EPPO Datasheet: *Heracleum sosnowskyi*

Last updated: 2026-04-09

The original datasheet covered *Heracleum mantegazzianum, Heracleum sosnowskyi* and *Heracleum persicum.* Only relevant parts of the datasheet is present for each species in this dynamic datasheet.

IDENTITY

Preferred name: *Heracleum sosnowskyi*
Authority: Mandenova
Taxonomic position: Plantae: Magnoliophyta: Angiospermae: Campanulids: Apiales: Apiaceae
Common names: Sosnowsky's hogweed
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EPPO Categorization: A2 list
view more categorizations online...
EU Categorization: IAS of Union concern
EPPO Code: HERSO

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Notes on taxonomy and nomenclature

Heracleum sosnowskyi was only described in 1944, so, until then, plants of this species were recorded as some of the previously described *Heracleum* spp. These include *H. pubescens* (described in 1819 from Crimea and Eastern Greater Caucasus, now considered as endemic of Crimea, Ukraine), *H. wilhelmsii* (described in 1841 from Georgia) or *H. mantegazzianum* (described in 1895 from Western Greater Caucasus) (Jahodova *et al.*, 2007b). The plants naturalized in the Western European countries have generally been known as *H. mantegazzianum*, without consideration of the possibility that *H. sosnowskyi* or another invasive *Heracleum* sp. (e.g. *H. persicum* Fischer) might also be present.

HOSTS

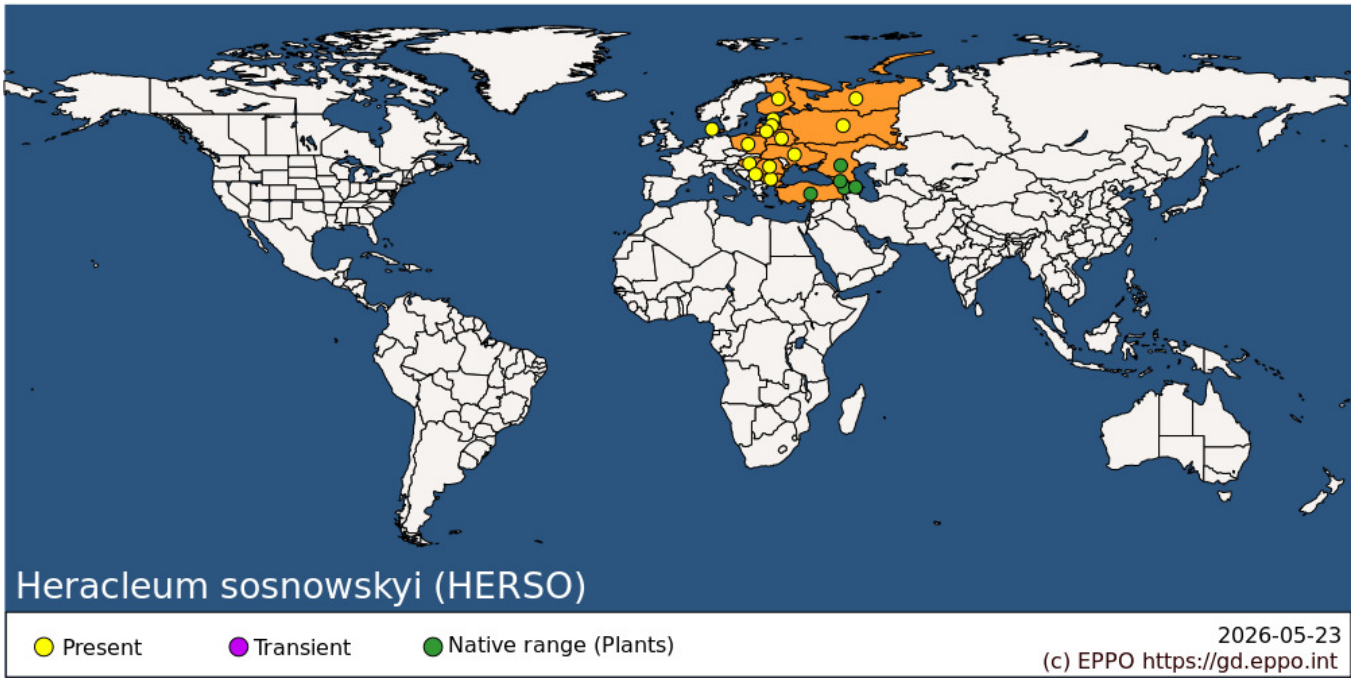
The native range of *H. sosnowskyi* is in the Caucasus where it grows in mountain areas alongside streams, in forests or in alpine meadows. The climate in the natural habitat is continental, with hot summers and cold winters. In other areas, *H. sosnowskyi* has been introduced as an agricultural crop and has spread rapidly, infesting grasslands, forests, wetlands, riverbanks? canal sides, rail?roadsides, urban areas, as well as abandoned agricultural land, particularly in Latvia (Thiele *et al.*, 2007).

