

Historic and recent occurrences of Kievan nettle (*Urtica kioviensis* Rogow.) in Hungary

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Abstract: This paper presents occurrence data of *Urtica kioviensis* Rogow. in Hungary from the 20th century till today, based on a survey of six Hungarian public herbaria and the literature. Altogether 84 herbarium sheets from 9 counties, 83 literature records mentioned from 12 counties, and 57 flora mapping data were encountered. Based on these, we updated the distribution map of the species in Hungary. We found that the typical habitats of *U. kioviensis* in Hungary include marginal zones of bog forests, reeds, and old small watercourses. We report two newly discovered locations of the species in the Hanság area. Near Fehértó, in a peat-forming reed bordering a lake, approximately 150 plants were found, while in the vicinity of Dör, in a former open pit sand mine, approximately 300 plants were observed. The habitat at Dör is secondary, the current vegetation must be the result of progressive succession processes that started after the abandonment of sand mining. The integrity of Hungarian habitats has been threatened in recent decades by increasingly frequent climatic anomalies (mainly water shortages due to the lack of precipitation for long periods) and anthropogenic factors (fragmentation of biotopes, organic/inorganic substances washing into groundwater), which may cause a decrease in the number of plants. As a significant part of the distribution area of the species is located in Hungary, the protection of its populations and habitats is also of key importance.

Introduction

In Hungary, the extent of swampy and marshy habitats has decreased drastically, primarily due to the water management of the 20th century (SOMOGYI 2002). The remaining habitat fragments are greatly threatened by prolonged droughts becoming more frequent recently and by a climate becoming drier year by year (BARTHOLY 2011). The active protection and conservation management of the remaining biotopes has become an increasingly urgent task. With the decline of habitats, that once had high species diversity, the incidence of typical species has also decreased significantly. This is true for *Urtica kioviensis*, a protected species in Hungary (KIRÁLY 2007). It is listed as a near threatened species in the category system of NÉMETH (1989). The LANSDOWN (2011) guideline classifies it as Data Deficient (DD). The species is protected in Hungary since 1982 with a

current conservation value of HUF 5,000 (23/2005. (VIII. 31.) Regulation of the Ministry of Environment and Water).

Urtica kioviensis is a glacial relict plant in Hungary, which occurs in reeds on peatland, peat moss-floating mats, Hungarian ash-alder carrs, less frequently in willow-poplar riverine forest, canal banks, and tall sedge meadows (SOÓ 1970, KIRÁLY 2009, CSÁKY 2018). Due to the drying climate and the shrinking of its habitats, its populations are declining (CSÁKY 2018). This paper summarizes historic and recent occurrence data for the species and presents its new locations.

The species was described by the Russian-born botanist and palaeontologist professor, Athanasi Semenovich Rogovitsch. He distinguished it from *Urtica dioica* primarily on the basis of morphological differences and described it as a new species for science (ROGOVITSCH 1843). In Hungary, it was first found by János Bolla in the alder forests of Súr (today: Šúrovce, Slovakia) in 1842. He reported the discovery in 1856 and gave the species the name *Urtica radicans* Bolla (BOLLA 1856). It was later revealed that this species is identical to *Urtica kioviensis* Rogow.

The origin and the distribution area of the species are evaluated slightly differently by various authors. HEGI (1927) and TUTIN et al. (1964) claimed the distribution area covering the following countries: Ukraine, Romania, Hungary, Slovakia, Austria, and Germany. SOÓ (1970) regarded it as a Pontic-Pannonian species appearing on plains. Ádám Boros considered it a bog plant which has arrived from the east (BOROS 1944), while Imre Máthé regarded it a Pontic element (MÁTHÉ 1947). Bálint Zólyomi considered it a member of the Ponto-Sarmatic (Pannonian) group of continental floristic elements, which has expanded from east to west in the earlier postglacial period and reached the westernmost limit of its distribution in Brandenburg province (ZÓLYOMI 1936). According to WOLTERS et al. (2005), it is a thermophilic, lowland-floodplain species that shows subcontinental, Pontic-Pannonian distribution. REJLOVÁ (2014) suggested that the centre of the species' distribution area is located in the Transcarpathian part of Ukraine and the river basins of the Tisza, Sava and Danube. DANIHELKA and LEPŠÍ (2004) referred to it as a continental plant found mostly in floodplains, extending from the southern part of eastern Russia all the way to Hungary. Towards the west, some isolated occurrences can be found in Slovakia, eastern Austria, south-eastern Czechia, central Germany, and Denmark. In Central Europe, the species mainly appears in the clearings of alder forests and willow carrs, in intermittently flooded basins, and in oxbow lakes and reeds with permanently wet or intermittently flooded parts (DANIHELKA and LEPŠÍ 2004). The map of JALAS and SUOMINEN (1976) shows a similar distribution. On its current European distribution map, the species displays an almost continuous area from Germany to the Ural Mountains, but it is apparently absent from Poland

(URL1). Although the Polish flora atlas does not provide an occurrence map, it does mention that the plant occurs in the southern part of the country (URL2). Interestingly, BOROS (1944) noted that the species had not yet been encountered in Poland, but claimed that “on the Polish plain, in the former floodplain of the rivers of Galicia, I think it can be found easily”. Macrobotanical and pollen morphological investigations have identified former sites of Kievan nettle in many parts of Europe (WOLTERS et al. 2005).

BOROS (1944) published the first distribution map for the species in Hungary. This work lists a total of 19 locations, 16 of which are shown on the map. Even at that time, the species was not considered common in the Carpathian Basin despite the more favourable climatic and hydrological conditions then. According to BOROS (1944), the species might have escaped the attention of botanists due to its hard-to-reach habitats and difficulties with its identification. At the turn of the millennium, FARKAS (1999) described its current occurrences, which were also depicted on a map. BARTHA et al. (2015) presented the current distribution map of the species for Hungary. According to the online version of the Flora Atlas (BARTHA et al. 2020), 81 flora mapping quadrats are currently known in Hungary with the occurrence of *Urtica kioviensis*, of which 71 are occurrences found after 1990, 3 encountered between 1951 and 1990, and 7 from before 1950.

