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Chorological contributions for some narrow-range endemic plant taxa in Turkey

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Türkiye'deki bazı dar yayılışlı endemik bitki taksonları için korolojik katkılar

Abstract: The taxonomy of narrow endemic plant taxa, chorology and protective biology are an important contribution for every new population determined. Here, new population information from Turkey has been given for a total of 5 narrow-range endemic plant taxa, led by *Aethionema dumanii* (*Brassicaceae*), *Astragalus aytatchii* (*Fabaceae*), *Salvia halophila* (*Lamiaceae*), *Sedum hewittii* (*Crassulaceae*) and *Senecio olympicus* (*Asteraceae*). Furthermore, some features and ecological preferences, localities, distribution map and images of the species are given.

Key words: Endemic, chorology, new populations, Turkey

Özet: Tespit edilen her yeni popülasyon, dar endemik taksonların taksonomisi, korolojisi ve koruma biyolojisi için önemli bir katkıdır. Burada *Aethionema dumanii* (*Brassicaceae*), *Astragalus aytatchii* (*Fabaceae*), *Salvia halophila* (*Lamiaceae*), *Sedum hewittii* (*Crassulaceae*) ve *Senecio olympicus* (*Asteraceae*) olmak üzere toplam 5 dar yayılışlı endemik bitki taksonu için Türkiye'den yeni popülasyon bilgileri verilmiştir. Ayrıca türlerin bazı özellikleri ve ekolojik tercihleri, lokaliteleri, yayılış haritası ve resimleri verilmiştir.

Anahtar Kelimeler: Endemik, koroloji, yeni popülasyonlar, Türkiye

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1. Introduction

According to the International Union for Conservation of Nature (IUCN) criteria, the plant species, which continue their existence in nature and about which there is sufficient information, are evaluated in the threat categories, which are defined as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC). Among these, the CR, EN, and VU are categories, which should be protected. It is necessary to know the extent of the area of distribution and the number of individuals for being able to decide in which category a taxon is placed (IUCN Standards and Petitions Committee, 2019). Consequently, it is an important discovery, which includes for any species the categories of threat required for protection, to find new populations, and which directly affects the threat category of a known species. According to the IUCN, species, whose lineages are under threat, are evaluated from the aspect of 5 criteria that are listed from A to E. The discovery of new populations directly affects these criteria, especially A and B. The A criterion is related to "decrease in population", whereas B is related to "extent of area of distribution" (IUCN Standards and Petitions Committee, 2019). The discovery of every new population increases the population number of the species and extends the area of distribution. Here, new distribution areas of 5 narrow-range endemic species were presented in order to contribute to the classification of the threat categories of the species.

2. Materials and Method

Here, the narrow endemic plant taxa given to new populations have been collected during the floristic activities performed at different times in different provinces of Turkey. Together with the detailed address to the extent possible in the section of the distribution information for taxa, their Global Positioning System (GPS) records have also been written. Furthermore, photographs have been given, which display diagnostic characters for the taxa. The specimens collected were delivered to the GAZI and ANK herbaria to be kept. The Google Earth application was used to assess the distribution areas of the species. The width of the distribution area was calculated with the aid of a polygon drawn to include all recognized species addresses.

3. Results and Discussions

Brassicaceae

Aethionema dumanii Vural & Adıgüzel, Turkish J. Bot. 19(4): 481 (1995), (IPNI, 2020).

Specimens examined: B6 Sivas: Between Şarkışla and Pınarbaşı (Malatya road), 37 S 282176-4322577, 1600 m, marl steppe, 8.8.2018, Koç 3480 & Hamzaoğlu (GAZI, ANK).

