Heracleum mantegazzianum

System: Freshwater

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Common name
barszcz mantegazyjski (Polish), Herkulesstaude (German), barszcz mantegazziego (English), cartwheel flower (English), hiid-karuputk (English), berce de Mantegazzi (French), kjempebjonnikjeks (Norwegian), kaukasionjattiputki (Finnish), wild rhubarb (English), jättebjörnlöka (English), kaukaskisk jättefloka (English), kæmpebjørneklo (Danish), bjarnarklö (English), mantegaci latvanis (English), giant cow parsnip (English), berce de caucase (English), giant cow persicum (English), berce du caucase (French), Riesenbarenklau (German), giant hogweed (English), Kaukasischer Barenklau (German), kaukaskisk jattefloka (Swedish), mantegaco barštis (English), tröllahvönn (English), jättefloka (English)

Synonym
Heracleum asperum, M. Bieb.
Heracleum giganteum, Fischer ex Hornem.
Heracleum lehmannianum, Bunge
Heracleum persicum, Desf. Ex Fischer
Heracleum sibricum, Sphalm
Heracleum stevenii, Manden
Heracleum villosum, Fischer ex Sprengel

Similar species
Heracleum lanatum, Heracleum maximum

Summary
Heracleum mantegazzianum is native to Asia and has been introduced into Europe and North America. It is characterised by its size and may grow to 4.5 to 6 metres in height. It is most common along roadsides, vacant lots, streams and rivers, and can be considered an invasive freshwater weed. It forms a dense canopy, out-competing native riparian species and results in an increase in soil erosion along the stream banks where it occurs. Heracleum mantegazzianum germinates from early spring throughout the growing season, after exposure to winter temperatures. H. mantegazzianum exudes a clear watery sap that sensitises the skin to ultraviolet radiation which can result in severe burns. Populations in urban and suburban areas represent an increasing public health hazard. Glyphosate is considered the most effective herbicide.
Species Description

*Heracleum mantegazzianum*, or giant hogweed, is a perennial, monocarpic herb in the carrot and parsley family, Apiaceae (Krinke, *et al.*, 2005). It is very tall, typically growing to 3-4 meters in height and may exceed 5 meters (Page *et al.*, 2006). Its inflorescences are white, sometimes pinkish, compound umbels up to 80 cm across with 30-150 rays (Neilson *et al.*, 2005; EPPO, 2006). Individual flowers are on pedicels 10-20 mm long and have petals up 12 mm long (EPPO, 2006). Terminal umbels are the largest and are surrounded by satellite umbels and additional umbels may occur on auxiliary stems (Krinke *et al.*, 2005). Stems are rigid, stout, and typically 5-10 cm in diameter. Stems and leaf stalks are either completely or spotted dark reddish-purple in color, hollow, and produce postulate bristles that produce phototoxic sap (Neilson *et al.*, 2005; EPPO, 2006). *H. mantegazzianum* has a thick, yellow branching taproot 15 cm in diameter and up to 60 cm long (Page *et al.*, 2006; EPPO, 2006). Leaves are alternate with lower leaves 1-2.5 meters long, compound, irregularly shaped in ternate or pinnate segments, deeply lobed, and irregularly toothed. Upper leaves are smaller and sometimes not divided with longer petioles and more inflated sheaths. Leaves are usually pubescent on the underside when young and glabrous above (Page *et al.*, 2006). Fruits are dry schizocarps consisting of two mericarp seeds 6-18 mm long, 4-10 mm wide and about 1 mm thick, which are joined until ripening. Mericarps are elliptical, flattened, and emarginate at the apex with thin low dorsal ridges and broadly winged lateral ridges (Page *et al.*, 2006; Tiley *et al.*, 1996). The endosperm is oily and mature fruits have a strong resinous smell (Tiley *et al.*, 1996).

Notes

The sap of *Heracleum mantegazzianum* causes a skin reaction that sensitizes skin to sunlight that results in severe swelling in blisters. Contact of skin to the plant should be avoided (Westbrooks, 1991).

