

NOBANIS – Invasive Alien Species Fact Sheet

Galinsoga quadriradiata

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Bibliographical reference – how to cite this fact sheet:

Kabuce, N. and Priede, N. (2010): NOBANIS – Invasive Alien Species Fact Sheet – *Galinsoga quadriradiata*. – From: Online Database of the North European and Baltic Network on Invasive Alien Species – NOBANIS www.nobanis.org, Date of access x/x/201x.

Species description

Scientific names: *Galinsoga quadriradiata* Ruiz & Pav., Compositae (Asteraceae)

Synonyms: *Wilburgia urticifolia* Kunth, *Adventina ciliata* Raf., *Galinsoga urticifolia* (Kunth) Benth., *G. ciliata* (Raf.) S.F. Blake, *G. hispida* Benth., *G. aristulata* Bickn., *G. bicolorata* St.John & White, *G. caracasana* (DC.) Schultz-Bip.

In some European floras the synonym *G. ciliata* (Raf.) S.F. Blake is considered to be a separate species and *G. quadriradiata* auct. is often cited as a synonym for *G. ciliata*. However, in its native range in South and Central America as well as in modern floras in various European countries *G. ciliata* (Raf.) S.F. Blake is defined as a synonym for *G. quadriradiata* Ruiz & Pav., and *G. quadriradiata* clearly has priority. *Galinsoga* as a genus was described by Ruiz and Pavón in 1794, *G. parviflora* was described by Cavanilles in 1795, and *G. quadriradiata* was described by Ruiz and Pavón in 1798. Flora of North America gives 32 synonyms for the species *G. quadriradiata*. The name *ciliata* is based on *Adventina ciliata*, described by Rafinesque in 1836, and even the name *urticifolia* will have priority before that name, as *Wilburgia urticifolia* was described by Kunth in 1818. The recombinations *G. ciliata* was done by S.F. Blake in 1922 and *G. urticifolia* by Bentham in 1852.

Common names: hairy galinsoga/shaggy soldier (GB), behaartes Franzosenkraut (DE), kirtelkörtstråle (DK), karvane võõrkakar (EE), ripsisaurikki (FI), blakstienotoji galinsoga (LT), matainā sīkgalvīte (LV), harig knopkruid (NL), nesleskjellfrø (NO), żółtlica owłosiona (PL), галинзога четырёхязычковая (RU), hårgängel (SE), pět'our srstnatý (CZ).



Fig. 1. Stem of *Galinsoga quadriradiata*, photo by Normunds Rustanovičs.



Fig. 2. Flowers of *Galinsoga quadriradiata*, photo by Normunds Rustanovičs.



Fig. 3. Leaves and flowers of *Galinsoga quadriradiata*, photo by Normunds Rustanovičs.

Species identification

Galinsoga quadriradiata has an erect stem, 10 – 80 cm high with many branches and covered by coarse hairs. The leaves are opposite, dark green, up to 6 cm long and 4 cm wide, simple, ovate, acute to acuminate, broadest at the base; the leaf-margin is dentate; both surfaces are bristly hairy (Fig. 1). Flower heads are less than 1 cm wide and consist of 4 or 5 white, 3-toothed ray florets and many yellow disk florets (Fig. 2-3). The fruit is an achene, 1.5 mm long, hairy, tapered from the base to the apex, with a white pappus that resembles a crown. Pappus scales are entire and involved bracts have a very narrow, acute apex (Anonymous 1996, Šulcs 1998, Reinhardt *et al.* 2003).

Due to some similarities it is often confused with *G. parviflora*, which is paler green, has short hairs and 3-lobed pappus scales and involved bracts with broader and rounded apex (A. Kurtto, pers. comm.).

Native range

The native range of *G. quadriradiata* covers parts of South and Central America from Mexico to Chile, but due to human activity the species has been spread far from its original range (Fig. 4.).

