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Abstract


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. euboeum*, *B. flavicans*, *B. flavum*, *B. gaudianum*, *B. gerardi*, *B. glumaceum*, *B. gracile*, *B. greuteri*, *B. gussonei*, *B. karglii*, *B. lancefolium*, *B. marschallianum*, *B. odontites*, *B. pachnospermum*, *B. praealtum*, *B. rollii*, *B. rotundifolium*, *B. semicompositum*, *B. subovatum*, *B. tenissimum*, *B. trichopodum*, *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.

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. nemato-cladum* 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 involucelli 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 Herzegovina, 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 sumarize 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 especially from SE Europe make it impossible to give a complete list of material studied. Cotation 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. atra
8. Bractlets scarious throughout ............................................. 9
1. Bractlets herbaceous at least in central part ...
2. Bractlets with conspicuous veinlets ...
3. Veinlets lacking or few and inconspicuous ...
4. Longest umbel rays 1/2-1 as long as peduncle, bractlets entire ...
5. B. odontites
6. Longest umbel rays less than 1/2 as long as peduncle, bractlets finely serrulate apically ...
7. B. flavum
8. All or most umbels one-rayed, the two bracts placed closely below the bractlets ...
9. Umbels with (2-)several rays ...
10. Bractlets 3-veined, herbaceous part between the veins contrasting towards scarious part outside ...
11. Bractlets flat or almost so, tapering to a conspicuous arista ...
12. B. greuteri
13. Bractlets 3-5(-7)-veined, at least partly herbaceous outside the second vein ...
14. Bracts longer than umbel rays ...
15. Umbel rays 4-7, much unequal ...
16. B. flavicans
17. Petal bend conspicuously lobed ...
18. Petal forming a slightly concave bend ...
19. Fruit verrucose or papilllose ...
20. Fruit surface smooth ...
21. Fruit surface with light papillae; bracts 4 ...
22. Fruit surface verrucose; bracts 3 or 4 ...
23. Umbel rays very unequal, stylopodium 0.5-0.6 mm wide, styles 0.15-0.2 mm ...
24. Petal bend conspicuously verrucose or pointed ...
25. Petal with a verrucose projection in the middle; mericarps semi-globose ...
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 ...
28. Some central flowers of umbels often pelorial, not belonging to an umbellule; umbellules 2-5-flowered ...
29. Umbels 5-7-radiate; petals 0.3-0.4 mm; stylopodium 0.5-0.6 mm wide ...
30. B. gerardi
Bupleurum sect. Bupleurum

≡ Diatropa Dumort., Fl. Belg.: 76. 1827 (monospecific, with D. rotundifolia).
≡ 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

Annual. 25-80 cm, erect, usually ± 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 × 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. *Anthers* 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 ovarium, narrower than the ripe fruit. *Styles* 0.2-0.3 mm, much shorter than stylopodium radius. *Ripe mermicarps* 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, Km, 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 Korcê, Moskopole (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, Feuc (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, Monwatz (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-Gësfe 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 am Neusiedler See, 21.7.1907, Stadlmann & al. (WU).
Fig. 2. European distribution of Bupleurum rotundifolium according to material revised.
ENGLAND: Upper Brighton, Cheshire, 1908, Drabble (BM); W. Gloster, VC 34, Almondsbury, 11.7.1916, Roper (K, BM); Patchway, Bristol, Glos., 5.9.1924, Foggit (BM); Herts, S of Tingley Wood, 13.7.1929, Little (BG); Somerset, Charlton Mackrell, 100 ft, 1.8.1937, Makins 877 (K); VC 18, S. Essex, Dagenham dump, 1938-39, Airy-Shaw (K); Herts, Allen’s Green near Sawbridgeworth, 8.7.1941, Pugsley (BM); Berkshire, Coothill, 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, 24.7.1937, Koznetzova Dzhankulj prope Oleneska, 5.7.1964, Chater 67 (K, BM); Verbano-Cusio-Ossola, Lanzada, 900-950 m, 1970, Caspari (M); Fuss des Hackelsberges, 6.6.1959, Hupke (H).

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, Duschk (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), 25.6.1952, Vinck (LD); München auf Schutt bei Sendling, 9.1957, Caspari (M); Fuss des Hackelsberges, 6.6.1959, Sauer 3049 (M-Sauer); Fulda, Hainbach auf dem Schulzenberg, 23.7.1971, Hupke (H).

GREECE: In oliveto Athenarum 5.1893, Tuntas (UPA); Krystallopegeae, 22.6.1932, Alston & Sandwith 438 (BM); pr. Photolivos ad occidentem Drama, 31.5.1934, Rechinger 6198 (W); Nom. Ioanninnon, Mt Smolikas in decl. borealis, 1300 m, 9.7.1958, Rechinger 20822 (W); Nom. Kozanni & Cesnjavsko (PR); Montium Galicica, Sv. Stefan ad Ohrid, 800-900 m, 18.6.1924, Rechinger 20822 (W).


ITALY: Söll náhchi 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, Bracht (PR); Torino, Busoleno, 6.1906, coll. ignot. (S); Basilikata, 3-4 km N Potenza, La Botte, 900-950 m, 22.5.1977, Barri & Krendl (W).

KOSOVO: In fauci rivuli Susica pr. Peć (Ipek), 750-950 m, 6.7.1933, Rechinger & Scheffer 479 (W).