When the flower and fruit characters and the habitat preferences stated in the original publication were taken into consideration, it was decided that the specimens collected from Sivas belong to *Aethionema dumanii*. According to the existing data, the species is an endemic plant, which prefers the marl and gypsum steppes between 840−1400 meters in Eskişehir, Ankara, and Afyonkarahisar (Vural and Adıgüzel, 1995). According to the Flora of Turkey and the East Aegean Islands, since the species is a perennial, has unilocular fruits, is shorter than 30 cm and its

fruits have the dimensions of 6-9 × 7-9 mm, it resembles *A. eunomioides* (Boiss.) Bornm. (Hedge, 1965). However the leaves of *A. dumanii* are oblong-linear and alternately arranged (not ovate-spatulate or orbicular and the bottom leaves are not arranged opposite), the fruit edge is undulate, irregular crenate-dentate and the wings are at a width of 3-4 mm (not smooth and 1.5-2 mm) (Fig. 1). Together with the addition of the data for the new population, the upper elevation interval has reached 1600 meters, it was understood that its distribution continued towards the east and that the extent of its area of distribution became approximately 15.000 km^2 (Fig. 2).

Fabaceae

Astragalus aytatchii Akan & Civelek, Ann. Bot. Fenn. 38(3): 169 (2001), (IPNI, 2020).

Specimens examined: B8 Erzurum: Aşkale, N. of Yeşilova village, 37 S 642438-4422857, 1750 m, gypsum-bearing steppe, 29.5.2019, Hamzaoğlu 7587 & Koç (GAZI, ANK).

Astragalus aytatchii is a defined endemic species with specimens, which were collected from the surroundings of Hocabey Village, to the south of the Sivas Provincial Center (Fig. 3). This species, which belongs to the *Alopecuroidei* DC. (= *Alopecias* (Steven) Bunge) section, resembles *A. elatus* Boiss. & Balansa (Akan and Civelek, 2001), since its peduncle is shorter than 5 mm, its calyx is 8-10 mm long and it teeth are 3-5 mm long, the upper surface of its leaflets are without hairs and the lower surface is hairy, adpressed pilose, the stipules are 8-15 mm long, its bracts are 8-15 mm long, its standard is 18-19 mm long, and inflorescence is ovate or orbicular. However, in *A. aytatchii*, the bodies are 10-35 cm long (not 50-90 cm), the leaves are 6-18 cm long (not 19-36 cm), the leaflets are 9-14 pairs (not 20-24 pairs), and the calyx is 8-10 mm long (not 12-18 mm). It was stated that in the area where the species was defined on deep gypsum soil at an interval between 1500-1600 meters, approximately 100-150 mature individuals were found in the population and growing in an area of only 1000-1500 square meters. Together with the newly determined population at Aşkale, Erzurum Province, the extent of the area of distribution of the species became approximately 3000 km^2 (Fig. 2). When both the type and the addresses given here are taken into consideration, it is observed that the species preferred steppes with gypsum. It can be stated that the probability of finding the species at other addresses in the steppes with gypsum betwe–en Sivas and Aşkale is rather high.

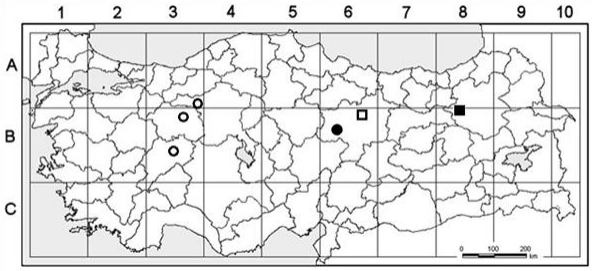

Figure 2. The known populations of *Aethionema dumanii* (O) and the newly determined populations (●), the known populations of *Astragalus aytatchi* (□) and the newly determined populations (■).

Lamiaceae

Salvia halophila Hedge, Notes Roy. Bot. Gard. Edinburgh 23: 58 (1959), (IPNI, 2020).

