

RARE AND DATA-DEFICIENT WEED FLORA OF EAST HUNGARIAN KURGANS – A LARGE-SCALE SURVEY

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In increasingly intensified agricultural landscapes, species of natural habitats as well as components of the weed flora showed a constant decline over the past decades. Weed species adapted to extensive arable use or moderate disturbance regimes in grasslands are especially endangered in anthropogenic landscapes. In this study, we aimed to highlight the role of kurgans (ancient burial mounds) covered by fallows, oldfields and ancient grasslands in the conservation of rare weed species. We reported occurrence data for 59 weed species from the Tiszántúl (Crisicum) and Nyírség (Nyírségense) floristic areas, East Hungary. We reported species (i) that are particularly rare in the study area (e.g., *Filago germanica*, *Geranium divaricatum*, *Glaucium corniculatum*, *Reseda luteola*, and *Silene conica*), (ii) occur throughout the country, but are rare in certain regions (e.g., *Aegilops cylindrica*, *Calypina irregularis*, *Crepis pulchra*, *Medicago monspeliaca*, *Sherardia arvensis*, *Trifolium diffusum*, and *Festuca myuros*), and (iii) that are specific to particular regions (e.g. *Roemeria hispidula* and *Spergula pentandra*), and (iv) that are data-deficient in the study area, but are not necessarily rare (e.g. *Anthriscus caucalis*, *Asperugo procumbens*, *Lappula squarrosa*, and *Medicago minima*). We also provided data on two rare neophyte weed species (*Helminthotheca echiodides* and *Taeniatherum caput-medusae*). Eighteen of the species included in this paper are on the Hungarian Red List, and two species are protected by law (*Centaurea solstitialis* and *Lathyrus nissolia*). Our results highlight the importance of kurgans in the conservation of rare weed species, as these landscape features can provide refuge for species adapted to moderate levels of disturbances associated with extensive land uses.

Key words: arable weed, biotic data, burial mound, conservation, floristic survey, grassland, out of production areas, segetal vegetation

INTRODUCTION

Although there is a large number of publications about weed species in Hungary from the 20th century, these publications mostly focused on the effects of weeds on agricultural production, and technical aspects of weed con-

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trol in croplands. Fewer publications considered the weed flora from a botanical perspective, and these publications mostly focused on segetal weeds with agricultural relevance (e.g., Timár 1951, Ubrizsy 1957, Ujvárosi 1966). Among the Hungarian floristic studies specifically related to weeds, Gondola (1969) was the first who provided a relatively large number of observations; however, focused only on the Nyírség region and its peripheral areas. Since the 2000s, the number of floristic publications on weeds has increased, focusing mainly on certain areas in West and Central Hungary, such as the Kisalföld (Király and Király 2012, Pinke 1998, Pinke and Pál 2001), Mecsek and its surroundings (Pál 2002, Pál *et al.* 2010), Transdanubian Central Mountains and their periphery (Pinke *et al.* 2003, 2005a), Somogy (Pinke *et al.* 2006), Dráva plain (Pál and Pinke 2007), and Börzsöny (Nagy 2000). The paper of Pinke *et al.* (2005b) provides data on the occurrence of Atlantic-Mediterranean weeds in the Transdanubian region. In the past decades, although weeds were mentioned in many publications, to our knowledge, no papers specifically dealing with weeds were published from the Tiszántúl and Nyírség floristic areas.

Studies focusing on weed species and especially on rare weed species have a high conservation importance. The reason is that in increasingly intensified agricultural landscapes, together with the species typical of natural and semi-natural habitats also many components of the weed flora have shown a constant decline in the past decades (Albrecht *et al.* 2016, Deák *et al.* 2016, Kovács-Hostyánszki *et al.* 2010, Pinke *et al.* 2011). Populations of weed species adapted to extensive arable use or moderate disturbance regimes in grasslands are especially endangered due to the changing land use practices (Albrecht *et al.* 2016). These involve increasing parcel sizes, lack of crop rotation, increased amounts of fertilisers and pesticide used in croplands, and the abandonment of traditional grassland management (Pinke 2020, Storkey *et al.* 2012). Consequently, formerly widespread weed species have become rare and are now confined to a few extensively used areas. In agricultural landscapes, such areas include extensively used croplands, fallows, field margins, road and railway verges (Kis 2022, Storkey *et al.* 2012). In Hungarian landscapes, kurgans (ancient burial mounds) can also potentially provide refuge for species that are sensitive to intensified land use (Deák *et al.* 2016). In Hungary, farmers who apply for subsidies provided by agri-environmental schemes must maintain “Good Agricultural and Environmental Condition” on the mounds registered in the Agricultural Parcel Identification System (MePAR). This led to the cessation of ploughing on numerous mounds, that on the one hand allowed fallows and oldfields to form, and on the other hand prevented harmful land use measures in existing oldfields and ancient grasslands on the mounds. Both could considerably support nature conservation goals (Deák *et al.* 2020).

Most floristic publications about the Hungarian mounds describe a single mound: Csípő-mound in Egyek (Joó 2003, Penksza *et al.* 2011), Kántor-mound

in Szentes (Vona and Penksza 2004, Penksza *et al.* 2005), Bekai-mound in Magyarcsanád (Penksza *et al.* 2005, Herczeg 2005, Herczeg *et al.* 2009), Bóve-mound in Hódmezővásárhely (Penksza *et al.* 2005, Herczeg 2005, Herczeg *et al.* 2009), Sáp-mound in Szegvár (Herczeg *et al.* 2006), Temető-mound in Medgyesegyháza (Csathó 2008), Mondró-mound in Hencida (Deák *et al.* 2015), Hegyes-mound in Mindszent (Csathó *et al.* 2015), Kettős-mound in Cibakháza (Olasz *et al.* 2019), Ecse-mound in Hortobágy area (Csathó *et al.* 2019), Zsolca-mound in Felsőzsolca (Tóth *et al.* 2019), Barta-mound in Mezőhegyes (Bede and Csathó 2020), Mogyorós-mound in Öcsöd (Bede *et al.* 2022a), Barcé-mound in Dévaványa (Bede *et al.* 2022b), Hegyes-mound in Klárafalva (Bede and Csathó 2022), or the occurrence of certain rare species on multiple mounds (Deák *et al.* 2019, Détár 2012, Kis 2018, Zólyomi 1969). As a part of large-scale ecological studies, the papers by Deák *et al.* 2020, 2021, 2024 provided species lists of protected and rare plants from multiple mounds in Hungary. Besides Hungary, there are large-scale researches aiming to explore the flora of the kurgans in Ukraine (Moysiyenko *et al.* 2023), and Bulgaria (Apostolova *et al.* 2022) providing valuable data on the conservation values of these iconic landmarks.

In this paper, we aimed to provide a large-scale overview on the potential of kurgans in conserving rare and data-deficient weed species, on mounds embedded in intensively used agricultural landscapes in East Hungary.

MATERIAL AND METHODS

The floristic data in this paper were collected over a three-year period (2022–2024) as a part of a large-scale kurgan survey aimed at exploring the importance of kurgans in maintaining biodiversity and ecosystem services in agroecosystems of Hungary. In this paper, we report occurrence data on such weed species, that are rare or data-deficient in the study region and are disturbance-tolerant elements of the studied habitats, but due to their low competitive ability do not dominate the vegetation.

During the fieldwork, herbarium specimens of some species were also collected and deposited either in the collection of the University of Debrecen (DE) or in the Botanical Collection of the Hungarian Natural History Museum (BP). If a specimen was deposited in a collection, we indicated it in the enumeration. The reported species are listed in alphabetical order, and the species nomenclature follows the World Flora Online ([http1](http://www.worldfloraonline.org)). For each data, the administrative boundary (name of the municipality; also in alphabetical order), the name of the mound and the code of the relevant flora mapping quadrat (Central European Flora Mapping System [CEU]; Király and Horváth 2000) are provided.

When a given species was found in both Tiszántúl (Crisicum) and Nyírség (Nyírségense) floristic areas, we reported the data for the two areas separately. In all cases, we cited previous known occurrences from literature,

herbarium and floristic mapping sources to contextualize our findings. Herbarium data are sourced from the Soó Rezső Herbarium of the University of Debrecen (DE), the “Siroki Zoltán Herbarium” of the University of Debrecen (based on Takács *et al.* 2015b), and the collection of the ELTE Botanical Garden (BPU) (based on Nótári *et al.* 2017). Since we focused on the flora of kurgans, and not CEU quadrats, it should be taken into account that some CEU quadrat-level data might be confirmatory only.

Abbreviation in enumeration: h. = halom (mound).

RESULTS

The data presented in this paper were originated from 247 kurgans; located in the administrative boundaries of 86 settlements. We reported data on a total of 59 weed species occurring on kurgans. Of the species presented, two are protected by law (cf. <http2>) and 18 are included in the Hungarian Red List (Király 2007). Two of the species in the latter group are considered neophyte species (*Helminthotheca echioides* and *Taeniatherum caput-medusae*) (Csiky *et al.* 2023). We included them in the enumeration because of their inclusion in the Red List. For 54 species, we collected occurrence data only from the Tiszántúl (Crisicum), for four species, we published observations from both the Tiszántúl and Nyírség, while for one species we present occurrence data only from the Nyírség. The published data cover a total of 142 CEU floristic quadrats (Fig. 1). The number of species per quadrat varied between one and eleven.

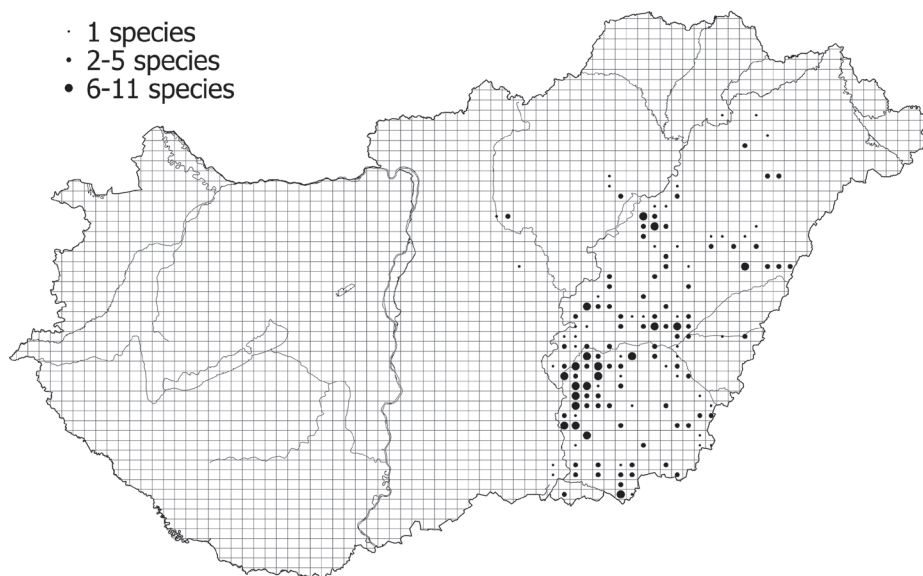


Fig. 1. The study area and the relevant CEU quadrats. The size of the dots shows the number of recorded rare weed species per kurgan

Enumeration

Adonis flammea Jacq. – Mindszent: Hegyes-h., in the lower, ploughed parts of the mound [9487.3] (DE); Tótkomlós: Nádas-h. [9590.4]. – Its earlier localities are summarized by Soó and Máthé (1938); its earlier records correlate strongly with its current occurrences (cf. [http3](http://3)). A recent record from near Mezőtúr was published by Jakab (2005), and it has also been found in the Csanádi-pusztá (Molnár *et al.* 2016c). The closest known occurrence to Mindszent is the data of Tóth T. from Derekegyháza ([http3](http://3)); it was also reported by Jankó (1886) from near Tótkomlós.

