

SYNOPSIS OF THE GENUS AURINIA IN TURKEY

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THE GENUS *AURINIA* Desv. has long been considered a section of *Alyssum* L., but, although both taxa are in the Cruciferae tribe Alysseae, affinity between them appears to be tenuous and remote. The major objection to keeping *Aurinia* as a section of *Alyssum* is that, although composed of a relatively homogeneous group of species, *Aurinia* is anomalous in comparison with the natural sections (i.e., *MENIOCUS* (Desv.) Hook., *PSILO-NEMA* (Meyer) Hook., *ALYSSUM*, *GAMOSEPALUM* (Hausskn.) Dudl., *TETRADENIA* (Spach) Dudl., and *ODONTARRHENA* (Meyer) Koch) of *Alyssum*. Lines of probable affinity may be traced between these sections, but *Aurinia* does not appear to have any such clearcut relationships. Among the genera of the Alysseae, *Aurinia* seems to be most closely allied to *Berteroa* DC., or possibly to *Alyssoides* Mill.

No taxon presently considered an *Alyssum* possesses the combination of characters which are evident in *Aurinia* and which permit it to be easily recognized, and distinguished feasibly from *Alyssum*. These characters are contrasted in the following table.

	AURINIA	ALYSSUM
ROSETTE LEAVES	Usually repand-sinuate, dentate, or pinnatifid, (20-) 40-60(-100) mm. long; petioles deeply grooved with swollen bases which are persistent on caudices.	Usually entire; (2-)5-15 (-20) mm. long; petioles flat and attenuate, bases never swollen or persistent on caudices.
CAULINE LEAVES	Reduced, 1/2 (or less) the size of the rosette leaves.	More or less equal in size to the rosette leaves.
FERTILE STEMS	Sparsely foliate, often nearly scapose.	Always leafy, never scapose.
FLOWER BUDS	Globose, as long as broad.	Elliptic and oblong.
CALYX	Cup-shaped, with sepals widely spreading at maturity.	Elongate, with sepals erect at maturity.
STIGMAS	(Immature) conspicuously bilobed.	Globose, rarely bilobed.

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Aurinia Desv. Jour. Bot. 3: 162. 1814 (!). LECTOTYPE SPECIES: *Alyssum saxatile* L. Sp. Pl. 2: 650. 1753 (= *Aurinia saxatilis* (L.) Desv. loc. cit.). — Meyer in Ledeb. Fl. Ross. 1: 136. 1842. — Griseb. Spic. Fl. Rum. & Bith. 1: 271. 1843. — Koch, Hort. Dendrol. 23. 1853. — Schur, Enum. Pl. Transsilv. 61. 1866.

Alyssum sect. *Anodonte* DC. Syst. Nat. 2: 317. 1821 (!). LECTOTYPE SPECIES: *Alyssum edentulum* Waldst. & Kit. (= *Aurinia petraea* (Ard.) Schur).

Anodonte (DC.) G. Don, Gen. Hist. Dichl. Pl. 1: 180. 1831 (!).

Anodonte sect. *Vesicaria* sensu G. Don, loc. cit. (!), non *Vesicaria* Adans.

Alyssum sect. *Aurinia* (Desv.) Koch, Syn. Fl. Germ. & Helv. 1: 58. 1837 (!). — Boiss. Fl. Or. 1: 263 & 265. 1867. — Schulz in Engler & Prantl, Nat. Pflanzenfam. II. 17b: 491. 1936. — Busch in Komarov, Fl. U.R.S.S. 8: 348. 1939. — Nyár. Anal. Acad. Rep. Pop. Rom. Sect. Științe Geol. Geog. Biol. ser. A. mem. 3. 1: 8. 1949.

Aurinia sect. *Corioceratium* Griseb. Spic. Fl. Rum. & Bith. 1: 272. 1843 (!). LECTOTYPE SPECIES: *Aurinia saxatilis* (L.) Desv.

Lepidotrichum Velen. & Bornm. Oesterr. Bot. Zeitschr. 39: 324. 1889 (!). TYPE SPECIES: *Lepidotrichum uechtritzianum* (Bornm.) Velen. & Bornm.

Plants perennial, or biennial. *Rosette leaves* up to 100 mm. long, with repand or sinuate or dentate to pinnatifid margins and deeply grooved petioles with swollen and persistent bases (except *Au. halimifolia*), usually distinctly rosulate and conferted on indurated caudices. *Cauline leaves* reduced, usually $\frac{1}{2}$ (or less) the size of rosette leaves. *Fertile stems* sparsely foliate, often nearly scapose. *Indumentum* of stellate or lepidote hairs with few or many branched or unbranched rays. *Inflorescence* unbranched and racemose, or multibranched, corymbose or paniculate. *Pedicels* divergent and spreading. *Flower buds* globose, as long as broad. *Calyx* cup-shaped. *Sepals* 4, widely spreading at maturity, free, never truly saccate. *Petals* 4, yellow or white, bifid or entire, spatulate and clawed. *Long filaments* 4, always free, equally bilaterally winged and dilated at bases, often with small basal teeth. *Short filaments* 2, winged with small basal teeth. *Anthers* short, obtuse, filament tips never prolonged. *Nectaries* 4, globose or triangular, one at each side of short filaments. *Styles* of varying lengths, often widely dilated to bases, persistent. *Stigmas* (immature) conspicuously bilobed. *Silicles* latiseptate, always dehiscent, glabrous or rarely with indumentum (only *Au. rupestris*), bilocular with conspicuous repla, locules 2–4(–6)-ovulate with placentation nearly apical, or rarely lateral (*Au. halimifolia* & *Au. leucadaea*); valves compressed or subinflated, or equally inflated and turgid. *Seeds* winged, or rarely wingless (*Au. uechtritziana*), not mucilaginous. *Embryo* notorrhizal.

