EPPO Datasheet: *Heracleum mantegazzianum*

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 mantegazzianum*
Authority: Sommier & Levier
Taxonomic position: Plantae: Magnoliophyta: Angiospermae: Campanulids: Apiales: Apiaceae
Other scientific names: *Heracleum circassicum* Mandenova, *Heracleum giganteum* Hornemann, *Heracleum grossheimii* Mandenova
Common names: Siberian cow-parsnip, cartwheel flower, giant cow parsnip, giant hogweed (GB)
view more common names online...
EPPO Categorization: List of Invasive Alien Plants
view more categorizations online...
EU Categorization: IAS of Union concern
EPPO Code: HERMZ

more photos...

Notes on taxonomy and nomenclature

Heracleum mantegazzianum and related *Heracleum* species (*H. sosnowskyi, H. persicum*) originate from the Caucasus region (one of two centres of diversity for *Heracleum* spp., the other being China), and synonymy therefore depends on botanical explorations in that region (Jahodová *et al*., 2007a). The main sources of synonymy are: (i) historical – before the taxonomic description of a full range of *Heracleum* spp., plants were referred to by the names of those described first (beginning of the 19th century); (ii) modern – due to intensive taxonomic work by Russian botanists (in the 20th century), who generally accept a narrower species concept.
Historical synonyms include: *Heracleum speciosum* Weinmann, *Spondylium pubescens* Hoffmann and *Pastinaca pubescens* (Hoffmann) Calestani. These were early names that are no longer in taxonomic use and cannot be regarded as true synonyms. *Heracleum pubescens* (Hoffmann) Marschall von Bieberstein was the first tall *Heracleum* sp. to be described (in 1819), and many plants were later referred to as this species. Modern synonyms are quoted above (see 'Other scientific names'). Other historical synonyms include *Heracleum asperum* Marschall von Bieberstein, *Heracleum caucasicum* Steven, *Heracleum lehmannianum* Bunge, *Heracleum panaces* Steven, *Heracleum stevenii* Mandenova, *Heracleum tauricum* Steven and *Heracleum villosum* Sprengel. The names of two other species now naturalized in Europe (*Heracleum persicum* Fischer and *H. sosnowskyi* Mandenova) are also historical synonyms of *H. mantegazzianum*. The name *Heracleum trachyloma* Fischer & C.A. Meyer has recently been used for the most widespread *Heracleum* sp. naturalized in the United Kingdom (Sell & Murrell, 2009).