Aegilops cylindrica Host – Békésszentandrás: Fekete-h., Hármashatár-h. [9188.4]; Gyomaendrőd: Polyák-h. [9190.1]; Hódmezővásárhely: Tege-h. [9487.4], Hét-h. [9687.4]; Kengyel: Szélmalom domb [8987.2]; Körösladány: Kistrét-h. [8992.3]; Kunszentmárton: Köttön-h. [9287.2]; Nagyiván: Deli-h. [8491.4]; Nagytőke: Szász-h., Szedres-h. [9287.2], Hegyes-h. [9288.3]; Nádudvar: Sándorok-laponyag [8592.3]; Öcsöd: Közép-h. [9188.1]; Pusztatottlaka: Hegyeshatár-h. [9492.3]; Szarvas: Zöld-h. [9189.4], Kovács-h. [9289.2]; Szegvár: Kis-Ludas-h. [9487.1]; Szentes: Dinnyés-h. [9188.2], Márton-h. [9387.4], Hegyeshatár-h. [9288.2]; Tiszafüred: Kopasz-h. [8491.1]; Törökszentmiklós: Földvári-h. [8888.3]. – The Hungarian distribution of the species is summarized by Táboriská *et al.* (2015): based on previous and recent data, it is widespread in the central and southern parts of the Tiszántúl. Jakab (2005) published many records from the study area, with the comment “most often found in field margins, wheel tracks, embankments”; no specific data on mounds were reported. More recently, it has been reported from the Crisicum, from the Csanádi-, Kígyósi- and Dévaványa-Ecsegi pusztá (Molnár *et al.* 2016a, Molnár *et al.* 2016c, Molnár 2018), and some occurrences have been reported by Lukács *et al.* (2017) and Molnár (2021), and it has also been found near Deszk (Aradi *et al.* 2017). Deák *et al.* (2019) report its occurrence on some mounds from the mid-part of the Tiszántúl, and it is also found on the Ecse-h. in Hortobágy (Csathó *et al.* 2019) and on the Mogyorós-h. in Öcsöd (Bede *et al.* 2022a). Some recent collections from Tiszántúl: Fegyvernek (Molnár V. *et al.* 2016, DE); Szentes, Tere-h. (Nagy T. and Takács A., 2016, DE); Hódmezővásárhely (Nagy T. and Takács A., 2016, DE); Tiszakürt (Gulyás G. 2017, DE).

Ajuga chamaepitys (L.) Schreb. – Csépa: Kun-h. [9186.4]; Fábiansebestyén: Sváb-h. [9388.2]; Hódmezővásárhely: Nádas-h. [9688.4]; Jászfényszaru: Pipis-h. [8484.2]; Kengyel: Beszélő-h. [8888.3]; Kuncsorba: Csobai-h. [8889.3]; Mindszent: Hegyes-h. (confirming the data of Csathó *et al.* 2015) [9487.3]; Nagytőke: Szász-h. [9287.2]; Pitvaros: Szeles domb [9790.1]; Szentes: Szeg-h. [9388.4], Szil-h. [9388.3] (BP); Tiszaörs: Kettős-h. [8491.3]; Tiszatenyő: Kerekegyházi-kettős-h. [8888.3]. – Borbás (1881) mentions it from Gyomaendrőd, Gyula, Szarvas, Mezőberény, Békéscsaba, and Bélmegyer. Simonkai (1893) reports the species

from the former Arad County, from set-aside and fallow areas and arable fields. Lányi (1914) reports its occurrence in Csongrád, Algyő, and Szeged. Máthé (1939) mentions its occurrence on the embankment of the river Berettyó. Presumably several other archival records exist, since according to Soó and Máthé (1938) it was still a common species; however, it is currently somewhat rarer (cf. <http3>). Recent literature data are scarce. It has been reported from some mounds from the mid part of the Tiszántúl (Deák *et al.* 2019). In the South Tiszántúl it is also known from Hegyes-h. in Mindszent (Csathó *et al.* 2015) and Kettős-h. in Cibakháza (Olasz *et al.* 2019). It has been also reported from Nagylak and Makó (Penksza and Kapocsi 1998), Újkígyós (Sallainé Kapocsi 2009), Csanádi-puszta (Molnár *et al.* 2016c) and more recently from Szolnok (Haszonits in Molnár *et al.* 2019, Haszonits *et al.* 2021). Some recent collections from Tiszántúl: Orosháza (Virók V. 1996, DE); Nagyszénás (Virók V. 2000, DE); Gyomaendrőd (Molnár V. 2015, DE); Hajdúnánás (Nagy T. and Takács A. 2013, DE).

Allium atropurpureum Waldst. et Kit. – Békésszentandrás: Furugy-h. [9189.3], Nádas-h. [9288.2]; Gyomaendrőd: Rigó-h. [9091.3]; Mezőberény: Bodzás-h. [9192.3]; Öcsöd: Átalag-h., Két-h. [9188.1]. – Earlier data of the species are presented in Soó and Máthé (1938). Among them, it is worth highlighting the report of Budai (1916) from Mezőtúr, according to which “the wheat field is red in places with its blossoms and it can be considered as a problematic weed with its mass appearance”. More recently, Tóth (2003) and Jakab (2005) describe several occurrences from the South Tiszántúl. Since then, a few scattered records have become known, mainly from the South Tiszántúl (Aradi *et al.* 2017, Batori *et al.* 2014, Haszonits *et al.* 2021, Takács *et al.* 2015a) and from Jászság (Molnár 2021). It is also known from the Mogyorós-h. near Öcsöd (Bede *et al.* 2022a). Z. Siroki collected from Kisújszállás (1969 in Takács *et al.* 2015b). It is currently scattered in the South Tiszántúl (<http3>). Some recent collections from Crisicum: Nagymágocs (Virók V. 2003, DE); Szarvas (Nagy T. and Takács A. 2016, DE); Tiszaföldvár (Süveges K. 2020, DE); Mezőtúr (Süveges K. 2020, DE).

Androsace elongata L. – Dévaványa: Barczé-h. [8991.4]; Körösladány: Kistrét-h. [8992.3]; Szeghalom: Szívós-h. [8992.3]; Szentes: Sáp-h. (confirming the data of Jakab and Tóth 2003) [9387.4] (DE). – Earlier data are presented by Soó and Máthé (1938), of which the data from the Hortobágy region and from the vicinity of Szarvas and Mezőtúr are relevant for the present communication. The species currently appears to be widespread in some areas of the northern part of the Tiszántúl (e.g. Hevesi- and Borsodi-plains [<http3>]), and scattered elsewhere (cf. Süveges *et al.* 2020, Takács *et al.* 2013), but declines significantly after crossing to east the river Tisza. More recently, Jakab (2005) and Jakab and Tóth (2003) describe several occurrences from the South Tiszántúl. Other scattered data from Crisicum are reported by Penksza and Kapocsi (1998), Takács *et al.* (2015a), Molnár *et al.* (2017), Molnár *et al.* (2019). Some of its data have been recently published on mounds (Csathó *et al.* 2019, Deák *et al.* 2019).

Anchusa arvensis (L.) M. Bieb. (syn. *Lycopsis arvensis* L.) – Fábiansebestyén: Sváb-h. [9388.2]; Körösladány: Kistrét-h. [8992.3]; Makó: Fekete-h. [9690.3]; Sáránd: Szabó-h. (lots of) [8595.4] (DE); Szelevény: Öt-h. [9287.1]; Szentes: Szeg-h. [9388.4] Jámor-h. [9287.4]; Tiszafüred: Beke-h. [8491.3]. – Interestingly, it is not included in the enumeration of Soó and Máthé (1938). Ubrizsy (1949) reports it from Szarvas and its surroundings. Lukács *et al.* (2017) provide some data from the Central Tisza Region and summarize its previous occurrences in the region: Hortobágy, Hajdúnánás, Abádszalók, Karcag, Örményes (it is worth noting that Z. Siroki also published the occurrence of the species from Hortobágy (Siroki 1965), not only collected it). Other recent data: Hortobágy (Molnár *et al.* 2017), Gyomaendrőd (Nótári in Molnár *et al.* 2019), Hejőpapi (Süveges *et al.* 2020), Pocsaj (Szigetvári in Csiky *et al.* 2020). Its earlier occurrences in Tiszántúl are summarized by Kis (2022), and he reports some new occurrences from near Karcag. The locality reported in this publication in Sáránd, is located on the border of Crisicum and Nyírségense, the closest data are from Debrecen (Dobos L. 1952 in Nótári *et al.* 2017, Siroki Z. 1973 in Takács *et al.* 2015b, Takács and Löki 2015, Lovas-Kiss and Süveges 2022).

Anthriscus caucalis M. Bieb. – Battonya: Tompa-h. [9691.4]; Békésszent-andrás: Gödény-h., Hármashatár-h. [9188.4], Furugy-h. [9189.3]; Derecske: Kis-Botos-h. [8695.3]; Hódmezővásárhely: Tege-h., Bőve-h. [9487.4], Rémáris-h. [9588.1]; Kétegyháza: Török-h. [9492.4]; Magyarcsanak: Bekai-h. [9889.2]; Makó: Fekete-h. [9690.3], Kecskés-h. [9788.2]; Makó-Királyhegyes: Első-h. [9789.2]; Mindszent: Szeri-h., Mórán-h. [9487.4], Józsepi-h. [9487.3]; Orosháza-Csorvás: Gerenes-hát-h. [9390.3]; Öcsöd: Két-h. [9188.1]; Öcsöd-Kunszentmárton: Bábocka-h. [9188.3], Péterszögi-h. [9187.4]; Örménykút: Telek-h. [9190.1]; Pitvaros: Szeles domb [9790.1]; Sáránd: Lénárd-h. [8595.4]; Szeghalom: Dió-h. [8992.4]; Szelevény: Kásás-h. [9187.3]; Szentes: Hegyes-határ-h. [9288.2], Fekete-h. [9288.3], Jámor-h. [9287.4], Kántor-h. [9387.2]; Szil-h. [9388.3]; Telekgerendás: Anonym-h. [9391.4]; Tépe: Belső-h. [8695.3]; Tiszacsege: Sólyom-h. [8392.1]; Túrkeve: Pásztói-h. [8989.2]. – Earlier data are summarized by Soó and Máthé (1938), from which relevant for the data published now: Békéscsaba–Újkígyós, Makó, Nagylak, Bánhegyes, Battonya, Csongrád and Szeged. Later, Ujvárosi (1941) reported on Mezőcsát and Gelej, Soó (1948) on Balmazújváros, and Ubrizsy (1949) on Szarvas. More recent data are known from Makó (Nagy and Takács in Molnár *et al.* 2016b). It was recorded from Hegyesi-h. in Klárafalva (Bede and Csathó 2022). More recent collections are known from Orosháza (Virók V. 2003, DE) and Bélmegyer (Takács A. and Süveges K. 2017, DE). The species has a scattered distribution in the southern parts of Tiszántúl, while in the northern parts it seems to be rare ([http3](http://3)).