DISTRIBUTION: Central and southern Europe, east to the Ukraine and the Caucasus, north to Poland, and in Turkey.

SPECIES NOT OCCURRING IN TURKEY:

- Au. corymbosa* Griseb. Spic. Fl. Rum. & Bith. 1: 271. 1843 (!). The Balkans.
- Au. halimifolia* (Boiss.) Cullen & Dudley, comb. nov.² The maritime Alps of France and Italy.
- Au. leucadaea* (Guss.) Koch, Hort. Dendrol. 23. 1853 (!). Yugoslavia and Italy.
- Au. petraea* (Ard.) Schur, Enum. Pl. Transsilv. 61. 1866 (!); Fuss, Fl. Transsilv. 64. 1866, possibly the earlier combination, fide *Index Kewensis*. Central and southeastern Europe. Escaped from cultivation in New York State.

KEY TO SPECIES OF AURINIA OCCURRING IN TURKEY

- A. Inflorescence compound, multibranched, corymbose; margins of rosette leaves always repand or sinuate, or dentate to pinnatifid; indumentum of stellate hairs, few or many rayed, never lepidote; valves of silicles membranous and smooth.
- B. Flowers yellow; seeds broadly winged; silicles (3-)4-8(-12) $\times$ (2-)3-8(-15) mm., valves compressed or only slightly inflated at center; inflorescence 5-15(-20) cm. long; fertile stems greenish, with sparse indumentum. 1. *Au. saxatilis*.
- B. Flowers white; seeds wingless; silicles 2-4 $\times$ 2-2.5 mm., valves turgid, strongly and equally inflated; inflorescence 20-40 cm. long; fertile stems whitish with dense indumentum, especially towards base. 2. *Au. uechtritzi*.
- A. Inflorescence simple, unbranched, racemose; margins of rosette leaves always entire; indumentum of strongly lepidote hairs; valves of silicles cartilaginous and prominently ridged at apex. 3. *Au. rupestris*.

1. ***Aurinia saxatilis*** (L.) Desv. Jour. Bot. 3: 162. 1814 (!). — Kotov, Fl. Ukraine 5: 329. *pl.* 75. 1953.
1. Silicles elliptic or obovate, 3-5(-6) $\times$ 2-4(-5) mm., always longer than broad, obtuse or acute, rarely emarginate; styles 0.5-1 mm. long, not conspicuously dilated to bases; margins of rosette leaves sinuate, or only sparsely dentate, with teeth not more than 0.5 mm. long. a. Subsp. *saxatilis*.
1. Silicles orbicular or oblate, 3.5-10(-12) $\times$ 4-12(-15) mm., usually wider than long, emarginate or truncate (or if obtuse or acute, then silicles 8-10 (-15) mm. long and wide, and styles 2-5.5 mm. long); styles 2.5 mm. long, strongly dilated at bases (bases 0.5-0.8 mm. in diameter; apices 0.1-0.2

² ***Aurinia halimifolia*** (Boiss.) Cullen & Dudley, comb. nov. *Ptilotrichum halimifolium* Boiss. Voy. Bot. Mid. Esp. 1: 45. 1839, non *Alyssum halimifolium* Willd. Linn. Sp. Pl. ed. 4. 3(1): 460. 1800, nomen illeg. nec *Alyssum halimifolium* L. Sp. Pl. 2: 650. 1753 (= *Lobularia maritima* (L.) Desv.). Boissier's combination is treated as a new name (cf. note to Article 72, *Internat. Code of Bot. Nomencl.* 52. 1961). Accordingly, the basionym of *Aurinia halimifolia* is *Ptilotrichum halimifolium* Boiss., not *Alyssum halimifolium* Willd.

mm. in diameter); margins of rosette leaves strongly dentate, often pinatifid, with teeth (0.5-)1-5 mm. long (or if margins entire, then plants very reduced, only 5-10 cm. tall).

2. Silicles 3.5-6 mm. $\times$ 4-7 mm.; pedicels 4-10 mm. long; styles 1-1.5 mm. long; petals 3-4(-4.5) $\times$ 1.5-2 mm.; wings of seeds 0.4-0.5 mm. wide. b. Subsp. *orientalis*.
2. Silicles 6-12 $\times$ 8-15 mm.; pedicels (7-)10-20 mm. long; styles (1.5-)2-2.5 mm. long; petals (4.5-)6-7 $\times$ (2-)2.5-3.5 mm.; wings of seeds (0.5-)0.7-1 mm. wide. c. Subsp. *megalocarpa*.

Subsp. *saxatilis*

Alyssum saxatile L. Sp. Pl. 2: 650. 1753 (!). Holotype, cultivated in the Leiden Botanic Garden (L, hb. *Royen*; hb. lugdb. Bat. no. 901050). — Reichenb. Ic. Bot. 3: 30. t. 232. 1825; Ic. Fl. Germ. & Helv. 2: 9. t. 21, fig. 4280. 1837-1838. — Mansfeld, Repert. Sp. Nov. 46: 115. 1939. — Nyár. Fl. Rep. Pop. Rom. 3: 327. pl. 56, fig. 2. 1955. — Moravec, Preslia 32: 360. 1960.

Alyssum arduinii Fritsch, Exc. Fl. Öst. 253 & 268. 1897 (!); in Kerner, Sched. Fl. Aust.-Hung. 9: 24. 1902.