KRYM: Sudak, Abhänge des Sokoll, 20.6.1895, Callier (LD); Steppeanland bei Burunduk, 5.7.1896, Callier 300 (G, K, LD, O, PRC, W, WU-Hal); inter Kuczuk-Usen et Demerdski, 23.5.1905, Busch (S); Daliac. septentr. Kaczikalen, 6.6.1905, Busch (S); Peninsula Tarchankut, Dzhankulj prope Olenevska, 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 Police, 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, Grønlia, 15.7.1884, Jörgensen (BG).
Poland: Gubernia Lubelska, Starovska Senkenfelder-Starovska góra, 1883, Karo (LD); Oppeln am Wege nach Kempa, 10.7.1891, Schabe (O); Male Matury pr. Częstochowa, 25.6.1931, Domin & Krajina 3347a (PR); Breazu, Iaşi, 11.7.1962, Toma (BM); Dobrogea, austr. a pago Babadag, 8.1963, Žertova (PR).
Romania: Langenthal, 10.7.1882, Barth (UPS); Dobrogea, austr. a pago Babadag, 8.1963, Zertova (PR).
Slovakia: Uhrovec prope Bánová, 7.1930, Domin & Sillinger (PRC); Komarno, Malé Pisky, 3.7.1932, Weber (PRC); Zádiel, okr. Moldava, 15.7.1951, Osvačilová (PRC); Colle supra Domica 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, Osvalčišová (PRC); Sahy, /Eletes/ vych. Slatina-kupele, 14.8.1957, Chrtek & Soják (PRC).
Slovenia: In ruderatis 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, 4.5.1948, 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 307-WNO 243, 720 m, 16.8.1985, Martinez de Icaya & Morante 135 (PRC); Santander, Potes, 16.8.1952, Casaseca (TUR); Teruel, a. d. Strasse Albaracín-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 (PRC).
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, Sennen (BM); Uppsala, Öfre Slottsgatan 2, 10.9.1908, Fries (S); Södermanland, Barlastplats I, Hästholmen, Nacka, 6.1913, Lauren (S); Uppland, Löttsta, par. Järffalla, 21.6.1916, af Ugglas (S); Göteborg, Kvillebäcksvägen, 16.7.1928, Fries (S); Södermanland, Nacka, Saltsocknvärn, 7. & 8. 1934, Domeij (LD); Skåne, Kvillebäcksvägen, 16.7.1928, Fries (S); Göteborg, kvarnen 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).

2. Bupleurum croceum Fenzl, Pug. Pl. Nov. Syr.: 16. 1842. – Fig. 3
Holotype: Syria, prope Aleppo, Kotschy 235 (W!; isotype UPS!).
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 bractlets 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 commissural surface with a narrow furrow.

Chromosome number. – 2n = 16 (Cauvet-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, Uudenkaupung, Naantalia, 20.6.1953, Laine (TUR); ibid., 1.8.1954, Tarén (TUR); Reso, 7.1953, coll. ignot. (TUR).
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. perfoliatum var. lanceolatum Desv. in J. Bot. (Desvaux) 2: 315. 1809. – Type: Described as from “Midi”.

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

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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, Ranemark & 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, perfolliate, apiculate; uppermost leaves ovate, perfolliate, green; margin entire, scarious, 0.05-0.1 mm wide; vening 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-radicate, rays slightly unequal, 2(8-151) mm, the longest 1/4-2/3 as long as peduncle. Bractlets usually 5, rarely in some umbelullules 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-spathulate, 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 slowly w-shaped bend, inflexed lobe 0.15-0.2 mm, 1/3-1/2 as long as limb, apiculate to 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 ovarium, 1/3-1/2 as wide as the top of the ripe fruit; styles 0.2-0.3 mm, much shorter than stylodium 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 S 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 stylodium 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, Genreou 1413 (K); p. Argolis, d. Ermiomis, Portoheili, 0-5 m, 16.4.1972, Stama-
4. *Bupleurum subovatum* Link ex Spreng., Sp. Umbell.: 19. 1818 – Fig. 6
≡ *B. perfoliatum* var. *longifolium* Desv. in J. Bot. (Desvaux) 2: 315. 1809. – Type: Described as common in France.
≡ *B. granulatum* Gaudin, Fl. Helv. 2: 376. 1828. – Syntypes circa Massiliam a cl. Robillard and Consentia 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. 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; veinling 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. Umbels (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 ovate 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. Stylepodium 1.2-1.5 mm broad, wider than ovarium, only c. 1/3 as wide as the top of the ripe fruit. Styles 0.5-0.9 mm, equalling or slightly longer than stylepodium 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, tubercules 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); Skutari, Felder nahe der Stadt, 22.5.1944, Höflinger (W); 3 km N Levan, S. Fier, 7.7.1980, Höflinger (W); 3 km N Levan, S. Fier, 7.7.1980, Höflinger (W); 3 km N Levan, S. Fier, 7.7.1980, Höflinger (W); 3 km N Levan, S. Fier, 7.7.1980, Höflinger (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: Pridvorce u Trebinje, 5.8.1886, Vandans (PR); um Posusje Bez. Ljubuski, 6.1894, Fiala (PRC); bei Zitoniski, 24.5.1906, ?Kmag (WU), Uskoplje, 3.6.1926, Korb (W).