GEOGRAPHICAL DISTRIBUTION

History of introduction and spread

Heracleum sosnowskyi is native to the Eastern and Central Caucasus (first described from Georgia), Central, Eastern and South-Western Transcaucasia and North-East Anatolia in Türkiye. It was first introduced to Central and Northern Russia in 1947 as a highly productive fodder crop for livestock. Later, it was introduced to other countries such as Belarus, Poland, Ukraine, the Baltic countries and the eastern part of Germany. In Germany, nowadays it is recorded as absent. Heracleum sosnowskyi started to spread very rapidly at the end of the 1980s as agricultural production systems and markets changed. In Russia, H. sosnowskyi has been hybridized in breeding programmes, with various other Heracleum spp. from different parts of the former USSR. Such hybrids may also have been naturalized. In 2008, the Latvian NPPO detected 7956?ha of territories invaded by *H. sosnowskyi*. It is also reported from a restricted area in the Czech Republic (Pyšek *et al.*, 2022) and Finland (Kabuce, 2006). Taxonomic uncertainty has resulted in some countries overlapping the distribution of H. *mantegazzianum* and *H. sosnowskyi*, for example in Poland and Hungary. See, for example, Global Biodiversity Information Facility and Zakhozhiy *et al.* (2022), where

the localities of all tall invasive hogweeds show overlapping patterns, indicating uncertain taxonomic differentiation.



EPPO Region: Armenia, Azerbaijan, Belarus, Bulgaria, Denmark, Estonia, Finland, Georgia, Hungary, Latvia, Lithuania, Poland, Romania, Russian Federation (Central Russia, Northern Russia, Southern Russia), Serbia, Türkiye, Ukraine

MORPHOLOGY

Plant type

Heracleum sosnowskyi is an herbaceous, usually monocarpic (flowering only once in a lifetime), seed-propagated herb living usually between 3 and 6?years (Tkachenko, 1989). Seeds of the three species are illustrated in Figure 1.

Image not found or type unknown

FIGURE 1

Drawings of *H. mantegazzianum*, *H. sosnowskyi* and *H. persicum* seeds by J. C. Schou (in Nielsen *et al*., 2005).

Heracleum sosnowskyi can easily be confused with H. mantegazzianum. Plants have a thick taproot and are usually smaller than those of *H. mantegazzianum* since they are up to 3?m tall instead of 5 (Nielsen *et al*., 2005). *Heracleum sosnowskyi* is distinguishable by having less divided leaves, the leaves of mature plants being divided to a varying extent, either into three approximately equal parts, which may themselves be similarly divided, or into more than three leaflets arranged in rows along the central rachis (pinnate). Outer petals are radiate, 9–10?mm long, while those of H. mantegazzianum are 12?mm long. The fine hirsute indumentum of the rays of the umbel is also characteristic of this species. Each compound umbel has 30–150 rays (Nielsen et al., 2005) and only short hairs. Fruits are oval to elliptical, broadly winged and comprise a pair of mericarps, which separate from each other before being shed, each containing a seed. Fruits from the terminal umbels tend to be smaller: some 10.5–16.5?mm long and 5.3–8.7?mm wide (Moravcová *et al*., 2007). Mature fruits are brown with swollen brown oil canals ¾ of the length of the fruits. This is a distinctive character of the species.

Heracleum spp. hybridize easily, thus causing confusion in identification. The common *Heracleum* species in Europe, *H. sphondylium*, *H. sibiricum* and the corresponding common species in the USA, *H. montanum* Bartr. (= *H. lanatum* Michx.) are not easily confused with the invasive hogweeds, being much smaller, rarely over 2?m high, with grey-green, pubescent and less acutely toothed leaves.