Urtica kioviensis was initially treated as a member of the *Urtica dioica* group (ASCHERSON and GRAEBNER 1908–1913, GOMBA 1914). Ádám Boros completely rejected this position, referring to morphological differences (BOROS 1944). HEGI (1927) regarded it as an independent species. MEUSEL et al. (1965) mentioned in their work that the *U. dioica* group was not clarified, so they did not treat *U. kioviensis* as a separate species. The species was discussed as a separate taxon in later European flora studies (JALAS and SUOMINEN 1976). In 2004, a research based on histological and morphological examinations found that the two species in question (*Urtica dioica* and *U. kioviensis*) were well separated both morphologically and histologically (PÓS and DÁNOS 2004). This also supported Boros’ opinion. REJLOVÁ et al. (2019) reported the results of their genetic studies, which clearly showed that *U. kioviensis* was genetically well separated from *U. dioica*.

According to SOÓ (1970), *Urtica kioviensis* prefers moist, nutrient and base-rich, alluvial, peat, and sandy soil with humus. In Hungary, its living conditions are primarily met in reeds, canal banks and alder-ash carrs. According to PAPP (2009), undisturbed swamps, oxbow lakes and carrs are the species’ potential habitats. WOLTERS et al. (2005) describes the plant to occur mainly in swamps dominated by *Phragmites australis*, *Phalaris arundinacea* and *Carex riparia*, as well as in willow shrubs (*Alno-Salicetum cinereae*) and in various *Alnetum* types. In a Romanian study of glacial relict species, *U. kioviensis* was found in *Salix alba*-dominated forests with *Rubus caesius* undergrowth escorting streams in

narrow belt, and in *Salix cinerea*-dominated bogs with *Calamagrostis canescens* undergrowth (SZATMARI 2015). The latter vegetation type occurs exclusively in the South-Eastern Carpathians and on the Satu Mare Plain (SZATMARI 2015). According to REJLOVÁ (2014), Kievan nettle is a hemerophobic plant species that has very specific habitat needs and is quite sensitive to changes in the environment. This finding is consistent with that of WOLTERS et al. (2005), claiming *U. kioviensis* to be an oligo-mesohemerobic species that does not occur in habitats disturbed by humans. In the Hungarian literature, the plant is mentioned as a rare specialist species, and it appears as a character species in association descriptions (BORHIDI 1993). ORTMANN-AJKAI (2018) considered it a dystrophic indicator species of the vegetation type *Calamagrosti-Salicetum cinereae*. In Serbia, the plant is the naming species of the scrub association *Urtico kioviensis-Salicetum cinereae* (JOVANOVIĆ 1997). The presence of this vegetation type in Bosnia and Herzegovina is reported by ČURČIĆ et al. (2017), who claimed that the occurrence of the species was new data for the country, and mistakenly classified *U. kioviensis* as a Pannonian endemism.

In Hungary, with the increase of research interest on bogs and swamps, the number of known *U. kioviensis* locations also increased gradually. In the middle of the last century, SOÓ and JÁVORKA (1951) summarized the collected location data and discussed them at micro-region, sometimes at village border level. At longer intervals, new places of occurrence were reported from many parts of the country (MÁTHÉ 1947, KÁRPÁTI 1961, PAPP et al. 1985). Since 1990, several publications reported recent data on the species throughout the country (TATÁR 2002, MÉSZÁROS and SIMON 2009, BAUER 2010, BÁTORI et al. 2011, TAKÁCS et al. 2013, VOIGT and SOMAY 2013, KEVEY 2013, 2018; TÓTH 2014, 2018; CSIKY et al. 2017).

Botanists have shown interest in the marshes of Hanság for centuries. This almost untouched area was visited from abroad and from different parts of Hungary. Andreas Kornhuber, a scientist from Vienna, published an article on Hanság, in which he mentioned the occurrence of *Urtica kioviensis* (KORNHUBER 1886). He found it in the alders of Southern Hanság, describing the species abundance as “*in grosser Anzahl*”. ZÓLYOMI (1934) observed that reeds containing *U. kioviensis* were always located in or near to wetlands with ancient flora and vegetation. Taking these into account, he created a subassociation called *Phragmitetum urticetosum kioviensis* (ZÓLYOMI 1934). István Csapody mentioned in his monograph on the Fertő landscape that he had collected the species, and the data marked with the location name “Boldogasszony Éger, Király-Éger” also prove the occurrence in Southern Hanság (CSAPODY 1975). In addition, we encountered one more recent data from Szigetköz (KEVEY 2001) and one from Southern Hanság (data of Király 2004 in BARTHA et al. 2015).

Material and methods

In our herbarium survey, we summarized data of the following Hungarian public collections: Botanical Department of the Hungarian Natural History Museum (BP), Eszterházy Károly University (EGR), University of Pannonia (GK), Balaton Museum (KBM), University of Pécs (JPU), University of Debrecen (DE). The data of herbarium specimens were listed by county and time of collection. We plotted the geographical coordinates of locations included in the processed data in a WGS'84 projection system. If the specified location could not be accurately detected, potential quadrats were indicated when entering the CEU code. We surveyed herbarium specimens and literature dating from 1900 till the present. None of the herbarium specimens from the 1800s were collected in present-day area of Hungary, thus those data were omitted. Literature data is listed in the same way as that for herbarium specimens.

For plant identification, we used PAPP in KIRÁLY (2009) and BÓDI in KIRÁLY et al. (2011). The exact locations of the populations were recorded by GPS-based point determination using a Trimble Geo XT field computer. Péter Gnotek (Gnotek P. ex verb.) found a location in Fehértó, where we identified the plant and recorded its occurrence together with him. We placed our data in the CEU mesh system (NIKLFELD 1971). Voucher specimens were collected from the locations and were deposited in the Botanical Department of the Hungarian Natural History Museum (BP).