Corsica: Bonifacio, 24.5.1849, Krakl 602 (W); ibid., 1880, Reverchon 284 (PR, PRC, WU, WU-Hal); ibid., 1880, Renvall (H).
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); Gallesano, S Istrien, 26.5.1912, Cufodontis (W); Insel Arbe bei Kloster S. Eufemia, 3.6.1912, Morton 5 (WU); Sabioncello, bei Kuciste, 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, Gleenese, Seafield 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, Störmer (O); Charente infer., Angenhous 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-apudmare, 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).

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


Portugal: Vallée d’Alcantara, env. de Lisbonne, 5.4.1877, Murray dura, 17.5.1888, Gooding 14 miles ENE of Dorian, 1918, Macedonia: Huma op. Ghevgheli, 700 m, 6.1909, Raus & al. 5762 (B).

Italy: Cariaggi, di Migliarea, 300 m, 22.5.1958, Hultén & Norlindh (PRC); Livorno: 25 km N Weimbr., Cantahed, 22.6.1973, Haristos 3133 (C, H, LD, TUR, UPS); 20 km NW Coimbra, Cantanhede, 100 m, 25.5.1972, Suominen 1431 (H).

Kriti: Karpathos, Pigadia, 4.1883, Picchler (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 Lisbone, 5.4.1877, Daveau (PRC); Montegili, Estremadura, 17.5.1888, Murray (BM); Arredores de Coimbra, prox. a Eiras, Tojal, 6.1895, Ferretra 1365 (LD, O, WU, Wu-Hal); Lisboa, Algés, 50 m, 6.5.1938, 1365 (BM).

Sicilia: Cacciato 16816 (G, K, M, W); Alpes-Maritimes, Antibes, Biot, 4.5.1946, Merxmüller & Lippert 23673 (M); Livorno zwischen Montenero und Cse Nuove, 25.5.1977, Merxmüller & Lippert 23673 (M); Livorno zwischen Montenero und Cse Nuove, 7.6.1973, Burri & Krendl 8454 (LD); Calabria, 7 km SSE Castrovillari, 250 m, 27.6.1980, Snogerup 2118 (LD).

Kriti: Karpathos, Pigadia, 4.1883, Picchler (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 Lisbone, 5.4.1877, Daveau (PRC); Montegili, Estremadura, 17.5.1888, Murray (BM); Arredores de Coimbra, prox. a Eiras, Tojal, 6.1895, Ferretra 1365 (LD, O, WU, Wu-Hal); Lisboa, Algés, 50 m, 6.5.1938, Roothamer 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: I agris prope Laconi, 7.1827, Müller (PR); Santa Teresa Gallura, par Tempio, 14.5.1882 & 17.6.1881, Reverchon 31 (K, LD, PR; UPS; W, WU-Hal).


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 Sennin Pl. d’Esp. 363 (BM, K, LD, W); Córdova, 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 Abadacigas, 540 m, 14.5.1982, Quintana 11476 (C, H).

Sweden: Skåne, Höganiäs, 23.7.1917, Lindell (S); Stockholm, Värtan, Storängshatten, 9.1928, Westfjeld (UPS); Skåne, Lomma, 28.5.1931, Ahlner (K); Göteborg, Ringön, 19.7.1954, Blom (S).

Turkey: A2 Istanbul, Halkali, 29.5.1893, Post-Aznavour (G); Gallipoli, Helles, 28.5.1923, Ingoldby 273 (K); between Bujukcekmene 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 Buljbarica 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].

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 granulose 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*

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 Guusone, 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. Stems 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) equaling 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 (L D); F: Bulgaria, Eli Dere, 1909, Stribny (L D).
(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, Sl 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, Podpéra (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 Juenal 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, Hildburghausen, 9.1901, Eckart (JE).


**Italy:** Calabria orient. pr. Brancalone, 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).

**Netherlands:** Haarlemmerweg bij Amsterdam, 1860, Hingst (L); Apeldoorn, 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).
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); Gergenti, 26.4.1927, Haefström (S); Segesta, 25.5.1927, Roniger (W); Agrigento, San Leone, 0-50 m, 13.4.1952, Mersmüller & Wiedmann (M); 2 km südlich Agrone, an der Strasse Catania-Siracusa, 80 m, 28.4.1961, Podlech 7444 (M); by Dittaino at Sparagogna W of Catennanova, 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 Büyükkeristiran, 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, Jalsas 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!).
Fig. 10. *Bupleurum glumaceum* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruits.

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 Kephalonia, Hagios Theodoros, N-Seite des Dhivri, nahe dem E-Werk Bistriza E Sarandë, 100-300 m, 11.7.1980, Krendl (W).

Rhodes: Insula Kephalonia, Hagios Theodoros, N-Seite des Dhivri, 100-300 m, 11.7.1980, Krendl (W).

