

Bupleurum L. (Umbelliferae) in Europe — 1. The annuals, B. sect. Bupleurum and sect. Aristata

Authors: Snogerup, Sven, and Snogerup, Britt

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SVEN SNOGERUP & BRITT SNOGERUP

Bupleurum* L. (*Umbelliferae*) in Europe – 1. The annuals, *B.* sect. *Bupleurum* and sect. *Aristata

Abstract

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A full survey of the European annual species of *Bupleurum* is presented, including a key, descriptions, illustrations, maps and specimen lists covering the distribution within Europe. The following species are treated: *B. aequiradiatum*, *B. affine*, *B. aira*, *B. apiculatum*, *B. asperuloides*, *B. baldense*, *B. brachiatum*, *B. capillare*, *B. commutatum*, *B. croceum*, *B. euboicum*, *B. flavicans*, *B. flavum*, *B. gaudianum*, *B. gerardi*, *B. glumaceum*, *B. gracile*, *B. greuteri*, *B. gussonei*, *B. karglii*, *B. lancifolium*, *B. marschallianum*, *B. odontites*, *B. pachnospermum*, *B. praealtum*, *B. rollei*, *B. rotundifolium*, *B. semicompositum*, *B. subovatum*, *B. tenuissimum*, *B. trichopodium*, *B. veronense*, *B. virgatum*. The new combinations *B. gussonei* and *B. aequiradiatum* are validated.

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Acknowledgements

References

Introduction

Our work on the European annual *Bupleurum* started in 1958 with the discovery of the new species *B. aira* on the island of Naxos, Greece. Since then, our interest has gradually widened to more groups of species. This means that some species were well known already 1958, others only recently. This does not influence the taxonomy very much but the notes about distribution and the maps are not carried to the same level of knowledge for all species. Our main ambition has been to produce a well founded taxonomic treatment, the distribution of each species then to be given according to the present knowledge. For the citation of type material we have the ambition to feel sure about the application of correct names. Selection of lectotypes has been done only when the material concerned has been sufficiently studied.

Subdivision of the genus

We agree with the division into subgenera by Cauwet-Marc (1976). For the moment, we avoid to revise the nomenclature of the subdivisions of *Bupleurum* subg. *Bupleurum* containing perennial species only. Only the groups containing the European annuals are formally treated and characterised.

The genus is subdivided into two subgenera.

Bupleurum* subg. *Tenoria (Spreng.) Cauwet, Biosyst. Espèces Vivaces *Bupleurum* Medit. Occ. 3: 30. 1976 ≡ *Tenoria* Spreng., Pl. Umbell. Prodr.: 32. 1813. – Lectotype (designated here): *B. fruticosum* L.

This subgenus comprises all the frutescent and suffrutescent perennials of the genus. They occur only in the W Mediterranean, NW Africa and the Atlantic Islands, except for the more widespread *B. fruticosum* L.

***Bupleurum* subg. *Bupleurum* L.** – Type: *B. rotundifolium* L., see under *B. sect. Bupleurum*.

This subgenus comprises the herbaceous perennials and the annuals of the genus. The perennials of this subgenus may be woody at the base, but the flowering shoots are herbaceous throughout. We are not convinced that the intricate systems of infrageneric units practised by several previous authors are based on real phylogenetic facts. Therefore, we uphold only well understood and probably old groups on the levels of section and subsection.

Annuals have probably originated separately at least three times within this subgenus. The first group concerned is *B. sect. Bupleurum*, which differs from the rest of the subgenus in lacking bracts and has very broad, semi-perfoliate upper leaves. It probably constitutes one of the basic clades of the genus. The second group is *B. sect. Aristata*, which is a large and certainly old taxon, according to its morphology most related to the groups of perennials which Wolff (1910) included in his *B. subsect. Nervosa*. The third one consists of a single Asiatic annual, *B. nematocladum* Rech. fil., which is closely related to the group of perennials which Wolff included in his *B. subsect. Nervosa* ser. *Falcata*. The European annual species thus belong to two natural and no doubt old groups, here treated as sections, which are certainly not sister groups of each other. Any more far-going statements on the phylogeny must in our opinion be founded on DNA research including the entire genus.

General remarks on morphology and terminology

In this work we allow the term annual to include all hapaxanthic species that complete their life cycle in the course of less than two years time. The *Bupleurum* annuals are often short-lived, germinating in spring and setting seed in the following summer. But some individuals start by forming a rosette and probably mostly do so if germinating in autumn or winter. Both growth forms may appear in the same species or even in the same population. Still, there is a clear distinction between the annuals and herbaceous perennials because the latter have a rhizome or a woody and usually branched basal stock.

In most species there is a sequence of leaf shapes. The cotyledons are often much different from the first following leaves and these in turn from the middle and upper ones. The shape of cotyledons and first leaves may be of great interest for the understanding of relationships among groups and species. But information is still lacking for many species because young plants have not been collected.

Our descriptions of umbels refer to the well-developed ones. The stem ends in a top umbel, which is usually the largest one. It is often overtopped by branches, which carry a few to many well-developed side umbels. The last formed ones are, however, smaller and often very depauperate with few and more or less reduced umbellules. These depauperate, late umbels are usually not mentioned in the descriptions, as they can be abnormal in several ways. When using the key or the descriptions for identification of specimens, only the largest, best-developed umbels should be considered. Very starved individuals may sometimes fail to develop any normal umbel at all.

We use the English term “bractlet” for the involucrells phylla of the umbellules (partial umbels). The term “bracteol” has a well-defined meaning, in common for all the flowering plants, and should not be misused for something else in the *Umbelliferae*.

The fruits vary among groups and species of *Bupleurum* to an extent far exceeding what has been observed in any other genus of the family. Comparison of many other characters make it quite obvious that the traditional circumscription and subdivision of the genus is in all essentials correct. This means also that the low evaluation of the variation in fruit characters is throughout appropriate. Ornamentation and anatomy of fruits differ more between closely related taxa in *Bupleurum* than in any other part of *Umbelliferae*.

Material and methods

During the period 1960-1999 herbarium material from the following collections was studied in more or less detail: ATH, ATHU, B, BG, BM, C, CAI, CAIM, E, FI, G, GB, H, HUJ, JE, K, L, LD, M, O, OULU, PR, PRC, S, TUR, UPA, UPS, W, WU. Limited amounts of material have also been available from a number of other public and private collections.

Cultivation in greenhouse was performed with the species for which viable seeds were available. This has led to our own chromosome counts for several species. In several cases, even apparently fully ripe seeds failed to germinate. Data from cultivated material are included for cotyledons, first leaves and flower characters, but only occasionally for size, habit and form of entire inflorescences. The great modification in such characters in cultivation would widen the descriptions far outside the ranges found under natural conditions. Field studies have also been possible for many, but not all, of the species treated.

Europe is delimited as in “Flora europaea”, i.e. excluding the East Aegean Islands and Caucasus. In the notes on distribution, the abbreviations for countries and areas are as far as possible according to “Flora europaea” and “Atlas florae europaeae” except for the following citations to actual political regions: Bos = Bosnia and Hercegovina, Kos = Kosovo, Mak = Macedonia, Jug = Serbia and Montenegro. Countries where the species is considered as certainly introduced are listed in parenthesis.

In the maps we have not tried to distinguish between natural, naturalized and casual occurrences. As most annual species of *Bupleurum* occur in open and more or less disturbed habitats, such a distinction is often difficult and we therefore prefer to summarize available information in a more general form in the notes on distribution. Separate maps are given for most species, only restricted endemics are combined in one map. Three species with few localities in Europe are not mapped. For some species our information is incomplete for parts of the distribution area. Only material studied has been mapped, except for *B. rollii*.

From areas where a species is common, only a small number of representative specimens are cited for each country or other area, if possible recently collected. For disjunct occurrences or rare species a more full citation of material seen is given. The large amounts of material seen especially from SE Europe make it impossible to give a complete list of material studied. Citation to countries in the distribution notes is mostly founded on material revised but data from reliable floras have also been accepted.

Key to the European annual species of *Bupleurum*

1. Upper leaves perfoliate, bracts lacking or vestigial 2
- Upper leaves linear, not perfoliate, bracts conspicuous 5
2. Fruit surface tuberculate 3
- Fruit surface smooth 4
3. Fruit 2.2-3.1 mm, stylopodium 0.8-1.1 mm 3. *B. lancifolium*
- Fruit 3.7-4.7 mm, stylopodium 1.2-1.5 mm 4. *B. subovatum*
4. Upper leaves orbicular, yellowish; inner umbellules of each umbel much reduced 2. *B. croceum*
- Upper leaves ovate, green; umbellules equal or subequal 1. *B. rotundifolium*
5. Bractlets (1/5-)1/4-3/4 as wide as long, enclosing buds and fruits before and after anthesis, ± scarious or shining at anthesis 6
- Bractlets 1/10-1/4 as wide as long, not enclosing buds or fruits, herbaceous 20
6. Bractlets in all or most umbellules 4 7
- Bractlets in all or most umbellules 5 8
7. Inflexed lobe of petal attenuate to a narrow apex 18. *B. gaudianum*
- Inflexed lobe of petal broad, apically bifid 14. *B. aira*
8. Bractlets scarious throughout 9

- Bractlets herbaceous at least in central part 11
- 9. Bractlets with conspicuous veinlets 5. *B. odontites*
- Veinlets lacking or few and inconspicuous. 10
- 10. Longest umbel rays 1/2-1 as long as peduncle, bractlets entire. 13. *B. gracile*
- Longest umbel rays less than 1/2 as long as peduncle, bractlets finely serrulate apically 12. *B. flavum*
- 11. All or most umbels one-rayed, the two bracts placed closely below the bractlets 17. *B. capillare*
- Umbels with (2-)several rays 12
- 12. Bractlets 3-veined, herbaceous part between veins contrasting towards scarious part outside 13
- Bractlets 3-5(-7)-veined, at least partly herbaceous outside the second vein 14
- 13. Bracts longer than umbel rays 7. *B. greuteri*
- Bracts shorter than or equalling the longest rays 6. *B. glumaceum*
- 14. Bractlets conspicuously navicular-excavate, with a short or to 2 mm long arista 15
- Bractlets flat or almost so, tapering to a conspicuous arista. 16
- 15. Umbel rays 4-7, much unequal 15. *B. flavicans*
- Umbel rays 2-5, subequal 16. *B. karglii*
- 16. Bractlets 5-7-veined 8. *B. baldense*
- Bractlets 3-veined. 17
- 17. Petal bend conspicuously lobed. 11. *B. apiculatum*
- Petal bend not conspicuously lobed 18
- 18. Petal forming a slightly concave bend 5. *B. odontites*
- Petal forming a very convex bend 19
- 19. Bractlets with conspicuous veinlets, entirely herbaceous between the veins 9. *B. veronense*
- Bractlets with no or inconspicuous veinlets, with scarious parts between the veins 10. *B. gussonei*
- 20. Fruit verrucose or papillose 21
- Fruit surface smooth. 24
- 21. Fruit surface with light papillae; bracts 4 22. *B. semicompositum*
- Fruit surface verrucose; bracts 3 or 4 22
- 22. Fruit surface with light, papillaelike rugulae, wings inconspicuous or consisting of rows of papillae 20. *B. euboeum*
- Fruit surface with irregular, partly confluent rugulae, ridges with partly irregular, verrucose wings 23
- 23. Umbel rays very unequal, stylopodium 0.5-0.6 mm wide, styles 0.15-0.2 mm 19. *B. tenuissimum*
- Umbel rays subequal, stylopodium 0.7-0.9 mm, styles 0.3-0.4 mm 21. *B. marshallianum*
- 24. Petal bend conspicuously verrucose or pointed. 25
- Petal bend smooth. 26
- 25. Petal bend with a verrucose projection in the middle; mericarps semi-globose 23. *B. asperuloides*
- Petal bend with a single point in the middle; mericarps prismatic 24. *B. rollii*
- 26. Inflexed lobe of petal long, broad, usually conspicuously truncate 27
- Inflexed lobe of petal short and broad or very narrow in distal part, scarcely truncate 30
- 27. Uppermost leaves with broad, amplexicaul base; umbel rays subequal 27. *B. trichopodium*
- Bases of uppermost leaves not amplexicaul; umbel rays very unequal 28
- 28. Some central flowers of umbels often pelorial, not belonging to an umbellule; umbellules 2-5-flowered 29. *B. virgatum*
- Umbels without pelorial flowers; 6-11-flowered 29
- 29. Umbels 5-7-radiate; petals 0.3-0.4 mm; stylopodium 0.5-0.6 mm wide 28. *B. gerardi*

- Umbels 3-4-radiate; petals 0.6-0.8 mm; stylopodium 0.8-1 mm wide . . . 33. *B. brachiatum*
- 30. Inflexed lobe of petal very narrow in distal part, petals purple 26. *B. affine*
- Inflexed lobe short, $\pm$ broad and inrolled 31
- 31. Branches several in elongate row below the main umbel; leaves usually 5-10 mm broad, fruit (3-)4-7 mm 25. *B. praealtum*
- Branches few, long, often some $\pm$ overtopping the main umbel; leaves usually less than 5 mm broad, fruit 1.8-3.5 mm 32
- 32. Stylopodium 0.4-0.6 mm, narrower than the mericarp, style 0.15-0.3 mm 33
- Stylopodium 0.8-1.2 mm, as wide as mericarp, style (0.2-)0.3-0.8 mm 34
- 33. Rays of largest umbels 6-8; all flowers in pedunculate umbellules; inflexed lobe of petal usually broad; fruit 2.5-3.5 mm 28. *B. gerardi*
- Rays of largest umbels 2-4(-6); some flowers or umbellules often basal in umbel; inflexed lobe of petal short, narrow; fruit 2.2-2.5 mm 29. *B. virgatum*
- 34. Umbel rays all subequal or one much shorter; mericarps 1.8-2 mm 32. *B. aequiradiatum*
- Umbel rays very unequal; mericarps 2.5-2.8 mm 35
- 35. Most umbels 6-8-radiate; bractlets subequal to the flowers; styles c. 0.5 mm 30. *B. commutatum*
- Most umbels 4-5-radiate; bractlets conspicuously exceeding the flowers; styles 0.2-0.3 mm 31. *B. pachnospermum*

Bupleurum* sect. *Bupleurum

Type: *B. rotundifolium* L., typ. cons. prop., selected as type of the generic name *Bupleurum* by Hitchcock in Brit. Bot.: 138. Aug. 1929. (A conflicting selection was made earlier by Britton & Brown, Illustr. Fl. 2: 639. 1913, who selected *B. rigidum* L. as type).

$\equiv$ *Diatropa* Dumort., Fl. Belg.: 76. 1827 (monospecific, with *D. rotundifolia*).

$\equiv$ [*Trachypleurum* Reichenb., Consp. Regn. Veg. 1: 143. 1828, p.p., nom. nud.] $\equiv$ *Bupleurum* [unranked] *Trachypleurum* Reichenb., Fl. Germ. Exs.: 472. 1832, nom. illeg.

$\equiv$ *Bupleurum* sect. *Perfoliata* Godron in Grenier & Godron, Fl. France 1: 717. 1848. – Lectotype (designated here): *B. rotundifolium* L.

Note. – After the acceptance of *B. rotundifolium* as type of the generic name *Bupleurum* by Tutin (1968) and Cauwet-Marc (1976) the resulting application of the name *Bupleurum* for this section has become common use. We will therefore continue this usage and propose conservation if it proves necessary.

Annual. Leaves broad, at least upper ones always perfoliate. Bracts usually lacking, rarely few and irregularly developed. Bractlets broad, herbaceous, though often yellowish or rarely tinged purple. Petals broad, smooth or finely granulose, with a median wing and an inflexed lobe adnate to the wing. Mericarps semi-globose to semi-ellipsoidal or semi-ovoidal or subprismatic, smooth or tuberculate to granulate, ridges filiform or variously winged, oil ducts usually inconspicuous in ripe fruit.

Distribution. – Mediterranean and Irano-Turanian as spontaneous, some species widely introduced.

1. *Bupleurum rotundifolium* L., Sp. Pl.: 236. 1753 – Fig. 1

$\equiv$ *Diatropa rotundifolia* Dumort., Fl. Belg.: 760. 1827 $\equiv$ *Tenoria rotundifolia* Bubani, Fl. Pyr. 2: 360. 1900 $\equiv$ *B. perfoliatum* var. *rotundifolium* (L.) Desv. in J. Bot. (Desvaux) 2: 315. 1809. – Lectotype (designated by Rechinger & S. Snogerup in Rechinger, Fl. Iran. 162: 269. 1987): Herb. Linn. 335.1 (LINN!).

$\equiv$ *B. perfoliatum* Lam., Fl. France 3: 405. 1778, p.p., nom. illeg.

Annual, 25-80 cm, erect, usually $\pm$ pseudo-dichotomously branching only apically, umbels usually 3-25, stem straight, as young obscurely angular, soon terete, 3-7 mm thick, partly hollow,

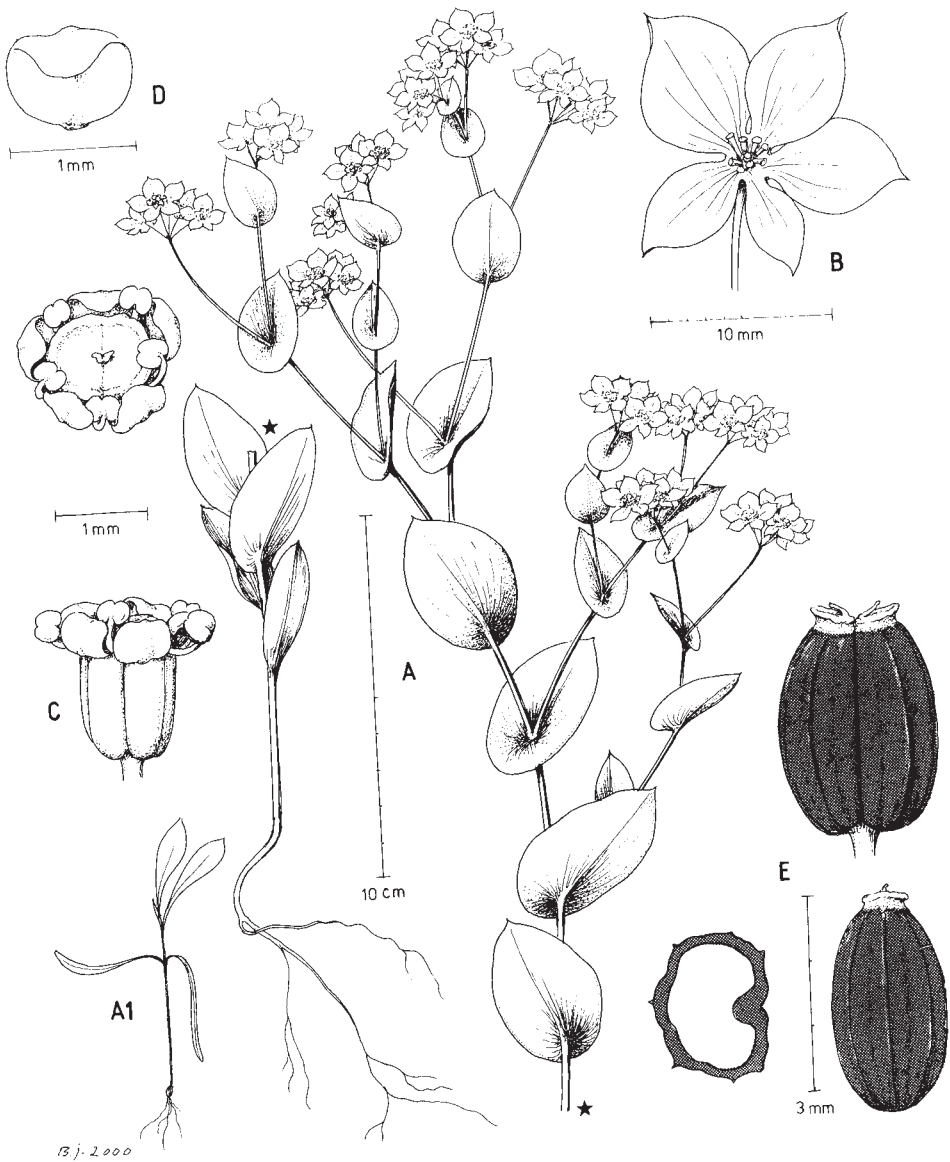


Fig. 1. *Bupleurum rotundifolium* – A: habit; A1: seedling; B: umbellule, flowers removed; C: flowers in early stage; D: petal; E: fruits. – Material: A, B–D: Greece, nom. Pellis, Arnissa, S. & B. Snogerup 15289 (LD); A1: Bulgaria, Snogerup cult. no. 8604 (LD); E: Bosnia, Mostar, 1889, Murbeck (LD).

finely striate, smooth. *Cotyledons* 20-40 mm, lamina linear, to narrowly lanceolate, sessile or with petiole up to 10 mm, with median and marginal veins, veinlets pinnately arranged. *First leaves* soon withering, petiole up to 20 mm, lamina 10-50 × 5-20 mm, elliptical, later ones gradually more short-petiolate, obovate; persistent *cauline leaves* 20-80 × 10-40 mm, upwards changing from obovate and obovate-amplexicaul to elliptical, basally perfoliate, obtuse with a small mucro; uppermost leaves ovate to almost orbicular, perfoliate; margin entire or very finely serrulate, with up to 0.15 mm broad scarious margin; veining parallel or in upper leaves radially divergent, median vein strong, usually reaching the margin, marginal vein thin. *Peduncles* (1-)2-5(-12) cm. *Bracts* usually lacking, rarely 1, if present up to 15 × 10 mm, very variable in size and shape. *Umbel rays* 4-8, usually 6 in the largest umbels, unequal, 3-10(18) mm, the longest usually 1/5-1/3 as long as peduncle, umbellules similar. *Bractlets* usually 5, rarely 4 in some umbellules, variously unequal, much exceeding the flowers, connate for 1 mm or less, herbaceous, at anthesis yellowish, elliptical to obovate-elliptical, apiculate, with 3-7 veins and well developed anastomosing veinlets; the 3 largest bractlets 6-15 × 2.5-9 mm, the 2 smallest 5-8 × 1.5-3 mm. *Umbellules* usually 8-12-flowered, pedicels unequal, 0.5-2.5 mm. *Petals* first greenish to purplish, at late anthesis light yellow, entire, limb c. 0.5 × 0.5-0.7 mm, broader than long, obtrapezoidal, midvein narrow, somewhat broader at the straight to shallowly w-shaped bend, inflexed lobe 1/3-1/2 as long as limb, 0.3-0.4 mm broad, apically slightly widened, shallowly 3-lobed. *Anththers* 0.3-0.4 mm, c. 1/2 as long as filaments. *Stylopodium* green or rarely purplish, 0.9-1.2 mm broad, about as wide as ovary, narrower than the ripe fruit. *Styles* 0.2-0.3 mm, much shorter than stylopodium radius. Ripe *mericarps* 2.8-3.7 × 1.2-1.5 mm, longer than pedicel, pentagonal in transect or as mature rounded, all surfaces smooth, ± glaucous, ridges filiform or with wings up to 0.1 mm high, commissural surface with a narrow furrow.

Chromosome number. – $2n = 16$ (Cauwet-Marc 1976, S. Snogerup 1994).

Flowering. – May to August (in Europe), fruiting June to September.

Habitat. – Open soil, often in man-made localities such as road-sides and fields, steppe, riverbanks, preferably on calcareous soils, 0- c. 2000 m.

Distribution. – Certainly native in S Europe, formerly frequent as a field weed, only as introduced and mostly casual in Central, W and N Europe. Al, Au, Be, Bel, Bos, Br, Bu, Co, Cze, Da, Est, Ga, Ge, Gr, He, Ho, Hrv, Hs, Hu, It, Jug, Kos, Kry, Lit, Mak, No, Po, Rm, Rus, Sa, Sla, Sle, Su, Tu, Ukr. – Fig. 2.

SW Asia, N Africa, cosmopolitan as a casual at harbours, waste places, etc. Recently becoming less common in much of its area.

Selected material seen

ALBANIA: Luma, Kula Lums, 300 m, 8.6.1918, *Dörfler* 642 (WU); Distr. of Korçë, Moskopölë (Voskopoj), 3700 ft, 19.8.1935, *Alston & Sandwith* 2511 (BM, K, S).

AUSTRIA: Leithagebirge, Fuß des Haglersberges bei Winter, 18.5.1913, *Korb* (W); Eichkogel bei Mödling, 24.7.1923, *Korb* (W); Brunn am Gebirge, 6.1924, *Feuz* (K); Hintenburg nächst Ternitz, 6.7.1924, *Rechinger* (W); Fremdenau (Wien) auf Schutter der Donau, 20.6.1926, *Rechinger* (W); Burgenland, Podersdorf am See, 1930, *Morawetz* (WU); nächst Kote 427 nördlich Au (Bez. Mistelbach), 4.9.1932, *Penz* (WU); Leithagebirge near Neusiedl am See, 4.7.1962, *Jacobs* (BG, H, W); Hackelsberg am Neusiedler See, 3.6.1968, *Grims* (herb. Greuter); Wöllersdorf, südlich vom Ort, 380 m, 15.9.1968, *Malicky* (WU).

BELARUS: Prov. Kiew, Chejlov, 4.7.1927, *Elin* (S).

BELGIUM: Entre Rochefort et Hamerenne, 1861, *Rel. Maillanae* 715 (K, PRC, S, W); entre Han-sur-Gefse et Hamerene, 21.8.1861, *Crépin* (O); Rochefort, 29.6.1941, *Stomer* (K).

BOSNIA-HERCEGOVINA: Mostar, 13.7.1889, *Murbeck* (LD); bei Jajce, 28.6.1892, *Beck* (PRC); Travnik, 7.1892, *Brandis* (WU-Hal); pr. Vardište, 500 m, 24.6.1907, *Malý* (K); Schlossberg von Trogor, 21.7.1907, *Stadlmann & al.* (WU).



Fig. 2. European distribution of *Bupleurum rotundifolium* according to material revised.

BULGARIA: Gabrovo, 1899, *Urumoff* (PRC); pr. Sliven, versus Sotirja, 16.7.1907, *Schneider* 625 (BM, K, W, WU); Varna, to the N, near the coast, 9.8.1926, *Turrill* (K, M); Vitosa, pr. Vladaja, 17.7.1927, *Georgieff* (K); ad monasterium Aladscha prope Varna, 16.7.1930, *Rechinger* 945 (LD, W); montes Stara Planina (Balkan) in fauce fluvii Iandra pr. Tirnovo, 18.7.1930, *Rechinger* 1134 (LD, W); montes Rhodope centrales, Novo Selo, 600 m, 21.7.1930, *Rechinger* 1332 (LD, W); Dobrogea, Balcic-Ecrene, 12.7.1931, *Domin & Krajina* 2470 (PRC); in montibus Balkan (Stara Planina) vallis Sucurum ad Karlovo, 8.6.1936, *Klástersky & Deyl* (PR); Rhodopy-Bachovo-Asenograd, 5.9.1949, *Medlinová* (PR); Slantshev Briag 80 km nördl. von Burgas, 10-40 m, 2.-10.6.1971, *Mandl* (W).

CROATIA: Istria, Pola, 10.5.1880, *Schlyter* (UPS); ad Ragusam, 6.1907, *Adamovic* (K); Comit. Bács, Karlovac, 10.6.1909, *Kupčok* (PR); Gallesano, S Istrien, 26.5.1912, *Cufodontis* (W).

CZECH REPUBLIC: Oholi Prahy, Pod Valkovestym, 4.7.1943, *Medlinová* (PRC); trib. Uher. brod, collis Kralov, 230-260 m, 10.7.1947, *Moravec* (PRC); Polabi, Kopce u Uzic, 190 m, 3.6.1948, *Pulchart* (PRC); Pole u Drinova, 20.6.1948, *Homolka* (PRC); ad pedem montis Rip prope Vraskov, 240 m, 1.7.1952, *Dostal* 32079 (PRC); prope Kopec, ab Neratovice, 14.8.1952, *Deyl* (PRC); inter Zajeci et Rakvice procul Breclav, 23.6.1957, *Deyl* (PRC); regio Mikulovske kopce in colle Svaty kopecek ab Mikulov, 300 m, 6.1959, *Dostal* 32080 (PRC); in collibus Pouzdranske kopce prope Pouzdrany, haud procul ab Hustopece, 3.6.1964, *Deyl* (PRC); distr. Vyskov in collibus Vetrniky supra Letonice, 300 m, 22.6.1966, *Dostal* (PRC).

DENMARK: Amager, 1853, *Visby* (S, UPS); Sjælland, Storehedinge, 7.7.1867, *Mortensen* (UPS); Falster, ved Funderup, 21.7.1889, *Mortensen* (BM); Sjælland, Tystofte ved Skelskør, 1930, *Jørgensen* (C).

- ENGLAND: Upper Brighton, Cheshire, 1908, *Drabble* (BM); W. Gloster, VC 34, Almondsbury, 11.7.1916, *Roper* (K, BM); Patchway, Bristol, Glos., 5.9.1924, *Foggitt* (BM); Herts, S of Tingley Wood, 13.7.1929, *Little* (BG); Somerset, Charlton Mackrell, 100 ft, 1.8.1937, *Makins* 787 (K); VC 18, S. Essex, Dagenham dump, 1938-39, *Airy-Shaw* (K); Herts, Allen's Green near Sawbridgeworth, 8.7.1941, *Pugsley* (BM); Berkshire, Cothill, field of kale, 24.8.1944, *Turrill & Hubbard* 12415 (K); VC 23 Oxfordshire, Woodstock, field off Green Lane near Woolton turn, 27.8.1944, *Turrill* (K); VC 38, Newbold-on-Stour, Warwicks., 200 ft, 5.9.1953, *Townsend* (K).
- FRANCE: Gap (Hautes Alpes), 950 m, 18.6.1911, *Lacaita* 24/11 (BM); Cerdagne, Slivia, vers Ur, 1290 m, 24.7.1918, *Sennen* (BM); Flavigny-sur-Ozerain (Côte d'Or), 3.7.1927, *Desplantes* (LD); Cerdagne, Montelle, 1190 m, 4.7.1928, *Sennen* (BM); Hautes-Alpes, Antonaves, ferme sous le Saint Ciry, 1050 m, 12.7.1947, *Barbezat* (LD); Aude, near Quillan, 6.1950, *Schafer* 63 (BM); Drome, Laborel, champs aux Combes de Laborel, 700 m, 27.6.1951, *de Retz & Terré* 5:1705 (K); Corcelles les Monts, 1963, *coll. ignot. Hortii Dijon* (LD); Basses-Alpes, ad occidentem oppido Sisteron, Les Combes, 600 m, 12.5.1969, *Charpin & Greuter* 8249 (M).
- GERMANY: Berlin Oranienburg, 1899, *Jessen* (H); Eisenach, Stedtfeld auf dem Goldberge, 400 m, 23.7.1905, *Ulbrich* 5411 (LD); Neustadt a. Saale, 24.6.1908, *Duschl* (LD, PRC, S); Bayern, Pommelsbrunn, 8.1909, *Meister* (PR); Oberpfalz, Pielenhofen, 400 m, 17.6.1911, *Rubner* 1399 (BG, K, PR); Schindberg südwestl. Münnerstadt (Unterfranken), 25.6.1922, *Oberneder* 3335 (BM); Württemberg, Neresheim, 25.6.1952, *Vallin* (LD); München auf Schutt bei Sendling, 9.1957, *Caspari* (M); Fuss des Hackelsberges, 6.6.1959, *Sauer* 3049 (M-Sauer); Fulda, Haimbach auf dem Schulzenberg, 23.7.1971, *Hupke* (H).
- GREECE: In oliveto Athenarum 5.1893, *Tuntas* (UPA); Krystallopegae, 22.6.1932, *Alston & Sandwith* 430 (BM); pr. Photolivos ad occidentem Drama, 31.5.1934, *Rechinger* 6198 (W); Nom. Ioanninon, Mt Smolikis in decl. borealibus, 1300 m, 9.7.1958, *Rechinger* 20822 (W); Nom. Kozani, SE Polirrhao, 650 m, 26.6.1971, *Stamatiadou* 12956 (ATH, C); along road Grevenon-Kalambaka just before crossing of Venetikos river, 550 m, 40°03'N, 21°29'E, 30.5.1989, *Strid & al.* 29898 (C, LD); 7 km W of Arnissa, 750 m, 40°48'N, 21°45'E, 19.6.1998, *Snogerup* 15289 (LD, UPS).
- HUNGARY: Deliblat, Kincstari homokpuszta, 6.1908, *Wagner* (PR); Óbecse, Comit Bács-Bodrog, 15.6.1916, *Kovács, Fl. Hung. Exs. VIII: 767, II* (BM, C, H, K, LD, O, PR, PRC, S, W, WU); Kolosvar, in colle Czipadomb, 8.7.1919, *Cholmsky* (W); Burgenland, bei Gschies, 9.6.1924, *Rechinger pat.* (O, W); Budapest, M. Gellérthegey, 150 m, 18.6.1925, *Filarsky, Fl. Hung. Exs. VIII: 767, I* (BM, C, K, LD, O, PR, PRC, W, WU); Comit. Heves, mt. Saskó pr. Parádfüddő, 800-900 m, 29.7.1928, *Boros* (W); Buda, Hármashatárhegy, 14.7.1944, *Papp* 2520 (C, K, S); collis Nagyeged boreorientem ab Eger, 250-450 m, 24.8.1970, *Vašak* (PR); Comit. Heves, N von Eger, vom Kis-Eged zum Bajusz-hegy, 200-550 m, 12.7.1973, *Krendl* (W).
- ITALY: Söll nächst Tramin, s. dat., *Norandell* (W); Lombardia dit. Brix ad Benacum, 2-800 m, 20.6.1866, *Porta* (K); Venetia, supra Torri del Benaco, 200-220 m, 7.1878, *Rigo* (W); Verona, 1890, *Brachs* (PR); Torino, Busoleno, 6.1906, *coll. ignot.* (S); Basilikata, 3-4 km N Potenza, La Botte, 900-950 m, 22.5.1977, *Burri & Krendl* (W).
- KOSOVO: In fauci rivuli Susica pr. Peč (Ipek), 750-950 m, 6.7.1933, *Rechinger & Scheffer* 479 (W).
- KRYM: Sudak, Abhänge des Sokoll, 20.6.1895, *Callier* (LD); Steppenland bei Burunduk, 5.7.1896, *Callier* 300 (G, K, LD, O, PRC, W, WU, WU-Hal); inter Kuczuk-Usen et Demerski, 23.5.1905, *Busch* (S); Dacliv. septentr. Kaczikalen, 6.6.1905, *Busch* (S); Peninsula Tarchankut, Dzhankulj prope Oleneska, 5.7.1964, *Kuznetzova* (H); between Uchan-Su and Stavri Kaja 5 km E of Yalta, 700 m, 7.8.1964, *Chater* 67 (BM); distr. Bakhchisarai, oppidi vetusti Chufut-Kale, 300-400 m, 23.7.1977, *Vašak* (W); distr. Yalta, in valle rivi Guva, Dolina trekh gor, in clivis Yaltinskaia iaila, 200-300 m, 4.8.1977, *Vašak* (W); distr. Simpheropol, mons Barsuchia poliana, Perevalnoie, 500-900 m, 6.8.1977, *Vašak* (W).
- MACEDONIA: SW Nikola distr. Ouce Polje, 19.5.1926, *Kosanni & Cesnjavsko* (S); in angustis flumini Treska an Majka Bogorodica a Glumovo, 21.6.1937, *Klástersky* (PR); Katlanovska Bana procul Skoplja, 300 m, 7.1937, *Deyl* (PR); montium Galicica, Sv. Stefan ad Ohrid, 800-900 m, 24.7.1937, *Klástersky* (PR).

NORWAY: Kristiania, Grønli, 15.7.1884, *Jørgensen* (BG).

POLAND: Gubernia Lubelska, Starovska Sankenfelder-Starovska góra, 1883, *Karo* (LD); Oppeln am Wege nach Kempa, 10.7.1891, *Schube* (O); Male Matury pr. Czeszochowa, 20.7.1952, *Błaszczuk, Pl. Pol. Exs. 448* (BM, K, PRC, S, UPS, W).

ROMANIA: Langenthal, 10.7.1882, *Barth* (UPS); Dobrogea, Agemter nächst Constanta, 12.7.1931, *Vierhapper* (WU); Fanatele Clujului, Coparsaie, 25.6.1931, *Domin & Krajina 3347a* (PRC); Breazu, Iași, 11.7.1962, *Toma* (BM); Dobrogea, austr. a pago Babadag, 8.1963, *Žertova* (PR).

SLOVAKIA: Uhrovec prope Bánová, 7.1930, *Domin & Sillinger* (PRC); Komarno, Malé Pisky, 3.7.1932, *Weber* (PRC); Zádiel, okr. Moldava, Hataru kolem Homole hojny, 16.7.1933, *Pulchart & Souček* (PRC); Colle supra Domicia prope Housovo-Plešivec, 300 m, 1.9.1933, *Krajina* (PRC); Nová Stráž/Komárno, 6.1934, *Weber* (PRC); Slovensko Kras, ad Hačava prope Turnia, 780 m, 15.7.1951, *Osvačilová* (PRC); Sahy, /Eletes/ vych. Slatina-kupele, 14.8.1957, *Chrtek & Soják* (PRC); distr. Štúrovo, Malé Kosily, 20.7.1973, *Chrtek & al.* (PRC); Distr. Štúrovo, parte orientali Kamenica nad Hromon, 130 m, 11.6.1975, *Šourková* (PRC).

SLOVENIA: In rudatis pr. Zirknitz, 560 m, s. dat., *Paulin 659* (BM).

SPAIN: Pyrénées à Montgrouy, 1400 m, 22.8.1912, *Sennen* (BM); Pyrénées à Ripoll, 750 m, 29.7.1914, *Sennen* (BM); Teruel (Aragon), 14.6.1923, *Lacaita 347/22* (BM); Prov. Lerida, Mousch de Rabies, unterhalb d. Fuente blanca, 4.5.1926, *Kretschner* (S); Granada, 6.1933, *Ripley 177* (K); Prov. Jaén, Sierra de Cazorla, Casa Forestal de Nava de San Pedro, 30.6.1948, *Heywood & Davis 377* (BM); Santander, Potes, 16.7.1954, *Casaseca* (TUR); Teruel, a. d. Strasse Albaracin-Cañete, bei Royuela, 19.5.1970, *Merxmüller & Gleisner 25741* (M); Teruel, Peralejo, 1010 m, 4.7.1975, *Segura Zubizarreta* (H); Alava, Artaza 307-WNO 243, 720 m, 16.8.1985, *Martinez de Icaya & Morante 135* (WU).

SWITZERLAND: Bas-Valais, à Branson, 7.1857, *Bernet* (S); betw. Seerri & Vissaye, 19.7.1903, *Gregor* (K); Sierre, Rhône valley, 8.1903, *Lester-Garland* (K); Plan-les-Theatres près Genève, 7.1905, *Rapin* (H); colline de Champlan sur Sion, 750-780 m, 14.5.1908, *Marret* (C, S); between St. Luc & Vissaye, 19.7.1924, *Gregor* (K).

SWEDEN: Timrå, Östrand, 21.7.1906, *coll. ignot.* (UPS); Uppsala, Öfre Slottsgatan 2, 10.9.1908, *Fries* (LD, S); Södermanland, Barlastplats I, Hästholmen, Nacka, 6.1913, *Laurent* (S); Uppland, Löfsta, par. Järfälla, 21.6.1916, *af Ugglas* (S); Göteborg, Kvillebäcksvägen, 16.7.1928, *Fries* (S); Södermanland, Nacka, Saltsjökvärn, 7. & 8. 1934, *Domeij* (LD); Skåne, Kävlinge, 30.6.1943, *Lundh* (LD); Västergötland, Angered, Agnesbergs kvarn, 15.7.1949, *Fries* (S); Göteborg, kvarten Tre Lejon, 10.8.1952, *Blom* (S); Landskrona, Tofta, 55°52'N, 12°54'E, 13.7.1969, *Blixt* (LD).

TURKEY-IN EUROPE: Flamour (côte nord), 10.7.1893, *Post-Aznavour* (G); Kirklareli, near Vize, 11.6.1968, *Baytop 13212* (E).

UKRAINE: Cherson, 7.1864, *Lindemann* (W); prope Haragaci (distr. Cahul), 4.9.1932, *Zahariadi* (LD); distr. Lăpușna, in collina Dealul Holm pr. Chișnau, 100 m, 3.8.1937, *Bujorean, Fl. Rom. Exs. 2559* (C, W).

YUGOSLAVIA: Belgrad, 5.1888, *Bornmüller* (W); Serbia, prope Pirot, 1891, *Ničić* (WU); Bela Palanka, 6.1896, *Adamovic* (W); Serbia, Čačak, 7.1896, *Wijicic* (WU); Montenegro, Andrijevica, 800 m, 15.7.1923, *Rohlén* (PRC); Dubci ab Uzice, 500 m, 15.7.1923, *Novák* (PRC).

2. *Bupleurum croceum* Fenzl, Pug. Pl. Nov. Syr.: 16. 1842. – Fig. 3

Holotype: Syria, prope Aleppo, *Kotschy 235* (W!; isotype UPS!).

= *B. semiperfoliatum* Grisebach, Spicil. Fl. Rumel. 1: 350. 1843. – Type: In Mesopotami, *Donietti* (not seen).

Annual, 25-65 cm, erect, usually pseudo-dichotomously branching only apically, umbels usually 3-15(-20), stem straight, as young obscurely angular, soon terete, 1-6 mm thick, with a narrow central cavity, striate, smooth. *Cotyledons* c. 15 mm long, linear, only seen as withered. *First leaves* soon withering, short-petiolate, lamina 10-30 × 4-12 mm, narrowly obovate to elliptical;

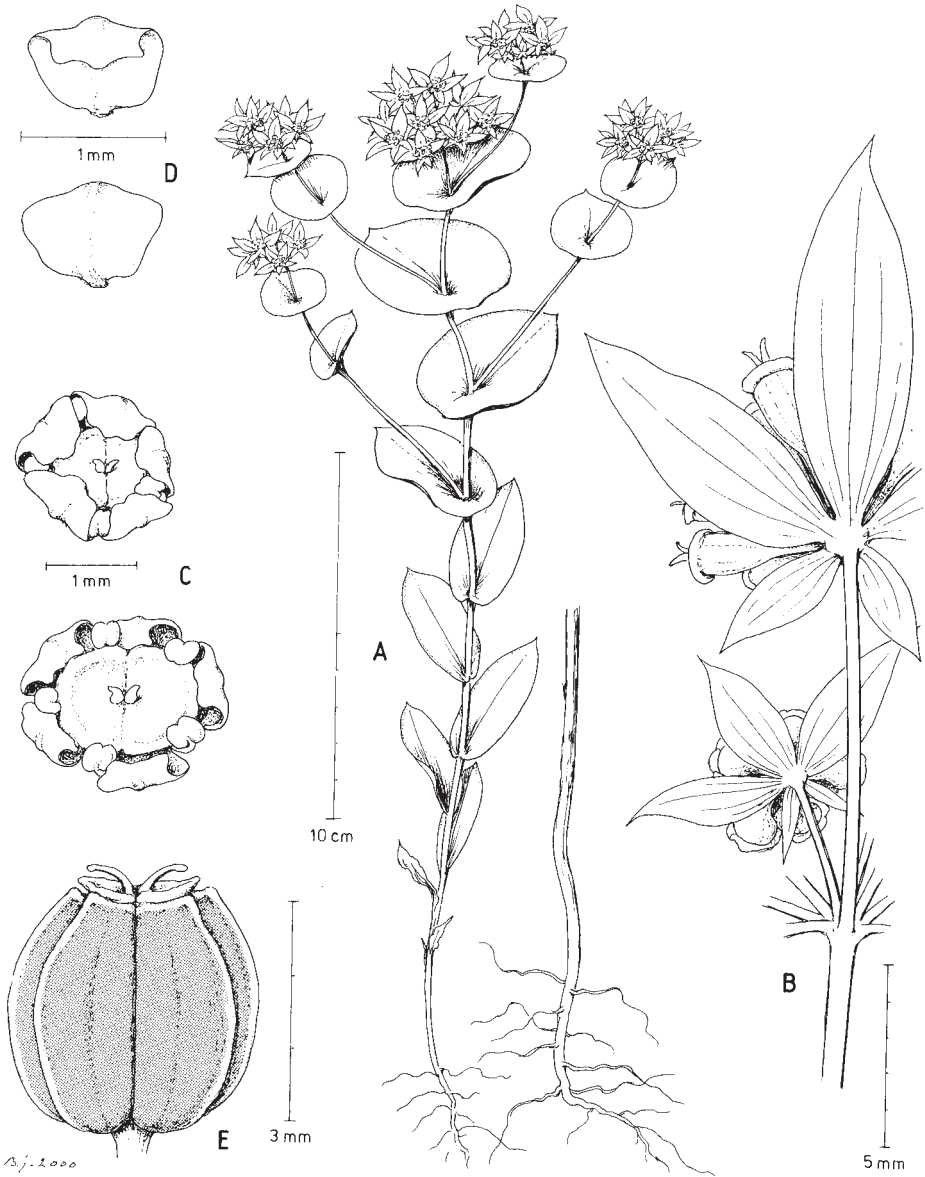


Fig. 3. *Bupleurum croceum* – A: habit; B: part of inflorescence with two umbellules; C: flowers; D: petals; E: fruit. – Material: A-D: Turkey, Gümüşane, 1956, *Olsson* (LD); E: Kurdistan, Mardin, *Sintenis 1143/1888* (LD).

persistent cauline leaves sessile, 30-80 × 10-35 mm, gradually changing from elliptical, apiculate, semi-amplexicaul to broadly ovate, amplexicaul-perfoliate, mucronate, in apical part finely serrulate; uppermost leaves 4-8 cm broad, broadly ovate to orbicular, perfoliate, yellowish, often scarcely herbaceous; scarious margin c. 0.2 mm broad; veining parallel or in upper leaves radially divergent, median vein most prominent, veinlets inconspicuous, marginal vein very thin. *Peduncles* usually 10-40 mm. *Bracts* lacking or rarely 1-2 rudimentary, variously shaped. *Umbel rays* 8-18, the outer subequal, 6-15 mm, a few central shorter, 3-5 mm, longest ones in fruit 1/3-1/2 as long as peduncle; inner umbellules reduced, few-flowered, outer umbellules 8-13-flowered, pedicels 1.3-2.2 mm. *Bractlets* in outer umbellules 5, 3 large and 2 much smaller, in inner umbellules 0-3 small, all completely free from each other, herbaceous, at anthesis brilliant orange, entire or obscurely denticulate above; the 3 largest bractlets 5-10 × 1.5-3.5 mm, elliptical to obovate, apiculate, 3-5 veined with no or inconspicuous veinlets, the 2 smallest 1.5-4 × 0.2-1 mm, lanceolate to narrowly ovate, apiculate, 1-3-veined. Large outer umbellules 8-13-flowered, small central ones few-flowered; pedicels 1.3-2.2 mm. *Petals* yellow, with a finely granulate surface, entire, limb 0.5-0.7 × 0.7-0.9 mm, broadly obtrapezoidal, midvein narrow, with a surrounding thickened zone, broader at the shallowly w-shaped bend, inflexed lobe c. 1/4 as long as limb, ± rolled, shallowly notched. *Anthers* 0.4-0.5 mm, c. 1/2 as long as filaments. *Stylopodium* 1.1-1.5 mm broad, c. 1.5 times as wide as ovary, equalling the top of the ripe fruit. *Styles* 0.7-0.85 mm, longer than or equalling stylopodium radius. Ripe *mericarps* 3.5-4.2 × 1.5-2 mm, c. twice as long as the pedicel, subprismatic, pentagonal in transect, surfaces smooth, ridges filiform, commissural surface with a narrow furrow.

Chromosome number. – $2n = 16$ (Cauwet-Marc 1976).

Flowering. – May to July, fruiting July to August.

Habitat. – In its original area a plant of dry open areas and also a segetal weed. In Europe outside Turkey only casual, found in the ruderal flora of harbour areas, mills and similar places.

Distribution. – Turkey-in-Europe, last collected 1918, only known as a casual in the rest of Europe, probably overlooked in some further countries. Tu, (Br, Cze, Fe, Ge, Su). Not mapped.

NW and inner Anatolia to the Syrian Desert and Iran east to c. 32°E. Spread as a casual to many places, but not known as a successful introduction outside its native area.

European material seen

CZECH REPUBLIC: Okoli Plzne, Kaznějove, 13.7.1943, *Schneider* (PRC).

ENGLAND: Unmounted and unlabelled material seen (BM).

FINLAND: Raisio, Uudenkaupungi, Naantalia, 20.6.1953, *Laine* (TUR); *ibid.*, 1.8.1954, *Tarén* (TUR); Reso, 7.1953, *coll. ignot.* (TUR).

SWEDEN: Göteborg, Tre Lejon, 23.7.1952, *Blom* (LD, S); *ibid.*, 1953 & 1956, *Blom* (BM, LD, S, UPS); Västergötland, Angered, Agnesberg, 20.6.1953, *Blom* (LD, S).

TURKEY-IN-EUROPE: Parc du Robert Collège à Roumeli-Hissari-Bibek, 14.6.1918, *Aznavour* (G).

3. *Bupleurum lancifolium* Hornem., Hort. Hafn. 1: 267. 1813 – Fig. 4

Lectotype (proposed by Susanna S. Neves on the specimen label, dated Jan. 2000, and designated here): In Aegypto, plant grown in 1804 in the Botanic Garden Copenhagen from seeds sent from Egypt via Paris (C!).

= *B. heterophyllum* Link., Enum. Hort. Berol. Alt. 1: 262. 1821 ≡ *B. protractum* var. *heterophyllum* Boiss., Fl. Orient. 2: 836. 1872 ≡ *B. protractum* subsp. *heterophyllum* (Link) Munby, Contr. Conn. Fl. N. Ouest Afr.: 84. 1897 ≡ *B. subovatum* var. *heterophyllum* (Link) Wolff in Engler, Pflanzenr. 43: 48. 1910 – Lectotype (designated here): B-W 5640!

= *B. perfoliatum* var. *lanceolatum* Desv. in J. Bot. (Desvaux) 2: 315. 1809. – Type: Described as from “Midi”.



Fig. 4. *Bupleurum lancifolium* – A, A1: habit; B: umbellule; C: flower; D: petals; E: fruits. – Material: A, B-D: Egypt, Abu Sir, *Björkqvist & al.* 249 (LD); A1: Spain, Malaga, *Nilsson* 692 (LD); E: Greece, Kikladhes, Astipalea, *Runemark & Nordenstam* 15149 (LD).

Annual, (2-)5-35 cm, usually monopodially or pseudo-dichotomously branched from the base, branches spreading-erect or ascending, small specimens rarely erect, unbranched or branching in upper part, umbels usually 2-10, stem as young obscurely angular, soon terete, 1-3 mm thick, compact or slightly hollow at base, finely striate, smooth. *Cotyledons* 10-15 × 0.3-1 mm, linear, sessile or short-petiolate. *First leaves* soon withering, petiolate, usually 20-40 × 2-5 mm, linear to narrowly spatulate, finely serrulate; *persistent cauline leaves* 30-100 × 7-22 mm, gradually changing from very narrowly ovate, amplexicaul and tapering towards apex to ovate, perfoliate, apiculate; *uppermost leaves* ovate, perfoliate, green; margin entire, scarious, 0.05-0.1 mm wide; veining parallel to parallel-divergent, median vein most prominent, veinlets few, conspicuous, anastomosing, marginal vein very thin. *Peduncles* 5-20(-35) mm. *Bracts* usually lacking, rarely in some umbels 1-2, early dehiscent, 2-10 × 5-8 mm, broadly ovate, if 2 much unequal. *Umbel rays* 2-3(-4) or rarely some umbels 1-radiate, rays slightly unequal, 2-8(-15) mm, the longest 1/4-2/3 as long as peduncle. *Bractlets* usually 5, rarely in some umbellules 6-9, 3 slightly larger than the other 2 but not of obviously separate classes, at base connate for 1-2 mm, herbaceous, ± yellowish at anthesis, 3-9-veined, veinlets few, anastomosing; the 3 largest bractlets 6-13 × 5-8 mm, usually longer than umbel rays, elliptical to ovate, apiculate to acute, the median narrower, the lateral oblique; the 2 smallest bractlets 2.5-5 × 2-3.5 mm, elliptical to obovate or obovate-spatulate, acute to obtuse. *Umbellules* all similar, usually 8-16-flowered, pedicels subequal, 0.5-1.5 mm, fruits crowded to a semi-globose cluster. *Petals* yellow, entire, smooth or very finely granulose, limb 0.35-0.5 × 0.5-0.7 mm, obtrapezoidal, midvein narrow, broader at the shallowly w-shaped bend, inflexed lobe 0.15-0.2 mm, 1/3-1/2 as long as limb, apically retuse, blunt or acute, often with a small mucro. *Anthers* 0.3-0.35 mm, 1/2-3/5 as long as filaments. *Stylopodium* 0.8-1.1 mm broad, equalling ovary, 1/3-1/2 as wide as the top of the ripe fruit; *styles* 0.2-0.3 mm, much shorter than stylopodium radius. Ripe *mericarps* 2.2-3(-3.5) × 1.5-1.7 mm, longer than pedicel, semi-ellipsoidal to subprismatic, pentagonal in transect, with ridges c. 0.1 mm high, outer surfaces tuberculate, tubercles irregular, connected in various directions; commissural surface also tuberculate, flat or slightly concave, with a narrow furrow.