Results

Literature and herbarium data

Our herbarium survey yielded 84 sheets from 9 counties altogether. We found a total of 83 mentioning of *U. kioviensis* from 12 counties in the literature, and 57 flora mapping data from 14 counties. An enumeration of these data and several additional occurrences known from personal communication is provided in the Appendix. The distribution of occurrence data according to counties and time of collection is shown in Fig. 1. The highest number of occurrences is in Somogy (47), Szabolcs-Szatmár-Bereg (33) and Győr-Moson-Sopron (31) counties. Each of these counties possesses a well-known swamp area where *U. kioviensis* is abundant. Of the 14 counties where the species was seen, 7 have only post-1990 records. Altogether, 25.5% of the records are from before 1950, 12.6% from 1951–1990, and 61.9% after 1990. These temporal inequalities certainly reflect the changing way in which floristic data are collected; while earlier botanists mainly focused on the most precious, sanctuary-like habitats, after 1990,

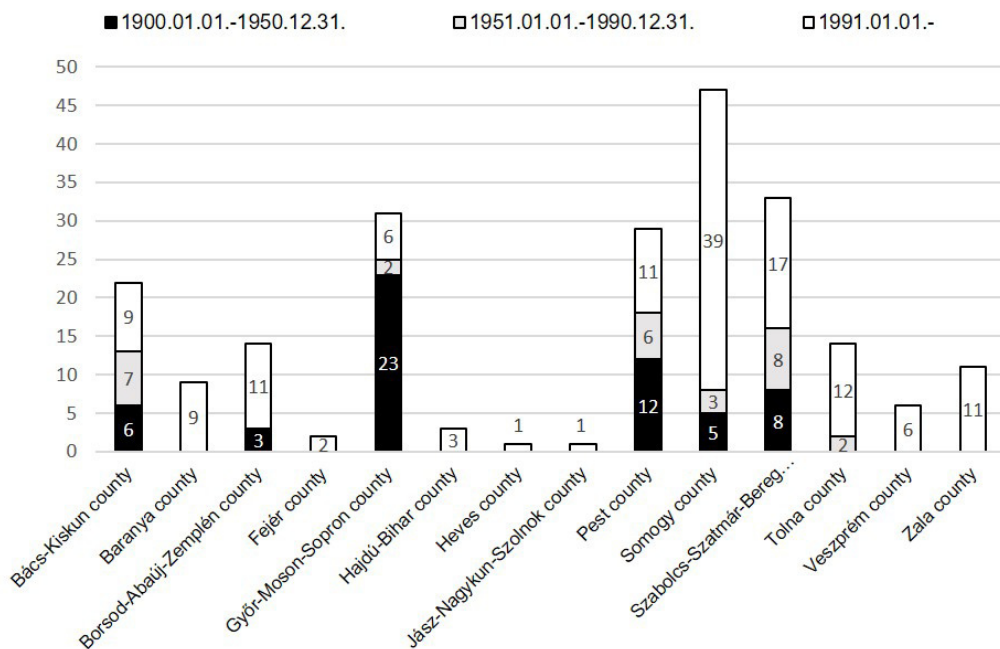


Fig. 1. Occurrence data of *Urtica kioviensis* by county and by time of collection.

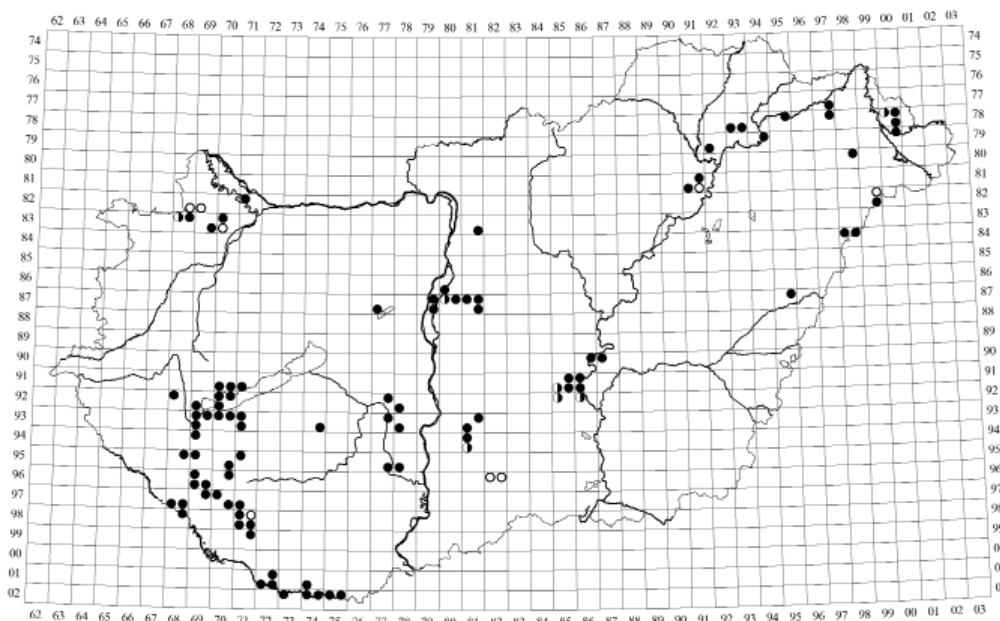


Fig. 2. Actual distribution map of *Urtica kioviensis* in Hungary. Each occurrence is native. Time of recording: ○ = before 1950, ◐ = 1951-1990, ● = after 1991.

data collection has been extended to further areas of lower natural value, particularly during the mapping of the flora of Hungary covering the whole country. Based on these data, we prepared the current distribution map of the species in Hungary containing a total of 108 localities spread across 69 flora mapping quadrats (Fig. 2).

According to the surveyed literature and data of herbarium specimens, *U. kioviensis* most often occurs in alder-ash bog forest and reeds (Fig. 3).

New occurrences

In 2019, *Urtica kioviensis* was found at two new locations in Hanság: near the villages Fehértó and Dör. Both areas are classified as Natura 2000 (HUFH30005) and are valuable for both habitat and bird protection.

1) Fehértó: Approximately 150 plants at the southern tip of Lake Fehér, under willow trees, on the edge of a peat-forming reed. 5/15/2019 [8370.1] Herbarium specimens collected. WGS84 ϕ : 47.69039970, WGS84 λ : 17.35170903.

