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A first vouchered wild record for the flora of Turkey: *Aegilops juvenalis* (Thell.) Eig (Poaceae)

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Abstract: *Aegilops juvenalis* (Thell.) Eig (Poaceae) is recorded and vouchered for the first time from Turkey. This first vouchered wild record is confined to Ceylanpınar province in C8 Şanlıurfa. The diagnostic morphological characters discriminating it from of *Aegilops crassa* Boiss. are pointed out. Notes are presented on its ecology and phenology. A distribution map of this species is also given.

Key words: Poaceae, *Aegilops juvenalis*, new record, Turkey

Türkiye Florası için herbaryum materyali haline getirilen ilk yabancı kayıt: *Aegilops juvenalis* (Thell.) Eig (Poaceae)

Özet: *Aegilops juvenalis* (Thell.) Eig (Poaceae) Türkiye'den ilk defa herbaryum materyali haline getirilmiş ve rapor edilmiştir. Bu ilk herbaryum materyaline dönüştürülmüş yabancı kayıt C8 Şanlıurfa, Ceylanpınar'dan rapor edilmiştir. Bunun *Aegilops crassa* Boiss. türünden ayırt edici morfolojik karakterleri belirtilmiştir. Türün ekolojisi ve fenolojisi üzerine notlar sunulmuştur. Ayrıca türün Türkiye'deki dağılım haritası verilmiştir.

Anahtar sözcükler: Poaceae, *Aegilops juvenalis*, yeni kayıt, Türkiye

Introduction

The genus *Aegilops* L. consists of more than 20 species and constitutes the secondary gene pool for cultivated wheats (van Slageren, 1994). Species in the genus *Aegilops* are distributed in South-west and Central Asia and throughout the Mediterranean

basin. A primary centre of diversity of the genus *Aegilops* is considered to be the 'Fertile Crescent', because a larger number of *Aegilops* species are found there than in other areas (van Slageren, 1994).

In the *Flora of Turkey*, Davis (1985) reported 15 species within 2 subgenera that did not include

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Aegilops juvenalis (Thell.) Eig. This species is one of the hexaploid species ($2n = 6x = 42$) in the genus. The genome constitution was designated as DMU where the DM genome is from *A. crassa* and the U genome from *A. triuncialis* L. or *A. umbellulata* Zhuk. (van Slageren, 1994). Maxted et al. (2008) have identified *Aegilops juvenalis* with the highest priority to conserve, as the species is represented by only 20 germplasm accessions conserved ex situ.

After the publication of the flora and supplements the new taxa of grasses were compiled in the supplements for publication (Davis, 1985; Davis et al., 1988; Güner et al., 2000). Besides these, additional taxonomic studies were done on certain genera mostly by means of using numerical taxonomic methods (Doğan, 1988, 1991, 1992, 1997, 1999).

The authors carried out several field missions between 2006 and 2009 and collected huge amounts of herbarium specimens of the genus *Aegilops*, for the purpose of revising the tribe Triticeae Dumort. In addition, population size, phenological traits, and ecological preferences were observed in the field (Davis & Heywood, 1973). Particular attention was paid to an *Aegilops* sample collected from south-east Anatolia (C8 Urfa, C8 sensu Davis, 1965) in 2007. Upon closer examination and going through the *Flora of Turkey* (Davis, 1985) and other relevant floras, such as *Flora Orientalis* (Boissier, 1884), *Flora of Syria, Palestine and Sinai* (Post, 1933), *Flora Iranica* (Bor, 1970), *Flora of Iraq* (Bor, 1968), and the latest monographic treatment by van Slageren (1994), it was identified as *A. juvenalis*. This species is known from Iraq, Syria, Turkmenistan, Uzbekistan, and Azerbaijan. Although van Slageren (1994) mentioned an adventive collection from İzmir, (JE) and Kiziltan et al. (1990) suggest one possible germplasm collection from Adıyaman, (C7) which is not vouchered, the species has not been previously recorded wild from Turkey. The specimens of this first vouchered record were compared with material housed at various European (E, BM, K) and Turkish herbaria (ANK, GAZI, ISTE, HUB, VANF). All the plant name authors are given according to Brummitt and Powell (1992).