Asperugo procumbens L. – Békésszentandrás: Gödény-h. [9188.4]; Csárdaszállás: Fél-h. [9191.1]; Derecske: Kis-Botos-h. [8695.3]; Eperjes: Sipos-h. [8289.3]; Fegyvernek: Nagy-Koller-h. [8789.3]; Gyomaendrőd: Rigó-h. [9091.3],

Pó-h. [8990.4]; Hajdúdorog: Bene-h. [8095.3]; Hajdúszoboszló: Akácdűlői-h. [8594.1], Két-h. (south one) [8593.4]; Karcag: Zádor-h., Lőzer-h. [8691.2], Rózsa-h. [8791.1]; Kunszentmárton: Köttön-h. [9287.2]; Mezőtúr: Leski-h. [9089.4]; Mindszent: Mórán-h. [9487.4]; Öcsöd: Bűdös-h. [9088.3], Két-h. [9188.1]; Örménykút: Telek-h. [9190.1]; Pitvaros: Szeles domb [9790.1]; Sárrétudvari: Őr-h. [8792.4]; Szeged: Anonym-h. between Szőreg and Kübekháza [9887.1]; Szeghalom: Korhány-h. [8992.2]; Szentes: Mikecz-h., Fekete-h. [9288.3], Tere-h. [9288.2], Besenyő-h. [9387.2]; Telekgerendás: Furis-h. [9391.4]; Tiszaföldvár: Őze-h. [9087.4]; Tiszatenyő: Köves-h. [8888.3]. – Old data from the Tiszántúl are presented by Soó and Máthé (1938): earlier occurrences are known from almost the entire area of the Tiszántúl. It still seems to be almost common today (cf. [http3](http)). More recently, quite a number of literary and herbarium specimens are known, sporadically from almost the whole Tiszántúl. Recent literature records include Tiszalúc (Takács *et al.* 2014), Berettyóújfalu (Lukács *et al.* 2017), Mezőzombor, Szeged (Takács *et al.* 2015a), Kisújszállás (Molnár *et al.* 2016b), Hajdúnánás (Molnár *et al.* 2017), Tiszafüred (Matus *et al.* 2019), Nyékládháza (Süveges *et al.* 2020), Mezőcsát (Haszonits *et al.* 2021), Bélmegyer (Kevey *et al.* 2021). Among mounds, it was found from Hegyesi-h. in Klárafalva (Bede and Csathó 2022). Some of the more recent collections of Crisicum are from Orosháza (Virók V. 1995, DE); Kaszaper (Molnár V. A. and Sramkó G. 2014, DE); Hajdúnánás (Süveges K. 2015, DE); Gyomaendrőd (Molnár V. A. 2015, DE); Törökszentmiklós (Takács A. and Nagy T. 2015, DE; Molnár V. A. *et al.* 2016, DE); Szentes (Nagy T. and Takács A. 2015, DE); Jászberény (Molnár V. A. *et al.* 2016, DE); Kisköre (Molnár V. A. *et al.* 2016, DE); Mezőzombor (Nagy T. and Takács A. 2016, DE); Vésztő (Takács A. and Süveges K. 2017, DE); Debrecen (Hábenczyus A. and Süveges K. 2020, DE); Hajdúböszörmény (Süveges K. 2021, DE).

Calepina irregularis Thell. – Árpádhalom: Árpád-h. [9389.3]; Battonya: Balta-kereszt-h. [9792.1]; Hódmezővásárhely: Rémáris-h. [9588.1]; Magyarcsanak: Bekai-h. [9889.2]; Makó: Goszpodai-h., Kecskés-h. [9788.2]; Makó-Királyhegyes: Első-h. [9789.2]; Mártély: Bánfi-h. [9587.4]; Mindszent: Hegyes-h. [9487.3]; Szentes: Tési Péter halma [9387.2], Jámor-h. [9287.4]. – Soó and Máthé (1938) report data mainly from the South Tiszántúl: Makó, Orosháza, Hódmezővásárhely, Szeged, Algyő, Békéscsaba, Gerendás, Bánhegyes, Mezőhegyes, Mezőkovácsháza. In the Central Tisza Region, Korda *et al.* (2017) describe several recent occurrences. Some recent data are known from Magyarcsanak, Klárafalva (Bátori *et al.* 2014), Gyomaendrőd, Szeged, Szentes (Takács *et al.* 2015a), Pocsaj (Molnár *et al.* 2016b), Szolnok (Haszonits *et al.* 2021). Some of its recent collections are from Békéssámsón (Virók V. 2004, DE); Hódmezővásárhely (Molnár V. A. *et al.* 2018, DE); Rákóczipfalva (Hábenczyus A. and Süveges K. 2023, DE). Its current known distribution shows a similar pattern as the archival data, but it seems to be a species slightly expanding northwards ([http3](http)).

Carlina vulgaris L. – Tiszaigar: Igari-Kettős-h. [8491.3]. – It is a common species in most part of the country, but it is rare in the central and southern parts of the Tiszántúl ([http3](http://3)). There are only very few earlier literature records: Szeged (Lányi 1914) and Mezőcsát (Budai in Soó and Máthé 1938). Siroki Z. collected on Egyek (1947 in Takács *et al.* 2015b). More recently, several observations in the South Tisza Transdanubian region are known (e.g. Molnár 2018, Molnár 2022, [http3](http://3)). The closest to the data from Tiszaigar was observed near Tiszaderzs ([http3](http://3)).

Carthamus lanatus L. – Kétegyháza: Török-h. [9492.4]; Magyarcsanád: Bekai-h. (confirming the data of Jakab 2005) [9889.2]; Mezőberény: Bodzás-h. [9192.3]. – Soó and Máthé (1938) describe occurrences from almost the whole Tiszántúl, but most of the old records (e.g. besides Magyarcsanád and Mezőberény) are known from the South Tiszántúl. Some of its earlier occurrences: Füzesgyarmat (Zsák 1941), Pitvarosi-puszták (Molnár 1992), Elek (Kertész 1999). A larger number of records from the above-mentioned areas are described by Tóth (2003) and Jakab (2005). Also known from the Dévaványai-Ecsegi-, Csanádi- and Kígyósi-puszták (Molnár 2018, Molnár *et al.* 2016a, 2016c). From the Central Tisza Region, Lukács *et al.* (2017) and Deák *et al.* (2019) report newer occurrences from several localities (e.g. on mounds) and present earlier data from this region, in addition to these Csathó *et al.* (2019) report the species from a mound in the Hortobágy.

Caulalis platycarpus L. – Kétegyháza: Anonym-h., north of the settlement [9493.1]; Mindszent: Hegyes-h. (confirming the data of Csathó *et al.* 2015) [9487.3], Szeri-h. [9487.4]; Öcsöd: Átalag-h. [9188.1]; Szentes: Szil-h. [9388.3]. – Soó and Máthé (1938) present quite a lot of data, which more or less cover the whole area of Crisicum; in Csanád county it is described as common. More recent records presented since then are from Hajdúszoboszló (Soó 1940); Újszász, Nádudvar (Zsák 1941); Szeged (Timár 1954b); Berettyóújfalu (Siroki 1965); Csanádi-puszták (Molnár *et al.* 2016c); Szolnok (Haszonits *et al.* 2021). Some herbarium data: Egyek, Berekböszörmény (Siroki Z. 1947; 1970 in Takács *et al.* 2015b); Hajdúböszörmény (Gondola I. 1966 in Takács *et al.* 2015b); Hortobágy (Soó R. 1947 in Nótári *et al.* 2017); Egyek (Simon T. *et al.* 1950, DE, Boros O. 1953 in Nótári *et al.* 2017); Orosháza (Virók V. 2000, DE); Szolnok (Süveges K. 2020, DE). This formerly common segetal weed is nowadays a declining species, occurring sporadically in the Tiszántúl ([http3](http://3)).

Centaurea cyanus L. – Nagytőke: Hegyes-h. [9288.3]; Öcsöd-Kunszentmárton: Bábocka-h. [9188.3]; Szelevény: Őt-h. [9287.1]; Szentes: Kajáni-temető-h. [9288.3]; Tiszacsege: Filagóriás-h. [8292.3]; Tiszafüred: János-állás-h., Kócs-h. [8491.1]; Tiszaörs: Kettős-h. [8491.3]. – According to Soó and Máthé (1938), it was a common species in the Crisicum. More recently it has declined sharply (it is still not rare in some areas of Crisicum, e.g. Jászság, Hevesi-plain [[http3](http://3)]). Takács *et al.* (2013) and Süveges *et al.* (2020) report some occurrences

es in the northern areas of Crisicum. It is also known from near Elek (Kertész 1999), from the Dévaványa-Ecsegi puszta (Molnár *et al.* 2016a), from the Kis-Sárrét (Molnár 2022). Other scattered records are from Tiszalúc (Takács *et al.* 2015a); Besenyőtelek–Poroszló (Molnár *et al.* 2016b); Szolnok (Molnár *et al.* 2019); Mezőcsát (Haszonits *et al.* 2021). Some herbarium collections: Hajdúnánás (Kállay Gy. 1943, DE); Egyek (Soó R. 1947 in Nótári *et al.* 2017), Szentés (Virók V. 2000, DE); Jászfákóhalma (Molnár V. *et al.* 2016, DE).

***Centaurea solstitialis* L.** – Csanádpalota: Csigai-Nagy-h. [9890.1]; Hódmezővásárhely: Rémáris-h. [9588.1]; Magyarcsanád: Bekai-h. [9889.2]; Makó: Kecskés-h. [9788.2]; Mezőtúr: Leski-h. [9089.4]; Kétegyháza: Török-h. [9492.4]; Öcsöd: Büdös-h. [9088.3]. – Current occurrences of the species in the Crisicum are concentrated in the central and southern parts of the Tiszántúl (http3), which more or less overlaps with earlier data (Soó and Máthé 1938). Several important occurrence data from the Southern Tiszántúl have been published in the 2000s: most and largest populations are found in the area between Szentés and Püspökladány (Jakab 2005, Jakab and Tóth 2003, Tóth 2003), and from the Kígyósi-puszta is also reported (Bátori *et al.* 2014, Molnár 2018). A point occurrence is also known from the Taktaköz (Takács *et al.* 2013). Lukács *et al.* (2017) and Deák *et al.* (2019) have described recent occurrences from Hortobágy and its neighbouring areas and reviewed earlier occurrences in the region; the latter authors report populations specifically on mounds. It has also been recorded from the border of Öcsöd on the Mogyorós-h. (Bede *et al.* 2022a). Collections are known from Gyomaendrőd (Soó R. 1947 in Nótári *et al.* 2017) and Nádudvar (Simon T. 1963 in Nótári *et al.* 2017). Its occurrence on mounds fits well with our knowledge on the distribution range of the species.

***Chenopodium vulvaria* L.** – Magyarcsanád: Bekai-h. [9889.2]. – Soó and Máthé (1938) describe its occurrences from quite a number of localities, and it is referred to as a very common species in the South Tiszántúl region. More recently, it has been found sporadically throughout the country, including the South Tiszántúl (http3). It is mainly found in ruderal habitats and settlements, but is also known from natural grassland: Püspökladány, on a pasture (Zsák 1941). Some recent occurrences from South Tiszántúl: Gyomaendrőd (Nótári in Molnár *et al.* 2019); Orosháza (Virók V. 2000, DE); Battonya (Süveges K. 2019, DE); Vésztő (Süveges K. 2022, DE); Szeged (Hábenczyus and Süveges 2024).