Lifecycle Stages

The seeds of giant hogweed germinate from early spring and continue throughout the growing season. Cold winter temperatures are necessary to break dormancy (EPPO, 2006). Seedlings initiate a vegetative rosette pattern of growth for the first season that may last 3-4 years (PBPI, undated; Pergl & Perglova, 2006). This phase allows rapid growth and dense development to outgrow and shade out competitive vegetation. *H. mantegazzianum* may postpone flowering until conditions are favorable and sufficient reserves are stored. When it does flower it flowers early and in great abundance (Neilson *et al.*, 2005). Seedlings reach high densities of several thousand/m² (Klingenstein 2007), and seed banks reach densities of up to 12,000/m² (Neilson *et al.*, 2005). On average only 10% of plants flower each year while remainders survive in the rosette stage to the next year (Klingenstein, 2007). In winter foliage dies back and re-grows from the stem and taproot in the spring (Pysek, 1991; PBPI, undated).
Uses

*Heracleum mantegazzianum* is a very popular ornamental. Many introductions to new locations are the result of its planting in ornamental gardens or growth for use in flower arranging. *H. mantegazzianum* is reportedly widely planted in Switzerland by beekeepers to increase food resources for bees. The dried fruits of the plant are used as a spice in Iranian cooking (Westbrooks, 1991). *H. mantegazzianum* has been cultivated for silage in Russia and has been suggested as a forage crop in Poland (EPPO, 2006).

Habitat Description

In its native range, *Heracleum mantegazzianum* is found on forest edges and glades, in riparian zones, and in mountainous areas with annual rainfall of 1000-2000 mm and a temperate continental climate of hot summers and cold winters. In nonnative locations, giant hogweed is typically introduced to ornamental gardens and spreads along river courses, roadsides, railways, vacant lots and other disturbed locations to invade sunny, moist locations (EPPO, 2006; EIAS, 2003; Pysek & Prach, 1993; Pysek & Pysek, 1995; Tiley et al, 1996; Washington State Department of Ecology, undated). Cold winters are required to ensure germination, but may also be necessary for flowering. It is most associated with temperate deciduous forest and mixed conifer forest vegetation zones (EPPO, 2006). Although it is generally a plant of open ground, *H. mantegazzianum* can establish and grow successfully in edges of clearings and partially shaded habitats, preferring moist conditions for much of the year, but can tolerate moderate summer droughts (Tiley et al, 1996). It is usually found on alkaline or only slightly acidic soils, from pH 6.0 to 8.5, and appears to be favored by soils with high nitrogen content. Occurrence of giant hogweed along riverbanks is usually associated with sandy or silty soils, but it is also recorded on a wide range of soil textures from gravels to clay and highly organic or waterlogged soils are also tolerated. (EPPO, 2006).

Reproduction

*Heracleum mantegazzianum* is an amphimictic perennial whose flowers are insect pollinated and self compatible (EPPO, 2006). It is also monocarpic and only reproduces once, usually in its third or fourth year (Pergl & Perglova, 2006; Page et al, 2006). Reproduction is done only by seeds which are copiously produced, from 5,000-100,000 per plant (EPPO, 2006). Seeds remain viable for up to 7 years and possibly longer (CEH, 2004). Flowering typically lasts from June to August. Flowers are compound umbels with 30-150 rays per flower and a total of more than 80,000 flowers can occur on a single plant (Klingenstein, 2007). Fruits are broadly winged schizocarps composed of two mericarps 6-18 mm long and 4-10 mm wide (Krinke et al, 2005; Tiley et al, 1996).
General Impacts

*Heracleum mantegazzianum* is considered to be one of the most problematic invasive plants in Europe (Pysek et al., 1998). It produces a toxic sap that causes a painful and problematic phototoxic reaction. It establishes dense monocultures that threaten natural ecosystems. It is also known to increase erosion of river and stream banks and to be a problematic weed in both agricultural and urban environments.

The sap of *H. mantegazzianum* causes a phytotoxic reaction when in contact with the skin and exposed to sunlight (Klingenstein, 2007). Toxic furanocoumarins or psoralens are stored as biologically active aglycones in sap in the oil channels or ducts in the leaves, stems, roots, flowers and seeds. When they come in contact with the skin they cause an extreme sensitivity to sunlight called phytophotodermatitis (CEH, 2004). The phototoxic reaction is can be activated by ultraviolet radiation only 15 minutes after contact, with a sensitivity peak between 30 min and two hours (Klingenstein, 2007). It can lead to severe slow healing burns or scarring (EIAS, 2003). Blistering occurs 24-48 hours after exposure to sunlight and dense post inflammatory hyperpigmentation is visible after 3-5 days and may persist for up to 6 years (CEH, 2004; Klingenstein, 2007). Gardeners, landscape workers, and children are at particular risk. Since the plant itself is painless workers or children in contact with the plant may continue exposure to the sap for hours (Klingenstein, 2007). Its hazard to human health causes *H. mantegazzianum* to lower the recreational value of invaded lands (Pergl & Perglova, 2006).