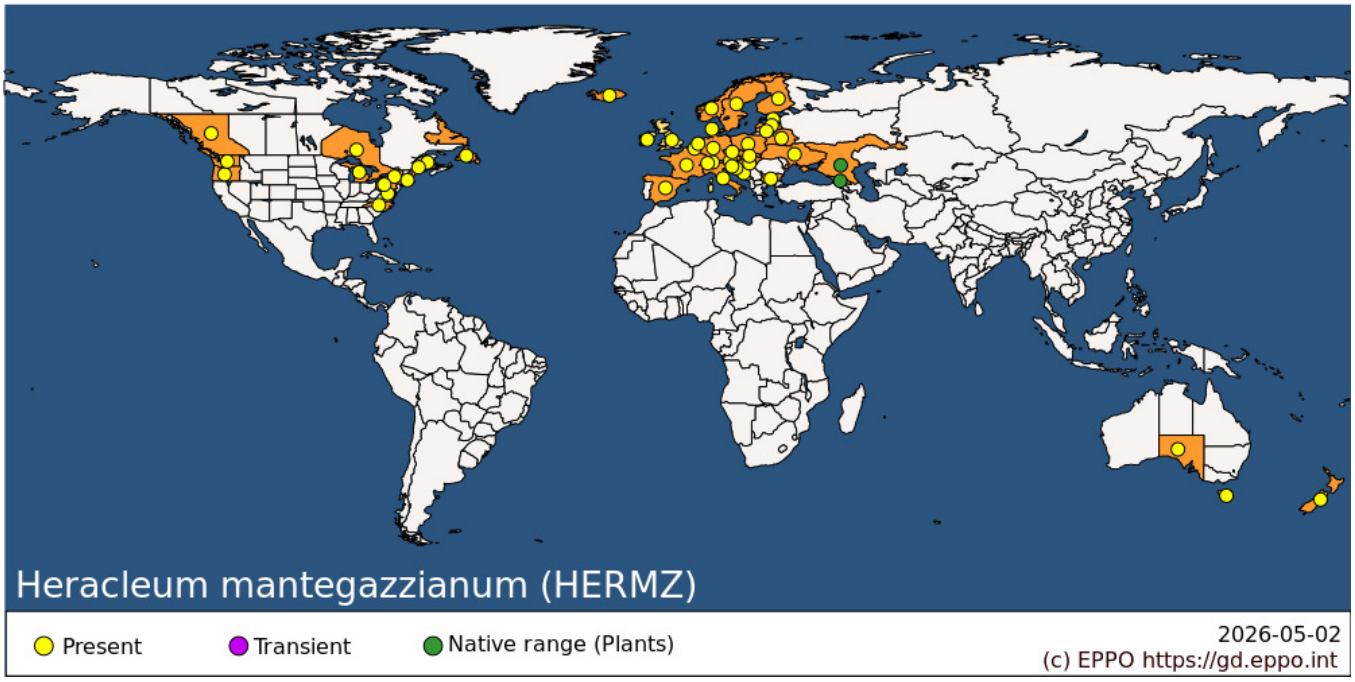
GEOGRAPHICAL DISTRIBUTION

History of introduction and spread

Heracleum mantegazzianum is native to the Western Greater Caucasus (Russia, Georgia). It is now becoming widely naturalized throughout Western Europe with a continuing increase in its distribution (Gudžinskas & Kazlauskas, 2022; Pyšek, 1994). It is considered invasive in most of the countries where it has repeatedly been introduced as a garden ornamental since the 1800s, after which there has been natural spread along rivers (NAPIS, 2004; Neiland, 1986; Pergl *et al*., 2012). It was first introduced into the United Kingdom as a garden ornamental plant around 1817

and is now widely reported in European countries. It is also naturalized in Canada and the United States (EPPO, 2020).

In the Czech Republic, a front of populations of *H. mantegazzianum* has been observed advancing at an average rate of about 10?m per year, the total area increasing by some 1200?m^2 each year. The number of host localities has doubled every 14?years during the phase of rapid invasion (Pyšek *et al*., 2007).



EPPO Region: Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France (mainland), Georgia, Germany, Hungary, Ireland, Italy (mainland), Latvia, Liechtenstein, Lithuania, Netherlands, Norway, Poland, Russian Federation (Southern Russia), Slovakia, Slovenia, Spain (mainland), Sweden, Switzerland, Ukraine, United Kingdom
North America: Canada (British Columbia, New Brunswick, Newfoundland, Ontario), United States of America (District of Columbia, Maine, Massachusetts, Michigan, New York, North Carolina, Oregon, Pennsylvania, Washington)
Oceania: Australia (South Australia, Tasmania), New Zealand

MORPHOLOGY

Plant type

Heracleum mantegazzianum 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.

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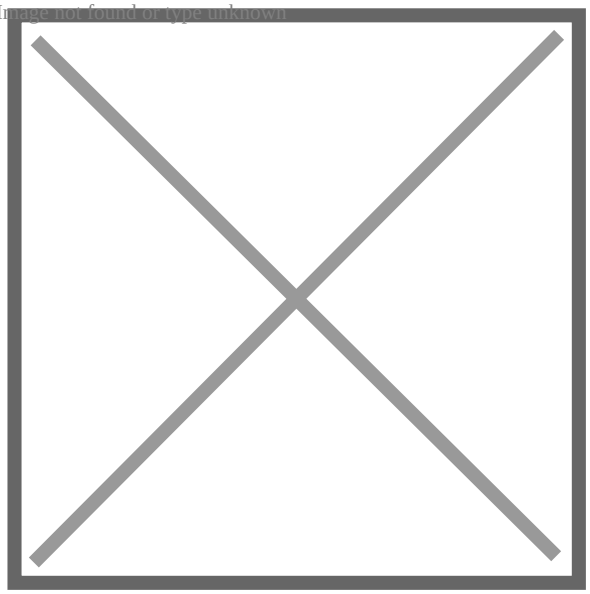