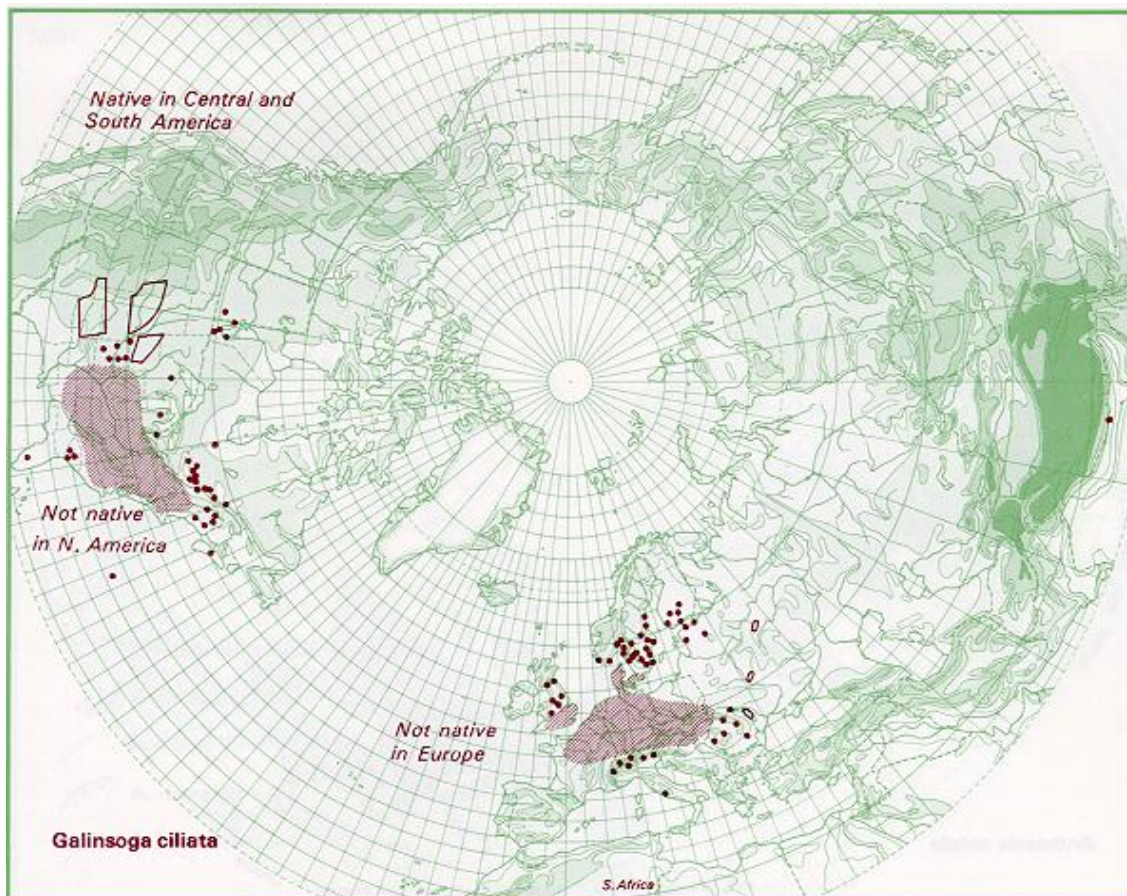


Fig. 4. Distribution of *Galinsoga quadriradiata* (Hultén and Fries 1986).

Alien distribution

History of introduction and geographical spread

Galinsoga species originate in South America. Firstly, *Galinsoga* species were introduced from Peru into Kew Gardens in the U.K. in 1796 and by 1863 *G. parviflora* was described as ‘quite as common as groundsel’ in the area between Kew and East Sheen (Gray 1863 in Bond et al. 2006). In comparison to its congener species *G. parviflora*, *G. quadriradiata* did not spread that rapidly, however both of them are similar in their spreading histories. Nowadays *G. quadriradiata* is a weed growing in many crops, gardens and wastelands in most temperate and subtropical regions of the world (Kagima 2000). It is one of the most common weeds in North America. The earliest recorded naturalized population in North America was found in the vicinity of Philadelphia, where it was growing in the Bartram Botanical Garden from 1836 (Shontz and Shontz 1970 in Kagima 2000). The species is extensive in Africa (Kagima 2000), present also in India (Gopinathan, Babu 1982), Nepal (Manandhar 2002), Taiwan and other regions of the world.