Santorini: Akrokorinth, 400 m, 10.6.1937, Lemperg 412 (GB, K, PR, W); Fthiotidos, 11 km a Makrokomi versus Rendina, 6.7.1958, Rechinger 20583 (B, K, LD, M, W); Nom. Pireias, Agiass-Kaste 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. Messinia, inter vicos Pylos et Meltoni, 7.5.1979, Tsanoudakis & Iatrou 5369 (UPA); Argolis, 4 km N of Didyma, 500 m, 15.5.1982, Runemark & Svensson 48733 (LD); Kerkya, mons Pantokrator, in ditione pagi Petalia, 650 m,
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 to 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. 11. Distribution of Bupleurum glumaceum according to material revised.
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 Nicolò, 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, 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, 36º09'N, 23º02'E, 21.5.1986, Oxelmann & Tollsten 1161 (GB); near the harbour village of Kapsali, 0-80 m, 36º09'N, 23º00'E, 16.5.1995, Strid & al. 39041 (C); 1.5 km S Agia Pelagia, 140 m, 36º18'N, 22º58'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 Gerolimin, 0-50 m, 22.5.1964, Runemark & Snogerup 20708 (LD); 3 km NW of Kampos (N Areopolis), 24.5.1964, Runemark & Snogerup 20779 (LD); Monemvasia, 18.5.1970, Stamatiadou 8958 (ATH); 1 km W of Karnou-
polis SW of Gythion, 15.5.1977, Snogerup 1552 (LD); ad vicum Gerolimin, 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 Korogonina Nika, 240-330 m, 16.5.1984, Strid 23058 (C); Gerolimenas, 2.6.1984, Georgiou 645 (UPA); 1 km SW Gerolimin, 36°29’N, 22°24’E, 4.5.1985, Oxelmann & Tollsten 913 (GB); just W of Gerolimenas, 30-100 m, 36°29’N, 22°24’E, 22.4.1989, Strid & al. 28378 (C); 0.5 km NW Korogonina Nika, 200-360 m, 36°29’N, 22°28’E, 26.4.1991, Kit Tan 10423 (C); 12 km from EOS Katafigion Tagetos along road to Anogia, 36°35’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 9746 (C, E, G, RSA, UPA); südl. Maleahalbinsel, 13.5.1992, Rasker (B); 0.9 km SW Pyrrhios, 370 m, 36°39’N, 22°28’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 Commerc. 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. 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 aven 0.5-1.9 mm, 3-5-veined, veinlets many, anastomosing and in 3-veined bractlets joining into a distinct marginal vein, finely 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, equaling or slightly wider than the fruit, styles 0.25 mm, about equaling 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 unwaved 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

Balearic: 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).
England: L’Ouressse, 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, Bournay near Talmont, 27.6.1954, **Wennerberg** (GB); Hérault, Gigau, 21.5.1956, **Weber** (G); Dept. Morbihan, Penthièvre, 9.6.1958, **Vervoort** (L); Dordogne, Vallée de la Vézère, près St-Léon-sur-Vézère, 24.5.1961, **Sté. Bot. de France** (C, LD); Dept. Morbihan, Penthièvre, 9.6.1958, **Vervoort** (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, Mas-sif d’Alauch, plateau entre la Grande Tête Rouge et la Pouchue des Escaoupré, 450 m, 13.6.1975, **Martin 7668** (C, G, H, LD, TUR, UPS); Alp. Maritime, Col de Braus zw. Sospel u. l’Escarene auf Mt. Ventabrieu, 1000-1040 m, 22.7.1995, **Hörandl & al. 6954** (WU).

Italy: Campania, Valle della Ferrieira (Amalfi), 31.5.1952, **Corradi & al.** (Fl); 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 Guragna, W Pieve Fosciana, 300-400 m, **Burri & Krendl** (W); Abruzzen, 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, **Snoegerup 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 Castellucchio 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).

Fig. 15. Distribution of *Bupleurum baldense* according to material revised.
**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 obovate 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. **Stylodium** 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 stylodium radius. **Mericarps** 2-3 × c. 1 mm, pentagonal in transect, ridges filiform, smooth or with very small 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, Slc. – Fig. 17.

Fig. 16. *Bupleurum veronense* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit. – Material: A, B-F: Bosnia-Hercegovina, Nevesinje, 1969, Engstrand (LD); A1: Italy, Općinae ad Tergestum, Marchesetti 3686 (LD); G: Italy, Friuli, Snogerup cult. no. 853504 (LD).
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 Ivani, Boboshtica to Dardha, near the village of Zvesdë, 1250 m, 28.10.2000, Kit Tan & al. 24757 (LD).

Bosnia-Hercegovina: Karstheide Gradina SØ von Ljono, 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-