Giant hogweed changes species composition and reduces species diversity of native plant communities (Neilson et al., 2005). It establishes dense stands that displace and suppress the growth of native flora, especially in disturbed areas and riparian zones (CEH, 2004; Neilson et al., 2005; Page, 2006). *H. mantegazzianum* outcompetes native plants by shading them out, growing leaves above resident herbs and grasses (Thiele & Otte, 2007). It may also have allelopathic properties (Page, 2006).

Replacement of native vegetation results in other effects to ecosystems and likely causes far reaching impacts. It displaces native riparian vegetation and then causes bank erosion in the winter it dies back (Page, 2000). Such instability of river banks caused by giant hogweed poses a serious threat to salmon spawning habits in Ireland (Caffrey, 1999). *H. mantegazzianum* is also known to hybridize with European native *Heracleum sphondylium* (Klingenstein, 2007), and be a problematic weed to agricultural and urban environments (Page, 2006).

Management Info

The Giant Hogweed Best Practice Manual provides up to date knowledge about all relevant aspects of the biology, ecology, taxonomy and management of invasive hogweeds. Background information and management guidelines mainly refers to Giant Hogweed (*H. mantegazzianum*) but is also usable for the closely related *H. sosnowskyi* and *H. persicum*.

The manual is available in eight different languages from: English, Czech, Danish, Dutch, German, French, Latvian, and Russian.

The European and Mediterranean Plant Protection Organization (EPPO) datasheet on the hogweed provides information on options available for the control of this species including regulatory status. Please follow this link for a summary of management options available for the control of the hogweed.
Pathway

*H. mantegazzianum* has been introduced to Europe, the United Kingdom, Canada and the United States as a garden curiosity (The Washington State Department of Ecology (UNDATED)).

**Principal source:** European and Mediterranean Plant Protection Organization (EPPO), 2006. EPPO data sheet on Invasive Plants *Heracleum mantegazzianum*


**Compiler:** National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

**Review:** Anon

**Publication date:** 2011-02-23

**ALIEN RANGE**

1. Australia
2. Austria
3. Belgium
4. Canada
5. Czech Republic
6. Denmark
7. Estonia
8. Europe
9. Finland
10. France
11. Germany
12. Hungary
13. Iceland
14. Ireland
15. Italy
16. Latvia
17. Mediterranean Area
18. Netherlands
19. New Zealand
20. Norway
21. Poland
22. Slovak Republic
23. Sweden
24. Switzerland
25. Ukraine
26. United Kingdom
27. United States

**BIBLIOGRAPHY**

86 references found for *Heracleum mantegazzianum*

**Management information**

Alien Plants in Ireland, 2007. *Heracleum mantegazzianum*

**Summary:** The database of alien plants in Ireland contains detailed information on 715 alien plant taxa currently occurring in (semi-) natural habitats in Ireland (both the Republic and Northern-Ireland). This database was developed in 2006 at the School of Natural Sciences, Trinity College Dublin, as part of the BioChange project, funded by the Environmental Protection Agency (EPA), Ireland.


FULL ACCOUNT FOR: *Heracleum mantegazzianum*


**Summary:** Available from: http://www.nerc-wallingford.ac.uk/research/capm/pdf%20files/4%20Giant%20Hogweed.pdf [Accessed 25 March 2010]


Hansen, Steen Ole; Hattendorf, Jan; Wittenberg, Ruediger; Reznik, Sergey Ya.; Nielsen, Charlotte; Ravn, Hans Peter; Nentwig, Wolfgang., 2006b. Phytophagous insects of giant hogweed *Heracleum mantegazzianum* (Apiaceae) in invaded areas of Europe and in its native area of the Caucasus. European Journal of Entomology. 103(2). APR 6 2006. 387-395.


Moravcova, Lenka; Perglova, Irena; Pysek, Petr; Jarosik, Vojtech; Pergl, Jan, 2005. Effects of fruit position on fruit mass and seed germination in the alien species Heracleum mantegazzianum (Apiaceae) and the implications for its invasion. Acta Oecologica. 28(1), JUL-AUG 2005. 1-10.

Moravcova, Lenka; Perglova, Irena; Pysek, Petr; Jarosik, Vojtech; Pergl, Jan, 2005. Effects of fruit position on fruit mass and seed germination in the alien species Heracleum mantegazzianum (Apiaceae) and the implications for its invasion. Acta Oecologica. 28(1), JUL-AUG 2005. 1-10.

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Nehrbass, Nana; Winkler, Eckart; Mullerova, Jana; Pergl, Jan; Pysek, Petr; Perglova, Irena, 2007. A simulation model of plant invasion: long-distance dispersal determines the pattern of spread. Biological Invasions. 9(4), JUN 2007. 383-395


Summary: The manual provides information about as many relevant aspects as possible of the biology, ecology and management of tall invasive hogweeds in Europe: Taxonomy and genetics, development and phenology (seasonal changes and growth cycle), population dynamics, interactions with soil, nutrients, vegetation cover, land use change and control options. This brochure is also available in eight languages at the project homepage www.giant-alien.dk.