Alyssum arduinii subvar. *lamprocarpum* Borb. Balaton Fl. 391. 1900. Holotype, Hungary. Túl-a-Dunán, Borbás (BP, non vidi). — Jáv. & Csap. Ic. Hung. 7: pl. 213, figs. 1600 & 1600a. 1930.

Alyssum saxatile var. *typicum* Beck, Glasn. Zem. Muz. Bosn. Herceg. 28: 129. 1916 (!).

Alyssum saxatile var. *arduinii* (Fritsch) Hayek, Prod. Fl. Pen. Balc. 1: 430. 1925 (!).

Alyssum saxatile subsp. *arduinii* (Fritsch) Paw. Fl. Tatrorum. 1: 325. 1956 (!).

DISTRIBUTION AND HABITAT: Widespread on calcareous substrates in central and southeastern Europe, extending east to the Ukraine and the upper Caucasus, and north into Poland, alt. up to 1000 m. Fl. Apr.-June.

Europe. FRANCE: Bei Muggendorf, fränk. Jura, 410 m., *Reinsch* 157 (E, GH, K, W). GERMANY: 1889, *Dresler* (GH); Muggendorf, 1838, *Souder* (E); Aug. 1840, *Koch* (K); *Koch 11 bis* (BM, GH, K, W). AUSTRIA: ad Danube, *Kerner* (K, W); Wien, *Kerner* (GH, K, W); ad Danubium pr. Melk, *Strobl* (BM, E, G, GH, K, W); pr. Krems (E); Thaya bei Zaabs, May-June 1871, *Krenberger* (BM, GH, K, W). CZECHOSLOVAKIA: Thajortal, *Obrony* 160b (BM, E, G, GH, K, W); Burberg bei Kaaden, *Stelzharmner* 760 (BM, E, G, GH, K, W); Moravia, Rosenstein ad Mikulov (Nikolsburg), 450 m., *Sirjaev* 219 (BM, GH, K, W); Znaim, *Oborny* (BM, E, G, GH, K, W); Valle Radstinské, urb. Praha, May 1938, *Milaš* (BM, E, K, GH, W); Bohemia, *Stekhemak* 160 (E, W). HUNGARY: Buda, May-June 1876, *Richter* (E, W); Budors pr. Ofen, *Richter* 11 (BM, GH, K, W); Esckerberg, *Tauscher s.n.* (E, W); Mt. St. Gerade, *Schiffer* (E, W); Comit. Zala, mont. Szent-Gyorgyhegy ad Kisapati, 250 m., *Kummerle* 189 (BM, E, G, GH, K, W); Comit. Pest., mont. Töröku-grato, pr. Budaörs, 200 m., 6 June 1913, *Jávorka* (BM, GH, K, W); Buda, *Ball* (E, GH). YUGOSLAVIA: Macedonia, Sor. Planina, Popova Sapka, 30 miles west of Skopje, 210 m., *Stainton* 7962 (K, W); Serbia Suva Planina, pr. Babuschnitza, *Rechinger* 16036 (W); Djep, *Ilić* (E, W). BULGARIA:

Noë 4280 (E, K); Rhodope hills, *Turrill* ? (BM, K). ROMANIA: Matschan, Dobrudscha, 1873, *Sintenis* 576 (G, K, W); Guravoie, 15 July 1895, *Degen* (BM, E, K, G, W); Transsilvania, Koppandi-Hasadek, pr. Torda, *Wolff* (BM, E, G, GH, K, W). RUSSIA: Konuva, 28 Mar. 1903 (E); Borythreum (Borysthenis), July 1820, *Steven* (BM, G-DC); Podolia, 1820, *Andrzejowski* (G-DC).

Fritsch, in Kerner (1902), who pointed out that Linnaeus (*Species Plantarum*, 1753) cited polynomials from Royen, and from Tournefort for *Alyssum saxatile* (the basionym of *Aurinia saxatilis*), correctly maintains that the polynomial from Tournefort, *Corollarium Institutionum*, 15. 1703, which reads: "*Alyssum creticum saxatile, foliis undulatis incanis*" is synonymous with *Alyssum orientale* Ard. (subsp. *orientalis* (Ard.) Dudl.). Furthermore, because of Linnaeus's discordant references, Fritsch applied a *nomen novum*, *Alyssum arduinii*, to refer to that part of *Alyssum saxatile* which was based on the polynomial from Royen, *Florae Leydensis*, 33. (1740) reading: "*Alyssum caulibus frutescentibus paniculatis, foliis lanceolatis undulatis integris*." Examination of Royen's original specimen in the Leiden herbarium proves without any doubt that it is subsp. *saxatilis*, and not subsp. *orientalis*.

The three well developed subspecies which are recognized in *Aurinia saxatilis*, subspecies *saxatilis*, *orientalis*, and *megalocarpa*, are morphologically distinct, and have characteristic distributions. Subspecies *saxatilis*, the northern and most widespread in the species, is almost entirely replaced in the Balkans and Aegean region by subsp. *orientalis*. Whereas subsp. *orientalis* is only partially sympatric in the northern Balkans with subsp. *saxatilis*, subsp. *megalocarpa* is completely sympatric, in terms of geography, with subsp. *orientalis*.

Subsp. *orientalis* (Ard.) Dudley, comb. nov.

Alyssum orientale Ard. Animad. Bot. Spec. Alt. 2: 32. t. 15, fig. 1. 1764 (!).