Yugoslavia: Ad portum Novi Bar, 3 m, 6.7.1930, *Novák 5853* (E).
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. & R. 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, 2½-1 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 aristula 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, 250 m, 27.6.1980, Snogerup 2117 (B, BM, G, LD); 7 km SSE of Castrovillari, the narrow valley of river Coscile, 28.6.1980, Snogerup 2138 (B, LD, UP, 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, Stibrany (E); prope Sliven ad collum Sekerdzhe, 16.7.1907, Schneider 446 (K, W); Kaspitsian, 14.7.1930, Rechinger 1190 (BG, LD, W); Philippopol, Dschendem-Tephe, 20.7.1930, Ronninger (W); Dragoman, montium Golem Cepan, 31.7.1930, Rechinger 1872 (W); proce Goce Delchev, 7.8.1955, Vihodzovsky, Pl. Bulg. Exs. VI: 573 (C, E, H, O, S, UPS, W); Varna, supra lacum Varnense pr. Beloslav 50 m, 6.7.1967, Cernoch 1697 (LD); Melnik impedi Pirium, 20.7.1972, Sadasik (PRC); Distr. Blagoevgrad, vicinitate Lozenica ad Melnik, 4.8.1975, Drylova (PR); Struma valley, the hills by Kresna, 9.7.1980, Kuzmanov 801110a (G).
Greece: 15 km SSE Kozani, 400 m, 26.6.1970, Strid 514 (LD); Nom. Kavalas, near Ofirionon E of Smyrnon, 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); Halkidiki, pr. Ajios Prodromhos, 450 m, 5.7.1971, Greuter 9167 (ATH, G); Nom. Kilkis, 1 km SE Peukodasos S of Euzoni, 29.7.1971, Snogerup 1124 (LD); Serres, entre Siderokastron et Paliastras, 50 m, 16.6.1973, Greuter & al. 10148 (G); at river Aliakmon at bridge of road Kozani-Servia, 280 m, 19.6.1973, Haristos 6929 (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, mens Orvilos, supra Kapahytos, 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, Pierker & al. 56 (B).
Macedonia: Nicolic a. Doiran See, 6.1917, Burgeff (M); in collibus ad basin montes Wodno, 3-400 m, 16.7.1918, Borrmüller 4191 (JE); Felsen der Kilsura von Drenovo N.O. 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 Velez, in fauce fluminis Topolka, 20.6.1968, Weber (PR); 10 km SW of Vandalovo, 29.7.1971, Snogerup 1125 (LD); Stobi, S von Gradsko, 150-200 m, 1.7.1976, Krendl (W); NW of Strumitsa, am Ostrec, 650-717 m, 7.7.1977, Krendl (W).
Yugoslavia: Alexinec, 7.1892, Formánek (PR); M. Belava, 600 m, 21.8.1897, Adamovic (PR,
12. *Bupleurum flavum* Forssk., Fl. Aegypt.-Arab.: 205. 1775 – Fig. 21

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


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


**Turkey-in-Europe:** Bosphorus, St. Stephano, s. dat., *Berggren* (UPS); ibid., 10.7.1896, *Nemetz* (W, WU); Constantinopol, entre San-Stefano et Floria, 20.7.1870, *Aznavour* (BM, E, 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, 120, *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- Havsa, 3 km from Havsa, 100 m, 15.7.1956, *Mc Neill* 201 (E, K, W); Kücükçekmece to Büyükçekmece, 50-100 m, 12.8.1962, *Davis & Coode* 39233 (BM, E, K); above Tekir Dag, 100 m, 12.8.1962, *Davis & Coode* 39291 & 39297 (BM, E, K); 14 km ETekir daga, 13.7.1968, *Baytop 13363* (E); 25 km N Gelibolu, 10 m, 1.7.1968, *Sorger* (herb. Sorger); between Konahköprü and Marmara Eryölisi, 25 km N Gelibolu, 10 m, 1.7.1968, *Sorger* (herb. Sorger); Konahköprü and Marmara Eryölisi, 25 km N Gelibolu, 10 m, 1.7.1968, *Sorger* (herb. Sorger); Canakkale, Kavak, 15.7.1968, *Baytop 13589* (E).

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


= *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!; iso-types G!, K!, LD!, W!).

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

[← *B. flavum* sensu Rech. fil., Fl. Aegaea: 402. 1943, non Forsskål (1775)].
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 ± 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 × 2-6 mm, ± narrowly elliptical, with midrib, thin marginal veins and reticulate veinlets. Middle and upper leaves gradually sessile, narrower to linear, 15-50(-120) × 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 × 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 × 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 × 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 × 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).
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: Islands Tria Nisia Cycladum, c. 36 1/2°N, 27°E, in saxosis calc. insulae aus-tralis, 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 Tourlaria, 250-500 m, 13.5.1968, Snogerup 51280 (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. Lasithiou: Ep. Mirabellou, Kalo Horio, 0.5 km E of Isto, 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 Kiriamadhi und Tenada, 50 m, 35°17'30''N, 26°17'30''E, 11.5.1982, Risse 366 (B, UPA); Ins. Dionysades, ins. Dragonada, 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). —


Annual, 10-50 cm, pseudo-dichotomously branched from near the base, with usually 20-70 umbels, last formed umbels often very depaupe rate, 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, Psiliammos, 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. Exsiccat. 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, cuculate 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, Černoch 14784 (LD); A1: Greece, Malakasi, Sintenis 1425/1896 (LD).
only seen in one specimen, 2-2.5 × 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 Peloponnnesos. 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 Dhiwri, 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. Gionscala, 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. Karantanio, 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
16. Bupleurum karglii Vis., Fl. Dalmat. 3: 35. 1852 – Fig. 28
Type: In sterilibus montium Vellebit ad Vella Paklenija, ubi detexit Jos. Kargl (BASSA?) [material from type locality 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 ob lanceolate 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. Ioannino, mt Timfi, Drakolimni, Strid & al. 15623 (LD); G-H: Yugoslavia, Kotor, Strid 1669 (LD).
**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 Lunxheris, 4000 ft, 10.7.1933, Alston & Sandwith 2172 (K, BM); Shkodra, Theti, 1000 m, 15.8.1979, Krendl (C); Kreis Shkodra, S-Hänge des Velecikut, 1100-1400 m, 22.7.1980, Krendl (C, W).