BIOLOGY AND ECOLOGY

General

Seeds germinate in early spring after morphophysiological dormancy is broken by the cold and wet conditions of autumn and winter. Autumn germination under favourable conditions may also be possible (though not observed), as seeds of *H. sosnowskyi* require a shorter period of cold stratification to break dormancy (2?months or less) than those of *H. mantegazzianum* (Moravcová *et al.*, 2007). Experiments in the Czech Republic have shown that the seed bank is very quickly depleted by rapid germination in spring and seeds do not survive for more than one season. However, studies in regions where *H. sosnowskyi* is invasive are needed to verify this. Germination of *H. sosnowskyi* seeds under laboratory conditions is very high (71%–94% in different temperature regimes) (Moravcová *et al.*, 2007).

Heracleum sosnowskyi produces from 15?000 to 20?000 seeds, weighing ca 12–14?mg, and even winged, the seed usually falls within a few metres from the mother plant (Krivosheina *et al.*, 2020). In the climatic conditions of the Leningrad Region (Russia), about 50%–60% of seeds germinated after 60- to 70-day stratification, up to 12% in the second and third years after their sowing, and only a small fraction after 20- to 30-day stratification (Chadin *et al.*, 2019). Stem leaves are compound leaves with long petioles and three to five divided leaflets. Leaf blades are 30–150? cm long and 30–120?cm wide. Umbels are numerous (usually 5–6, up to 10); the central umbel is the largest (up to 40?cm in diameter).

Flowering occurs from June to August. As with *H. mantegazzianum*, the flowers of *H. sosnowskyi* are insect pollinated, visited by a wide range of insects, including a number of Hymenoptera, Diptera and Coleoptera. The plant is reported to live up to 6?years when planted for biomass and silage production. Plants of *H. sosnowskyi* usually flower at 2–6?years (Dalke *et al.*, 2023). The majority of seeds (98.2%) are distributed in the upper soil layer of 0–5?cm, with little in the deeper layers of 6–10?cm and 11–15?cm (Moravcová *et al.*, 2007). Seeds are dispersed locally near the parent plants and over longer distances by watercourses. When the plant is established, its large size, fast growth and voluminous green mass suppress other plant species, so that it forms a single-species stand.

Habitats

The native range of *H. sosnowskyi* is in the Caucasus, where it grows in mountain areas alongside streams, in forests or in alpine meadows. The climate in the natural habitat is continental, with hot summers and cold winters. In other areas, *H. sosnowskyi* has been introduced as an agricultural crop and has spread rapidly, invading grasslands, forests, wetlands, riverbanks/canal sides, rail/roadsides, urban areas, as well as abandoned agricultural land, particularly in Latvia (Thiele *et al.*, 2007).

Environmental requirements

Climatic preferences include temperate and cold climatic regions without a dry season, characterized by reasonable moisture and cold winters. Cold winters are required to ensure germination. Moist conditions are favoured for much of the year, but moderate summer droughts can be tolerated (Tiley *et al.*, 1996). Recently, several studies focused on climate modelling were published, but most of the data come from GBIF or iNaturalist, so they predict a restricted spread to the east of Europe as a result of biased source data (Cuddington *et al.*, 2022).

Heracleum sosnowskyi develops in fresh and slightly moist, neutral soils, rich in nutrients, in the pH range 6.3–7.0. *Heracleum sosnowskyi* communities have developed in artificial and seminatural habitats over the last 20?years. They are nitrophilous, and their expansion is stimulated by eutrophication of the environment (Laivins & Gavrilova, 2003). *Heracleum sosnowskyi* is a light-demanding plant, which cannot tolerate shade in the first growth stages (Obo?evi?a, 2001). Nevertheless, it is considered more shade-tolerant than *H. mantegazzianum* (Nielsen *et al.*, 2005).

Heracleum sosnowskyi, like *H. mantegazzianum*, is associated with areas with warm to hot wet summers and cool wet winters. It is considered to be more suited to continental climates and is not adapted to drier conditions. It is winter hardy down to ?25°C. The new shoots of *H. sosnowskyi* are rather cold-resistant and can survive ?4°C to ?7°C. It is found that starting from the second year, they can survive up to ?25°C, and under a snow cover, even down to ?45°C (Obo?evi?a, 2001). Seeds germinate in early spring (but not during summer) and require a period of cold stratification for breaking dormancy (<2?months). *H. sosnowskyi* easily colonizes anthropogenic and seminatural habitats because they feature open patches of disturbed soil required for the germination of its seeds. It relatively easily penetrates into natural habitats that include eroded areas, ravines and anthills not covered by plants. It rarely invades the communities with a dense, intact sod layer (Arepieva *et al.*, 2021).