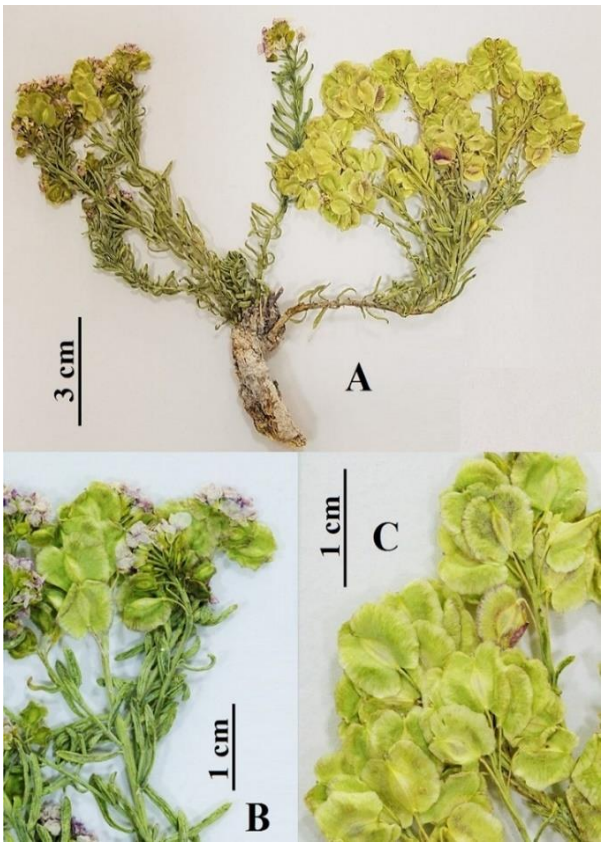

Figure 1. *Aethionema dumanii* – A. Habit, B. Inflorescence and C. Fruits.

Figure 3. *Astragalus aytatchii* – A. Habit, B. Inflorescence.

Specimens examined: A3 Ankara: Beypazarı, between Kırbaşı and Uşakbükü villages, 36 T 395037-4429963, 810 m, gypsum-bearing and salty slopes, 11.6.2016, Koç 2313 & Hamzaoğlu (GAZI, ANK).

According to the distribution information given in the Flora of Turkey and the East Aegean Islands, the species is an endemic grown in the surroundings of Tuz Lake on the salty marshes (Aksaray and Konya) (Hedge, 1982). When it is compared with the depiction given in the work, it was determined that the number of flowers found in the verticillates in the Beypazarı specimens is generally 3-4 each (not 4-6) and that the length of the leaves was longer (Fig. 4). The extent of the area of distribution of taxon became approximately 4000 km^2 together with the Beypazarı population, which was determined at a bird's-eye view of approximately 200 km to the northwest according to Tuz Lake (Fig. 5). While the species is growing on very slightly sloped salty marshes at Tuz Lake, it was determined on the slope of a hill with gypsum, which has water seepage at Beypazarı. On the area of the species determined in the Beypazarı, species, which are frequently observed in the surroundings of Tuz Lake, were also encountered, such as *Onosma halophila* Boiss. & Heldr., *Taraxacum farinosum* Hausskn. & Bornm. ex Hand.-Mazz., and *Gypsophila oblanceolata* Barkoudah. Furthermore, a new species *Hypericum turcicum* Özbek & Hamzaoğlu from the area, was published recently (Özbek et al., 2019).

Crassulaceae

Sedum hewittii Chamberlain., Notes. Roy. Bot. Gard. Edinburgh 31(2): 325 (1972), (IPNI, 2020).