Type, "ab Oriente," *Arduino* (PAD, non vidi).³ — Boiss. Fl. Or. 1: 266. 1867. — Velen. Fl. Bulg. 37. 1891.

Clypeola tomentosa L. Mantissa, 92. 1767 (!). Holotype, "ab Oriente," *Arduino* (LINN no. 828:3).

Alyssum affine Ten. Syll. Fl. Neap. 315. 1831 (!). Holotype, Italy. In saxosis Japygiae: Lecce, Martina, 1819, *Tenore* 23716 (NAP, non vidi); isotypes (G-DC; K, no. 303 sent in 1824, and one sheet ex herb. Gay; GH, sent in 1846).

³Seeds from the Orient, which were given to Arduino by Dr. Leonardo Seslerio were grown in the Padova Botanic Garden. Arduino states that the original description and figure of *Alyssum orientale* were based on two cultivated specimens in his herbarium, grown from these seeds. Evidently there were more than two specimens originally, because in 1761 Arduino sent a specimen to Linnaeus. This specimen no. 828:3 in the Linnaean herbarium (LINN) was annotated by Linnaeus "Ard.", indicating the source of the specimen. This Arduino duplicate, and the description and figure of *Alyssum orientale*, served as the basis of *Clypeola tomentosa* L. (1767), a synonym of *Alyssum orientale*, and accordingly of *Aurinia saxatilis* subsp. *orientalis*. There may be additional specimens, cultivated from the seeds given to Arduino by Seslerio, in the herbaria of the Botanical Museum in Copenhagen and the University of Firenze.

- ^h*Aurinia orientalis* (Ard.) Griseb. Spic. Fl. Rum. & Bith. 1: 272. 1843 (!).
Alyssum orientale var. *majus* Hausskn. Mitt. Thür. Bot. Ver. 3-4: 112. 1893 (!). Holotype, Greece. In decliv. nemorosus infra Mon. Korona, Pindus Dolopicus, 1067-1097 m., 20-28 June 1885, *Heldreich* (JE, non vidi); isotypes (BM, E, G, K).
Alyssum saxatile var. *alpinum* Hal. Denkschr. Akad. Wien Math. Naturw. 61: 496. 1894 (!). Holotype, Greece. In der oberen Region der Kyllene oberhalb Gura, *Halácsy* (w).
Alyssum denticulatum Form. Verh. Natur. Ver. Brünn 32: 177. 1894. Holotype, Yugoslavia. In saxosis ad urbem Ochrida in Macedonia, *Formánek* (BRNU, non vidi). — Vandas, Reliq. Formánek. 35. 1909.
Alyssum saxatile var. *majus* (Hausskn.) Hal. Consp. Fl. Gr. 1: 91. 1900 (!).
Alyssum saxatile var. *albidum* Tuzs. Bot. Közlem. 8: 266. 1909 (!). Lectotype, Crete. Cap. Maleca, *Sieber* (BM, E, GH, K, W).
Alyssum saxatile var. *orientale* (Ard.) Beck, Glasn. Zem. Muz. Bosn. Herceg. 28: 129. 1916 (!). — Hayek, Prod. Fl. Pen. Balc. 1: 430. 1925.
Alyssum saxatile var. *orientale* f. *maius* (Hausskn.) Hayek, *loc. cit.* (!).
Alyssum saxatile subsp. *orientale* (Ard.) Rech. f. Ann. Naturh. Mus. Wien 43: 300. 1929 (!).
Alyssum orientale f. *humilis* Vierh. Oesterr. Bot. Zeitschr. 84: 138. 1935 (!). Holotype, Crete. Hagios Vasilis, alpine Stufe des Kedros, 19 Apr. 1904, *Dörfler* 561 (WU); isotypes (BM, G, K).
Alyssum saxatile auct. Levanticum — Sibth. & Smith, Ic. Fl. Gr. 7: 21. t. 624. 1830. — Hal. Consp. Fl. Gr. 1: 90. 1900. — Bornm. Mitt. Thür. Bot. Ver. 24: 11. fig. 2. 1909.

DISTRIBUTION AND HABITAT: Saxatile on calcareous substrates in Calabria in southern Italy, the Balkans, the Aegean Islands, Crete, Turkey-in-Europe, and the western coast of Anatolia; alt. 50-1500 (-2286) m. Fl. Apr.-May.

ITALY: Calabria, Catanzaro, near Tiriolo, *Rigo* 312 (A, K, W); Mt. Tiriolo, near Castrovillari & Mt. Pollina, 400-800 m., *Huter, Porta & Rigo* 235 (BM, E, K, W); San Pietro in Devafane, May 1874, *Groves* (BM, K); near Rossano, *Lacaita* 104/24 (BM); 1820, *Dierville* (G-DC). Italia meridionale, 1819, *Moratti* (G-DC). YUGOSLAVIA: Macedonia, Ohrid, *Rechinger* 15927 (K, W); 20 miles south of Skopje, Katlanova, 305 m., *Stainton* 7819 (K). ALBANIA: Bertiscus, Pecska Bistrica near Peč (Ipek), 600-750 m., *Rechinger & Scheffer* 124 (K, W); Sant. Graminta, 1897, *Baldacci* (BM). CORFU: San Deca, 7 May 1878, *Spreitzenhofer* (GH, K); pass to Paleocastuzza, Apr. 1855 (K); H.T. (K); ex hb. Montbret (W); pass. Panteleimon in Skripero, 126-317 m., 10 May 1896, *Baenitz* (E, K, W). BULGARIA: Montes Stara Planina, fluv. Isker near Lakatnik, *Rechinger* 1741 (W); in sax. ad Sveti Dimitri near Basarbova, *Rechinger* 569 (W); Dermende, May 1890, *Pichler* (G, W); Kricin, May 1895, *Stříbrný* (E, K, W); May 1902, *Stříbrný* (E, K, W); Kritchma, 27 June 1896, *Stříbrný* (E, K, W); Tekir, 9 June 1895, *Stříbrný* (E, K, W); Eli Dere, May 1907, *Stříbrný* (E, K, W). ROMANIA: Kleine Karpathen, Ruine Tallenschein bei Theben-Neudorf, June 1902, *Schneider* (A, W); Danubii, inter Verciorova et Guravoie, et inter Svintza et Drenkova, *Degen* 3268 (BM, E, GH, K, W). CRETE: *Tournefort* (BM); Kissamos, Polyrhnenen, *Gandoger* 8736 (BM, K); Cap Makea, Canée, *Gandoger* 82101 (BM, K). GREECE: *Sibthorp* 1057 (OXF); Attica, Mt. Parnes, Ilatoci,

