GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Senecio inaequidens***

Senecio inaequidens 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae

Common name

narrow-leaved ragwort (English), guano bush (English), senecione Sudafricano (Italian, Italy), séneçon du Cap (French, France), Starcek úzkolistý (Czech, Czech Republic), Starzec nieróżnozebny (Polish, Poland), Smalbladet Brandbæger (Danish, Denmark), small-leaved groundsel (English), South African ragwort (English, Great Britain), sénecon Sud-africain (French, France), Bezemkruiskruid (Dutch, Netherlands), groundsel (English), Südafrikanisches Greiskraut (German, Germany), Ungleichzähniges Greiskraut (German, Germany), Buurivillakko (Finnish, Finland), Boersvineblom (Dutch, Netherlands), Schmalblättriges Kreuzkraut (German, Germany), Boerstånds (Swedish, Sweden)

Synonym

Senecio burchelli
Senecio carnulentis
Senecio douglasii
Senecio vimineus
Senecio harveianus
Senecio lautus
Senecio paniculatus
Senecio reclinatus
Senecio fasciculatus minor

Similar species

Senecio douglasii, Senecio harveianus, Senecio lautus, Senecio lythroides, Senecio madagascariensis, Senecio malacitanus, Senecio paniculatus

Summary

Senecio (Asteraceae) contains circa 1500 species worldwide of which 133 are considered weeds. *Senecio inaequidens* is a dominant invasive species throughout western Europe and is one of the most rapidly spreading introduced plant species in Europe.

view this species on IUCN Red List

Species Description
Senecio inaequidens is a perennial herbaceous or woody shrub, up to 100 cm tall, spherically shaped, rising from a shallow taproot. The stems and leaves can be described as follows: stems erect, leafy, rising from the woody base, numerously branched and glabrous, but sometimes sparsely hairy; leaves alternate, usually sessile, occasionally petiolate, with the blade bright green, simple and slightly thickened, usually with the base clasping the stems, basal leaves sessile, 3 to 14 cm long and 0.3 to1 cm wide and have linear to elliptic-lanceolate blades with acute apices. The name 'inaequidens' means 'irregular teeth' in Latin and refers to the margins of the leaf blade, which are irregularly-toothed. The upper leaves are shortly petiolate, subsessile or sessile and occasionally pinnately-lobed. The inflorescence is an open, terminal or axillary, corymbose panicle ranging from 80 to 100 per plant. Radiate capitula 18 to 25 mm in diameter; with about 20 involucral bracts are characteristic of the species. The bracts are narrowly ovate with acute apices, more or less glabrous, keeled, 5 mm long and resinous. The calyculus bracts, 8 to12, have acute apices, are more or less glabrous and dark tipped. The ray florets, 7 to 13, are female, with bright yellow ligules, which become revolute. A cypsela (fruit) is 2.0 to 2.5 mm long, cylindrical, pubescent between ribs with a white pappus, 2 to 3 times as long as the cypsela and readily detached. (Dimande *et al*. 2007)

Notes
Pyrrolizidine alkaloids produced by *Senecio* are known to accumulate in roots (Hartmann 1994, in Medina *et al*, 2003), and allelopathy may be a component of *Senecio* ability to invade disturbed areas. These chemicals are also toxic to many animals such as livestock; *S. inaequidens* is often avoided by grazing animals which contributes to the success of the plant and its competitive advantage over other species found in Mediterranean pastures (Bossdorf *et al*, 2008). Bossdorf *et al*, (2008) found that plants from introduced populations had a significantly lower reproductive output, but higher allocation to root biomass and they were more tolerant to insect herbivory. Invasive populations of *S. inaequidens* in Europe were found to be significantly larger and less parasitised than plants in native South African populations (Prati & Bossdorf 2004, in Bossdorf *et al*, 2008).

Lifecycle Stages
Senecio inaequidens is a short-lived perennial, with a life span of 5-10 years (Brunel 2003, in EPPO 2006b).

Uses
The species is not used in Europe in any way. Reportedly the leaves of *Senecio inaequidens* are used as food in specific populations of Southern of Africa. Antioxidant, anti-diabetic and cytotoxic testing of *S. inaequidens* was conducted be Filomena and colleagues (2006); results suggested the extracts may confer anti-diabetic properties.