Summary: The Giant Alien project under the 5th Framework Programme of the European Union has taken an integrated approach to develop just such a sustainable strategy for invasive alien weed management in Europe. The project started in January 2002 and finished in April 2005. This manual mainly refers to Heracleum mantegazzianum but is also usable for the closely related H. sosnowskyi and H. persicum. One overall objective of our project was to provide all European authorities (e.g. municipalities, counties, districts, highway agencies, environment agencies) and private landowners with scientifically based but simple and practical management methods to reduce the abundance and prevent further spread of the invasive hogweeds.

The manual is available in eight different languages from: English, Czech, Danish, Dutch, German, French, Latvian, and Russian


Summary: Information on identification, management, treatment to exposure, distribution, and growth of species.

Pergl, J. and I. Perglov?, 2006. Heracleum mantegazzianum: Delivering Alien Invasive Species Inventories for Europe (DAISIE)


Summary: http://www.iucngisd.org/gisd/species.php?sc=418

Summary: The Giant Hogweed Heracleum mantegazzianum is a pernicious invasive species, with significant impact on human health due to its phytotoxic sap. From its native area, the Caucasus, it has spread across Europe creating serious environmental and health problems. This book, the output of a threeyear EU project involving 40 European experts, is an authoritative compendium of current knowledge on this amazing invasive plant and will facilitate improved management. It is an invaluable resource for both practitioner and student, and covers topics including taxonomy, genetics, reproduction, population ecology, and invasion dynamics. It also reviews the possibilities of mechanical, chemical and biological control. On this amazing invasive plant and will facilitate improved management. It is an invaluable resource for both practitioner and student, and covers topics including taxonomy, genetics, reproduction, population ecology, and invasion dynamics. It also reviews the possibilities of mechanical, chemical and biological control.


Summary: English:
The species list sheet for the Mexican information system on invasive species currently already has a direct link to the alert page. It is important to notice that these lists are constantly being updated, please refer to the main page (http://www.conabio.gob.mx/invasoras/index.php/Portada), under the section Novedades for information on updates.

Invasive species - Plants is available from: http://www.conabio.gob.mx/invasoras/index.php/Species_invasoras_-_Plantas

[Accessed 30 July 2008]

Spanish:
La lista de especies del Sistema de información sobre especies invasoras de México cuenta actualmente con información acerca de su nombre científico, familia, grupo y nombre común, así como su estado de invasión en México, rutas de introducción y ligas a otros sitios especializados. Algunas de las especies de mayor riesgo ya tienen una lista directa a la página de alertas. Es importante resaltar que estas listas se encuentran en constante proceso de actualización, por favor consulte la portada (http://www.conabio.gob.mx/invasoras/index.php/Portada), en la sección de novedades, para conocer los cambios.

Especies invasoras - Plantas is available from: http://www.conabio.gob.mx/invasoras/index.php/Species_invasoras_-_Plantas

[Accessed 30 July 2008]

Dassonville, Nicolas; Vanderhoeven, Sonia; Vanparys, Valerie; Hayez, Mathieu; Gruber, Wolf; Meerts, Pierre, 2008. Impacts of alien invasive plants on soil nutrients are correlated with initial site conditions in NW Europe. Oecologia (Berlin). 157(1). AUG 2008. 131-140.


ITIS (Integrated Taxonomic Information System). 2005. Online Database Heracleum mantegazzianum

Summary: An online database that provides taxonomic information, common names, synonyms and geographical jurisdiction of a species. In addition links are provided to retrieve biological records and collection information from the Global Biodiversity Information Facility (GBIF) Data Portal and bioscience articles from BioOne journals.


Moravcova, Lenka; Pysek, Petr; Pergil, Jan; Perglová, Irena; Jarosik, Vojtech. 2006. Seasonal pattern of germination and seed longevity in the invasive species Heracleum mantegazzianum. Preslia (Prague). 78(3). SEP 2006. 287-301.


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Pysek, Petr; Krinke, Lukas; Jarosik, Vojtech; Perglova, Irena; Pergl, Jan; Moravcova, Lenka. 2007. Timing and extent of tissue removal affect reproduction characteristics of an invasive species *Heracleum mantegazzianum*. Biological Invasions. 9(3). APR 2007. 335-351.


**USDA, ARS, 2010. Taxon: Heracleum mantegazzianum Sommier & Levier. National Genetic Resources Program, Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland.**
