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PERENNIAL *HELIANTHUS* TAXA IN TÂRGU-MUREȘ CITY AND ITS SURROUNDINGS

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Abstract: Although in the neighbouring countries several perennial *Helianthus* taxa have been recorded in the last decade, in Romania only three have been identified so far. The literature and herbaria data of Târgu-Mureș date back to the end of the XIXth century, and only refer to *H. × multiflorus* and *H. tuberosus*.

The aim of this study was to identify the perennial *Helianthus* taxa in this region and to prepare their current distribution map. The survey was conducted in Târgu Mureș city and the neighbouring villages: Livezeni, Sântana de Mureș, Sâncraiu de Mureș, Sângeorgiu de Mureș, and Corunca.

Four taxa were identified: *H. pauciflorus* Nutt., *H. × laetiflorus* Pers., *H. tuberosus* L. s.str., and *Helianthus tuberosus* L. s.l. The first two taxa are cultivated as ornamental plants, *H. tuberosus* s. str. is cultivated in a few farms, whereas *H. tuberosus* s. l. is an invasive species that spreads along the rivers.

Keywords: *Helianthus tuberosus*, Jerusalem Artichoke, *H. pauciflorus*, *H. × laetiflorus*, invasive plants, ornamental plants, Târgu-Mureș

Introduction

12 perennial taxa (out of the 66) belonging to the *Helianthus* genus of American origin are cultivated in Europe for ornamental purpose and for their inulin content. Some of them are invasive. Due to their successful vegetative propagation, allelopathy or shading, they spread aggressively, eliminate other species of the natural habitats, change the structure of plant communities, and even behave as dangerous weeds [BALOGH, 2006]. As a consequence, several works on invasive species have dedicated large chapters to the *Helianthus* taxa [BALOGH, 2006, 2007, 2008].

Another major issue related to the invasive taxa of this genus is that by their getting wild, they earn phenologic plasticity, probably hybridize, so their taxonomic position is uncertain and largely debated [BALOGH, 2006].

The Wild Jerusalem Artichoke (*H. tuberosus* L. s. l.) is one of the 34 invasive taxa of EPPO (European and Mediterranean Plant Protection Organization) [***]. The species is invasive even in its native country, disturbing natural forest communities [BALOGH, 2006]. In Hungary, it is also considered as invasive, whereas the cultivated Jerusalem artichoke (*H. tuberosus* L. s. str.), the Ten-petals sunflower (*H. decapetalus* L.), the Stiff sunflower (*H. pauciflorus* Nutt.) and one of its subspecies (*H. pauciflorus* subsp. *subrhomboideus* (Rydb.) O. Spring et E. Schilling), and the Cheerful sunflower (*H. × laetiflorus* Pers.) are known as less aggressive plants [BALOGH, 2006]. Some authors make probable the occurrence of the Paleleaf woodland sunflower (*H. strumosus* L.) too in

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Hungary [BALOGH, 2006]. In the Republic of Moldavia, *H. decapetalus*, *H. tuberosus* and *H. tuberosus* var. *subcanescens* A. Gray are mentioned [MĂRZA, 2010].

In Romania, the Wild Jerusalem Artichoke (*Helianthus tuberosus* L. s. l.) is similarly on the black list of invasive plants [NEGREAN & ANASTASIU, 2004]. Of the other taxa present in the neighboring countries, the literature mentions the Ten-petals sunflower (*H. decapetalus*) as being frequent in Transylvania [CIOCĂRLAN, 2000], but BALOGH [2006] and KOVÁCS [2006] place this taxon in the affinity group of *Helianthus tuberosus* s. l.

The presence of *Helianthus tuberosus* in Transylvania is recorded in different herbaria starting with the end of the XIXth century. Thus, the species occurred in Arad [MITTELMANN – BP, 1889], Deva [MITTELMANN – BP, 1889], and Cluj County - Tăietura turcului [RICHTER – CL, 1903], at early times. *H. decapetalus* were found at Sighișoara [ȚOPA – CL, 1948], at Cipău near the Mureș river and at Cluj-Napoca [ȚOPA – CL, 1962], as well as in Maramureș county, at Șomcuta Mare [ȚOPA – CL, 1965], some times later. The Romanian Flora monography [Săvulescu 1964] mentioned three perennial *Helianthus* species in Romania: *H. tuberosus*, *H. decapetalus* and *H. × multiflorus*.

