kiriaki, E of Galatini, 1200 m. Rocky deforested limestone slopes, 40° 19' N, 21° 35' E, 31 May 2001 (flowering and fruiting). Strid (with Kit Tan, G. Vold & P. Lassen) 52521 (ATH, G, GB).

This distinctive species, which is probably endemic, was first observed by Per Hartvig and Niels Jacobsen in the same locality in early April 2000. A small specimen was collected and shown to us. The only other yellow-flowered species of *Erodium* in Europe is *E. chrysanthum* L'HÉR. ex DC. which is endemic to the mountains of Peloponnisos and Sterea Ellas and differs conspicuously by its lower stature and smaller fruits but especially by the silvery-sericeous, 2-pinnatisect leaves with linear-lanceolate ultimate segments. *E. hartvigianum* may be related to some members of the *E. absinthoides* group which is very polymorphic especially in Turkey. Species in this group are also caulescent, dioecious perennials of mountain habitats, but they always have pink, purplish or white petals and generally narrower leaf segments. There is some similarity with *E. cedrorum* SCHOTT & KOTSCHY from south central Anatolia (Flora of Turkey grid-squares C4, C5); this is also a glandular-pubescent plant but the leaf segments are relatively broad and different in shape, the petals are smaller and bright pink, and the fruits smaller. *E. hartvigianum* is an attractive rock garden plant and has already been established in cultivation in the Göteborg Botanical Garden where it flowered for the first time in May 2003.

Onosma kittanae STRID in Pl. Syst. Evol. 242: 157 (2003). Fig. 2.

Onosma elegantissimae persimilis et propter folia anguste linearia et corollas glabras vel parce pubescentes proxissime affinis, sed differt corolla nivea (nec flavida) et semper glabra. Ab *O. thracica* simili (Bulgarian incolenti) differt corollae tubo niveo glaberrimque (nec luteo nec dense puberulo) et sepalis longioribus gracilioribusque et caule foliisque setis stellatis tenuibus.

Laxly caespitose perennial with a slender woody base and several sterile leaf rosettes at anthesis. Basal leaves narrowly linear-oblong, 5–10 (–13) cm long and 2–3 (–4.5) mm broad, dull greyish-green, with distinct midrib and obscure lateral veins on lower surface. Stems few, ascending, 15–30 cm tall, terete, densely appressed-setose; bristles c. 1 mm, simple or with few rays. Bristles on basal leaves and leaves of sterile rosettes dense, appressed, all stellate, with seta c. 0.7 mm long and 6–8 short, spreading or deflexed rays at base, ± uniform on upper surface, those on ventral midrib with poorly developed rays. Cauline leaves usually 5–9, evenly distributed up to inflorescence, similar to basal leaves but linear-oblong and slightly broader, with

similar indumentum. Inflorescence terminal, of (1-) 2 scorpioid, bracteate cymes. Bracts shorter than calyx, lanceolate, with short appressed simple bristles on surface and longer suberect simple bristles at margin. Flowers 6-12 per cyme, nodding to semi-pendent at anthesis, later erect on straight infructescence; pedicels c. 2 mm long, scarcely elongating in fruit. Calyx divided almost to base; lobes narrowly linear-lanceolate, c. 12×1 mm at anthesis, up to 17 mm long in fruit, subglabrous on both surfaces but with dense, erecto-patent, straight, simple bristles c. 1.5 mm long at lower margins. Corolla subcylindrical-clavate, 20-22 mm, with very short, recurved lobes, glabrous, white. Stamens all equal, inserted c. halfway on corolla; anthers 8-9 mm, sagittate, coherent only at base, included in corolla or slightly exserted. Style gynobasic, exserted; stigma small, capitate, shortly 2-lobed. Calyx persistent in fruit, erect. Nutlets 4 in each fruiting calyx, with slender persistent style between them, erect, 2.2-2.8 mm, ovoid-trigonal with flat triangular base, with 1 rounded and 2 ± flat sides, shortly apiculate, smooth, glabrous, greyish, often mottled, finally shiny black.