Uses and benefits

Heracleum sosnowskyi has been cultivated for silage, biomass production and honey production in Russia and the Baltic States. Average yield of green matter reached 50–100 tonnes $ha^{?1}$ in the third year of growing. Honey yield per plant was theoretically 12.7?g from one plant or 270?kg $h?a^{?1}$. In Russia, two cultivars were grown: ‘Uspekh’ and ‘Severzhanin’.

PATHWAYS FOR MOVEMENT

The main pathway of introduction for all three species was plants for planting for use as ornamentals (especially for *H. mantegazzianum*) or as fodder crops or honey plants (especially for *H. sosnowskyi* in Russia and in the Baltic countries) (Laivinš & Gavrilova, 2003). Seeds may also be introduced involuntarily, as contaminants of soil and growing media, from used machinery, vehicles, plants for planting or footwear (EPPO, 2020).

Once introduced, *Heracleum* spp. reproduce very efficiently from seed, which are spread by wind (e.g. 4?m), water (up to several kilometres) and human activities (Laivinš & Gavrilova, 2003). Seeds can float along rivers for up to 3? days before they sink (Pyšek, 1994). In Latvia, seed has been observed to spread on frozen snow, where it forms a thin ice layer on the surface, and then wind can blow seeds over several kilometres (EPPO, 2020).

IMPACTS

Heracleum mantegazzianum, *H. sosnoswkyi* and *H. persicum* have negative impacts on biodiversity and on the environment in general, on human health and tourism.

Effects on plants

There are no records of direct impact on crops. *Heracleum mantegazzianum* is not normally a weed of crops but there are reports of its encroachment into crop fields, for example in potatoes in Sweden, and it has also been seen invading pastures. In Latvia alone, the total cost of the 2006–2012 control program of this species was estimated at 12 million EUR (Cabinet of Ministers Order No. 426, 2006).

Heracleum persicum, as well as the two other *Heracleum* spp., block sunlight from penetrating to the undergrowth

and suppress other vegetation. The leaves of *H. persicum* contain allopathic substances which may act as growth inhibitors on other plants as the leaves decompose (Myras, 1978).

For these species, significant costs are incurred by the measures taken to control the weed in amenity and other areas and to turn the land back to agriculture, and this activity is also likely to increase soil erosion along stream banks where they occur.

Heracleum spp. can create stands that may range in extent from square metres to hectares; small patches, linear stands or fringes can be found. The density of populations may also vary: in large stands, it ranges from sparse growth (1–3 adult individuals/10?m^2) to almost entire ground cover (more than 20 adult individuals/10?m^2) (Nielsen *et al.*, 2005). The cover of *H. mantegazzianum* in the vegetation sampled in a German study varied between 1% and 95% (Thiele & Otte, 2007). In 31% of sampled plots, it was dominant, with cover exceeding 50%. The enormous height and leaf area of *H. mantegazzianum* are assumed to overgrow most (indigenous) plant species and hence to be in competition with them for light, absorbing up to 80% of incoming light in dense stands. A strong decline in species richness has been observed in abandoned grasslands and ruderal habitats in Latvia due to the presence of *H. sosnowskyi* (Nielsen *et al.*, 2005). In amenity areas, established colonies compete strongly with and rapidly replace most other plants except trees. Along riverbanks, it can almost totally replace the natural vegetation and threaten biodiversity, including fauna associated with (native) plants, building a ‘giant hogweed landscape’ (Nielsen *et al.*, 2005).

Nevertheless, since many stands of the species are linear, the biodiversity effects are often overestimated, as light can filter in from the sides (Starfinger & Kowarik, 2003). According to the study conducted in Germany by Thiele and Otte (2007), observed impacts on plant communities and local plant species richness are largely driven by successional changes following abandonment of land use or after large-scale disturbance. In the course of succession, competitive native tall herbs, such as *Urtica dioica*, have similar impacts on resident vegetation. Therefore, these impacts could be seen as symptoms of human-driven changes rather than a particular effect of *H. mantegazzianum*. Moreover, although *H. mantegazzianum* affects up to 10% of the area of suitable habitats in the study area, it appears that regional populations of native plant species have not been endangered until now, as these co-occurring species are very common.