The stand on the village border of Fehértó is a new occurrence, it has not been reported from this area before. Its habitat is fully in line with the description in the literature (Fig. 4). Its localised stands are found in the wide reed belt surrounding the shallow lake. The more open surfaces are dominated by different

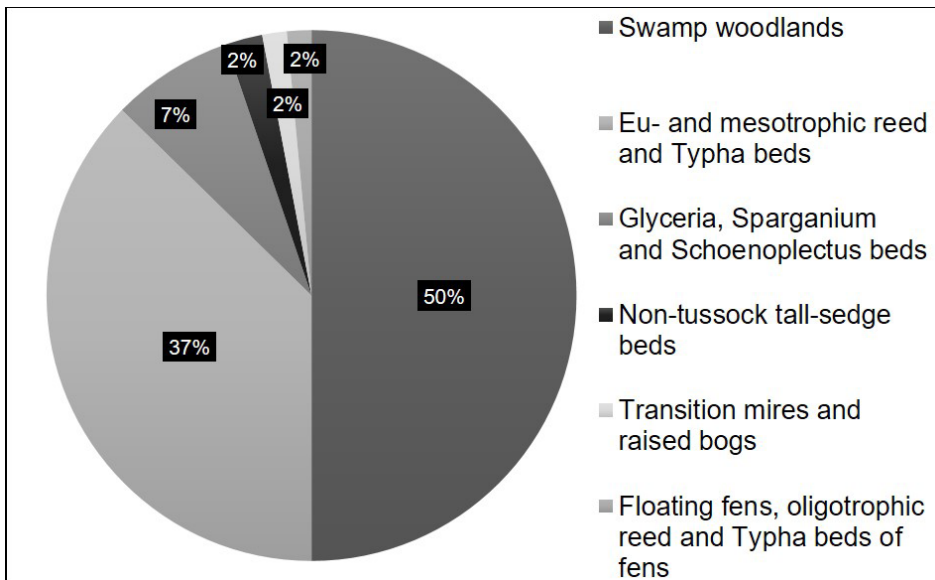


Fig. 3. Habitat preference of *Urtica kioviensis* in Hungary based on herbarium and literature records.

sedge species – *Carex acuta*, *C. elata*, *C. pseudocyperus* – with *U. kioviensis* appearing sporadically. Where *Phragmites australis* is present with a higher coverage (> 45%), Kievan nettle is also typically present with a higher number of shoots. Typical herbaceous plants include *Calystegia sepium*, *Lycopus europaeus*, *Mentha aquatica*, *Persicaria amphibia*, and *Stachys palustris*. Additional populations are likely to live in the reeds lined with willow trees around the lake.

2) Dör: Approximately 300 plants among the willow trees along the byroad connecting Bányogyszovát with road 85. 05/01/2019 [8369.4] Herbarium specimens collected. WGS84 ϕ : 47.61509264; WGS84 λ : 17.33006204

The population found in the village border of Dör is located next to byroad 8511 connecting road 85 and Bányogyszovát. The northwest–southeast depression along the road is currently filled with a willow grove dominated by *Salix alba*. In its herb layer, open mud surfaces have been colonized by *Urtica kioviensis* (Fig. 5), while elsewhere *Carex riparia* forms a monodominant sward. Between the byroad and the depression, there is a characterless forest stand with the main species of *Cornus sanguinea*, *Fraxinus excelsior*, *Juglans regia*, *Populus × euramericana*, *Prunus cerasifera*, *Robinia pseudoacacia*, *Salix alba*, and *Sambucus nigra*.



Fig. 4. The habitat of *Urtica kioviensis* in Lake Fehér near the village Fehértó in 2019.

Discussion

Nowadays, due to unfavourable climatic influences, the typical species composition of wetlands is changing. As the annual amount of precipitation decreases gradually, the natural water supply of these habitats is also declining. At the same time, the groundwater level is sinking deeper and deeper. In the long run, this process will lead to the dehydration of wetland habitats and the decline of the abundance of hygrophilous species. This is an unfavourable situation for *Urtica kioviensis* as well. For this reason, the protection of its habitats is important, and this must be one of the priority tasks of nature conservation. The Hanság area is networked with a dense canal system, on which intermittent flooding and water retention is possible. A properly managed water supply would greatly help the survival of these populations of *U. kioviensis*. Exploring and preserving its populations, and even maintaining them under the management of nature conservation, are also an international nature conservation interest, because Hungary has an outstanding number of populations of the species in Europe as well. The primary threats to its habitat survival are intermittent water shortages, water eutrophication caused by fertilizers leaching from nearby areas, and habitat fragmentation.



Fig. 5. The habitat of *Urtica kioviensis* at Dör in 2019.

The future of the stands in Lake Fehér seems assured. The area is almost free of direct anthropogenic influence and is one of the strictly protected areas of the Fertő–Hanság National Park Directorate. The location at Dör, however, is directly adjacent to a byroad, thus the risk of degradation is higher. Interestingly, open pit sand mining has been carried out here in the past, and the depression still shows signs of this activity (Szalay L. ex verb.). The current vegetation status is the result of progressive successional processes that began after abandonment. According to the 18th and 19th century military survey maps, the area was not part of the nearby Kóny marshland, but it was adjacent to it. ZÓLYOMI's (1934) statement that *Urtica kioviensis* always indicates an ancient watercourse and occurs in areas with ancient vegetation is only partially valid here. There are no traces of the depression on the military survey maps, but it can be seen that the swamp is located right next to it. On the pioneer surfaces created by open pit mining, *U. kioviensis* has successfully established and now its population appears stable.

Acknowledgments

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- URL1: <https://www.i-flora.com/en/fact-sheets/search-for-species/art/show/urtica-kioviensis-1.html> Downloaded: 12.10.2021.
- URL2: https://www.atlas-roslin.pl/gatunki/Urtica_kioviensis.htm Downloaded: 25.02.2020.

Appendix. Enumeration of *Urtica kioviensis* Rogow. occurrences in Hungary based on literature and herbarium data, and personal communications. Data from personal communications are listed in the section of Literature data. Records are grouped by counties, and contain the following information: name of settlement, location description, CEU code, name of data provider(s), date of finding the plant, acronym of public herbarium where the voucher specimen is deposited or literature reference. Abbreviations and symbols used: ap = at; det. =

name of determiner; exs (exsiccata) = collection; leg. = name of collector; pag. = settlement; pr. (prope) = near; [name of settlement] = settlement name to which the location belongs to currently; "text" = name of location (in Hungarian). Mapping units (CEU codes) are given in square brackets for literature records and in parentheses for herbarium data.

Baranya county

Literature data

- 1 Kisszentmárton: "Horgásztanya" [0274.1] (KEVEY 2013).
- 2 Matty: "Hótedra" [0275.2] (KEVEY 1995).