FIGURE 1

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

Heracleum mantegazzianum grows from a yellow branched root system 40–60?cm deep, which reaches 15?cm in diameter at the crown when mature. The species persists in the form of a vegetative rosette for several years and then flowers (after the plant has accumulated enough resources for reproduction) (Pergl *et al.*, 2006). Perglová *et al.* (2007) report that *H. mantegazzianum* is strictly monocarpic and dies after flowering, but there are some reports of polycarpy. The flowering stem can reach 5?m in height and 10?cm in diameter at the base. The stem is ridged, with purple blotches, and covered with pustulate bristles. Leaves are alternate, up to 3?m long and 1.7?m wide, ternately or pinnately lobed and coarsely toothed; upper leaves are progressively smaller, with the upper leaf surface glabrous and the underside pubescent, as is the petiole. The inflorescences are compound umbels of four orders. The main inflorescence (first-order) is a terminal compound umbel up to 80?cm in diameter with about 100 unequal hairy rays, each 10–40?cm long. There are also up to 8 satellite umbels, which usually overtop the main one, and others developing on branches below. The main umbel is hermaphrodite; the umbels of higher orders, maturing later, may be only male. Flowers, on pedicels 10–20?mm long, are white or pinkish with petals up to 12?mm long. Fruits are flattened and elliptical; 6–18?mm long by 4–10?mm wide; narrowly winged; with the larger fruits occurring on the main inflorescence and the smaller on satellites and branches, glabrous to villous; splitting into two mericarps; each with 3–5 elongated oil canals.

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 dormancy is broken by the cold and wet conditions of autumn and winter, by temperatures within the range of 1–6°C (Moravcová *et al.*, 2007). Germination occurs from January to March in the United Kingdom. Drying tends to delay eventual germination or results in a requirement for additional or longer stratification. Exposure to light is apparently not required for germination. After germination, a strong taproot is formed, which soon contracts to pull the crown downwards. In the Czech Republic, the first leaves of the rosette are usually visible at the end of February or in March (they often start growing under the snow cover). Stem elongation

is apparent at the end of May, and the peak of flowering occurs at the end of June and beginning of July. The first true leaf develops in April, small and almost round, replaced in succession by steadily larger leaves, the fifth or sixth taking the adult form. The established vegetative plant has 3–4 functional leaves at any time.

Flowering occurs mainly in the third year of growth, but under unfavourable conditions such as grazing, cutting or nutrient deficiency, flowering is postponed until sufficient reserves have been accumulated. In pastures, flowering may be delayed up to 7?years, which appears to be driven by the size of the crown and reserves in the root system. Individuals 12?years old have been reported from extremely dry sites (Pergl *et al.*, 2006).

The flowers of *H. mantegazzianum* are insect-pollinated and self-compatible (Perglová *et al.*, 2007). Self-pollination has been identified as advantageous in some colonizing species (Rejmánek *et al.*, 2005) and may lead to accelerated spread (Daehler, 1998). *Heracleum mantegazzianum* has unspecialized flowers that are pollinated by unspecialized insects; Coleoptera, Diptera, Hemiptera and Hymenoptera are the most frequent visitors (Grace & Nelson, 1981).

Most fruits ripen in the second half of July and start to be released (Perglová *et al.*, 2007). Propagation is exclusively by seeds, which are produced in very large numbers. Some 10?000–20?000 fruits are produced per plant in Europe, the maximum reaching some 50?000 fruits (Perglová *et al.*, 2007). Each mericarp contains one seed (Moravcová *et al.*, 2007). Seeds may remain viable for up to 15?years when stored dry, but in the field this period is apparently much shorter – only 8.8% of seeds buried in the soil survived 1?year, 2.7% lasted 2?years and 1.2% remained viable and dormant after 3?years (Moravcová *et al.*, 2007). Correspondingly, no viable seeds were found in a *Heracleum* site after 7?years of sheep grazing (Andersen & Calov, 1996). The vertical distribution of seeds in the soil seed bank shows that 94% of the total seeds, including dead seeds, are in the upper 0.5?cm of the soil layer, with few in the deeper layers of 6–10?cm and 11–15?cm (Moravcová *et al.*, 2007). In the United Kingdom, the aboveground parts of the vegetative plants senesce and die back in late September/October.

The chromosome number of *H. mantegazzianum* is 2*n*?=?22, as in most, if not all, *Heracleum* sp. Hybridization is recorded with *H. sphondyllium* in Germany and the United Kingdom (Ochsmann, 1996; Tiley *et al.*, 1996), but this is relatively infrequent even where the two species occur together, perhaps because of the lack of common insect visitors for pollination. The hybrids are virtually sterile.