Flowering from early May to June; fruiting June and July, with seeds ripening successively to early August.

Type: Greece, Nomos Evrou, Eparchia Soufliou. Pessani forest, Loutra to Dadia. Serpentine outcrop in mixed woodland with deciduous oaks, 400 m, 41°06' N, 26°06' E, 13 June 2000; flowers snow-white, nutlets shiny black, Kit Tan & G. Vold 23300 (holo. GB; iso. ATH, C, G, herb. Kit).

Other specimens examined: loc. *ibid.*, 7 May 2000, flowering only, Strid & al. 50429 (GB); 6 June 2001, flowering and fruiting, Kit Tan & G. Vold s.n. (seed collected, also numbered as Strid & al. 53002); Dadia to Mt Sapka, serpentine outcrop in mixed deciduous oak and *Pinus* woodland, 350 m, 41°05' N 26°06' E, 2 August 2001, fruiting only, Kit Tan & G. Vold 25264 (seed collected); loc. *ibid.*, 24 July 2002, Strid (with Kit Tan, G. Vold & P. Lassen) 53894 (seed collected).

Endemic. *Onosma kittanae* has some similarities to *O. thracica* VELEN. from south and southeast Bulgaria but differs by its snow-white and glabrous (not yellow and densely puberulent) corolla tubes, longer sepals and more slender, delicate stellate bristles on stem and leaves. Another possibly related species is *O. elegantissima* RECH. fil. & GOULIMY, which is restricted to serpentine on Mt Vourinos in north central Greece, and also has very narrow (usually 1.5-2 mm) linear basal leaves and glabrous or sparsely pubescent corollas. However, the habit of *O. elegantissima* is distinctly different, the plant being suffruticose and densely caespitose, forming large clumps; the leaf bristles are very densely appressed with (5-)10-15 (-20) rays and the corolla pale lemon-yellow. The only other entirely white-flowered *Onosma* in Greece is *O. stridii* TEPPER, which is endemic to Kallidhromon, a small serpentine mountain in Sterea Ellas. The latter taxon is caespitose and has much shorter and broader basal leaves, shorter flowering stems, leaf bristles with 10-30 rays, longer corollas, etc.

We have found a number of interesting species on small serpentine outcrops in the Pessani forest (Eparchia Soufliou) in the far north east of Greece. They include *Alyssum sibiricum*, *Agropyron cristatum*, *Arum elongatum*, *Convolvulus boissieri*, *Dianthus pinifolius* subsp. *tenuicaulis*, *Fumana aciphylla*, *Genista anatolica*, *Ranunculus gracilis*, *Sesleria alba*, *Thymus zygioides*, *Trifolium lucanicum*, *T. sylvaticum*, *Tripleurospermum oreades* and *Verbascum adrianopolitanum*. The new *Onosma* species is a further addition to this remarkable local flora.