Bács-Kiskun county

Herbarium data

- 1 In fraxinetis padulosis "Berek" vel (sic!) "Községi-erdő" ad Kecel (9481.3); Á. Boros, 19.08.1928, BP.
- 2 In fraxineto paludoso "Tabdi-erdő" prope Csengőd (9381.2); leg. Á. Boros, 16.10.1929, BP.
- 3 In fraxineto paludoso "Berek" / Községi-erdő / prope Kecel (9481.3); leg. Á. Boros, 06.06.1934, BP, DE.
- 4 In paludosis silvae "Városi-erdő" prope oppidum Kiskunhalas (9682.1 or 9682.2); leg. & det. B. Zólyomi & L. Baksay, 20.05.1950, BP.
- 5 In silvis uliginosis Tabdi-erdő, prope vicum Kiskőrös (9381.2); leg. J. Papp, 28.05.1950, BP.
- 6 In silva palustre Tabdi-erdő, prope oppidum Kiskőrös (9381.2); leg. J. Papp, 13.08.1950, BP.
- 7 In querceto, in loco paludoso silvae Tabdi-erdő, prope oppidulum Kiskőrös (9381.2); leg. J. Papp, 13.06.1951, EGR.
- 8 Oxbow lake of Tisza at Alpár prope pag. Tiszaalpár, in *Fraxino pannonicæ-alnetum* (9186.3 or 9286.1); leg. R. Soó & B. Zólyomi, det. J. Szujkó-Lacza, 24.08.1953, BP.
- 9 Kecskemét: Tőserdő [= Lakitelek] (9185.2 or 9185.4); leg. R. Soó, 24.08.1953, DE.
- 10 At the bank of the river Tisza, in marsh carrs, next to Alpár [= Tiszaalpár] (9186.3 or 9185.4); leg. G. Vida, 07.1955, EGR.
- 11 Next to Kiskőrös, west from Kecel, Berek-erdő (9481.3); leg. S. Jávorka & I. Csapody, 27.09.1956, BP.
- 12 Apud Tabdi / ab oppido in parte meridionali Budapest 101 km. / in silvis turfosis (9381.2); leg. M. Járainé Komlódi, 08.06.1957, BP.

- 13 Tőserdő [= Lakitelek] (9185.2); leg. Á. Babai, 21.10.1961, DE.
- 14 Lakitelek: in alnetis frequens, Tőserdő (9185.2); leg. N. Bauer, 26.04.2012, DE.

Literature data

- 1 Tiszaug: [9186.1; 9186.3; 9186.2; 9186.4] (FARKAS 1999).
- 2 Tiszaalpár: Tőserdő, [9185.2; 9185.4] (KÖRMÖCZI and MAKRA 2019).

Borsod-Abaúj-Zemplén county

Herbarium data

- 1 Mezőcsát: At the wet places of Dallos-ér (8191.3 or 8191.4); leg. J. Budai, 01.11.1910, BP; originally determined as *U. dioica*, revised by D. Geltman, 1983.
- 2 Nemesbikk: Vas-erdő (8191.2); leg. A. Takács, 01.09.2011, DE.
- 3 Nemesbikk: west from the village, in oxbow lake (8191.2); leg. A. Takács, 30.05.2012, DE.
- 4 Nemesbikk: in marsh carrs (8191.2); leg. T. Nagy, K. Süveges, A. Takács, 21.06.2015, GK.
- 5 Nemesbikk: west from the village, in oxbow lake (8191.2); leg. T. Nagy, K. Süveges, A. Takács, 21.06.2015, GK.
- 6 Nemesbikk: Low-lying older softwood forest (willows) (8191.2); leg. D. Horváth, 11.05.2016, DE.

Literature data

- 1 Mezőcsát: Dallos-ér, Budai (exs. 1910 det. Zólyomi), ap. Soó-Máthé [8191.3] (BOROS 1944).
- 2 Mezőcsát: [8191.3; 8191.4; 8291.1; 8291.2] (FARKAS 1999).
- 3 Mezőcsát: [8191.3; 8191.4; 8291.1; 8291.2] (SOÓ and MÁTHÉ 1938).
- 4 Nemesbikk: Égeres [8191.2], next to the bridge of Hejő [8191.2], Kerek-erdő [8191.2], Veres-torzsik [8191.2], Zúgó [8191.2], in marsh carrs (TAKÁCS et al. 2013).
- 5 Mezőzombor: Nagy-tó, [7893.4] (TÜRKE et al. 2020).
- 6 Szerencs: Pásztor-tó, [7893.3] (TÜRKE et al. 2020).
- 7 Tiszaladány: Oxbow lake of Tisza at Tiszaladány, [7994.2] (TÜRKE et al. 2020).

Fejér county

Literature data

- 1 Cece: Kákás-tó [9277.2] (FARKAS 1999).

Győr-Moson-Sopron county

Herbarium data

- 1 In silvaticis humidis supra pag. Osli (8368.1); leg. S. Jávorka, 08.08.1923, BP.
- 2 In arundinetis turfosis prope “Királytó-major” versus pag. Osli (8368.2); leg. B. Zólyomi, 03.09.1929, BP.
- 3 In alneto Csíkos Éger prope Földsziget-major [= Földsziget] (8368.2); leg. S. Polgár, 24.07.1930, BP.
- 4 In phragmitetis turfosis prope “Királytó-major” versus “Nagyéger” ad Kapuvár (8368.2); leg. B. Zólyomi, 02.09.1930, BP.
- 5 In phragmiteto ad “Királytó-major” prope pag. Osli (8368.2); leg. Z. Kárpáti, 06.1931, BP.
- 6 In phragmiteto ad lacum “Barbacs-tó”, prope pag. Barbacs (8369.4); leg. Z. Kárpáti, 24.07.1931, BP.
- 7 In alneto „Tarcsai-éger” prope “Királytó-major” (8368.2); leg. B. Zólyomi & Z. Kárpáti, 30.07.1931, BP.
- 8 In phragmiteto ad lacum “Barbacs-tó” [= Barbacs] (8369.4); leg. Z. Kárpáti, 25.08.1931, BP.
- 9 In phragmiteto ad lacum Barbacs-tó prope pag. Barbacs (8369.4); leg. Z. Kárpáti, 08.1931, BP.
- 10 In paludibus turfosis “Fenyős” prope “Királytó-major” ad pag. Csorna (8368.2); leg. B. Zólyomi, 31.08.1931, BP, DE.
- 11 In paludibus turfosis “Fenyős” prope “Királytó-major” ad pag. Csorna (8368.2); leg. B. Zólyomi, 31.07.1931, DE.
- 12 In arundinetis “Kónyi-tó” prope pagum Kóny (8370.3); leg. B. Zólyomi, 04.10.1933, BP.
- 13 In phragmitetis lacus “Barbacs-tó” prope Barbacs (8369.4); leg. Á. Boros, 22.09.1946, BP.
- 14 In phragmitetis “Róka-tó” = Fövényes, prope Kapuvár (8368.1); leg. Á. Boros, 20.07.1952, BP.