In Europe *G. quadriradiata* was first recorded at the end of 19th century (Šules 1998), and currently it is established in many European countries. In Germany *G. quadriradiata* was first found in Hamburg in 1892 (Reinhardt et al. 2003) and in 1925 in the Netherlands (Leni Duistermaat, pers.comm.). In the Baltic States the species was first found in Estonia in 1921 (Tartu) escaped from the botanical garden, and in Lithuania in 1924 (Gulbinai, environs of Vilnius) (Kuusk et al.

2003). In Latvia the first record dates back to 1928 in Liepāja in West Latvia (Melderis 1939). In the Nordic countries the first observations of *G. quadriradiata* are from Norway in 1900 (Lid and Lid 2005), in Sweden it was first recorded in 1926 (Almquist 1929 in Hylander 1971), in Denmark in 1927 (Hansen and Pedersen 1961) and in Finland in 1928 (Saansalo–Taubert 1962). In Poland, the species was first found in the second half of the 20th century near Wrocław (www.iop.krakow.pl/ias/), while the first herbarium records in Poland date back to 1876 (Tokarska-Guzik 2005). In Russia, it was found in 1842 as escaped from Saint-Petersburg Botanical Garden (Гусев 1966). Occasionally *Galinsoga quadriradiata* has been found in the European part of Russia since the 1920s. After 1945 it has expanded in the Ukraine and Belarus. The spreading to the north-western and central districts of Russia is registered from the 1970s (Виноградова 2003). The first record from Siberia was registered in 1991 (Зарубин и др. 1993).

Detailed list of the first records and expansion history of *G. quadriradiata* in numerous European countries is given by Schultz (1984).

The species has still not been found in Iceland, Greenland and the Faroe Islands.

Pathways of introduction

Since 1849, *Galinsoga quadriradiata* was grown in the European botanical gardens and most probably the species has escaped from there, similarly as its congener species *G. parviflora*. Additionally, in many European countries *G. quadriradiata* is introduced unintentionally - transported with soil, with grain or other agricultural products or the seeds have arrived attached to transport vehicles. For instance in Denmark it is hypothesised that the species has had two main routes of unintentional introduction, the first one being with commodities to harbour areas and the other as a pollution in seeds purchased for gardening (Hansen and Pedersen 1962). In Germany, *G. quadriradiata* was first found in a coffee midden suggesting that the species was unintentionally imported with coffee-beans (Reinhardt *et al.* 2003). In Finland, it appears that the species has been introduced exclusively with imported seeds and seedlings of ornamental plants, first to commercial greenhouses and nurseries and then to private gardens and public plantations (A. Kurtto, pers. comm.).

Alien status in region

The species is naturalised in many European countries (Table 1). In Germany and Poland it has spread throughout the entire territories and is especially common in areas under cultivation as well as on ruderal sites (Reinhardt *et al.* 2003, Tokarska-Guzik 2003) (Fig. 5).

In the Baltic States the species is common weedy plant throughout the entire territory occurring in crops and on arable lands (Gudžinskas 1997, Kuusk *et al.* 2003). In Latvia and Lithuania *G. quadriradiata* is an unintentionally introduced species and has never been grown in botanical gardens. The most intensive spreading of *G. quadriradiata* in Lithuania was noted in the 1980s (Gudžinskas 1997). In recent years it has spread very quickly throughout Latvia, and currently in some places it appears more common and successful invader than *G. parviflora*, the previously prevailing *Galinsoga* species in Latvia. The frequency of both species might be changed or due to the similarity of both species and lack of special interest on these invaders they have been confused in the literature (M. Ausmane, pers. comm.). In Estonia it has invaded natural plant communities, but occurs mostly in the southern parts of the country. It grows as a weed in fields and gardens, railways, coastland and dumpsites (Kull and Kukk 2005).