Chromosome number. – $2n = 16$ (Cauwet-Marc 1976, S. Snogerup 1994).

Flowering. – February to May, fruiting March to July.

Habitat. – In Europe near sea level, in open dry, usually man-made habitats. In its N African and SW Asiatic main area a plant of various open, dry habitats and also occurring as a segetal weed.

Distribution. – Found in a few places in the S Aegean and until now in only one place in the Iberian Peninsula. Native or introduced with early agriculture. Cr, Gr, Hs. – Fig. 5.

N Africa, Anatolia, Syria, Palestine, Iraq, Iran and Transcaucasia, rarely casual outside its natural area.

Taxonomic comment. – This species is well separated from *B. subovatum* by narrower lower leaves, smaller fruit, fewer flowers per umbellule, more connate bractlets, smaller anthers, smaller stylopodium radius and shorter styles. They have been united in many floras and were kept as varieties by Wolff (1910). Probably overlooked and undercollected. The frequent misunderstandings make it impossible to accept notes of distributions of these two species from most earlier authors. All three names quoted in the synonymy above may refer to material of the same origin, circulated to several botanical gardens.

European material seen

GREECE: Argolis, Argos, c. 1930, *Guiol* (BM, UPS); *ibid.*, 5.1931, *Atchley 1831* (K); Astipalea, E of Panormos, peninsula of Doma, 30.5.1960, *Runemark & Nordenstam 15056* (LD); Astipalea, Vathi, eastern side of the bay, 31.5.1960, *Runemark & Nordenstam 15149* (LD); Dromolakia, sea level, 26.3.1970, *Genneou 1413* (K); p. Argolis, d. Ermionis, Portoheli, 0-5 m, 16.4.1972, *Stama-*



Fig. 5. European distribution of *Bupleurum lancifolium* according to material revised.

tiadou 14825 (ATH); Spetsai, SW of the town, 10.5.1974, Egina, 2.5.1993, Raabe (B); Runemark & Bentzer 46985 (LD); Tolon, near Nafplion, 3.1978, Bowen 1024 (C).

KRITI: La Canée, 1883, Reverchon (G, LD, UPS, W); Insel Gaudos, unter Saaten bei Xenakis, 21.3.1903, Dörfler 111 (WU); unter Saaten bei Rettimo, 24.4.1904, Dörfler 845 (WU); Kasos, Hochfläche Argos zw. den Bergen Bixilia und Kapsalo, 6.6.1983, Raus 8676 (B).
 SPAIN: Malaga, Fuente de la Piedra, 18.5.1883, Nilsson 692 (LD).

4. *Bupleurum subovatum* Link ex Spreng., Sp. Umbell.: 19. 1818 – Fig. 6

≡ *B. rotundifolium* var. *subovatum* (Link ex Spreng.) Fiori & Paol., Fl. Anal. Ital. 3: 265, f. 2244. 1903 ≡ *Trachypleurum subovatum* (Link ex Spreng.) Calestani in Webbia 20: 163. 1905. – Lectotype (designated here): B-W5627/2!

= *B. perfoliatum* var. *longifolium* Desv. in J. Bot. (Desvaux) 2: 315. 1809. – Type: Described as common in France.

= *B. rotundifolium* var. *intermedium* Loisel. ex DC. in Lamarck & Candolle, Fl. France 6: 514. 1815. ≡ *B. intermedium* (Loisel. ex DC.) Steud., Nomencl. Bot. ed. 1: 128. 1821. – Type: Described from Montpellier, Nice, Toulon, Poitiers.

= *B. protractum* Hoffmanns. & Link, Fl. Portug. 2: 387. 1820 ≡ *Tenoria protracta* (Hoffmanns. & Link) Bubani, Fl. Pyr. 2: 360. 1900. – Type: Described from Lisboa.

= *B. granulatum* Gaudin, Fl. Helv. 2: 376. 1828. – Syntypes circa Massiliam a cl. Robillard and Consentiae in regno Neapolitano ab amicis L. Thomas (LAU?).

[– *B. intermedium* Poir. in Lamarck, Encycl. Méth. Bot. Suppl. 5: 585. 1817, nom. inval. (Art. 34.1)].

[– *B. intermedium* var. *genuinum* Briq., Monogr. Bupl. Alp. Marit.: 64. 1897, nom. inval. (Art. 24.3)].

[– *B. lancifolium* auct. non. Hornem. (1813)].

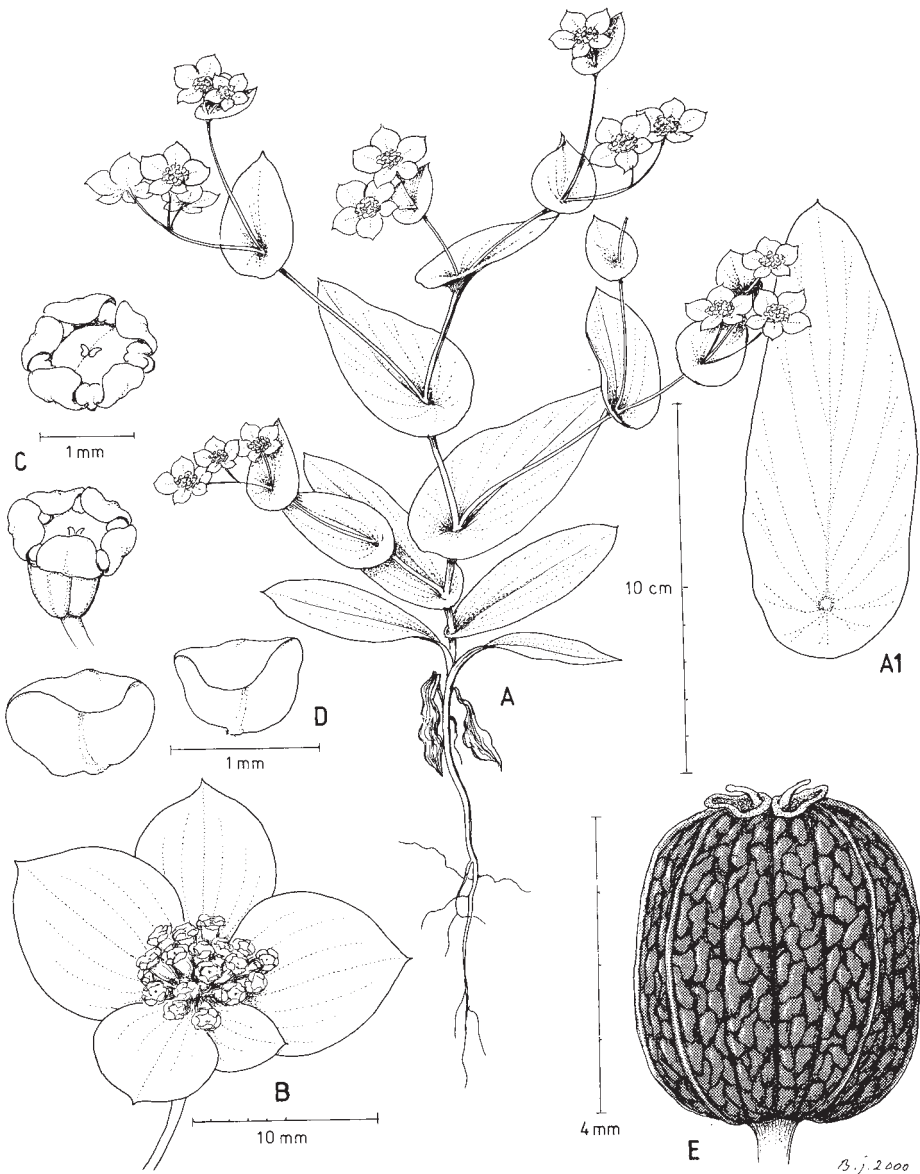


Fig. 6. *Bupleurum subovatum* – A: habit; A1: cauline leaf; B: umbellule; C: flowers; D: petals; E: fruit. – Material: A, B-D: Italy, Capri, 1958, *Hultén & Nordlindh* (LD); A1: Italy, San Marino, *S. & B. Snogerup* 1939 (LD); E: Italy, Calabria, Castrovillari, *S. & B. Snogerup* 2118 (LD).

Annual, 10-100 cm, usually branched in the upper half, lowest branches spreading-erect, upper part pseudo-dichotomously branched, umbels 3-25, occasionally 50 or more, 1-2(-4) on each ultimate branch, stem straight, as young obscurely angular, soon terete, (2-)5-7(-12) mm thick, solid or slightly hollow at base, finely striate, smooth. *Cotyledons* rarely observed, 20-30 mm, linear, sessile or short-petiolate. *First leaves* soon withering, sessile or with petiole up to 5 mm, lamina 5-30 × 2-7 mm, ± narrowly lanceolate to elliptical; *persistent cauline leaves* 30-120 × 10-70 mm, gradually changing from narrowly ovate or narrowly elliptical to ovate, perfoliate, usually abruptly contracted to an obtuse apex, usually shortly mucronate; uppermost leaves ovate to suborbicular, perfoliate, yellowish at anthesis; scarious margin up to 1 mm wide; veining parallel to divergent, median vein pronouncedly thicker, veinlets anastomosing, marginal veins inconspicuous. *Peduncles* usually 10-30(40) mm. *Bracts* lacking or rarely 1-2, 5-10 × 5-10 mm, broadly ovate, transversally elliptical or broadly obovate. *Umbel rays* (2-)3-4(-5), slightly unequal, (5-)10-25 mm, 1/2 as long as to almost equalling peduncle. *Umbellules* all similar. *Bractlets* usually 5, 3 slightly larger than the other 2 but not of obviously separate classes, connate for less than 1 mm, herbaceous, at anthesis yellowish, veins 5-7, usually rather thin, veinlets well developed, anastomosing, veining in apical part often entirely reticulate; the 3 largest bractlets 10-15 × 7-12(-15) mm, usually shorter than umbel rays, obtuse, often mucronate, the median elliptical to broadly ovate, the lateral obovate to broadly obovate, oblique; the 2 smallest bractlets 5-8 × 4-6 mm, obovate to broadly obovate, obtuse to retuse. Umbellules usually 15-25-flowered, pedicels 1-2.5 mm, subequal, fruits crowded to a semi-globose cluster. *Petals* yellow, entire, smooth or very finely granulose, limb 0.45-0.65 × 0.7-1 mm, obtrapezoidal, midvein narrow, broader at the shallowly w-shaped to straight bend, inflexed lobe 0.25-0.3 mm, c. 2/5 as long as limb, trapezoidal, obtuse to shallowly retuse, often with a small point. *Anthers* 0.4-0.5 mm, 1/2-2/3 as long as filaments. *Stylopodium* 1.2-1.5 mm broad, wider than ovary, only c. 1/3 as wide as the top of the ripe fruit. *Styles* 0.5-0.9 mm, equalling or slightly longer than stylopodium radius. Ripe *mericarps* (3.2-)4.5-5 × 2-2.5 mm, longer than the pedicel, semi-elliptical to semi-globose, pentagonal in transect, ridges 0.1 mm high, outer surfaces tuberculate, tubercles irregular, connected in various directions, commissural surface also tuberculate, flat with a narrow furrow.

Chromosome number. – $2n = 16$ (Cauwet-Marc 1976).

Flowering. – April to May, fruiting May to July.

Habitat. – Fields, vine yards, garigue, open forests, usually on limestone. In Central and N Europe only as a usually casual introduction in ruderal localities. 0-700 m.

Distribution. – Probably native to S and SE Europe, introduced or casual elsewhere. In all of its area mainly found in man-made habitats and frequently spread with cereals, native area therefore very difficult to estimate. Al, (Au), Bl, Bos, Br, Co, Cr, Cze, (Da), Fe, Ga, (Ge), Gr, (He), Hrv, Hs, It, Jug, Lu, Mak, Sa, Si, (Su), Tu. – Fig. 7.

Throughout N Africa and SW Asia, Caucasus, cosmopolitan as a casual in harbours, waste places, etc.

Selected material seen

ALBANIA: Shkodra westl. von Gajtani, 18.6.1916, *Janchen* (WU); Kafareni, 12.5.1918, *Schneider* (W); Cseismen, 13.5.1918, *Schneider* (W); Skutari, Felder nahe der Stadt, 22.5.1944, *Höpflinger* (W); 3 km N Levan, S. Fier, 7.7.1980, *Krendl* (C, W).

BALEARES: Ibiza, 5.1899, *Gandoger* (W); Mallorca, road Palma-Inca a few km SE Inca, 26.5.1969, *Dahlgren & al.* 131 (LD).

BOSNIA-HERZEGOVINA: Pridvorice u Trebinje, 5.8.1886, *Vandas* (PR); um Posusje Bez. Ljubuski, 6.1894, *Fiala* (PRC); bei Zitomiskí, 24.5.1906, ?*Kmag* (WU); Uskoplje, 3.6.1926, *Korb* (W).

CORSICA: Bonifacio, 24.5.1849, *Kralik* 602 (W); *ibid.*, 1880, *Reverchon* 284 (PR, PRC, WU, WU-Hal); *ibid.*, 7.7.1904, *Renvall* (H).



Fig. 7. European distribution of *Bupleurum subovatum* according to material revised.

CROATIA: Insel Lagosta, 29.5.1901, *Ginzberger* (WU); Lussin, Cigala, 6.1901, *coll. ignot.* (K); Ins. Meleda, Porto Palazzo, 22.5.1905, *Lindberg* (H); bei Stignano und Scoglio Veruda bei Pola, 9.-10.6.1909, *Korb* (UPS); Salona, 6.1910, *Krieger* (K); Galllesano, S Istrien, 26.5.1912, *Cufodontis* (W); Insel Arbe bei Kloster S. Eufemia, 3.6.1912, *Morton* 5 (WU); Sabioncello, bei Kucište, 4.6.1913, *Mladinero* (W); Istrien, Montona, 6.1926, *Meebold* (K); Istrien, Rovijn, 17.6.1963, *Starbäck* (S).

CZECH REPUBLIC: Bohemia, Lobkovicova xakrada, 3.7.1943, *Klan* (PRC).

DENMARK: Sjælland, Ved Kallebostrand, 9.7.1871, *Benzon* (LD); Distr. 32, Svendborg, 15.7.1945, *Hansen* (C); Albanigade 3, Odense, 15.7.1963, *Rasmussen* (C); Vangede, 7.8.1967, *Jensen* (C); Hæstrup, Vendsyssel, 7.1968, *Lorenzen* (C).

ENGLAND: VC 17 Surrey, Chipstead stn., 11.7.1954, *Welch* (BM); VC 9 Dorset, Parkstone, 19.7.1955, *Banham* (BM); VC 33 St. Marks, Cheltenham, 31.7.1956, *Townsend* (K); VC 60 Blackpool, 1.8.1959, *Goodman & Dovy* 3680 (BM); VC 23 Middlesex, Hounslow Heath, 1961, *Townsend* (UPS); VC 17 Surrey, Hill Top Lane, Caterham, 7.1961, *coll. ignot.* (K); Devon, Axminster, 7.1963, *Brierley* (K); VC 3 S Devon, Sidmouth, Glenese, Seafeld Road, 8.8.1966, *Prowse* (K); VC 21 Middlesex, Haines Road, Twickenham, 13.7.1970, *Townsend* (K); Staffs VC 39, 15. Richmond Park, Wall Heath, Brierly Hill, 8.1970, *Roberts* (BM).

FRANCE: Brax, près de Laplume, Lot-et-Garonne, 5.7.1894, *Duffour* 528bis (LD, W); Blaye, Gironde, 30.6.1898, *Groves* (BM); Montpellier, 17.5.1931, *Størmer* (O); Charente infer., Angenhus sur mer, 6.1933, *Charrier* (PR); Perpignan, 4.5.1935, *Lenander* (S); Lattes, Montpellier,

2.5.1937, *Preis* (PRC); Alpes-Maritimes, Antibes, Biot, 4.5.1946, *Lenander* (S); Angoulins-apud-mare, pr. Rapellam, 5.6.1947, *Rallet* (S); Marseille, Le Redon, 27.5.1958, *Lawalree* 9245 (UPS); oberen Kante der Gorges du Loup, 2 km NE Gourdon, 710 m, 20.6.1962, *Roessler* 4364 (M).

GERMANY: Bayern, Südbahnhof München, 7.1937, *Merxmüller* 12724 (M).

GREECE: Ins. Euboea septentrionalis, Hagia Anna, 1.6.1955, *Rechinger* 16816 (G, K, M, W); Paros, the shore E of Parikia, 6.4.1967, *Runemark & Bentzer* 24342 (LD); Sterea Ellas, nom. Viotias, Thiva-Livadia, near Livadia, 25.5.1968, *Stamatiadou* 2996 (ATH); Nom. Chalkidikis, Nea Moudania, Topodesia-Ambelia, 30.5.1971, *Haristos* 246 (ATH); Alonnisos, 0-1 km WNW of the harbour, 10-100 m, 5.5.1972, *Snogerup & Gustafsson* 44098 (LD); Prov Rhodopi, between Sapes and Nea Sanda, SW of Likio, 18.5.1972, *Stamatiadou* 15093 (ATH); Nom. Magnisia, ep. Volou, Melissatika, 200 m, 2.6.1972, *Raus* 466 (ATH); Nom. Chalkidikis, distr Arnea, Ierissos, Ajos Pavlos chapel area, 22.6.1973, *Haristos* 6719 (ATH); Nom. Pierias, NE foot of Mt Olympos, near Dion, 40 m, 16.5.1974, *Strid & Andersen* 8454 (ATHU, C); Nom. Attikis, Mt Pateras, Megalo Vathichori, a doline SW of the summit Megali Kolosoura, 700 m, 38°06'N, 23°17'E, 29.5.1994, *Constantinidis* (UPA).

ITALY: Gargano, Manfredonia, 5.1948, *Runemark* (LD); prati presso Roma, 14.5.1957, *Cacciato* (W); Capri, Belvedere di Migliaria, 300 m, 22.5.1958, *Hultén & Norlin* (LD); Firenze, 7.6.1963, *Rankala* (H); Salerno, Sala Consilina, 31.5.1968, *Merxmüller & Lippert* 23673 (M); Livorno zwischen Montenero und Cse Nuove, 7.6.1973, *Burri & Krendl* (W); Basilikata, 1 km S Leonessa, S Foggia, 400-450 m, 23.5.1977, *Burri & Krendl* (W); Basilikata, 1-2 km SE Melfi C. Montemarano, N Toppo SE Paola, 500 m, 24.5.1977, *Burri & Krendl* (W); San Marino, 1 km S lower town, 19.6.1980, *Snogerup* 1939 (LD); Calabria, 7 km SSE Castrovillari, 250 m, 27.6.1980, *Snogerup* 2118 (LD).

KRITI: Karpathos, Pigadia, 4.1883, *Pichler* (*Barbey*) 290 (G, WU); Kasos, Aija Marina, 50 m, 23.4.1982, *Raus & al.* 5762 (B).

MACEDONIA: Huma op. Ghevgheli, 700 m, 6.1909, *Dimonie* (PRC); Dova Tepe, on the railway 14 miles ENE of Dorian, 1918, *Gooding* (BM).

PORTUGAL: Vallée d'Alcantara, env. de Lisbonne, 5.4.1877, *Daveau* (PRC); Montegili, Estremadura, 17.5.1888, *Murray* (BM); Arredores de Coimbra, prox. a Eiras, Tojal, 6.1895, *Ferreira* 1365 (LD, O, WU, WU-Hal); Lisboa, Algés, 50 m, 6.5.1938, *Rothmaler* 13051 (S); Verride, 28.5.1949, *Fernandes & Sousa* 3153 (C, H, LD, TUR, UPS); 20 km NW Coimbra, Cantanhede, 100 m, 25.5.1972, *Suominen* 1431 (H).

SARDEGNA: In agris prope Laconi, 7.1827, *Müller* (PR, W); Santa Teresa Gallura, par Tempio, 14.5.1882 & 17.6.1881, *Reverchon* 31 (K, LD, PR, PRC, UPS, W, WU, WU-Hal).

SCOTLAND: Midlothian, Dalmahoy nr. Kirknewtown, 400', 27.10.1974, *Ratter & Woods* (LD).

SICILIA: Seliunto, 6.5.1878, *Sardagna* (WU); Catania, 6.1908, *Albo* (BM); zwischen Bocca-difalco und San Martino, 14.5.1921, *Zerny* (W); Mte Caputo, Palermo, 9.5.1924, *Wall* (LD); Siracusa, 24.4.1966, *Cedercrantz* (H); Taormina, Lettojanni, 7.5.1978, *Kosonen* (OULU).

SPAIN: Antequera, el Torcal, 17.5.1883, *Nilsson* 692a (UPS); Aragon, Catalogniae, 10.6.1910, *Vicioso* (LD); Fl. Calpensis, near Palmones Bridge, 8.5.1912 *Wolley-Dod* 948 (BM); Castellón, Segorbe, 28.5.1918, *Pau in Sennen Pl. d'Esp.* 3631 (BM, K, LD, W); Córdoba, 2 miles NW of town, 400 ft, 5.5.1924, *Ellman & Hubbard* 92 (K); prov. de Malaga, Torrox, 16.5.1952, *Roivainen* (H, UPS); Sevilla region. Camas, 21.5.1967, *Hansen* (C); Malaga, entre Antequera y el Valle de Abdacagis, 540 m, 14.5.1982, *Quintana* 11476 (C, H).

SWEDEN: Skåne, Höganäs, 23.7.1917, *Lindell* (S); Stockholm, Värtan, Storängshatten, 9.1928, *Westfeldt* (UPS); Skåne, Lomma, 1.9.1928, *Norrman* (LD); Gästrikland, Gefle, Näringen, 28.8.1931, *Ahlner* (S); Göteborg, Skräppekärr, 9.7.1935, *Fries* (S); Göteborg, Ringön, 19.7.1954, *Blom* (S).

TURKEY-IN-EUROPE: A2 Istanbul, Halkali, 29.5.1893, *Post-Aznavour* (G); Gallipoli, Helles, 28.5.1923, *Ingoldby* 273 (K); between Büyükcemece and Ceteke, Istanbul, 11.6.1968, *Baytop* 13088 (E).

YUGOSLAVIA: MONTENEGRO: Bar, 5.1900 *Rohlena* (PR, PRC); Rijeka, 6.1900, *Rohlena* (PRC); ad Negusi, 6.1910, *Prej* (PRC); Adriaküste b. Sveti Stefan, 6.1969, *Leute* (W); circum Buljarica prope Petrovac, 24.6.1974, *Deyl* (PR).

Bupleurum* sect. *Aristata Godron in Grenier & Godron, Fl. France 1: 724. 1849

Type: *B. aristatum* Bartling (only species included) [= *B. veronense* Turra].

= *Agostana* Bute ex S. F. Gray, Nat. Arr. Brit. Pl. 2: 526. 1821 ≡ *B. sect. Agostana* (Bute ex S. F. Gray) Kuntze in Post & Kuntze, Lex. Gen. Phan.: 84. 1903 ≡ *B. subg. Agostana* (Bute ex S. F. Gray) Koso-Poljansky in Trudy Bot. Sada 30: 167. 1914. – Lectotype (designated here): *B. tenuissimum* L.

Annual or rarely biennial. Middle and upper leaves narrow with parallel veins. *Bracts* and bractlets present, variable in form and structure. *Petals* of various form, smooth or partly granulate to verrucose, with median wing and inflexed lobe adnate to the wing. *Mericarps* subprismatic to semi-cylindrical or semi-ellipsoidal, smooth or variously ornamented, ridges filiform or narrowly winged, oil ducts variable in number and distinctness.

Distribution. – Europe, SW Asia, N Africa and Atlantic Islands, some species worldwide as more or less casual introductions.

Taxonomic note. – The species of this section were included in *B. sect. Isophyllum* (Hoffm.) Dumort., Fl. Belg.: 115. 1827 ≡ *Isophyllum* Hoffm., Gen. Umb. ed. 1: 115. 1814. We regard this name as including only the perennial *B. falcatum* L. and relatives. The two accepted subsections are generally well separated by the shape and function of the bractlets, but a few species may be difficult to place correctly without former experience of the groups. Among the European ones this is especially the case with the local endemics *B. aira* and *B. gaudianum*.

Bupleurum* subsect. *Aristata

= *B. sect. Glumacea* Boiss., Fl. Orient. 2: 835. 1872 ≡ *B. sect. Glumacea* (Boiss.) Rouy & Camus in Rouy & Foucaud, Fl. France 7: 326. 1901 ≡ *B. subsect. Glumacea* (Boiss.) Wolff in Engler, Pflanzenr. 43: 59. 1910.

Bractlets 1/3-2/3 as wide as long, enclosing the flowers before and after anthesis.

5. *Bupleurum odontites* L., Sp. Pl. 1: 237. 1753 – Fig. 8

Lectotype (designated here by J. P. Reduron): herb. Linnaeus 335/11 (LINN [photos!]).

= *B. fontanesii* Guss., Fl. Sic. Prodr.: 313. 1827. – Type: Described from material collected in Sicily by Gussone, probable isotype E!

= *B. sprunerianum* Hampe in Flora 25: 63. 1842. – Lectotype (designated here): [Greece], zwischen Theben und Livadia, s. dat., *Spruner 531* (WU-Hal!).

Annual, (5-)20-50 cm, large individuals pseudo-dichotomously branched from near the base, with 5-60(-100) umbels, main stem ending in a top umbel 3-15(-35) cm above ground and overtopped by the spreading-erect lateral branches. *Stem* often conspicuously flexuous, in basal part terete, striate, in large specimens up to 5 mm thick, in thinner parts angular with narrow scarious, serrate wings. *Cotyledons* sessile, linear to very narrowly obovate, c. 15 × 1 mm. First leaves sometimes like the cotyledons, following basal ones from a sheathing base petiolate, petiole up to 30 mm, lamina elliptical, 10-20 × 5-8 mm with midrib and a marginal vein, upper ones gradually sessile, very narrowly obovate to linear-lanceolate, 40-170 × 4-8 mm, apiculate, 3-5-veined, serrulate on margins and often upper part of midrib. Leaves in the inflorescence very narrowly ovate. *Peduncles* 3-15(-30) mm, in large umbels 1/5 as long as to slightly longer than the longest rays. *Rays* 4-6(-8), very unequal, 0.75-35 mm. *Bracts* 5 or in some late formed umbels 4, (2/3 as long as to) equalling or longer than the rays, 10-45 × 2-4 mm, lanceolate to narrowly ovate, apiculate, serrate especially on upper part of margin and midrib, 5-7-veined with many conspicuous, reticulate veinlets, as young herbaceous with a narrow scarious margin, becoming whitish and ± semi-transparent. *Bractlets* 5 or rarely 4 in some depauperate umbellules, exceeding the flowers and enclosing them before and after anthesis, during anthesis patent and glossy yellowish, (4-)10-20(-30) ×



Fig. 8. *Bupleurum odontites* – A: habit; B: umbel and late flower; C: bractlet; D: flower; E: petals; F: fruit and umbellule in early fruit. – Material: A-E: Greece, Chios, Emborios, S. & B. Snogerup 8261 (LD); F: Bulgaria, Eli Dere, 1909, Střibny (LD).

(1.2-)1.5-4 mm, enlarging until ripening of the fruits, lanceolate to narrowly lanceolate, apiculate, serrulate especially on upper parts of margin and the midrib beneath, with 3 strong veins and usually 2 weaker ones near the margins, veinlets several, conspicuous, reticulate; after anthesis becoming semi-transparent throughout but as young herbaceous along the veins and in apical part. *Umbellules* 10-13-flowered, pedicels very unequal, 1-7 mm. *Petals* 0.65-0.75 × 0.55-0.85 mm, entire, the petal bend slightly concave with high margins, inflexed lobe c. 2/3 as long as limb, bifid, midvein narrow, continuing on the lobe. *Anthers* 0.35-0.4 mm. *Stylopodium* 0.75-0.95 mm broad, narrower than ripe fruit, *styles* 0.4-0.45 mm, about equalling stylopodium radius. Ripe *mericarps* (1.3-)1.5-1.8(-2.2) × 0.75-0.9 mm, semi-circular in transect, dark brown, smooth, ridges filiform but in ripe fruit inconspicuous, oil ducts invisible.

Chromosome number. – $2n = 16$ (S. Snogerup 1994).

Flowering. – April to July, fruiting June to September.

Habitat. – Different dry open habitats, in Europe almost exclusively as a field weed and ruderal, probably introduced with early agriculture.

Distribution. – Scattered in lowlands of S Europe, a rare more or less recent and casual introduction elsewhere, probably so in more countries than those listed. Repeatedly collected recently only in Gr, Si and Tu. – Al, (Au), (Br), Bu, Cr, (Da), (Ga), (Ge), Gr, (Ho), Hrv, Hs, It, Sa, Si, (Su), Tu. – Fig. 9.

Anatolia, Palestine, Syria, NW Africa, cosmopolitan as a casual. Native area uncertain, probably introduced in much of its area with early cultivation.

Selected material seen

BULGARIA: Kazalagac, 1886, *Skorpil* (PR); ad Tundzam, 7.1900, *Podpěra* (PRC); ad Eli Dere, 6.1909, *Stříbrny* (LD).

CROATIA: Slano, 21.7.1926, *Fiedler* (K).

DENMARK: Jylland, Brønderslev, 30.9.1930, *Kaad* (C, LD).

ENGLAND: Blaby Mill nr Leicester, 17.7.1903, *Vice* (L); Queens Drive, Bedford, 9.1968, *Key* (K).

FRANCE: Port Juvenal pr. Montpellier, 6.6.1857, *Hb. Gay* (K); Bouches-du-Rhône, Décombres aux Martegaux près de Marseille, 1.7.1860, *Roux as Billot 3097* (BM, JE); Marseille, 1862, *Grenier* (PR).

GERMANY: Fl. Thuringiaca, Hildburgshausen, 9.1901, *Eckart* (JE).

GREECE: Theben, 6.1833, *Berger* (M); in aridis prope Thessalonicam, 6.1890, *Charrel as Heldreich*, *Hb. Gr. Norm. no. 1146* (B, FI, G, GB, JE, K, LD, PR, PRC S, UPS, W); Hagion Oros prope coenobium Prodrom, 200 m, 5.1909, *Dimonie* (B, FI, G, GB, LD, M, PR, W); Thracia occid., Porto Lagos, 16.6.1936, *Rechinger 9628* (W); Insula Euboea bor.-occid., Paleochora, 29.6.1958, *Rechinger 19408* (G, K, LD cult., M, S, W); Drama, 400 ft, 16.6.1959, *Stainton 7612* (K, W); Samothraki, Chora-Kamariotissa, 7.6.1970, *Stamatiadou 9484* (ATH); Nom. Rodhopis, 17 km from Nea Chili along road to Komotini, 200 m, 7.7.1970, *Strid 572* (LD); Spanisin, road to Thessalonikus, 7.4.1971, *Haristos 24* (ATH); Prov. Halkidhiki, distr. Arnea, Ierissos, Ajos Pavlos chapel area, 22.6.1973, *Haristos 6736* (ATH); SE of Krovili, 50 m, 40°57'N, 25°36'E, 6.6.1991, *Anagnostopoulos & al. 2024* (UPA).

ITALY: Calabria orient. pr. Brancaleone, 9.5.1877, *Huter, Porta & Rigo it. ital. III, 182* (FI, GB, K, M, W); Basilicata, Potenza, La Botte, 6.1916, *Gavioli* (FI); Monte Ripoli, prope Tivoli, 700 m, 8.6.1957, *coll. ignot.* (W); Aspromonte, SW of Reggio de Calabria, c. 8 km N of Melita di Porto Salvi, 200 m, 11.6.1979, *Davis & Sutton 64798* (E).

KRITI: Suda, s. dat., *Sieber* (LD).

NETHERLANDS: Haarlemmerweg bij Amsterdam, 1860, *Hingst* (L); Apeldorn, 7.1877, *Ank.* (L); Wormerveer, 24.7.1926, *Kloos* (L); Rotterdam, Mathenesser dijk, 25.6.1930, *Kern & Reichgelt* (L); Pettelaar, 9.1939, *Giersbergen* (L); Deventer, Oude Pothoofd, 7.11.1948, *Renvecamp* (L).



Fig. 9. European distribution of *Bupleurum odontites* according to material revised.

SARDEGNA: Elmas, a Cagliari non longe, 10.5.1872, *Sommier* (FI).

SCOTLAND: Glasgow, before 1921, *Grierson* (K).

SICILIA: Marsala, 5-7.1902, *Ross* 339 (E, FI, JE, L, LD, M, O, S, WU); Palermo, 5.1911, *Ross* (BG); Girgenti, 26.4.1927, *Hafström* (S); Segesta, 25.5.1927, *Ronniger* (W); Agrigento, San Leone, 0-50 m, 13.4.1952, *Merxmüller & Wiedmann* (M); 2 km südlich Agnone, an der Strasse Catania-Siracusa, 80 m, 28.4.1961, *Podlech* 7444 (M); by Dittaino at Sparagogna W of Catenauova, 27.5.1964, *Brummit* 4581 (K, LD); Prov. Palermo, 3 km W Gangi, 16.6.1965, *Brummit & al.* 5179 (K); Agrigento betw. Montallegro and Ribera, 50 m, 18.5.1979, *Davis & Sutton* 63331 (E).

SPAIN: Valencia, Chiva, 6.1903, *Dominco* (GB).

SWEDEN: Göteborg, frihamnen, 12.7.1942, *Blom* (S); Göteborg, Mölndal, 26.7.1947, *Blom* (S).

TURKEY-IN-EUROPE: Agri Byzantini, Abraham Pascha Tschiftlik inter Bouyukderé et Kila, 4.6.1890, *Degen* (FI, G, K, PR, PRC, W, WU); Istanbul, Yesilköy, 29.6.1966, *Alava* 5323 (E); between Yenibedin and Büyükkristiran, 13.6.1968, *Baytop* 13349 (E); Canakkale, 25 km N Gelibolu, 10 m, 1.7.1968, *Sorger* 68-2-44 (herb. Sorger); Istanbul, Safraköy, 17.6.1973, *Jalas* 2223 (H); between Kesan and Tekirdağ, 9 km W Inecik, 160 m, 7.7.1973, *Strid* 603 (LD).

6. *Bupleurum glumaceum* Sm. in Sibthorp & Smith, Fl. Graec. Prodr. 1: 177. 1806 – Fig. 10
 ≡ *B. odontites* var. *glumaceum* (Sm.) Cesati in Bibliot. Ital. 82: 387. 1836 & in Linnaea 11: 315. 1837. – Holotype: *Sibthorp* (OXF!).

= *B. odontites* var. *kochianum* Cesati in Bibliot. Ital. 82: 387. 1836. – Lectotype (designated by S. Snogerup in Bot. Not. 115: 359. 1962): Greece, *Friedrichstal* (W!).

= *B. glumaceum* var. *aristatum* Boiss. & Heldr. in Boissier, Diagn. Pl. Orient., ser. 2, 2: 81.

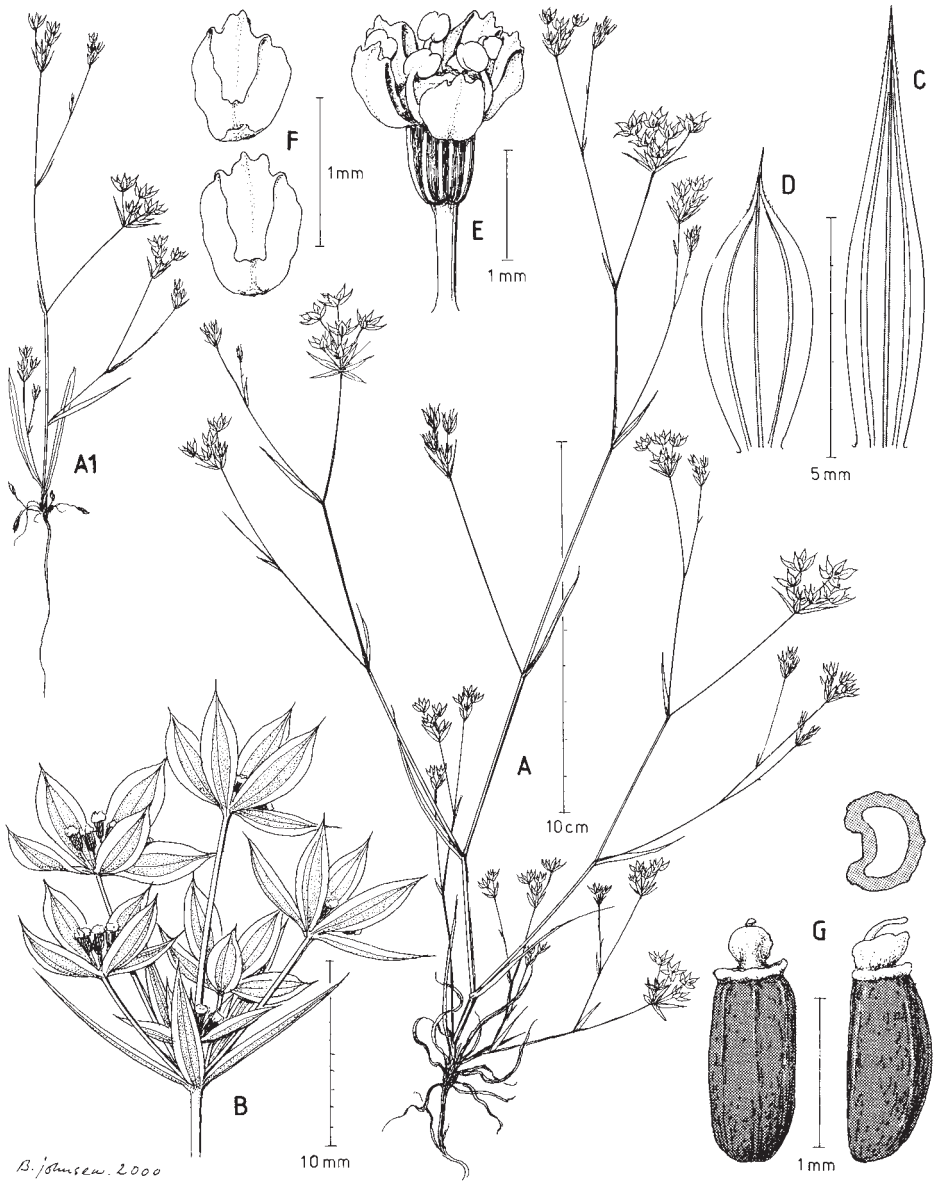


Fig. 10. *Bupleurum glumaceum* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruits. – Material: A-F: Greece, Peloponnesos, Sophikon, *Snogerup* 20389 (LD); G: Greece, Olympus, *Leptokaryaes*, *Sintenis & Bornmüller* 1260/1891 (LD).

1856. – Type: Hab. in agris & ad vias prope Thessalonicam frequens. 7.1847, *Heldreich* 1747 p.p. (FI!).

= *B. semidiaphanum* Boiss., *Diagn. Pl. Orient.*, ser. 2, 6: 73. 1859. – Lectotype (designated here): Zakynthos, *Margot* 1837 (G-BOIS!).

[– *B. glumaceum* var. *euglumaceum* Wolff in Engler, *Pflanzenr.* 43: 62. 1910, nom. inval. (Art. 24.3)].

Annual, 10–100 cm, erect, as young sometimes developing a few-flowered rosette, top umbel often overtopped by one or a few branches, large specimens sometimes pseudo-dichotomously branched from near the base, small ones with short branches only, umbels 5–30(–60). *Stem* slightly flexuous, striate, as young and apically 4-angular, becoming terete and 1–2(–3) mm thick, smooth or in upper part finely scabrous on the angles. *Cotyledons* from a sheathing base linear without conspicuous petiole, 7–10 × 0.5–1 mm. *First leaves* with sheathing base, petiole 5–25 mm and lamina 4–10 × 2–3 mm, broadly elliptical to oblanceolate with midrib, marginal vein and a reticulum of veinlets. *Middle and upper leaves* gradually sessile, linear, longest ones often 60–100(–120) × 1.5–3 mm with 3 inner veins and a thin marginal one. *Peduncles* 15–40(–50) mm. *Umbel rays* 4–6(–8), unequal, 1–20 mm, longest ones 1/5–2/5 as long as peduncle. *Bracts* 4–5, 1/2–2/3 as long as longest ray, 5–20 × 1–2 mm, lanceolate, acuminate, serrulate, 3-veined with veinlets only between the veins, herbaceous between the veins, scarious outside. *Bractlets* 5, 5–10 × 2–3 mm, exceeding the flowers and enclosing them before and after anthesis, at anthesis patent and glossy yellowish, lanceolate to obovate, acuminate, with a conspicuous, 1–3 mm long awn, serrulate on upper parts of margin and veins beneath, 3-veined herbaceous and with conspicuous veinlets between the veins, scarious and without veinlets outside them. *Umbellules* 5–8-flowered, pedicels 0.5–1.5 mm. *Petals* 0.7–1.1 × 0.4–0.6 mm, slightly serrate on margin, petal bend variable but usually with higher, cucullate middle part, inflexed lobe 1/2–2/3 as long as limb, rectangular or tapering towards the top, entire or slightly emarginate. *Anthers* 0.3–0.35 mm, filaments 0.5–0.8 mm. *Stylopodium* 0.6–0.9 mm wide, *styles* 0.25–0.5 mm, about equalling the stylopodium radius. *Mericarps* 1.5(–2) × 0.6–0.7 mm, as unripe pentagonal with prominent oil ducts, as ripe almost semi-cylindrical, with filiform to inconspicuous ridges, black.

Chromosome number. – $2n = 16$ (S. Snogerup 1962, Cauwet-Marc 1976).

Flowering. – Late April to July, fruiting June to September.

Habitat. – In different dry, open localities, rarely as weed or ruderal, mostly on limestone substrate, 0–1000(–1200) m.

Distribution. – A Balkan endemic occurring from Olympos, S Albania and the island of Kerkira south to S Peloponnesos and east to the island of Evvia and Attica. Al, Gr. – Fig. 11.

Selected material seen

ALBANIA: Capo Stylo, 6.1888, *Baldacci* (BM, FI, K, W); Santi Quaranta, Macchie am Meer, 17.6.1938, *Huber-Morath* 5160 (herb. Huber-Morath); Bezirk Sarandë, N-Seite des Dhivri, nahe dem E-Werk Bistriza E Sarandë, 100–300 m, 11.7.1980, *Krendl* (W).

GREECE: Insula Kephallonia, Hagios Theodoros, 15.5.1926, *Bornmüller* 687 (B, BM, G, K, LD, PR, S, W); Akrokorinth, 400 m, 10.6.1937, *Lempert* 412 (GB, K, PR, W); Fthiotidos, 11 km a Makrokomi versus Rendina, 6.7.1958, *Rechinger* 20583 (B, K, LD, M, W); Nom. Pierias, Ägäis-Küste bei Lithochorion, 7.1960, *Sorger* 60-5-1-28 (B); Pindus Mts, Vikos gorge, 2000 ft, 6.7.1961, *Cambridge Univ. Exp.* 8 (K); Euboea, Steni, 450 m, 21.6.1968, *Engstrand* (LD); Attiki, Mt. Penteli above Nea Makri, 220 m, 9.6.1972, *Greuter* 10351 (ATH); Sterea, supra Arahova, 1100 m, 17.7.1977, *Greuter & al.* 14724 (ATH, C, UPA); Prov. Messina, inter vicos Pylos et Metoni, 7.5.1979, *Tzanoudakis & Iatrou* 5369 (UPA); Argolis, 4 km N of Didyma, 500 m, 15.5.1982, *Runemark & Svensson* 48733 (LD); Kerkyra, mons Pantokrator, in ditone pagi Petalia, 650 m,

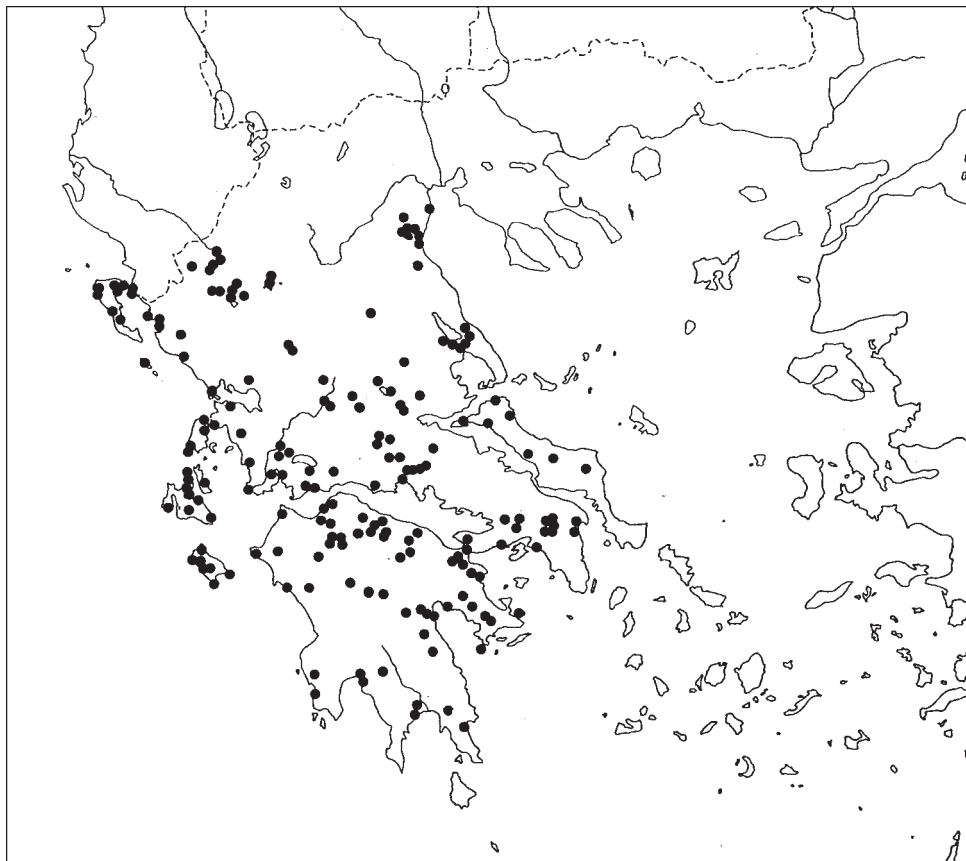


Fig. 11. Distribution of *Bupleurum glumaceum* according to material revised.

27.7.1982, *Georgiou 195* (UPA); below N part of Metsovon, 1000-1150 m, 39°47'N, 21°11'E, 16.7.1987, *Snogerup & Strid 5097* (LD); Poros, S and C parts, 100-200 m, 37°31'N, 23°29'E, 24.5.1989, *Strid & al. 29668* (ATH, C, G, LD, UPA); Mt. Menalo, 10 km from Levidi to ski centre, 37°38'N, 22°18'E, 11.7.1991, *Kit Tan & Vold 10257* (C); Mt. Olimbos, 1.8 km N of Litochoro along road to Ag. Dionisios, 350 m, 40°06'N, 22°29'E, 24.6.1992, *Anagnostopoulos & Athanasiou 3244* (UPA); Peloponnesos, Erimanthos, N. foothills by Tsapournia, 950-1000 m, 20.7.1992, *Strid 33474* (C); Mt Othris, Koufoskilorema, 2-3 km E of Neochorio, 680-780 m, 39°02'N, 22°32'E, 23.8.1992, *Constantinidis 2779* (UPA); Island Levkas, 0.5-2 km N of cape Levkatas, 20-100 m, 38°34'N, 20°32'E, 22.5.1993, *Constantinidis 3632* (UPA); mons Zalongon, 400-600 m, 39°09'N, 20°41'E, 5.8.1993, *Phitos & Kamari* (UPA); 1.5 km a viko Astakos versus Aetolikion, 100 m, 38°31'N, 21°06'E, 27.5.1994, *Phitos & al. 23906* (UPA).

7. *Bupleurum greuteri* S. Snogerup in Kit Tan, Davis & Hedge Festschrift: 23-26. 1989 – Fig. 12 Holotype: Greece, Kithira, W of Diakostis, 50 m, 26.5.1964, *Runemark & Snogerup 20833* (LD!).

Annual, 6-20 cm, small individuals only sparingly branched apically, with 1-10 umbels, large specimens often pseudo-dichotomously branched from the base, with up c. 25 umbels. The main stem ending in a large central umbel, overtopped by one or several branches, last-formed umbels often depauperate. *Stem* in basal part 0.5-1.5 mm thick, 3-4-angular with weak ridges or basally

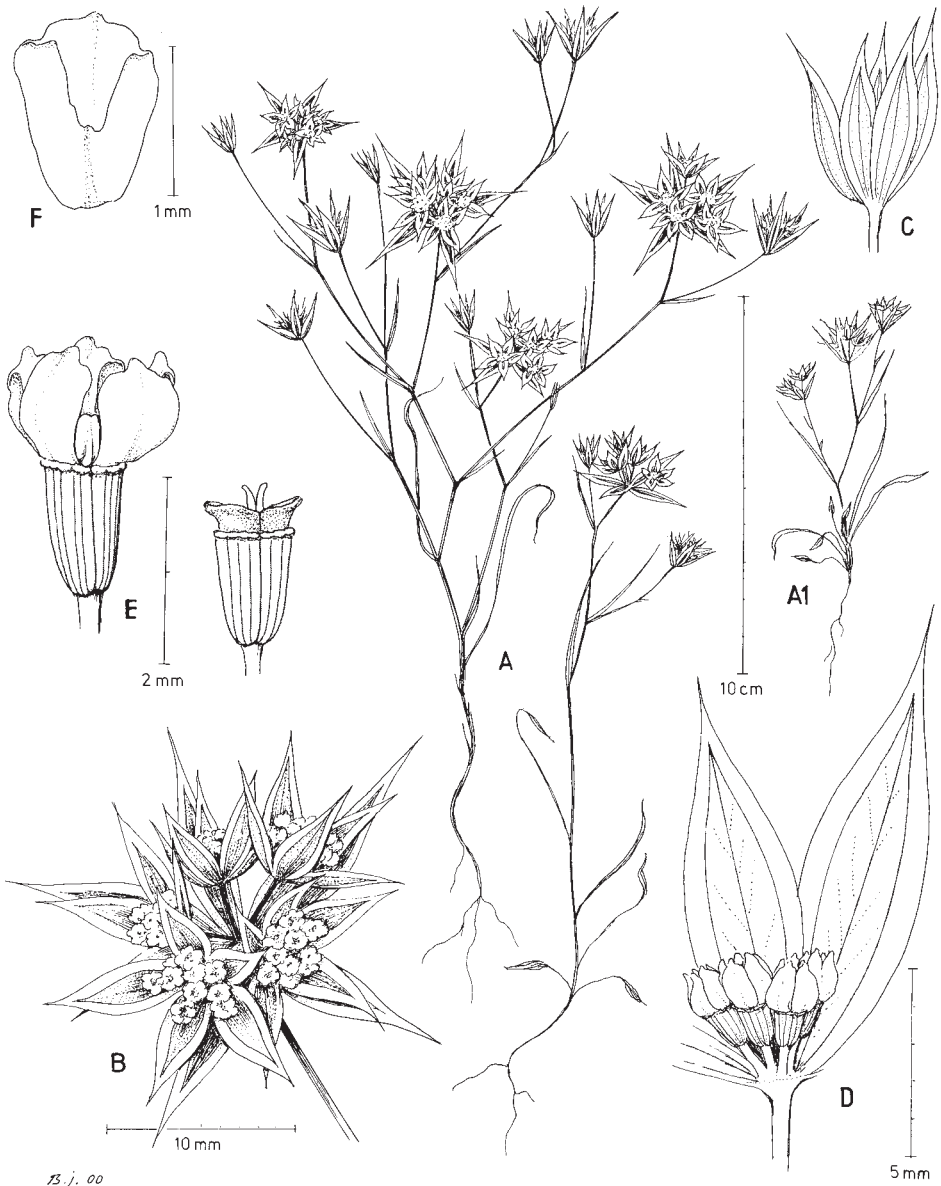


Fig. 12. *Bupleurum greuteri* – A, A1: habit; B: umbel; C, D: umbellule; E: flowers; F: petal. – Material: A-F: Greece, Laconia, Vathia, Kit Tan 10482 (C).

terete, smooth, striate. *Cotyledons* only seen as withered, probably linear. All *leaves* entire, serrulate with teeth 0.03 mm or shorter. *First leaves* soon withering, with petiole 8–20 mm and lamina 5–15 × 3–5 mm, elliptical to narrowly oblanceolate, with a prominent midrib, marginal veins and inconspicuous reticulate venation. *Upper leaves* successively sessile, narrower, more linear, the largest often 5–8 cm long and 1.5–3 mm broad, basal part, corresponding to a petiole, with parallel veins and a scarious margin, distal part with venation as in the lamina of basal leaves. *Peduncles* 10–25(–30) mm long. *Umbel rays* usually 3–5, unequal, in central umbels the longest usually 5–10 mm, all much shorter than peduncle. *Bracts* 5 or rarely 4, 10–25(–30) mm, sometimes unequal, usually enclosing the umbellules or almost so, like bractlets in shape and texture though often narrower at base and with awn up to 6 mm. Bracts and bractlets sometimes becoming purplish in fruit. *Bractlets* usually 5, rarely 4, exceeding and enclosing the flowers before and after anthesis, during anthesis patent and glossy yellowish, 5–12 × 1–4 mm, lanceolate to narrowly ovate, acuminate-cuspidate with awn 1.5–3 mm, serrulate with teeth less than 0.05 mm, with 3 or sometimes 5 prominent longitudinal veins, between the veins herbaceous with several veinlets, outside them with a usually 0.5–1 mm wide whitish scarious and veinless margin. Well developed *umbellules* 4–6-flowered, with subequal pedicels c. 0.5 mm long. *Flowers* protandrous. *Petals* c. 1.2 mm, often with a few teeth on upper part of margin, at the bend variously acutely lobed, cucullate, inflexed lobe 0.5–0.6 mm, narrow, blunt or slightly emarginate. *Anthers* 0.3–0.4 mm, *filaments* c. 0.5 mm. *Stylopodium* 0.8–1 mm wide, *styles* 0.3–0.4 mm, basally erect and apically curved outwards, shorter than stylopodium radius. *Mericarps* not seen when ripe, 1.2 mm long or probably more, rounded prismatic, smooth, ridges filiform.