Habitat Description
Habitat preferences: ruderal areas, rocky outcrops, sand dunes (Belgian Forum on Invasive Species, 2008). In its native region *S. inaequidens* colonises steep moist grassy slopes and sand and gravel banks of periodic streams at elevations of between 1400 and 2850 m (Hilliard 1977, in Heger & Böhmer 2006). In South Africa is it also found on roadsides, in areas damaged by fire and on coastal dunes of the Eastern Cape Province, and in Lesotho, Botswana, Namibia and Mozambique (Heger &Böhmer 2006). In South Africa the species colonises a wide ecological range of areas from dry to humid habitats, from stone to clay soils, and from exposed to shaded locations (Werner *et al*. 1991, *cf*. Adolphi 1997, in Heger & Böhmer 2006).
S. inaequidens can grow under temperate and Mediterranean climates. It is opportunistic and has the ability to colonise a wide range of habitats including the following vegetation zones: temperate deciduous forests, temperate steppes and Mediterranean sclerophyllous forests and sclerophyllous shrubs (EPPO 2006b). In Italy *S. inaequidens* spreads along roads and torrents and up to altitudes of 1420 meters (Brandes 1999). It reaches the highest cover at well drained places lying in the full sun with a vegetation cover of between 20 and 85 percent (Brandes 1999). The species even invades in montane pastures and montan (subalpine) ruderal vegetation (Brandes 1999). In other parts of its range it has been observed from coastal areas up to 1900 m altitude (EPPO 2006b). It is also found in natural environments such as dunes and cliffs in littoral areas, and temporary ponds in France (Brunel 2003, in EPPO 2006b). Unusual habitats include lawns and the facade of the cathedral at Cologne, Germany (Heger & Böhmer 2006).
S. inaequidens colonises open and disturbed lands, wastelands, fallows, railway tracks, roadsides, crops (vineyards), burnt land and pastures (EPPO 2006b). In Central Europe *S. inaequidens* spreads rapidly along motorways and railroad tracks and grows predominantly in ruderal habitats and occasionally old fields in early successional stages (Bossdorf *et al* 2008). In Europe *S. inaequidens* grows on warm and dry ruderal sites and is often found associated with railroads and gravel areas, highways, river ports, logging areas, industrial sites, disused quarries, storm-damaged forests and on flat roofs or in flower tubs. It also occurs on natural sites such as in volcanic soils, on rocky sites (in the central Rhine valley, Germany) and in coastal dunes of Belgium and Germany (Heger & Böhmer 2006).
Disturbance has been shown to enhance invasion (Hobbs & Huenneke 1992, in Cano & Sans 2007) by supplying aliens with new resources, as a consequence of the decline in the use of the resources by native vegetation. Garcia-Serrano and colleagues (2004) also found that shrubs facilitated the recruitment of *S. inaequidens*; the presence of open shrublands can be a driving force for the invasion processes of introduced species in Mediterranean communities (Cano & Sans 2007). Shrubland was the habitat that most favoured recruitment in natural conditions, however, grassland was the most suitable habitat in the short term (Cano & Sans 2007). Severe disturbances such as fires could also occur in forests and allow the invasion of grass and shrub lands (Cano & Sans 2007).
Mean annual rainfall ranges from 500 to 1000 mm. Mean annual temperature ranges from 10 deg;C to 20 deg;C. Mean maximum temperatures are 30 deg;C to 35 deg;C. Mean minimum temperatures are minus 5 to 0 deg;C. The absolute minimum temperature is minus 15 deg;C (EPPO 2006b).

