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A NEW RECORD FROM TURKEY: *CONSOLİDA SAMİA* P.H. DAVİS (RANUNCULACEAE)

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ABSTRACT

Consolida samia P.H.Davis (Ranunculaceae) is one of the "Top 50 Plants" of IUCN Species Survival Commission. *C. samia*, as a new record for the Flora of Turkey is described and illustrated from West Anatolia in this study. The specimens were collected from a gravel-like substrate with the largest pebbles in the Balikesir border of Manisa. The description of the species has also been expanded, following collection of specific plant materials. In this study, the detailed morphological characteristics and palynological properties were determined and compared with the closely related taxon *C. hellespontica* (Boiss.) Chater. Also, line drawing, photographs and a distribution map of *C. samia* species of Turkey were presented. Our studies led us to recommend it as CR B1ab (iii,v)+2ab(iii,v), according to the 2001 IUCN categories.

Key words: *Consolida*, flora, Ranunculaceae, Turkey.

INTRODUCTION

Ranunculaceae family, which is distributed worldwide, but very rich in North temperate regions, is represented by 59 genera and 2500 species. While the family is represented the most densely in the Far East by 44 genera, it is known from Europe and North America by 24 genera (Ertuğrul *et al.* 2010). Many genera of this family have beautiful flowers and cultivated as indoor plants. Moreover, several genera are used as medicinal plants because these contain substances of pharmacological importance (Tamura, 1964).

The genus *Consolida* S.F.Gray was treated as a group in genus *Delphinium* L. over years. But in 1821 Gray, who worked on Flora British, raised *Consolida* to species level based on only *C. regalis* (L.) S.F. Gray species (Ertuğrul *et al.*, 2010). Genus *Consolida* have been reported as a different genus from genus *Delphinium* by several researches (Tutin *et al.* 1964, Davis, 1965a, Hayek, 1970, Iranshahr 1992, Strid and Tan, 2002). But many researchers (De Candolle, 1824, Boissier, 1867, Huth, 1895 Bouloumoy, 1930, Komarov, 1937) have reported *Consolida* as a subgenus or a section in genus *Delphinium*.

The genus *Consolida* was represented by 28 species (33 taxa) in Turkey (Davis, 1965a, Davis *et al.*, 1988, Çırpıcı 2000). Fourteen of these are endemic. *Consolida samia* was described for the first time by Davis (1965b) but the pollen characters were not described by him. This species is one of the "Top 50 Mediterranean Islands Plants". Also, it is listed in Appendix I of the Bern Convention and as a priority species in Annexes II and IV of the EC Habitats Directive (Montmollin and Strahm 2005).

Pollen morphology of the Ranunculaceae has also been studied by Kumazawa (1936), Savittski (1982), Al-Eisawi (1986), Clarke *et al.* (1991) and Perveen and Qaiser (2006), but only a few studies have been conducted on the genus *Consolida*. Noor *et al.* (2004) investigated the pollen fertility of *Consolida ambigua* (L.). In addition, pollen grains of *Consolida orientalis* (Gay) Schröd. and *Consolida regalis* Gray were studied palynologically by Oberschneider (1998).

During one of the field trip in West Anatolia [B1], a locally unusual specimen of *Consolida* was encountered. At first glance, it looked close to *Consolida hellespontica* (Boiss.) Chater. After closer examination and consultation with the Flora of Turkey (Davis 1965a, Davis *et al.*, 1988, Cirpici, 2000), it was realized that the specimens were different from *C. hellespontica*. The specimens were cross-checked with various *Consolida* accounts given in relevant litterature e.g., Flora Europae (Tutin *et al.*, 1964), Flora of Balkan (Hayek, 1970), Flora Iranica (Iranshahr, 1992), Flora Hellenica (Strid and Tan, 2002), Flora of USSR (Komarov, 1937) and Lebanon and Syria Flora (Bouloumoy, 1930). The specimens have been also cross-checked with the material housed at various European and Turkish herbaria, Ege University Herbarium (EGE), Gazi University Herbarium (GAZI), Hacettepe University Herbarium (HUB), Geneva Herbarium (G), Istanbul University Herbarium (ISTE), Royal Botanic Garden (RGB) photo!, Linnean Herbarium (S-LINN) photo! and Stevens Point Freckmann Herbarium photo!. Eventually, the specimens were identified as *Consolida samia* which is not previously reported in the literature relating to the Flora of Turkey.

MATERIALS AND METHODS

The specimens of *C. samia* collected in their natural habitats (Fig. 1) in Manisa (Turkey) from the following locations:

[B1] Manisa: Soma, Provincial boundary of Manisa-Balikesir, Kocasivri hill, pebbles areas, 900 m, July 21, 2009, Y. Altan, with the collection number 6820.

