

***HELIANTHUS GROSSESERRATUS*, A NEW ALIEN PLANT SPECIES IN LITHUANIA**
Zigmantas GUDŽINSKAS^{1*}, Lukas PETRULAITIS²
¹ Nature Research Centre, Institute of Botany, Žaliųjų Ežerų Str. 49, LT-08406 Vilnius, Lithuania

² Šiauliai University, Faculty of Technology and Natural Sciences, Department of Environmental Research, Vilniaus Str. 141, LT-76353 Šiauliai, Lithuania

*Corresponding author. E-mail: zigmantas.gudzinskas@botanika.lt

Abstract

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Helianthus grosseserratus M. Martens was first recorded in Lithuania in 2014. Rather large population of this species was found in Šiauliai district (northern Lithuania), in the vicinity of Bridai village, on the territory of recultivated former municipal dump. This species can be easily distinguished from other perennial *Helianthus* species by glabrous stem, long, serrate, alternate leaves on the upper part of the stem and spindle-shaped roots. Supposedly, *H. grosseserratus* was brought to the area with garden waste or soil used for dump recultivation about 30 years ago and recently it has established in the locality. In the investigated capitula, no developed seeds were found. *H. grosseserratus* reproduces vegetatively by rhizomes and under favourable conditions can survive for a long time.

Keywords: alien species, *Asteraceae*, dumps, *Helianthus*, identification, morphology.

The genus *Helianthus* L. (*Asteraceae*) consists of 52 species native to North America and Mexico (SCHILLING, 2006). This genus includes 38 perennial and 14 annual species (SEILER & GULYA, 2004; SCHILLING, 2006). The most important species in commercial terms is *H. annuus* L. grown mainly for its oilseed. *H. tuberosus* L. is distinguished by its large tubers, which have been selected for their food value and several other species of the genus are valued as ornamental plants (KAYS & NOTTINGHAM, 2008).

The genus *Helianthus* is extremely diverse and, from the taxonomic point of view, it is a difficult group of species (SEILER & GULYA, 2004). Taxonomic difficulties are based on a combination of factors, notably developmental and ecological plasticity, the frequency of interspecific hybridization and the presence of polyploidy (SCHILLING, 2006). Most of *Helianthus* species exhibit extensive phenotypic variation, which appears to include both heritable and

non-heritable (environmental) components (SEILER & GULYA, 2004).

In Lithuania, this genus was represented by six alien species: *H. annuus* L., *H. lenticularis* Douglas ex Lindl., *H. petiolaris* Nutt., *H. rigidus* (Cass.) Desf., *H. strumosus* L. and *H. tuberosus* L. (GUDŽINSKAS, 1997, 1999). Currently, *H. lenticularis* is usually treated as weedy race of *H. annuus*, whereas *H. rigidus* is recognised as the type subspecies of *H. pauciflorus* Nutt. (SCHILLING, 2006). In Lithuania, the annual *Helianthus* species (*H. annuus* and *H. petiolaris*) occur as casual aliens, whereas the perennial species (*H. pauciflorus*, *H. strumosus* and *H. tuberosus*) are naturalized.

Furthermore, other two species of this genus, i.e. *H. ×laetiflorus* Pers. and *H. subcanescens* (A. Gray) E.E.Wats., were reported occurring in the environs of Kaunas (PROTOPOVA, 1994), however, it is not clear, whether this record is based on cultivated or

escaped plants. Currently, *H. subcanescens* (A. Gray) E.E.Wats. is included in *H. tuberosus*. Escaped from cultivation plants of *H. ×laetiflorus* have not been recorded yet in Lithuania, however, their occurrence is expected.

In summer of 2014, an unknown species of the genus *Helianthus* was found in the environs of Bridai village in Iauliai district (northern Lithuania). The study of specimens revealed that it is *H. grosseserratus* M.Martens (Fig. 1), a species earlier not recorded in Lithuania. Therefore, morphological description of this species is presented.

Helianthus grosseserratus M.Martens, Index Seminum (Louvain): 4, in adnot. 1839. – *H. instabilis* E.Watson, Pap. Michigan Acad. Sci., 9: 423, pl. 65. 1929. – Fig. 1.

H. grosseserratus is a perennial rhizomatous plant with spindle-shaped roots. Stems erect, 100–300 cm (in native range can reach up to 500 cm) high, glabrous, glaucous, only in upper part scabrellous or strigillose. Leaves in the lower part of stem opposite, in the middle of stem and higher the leaves are alternate, lanceolate or narrowly ovate, with 1–5 cm long petioles. Leaf blade is 10–20(30) cm long and 2–6(9) cm wide, with cuneate base. Leaf margin usually coarsely or shallowly serrate, their upper side puberulent, gland-dotted. Compound inflorescence is with 3–15(30) capitula. Involucres are broadly hemispheric, 15–25 mm in diameter. Phyllaries are loose, spreading, lanceolate-linear, 10–14 mm long and 1.5–2.5 mm wide, with slightly ciliate margins and attenuate apices. Paleae are 7–8 mm long, entire or three-toothed, their apices acuminate, hairy. The number of ray florets in a capitulum ranges from 14 to 20, their laminae are 23–40 mm long, yellow. Disc florets are yellow; their number is about 100 in a capitulum, rarely more. Cypselae are 3–4 mm long.