Reproduction
Phenological studies of *Senecio inaequidens* have shown a long period of flowering and seeds production (Pace & Tammaro 2006). *S. inaequidens* produces flowers mainly in spring and autumn, but it may flower all year round (Dimande *et al*. 2007). In Spain the species is known to geminate in the spring and in the fall (Cano & Sans 2007). In France flowering occurs from April to January (EPPO 2006b). On average 10 000 seeds are produced per plant and per year; achenes (dry fruit-like propagules) may remain viable for at least 2 years when stored dry (Ernst 1998, in EPPO 2006b). In south-western Germany *S. inaequidens* produces flowers from July to December (Heger & Böhmer 2006).
Germination can take place during most of the year and may be favoured by compacted soils (see EPPO 2004, in Heger & Böhmer 2006). In controlled studies by López-García & Maillet (2005) *S. inaequidens* germinated over a wide temperature range (from 14 deg;C/6 deg;C day/night temperatures to a constant temperature of 30 deg;C).

General Impacts
Senecio inaequidens is a declared noxious weed by the United States Department of Agriculture Animal and Plant Health Inspection Service. The Global Compendium of Weeds lists it as an agricultural and environmental weed. It is included in the European and Mediterranean \nPlant Protection Organization List of Invasive Alien Plants under the Phytosanitary *EPPO A2* alert list, however, it is not currently regulated by any European country (EPPO 2006b). The plant is listed as a noxious weed in Hawaii. It is a declared pest plant in Queensland and New South Wales (Australia) and is a prohibited species in Western Australia. It is reported as a weed in vineyards and reduces the value of invaded pastures (Michez 1995, Mayor 1996, Brunel 2003, in EPPO 2006b).
Large quantities of *Senecio* species ingested by livestock over a short period of time induce acute poisoning which leads to death. A large single non-lethal dose or multiple lower doses ingested over a longer period may cause chronic diseases including anorexia, diarrhoea and nervous system symptoms including incoordination of the hind limbs, circling, apparent blindness and tremors (Dimande *et al*. 2007).
Invasive plants are capable of modifying ecosystem function. In a study by Dassonville and colleagues (2008) the impacts of highly invasive plant species, including *Senecio inaequidens*, on nutrient pools in the topsoil and the standing biomass was tested. Invaded plots had increased above-ground biomass and nutrient stocks in standing biomass compared to un-invaded vegetation. Enhanced nutrient uptake may be a key trait of highly invasive plant species.
German experts agree that *S. inaequidens* does not demonstrably pose a threat to indigenous species or plant communities at present as the plant rather appears to fill vacant ecological niches in Europe. It has not been investigated whether the species puts indigenous species at risk near natural sites but it has been observed that *S. inaequidens* forms dominant populations on rocky sites (Adolphi & Klingenstein Pers. Comm., in Heger & Böhmer 2006). It is impossible to exclude a threat to indigenous plant species of great importance to nature conservation (eg: blue lettuce *Lactuca perennis*). Its colonisation success on open rocky sites may pose a risk to endangered animal species (eg: Saltatoria - a division of Orthoptera including grasshoppers, locusts, and crickets). In coastal dunes it occurs especially in yellow dunes with marram grass (*Ammophila arenaria*) and in sea-buckthorn scrub (*Hippophae rhamnoides*) where it changes the floristic composition of the dune vegetation (Isermann Pers. Comm., in Heger & Böhmer 2006). In the French Mediterranean area it is reportedly a threat to native *Centaurea corymbosa* (Brunel 2003, in EPPO 2006b).
S. inaequidens is a cereal crop weed and in South Africa may find its way into bread causing toxicity in consumers and perhaps even death (Bromilow 1995, in Heger & Böhmer 2006). *S. inaequidens* toxins may also be detected in the milk of cattle which feed on the plant, although it is usually avoided by grazing animals. In France *S. inaequidens*can be found in vineyards and pastures and in Denmark the species has been found in apple tree orchards (Skovgaard Pers. Comm., in Heger & Böhmer 2006).
Because narrow-leaved ragweed is not susceptible to the most commonly used herbicide, glyphosphate, this plant causes additional annual expenditures of 100,000 Euros for control measures along railroad tracks in Germany (Reinhardt & Streit 2003).
Climate change can be considered to have favoured the invasion of *S. inaequidens* in Europe and the plant's ability to reproduce may increase considerably with the gradual warming of the climate (Heger & Böhmer 2006).