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

**Croatia:** Montis Biokovo, 1400 m, s. dat., Pichler, Pl. 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 Graćac, 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 faucois Vikos, Megala Stadthia, 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 Peć, 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, Janchen (WU); Zlatibor, sub cacuminis 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. Rachoja, 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, ± 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 × 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 × 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 × 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 longawn 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 × 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. Stylodium 0.6-0.7 mm wide, at least as wide as ovarium but narrower than ripe fruit, styles 0.25-0.4 mm, about equalling stylodium radius. Mericarps 2-2.5 × 1-1.5 mm, light brown, smooth, narrower towards the ends, rounded in transverse, 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 scree 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 Scapla et Palucakia (rarum), 3800’, 18/30.7.1854, Orphanides 359 p.p. (C, F, K, O, UPS, W); ibid., 17.8.1856, Heldreich, Hb. Gr. Norm. no. 19 (F, G, K, M, UPS, W, WU); ibid., 3500’, 17.8.1856, Heldreich, Hb. Gr. Norm. no. 19 (F, G, K, M, UPS, W, WU-Hal); ibid., 1100 m, rocky limestone slopes, 25.8.1962, Davis 39327 (BM, E, K); ibid., ad margines viae, 17.7.1977, Georgiadis 4157 (UPA); ibid., 1100 m, in glareosis ad margine viam publicam, 17.7.1977, Greuter 14720 (C, herb. Greuter); ibid., 1100 m, ad viam in petrosis, 8.10.1987, Phitos & Kamari 20481 (C, F, K, M, UPS, W, WU); 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 5232 (LD); ibid., 1100 m, 9.8.1987, Phitos & Kamari 204481 (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(-) 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. Stylodium 0.5-0.6 mm wide, wider than ovarium, about equalling top of ripe fruit, styles 0.2-0.35 mm, shorter to slightly longer than stylodium 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.
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).


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
≡ 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 amplexical 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, Beling (LD).
gest one (1/3-1) times as long as peduncle. Bracts 3-4(-5), 2.5-9 × 0.7-1 mm, lanceolate, apiculate, serrulate especially near apex, herbaceous, 3-veined. Bractlets in largest umbellules, in smallest 3-4, 2.5-6 × 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 × 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 ovarium but narrower than the top of the ripe fruit, styles 0.15-0.2 mm, half as long as to subequaling stylopodium radius. Mericarps as ripe dark greyish brown to black, 1.9-2.3 × 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, Ly, Po, Km, 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


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


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


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


**HUNGARY:** Comit. Bereg, inter Hete et Fejércse, 6.9.1926, *Boros* (W); Comit Szabolcsz, ad Hajnalo pr. Tiszalók, 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, *Devl* (PR).

**ITALY:** Emilia, Ferrara, Casaglia, 7.1911, *Ferioli, Fl. It. Exs. 1709* (WU); Venetia, prope
20. *Bupleurum euboeum* Beauverd & Topali in Candollea 7: 260. 1937 – Fig. 34


[– *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 specimens 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 euboeum* – 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. *Umblellae* 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, inflated 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. *Stylodium* (0.3-)0.5-0.7 mm, as wide as ovarium but narrower than ripe fruit, *styles* 0.4-0.5 mm, longer than stylodium 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).

Fig. 35. European distribution of Bupleurum euboeum according to material revised.

Pangeou, WSW of Ofrinion on Strimon river, 31.7.1977, Stamatiadou 20727 (ATH, C); Thraki, Evros delta, 7.1978, Polanin 15164 (E); Alikes Kitrous, 27.8.1991, Drossos 15501 (TAU); Xirolimni lagoon, Drossos 10269 (TAU); Karatza lagoon, 10.3.1992, Drossos 10607 (B); Pelo-ponnesos, 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).
≡ 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 stylodium 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. Transcausia, N Iran.

European material seen

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

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

**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, 0.2-15 mm, very unequal, longest one usually longer than peduncle. **Bracts** 4, 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.

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

**Croàtia:** 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, Gaillaume [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 Gavrion, 12.5.1968, Snogerup & v. Bothmer 31189 (LD); penins. Sithonia, reg. Koutsoupia, adv. scopulorum Ajia Eleni, inter Neos Marma ras et Toroni, 2-5 m, 16.6.1972, Greuter 10382 (ATH); Nom. Fokidos, 1 km E of Itea, 0-5 m, 18.5.1975, Landsström 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, Koumpli-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.
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. Umbels 1(0-)2 or in top umbels 3, 0.2-25 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, subequall. 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-rugulose, continuing on lobe. Anthers 0.3-0.4 mm, filaments c. 0.5 mm. 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


Krym: 1893, Fedischenko (G); Jalta, 21.8.1900, Golde 1719 (C, H, PRC, WU); ibid., 11.8.1938, Anderberg (UPS); Aluscha, 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, Střibrny (LD).
Macedonia: Demirkafen, 8.1891, Formánek (PR).

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

Turkey-in-Europe: Tekirdag, Marmarakoy to Yenikoy, 5.9.1975, Ochatay 33752 (E).

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

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 0.1-0.05-(-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, Papasidero, 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 Papasidero, Cosenza province, 12.9.1990, Burton (LD).

25. Bupleurum praetaltum L., Fl. Monsp.: 12. 1756 – Fig. 42
= B. junceum L., Sp. Pl. ed. 2: 343. 1762. – Type: Described from France and Italy.