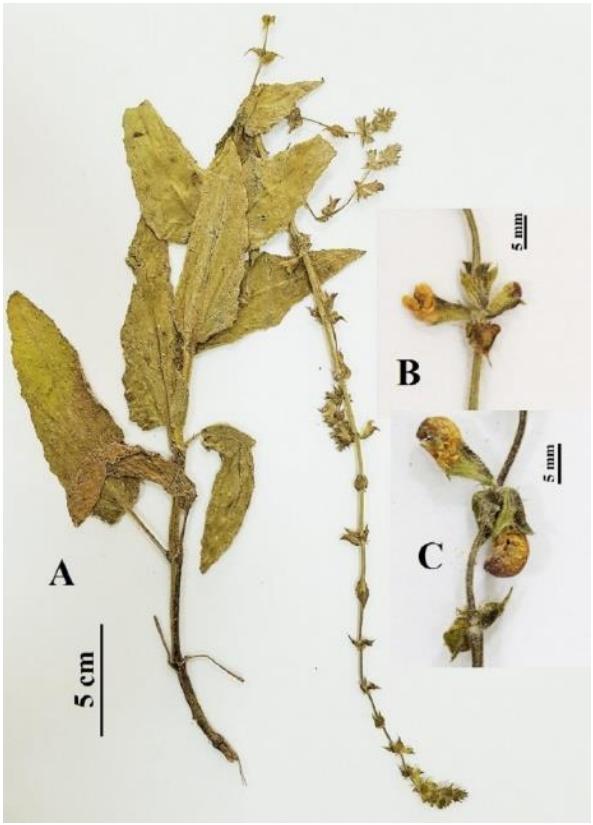

Figure 4. *Salvia halophila* – A. Habit, B and C. Inflorescence.

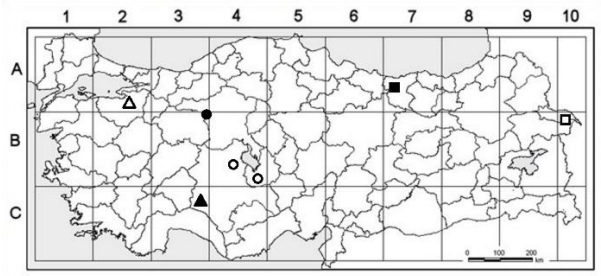

Figure 5. The known populations of *Salvia halophila* (○) and the newly determined populations (●), the known populations of *Sedum hewittii* (□) and the newly determined populations (■), the known populations of *Senecio olympicus* (△) and the newly determined populations (▲).

Specimens examined: A7 Giresun: Dereli, SW. of Aksu village, Karagöl Mountain, towards the summit of Kılınçtepe, 37 T 428850-4486785, 3000 m, rocky slopes, 9.8.2008, Hamzaoğlu 5315 & Koç (GAZI).

According to the distribution information given in the Flora of Turkey and the East Aegean Islands, the species is an endemic that is only growing at Ağrı Mountain (Chamberlain, 1972). Together with the Karagöl (Dereli, Giresun) population, which was determined approximately 530 km to the west-northwest compared to Ağrı Mountain (Ağrı-Iğdır), the extent of the area of distribution of the taxon has become approximately 6000 km^2 (Fig. 5 and 6). *Sedum hewittii* grows at Ağrı Mountain between 2750-3050 meters, on volcanic bedrock and moist areas. The newly determined population displays a similarity to the Ağrı Mountain population from the aspect of these characteristics.

Figure 6. *Sedum hewittii* – A. Habit, B. Inflorescence.

Asteraceae

Senecio olympicus Boiss., Diagn. Pl. Orient. ser 1(4): 13 (1844), (IPNI, 2020).

Specimens examined: C3 Konya: Between Seydişehir and Derebucak district, west of Taraşçı villag, left of Rezebeli Pass, towards the summit, 36 S 385253-4145410, 2140 m, calcareous rocks, 14.7.2011, Hamzaoğlu 6167 & Koç (GAZI).

According to the distribution information given in the Flora of Turkey and the East Aegean Islands, the species is an endemic only growing at Uludağ (Bursa) (Matthews, 1975). The population was determined at Rezebeli Pass at a bird's eye view of approximately 390 km to the south-southeast of the Uludağ population (Fig. 5 and 7). The extent of area of distribution of the taxon has become approximately 3000 km^2 with this new population. The edges of the lower leaves in the individuals belonging to the Rezebeli population are smooth (not remotely repand-denticulate). The continuousness and the taxonomic importance of this morphological difference should be discussed by examining in detail more individuals.

Figure 7. *Senecio olympicus* – A. Habit, B. Capitulum.

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