GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Clematis vitalba***

Clematis vitalba 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae

Common name traveler's-joy (English), Gewoehnliche Waldrebe (German), powojnik pnacy (English, Poland), old man's beard (English), evergreen clematis (English)

Synonym

Similar species *Clematis ligusticifolia, Clematis tibetana, Clematis flammula*

Summary *Clematis vitalba* is a perennial vine with climbing, woody stems that can grow 20 to 30 metres long. In the native ranges *C. vitalba* is associated with chalk and limestone areas, but outside of its native range, this species is found in forestlands and in the margins and openings of forested lands. It is also found in riparian areas established with willows, in waste areas, and in coastal and lowland areas. This species physically smothers and collapses indigenous forest and causes a loss of indigenous plant species. When this loss occurs there is an influx of exotic plants into gaps or grazing damage by livestock. Control using a combination of mechanical and chemical methods can be effective but is very expensive. Much research is being conducted in the hopes of discovering biological means to control this species.

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Species Description

Clematis vitalba is described as a perennial vine with climbing, woody stems. It can grow 20 to 30 metres long. The leaf arrangement is opposite. The leaves are pinnately compound, consisting of usually 5 leaflets. The leaflet margins are usually entire, but the upper leaflet is sometimes 3-lobed. This species is deciduous. The flowers are white to greenish-white, and they are about 2cm in diameter. The inflorescence of *C. vitalba* is a terminal axillary panicle - the flowers are found in stalked clusters of the upper leaf axils. Each individual flower is perfect, they contain both male and female flower structures (stamens and pistils). The flowers do not have petals - they are composed of 4 sepals, many stamens and many styles. Some stamens can be non-fertile, and some are petaloid. The styles are plumose (feathery), and they are long, white and persistent. The fruit is an achene (The Washington State Noxious Weed Control Board, 2003).

Lifecycle Stages

The Washington State Noxious Weed Control Board (2003) states that, \"*Clematis vitalba* is a woody, perennial vine, with annual leaf loss (deciduous). Flowers are visible throughout most of the summer. The whitish, fluffy seed heads are visible in the fall and winter (as are the leaves for several weeks in fall (autumn)- bright yellow (Colin Ogle., pers.comm., 2005) Seeds fall sporadically over the winter, which may contribute to a seed bank.\"

Uses
Clematis vitalba is grown as an ornamental species in Europe, and its English common names are old man's beard or traveller's joy (Hill *et al.* 2001). The Plants For A Future Database (2003) reports that, \"Young shoots can be cooked and used like hop shoots (*Humulus lupulus*), **but that caution is advised due to reports of toxicity**.\" The authors also state that, \"The leaves are analgesic, diuretic and rubefacient. The boiled roots and stems are used as a cure for the itch. When applied in the nostrils, the plant juice has been used to relieve migraine attacks, but it can also destroy the mucous membranes. **The plant should not be taken internally because it is poisonous**.\" The authors report that, \"The stems can be used in basketry.\"

Habitat Description
In the native ranges of Wales and southern England, *Clematis vitalba* is associated with chalk and limestone areas. Low calcium levels impede, or delay the growth. In central Europe this species is found in soils ranging from weakly acidic to weakly basic, and it requires highly fertile soils with good drainage. The climate of the native ranges is temperate and moist. Limiting factors in native ranges include an annual rainfall of less than 800mm (31.5 inches), and the low summer temperatures of the higher elevations. Outside of its native range, this species is found in forest lands and in the margins and openings of forested lands. It is also found in riparian areas established with willows, in waste areas, and in coastal and lowland areas (Cronk and Fuller, 1995). In Washington State, *C. vitalba* is found west of the Cascade Mountains. Bungard *et al.* (1999) state that, \"*C. vitalba* tends to favours soils with moderate to high fertility, calcareous soils, and recently disturbed soils where it can be expected that NO3 is the dominant form of plant-available N (Haynes, 1986).\" Infestations of *C. vitalba* occur in forest reserves, gardens, road margins and other places around Taihape in New Zealand (Ogle *et al.* 2000), infestations of *C. vitalba* occur in every region of New Zealand except Northland (north of Auckland).

Reproduction
The Washington State Noxious Weed Control Board (2003) states that, \"*Clematis vitalba* matures faster in full sunlight, and seed production is possible after one to three years, depending on the exposure to full sunlight. Asexual reproduction is possible after one year. An estimated 17,000 viable seeds are produced per 0.5m² in areas where *C. vitalba* is a canopy species. Seed dispersal is by wind, water, people and animals. *C. vitalba* is wind pollinated and insect pollinated. The filaments produce nectar, which attract insect pollinators. Several bee species and flies are attracted to the pollen and nectar. *C. vitalba* can also spread by fragmentation, when roots are produced from stem fragments and from attached stems. Vegetative spread by fragmentation occurs more often from older plants, since the older stem tissue holds more water and it has higher carbohydrate reserves (Cronk and Fuller, 1995).\"