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 ob lanceolate to linear, with midrib and marginal vein, veinlets inconspicuous. All leaves with amplexicaul base. First leaves often gradually changing from such with ill-defined petiole to sessile, narrowly ob lanceolate, 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. Petioles 0.3-4 mm, unequal to subequal, longest equal 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 umbelles, 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 ovarium 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 praecatum* – 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, 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: Celebrislagh ap. Durazzo, 22.8.1894, Formánek (WU-Hal); Shkodra, Dorf Pardica, 31.7.1916, Janchen (WU); Westabhang des Pashtrik, 15.8.1918, Zerny (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 Bakračuša 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 (W); Drina gorge, W of Visegrad, near Dededy, Frost-Olsen 1991 (C).

**Italy**: Aprutii, Caramanico, 600–650 m, 8.1906, Rigo (S); Garessio, Eca-Nasago, 20.7.1908, Zurani (S); Mte Maggiore, Veli Golin gegen Boljunica, 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); Ne Peč, 600-800 m, 31.7.1975, Krendl (W).

**Macedonia**: Mtis Galicitza pr. Ohrida, 7.1908, Dimonie (PRC, W, WU, WU-HAL); Skoplje, supra Raduse, 20.7.1967, Weber (PR); Punjab planina, in fagone 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, Hâvren (H); Oltenia, distr. Mehedinți, Vârciorova, 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, Moraria & Danciu (LD); Oltenia, distr. Dolj: Dilga, 130 m, 15.8.1966, Cîrtu, Fl. Olt. Exs. 694 (H, LD, O, PRC, UPS).

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

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*Fig. 43. European distribution of Bupleurum praecatum according to material revised.*
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. breviradiatum (Reichenb.) Wettst. in Biblioth. Bot. 5(26): 52. 1892

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, wide st 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. Stylodium 0.7-0.9 mm wide, equalling ovary but much narrower than ripe fruit, styles 0.2-0.25 mm, much shorter than stylodium 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).
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, Uk. – Fig. 45.

Caucasus, NW Anatolia.

Selected material seen
Austria: Vöslau, 24.8.1907, Schneider (W); Hetzendorf, 6.10.1912, Leate (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-Herzegovina: Sarajevo, Lapišnica-Schlucht, 4.9.1891, Murbeck (LD).

Bulgaria: Nova Mahala, 21.9.1895, Stribrny (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, Súza (S); distr. Znojmo: ripam dextram rivi Jevišovka inter Smidluv et Lapikus, c. 1 km mer.-occ a Rudlice, 27.6.1977, Skalicky & 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).

Fig. 45. European distribution of *Bupleurum affine* according to material revised.
27. Bupleurum trichopodum 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. Gracc. Prodr. 1: 178. 1806].

Short-lived annual, 5-30(-50) cm, usually pseudo-dichtomously 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. Uppersmost 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. Stylodium 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 stylodium 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 trichopodium – 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. Achaias, Ano Kastritsi, Strid & al. 29594 (LD); G: Greece, nom. Viotias, Parnassos, Gustavsson 7046 cult. (LD).
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 Dafero along road to Exarchos, 700 m, 40°10’N, 21°36’E, 23.6.1992, Anagnostopoulos & Athanasiou 3217 (UPA); Nom. Achaias, ep. Kalavryton, ad monast. Mega Spilaeon, 900 m, 23.4.1994, Phitos & Kamari 23939 (UPA).

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


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

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, ± 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 × 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 × 1.5-3(-5) mm, most ones semi-amplexicaul, very narrowly lanceolate to linear, apiculate to subulate on apical part of margin and sometimes on veins beneath, with 3-7 veins, the outer thin and ± 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 equaling peduncle, but sometimes longer: Bracts 3-5(-6), ± unequal, (3-)6-10(-18) × 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 × 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, 0.3-4 × 0.45-0.6 mm, bend almost straight or slightly cuculate 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 ± 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 × 0.6-1 mm, prismatic to rounded, smooth, whitish to dark and ± purplish brown, glaucous, ridges low to filiform, oil ducts usually 3 in each field, ± 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: Azerbaydzhazh, Baku, Akhmedlu, Holmberg 942 (LD); G: Krym, Sudak, Callier 56 (LD).
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 misidentifications 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.
≡ B. jacquinianum Jordan, Pug. Pl. Nov.: 71. 1852
≡ B. gerardi var. subadpressum Rouy & Camus in Rouy & Foucaud, Fl. France 7: 333. 1901.

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-oblanceolate, 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, scabrous 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, bent almost straight with raised marginal wings, inf lexed 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 ovarium 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).
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, UPS); Coimbra, Vale de Figueiras, 13.6.1954, Matas & Pereira (LD, UPS); Beira Litoral, Coimbra Dianteiro, 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 occidental.), 1854, Balansa 36 (G-BOIS!; isolectotypes BM!, C!, E!, FI!, W!). = B. laxum Velen. in Österr. Bot. Z. 41: 397. 1891. – Syntypes: In calidis collinis supra Kneževo et supra vicum Rilo selo legi a. 1887 et 1889. Probable isotypes from Kneževo 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., Uramoff (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 Bačkovo, 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, Uramoff (WU); ibid., 15.7.1899, Uramoff (PRC); Sopot, 1897, Uramoff (WU); ibid., 20.7.1899, Uramoff (PRC); Skobelevo, 7.1897, Velenovský (PRC); Trojan Baluan, 1.8.1898, Uramoff (WU-Hal); Burgas, 1899, Uramoff (WU); Harmanly, Ulhidere, 6.1900, Podpěra (PRC); Kaur Alaa ad Ardam, 1901, Stříbrny (PRC); Kistendjil, 1902, Uramoff (WU); Dragoman, 1903, Tosev (PR); in reg. mont. oppido Dzumaza ad extremum finis Turco-Bulgariae, 1000 m, 8.1909, Dimonie (PRC); Mélnik, 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 Karnaro-Trojan, s. of the pass, 900 m, 12.7.1977, Frost-Olsen 928 (C).