This species is native to midwestern North America and has spread as a roadside weed into other areas of North America such as New England and the southeastern United States. It is introduced in Canada (SCHILLING, 2006). In North America, *H. grosseserratus* grows in dry, mesic or wet prairies and in other open sites, but most frequently it inhabits wet and wet-mesic prairies (EGGERS & REED, 1997).

In Europe, *H. grosseserratus* has been recorded in East and Central Denmark only, where it is a rare

alien species. It has been introduced as an ornamental plant and occasionally escapes from cultivation (MADSEN & LYCK, 1991; KARLSSON, 1998).

H. grosseserratus can be easily distinguished from other perennial species of this genus. It has glabrous and somewhat glaucous stem below the compound inflorescence, whereas stems of *H. tuberosus*, *H. pauciflorus* and *H. strumosus* are hispid or hirsute. Leaves of *H. grosseserratus* are narrow, mainly lanceolate or narrowly ovate, their margin is shallowly serrate. On the lower part of the stem, leaves are opposite, whereas on the upper part (usually above the middle of the stem) leaves are distinctly alternate. *H. grosseserratus* can be easily distinguished by underground parts. It has spindle-shaped roots and do not produce tubers, characteristic to *H. tuberosus*. *H. strumosus* and *H. pauciflorus* have long rhizomes, but they do not have spindle-shaped roots.

H. grosseserratus was found in the area of former municipal dump of Iauliai city, in the vicinity of Bridai village. This dump was closed and the area was recultivated in mid-1980s. Now this territory is covered with a 30-year-old mixed forest. Tree stand is composed of *Betula pendula*, *Picea abies*, *Alnus incana*, *Fraxinus excelsior*, etc. Eight groups of *H. grosseserratus*, covering patches from 2 m² to 20 m², and several solitary individuals were scattered over the area of about 120 m².

In Lithuania, *H. grosseserratus* has not been noted in cultivation so far; however, it might be or is still cultivated in private gardens or collections. Most probably propagules of this species reached this area at the final stages of Bridai dump exploitation or were brought to this area with soil used for dump recultivation after its closure. Supposedly, the population of *H. grosseserratus* existed in this locality for about three decades. This population most probably arose from single individual or propagules of a single clone.

H. grosseserratus is a self-incompatible species (HEISER et al., 1969), therefore, even in native populations it does not set seeds or their production is unstable and very low (STUESSY et al., 1986). Examination of 30 heads, collected on 21 October 2014, revealed no developed seeds. Thus, reproduction by seeds of this species in Lithuania, at least in this locality, is probably impossible. Nevertheless, *H. grosseserratus* is a clonal plant and can survive in particular locality for a long time until habitat conditions remain favourable (STUESSY et