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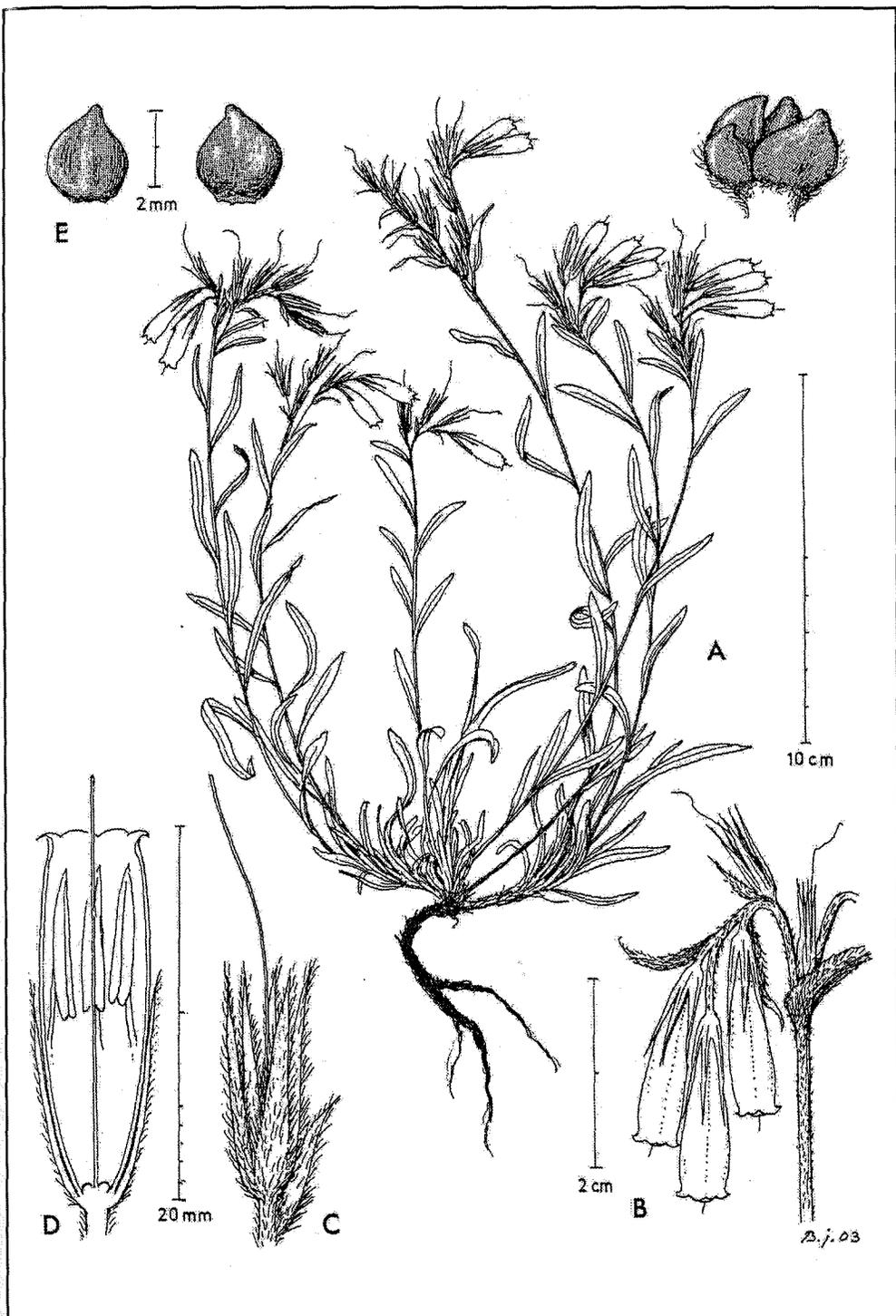


Fig. 2. *Onosma kittanae*: A, habit; B, inflorescence; C, fruiting calyx; D, flower; E, nutlets

Centaurea johnseniana KIT TAN & STRID, sp. nov. Fig. 3.

Centaurea ex affinitate *C. affinis*, speciei variabilis, a qua differt vitae cyclo monocarpico (hapaxantho), caulibus valde rigidis, ramis subdivaricatis calathidiis numerosis, involucri bractearum appendicibus longioribus, angustioribus et semper in spinulam terminalem quam fimbriae laterales longiorem elongatis.