Literature data

- 1 Barbacs: Barbacs-tó [8369.4] (FARKAS 1999).
- 2 Barbacs: Reeds of Barbacs-tó, Kárpáti (exs. 1933) [8369.4] (BOROS 1944).
- 3 Csorna: Reeds of Fenyős, reeds of Kerek-tó in the Csíkos-éger [8368.2], reeds of Kismetszés at the pumping station of Bősárkány [8269.3], Zólyomi (exs. 1930) (BOROS 1944).
- 4 The outskirts of Csorna-Kapuvár: enormous numbers in Hanság [8268.4; 8269.3; 8368.1; 8368.2; 8369.1] (KORNHUBER 1886).

- 5 Csorna-Kapuvár: Fövenyes-tó [8368.1], Róka-tó [8368.2], Nagy-ér, Királytó, [8368.2], Kerek-tó, Kismetszés [8269.3] (ZÓLYOMI 1934).
- 6 Dunaszeg: Dunaszegi-tó, [8271.1] (KEVEY 2001).
- 7 Kapuvár: in Király-éger and Boldogasszony-éger [8368.2] (CSAPODY 1975).
- 8 Kapuvár: Nagyéger-erdő (Hanság) [8368.2], According to Zólyomi (exs. 1930), only in the reeds of Róka-tó [8368.2] and in the Osli alder forest. In the latter location also Gayer (exs. 1923) (BOROS 1944).
- 9 Királytó-major, Kapuvár, Csorna, and at the confluence of the borders of Mosontarcsa in Moson County [8268.4] (BOROS 1944).
- 10 Hanság: Király-éger [8368.2] (KORNHUBER 1886), Zólyomi (exs. 1930) (BOROS 1944).
- 11 Hanság: Tarcsai-éger [8268.4] (BOROS 1944).
- 12 Hanság: the reeds of Király-tó [8368.2], Zólyomi (exs. 1930), Zólyomi-Kárpáti (exs. 1931) (BOROS 1944).
- 13 Kóny: the reeds of Kónyi-tó [8370.3] Zólyomi (exs. 1933) (BOROS 1944).
- 14 Kóny: Kónyi-tó [8370.3] (FARKAS 1999).

Hajdú-Bihar county

Herbarium data

- 1 Fülöpbánháza [= Fülöp]: Southeast of the settlement, in the rush-bed (8498.1); leg. B.A. Lukács, G. Gulyás & V.A. Molnár, 27.08.2004, DE.

Literature data

- 1 Pocsaj: [8796.2; 8797.1] (FARKAS 1999).

Pest county

Herbarium data

- 1 In fraxinetis paludosis ad Sári [= Dabas] (8781.4); leg. Á. Boros, 07.10.1928, BP.
- 2 In fraxinetis paludosis prope Ócsa versus Mádencia (8781.1); leg. Á. Boros, 14.10.1928, BP.
- 3 In fraxinetis paludosis versus Felsőbabád prope Ócsa (8781.1); leg. Á. Boros, 04.08.1929, BP.
- 4 In fraxinetis paludosis ad Mádencia prope Ócsa (8781.1); leg. Á. Boros, 28.08.1932, BP, DE.
- 5 In fraxinetis paludosis inter Ócsa et Sári [= Dabas] (8781.1 or 8781.4); leg. Á. Boros 12.08.1934, BP.
- 6 Ócsa: in the marshy forest (8781.1); leg. L. Vajda, 12.08.1934, BP.

- 7 In alneto turfoso “Nagy-erdő” prope Ócsa (8781.1); leg. Á. Boros, 27.08.1950, BP.
- 8 In fraxineto ad pagum Ócsa (8781.1); leg. Z. Kárpáti, 27.08.1950, BP.
- 9 Alnetis prope pagum Ócsa (8781.1); leg. A. Horánszky, 28.08.1950, BP.
- 10 Next to Ócsa in marsh carrs (8781.1); leg. A. Horánszky, 14.06.1951, BP.
- 11 Prope pag. Sári [= Dabas], In silva uliginosa “Kőris-erdő” (8781.4); leg. T. Pócs, 22.08.1951, BP.
- 12 In *Alnetum glutinosum* prope pag. Sári [= Dabas] (8781.4); leg. S. Jávorka & L. Baksay, 22.08.1951, BP.
- 13 Prope pag. Sári [= Dabas], In Alneto (8781.4); leg. T. Pócs, 23.08.1951, DE.
- 14 In Dunavidék, in phragmitetis alnetis prope vicum Ócsa. (8781.1); leg. G. Vida, 11.10.1953, EGR.
- 15 In Phragmitetis natantibus in ramo fluvii Danubii “Soroksári Duna” pr. pag. Szigetcsép (8779.2 or 8779.4); leg. L. Felföldy, 17.07.1992, BP.
- 16 In insula natanti ad ripam canalis “Duna-Tisza-csatorna” pr. pag. Alsónémedi (8780.2); leg. L. Felföldy, 27.07.1995, BP.
- 17 Ócsa: Nagy-erdő (8781.2); leg. K. Süveges, 17.08.2018, DE.