***Crepis pulchra* L.** – Apátfalva: Belezi-h. [9789.4]; Békés: Anonym-h. west of the settlement [9292.2]; Békésszentandrás: Dinnyés-h. [9188.2]; Cibakháza: Kettős-h. (north one) [9087.1]; Dévaványa: Vas-doktor halma, Kovács-laponyag [8891.4], Ór-h. [8992.1]; Fábiánsebestyén: Ördög-h. [9388.1]; Gyomaendrőd: Anonym-h., on the northern edge of the administrative boundary of the settlement [8991.1], Polyák-h. [9190.1], Pó-h. [8990.4]; Gyula: Sió-h. [9393.1]; Hajdúdorog: Bene-h. [8095.3]; Hajdúszoboszló: Nyéki-h. [8593.2], Két-h. (north and south ones too) [8593.4]; Hajdúszovát: Nagy-Hegyes-h., Balla-h.

[8594.4]; Hódmezővásárhely: Tege-h. [9487.4], Nádas-h. [9688.4]; Karcag: Kis-Görgető-h., Nagy-Görgető-h., Zádor-h., Lőzér-h. [8691.2], Nagy-Organdó-h. [8691.4]; Kengyel: Baghy domb [8987.2]; Kétegyháza: Anonym-h., north of the settlement [9493.1]; Kisújszállás: Buk-h. [8890.2]; Körösladány: Kistrét-h. [8992.3]; Körösújfalú: Koti domb [9094.1]; Kuncsorba: Csobai-h. [8889.3]; Kunszentmárton: Kettős-h. [9187.4], Kis-János-h. [9188.3]; Makó: Goszpodih. [9788.2]; Martfű: Varsány-h. [8987.4], Kalapos-h. [8988.3]; Murony: Földvári dombok [9292.1]; Nagyiván: Deli-h. [8491.4]; Nagyszénás: Szénási-Kettős-h. [9289.4]; Nagytőke: Jaksor-h. [9287.1], Szász-h. [9287.2]; Öcsöd: Vágó-h., Átalag-h., Két-h. [9188.1], Mogyorós-h. [9188.2], Büdös-h. [9088.3]; Örménykút: Telek-h. [9190.1]; Poroszló: Nagy-Kóta-h. [8389.2]; Püspökladány: Makkod-h. [8692.4]; Sáránd-Mikepércs: Török-h. [8595.4]; Sárrétudvari: Anonym-h. between Sárrétudvari and Szerép [8792.4]; Szarvas: Szappanos-h., Czibula-h. [9189.4], Borgulya-halmok [9190.1]; Szeged: Anonym-h. between Szőreg and Kübekháza [9887.1], Szék-h. [9686.4], Ót-h. [9786.2]; Szeghalom: Balkány-h. [8992.2], Majta-laponyag [9092.2], Dió-h. [8992.4]; Szegvár: Nádas-h. [9487.2]; Szelevény: Kásás-h. [9187.3]; Szentés: Tere-h. [9288.2], Mikecz-h., Szil-h. [9288.3], Szeg-h. [9388.4], Kálvária domb [9387.4]; Tiszafüred: Beke-h., Fő-Sarkad-h. [8491.3], Bodzás-h., Rókás-h. [8490.2], Lapos-h. [8491.4]; Tiszaföldvár: Kövér-h. [9087.2]; Tiszainoka: Fekete-h. [9087.3]; Tiszaörs: Kettős-h. [8491.3]; Tiszaszentimre: Bolond-h. [8590.2]; Tiszatenyő: Kerekegyházi-kettős-h., Öcsödi-kettős-h. [8888.3]; Törökszentmiklós: Keresztes-h. [8888.4]; Túrkeve: Pásztói-h. [8989.2], Vecserke [8990.1], Póhalmi-h. [8989.4]. Nyírsége: Bököny: Kósa-tag [8296.1]; Geszteréd: Tömöri-tag [8296.2]; Ibrány: Fekete-h. [7995.2]. – Soó and Máthé (1938) report the species only from Makó and Földeák. Later, Timár (1953, 1954b) reports it from Szeged and Algyő. More recently, it has been found in several places during the flora mapping campaign (e.g. it seems to be common on the Hevesi-plain) (http3). Lukács *et al.* (2017) report it from several places in the Hortobágy region, with the comment “strongly spreading”. Some additional data are from Szolnok (Kovács and Priszter 1957, Haszonits in Molnár *et al.* 2018, Haszonits *et al.* 2021), Jászboldogháza, Újszász (Haszonits *et al.* 2021). It is also included in the species lists of some areas: Dombegyház (Csathó and Csathó 2010), Deszk (Ara-di *et al.* 2017), Kígyósi-puszta (Molnár 2018), Hegyes-h. in Klárafalva (Bede and Csathó 2022). Some recent collections are Székkutas (Virók V. 2004, DE); Nyékládháza (Virók V. 2009, DE); Pocsaj (Nagy T. and Takács A. 2016, DE); Tiszapalkonya (Takács *et al.* 2019, DE). It is a common species in the mounds of the Tiszántúl; often found on mounds that were cultivated as ploughland a few years ago, but usually in small numbers.

Cynoglossum montanum L. (syn. *Cynoglossum hungaricum* Simonk.) – Tótkomlós: Nádas-h. [9590.4] – Soó and Máthé (1938) present only two data: Kétegyháza, Lakitelek. Only one flora mapping data is known from the South

Tiszántúl: Nagymágocs (Virók V. [http3]). A few more data are known from the edges of the Crisicum (Nagy T. and Takács A. in Molnár *et al.* 2016b, http3), and it occurs in the Barcé-h. in Dévaványa (Bede *et al.* 2022b).

Erigeron acris L. – Gyomaendrőd: Kis-Dögös-h. [8991.1] – Archival data are known from Szeged (Lányi 1914) and Szolnok (Timár 1948). It is reported from the Hevesi-plain by Schmotzer (2014), and a collection is known from Sarud (Gulyás G. and Süveges K. 2017, DE), and it has been recorded from the Kettős-h. in Cibakháza (Olasz *et al.* 2019). No other data were found, but based on the results of flora mapping, it is distinctly common in some parts of Crisicum; the closest recent data are from the area of Mezőtúr and Kisújszállás (http3).

Erodium ciconium (L.) L'Hér. – Hódmezővásárhely: Rémáris-h. [9588.1]; Kunszentmárton: Péter-szögi-h. [9187.4]; Mindszent: Hegyes-h. (confirming the data of Csathó *et al.* 2015), Józsepi-h. [9487.3], Szeri-h., Ludas-h. [9487.4] (a collected specimen is known from here: Süveges K. 2020, DE); Szegvár: György-h. (confirming the data of Jakab 2005) [9487.1]; Szentes: Kántor-h. (confirming the data of Vona and Penksza 2004) [9387.2]; Sáp-h. (confirming the data of Jakab 2005) [9387.4]. – Soó and Máthé (1938) report data from three settlements: Szeged, Hódmezővásárhely, Makó; later Zsák (1941) also reports occurrences from Szeged, Timár (1954b) from Szentes, Soó and Borsos (1957) from Tisza-kürt and Szelevény. More recent literary records include Pitvarosi-puszta (on mounds!) (Molnár 1992); Szegvár (Tóth 2003); Hortobágy (Joó 2003) (Csípő-h.!); Szentes and Mindszent (Jakab 2005, Csathó *et al.* 2010, see above); Kunszentmárton (Nagy T. and Takács A. in Molnár *et al.* 2016b); Szeged (Aradi *et al.* 2017, Hábczyus and Süveges 2024); Szentes (Deák *et al.* 2024). During the flora mapping, it was found in several localities around Orosháza (http3). Some of its more recent collections are from Orosháza (Virók V. 2003, DE); Székkutas (Virók V. 2004, DE); Cibakháza (Süveges K. 2020, DE).

Erysimum diffusum Ehrh. – Hajdúdorog: Bene-h. [8095.3]; Mindszent: Szeri-h. [9487.4]; Szeghalom: Majta-laponyag [9092.2]. – Older data were reported from Kisújszállás, Orosháza, Csorvás, Szeged, Püspökladány, Tótkomlós, Lakitelek (Soó and Máthé 1938), Emőd, Igrici, Mezőcsát, Ónod, Tiszakeszi (Ujvárosi 1941), Hortobágy (Soó 1948). In the period of flora mapping, it has been found in only a few places in the southern and central parts of the Tiszántúl, the closest to its occurrence in Szeghalom being Mezőtúr (from where Tóth 2003 indicates it), Karcag and Berettyóújfalu (http3). Its most recent records in the literature are from the northern part of the Tiszántúl (Schmotzer 2014, Süveges *et al.* 2020, Takács *et al.* 2014).

Euphorbia falcata L. – Öcsöd: Büdös-h. [9088.3]. – Its older data are described by Soó and Máthé (1938), and it is nearest occurrence to Öcsöd is from Szarvas. According to Ubrizsy (1949), it is a common species in the set-aside fields of the Tiszántúl. Some scattered observations are from Szeged (Kiskundorozsma) (Zsák 1941), Miskolc (Hejőcsaba) (Ujvárosi 1941), Gelej (Kovács

and Priszter 1957). From near Makó, Penksza and Kapocsi (1998) recorded the species. From the Hevesi-plain it is reported by Schmotzer (2014). A collection is known from Békéssámson (Virók V. 2003, DE). According to the flora mapping, it occurs almost throughout the Tiszántúl, but seems to be rarer in some regions (http3).

Euphorbia helioscopia L. – Magyarcsanád: Bekai-h. [9889.2]. – According to Soó and Máthé (1938) it is a common species. It is probably still a common species in the South Tiszántúl (cf. http3). It has not been observed on any other mounds in Tiszántúl.

Festuca myuros L. (syn. *Vulpia myuros* (L.) C. C. Gmel.) – Apátfalva: Belez-h. [9789.4]; Békésszentandrás: Fekete-h. [9188.4]; Békés: Anonym-h. west of the settlement [9292.2]; Biharugra: Anonym-h., south-west of the settlement [9095.1]; Csabacsúd: Csatai-h. [8289.1]; Debrecen: Kamarás-h. [8595.1]; Dévaványa: Vas-doktor halma [8991.4], Szilasok halma [8991.3]; Egyek: Kétöklű-h., Kis-Ökör-h., Fene-h. [8391.4]; Gyomaendrőd: Polyák-h. [9190.1]; Hajdúszoboszló: Hegyes-h. (there are two mounds of this name on the border of the settlement; this is the eastern one) [8594.4]; Hódmezővásárhely: Gorzsai-Kettős-h. [9687.4]; Kevermes: Barta-h. [9593.3]; Kisújszállás: Buk-h. [8890.2]; Körösladány: Czipra-h., Édes-h. [9092.1], Kistrét-h. [8992.3]; Köröstarcsa: Vitális-h. [9191.4]; Kunszentmárton: Kis-János-h. [9188.3], Kettős-h. [9187.4]; Maroslele: Kingéc-h. [9787.2]; Mezőtúr: Leski-h. [9089.4]; Nagyszénás: Sznási-Kettős-h. [9289.4]; Nagytóke: Jaksor-h. [9287.1], Hegyes-h. [9288.3]; Öcsöd: Búdös-h. [9088.3]; Szarvas: Velki-h. [9189.2]; Szeghalom: Dió-h. [8992.4]; Szélevény: Öt-h. [9287.1]; Szentes: Tési Péter halma [9387.2], Márton-h. [9387.4], Mikecz-h., Kajáni-temető-h. [9288.3], Szeg-h. [9388.4], Dinnyés-h. [9287.4]; Székkutas: Kakasszék-h. [9489.4]; Sáránd: Szabó-h. [8595.4]; Tiszabó: Meleg-h. [8789.1]; Tiszaigar: Igari-Kettős-h. [8491.3], Tetves-h. [8490.2]; Tiszaörs: Fekete-h. [8590.2]; Tiszatenyő: Öcsödi-kettős-h. [8888.3]; Törökszentmiklós: Földvári-h. [8888.3]; Túrkeve: Pásztói-h. [8989.2], Póhalmi-h. [8989.4]. Nyírségense: Érpatak: Anonym-h. south of the settlement [8296.2]; Geszteréd: Tömöri-tag, illetve egy Anonym-h. east of the settlement [8296.2]; Nyíregyháza: Geri-h. [8096.1]. – Soó and Máthé (1938) record the species only from Makó and Egyek. Later, Timár (1948, 1954b, 1957) mentions it from Szeged and Sándorfalva. It is known from the following places: Nádudvar, Tiszafüred (Molnár 2005), Ónod (Virók *et al.* 2010), Felsőzsolca (Takács *et al.* 2013), Hevesi-plain (Schmotzer 2014), Dévaványai-Ecsegi puszták (Molnár *et al.* 2016a), Hatvan, Szentes (Molnár *et al.* 2016b), Hortobágy, Nádudvar (Molnár *et al.* 2017), Hortobágy, Püspökladány, Újszentmargita (Lukács *et al.* 2017), Szolnok (Molnár *et al.* 2018), Kétegyháza, Szolnok (Molnár *et al.* 2019), Derecske (Matus *et al.* 2019), Hejőpapi, Nyékládháza, Tiszaújváros, Sajószöged (Süveges *et al.* 2020), Jászberény, Jászfényszaru, Szentes, Szolnok, Újszász, Vámosgyörk (Haszonits *et al.* 2021), Jászboldogháza (Molnár 2021), Hajdúszoboszló