500 m., *Samuelsson & Zander* 120 & 476 (E, GH, K); 1000 m., *Rechinger* 585b (w); *Heldreich* 2693 (G, w); Athens-Phaleron, *Patten* 196 (GH); Acropolis, Athens, 23 Mar. 1900, *Patten D* (GH); *Spruner* (G, GH, K, w); Mar. 1876, *Pichler* (G, GH, K, w); 1889, *Sintenis* 15 (w); Feb. 1847, *Heldreich* (E, w); 1843-1844, *Heldreich* (E); *Heldreich* 412 (BM, K); Athens, Lycabetho, Mar. 1862, *Heldreich* (G, GH, K); 60-457 m., *Orphanidis* 276 (BM, E, G, GH, K, w); *Schrenk* 27 (w); *Davis* 93 (BM, E); *Heldreich* 1112 (K); Mar. 1842, *Boissier* (G, GH, K, w); Ardetto near Athens, *Heldreich* 1112b (BM, K); Thana ad Acropolis, Oct. 1867, *Ball* (E); Hieropolis, *Spruner* (K); Attica, *Guiol* 915 (BM); Mt. Hymetto, Mar.-Apr. 1847, *Heldreich* (E, w); Chelmos, 228 m., *Davis* 990 (E); *Lempert* 1088 (K); Phocis near Delphi, *Leonis* 383 (A, E, G); Turkovinis near Athens, 7 Apr. 1927, *Rechinger* (w); Kymelti versus Tankrati, *Rechinger* 482 (w); near Kalanistra, 500 m., 11 June 1893, *Halácsy* (w); Thessalia, Agris prope Volo [Vólos] (Tersana), 1896, *Sintenis* 70 & 71 (BM, GH, K, w); Volos, *Rechinger* 22609 (w); Makiniata near Volo, *Polunin* 6552 (K); in valle Tempe fluv. Peneios, prope Rapsani, *Rechinger* 22572 (w); Kasabaliotiko pr. Kasabali, *Rechinger* 1190 (w); Kastri pr. lacus Karla, *Rechinger* 22842 (w); Pelion pr. Volos, 800-1500 m., *Rechinger* 22718 (w); Macedonia, Gjefgjeli, *Rechinger* 1525 (w); fluv. Angista pr. Phorolivios opp. Drama, *Rechinger* 6171 (K, w); Salonika, Lembert hills, 1 May 1917, *Wilson* (E); Epirus, dist. Zagorion, fluv. Voidomatis, 17 km. versus Joannina, *Rechinger* 21428 (w); Mt. Tymphi, fluv. Vikos, 300-800 m., *Rechinger* 21149 (w); inter Vriskos et Joannina, *Rechinger* 20719 (w); pr. Klissoura, 47 km. south of Joannina, 400 m., *Rechinger* 23327 (w); 20 km. south of Joannina, *Rechinger* 23263 (w); Euboea, *Aucher* 239 (BM, K, OXF); pr. Steni, 350-500 m., *Rechinger* 1921 (K, w); in montis Xiron Oros pr. Hagia Anna, 750-950 m., *Rechinger* 17111 (w); Psachna et Achmet Aga (Prokopion) a Hagios, 300-500 m., *Rechinger* 16500 (K, w); Mt. Kandili, 10 km. ab Achmet Aga, 300 m., *Rechinger* 18166 (w); a Limni, *Rechinger* 16686 (w); Thrace, Derbend, 10 km. north of Alexandriopolis, *Rechinger* 22258 (w); Lignitorichion et Potamos pr. Alexandriopolis, *Rechinger* 6048 (K, w); north of Arvas, 200 m., *Ball* 522 (LIVU); Mt. Karlik-Dagh pr. Komotini (Gumuldschina), 1400 m., *Rechinger* 10497 (K, w); fluv. Nestos (Mesta), pr. Toxotai (Oktschilar), 60-100 m., *Rechinger* 9649, 9349, 9812 (w); *Rechinger* 10497, 10966 (w); Montes Rhodope supra pr. Iasmos (Jasi-Koj) *Rechinger* 9525 (w); Mesta valley, *Tedd* 547 (K); above Yassikeuy, 366 m., *Tedd* 1805 (K); Mt. Xanthi, 120 m., *Tedd* 2196 (K); near Heraclitera, 90 m., *Tedd* 1964 (K); Kizil Ada, 762 m., *Tedd* 1956 (K); Peloponnesus, Laconia, Pen. Mani, supra Porto Kalion, *Rechinger* 20134 (w); Korinthia, lacum Stymphalia, *Rechinger* 10534 (w); Akropkari, *Rechinger* 573 (w); Messenia, Verga ad Kalamai (Kalamata) ad Mt. Taygetos, *Rechinger* 20400 (w); 950 m., *Bornmüller* 119 (w). AEGEAN ISLANDS: Samothrake, Mt. Phen-gari, 500-1400 m., *Rechinger* 9812 (K, w); 28 June 1934, *Tedd* (K); Thasos, Mt. Isparion, 1097 m., *Tedd* 1886 (K); Sporadum, Kyria Panagia, Reiser Insel, Hagios Petros, *Rechinger* 1045 (K, w); Chios, Kardhámyla, *Platt* 420 (K); Haghios Georgios, Sykovaro, *Platt* 46 (K). TURKEY: A2 (E); Prov. Istanbul, Bosphorus, near Fanar, *Sibthorp* (OXF); Rumelia, Kartova, 1836, *Friwaldsky* (BM, E, K); Bl; Prov. Çanakkale, Giaow Hissar, valley of Rhodius, Apr. 1856, *Kirk* (E); Seidinlii in mont. Arablar-Depressi, 1883, *Sintenis* 226 (BM); Prov. Izmir, Smyrna, Sedcheni, 27 Apr. 1870, *Peyronin* (G); Koukoularoudja, *Balansa* 62 (BM, E, G, K, w); *Whittall* 414 (E); Mt. Sipylo (Manisa dağ), 250 m., 1906, *Bornmüller* 9084 (BM, E, G, K, w); C2, Prov. Denizli, Denizli-Acipayam, 25 km. from Denizli, 860 m., *Dudley, D.* 35340 (A, E, K).