Nutrition
Hume *et al.* (1995) conducted an in-depth study of the nutritional requirements of *Clematis vitalba*. The authors found that, \"The nutritional requirements of the naturalised vine, *C. vitalba*, were investigated in order to determine soil factors which might restrict its growth. Topsoil samples (0-10cm), collected from 19 sites where *C. vitalba* has naturally established in New Zealand, had moderately acid to near neutral pH values, high to very high percentage base saturation, and medium to very high concentrations of the exchangeable cations Ca, Mg, and K, but tended to have low plant-available P and phosphate-extractable sulphate concentrations. Extractable-Al concentrations were very low. Profile descriptions at these sites showed that almost all soils were being or had been rejuvenated by alluvium, colluvium, or tephra. The soils had few physical impediments to root growth, so plants were readily able to exploit the soils and their nutrients. The addition of Fe was found to depress root growth. The growth and spread of *C. vitalba* may be restricted by extremely acid soil conditions and by very low concentrations of N, P, Ca, S, and possibly Mn in the soil. However, it does not appear to be unusually sensitive to soil acidity or nutrient deficiencies.\"

General Impacts
Hill *et al.* (2001) report that, \"Vines can climb the tallest forest trees, forming a dense, light-absorbing canopy that suppresses all vegetation beneath it. *C. vitalba* can be so vigorous that the weight of foliage and stems breaks the supporting trees, reducing once-healthy forest to a low, long-lived thicket of vines scrambling over stumps and logs\". However Ogle *et al.* (2000) observe that the vines ascend to the canopy of forest but are unable to climb large diameter emergent trees unless shrubs and smaller trees provide a series of 'stepping stones' to the crown of tall trees. Their study findings (study area Taihape reserve, New Zealand) indicate that the numbers and variety of understorey trees and shrubs that have been severely reduced following the infestation of *C. vitalba* correlates with observations of the growth habit of *C. vitalba*. Ogle *et al.* showed e.g. that not a single canopy tree species had been lost from the Taihape Reserves though 25% or so of the understorey trees and shrubs species had been lost.

Management Info
Physical: Early control in New Zealand focussed on the cutting of vines followed by chemical treatment, later introducing grazing sheep to help control regrowth (Ogle *et al.*, 2000). Stem bases or roots can be dug out in winter, and seedlings can be manually removed (Martin, 2001).
Chemical: Various methods of chemical control have been used in New Zealand to treat *C. vitalba*. These include cutting and treating with 2,4,5-T in the 1970s, and a combination of 2,4,5-T and multi-film penetrant. In the 1980s-1990s, the infestation of *C. vitalba* in Taihape was controlled using a combination of glyphosate application and sheep grazing to control regrowth. 2% glyphosate such as RoundUp™ is recommended to control new growth in spring following the cutting of vines in winter, and seedheads can be sprayed with metsulfuron methyl (Escort™) or glyphosate.
Biological: Hill *et al.* (2001) report that, \"Concern about the damage caused by *C. vitalba* in New Zealand grew during the 1970s, and biological control was first suggested by Syrett (1984). The search in Europe for insect biological control agents started in 1989 when the International Institute of Biological Control (IIBC) at Delemont, Switzerland, compiled a literature review, and began a field survey to identify insects that attacked *Clematis* species in central Europe. Eighty-one phytophagous species were recorded, including 31 insect, 4 mite, and 4 nematode species that were regarded as monophagous or oligophagous (Groppe, 1991; Wittenberg & Groppe, 1991, 1992). Four *Phytomyza* species (Diptera: Agromyzidae) that mine the leaves and shoots of *Clematis* species were included in that list. Although not the most host-specific, *Phytomyza vitalbae* was selected for further study because it was the only species that was sometimes common and damaging in Europe\". Hill *et al.* (2001) further state that, \"There is a risk that *P. vitalbae* will attack both native and ornamental *Clematis* species in New Zealand. *C. foetida* appears to be the native species most likely to be attacked in New Zealand. However, the results presented here strongly indicate that the risk of significant damage to non-target plants is negligible to low. *P. vitalbae* was released from quarantine in New Zealand in 1996. It is considered to be established at 20 of the 29 release sites, and populations have grown rapidly at those sites. They have spread 5 km within 15 months at one site\". There is no information available in regards to any success *P. vitalbae* has had in damaging the aggressive populations of *C. vitalba* in New Zealand.

Pathway
Movement of gravel containing the seed to new sites for road and railway making.

Principal source: Ogle *et al.* 2000 Impact of an exotic vine *Clematis vitalba* (F. Ranunculaceae) and of control measures on plant biodiversity in indigenous forest, Taihape, New Zealand.
Old Man's Beard (Clematis vitalba L.) (Washington State Noxious Weed Control Board, 2003)

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

Review: Colin Ogle, Ecology Consultant. Wanganui, New Zealand.

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ALIEN RANGE

[2] CANADA
[1] POLAND
[19] NEW ZEALAND
[3] UNITED STATES

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