(Takács in Süveges *et al.* 2021). Kis (2022) provide quite a lot of new data from the Tiszántúl, near railway lines. In addition, some of its occurrences have been recorded during the flora mapping (<http3>). – Nyírségense: Boros (1932) mentions only one record from Debrecen (Pallag). Later, Zsák (1941) reports it from Újfehértó. Since the 2000s, it has been recorded in more and more places: Debrecen (Molnár V. *et al.* 2000, Takács and Löki 2015), Nyírszaholy (Molnár *et al.* 2017), Nyíradony, Létavértes (Matus *et al.* 2019), Monostorpályi, Debrecen (Lovas-Kiss and Süveges 2022). In addition, it has been recorded in some places during and after the flora mapping (<http3>). Following its few previous records, its occurrence data increased dramatically after the 2000s in both Tiszántúl and Nyírség. Most of its data from the Tiszántúl are related to railway lines. It is a frequent species on mounds, usually not dominant, but in small patches (few m²) it can reach quite high cover. It should be noted that its massive expansion has been reported throughout the country recently, particularly in autumn-sown crops, in minimum tillage systems (Ughy 2017).

Filago arvensis L. – Apátfalva: Belezi-h. [9789.4]; Jászfényszaru: Pipis-h. [8484.2]; Kunszentmárton: Kis-János-h. [9188.3]; Maroslele: Kingéc-h. [9787.2]; Tiszacsege: Solyom-h. [8392.1] (BP); Törökszentmiklós: Földvári-h. [8888.3]. – Soó and Máthé (1938) describe occurrences from the following settlements: Tiszalök, Hajdúnánás, Kunhegyes, Dévaványa, Vésztő, Szarvas, Lakitelek. Later, it has been reported near Hajdúszoboszló (Soó 1940), Püspökladány and Szelevény (Zsák 1941) and Tiszasas (Timár 1954a). Interestingly, Ubrizsy (1949) refers to it as a common species in Békés county. In comparison, nowadays few recent records are known (<http3>). One observation is reported from Hortobágy and Kunmadaras (Kovács in Molnár *et al.* 2016b). Lukács *et al.* (2017) summarize its occurrences in the vicinity of Hortobágy and report a new record from Újszentmargita; also, a collection from Hajdúböszörmény is known from the region (Takács A. 2019, DE). Schmotzer (2014) and Süveges *et al.* (2020) report the species from the northern part of Crisicum. Its current southernmost occurrence is recorded by K. Penksza from Magyarcsanak (<http3>).

Filago germanica (L.) Huds. (syn. *Filago vulgaris* (L.)) – Karcag: Nagy-Görgető-h. [8691.2]; Körösladány: Korhány-h. [9092.1] (DE); Nagykamarás: Botos-h. [9593.1] (DE); Tiszaigar: Csárda-h. [8490.4]. – Soó and Máthé (1938) reports the species from the following localities: Kismarja, Hencida-Gáborján, Vésztő, Dévaványa, Kétegyháza-Újkígyós. Later, Máthé (1939) reports from Hencida, and Timár (1954b, 1957) from Szeged, Sándorfalva, and Hódmezővásárhely. An archive record from the Hevesi-plain is reported by Schmotzer (2014). More recently, *F. lutescens* L. from Crisicum has been reported from Okány and Nyékládháza (<http3>), and Lukács *et al.* (2017) report two occurrences from Berettyóújfalu. One collection is also known from Kesznyéten (Virók V. 2000, DE).

Gagea villosa (M.Bieb.) Sweet – Öcsöd: Vágó-h. [1988.1]. – Earlier data based on Soó and Máthé (1938): Hencida-Gáborján, Szolnok, Szeged, Makó. Some scattered records are known from Bócs, Csobaj, Furta, Köröstarcsa (Takács *et al.* 2016), Gyula (Korda *et al.* 2017), Szolnok (Haszonits *et al.* 2021), Klárafalva (on mound) (Bede and Csathó 2022), Szeged (Hábenczyus and Süveges 2024), and sporadic occurrences in the northern parts of the Crisicum (Schmotzer 2014, Süveges *et al.* 2020, [http3](#)). During the flora mapping campaign, it was found in larger numbers in the southernmost parts of Tiszántúl and in the Túrkeve–Dévaványa area ([http3](#)). It probably occurs on other mounds as well.

Geranium dissectum Jusl. – Békésszentandrás: Fekete-h. [1988.4]; Biharugra: Varjú domb [9095.1]; Dévaványa: Anonym-h. west of the settlement [8991.3]; Gyomaendrőd: Polyák-h. [1910.1]; Karcag: Kis-Görgető-h. [8691.2]; Kisújszállás: Buk-h. [8890.2]; Köröstarcsa: Mák-h. [1912.1]; Kunszentmárton: Kettős-h. [1987.4]; Magyarcsanak: Bekai-h. (confirming the data of Penksza and Kapocsi 1998) [9889.2]; Mezőberény: Bodzás-h. [1912.3]; Nagytőke: Kettősms. (on the north one), Tőke-h. [9287.4]; Szarvas: Borgulya-halmok [1910.1]; Szegvár–Derekegyház: Ludas-h. [9487.4]; Szentes: Tere-h. [9288.2], Márton-h. [9387.4]; Zsadány: Anonym-h., north of the Fancsika-puszta [9095.1]. – Soó and Máthé (1938) provide relatively few data: Kisújszállás, Szarvas, Vésztő, Békéscsaba-Újkígyós, Gyula. Later, Zsák (1941) reported the species from Berettyóújfalu, Ubrizsy (1949) from Szarvas (as a common species), Öcsöd, Gyomaendrőd and Timár (1957) from Szeged. More recently, it seems to be common in the South Tiszántúl ([http3](#)). Some more recent occurrences are situated next to Makó (Penksza and Kapocsi 1998), Elek (Kertész 1999), Csanádpalota, Klárafalva, Deszk (Bátori *et al.* 2014), in the Hevesi-plain (Schmotzer 2014), Csanádi-puszta (Molnár *et al.* 2016c), Kígyósi-puszta (Molnár 2018), Gyomaendrőd (Nótári in Molnár *et al.* 2019), Jászalsószentgyörgy (Molnár 2021), and it is also known to occur on the Mogyorós-halmon in Öcsöd (Bede *et al.* 2022a). Some of its collections are: Kardoskút (Siroki Z. 1945; 1975 in Takács *et al.* 2015b), Orosháza (Virók V. 2000; 2003, DE); Békéssámsón (Virók V. 2004, DE); Kisköre (Molnár V. A. *et al.* 2016, DE); Szarvas (Nagy T. and Takács A. 2016, DE); Zsadány (Takács A. and Süveges K. 2019, DE).

Geranium divaricatum Ehrh. – Battonya: Balta-kereszt-h. [9792.1]; Magyarcsanak: Bekai-h. [9889.2]; Makó: Fekete-h. [9690.3]; Szentes: Piponya-h. [9387.4]; Szentes–Szarvas–Békésszentandrás: Magyaros-laponyag [9288.2]. – Soó and Máthé (1938) present only two archival data from the North-Tiszántúl. Some of its more recent data are Tizsakürt (Soó and Borsos 1957), Szabadkígyós (Bátori *et al.* 2014), Hevesi-plain (Schmotzer 2014), Füzesabony (Molnár 2019); a data from Nádudvar is also known (Deák *et al.* 2019) and these authors summarized its data from the central parts of Tiszántúl. Flora mapping data are known from near Bélmegyer and Kétegyháza, and from near Körösladány collected by K. Süveges (2023, DE).

Glaucium corniculatum (L.) Curtis – Kuncsorba: Csobai-h. [8889.3] (DE), Telekgerendás: Furis-h. [9391.4]; Törökszentmiklós: Keresztes-h. [8888.4] (DE). – Earlier data are summarized by Soó and Máthé (1938), and the nearest to recent data are from Kisújszállás and Mezőtúr; from the latter place is still reported as a common segetal weed by Budai (1916). It was recorded only near Mezőhegyes during the flora mapping (Csathó A. I. [http3]). More recently, its earlier occurrences have been reported and processed from mounds near Pocsaj, Debrecen and Túrkeve in the central part of Tiszántúl (Deák *et al.* 2019). It is also worth mentioning an earlier collection, which is missing from the above literature: Kaba (Felföldy L. 1938, DE).

Helminthotheca echioides (L.) Gaertn. – Kunszentmárton: Péter-szögi-h. [9187.4]; Szelevény: Öt-h. [9287.1]. – The species was reported by Timár (1948, 1954b) from Szeged, by Soó and Borsos (1957) from Tiszaúrt. Later Papp (1965) reported the occurrence of the species from near the Tisza, from the areas of Szentes and Szeged. From near Makó it was reported by Molnár V. *et al.* (2000). Several occurrences from the region are described by Tóth and Jakab (2003) and Jakab (2005). Some recent records are known next to Apátfalva–Magyarcsanak (Penksza and Kapocsi 1998), Magyarcsanak (Korda in Molnár *et al.* 2019), Szeged, Deszk (Aradi *et al.* 2017). It has now become a very common species in the vicinity of Szeged and in the southernmost areas of Tiszántúl (http3), and is clearly a taxon in the process of expanding, also occurring very far from its previous records, e.g. on the Hevesi-plain (Schmotzer 2014) and near Karcag and Tarcál (Süveges *et al.* 2021). Some recent collections are from Makó (Virók V. 2000, DE); Szeged (Lovas-Kiss Á. *et al.* 2013, DE); Szentes (Gulyás G. 2014, DE); Mártély–Hódmezővásárhely (Molnár V. A. *et al.* 2015, DE); Szolnok (Molnár V. A. *et al.* 2018, DE).