Results and discussion

Aegilops juvenalis (Thell.) Eig

Aegilops juvenalis (Thell.) Eig in Feddes Repert., Beih. 55: 93 (1929); Nevski in Komorov, Fl. URSS 2: 672(1934 Russian) /535 (1963, English): Parsa, Fl. Iran, Suppl. Gen. 3: 608 (1952); Chennaveeraiah in Acta Horti Gotoburg. 23: 167 (1960); Mouterde, Nouv. Fl. Liban, Syrie 1: 152 (1966); Bor, Fl. Iraq 9: 182 (1968); Bor, Fl. Iranica 70/30: 194 (1970); Tzvelev in Zlaki SSSR: 158 (1976, Russian)/226 (1984, English) (Figure 1).

Basionym

Triticum juvenale Thell., in Feddes Repert. 3: 281 (1907), Fl. Adv. Montpellier 151 (1912): Type: (France, Hérault) Port Juvenale, V 1857, Touchy *s.n.* (holo: MPU; iso W)

Robust, tufted annuals. Culms erect, up to 20 cm. Leaves linear acuminate, 3.5-4.0 cm long, 0.3-0.5 cm wide, with scabrous surface; margins of sheaths densely ciliate especially at base. Spike (inflorescence) cylindrical to slightly moniliform, tapering towards the apex, 3.0-4.5 cm long excluding awns, 0.5-0.7 cm wide; with 2-3 fertile spikelets disarticulating barrel type at maturity, and 1-2 spikelets attached to the culm. Spikelets cylindrical to urceolate, 8-13 mm long, the apical spikelet obconical, 9-10 mm long and 2.5 mm wide; rachilla internodes 8-10 mm long; with 3-5 florets of which the upper 2-3 sterile. Glumes coriaceous, broadly ovate, truncate, 6-7 mm long; covered with adpressed velutinous indumentum on surface and long hairs; veins unequally wide, sunk into the surface, \pm parallel, apex with 2 short to longer, setulose awns. Awns 2-3 mm, spaced apart; adaxial awn 5-20 mm, abaxial awn often shorter, sometimes reduced to a sharp tooth; apex of apical floret with a central awn of 7-25 mm, flanked by 2 sharp, lateral teeth, each of which may develop into a shorter awn (mostly 1 awn and 1 tooth present). Lemmas of fertile florets slightly exceeding glumes, 8-10 mm long, narrowly ovate, truncate, with 2-3(-4) cm central awn flanked by 2 teeth, 1 of which develops into a shorter awn; awn of lemmas flat at base. Paleas



Figure 1. Habit of *Aegilops juvenalis* (Thell) Eig.

narrowly ovate to elliptical, with 2 sharp, setulose keels ending in an acute apex. Flowering in April-May. Steppe and edge of cultivated fields, 400-450 m.

C8 Şanlıurfa: Ceylanpınar, Ceylanpınar State Farm, Güzelyat area, SE of Güzelyat Castle, around GSM base station, 437 m, 23 Apr 2007, *E.Cabi 1879* (GAZI), (Figure 2).

The specimens are deposited at the herbarium of GAZI.

Ecology and Phenology

Ceylanpınar State Farm is one of the important floristic areas in the region on the basis of its plant diversity and richness including 217 plant genera belonging to 51 families (Adıgüzel & Aytac, 2001). The farm is located in the northern part of the Fertile Crescent adjacent to the Syrian border. Diverse habitats especially the steppes in the farm constitute suitable ecological conditions for wild wheats (*Aegilops* spp. and *Triticum* spp.). In the farm there is also a genetic reserve area designated for the purpose

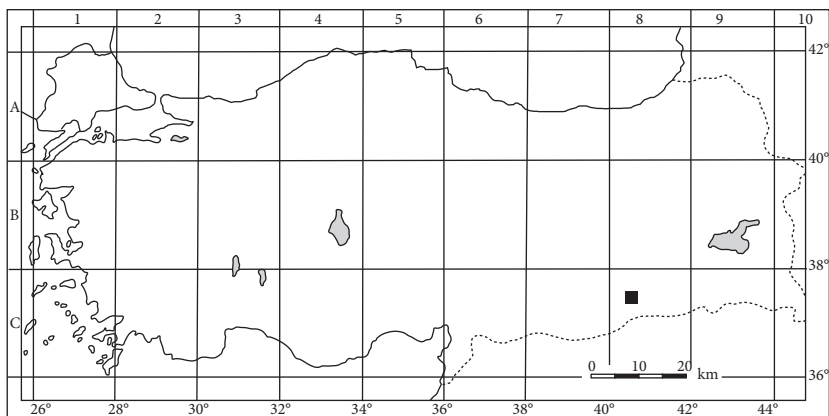


Figure 2. Distribution map of *A. juvenalis* (Thell) Eig.

of conserving *Aegilops* species (Karagöz, 1998; Karagöz et al., 2009).

