

Rumex obtusifolius [简体中文](#) [正體中文](#)

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae

Common name acedera obtusifolia (Spanish), bijuaca (Spanish), romaza vulgar (Spanish), vinagrillo (Spanish), engorda puercos (Spanish), acedera de hojas obtusas (Spanish), bluntleaf dock (English), broad-leaved dock (English), romaza de hojas grandes (Spanish), pabelle (French), patience à feuilles (French), rumex à feuilles obtuses (French), patience sauvage (French), broadleaf dock (English), celery seed (English), oseille (French), dun ye suan mo (Chinese), ezo-no-gishi-gishi (Japanese), bitter dock (English), lengua de vaca (Spanish), labaca (Portuguese), dock (English), yerba mulata (Spanish), língua-de-vaca-amarga (Portuguese), stumpfblättriger Ampfer (German), labaça-de-vaca-amarga (Portuguese)

Synonym *Rumex obtusifolius*, var. *subalpinus* Schur [= *Rumex obtusifolius* subsp. *subalpinus*]
Rumex sylvestris, Wallr. [= *Rumex obtusifolius* subsp. *silvestris*]
Rumex sylvestris, var. *transiens* Simonk. [= *Rumex obtusifolius* subsp. *transiens*]

Similar species *Rumex hydrolapathum*

Summary Broad-leaved dock (*Rumex obtusifolius*) is a problematic weed throughout its native and introduced range. It invades a wide variety of habitats in the Sub-Antarctic region including areas dominated by native plant species. It is also a major problem in pastures. Current management strategies include chemical and mechanical control, although studies investigating biological control agents are ongoing.



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Species Description

Rumex obtusifolius is an erect perennial herb that grows up to 40-150cm tall. Plants usually consist of a basal rosette of leaves and a large, fleshy taproot. The leaves develop individually as tightly rolled leaf spikes. These spikes unfurl about a week after initiation, the leaves going on to expand to a maximum size of 40 cm long by 20 cm wide (I.P. Keary, pers. obs., in Grossrieder & Keary, 2004). Leaf area and stem length are very plastic in response to environmental cues, especially light. Developmental rates and overall plant size also vary a great deal between individuals grown in similar conditions (I.P. Keary, pers. obs., in Grossrieder & Keary, 2004). During flowering, a tall spike up to 150 cm in height is produced which bears the inflorescence. Following flowering, the plant undergoes defoliation. This can result in a complete loss of leaves for up to two months (Grossrieder & Keary, 2004).

Notes

Subspecies of *Rumex obtusifolius* include: *Rumex obtusifolius* subsp. *obtusifolius*, *Rumex obtusifolius* subsp. *silvestris*, *Rumex obtusifolius* subsp. *subalpinus*, *Rumex obtusifolius* subsp. *transiens* (USDA-NRCS 2008).

Lifecycle Stages

The number of seeds produced is highly variable, from about a hundred to a maximum of 60,000 to 80,000. The seeds are small and highly dispersive. They are capable of being moved long distances by wind and animals and can be transported both on the coats of livestock and via their dung. However, the majority of the seeds tend to be found clumped close to the parent plant. Flowering seldom takes place in the first year of growth (although it has been recorded as early as 9 weeks after germination), thereafter the plant normally flowers once a year, but twice is not uncommon (Grossrieder & Keary, 2004).

Rumex obtusifolius is a perennial plant, meaning it persists for several seasons. A study investigating *R. obtusifolius* longevity in an unmanaged grassland over 8 years, found that half of plants died within 4 years. 4% of plants survived the whole 8 years. In general winter mortality was greater than summer mortality. Plants decreased in size before mortality. Below ground competition and water deficiency are proposed reasons for most mortalities (Martinkova *et al.*, 2009).

Uses

Rumex obtusifolius is sometimes used for medicinal purposes (USDA-NRCS 2008). It is used in folklore medicine, and has been used as an antidote to nettle, depurative, astringent laxative and for the treatment of sores, blisters, burns, cancer and tumours (Dr Duke's Phytochemical and Ethnobotanical Databases, 2009 in Harshaw *et al.*, 2010). Studies of the plant have revealed the presence of anthracene derivatives, flavonoids, procyanidins, oxalic acid. It also has antioxidant and antibacterial activities (Harshaw *et al.*, 2010).

Habitat Description

Historically *Rumex obtusifolius* has been particularly associated with disturbed ground, short-term leys and badly managed grassland but is now a widespread problem across many farms, including organic farms, in Europe. Its adaptation to growth on naturally disturbed environments, such as river banks and dunes, makes it ideally suited to colonising gaps and wasteland produced by human activity (Grossrieder & Keary 2004). In addition to a wide climatic tolerance (see Geographical Range sub-heading), Cavers & Harper showed that the plant is capable of growing from seed on a wide range of soils, with only the most acid soils, such as those from peat bogs, inhibiting growth (in Grossrieder & Keary 2004).