Further details on the occurrence of different *Helianthus* taxa in Romania are provided by MARIAN [2001/2002], FENESI [2005], KOVÁCS [2004, 2006], OPREA & SÂRBU [2006], FENESI & al. [2009] etc.

The cultivated Jerusalem artichoke can behave to a certain extent as an invasive plant [PÉNTEK & SZABÓ, 1985]. As early as its first mentionings, the plant was known as very difficult to destroy [LIPPAY, 1664]. Formerly it was grown in many places throughout Transylvania, but because of its difficult storage, it didn't become widely cultivated [I'SÓ, 1955]. Today its cultivation ressurect, as a long-forgotten vegetable with special nutritional values. Despite the fact that the cultivated Jerusalem Artichoke can behave as a weed, its escaped individuals are not thought to be the main founders of the Hungarian invasive populations. Instead, these ones might originate in some other taxon belonging to the group of *H. tuberosus* s. l., that we today name the Wild Jerusalem Artichoke [BALOGH, 2008]. Nevertheless, this hypothesis has yet to be tested.

The wild Jerusalem Artichoke is currently largely spreading along the rivers. Water and small rodents can transport its stolons and tubers to larger distances, whereas moist soils facilitate its establishment. By contrast, *H. pauciflorus* and *H. × laetiflorus*, when escaped from cultivation, prefer dry weed communities or sandy grasslands, and generally avoid mesic habitats [BALOGH 2006].

Very few literature refer to the perennial sunflower species in Târgu-Mureș city and its surroundings. The last floristic survey of the region belongs to NYÁRÁDY E. I. [1914], who did not register perennial *Helianthus* taxa at the time. Herbaria data point out the presence of *H. tuberosus* at Târgu-Mureș shortly afterwards [Herbarium of NAGY ÖDÖN, Natural History Museum of Târgu-Mureș – OROIAN, 1995]. FENESI & RUPRECHT [2002] report the presence of *H. tuberosus* at Corunca and Târgu-Mureș [pers. comm.]. Two other taxa were recorded in herbaria: *H. decapetalus* at Cipău near Iernut [ȚOPA 1962, CL], and *H. × multiflorus* at Târgu-Mureș [BARABÁS 1897, CL].

The aim of this work was to prepare a distribution map of the perennial *Helianthus* taxa occurring in Târgu-Mureș city and its surroundings. Our departing points were: a) There are probably several perennial *Helianthus* taxa in the wild or cultivated in this area, some of them being invasive; b) The wild Jerusalem artichoke (*Helianthus tuberosus* s. l.) is present in the studied area, and is currently spreading along the Mureș and other rivers.

Material and method

The research was conducted in Târgu-Mureş city and its surrounding villages: Livezeni, Corunca, Cristeşti, Sântana de Mureş, Sângeorgiu de Mureş, and Sâncraiu de Mureş, during 2007-2009. Perennial *Helianthus* taxa were identified following BALOGH [2006] and GPS-recorded. Herbarium specimens of each taxa were prepared and the surface covered by the plants was approximated. GPS-records were featured on aerial map using ArcView GIS 3.1 [ESRI Inc., New York].

Results

The following *Helianthus*-taxa were identified in Târgu-Mureş and its surroundings (Fig. 1):

- *Helianthus tuberosus* L s. l. (wild Jerusalem Artichoke): is an invasive plant located alongside the Mureş river, and also occurs spontaneously in smaller patches in Târgu-Mureş and Livezeni (in inhabited places), in Corunca and Sântana de Mureş (in inhabited places and cultivated fields), and in Sâncraiu de Mureş (in cultivated fields).
- *Helianthus tuberosus* L. s. str. (cultivated Jerusalem artichoke): is cultivated in the farms of Corunca village, and in smaller groups in Târgu-Mureş, Sâncraiu de Mureş and Sângeorgiu de Mureş.
- *Helianthus pauciflorus* Nutt. (Stiff sunflower): was found only in Târgu-Mureş, Livezeni and Sângeorgiu de Mureş, cultivated as ornamental plant in the green spots of the inhabited places.
- *Helianthus* × *laetiflorus* Pers. (*H. pauciflorus* subsp. *subrhomboideus* × *H. tuberosus* s. l.) (Chererful sunflower): is cultivated as ornamental plant in most of the analyzed localities, being very frequent in Corunca and more rare in Sângeorgiu de Mureş. Because of its hybrid origin, *H. × laetiflorus* is difficult to be identified with certainty. It often resembles very much to one of its parental species, *H. pauciflorus*, but it differs from it in its leaves larger than five centimeters and the number of anthodiums higher than six [BALOGH, 2006].