Greece: In regione superiori montis Corthiat Macedoniea, 7.1862, Orphanides 368 (WU-Hal); Peninsula Hagion Oros, Kerasia, 17.6.1891, Sintenis & Bornmüller 724 (B, LD, WU-Hal); in pascuis collinis ad Thessalonican, 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); halkidi, 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 Lemnos, 940 m, 8.7.1972, Haristos 3922 (ATH); distr. Langadh, Livadhi, Pournaroudhia area, 740 m, 27.7.1972, Haristos 3922.
Fig. 52. *Bupleurum commutatum* – A, A1: habit; B: umbel; C: bract; D: bractlet; E: flower; F: petals; G: fruit.
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, Greater 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 Fussse des Solutica, 800 m, 3.7.1978, Krendl (W); Nom. Evrou ep. Souflou, montes Boukata Dag, 6 km N Pessani, 400 m, 15.7.1978, Greater 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,

Krym: Steinigeröll des Sokoll bei Sudak, 20.6.1895, Callier 56 (S, WU); ibid., 28.5.1896, Callier 97 (S, WU); opp. Alusta, montes Demerdzi jaja 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 mts Kajmakčalan, 600 m, 6.1909, Dimonie (W, WU); Dojran See Gebiet, S Bogdanz, 7.1916, Burgeff 2154 (M); Nicolici a.
Dojran See, 6.1917, Burgeff 1607 (M); distr. lac Doiran, Kaluckowo, 120 m, 30.6.1917,
Bormüller 1022 (PRC); Berovo, 16.7.1929, Čemjanski (O); Montes Sar-planina, ab Teto,
ad Vesala, 1270 m, 12.7.1934, Hraby & al. (PRC); Prilep, montis Tresvamiz planina supra oppi-
dum, 5.7.1936, Škrivaneš (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, Pančić (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

Pančić, Fl. Princ. Serb.: 329. 1874 – Fig. 54
≡ B. gerardi subsp. glaucocarpum (Borbás) Hayek in Feddes Repert. Beih. 30: 975. 1931. – Syntypes: Baenitz Herb. Europ. 8312; Budae in monte Tiliarum, Lipótmező, in monte Pismány ad oppidum Sí 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 oblancoate, 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 infiles, infiles 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. Stylodium 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 stylodium 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).
Croatia: Fiume, 8.1840, Noe (PRC).
Czech Republic: Moravia, Thajuthae, 8.1885, Obeny (PR).
Greece: Osa in Thessalia, 8.1889, Formánek (PR); Phlambures-Mitsica in m. Chassia Thessalia, 8.1896, Formánek (PR); Mt. Gül-tepe pag. Kereci-kőj prope Thessalonicanam, 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.
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).


MACEDONIA: Uskub supra Sor. Vodena, 18.7.1891, Formánek (WU-Hal); Vrchoły nad Grbavcem, 7.1923, Vanda (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, Vlakiani, 6.7.1937, Behr (W).

YUGOSLAVIA: M. Vrska Čuka, 8.1880, Petrović (LD, UPS, WU-Hal); ibid., 7.1900, Adamovic (WU); Montis Rianj, 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

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

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 distinctly 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), (3-15-17) 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 subglobular, 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: Kneževo, s. dat. Velenovský (PRC); Aitos, 1886, Skorpil (PRC); ad Sadovo, 7.1891, Stříbrny (PRC); ibid., 6.1892, Stříbrny (PR); ibid., 7.1892, Stříbrny (WU-Hal); Nova Mahala, 9.1891 & 8.1906, Stříbrny (PR); ibid., 6.8. & 28.8.1983, Stříbrny (LD, S, WU-Hal); ibid., 9.1893, Stříbrny (W, WU); in herbidis ad Stanimaka, 6.1892, Stříbrny (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, Chargin 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, Serpentingestein, 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, Čermocht 23127 (LD); A1: Greece, Thessalia, Lutropigi, Rechinger 20677 (LD); G: Greece, nom. & ep. Grevenon, Mavrovouni, Greater 12114 (LD).
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).


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. **Umbellales** (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.


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, via Sudak-Kamenka, 23.9.1974, **Glädka & Vinogradova** 5833 (C, H, W); Pranepihul Kasa-daca, 25.9.1975, **Vinogradova & Ivanina** (C, H, W).

**Acknowledgements**

Thanks are due to the curators of the herbaria mentioned in “Material and methods” for loan of specimens and access to the collections during our visits. We also want to thank Bent Johnsen, Copenhagen, who made the drawings, Dr Adelaïde L. Stork at the Conservatoire Botanique, Genève, who helped us tracing literature, Mr R. M. Burton, Eynsford, who provided us with material of **Bupleurum rollii**, and Dr J. P. Reduron, Mulhouse, for information on French localities and typification problems. The research leading to this publication has been supported by the Swedish Natural Science Research Council, the Royal Swedish Academy of Sciences, Stockholm (Enander Foundation), the Royal Physiographic Society, Lund, and Stiftelsen Längmanska kulturfonden, Stockholm.

**References**


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