In the Sub-Antarctic region, where it has been introduced, *R. obtusifolius* tends to dominate disturbed land such as soil-slips and depressions and man-modified sites (Dean *et al.* 1994). In general it invades a variety of habitats including: footpaths, landslides, depression left by boulders, old settlements/cultivations, rivers, beach lands, bird burrows and nests, cleared plots, marsh land and undisturbed/native vegetation (Dean *et al.* 1994).

R. obtusifolius is naturalised in Hawai'i in relatively mesic, disturbed areas; sometimes present in areas dominated by native species, usually found at altitudes of between 600 and 1470 meters (Wagner *et al.* 1999, in PIER 2007). This species is present in New Zealand near human habitations; it is also common to abundant in pastures, river banks, open moist places and around stockyards, cowsheds and other places with high nitrogen levels (Webb *et al.* 1988, in PIER 2007).

Reproduction

Rumex obtusifolius reproduces via production of seeds enclosed in a fruit (Holm *et al.*, 1977 in PIER, 2007). The seeds can remain viable in the soil for many years. A very small number of seeds retain viability after 80 years burial and around a third remain viable after 20 years (Grossrieder & Keary, 2004). The persistence of its seeds, combined with the longevity and seed-producing capacity of the mature plants, means that *R. obtusifolius* is able to make a large contribution to the soilborne seed bank of any areas it infests. This extends the problems presented by the weed beyond the life span of the current mature plants until the seed bank is exhausted (Grossrieder & Keary, 2004).

R. obtusifolius can also reproduce clonally. If the taproot is split during cultivation, the fragments can regenerate to produce new plants (Grossrieder & Keary, 2004). Work by Pino *et al.* has shown that only the underground stem above the root collar can produce such regrowth. Despite this finding, it is still common practice to remove at least the upper 9 cm of the root system to prevent regrowth (in Grossrieder & Keary, 2004). The underground stem system can also split naturally with age and secondary root systems develop, allowing the plant to spread clonally in closed habitats (Grossrieder & Keary, 2004).

Nutrition

Rumex obtusifolius is a C3 plant. It strongly competes with other, agriculturally valuable species for resources (nutrients, water, space and light) (Ref). It can survive on low nutrient soils (Martinkova *et al.*, 2009). A recent study found that *R. obtusifolius* increases its above ground biomass in response to drought, causing it to comprise 80% of total community biomass. It is much less affected by drought than other plant species due to higher water use efficiency and change in nitrogen acquisition patterns. This gives *R. obtusifolius* a competitive advantage over other species, which may be particularly pronounced in future drier climatic conditions (Gilgen *et al.*, 2010).

General Impacts

Rumex obtusifolius is a major weed of gardens and arable land (Webb *et al.*, 1988 in PIER, 2007). The Global Compendium of Weeds (2007) lists *R. obtusifolius* as an agricultural, environmental and garden weed. Broad-leaved dock is a pernicious weed throughout its native and introduced range. It invades agricultural land, particularly heavily managed pasture land. In the grassland systems of Switzerland *R. obtusifolius* is a major problem. As a weed of pastures and meadows, the main impact of this plant is to reduce the value of infested land as grazing for livestock. *R. obtusifolius* is only 65% as valuable as grass as grazing material because of a combination of reduced palatability (and therefore grazing levels) and reduced digestibility (Courtney & Johnson, 1978 in Grossrieder & Keary, 2004). It also contains oxalic acid which may be poisonous to livestock.

Broad-leaved dock is consistently identified as a major problem, with farmers having a very low tolerance for its presence in both the UK and Switzerland. Infestation of grassland by this weed is consistently cited by organic farmers as a particular cause for concern, although both species prove difficult to control even when chemical interventions are allowed. Established plants of both species possess a large and persistent taproot that contains a large reserve of resources. This allows individual plants to tolerate repeated defoliation (Grossrieder & Keary, 2004).

Mature plants also suppress the grass yield of pasture. Oswald and Haggard (in Grossrieder & Keary, 2004) found that increasing ground cover by *Rumex* reduced grass yields, as did increasing *Rumex* density. According to Courtney (Grossrieder & Keary, 2004), this effect is greater when the pasture is cut 3 to 4 times a year (a 70% reduction in grass yield) rather than 5 to 7 times a year (a 16% reduction).