Specimens intermediate between subsp. *saxatilis* and subsp. *orientalis*. YUGOSLAVIA: Macedonia, lacus Ohrid pr. Pistani, 17 km. a Sveti Naum, *Rechinger* 19717 (w); fluv. Radika inter Debar et Mavrovi Hanovi, *Rechinger* 15795 (w). BULGARIA: Macedonia, Tartorly, 25 May 1917, *Nixolaff* (GH, w).

Specimens intermediate in morphology between subsp. *saxatilis* and subsp. *orientalis* may be found in the area (primarily in the northern Balkans) where these two subspecies overlap. The occurrence of intermediates and the southern distribution of subsp. *orientalis*, replacing subsp. *saxatilis*, indicate that subspecific rank is the most appropriate. The density of indumentum, the degree of leaf lobation or dentation, and the stature of the plants of subsp. *orientalis* show considerable variation. Often the indumentum is denser, the leaf teeth fewer and less pronounced, and the plants dwarf at altitudes above 1500 meters. This does not, however, appear to be a constant pattern. Recognition of these variations has accounted for the varieties listed in the synonymy.

Subsp. *megalocarpa* (Hausskn.) Dudley, comb. nov.

Alyssum orientalis var. *megalocarpum* Hausskn. Mitt. Thür. Bot. Ver. 3-4:

112. 1893. Holotype, the Aegean island of Chios. Bl: In saxosis ins. Chios.

1853, *Pauli* (JE, non vidi). — Bornm. Engl. Bot. Jahrb. 59: 449. 1925.

Alyssum ephesium Bornm. Mitt. Thür. Bot. Ver. 24: 11. fig. 1. 1909 (!).

Holotype, Turkey, C1: Ad Ephesi ad moenia dirupta, 1 June 1906, *Bornmüller* 9083 (B, non vidi); isotype (oxf).

Alyssum saxatile subsp. *megalocarpum* (Hausskn.) Rech. f. Beih. Bot. Centr.

54(B): 611. 1936 (!). — Rech. f. Fl. Aegaea, 223. 1943.

DISTRIBUTION AND HABITAT: Saxatile on calcareous substrates in the Cyclades, Sporades, western Aegean Islands, and the western coast of Anatolia; alt. 150–610 (–1219) m. Fl. Apr.–May.

GREECE: Peloponnesus, Laconia, Pen. Malea, Monemvasia, *Rechinger* 20093 (K, w). AEGEAN ISLANDS: B1, Chios, Scio, 1822, *Oliver* (G-DC); near Vrontados, *Gathorne-Hardy* 474 (E); Tal, valley of Livadi, 500 m., *Rechinger* 5311 (E, K, w); Lesbos, Malea near Philia, *Candargy* (fide Rech. 1943); C1, Kos, Mt. Dikios Asphendiu near Pyli, *Forsyth-Major* 642 (A, BM, GH, K, w); 800 m., *Rechinger* 8023 (E, K, w); inter Pili & Kardamena, *Rechinger* 7981 (K, w); C1, Samos, Mt. Kakis, 610–1219 m., *Davis* 1672 (BM, E, K); Mt. Ambelos, 700 m., *Rechinger* 3903 (E, G, K, w); Mt. Kerki, 1200 m., *Rechinger* 1966 (E, K, w); 1000 m., *Rechinger* 4125 (E, K, w); ad monasterium Zoodochus Rigi, 300 m., *Rechinger* 3715 (E, K, w); *Amorgos*, ad Langada, Mt. Krikelas, *Rechinger* 2352 (w); *Davis* 955 (K); 500 ft., *Davis* 1433 (A, BM, E, K). TURKEY: C1, Prov. Aydin, Ruins of Priene, 150 m., *Dudley*, *D.* 34972a (A, E); 20 miles from Söke, *Davis* 25231 (BM, E, K).