Literature data

- 1 Csengőd: Ash carrs of the Tabdi-erdő [9381.2] Boros (exs. 1929) (BOROS 1944).
- 2 Dunavarsány-Majosháza: The reed of *Urtica kioviensis* facies (*Scirpeto-Phragmitetum urticosum kioviensis*) is widespread on the left bank of the Soroksári-Dunaág from the Szigethalom bridge to Majosháza, where it stretches in a 10–30 m wide strip and has a permanent water depth of 70–120 cm. In many places, the web of Phragmition and Magnocaricion forms a floating mat. *Urtica kioviensis* is the most common on these floating mats. [8780.1] (KÁRPÁTI 1961).
- 3 Kecel: The ash-reed carrs of Berek-erdő, Községi-erdő [9481.3] Boros (exs. 1928, 1934) (BOROS 1944).
- 4 Ócsa and Sári: Ash carrs between settlements [8781.1; 8781.2; 8781.3; 8781.4.] Boros (exs. 1934) (BOROS 1944).
- 5 Ócsa: [8781.1; 8781.2] (FARKAS 1999).
- 6 Ócsa: “Nagy-erdő” [8781.1] (KEVEY 2018).
- 7 Szigetcsép: Csepel-sziget, Soroksári-Dunaág [8779.2] (FARKAS 1999).
- 8 Szigetszentmiklós: Csepel-sziget, close to highway M0 [8680.1; 8680.2] (Farkas ex litt. 2020)
- 9 Veresegyház: Malom-tó, Nagy úszóláp [8381.4] (TATÁR 2002).

Somogy county

Herbarium data

- 1 In paludosis “Macskás-tó” dict. silvae “Babancsík” prope Gyöngyöspuszta [= Kőkút] (9871.2); leg. Á. Boros, 26.07.1923, BP.
- 2 In arundinetis paludosis “Kisbalaton” ad “Diás sziget” prope Vörs (9369.1); leg. Á. Boros, 20.06.1928, BP.
- 3 In palude Kisbalaton, ad canalem “Cölömpös-árok” [= Vörs/Sávoly] (9369.1 or 9369.3); leg. R. Soó, 20.06.1928, KBM.
- 4 In phragmitetis ad ripas lacus Balaton pr. balu. Alsómárfürdő [= Balatonmárfürdő] (9270.3); leg. Á. Károlyi, 06.07.1952, BP.
- 5 In phragmitetis ad ripas lacus Balaton pred stationem Alsómárfürdő [= Balatonmárfürdő] (9270.3); leg. Á. Károlyi, 06.07.1952, BP.
- 6 In phragmitetis pr. pag. Balatonmárfürdő [= Balatonmárfürdő] (9270.3); leg. Á. Károlyi, 21.06.1953, BP.
- 7 Baláta-tó [= Szentágotfalva] (9669.3); leg. É. Albert, 05.1992, JPU.
- 8 Between Mike and Lábod. Petes-malom [= Lábod] (9770.4); leg. Gy. Szollát, 23.08.1998, BP.
- 9 Gyékényes: Lankóci-erdő (9768.3); leg. V. A. Molnár, 09.05.2016, DE.
- 10 Gyékényes: Lankóci-erdő, in ash carrs (9768.3); leg. Gy. Szollát, 23.10.2003, BP.

Literature data

- 1 Balatonfenyves: Nagy-berek [9270.4; 9271.3; 9370.2; 9371.1] (FARKAS 1999).
- 2 Balatonmárfürdő: [9270.3; 9270.4; 9370.1; 9370.2] (FARKAS 1999).
- 3 Böhönye: west from Dávodi-tó, [9570.4] GPS: 46.431781, 17.459259 (JUHÁSZ and MÁRKUS 2018).
- 4 Csurgó: “Lázi-berek” [9768.3] (KEVEY 2013).
- 5 Drávasztára: In the forest, east of the settlement, in a swamp surrounded by a hardwood grove, scattered [0172.4] (CSIKY et al. 2017).
- 6 Gyékényes: “Lankóci-erdő” [9768.3] (KEVEY 2013).
- 7 Gyöngyöspuszta: the reeds of Macskás-tó next to the forest of Babancsík [9871.2] Boros (exs. 1923) (BOROS 1944).
- 8 Kaszó: Northeast of Darvaspuszta [9669.1] GPS: 46.355284, 17.222673 (JUHÁSZ and MÁRKUS 2018).
- 9 Kaszó: Szár-homok [9669.3] GPS: 46.335737, 17.238766 (JUHÁSZ and MÁRKUS 2018).
- 10 Lábod: Csorda-járás [9770.4] GPS: 46.210275, 17.477283. (JUHÁSZ and MÁRKUS 2018).

- 11 Lábod: Gölberki [9770.4] GPS 46.218145, 17.490030 (JUHÁSZ and MÁRKUS 2018).
- 12 Lábod: Kissalléri-erdő [9771.3] GPS: 46.216757, 17.510148 (JUHÁSZ and MÁRKUS 2018).
- 13 Mesztegnyő: Felsőkak [9571.1] GPS: 46.485822, 17.512653 (JUHÁSZ and MÁRKUS 2018).
- 14 Nagybajom: Külön-kerék [9670.2] GPS: 46.391179, 17.460231 (JUHÁSZ and MÁRKUS 2018).
- 15 Nagybajom: west of Külön-kerék [9670.2] GPS: 46.386269, 17.457892 (JUHÁSZ and MÁRKUS 2018).
- 16 Ötvöskónyi: Kónyi-erdő, Bogáti-erdő, many plants in alder and willow carrs. It is not uncommon in inner Somogy, the populations of the area are significantly threatened, as the microclimatic conditions of the small bog patches change due to the end use of the hornbeam-pedunculate oak forests of the surrounding areas [9770.1] (BÁTORI et al. 2011).
- 17 Selye: In the reeds and tall sedges next to Nagyszigettanya, plenty of plants [0172.2] (CSIKY et al. 2017).
- 18 Somogysimonyi: Gödör-berki-erdő [9569.1] GPS: 46.475750, 17.216815 (JUHÁSZ and MÁRKUS 2018).
- 19 Somogyudvarhely: "Vecsenye" [9868.2] (KEVEY 2013).
- 20 Vörs: On the border of Somogy and Zala counties, in reeds [9369.1] Boros ap. Soó (exs. 1928). (BOROS 1944).