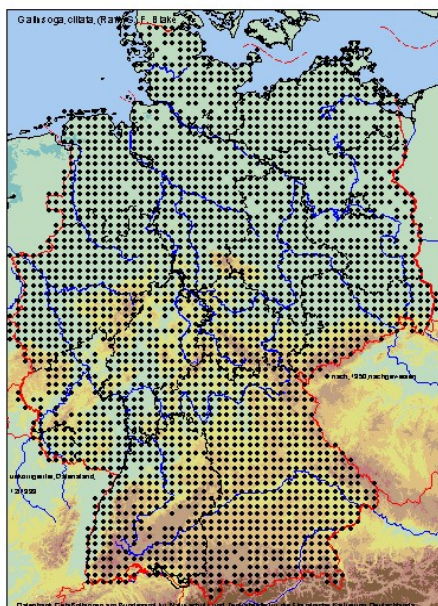


Fig. 5. Distribution of *Galinsoga quadriradiata* in Germany (www.floraweb.de)

The species is common in Denmark, but is not considered as invasive (Hansen and Pedersen 1962, Mossberg and Stenberg 1999). In Finland *G. quadriradiata* is a fairly common weed of heated greenhouses, while in open areas it is rare and has established only in a few cities in the southern part of the country. Due to its low frequency and prevalence for human-created habitats, the species cannot be regarded as invasive in Finland (A. Kurto, pers. comm.). In Norway the species has a weedy character occurring in urban areas and ruderal sites. It is fairly common in the surroundings of Oslo, and it has some scattered localities along the southern coast to about Stavanger in the south-west. It is still considered to be expanding its range in Norway (Lid and Lid 2005). In Russia *G. quadriradiata* is naturalised in the southern part of the European Russia, and it is considered as rare and not established in the northern districts (Цвелев 2000, Григорьевская и др. 2004).

Country	Not found	Not established	Rare	Local	Common	Very common	Not known
Austria						X	
Belgium						X	
Czech republic					X		
Denmark					X		
Estonia				X			
European part of Russia					X		
Finland			X				
Faroe Islands	X						
Germany						X	
Greenland	X						
Iceland	X						
Ireland		X					
Latvia					X		
Lithuania					X		
Netherlands						X	
Norway				X			
Poland						X	
Slovakia							
Sweden					X		

Table 1. The frequency and establishment of *Galinsoga quadriradiata*, please refer also to the information provided for this species at www.nobanis.org/search.asp. Legend for this table: **Not found** – The species is not found in the country; **Not established** - The species has not formed self-reproducing populations (but is found as a casual or incidental species); **Rare** - Few sites where it is found in the country; **Local** - Locally abundant, many individuals in some areas of the country; **Common** - Many sites in the country; **Very common** - Many sites and many individuals; **Not known** – No information was available.

Ecology

Habitat description

Galinsoga quadriradiata is adapted to a warm climate and heavy, nitrogen-rich and clayey soils (Anonymous 1996). It is found in gardens, greenhouses, plantations, cultivated plots, roadsides, railways and dump sites, especially in urban areas (Gudžinskas 1997, Šulcs 1998, Reinhardt *et al.* 2003). These habitats are very similar to habitats where *G. quadriradiata* is found in its native range, where it is also a common weed. Penetration of *G. quadriradiata* into riverbank communities and habitats is noted in Lithuania (Gudžinskas 1997).

In Poland, it is a common crop weed and ruderal plant, found in plant communities of *Sisymbrium*, *Eu-Polygonion* and *Panico-Setarion* alliances. More rarely it occurs in semi-natural habitats such as forest paths, clearings and margins in mixed coniferous and deciduous woodlands (Chmura 2004, Tokarska-Guzik 2005).

Reproduction and life cycle

G. quadriradiata is an annual plant and propagation is only by seeds. *G. quadriradiata* flowers from June until late autumn. The plant is either self- or insect-pollinated (Reinhardt *et al.* 2003).

Seeds are enclosed in an achene and are small, about 1.5 mm long. A plant 8-9 weeks old can produce 3000 flower heads and a large number of seeds, up to 7500 (Kagima 2000, Huffman 2004). Seeds are able to germinate immediately upon contact with warm moist soil; therefore the plant can achieve 2-3 generations each growing season (Reinhardt *et al.* 2003). However, the species is very sensitive to frost, and its seeds require high temperatures to germinate (A. Kurtto, pers. comm.). *Galinsoga* seeds are viable for only a few years under field conditions (Huffman 2004).

Dispersal and spread

Seed dispersal is by wind or animal transport (Reinhardt *et al.* 2003), sometimes by water (Melderis 1939). The small, light seeds can be blown for short distances by the wind. The achenes are covered with short stiff hairs, which may help them cling to the fur of animals or the clothing of humans (Shontz and Shontz 1970 in Kagima 2000). Furthermore, dispersal by human activities related to gardening such as transport of soil and plants plays a major role in the dispersal of the species (Hansen and Pedersen 1961).