Flowering. – April to June, fruiting June to August.

Habitat. – Communities of annuals of varying density on bare patches in phrygana, often on fine scree or gravel. Several of the localities are below cliffs and in rocky slopes, all on limestone, 0–650 m.

Distribution. – A Greek endemic. S Peloponnisos and the island of Kithira. Gr. – Fig. 13.

Similar species. – *B. greuteri* is most like *B. glumaceum* in bractlets and petals, and this is no doubt the most closely related species. In the habit, with few umbels and the large bracts *B. greuteri* more closely resembles *B. baldense* Turra. It differs from *B. glumaceum* in the length of the bracts, in the venation of the bractlets and the slightly larger stylopodium and longer styles. It is also lower than *B. glumaceum* and the umbels are generally much fewer. *B. greuteri* and *B. glumaceum* differ from all other species of *B.* subsect. *Aristata* in the venation and texture of the bractlets and the unusual shapes of their petals.

Additional material seen

GREECE: KITHIRA: Cerigo, Mte San Giorgio, Skatochori, 16.6.1880, *Spreitzenhofer* 47 (W, WU); Cerigo, Mte San Giorgio zunächst San Nicolo, 15.6.1880, *Spreitzenhofer* 23 (B, WU); Kythira, 5.1937, *Werner* (G, W); O-Abfall des Burghügels ob der Fahrstrasse nach Kapsali, 100 m, 11.5.1964, *Greuter* 6514 (ATH, B, LD, UPA); W of Chora, 25.5.1964, *Runemark & Snogerup* 20821 (LD); old castle of Chora, 25.5.1964, *Runemark & Snogerup* 20818 (LD); Spilies, 2 km E Kithira, 100 m, 36°09'N, 23°02'E, 21.5.1986, *Oxelmann & Tollsten* 1161 (GB); near the harbour village of Kapsali, 0–80 m, 36°09'N, 23°00'E, 16.5.1995, *Strid & al.* 39041 (C); 1.5 km S Agia Pelagia, 140 m, 36°18'N, 22°58'E, 20.5.1995, *Jahn* (B). — LACONIA: Ad radices montium Parnon, in saxosis calc. inter Skala et Molaioi, c. 22 km a Skala orientem versus, 7.6.1958, *Rechinger* 20004 (M, W); Spilea W of Pyrgos, 20.5.1964, *Runemark & Snogerup* 20560 (LD); c. 2 km ENE of Areopolis, 650 m, 21.5.1964, *Runemark & Snogerup* 20547 (LD); 2 km N of Areopolis, 50 m, 22.5.1964, *Runemark & Snogerup* 20724 (LD); SW of Gerolimn, 0–50 m, 22.5.1964, *Runemark & Snogerup* 20708 (LD); 3 km NNW of Kampos (N Areopolis), 24.5.1964, *Runemark & Snogerup* 20779 (LD); Monemvasia, 18.5.1970, *Stamatiadou* 8958 (ATH); 1 km W of Karnou-

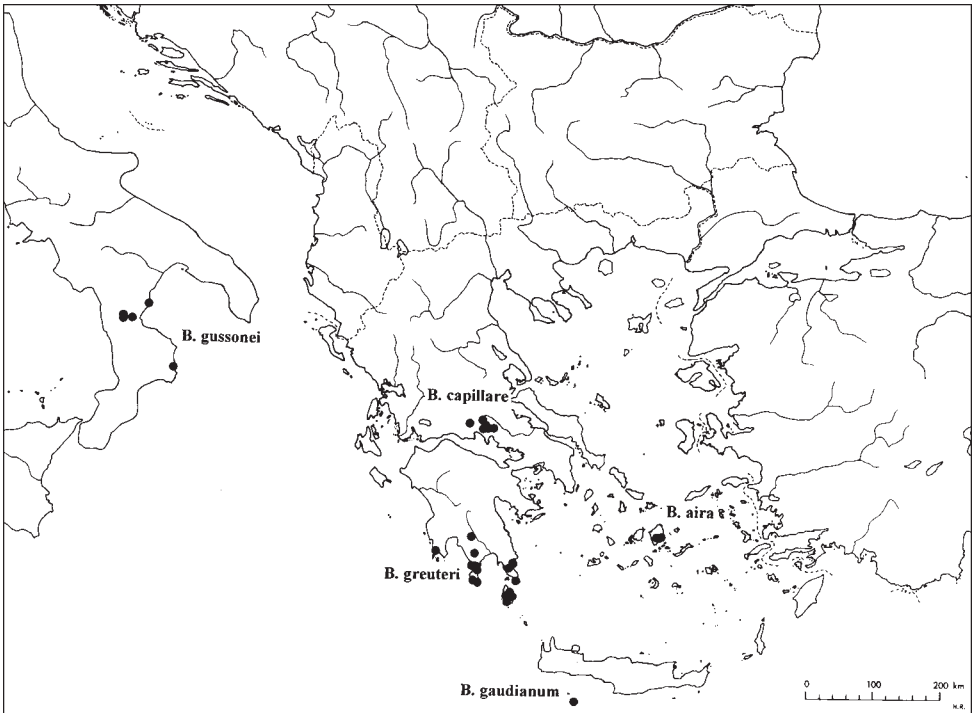


Fig. 13. Distribution of *Bupleurum gussonei*, *B. greuteri*, *B. gaudianum*, *B. capillare* and *B. aira* according to material revised.

polis SW of Gythion, 15.5.1977, *Snogerup 1552* (LD); ad vicum Gerolimim, 9.5.1979, *Tzanoudakis & Iatrou 5677* (UPA); Maleas Peninsula, 4 km S of Velanidia, 50-100 m, 1.5.1982, *Runemark & Svensson 48074* (LD); Mani Peninsula, 1 km SSE of Korogonia Nika, 240-330 m, 16.5.1984, *Strid 23058* (C); Geroliminas, 2.6.1984, *Georgiou 645* (UPA); 1 km SW Gerolimim, 36°29'N, 22°24'E, 4.5.1985, *Oxelmann & Tollsten 913* (GB); just W of Geroliminas, 30-100 m, 36°29'N, 22°24'E, 22.4.1989, *Strid & al. 28378* (C); 0.5 km NW Korogonia Nika, 200-360 m, 36°29'N, 22°28'E, 26.4.1991, *Kit Tan 10423* (C); 12 km from EOS Katafigion Taigetos along road to Anogia, 36°59'N, 22°25'E, 28.4.1991, *Kit Tan & Vold 9260* (C); 1 km NE of Vathia, 200-360 m, 36°28'N, 22°28'E, 1.5.1991, *Kit Tan 10482* (C); near the cave at Pirgos Dirou, 20-100 m, 36°37'N, 22°23'E, 29.5.1991, *Strid & al. 32875* (C, G); 1 km W Oliaravos, 780-820 m, 36°48'N, 22°24'E, 17.6.1991, *Kit Tan & Vold 9740* (C); above Vathia, 36°27'N, 22°28'E, 20.6.1991, *Kit Tan & Vold 9796* (C, E, G, RSA, UPA); südl. Maleahalbinsel, 13.5.1992, *Rasker* (B); 0.9 km SW Pyrihos, 370 m, 36°39'N, 22°25'E, 27.4.1995, *Willing 40066* (B). — MESSENIA: In der Nähe von Methoni, 5.1992, *Phitos* (UPA).

8. *Bupleurum baldense* Turra in Giorn. Ital. Sci. Nat. Agric. Arti Comm. 1: 120. 1764 – Fig. 14 Type: Original material in Vicenza destroyed. – Lectotype (designated here): sheet annotated “In summitate Montis delli Masi prope Montem della Corona Morenus collexit”, and “Baldo”, also annotated with short diagnosis and “Nob.” by Turra (M!).

= *B. odontites* var. *opacum* Cesati in Bibliot. Ital. 82: 388. 1836 ≡ *B. opacum* (Cesati) Lange in Willkomm & Lange, Prodr. Fl. Hisp. 3: 71. 1874. – Syntypes: Monspeli, Gennae, in Valle di Staforae (Apennin. transpad.).

= *B. divaricatum* Lam., Fl. France ed. 1, 3: 410. 1778, nom. illeg.

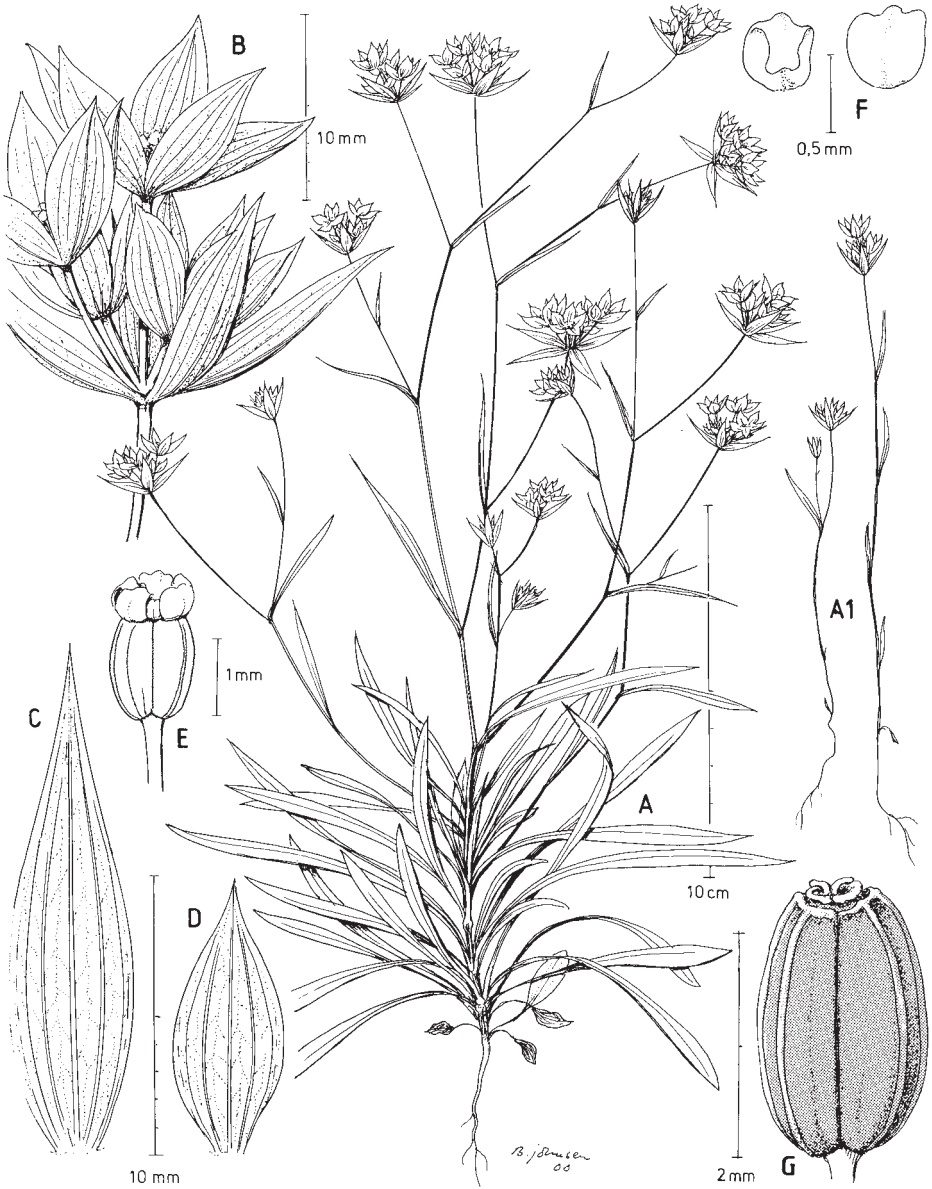


Fig. 14. *Bupleurum baldense* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A, B, C, D, E, F: France, Dijon, *Snogerup* cult. no. 861204 (LD); A1: Italy, Calabria, S. Giovanni in Fiore, S. & B. *Snogerup* 2113 (LD); G: France, Falcon-Nice, *Snogerup* cult. no. 860303 (LD).

Annual, (2-)5-20(-35) cm, stem ending in a top umbel 1-25 cm above ground, usually overtopped by one or several branches, usually branching only above, but especially in maritime localities often branched from the base, umbels usually (1-)3-10 but in large specimens sometimes up to 50. *Stem* erect, often slightly flexuose, striate, in young and upper parts 4-5-angular, basally becoming terete and up to 3 mm thick, smooth. *Cotyledons* with an up to 5 mm long petiole, lanceolate to almost orbicular, c. 10 mm, with midrib, marginal vein and pinnately arranged veinlets. *First leaves* with an up to 25 mm long petiole, lamina 7-50 × 2.5-7 mm, upwards changing from broadly elliptic to linear-lanceolate, often persisting until flowering time. *Middle and upper leaves* narrowly lanceolate to linear, 20-60(-100) × 3-6 mm, with 3-5 parallel veins, a marginal vein and reticulately anastomosing veinlets, uppermost ones shorter. Leaves all with smooth or very finely scabrous margin. *Peduncles* of central umbels (5-)10-30(-50) mm. *Umbel rays* 3-4, very unequal, 3-13 mm, longest ones 1/4-1 time as long as the peduncle. *Bracts* 4-5, (5-)9-22(-32) × 1.8-5 mm, 1.5-3 times as long as the rays and usually exceeding most of the umbellules, elliptical, narrowly acuminate, finely serrulate especially near apex, 3-5-veined with many conspicuous anastomosing veinlets, herbaceous with a c. 0.1 mm wide scarious margin. Bracts and bractlets sometimes becoming purplish in fruit. *Bractlets* 5, (5-)9-13(-15) × (2-)2.8-3.7(-5) mm, much exceeding the flowers and concealing them before and after anthesis, ovate, acuminate, with awn 0.5-1.5 mm, 3-5-veined, veinlets many, anastomosing and in 3-veined bractlets joining into a distinct marginal vein, finely scabrous-serrulate especially near apex, herbaceous with an 0.1-0.3 mm wide scarious, veinless margin. *Umbellules* 4-7-flowered, pedicels 1-1.5 mm. *Petals* usually 0.5 × 0.4-0.5 mm, with smooth margin, petal bend w-formed, inflexed lobe 0.3-0.4 mm, oblong, truncate or shortly bifid, midrib narrow, reddish brown, continuing almost to the notch of the lobe, rarely with an up to 0.15 mm broad basal part. *Anthers* 0.25-0.3 mm. *Stylopodium* 0.45-0.55 mm broad, equalling or slightly wider than the fruit, *styles* 0.25 mm, about equalling stylopodium radius. Ripe *mericarps* 1.6-2.0 × 0.8-0.9 mm, rounded pentagonal in transect, smooth, inner surface flat with a narrow furrow, ridges filiform to inconspicuous, fruit dark greyish brown.

Chromosome number. – $2n = 16$ (Cauwet-Marc 1976, S. Snogerup 1994).

Flowering. – May to July, fruiting July to September.

Habitat. – Various dry, open localities, rarely as weed or ruderal, mostly on lime-rich substrates, 0-1000(-1400) m.

Distribution. – A European endemic. W Europe and the W and central Mediterranean parts of S Europe to E Italy. Bl, Br, Co, Ga, Hs, It, Sa, Si. – Fig. 15.

The occurrence on Sicily is uncertain, as we have only seen two old and imperfectly labelled sheets, see below.

Similar species. – *B. baldense* has often been mixed up with *B. veronense* or placed together with it on subspecies rank.

Nomenclatural comment. – The name *B. divaricatum* Lam. has been widely used for this species but it was published as an unavowed substitute for *B. odontites* L. and therefore illegitimate. The locality annotated to the type sheet of *B. baldense* in M agrees with the only one given by Turra in the protologue and it should perhaps be regarded as the holotype but more specimens may exist.

Selected material seen

BALEARES: MENORCA: Sta Ponsa, 19.5.1872, *Rodriguez* (C); Santa Galdana, Moro Llevan, 50 m, 1.6.1985, *Charpin 19296* (G). – MALLORCA: Road Soller-Puig Major, 560 m, 28.5.1969, *Dahlgren & al. 444* (LD); Eremita de Betlem (Arta) 2 km ESE of the monastery, 31.5.1969, *Dahlgren & al. 938* (LD); montée de Puigpunent à Galazo, 600 m, 4.6.1985, *Charpin 19348* (G); Pollensa, 14.5.1990, *Feilberg 8043* (C); Cala metzquida, 39°45'N, 3°26'E, 29.5.1972, *Jacobsen & Jensen 2670* (C). CORSICA: Près de Propriano, *Exs. Fac. Sci. Clermont-Ferrand* (LD); Evisa, 870 m, 22.7.1932, *Aellen 270* (K, LD).

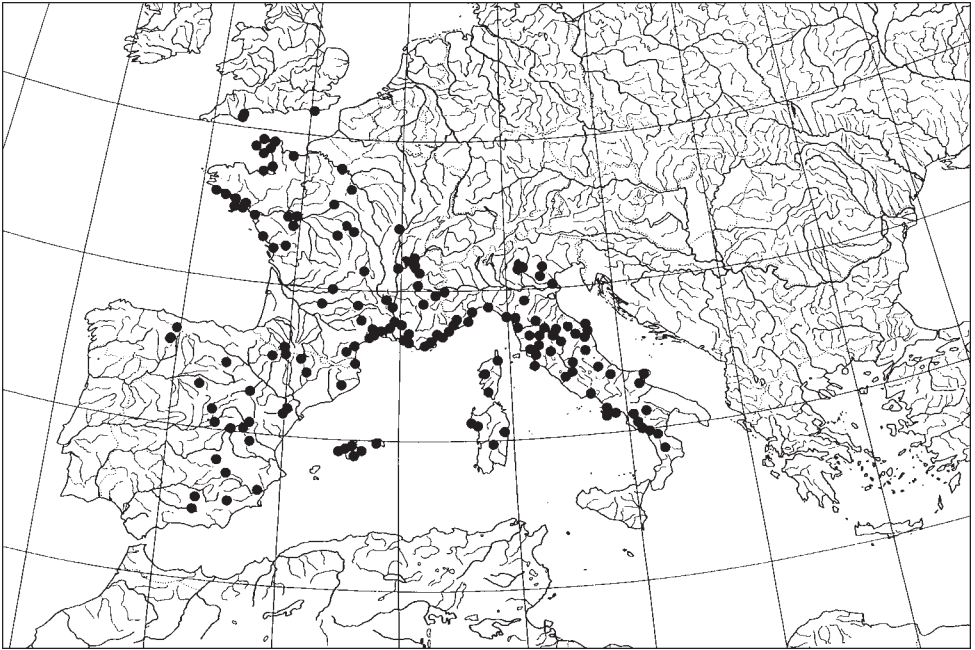


Fig. 15. Distribution of *Bupleurum baldense* according to material revised.

ENGLAND: L'Oucresse, Guernsey, 22.5.1897, *Playfair* (K); Devonshire, Berry head, 12.7.1909, *Edwards* (C); Sands of St Ouens Bay, Jersey, 12.7.1930, *Arsène* (K); S Devon, Torquay, 4.7.1931, *Sandwith* (S); Alderney, W slope of Mt Hale Font, 16.6.1934, *Jackson & Shaw 152* (K); E. Sussex, Beachy Head, Eastbourne, 13.7.1960, *Townsend* (S, UPS).

FRANCE: Dep. Manche, Saint Pair-sur-Mer, Queron, 2.6.1953, *Österlind* (UPS); Vendée, Bourgenay near Talmont, 27.6.1954, *Wennerberg* (GB); Hérault, Gigeau, 21.5.1956, *Weber* (G); Dept. Morbihan, Penthievre, 9.6.1958, *Vervoort* (L); Dordogne, Vallée de la Vézère, près St-Léon-sur-Vézère, 24.5.1961, *Sté. Bot. de France* (C, LD); Dep. Aveyron, Le Maubert, Causse Noir, 4.7.1961, *Duvigneaud 61/F/496* (L); Alpes-Maritimes, Mont Alban, 16.6.1968, *Høeg & Sunding* (O); Hérault, Pic St Loup, 350-400 m, 1.6.1974, *Charpin 10417* (G); Aveyron, Peyre près Millau, 400 m, 15.5.1975, *Bernard & Fabre 7667* (C, G, H, LD, TUR); Bouches-du-Rhône, Massif d'Allauch, plateau entre la Grande Tête Rouge et la Pouche des Escaoupré, 450 m, 13.6.1975, *Martin 7668* (C, G, H, LD, TUR, UPA); Alp. Maritime, Col de Braus zw. Sospel u. l'Escarene auf Mt. Ventabieu, 1000-1040 m, 22.7.1995, *Hörandl & al. 6954* (WU).

ITALY: Campania, Valle della Ferrieira (Amalfi), 31.5.1952, *Corradi & al.* (FI); Pr. Tivoli (Monte Ripoli), 700 m, 8.6.1957, *Cacciato* (S, W); Isola di Capri, Mte Solare gegen Anacapri, 500 m, *Lippert & Zollitsch 3121* (M); prov. Foggia, an der SS89 Foggia Manfredonia c. 1.5 km NÖ der Abzweigung nach San Giovanni Rotondo, 22.5.1972, *Matthias* (UPA); SW Castiglione di Gurfagna, W Pieve Fosciana, 300-400 m, *Burri & Krendl* (W); Abruzzes, 3-4 km S Rocca Pia, bei der Cle Martinello, 1450 m, 3.7.1979, *Burri & Krendl* (W); Calabria, 1 km N S. Giovanni in Fiore, 1000 m, 27.6.1980, *Snogerup 2113* (LD); Monti Arunci c. 50 km from Frosione on SS82, 15 km before Itri, 6.7.1983, *Akeroyd & al. 3246* (H); 16.5 km SE Lagonegro along SS19 to Castelluccio 3 km from Lauria, 10.7.1983, *Akeroyd & al. 3388* (H); Marche, Prov. di Macerata, Comm. di Castelsanangelo sul Vera Gualdo, 900 m, 9.7.1995, *Mucina 4291* (WU).

SARDEGNA: Prope Laconi, 6.1827, *Müller* (E, H, JE, M, PR, PRC, W); Dintorni di Alghero, 14.5.1895, *Martelli* (PRC); Dorgali al Gologone, 23.6.1895, *Martelli* (BM, O); Prov. Sassari, Cabo Caccia, 50-100 m, 21.5.1983, *Charpin 17680* (G).

SICILIA: In agris argillosis, s. dat., herb. *Sprengel* (W); s. dat., *Parlatore* (O).

SPAIN: Catalogne, Vallirana, vers “Lo Celegrames”, 2.7.1917, *Sennen* (BM); Prov. Leon, near Cistierna, 8.7.1927, *Wilmott* (BM); Prov. de Granada, Pinos Genil, 900 m, 22.6.1952, *Roivainen* (H, UPS); Prov. Huesca, Rio Aragon-Sabardan dalen Embúrn, 24.5.1960, *Cedercreutz* (H); Teruel, 2 km NW of Gea de Albarracin, 5.6.1962, *Brummitt & al.* 800 (E); Albacete, Villaverde de Gualdalar to Riopax, 18.6.1969, *Gibbs* 69.336 (E); Picos de Europa, W Pernes, 1°3'45"N, 43°8'0"E, 1000 m, *Harvey* 366 (BM); Cuenza, Belinchón, Cerro Mojón, 30 T VK 9730, 750 m, 17.6.1978, *Pajaron* 62 (C, G); Prov. Palencia, base de Peña Redanda, 1200-1300 m, 9.7.1978, *Charpin* 14864 (G); Prov. Segovia, San Frutos, Vallée du R. Duraton, 4.7.1789, *Charpin* 22061 (G).

9. *Bupleurum veronense* Turra, Fl. Ital. Prodr.: 65. 1780 – Fig. 16

Type: Original material in Vicenza destroyed. No citation, but certainly described from near Verona.

= *B. aristatum* Bartl. ex Reichenb., Icon. Bot. Pl. Crit. 2: 70. 1824. – Holotype: Insel Voglia in Dalmatien, *Bartling* (drawing!).

= *B. odontites* var. *intermedium* Cesati in Linnaea 11: 315. 1837. – Type: Described from Istria and Dalmatia.

Annual or perhaps sometimes biennial, (2-)5-30(-70) cm, very variable in habit, usually branched from the middle or only above, some specimens starting with a rosette and then branching from the base. Total number of umbels (3-)8-30(-70), last umbels often depauperate. *Stem* often slightly flexuose, ending in a top umbel at 2-25(-60) cm above ground, overtopped by one or several branches, 3-4-angular, below becoming terete and 1-2(-3) mm thick, striate, smooth or inconspicuously scabrous above. *Cotyledons* only seen in one population, with petiole up to 10 mm, lamina 7-10 × 2-4 mm, narrowly lanceolate, with midrib, marginal vein and pennately arranged veinlets. All leaves with amplexicaul bases. *First few leaves* with petiole 15-40 mm, lamina 8-40 × 4-10 mm, broadly elliptical to obovate. *Middle and upper leaves* gradually sessile, 20-130 × (1-)2-5 mm, narrowly oblanceolate to linear, with several parallel veins, marginal vein and anastomosing veinlets. *Peduncles* (3-)5-15 mm. *Umbel rays* (4-)5-6, much unequal, 2-13 mm, longest ones half as long to as long as peduncle. *Bracts* 5, usually 1.5 times as long as rays, (3.5-)9-25 × (1-)1.5-3.5 mm, lanceolate or narrowly so, acuminate with up to 3 mm long awn, 3-veined, shorter than the umbellules. *Bractlets* 5, much exceeding the flowers and enclosing them before and after anthesis, (3-)8-12 × (0.8-)2-4 mm, lanceolate to broadly lanceolate, acuminate with awn 0.8-3 mm, finely denticulate on upper margin and veins, veins 3, midrib often forming a sharp ridge, with conspicuous veinlets both between and outside the veins usually joining into a thin marginal vein, herbaceous between veins and veinlets, outside them with a scarious margin 0.1-0.3 mm wide. *Umbellules* 7-12-flowered, pedicels 0.5-1.5 mm, unequal. *Petals* 0.6-0.9 × 0.4-0.75 mm, bend convex with ± conspicuous lateral horns, inflexed lobe 2/3-3/4 as long as limb, from a broad base narrowed towards the middle and widened towards the emarginate apex, midvein reddish brown, very broad in upper part of petal face, again narrower at bend and continuing on the inflexed lobed. *Anthers* 0.3-0.4 mm, *filaments* 0.4-0.7 mm. *Stylopodium* 0.7-1.4 mm wide, cup-shaped in fruit, narrower than the top of the fruit, *styles* 0.4-0.6 mm, about as long as stylopodium radius. *Mericarps* 2-3 × c. 1 mm, pentagonal in transect, ridges filiform, smooth or with very small low papillae, glaucous.

Chromosome number. – 2n = 16 (S. Snogerup 1994).

Flowering. – May to early August, fruiting July to September.

Habitat. – Various open, dry localities, 0-700(-1200) m.

Distribution. – NE Italy and W Balkan Peninsula. Al, Bos, (Ge), Gr, Hrv, It, Jug (Montenegro), Kos, Mak, Sle. – Fig. 17.

Probably a European endemic, but *B. aenigma* Koso-Pol. in Bull. Jard. Bot. Pétersb. 17: 112. 1917 from W Caucasus may perhaps be conspecific.

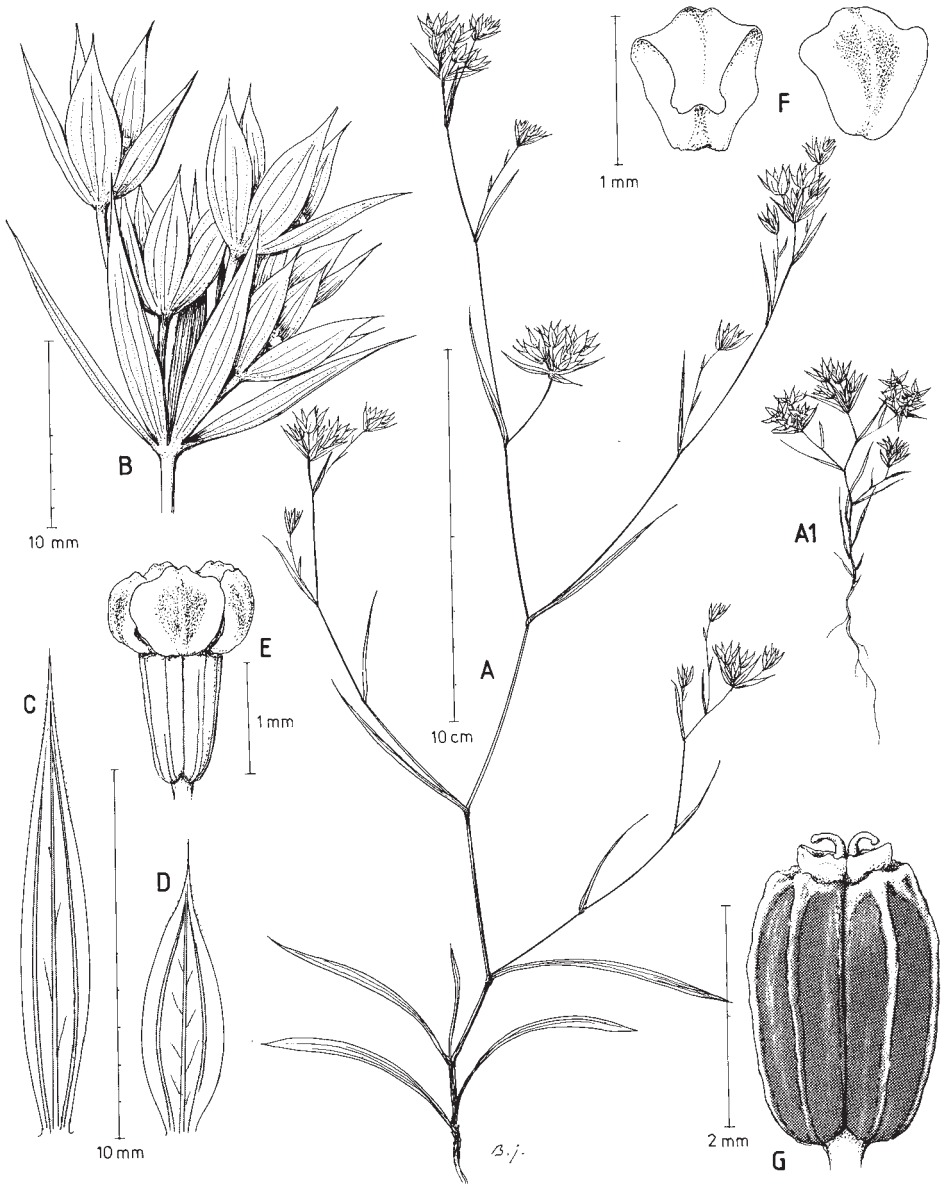


Fig. 16. *Bupleurum veronense* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A, B-F: Bosnia-Herzegovina, Nevesinje, 1969, *Engstrand* (LD); A1: Italy, Opčine ad Tergestum, *Marchesetti* 3686 (LD); G: Italy, Friuli, *Snogerup* cult. no. 853504 (LD).



Fig. 17. Distribution of *Bupleurum veronense* according to material revised.

Variation. – Ecotypes of coastal places are often very small, having also small bracts and bractlets. They are, however, connected with the typical inland form by a series of various intermediates.

Nomenclatural comment. – We avoid selecting a neotype at present. We have seen material from near Verona, where no other species of the group is known to occur, and an appropriate Turra specimen may still be found. If it later proves necessary to select a neotype, a new widely distributed collection would be to prefer. We also know that a local study is going on in Vicenza.

Selected material seen

ALBANIA: Supra Kanina distr. Valona, 14.6.1892, *Baldacci* 15 (K, M, W, WU); Umgebung von Shkodra, zwischen Gajtani und Rogami, 18.6.1916, *Janchen* (WU); Distr. Luma, zw. Kula Lums u. Bicaj, 350 m, 24.6.1918, *Dörfler* 692 (LD, WU); Kukës, am Fuss des Koritnik, im Vana-Tal, 10 km E Kukës, 700-800 m, 12.7.1979, *Krendl* (W); valley between Mali i Thatë' and Mali i Ivanit, Boboshtica to Dardha, near the village of Zvesdë, 1250 m, 28.10.2000, *Kit Tan & al.* 24757 (LD).
 BOSNIA-HERCEGOVINA: Karstheide Gradina SÖ von Liono, 16.7.1907, *Stadlmann & al.* (WU); Hresa, 5.8.1919, *Loschnigg* (WU); prope Sarajevo, 7.1933, *Sillinger & Deyl* (PR); montes Plasa planina, in monte Cruy SE Jablanica, 7.7.1933, *Sillinger & Deyl* (PRC); Stoloe, 26.6.1953, *coll. ignot.* (K); 15 km W Nevesinje, 400 m, 17.6.1969, *Engstrand* (LD); Karsthochebene Krbljine-

Gvozno, 1100 m, 16.7.1969, *Gilli* (W); Busak bei Mostar, 19.7.1969, *Gilli* (W); coast of Mala Duba S of Split, 18.7.1969, *Stork* (S); Neretva-Tal 10 km S Jablanica, 130 m, 16.7.1970, *Thyret* (C, M).

CROATIA: Entre Senj et Otočac, 4.8.1965, *Charpin* (G); Mittlerer Velebit, Karlobag, 31.5.1966, *Podlech 13204* (M); nahe Dubrovnik, 17.6.1966, *Valta* (H); Spalato, monte Kozjak supra Kastel Gomilica, 400 m, 14.7.1969, *Černoch* (LD); Novi Vinodolski, 21.7.1969, *Nilsson 44* (LD); Hrvatska, Korcula isl. Lumbarda 50-100 m, 22.6.1971, *Aalto 1404* (H); Ostküste Istriens, zw. Mošćenice u. Brseč, 20.7.1972, *Lewejohann Slo-72-116* (LD); Gradina 7 km à l'E de Vrsar, 125 m, 6.8.1972, *Van der Veken 9662* (C, H, LD); NNW Senj, 26.7.1974, *Nydegger* (C, LD); Baska, Quarnero nisl Krk, Bunculuka, 70 m, 16.7.1983, *Černoch 39705* (C, H).

GERMANY: Aken a. d. Elbe (Magdeb.), mit Erbsen aus Serbien eingeschleppt, 1919, *Schusta* (JE).

GREECE: An der Strasse von Smixi nach Ziakas, Aufstieg zu Kalkmassiv 5 km vor Ziakas, 40°03'N, 21°15'E, 12.7.1982, *Lippert 18726* (C, M); Mt. Boutsis, 5 km NE Kristallopigi, 950-1000 m, 40°40'N, 21°07'E, 18.7.1985, *Strid 24702* (C, G, RSA); 4 km NE Kella, 950 m, 40°48'N, 21°44'E, 19.6.1998, *Snogerup 15317* (LD, UPS).

ITALY: Tirolia austral. Tridentum, alle Laste, in pascuis rupestribus, 9.1890, *Evers* (LD, PRC); Lombardia, Braghiera fra Abentichieri e Castenedolo pr. Brescia, 27.8.1890, *Fiori* (FI, PR); Verona, lungo le muva, 14.7.1904, *Minio* (FI); Alpes Bergamasques, Isedore, 8.8.1912, *Chenevard* (G); Venetia, prov. Vicenza, Colli Berici, circa lacus di Fimon, 50-100 m, 6.1914, *Béguinot, Fl. It. Exs. 904ter* (FI, G, K, WU); Prov. Veronae, in collibus prope Torri del Benaco, 15.6.1920, *Rigo* (BG, M); Malcesine, Lago di Garda, 7.1954, *Baschant* (LD); Rocca di Manerba, S Salo, 218 m, 2.6.1961, *Sauer 4141* (M-Sauer); Trieste, M. Spaccato, 280 m, 23.8.1972, *Poldini 6745* (C, H, LD, PR, TUR, UPA); Rocca di Manerba am Gardasee, 218 m, 8.7.1974, *Nydegger* (H, LD).

KOSOVO: Bertiscus, Peč (Ipek), 500-700 m, 2.7.1933, *Rechinger & Scheffer 45* (W); Metohija, 2-3 km W von Peč, N-hänge des Gubavac, 550 m, 23.7.1975, *Krendl* (W); Prizrenska Bistrica-gorge 5-6 km E of Prizren, 580 m, 13.7.1976, *Frost-Olsen 542* (C); road Orahovac-Pristina 3 km N Orahovac, 8.7.1979 *Frost-Olsen 2066* (C); 9 km NE Prizren, 2 km NE of Korisa, 650-800 m, 16.8.1982, *Hartvig & al. 10149* (C).

MACEDONIA: Ad Zirovnica sub montibus Korab, 1000 m, 14.7. 1937, *Kláštersky* (PR); Ochrid, supra Velesto, 2.6.1938, *Weber* (PR); inter Gradsko et Stobi, 8.7.1938, *Weber* (PR); Demirkapu, supra flum. Vardar, 17.7.1938, *Weber* (PR); beim Kloster Nerezi westl. Skoplie, 29.6.1963, *Greuter S 6170* (herb. Greuter); in fauce fluminis Treska ad Glumovo, 18.6.1967, *Weber* (PR); NE of Debar, 700 m, 18.7.1979, *Larsen 36522* (C); lower slopes of Krstvar S of Skopje, c. 1980, *Edmondson 361* (E).

SLOVENIA: Carniolia, bei Wippach, 7.1899, *Mulley* (W); NW Ljubljana, 2000', 8.8.1962, *Smith 132* (K); 500 m SE vom Dol Lezece bei Divaca, 6.VII.1964, *Krendl 1253* (W); à Skocjan jama reg. de Postojna, 2.8.1965, *Charpin* (G); Kalkhügel Stena im Dragonja-Tal 4 km SE Secovlje, 25-35 m, 2.6.1994, *Hörandl & al 5771* (WU).

YUGOSLAVIA: Ad portum Novi Bar, 3 m, 6.7.1930, *Dostal* (PRC); Sandzak Novi Pazar, monasterium Sveta apud Pljevlja, 850 m, 8.7.1932, *Novák 5853* (PRC); Tara valley, way from Plevlje to Durmitod, 7.1932, *Thompson 84* (K); montis Vjetarnik pr. Bioce, 1000 m, 27.7. 1933, *Rechinger & Scheffer 1654* (W); ad Njegusi, Bogojevdo, 6.1937, *Pejovic* (G, PR); Satorman-Gebirge, Südseite oberhalb Petrovac, 600 m, 19.7.1967, *Pachernegg* (WU); Adriaküste bei Miločer/Budva, 6.1969, *Leute* (W); 3-4 km S Moraca monastery in the Montenegro valley, N of Titograd, 18.7.1969, *Stork* (S); in arenosis litoris maris Velika Plaza ad orientem versus Ulcinj, 10.5.1974, *Deyl* (PR); prope fluminem Cijevna SE Titograd, 27.6.1974, *Deyl* (PR).

10. *Bupleurum gussonei* (Arcang.) S. Snogerup & B. Snogerup, **comb. & stat. nov.** – Fig. 18 ≡ *B. aristatum* subsp. *gussonei* Arcang., Comp. Fl. Ital.: 269. 1882 ≡ *B. baldense* subsp. *gussonei* (Arcang.) Tutin in Feddes Repert. 74: 31. 1967, nomen non planta. – Syntypes: “Capo di Lecce e colli di Cassano in Calabria”, not seen [later collected material from Cassano seen, see below].

Annual, one-stemmed, (7-)10-20 cm, branched from near the base or in some small specimens only in upper half, with (3-)5-20(-40) umbels. *Stem* 3-4-angular with smooth angles, striate, in

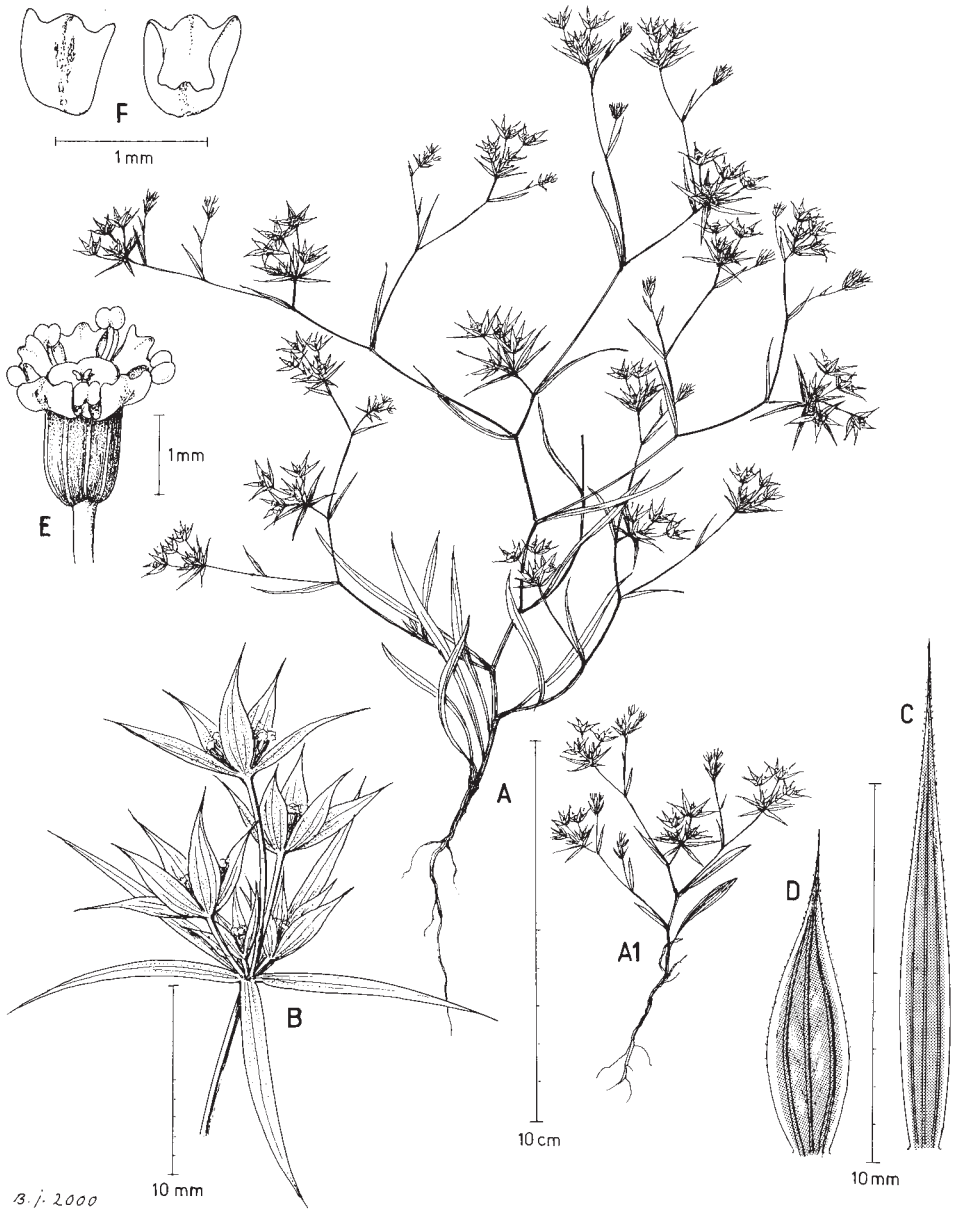


Fig. 18. *Bupleurum gussonei* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals. – Material: A-F: Italy, Calabria, S. Basile, S. & B. Snogerup 2138 (LD).

basal part of large specimens terete, 0.3-1 mm thick, slightly to conspicuously flexuose. *Cotyledons* probably linear, small, only seen as withered and fragmented. All *leaves* with amplexicaul bases. *First leaves* with a petiole up to 15 mm long and lamina 5-15 × 2-3 mm; *upper leaves* sessile, very narrowly lanceolate to linear, 20-35(-70) × 1-3 mm, serrulate especially in upper parts of margin and veins, 3-5-veined, with a narrow scarious border. *Peduncle* of central umbels (2-)5-10(-15) mm, *umbel rays* 4-6, much unequal, 1.5-12(-15) mm, longest ones equalling or in top umbel usually 1.5-4 times as long as the peduncle. *Bracts* 5, 2/3-1 time as long as the rays, 6-18 × 1-2 mm, lanceolate to linear-lanceolate, subulate with an awn up to 3 mm, (1-)3-veined, serrulate on veins and margin, herbaceous with an 0.1-0.2 mm wide scarious border. *Bractlets* 5, exceeding the flowers, 3.5-12 × 1-2.2 mm, lanceolate, aristate with arista 1.5-4 mm, with 3 raised and serrulate veins, veinlets few and inconspicuous, herbaceous with ± conspicuous scarious blotches between the veins, almost totally scarious outside them, the scarious margin 0.1-0.3 mm wide, coarsely serrulate. *Umbellules* 5-8-flowered, pedicels 0.3-1 mm. *Petals* 0.6-0.8 × 0.5-0.6 mm, mostly with some small teeth on upper part of margin, the bend very convex or with an apical projection, with conspicuous lateral horns, inflexed lobe c. 3/4 as long as the limb, broad, bifid, midvein light brown, broad in upper part of limb, narrow on the lobe to near the apex. *Anthers* 0.3-0.35 mm. *Stylopodium* 0.7-0.8 mm wide, wider than the fruit, *styles* c. 0.4 mm, equalling to longer than stylopodium radius. *Mericarps* 1.5 × 0.5 mm, smooth, greyish glaucous, ridges inconspicuous.

Flowering. – May to July, fruiting July to August.

Habitat. – Dry slopes, roadsides, 0-700 m.

Distribution. – An endemic of Calabria, local, until now known only from a few localities. It. – Fig. 13.

Material seen

ITALY: CALABRIA: “Ceullie en Calabre par E. Thomas et envoyée sans nom par E. Thomas en 1916” (K); ad pedem mtis Pollino 4-500 m, 11.7.1877, *Huter, Porta & Rigo 791* (WU); in pascuis montium prope S. Basile sol. calc. 700 m, 16.7.1907, *Rigo* (JE); Marina di Cotrone a Scorzo, 21.6.1911, *Lopez* (FI); ca 2-3 km W oberhalb von Cassano, 570-660 m, 14.6.1976, *Burri & Krendl* (W); N of Roseto, Capo Spulico, 10-50 m, 24.6.1980, *Snogerup 1987* (ATH, B, C, H, K, LD); 7 km SSE of Castrovillari, 250 m, 27.6.1980, *Snogerup 2117* (B, BM, G, LD); N-NNE of S. Basile, the narrow valley of river Coscile, 28.6.1980, *Snogerup 2138* (B, LD, UPA, W).

11. *Bupleurum apiculatum* Friv. in Flora 18: 335. 1835 – Fig. 19

Type: Rumelia, *Frivaldszky*, (isotypes K!, PRC!, WU[specimen marked “838” = 1838]!).

Annual, (10-)25-40(-65) cm, usually pseudo-dichotomously branched in upper half, but some large plants first forming a few-leaved rosette and then branching from near the base, top umbel overtopped by one or a few of the upper branches, umbels 5-30(-50), some of them usually depauperate. *Stem* erect, usually slightly flexuose, striate, in young and upper parts 4(-5)-angular, below becoming terete and up to 3 mm thick, smooth. *Cotyledons* not seen. All *leaves* with amplexicaul bases. *First leaves* only seen in fragmented state, petiolate. *Middle and upper leaves* (20-)30-60(-90) × 1-1.5(-2.5) mm, very narrowly lanceolate to linear, subulate with a long awn, finely serrulate in upper part of margin and ribs, 3-5-veined with the midrib thickest, those in the inflorescence smaller. *Peduncles* (10-)15-50(-65) mm, 1.2-2 or those of largest umbels to 3 times as long as rays. *Umbel rays* (4-)6-7(-9), very unequal, 2-30 mm, the longest usually c. twice as long as the bracts, at anthesis divergent 90-120°, in fruit only 45-60°. *Bracts* 4-5, subequal, 6-17 × 0.7-1.5 mm, narrowly lanceolate to very narrowly ovate, apiculate with 1.5-2 mm long awn, serrate on margin and apical part of midrib beneath, 3-veined with inconspicuous veinlets, herbaceous between veins and in a narrow strip outside, with scarious margin c. 0.15 mm. *Bractlets* 5,

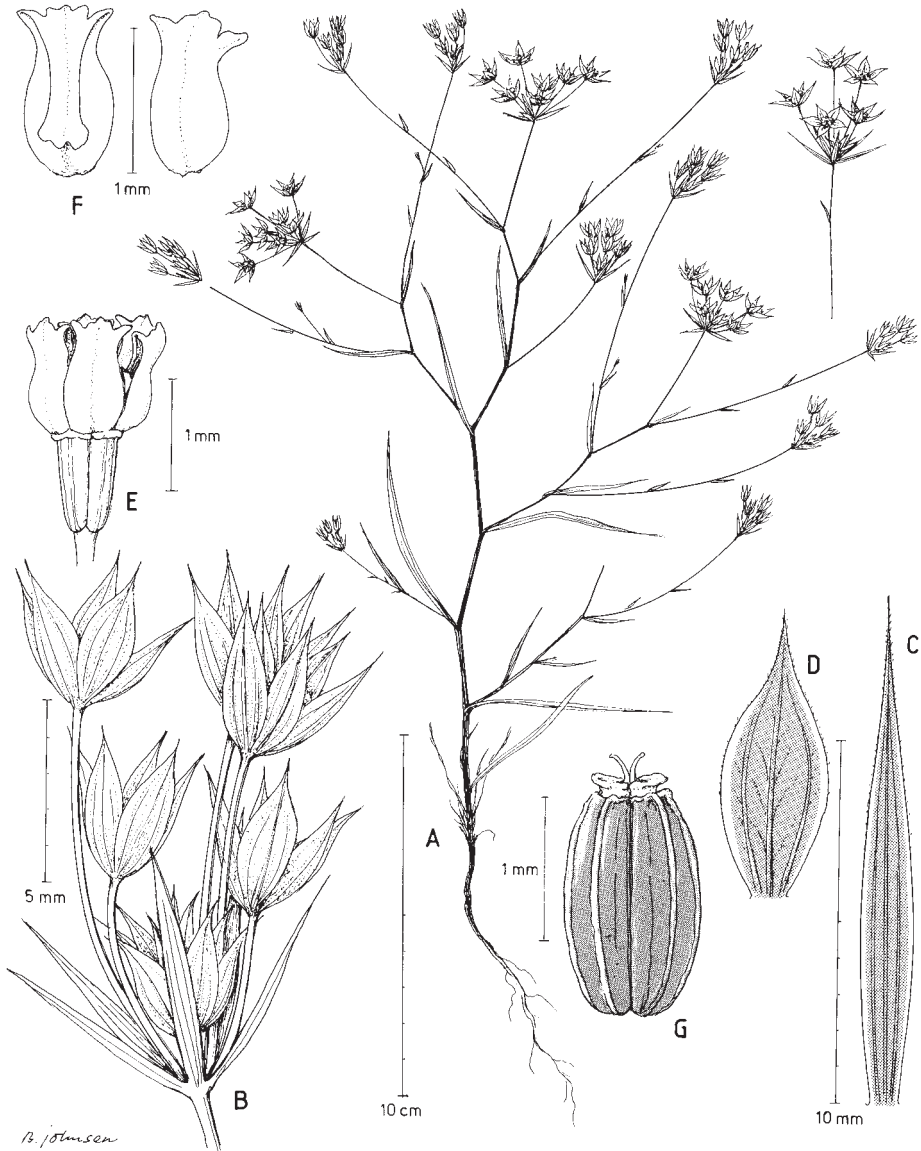


Fig. 19. *Bupleurum apiculatum* – A: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A: Greece, nom. Dramas, mt. Falakro, Prosani, *Gustavsson 16* (LD); B-F: Greece, nom. Pellis, Arnissa, S. & B. *Snogerup 15277* (LD); G: Macedonia, Valandovo, S. & B. *Snogerup 1125* (LD).

exceeding the flowers and enclosing them before and after anthesis, at anthesis patent and whitish, 7-8.5(-10) × 1.8-2.6(-3.4) mm, elliptical to lanceolate, aristate with arista 2-3 mm, serrate on margin and upper part of midrib, 3-veined, veinlets few and inconspicuous but present both between and outside veins, entirely or partly herbaceous between the veins and in a narrow strip outside, scarious margin 0.2-0.3 mm, often most of the bractlet becoming scarious in fruit. *Umbellules* 9-11-flowered, pedicels 0.8-1.5 mm. *Petals* 0.9-1.1 × 0.5-0.65 mm, limb widest near the base and at the conspicuously 3-4-lobed bend, inflexed lobe almost as long as the limb, narrowed in its middle part but with a wide, bifid top with usually irregularly lobulate parts, midrib narrow but conspicuous, continuing on the lobe to its division. *Anthers* 0.3-0.35 mm, *filaments* 0.5-0.6 mm. *Stylopodium* 0.55-0.7 mm wide, narrower than the fruit, *styles* 0.35-0.45 mm, longer than the stylopodium radius. *Mericarps* 2-2.3 × 0.8-0.9 mm, semi-cylindrical, its inner face with a narrow furrow, smooth and at least as young glaucous, ridges filiform.