Heracleum mantegazzianum can lead to riverbank erosion through the suppression or exclusion of native species, which play an important role in riverbank stabilization. When *H. mantegazzianum* plants in dense stands die off in winter, they leave bare soil that can be eroded by rainfall or winter floods. Deposition of eroded silt can alter substrate characteristics in rivers and, for example, render gravel substrates unsuitable for salmonid spawning (Thiele & Otte, 2007).

Environmental and social impact

Hybrids are possible in the genus *Heracleum* (Gavrilova, 2003). Hybrids between *H. mantegazzianum* and native *H. sphondylium* are reported from Great Britain (McClintock, 1975) and Germany (Ochsmann, 1996). They are found in sites where the two species grow together, although they are not numerous (Grace & Nelson, 1981; Stewart & Grace, 1984). Hybridization of both *H. mantegazzianum* and *H. sosnowskyi* with the native *Heracleum sibiricum* is expected in Lithuania (pers. comm. Z. Gudžinskas). Hybridization between *H. mantegazzianum* and *H. sosnowskyi* is possible (Klingenstein, 2006).

Heracleum mantegazzianum, *H. sosnowskyi* and *H. persicum* contain photosensitizing furanocoumarins. In contact with the human skin and in combination with ultraviolet light, a toxic reaction can occur 15?min after contact, with a sensitivity peak between 30?min and 2?h causing burning of the skin. After about 24?h, flushing or reddening of the skin (erythema) and excessive accumulation of fluid in the skin (edema) appear, followed by an inflammatory reaction after 3?days. Approximately 1?week later, a hyper-pigmentation (usually darkening of the skin) occurs, which can last for months. The affected skin may remain sensitive to ultraviolet light for years. Although such photosensitized toxic reactions can be caused by other plants in the EPPO region, these *Heracleum* sp. are particularly dangerous because of the high intensity of the reactions and the large size of the plants. The public is not generally aware that such risks exist, so these plants present a real hazard, especially to children.

Dense infestations can seriously interfere with access to amenity areas, riverbanks, etc., and along roadsides, large stands can reduce visibility and result in road safety hazards. Obstruction of lake shores and riverbanks by stands of *H. mantegazzianum*

affects anglers, water sports enthusiasts, swimmers, bird watchers, hikers and those working along river systems (Thiele & Otte, 2007). The costs of maintenance of roads may increase due to *H. sosnowskyi* (A. Garkaje, pers. comm., 2008).

Cultivation of *H. sosnowskyi* as a forage plant was eventually abandoned in the Baltic States at the end of the 1980s as agricultural production systems and markets changed, partly because the aniseed-scented plants affected the flavour of the meat and milk of the animals to which they were fed, and partly because of the health risk to humans and cattle (Nielsen *et al.*, 2005).

A German study from 2003 assessed the economic impact of *H. mantegazzianum* to be more than 12 million EUR annually in the country, distributed among the health system (1050000 EUR), nature reserves (1170000 EUR), road management (2340000 EUR), municipal management (2100000 EUR) and district management (5600000 EUR) (Reinhardt *et al.*, 2003).

CONTROL

The EPPO Standard PM 9/9 (2) *Heracleum mantegazzianum, H. sosnowskyi* and *H. persicum* describes the control procedures aiming to contain and eradicate the three species.

Additional information can be found in Pergl (2017) and Rajmis *et al.* (2017).

Some countries developed dedicated legislation acts specifying control measures for these *Heracleum* species (e.g. Czech Republic https://invaznidruhy.aopk.gov.cz/zasady-regulace).

REGULATORY STATUS

In the United Kingdom, legislation requires that landowners should control the plant and prevent further spread (Willoughby, 1996). *Heracleum sosnowskyi* is regulated in Estonia, Latvia and Lithuania. In Latvia, the legislation requires that landowners should control the plant and prevent further spread. In Sweden, there is control legislation for *H. mantegazzianum* based on the Plant Protection Act.

Heracleum sosnowskyi is on the EPPO A2 list of pests recommended for regulation and is listed as (EU) species of Union concern.

PHYTOSANITARY MEASURES

All three *Heracleum* species are listed as (EU) species of Union concern, and as such their sale is prohibited and their movement in the EU is restricted. Phytosanitary measures for existing populations and preventing spread include managing the pathways. This can include preventing spread via unintentional transport of seeds or contaminated soils. Early detection is required to prevent the establishment of new populations and allow rapid eradication. Management practices can follow those detailed in the control section.

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