Every part of each plant were carefully examined and measured. Our specimens were compared with other similar *Consolida* specimens, and the differences were determined. Additionally, slides of the specimens were prepared in the field. The collected materials were numbered and stored at the Herbarium of Celal Bayar University, Department of Biology.

All the pollen specimens were acetolysed according to the standard method described by Erdtman (1960). They were observed in glycerin-water using a standard Olympus CX21FS1 microscope with D plan 1.00–1.25 160/0.17 oil immersion objective and NFKx3.3 LD 125 lens. Thirty pollen grains were regarded as sufficient for the palynological analysis. For SEM, pollens were directly mounted on stubs using double-sided adhesive tape. Samples were coated with gold POLARON SC7620 ion-sputter and then observed by standard techniques using a LEO 440 scanning electron microscope. In general, the terms used for terminology are those proposed by Punt *et al.* (2007).

RESULTS AND DISCUSSION

Consolida samia P. H. Davis in Notes R.B.G. Edinb. 26: 172 (1965) (Fig. 2, 3)

Type: Samos, S.W. slope of Mt. Kerki, steep screes of limestone, c. 800 m, 26 v 1963, *H. Runemark & S. Snogerup* 19592.

Stem 4-6-(8) cm, with a few ascending branches, spreading tomentollus. Racemes rather dense. Lower bracts 3-5-sect, upper entire. Bracteoles reaching beyond the base of the flower, persistent. Flowers pale lilac, 18-27 mm. Posterior sepal 7-9 mm, spur 14-17 mm, nearly 2 x longer than the corolla. Corolla 7-8 mm, subtrilobed with subcordate base, lateral lobes ± rounded at the tips and slightly deflexed. Perianth subpersistent. Follicle oblong, adpressed-strigulose, borne on pedicels refracted downwards. Fl. 6-7. In pebbles area. 930 m.

Consolida samia, the distribution of which was not recorded previously in Turkey, is distributed in only one locality in Samos island of Greece (Montmollin and Strahm, 2005) in adjacent to West Anatolia of Turkey. For that reason its distribution in the West of Turkey is not surprising. The number of species of *Consolida* in Turkey (Davis, 1965a, Davis *et al.* 1988, Cirpici 2000) reaches 29 with the addition of *C. samia*. The closest species to *C. samia* among Turkish *Consolida* is *C. hellespontica*. It differs from *C. samia* as indicated in Table 1.

Table 1. A comparison between the diagnostic characters of *Consolida samia* and *C. hellespontica*.

Characters	*C. samia*	*C. hellespontica*
Plant high	4–6–(8) cm	10–35 cm
Indumentum	more spreading tomentollus	adpressed-pubescent
Flower (Colour)	pale lilac	deep purple or violet
Posterior sepal	7–9 mm	8-15 mm
Spur	nearly 2 x longer than the corolla	equal or slightly longer than corolla
Distribution	West coast of Turkey and Samos	Mainly inner Anatolia

Table 2. Pollen morphological data of the *Consolida samia*.

Pollen characteristics (n=30)	Min. (µm)	Max. (µm)	Mean	± SD
Diameter polar (P)	38.9	48.5	43.5	4.8
Diameter equatorial (E)	26.9	35.2	31.6	4.3
P / E ratio	1.32	1.45	1.40	0.1
Colpus length (Clg)	28.1	38.1	33.3	5.0
Colpus width (Clt)	1.45	2.79	2.11	0.7
Mesocolpium (M)	16.4	20.6	18.9	2.2
Exine thickness	1.25	1.50	1.37	0.1
Microperporate diameter	0.26	0.31	0.28	0.03
Number of perforations / 5µm^2	10	15	12	2.65
Number of spines / 5µm^2	11	12	11.33	0.58

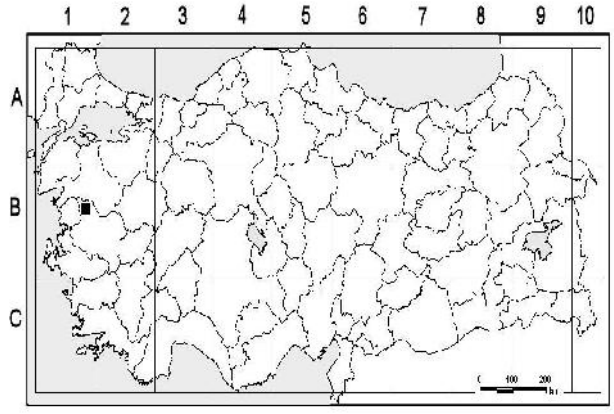

Fig. 1. The distribution of *C. samia* (■) in Turkey.

