

TAXONOMIC NOTES ON *SEMPERVIVUM ARMENUM* BOISS. & A. HUET (CRASSULACEAE) FROM TURKEY WITH AN AMENDED DESCRIPTION

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Abstract

As a part of a revision of the genus *Sempervivum* L. in Turkey *S. armenum* Boiss. & A. Huet var. *armenum* and var. *insigne* Muirhead, are better treated at the rank of subspecies based on over 150 specimens. Moreover, an amended and expanded description, distribution, phenology, ecology of these subspecies are provided. With respect to IUCN categories, subsp. *insigne* has been assessed as vulnerable.

The genus *Sempervivum* L. (Crassulaceae) comprises about 50 species and 17 hybrids throughout the world. It is mainly distributed in mountainous regions of central and southern Europe, southwestern Asia, Caucasia and the Mediterranean (Topalov *et al.* 2006). The species *S. armenum* Boiss. et A. Huet. was reduced to synonym under *S. globiferum* L. by Boissier (1872). This has resulted in continued confusion on Turkish *Sempervivum*. Wale (1942) concluded that *S. armenum* is distinct from any European species. The first revision of *Sempervivum* in Turkey was done by Muirhead (1972) in which she recognized 11 species and 2 varieties. Since the publication of the flora, three more species, one subspecies, one hybrid and one new record have been described from Turkey (Davis *et al.* 1988, Karaer *et al.* 2010, Neeff 2005).

Since 1999, as a part of a revisional study of the genus *Sempervivum* in Turkey, the first author has carried out extensive field studies (Fig. 1) and collected a large number of specimens (about 2500 specimens) and preserved them at the Biology Department, Ondokuz Mayıs University.

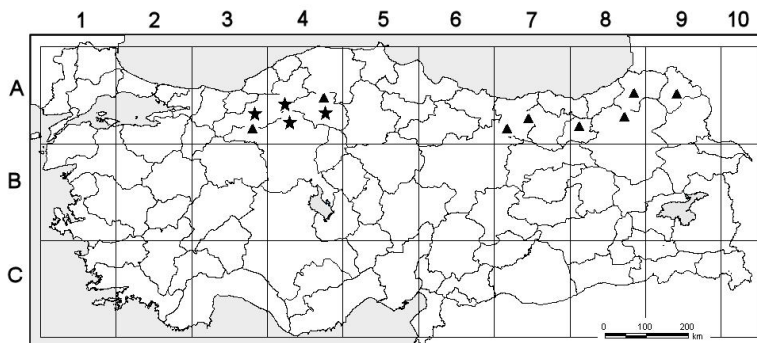


Fig. 1. Distribution map of *Sempervivum armenum*, subsp. *armenum* (▲) and subsp. *insigne* (★) in Turkey.

After extensive field and herbarium studies, present authors have reached the conclusion that these *S. armenum* var. *armenum* and var. *insigne*, have many and consistent morphological (Table 1), ecological and geographical differences that they think these two varieties should be recognized as subspecies, i. e. *S. armenum* Boiss & A. Huet subsp. *armenum* and *S. armenum* Boiss & A. Huet and subsp. *insigne* (Muirhead) F. Karaer.

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Table 1. Main morphological differences between subspecies of *Sempervivum armenum*.

Parameters	Subsp. <i>armenum</i>	Subsp. <i>insigne</i>
Rosettes in diameter (cm)	4 - 8	2 - 3 (-4)
Stem length (cm)	20 - 25	9 - 18 (-20)
Stem/leaves colour	Purple	Pale rose
Flowers number	30 - 50	15 - 25 (-30)
Flowers diameter (cm)	21 - 28	16 - 20
Calyx tip	Purple	Green (rarely purple dots)
Filament colour	Pale lavender	Violet

Sempervivum armenum Boiss. & Huet subsp. *armenum*, in Boiss., Diagn. Ser. 2(2): 60 (1856).

Synonyms: *S. braunii* Ledeb. var. *glabrum* Medw., Pl. Caucasus: 169 (1915).

= *S. armenum* var. *armenum*, Ic: Notes R.B.G. Edinb. 29: t. 1A f. 1 (1969).

Type: Inter Bayburt et Erzurum, in valle Kassaklu, August 1853, A. Huet (iso. K!).

Perennial, 20 - 30 cm, up to 35 cm tall when in flower. Rosettes 4 - 8 cm in diameter; leaves oblanceolate-spathulate, ovate-lanceolate to spathulate, 30 - 50 × 9 - 11 mm, mucronate, young rosettes leaves with a few scattered glands but when mature glabrous, glaucous with dark purple tip, margin strongly pectinate-ciliate, ciliae c. 1 mm long, cauline leaves lanceolate, glandular hairy, 30 - 47 (-52) × 10 - 12 (-15) mm, short pubescent hairy at the base or rarely glabrous, purple, imbricate, scape c. 7 - 9 mm in diameter. Inflorescence 30 - 50 (-60) flowered, narrowly scorpioid cymose, with 3 - 5 branches, branches 5 - 10 cm long; bracts linear, up to 15 × 5 mm, green to pale rose, glandular hairy. Flowers c. 21 - 28 (-33) mm in diameter, pedicels 1 - 3 mm long, calyx lobes lanceolate, acute, 3 - 3.5 × 1.5 mm, tip dark purple, densely glandular; (12) 14 - 17 merous; petals linear-lanceolate, 9 - 11 × 1.5 mm, densely glandular, pale yellow or greenish, purplish towards the base. Stamens (24-) 28 - 34, filaments pale lavender, hairy at base. Carpels glandular hairy; scales erect, subquadrate-rotund.