Subspecies *megalocarpa* is distinguished from subsp. *orientalis*, with which it is sympatric, entirely by the quantitative characters listed in the key to subspecies. The area of distribution of subsp. *megalocarpa* is relatively limited in comparison to that of subsp. *saxatilis* or subsp. *orientalis*, and is completely contained within the range of subsp. *orientalis*.

There appears to be little morphological intergradation between subsp. *orientalis* and subsp. *megalocarpa*. The fruits of some gatherings of subsp. *orientalis* (determined as *Alyssum affine*), however, from Calabria in Italy (e.g., *Rigo* 312) approach in size some of the smaller fruited specimens of subsp. *megalocarpa* from the Aegean Islands (e.g. *Forsyth-Major* 642).

2. *Aurinia uechtritziana* (Bornm.) Cullen & Dudley, comb. nov.

Ptilotrichum (Koniga) *uechtritzianum* Bornm. Österr. Bot. Zeitschr. 38: 10. 1888 (!). Holotype, Bulgaria. Ost.-Bulgarien, massenhaft in der Bucht von Varna zwischen Pontus und Devno-See, bei Galata, 1886, *Bornmüller* (B, non vidi); isotypes (G, K, W).

Lepidotrichum uechtritzianum (Bornm.) Velen. & Bornm. Österr. Bot. Zeitschr. 39: 324. 1889 (!). — Bornm. Bot. Centr. 41: 163. 1890. — Velen. Fl. Bulg. 42. 1891; Suppl. Fl. Bulg. 1: 27. 1898. — Aznavour, Bull. Soc. Bot. Fr. 64: 165. 1897. — Schulz in Engler & Prantl, Nat. Pflanzenfam. II. 17b: 495. fig. 271, *m-o*. 1936. — Hayek, Prod. Fl. Pen. Balc. 1: 428. 1925. — Stoj. & Steff. Fl. Bulg. ed. 2. 532. *pl.*, p. 585. 1948.

DISTRIBUTION AND HABITAT: Maritime sands along the coast of the Black Sea in Bulgaria; one coastal record from Asiatic Turkey. Fl. July–Aug. (–Sept.).

BULGARIA: Burgas, *Jablonowski* (PRC, *fide* Velen. 1898). TURKEY: A2(A), Prov. Istanbul, Bournov (Jum Burnu near Kartal), *Nemetz* 178 (G, hb. B.V.D. Post).

The long, linear rosette leaves, with dentate or repand margins, of *Aurinia uechtritziana* are conferred on indurated caudices. The bases of these leaves are grooved, swollen, and fleshy during the growing season, and persistent for a number of years. In addition to these characters, *Au. uechtritziana* shares with the other species of *Aurinia* spherical buds, cup-shaped calyces, reduced cauline leaves, and very sparsely foliate, nearly scapose fertile stems. The recognition and correlation of these characters for *Au. uechtritziana*, show that there are no apparent reasons, especially as there are no differences in floral morphology, to maintain the monotypic genus *Lepidotrichum* distinct from *Aurinia*. Although the silicles of *Au. saxatilis*, *Au. leucadaea*, and *Au. rupestris* are compressed or rarely sub-inflated, the strongly inflated and turgid silicles of *Au. uechtritziana* are not unique in the genus. *Aurinia corymbosa* and *Au. petraea* also have turgid silicles whose valves are strongly and equally inflated. In the majority of species of *Aurinia* the petals are yellow; however, in *Au. rupestris* and *Au. uechtritziana* they are white.

The only Turkish record of *Au. uechtritziana* to date was considered previously (cf. Velen. 1898; Hayek, 1925) as coming from Turkey-in-Europe (Thrace). In the original publication of this record, however, Aznavour (1897) clearly states that the plant was collected near Kartal, a village on the Marmara Sea on the Asiatic side of the Bosphorus. This collection, unfortunately, is only a portion of an inflorescence, but the

floral and indumentum characters indicate that it may be correctly referred to *Au. uechtritziana*.

3. *Aurinia rupestris* (Ten.) Cullen & Dudley, comb. nov.

Subsp. *rupestris*

Alyssum rupestre Ten. Prod. Fl. Nap. 1: 37. 1811 (!). Holotype, Italy. In fissuris rupium Magellae (Mugellae a Sarimaravallo), *Tenore* (NAP, non vidi); isotype (G-DC). — Ten. Cat. Pl. Hort. Neap. 1: 57. 1815; Fl. Nap. 2: 72. t. 60. 1820; Syll. Fl. Neap. 316. 1831. — DC. Syst. Nat. 2: 319. 1821. — Bertol. Fl. Ital. 6: 498. 1844. — Fiori & Paol. Fl. Anal. Ital. 1: 458. 1898; Ic. Fl. Ital. 1: 166. fig. 1451. 1899.

Koniga rupestris (Ten.) Heyn. Nom. Bot. Hort. 1: 439. 1840 (!).

Lobularia rupestris (Ten.) Steud. Nom. Bot. ed. 2. 68. 1841 (!).

Koniga scardica Griseb. Spic. Fl. Rum. & Bith. 1: 278. 1843 (!). Holotype, Albania. In regione alpina Scardi: sparsim in pratis m. Kobelitz, alt. 1524–2134 m., *Grisebach* (GOET, non vidi); isotypes (G, K).

Ptilotrichum rupestre (Ten.) Boiss. Fl. Or. 1: 288. 1867 (!). — Hal. Consp. Fl. Gr. 1: 87. 1900. — Hayek, Prod. Fl. Pen. Balc. 1: 442. 1925.

Ptilotrichum rupestre var. *scardica* (Griseb.) Hal. loc. cit. (!).