At least in Finland, the most effective vectors of dispersal are from clumps of seedlings raised in municipal nurseries or bought in commercial greenhouses. The species is also spread with transport of garden soil (A. Kurtto, pers. comm.).

Impact

Affected habitats and indigenous organisms

G. quadriradiata is often found on arable lands and in gardens. It is highly competitive and spreads quickly often being the dominant species in a field. However, since the species is rarely and occasionally found in natural or semi-natural habitats, its impact on native natural habitats and native species is negligible. No negative effects on habitats or indigenous organisms are known.

Genetic effects

G. quadriradiata can hybridise with *G. parviflora* (Gopinathan and Babu 1982; Reinhardt *et al.* 2003).

Human health effects

No effects on human health are known

Economic and societal effects (positive/negative)

G. quadriradiata causes economical damage to the crop cultures as a strong competitor in weedy plant communities. *G. quadriradiata* is a permanent problem for many farmers including commercial greenhouses, but there are no data on the cost of controlling it as an agricultural weed. The presence of *G. quadriradiata* may reduce yields up to 10 - 50 % in fields planted with vegetables and crops (Kuniga 1994). *G. quadriradiata* takes up nutrients that are necessary for the growth of cultivated plants. Other damage is caused by the relatively high leaf surface area of *G. quadriradiata*, which may shade out cultivated plants (Reinhardt *et al.* 2003).

Galinsoga species serve as alternate hosts for many insects, viruses and nematodes which affect crop species (Huffman 2004).

The young stems and leaves of *Galinsoga* species are cooked and eaten as a vegetable in Africa and southeast Asia. In South America its dried leaves are used as an essential flavouring for certain dishes (Kagima 2000, Grubben and Denton 2004).

Management approaches

Prevention methods

In its introduced range, *Galinsoga* species are considered rather a noxious weed and thus problematic for farming than a problem for native habitats or species. Therefore the prevention methods are adjusted to the needs of farming in order to prevent establishment and spread of the unwanted weed and host for agricultural pest. In Europe, the species is not listed in black lists of invasive plants.

Eradication, control and monitoring efforts

Galinsoga species are best controlled during early blooming period in order to prevent seed production. There are several herbicides which are very effective in controlling *G. quadriradiata* (Reinhardt *et al.* 2003), but since it mainly occurs as a weed in fields planted with vegetables and intercrops, herbicide use is limited or impossible. Priority has been given to biological methods used in weed control (Turakainen 2001). Crop rotation is encouraged, for example, a rotation with corn and tomatoes is recommended (Kagima 2000). Summer cover crops of *Sorghum bicolor* or *Sorghum sudanense* will suppress the germination of *G. quadriradiata* seeds. Early tillage to bury seeds may be useful, since *Galinsoga* seeds germinate best in lightly disturbed soil not deeper than 2 to 3 cm (Huffman 2004). Black plastic mulch is a good control in intensive agriculture production or in home horticulture. One of the other possible control measures is the use of allelopathy. Allelopathy traits in winter rye have been reported (Turakainen 2001). If *Galinsoga* has recently appeared in the garden, regular combating with a hoe is likely to be successful.

Information and awareness

The information (articles in press, other media etc.) on *Galinsoga* species spread for public is mainly related to control and eradication methods for gardeners and farmers, *e.g.* Bond *et al.* (2006). No campaigns concerning particularly *G. quadriradiata* are known in the region. In some cases, some attention was paid in a context to other alien plants, *e.g.* in Estonia the Ministry of Environment has published two booklets giving information on invasive alien species of local importance (in 2001 and 2005), which also mention this species.

Knowledge and research

Research on the effect of winter rye and winter rape in *Galinsoga* seed viability and development was conducted in 2001 in the Latvian University of Agriculture, Department of Soil Management (M. Ausmane, pers. comm.).

Recommendations or comments from experts and local communities

None.

References and other resources

Contact persons

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Links

[USDA](#) Plants Database

[Den](#) virtuella floran (in Swedish)

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Date of creation/modification of this species fact sheet: 22-08-2007/ 14-12-2010