Lappula squarrosa Dumort. – Fábiansebestyén: Ördög-h. [9388.1]; Karcag: Nagy-Organó-h. [8691.4], Vermes-h. [8791.1]; Kengyel: Godó-h. [8888.3]; Kisújszállás: Buk-h. [8890.2]; Mindszent: Hegyes-h. [9487.3]; Nagytőke: Mirmidó-h. [9288.3]; Pitvaros: Szeles domb [9790.1]; Pocsaj: Makkosi-h. [8697.3]; Pusztatottlaka: Hegyeshatár-h. [9492.3]; Szarvas: Zöld-h. [9189.4]; Tiszabő: Meleg-h. [8789.1]; Tiszafüred: Dunai-h. [8490.2]; Tiszatenyő: Kerekgyház-Kettős-h. [8888.3]; Törökszentmiklós: Barta-h. [8888.2], Földvári-h. [8888.3]; Túrkeve: Pásztói-h. [8989.2]. – Old records are reported from Gyomaendrőd, Orosháza (Borbás 1881), Battonya, Földeák (Thaisz 1902), Szentes, Csongrád (Thaisz 1903), Szeged, Algyő (Lányi 1914), Egyek (Ohat) (Máthé 1933), Hajdúszoboszló (Soó 1940). Soó and Máthé (1938) refer to it as a common species; and it is not rare nowadays (cf. http3). Recent records are from the Pitvarosi-puszták (Molnár 1992), and Tóth (2003) indicates it as a species with a sporadic distribution in the South Tiszántúl and reports it from Szentes, Mezőtúr, Fábiansebestyén and Csabacsúd. Other occurrences are known from the Hevesi-plain (Schmotzer 2014), Csanádi-puszták (Molnár *et al.* (2016c),

Szolnok (Haszonits in Molnár *et al.* 2018), Alsózsolca, Sajókeresztúr (Koscsó in Süveges *et al.* 2020). Some herbarium data: Hajdúnánás (Igmándy J. 1938, DE), Konyár (Soó R. 1949 in Nótári *et al.* 2017), Püspökladány (Igmándy J. and Igmándy Z. 1948, DE), Hortobágy (Siroki Z. 1985 in Takács *et al.* 2015b).

Lathyrus hirsutus L. – Cibakháza: Cibakházi-Kettős-h. [9087.3]; Dévaványa: Erdős-Mihály-laponyagja [8991.1]; Gyomaendrőd: Alacsony-h. [8991.3], Anonym-h., on the northern edge of the administrative boundary of the settlement [8991.1]; Gyula: Mikó-h. [9493.2]; Hosszúpályi: Sóstó-h. [8696.3]; Kengyel: Szélmalom domb [8987.2]; Szentes: Kajáni-Temető-h. [9288.3]; Túrkeve: Tere-h. [8990.2]. – According to Soó and Máthé (1938) it may have been widespread in large parts of the Tiszántúl earlier; our current data suggest that it is still common, although it is absent from some parts (cf. [http3](#)). Later literature records include occurrences in Hencida (Máthé 1939), Sajólad (Ujvárosi 1940), Mezőcsát (Ujvárosi 1941), Geszt (Soó 1948), Sarkad (Ubrizsy 1949), Magyarcsanak, Makó (Penksza and Kapocsi 1998), Elek (Kertész 1999), Szelevény (Tóth 2003), Gyula (Bátori *et al.* 2014), Hevesi-plain (Schmotzer 2014), Dévaványa-Ecsegi-pusztá (Molnár *et al.* 2016a), Kígyósi-pusztá (Molnár 2018), Alattyán, Doboz (Kevey *et al.* 2021). Some herbarium data: Gáborján (Kovács L. 1940, DE); Hortobágy, Hódmezővásárhely (Siroki Z. 1974; 1975 in Takács *et al.* 2015b); Méhkerék (Virók V. 2000, DE); Újtikos (Takács A. 2010, DE); Mezőpeterd (Molnár V. A. *et al.* 2015, DE), Hortobágy (Molnár V. A. and Süveges K. 2019, DE).

Lathyrus nissolia L. – Biharugra: Anonym-h., south-west of the settlement [9095.1]; Dévaványa: Erdős-Mihály-laponyagja [8991.1]; Gyomaendrőd: Anonym-h., on the northern edge of the administrative boundary of the settlement [8991.1]; Szentes: Piponya-h. [9387.4]; Törökszentmiklós: Keresztes-h. [8888.4] (DE). – Soó and Máthé (1938) reported the species from Hortobágy, Kisújszállás, Vésztő, Gyula, Mezőtúr. Later, Ujvárosi (1941) reports it from Nyékládháza, Ubrizsy (1949) from Sarkad, Kertész (1999) from Elek. Current occurrence data indicate that its distribution is scattered in the Tiszántúl ([http3](#)). More recently, Jakab and Tóth (2003) describe important occurrences from Mezőtúr, and Jakab (2005) from Szentes, Dévaványa, Körösladány and Ecsegfalva. Lukács *et al.* (2017) summarize new occurrences and literature data from the central parts of Tiszántúl; among these, it is worth highlighting the data of Molnár V. in Takács *et al.* (2015) on Szálka-h. Some of its other scattered data include Tiszadob (Takács *et al.* 2014), Hevesi-plain (Schmotzer 2014), Dévaványai-Ecsegi-pusztá (Molnár *et al.* 2016a), Csanádi-pusztá (Molnár *et al.* 2016c), Kígyósi-pusztá (Molnár 2018), Szolnok (Haszonits *et al.* 2021), Alattyán (Molnár 2021). Some recent collections are from Békésszentandrás (Virók V. 2000, DE); Jászdózsa (Molnár V. A. *et al.* 2016, DE); Hortobágy (Gulyás G. 2017, DE); Geszt (Süveges K. and Takács A. 2017, DE).

Malva setigera K. F. Schimp. et Spenn. (syn. *Althaea hirsuta* L.) – Hódmezővásárhely: Nádas-h. [9688.4] (DE). – Earlier data of the species are summarized by Soó and Máthé (1938), but no recent occurrences of this nationally rare species were found in the literature, while some flora mapping data are known from the South Tiszántúl, nearest to its occurrence in Hódmezővásárhely at Algyó (Tóth T. [http3]).

Medicago minima (L.) L. – Árpádhalm: Árpád-h. [9389.3]; Battonya: Tompa-h. [9691.4]; Békésszentandrás: Gödény-h. [9188.4]; Csárdaszállás: Fél-h. [9191.1]; Dévaványa: Anonym m. west of the settlement, Kettős-Szék-h. [8991.3]; Egyek: Tökös-h. [8391.3]; Gyula: Kálvária domb [9393.4]; Hosszúpályi: Sóstó-h. [8696.3]; Hódmezővásárhely: Rárósi-h., Téglási-h. [9588.1], Tege-h. [9487.4], Nádas-h. [9688.4]; Jászfényszaru: Pipis-h. [8484.2], Kender-h. [8484.1]; Karcag: Lőzer-h. [8691.2]; Kétegyháza: Török-h. [9492.4]; Kunmadaras: Márton-h. [8591.3]; Kunszentmárton: Köttön-h. [9287.2]; Lökösháza: Bemih., Tátár-h. [9593.4]; Magyarcsanak: Bekai-h. (confirming the data of Penksza and Kapocsi 1998) [9889.2]; Makó: Fekete-h. [9690.3], Első-h. [9789.2]; Mezőberény: Bodzás-h. [9192.3]; Mindszent: Hegyes-h. [9487.3]; Nagytőke: Szász-h. [9287.2], Tőke-h. [9287.4]; Öcsöd: Vágó-h., Hegyes-h. [9188.1]; Pocsaj: Róka-h., Ebéd-h. [8696.4]; Pusztatölke: Hegyeshát-h. [9492.3]; Szegvár-Derekegyház: Ludas-h. [9487.4]; Szegvár: Anonym-h. near Kontra street [9487.1]; Szelevény: Kis-h. [9187.3]; Szentes: Sáp-h. [9387.4]; Szentes-Nagytőke: Kettős-h. (on both mounds) [9287.4]; Székkutas: Kakasszék-h. [9489.4]; Tépe: Belső-h. [8695.3]; Tiszafüred: Lyukas-h., Bába-h., Nagy Bence-h. [8491.4]; Beke-h., Fő-Sarkad-h. [8491.3], Bodzás-h., Rókás-h., Dunai-h., Vadas-h. [8490.2], János-állás [8491.1]; Tiszaigar: Igari-Kettős-h. [8491.3]; Tiszaörs: Hegyes-h. [8491.3]. – Nyírségense: Bököny: Kósa-tag [8296.1]; Érpatak: Anonym-h. south of the settlement [8296.2]; Geszteréd: Anonym-h. east of the settlement [8296.2]. – Based on Soó and Máthé (1938) and also more recently (http3) it is considered a taxon with sporadic distribution in the Tiszántúl. Later literature data are from Hencida (Máthé 1939), Debrecen (Soó 1948), Elek (Kertész 1999), Nagytőke, Orosháza (Tóth 2003), Hevesi-plain (Schmotzer 2014), Dévaványa-Ecsegi puszt (Molnár *et al.* 2016a), Csanádi-puszt (Molnár *et al.* 2016b), Kígyósi-puszt (Molnár 2018), Szolnok (Molnár *et al.* 2019), Nyékládháza (Süveges *et al.* 2020), Füzesabony, Újszász (Haszonits *et al.* 2021), Öcsöd (Mogyorós-h., Bede *et al.* 2022a). Collected from Kardoskút by Z. Siroki (1975 in Takács *et al.* 2015b) and V. Virók (2004, DE). This species is probably spreading in the whole country. – Its earlier data from the Nyírségense: Debrecen (Soó 1934), Debrecen, Hajdúbágyos, Hajdúnánás (Soó 1937), Nyíregyháza (Zsák 1941), Penészlek (Papp *et al.* 1997) Nagykálló (Molnár *et al.* 2016b).

Medicago monspeliaca (L.) Trautv. – Magyarcsanak: Bekai-h. [9889.2]; Pocsaj: Ebéd-h. [8696.4] (DE). – Soó and Máthé (1938) describe earlier occurrences from Orosháza, Szelevény, Szabadkígyós, Tótkomlós, Csanádapáca

and Sándorfalva. Later Timár (1957) reports the species from Szeged. Only a few data were found during the flora mapping, some of them have been published: Jakab (2005) reports it from Hódmezővásárhely and Ecsegfalva, and É. Kertész (2005) mapped it from Okány and Szabadkígyós ([http3](#)). Two observations from mounds are known from Tépe and Szolnok (Deák *et al.* 2019).

Myagrum perfoliatum L. – Körösladány: Rév-h. [9092.3]. – Soó and Máthé (1938) report earlier data from Törökszentmiklós, Kisújszállás, Karcag, Vésztő, Makó, Újszász, Szolnok and Szeged, later Timár (1954b) reports from Hódmezővásárhely. It occurs somewhat sporadically in the Crisicum ([http3](#)). More recently, Jakab (2005) reports from Sarkad, Körösladány, Szeghalom. It is known from the Hevesi-plain (Schmotzer 2014), Mezőberény (Csathó 2015), Jászboldogháza (Molnár 2016), Tiszafüred (Lukács *et al.* 2017), Újszász (Haszonits *et al.* 2021), Szeged (Hábenczyus and Süveges 2024). Some of its collections include Berekbőszörmény (Siroki Z. 1970 in Takács *et al.* 2015b), Jászdózsza (Molnár Cs. 2003, DE); Eperjes (Süveges K. 2020, DE).