DISTRIBUTION AND HABITAT: An alpine confined to calcareous screes in Italy, Yugoslavia, Albania and Greece; alt. (500–) 1850–2700 m.

ITALY: Aprutii, Morrone, 1819, *Gussone* (G-DC); Morrone (fr.), monte Majella loca la Cimanera (fl.), 500–2000 m., July 1905, *Rigo* (BM, E, GH, K, w); Aprutio, Mont. Moroni et Majella, 1524–1829 m., 30 July 1874, *Porta & Rigo* (BM, E, GH, K, w); Aprutii, mont. “La Majella” et “Morrone”, *Rigo* 3908 (BM, E, GH, K); monte Amaro, 1819, *Schouw* (G-DC); Prov. de Chieti, monte Majella, inter mont. Amaro, 2700 m., *Fiori* 1281 (BM, E, GH, K); Mt. Majella, *Boissier* (BM, G, GH, K). ALBANIA: Lunxherie, 1800–1900 m., *Lemperg* 1406 (E, GH, K, w); Nemerzka, 2100 m. (haufiger), 1850–2100 m. (selten), *Lemperg* 786 (E, GH, K, w); Nordost-Albanien, dist. Luma, Galica Lums, *Dörfler* 705 (A, BM, E, K, GH, w); Koritnik, 2200 m., *Dörfler* 605 (BM, E, K, GH, w).

The features which indicate that *Alyssum rupestre* and *Ptilotrichum cyclocarpum* (subsp. *cyclocarpa*) should be treated as components of *Aurinia*, rather than of *Alyssum* (or *Ptilotrichum* which is a synonym of *Alyssum*) are the major diagnostics of *Aurinia*. These characters are: spherical buds; cup-shaped calyces; long and narrow rosette leaves, with deeply grooved petioles having swollen and persistent bases conferted and rosulate on indurated caudices; very reduced cauline leaves; and sparsely foliate, nearly scapose fertile stems. *Aurinia rupestris* differs from the other species of the genus in having simple racemes.

Subsp. *cyclocarpa* (Boiss.) Cullen & Dudley, comb. & stat. nov.

Ptilotrichum cyclocarpum Boiss. Ann. Sci. Nat. Paris, II. 17: 159. 1842 (!). Holotype, Turkey. B7: Prov. Tunceli, Kurdistan (Mounzur Dag), *Aucher*

279 *bis* (g, non vidi); isotype (κ). — Boiss. Fl. Or. 1: 288. 1867. — Grossh. Fl. Kavkava. ed. 2. 4: 211. 1950.

DISTRIBUTION AND HABITAT: An alpine endemic of Turkey, from the Cilician Taurus, the Anti-Taurus, and the Armenian Highlands; dry limestone ridges and screes; alt. 2000–2800 m. Fl. May–Aug.

TURKEY. A7, Prov. Gümüşane, Karahissartasch (near Elias dağ), 1894, *Sintenis* 5505 (BM, E, GH); Gümüşane, *Bourgeau* 33 (BM, E, GH, κ, w); Ardas (Torut)–Besklise, *Sintenis* 92 (E, w). A8, Prov. Gümüşane Erzurum, Bayburt-Erzurum, 1500 m., *Huet* (E, GH, w). B5, Prov. Kayseri, Bakir dağ, near Akoluk Yayla, 2500–2700 m., *Davis* 19346 (BM, E, κ). B6, Prov. Kayseri, Pinarbasi, 2000 m., *Stainton* 5167 (E, κ); Prov. Maraş, Berit dağ, 2800 m., *Balls* 1087 (BM, E, κ); dist. Göksun, Binboga dağ, above Yalak, 2000 m., *Davis* 19977 (BM, E, κ); 2200–2300 m., *Davis* 20155 (BM, E, κ); Isik dağ, above Karli Yayla, 2800 m., *Davis* 20021B (BM, E, κ). B7, Prov. Tunceli, Munzur dağ, above Ovacik, 2800 m., *Davis* 31241 (BM, E, κ). C2, Prov. Burdur, Eldirek dağ, south of Dirmil, chalk, 1850–1920 m., *Huber-Morath* 8451 (HM). C5, Prov. Içel/Niğde, Kysil depe above Bulghar Maaden, 2800 m., *Siehe* 457 (BM, E); Bulghar Magara, 2600 m., *Siehe* 573 (E, κ); Bulghar Maaden, *Balansa* 418 (E, κ); Gysil depe-Ketsiebele, 2580 m., *Kotschy* 126c (E, w).

The only consistent difference between the Italian and Balkan subsp. *rupestris*, and the Anatolian subsp. *cyclocarpa*, is that the fruits of the latter, even in the immature state, are always glabrous. The fruits of subsp. *rupestris* have an indumentum, at least when immature. This constant difference, in conjunction with completely allopatric distributions, justifies the retention of the Turkish taxon at subspecific rank. A number of specimens from Albania and Greece link the two subspecies morphologically. The mature fruits of these intermediate specimens (often determined as *Koniga scardica* or *Ptilotrichum rupestre* var. *scardicum*) are glabrous, as are the mature fruits of the Turkish subsp. *cyclocarpa*. Their immature fruits, however, have an indumentum characteristic of that which is persistent on the fruits of the strictly European subsp. *rupestris*. This pattern of variation could be interpreted as an interrupted cline.



Dudley, T. R. 1964. "Synopsis of the Genus *Aurinia* in Turkey." *Journal of the Arnold Arboretum* 45(3), 390–400. <https://doi.org/10.5962/p.325004>.

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