Herbaceous, monocarpic perennial; leaf rosettes developing for 2–3 years before flowering. Taproot woody, vertical. Flowering stem (15–)25–35(–45) cm, erect to suberect, rather stout and rigid, 3–5 mm diam. at base, angled to sulcate, greyish arachnoid-tomentose to glabrescent, branched at base or in lower part with several straight branches diverging at an angle of 45°–60°. Rosette leaves oblanceolate, 7–12 × 2–3.5 cm, shortly petiolate, greyish arachnoid-tomentose, 2-pinnatifid with narrowly winged rhachis; ultimate segments divaricate, elliptic, 4–6 × 1.5–3 mm, acute to shortly acuminate. Basal leaves of flowering stems ± withered at anthesis. Cauline leaves resembling basal ones but more reduced, 1-pinnatifid or the uppermost 3-fid, with lanceolate segments. Capitula usually 15–40 per plant, solitary on leafy branches, becoming slightly clavate in fruit. Involucre 10–16 × 7–11(–14) mm, ellipsoid in flower, becoming broadly obovoid-turbinate in fruit. Phyllaries imbricate, 3–4-seriate, ovate-oblong, 5–7 mm (excl. appendage), pale greenish to stramineous, with conspicuous longitudinal veins, subglabrous. Appendages of middle phyllaries triangular, 1.5–2.5 mm broad at base (excl. cilia), dark brown, not auriculate, with 5–7 pairs of brown cilia 0.7–1.5 mm long and a terminal spinule 1.5–2(–3) mm. Florets 16–22 mm, pinkish-purple to reddish-purple; anther tube narrowly cylindrical, c. 7 mm, yellow. Achenes oblong-ovoid, c. 4 mm, laterally compressed, truncate at apex, sparsely puberulent to subglabrous at maturity, greyish-brown; pappus with several-seriate bristles c. 3 mm.

Flowering from mid-May to end of June; fruiting till August.

Type: Greece, Nomos Serron, Eparchia Sintikis. 3 km NNE of Siderokastro, in crevices and ledges of rocky limestone outcrop, 200–250 m, 41° 15' N, 23° 25' E, 20 May 2000, Strid 50880 (holo. GB; iso. ATH, G, GOET, LD, herb. Kit).

Other specimens examined: loc. *ibid.*, 19 June 2000, Kit Tan & G. Vold 23551 (ATH, C, G, herb. Kit); loc. *ibid.*, 13 June 2001, Kit Tan & G. Vold 25170 (herb. Kit); loc. *ibid.*, 10 October 2000, Strid, Kit Tan & G. Vold 51308 (seed collected); loc. *ibid.*, 3 June 2001, Strid (with Kit Tan, G. Vold & P. Lassen) 52743 (ATH, C, G, GB, LD, herb. Kit); loc. *ibid.*, 3 June 2001, Strid (with Kit Tan, G. Vold & P. Lassen) 52749 (GB).

The last specimen listed deviates in being c. 45 cm tall with numerous smaller and darker heads and relatively longer phyllary spinules. Several individuals matching this description were observed but have not been treated as worthy of taxonomic rank.

Possibly a local endemic. *C. johnseniana* is related to the variable *C. affinis* FRIV. but differs in its monocarpic habit, stiff rigid stem and numerous capitula on subdivaricate branches. The appendage of the middle phyllaries is somewhat longer and narrower and always extended into a distinct spinule longer than the lateral fimbriae. It is a chasmophyte originally restricted to crevices and ledges of limestone rocks. Kit Tan and G. Vold have found it in abundance on gravelly sand along man-made tracks at the foot of the rocks; dispersal and spread has been facilitated by quarry-

