



RESEARCH ARTICLE

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Gamochaeta coarctata: A new alien species for Turkey

Gamochaeta coarctata: Türkiye için yeni bir yabancı bitki kaydı

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Article Info

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Article history

Received: August 14, 2021

Received in revised form: September 22, 2021

Accepted: September 29, 2021

Available online: September 30, 2021



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Keywords:

Gamochaeta coarctata, invasive, new record, alien plant, Turkey.

Anahtar Kelimeler:

Gamochaeta coarctata, istilacı, yeni kayıt, yabancı tür, flora, Türkiye.

ABSTRACT

Asteraceae is the largest plant family in Turkey and represented by 138 genera and 1336 species in Turkey. In this paper, *Gamochaeta coarctata* (Willd.) Kerguelen (Asteraceae) which is native in South America, is reported for the first time as a new alien species for Turkey (İstanbul). The plant was noticed, in a population of more than 250 individuals on the side of walking path in May 2021. In order to identify this unfamiliar plant, a sample was taken from the plant and its photographs were taken. When researched, it was seen that the plant is not included in the Flora of Turkey and with the literature review, the plant was identified as *Gamochaeta coarctata* which a new alien species for Turkey. In order to determine the area distribution of the plant, it was wandered around the land and it was observed that the plant became established on the edges of the walking paths on different routes, on the forest edge and in the meadow by the dam lake. In this paper, the species was introduced with taxonomical and morphological features. Its ecological impact was evaluated with potential risks also. The species can be considered in Turkey as an alien species and have a rapid expansion potential, but further field investigations on this species are necessary to avoid its diffusion.

ÖZ

Asteraceae (Compositae), Türkiye’de en geniş bitki familyası olup 138 cins ve 1336 türle temsil edilir. Bu çalışmada *Gamochaeta coarctata* (Willd.) Kerguelen (Asteraceae) Türkiye Florası için yeni bir yabancı tür olarak kaydedilmiştir. İstanbul-Kemerburgaz Kent Ormanı’nda 2021 yılı mayıs ayında yürüyüş yolu kenarında 250 den fazla bitkiden oluşan bir populasyon halinde görülmüştür. Bu bilinmeyen bitkinin tespiti için bitkiden numune alınarak fotoğrafları çekilmiştir. Araştırıldığında, bitkinin Türkiye Florasında yer almadığı görülmüş ve yapılan literatür taraması ile bitki *Gamochaeta coarctata* olarak teşhis edilerek Türkiye için yeni bir yabancı tür olarak teşhis edilmiştir. Bitkinin alanda dağılımını belirlemek için arazide dolaşmış ve farklı güzergahlardaki yürüyüş yollarının kenarlarında, orman kenarında ve baraj gölü kenarındaki çayırdaki bitkinin yerleştiği gözlemlenmiştir. Türün bölgeye nasıl ve ne zaman geldiği bilinmemektedir. Hızlı yayılma kabiliyetinde olan bu yabancı türün bulunduğu bölgede istilacı olma potansiyelinin yüksek olduğu düşünülmektedir.

Citation:

To cite this article: Yılmaz H (2021). *Gamochaeta coarctata*: A new alien species for Turkey. *Turk J Biod* 4(2): 77-81. <https://doi.org/10.38059/biodiversity.889433>.

1. INTRODUCTION

Asteraceae (Compositae) family is one of the largest plant families in the world and is characterized by flower heads composed of many small flowers, called florets, that surrounded by bracts forming an involucre. The Asteraceae family, which many species are valuable as a food, ornamental and medicinal plant, is the largest

plant family in Turkey and represented by 138 genera and 1336 species in Turkey (Güner et al., 2012).

Gamochaeta is a genus of Asteraceae that records approximately 53 species in the world, all native to the Americas and distributed mainly in South America (Nesom, 2006). The genus closely related to *Gnaphalium* and it is best distinguished by mucilage-producing papilliform hairs on the faces of small achene and slender pappus bristles that are basally connate in

smooth rings and therefore entire pappus falling as a unit (Nesom, 1990; Nesom, 2006).