These problems are exacerbated by the ability of *R. obtusifolius* to exploit nitrogen efficiently. Niggli *et al.* (in Grossrieder & Keary, 2004) found that increases in fertilizer had no negative effect on the weed. Jeangros & Nösberger (in Grossrieder & Keary, 2004) found that higher levels of nitrogen fertilization were of net benefit to *R. obtusifolius* seedling growth, particularly when shoot competition with the sward was reduced. Additionally, plants can host high diversity of plant pathogens and invertebrate pests that may affect surrounding plants (Martinkova *et al.*, 2009 and references therein).

Management Info

The long-term goal of control measures against *Rumex* is to reduce build-up of seeds and weaken their regrowth capacity by removing or destroying their above- and below-ground biomass.

Chemical: *R. crispus* is sensitive to many herbicides, especially synthetic auxins (MCPA, 2,4-D, dicamba, dichlorprop-P, fluroxypyr, etc.) and many sulphonylureas (tribenuron, thifensulfuron, amidosulfuron, etc.) (Jursík *et al.*, 2008). Thifensulfuron can be used for dock management in perennial legume stands, good efficacy is also shown by asulam, which is recommended for local application only, due to lower selectivity (Jursík *et al.*, 2008). Public concern about pesticides in the environment has led to greater demand for non-chemical control methods and the development of mechanical and cultural measures to control plants (Zaller, 2004).

Mechanical: If herbicides are not used, the best option is control via manual removal or destruction of plants. This can be achieved via hand weeding, although is only suggested for use in small areas as it is labour intensive (Besson *et al.*, 1982 in Grossrieder & Keary, 2004). It is necessary to remove the tap root to a depth of 20 cm in order to prevent regrowth (Zaller, 2004). Recent developments in mechanical control include a motor-driven dock pulling machine which can pull up about 600 *Rumex* plants per hour (Pötsch, 2003 in Zaller, 2004). Well developed *R. obtusifolius* plants can be difficult to control with cutting or grazing. Because of rapid replenishment of carbohydrate in roots, plants require repeated defoliation over a period of several years, which can be achieved by frequent cutting or grazing (Stilmant *et al.*, 2010). However, increased cutting frequencies may increase disturbance and offer opportunities for new seedlings to germinate and establish (Grossrieder & Keary, 2004).

Grazing: Grazing by sheep has been proposed as an alternative to manual removal, but may not be as effective as hand pulling (Van Middelkoop *et al.* 2005 in Van Evert *et al.*, 2009). While *Rumex* species are unpalatable to many livestock, they are a favourite of deer (Cavers & Harper, 1965). More studies should focus on mixed grazing (e.g. cows and goats) to control *Rumex* (Zaller, 2004).

Cultural: Mechanical removal can be combined with grassland renewal and rotation with a grain crop (Van Middelkoop *et al.*, 2005 in Van Evert *et al.*, 2005). Some authors have suggested combating the problem of regrowth by leaving the ground as a bare fallow following a rotary cultivation in spring, so that the unearthed root fragments are killed by desiccation (in Grossrieder & Keary 2004). As *Rumex* seedlings require high light, control through shading may be effective (Zaller, 2004).

Biological: Numerous insects and fungi have been proposed as biological control agents for *R. obtusifolius*. The most thoroughly studied organisms are the beetle *Gastrophysa viridula* and the rust fungus *Uromyces rumicis*. Studies with Coleoptera have found reductions in seed production, regeneration, and leaf and shoot growth. Similarly studies with fungi have found similar effects and increased root rotting. However no agent has shown to be sufficiently effective against *R. obtusifolius*. Studies have shown that combinations of herbivorous beetles and fungi may produce more effective results. Efficacy of biological control tends to be more effective when plants are already stressed by environmental conditions (Reviewed by Zaller, 2004).

Principal source:

Grossrieder, M. & Keary, I.P. 2004. The potential for the biological control of *Rumex obtusifolius* and *Rumex crispus* using insects in organic farming, with particular reference to Switzerland. *Biocontrol News and Information*, 25(3): 65-79.

Zaller, J.G. 2004. Ecology and non-chemical control of *Rumex crispus* and *R. obtusifolius* (Polygonaceae): a review. *Weed Research*, 44: 414-432.

Compiler: Interim profile: IUCN SSC Invasive Species Specialist Group (ISSG) with support from the EU-funded South Atlantic Invasive Species project, coordinated by the Royal Society for the Protection of Birds (RSPB) Updates with support from the Overseas Territories Environmental Programme (OTEP) project XOT603, a joint project with the Cayman Islands Government - Department of Environment

Review:

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ALIEN RANGE

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| [1] FALKLAND ISLANDS (MALVINAS) | [1] JAPAN |
| [1] NEW ZEALAND | [1] REUNION |
| [3] SAINT HELENA | [1] SAINT PIERRE AND MIQUELON |
| [1] SOUTH AMERICA | [4] UNITED STATES |

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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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