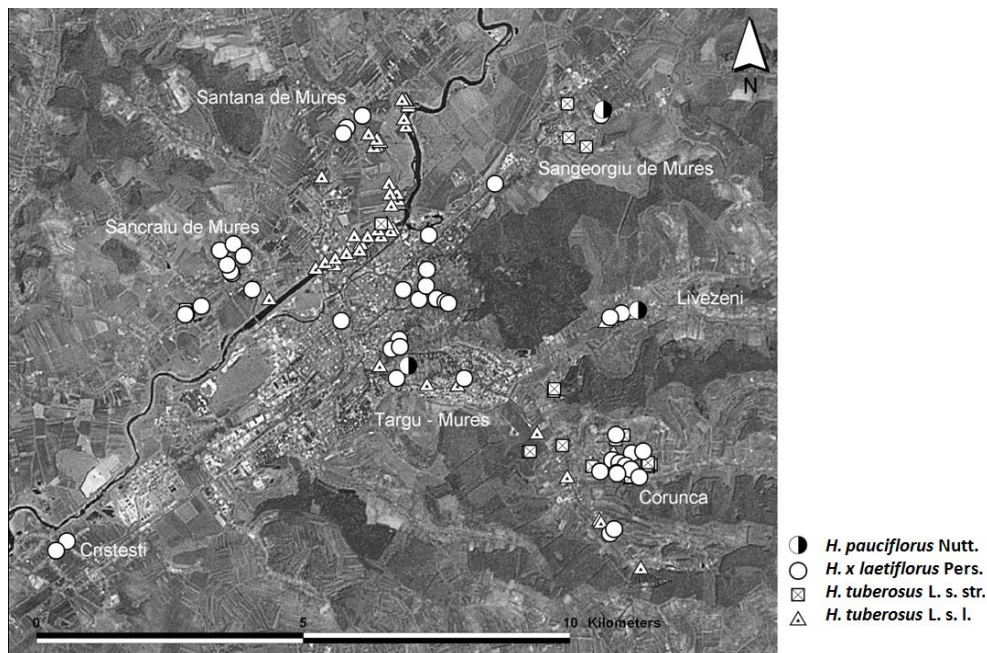


Fig. 1. The distribution map of the perennial *Helianthus*-taxa in Târgu-Mureș and its surroundings

Discussions

The outcome of this study is the first distribution map of the perennial *Helianthus* taxa of Târgu-Mureș and its surroundings. This is the first time that the *H. tuberosus* s. str., *H. pauciflorus* and *H. × laetiflorus* are mentioned in this area.

H. tuberosus s. l. is very abundant in this region. It occurs mostly along the Mureș valley, where it can cover several hundreds of square kilometers. Similarly to other regions of Europe, it behaves as an invasive species in the studied region, where it has severely altered the natural habitats along the Mureș and Pocloș rivers. Near the Mureș river, the plant behaves as a weed, as it has invaded the cultivated fields.

H. tuberosus s. str. is much more rare in the area. People started to cultivate it again because of its nutritional properties, being used in the diet of diabetics [FILEP, pers. obs.]. Therefore, new sets of subsontaneous populations can be expected, as inferred by PÉNTEK & SZABÓ [1985].

H. pauciflorus and *H. × laetiflorus* occur as ornamental species only in the village gardens or city green spots, but not in the wild. We didn't register escaped or naturalized individuals.

H. × multiflorus, mentioned in the region more than a century ago [BARABÁS 1897, CL], was not found, either because more detailed research is needed to discover it, or it has been only sporadically cultivated in Târgu-Mureș during the last century.

Conclusions

So far, four perennial *Helianthus* taxa have been identified in Târgu-Mureş and the surrounding villages. Two of them, *Helianthus pauciflorus* Nutt. and *Helianthus* × *laetiflorus* Pers. (*H. pauciflorus* subsp. *subrhomboideus* × *H. tuberosus* s. l.) are cultivated as ornamentals, and no escaped individuals were registered in the area. *H. tuberosus* s. str. is cultivated in a few places for its nutritional value, but it could escape and naturalize. *H. tuberosus* s. l. is an invasive species which is a serious threat to the local biodiversity and a weed species of the river meadows, very difficult to fight against.

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