Sempervivum armenum Boiss. & Huet subsp. *insigne* (Muirhead) F. Karaer *stat. nov.*

Basionym: *Sempervivum armenum* Boiss. & Huet var. *insigne* Muirhead in Notes R.B.G. Edinb. 29: 19 (1969).

Type: Ankara: near Kızılcahamam, c. 1200 m, 22 July 1956, McNeill 284 (holo. E!, cult. E!).

Subsp. *insigne* differs from subsp. *armenum* because of its smaller rosettes 2 - 3 (-4) cm in diameter and smaller basal leaves (20 - 29 × 7 - 9 mm), smaller scape length (9 - 18 (-20) cm when in flower, its pale rose and 15 - 30 (-35) × (5) 7 - 9 mm cauline leaves. As well as, its inflorescence (10) 15 - 30 (-35) flowered, flowers smaller in diameter size, calyx tip green (rarely purple dots) and filaments violet.

Subsp. *insigne* is a local endemic. It is distributed only North-West Anatolia. However, subsp. *armenum* is distributed in North-East Anatolia and rarely distributed in North-West Anatolia they occupy their own habitat although sometimes they overlap. This situation could make gene exchange between subspecies feasible and interspecific hybridisation occurs in these places. *S. armenum* subsp. *insigne* was probably formed by means of sympatric speciation from subsp. *armenum*. With respect to morphological relationships of these two subspecies and their distribution pattern, there is a possibility that subsp. *armenum* is the ancestral to subsp. *insigne*. The collection sites are within the Euro-Siberian phytogeographic region and the locality has a relatively humid climate. In Turkey, distribution of the subsp. *armenum* shows interruption in the

central Black Sea region. It appears believe that there are some climatic, edaphic, geologic and geomorphologic differences that give rise to this interruption.

For the first time, the conservation status of *S. armenum* subsp. *armenum* and subsp. *insigne* was assessed as LR (Lower Risk) in Turkish Red Data Book (Ekim *et al.* 2000). According to authors recent field surveys and IUCN criteria (IUCN 2001), *S. armenum* subsp. *insigne* has been assessed as VU (Vulnerable) because of its local existence and small population size, and subsp. *armenum* has been assessed as LC (Least Concern) because of its distribution patterns and population size.

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References

- Boissier E. 1872. Flora Orientalis - Genevae et Basileae. Apud H. Georg, Lugundi.
- Davis P.H., R.R. Mill and K. Tan. 1988. *Sempervivum* L. In: Flora of Turkey and East Aegean Islands (Supplement I.). Vol. 10, P.H. Davis, R.R. Mill and K. Tan (Eds). Edinburgh Univ. Press, Edinburgh.
- Ekim T., M. Koyuncu, H. Duman, Z. Aytaç and N. Adıgüzel. 2000. Red data book of turkish plants (Pteridophyta and Spermatophyta). Barışcan Ofset, Ankara.
- IUCN. 2001. IUCN Red List Categories: Version 3.1. pp. 1-23. Prepared by the IUCN Species Survival Commission. IUCN, Gland and Cambridge.
- Karaer F. and F. Celep. 2008. *Sempervivum ekimii* nom. et stat. nov. for *S. minus* var. *glabrum* (Crassulaceae), with an amplified description. Ann. Bot. Fennici 45: 229-232.
- Karaer F., F. Celep and H.G. Kutbay. 2010. Morphological, ecological and palynological studies on *Sempervivum sosnowskyi* Ter-Chatsch. (Crassulaceae) with a new distribution record from Turkey. Aust. J. Crop (in press).
- Mitchell P.J. 1974. Turkish Sempervivums. J. Sempervivum Soc. 5(4): 2-6.
- Muirhead C.W. 1969. Turkish species of *Sempervivum* L. Notes Bot. Gard. Edinb. 29: 15-28.
- Muirhead C.W. 1972. *Sempervivum* L. In: Flora of Turkey and East Aegean Islands. Vol. 4, P.H. Davis (Ed.), pp. 209-248. Edinburgh Univ. Press, Edinburgh.
- Neeff P. 2005. Neue Taxa der Gattung *Sempervivum* (Crassulaceae) in der Türkei. Kakteen und andere Sukkulente 56(3): 71-72.
- Topalov K., M.E. Mort, P. Neeff, D. Lakusic and B. Zlatkovic. 2006. Preliminary phylogenetic analyses of *Sempervivum* L. (Crassulaceae) inferred from DNA sequence data. In: Abstract, pp 300. Botany 2006 Conference, California State Univ. Press, Chico.
- Wale R.S. 1942. Anatolian Semperviva. Bull. Alp. Gard. Soc. 10: 233-241.

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