Flowering. – June to August, fruiting July to September.

Habitat. – Open, dry localities, 0-600 m or probably sometimes higher.

Distribution. – A Balkan endemic. From N and NE Greece to Romania. Also cited for Tu by Webb (1966) but no material seen. The find from the island of Krk, Croatia, may represent a recent introduction. Bu, Gr, Hrv, Jug, Mak, Rm. – Fig. 20.

Selected material seen

BULGARIA: In collinis ad Kalofer, 7.1907, *Stříbrny* (E); prope Sliven ad collum Sekerdze, 16.7.1907, *Schneider* 446 (K, W); Kaspitschan, 14.7.1930, *Rechinger* 1190 (BG, LD, W); Philippopol, Dschendem-Tepe, 20.7.1930, *Ronniger* (W); Dragoman, montium Golem Čepan, 31.7.1930, *Rechinger* 1872 (W); prope Goce Delčev, 7.8.1955, *Vihodzevsky*, *Pl. Bulg. Exs. VI: 573* (C, E, H, O, S, UPS, W); Varna, supra lacum Varnense pr. Beloslav 50 m, 6.7.1967, *Černoch* 16978 (LD); Melnik inpedi Pirium, 20.7.1972, *Sdusik* (PRC); Distr. Blagoevgrad, vicinitate Lozenica ad Melnik, 4.8.1975, *Deylova* (PR); Struma valley, the hills by Kresna, 9.7.1980, *Kuzmanov* 801110a (G).

CROATIA: Krk, Njivice, 3.8.1982, *Moe* (BG).

GREECE: 15 km SSE Kozani, 400 m, 26.6.1970, *Strid* 514 (LD); Nom. Kavallas, near Ofrinionon E of Strymon, road Thessaloniki - Kavala, 10-20 m, 5.7.1970, *Strid* 551 (LD); Prov. Larissa, road Tirnavos-Elassona, S Stefanovouni, 340-350 m, 25.6.1971, *Stamatiadou* 12924 (ATH, C); Halkidhiki, pr. Ajios Prodhromos, 450 m, 5.7.1971, *Greuter* 9167 (ATH, G); Nom. Kilikis, 1 km SE Peukodasos S of Euzoni, 29.7.1971, *Snogerup* 1124 (LD); Serres, entre Siderokastron et Palaio-kastron, 50 m, 16.6.1973, *Greuter & al.* 10148 (G); at river Aliakmon at bridge of road Kozani-Servia, 280 m, 19.6.1973, *Greuter* 11297 (ATH, C); Thessaloniki, village Filiron, Dhasos, 400 m, 6.7.1973, *Haristos* 6929 (ATH); Pella, SE Nea Zoi, near Stromitsa stream, 100-110 m, 26.7.1976, *Stamatiadou* 19387 (ATH); Drama, mons Orvilos, supra Kataphyton, 750-1000 m, 6.8.1978, *Georgiades* 4823 (UPA); Nom. Serron, 5 km from Levkothea along road to Serre, 140 m, 3.6.1989, *Strid & al.* 30109 (C, LD); Nom. Pellis, ep. Almopias, Strasse von Fustani nach Aetochori, 530-570 m, 17.8.1990, *Pirker & al.* 56 (B).

MACEDONIA: Nicolice a. Doiran See, 6.1917, *Burgeff* (M); in collibus ad basin montes Wodno, 3-400 m, 16.7.1918, *Bornmüller* 4191 (JE); Felsen der Klisura von Drenovo N.Ö. von Prilep, 8.8.1923, *Vandas* (GB); Skopje, Mt Gorne supra urbem, 11.6.1967, *Weber* (PR); prope Negotino, 11.6.1968, *Weber* (PR); Titov Veles, in fauce fluminis Topolka, 20.6.1968, *Weber* (PR); 10 km SW of Valandovo, 29.7.1971, *Snogerup* 1125 (LD); Stobi, S von Gradsko, 150-200 m, 1.7.1976, *Krendl* (W); NW of Strumitza, am Ostrec, 650-717 m, 7.7.1977, *Krendl* (W).

ROMANIA: Dobrogea, distr. Constanta, ad Cernavoda, 120 m, 15.8.1910, *Prodán*, *Fl. Rom. Exs.* 63 (BM, C, E, G, GB, H, K, L, LD, M, O, PR, PRC, S, W, WU); Dobrogea, distr. Constanta, ad Saligny, 40-70 m, 19.5.1926, *Grintescu*, *Fl. Rom. Exs.* 661 (C, H, O, PR, S, W, WU); Dobrogea, Caramanchioi mellan Jurilovka och Tulcea, 14.7.1931, *Häyrén* (H).

YUGOSLAVIA: Alexinec, 7.1892, *Formánek* (PR); M. Belava, 600 m, 21.8.1897, *Adamovic* (PR),



Fig. 20. Distribution of *Bupleurum apiculatum* according to material revised.

PRC, WU); ad Niš, 10.6.1898, *Moravac* (GB, JE, WU); Pirot, 6.1902, *Bierbach* (H); Sicevske Klisura apud Niš, 300 m, 12.7.1923, *Novák* (PRC); 5 km östlich Bela Palanka, 30.7.1968, *Merxmüller & Zollitsch* 23878 (M).

12. *Bupleurum flavum* Forssk., Fl. Aegypt.-Arab.: 205. 1775 – Fig. 21

Holotype: Dardanelles, *Forsskål cent.* 7 no. 23 (C!).

= *B. thracicum* Velen. in Sitz.-Ber. Böhm. Ges. Wiss. 1892: 381. 1892 ≡ *B. glumaceum* var. *thracicum* (Velen.) Wolff in Engler, Pflanzenr. 43: 63. 1910. – Lectotype (designated by S. Snogerup in Bot. Not. 115: 361. 1962): Sliven, 1886, *Skorpil* (PRC!).

= *B. glumaceum* var. *pichleri* Wolff in Engler, Pflanzenr. 43: 63. 1910. – Lectotype (designated by S. Snogerup in Bot. Not. 115: 361. 1962): Brussa, 1873, *Pichler* (W!; isolectotypes BM!, FI!, G!, JE!, K!, PRC!, WU!).

Annual, 10-100 cm, pseudo-dichotomously branched from the middle or also with some small branches from near the base, umbels (10-)20-30(-60), the top umbel slightly overtopped by one or a few branches. *Stem* erect, often slightly flexuose above, striate, young parts 4-angular, below becoming terete and up to 2.5 mm thick, smooth or very finely scabrous on the ridges. *Cotyledons* not seen, probably linear. All *leaves* with amplexicaul bases. *First leaves* with petiole 10-20 mm, lamina 15-50 × 2-3 mm, very narrowly elliptical to linear, with middle and marginal veins and ± erect veinlets. *Middle and upper leaves* sessile, linear, 30-60(-90) × 1-3 mm, those in the inflorescence smaller, smooth or finely scabrous on upper part of margin, with 3 parallel veins and inconspicuous veinlets. *Peduncles* (20-)30-50(70) mm. *Umbel rays* 3-8, very unequal, 1.5-16 mm, longest ones usually 1/5-1/3 as long as the peduncle. *Bracts* 3-5, 2/3 as long as to slightly longer than the longest rays, 6-15 × 1.5-2 mm, narrowly lanceolate, acuminate, 3-veined with veinlets only between the veins, herbaceous between the veins, scarious outside. *Bractlets* 5, exceeding the flowers and enclosing them before and after anthesis, at anthesis patent and glossy yellowish,

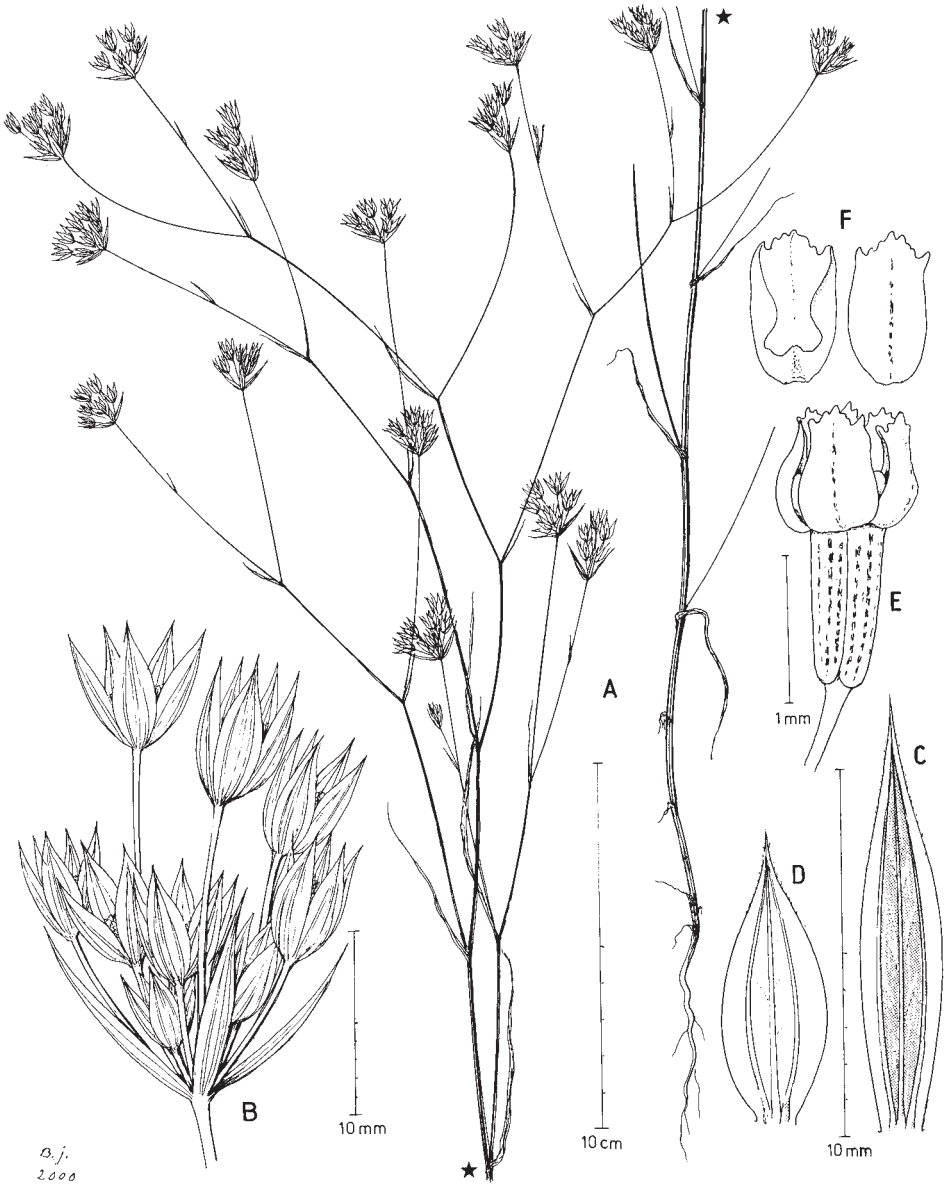


Fig. 21. *Bupleurum flavum* – A: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals. – Material: A-F: Dardanelli, Sintenis 520/1883 (LD).

5-8 × 2-2.5 mm, broadly lanceolate, acuminate, with 3 conspicuous, raised and sharp-ridged veins, veinlets lacking or a few inconspicuous ones between the veins above, dentate on margins and upper part of veins, scarious. *Umbellules* 5-9-flowered, pedicels 0.5-1 mm, subequal. *Petals* yellow, drying white, limb 0.7-0.9 × 0.5-0.6 mm, sparsely denticulate on the sides, petal bend slightly irregularly lobed, inflexed lobe almost as long as limb, bifid, midvein narrow, reddish brown. *Anthers* 0.25-0.3 mm, *filaments* c. 0.5 mm. *Stylopodium* 0.4-0.6 mm wide, about as wide as the fruit, *styles* 0.3 mm, about equalling the width of the stylopodium. *Mericarps* 1.6-2 × 0.4-0.5 mm, pentagonal to semi-terete, ridges filiform, light greyish brown, smooth, oil ducts conspicuous and ± purplish.

Flowering. – June to July, fruiting July to September.

Habitat. – Phrygana, steppe and other open, dry localities, 0-200 m.

Distribution. – S Bulgaria, NE Greece, Turkey-in-Europe. Bu, Gr, Tu. – Fig. 22.

W and S Anatolia, E Aegean islands.

European material seen

BULGARIA: In m. Chadume pr. Philippopolis, s. dat., *Formánek* (PR); Jambol, 1886, *Skorpil* (PRC); Burgas, 1893, *Velenovský* (PRC); Duganovo pr. Kavaklii, 7.1900, *Podpěra* (PRC); Bulharsko, Pricernomori, Slunecne sv. Burgasu, 8.1959, *Chrték* (PRC); Burgas, zw. Slancev brjag u. Banja, 50 m, 13.8.1968, *Merxmüller & Zollitsch* 24477 (M); Slantshev brjag, 12.7.1980, *Ekman* (H).

GREECE: Inter Komotini et Porto Lagos, 30.6.1936, *Rechinger* 10377 (W); Nom. Evrou, Didymotichon, 6.1963, *Bauer* 330 (W); Nom. Evrou, Avas, 5-28.6.1965, *Bauer & Spitzenberger* 1802 (W); Nom. Evrou, 17 km from Nea Chili to Komotini, 200 m, 7.7.1970, *Strid* 576 (C, LD); Nom. Rodhopis, NW of Sappe along road to Komotini, 100 m, 41°02'N, 25°41'E, 4.8.1984, *Strid & Hartvig* 24166 (B, C, G, LD, UPA).

TURKEY-IN-EUROPE: Bosphorus, St. Stephano, s. dat., *Berggren* (UPS); *ibid.*, 10.7.1896, *Nemetz* (W, WU); *ibid.*, 3.8.1905, *Aznavour* (BM, E, G, GB, JE, PR); Constantinopel, entre San-Stefano et Floria, 20.7.1870, *Aznavour* (PR); inter Rodosto et Köpekli, 24.6.1890, *Degen* (FI, G, JE, K, PR, PRC, W, WU); Halkali, 29.6.1894, *Aznavour* (G); Halkali-Ménekché Ichiftlik, 7.7.1902, *Aznavour* (G); Kutschuk Tschekmedsche, 19.7.1902, *Schwöder* (W); Chanak, Dardanelles, 1920, *Cheeseman* (BM, K); Gallipoli, Gaba Tehe, 10.6.1923, *Ingoldby* 309 (K); Galatacia to Jesilköy, 26.8.1937, *Post* (G); Halkah, Istanbul, 12.7.1952, *Baytop & Berk* (G); Edirne- Havsas, 3 km from Havsas, 100 m, 15.7.1956, *Mc Neill* 201 (E, K, W); Küçükçekmece to Büyükçekmece, 50-100 m, 12.8.1962, *Davis & Coode* 39233 (BM, E); *ibid.*, 7.8.1967, *Baytop* (E); Tekirdağ, Inecik, 100 m, 12.8. 1962, *Davis & Coode* 39283 (BM, E, K); above Tekir Dag, 100 m, 12.8.1962, *Davis & Coode* 39291 & 39297 (BM, E, K); 14 km E Tekirdağ, 13.6.1968, *Baytop* 13363 (E); 25 km N Gelibolu, 10 m, 1.7.1968, *Sorger* (herb. Sorger); between Konahköprü and Marmara Eryölisi, Tekirdağ, 13.7.1968, *Baytop* 13457 (E); Tekirdağ, Ganos depi, 14.7.1968, *Baytop* 13574 (E); Canakkale, Kavak, 15.7.1968, *Baytop* 13589 (E).

13. *Bupleurum gracile* d'Urv. in Mem. Soc. Linn. Paris 1: 286. 1822 – Fig. 23

Lectotype (designated by S. Snogerup in Bot. Not. 115: 363. 1962): Kikladhes, Astipalea, 1819, d'Urville (K!).

= *Odontites luteola* Spreng. in Roemer & Schultes, Syst. Veg. 6: 380. 1820, p.p., nom. illeg.

= *B. aegaeum* Rech. fil. in Feddes Repert. 43: 144. 1938. – Holotype: Dyo Adelphi, Cycladum, c. 36 1/2°N, 26 1/2°E, in saxosis calc. insulae occidentalis, 29.5.1935, *Rechinger* 7753 (W!; isotypes G!, K!, LD!, W!).

[– *B. glumaceum* var. *euglumaceum* sensu Wolff in Engler, Pflanzenr. 43: 62. 1910, non Sm. (1806), nom. inval.].

[– *B. flavum* sensu Rech. fil., Fl. Aegaea: 402. 1943, non Forsskål (1775)].



Fig. 22. European distribution of *Bupleurum flavum* according to material revised.

Annual, (5-)10-20(-50) cm, some small plants much branched from near the base with densely placed umbels, others tall with only small branches below and only slightly pseudo-dichotomously branched above, umbels (5-)10-20(-100), usually some very depauperate. *Stem* erect, usually $\pm$ flexuous, striate, young parts 3-4-angular, below becoming terete and up to 2 mm thick, smooth or finely minutely scabrous on ridges above. *Cotyledons* linear, 8-15 mm. *All leaves* with amplexicaul bases. *First leaves* with petiole (5-)10-40(-50) mm, lamina 10-50 $\times$ 2-6 mm, $\pm$ narrowly elliptical, with midrib, thin marginal veins and reticulate veinlets. *Middle and upper leaves* gradually sessile, narrower to linear, 15-50(-120) $\times$ 0.5-5 mm, in the inflorescence very small, with 3-5 parallel and weak marginal veins. *Peduncles* (5-)10-25(-40) mm. *Umbel rays* 3-6, very unequal, 1-15(-20) mm, longest ones half as long as to equalling peduncle. *Bracts* 3-4, about half as long as longest rays, 3-7 $\times$ 0.5-1.5 mm, lanceolate, acuminate, 3-veined with few veinlets between the veins, herbaceous between the veins, scarious outside. *Bractlets* 5, exceeding the flowers and enclosing them before and after anthesis, at anthesis patent and glossy whitish, 5-8 $\times$ 2-3 mm, elliptical to ovate, acuminate, entire or finely scabrous above, scarious, 3-veined, veins sharply ridged, veinlets lacking or a few inconspicuous ones between veins. *Umbellules* 4-8-flowered, pedicels 0.8-1.3 mm. *Petals* yellow, drying white, limb 0.5-0.6 $\times$ 0.4-0.6 mm, entire, petal bend straight, even or with two low, rounded lobes, inflexed lobe c. 3/4 as long as limb, bifid, midrib narrow, continuing on the lobe. *Anthers* 0.25 mm, *filaments* c. 0.5 mm. *Stylopodium* 0.5-0.6 mm wide, *styles* 0.2-0.3 mm, about equalling stylopodium radius. *Mericarps* 1.3-1.8 $\times$ 0.6-0.9 mm, blackish brown,

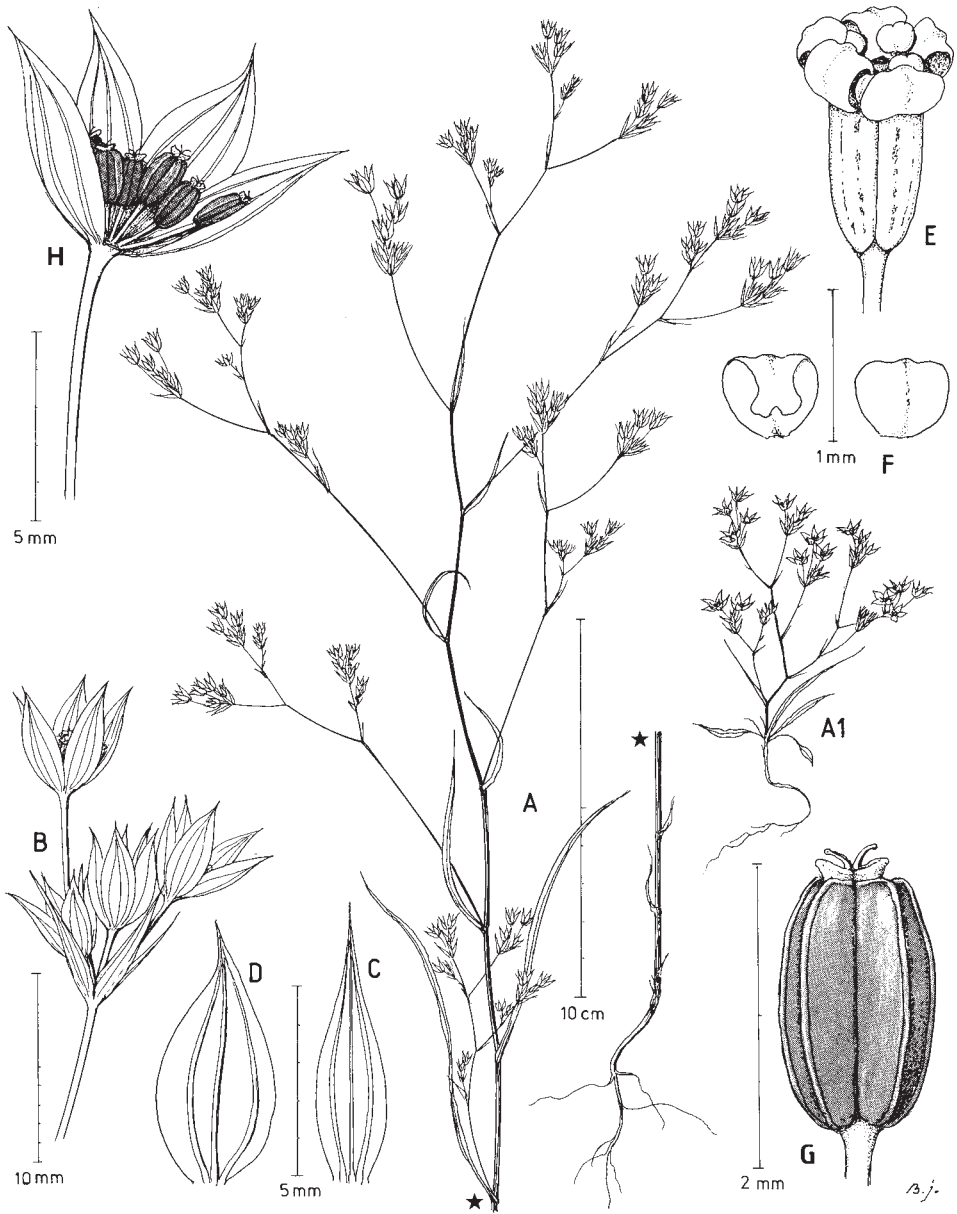


Fig. 23. *Bupleurum gracile* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit; H: fruiting umbellule. – Material: A, B-F: Greece, Athens, Skaramanga, 1939, *Lindberg* (LD); A1: Greece, Kikladhes, Amorgos, *Snogerup* 20305 (LD); G, H: Greece, Kikladhes, Denousa, *Runemark* 9460 cult. (LD).

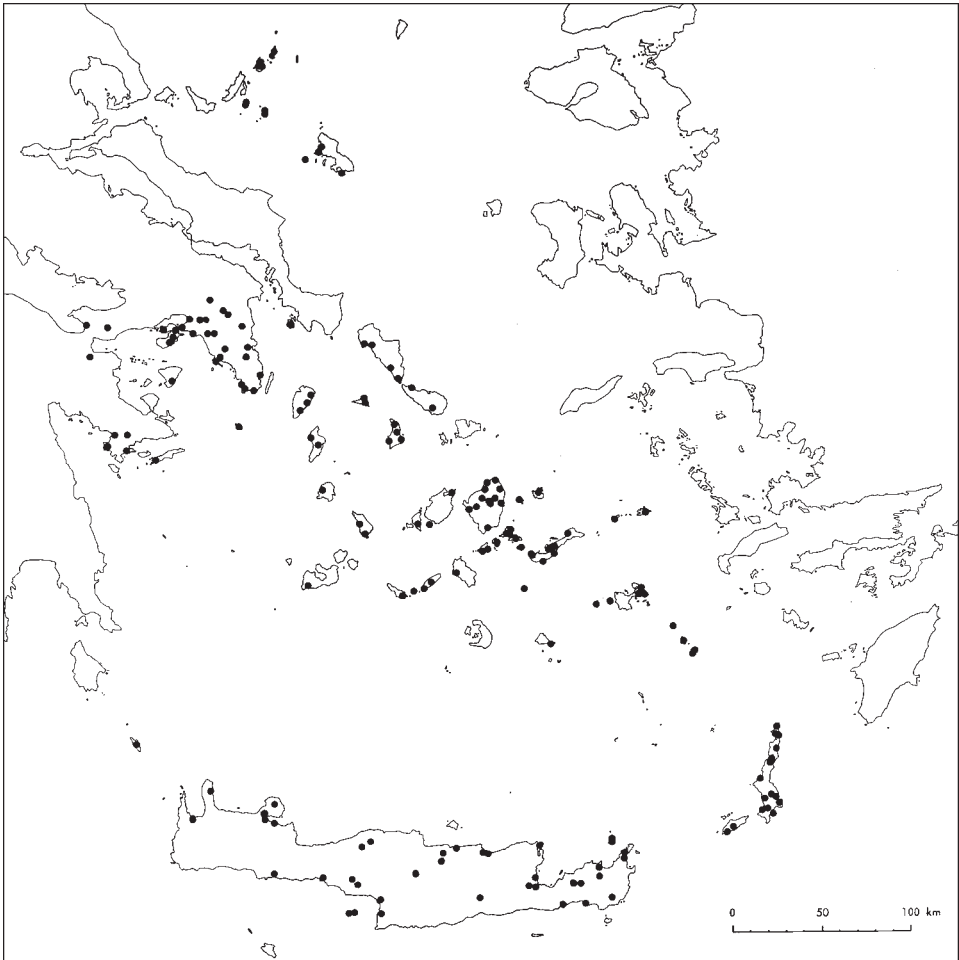


Fig. 24. European distribution of *Bupleurum gracile* according to material revised.

semi-circular in transect, blackish brown, smooth, ridges filiform, oil ducts thick but becoming inconspicuous in the ripe fruit.

Chromosome number. – $2n = 14$ (S. Snogerup 1962).

Flowering. – April to June, fruiting June to August.

Habitat. – Phrygana and other dry open natural and man-made habitats, on calcareous substrates, 0–1000 m.

Distribution. – SE Greece and Aegean islands. Cr, Gr. – Fig. 24.

W and S Anatolia, E Aegean Islands, Cyprus, probably Lebanon.

Selected material seen

GREECE: NOM. ARGOLIDOS: Spetsai, Korakonisia, 11.5.1974, *Runemark & v. Bothmer* 47022 (LD); 4 km S of Ermioni near the sea, 16.5.1982, *Runemark & Svensson* 48757 (LD). — NOM. ATTIKIS: Inter Paleo Fokea et Legrena, Thimari, 10 m, 22.7.1971, *Greuter* 9456 (ATH); Idhra, the

island of Ag. Nikolaos, 14.5.1974, *Runemark & Bentzer 47264* (LD); Cape Sounion, 13.5. 1976, *Townsend 76/67* (K); Salamis, N-slope of Mt Mavrovouni, 3 km SSE of the town, 150-200 m, 20.5.1979, *Snogerup 1711* (LD); Mt Parnis, 5 km S of the top, 500 m, 23.5.1979, *Snogerup 1733* (LD); foothills of Imittos below monastery of Kesariani, 300 m, 27.5.1982, *Strid 19701* (C). — NOM. DODEKANISOU: Insulae Tria Nisia Cycladum, c. 36 1/2°N, 27°E, in saxosis calc. insulae australis, 29.5.1935, *Rechinger 7732e* (G, W); Sirina, central part of the island, 200 m, 2.5.1958, *Runemark & Snogerup 7413* (LD); Astipalea, Ag. Kiriaki, 4.6.1960, *Runemark & Nordenstam 15448* (LD). — NOM. EVVIAS: Skiros, W coast, 1.5 km S of Ormos Kalogrias, 30 m, 38°55'N, 24°28'E, 1.5.1989, *Strid & al. 28810* (ATH, C, G, UPA). — NOM. KIKLADON: Naxos, the valley of Mavrianos, 1-2 km N Moutsounis, 20-80 m, 6.6.1958, *Runemark & Snogerup 10554* (LD); Andros, 3 km S of the top of Mt Rakhi, 50-100 m, 13.5.1968, *Snogerup & v. Bothmer 31519* (LD); Amorgos, between Ayialis and Tournalia, 25.4.1969, *Runemark & al. 41280* (LD); Gyaros, 12.4.1978, *Tzanoudakis 37941* (UPA); Antiparos, 5.1984, *Faegri* (BG). — NOM. KORINTHIAS: Kalamaki, 9.5.1883, *Lacaita* (BM, FI); Kato Almiri, 37°51'N, 23°00'E, 1.5.1991, *Lassen 91227* (LD); 4 km NW of Loutraki, 350-450 m, 38°00'N, 22°57'E, 19.5.1991, *Strid 31192* (C, G). — NOM. MAGNISIAS: The island of Adelphopoulo SE of Alonnisos, 28.4.1972, *Snogerup & al. 43708* (LD); Skantzoura, 1-1.5 km S of the monastery, 50-100 m, 3.5.1972, *Snogerup & Gustafsson 44053* (LD); Kira Panagia, Ormos Hag. Petros, 39°19'N, 24°04'E, 5.5.1988, *Snogerup 5333* (B); Yioura, the peninsula of Angistri, 20-100 m, 39°22'N, 24°09'E, 10.5.1988, *Snogerup 5556* (LD). KRITI: NOM. CHANION: Kissamos, 1884, *Reverchon 52* (GB, JE, PRC); Penins. Akrotiri, montis Korakies, 200 m, 25.5.1942, *Rechinger 13294* (W); Sfakia, above the village, 100-400 m, 12.5. 1962, *Runemark & Snogerup 17013* (LD, UPA). — NOM. IRAKLIU: Ep. Temenous, Hügel Kefalia östl. Knossos, 100-150 m, 30.4.1960, *Greuter 2824* (W); Ep. Pírgiotissis, hills S of Pitsidia, 21.4.1982, *Shay 981* (B); ep. Malevizi, Tal SW von Kato Asites, 500-600 m, 35°12'N, 24°59'E, 17.5.1982, *Risse 440* (B, UPA); ep. Padiados, gorge between Kokkini Hani and Kato Vathia, 60-100 m, 30.4.1983, *Greuter & al. 19587* (B, LD); above Limni Hersonisou, 100 m, 16.5.1983, *Larsen & al. 38133* (C). — NOM. LASITHIU: Ep. Mirabellou, Kalo Horio, 0.5 km E of Istro, 25.5.1976, *Landström 3041* (LD); Mirabellou, Hang westlich von Kritsa, 300-400 m, 22.5.1981, *Risse 176* (B, UPA); Ep. Sitia, Halbinsel zwischen den Buchten Kiriamaadhi und Tenada, 50 m, 35°17'30"N, 26°17'30"E, 11.5.1982, *Risse 366* (B, UPA); Ins. Dionysades, ins. Dragonada, 26.9. 1987, *Iatrou & al. 3188* (B); ep. Sitias, Itanos, 1 km N of ancient site, 5-20 m, 6.5.1996, *Lassen 96072* (LD). — NOM. RETHIMNIS: Hag. Vasilis, bei Kryavrysis, 1.6.1904, *Dörfler 383* (G, W, WU); Ag. Vasilis, Paximadia Islands, the W-island, 31.5.1964, *Snogerup & al. 20926* (LD); around monastery of Arkadhi, 480 m, 4.6.1972, *Petamidis 1552* (ATH). — NOM. DODEKANISOU: Saria, Nordteil der Insel bei Palatia und Argos, 10-150 m, 35°53'N, 27°14'E, 28.4.1983, *Raus 7944* (B); Karpathos, Strasse zur Lastos-Ebene 2 km NW von Volada, 700-740 m, 35°33'N, 27°09'E, 1.6.1986, *Höner & Potthoff 493* (B).

14. *Bupleurum aira* S. Snogerup in Bot. Not. 115: 366. 1962 – Fig. 25

Holotype: Nom. Kikladon, Naxos, 2 km W of Psiliammos, 100 m, 7.6.1958, *Runemark & Snogerup 10684* (LD!; isotypes: K!, W!, UPA cult!).

Annual, 10-50 cm, pseudo-dichotomously branched from near the base, with usually 20-70 umbels, last formed umbels often very depauperate, central umbel overtopped by one or a few branches. *Stem* flexuous, very slender, as young 3-4-angular, below becoming terete and up to 1.5 mm thick, smooth. *Cotyledons* linear or very narrowly lanceolate, 10-15 mm. All *leaves* with amplexicaul base. *First leaves* with petiole 10-20(-40) mm, lamina 10-40 × 1.5-5 mm, ± narrowly lanceolate, with median and marginal veins and reticulate veinlets. *Middle and upper leaves* gradually narrower, uppermost ones linear and sessile, 10-40(-60) × 0.5-3 mm, with 3 parallel and thin marginal veins, finely scabrous above. *Peduncles* of largest umbels 10-40 mm. *Umbel rays* 3-6, unequal, 3-20 mm, longest ones 1/2-3/4 as long as peduncle. *Bracts* 3-4, 2-7 × 0.5-1 mm, shorter

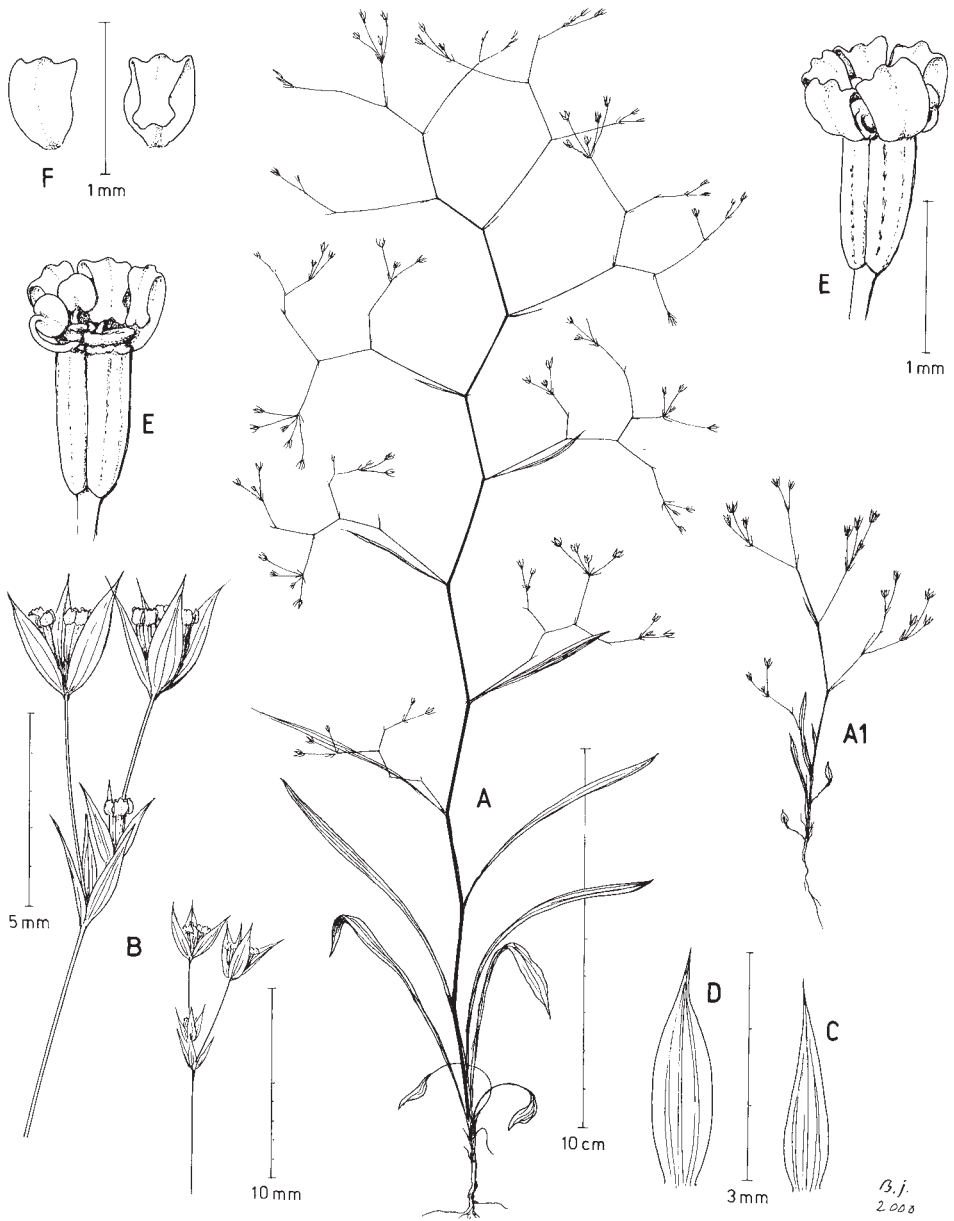


Fig. 25. *Bupleurum aira* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flowers; F: petals. – Material: A: Greece, Kikladhes, Naxos, Psilammos, Runemark & Snogerup 10684 cult. (LD); A1, B-F: Greece, Kikladhes, Naxos, Sangri, Snogerup 20193 (LD).

than the rays, lanceolate, acuminate, entire or very minutely scabrous near apex, 3-veined with few internal and no external veinlets, herbaceous between the veins, scarious outside. *Bractlets* (3-)4(-5), 2.5 × 1-1.5 mm, exceeding and enclosing the flowers before and after anthesis, scarious, at anthesis patent and glossy greenish white, lanceolate, acuminate, entire or minutely scabrous, with 3 ridged veins, veinlets lacking or a few inconspicuous ones between the veins. *Umbellules* 1-3-flowered or sometimes the first one with more flowers, pedicels 0.2-1.5 mm. *Petals* yellow, 0.4-0.5 × 0.4 mm, entire, with straight or slightly convex bend, inflexed lobe 0.3-0.4 mm, bifid, c. 3/4 as broad as the petal limb, midrib narrow, continuing on the lobe. *Anthers* 0.25 mm, *filaments* 0.4 mm. *Stylopodium* 0.4-0.5 mm, narrower than ripe fruit, *styles* 0.15-0.2 mm, shorter than stylopodium radius. *Mericarps* 1.2-1.8 × 0.5-0.6 mm, semi-circular in transect, smooth, blackish brown, ridges filiform, oil ducts thick but becoming inconspicuous in ripe fruit.

Chromosome number. – $2n = 14$ (S. Snogerup 1962).

Flowering. – Late April to June, fruiting June to August.

Habitat. – Open spots with communities of spring-flowering annuals in man-made habitats, probably native in open spots of natural phrygana, only found among stones and gravel of limestone, c. 100 m.

Distribution. – A local endemic of the island of Naxos, Kikladhes, Greece, only known from two localities in the middle S part of the island, c. 5 km apart. Considered vulnerable because of the small area, which is much influenced by human activity. Gr. – Fig. 13.

Additional material seen

GREECE: NAXOS, 3.5 km SSE Sangri, 100 m, 18.5.1963, *Snogerup 20193* (B, LD).

15. *Bupleurum flavicans* Boiss. & Heldr. in Boiss., *Diagn. Pl. Orient.*, ser. 2, 6: 74. 1859 – Fig. 26
Lectotype (designated here): Pr. Charitza ad flumen Carpenisi Eurytaniae, 27.7.1857, *Samaritani* & *Guicciardi* in *Heldreich Pl. Exsicc. Graec.* 3358 (G-BOIS!).

Annual, (10-)20-50 cm, pseudo-dichotomously branched from near the base or smallest plants only above, umbels (1-)5-30(-100) usually some depauperate. *Stem* erect, ± flexuose, striate, as young 3-4-angular, below becoming terete and up to 3 mm thick, smooth. *Cotyledons* not seen. *Lower and middle leaves* with an amplexicaul base. *First few leaves* only seen as withered, small, densely placed, with petiole (2-)5-15(-20) mm, lamina 7-10 × 2-5 mm, elliptical to narrowly lanceolate, with midrib, 2(-6) weaker veins, a marginal one and reticulate veinlets. *Middle and upper leaves* sessile, very narrowly oblanceolate to linear, 15-50(-150) × 1.5-3(-4) mm or some in the inflorescence very small, acuminate, margin minutely scabrous near apex, veins 3-5 and a thin marginal one, veinlets inconspicuous. *Peduncles* 10-30(-40) mm. *Umbel rays* 3-6, unequal, 3-20 mm, longest ones 2/3-1 1/3 as long as peduncle. *Bracts* 3-5, 1/3-1/2 as long as longest rays, 8-12 × 0.75-1 mm, linear-lanceolate, 3-veined without conspicuous veinlets, herbaceous with narrow scarious margin, minutely scabrous above. *Bractlets* 5, much exceeding the flowers and enclosing them before and after anthesis, spreading and yellowish green during anthesis, 6-8 × 2.2-3 mm, broadly lanceolate, rounded navicular, aristate with awn 0.8-2 mm, minutely scabrous on margin, with three veins and a ± conspicuous marginal vein, many veinlets, herbaceous with an 0.1-0.2 mm wide scarious margin outside the marginal vein, becoming larger and scarious in ripe fruit. *Umbellules* mostly 8-15-flowered, pedicels 0.5-2 mm. *Petals* 0.8-1 × 0.7-0.8 mm, widest above, bend with high, cucullate middle part and protruding lateral wings, inflexed lobe c. 3/4 as long as limb, broad, bifid, midrib dark, very broad in lower 2/3 of the petal, thin above and on the lobe. *Anthers* 0.3-0.4 mm, *filaments* 0.5 mm. *Stylopodium* 0.7-1 mm wide, as wide as ovary but narrower than the ripe fruit, *styles* 0.3-0.4 mm, as long as the stylopodium radius. *Mericarps*

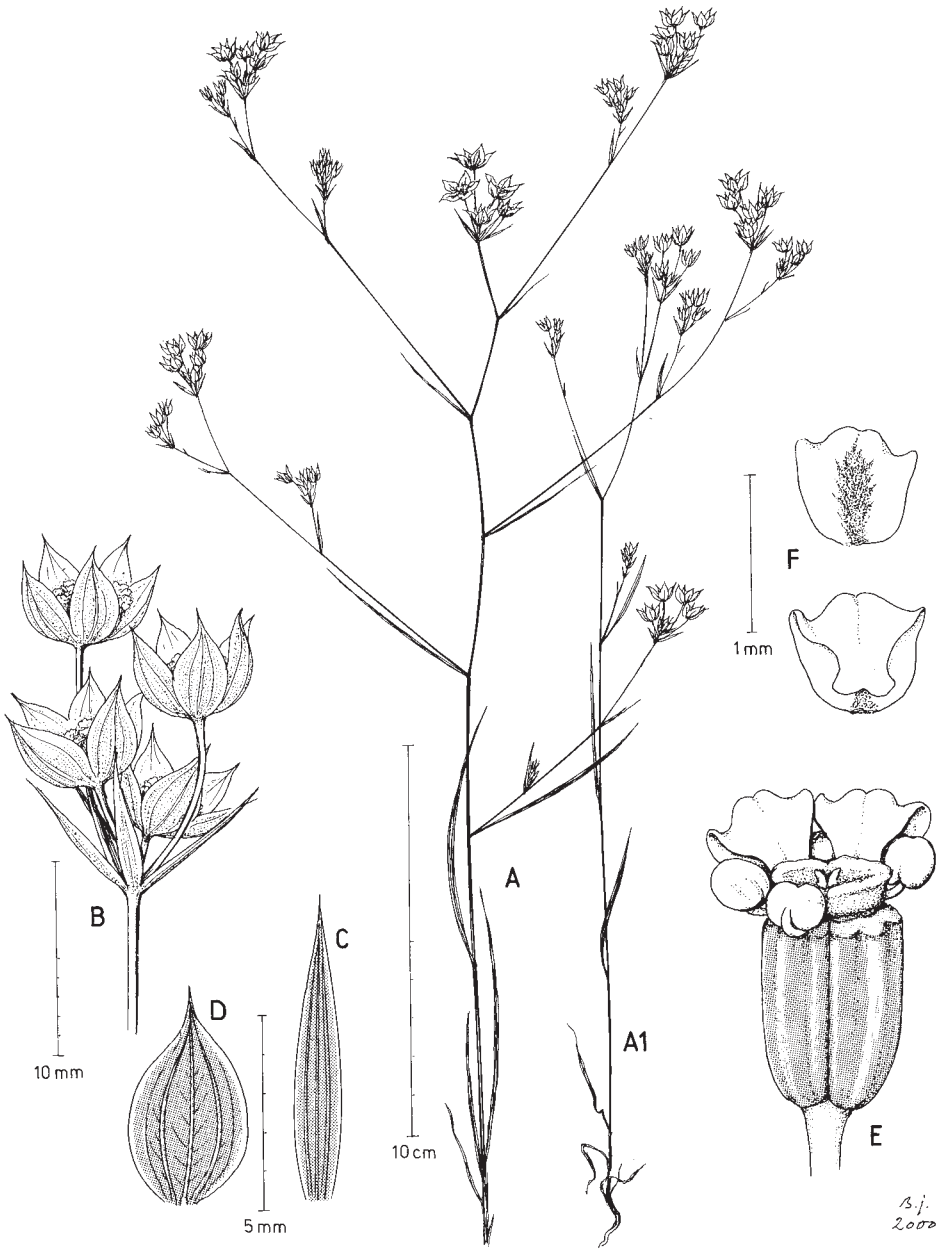


Fig. 26. *Bupleurum flavicans* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower, F: petals. – Material: A, B-F: Macedonia, Ohrid, Černoč 14784 (LD); A1: Greece, Malakasi, Sintenis 1425/1896 (LD).

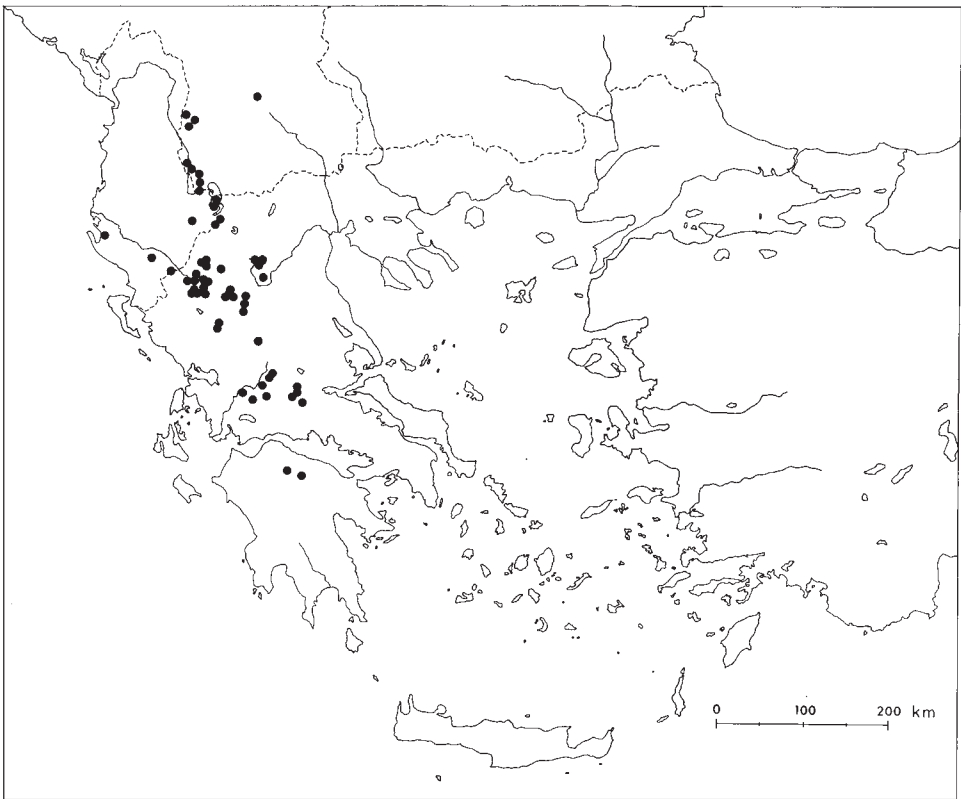


Fig. 27. Distribution of *Bupleurum flavicans* according to material revised.

only seen in one specimen, $2-2.5 \times 0.7-0.8$ mm, semi-circular in transect, dark brown, glaucous, ridges filiform, oil ducts inconspicuous.

Flowering. – Late May to August, fruiting August to October.

Habitat. – Dry forest openings, fields and meadows on limestone, at least 800-1500 m.

Distribution. – A Balkan endemic occurring from S Albania and SW Macedonia to N Peloponnesos. Al, Gr, Mak. – Fig. 27.

Selected material seen

ALBANIA: Ad Kanina in Epirus, 26.6.1889, *Baldacci* (FI, W, WU); serpentine rocks between Dardha and Korce, 17.8.1938, *Hepburn* 142 (K); Shkodra, Thithi beim Wasserfall, 1000 m, 15.8.1979, *Krendl* (W); Bezirk Baranda, N-Seite des Dhivri, 400-900 m, 11.7.1980, *Krendl* (W); NW-Ausläufer des Mali i Çajupit, Mali i Lunxhëriës, ca 12 km NNE von Gjirokastra, 5.8.1989, *Baltisberger* 11930 (C).

GREECE: Sermeniko, mte. Gionskala, 10.8.1896, *Sintenis* 1118 (E, FI, G, GB, JE, K, LD, M, PR, PRC, S, W); Kyllene, 13.7.1905, *Bretzl* (W); Prov. Florinis, ad cacumen montis Boutsi supra Gavros, 1650-1776 m, 9.8.1977, *Phitos & Kamari* 16072 (UPA); Prov. Eurytania, montes Pindos merid. dit. pag. Karitsa, ad fl. Karantano, 1000 m, 12.7.1979, *Phitos & al.* 16701 (UPA); Karditsa, montes Agrapha, supra Fylakti, Gionskala, 1200-1300 m, 14.7.1979, *Georgiadis & al.* 622 (UPA); Prov. Kozani, mons Vourinos, “Vrisi Tsamina”, 1200 m, 9.7.1981, *Dudley* 16991

(UPA); Prov Etolia kai Akarnania, Pentelikon-Massiv, zw. Ladikon und Prousos, 1450-1550 m, 30.6.1982, *Hagemann & al.* 664 (B, LD, UPA); below the N part of Metsovon, 1000-1150 m, 39°47'N, 21°11'E, 16.7.1987, *Snogerup* 5088 (LD); 3 km from Dafni to Marmara, 38°45'N, 22°09'E, 29.6.1989, *Kit Tan & al.* 6809 (C, E, G, RSA); 5 km from Kristallopigi at the Albanian border, 40°37'N, 21°03'E, 22.7.1990, *Kit Tan & Vold* 8013 (C).

MACEDONIA: Luben, 8.1893, *Formánek* (PRC); Gobes pl, 8.1893, *Formánek* (PR); in monte Bukovik supra Kicevo, 30.6.1925, *Soška* (O); ca. pag. Mavrovo opp. Gostivar, Bistra Mt, 1600 m, 25.7.1933, *Grebencicoff* (K); Skoplje, ad Sopiate, 21.6.1938, *Weber* (PR); Ovce Polje, 4.7.1938, *Weber* (PR); Struga, 27.6.1966, *Weber* (PR); Ochrid, Mt. Petrino ad Velesto, 2.7.1966, *Weber* (PR); Bistra Pl. c. 500 m SE von Galicnik, 1200-1300 m, 5.7.1976, *Krendl* (W); Ohrid, E von Pestanic, 800-1000 m, 15.7.1976, *Krendl* (W).

16. *Bupleurum karglii* Vis., Fl. Dalmat. 3: 35. 1852 – Fig. 28

Type: In sterilibus montium Vellebith ad Vella Paklenija, ubi detexit *Jos. Kargl* (BASSA?) [material from type locality seen].

= *B. longepetiolatum* Weiss in Verh. Zool.-Bot. Ges. Wien 16: 581. 1866. – Type: Dalmatien, Umgebung von Megline, *Radostak*, not seen.

Annual or probably often biennial, but very rarely flowering more than once. Biennial specimens often forming a several-leaved rosette, such basal leaves usually withered at anthesis. Plant 12-30(-50) cm or in summit areas much smaller, with (3-)10-30(-60) umbels. *Stem* somewhat flexuose, usually pseudo-dichotomously branched from near the base, striate, 3-4-angular above, terete and up to 3 mm thick below, minutely scabrous above. *Cotyledons* linear, only seen as withered. All *leaves* with an amplexicaul base. *Basal and lower cauline leaves* with petiole (5-)10-30(-40) mm, lamina (5-)10-20(-40) × 2-4(-7) mm, elliptical to narrowly lanceolate, first ones with 3 inner, 1 marginal vein and anastomosing veinlets. *Upper cauline leaves* gradually sessile, 10-50(-80) × 1.5-3 mm and uppermost ones very short, very narrowly oblanceolate to linear, with 1-3 veins, 1 weak marginal one and reticulate veinlets, minutely scabrous in upper part of margin. *Peduncles* mostly (5-)10-30(-50) mm. *Umbel rays* 2-4, (3-)7-20 mm, slightly to very unequal, shorter than or about equalling peduncles. *Bracts* (2-)3(-5), much shorter than the rays, (2-)3-7(-10) × 1-2.5 mm, ovate to narrowly lanceolate, acuminate with awn 0-0.5 mm, 3-5-veined, smooth or minutely scabrous near apex, with 0.1-0.2 mm wide scarious margin. *Bractlets* 5 or rarely 4, exceeding and enclosing the flowers before and after anthesis, at anthesis spreading and yellowish, (3-)4-8 × 2-4 mm, lanceolate, rounded navicular, acuminate to obtuse-mucronate with awn 0.1-0.3 mm, 3-veined with many veinlets between and outside the veins, smooth or very minutely scabrous at apex, herbaceous with 0.2-0.3 mm broad scarious margin, becoming straw-coloured and finally semi-transparent in fruit. *Umbellules* 6-10-flowered, pedicels 0.5-1.5 mm. *Petals* 0.6-0.9 × 0.6-0.8 mm, widest above, bend convex and cucullate with slightly protruding wings, inflexed lobe 2/3 as long as limb, bifid, vein broad below, narrow above and on the lobe. *Anthers* 0.3-0.45 mm, *filaments* 0.6-1 mm. *Stylopodium* 0.7-0.9 mm wide, as wide as ovary but narrower than the ripe fruit, *styles* 0.3-0.45 mm, shorter than to equalling the stylopodium radius. *Mericarps* not seen fully ripe, 2-3 × 0.8-1.2 mm, semi-circular in transect, smooth, brown, glaucous, ridges filiform, oil ducts inconspicuous in fruit.