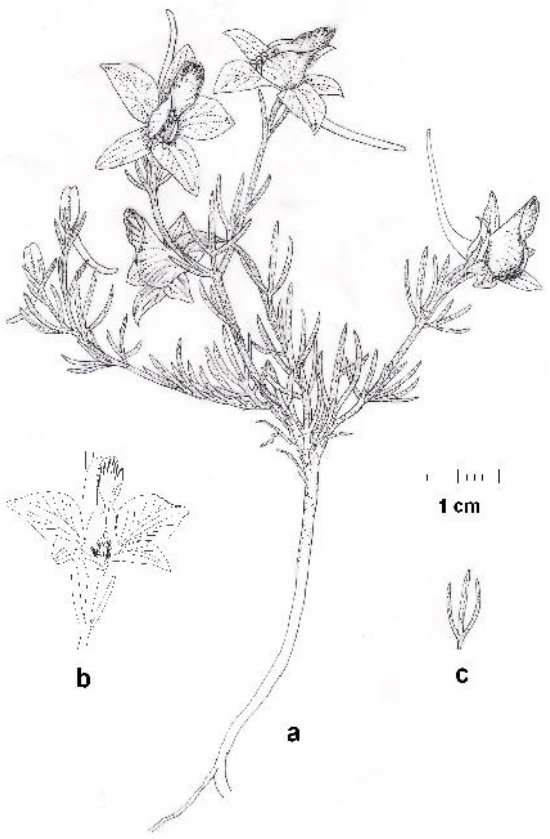

Fig. 2. *Consolida samia* P.H.Davis — a. habit; b. flower; c. leaf.

Fig. 3. *Consolida samia* in the wild.

The pollen properties of *Consolida samia* are here described for the first time. The pollen grain characters of the taxon are presented in Table 2. *Consolida* pollen grains are characterized by radiosymmetric, monads and medium size. The general shape of pollen of *C. samia* is prolate-spheroidal in equatorial view and is circular in polar view. The pollen is tricolpate, isopolar and ornamentation is microechinate-perforate (Fig 4). Oberschneider, (1998) investigated palynological properties of *Consolida orientalis* and *Consolida regalis* and determined the pollen grains of two studied species were spheroidal, tricolpate; exine sculpturing was microechinate-perforate; size medium and isopolar. Oberschneider's results compared with our study, pollen characteristics are mostly similar.

In this study, it is very important that a new locality has been found for *Consolida samia*. Also, *C. samia* which was known as Island endemic lost this characteristic after it was collected from Turkey. This species is rare in Turkey and only known from one locality. The population grows in a very limited area; where it is under high grazing pressure and numbers of individuals is lower than 100. We suggest that *C. samia* which are the local endemic of Mediterranean, should be evaluated as Critically Endangered (CR) B1ab (iii,v)+ 2ab (iii,v) according to the most recent IUCN (2001) categorization [B1, extent of occurrence less than 100 km^2; a, severely fragmented or known to exist at only a single location (Manisa, Soma Kocasivri hill); b (iii, v), continuing decline inferred.; B2, area of occupancy estimated to be less than 10 km^2; a single population known; b (iii, v), habitat continuing decline inferred].

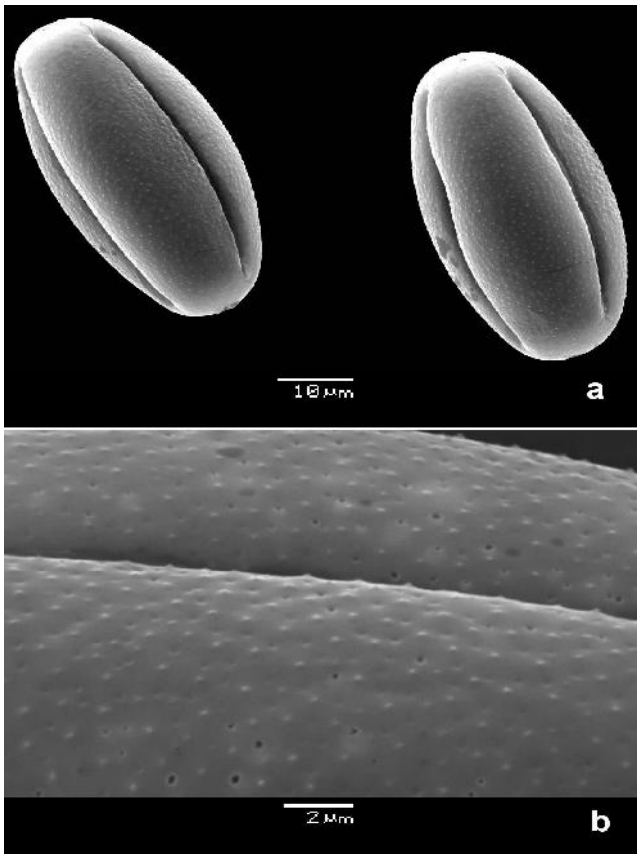

Fig. 4. SEM micrographs of pollen. — a: dry pollen grains in equatorial view, b: detail of sexine ornamentation.

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