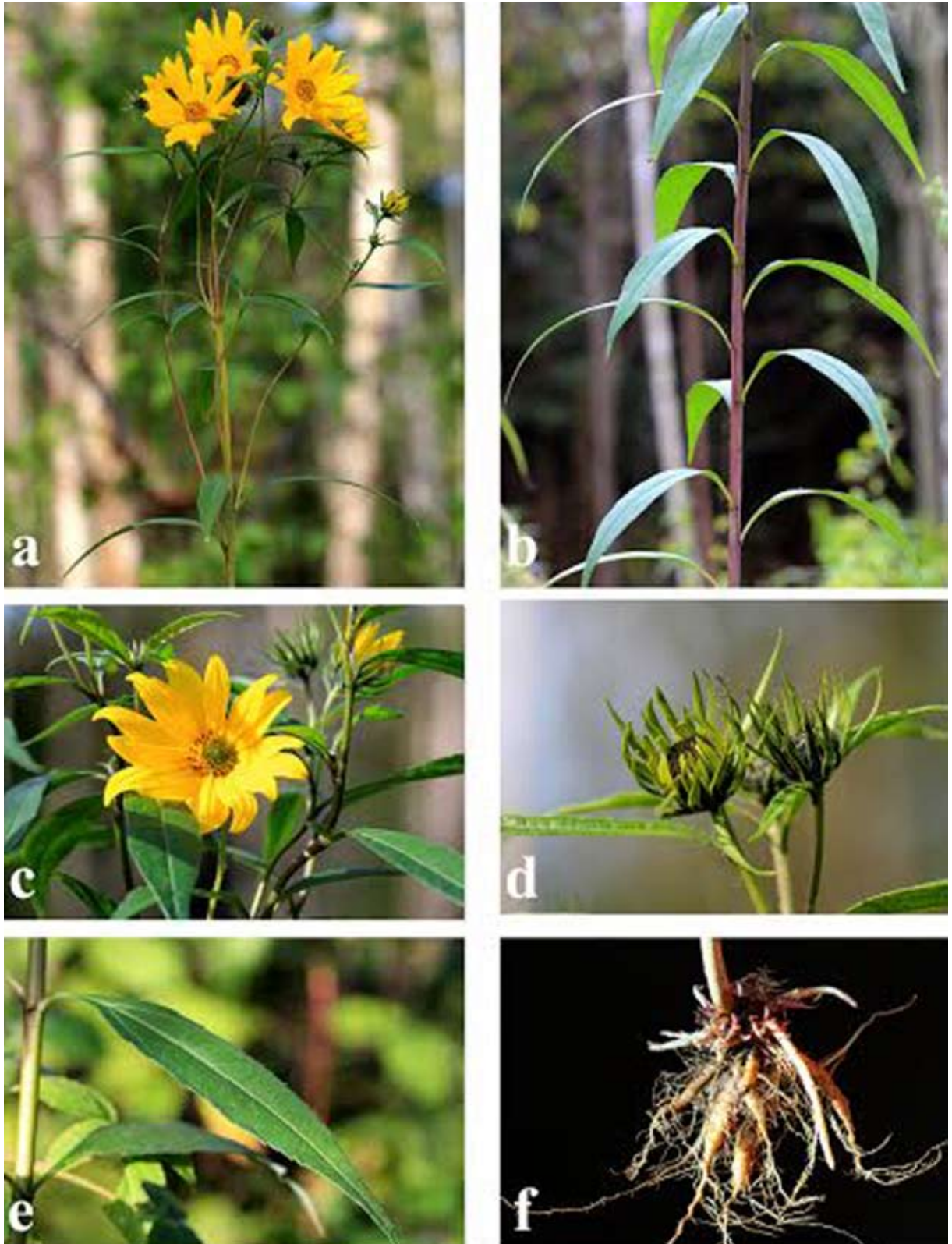


Fig. 1. *Helianthus grosseserratus*: a – upper part of plant; b – leaves on the upper part of stem; c – capitulum; d – involucre with loose phyllaries; e – leaf; f – underground part of plant with spindle-shaped roots and rhizomes (Photographs by Zigmantas Gudžinskas)

al., 1986). Vegetative spread and increase of the area occupied by this species is rather slow. Investigations of underground parts revealed that each individual has several (1 to 4) rhizomes of 5–25 cm long.

At present, *H. grosseserratus* should be ascribed to the group of established species, however, its further spread into new areas is hardly possible.

Examined specimen. Šiauliai district, 2 km north of Bridai village, territory of former municipal dump, in sparse mixed forest (56° 01' 53" N, 23° 22' 24" E), 16 September 2014. Leg. et det. Z. Gudžinskas and L. Petrulaitis (BILAS).

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HELIANTHUS GROSSESERRATUS – NAUJA SVETIMŽEMĖ RŪŠIS LIETUVOJE

Zigmantas GUDŽINSKAS, Lukas PETRULAITIS

Santrauka

Svetimžemė rūšis – plikastiebė saulėgraža (*Helianthus grosseserratus* M. Martens) – pirmą kartą Lietuvoje aptikta 2014 m. Gana didelė šios rūšies populiacija rasta Šiaulių r., į šiaurę nuo Bridų gyvenvietės, maždaug prieš 30 metų uždaryto ir rekultivuoto komunalinių atliekų sąvartyno teritorijoje. Populiacija išikūrusi retame mišriame miške, kurio medyną sudaro plaukuotieji beržai, paprastosios eglės, paprastieji uosiai, baltalksniai ir kiti medžiai. Plikastiebę saulėgražą nuo kitų Lietuvoje aptinkamų daugiamečių saulėgražų galima atskirti pagal pliką stiebą su melsvomis apnašomis, ilgus, pjūkliškai dantytus lapus, kurie aukščiau stiebo vi-

durio visada išsidėstę pražangiai, ir storas, verps-tiškas šaknis.

Manoma, kad plikastiebės saulėgražos dauginimosi organų (šakniastiebių arba augalo kerų) pateko su atliekomis prieš pat sąvartyno uždarymą arba jų buvo atgabenta su gruntu, naudotu uždarytam sąvartynui rekultivuoti. Lietuvoje rūšis yra įsitvirtinusi. Nepaisant to, kad tirtuose graižuose nebuvo aptikta užmegztų sėklų, plikastiebė saulėgraža lengvai dauginasi vegetatyviniu būdu ir, esant palankioms sąlygoms, tam tikroje vietovėje gali išlikti ilgą laiką. Labai mažai tikėtina, kad plikastiebė saulėgraža šalyje galėtų plačiau paplisti arba tapti invazine rūšimi.