Chromosome number. – 2n = 16 (Cauwet-Marc 1976).

Flowering. – June to September, fruiting September until winter.

Habitat. – Dry open localities, usually scree and rock crevices, on limestone, from the lower forest region to the alpine zone, 350-1950 m.

Distribution. – An endemic of the W Balkan Peninsula. Al, Bos, Gr, Hrv, Jug (Montenegro), Kos. – Fig. 29.

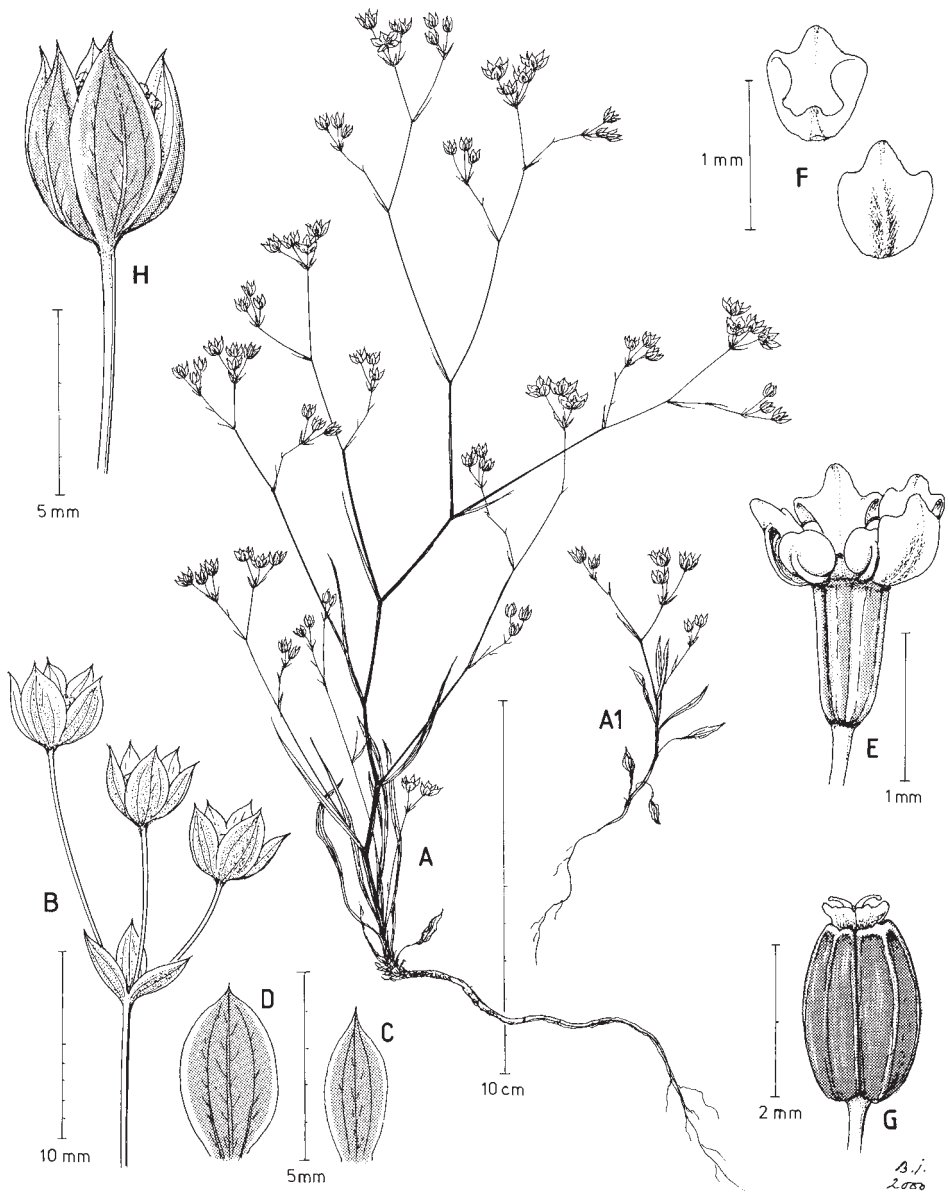


Fig. 28. *Bupleurum karglii* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit; H: umbellule in late flower. – Material: A, B-F: Albania, Sala, Abata-Lekaj, Dörfler 292 (LD); A1: Greece, nom. Ioanninon, mt Timfi, Drakolimni, Strid & al. 15623 (LD); G-H: Yugoslavia, Kotor, Strid 1669 (LD).



Fig. 29. Distribution of *Bupleurum karglii* according to material revised.

Variation. – There is a considerable variation in general habit and size of different parts. Small, thin plants with few and small basal leaves have been named f. *patulum* Wolff. The variation is, however, in some cases present among individuals of the same locality. It may represent responses to length of vegetation period and weather more than regional trends.

Selected material seen

ALBANIA: Distrikt Sala, zwischen Abata u. Lekoj, 800 m, 3.8.1916, *Dörfler* 292 (E, GB, K, LD, M, W, WU, UPS); Kruja, 2.9.1918, *Schneider* (W); District of Gjinokastrë, Cajup, Mali Lunxheriis, 4000 ft, 10.7.1933, *Alston & Sandwith* 2172 (K, BM); Shkodra, Theti, 1000 m, 15.8.1979, *Krendl* (C); Kreis Shkodra, S-Hänge des Veleçikut, 1100-1400 m, 22.7.1980, *Krendl* (C, W).

BOSNIA-HERCEGOVINA: Koprivni ad castellum Konjska prope Trebinje, 8.1891, *Vandas* (PR, PRC); Prenj Pl. gegen Glogovo, 1800 m, 25.7.1892, *Beck* (PRC); Nevesinje, bei den Wänden der Velež oberhalb Jezero, 1150 m, 28.8.1895, *Raap* 181, ed. *Callier* (C, H, JE, K, LD, PRC, W, WU); montis Brasina supra Bjelo polje, 1200 m, 8.1899, *Vandas* (PRC); Klenci am Nordfuss der Velež planina, 13.7.1905, *Janchen* (WU); Juric stan supra val. Drežnica, 8.1910, *Vandas* (PR); Orjen, 1850 m, 6.8.1912, *Čelakovsky* (PR); in saxosis collis Diva Grabovica, 8.1914, *Vandas* (PR).

CROATIA: Montis Biokovo, 1400 m, s. dat., *Pichler, Fl. Exs. Au.-Hung.* 2099 (GB, H, JE, K, L, LD, M, PR, PRC, W, WU); Velebit, montis Sopanj ad Libinje, 11.9.1913, *Degen* (GB, LD, W); Velebit, westlich der Passhöhe zwischen Obrovac und Gračac, 3.8.1960, *Podlech* 6579 (M); in jugo Biokovo supra Makarska, 1200-1500 m, 7.8.1970, *Soják* (PR); Velebit montes, Mala Paklenica in proximate opp. Starigrad, 350 m, 10.9.1979, *Černoch* 35473 (C, H, LD).

GREECE: Thymphi, cacuminis Astraka c. 1950 m, 1960?, *Phitos 114* (M); Prov. Ioannina, in faucibus Vikos, Megala Stadhia, 700 m, 18.8.1974, *Charpin 11234 & Greuter 12406* (UPA); Konitsa, ad pontem fl. Aoos, 8.7.1981, *Dudley 17307* (UPA); Mt. Timfi (Gamila) 6 km NE Papigo, E-N of Lake Drakolimni, 2000 m, 15-16.8.1981, *Franzén & al. 674* (B, C, UPA); Mt. Timfi, 6.5 km SSE Konitsa, NE of the lake Drakolimni, 2000 m, 8.9.1982, *Hartvig & al. 10790* (C). Kosovo: Metohija, W von Peč, Rugovo-Schlucht, 520-550, 23.7.1975, *Krendl* (W); 4 km W of the pass Prevalac on road Prizren-Skopje, 1250-1300 m, 10.7.1979, *Frost-Olsen 2124* (C). YUGOSLAVIA: Montenegro pr. Sanierdo et ad torrentem pr. Njegusch, 8.1885, *Pichler* (JE, K, LD, M, UPS, W); ad pontem Tamara distr. Klementi, 14.7.1900, *Baldacci 121* (BM, K, W); Ost-Montenegro, zw. Klopot und Vilac, 450 m, 18.7.1916, *Janichen* (WU); Zlatibor, sub cacumene montis Sargan, serpentin, 830 m, 12.7.1925, *Novák* (PRC); supra rivuli Rasnicka Rjeka apud Draglica non procul ab Nova Varos, 950-980 m, 18.7.1925, *Novák* (PRC); montis Kosa supra Sutorman, 1100 m, 8.7.1930, *Dostal* (PRC); Bertiscus, Monte Greben prope Gusinje, 1000-1200 m, 7.1933, *Rechinger & Scheffer 1562* (W); in valle Vrbnica prope Orak, 800 m, 23.7.1933, *Sillinger & Deyl* (PR); Rumija, 1000-1300 m, 13.7.1936, *Lempberg 228* (E, K); supra Njegusi, 1000 m, 7.1936, *Rohlena* (S); above Kotor, road to Cetinje, 900 m, 4.8.1970, *Strid 1669* (LD); summit of Mount Lovcen above Kotor, 17.7.1976, *Halliday 292/76* (E).

17. *Bupleurum capillare* Boiss. & Heldr. in Boissier, Diagn. Pl. Orient, ser. 2, 2: 82. 1856 – Fig. 30 Holotype: In monte Parnasso ad margines vinetorum pr. Rachova, 31.7.1852, *Heldreich 2690* (G-BOIS!; isotypes FI!, O!, UPS!, W!).

Annual, (10-)30-50(-60) cm, often with pronounced main stem, but some specimens pseudo-dichotomously branched from the base, umbels usually 10-40. *Stem* erect, slender, $\pm$ flexuose, striate, young parts 4-5-angular, below becoming terete and up to 2.5 mm thick, smooth. *Cotyledons* and first leaves only seen as withered and fragmented. *First few leaves* with petiole at least up to 30 mm, lamina probably narrowly lanceolate. *Persistent cauline leaves* 10-100 $\times$ 1-3 mm, sessile, linear, apiculate, smooth, with 1-3 parallel veins, 1 weak marginal vein and inconspicuous veinlets, leaves in the inflorescence still smaller, often like the bracts. *Peduncle* 10-40 mm, several times longer than rays and umbels. *Umbels* one-rayed or rarely (*Phitos & Kamari 20481*) a few ones 2-rayed, ray only 0.5-1.5 mm. *Bracts* 2, 1.5-4 $\times$ 0.8-1.5 mm, longer than the ray, lanceolate, usually acuminate, with smooth margin, 3-veined, herbaceous with c. 0.1 mm wide scarious margin. *Bractlets* 5, (4-)5-7 $\times$ 2-3 mm, exceeding and enclosing the flowers before and after anthesis, at anthesis spreading and yellowish, lanceolate, acuminate or obtuse with an 0-0.3 mm long awn or mucro, entire, 3-5-veined, veinlets lacking or few and inconspicuous, until anthesis herbaceous with up to 0.3 mm wide scarious margin, in fruit becoming entirely scarious, smooth. *Umbellules* 5-10-flowered, but often only one or a few of the flowers seed-setting; pedicels 0.5-2 mm, unequal. *Petals* 0.5-0.6 $\times$ 0.6-0.7 mm, widest above, bend straight with slightly raised margin, inflexed lobe c. half as long as the limb, broad at base, narrowest at middle, bifid, vein narrow, continued on lobe. *Anthers* c. 0.4 mm, *filaments* c. 1.5 mm. *Stylopodium* 0.6-0.7 mm wide, at least as wide as ovary but narrower than ripe fruit, *styles* 0.25-0.4 mm, about equalling stylopodium radius. *Mericarps* 2-2.5 $\times$ 1-1.5 mm, light brown, smooth, narrower towards the ends, rounded in transect, ventral side with a deep furrow, ridges filiform, oil ducts conspicuous, purplish-brown, one in each field.

Flowering. – July to September, fruiting August to November.

Habitat. – Natural occurrences in screes of small limestone pebbles in lower mountain slopes and forest openings. Now mostly within and between fields, usually vineyards. Also as undergrowth among the wine, and in road cuttings, old as well as recent ones, 800-1250 m.

Distribution. – A narrow local endemic of the S slopes of the mountains Parnassos and Giona. Several localities on Mt Parnassos from the NW outskirts of Arachova until 3 km WNW of

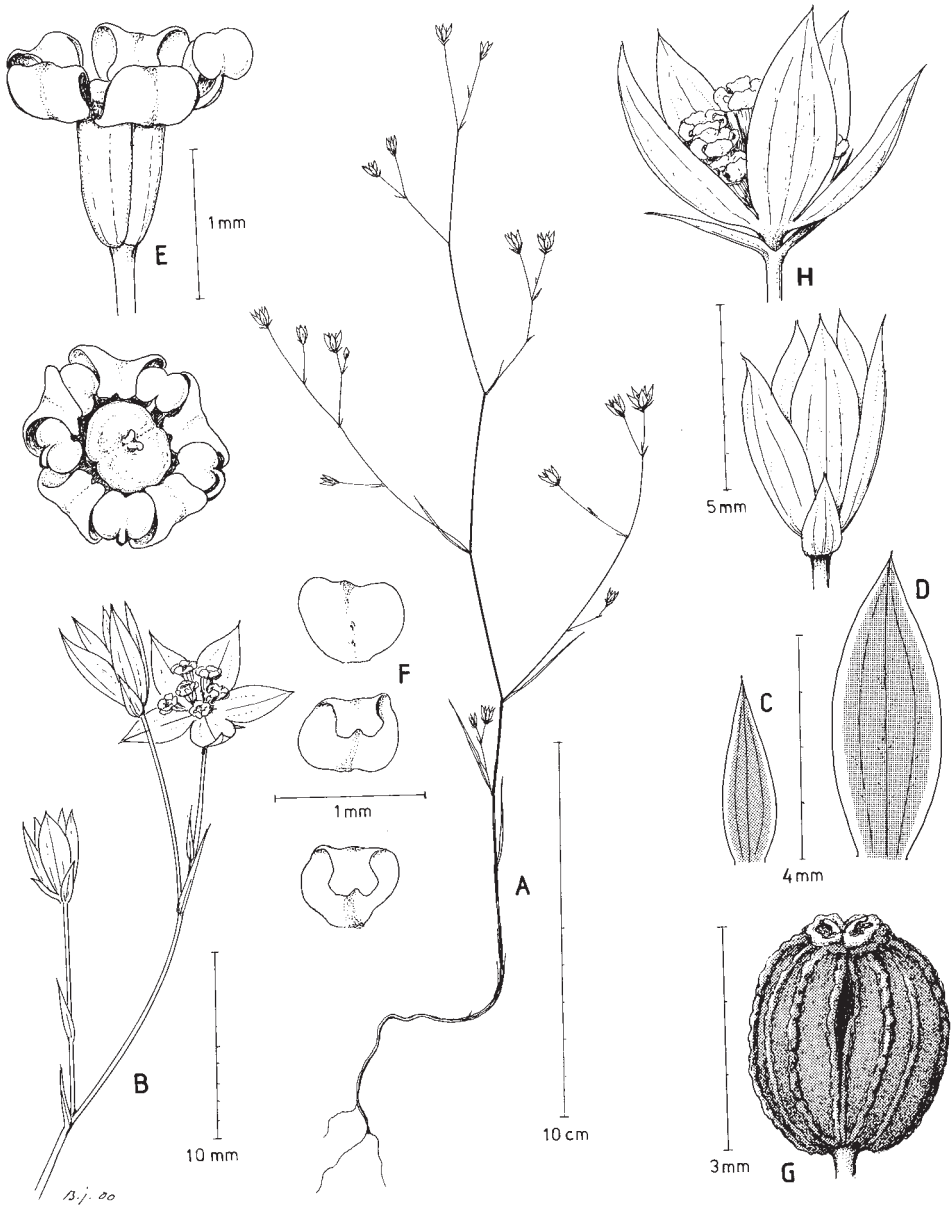


Fig. 30. *Bupleurum capillare* – A: habit; B: inflorescence branch; C: bract; D: bractlet; E: flowers; F: petals, G: fruit; H: umbels. – Material: A-F, H: Greece, nom. Fokidos, Karoute, *Strid & al.* 30424 (LD), G: Greece, nom. Viotias, Arachova, *S. & B. Snogerup* 5231 (LD).

Arachova and N of the road towards Delphi until c. 6 km W of Arachova. One known locality in Mt Giona. In 1854 also found between Scalia and Palucakia c. 5 km E of Arachova. Gr. – Fig. 13.

Additional material seen

GREECE: S. loc., *Sibthorp* (OXF); in monte Parnasso inter Rachovam et Livadi, prope Scalia et Palucakia (rarum), 3800', 18/30.7.1854, *Orphanides* 359 p.p. (C, FI, K, O, UPS, W); in reg. infer. m. Parnassi, prope Rachova, rar., 3800', 30.7.1854, *Orphanides*, *Fl. Gr. Exs.* 359 p.p. (E, G, GB, L, LD, M, UPS, W, WU); *ibid.*, 7.1855, *Guicciardi* (C, K, LD, M, PR, PRC, W, WU); *ibid.*, 3500', 17.8.1856, *Heldreich*, *Hb. Gr. Norm. no. 19* (FI, G, K, M, UPS, W, WU, WU-Hal); *ibid.*, 1100 m, rocky limestone slopes, 25.8.1962, *Davis* 39327 (BM, E, K); *ibid.*, ad margines viae, 17.7.1977, *Georgiadis* 4155 (UPA); *ibid.*, 1100 m, in glareosis ad margine viam publicae, 17.7.1977, *Greuter* 14720 (C, herb. Greuter); *ibid.*, 1100 m, ad viam in petrosis, 8.10.1987, *Phitos & Kamari* 19947 (B, UPA); *ibid.*, 1100-1150 m, 38°29'30"N, 22°33'E, 8.10.1987, *Greuter & Zimmer* 20412 (B); *ibid.*, roadside, 1250 m, 4.11.1987, *Snogerup* 5231 (LD); *ibid.*, 1000-1100 m, 5.11.1987, *Snogerup* 5232 (B); *ibid.*, 1100 m, 9.8.1989, *Phitos & Kamari* 20481 (C, UPA); 6 km W of Arachova, S slope above the road, 800 m, in scree of limestone, 4.11.1987, *Snogerup* 5237 (LD); 13 km from the village of Karute along road to Amfissa, road cutting in *Abies* forest, 950 m, 38°32'N, 22°20'E, 9.9.1989, *Strid & al.* 30424 (ATH, C, G, LD, UPA).

18. *Bupleurum gaudianum* S. Snogerup in Willdenowia 14: 309. 1984 – Fig. 31

Holotype: Island of Gavdos, 2-4 km S-SW of Kastri, 10.5.1980, *Runemark & B. Snogerup* 47733 (LD!; isotype B!).

Annual, probably germinating in spring, 2-10 cm or probably sometimes taller, main stem in largest specimens branched from near the base, always pseudo-dichotomously above, with up to (2-)15-25 umbels, last-formed umbels often depauperate. Whole plant often purplish in fruit. *Stem* erect, flexuose, young parts 0.2-0.5 mm thick, with 2-4 ridges, below becoming terete and up to 1 mm thick, smooth. *Cotyledons* c. 3 × 0.2-0.3 mm, very narrowly oblanceolate to linear, acute, with scarcely delimited petiole and a broad base. All *leaves* with an amplexicaul base, a strong midrib, weak anastomosing veinlets and a ± inconspicuous marginal vein, entire. *First leaves* with petiole 3-10 mm, lamina 2-4 × 1-1.5 mm, lanceolate, acute. *Lower cauline* leaves upwards gradually more linear with shorter petioles and apiculate. *Upper leaves* 3-5 mm, narrowly linear, sessile with a broad, sheathlike scarious margin in basal part. *Peduncles* (2-)4-8(-10) mm, *umbel rays* (2-)3(-4) or rarely 5 in the largest umbel, 2-10 mm, very unequal, longest one usually equalling or longer than peduncle. *Bracts* 3, in well-developed umbels 2-3 × 0.3-1 mm, like the bractlets but narrower with a longer awn. *Bractlets* 4, rarely 5 in the largest umbellule, 2-4 × 0.5-1.5 mm, exceeding and enclosing flowers before and after anthesis, at anthesis spreading and mixed whitish and purple, lanceolate to ovate, keeled, the thick midrib prolonged into a sharp, 0.1-0.3 mm long awn triangular in transect, 2 lateral veins present but usually inconspicuous, young bractlets with a central herbaceous part, later greyish purple except near apex, with an 0.1-0.4 mm broad whitish scarious margin, entire. *Umbellules* (1-)2-5-flowered, pedicels 0.1-0.5 mm, unequal. *Flowers* conspicuously protandrous. *Petals* purplish, often drying white, 0.5-0.6 × 0.4-0.6 mm, broadest above, inflexed lobe inconspicuous, only c. 0.2 × 0.1 mm, tapering to a sharp point, vein very thin, continuing to point of lobe. *Anthers* 0.2-0.3 mm, *filaments* 0.4-0.5 mm. *Stylopodium* 0.5-0.6 mm wide, wider than ovary, about equalling top of ripe fruit, *styles* 0.2-0.35 mm, shorter to slightly longer than stylopodium radius. Unripe *mericarps* c. 1 × 0.5 mm, whole fruit almost globose, probably smooth when ripe, ridges filiform, oil ducts inconspicuous.

Flowering. – April to May, fruiting May to June.

Habitat. – Open spots in low phrygana on neogene sediments, below 250 m.

Distribution. – Endemic to the island of Gavdos south of W Kriti. Regarded as vulnerable due to its small distribution area in a vegetation at least mainly upheld by human activity. Cr. – Fig. 13.

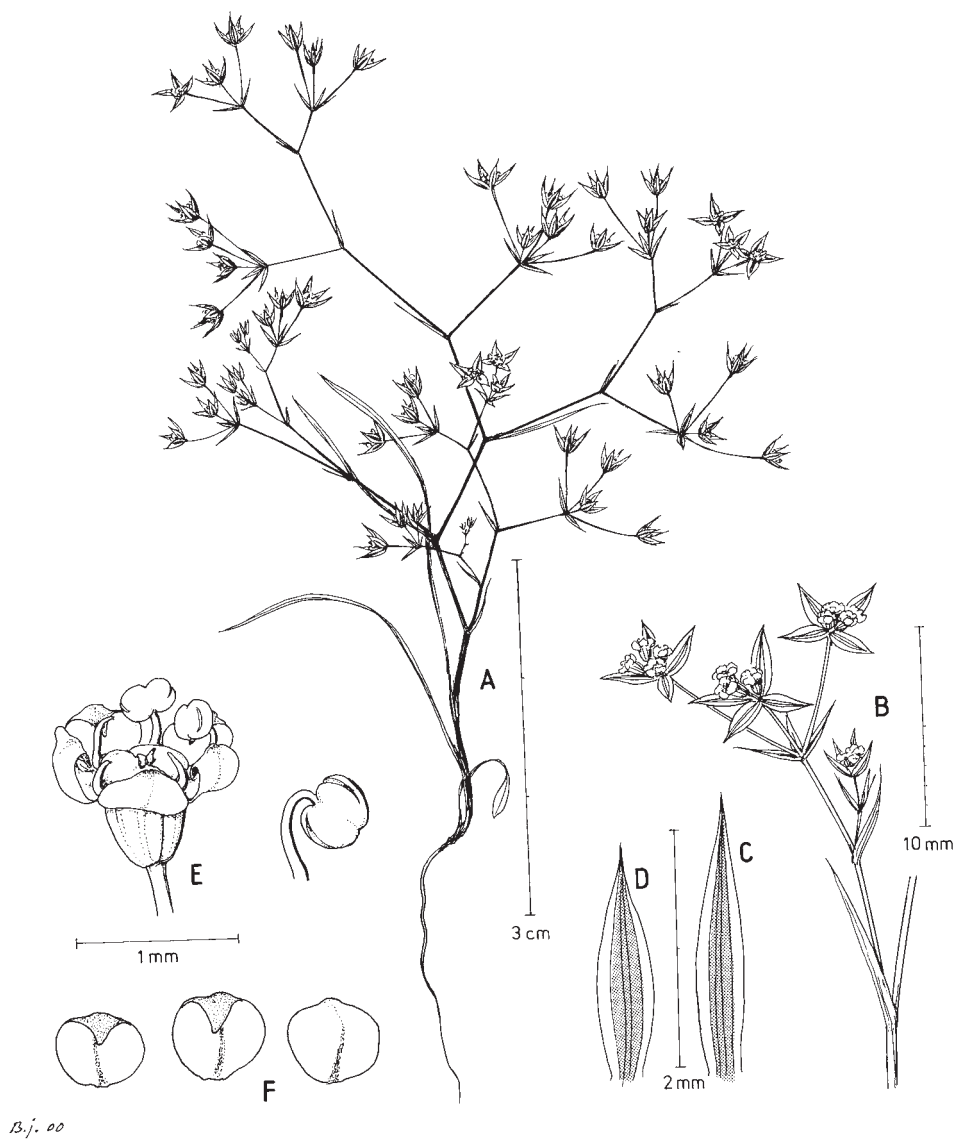


Fig. 31. *Bupleurum gaudianum* – A: habit; B: inflorescence branch; C: bract; D: bractlet; E: flower; F: petals.
– Material: A-F: Kriti, Gavdos, Runemark & B. Snogerup 47733 (LD).

Additional material seen

KRITI: GAVDOS: 1 km N Kastri, 11.5.1980, *Runemark & B. Snogerup 47854* (LD); NE-Hang N Vatsiana, 100-220 m, 34°50'N, 24°06'E, 25.5.1994, *Bergmeier & Jagel 94-64* (C); am Weg nach Sarakino, 20 m, 34°51'N, 24°06'E, 27.4.1995, *Bergmeier 95-8* (C); Spitia Papadias, 0.8 km W km W Hafen, 60 m, 34°51'N, 24°06'E, 1.4.1996, *Jahn 1* (B); 500 m NNE Vatsiana, 140 m, 34°49'N, 24°06'E, 3.4.1996, *Jahn 2* (B).

Bupleurum* subsect. *Juncea Briq., Monogr. Bupl. Alp. Marit.: 52 & 97. 1897. – Lectotype (designated here): *B. junceum* L. [= *B. praealtum*].

= *B. sect. Odontea* (Spreng.) Dumort., Fl. Belg.: 76. 1827 ≡ *Odontites* Spreng., Pl. Umbell. Prodr.: 33. 1813. – Type: *B. tenuissimum* L.

= *B. subsect. Trachycarpa* (Lange) Briq., Monogr. Bupl. Alp. Marit.: 52 & 108 ≡ *B. sect. Annua* [unranked] *Trachycarpa* Lange in Willkomm & Lange, Prodr. Fl. Hisp. 3: 68. 1874. – Lectotype (designated here): *B. tenuissimum* L.

Bractlets 1/8-1/3 as wide as long, erecto-patent to patent at all stages and not concealing the flowers, herbaceous.

Taxonomic notes. – We use the name *B. subsect. Juncea* in a wider sense than Wolff (1910). He distinguished between two annual subsections with narrow bractlets, subsect. *Juncea* and subsect. *Trachycarpa*, on the base of absence or presence of different sorts of protuberances on the fruit. There are, however, all stages of intermediate conditions. We find no reason to believe that the species with papillae, verrucae, hooked hairs, etc. form together a sister group to those having an even fruit surface or low papillae only.

Wolff (1910) also included several groups of perennials as further subsections in the same section. We think that it is more correct to delimit *B. sect. Aristata* to subsect. *Aristata* and subsect. *Juncea* and regard the perennial groups as separate sections. The perennials concerned are contained in *B. sect. Isophyllum* (Hoffm.) Dumort.

19. *Bupleurum tenuissimum* L., Sp. Pl.: 238. 1753. – Fig. 32

≡ *Odontites tenuissima* Spreng., Pl. Umbell. Prodr.: 33. 1813. – Lectotype (designated here by J. P. Reduron): Linnaean Herbarium Stockholm no. 116.13 (S).

= *B. procumbens* Desf., Fl. Atl. 1: 230. 1798 ≡ *Odontites procumbens* (Desf.) Spreng., Pl. Umbell. Prodr.: 33. 1813. – Holotype: Sheet without locality, cited as “prope Tunetum” (P-Flora Atlantica microfiche!).

= *B. tenue* Salisb., Prodr. Stirp. Hort. Chap.: 160. 1796, nom. illeg.

= *B. pollichii* C. C. Gmel., Fl. Bad. 1: 613. 1805. – Type: Ad salinas Nauenheimenses, *Pollich*. Material from type locality seen.

= *B. tenuissimum* var. *columnae* Guss. ex Grenier & Godron, Fl. France 1: 723. 1849 [= *B. columnae* Guss., Fl. Sic. Prodr. Suppl.: 70. 1832, nom. nud.]. – Type: Described from France.

= *B. affine* Cesati, Pass. & Gibelli, Comp. Fl. Ital.: 579. 1880, non Sadler (1825), nom. illeg.

Annual, 2-40(-60) cm, with defined main stem, usually branched from the base, branches ascending to spreading-erect or in some S European specimens erect, in large specimens often long, rarely all short with only one or a few umbels each. Umbels usually 15-40(-50), very differently developed. *Stem* erect, in young parts angular with 4-5 low, papillose to serrate wings, below becoming terete and up to 2.5 mm thick. *Cotyledons* narrowly elliptical to linear, 8-12 × 0.5-1.5 mm. *All leaves* with amplexicaul base. *First few leaves* densely placed, small and early withering, petiole 3-10 mm, not well delimited, lamina 2.5-10(-20) × 1.5-3(-6) mm, elliptical to narrowly oblanceolate, with 3-5 veins and a weak marginal one and inconspicuous, reticulate veinlets. *Cauline leaves* 10-70 × 2.5-5 mm, narrowly oblanceolate to linear, apiculate, denticulate especially apically. *Peduncles* 1-25(-40) mm. *Umbel rays* 1-5, in top umbels 3-5, 0.3-25 mm, very unequal, lon-

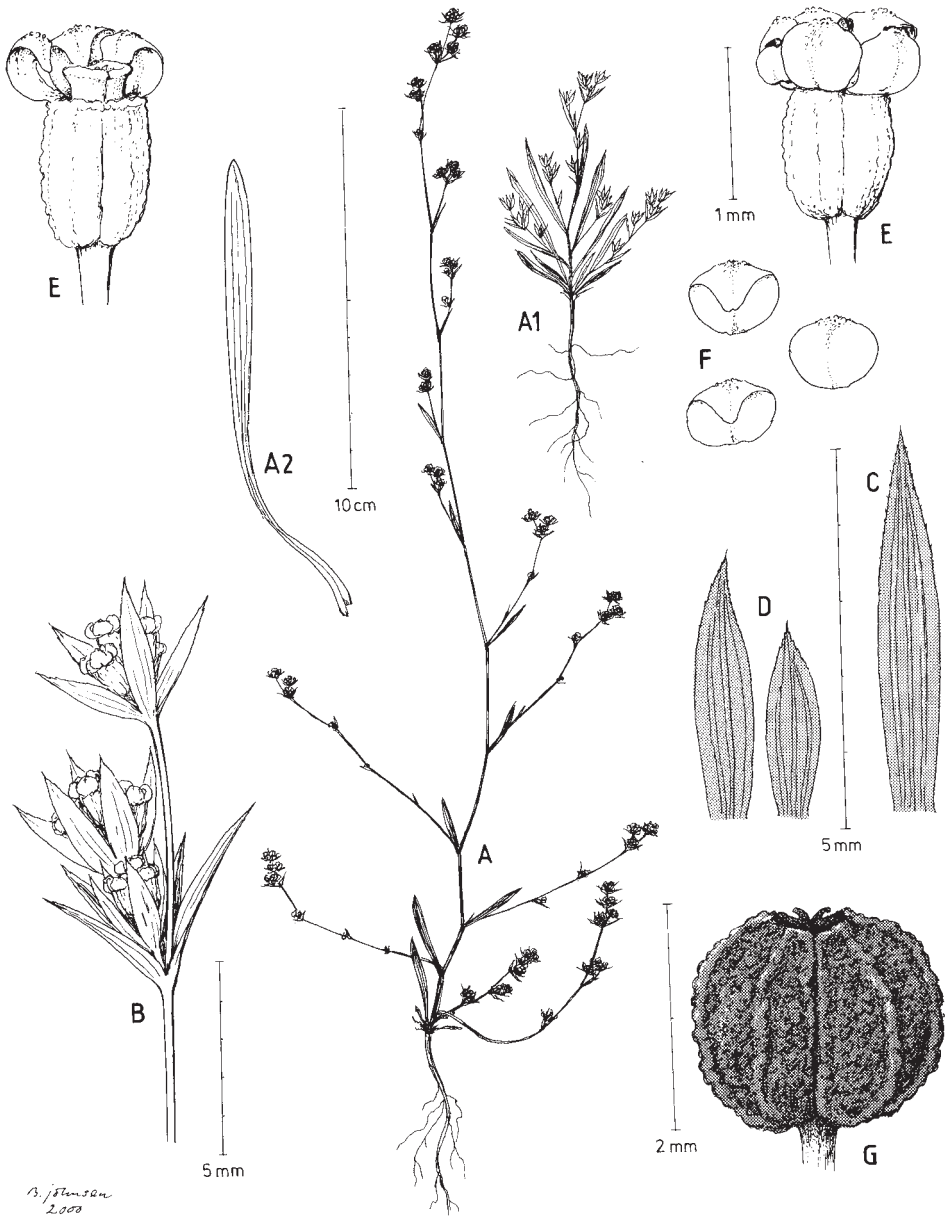


Fig. 32. *Bupleurum tenuissimum* – A, A1: habit; A2: basal leaf of large specimen; B: umbel; C: bract; D: bractlets; E: flowers; F: petals; G: fruit. – Material: A, E: Sweden, Öland, Ventlinge, 1900, *Medelius* (LD); A1, B, C, D: Sweden, Öland, Lundebytorp, 1970, *Snogerup* (LD); A2: Portugal, Coimbra, *Snogerup cult. no. 863005* (LD); G: Germany, Braunschweig, Salzdahlum, *Belting* (LD).

gest one (1/3-)1.3 times as long as peduncle. *Bracts* 3-4(-5), $2.5-9 \times 0.7-1$ mm, lanceolate, apiculate, serrulate especially near apex, herbaceous, 3-veined. *Bractlets* 5 in largest umbellules, in smallest 3-4, $2.5-6 \times 0.5-1$ mm, equalling or exceeding flowers but shorter than the fruits, lanceolate to narrowly lanceolate, apiculate, finely serrulate above, with 3 inconspicuous veins, herbaceous. *Umbellules* (1-)2-6, largest ones 3-6-flowered, pedicels 0.2-2 mm, very unequal. *Petals* usually purplish, $0.4-0.5 \times 0.55-0.65$ mm, inflexed lobe 1/2-3/4 of limb, tapering to a truncate or entire top, bend straight, usually with small papillae, midrib narrow, continuing on lobe. *Anthers* c. 0.3 mm, *filaments* c. 1 mm. *Stylopodium* 0.5-0.6 mm broad, as wide as ovary but narrower than the top of the ripe fruit, *styles* 0.15-0.2 mm, half as long as to subequalling stylopodium radius. *Mericarps* as ripe dark greyish brown to black, $1.9-2.3 \times 1.3-1.45$ mm, almost semi-globose with narrow top, rugulose with irregularly confluent rugulae and very small unicellular papillae, ridges with partly irregular wings 0.15-0.2 mm high.

Chromosome number. – $2n = 16$ (Cauwet-Marc 1976, S. Snogerup unpubl.).

Flowering. – July to September, fruiting August to December.

Habitat. – In the western and southern parts of its area mainly in salt marshes, rarely in eutrophic fens. In E and Central Europe also in inland saline localities, 0-500 m. Most inland localities threatened by present landscape management and pollution.

Distribution. – Mainly a coastal species of W Europe, the S Baltic Sea and the W Mediterranean. Scattered east to Greece and through Central and E Europe to the Black Sea area. Al, Au, Be, Bos, Br, Bu, Co, Cze, Da, Est, Ga, Ge, Gr, Ho, Hrv, Hs, Hu, It, Jug, Kry, Lu, Po, Rm, Sa, Si, Sla, Sle, Su, Tu, Ukr. – Fig. 33.

NW Africa, NW Anatolia.

Variation. – Specimens from the northern and eastern part of the distribution have almost constantly 4 bracts, which are thin and leaflike. Individuals and populations with 3 shorter and thicker bracts are gradually more frequent towards the south and on Sicilia almost entirely replacing the usual form. This property is often combined with a stem carrying several short branches with one or few umbels each. Such forms have been called *B. columnae* Guss. (1832). They are, however, found occasionally throughout the species area, e.g. in Hungary and in the Iberian Peninsula, and there are many intermediates.

Selected material seen

AUSTRIA: Ostufer des Neusiedler Sees, Apetlon-Wallern, Lange Lacke, 4.9.1922, *Ronniger* (S, W); zwischen Weiden am See und Neusiedl, 21.9.1924, *Rechinger* (O, W); E Illmitz, SE-Ende des Wörtenlacke, 115-120 m, 31.8.1981, *Krendl* (W); ca. 1.5 km SSE Baumgarten a.d. March, 4.9.1995, *Hörandl & al.* 7078 (WU).

BOSNIA-HERCEGOVINA: Banyaluka, 9.1886, *Conrath* (PR).

BULGARIA: Varnar, 2.9.1886, *Bornmüller* (WU-Hal); Bez. Tolbuhin, Kranevo N Varna, 15.8.1968, *Merxmüller & Zollitsch* 24542 (M); distr. Burgas, apud Slanjev brjag, 19.8.1986, *Kral* (PRC).

CORSICA: Stagno di Palo, 20.7.1933, *Aellen* 1245 (LD).

CROATIA: Istria, Kaiserwald bei Pola, 16.9.1881, *Sintenis* (LD, WU-Hal); Istria, Rovigno, 8.9.1899, *Juel* (UPS).

CZECH REPUBLIC: Morava sredni-Cejo, z Krumvire do Terezina, 190 m, 17.7.1954, *Šourek* (PRC); Most, Bylany, 15.10.1967, *Křisa & Váňa* (PRC); Hustopeče, inter stat. viae ferr. Sakvice et Starovičky, 8.9.1969, *Weber* (PRC); distr. Brno, ad pag. Moutnice prope opp. Sokolnice, 19.8.1972, *Weber* (C, H, LD, W); distr. Mikulov, prope stationem viae ferrae Sedlec, 180 m, 1977, *Chrtek* (PRC).

DENMARK: Sjælland, Amager, S for Krudtårnet ved Store Magleby, 8.10.1949, *Danielsen* (BG); Fyn, Føns S. of Middelfart, 10.8.1967, *Larsen* 23428 (BG, H, O, S); Jutland, on the NE-coast of Rømø, 23.8.1970, *Jørgensen & Svendsen*, *Pl. Vasc. Dan. Exs.* 362 (H, O, S, W); Samsø, Nordby,



Fig. 33. European distribution of *Bupleurum tenuissimum* according to material revised.

26.8.1975, *Hansen* 7671 (H); Bornholm, Gudhjem, Melsted Sølvklippen, 18.8.1985, *Lütken* (LD); Isle of Læsø, S Byrum, 17. 9.1985, *Hansen* 12387 (H).

ENGLAND: Essex, Burnham on Crouch, 29.8.1896, *Groves* (O); W. Sussex VC 13, banks of Chichester Channel, Itchenor, 24.9.1913, *Little* (S); Durham Down, Bristol, VC 34, 20.8.1922, *Thompson* (BG); S. Somerset, Combwich, between the village and R. Parret, 8.1933, *Thompson* (W); Kent, Pegwell Bay, 28.8.1935, *Campbell* (BG, O, S, W).

FRANCE: Vendée, Olonne, 8.1927, *Charrier* (PR); Charente-Maritime, Angoulins, 9.1948, *Rallet* (S); Puy-de-Dôme, Marais de Coeur près Gerzat, 20.8.1950, *coll. ignot.* (LD); nordöstlich der Strasse nach St. Tropez zw. P. 104 & 108, 4.10.1961, *Berger* 2598 (LD); Etang de Capestang, ouest de l'Etang, entre Tamarissière et Roque, 20 m, 28.8.1983, *Bosc* (C, H, LD).

GERMANY: Schleswig Holstein, Insel Aarae, 8.8.1908, *Christiansen* (S); Mecklenburg, Insel Poel, Strandwiesen südl. Kirchdorf, 6.8.1959, *Duty* (LD); Magdeburg, Loburg, Trift nördlich, 20.8.1920, *Becker* (LD); Fl. Thuringiaca, am Salzbach, 8.1917, *Schwarz* (S); Thüringen, Sondershausen, an der Halde des Kaliwerkes "Glückauf" bei Stockhausen, 19.9.1973, *coll. ignot.* (LD).

GREECE: Nomos Etolias-Akarnanias, left side of Aheloos river near Katohi, 10-15 m, 19.9.1971, *Stamatiadou* 13908 (ATH, C); ad ostia fluvii Pinios prope portem Stomio, 39°52'30"N, 22°43'E, 11.10.1975, *Greuter* 13137 (ATH, B, C, herb. Greuter); Kerkira, Akr. Lefkimmi, 1.11.1994, *Gutermann* 28668 (WU); SE of Ammoudia, near the river Acheron, 0-10 m, 39°14'N, 20°29'E, 29.8.1996, *Snogerup* 13388 (LD).

HUNGARY: Comit. Bereg, inter Hete et Fejércse, 6.9.1926, *Boros* (W); Comit Szabolczs, ad Hajnalos pr. Tiszalök, 100 m, 1.10.1926, *Boros* (W); Comit. Pest, prope Budaörs, 150 m, 29.9.1944, *Kárpáti* (LD, S); Buda, Herkules forra sok, 29.9.1944, *Papp* (S); Kunszentmiklos (60 km a Budapest), 1965, *Deyl* (PR).

ITALY: Emilia, Ferrara, Casaglia, 7.1911, *Feroli*, *Fl. It. Exs.* 1709 (WU); Venetia, prope

- Campatto, 8.1911, *Vaccari, Fl. It. Exs. 1710* (WU); herb. Pedemontanum, Agliano, 260 m, 15.9.1919, *Ferrari* (LD); Triest bei Zante, 28.8.1920, *Korb* (W).
- KRYM: Noritas, 17.9.1904, *Atonig* (E); Planerskoje (Koktebel) ad litorem mari, 20.9.1975, *Vinogradova 5839* (C, E, H, S, W).
- NETHERLANDS: Zelande, entre Bouchante et Philippine, 29.9.1866, *Crépin* (WU); Prov. Zeeland, Kamperland, 29.8.1961, *de Visser* (C).
- POLAND: Naumburg, Wiesen im Briesnitzthal nach Christianstadt zu, 21.8.1894, *Schulz, Callier, Fl. Sil. Exs. 1069* (O, S, WU).
- PORTUGAL: Caparide pr. Cascaes, 10.1885, *Coutinho 822* (WU); Prov. Beira Litoral, Figueira da Foz, 8.1948, *Fontés* (LD); Baixo Alentejo, Alcácer do Sal do Rio Sado, 18.9.1950, *Fontes & Rainha 4128* (W); Figueira da Foz, Fontela, 13.10.1950, *Matos & Matos* (C, LD, PR); Estremadura, caldas de Rainha, Foz do Arello, 10.9.1960, *Rainha 4424* (LD).
- ROMANIA: Transsilvania, distr. Tarnava mica, ad Tiur pr. Blaj, 355 m, 25.9.1928, *Borza & Pop, Fl. Rom. Exs. 819* (C, H, O, PRC, W); regio Cluj, Someşeni-Bai, 15.8.1961, *Morariu* (LD); Slaniska ve Spataru/sv. od Bukuresti, 6.9.1969, *Lhotska & Kropáč* (PR); Tinosu, distr. Prahova, 22.10.1969, *Negrean* (S); Oltenia, ad silvam Resca, 50 m, 16.10.1977, *Paun, Fl. Olt. Exs. 994* (H, LD, O, S, WU).
- SARDEGNA: In collibus prope Cagliari, 10.1827, *Müller* (E, PR, W).
- SICILIA: Prope Panormum, 8.1855, *Huet de Pavillon* (W); Castelbuono, 10.1879, *Lacono* (E, PR, W).
- SLOVAKIA: Distr. Štúrovo, orient. viae ferrae Kamendin-Kamenné Darmoty, 1 km versus Kamenohu, 120 m, 30.7.1957, *Hosticka & Zelený* (PRC); distr. Komárno, Okánikovo a Velký Kosihy, 14.8.1964, *Fejdiava* (PRC); distr. Nitra, ad Tvrdošovce, 8.1966, *Dostal 13966* (PRC); distr. Nové Zámky SSE a Kamenín, 13.9.1968, *Kučera* (PRC); around Nitra, 1988, *Svobodova* (PRC).
- SLOVENIA: Istrien, Lezziole bei Pirano, 25.9.1870, *coll. ignot.* (W); Istria, Strunjan, 2 m, 17.9.1982, *Wraber* (C, UPA).
- SPAIN: Zaragoza, Sigués, près Venta Garrica et Pantano de Yesa, 530 m, 26.9.1969, *Montserrat 7160/69* (ATH, C, H, LD); Riba de Santiuste (Guadalajara), 1000 m, 16.XI.1969, *Zubizareda 2744* (H); SW Rinconillo, 0 m, 4.10.1974, *Allen 9271* (E); Zamora, env. d'Otero de Sariegos, 650 m, 7.9.1982, *Ladero & Valle 12386* (C, H); Navarra, Viana, laguna de Las Cañas, 380 m, 30T-WN4904, 20.9.1984, *Morante* (WU).
- SWEDEN: Skåne, St. Hammar, Kungstorp, 29.8.1964, *Asplund* (S); Skåne, mellan Lomma och Arlöf, 2.9.1982, *Kullberg* (LD, S); Småland, Ålem sn, Ängeskär, 18.8.1988, *Rühling* (LD); Öland, 1 km N of Lundebytorp, NE of Djupvik, 5.8.1970, *Snogerup* (LD); Öland, Hulterstad, Alby-Bårby mellan Gösslunda och fågelskyddsomr., N vägen, 19.8.1993, *Jerbo* (S).
- TURKEY-IN EUROPE: Makrikeny, 22.10.1893, *Post* (G); Chichli, Kiathané, 1.11.1903, *Post* (G, K); Çekmece-Bakirköy, 6.10.1939, *Post* (G); Prov. Istanbul, Belgrade forest, near Balabandere, 24.9.1960, *Yaltirik* (E).
- UKRAINE: In declivibus collinis "Lysa hora" prope urbem Uzhorad, c. 150 m, 15.9.1931, *Bucek, Fl. ERBS 1080* (BG, H, LD, O, PR, PRC, S, W, WU).
- YUGOSLAVIA: Niš, 7.1896, *Adamovic* (W).

20. *Bupleurum euboicum* Beauverd & Topali in Candollea 7: 260. 1937 – Fig. 34

Holotype: In locis maritimis arenosis prope urbem Chalkis Euboeae copiosissimum, 22.6.1935, *Topali & Beauverd 504* (G!; isotypes: LD!, W!, herb. Huber-Morath!).

[– *B. gracile* auct., non (Bieb.) DC. (1830) = *Odontites gracilis* Bieb. (1816), non *B. gracile* d'Urville (1822)].

[– *B. marschallianum* auct., non C. A. Mey. (1831)].

Annual, 15–65 cm, with main stem ending in a top umbel at 15–60 cm, large specimems with long ascending to spreading-erect branches from near the base, small with short branches, umbels (3–)10–30(over 100), if many late formed ones depauperate. *Stem* erect, ± flexuose, as young sharply 3–5-angular, usually with low wings on the angles, below becoming terete and up to 2.5 mm thick, striate, smooth. *Cotyledons* only seen as withered, linear, 10–15 mm. All *leaves*

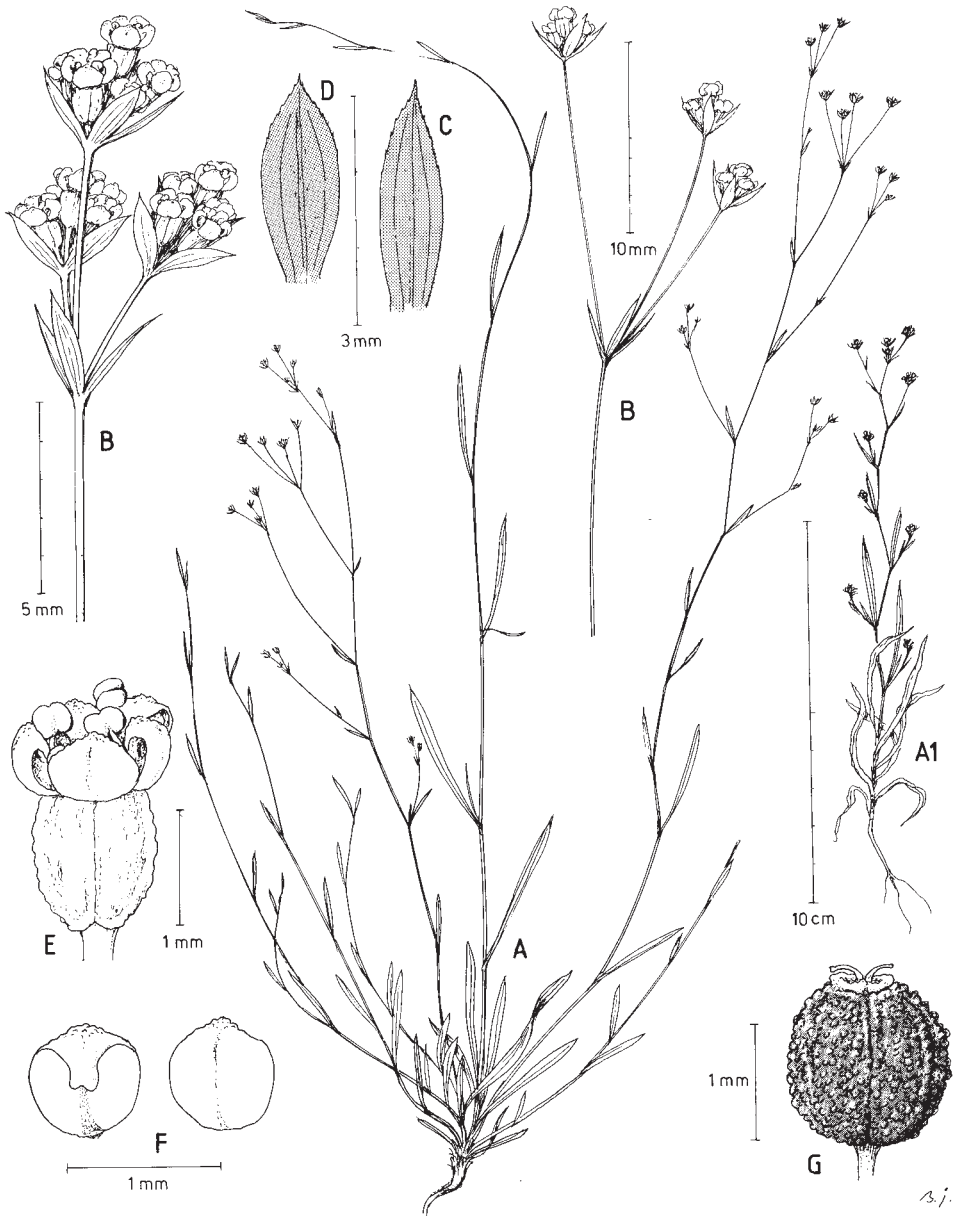


Fig. 34. *Bupleurum euboicum* – A, A1: habit; B: umbels; C: bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A, B (right umbel), C-F: Greece, Attica, Pyraei, 1876, *Pichler* (LD); A1, B (left umbel): Greece, Euboea, Chalkis, *Beauverd & Topali* 504 (LD), G: Greece, Saloniki, Katarine, *Sintenis* 1843/1889 (LD).

with amplexicaul base. *First leaves* densely placed, scarcely delimited petiole 10–30 mm, lamina 8–25 × 1–2 mm, narrowly elliptical to linear. *Cauline leaves* 20–80 × 1.5–5 mm, narrowly oblanceolate to linear, apiculate, minutely scabrous apically, with 3–5 parallel veins, the midrib conspicuous, veinlets many but inconspicuous, anastomosing. *Upper leaves* very small and narrow. *Peduncles* of largest umbels (5–)15–35 mm. *Umbel rays* 1–5, in top umbels usually 3–5, 3–30 mm and subequal or in late umbels very unequal. *Bracts* 3, 1.5–6 × 0.3–0.5(–1) mm, mostly much shorter than longest rays, narrowly lanceolate, apiculate, minutely scabrous. *Bractlets* 5 or in some depauperate umbellules 4, 2.5–4 × 0.5–1 mm, often unequal, lanceolate, often slightly navicular, apiculate, smooth or inconspicuously scabrous, (1–)3-veined, herbaceous. *Umbellules* 3–6-flowered, pedicels 0.4–1.5 mm, unequal. *Petals* yellow, 0.4–0.65 × 0.5–0.7 mm, the bend with low papillae, inflexed lobe c. 3/4 as long as limb, narrow, shortly bifid, vein whitish, continuing on the lobe. *Anthers* 0.35–0.4 mm, *filaments* c. 0.5 mm. *Stylopodium* (0.3–)0.5–0.7 mm, as wide as ovarium but narrower than ripe fruit, *styles* 0.4–0.5 mm, longer than stylopodium radius. *Mericarps* 1.5–1.8(–2) × c. 1 mm, rounded pentagonal in transect, with a narrow furrow on ventral side, with low, whitish, papilla-like rugulae, ridges inconspicuous or grading into rows of rugulae.