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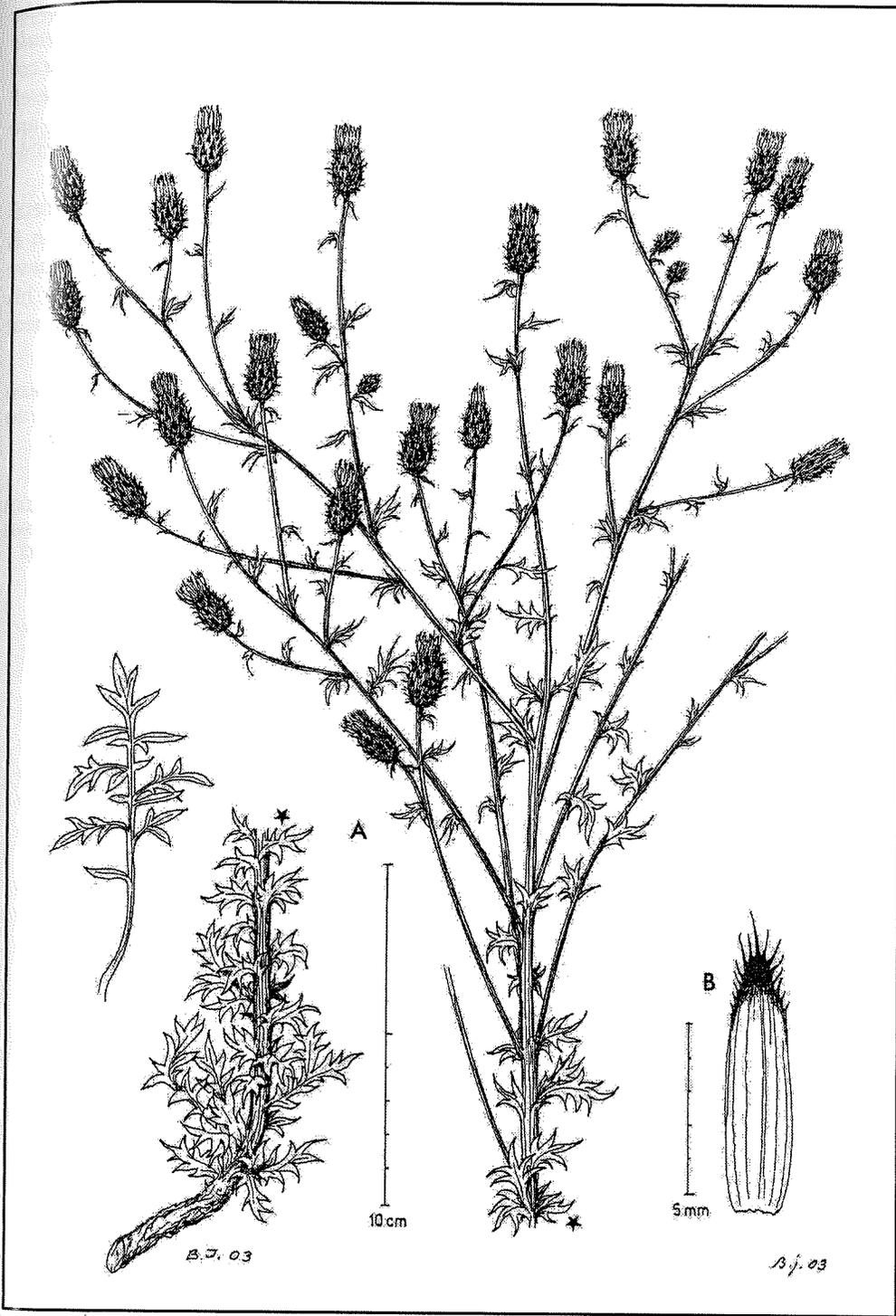


Fig. 3. *Centaurea johnseniana*: A, habit; B, middle phyllary

ing activities in the vicinity. Other interesting species in the area include *Alyssoides utriculata*, *Astragalus gladiatus*, *Aubrieta deltoidea*, *Bolanthus thymifolius*, *Campanula jacquinii* subsp. *rumeliana*, *Cerastium banaticum*, *Globularia cordifolia*, *Hippocrepis comosa*, *Minuartia setacea*, *Rhamnus saxatilis* subsp. *rhodopeus*, *Saxifraga stribnyi*, *Seseli rigidum*, *Silene flavescens* subsp. *thessalonica* and *Syringa vulgaris*. Many of these are mountain plants favouring open rocky habitats and usually growing at considerably higher altitudes.

We are indebted to Prof. G. Wagenitz (Göttingen) who examined some specimens and confirmed our view that they represented a new species. This taxon is named in honour of the Danish botanical artist, Bent Johnsen, with whom we have collaborated for many years. With sadness we inform friends and admirers of his work he passed away in May 2004; the *Centaurea* illustration with numerous neat little capitula is a fitting tribute to his drawing skill even at the age of 84.

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