Alien species are species which have been introduced by human activities accidentally or intentionally to regions outside their native geographic range (Richardson et al., 2011). Although not all alien species have detectable effects on native biota and their new environment, even some have also positive effect (Goodenough, 2010; Davis et al., 2011) but some of caused significant changes to the recipient ecosystems (Blackburn et al., 2014; Pyšek et al., 2021). The most effective method of management invasive species is to prevent new introductions (Keller et al., 2008) or at least to detect them early.

In Turkey, which has a rich flora, a large number of alien plant and animal species have been introduced from past to present intentionally or accidentally (Uludağ et al., 2017), and their numbers are increasing day by day.

This paper aims to document new record of *G. coarctata* as an alien plant species for Turkey and to give relevant information about the ecology and distribution and status about it.

2. MATERIAL AND METHOD

İstanbul-Kemerburgaz City Forest was opened on October 2019 and it is currently the largest urban green area open to the public in Istanbul, within 550-hectare area. The plant was seen for the first time in May 2021 in a population of more than 250 plants on the side of the walking path (Figure 1).

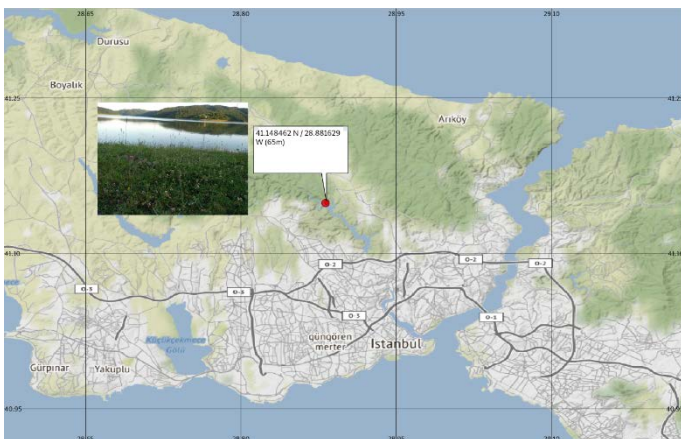


Figure 1. The area where the specimens collected

Samples were taken from the plant and photographs were taken. It was clear that the plant was a member of the Asteraceae, but its genus and species were not identified using Flora of Turkey and its supplements

(Davis et al., 1975; Davis et al., 1988; Güner et al., 2000). This species is also not included in Uludağ et al. (2017). After detailed studies it has been determined as genus *Gamochaeta* which belongs to Asteraceae family that is not found in Turkey. The species was then identified as *G. coarctata*, which native species of South America but has spread widely in New Zealand, Australia and parts of Africa and Europe (Euro+Med, 2006). Identification of the species was based on the description made by Nesom (2006) and digital specimen images at the FLAS Herbarium (Wunderlin, 2021). The voucher specimens were deposited at the Faculty of Forestry Herbarium of Istanbul University (ISTO).

In the meantime, when it was investigated whether there were other populations of the plant by wandering in the forest, other plant populations were also found on the roadsides in different places, near forest edges and near the dam lake.

3. RESULTS

New record in Turkey: A2 İstanbul: Eyüp-Kemerburgaz. The Kemerburgaz City Forest, walking paths near Alibeyköy Dam, 31.05.2021, 65 m, Yılmaz H., ISTO 38866, 38865.

The description of the species is given according to Nesom (2006), Freire et al. (2016) and the specimens is as follows:

Gamochaeta coarctata (Willdenow) Kerguelen, Lejeunia. 120: 104. 1987.

Type: Uruguay: Montevideo, s.d., Commerson s.n. (lectotype: P). Lectotypified by Cabrera, Bol. Soc. Argent. Bot. 9: 380. 1961.