Flowering. – June to August, fruiting August to October.

Habitat. – Sand dunes, salt marshes, rarely mountain slopes near the sea, 0–500 m.

Distribution. – Bulgaria, E Greece and the Aegean. Perhaps only as introduced in Bulgaria. Bu, Cr, Gr, Tu. – Fig. 35.

NW, W and SW Anatolia.

Additional European material seen

BULGARIA: Philippopol, 8.1889, *Velenovský* (PR, PRC).

GREECE: Prope Naupliam, 1834, *Schuller* (W); *ibid.*, *Sartori* (W); prope Argos, 7.1836, *Zuccarini* (E); Phalerum Atticae, s. dat. *Spruner* (W); *ibid.* 7.8.1847, *Heldreich* (C, E, FI, W); *ibid.*, 1848, *Orphanides* (W); *ibid.*, 7.1849, *Orphanides* 1136 (E, G, LD, W); *ibid.*, 7.1854, *Sartori* (C, G, PR, W); *ibid.*, 7.1858, *Heldreich* 418 (G); *ibid.*, 6.7.1877, *Heldreich* (FI, K); *ibid.*, 1885, *Hausknecht* (K); *ibid.*, 7.1886, *Orphanides* (W); *ibid.*, 1893, *Heldreich* (FI); Calamaki prope Corintham, 1849, *Clements* (E); Cap Burnu prope Salonichi, 9.8.1871, *Janka* (FI, K, W); Attica, in fossis Pyraei, 7.1876, *Pichler* (FI, K, LD, PRC); insula Paro, 12–17.8.1881, *Heldreich* (E, WU-Hal); Eleusis, Attika, 23.7.1888, *Heider* (W, WU-Hal); *ibid.*, 26.7.1888, *Heldreich* 1035 (B, FI, G, K, LD, PR, PRC, herb. Huber-Morath); *ibid.*, 7.1930, *Atchley* (K); Attika, in Halipedon bei Lavrion, 31.7.1888, *Heider* (WU); Saloniki, prope Katarine, 9.9.1889, *Sintenis* 1843 (LD, W, WU-Hal); Thessalonici, 5.5.1890, *Nadji* (PRC); *ibid.*, 6.1903, *Adamovic* (W); *ibid.*, 7.1906, *Adamovic* (K, W); Cycladum ins. Naxos, 2.7.1897, *Heldreich* 418 (G, K); insula Naxos prope Chalki, 2.8.1897, *Leonis & Dörfler* 254 (B, G, PR, WU-Hal); Attica, litore orientale pr Prasa, 31.7.1899, *Tuntas* (UPA); *ibid.*, 12.8.1899, *Tuntas* (W); Thessalonica, 6.1903, *Adamovic* (W, WU, WU-Hal); Dede-Agac, 7.1903, *Adamovic* (K); Mt Gül-tepé pagi Kereciköj, prope Thessaloniam, 400 m, 4.1909, *Dimonie* (G); Fetitza prope Njausta, 300 m, 4.1909, *Dimonie* (WU); mt. Athon Hagion Oros cönobium Prodrom 500 m, 5.1909, *Dimonie* (LD, M, WU); Njausta, 7.1909, *Dimonie* (FI, LD, WU); Attica, prope Scaramanga, 4.7.1930, *Guiol* (UPS); *ibid.*, 7.1936, *Atchley* 284 (K); M. Chaeronia (Boeotia), 1000, 10.1930, *Atchley* 354 (K); Thrace, Bouloustra, 6.7.1933, *Tedd* 1211 (K); Euboea centralis, inter Chalkis et Nea Artaki, 27.6.1958, *Rechinger* 19111 (B, G, K, LD, W); Naxos, sandy beach S of the town, 4.8.1958, *Runemark & Snogerup* 12780 (LD); *ibid.*, Kastraki, 10.8.1984, *Koumpli-Sovantzi* 2163 (ATHU); Antiparos, at the town, 17.5.1967, *Runemark & Bentzer* 28854 (LD); Paros, Parikia, 3.7.1967, *Runemark & Bentzer* 30851 (LD); Tinos, S of the town, 19.5.1968, *Runemark & Engstrand* 36474 (LD); Nom. Kavalas, Keramoti E of Kavala, 0–2 m, 11.7.1970, *Strid* 780 (LD); Nom. Serron, ep. Fillidos, near the river Strimonas by Amfipolis, 28.7.1971, *Haristos* 891 (ATH); Nom. Magnisias, Eleftherion, 25.9.1974, *Raus* 3087 (B), Alikes, 20.6.1974, *Raus* 2801 (B); *ibid.*, 29.7. 1974, *Raus* 2795 (B); *ibid.*, 20.9.1974, *Raus* 3426 (B); Nom. Kavalas, ep.

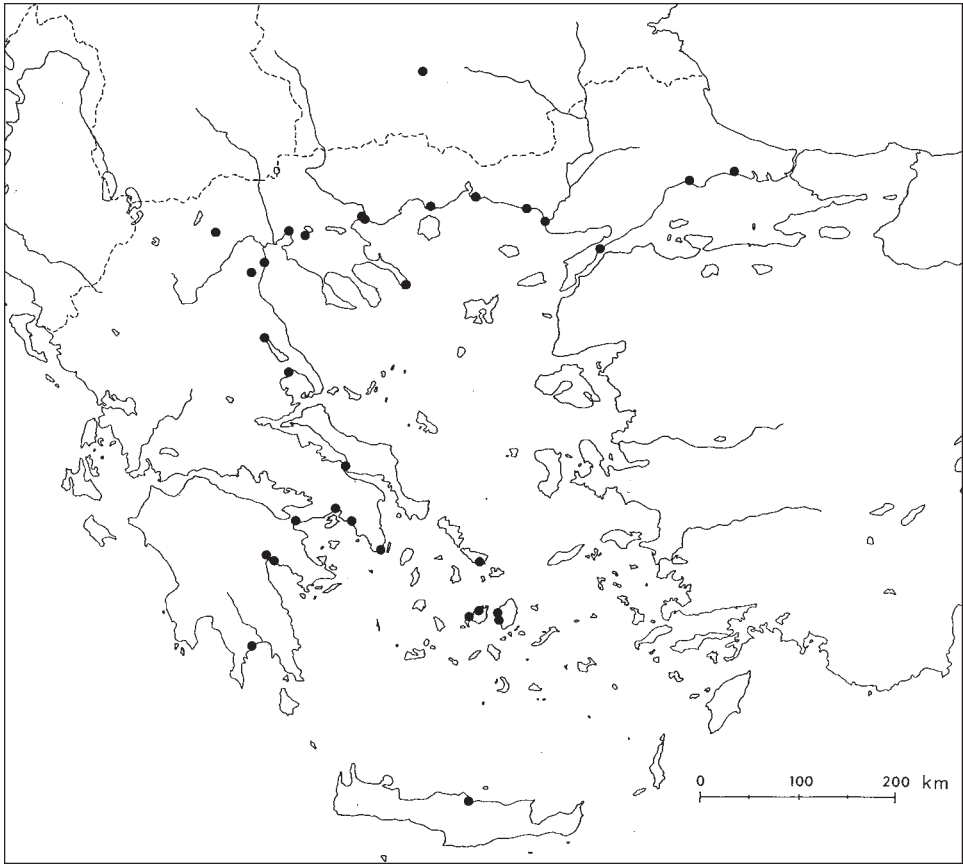


Fig. 35. European distribution of *Bupleurum euboicum* according to material revised.

Pangeou, WSW of Ofirion on Strimon river, 31.7.1977, *Stamatiadou 20727* (ATH, C); Thraki, Evros delta, 7.1978, *Polunin 15164* (E); Alikes Kitrous, 27.8.1991, *Drossos 15501* (TAU); Xirolimni lagoon, *Drossos 10269* (TAU); Karatza lagoon, 10.3.1992, *Drossos 10607* (B); Peloponnesos, 5 km from Githio towards Skala, 26.7.1992, *Strid 33658* (C).

KRITI: Platania, 10.8.1883, *Reverchon* (G); "Creta Beach" 5 km W Iraklion, 2.7.1969, *Wängsjö 3240* (LD).

TURKEY-IN-EUROPE: Gallipoli, Suvla, 11.8.1923, *Ingoldby* (K); on the way Istanbul - Tekirdağ 10 km after the crossroad to Yeni-ciftlik köyü, 7.8.1967, *Baytop* (E).

21. *Bupleurum marschallianum* C. A. Mey., Verz. Pfl. Cauc.: 114. 1831 – Fig. 36

Type: Karabagh, *Szovits 647* (W! isotype).

= *Odontites gracilis* M. Bieb. in Hoffmann, Gen. Pl. Umbell., ed. 2: 209. 1816 ≡ *B. gracile* (M. Bieb.) DC., Prodr. 4: 128. 1830, non d'Urville (1822) ≡ *B. tenuissimum* subsp. *gracile* (M. Bieb.) Wolff in Engler, Pflanzenr. 43: 104. 1910. – Type: Described from Caucasus.

= *B. tenuissimum* subsp. *gracile* var. *rossicum* Wolff in Engler, Pflanzenr. 43: 105. 1910. Type: several syntypes.

Annual, usually 25-60 cm, with main stem and several ascending to spreading-erect branches, umbels mostly 15-50. *Stem* erect, often flexuose above, striate, as young 4-5-angular with smooth

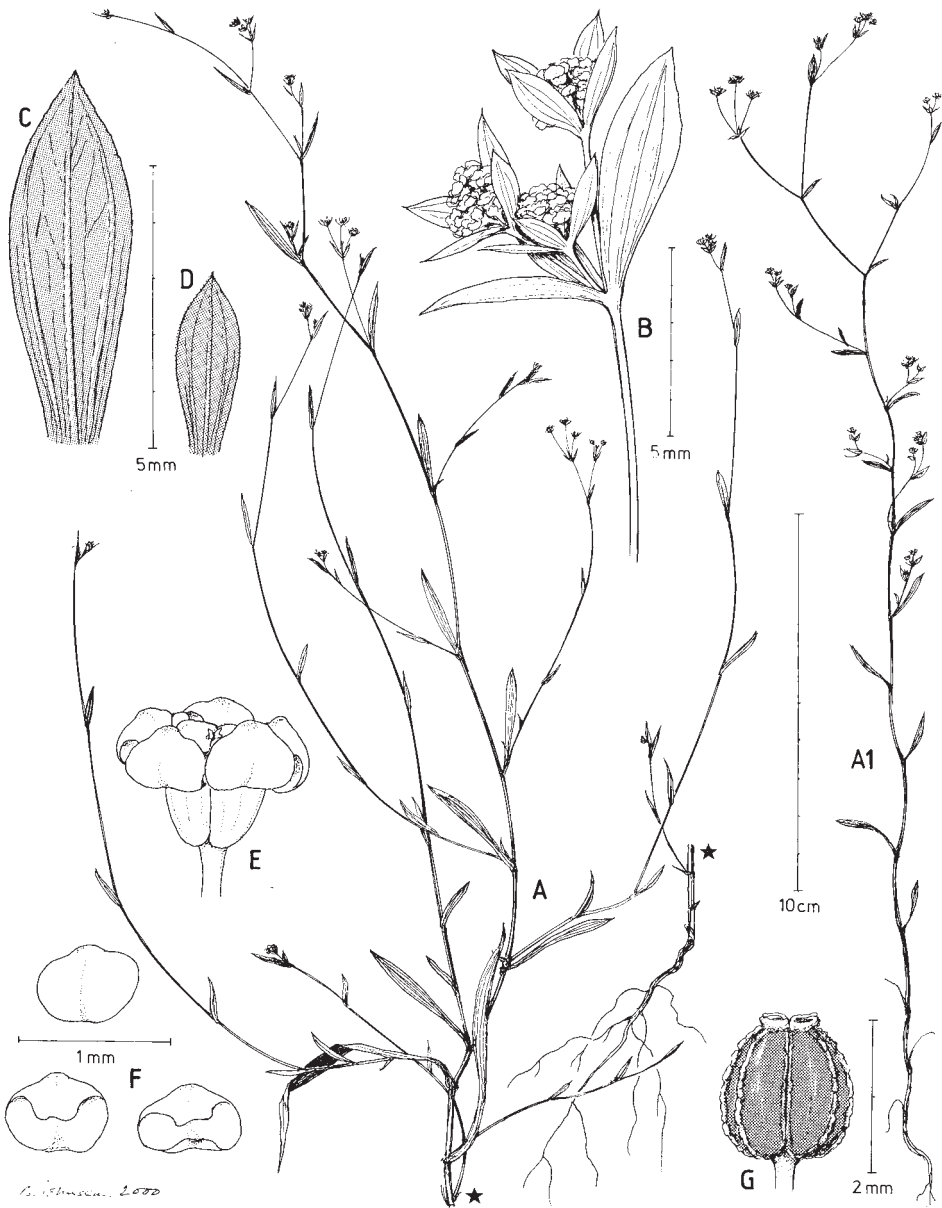


Fig. 36. *Bupleurum marschallianum* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A, C-G: Georgia, Tiflis, 1908, Koenig (C); A1, B: Azerbaydzhan, Lenkoranj, Sara, Pobedimova 3737 (LD).

or finely scabrous ridges, below becoming terete and up to 2.5 mm thick. *Cotyledons* not seen. *First leaves* only seen as withered, with petiole probably 15-20 mm and lamina 15 × 3 mm. *Cauline leaves* also often withered before or during anthesis, gradually more short-petiolate to sessile, 20-40 × 2-3 mm, linear-lanceolate. *Uppermost leaves* and those of the branches shorter but broader, often c. 10-15 × 6 mm, broadly lanceolate to elliptical. All leaves usually with 3 parallel veins, 1 conspicuous marginal vein and many anastomosing veinlets, acuminate, entire or often scabrous on margin and sometimes the midrib beneath. *Peduncles* (5-)10-25 mm, *umbel rays* 2-4(-5) or rarely up to 7 in top umbels, 5-20(-30) mm long, slightly unequal, longest ones usually 1/2-2 times as long as peduncle. *Bracts* 3(-4), 2.2-6 × 0.5-1.5 mm, slightly unequal in size and form, ± narrowly lanceolate or rarely some elliptical, apiculate, 3(-5)-veined, entire or minutely scabrous, herbaceous. *Bractlets* 5, sometimes one of them smaller, 1.5-4.5 × 0.5-1 mm, ± narrowly lanceolate, apiculate, 3-veined with few and obscure veinlets, entire or minutely scabrous, herbaceous. *Umbellules* usually 4-6-flowered, pedicels 0.5-1.5 mm, slightly unequal. *Petals* 0.25-0.4 × 0.4-0.7 mm, very broad, smooth throughout, inflexed lobe 1/2-2/3 as long and 1/2 as wide as limb, bifid. *Anthers* 0.25-0.3 mm, purplish, *filaments* 0.4-0.6 mm. *Stylopodium* 0.7-0.9 mm broad, purplish, *styles* 0.3-0.4 mm, equalling or shorter than stylopodium radius. *Mericarps* 1.8-2.0 × 1.7-1.8 mm or probably sometimes larger, whole fruit almost semi-globose, its surface with rugulae partly confluent into ± longitudinal crests c. 0.1 mm high, verrucose and somewhat irregular.

Flowering. – August to October.

Habitat. – Dry open localities near sea level. In its main distribution area in S Caucasus and N Iran, it occurs also in inland localities.

Distribution. – We have seen only one European collection, from SE Krym. Kry. Not mapped. Transcaucasia, N Iran.

European material seen

KRYM: Prope pag. Planerskoja (Koktebel) siccis montis Karadagh, 100 m, 21.9.1975, *Vinogradova & Ivanina 5837* (C, E, W).

22. *Bupleurum semicompositum* L., Demonstr. Pl.: 7. 1753 – Fig. 37

≡ *Odontites semicomposita* (L.) Spreng., Pl. Umbell. Prodr.: 33. 1813 ≡ *B. divaricatum* var. *semicompositum* (L.) Lam., Fl. France 3: 410. 1778. – Lectotype (designated by Rechinger & S. Snogerup in Rechinger, Fl. Iran. 162: 277. 1987): Herb. Linnaeus 335/13 (LINN!).

= *B. glaucum* Robill. & Cast. in Lamarck & Candolle, Fl. France, ed. 3, 5: 515. 1815 ≡ *Odontites glauca* Roem. & Schult., Syst. Veg., ed. 2, 6: 383. 1820 ≡ *Isophyllum glaucum* Fourr. in Ann. Soc. Linn. Lyon, ser. 2, 16: 394. 1868 ≡ *Tenoria glauca* Bub., Fl. Pyr. 2: 359. 1900 ≡ *B. semicompositum* subsp. *glaucum* Rouy & Camus in Rouy & Foucaud, Fl. France 7: 336. 1901. – Type: À Mazargue et la Gineste près Marseille, *Robillard & Castagne*, not seen.

= *B. semicompositum* subsp. *pseudodontites* Rouy & Camus in Rouy & Foucaud, Fl. France 7: 335. 1901. – Syntypes: *Kralik, Pl. Tunes. 232 & Todaro, Fl. Sicula 13*.

Annual, (2-)3-10(-20) cm, usually pseudo-dichotomously branched from near the base, small specimens sometimes almost unbranched and erect. Specimens growing or cultivated with good access to freshwater often large, erect, with broad leaves and large bracts and bracteoles. *Stem* flexuose, young parts 4-5-angular, often with inconspicuously winged angles, smooth or margins of wings slightly rough, basal part of large specimens becoming terete and up to 2 mm thick. *Cotyledons* petiolate, petiole 3-8 mm long, lamina 2.5-10 × 1-2 mm, elliptical to lanceolate. *First leaves* early withering, with petiole 5-30 mm and lamina 5-35 × 1.5-6 mm, ± narrowly elliptical to oblanceolate, with 3 longitudinal and often 1 conspicuous marginal vein. *Persistent cauline leaves* 10-30(-80) × 0.5-3(-10) mm, lower ones, indistinctly petiolate, ± narrowly oblanceolate, upper ones very small, non-petiolate and linear, or all linear-oblanceolate; margin finely serru-

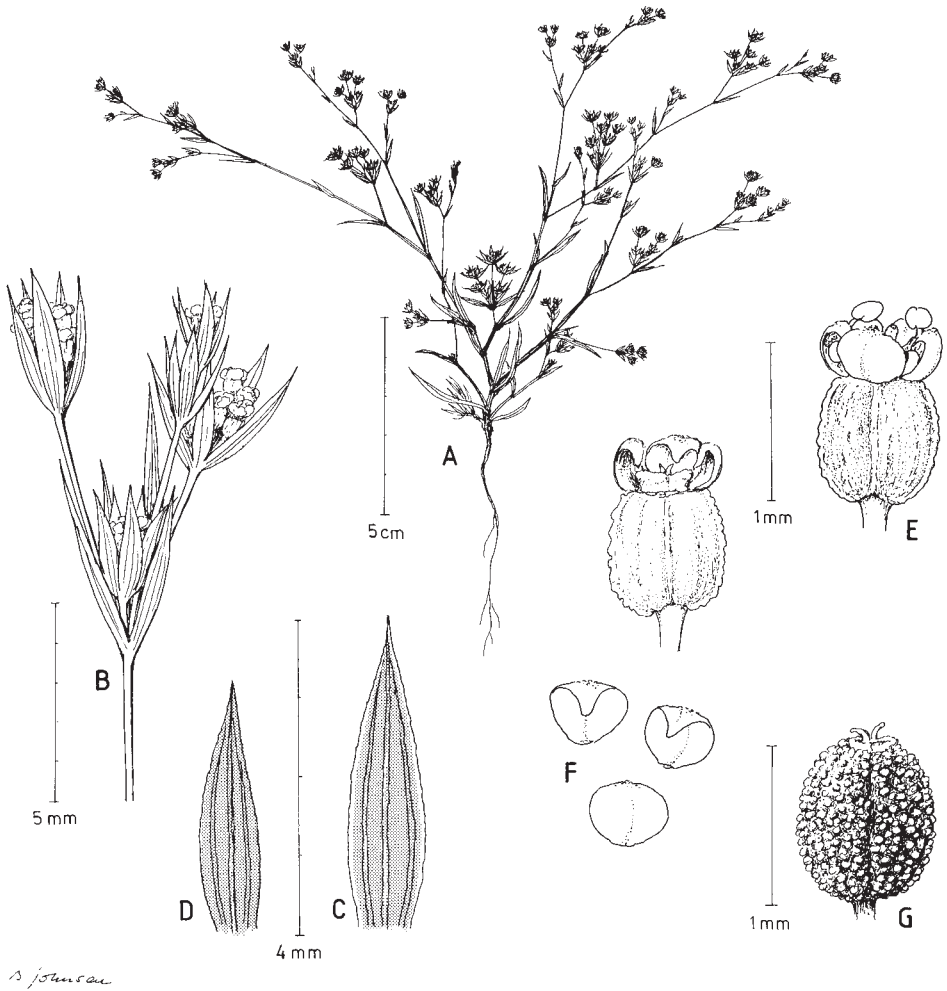


Fig. 37. *Bupleurum semicompositum* – A: habit; B: umbel; C: bract; D: bractlet; E: flowers; F: petals; G: fruit. – Material: A-F: Baleares, Menorca, Cabo Dartuch, *Dahlgren & al.* 859 (LD); G: Kriti, Selinos, Palaeochora, *Landström* 6829 (LD).

late, entire surface smooth or veins scabrous, veins 3-5, parallel, with few and inconspicuous veinlets. *Peduncles* of basal umbels often very short, those of upper ones up to 20 mm. *Umbel rays* (3-)-4-6, 0.2-1.5 mm, very unequal, longest one usually longer than peduncle. *Bracts* 4, 3-10(-20) × 0.5-2 mm, very unequal, lanceolate to narrowly linear-lanceolate, acuminate, with 3 conspicuous veins, scabrous-serrulate on margin and abaxial side of veins, herbaceous with narrow scarious margin. *Bractlets* 5, 2.5-5(-12) × 0.5-1.5(-2) mm, lanceolate or narrowly so, apiculate, with conspicuously scabrous margin and veins, herbaceous, 3-veined, veinlets lacking or inconspicuous. *Umbellules* 4-7-flowered, pedicels 0.3-2 mm, very unequal. *Petals* purplish, 0.25-0.4 × 0.3-0.5 mm, widest above, inconspicuously papillose with c. 0.05 mm papillae, bend straight, inflexed lobe 1/2-2/3 as long as limb, narrow, emarginate. *Anthers* 0.2-0.25 mm, *filaments* 0.4-0.6 mm. *Stylopodium* 0.35-0.45 mm broad, as wide as ovary but several times narrower than fruit, deeply divided, *styles* 0.15-0.25 mm, slightly shorter than stylopodium radius. *Mericarps* 0.9-1.1(-1.4) × 1-1.5 mm, blackish brown, with irregular, white papillae, rounded in transect, inner face with narrow, inconspicuous furrow, whole fruit almost globose, ridges filiform, oil ducts inconspicuous.

Chromosome number. – $2n = 16$ (Cauwet-Marc 1976, S. Snogerup 1994).

Flowering. – March to June, fruiting May to July.

Habitat. – Seashores, saline soil, dry open habitats, mostly in maritime localities, 0-50(-200) m.

Distribution. – Portugal and throughout the Mediterranean part of Europe. Bl, (Br), Co, Cr, Ga, (Ge), Gr, Hrv, Hs, It, Lu, Sa, Si. – Fig. 38.

The Atlantic Islands, N Africa, SW Asia east to the S Caspian, W Iran and Palestine.

Variation. – We have had several accessions of this species in experimental cultivation. It proved to become strongly modified by various conditions. It grows well with brackish to salt water and rather dry conditions, and then becomes small and like most collections from natural localities. But sister plants grown with good access to fresh water become tall, broad-leaved and light green. Such collections have often been called var. *pseudodontites* (Rouy & Camus) Wolff.

Selected material seen

BALEARES: Formentera, 5.1899, *Gandoger* (W); Ibiza, Es Clas des Hams, 2 km NW Santa Inez, 1968, *Dahlgren & al.* 1182 (LD); Menorca, Cabo Dartuch, 30.5.1969, *Dahlgren & al.* 859 (LD); Majorque, Formentor près du Faro, 17.6.1974, *Duvigneaud* 74E668 & *Lambinon* (UPA).

CORSICA: Campoboro near Propesiano, 5.1971, *Mc Callum Webster* 14589 (E).

CROATIA: Fiume [= Rijeka], 1846, *Richter* (PR).

FRANCE: La Grossetour à Toulon, 6.1871, *Huet* (K); Bouches-du Rhône, Pas des Lanciers, 6.1877, *Autheman* (WU-Hal); Bouches-du-Rhône, Ponteau, 6.-7.1882, *Autheman* (LD, PR, WU); Hérault, sable du Cordon littoral, 12.5.1897, *Mandon* (PRC); Hérault, Les Onglos, 12.5.1897, *Mandon* (BG, H); Reims, 1900, *Guillaume* [certainly introduced] (W); Aude, La Nouvelle, 1.6.1900, *Sennen* (H, LD, O); near Hyères, 7.6.1906, *Thompson* (E); Aude, Île Ste Lucie, près Narbonne, 8.6.1908, *Delpont* (S); Bouches-du-Rhône, la Camargue, Tour du Valat, 9.6.1959, *Nordin* F24 (UPS).

GREECE: Nom. Dodekanisou, Tria Nisia, the E-island, 15.5.1960, *Runemark & Nordenstam* 14411 (LD); Andros, the island of Megalo S of Gavriou, 12.5.1968, *Snogerup & v. Bothmer* 31189 (LD); penins. Sithonia, reg. Koutsoupiia, adv. scopulorum Ajia Eleni, inter Neos Marmaras et Toroni, 2-5 m, 16.6.1972, *Greuter* 10382 (ATH); Nom. Fokidos, 1 km E of Itea, 0-5 m, 18.5.1975, *Landström* 2454 (LD); Platakia, NW of Aegina, 0-5 m, 15.5.1976, *Haritonidou* 648 (LD); Nom. Argolidos, 2 km W Ermioni, 0-5 m, 16.5.1982, *Runemark & Svensson* 48750 (LD); Skiros, Vrykolakonisia, the largest, inner, islet, 38°56'N, 24°35'E, 1.5.1985, *Snogerup* 4090 (LD); Naxos, Prokopis, 5.5.1985, *Koumli-Sovantzi* 2537 (ATHU); by lake Vouliagmeni, W of the lagoon, 0-50 m, 38°02'N, 22°54'E, 21.5.1991, *Strid & al.* 32082 (C).

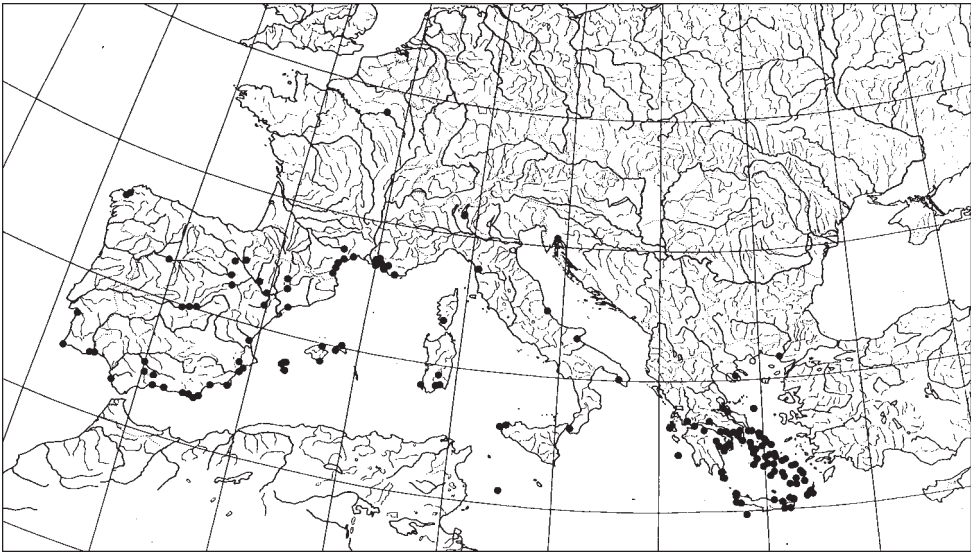


Fig. 38. European distribution of *Bupleurum semicompositum* according to material revised.

ITALY: Gallipoli, 5.1883, *Groves* (E); Pescara, 22.5.1887, *Sardagna* (WU); Calabria, Reggio, 5.1898, *Rigo 159* (W, WU, WU-Hal); Gargano, Manfredonia, 5.1948, *Runemark* (LD); Puglia, bei der Bahnstation Siponto, 2.5 km SW Manfredonia, 5 m, 21.5.1972, *Matthäs* (UPA).

KRITI: Nom. Lasithiou, distr. Hierapetra, in aren. ins. Gaidaronisi, 19.5.1942, *Rechinger 13119* (LD, W); Nom. Lasithiou, the island of Dragonara, 4.7.1960, *Runemark & Nordenstam 16577* (LD); island of Gavdos, Sarakino, 12.5.1980, *Runemark & B. Snogerup 47864* (LD); Nom. Chanion, Küste gegenüber dem Inselchen Elafonisi, 1–10 m, 31.5.1982, *Greuter 19420* (B, herb. Greuter); Nom. Chanion, Selinos, 2 km NW Paleochora, 12.6.1986, *Landström 6829* (LD); Nom. Lasithiou, Itanos, close to the sea, 6.5.1995, *Lassen 95005* (LD).

PORTUGAL: Algarve, Castro Marim, 5.1887, *Moller 328* (E, K, LD, WU-Hal); Prov. Baixo Alentejo, Alcácer do Sal, Comporta Esteiro, 9.8.1946, *Fontes & Bainha, Pl. Lusit. H. St. Agr. Nat. 1729A* (LD); Prov. Algarve, ribeira de Asseca, 10 m, 4.5.1947, *Silva & al. 1810* (LD, S).

SARDEGNA: Ins. St Pietro, 4.1829, *Steudel & Hochstetter* (E); Cagliari, 6.1854, *Huet de Pavillon* (S); Torre delle Stelle E Cagliari, 14.6.1981, *Hygen* (O).

SICILIA: Trapani, 14.4.1884, *Todaro* (PRC); Ins. Lampedusa, Ca Imbriacola, 14.4.1884, *Soller* (LD, PRC, W); in arenosis Favignana, Isole Egadi, 14.5.1898, *Bicknell* (C, E, PR, TUR, UPS, W).

SPAIN: Prov. de Granada, Almuñécar, Punta de la Mona, 25.4.1952, *Roivainen* (H, UPS); Malaga, Rincón de la Victoria, 17.5.1952, *Roivainen* (H); E of Zaragoza, N Osera, 1.7.1956, *Sandwith* (K); El Alquíán, Almería, 20 m, 24.4.1970, *Zubizareta 2742* (H); 6 km SW Ueida entre Albatanec and Souadell, 100 m, 17.5.1972, *Charpin* (G); Zuera, Zaragoza, 280 m, 21.5.1978, *Zubizareta 17012* (H); Toledo, El Salobral, 11.6.1982, *del Aguila & Sánchez-Mata* (K); 6 km NE Alicante, Cabo de Huertas, 5 m, 4.4.1984, *Jury & al. 5113* (H); Prov. Valladolid, Castro-ruño, 700 m, 8.5.1985, *Ladero & Valle 12385* (C, H); Provincia de Almería, Salinas del Cabo de Gata, 22.4.1996, *Sida* (PRC).

23. *Bupleurum asperuloides* Heldr. in Boissier, *Diagn. Pl. Orient.*, ser. 2, 6: 76. 1859 – Fig. 39
Lectotype (designated here by Pimenov): In vinetis prope pagum Rachova in regione inferiori m. Parnassi, alt. 2500' circ., 26.8.1856, *Heldreich 513*, *Herb. Graec. Norm. 3386* (G-BOIS!; isolectotypes LD!, PR!, W!).

[– *B. sintenisanum* Uechtr. in Kanitz, Pl. Roman.: 207. 1881, nom. nud., based on *Sintenis* 474a from Romania (LD!)]].

Annual, 30-90 cm or probably sometimes taller, usually with a conspicuous main stem and many long branches in middle and upper part or almost from the base, top umbel in real top position or overtopped by one or a few branches, umbels 10-50(-100 or more), if many, several of them depauperate. *Stem* erect, straight or slightly flexuose, striate, as young and above 3-5-angular, below becoming terete and up to 4 mm thick, smooth or minutely scabrous above. Cotyledons and first leaves only seen as withered and fragmented. *Cotyledons* probably c. 10 mm including petiole and very narrowly oblanceolate lamina. All *leaves* with amplexicaul base. *First few leaves* densely placed, small and conspicuously petiolate. Most *cauline leaves* withered before or during anthesis, (10-)30-100 × 2-4(-7) mm, narrowly oblanceolate to linear, acuminate, with 3-5 veins and usually a marginal one, the midrib prominent and raised below, veinlets inconspicuous, reticulate, margin and upper parts of veins scabrous. *Peduncles* (0.5-)5-30 mm. *Umbel rays* (1-)2 or in top umbels 3, 0.2-2.5 mm, very unequal, longest ones equalling or longer than peduncles. *Bracts* 3, 2-6 × c. 0.5 mm, lanceolate, acuminate, 3-veined, keeled, scabrous on margin and veins. *Bractlets* 4, 2-4 × 0.5-0.8 mm, lanceolate, acuminate, 3-veined, keeled, scabrous on margin and veins, herbaceous. *Umbellules* 1-6-flowered, pedicels 0.5-1.5 mm, subequal. *Petals* yellowish purple, 0.6-0.7 × 0.6-0.8 mm, widest above, at bend with slightly raised marginal wing, margin serrulate, inflexed lobe broad, long, midrib narrow, papillose, at the bend elevated and irregularly papillose-rugulose, continuing on lobe. *Anthers* 0.3-0.4 mm, *filaments* c. 0.5 mm. *Stylopodium* 0.6-0.75 mm broad, narrower than ovary and fruit, *styles* 0.2-0.3 mm, shorter than stylopodium radius. *Mericarps* (unripe) c. 2 × c. 0.8 mm, rounded pentagonal in transect, smooth, with narrow and inconspicuous furrow on ventral face, glaucous, finely rugulose at upper margin, ridges filiform, oil ducts inconspicuous.

Flowering. – July to September, fruiting September to early winter.

Habitat. – Forests, scrubs, vineyards, 500-1100 m.

Distribution. – A European endemic scattered from central and N Balkans to Krym. Bu, Gr, Kry, Mak, Rm, Tu. – Fig. 40.

NW and W Anatolia. Total number of localities known only c. 20.

Variation. – Plants from Romania, Dobrudscha, have more 3-rayed umbels and a less conspicuous midrib at the petal bend than usual. The present few and scattered population groups of this species are probably of relict nature, representing more or less old isolates. The variation among them is, however, hardly of such a magnitude that it can motivate taxonomic recognition at any rank. The two closely related local species *B. rollii* in Italy and *B. pauciradiatum* in S Anatolia differ constantly in several characters. The entire complex is of interest for further investigations.

European material seen

BULGARIA: Nova Mahala, several colls. 1893, 1895, 1899, 1906, 1907, *Stříbrny p.p.* as *Baenitz* H. E. (E, G, GB, H, LD, M, S, W, WU, UPS); *ibid.*, 6.1893, *Velenovský* (PRC); Haskovo, 7.1904, 6.1906, *Adamovic* (G, W, WU); Papasli, 7.1915, *Stříbrny* (S, W); distr. Varna, Zlatni pjasaci, 14.9.1962, *Golde* (PRC); Bezirk Sliven, 5 km östl. Nova Zagora, 12.8.1968, *Merxmüller & Zollitsch* 24441 (M); Bezirk Burgas, zw. Slanjev brjag u. Banja, 13.8.1968, *Merxmüller & Zollitsch* 24480a (M); Sliven, the hill Kagovez, 11.8.1977, v. *Bothmer & Buttler* 1465 (C); Arabovo, s. dat., *Stříbrny* (PRC).

GREECE: Prope Rachova in regione inferiore M. Parnassi, 2500', 26.8.1856, *Heldreich* 513 (FI, G, LD, M, PRC, S, W, WU-Hal); Distr. Grevena, in monte Mavrovouni, inter Anixis et Melissi, 13.8.1974, *Greuter* 12117 & *Charpin* 10966 (G, LD, UPA, W); road Kastoria-Neapoli c. 12 km N of Neapoli, 670-680 m, 40°23'N, 21°25'E, 15.9.1983, *Matthäs* 734 (B, LD).

KRYM: 1893, *Fedtschenko* (G); Jalta, 21.8.1900, *Golde* 1719 (C, H, PRC, WU); *ibid.*, 11.8.1938, *Anderberg* (UPS); Alushta, 5.8.1909, *Schirajewsky* (M).

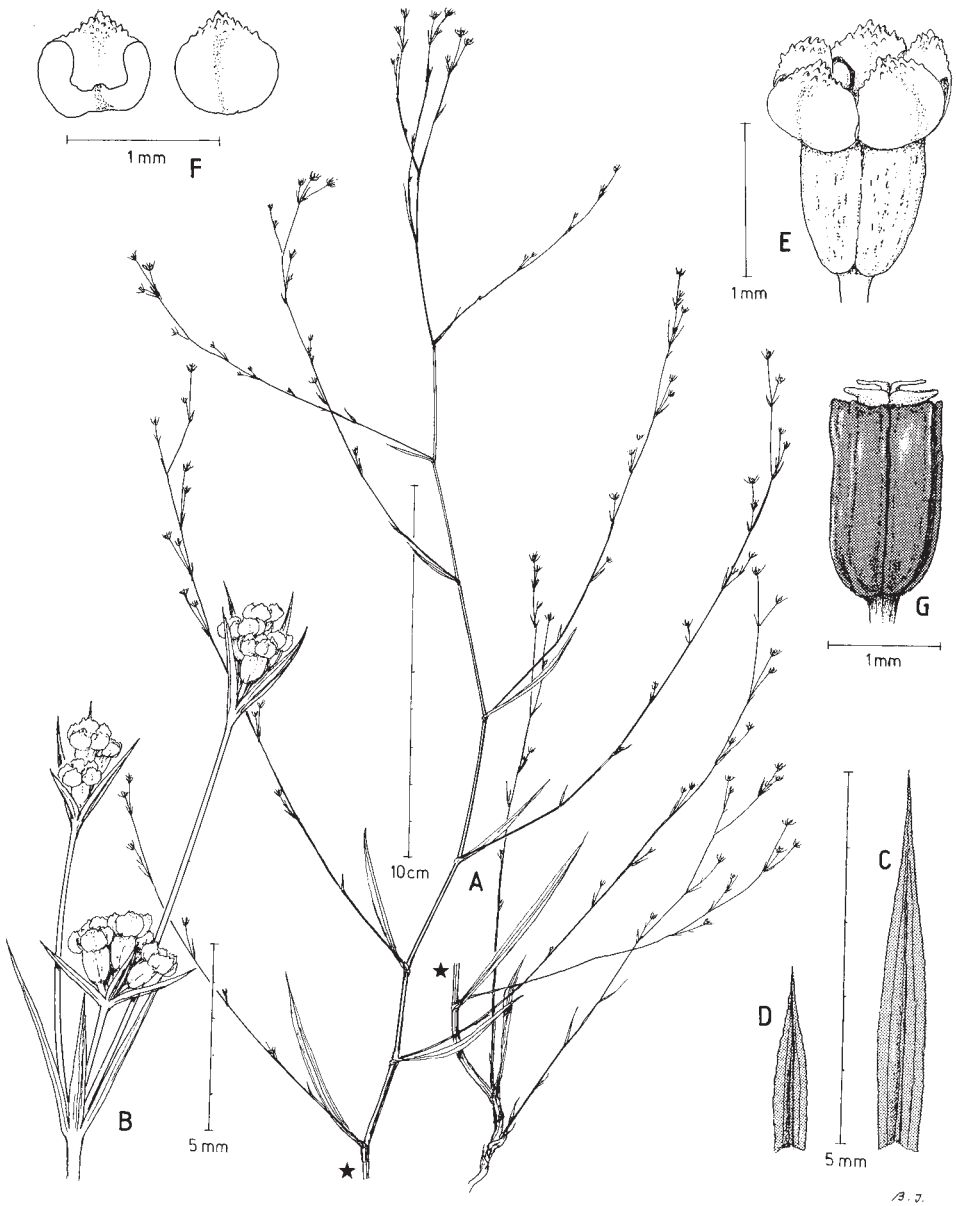


Fig. 39. *Bupleurum asperuloides* – A: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A-F: Greece, nom. & ep. Grevenon, Mavrovouni, *Greuter 12117* (LD); G: Bulgaria, Nova Mahala, 1899, *Střibný* (LD).

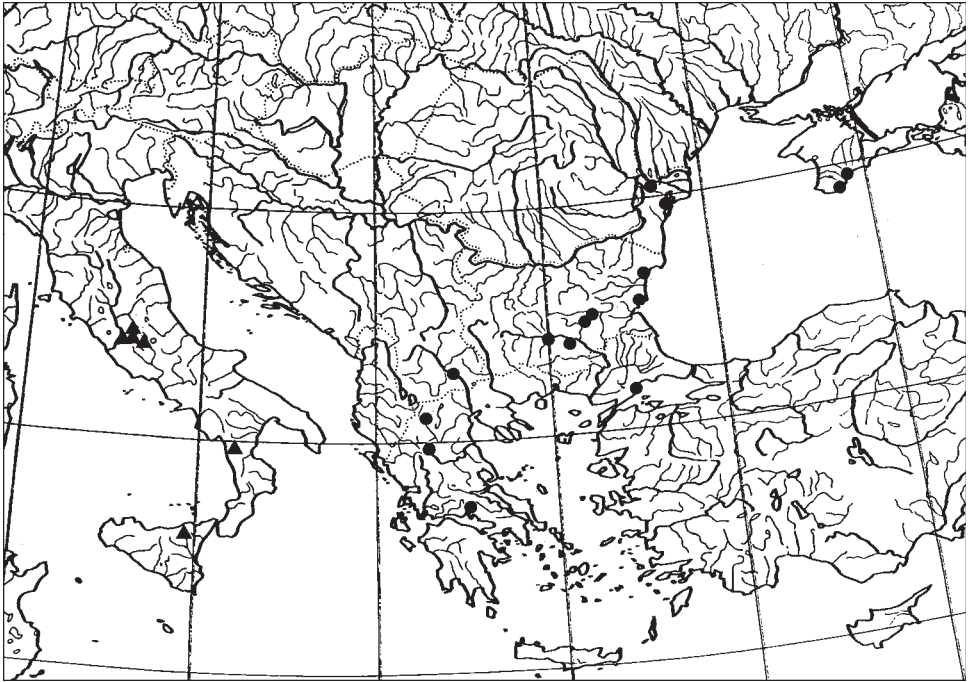


Fig. 40. European distribution of *Bupleurum asperuloides* (dots) and *B. rollii* (triangles) according to material revised. For *B. rollii* are also included localities given by Montelucci (1949).

MACEDONIA: Demirkafen, 8.1891, *Formánek* (PR).

ROMANIA: Dobrudscha, Tschukarowa, 24.8.1872, *Sintenis* 474a (LD); *ibid.*, 4.8.1872, *Sintenis* 475 (LD); Dobrudscha, Matschin, Gebirgswald von Grei, 4.8.1873, *Sintenis* 475 (S).

TURKEY-IN-EUROPE: Tekirdağ, Marmaraköy to Yeniköy, 5.9.1975, *Özhatay* 33752 (E).

24. *Bupleurum rollii* (Montel.) Pignatti, Fl. Italia 2: 214. 1982 – Fig. 41

≡ *B. gracile* var. *rollii* Montel. in *Nuovo Giorn. Bot. Ital.*, ser. 2, 56: 693. 1949. – Lectotype (designated here): Monti di S. Polo pr. Tivoli, 27.7.1948, *Rolli* (RO[photo!]).

Annual, 30-90 cm or probably sometimes taller, with pronounced main stem and erect to spreading-erect, thin branches from near the base. *First leaves* forming a rosette, withered before anthesis. Umbels usually 30-100, several of them depauperate. *Stem* striate, as young and in the inflorescences 4-angular, in most of its length becoming terete and up to 2.5 mm thick, smooth or minutely scabrous above. *Cotyledons* and first leaves not seen. *Cauline leaves* (15-)50-120 × (0.5-)1-3(-5) mm, narrowly linear, with 3-5 veins, a thin marginal one and weak mostly erect veinlets, finely scabrous on margin and veins below. *Peduncles* erect, (0.5-)5-10(-25) mm, very thin. *Rays* of top umbel 2-3(-4), of lateral ones mostly 1, (0-)2-12 mm, very unequal, usually shorter than peduncles. *Bracts* 3, (2-)2.5-4.5 × 0.5-1 mm, narrowly lanceolate, 3-veined, with herbaceous centre and up to 0.2 mm wide scarious margin. *Bractlets* 3-4, 2-3 × 0.5-0.7 mm, lanceolate, with 0.5-1 mm long awn, 3-veined, herbaceous between the veins, white outside them and brilliant at anthesis, margin finely scabrous. *Umbellules* 1-5-flowered, pedicels 0.1-0.5(-1) mm. *Petals* as fresh purplish with a broad darker field on the outside, 0.5-0.6 × 0.4 mm, with a conspicuous, obtuse to acutish, smooth or finely granulose projection at the bend, inflexed lobe c. 3/4 as long as limb, narrow in middle part, apically broader and shallowly bifid. *Anthers*

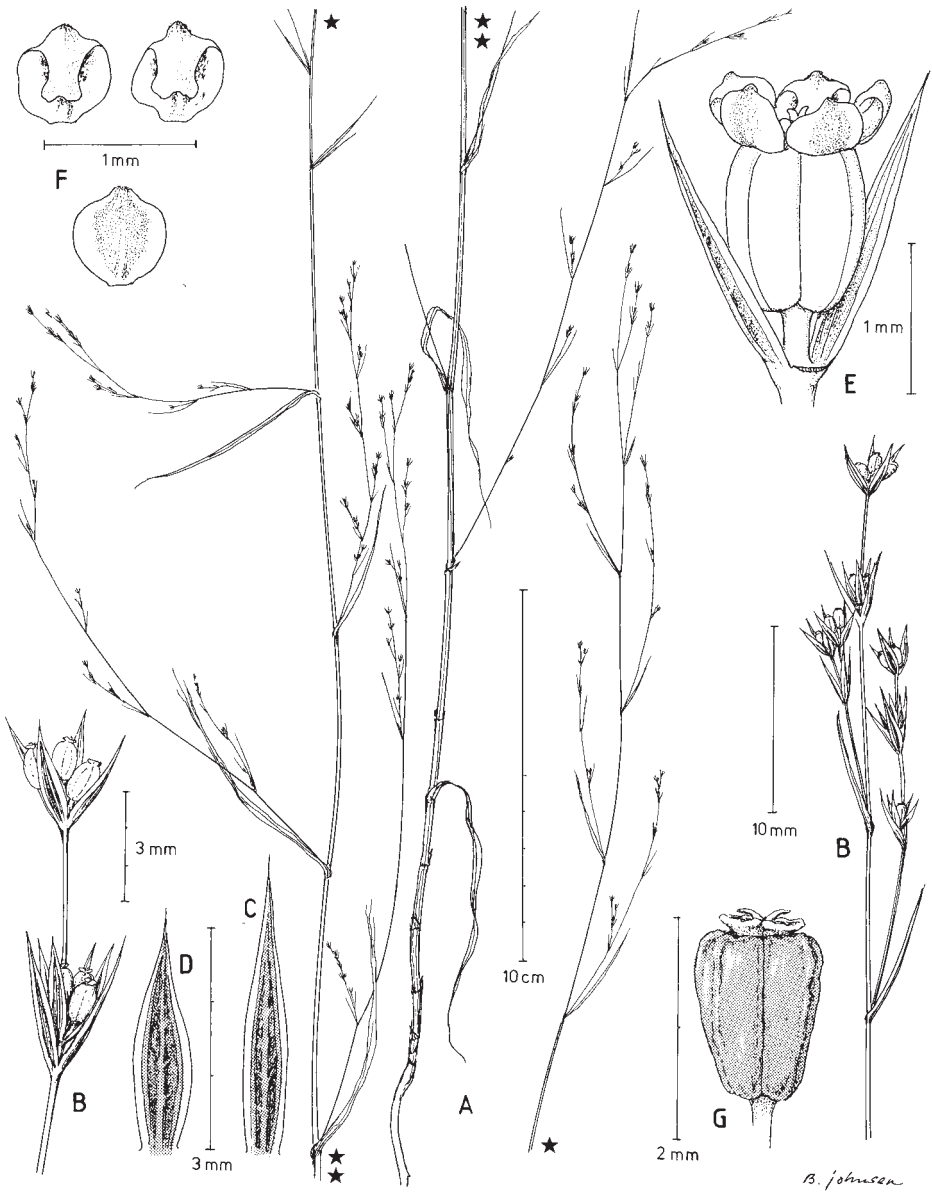


Fig. 41. *Bupleurum rollii* – A: habit; B: inflorescence branch and umbel; C: bract; D: bractlet; E: one-flowered umbellule (one bractlet removed); F: petals; G: fruit. – Material: A-G: Italy, Calabria, Cosenza, Papisidero, 1990, Burton (LD).

0.25-0.3 mm, *filaments* c. 0.5 mm. *Stylopodium* (0.4-)0.6-0.7 mm broad, yellowish green becoming light brown, c. 2/3 as wide as fruit, *styles* 0.2 mm, shorter than *stylopodium* radius. *Mericarps* as ripe probably c. 2 × 1 mm, pentagonal in transect, with ± sharp ridges and narrow, inconspicuous ventral furrow, smooth, as young glaucous.

Flowering. – July to September.

Habitat. – Dry slopes on limestone, usually among shrubs and rocks, 100-1000 m.

Distribution. – An endemic of S Italy, only known from a few localities in Lazio, Calabria and Sicily. It, Si. Certainly overlooked and present in several more places. – Fig. 40.

Similar species. – Most like *B. asperuloides*, differing in general habit but especially in the wide white margin of its bractlets and the different shape of the petals.

Material seen

ITALY: Calabria, near bridge over river Lao in limestone gorge below Papisidero, Cosenza province, 12.9.1990, *Burton* (LD).

SICILY: Monte Nebrodi, c. 5 km WNW of M. d. Morro, Catafusco, 900 m, 37°59'N, 14°48'E, 21.9.2001, *S. Snogerup*, *S. Brullo* & *B. Snogerup* 17861 (B, LD).

25. *Bupleurum praealtum* L., Fl. Monsp.: 12. 1756 – Fig. 42

Lectotype (designated by *S. Snogerup* in *Davis*, Fl. Turkey 4: 408. 1972): Dodoens, Stirp. Hist. Pempt.: 633, left figure.

= *B. junceum* L., Sp. Pl. ed. 2: 343. 1762. – Type: Described from France and Italy.

= *B. trifidum* Ten., Prodr. Fl. Neapol.: 18. 1811-15. – Type: “ad saepes” scripsit Tenore and “à Tenore 1828” (WU-Keck!); “*Bupleurum trifidum* Nob.” “scripsit Tenore!” (UPS!)

= *B. junceum* var. *rissoni* A. Rich. in Candolle, Prodr.: 128. 1830. – Type: Villefranche, 1819, A. Richard (G-DC, teste Reduron).

= *B. quadridentatum* Wettst. in Biblioth. Bot. 5 (26): 48. 1892. – Syntypes: Albania, Dolnja Voda, Dörfler & [Greece] Macedonia, Korfiati, 1890, Charrel (WU-Hal).