Management Info
Control of *Senecio inaequidens* is almost impossible once the plant is established (EPPO 2006b).
Monitoring: The identification of critical mechanisms that favour invasion is useful for local managers. One of the main outcomes of a Mediterranean study by Cano & Sans (2007) was to recommend a survey of open shrublands and grasslands during rainfall periods. A monitoring program is advisable in areas where *S. inaequidens* has either begun to exert massive colonisation pressure on locations outside of the ruderal sites preferred in the past or is capable of doing so (eg: in cereal cultures). A monitoring program should focus on expulsion mechanisms between *S. inaequidens* and thermophilous native species with poor competitive capacity, as well as on the potential impacts to agriculture and human health in terms of toxic contamination of produce (see General Impacts) (Heger & Böhmer 2006).
\n**Field management**: Reducing the risk of fire, avoiding overgrazing and sowing with perennial species with good ground cover such as *Trifolium* spp. are likely to limit the spread of *S. inaequidens* (Brunel 2003, in EPPO 2006b). From a management perspective it is clear that disturbance increases invisibility in all habitat types. Therefore disturbance should be reduced in natural ecosystems to minimize invasion by *S. inaequidens* (Garcia-Serrano & Sans 2004).
Manual control: Hand-pulling or mowing before flowering repeated for several years has proven to be effective in some natural areas of the South of France (EPPO 2006b). However, other sources claim *S. inaequidens* is resistant and even promoted by mowing (Radkowitsch Pers. Comm., Werner Pers. Comm., in Heger & Böhmer 2006). Non-specific control measures such as mowing may actually provide a competitive advantage for *S. inaequidens* over other ruderal plants (*cf.* also Guillerm *et al*. 1990, in Heger & Böhmer 2006). If using such a method monitoring and control must be carried out over several years to remove the seed bank. Hand-pulling is at best a method for small areas of establishement. Eradication has been achieved in Corsica in this way. It is essential to collect and destroy the plants which have been pulled out as they can still produce achenes (a type of dry fruit propagule) for two or three days following removal (EPPO 2006b).
\n**Chemical control**: It has been observed that this species is exceptionally resistant to herbicides (Hard Pers. Comm., in Heger & Böhmer 2006). In vineyards, treatment with low toxicity phytosanitary products has proved effective in the South of France (EPPO 2006b).
\n**Biological control**: The aphid *Aphis jacobaeae* is associated with the European native *Senecio. jacobaea* and has been observed to attack *S. inaequidens* in France (Fort *et al*. 2003, in EPPO 2006b). The beetle *Longitarsus jacobaeae* (*cf.* Scherber *et al*. 2003, in Heger & Böhmer 2006) is another proposed biological control agent; the adults of these beetles accept *S. inaequidens* for feeding and mating (Scherber *et al*, 2003). However biological control may not be easy to apply in practice or may only be applicable for small areas (*cf.* EPPO 2004, in Heger & Böhmer 2006).

Pathway
Senecio inaequidens finds in Helsinki, Finland, point to the possibility of spreading achenes (dry fruits) on the surfaces of containers (Kurtto Pers. Comm., in Heger & Bhmer 2006).*Senecio inaequidens* may be transported over considerable distances in the profile of tires (Griese 1996, in Heger & Bhmer 2006). Conveyances via road and rail vehicles are considered a transport pathway for long distance movement of *Senecio inaequidens* (Ernst 1998, in EPPO 2006b).

Principal source: Heger, T. and Böhmer, H.J., 2006: NOBANIS – Invasive Alien Species Fact Sheet – Senecio inaequidens. – From: Online Database of the North European and Baltic Network on Invasive Alien Species – NOBANIS
European and Mediterranean Plant Protection Organization (EPPO). 2006b. Data sheet on Invasive Plants *Senecio inaequidens*

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Summary: This compilation of information sources can be sorted on keywords for example: Baits & Lures, Non Target Species, Eradication, Monitoring, Risk Assessment, Weeds, Herbicides etc. This compilation is at present in Excel format, this will be web-enabled as a searchable database shortly. This version of the database has been developed by the IUCN SSC ISSG as part of an Overseas Territories Environmental Programme funded project XOT603 in partnership with the Cayman Islands Government - Department of Environment. The compilation is a work under progress, the ISSG will manage, maintain and enhance the database with current and newly published information, reports, journal articles etc.

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