Habitats

Heracleum mantegazzianum in its native range is a plant of forest edges and glades, often found alongside streams, in mountain areas with annual rainfall of 1000–2000?mm, characterized by temperate, continental climates of hot summers and cold winters. According to a German study (Thiele *et al.*, 2007), the most common habitat types are linear structures along traffic routes (roadsides, railway margins) and flowing waters. The species is a good colonizer of open and bare ground and benefits from human-induced habitat disturbances (i.e. a pioneer species). In the native and introduced range, it can be found forming dense populations. In the introduced range, a high proportion of stands include rivers, roads, railway banks, damp places, rubbish dumps and waste ground (Pyšek & Prach, 1993; Pyšek & Pyšek, 1995; Tiley *et al.*, 1996). In addition to rural habitats, the plant occurs in urban areas, gardens and parks (Pyšek & Pyšek, 1995). Although it is generally a plant of open ground, *H. mantegazzianum* can establish and grow successfully in woodland, the edges of clearings and partially shaded habitats.
Managed grasslands are marginal habitats, as the plant is not invasive as long as regular management is applied. Moreover, Thiele *et al.* (2007) found, according to their study in Germany, that sites invaded by *H. mantegazzianum* are not subject to regular land use except for marginal occurrences in managed grasslands. Indeed, 71% of plots examined were disused, 17% were maintained by rather irregular mowing or removal of shrubs and trees, and only 12% of sites were under agricultural land use.

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 mantegazzianum* tends to be associated with lowland sites in the United Kingdom, mainly due to the sources of infestation being

originally associated with gardens in the lowlands and not due to a climatic limitation (Willis & Hulme, 2002). The seeds are shown to germinate at all elevations up to 600?m in north-east England. In the Czech Republic, the plants occur in a wide range of altitudes from 154 to 1249?m. In the native distribution range, *H. mantegazzianum* grows at altitudes up to 2200?m (Otte & Thiele, 2007).

A study by Thiele *et al.* (2007) in Germany showed that *H. mantegazzianum* needs fairly high nutrient-rich soils and moisture levels for optimal growth. With respect to pH values, *H. mantegazzianum* was found in a wide range of conditions from acidic to alkaline. Extreme values were 4.0 and 8.5. In its native distribution range, it was found growing on soils of pH ranging from 5.34 to 6.68 (Pergl *et al.*, unpublished data). Occurrence along riverbanks is usually associated with sandy or silty soils, but a wide range of soil textures is also tolerated from gravel to clay and highly organic or waterlogged soils. It is occasionally found close to the sea and apparently has some tolerance of salt spray. Growth of the species in semi-shade is fairly good, but it cannot grow in full shade (Thiele *et al.*, 2007).

Heracleum mantegazzianum is associated with areas with warm to hot summers and cool winters. It is not favoured by drier conditions. Hardiness is not specified, but the plant is probably hardy to zone 6 (?23°C to ?18°C). It is associated with the vegetation zones: temperate deciduous forests and mixed conifer forests.

A study of climatic effects on *H. mantegazzianum* in its invaded range in the Czech Republic, conducted by Pyšek *et al.* (1998), showed that the distribution of the species was significantly affected by the January isotherm; the species was less represented in areas with a warmer January isotherm.

Natural enemies

Surveys for natural enemies in the native area of the Caucasus were conducted in 2002 with the aim of identifying potential biological control agents (Seier *et al.*, 2003). Many fungi were found associated with *H. mantegazzianum*, most species being new records for this host. However, none of the pests assessed, either insects or fungal pathogens, exhibited sufficient specificity to be considered safe for introduction into European countries (Cock & Seier, 2007).

Uses and benefits

Heracleum mantegazzianum has been widely grown as an ornamental plant in Europe because of its striking appearance and usefulness in flower arranging. It is reported to be widely sown in Switzerland by bee-keepers to increase food resources for bees (Westbrooks, 1991).

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 (1?050?000 EUR), nature reserves (1?170?000 EUR), road management (2?340?000 EUR), municipal management (2?100?000 EUR) and district management (5?600?000 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.

In the USA, *H. mantegazzianum* is declared a noxious weed and is specifically regulated in six states (Alaska, Connecticut, Michigan, New York, North Carolina, Wisconsin (USDA-NRCS, 2026)).

Heracleum mantegazzianum is on the EPPO list of invasive alien plants 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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