Annual or sometimes biennial, 30-200 cm, usually starting with some large, densely placed leaves withering before anthesis, then developing a strong main stem, large specimens with lateral branches from near the base, small often only pseudo-dichotomously branched above, main umbel overtopped by a few branches, umbels (10-)20-100 or more, some of them usually very depauperate. *Stem* erect, striate, flexuose above, in young and upper parts with 4-5 ridged angles, in middle and basal part becoming terete and up to 5 mm thick, in thick parts hollow, smooth. *Cotyledons* with 5-10 mm long indistinct petiole and lamina 10-25 × 0.5-2.5 mm, narrowly oblanceolate to linear, with midrib and marginal vein, veinlets inconspicuous. All leaves with amplexicaul base. *First leaves* often gradually changing from such with illdefined petiole to sessile, narrowly oblanceolate, of various size up to 200 × 7 mm. *Cauline leaves* 15-180 × 2-10 mm, very narrowly lanceolate to linear, acuminate, with thick midrib, 2-8 weaker side veins and 1 weak marginal vein, veinlets inconspicuous, margin scabrous. *Peduncles* (5-)10-55 mm. *Umbel rays* 2-4, 5-30 mm, unequal to subequal, longest equalling or shorter than peduncle. *Bracts* 3, 2-10 × 0.5-1.5 mm, unequal, lanceolate, acuminate, 3-veined, scabrous on margin, herbaceous. *Bractlets* 4 or rarely 5 in largest umbellules, 3-5 × (0.5-)1-1.5 mm, lanceolate, ± keeled, acuminate, 3-veined, with scabrous margin, herbaceous. *Umbellules* (1-)3-7-flowered, pedicels 0.3-4 mm, unequal. *Petals* yellow, 0.5-0.7 × 0.7-0.9 mm, broader than long, inflexed lobe short, very broad, shallowly emarginate, vein broad and continuing on lobe but often whitish and inconspicuous. *Anthers* 0.4-0.5 mm, *filament* c. 1 mm. *Stylopodium* 1-1.3 mm wide, at least as wide as ovary but narrower than ripe fruit, purple becoming brown, *styles* 0.3-0.4 mm, shorter than *stylopodium* radius. Whole fruit as unripe ellipsoidal, *mericarps* as ripe (3-)4.5-7 × 1-1.5 mm, smooth, prismatic to subcylindrical, pentagonal with low but conspicuous ridges, ventral side with a narrow furrow, oil ducts inconspicuous.

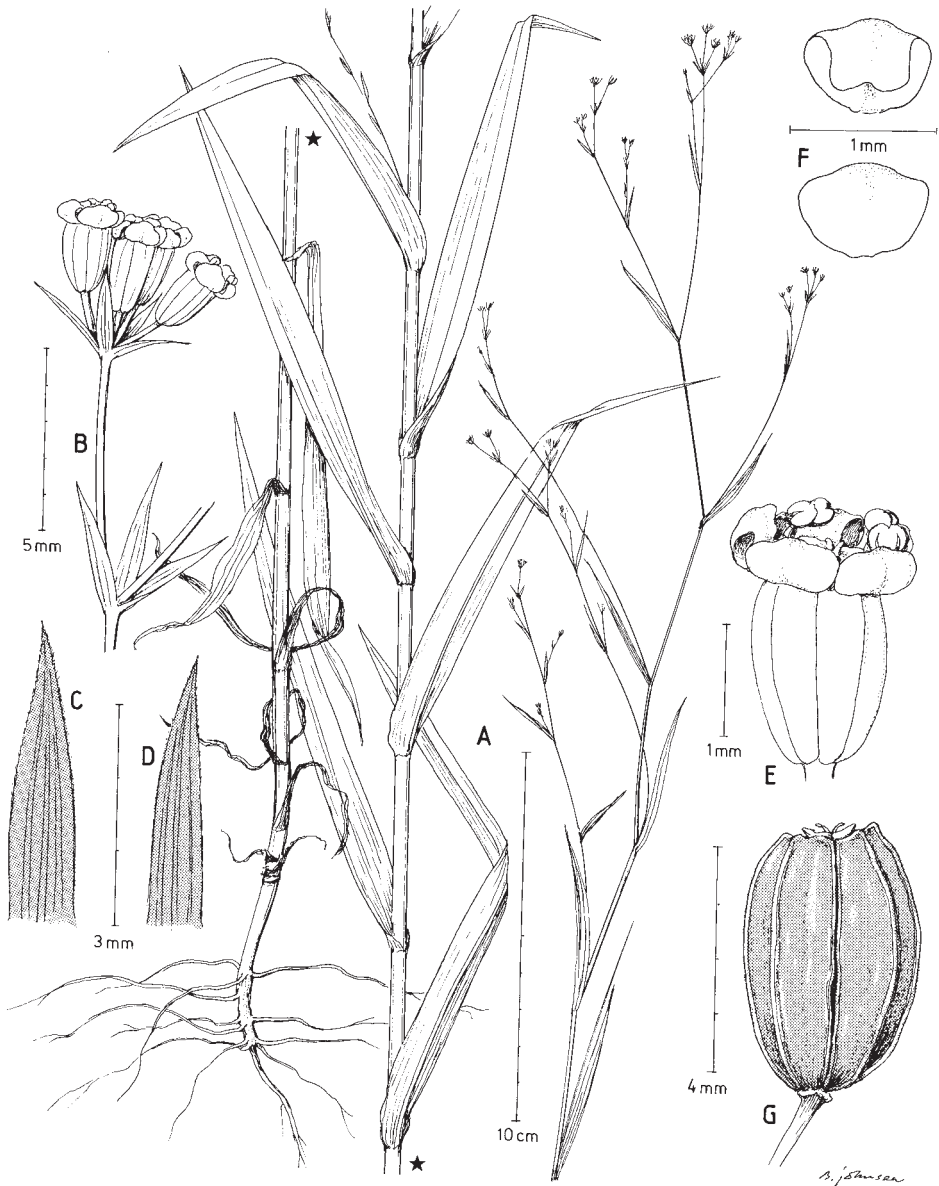


Fig. 42. *Bupleurum praealtum* – A: habit (one part left out); B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A: Bulgaria, Deli Orman, Obrasov-tschiflik, *Rechinger* 686 (LD); B-F: Bosnia, Velež plan., 1889, *Murbeck* (LD); G: Hungary, Kl. Karpathen, St. Georgen, 1901, *Rechinger* (LD).

Chromosome number. – $2n = 16$ (Cauwet-Marc 1976, S. Snogerup 1994).

Flowering. – June to September, fruiting August until winter.

Habitat. – Dry, open or shrubby habitats, ruderal places, 0-800(-1500) m.

Distribution. – Central and S Europe, from NE Spain east to the W Black Sea area. Al, Au, (Be), Bos, Bu, Ga, Gr, Hrv, Hs, Hu, It, Jug (Montenegro), Kos, Lu (1840), Mak, Rm, Sa, Si, Sla, Sle, Tu. – Fig. 43.

Probably native in S and SE Europe, cosmopolitan as ruderal and casual.

Variation. – Forms with small fruits are more common in W Mediterranean. Any evaluation of this variation is, however, difficult. The fruit continues to change in size and shape until the plant is all withered, and few collections therefore contain fruits that are certainly fully ripe. Further studies on living material are needed to show if a division into subspecies is necessary.

Selected material seen

ALBANIA: Celedrisdagh ap. Durazzo, 22.8.1894, *Formánek* (WU-Hal); Shkodra, Dorf Pardica, 31.7.1916, *Janchen* (WU); Westabhang des Pashtrik, 15-1600 m, 12.8.1918, *Zerny* (W); Muleti, Tirana, 12.9.1918, *Schneider* (W).

AUSTRIA: Hundskogel in der Brühl bei Mödling, 17.8.1907 *Korb* (UPS); Sattelkogel bei Mödling, 1.8.1911, *Kunsterb* (W); Eichkogel bei Mödling nächst Wien, 8.1915, *Keller* (W); Rodaun, 26.8.1921, *Schneider* (W); Gieshübl, 11.9.1926, *Schneider* (W).

BOSNIA-HERCEGOVINA: Am Lipovac (Starigrad) bei Sarajevo, 15.8.1905, *Malý* (WU); Krivosije, 7.1906, *Schneider* (W); inter Bakračušta et Han Orman, 28.8.1906, *Malý* (W); Uvac in Bosnia oriental, 7.1907, *Vandas* (PR); Prača prope Banja Stijenir, 575 m, 1.9.1920, *Malý* (WU); Drina gorge, W of Visegrad, near Dededy, *Frost-Olsen 1991* (C).

BULGARIA: Nova Mahala, 8.1906, *Střibrny* (E); Stanimaka, 6.1909, *Střibrny* (LD); Deli Orman ad Obrasov-tschiflik prope Russe (Rustschuk), 13.7.1930, *Rechinger 686* (LD, W); a litus Ponti euxini inter monasterium Aladscha et Sveti Konstantin Varna, 16.7.1930, *Rechinger 935* (W); Distr. Varna, Zlatni Pjasaci, 10.9.1962, *Kral* (PRC); Rhodope or., Čal planina, 2.8.1973, *Ančev, Pl. Bulg. Exs. 1042* (C, E, PR, UPA, W); Distr. Blagoevgrad, Liljanovo haud procul ab Sandanski, 4.8.1975, *Deylova* (PR); Centr. Rhodopi mt., Kozarsko, distr. Pazardzik, 21.8.1976, *Kuzmanov* (G); Montes Stara Planina, valle fluminis Iskar, Lakatnik 20 km seridio-occid. Vraca, 13.8.1975, *Deylova* (PR); 12 km N Slancev brjag on road Burgas-Varna, 22.7.1977, *Frost-Olsen 1057* (C); 4 km W of Narenčenski bani on the road Smoljan-Asenograd, 4.8.1977, *Frost-Olsen 1252* (C).

CROATIA: Velebit, inter Jablanac et Balinska Draga, 19.7.1908, *Degen* (GB, W); Split, Castel-Cambio, Bosic, 27.7.1912, *Čelakovsky* (PR, PRC); Insel Veglia (Krk), 17.7.1931, *Hübl* (WU); Opatija, Mount Euka, 31.8.1964, *Berglund* (GB); Rijeka, Bakarac, 12.9.1965, *Höpfinger* (C, H, LD, W); Istria, inner end of Limski Canal, 26.7.1968, *Alroth* (GB); 16 km S Senj along the coastal road, 120 m, 5.8.1970, *Strid 1668* (LD).

FRANCE: Caselnau près Montpellier, 7.1896, *Fehlmann* (C, UPS); Aude, Les Vignes, Quillan, 26.8.1903, *White* (E); Quillan, 26.8.1903, *Salmon & al.* (BM); Ain, Ambleon, 7.7.1907, *Brunard* (BG, GB, LD); Dauphiné, Ponts-de-Claix, 8.1909, *Victor* (LD); Var, Le Cannet des Maures, 1.8.1971, *Berger 4284* (ATH, C, H, LD); Gorge du Loup NW of Nice, 25.8.1975, v. *Bothmer & Gustafsson* (LD).

GREECE: Kalampaka, ad Kastreiki, 25.7.1896, *Sinten* 1003 (B, E, FI, G, LD, PR, PRC, W, WU, WU-Hal); Epirus, montes Smolika, Kerasovo, 1300-1600 m, 9.7.1958, *Rechinger 20822* (W); 15 km a Thessaloniki boreoorientem versus ad viam versus Sarakli, 10.7.1970, *Rechinger 38240* (W); Mt Pangeon, 2 km NW-NNW Podochorion, 600-700 m, 28.7.1971, *Snogerup 1114* (LD); Nom. Kiklis, Goumenissa, Pirria, 240 m, 6.8.1971, *Haristos 1025* (ATH); Nom. Dramas, Mt Menikion, forest road ascending from Mikropolis, 900-1100 m, 29.7.1985, *Strid 24981* (C, G, M, UPA); 11 km from Kalpaki on road to Ioannina, 550 m, 39°49'N, 20°43'E, 3.8.1989, *Strid & al. 30374* (C, LD).



Fig. 43. European distribution of *Bupleurum praealtum* according to material revised.

HUNGARY: Banati bei Barias ad Donau, 21.6.1905, *Hayek* (WU); St. Georgen pr. Pressburg, 17.7.1912, *Lyngé* (BG, O); Visegrad circa arcem regis Matthiae, 4.8.1922, *Vestergren* (GB, S); Com. Boorsod, Gilitkatet, pag. Monospel, 5.8.1932, *Wall* (S); Comit. Pest, in montibus Fekete-hegyek supra pag. Páty, 14.9.1939, *Kárpáti* (LD, UPS); Montes Rökk, Repashuta, boreo-orientem Eger, 400-450 m, 28.8.1970, *Vášak* (PR); Montes Mátra, Mariaczke prope Matrafüred, boreo-orientem Gyöngyös, 300-450 m, 10.9.1970, *Vášak* (PR).

ITALY: Aprutii, Caramanico, 600-650 m, 8.1906, *Rigo* (S); Garessio, Eca-Nasago, 20.7.1908, *Zurani* (S); Mte Maggiore, Veli Golin gegen Boljunicica, 17.9.1908, *Ginzberger* 243 (WU); Prov. di Roma, Paliano loco Vallalta, 8.1914, *Béguinot* (WU); Potenza in silva a Pollareta loco Pappasoli, 1200 m, 12.8.1928, *Gavioli* (PR); Venezia Giulia, Carso triestino Cattinara, 28.7.1951, *Sablich* (LD); Trieste, 23.8.1972, *Poldini* 6748 (C, H, LD, PR, TUR, UPA).

Kosovo: Metohija, NW Peč gegen die Pehlen, 900-1500 m, 31.7.1975, *Krendl* (W); N Peč, 600-800 m, 31.7.1975, *Krendl* (W).

MACEDONIA: Mtis Galicitz pr. Ohrida, 7.1908, *Dimonie* (PRC, W, WU, WU-HAL); Skoplje, supra Raduse, 20.7.1967, *Weber* (PR); Zedena planina, in fauce fluminis Treska ad Raduse, 21.7.1967, *Weber* (PR); Galicica Planina, c. 6 km E of the pass on the road Trpejca to Otesevo, 1300 m, 27.7.1979, *Frost-Olsen* 2670 (C).

PORTUGAL: Inter segetes totius Estremad., 5.1840, *Welwitsch* (PR).

ROMANIA: Orsova, Allinberg, 8.1901, *Häyren* (H); Oltenia, distr. Mehedinți, Vêrciorova, 150 m, 19.9.1941, *Borza & Buia*, *Fl. Rom. Exs.* 2561 (C, W); Dobrogea, a pago Babadag, 8.1963, *Žertova* (PR); Cioaca prope Orsova, 2.10.1965, *Morariu & Danciu* (LD); Oltenia, distr. Dolj: Dilga, 130 m, 15.8.1966, *Cîrtu*, *Fl. Olt. Exs.* 694 (H, LD, O, PRC, UPS).

SLOVAKIA: Comit. Sirmia, Cortanovci, 11.7.1910, *Kupčok* (PR); Bazinii, prope Csukard, 26.8.1918, *Holuby* (PRC); Carpathi Minores, montis Malý Rachsturm, 10.7.1922, *Novák* 637 (PRC); Parkan

ad Danubium pr. stat. Kovačov, 200 m, 5.8.1929, *Suza*, Fl. Exs. Rep. B. Sl. 441 (C, GB, K, LD, O, PRC, S, W, WU); Malé Karpaty, Modra, 8.1938, *Suza* (PRC); Nová Baňa, Krivine nad vsi Psiary nad Hronen, 200 m, 8.8.1956, *Černochoch* (PRC); Kovačov, 14.9.1968, *Kučera* (PRC); Štúrovo, mezi Kovačovem a nadrazim Kamenica, 200 m, 22.8.1956, *Soják* (PRC).

SLOVENIA: Zw. Selo u. Brestovica, 14 km südl. Nova Gorica, 22.7.1972, *Hofmann* (LD).

SPAIN: Serrania de Cuenca, 6.1898, *Gandoger* (W); Catalogne, Massif du Tibidabo, Barranco de S. Genis, 14.7.1912, *Sennen 1393* (E, W); *ibid.*, 13.8.1912, *Sennen 1392* (GB, LD, W); Barcelone, Massif du Tibidabo, 13.9.1928, *Sennen* (LD, W); Hervás, opidulum Cáceres, 10.8.1946, *Rivas Goday* (PR); Prov. Jaén, Sierra de Cazorla, Los Huertos de la Nava de San Pedro, 1260 m, 23.7.1951, *Heywood 1533* (BM); Ostpyreneen, Prov. Lerida: Segre-Tal 1 km O Seo de Urgel, 700 m, 27.7.1968, *Krendl* (W); Prov. Burgos, Oña, bords de la rivièrre Oca, 550 m, 12.9.1983, *Montserrat 11474* (C, H).

TURKEY-IN-EUROPE: Près Kara Kaya Dalisni R. Kavak-Benyuk-Liman, 30.7.1900, *Aznavour* (G); Istanbul, Kilidj. b. Bagtehény, 9.9.1900, *Aznavour* (G).

YUGOSLAVIA: Piro, 7.1892, *Jovanovic* (W, small-fruited form); Nissans, 7.1895, *Adamovic* (WU); Knjazevac, 400 m, 7.1896, *Adamovic* (W, WU); Montenegro, Medun pr. Podgorica, 7.1906, *Rohlén* (PR, PRC).

26. *Bupleurum affine* Sadler, Fl. Comit. Pest. 1: 204. 1825 – Fig. 44

≡ *B. gerardi* var. *affine* (Sadler) Griseb., Spicil. Fl. Rumel. 1: 347. 1843 ≡ *B. gerardi* var. *virgatum* Caruel in Parl., Fl. Ital. 8: 408. 1889. – Syntypes: [Hungary], ad sepes vinearum um den Blocks- und Adlerberg Budae & in graminosis arenosis siccis circa Pestinum sat frequens.

= *B. gerardi* Jacq., Fl. Austr. 3: 31. 1775, non All. (1774). – Type: [icon], Jacq., Fl. Austr.: t. 256.

= *B. breviradiatum* (Reichenb.) Wettst. in Biblioth. Bot. 5(26): 52. 1892 ≡ *B. gerardi* var. *breviradiatum* Reichenb., Icon. Bot. Pl. Crit. 2: 56. 1824. – Holotype: Gerhardsberge bei Ofen, Lang ([drawing!]).

Annual, 20-120 cm, with main stem and several spreading-erect to erect, short or up to 20 cm long lateral branches from near the base or in small specimens only above, top umbel usually overtopped by one or a few branches, umbels 10-50(-100 or more), usually only the top umbel of each branch fully developed. *Stem* erect, ± flexuose above, striate, in young and upper parts 4-5-angular, below terete and up to 3(-5) mm thick, smooth, angles often with low ridges. *Cotyledons* not seen. *All leaves* with amplexicaul base. *First leaves* only seen as fragments, some densely placed, withered before anthesis, probably like the cauline ones. *Persistent cauline leaves* (10-)20-150 × 1-5 mm, sessile, linear or very narrowly oblanceolate, acuminate, with scabrous margin, 3-7-veined with a conspicuous midrib and inconspicuous marginal vein. *Peduncles* 5-30(-50) mm. *Umbel rays* (2-)3-6, 0.5-30 mm, very unequal, shorter than or rarely equalling or longer than peduncles. *Bracts* (2-)3-4, 6-8 × 0.5-1 mm, much shorter than longest ray, narrowly lanceolate, acuminate, scabrous at margin and midrib with midrib and 2 weaker veins, herbaceous with c. 0.05 mm wide light margin. *Bractlets* 5, 2.5-5 × 0.5-1 mm, lanceolate, acuminate, ± keeled, scabrous at margin, with strong midrib and 2 side veins, herbaceous throughout or with up to 0.2 mm wide whitish border. *Umbellules* 4-6-flowered, pedicels 0.3-2 mm, very unequal. *Petals* dark violet becoming whitish, 0.4-0.5 × 0.45-0.5 mm, widest above, bend almost straight, inflexed lobe from a triangular base narrow, rectangular, midrib concolorous, inconspicuous. *Anthers* 0.2-0.3 mm, *filaments* 0.4 mm. *Stylopodium* 0.7-0.9 mm wide, equalling ovary but much narrower than ripe fruit, *styles* 0.2-0.25 mm, much shorter than stylopodium radius. Whole fruit ellipsoidal to subglobose, *mericarps* 2-3 × c. 1 mm, rounded pentagonal in transect with a narrow furrow in ventral face, smooth, glaucous, ridges low or filiform, oil ducts visible, one in each field.

Chromosome number. – 2n = 16 (Cauwet-Marc 1976).

Flowering. – July to September, fruiting September to November.

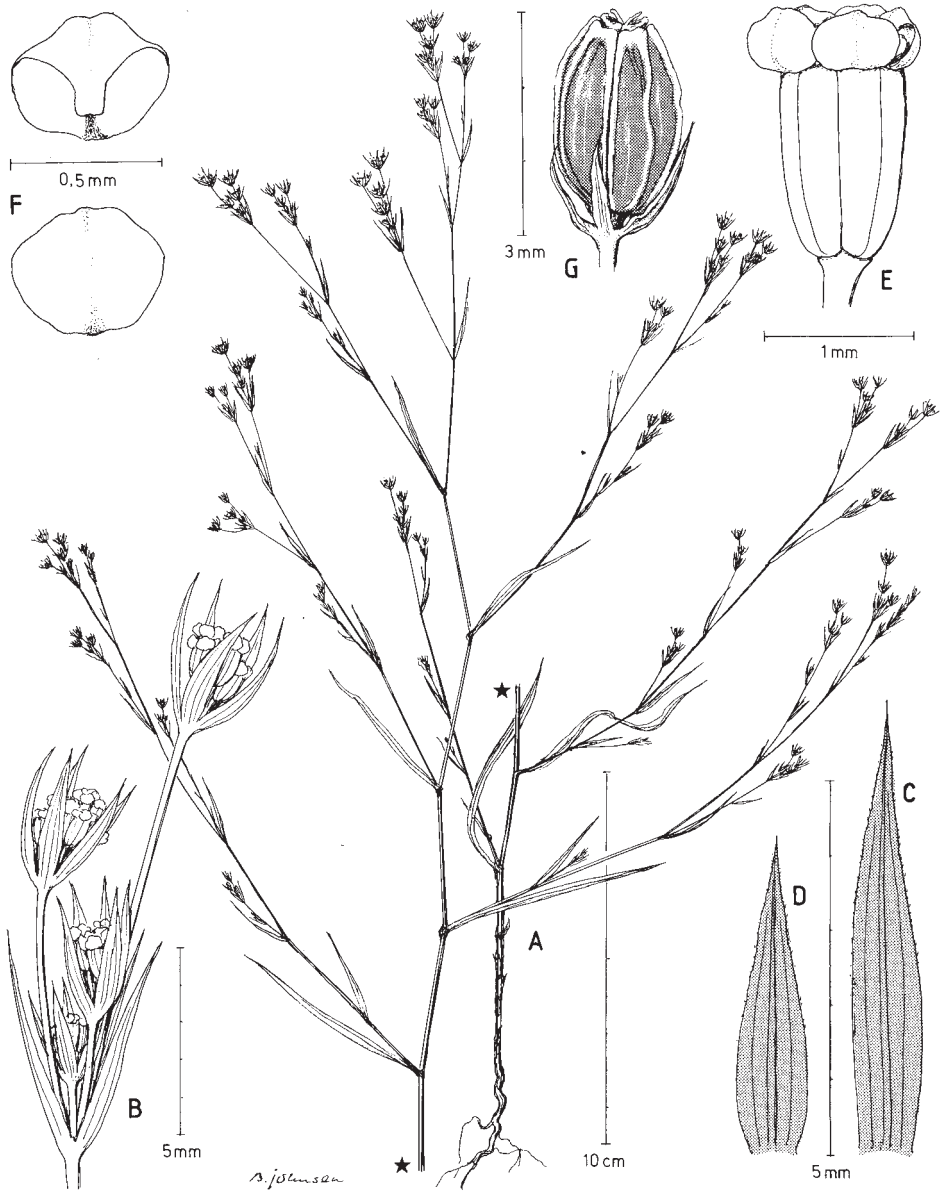


Fig. 44. *Bupleurum affine* – A: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A-F: Bulgaria, Dragoman, *Rechinger* 1844 (LD); G: Hungary, Budapest, 1946, *Kárpáti* (LD).



Fig. 45. European distribution of *Bupleurum affine* according to material revised.

Habitat. – Grassland, scrub, open woods, ruderal localities, from near sea level to 1350 m.

Distribution. – Central, E and S Europe, common from Austria and Czech Republic to Krym and south to N Greece, probably also native in the Rhône valley in France. Au, Bos, Bu, Cze, Ga, Gr, Hrv, Hu, Jug, Kry, Mak, Po, Rm, Sla, Ukr. – Fig. 45.

Caucasus, NW Anatolia.

Selected material seen

AUSTRIA: Vöslau, 24.8.1907, *Schneider* (W); Hetzendorf, 6.10.1912, *Leute* (W); Laaersberg, 31.7.1918, *Korb* (S, W); Mödling, 12.8.1919, *Korb* (W); Wien, am Aufstieg zum Leopoldsberg, 28.7.1948, *Höpflinger* (C).

BOSNIA-HERCEGOVINA: Sarajevo, Lapišnica-Schlucht, 4.9.1891, *Murbeck* (LD).

BULGARIA: Nova Mahala, 21.9.1895, *Střibrny* (E, GB, LD, W); bei Loidtscha, 6.8.1898, *Urumoff* (WU-Hal); supra Dragoman, 850 m, 13.8.1923, *Novák* (PRC); Deli Orman, ad Obrasov-tschiflic pr. Russe (Rustschuk), 13.7.1930, *Rechinger* 742 (W); 5 km östl. Nova Zagora, an der Strasse nach Sliven, 12.8.1968, *Merxmüller & Zollitsch* (M).

CROATIA: Insula Lesina, s. dat., *Botteri* (PR).

CZECH REPUBLIC: Bohemia, Vraniko, Prahy, 1887, *Polák* (PRC); Prencow, Zlatny, 25.7. & 29.9.1890, *Kmet* (M, UPS); Moravia, Zuasin, 11.8.1918, *Holuby* (PRC); Böhmen, Sparsum, 5.8.1935, *Suza* (S); distr. Znojmo: ripam dextram rivi Jevišovka inter Smidluv et Lapikus, c. 1 km mer.-occ a Rudlice, 27.6.1977, *Skalický & al.* (PRC).

FRANCE: Sables d'Olonne, s. dat., *Bonneau* (C); Toulouse [referring to a suburb of Lyon], s. dat., *Pouzolz* (E); Lyon, 27.7.1850, *coll. ignot.* (C, G); dune de la Bordiere près Les Sables, 7.1854, *coll. ignot.* (C); Lyon, Meyzieux, 7.1870, *Jordan* (UPS); Loire inf., St. Michel, 5.8.1877, *Lloyd* (E).

GREECE: Mt Olympos, NW foothills 5 km from Petra along road to Kokkinoplos, 660-700 m, 14.8.1975, *Strid & Hansen* 9293 (ATH, C, LD).

HUNGARY: Comit. Fejér, Hétház-pusztá prope Isztimer, 450 m, 21.8.1932, *Boros* (PR); Comit. Pest, montis Nagykevély supra Pilisborosjeno, 500 m, 17.9.1939, *Kárpáti* (C, GB, LD, PR, S, UPS); Comit. Komárom, montis Fábiánkő pr. Tarjan, 300 m, 22.9.1940, *Boros* (LD, S, UPS); montis Sashegy supra Budapest, 200 m, 27.7.1946, *Kárpáti* (GB, LD, S, UPS); Bilid-erdő prope Kereczend, meridiem ab Eger, 150–200 m, 29.8.1970, *Vašák* (PR).

KRYM: Simferopol, prope Neusatz, 30.7.1900, *Callier* 609 (C, E, GB, M, O, PR, W, WU-Hal); distr. Bakhchisarai, Chufat-kale, 300–400 m, 23.7.1977, *Vašák* (W).

ROMANIA: Valakiet, Comana S Bukarest, 5.7.1931, *Skottsberg* (GB); Dobrogea, austr. a Mihai-Viteazu inter Constanca et Tulcea, 8.1963, *Žertova* (PR); Moldavia, distr. Iași, Gollești, 150 m, 25.8.1964, *Topa & Lazar* (WU); Distr. Arad, declivibus meridionalis collis Dealul Moerea pr. Ineu, 1.8.1967, *Daneiu* (H, LD); Oltenia, distr. Dolj, pr. Radovan, Valea Rea, 150 m, 27.8.1969, *Teodorescu, Fl. Olt. Exs.* 695 (G, H, LD, O, UPS).

SLOVAKIA: Distr. Trenčín, Čachtické kopce, sub ruinam arcis Čachtický hrad, 16.9.1968, *Kučera* (PRC); distr. N. Meston Vah supra Visnove, 350 m, 26.8.1970, *Dostal* 19689 (PRC); distr. Plešivec, regio carstica Slovenský Kras, supra Kečovo, 400 m, 31.8.1970, *Dostal* 19686 (PRC); inter Tesáre et Domaníky, 8.7.1972, *Chrtkova* (PRC); distr. Nové Zámky, sub colle Oreg a Vel. Ludince, 240 m, 23.7.1973, *Chrték & al.* (LD, PRC).

UKRAINE: Podolia australis, prope Czerny, 29.7.1885, *Schmalhausen* (H).

YUGOSLAVIA: Niš, 400 m, 7.1897, *Adamovic* (W); Mackal non procul ab Uzice, 720 m, 15.7.1923, *Novák* 155 (PRC); Metikos non procul ab Kraljevo, 420 m, 29.7.1926, *Novák* 2004 (PRC); 500 m SE von Topela, 250–300 m, 25.7.1964, *Krendl* (W); 5 km N of Paracin, c. 120 km SE of Beograd, 30.7.1971, *Snogerup* 1131 (LD).

27. *Bupleurum trichopodium* Boiss. & Spruner in Ann. Sci. Nat., ser. 3, 1: 145. 1844 – Fig. 46
Lectotype (designated here by Pimenov): *Bupleurum an gerardia*, Attica, *Spruner* (G-BOIS!) [–*B. gerardi* All. sensu Sm., Fl. Graec. Prodr. 1: 178. 1806].

Short-lived annual, 5–30(–50) cm, usually pseudo-dichotomously branched from near the base but especially tall specimens sometimes with dominating main stem and lower branches lacking or short, umbellules (1–)5–30, late ones often very depauperate. *Stem* erect, striate, as young and above 3–4-angular, soon becoming terete and at base up to 2(–3) mm thick, smooth. *Cotyledons* with 0.7–1 mm petiole and lamina 6–11 × 1–2 mm, narrowly elliptical, with midrib, thin marginal vein and inconspicuous or lacking veinlets. *All leaves* with amplexicaul base. *First few leaves* with petiole 3–20 mm and lamina 4–20 × 2–5 mm, elliptical or narrowly so, with midrib, marginal vein and pinnately arranged veinlets, following cauline leaves 10–80(–120) × 2–5 mm, gradually with longer but scarcely delimited petiole, some sessile, linear or narrowly elliptical to lanceolate, acuminate, smooth or margin minutely scabrous near apex, with 3–7 veins but usually only midrib and marginal one reaching apex. *Uppermost leaves* narrowly lanceolate with broad, clasping base. *Peduncle* (5–)10–40(–60) mm. *Umbel rays* (1–)3–6, (0.5–)10–40(–60) mm, usually subequal, longest ones half to twice as long as peduncle. *Bracts* 0–3, variable and often leaflike, 5–20 × 0.5–3 mm usually much shorter than rays. *Bractlets* in well developed umbellules mostly 5, (2–)3–15 × 0.2–5 mm, in small umbellules 1–4 and smaller, very narrowly lanceolate, acuminate to cuspidate, usually with a long awn, with scabrous margin, herbaceous. *Umbellules* 1–6-flowered, pedicels 0.2–2.5 mm, unequal. *Petals* yellow, whitish or sometimes purple, becoming whitish, 0.4–0.5 × 0.5–0.6 mm, broadest above, bend straight or almost so, inflexed lobe c. 3/4 as long as limb, broad, bifid, vein thin, continuing on lobe. *Anthers* 0.2–0.3 mm, *filaments* 0.5–0.7 mm. *Stylopodium* 0.5–0.6 mm broad, as wide as ovary but narrower than ripe fruit, *styles* 0.15–0.3 mm, equalling or shorter than stylopodium radius. *Mericarps* 2.4–3 × 1.2–1.5 mm, smooth, prismatic to slightly rounded, in transect pentagonal with sharp ridges, inner face with narrow furrow, oil ducts visible, one in each field, smooth, ridges filiform.

Chromosome number. – 2n = 16 (S. Snogerup 1994).

Flowering. – April to June, fruiting June to July.

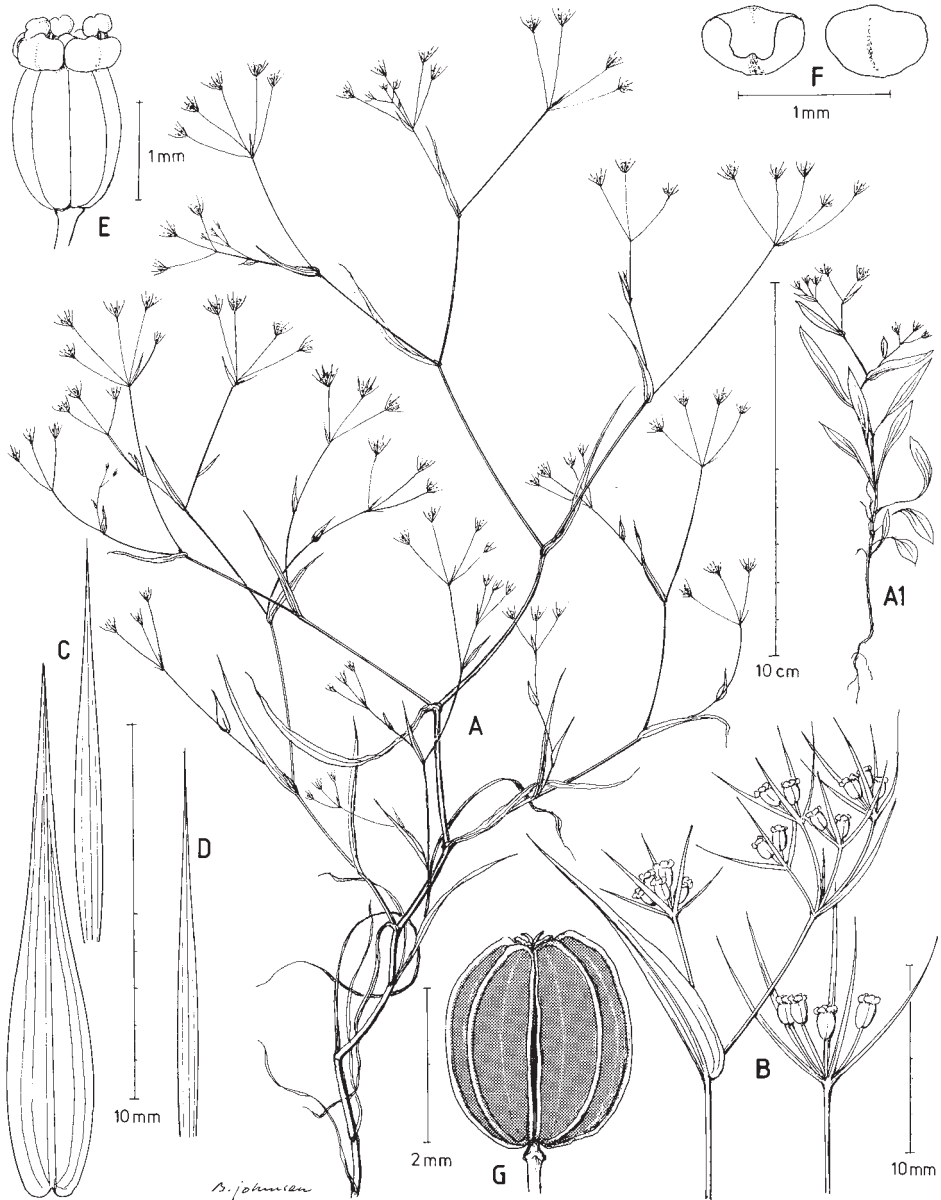


Fig. 46. *Bupleurum trichopodum* – A, A1: habit; B: part of inflorescence and umbellule; C: upper leaf and bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A, B (left part): Greece, nom. Magnisia, Skopelos, S. & B. Snogerup 5595 (LD); A1: Greece, Kikladhes, Amorgos, Snogerup 20254b (LD); B (right part), C-F: Greece, nom. Achaïas, Ano Kastritsi, Strid & al. 29594 (LD); G: Greece, nom. Viotias, Parnassos, Gustavsson 7046 cult. (LD).

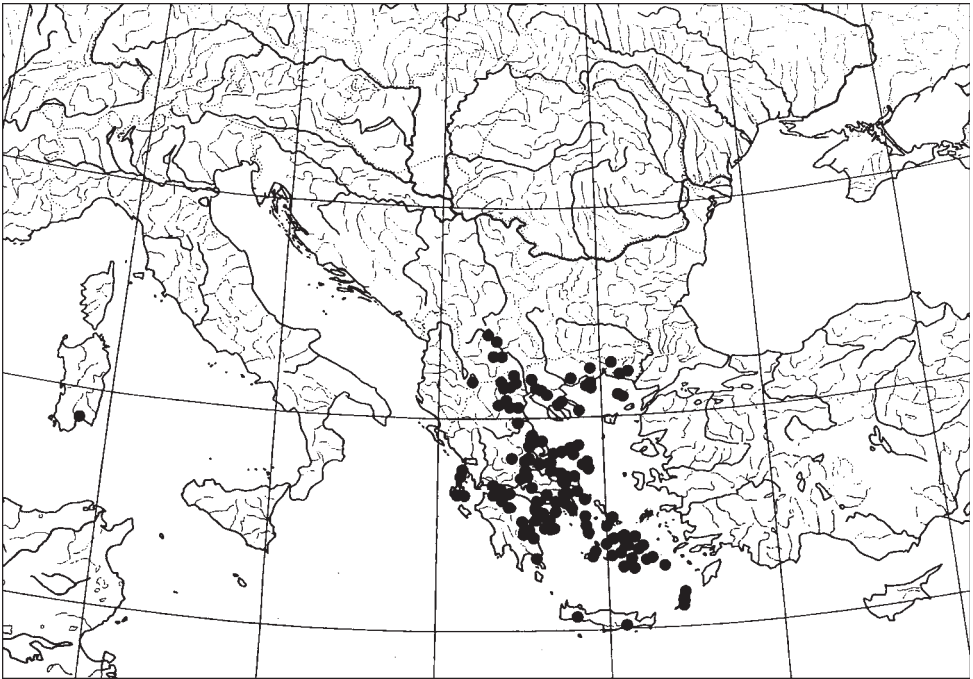


Fig. 47. European distribution of *Bupleurum trichopodum* according to material revised.

Habitat. – Phrygana, dry fields, rocks and cliff ledges, open forests, grassland, 0-1000 m.

Distribution. – Sardegna (perhaps introduced) and a common plant in large parts of the Balkans and the Aegean. Cr, Gr, Mak, Sa. – Fig. 47.

W Anatolia, Cyprus, (? Syria), Libya.

Variation. – The intraspecific variation is unusually large especially in shape and size of leaves, and sizes and numbers of inflorescence parts. Much of this variation is, however, among local populations and among individual plants. There is a tendency that plants of open vegetation near sea level are small, with short and broad leaves, few umbellules and few flowers. We consider that this is merely an ecocline variation occurring independently in various areas.

Selected material seen

GREECE: Nom. Kikladon, Kea, 2-4 km ESE-E of the village Kea, 250-350 m, 1.6.1968, *Snogerup & v. Bothmer* 34069 (LD); Nom. Evrou, 1 km N Avas gegen den Susuz tepe, 200-300 m, 25.5.1979, *Krendl* (W); W coast 1.5 km S Ormos Kalogrias, 30 m, 38°55'N, 24°28'E, 1.5.1989, *Strid & al.* 28812 (ATH, C, G, LD, UPA); 28 km from Megara to Aerial Station, 1050 m, 38°01'N, 23°09'E, 11.6.1989, *Kit Tan & Vold* 6141 (C); 3-4 km from Pirgi to Amissa, 40°40'N, 21°49'E, 9.7.1989, *Kit Tan & Vold* 7011 (C); Nom. Florinis, ad Agios Georgios prope Psarades, 1020-1100 m, 5.5.1990, *Phitos & Kamari* 21388 (UPA); 4 km NW of Loutraki, 350-450 m, 38°00'N, 22°57'E, 19.5.1991, *Strid* 31207 (ATH, C, G, LD, UPA); on the way from Kanalia to Kalamaki, 50-100 m, 39°30'N, 22°51'E, 1. 5.1992, *Anagnostopoulos & Athanasiou* 2383 (UPA); Mt. Vourinos, SW foothills, 2 km E of Dafnero along road to Exarchos, 700 m, 40°10'N, 21°36'E, 23.6.1992, *Anagnostopoulos & Athanasiou* 3217 (UPA); Nom. Achaïas, ep. Kalavryton, ad monast. Mega Spilaeon, 900 m, 23.4.1994, *Phitos & Kamari* 23939 (UPA).

KRITI: Mt. Dikti, SW side of Madhara above Kato Simi, 1400-1600 m, 35°03'N, 25°31'E, 26.5.1986, *Strid 25134* (C); Karpathos, Berg Kollas, Ostflanke, 700 m, 15.4.1984, *Raus 9699* (B, C, LD, UPA); Mt. Kalilimni, 1100 m, 2.6.1986, *Höner & Potthoff 501* (B).
 MACEDONIA: Drenowo, 200-400 m, 11.5.1917, *Bornmüller 4189* (PRC); Prilep, montes Pletvar supra Trojaci, 29.5.1938, *Weber* (PR); Veles, in fauce flum. Babuna, 6.6.1938, *Weber* (PR); Skoplje, Karsjak pl., Mt. Velja Glava supra Sveta Petka, 27.6.1938, *Weber* (PR); Kozjak, supra Trojaci, 27.6.1938, *Weber* (PR); in faucibus rivi Topulka prope Veles, 31.5.1964, *Rechinger 25813* (G); Prilep, montis Kozjak supra Trojaci, 18.6.1966, *Weber* (herb. Huber-Morath).
 SARDEGNA: In collibus umbrosis prope Cagliari, 4.1827, *Müller* (E, H, PR, S, UPS, W, WU); Capo S. Elia presso Cagliari, 4.1860, *coll. ignot. [Gean?]* (UPS); Torre delle Stelle, Cagliari, 70 m, 28.4. & 16.5.1985, *Marchioni* (LD).

28. *Bupleurum gerardi* All. in Mélang. Philos. Math. Soc. Roy. Turin 5: 81. 1774 – Fig. 48

Holotype (cf. Meikle 1977): [icon] Gérard, Fl. Gallo-Provinc.: fig. 9. 1761.

= *B. australe* Jordan, Pug. Pl. Nov.: 72. 1852. – Lectotype (designated here by J. P. Reduron): Toulon, 1850, *Jordan* (P-Grenier).

= *B. gerardi* var. *virgatum* Reichenb., Icon. Bot. Pl. Crit. 2: 56. 1824. – Holotype: “Monte-falcone”, *Sieber* ([drawing!]).

= *B. gerardi* var. *patens* Reichenb., Icon. Bot. Pl. Crit. 2: 56. 1824. – Holotype: Frankreich, *Schleicher* ([drawing!]).

Annual, 8-40(-75) cm, with main stem in small specimens simple or branched only above, large specimens often from near the base and pseudo-dichotomous above, umbels (1-)5-20(-40), if many several depauperate, in small and moderately large specimens the top umbel often conspicuously the largest and the one reaching highest, in large ones one or a few branches overtopping the main stem. *Stem* erect, striate, $\pm$ flexuose, as young and above 3-5-angular, becoming terete and up to 2 mm thick at base, smooth. *Cotyledons* c. 10×0.5 mm, linear, acute, with midrib and marginal vein. *First, densely set leaves* 10-40 $\times$ 1.5-2.5 mm, soon withering, from a broad amplexicaul base with an indistinct petiole or subsessile, narrowly oblanceolate to linear, with midrib, thin side veins and pinnate-reticulate veinlets. *Cauline leaves* (10-)20-100 $\times$ 1.5-3(-5) mm, most ones semi-amplexicaul, very narrowly lanceolate to linear, apiculate to subulate, minutely scabrous on apical part of margin and sometimes on veins beneath, with 3-7 veins, the outer thin and $\pm$ marginal, veinlets inconspicuous or lacking. *Uppermost leaves* similar though smaller, not more than semi-amplexicaul. *Peduncle* (5-)15-35(-75) mm. *Rays* 5-8, in the largest umbels usually 6-8, (1-)10-40 mm, unequal, longest one usually shorter than or equalling peduncle, but sometimes longer. *Bracts* 3-5(-6), $\pm$ unequal, (3-)6-10(-18) $\times$ 0.5-1.5 mm, much shorter than the long rays, narrowly lanceolate, cuspidate, 1-3-veined. *Bractlets* (3-)4-5 in large umbellules usually 5, often unequal, (2.5-)4-8 $\times$ 0.5-1 mm, usually considerably exceeding flowers, narrowly to very narrowly lanceolate, (acuminate-) cuspidate, scabrous, (1-)3-veined without veinlets, flat to keeled, herbaceous throughout or with up to 0.1 mm wide scarious margin. *Umbellules* (1-)5-9- flowered, those of the largest umbellules usually 6-9, pedicels 0.5-2 mm, in flower unequal, in fruit becoming subequal. *Petals* purplish sometimes drying white, rarely white, 0.3-0.4 $\times$ 0.45-0.6 mm, bend almost straight or slightly cucullate with raised marginal wings, inflexed lobe variable in size and shape, 1/2-3/4 as long as limb, usually 1/2-2/3 as broad and flat, rarely narrower and $\pm$ inrolled, emarginate to bifid, vein to 0.2 mm wide, widest on the bend and there often finely granulose to papillose, continuing on lobe. *Anthers* 0.2-0.3 mm, *filaments* c. 0.5 mm. *Stylopodium* 0.4-0.6 mm, slightly narrower than ovary and much narrower than the fruit, *styles* 0.15-0.25 mm, shorter than stylopodium radius. *Mericarps* 2.5-3.5 $\times$ 0.6-1 mm, prismatic to rounded, smooth, whitish to dark and $\pm$ purplish brown, glaucous, ridges low to filiform, oil ducts usually 3 in each field, $\pm$ inconspicuous.

Chromosome number. – $2n = 16$ (Malheiros-Garde & Garde 1951).

Flowering. – May to July.

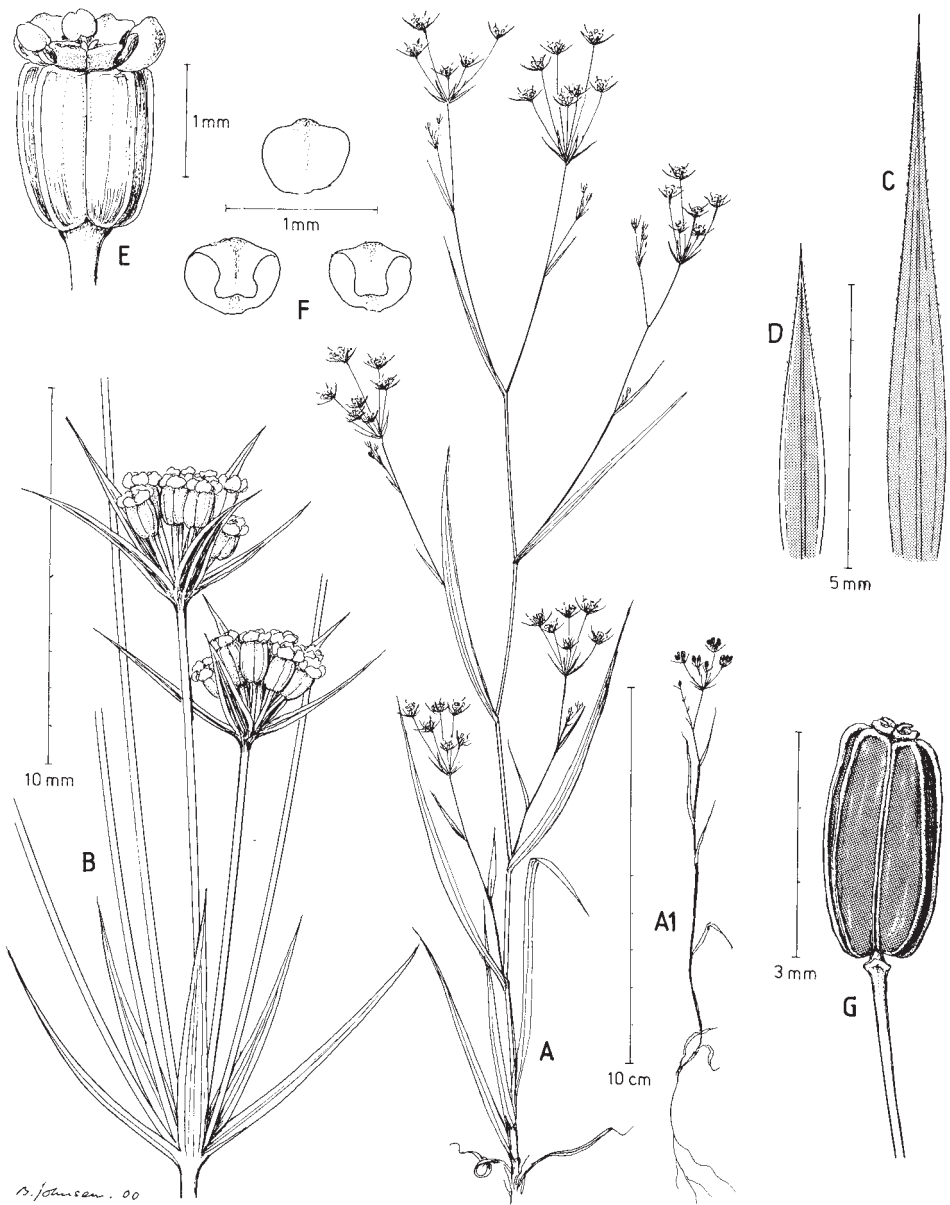


Fig. 48. *Bupleurum gerardi* – A, A1: habit, B: part of umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A, B-F: Italy, Liguria, Bajardo, 1892, *Bicknell* (LD); A1: Azerbaydzhan, Baku, Akhmedlu, *Holmberg* 942 (LD); G: Krym, Sudak, *Callier* 56 (LD).



Fig. 49. European distribution of *Bupleurum gerardi* according to material revised.

Habitat. – Dry, more or less open places, 600–1200 m.

Distribution. – The Mediterranean coast of France east to W Liguria in Italy, a few localities in E Andalusia, Spain, a few localities on islands of Croatia, in S Italy, Austria, Bulgaria and Krym. All or some of the European occurrences may represent old introductions. Because of frequent misdeterminations no records from literature can be accepted. Au, Bu, Ga, It, Hrv, Hs, Kry. – Fig. 49.

Georgia, Anatolia, Transcaucasia, W Iran, Iraq, Syria, Libanon, Palestine, Libya and Saudi Arabia, probably in some further areas as a ruderal and casual.

Taxonomic note. – The name *B. gerardi* is here used in a narrow sense, excluding the W European *B. virgatum* Cav. and the E Anatolian *B. rohlenae* Nab. Still, it is very variable and may merit further investigation.

Selected material seen

AUSTRIA: Wien, 1841, *Kováts* (WU).

BULGARIA: Stara Planina, vallis Sucurum ad Karlovo, 8.6.1936, *Klástersky & Deyl* (PR).

CROATIA: Ins. Torzola, middle of 19th century, *Botteri* (W); *ibid*, *Petter* (W); Lesina, middle of 19th century, *Botteri* (W).

FRANCE: Baret-Aix en Provence, 5.1898, *Bruyas* (UPS, W, WU) Var, Le Luc, couteau de Ste Hélène, 10.6.1904, *Bertrand* (LD, PR, S); Bouches-du-Rhône, Aix, champs à Saint Marc, 28.6.1904, *coll. ignot.* (LD); Toulon, versant Sud du Fazon, 150 m, 24.5.1906, *Verguin* (PR).

ITALY: Liguria, pr. Bajardo (S. Remo), 23.6.1892, *Bicknell* (LD).

KRYM: Steingeröll des Sokoll bei Sudak, 28.5.1896, *Callier* 97 (G, LD, O, W); prope Sudak, Ujutnoe, 20.9.1977, *Vinogradova & Gladkova* 5834 (C, E, H, S).

SPAIN: Prov. Malacitana, Sierra Prieta et Blanguilla, 900 m, 29.5.1879, *Huter, Porta & Rigo* 206 (C, E, PR, W, WU-Hal); Antequera, 16.5.1883, *Nilsson* (UPS); Andalousie, Sierra de Ronda, 26.6.1899, *Reverchon* 403 (C, LD, S, UPS); Prov. de Malaga, Torrox, 16.5.1952, *Roivainen* (UPS).

29. *Bupleurum virgatum* Cav., Icon. 1: 121. 1793 – Fig. 50

Type: Cavanilles (MA [photo]!)

= *B. filicaule* Brot., Fl. Lusit. 1: 452. 1804 ≡ *B. gerardi* var. *filicaule* (Brot.) Wolff in Engler, Pflanzenr. 43: 90. 1910. – Type: Described from near Coimbra (LISU?).

= *B. jacquinianum* Jordan, Pug. Pl. Nov.: 71. 1852 ≡ *B. gerardi* var. *jacquinianum* (Jord.) Briq., Monogr. Bucl. Alp. Marit.: 107. 1897. – Lectotype (designated here by J. P. Reduron): Lyon à Meyzieux, 7.1851, Jordan (NCY-Godron; isoelectotypes NCY, P).

= *B. scheffleri* Hampe, Prodr. Fl. Hercyn.: 109. 1873. – Holotype: Zwischen Blankenburg und Regenstein, 1866, Scheffler, not seen.

= *B. gerardi* var. *subadpressum* Rouy & Camus in Rouy & Foucaud, Fl. France 7: 333. 1901. – Lectotype (designated here by J. P. Reduron): Sierra Nevada, inter segetes in dehesa de S. Geronimo, 2000 m, 27.7.1879, Huter, Porta & Rigo, Iter Hisp. I, 204 (LY-Rouy; isoelectotypes PR!, PRC!, W!).