Szabolcs-Szatmár-Bereg county

Herbarium data

- 1 Körmei-erdő, in paludosis silvae pr. Bátorliget (8299.4); leg. R. Soó, 01.09.1932, DE.
- 2 In paludosis silvae "Körmei-erdő" (Fényi-erdő) ad Bátorliget (8299.4); leg. B. Zólyomi, 01.09.1932, BP.
- 3 In *Glycerieto aquaticae* "Fényi-erdő" (Körmei-erdő) ad Bátorliget (8299.4); leg. B. Zólyomi, 02.09.1932, BP.
- 4 In phragmitetis ad Bátorliget, prope pag. Nyírbátor (8299.2 or 8299.4); leg. Z. Kárpáti, 02.09.1932, BP.
- 5 In paludosis silvae nemorosae Boczkerek pr. pag. Tákos (7800.1); leg. L. Pólya, T. Simon & P. Jakucs, 15.05.1948, DE.
- 6 In padudosis silvae nemorosae, Bockerek-erdő, pr. pag. Tákos (7800.1); leg. T. Simon & P. Jakucs, 15.07.1948, BP.
- 7 In paludosis silvae nemorosae Kőrís-erdő pr. pag. Tarpa (7900.2 or 7901.1); leg. R. Soó, 05.06.1949, DE.

- 8 In phragmitetis “Bábtava”, pr. pag. Csaroda (7800.2); leg. R. Soó, 05.10.1952, DE.
- 9 In Phragmitetis lacus “Bábtava” prope Csaroda (7800.2); leg. Á. Boros, 19.07.1953, BP.
- 10 Csaroda: On peat moss bog (7800.2); leg. Z. Siroki, 13.10.1959, DE.
- 11 Csaroda: On peat moss bog (7800.2); leg. Z. Siroki, 13.06.1960, DE.
- 12 Bátorliget, Nyírség, protected area. River ditch bank (8299.4); leg. L.Zs. Vöröss, 03.08.1973, JPU.
- 13 Bátorliget: Fényi-erdő (8299.4); leg. M. Papp, 20.07.1983, DE.
- 14 In Alnetis silvae “Bockerek-erdő” pr. pag. Gelénes (7800.1 or 7800.2); leg. L. Felföldy, 28.07.1987, BP.
- 15 Bátorliget: Fényi-erdő, Hámfrész (8299.4); leg. B.A. Lukács, M. Papp, G. Gulyás & V.A. Molnár, 01.09.2004, DE.
- 16 Csaroda, south of the settlement, along the Szipa-főcsatorna (7800.2); leg. V.A. Molnár, 15.06.2016, DE.

Literature data

- 1 Bátorliget: In reeds [8299.2] Zólyomi-Kárpáti ap. Soó (exs. 1932) (BOROS 1944).
- 2 Bátorliget: Fényi-erdő [8299.4] (FARKAS 1999).
- 3 Bátorliget: Fényi-erdő, Hámfrész, in a marsh patch closer to the forest edge, in tall sedges [8299.4] (PAPP et al. 1985).
- 4 Csaroda: Bence-tó [7800.2] (NAGY et al. 1997).
- 5 Tiszabercel: [7895.2; 7896.1; 7895.4; 7896.3] (FARKAS 1999).
- 6 Tiszakanyár: [7797.4], GPS: 48.234272, 21.959765 (OLÁH and SZIGETVÁRI 2014).
- 7 Tiszakanyár: [7797.4], GPS: 48.231006, 21.961185 (OLÁH and SZIGETVÁRI 2014).
- 8 Tiszakanyár: [7797.4], GPS: 48.229853, 21.957269 (OLÁH and SZIGETVÁRI 2014).
- 9 Pátroha: [7897.2] GPS: 48.199353, 21.961789 (OLÁH and SZIGETVÁRI 2014).

Tolna county

Literature data

- 1 Harc: Gulyajáró [9577.4] (TÓTH 2014).
- 2 Kajdacs: [9477.2] (Farkas ex litt. 2020).
- 3 Mözs: Vörös-kereszt [9578.3] (FARKAS 1990).

- 4 Nagydorog: Banai-erdő [9378.3] (TÓTH 2014).
- 5 Nagydorog: Szotyó [9374.4] (TÓTH 2018).
- 6 Németkér: Fekete-tó [9278.3] (FARKAS 1990).
- 7 Németkér: “Látóhegy” [9378.2] (KALOTÁS 1992).
- 8 Németkér: Barát-erdő, plenty of plants in alder carrs, the marshy moor along the Hardi-ér, scattered [9278.3] (VOIGT and SOMAY 2013).
- 9 Paks: Cseresznyési-láprétek [9378.4] (Farkas ex litt. 2020).
- 10 Sárszentlőrinc: Between Sárvíz and the railway [9377.2] (TÓTH 2018).

Veszprém county

Herbarium data

- 1 Badacsonytomaj: rara, in *Phragmitetum communis* (9270.2); leg. N. Bauer, 19.06.2005, BP.
- 2 Szigliget: in lacu, ad *Phragmitetum communis* (9270.2); leg. N. Bauer, 19.06.2005, BP.

Literature data

- 1 Badacsonytomaj: There is a smaller stand in the reeds on the shore of Balaton at Balatonacsonytomaj [9171.3] (MÉSZÁROS and SIMON 2009).
- 2 Badacsonytomaj: Tomaji-öböl, reeds [9171.3] (BAUER 2010).
- 3 Szigliget: In the Szigligeti-öböl below the Bozót [9170.4] Lower Kongó, at the mouth of the Kétöles patak, in reeds [9170.3] along fishing entrances (BAUER 2010).

Zala county

Herbarium data

- 1 Kis-Balaton, Gurguló úszóláp, nádas-Felsőmély [= Vörs] (9369.1); leg. I. Szabó, 28.7.1998, GK.
- 2 Balatongyörök (9270.1 or 9270.3); leg. L. Almádi, 24.07.2003, GK.
- 3 Kis-Balaton, Ingói berek [= Sármellék] (9369.1); leg. J. Bódis & G. Sramkó, 18.09.2012, DE.
- 4 Kis-Balaton (9369.1); leg. G. Sramkó, 20.09.2012, DE.

Literature data

- 1 Miháld: [9568.1; 9568.2; 9568.3; 9568.4] (FARKAS 1999).
- 2 Zalakomár: [9468.2; 9469.1; 9468.4; 9469.3] (FARKAS 1999).