Synonyms: *Gnaphalium coarctatum* Willdenow, Sp. Pl. 3: 1886. 1803, based on *G. spicatum* Lamarck, Encycl. 2: 757. 1788, not Miller (1768); *Gamochaeta spicata* Cabrera

Description

Plants annual or biennial from fibrous roots. Stems decumbent-ascending, 15-50 cm long and white-tomentose. Leaves basal and cauline, basal leaves present at flowering, spatulate to oblanceolate-obovate, (1.5-)3-8(-12) cm long, 6-15(-22) mm wide, sessile, margins entire, flat or wavy towards the tip, strongly bicolored, glabrate or commonly glabrous and bright green above, adpressed white-pannose beneath. Cauline leaves similar, sparse, gradually or little smaller

upwards. Capitula heterogamous and disciform. Capitulescence initially usually in dense and continuous spiciform arrays 2–20 cm, later branching at lower nodes, interrupted. Involucre cylindrical-campanulate, 2.5 - 3 mm high, shiny, and glabrous. Phyllaries are arranged in 4 or 5 imbricate series. Outer phyllaries elliptic-obovate to broadly ovate-elliptic with rounded to obtuse apices, often slightly purplish or rosy and conspicuously shorter than the inner phyllaries. Inner phyllaries linear-oblong, with a distinctly brown-hyaline, apically rounded to obtuse or blunt, apiculate. Bisexual

florets 2–3 per capitulum, all corollas are usually purplish-tipped. Achene 0.5–0.6 mm, pappus white, ca. 2.5 mm, connate at base into a ring. Flowering April–June.

Habitat and ecology: Walking paths, roadsides, lake around, the edge of forest in Turkey (**Figure 2**). As Drury (1971) points out, plant sizes were observed to be much smaller in the meadow around the lake.



Figure 1. *G. coarctata*; a: habitat, b: phyllaries and seeds, c: basal leaves, d-g: habitus, e,f,h,i: flowers

The main associated species were *Trifolium repens* L., *Trifolium angustifolium* L., *Trifolium campestre* Schreb., *Cistus creticus* L., *Cistus salviifolius* L., *Brachypodium pinnatum* (L.) P.Beauv., *Dactylis glomerata* L., *Centaureum erythraea* Rafn.

G. coarctata is recognized by its persistent, strongly bicolored leaves which green and glabrous adaxial surfaces, involucre which 2,5-3 mm tall and glabrous, and 2–3 bisexual florets per capitula (Nesom, 2004).

4. DISCUSSION

How and where the plant came from to the city forest is an important question. Although it is not very dense, the presence of individuals in the meadow by the lake, the largest population being on the side of the road very close to the lake, suggests the possibility of transporting plant seeds with water. However, the fact that the plant is usually found on or near the recently built walking paths and also some populations found at quite a distance from the lake, suggests the possibility that the seeds were transported with the materials used during the construction of these roads or with reeds laid on the roofs of pergolas built on the roadside. However, no satisfactory explanation has been found as to how and which pathways the plant came to be.

Finally, the status of *G. coarctata* in Turkey flora is another important question that needs to be answered. *G. coarctata* is a native of South America and Mexico (Nesom, 2006), was listed in vascular alien flora of Catalonia (Aymerich & Sáez, 2019) and classified as naturalized in Italy (Galasso et al., 2018). In this paper, Turkey is added to its general distribution. This alien species colonized in different localities of the area in the process of establishing or expanding but it may be a little early to say that it has become naturalized in the city forest. However, these plants produce lots of seeds which are easily blown and dispersed by the wind and therefore they can spread quickly where is located and compete well with the native vegetation of the locations at which it occurs. Whether the species will be an invasive species or environmental weed or ruderal species of urban habitats has to be followed. In addition, because the impacts of alien species may change over time, it is essential to consider not only the current status of the species but also the predictable changes in the foreseeable future when conducting a risk analysis (Roy et al., 2018). Monitoring and investigating the

existence of populations of *Gamochaeta coarctata* will clarify the status of the species in Turkey.

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