Annual, 25-40(-80) cm, usually with branches only in upper half, top umbel usually overtopped by one or a few branches, umbels (2-)5-20(-30), if many several depauperate. *Stem* erect, ± flexuose, striate, smooth, in young and upper parts 4-5-angular, becoming terete and at base up to 2 mm thick. *Cotyledons* linear, c. 10 × 0.5 mm. All leaves with a ± amplexicaul base. *Basal leaves* few to 10, densely placed, withered before anthesis, with petiole c. 1 cm, lamina c. 100 × c. 3 mm. *Cauline leaves* usually 40-60(-100) × 2-5 mm, in cultivated specimens to 15 cm, linear to linear-oblancoate, cuspidate, with 5-9 parallel veins, finely serrulate with a narrow scarious margin near the base, uppermost ones linear-lanceolate to narrowly ovate. *Peduncles* of large umbels 20-50(-70) mm. *Umbel rays* 2-4(-6), 0-50 mm, very unequal, often one or a few flowers in base of umbel without ray or bractlets, small umbellules sometimes single from leaf axils. *Bracts* (2-)3(-4), sometimes difficult to distinguish from bractlets of very short-rayed umbellules, (3-)5-10(-15) × 0.5-1.5 mm, usually unequal, much shorter than the long rays, narrowly lanceolate, cuspidate, navicular, scarious on margin, 3(-5)-veined, entirely herbaceous or with up to 0.1 mm wide whitish margin. *Bractlets* 4-5, in largest umbellules 5, 3.5-7 × 0.5-1 mm, exceeding flowers, flat or ± keeled, narrowly lanceolate, acuminate to cuspidate, (1-)3-veined, with inconspicuous veinlets and sometimes a weak marginal vein, herbaceous with up to 0.1 mm wide scarious, denticulate margin. Most *umbellules* 2-6(-8)-flowered, some short-petiolate ones 1-flowered with only one bractlet, pedicels 1.5-5 mm, much shorter than fruiting flowers. *Petals* 0.4 × 0.4-0.5 mm, obovate-obtrapezoidal, bend almost straight with raised marginal wings, inflexed lobe 1/2-2/3 as long as limb, ± abruptly contracted to narrow, thin apical part, emarginate, vein sometimes whitish and apparently thin, but up to 0.25 mm broad, widest at bend, continuing halfway on the lobe. *Anthers* 0.2-0.3 mm, *filaments* c. 0.5 mm. *Stylopodium* 0.5-0.6 mm, almost as wide as ovary but narrower than fruit, *styles* 0.2-0.3 mm, shorter than to equalling the stylopodium radius. *Mericarps* 2.2-2.5 × 0.8-1 mm, rounded pentagonal, with narrow ventral furrow, ridges low to filiform, oil ducts 3(-4) in each field.

Chromosome number. – 2n = 16 (S. Snogerup unpubl.).

Flowering. – April to July, fruiting June to August.

Habitat. – Different open, dry localities, arable fields, 0-2000 m.

Distribution. – A SW European endemic, scattered in the Iberian Peninsula and France, probably introduced and extinct at Blankenburg in Niedersachsen, Germany, distribution imperfectly known. Ga, (Ge), Hs, Lu. – Fig. 51.

Material seen

FRANCE: Lyon, 1840, Jordan (LD); Deux-Sevres, Thouars, 22.7.1849, Boreau (LD); Vaucluse, Bord du Rhône sous Villeneuve près d'Avignon, 11.6.1870, Brown (W); Loire et Cher, Ponts-Chartrains, près Blois, 12.7. & 22.10.1888, Segret (W).

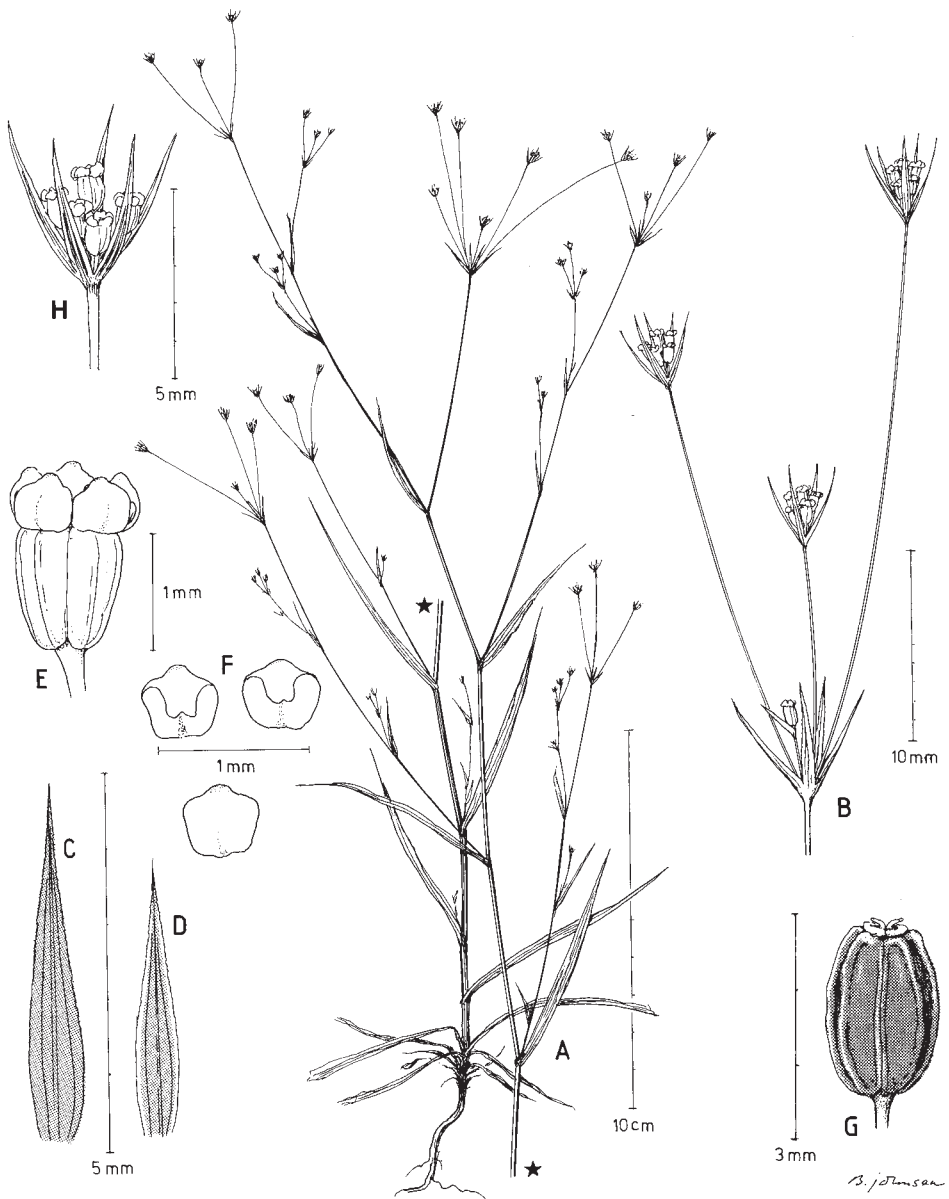


Fig. 50. *Bupleurum virgatum* – A: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit; H: umbellule. – Material: A: Portugal, Coimbra, Vale de Figueiras, 1954, *Matos & Pereira* (LD); B-F, H: France, Lyon, 1840, *Jordan* (LD); G: Portugal, Coimbra, Dianteiro, *da Silva* 1647 (LD).



Fig. 51. Distribution of *Bupleurum virgatum* according to material revised.

GERMANY: Hercynia, Blankenburg, s. dat., *Bertram* (W).

PORTUGAL: Serra de Arrabida, 6.1840, *Welwitsch* 458 (W); Arreadores de Coimbra, Mainca, 7.1876, *Ferreira* (C); Arreadores de Coimbra, Eiras, 6.1895, *Ferreira*, *Fl. Lus. Exs. 1364* (LD, O, WU, WU-Hal); env. de Sacavem, 5.1936, *Soari* (PR, S); Prov. Estremadura, Cascais, 50 m, 3.5.1938, *Rothmaler* (S); Prov. Estremadura, Sezimbra, 150 m, 17.5.1938, *Rothmaler* (S); Prov. Estremadura, Setubal, montium Sa. da Arrabida, Formosinho, 450 m, 4.6.1938, *Rothmaler* (S); Coimbra, Santa Clara, 1.6.1950, *Matos & Matos* (C, LD, PR, UPS); Coimbra, Vale de Figueiras, 13.6.1954, *Matos & Pereira* (LD, UPS); Beira Litoral, Coimbra Dianteiro, 150 m, 10.7.1958, *da Silva* 51977 (LD); Beira Litoral, Peneta vs. Podentes, 7.7.1960, *da Silva* 6789 (W); Prov. Tras-os Montes e Alto Douro, Bragança Monte de Sao Bartolomeu, 800 m, 20.6.1966, *da Silva & al.* 7599 (UPS).

SPAIN: Ad pagum Beirrea Galleciae, 3.8.1852, *Lange* (C, S); Sierra Nevada, Dehesa de S. Geronimo, 2000 m, 27.7.1879, *Huter, Porta & Rigo* 204 (PR, PRC, W); Sierra de Alfacar, 22.7.1883, *Nilsson* 1606 (C, LD, UPS); Calatayud, Sierra de Vicort, 12.7.1908, *Vicioso* (PR, PRC, S).

30. *Bupleurum commutatum* Boiss. & Balansa in Boissier, *Diagn. Pl. Orient.*, ser. 2, 6: 75. 1859 – Fig. 52

Lectotype (designated here by Pimenov): [Turkey, B2 Izmir], Vignes au-dessus de Birghui (Tmolus occident.), 1854, *Balansa* 36 (G-BOIS!; islectotypes BM!, C!, E!, FI!, W!).

= *B. laxum* Velen. in *Österr. Bot. Z.* 41: 397. 1891. – Syntypes: In calidis collinis supra Knežovo et supra vicum Rilo selo legi a. 1887 et 1889. Probable isotypes from Knežovo in PR! and PRC!

Annual, (15-)30-80 cm, main stem with several branches in upper 1/2-3/4, straight below, slightly flexuose above, ending in a top umbel often overtopped by the uppermost branches, umbels (5-)20-60, usually 2-10 branches ending in well developed top umbels, those of secondary branches often much reduced. *Stem* striate, in young and upper parts 3-5-angular with smooth ridges, soon becoming terete and near the base up to 3 mm thick. *Cotyledons* and first leaves only seen as withered and fragmented. *Cotyledons* probably petiolate, narrowly lanceolate. All leaves with amplexicaul base. *First few leaves* closely set, indistinctly petiolate, 10-45 × 2-5 mm or probably sometimes longer, linear to very narrowly oblanceolate, with midrib and more or less marginal vein. *Cauline leaves* 20-110 × 1-4(-6) mm, the uppermost ones small and narrow, linear or some very narrowly lanceolate, cuspidate, scabrous on margin and apical parts of veins below, with 3-5(-7) veins, the later more or less marginal, veinlets inconspicuous. *Peduncle* of well developed umbels (5-)15-20(-35) mm. *Rays* (5-)6-8, 5-30(-50) mm, very unequal, longest ones in top umbels usually at least 20 mm, 3/4-1 1/2 as long as peduncle. *Bracts* (1-)3-4, 5-15 × 0.5-2.5 mm, much shorter than the longest rays, narrowly lanceolate, cuspidate, 3-veined, minutely scabrous. *Bractlets* (4-)5, 4-7(-8) × 0.5-0.8 mm, equalling or slightly exceeding fruiting flowers, narrowly lanceolate, cuspidate, more or less keeled, scabrous, 3-veined, herbaceous with up to 0.2 mm wide whitish margin. *Umbellules* 7-12-flowered, pedicels (0.5-)1.5-2.5 mm, unequal. *Petals* yellow, 0.65-0.9 × 0.65-0.9 mm, bend almost straight to slightly cucullate, with slightly raised marginal wings, inflexed lobe 3/5 as long as limb, ± abruptly contracted into a narrow, thin, ± inrolled, shallowly truncate apical part. *Anthers* 0.3-0.45 mm, *filaments* c. 1 mm. *Stylopodium* (0.7-)1.1-1.2 mm, as wide as or wider than ovary, narrower than ripe fruit, *styles* 0.5-0.8 mm, about equalling the stylopodium radius. *Mericarps* not seen fully ripe, 2.5-3 × c. 1 mm, rounded pentagonal with narrow furrow in ventral face, ridges filiform, oil ducts inconspicuous.

Flowering. – June to August, fruiting August to early winter.

Habitat. – Steppe, grassland, scrub, vineyards, often on mountain slopes, 30-1400 m.

Distribution. – From N Greece north to Serbia and east to Krym. Bu, Gr, Jug, Kry, Mak. – Fig. 53. W and central Anatolia.

Selected material

BULGARIA: Kistendjil, s. dat., *Urumoff* (PRC); Varescu in Rhodope m., 1884, *Formánek* (PR); Knjazevo prope Sofiam, 8.1887, *Vandas & Velenovský* (PR, PRC); Sadovo, 6.1892, *Velenovský* (LD, WU); inter Hvojna et Bačkov, 27.6.1892, *Wagner* 65 (G); Stanimaka, 7.1892, *Velenovský* (W); Kasa Bain in m. Rhodope, 8.1892, *Formánek* (PR); m. Kara Bair, 13.8.1892, *Formánek* (WU-Hal); Novo Mahala, 7.1893, *Velenovský* (PRC); Drenon in Rhodope m., 1894, *Formánek* (PR); Karlovo, 1894, *Urumoff* (WU); *ibid.*, 15.7.1899, *Urumoff* (PRC); Sopot, 1897, *Urumoff* (WU); *ibid.*, 20.7.1899, *Urumoff* (PRC); Skobelev, 7.1897, *Velenovský* (PRC); Trojan Baluan, 1.8.1898, *Urumoff* (WU-Hal); Burgas, 1899, *Urumoff* (WU); Harmanly, Ulhidere, 6.1900, *Podpěra* (PRC); Kaur Alaa ad Ardama, 1901, *Štříbrný* (PRC); Kistendjil, 1902, *Urumoff* (WU); Dragoman, 1903, *Tosèv* (PR); in reg. mont. oppido Dzumaza ad extremum finis Turco-Bulgariae, 1000 m, 8.1909, *Dimonie* (PRC); Melnik, 1.8.1965, *Rejmanek* (PRC); Sakar planina, inter Harmanli et Topolovgrad, haud procul T., 300 m, 19.7.1972, *Černoch* 23127 (LD); Stara Planina, road Karnare-Trojan, S of the pass, 900 m, 12.7.1977, *Frost-Olsen* 928 (C).

GREECE: In regione superiori montis Corthiat Macedoniae, 7.1862, *Orphanides* 368 (WU-Hal); Peninsula Hagion Oros, Kerasia, 17.6.1891, *Sintenis & Bornmüller* 724 (B, LD, WU-Hal); in pascuis collinis ad Thessalonicam, 7.1906, *Adamovic* (W); in monte Korphiati pr. Thessaloniki, 2.7.1956, *Rechinger* 17309 (M, W); Nom. Dramas, Mt Falakron, the valley of Prosostani, 400-500 m. 13.7.1970, *Strid* 819 (LD); Halkidiki, in latere SW mt Holoma s. p. Paleokastro, 700 m, 5.7.1971, *Greuter* 9118 (ATH); Kastoria peninsula, by the lake, 630-650 m, 27.7.1971, *Stamatiadou* 13570 (ATH); Pieria, W Megali Jefira, 30 m, 21.6.1971, *Haristos* 850 (ATH); NW Florina, 800-820 m, 24.6.1972, *Stamatiadou* 15941 (ATH); Prespa, E of Lemos, 940 m, 8.7.1972, *Haristos* 3922 (ATH); distr. Langadha, Livadhi, Pournaroudhia area, 740 m, 27.7.1972, *Haristos*

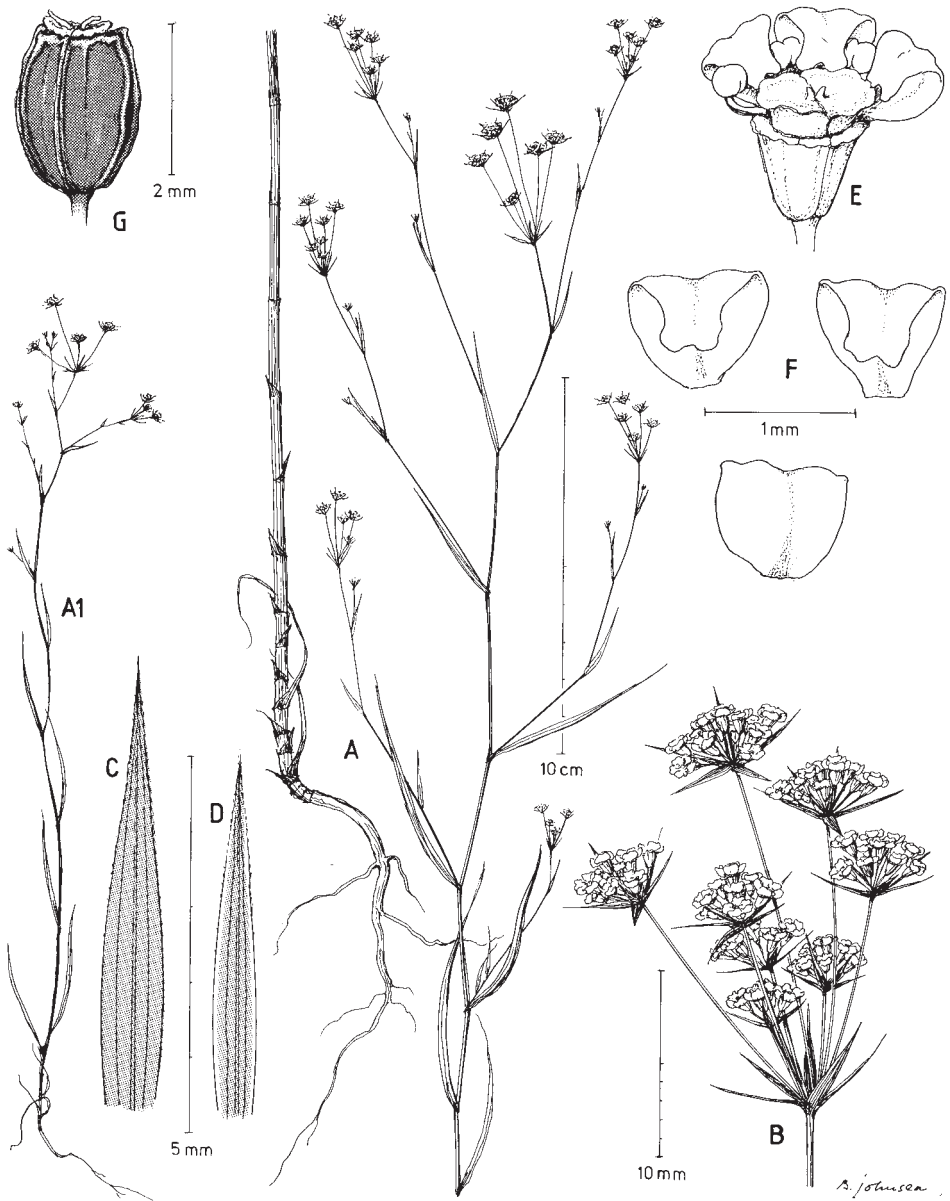


Fig. 52. *Bupleurum commutatum* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A, B-F: Greece, nom. & ep. Kastorias, Klisoura, S. & B. Snogerup 16033 (LD); A1: Greece, nom. Dramas, Falakron, Strid 819 (LD); G: Greece, nom. & ep. Florinis, S of Limni Chimaditis, S. & B. Snogerup 16050 (LD).

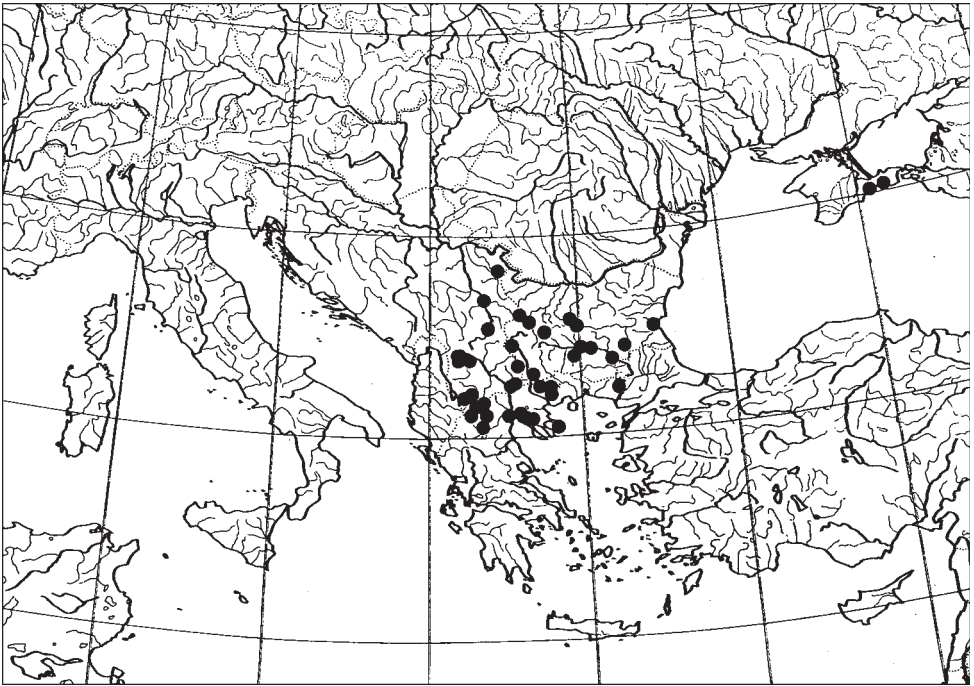


Fig. 53. European distribution of *Bupleurum commutatum* according to material revised.

4419 (ATH); 14 km à Serrai versus montes Laila, 500-600 m, 9.7.1973, *Rechinger 45345* (W); Florina, Plati, 900 m, 2-3.8.1973, *Greuter 11494* (ATH); Nom. Serron, Alistati, bei der Alistati-Höhle, 1977, *Mais* (W); S Florina, c. 1-2 km N Skopia, 700 m, 2.7.1978, *Krendl* (W); c. 1-2 km NW Florina am Fusse des Solicita, 800 m, 3.7.1978, *Krendl* (W); Nom. Evrou ep. Soufliou, montes Boukata Dag, 6 km N Pessani, 400 m, 15.7.1978, *Greuter 15993* (B); 1 km S of Papadia, 850 m, 40°58'N, 21°41'E, 28.6.1998, *Snogerup 15702* (LD); 4 km W of the S end of Limni Chimaditis, 100 m, 40°34'N, 21°29'E, 6.7.1998, *Snogerup 16050* (LD); 1 km SE of Klisoura, 1000 m, 40°31'N, 21°28'E, 6.7.1998, *Snogerup 16033* (LD); N of Klisoura, 1150 m, 40°32'N, 21°28'E, 6.7.1998, *Snogerup 16040* (B, LD, UPS).

KRYM: Steingeröll des Sokoll bei Sudak, 20.6.1895, *Callier 56* (S, WU); *ibid.*, 28.5.1896, *Callier 97* (S, WU); opp. Alusta, montes Demerdzi jajla supra pagum Lucistoe, 600-700 m, 26.5.1989, *Stepanek* (PRC).

MACEDONIA: Prilepe, 6.8.1898, *Formánek* (WU-Hal); ad Bitolam, 1900, *Velenovský* (PRC); in valle Treska pr. Uskub, 11.7.1905, *Adamovic 447* (WU); in collibus mtis Kajmakčalan, 600 m, 6.1909, *Dimonie* (W, WU); Dojran See Gebiet, S Bogdanz, 7.1916, *Burgeff 2154* (M); Nicolice a. Dojran See, 6.1917, *Burgeff 1607* (M); distr. lac Doiran, Kaluckowo, 120 m, 30.6.1917, *Bornmüller 1022* (PRC); Berovo, 16.7.1929, *Čemjavski* (O); Montes Sar-planina, ab Tetovo, ad Vesala, 1270 m, 12.7.1934, *Hruby & al.* (PRC); Prilep, montis Tresvamis planina supra oppidum, 5.7.1936, *Skrivanek* (PRC); Prilep, Montis Pletvar, 25.7.1938, *Weber* (PR); Bitola, 2.7.1967, *Weber* (PR); 3 km N Prilep, S-Hang des Markova Kula, 700-800 m, 26.6.1977, *Krendl* (W); 6-7 km N Prilep, zweiten Vorberg des Zlatoork, 900-1000 m, 26.7.1977, *Krendl* (W); Slevnica (betw. Krani and Pretor) at Prespa Lake, 855 m, 26.7.1979, *Frost-Olsen 2632* (C).

YUGOSLAVIA: Vranja, 8.1880, *Pančič* (M); *ibid.*, 8.1893, 7.1894, 2.7.1895 & 12.7.1896, *Adamovic* (FI, M, LD, PR, W, WU, WU-Hal); *ibid.*, 1906, *Adamovic* (W, WU); Brusnik, 23.7.1891, *Formánek* (WU-Hal); Niš, 1893, *Jovanovic* (WU); Pedes m. Krstitovica, 7.1896, *Adamovic* (WU).

31. *Bupleurum pachnospermum* Pančič, Fl. Princ. Serb.: 329. 1874 – Fig. 54

≡ *B. commutatum* var. *pachnospermum* (Pančič) Wolff in Engler, Pflanzenz. 43: 85. 1910. Type: Vrske Čuke u Crnorečkoj, seen by Wolff.

= *B. gerardi* subsp. *glaucoarpum* Borbás in Term. Füz. 19: 221. 1896 ≡ *B. commutatum* subsp. *glaucoarpum* (Borbás) Hayek in Feddes Repert. Beih. 30: 975. 1931. – Syntypes: *Baenitz Herb. Europ.* 8312!; Budae in monte Tiliarum, Lipótmező, in monte Pismány ad oppidum Sti Andreae (*B. sparsum* Deg. exsicc.!); Albae regiae et ad Ercsi, inter vineas (*Tauscher!*).

Annual, 25–60 cm, erect, main stem usually only pseudo-dichotomously branching in upper half, umbels usually 10–25, in large specimens 40 or probably sometimes more, usually only stem and 3–6(–10) branches ending in well developed umbels, those of secondary branches often depauperate, the top umbel usually overtopped by one or a few branches. *Stem* erect, striate, smooth, as young and in upper part 3–5-angular, becoming terete and near base up to 3 mm thick. *Cotyledons* and first leaves not seen. *Cauline leaves* 10–60(–100) × 1.5–4(–6) mm, linear to very narrowly oblanceolate, uppermost narrowly lanceolate, acuminate to cuspidate, scabrous on margin and upper part of veins beneath, with 3–9 veins, outer often more or less marginal. *Peduncle* of well developed umbels (10–)15–25(–35) mm. *Rays* of well developed umbels (3–)4–5(–6), 7–25(–35) mm, very unequal, longest ones 2/3–1 1/2 times as long as peduncle. *Bracts* (2–)3, (3–)6–15(–20) × 1–1.7 mm, shorter than longest rays, very narrowly lanceolate, cuspidate, scabrous on margin. *Bractlets* (4–)5, (3–)5–10 × 0.5–1.5 mm, conspicuously exceeding fruiting flowers, narrowly lanceolate, acuminate to cuspidate, flat to slightly keeled, scabrous on margin and upper part of midrib, 3-veined, herbaceous. *Umbellules* 5–10-flowered, pedicels 1–2 mm, subequal. *Petals* 0.5–0.6 × 0.6–0.7 mm, broadest above, bend almost straight to slightly cucullate with raised marginal wings, inflexed lobe 2/5–1/2 as long as limb, its apical part incumbent, narrow and thin, shallowly emarginate to obtuse, vein whitish, 0.1 mm wide, swollen and finely verrucose at bend, continuing halfway on the lobe. *Anthers* 0.3–0.4 mm, *filaments* c. 0.7 mm. *Stylopodium* 0.8–1.0 mm, as wide as or wider than ovary but narrower than fruit, purple becoming light brown, *styles* 0.2–0.3 mm, shorter than the stylopodium radius. *Mericarps* 2.5–3 × 0.8–1 mm, pentagonal in transect with sharp ridges and narrow furrow in ventral face, oil ducts inconspicuous, dark brown, conspicuously glaucous especially as unripe.

Flowering. – June to August, fruiting August to October.

Habitat. – Dry meadows, often in rocky slopes, also found in vineyards, altitudinal range not known.

Distribution. – A SE European endemic, from N Greece to Hungary and at least formerly in Austria and Czech Republic. Au, Bos, Bu, Cze, Gr, Hrv, Hu, Jug, Mak, Rm. – Fig. 55.

Some specimens from Macedonia have unusually many and short branches.

Material seen

AUSTRIA: Leopoldsberg bei Wien, 8.1866, *Breidler* (WU).

BOSNIA: Bez. Sarajevo, 20.7.1886, *Fiala* (PRC).

BULGARIA: Knjazevo prope Sofia, 8.1886, *Vandas* (PR); Varense u 20 km mezi Sofia a Petrovhanem, 8.1887, *Velenovský & Vandas* (PRC); Dragoman, decl. austr. mont. Golem Cepan, 31.7.1930, *Rechinger 1884* (LD, W); M. Pirin, Momina prope urb. Goce Delčev, 10.8.1955, *Vihodcevsy, Pl. Bulg. Exs. III: 572* (O, W).

CROATIA: Fiume, 8.1840, *Noe* (PRC).

CZECH REPUBLIC: Moravia, Thajuthae, 8.1885, *Obeny* (PR).

GREECE: Ossa in Thessalia, 8.1889, *Formánek* (PR); Phlambures-Mitsica in m. Chassia Thessalia, 8.1896, *Formánek* (PR); Mt. Gül-tepe pag. Kereci-köj prope Thessalonicam, 400 m, 4.1909, *Dimonie* (LD); Nom. Larisis, Anatoli, 1000 m, 15.7.1974, *Raus 2474* (B); Nom. Pellis, ep. Almopias, inter pagos Livadhia et Arhangelos, 1100 m, 28.7.1976, *Greuter 13960* (B, C, G, UPA); Nom. Larisi, Kato Olimbos, zw. Kriovrisi u. Sikaminea, 930 m, 6.7.1984, *Bergmeier*

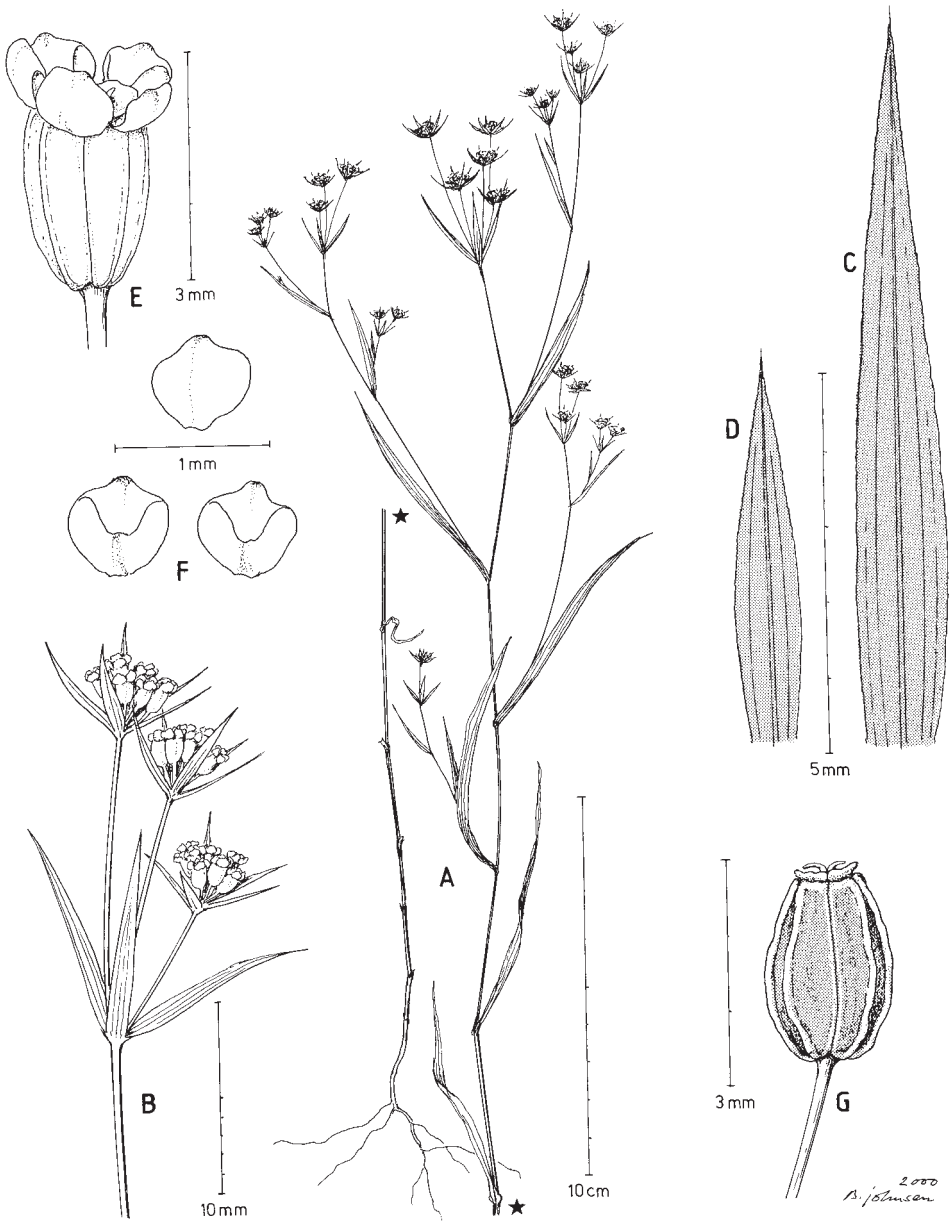


Fig. 54. *Bupleurum pachnospermum* – A: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit.
– Material: A-F: Hungary, mt. Pismány, Sudre, 1893, *Degen* (LD); G: Hungary, Ofen, 1883, *Richter* (LD).



Fig. 55. Distribution of *Bupleurum pachnospermum* according to material revised.

8470613 (herb. Bergmeier); Nom. Larisis, mt Kato Olimbos, zw. Kranea u. Kallipefki, 900–1100 m, 15.7.1984, *Bergmeier* 8471504 (herb. Bergmeier); Mt. Kallidromon, the Gioza summit, 1300–1399 m, 38°44'N, 22°33'E, 26.7.1992, *Constantinidis* 2761 (UPA).

HUNGARY: Scent-Endre, s. dat., *Degen*, Fl. E. A.-H. 3278 (C, E, LD, O, S, W, WU, WU-Hal); prope urbem Alban-Reziam, 9.7.1870, *Tauscher* (WU, WU-Hal); pr. opp. Ercsi, 23.7.1879, *Tauscher* (W, WU, WU-Hal); Wolfsthal bei Ofen, 5.1880, *Steinitz* (PR); Montis Tiliarium Budae, 19.7.1888, *Borbás* (PR); Budapest, montis Pismány ad oppidum Sanctum Andream, 15.8.1895, *Borbás*, *Baenitz* H. E. 8312, *Dörfler* H. N. 3429, Fl. A.-H. 3279 (E, LD, O, PR, W, WU, WU-Hal); ibid., 14.8.1896, *Borbás*, *Baenitz* H. E. 10209 (E, LD, S, W); vallis Farkasvölgy pr. Budapestinum, 9.8.1912, *Degen* (S, W); montis Sarnegy pr. Gyöngyös, 250–450 m, 30.7.1921, *Boros* (W); Gyöngyös, in mt. Sár-hegy, 500 m, 23.6.1961, *Žertova* (PR); Comit. Nograd, NE von Gyöngös Sarhegy, 500 m, 14.7.1973, *Krendl* (W).

MACEDONIA: Uskub supra Sor. Vodena, 18.7.1891, *Formánek* (WU-Hal); Vrcholy nad Grbavcem, 7.1923, *Vandas* (PR, PRC); in monte Vodno prope oppidum Skoplja, 400 m, 7.1937, *Deyl* (PR); Katlanovska Bana procul Skoplje, 300 m, 7.1937, *Deyl* (PR); Veles, Vlaskiani, 6.7.1937, *Behr* (W).

YUGOSLAVIA: M. Vrska Čuka, 8.1880, *Petrovič* (LD, UPS, WU-Hal); ibid., 7.1900, *Adamovic* (WU); Montis Rtanj, 7.1888, *Adamovic* (S).

32. *Bupleurum aequiradiatum* (Wolff) S. Snogerup & B. Snogerup, comb. & stat. nov. – Fig. 56
 ≡ *B. commutatum* var. *aequiradiatum* Wolff in Engler, Pflanzenr. 43: 84. 1910 ≡ *B. commutatum*

subsp. *aequiradiatum* (Wolff) Hayek in Feddes Repert. Beih. 30: 975. 1931. – Syntypes: Nova Mahala, 1891, 1893, 1906, *Střibrny* (LD!, PR!, S!, W!, WU, WU-Hal!); Vranja, 1887, *Bornmüller* (PR!).

Annual, 20-50 cm, erect, with main stem usually branched in upper 1/2-3/4, rarely from near the base, pseudo-dichotomous above, top umbel overtopped by one or several branches, umbels (5-)10-50, if many several depauperate. *Stem* striate, as young and above 3-4-angular, soon becoming terete and at base up to 2.5 mm thick, smooth. *Cotyledons* not seen, and the first, closely set leaves only as withered fragments. All leaves with amplexicaul base. *First leaves* probably indistinctly petiolate. *Cauline leaves* (5-)15-55 × 1.5-4 mm, very narrowly lanceolate to linear, acuminate to cuspidate, scabrous on margin and upper part of veins, with (7-)9-13 veins, the outer often ± marginal. *Peduncles* of well developed umbels 6-15(-25) mm. *Rays* (4-)5-6(-8), (3-)5-13(-17) mm, all subequal or often one shorter than the rest. *Bracts* (3-)4-5, 2.5-6(-10) × 0.5-1 mm, much shorter than the rays, unequal, narrowly lanceolate, cuspidate, scabrous 3-5-veined. *Bractlets* 5, (2-)3-5 × 0.4-0.7 mm, shorter than or equalling the flowers, narrowly lanceolate, ± keeled, cuspidate, scabrous on margin and sometimes upper part of midrib, 3-veined, herbaceous throughout or with up to 0.1 mm wide whitish margin. *Umbellules* 5-8(-12)-flowered, pedicels 0.5-2.5 mm, unequal. *Petals* whitish yellow, 0.4-0.5 × 0.7-0.9 mm, broadest above, bend almost straight, inflexed lobe 1/2-2/3 as long as limb, broad, emarginate to bifid, vein c. 0.2 mm wide, wider on the bend, continuing to end of lobe. *Anthers* 0.3-0.4 mm, *filaments* 0.7-1 mm. *Stylopodium* purple becoming whitish, (0.8-)0.9-1.0 mm, wider than ovary and narrower than fruit, *styles* 0.4-0.6 mm, about equalling the stylopodium radius. *Mericarps* not seen fully ripe, whole fruit subglobose, mericarps dark brown, ± glaucous, 1.8-2.5 × c. 0.8 mm, rounded pentagonal or semi-circular in transect with narrow ventral furrow, smooth, ridges filiform, oil ducts scarcely visible.

Flowering. – June to August, fruiting August to early winter.

Habitat. – Dry meadows in forest openings, roadsides, river banks at least 300-950 m.

Distribution. – Probably a SE European endemic, but according to Wolff (1910) also in NW Anatolia. Scattered from N and central Balkans east to Bulgaria. According to Wolff also in Krym but no material seen. The single sheet labelled as from Croatia refers to a locality outside our map and far from the otherwise known distribution. Bu, Gr, Hrv, Jug, Mak. – Fig. 57.

Material seen

BULGARIA: Knežovo, s. dat. *Velenovský* (PRC); Aitos, 1886, *Skorpil* (PRC); ad Sadovo, 7.1891, *Střibrny* (PRC); *ibid.*, 6.1892, *Střibrny* (PR); *ibid.*, 7.1892, *Střibrny* (WU-Hal); Nova Mahala, 9.1891 & 8.1906, *Střibrny* (PR); *ibid.*, 6.8. & 28.8.1893, *Střibrny* (LD, S, WU-Hal); *ibid.*, 9.1893, *Střibrny* (W, WU); in herbidis ad Stanimaka, 6.1892, *Střibrny* (PR); in herbidis collinis ad Haskovo, 7.1906, *Adamovic* (W, WU, WU-Hal); Sakar Planina, in locis graminosis ad viam publ. inter opp. Harmanli et Topolovgrad, haud procul a Topolovgrad, 300 m, 19.7.1972, *Černoch* 23127 (LD).

CROATIA: Auf den kleinen Lubricko Pudo bei Ostarje, 7.1881, *Pichler* (PRC).

GREECE: Larissa, champs au bord de la route de Tyrnavos, 16.6.1899, *St Lager* (G, PR); Thessalia: In declivibus circa 13 km a Lutropigi versus Kedron, in apertis quercetorum, substr. serpentin, 6.7.1958, *Rechinger* 20677 (LD, W); in monte Mavrovouni inter Anixis (Gria) et Melissi, 900 m, 13.8.1974, *Charpin* 10963 & *Greuter* 12114 (B, C, G, LD, UPA, W); Mt Katachloron, SW-side, 21 km W-WNW of Dhomokos, serpentine, slopes near brook, 300-600 m, 31.8.1982, *Hartvig & al.* 10611 (C); Vourinos-Massiv, östlich von Exarchos, südexponiert, Serpentinegestein, 950 m, 5.8.1983, *Hagemann & al.* 931 (B); by Venetikos river c. 10 km from Grevena along the road to Kalambaka, 500 m, 40°03'N, 21°29'E, 27.7.1989, *Strid & al.* 30341 (ATH, C, G, LD, UPA); c. 2.5 km SSW of Ano Agoriani along the road to Panagia, 470 m,

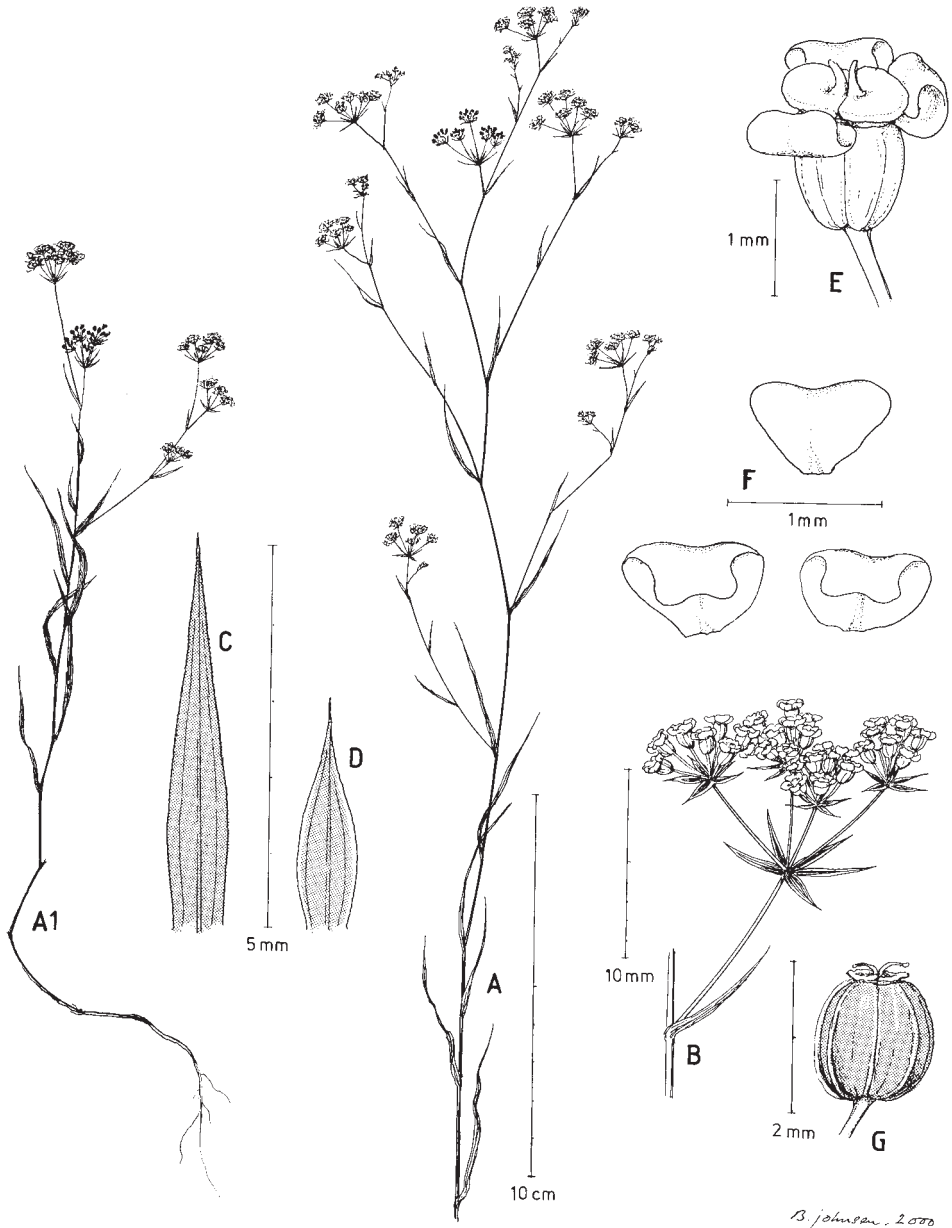


Fig. 56. *Bupleurum aequiradiatum* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A, B-F: Bulgaria, Sakar planina, Topolovgrad, Černoč 23127 (LD); A1: Greece, Thessalia, Lutropigi, Reching 20677 (LD); G: Greece, nom. & ep. Grevenon, Mavrovouni, Greuter 12114 (LD).



Fig. 57. Distribution of *Bupleurum aequiradiatum* according to material revised.

39°06'N, 22°11'E, 26.6.1997, *Constantinidis* 6996 (UPA); N Koridhallos, Krautfluren, Quellsumpf, 910 m, 39°49'N, 21°20'E, 18.7.1997, *Willing* 60953 (B).

MACEDONIA: Prilep, montis supra vicum Pletvar, 25.7.1925, *Weber* (PR).

YUGOSLAVIA: In arvis ad Vranja, 8.1878, *coll. ignot.* (W); inter segetes ad Vistagos-Vranja, 7.1887, *Bornmüller* (PRC); Vranja, 19.7.1887, *Brumble* (WU-Hal); Ristorni, 7.1889, *Formánek* (PR).

33. *Bupleurum brachiatum* C. Koch ex Boiss., Fl. Orient. 2: 844. 1872 – Fig. 58

Type: [Turkey, Vil. Kars], ad Artahan Ponti Lazici, *C. Koch*, not seen, destroyed in B?

Annual, 20-50 cm, with main stem branched from near the base or small specimens in the upper half only, pseudo-dichotomously branched in upper part, umbels mostly 10-50, if many several depauperate. *Stem* erect, flexuose, striate, in young and upper part 4-5-angular, becoming terete and at base up to 2.5 mm thick, smooth. *Cotyledons* and first leaves only seen as withered and fragmented. *Cotyledons* linear, sessile, probably 10-15 mm. All leaves with amplexicaul base. *First leaves* in large specimens densely set, probably like the middle cauline. *Cauline leaves* (5-)20-100 × 1-4 mm, linear or uppermost very narrowly lanceolate, acuminate, minutely scabrous on margin and upper part of midrib, glaucous, 3-5-veined with outer vein ± marginal, veinlets inconspicuous. *Peduncles* (5-)10-30 mm, *rays* in well developed umbels 3-4, 3-20 mm, unequal, longest one shorter than or rarely equalling peduncle. *Bracts* 3(-4), 2.5-6 × 0.5-1 mm, unequal, shorter than rays, narrowly lanceolate, acuminate, 3-veined. *Bractlets* 5, 2-3(-4) × 0.8-1.2 mm, lanceolate, acuminate, smooth or minutely scabrous near apex, 3(-5)-veined, herba-

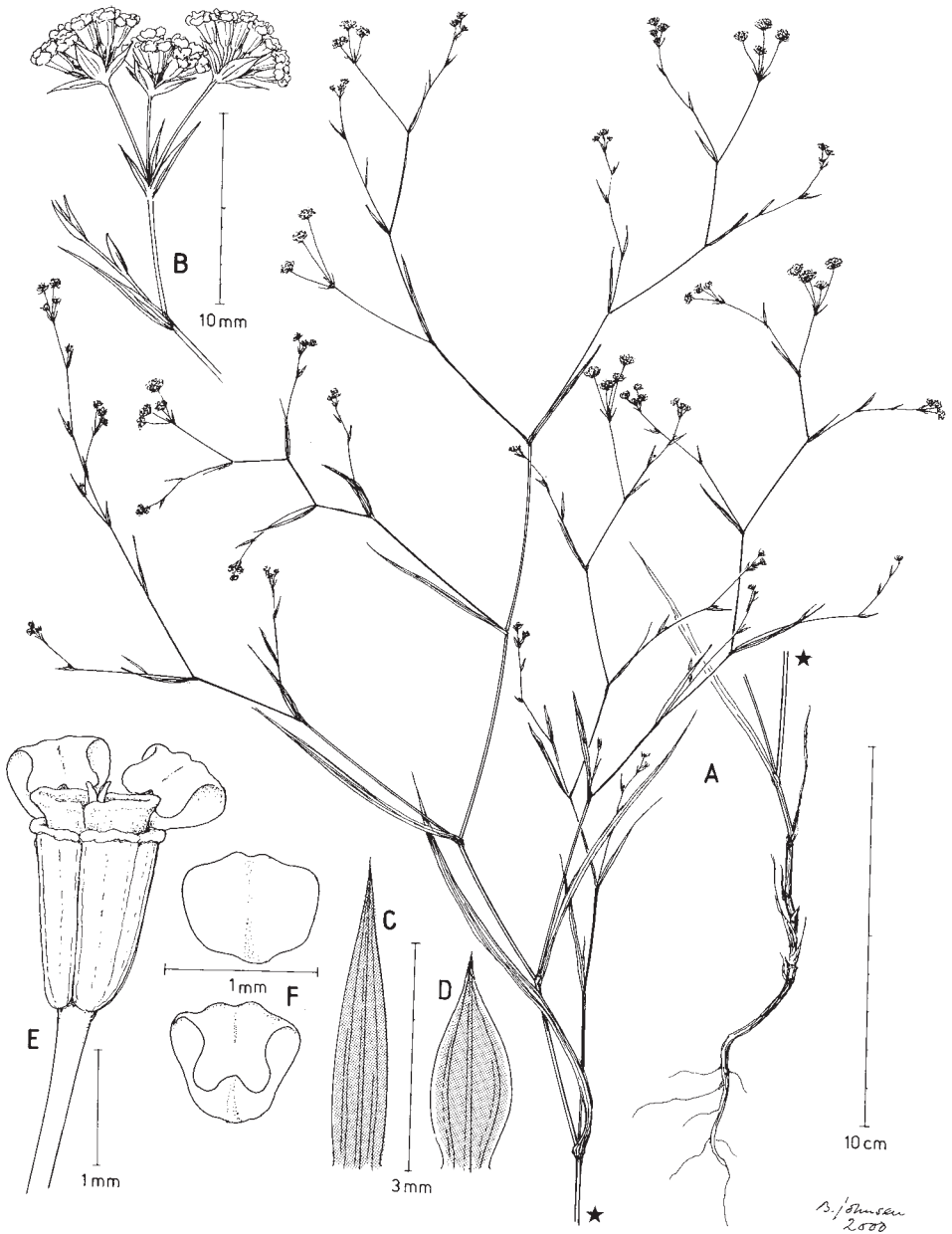


Fig. 58. *Bupleurum brachiatum* – A: habit; B: umbel; C: bract; D: bractlet; E: flower, F: petals. – Material: A-F: Georgia, Batum, Artwin, Holmberg 1952 (LD).

ceous or with up to 0.05 mm wide whitish margin. *Umbellules* (5-)6-11-flowered, pedicels 1-1.5 mm, subequal. *Petals* 0.6-0.8 × 0.6-0.8 mm, colour not known, at bend cucullate, finely and inconspicuously granulose-papillate, inflexed lobe c. 3/4 as long as limb, broad, bifid, vein broad on limb, narrow on lobe. *Anthers* c. 0.4 mm, *filaments* c. 0.5 mm. *Stylopodium* 0.8-1 mm broad, as wide as ovarium but narrower than fruit, *styles* 0.4-0.6 mm, about as long as stylopodium radius. *Mericarps* not seen fully ripe, probably 2-2.5 × 0.8 mm, rounded pentagonal in transect, smooth, glaucous, ridges filiform, oil ducts inconspicuous.

Flowering. – June to September.

Habitat. – Dry slopes, scree, from near sea level, in neighbouring areas to 1100 m.

Distribution. – Only found in SE Krym. Kry. Not mapped.

NE Anatolia, W Caucasus.

European material seen

Krym: Sudak, s. dat, *coll. ignot.*, annot *B. dubium* by Steven (H); pr. urb. Theodosian, 1.9.1905, *Fl. Ross.* 2526 (C, H); prope urb. Sudak, viam Sudak-Kamenka, 23.9.1974, *Gladkova & Vinogradova* 5833 (C, H, W); Pranepihul Kasa-daca, 25.9.1975, *Vinogradova & Ivanina* (C, H, W).

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Address of the authors:

Prof. Sven Snogerup, Dr Britt Snogerup, The Botanical Museum, Ö. Vallgatan 18, S-22361 Lund, Sweden; e-mail: sven.snogerup@botmus.lu.se, britt.snogerup@sysbot.lu.se