Neslia paniculata (L.) Desv. – Hajdúdorog: Bene-h. [8095.3] (BP). – The data comes from the border of Nyírség and Hajdúság. From the edges of the Nyírség, Gondola (1969) reports it as a weed species of crops field. Its only actual occurrence in Nyírség is indicated in the flora atlas, near Ibrány ([http3](#)). There is also a known collection from the edge of Nyírség: Tiszavasvári (Igmándy J. 1949, DE). It is a rare weed species in the whole country, which has been observed on only one mound so far.

Nigella arvensis L. – Gyula: Mikó-h. [9493.2]; Hajdúdorog: Bene-h. [8095.3]; Hajdúszoboszló: Hegyeshatár-h. [8594.4]; Tiszaigar: Csárda-h. [8490.4]; Tiszalök–Tiszaeszlár: Két ökör m. [7994.4]. – Archival data are reported from Szarvas, Gyomaendrőd, Gyula (Borbás 1881), Medgyesbodzás (Simonkai 1893), Földeák (Thaisz 1902), Szeged, Algyő (Lányi 1914), Hajdúszoboszló (Soó 1940), Soó and Máthé (1938) mentions it is a common species in the Tiszántúl. More recently, its distribution is scattered, occasionally common, occasionally absent ([http3](#)). It is known from the Hevesi-plain (Schmotzer 2014) and the Sajó–Hernád-plain (Süveges *et al.* 2020, Takács *et al.* 2013). Lukács *et al.* (2017) summarize its earlier occurrences from the central part of Tiszántúl and provide more recent data from near Püspökladány and Sárrétudvari. Since then, data have been reported from Debrecen, Abádszalók, Tomajmonostora and Cibakháza (from mounds) (Deák *et al.* 2019, Olasz *et al.* 2019), and Gyomaendrőd (Nótári in Molnár *et al.* 2019). Two more recent collections are from Orosháza (Virók V. 1996, DE) and Nagyhegyes (Gulyás G., 2016, DE).

Ranunculus arvensis L. – Jászfényszaru: Pipis-h. [8484.2]; Kengyel: Beszélő-h. [8888.3]; Ócsöd: Vágó-h. [9188.1] (BP); Tiszafüred: Hármash. [8491.3]. – Some archival data: Vésztő, Gyomaendrőd (Borbás 1881), Földeák (Thaisz 1902), Szentés (Thaisz 1903), Szeged (Lányi 1914), Hajdúszoboszló (Soó 1940). Soó and Máthé (1938) refer to it as a common species, nowadays its distri-

bution is rather scattered ([http3](#)). Jakab (2005) published a large amount of data from the central and southern parts of the Tiszántúl. More recent records and scattered data are from Magyarcsanád, Nagylak (Penksza and Kapocsi 1998), Elek (Kertész 1999), Pocsaj, Nagykőrű and Tiszacsege (Molnár V. *et al.* 2000), Csobaj (Takács *et al.* 2014), Hevesi-plain (Schmotzer 2014), Újszentmargita (Takács *et al.* 2015a), Csanádi-puszta (Molnár *et al.* 2016c), Dévaványai-Ecsegi-puszta (Molnár *et al.* 2016a). Some of its collections are from Hencida (Kovács L. 1929, DE); Hajdúnánás (Igmándy J. 1939, DE); Karcag (Oláh 1939, DE; Takács A. and Molnár V. A. 2015, DE); Egyek, Berekböszörmény (Siroki Z. 1948; 1970 in Takács *et al.* 2015b), Hódmezővásárhely (Virók V. 2000, DE); Orosháza (Virók V. 2003, DE); Újszentmargita (Takács A. and Molnár V. A. 2015, DE); Tiszaderzs (Molnár V. A. *et al.* 2016, DE); Körösladány (Molnár V. A. 2017, DE); Szolnok (Süveges K. 2020, DE).

Rapistrum perenne (L.) All. – Tótkomlós: Nádasi-h. [9590.4]. – Soó and Máthé (1938) describe its occurrences mainly from the South Tiszántúl, including from near Tótkomlós (Jankó 1886). Nowadays it is rare in the whole Tiszántúl, more recent literature records are known from the Central Tisza Region, the Sajó–Hernád-plain and the Jászság, partly from mounds (Deák *et al.* 2019, Lukács *et al.* 2017, Molnár 2021, Takács *et al.* 2013, [http3](#)); the closest occurrence to the locality in Tótkomlós in the flora mapping was found near Mezőkovácsháza ([http3](#)).

Reseda luteola L. – Pocsaj: Makkosi-h. [8697.3] (DE). – Soó and Máthé (1938) report the species from the following locations: Egyek, Tiszalök, Újiráz, Gyula, Tótkomlós, Makó, Szeged. Later Ubrizsy (1949) reports it from near Kondoros. More recent records are known from the Hevesi-plain (Schmotzer 2014), Hajdúnánás (Takács *et al.* 2014), Ároktő (Süveges *et al.* 2020), Szeged (Süveges 2023). Flora mapping data are known from Karcag and Csongrád ([http3](#)), and there is a collection from Tiszafüred (Süveges K. 2019, DE). A sporadic species in the Tiszántúl, observed on only one mound so far; common on Makkosi-mound.

Roemeria hispida (Lam.) Stace (syn. *Papaver hybridum* L.) – Békésszentandrás: Gödény-h. [9188.4]; Dévaványa: Barczé-h. [8991.4] (BP); Hódmezővásárhely: Rémáris-h. [9588.1]; Kengyel: Beszélő-h. [8888.3] (DE), Baghy domb [8987.2]; Kuncsorba: Csobai-h. [8889.3] (DE); Magyarcsanád: Bekai-h. (confirming the data of Penksza and Kapocsi 1998 and Herczeg *et al.* 2006) [9889.2]; Makó–Királyhegyes: Első-h. [9789.2], Középső-h. [9689.4]; Mindszent: Hegyes-h. (confirming the data of Csathó *et al.* 2015) [9487.3] (DE); Szentés: Kántor-h. [9387.2] (BP); Telekgerendás: Furis-h. [9391.4]; Túrkeve: Pásztói-h. [8989.2]. – Earlier data of Soó and Máthé (1938): Orosháza–Újkígyós, Hódmezővásárhely, Kunszentmárton, Makó, Szolnok, Csongrád, Szeged, in addition Soó R. collected it from Békéscsaba (1923 in Nótári *et al.* 2017). More recently, it is reported from Túrkeve, Királyhegyes (Jakab 2005), Újkí-

gyós (Sallainé Kapocsi 2009), and Klárafalva (Bede and Csathó 2022). Some of its collections are known from Békéssámson (Virók V. 2004, DE); Nagyrév (Süveges K. 2020, DE); Kaszaper (Süveges K. 2022, DE).

Salsola kali L. – Tiszaigar: Korda-h. [8490.4]. – Earlier occurrences from the neighbourhood of Tiszaigar are summarized by Deák *et al.* (2019), and more recent data are published, specifically on mounds. Its new data should be interpreted as an addition to that list.

Saxifraga tridactylites L. – Tápiószele: Tatár-hányás [8685.3]. – This recent occurrence is situated on the border of Crisicum and Praematricum. This taxon is common in the Praematricum, and rare in the Crisicum (http3), occurrences in the Crisicum are often associated with secondary habitats (cf. e.g. Süveges *et al.* 2020, Takács *et al.* 2016). According to flora mapping, it is common in the area of Tápiószele (http3), its closest known record in literature is from near Jászberény (Takács *et al.* 2016).

Scleranthus annuus L. – Szentes: Anonym-h., north of the settlement [9287.4]. – According to Soó and Máthé (1938) it is a common species in the Tiszántúl. It seems to be quite common in the neighbourhood of Szentes (http3), but its specific literary record is known only from near Nagytőke (Tóth 2003).

Sherardia arvensis L. – Túrkeve: Póhalmai-h. [8989.4] (DE). – Soó and Máthé (1938) report the species only from Szeged, Földeák and Makó. In the Tiszántúl it is extremely rare (http3), but recently several records have become known, presumably a species that is slightly expanding. More recent records are known from Csanádi-puszta (Molnár *et al.* 2016c), Pocsaj (Lukács *et al.* 2017), Sajószöged, Tiszaújváros (Süveges *et al.* 2020), Szolnok, Tiszakécske (Haszonits *et al.* 2021), Ebes (Süveges *et al.* 2021), Szeged (Hábenczyus and Süveges 2024). The closest to currently reported data from Túrkeve is from a neighbouring quadrat, also from a mound, reported by Deák *et al.* (2019).

Sideritis montana L. – Törökszentmiklós: Keresztes-h., a few individuals [8888.4]. – Soó and Máthé (1938) report the species sporadically from quite a few places from the South Tiszántúl, the closest to their more recent data being from the borders of Tiszatenyő and Szolnok. Later it was also found near Szajol (Soó *et al.* 1942). More recently, only a few localities are known in the Crisicum (http3); one occurrence is on a mound near Szolnok (Deák *et al.* 2019).

Silene conica L. – Hódmezővásárhely: Gorzsai-Kettős-h. [9687.4] (DE); Szelevény: Öt-h. [9287.1]. – It has only a few data from the Tiszántúl: Mezőcsát (Ujvárosi 1941), Hortobágy (Soó 1948), Tiszaug (Timár 1954a), Hevesi-plain (Schmotzer 2014), Nyékládháza (Süveges *et al.* 2020).

Sisymbrium altissimum L. – Pocsaj: Ebéd-h. (lots of) [8696.4]. – Based on Soó and Máthé (1938), it occurs sporadically in the Tiszántúl, the closest to its recent record is from the Hencida–Gáborján area; later Máthé (1939) also reports it from Hencida. More recently, it also appears to be scattered in the Crisicum (absent in some areas), the closest locality is mapped near Ártánd

(http3). A collection is known from the indicated area from Konyár (Soó R. 1949, DE) and from Pocsaj (Nagy T. and Takács A. 2016, DE).

Sisymbrium loeselii L. – Debrecen: Nagysándor-h. [8495.4]; Szarvas: Czibula-h. [9189.4]. – Soó and Máthé (1938) present only a few data of the species, but these are both from the North and South Tiszántúl. Later, Ubrizsy (1949) reports it from the areas of Szarvas, Kondoros and Mezőtúr. Two more recent records are known (Mezőhegyes [Haszonits *et al.* 2021], Hevesi-plain [Schmotzer 2014]) and there are some more recent collections from Orosháza (Virók V. 2003, DE), Debrecen (Takács A. and Nagy T. 2017, DE), Magyarcsanád (Süveges K. 2019, DE), Túrkeve (Süveges K. 2023, DE). It seems to be a sporadic species nowadays. One of its data indicated by Tóth T. from the same flora quadrat as the data from the Czibula-h. (http3).

Sisymbrium officinale (L.) Scop. – Tépe: Belső-h. [8695.3]. – Soó and Máthé (1938) present data mainly from the South Tiszántúl and Békés County. More recently, its distribution is scattered in the Tiszántúl (http3). The closest occurrences to its record from Tépe are known from herbarium collections: Gáborján (Kovács L. 1939, DE), Pocsaj (Molnár V. A. and Süveges K. 2019, DE).