Aegilops juvenalis grows on the steppes of Ceylanpınar Farm State at the edges of cultivated fields at an altitude of 437 m. It flowers in April and May. The other Triticeae species growing in the area are as follows: *Taeniatherum caput-medusae*, *Hordeum bulbosum*, *Heteranthelium piliferum*, *Crithopsis delileana*, and *Aegilops crassa*.

Aegilops juvenalis thrives in clayish loam soils. Organic content of the soils is low (1.54%) and soil

reaction is slightly alkaline (pH 7.70). Phosphorus (P_2O_5) content is low (3.67 ppm) and potassium (K) content is high (182.99 ppm). The climate of the farm is characterised as arid Mediterranean with a total average annual rainfall range of 109.2 and 333.4 mm per year. Distribution of the rainfall is uneven. Annual average temperature is 18.2 °C.

Aegilops juvenalis (Figure 3A) can be confused with *A. crassa* (Figure 3B), but it seems quite different from it. Morphological differences between *A. juvenalis* and *A. crassa* are given in the Table.

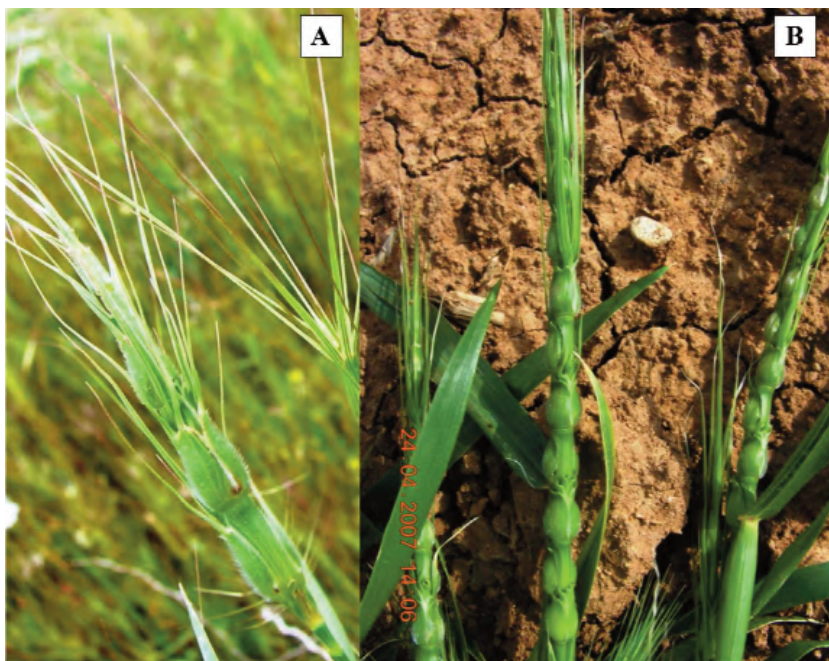


Figure 3. Spikes of *Aegilops juvenalis* (A) and *A. crassa* (B).

Table. Differences between *Aegilops juvenalis* and *A. crassa*.

Plant parts	<i>Aegilops juvenalis</i>	<i>Aegilops crassa</i>
Spike	erect, cylindrical and slightly moniliform	erect, distinctly moniliform
Glume	apex of lateral glumes truncate with 2 distinct awns.	apex of lateral glumes truncate with 2 unequally wide teeth, sometimes 1 of these teeth may develop into a short awn
Glume Indumentum	glumes covered densely with silky adpressed pubescence and longer hairs	glumes covered densely with short silky adpressed pubescence
Chromosome number	2n = 6x = 42	2n = 4x = 28, 2n = 6x = 42 (van Slageren, 1994)
Genomic formula	DMU (female parent "DM" × male parent "U")	DM (female parent "D" × male parent "M"; "DDM" (female parent "D" × male parent "DM") (van Slageren, 1994)

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