Sisymbrium orientale L. – Karcag: Vermes-h. [8791.1]; Tépe: Belső-h. [8695.3]; Tiszafüred: Kócs-h. [8491.1]; Tiszaigar: Tetves-h. [8490.2]. – Its earlier data are summarized by Soó and Máthé (1938), mainly from South Tiszántúl. Later Máthé (1939) reports it from Hencida, Ubrizsy (1949) from Kondoros and Csabacsúd. More recently it is not rare in the Crisicum (http3). Some recent records are known from Orosháza (Virók V. 2000; 2003, DE), Hevesi plain (Schmotzer 2014), and Kétegyháza (Molnár *et al.* 2019).

Spergula pentandra L. – Nyírségense: Bököny: Kósa-tag [8296.1]; Érpatak: Anonym-h. south of the settlement [8296.2]; Geszteréd: Anonym-h. east of the settlement [8296.2]. – Boros (1932) reports four occurrences from the Nyírség, and Soó (1934) reports only one occurrence from Debrecen, and later from near Nyíregyháza (Soó 1939). Later Gondola (1969) publishes several observations, mainly from the southeastern parts of the Nyírség, and Papp *et al.* (1997) report the species from Penészlek. More recently, it has also been found in cemeteries in the Nyírség (e.g. also in the cemetery of Érpatak) (Molnár *et al.* 2016, Takács *et al.* 2016). More recent data are reported by Matus *et al.* (2019). Some of its collections are: Nyíregyháza (Ubrizsy G. 1938, DE); Debrecen (Siroki Z. 1946; 1954 in Takács *et al.* 2015b), Újfehértó (Nótári K. 2015, DE); Besenyőd (Molnár V. A. 2016, DE); Hajdúbagosa (Molnár V. A. and Lovas-Kiss Á. 2016, DE); Nyírcsászári (Molnár V. A. 2016, DE); Rohod (Nagy T. and Takács A. 2016, DE); Debrecen (Takács A. and Süveges K. 2019, DE). It seems to be currently widespread in the Nyírség (http3).

Taeniatherum caput-medusae (L.) Nevski – Körösladány: Kisrét-h. [8992.3]. – Jakab (2005) reports the species from Dévaványa and Túrkeve, one of his data is from a mound also, and it is also reported from the Dévaványa-Ecsegi-pusztá

(Molnár *et al.* 2016a). It is known from the Hortobágy (from where it is also collected [Tóth A. 1989 in Nótári *et al.* 2017]) and the Bihar plain (Molnár 2007). More recently, it is reported from the Hortobágy by Molnár *et al.* (2019).

Trifolium diffusum Ehrh. – Gyomaendrőd: Alacsony-h. [8991.3]; Körösladány: Korhány-h. [9092.1] (DE); Mindszent: Szeri-h. [9487.4]; Poroszló: Nagy-Kóta-h. [8389.2]; Szelevény: Öt-h. [9287.1]; Szentes: Márton-h. [9387.4]; Tiszacsege: Sólyom-h. [8392.1]; Tiszafüred: Nagy-Kócs-h. [8491.4]; Tiszaigar: Igari-Kettős-h. [8491.3]; Tetves-h. [8490.2]; Tiszaörs: Kettős-h. [8491.3]. – Nyírsége: Nyíregyháza: Geri-h. [8096.1]. – Soó and Máthé (1938) report the species from only a few sites. Lukács *et al.* (2017) describe several new occurrences from the central part of the Tiszántúl and review previous data from this region. Another large number of records are presented by Deák *et al.* (2019), specifically from mounds. A new occurrence is known from Szentes (Korda in Haszonits *et al.* 2021) and a new occurrence from the Barcé-h. in Dévaványa (Bede *et al.* 2022b). Presumably it is an expanding species. – Nyírsége: Boros (1932) suggests that its distribution may have been previously scattered in the Nyírség. Later, one record from Nyírség is presented by Soó (1934). It was found in the Nyírség from a single locality during the flora mapping (cf. [http3](http://3)), but since then several more recent occurrences have been reported (Matus *et al.* 2019, Haszonits *et al.* 2021, Lovas-Kiss and Süveges 2022).

Valerianella dentata (L.) All. – Hódmezővásárhely: Tege-h. [9487.4]. – Its earlier records are concentrated in the southern part of the Tiszántúl (Soó and Máthé 1938), where it seems to be more frequent nowadays ([http3](http://3)), although no literature records have been found for the vicinity of the Tege-h. Some occurrences in South Tiszántúl are known: Berekböszörmény, Kardoskút (Siroki Z. 1970; 1975 in Takács *et al.* 2015b), Orosháza (Virók V. 1995; 2003, DE), Deszk, Csanádpalota (Bátori *et al.* 2014), Csanádi-puszta, Dévaványa-Ecsegi-puszta, Kígyósi-puszta (Molnár 2018, Molnár *et al.* 2016a, Molnár *et al.* 2016c), Bélmegyer (Kevey *et al.* 2021). So far, it has been reported from only one mound in Tiszántúl, near Öcsöd (Bede *et al.* 2022a).

Ventenata dubia (Leers) Coss. et Durieu – Dévaványa: Kovács-laponyag [8891.4], Anonym-h. on the western edge of the administrative boundary of the settlement [8991.3]; Ecsegfalva: Böcskei-h. [8891.4]; Gyomaendrőd: Kis-Dögös-h., and Anonym-h., on the northern edge of the administrative boundary of the settlement [8991.1], another Anonym-h. on the northern edge of the administrative boundary of the settlement [8990.4], Kettős-szék-h. [8991.3]; Körösladány: Kistrét-h. [8992.3], Czifra-h. [9092.1]; Szeghalom: Szívós-h. [8992.3]; Szentes: Pankotai-h. [9288.4]. – In the publication of Soó and Máthé (1938) there is only one record from near Mezőcsát (Budai 1914). Later, Ujvárosi (1941) published a data from Nyékládháza, also based on J. Budai. Siroki (1965) reports the species from Hortobágy. Jakab (2005) reports quite a lot of new records from the South Tiszántúl and refers to it as a very common

species in some areas (e.g. Kis- and Nagy-Sárrét, Dévaványai-plain). It is also reported from the area of Dévaványa by Molnár *et al.* (2016a). From the central part of Tiszántúl, Lukács *et al.* (2017) describe some recent occurrences (with a note 'abundant in some places') and assume the species to be data-deficient. Some scattered records are known from Csanádi-puszta (Molnár *et al.* 2016c), Besenyőtelek (Molnár *et al.* 2017), Egyek, Kunmadaras (on mounds) (Deák *et al.* 2019) Dévaványa (Barcé-h.) (Bede *et al.* 2020b). More recent collections are known from Szentes (Nagy T. and Takács A. 2016, DE); Bélmegyer and Biharugra (Takács A. and Süveges K. 2017, DE). It usually occurs on degraded, low mounds that are wedged into grasslands.

Vicia pannonica subsp. *striata* (M. Bieb.) Nyman (syn. *Vicia pannonica* Crantz) – Fegyvernek: Nagy-Koller-h. [8789.3]; Öcsöd: Vágó-h. [9188.1]; Szentes: Jámor-h. [9287.4]; Tépe: Belső-h. [8695.3]. – Its sporadic occurrences are described by Soó and Máthé (1938) from almost the whole Tiszántúl. Later it was recorded by Máthé (1939) from Hencida, Zsák (1941) from Újszász, Ujvárosi (1941) from Mezőcsát, Mezőkeresztes and Igrici, Timár (1954a) from the Tiszazug region. More recent data are known from Tiszaderzs, Tószeg (Takács *et al.* 2015a), Derekegyház, Kisújszállás, Tarnabod (Molnár *et al.* 2016b), Kismarja (Lukács *et al.* 2017), Szolnok (Haszonits in Molnár *et al.* 2018), Kígyósi-puszta (Molnár 2018), Gyomaendrőd, Nádudvar (Nótári in Molnár *et al.* 2019). High numbers of occurrences are known from the northern half of Crisicum (Schmotzer 2014, Takács *et al.* 2014, [http3](http)). Some of its collections are from Egyek (Simon T. 1947 in Nótári *et al.* 2017), Szarvas (Soó R. 1949 in Nótári *et al.* 2017), Hortobágy (Siroki Z. 1980 in Takács *et al.* 2015b), Böcs, Hódmezővásárhely (Nagy T. and Takács A. 2016, DE); Mezőszemere (Süveges K. 2020, DE). It probably also occurs on other mounds.

CONCLUSIONS

We found two protected weed species on the studied kurgans: *Centaurea solstitialis* and *Lathyrus nissolia*. However, these species are represented in many CEU quadrats in the study area.

Among the species that are rare or in serious decline at the country level, the occurrence of *Neslia paniculata* in Hajdúdorog, *Malva setigera* in Hódmezővásárhely, and the recent observations of *Geranium divaricatum* and *Glaucium corniculatum* are probably the most interesting.

Although *Silene conica*, *Filago germanica*, *Cynoglossum montanum* and *Reseda luteola* are moderately rare species in Hungary, their occurrences on mounds situated in the studied area are particularly interesting as from this area they were seldom reported before our study. The occurrence of *Reseda luteola* in Pocsaj is particularly surprising, as this species was not previously

reported from this geographical area, and can be considered as a new record from the Berettyó–Kálló region.

We would like to draw attention to the new occurrences of *Erodium ciconium* and *Roemeria hispida* in the South Tiszántúl Region. The petals of the latter species fall very early (flowering in the morning), so it is often hidden in the vegetation and can be easily overlooked during vegetation surveys, although its characteristic bristly fruits are clearly identifiable. It is also worth highlighting the records of *Rapistrum perenne* from Tótkomlós, *Sideritis montana* from Törökszentmiklós, and some recent observations of *Adonis flammea*, *Androsace elongata* and *Medicago monspeliaca*, and the occurrence of *Ventenata dubia* near Szentes.

Some of the species included in the enumeration are not necessarily rare in Tiszántúl, but are considerably underrepresented in the distribution atlas (http3). Such species include *Ajuga chamaepitys*, *Anthriscus caucalis*, *Asperugo procumbens*, *Crepis pulchra*, *Lappula squarrosa* and *Medicago minima*. Our recorded data helped to expand the known area of these species, and as our data originated exclusively from mounds, we can assume that the distribution range and frequency of these species might be larger. It is worth highlighting that *Crepis pulchra*, supposedly started to expand its area in the Tiszántúl only recently (cf. Soó and Máthé 1938, and Lukács *et al.* 2017), and accordingly we have not found any previous records of this species from the Nyírség. Thus, its occurrence on mounds is a new record to the Nyírségense.

We also recorded multiple new occurrences of species (*Festuca myuros*, *Aegilops cylindrica*, *Calepina irregularis*, *Anchusa arvensis* and *Sherardia arvensis*) that were formerly considered rare, but currently spreading in many regions of Hungary. Some of the species mentioned above, together with *Centaurea solstitialis*, *Helminthotheca echioides* and *Myagrum perfoliatum* also occur and spread along linear structures (e.g., embankments, railways and roads) at least partly due to climatic reasons. Their occurrences in the studied mounds might also be a result of recent establishment processes due to climatic changes experienced in the past years.

Our results show that kurgans holding fallows, oldfields and dry grasslands might have an important role in the maintenance of the populations of rare weed species. Consequently, prevention of ploughing on kurgans allowing spontaneous succession can considerably contribute to the preservation of rare weed flora even in intensively managed landscapes. The high number of data deficient weed species found on the study sites suggest that similarly to the Western Hungarian regions where large efforts are put on the monitoring of rare weeds similar projects would be needed in the eastern regions. Also, we suggest to set up a regular monitoring on a certain set of kurgans where rare weed species occur, in order to be able to detect the possible changes in their population sizes.

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