GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Dioscorea oppositifolia***

Dioscorea oppositifolia 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Liliopsida	Liliales	Dioscoreaceae

Common name Chinese yam (English), cinnamon vine (English)

Synonym
Dioscorea batatas , Dcne.
Dioscorea opposita , Thunb., nom. illeg.
Dioscorea cayenensis , Lam. var. *pseudobatatas* Hauman
Dioscorea decaisneana , Carri&#65533;re
Dioscorea doryphora , Hance
Dioscorea oppositifolia , L. var. *meeboldtii* Prain & Burkill
Dioscorea oppositifolia , L. var. *linnaei* Prain & Burkill
Dioscorea oppositifolia , L. var. *thwaitesii* Prain & Burkill
Dioscorea polystachya , Turcz.
Dioscorea potaninii , Prain & Burkill
Dioscorea rosthornii , Diels
Dioscorea swinhoei , Rolfe
Dioscorea trinervia , Roxb. ex Prain & Burkill

Similar species *Dioscorea villosa, Smilax spp., Convolvulus arvensis*

Summary
Dioscorea oppositifolia is a fast growing twining vine that has escaped from cultivation. It can survive in a number of different habitats and environmental conditions, but is most commonly found at the edges of rich, mesic bottomland forests, along stream banks and drainageways and near fencerows. Initial infestations are generally associated with human-caused disturbances, such as near old home sites and along roadways, and from these areas it can easily spread to nearby riparian swaths and undisturbed habitats. It can tolerate light levels ranging from full sun to full shade, but mostly grows at intermediate light levels along forest edges and it is typically found in silty loam soils. It also prefers soils that are relatively rich in nitrogen. D. oppositifolia propagules are dispersed primarily by gravity but may be dispersed further by water or by animals.

view this species on IUCN Red List

Species Description
Tu (2002) reports that *D. oppositifolia* is a perennial, twining vine in the *Dioscoreaceae* (yam) family. Underground, it has a deep, persistent, root-like tuber up to 1 metre long that resprouts annually. Aboveground, it has round, slender stems that twine spirally upwards (from left to right, counterclockwise). The leaves are usually arranged oppositely, although they may be alternate in the upper nodes, and are occasionally arranged ternately in whorls of 3 (Gleason & Cronquist 1991, in Tu, 2002). Leaves of are simple, 7 to 9-nerved (veined), 4 to 8cm long, and are typically ovate, hastate, or sagittate in shape (Tu, 2002). Leaves generally have a deeply lobed base, an acuminate tip, and are reddish-purple coloured along the leaf margins, petioles, and stems (Bailey 1949; Bailey & Bailey 1949, in Tu, 2002). New leaves often display a distinctive bronze-coloured tint (Beyerl 2001). Tu (2002) states that flowers are small, white (greenish-yellow), and have a cinnamon fragrance. The flowers are unisexual (plants dioecious) and arise from the leaf axils in spike or paniculate inflorescences. Fruits of are membranous, three-angled capsules (Gleason & Cronquist 1991, in Tu, 2002).

Lifecycle Stages
Tu (2002) states that the bulbils have been observed sprouting new shoots within 2 weeks of formation. There is currently little information on how long these bulbils remain viable. Even partially eaten bulbils (rodents will chew on them), or bulbils chopped apart by a tiller, are still capable of producing healthy plants (Beyerl 2001).

Uses
Tu (2002) states that both the tuber and bulbils of *D. oppositifolia* are edible, although the bulbils are generally not collected and used as food. The edible tuber, which can weigh up to 2kg or more if grown in deep loam soils, is flavourful and nutritious. The tuber contains about 20% starch, 75% water, 0.1% vitamin B1, and 10 to 15 mg Vitamin C. It also contains mucilage, amylase, amino acids, and glutamine. The tuber is sometimes used as an herbal tonic. It stimulates the stomach and spleen and has an effect on the lungs and kidneys. The tuber has been eaten for the treatment of poor appetite, chronic diarrhoea, asthma, dry coughs, frequent or uncontrollable urination, diabetes, and emotional instability. Externally, the tuber has also been applied to ulcers, boils and abscesses. It contains allantoin, a cell-proliferant that speeds up the healing process (Plants for a Future 1997, in Tu, 2002). Tu (2002) states that the leaf juice from *D. oppositifolia* can be used to treat snakebites and scorpion stings. Its roots contain diosgenin, which is a compound often used in the manufacture of progesterone and other steroid drugs. It has also been used traditionally as a contraceptive and in the treatment of various disorders of the genitary organs as well as for asthma and arthritis (Plants for a Future 1997, in Tu, 2002). It has been, and is still frequently planted for its ornamental value. The flowers smell like cinnamon and the twining vine is attractive for arbors, trellises, and porches (Illinois DNR, in Tu, 2002).

Habitat Description
D. oppositifolia can survive in a number of different habitats and environmental conditions, but is most commonly found at the edges of rich, mesic bottomland forests, along stream banks and drainageways, and near fencerows (Yayskievych 1999, in Tu, 2002). Tu (2002) states that initial infestations are generally associated with human-caused disturbances, such as near old home sites and along roadways. From these areas, it can easily spread into nearby riparian swaths and undisturbed habitats. *D. oppositifolia* can tolerate light levels ranging from full sun to full shade, but mostly grows at intermediate light levels along forest edges. Since it is often associated with riparian habitats, it is typically found in silty loam soils, which are typical of alluvial habitats (Beyerl 2001).

Reproduction
Tu (2002) states that *D. oppositifolia* can reproduce both sexually and asexually. Although it is capable of sexual reproduction, it has not been documented to reproduce sexually in North America. This could be because it is a dioecious species, and female (pistillate) plants have not been observed in the wild. It does, however, reproduce vigorously asexually, *via* the production of small potato-like axillary propagules, called bulbils. These bulbils exhibit a relatively low rate of survival in the field (versus in the greenhouse), but plants apparently produce adequate numbers of bulbils to more than compensate for their low rate of survival (Beyerl 2001). Each vine is capable of producing an average 20 bulbils per year (Tu, 2002).

Nutrition
Tu (2002) states that *D. oppositifolia* prefers soils that are relatively rich in nitrogen. Silty loams tend to be high in total nitrogen, and *D. oppositifolia* is well adapted to exploit any increase in soil nutrient levels, making it an excellent competitor for soil resources (Beyerl 2001).

General Impacts
Tu (2002) states that *D. oppositifolia* is a fast growing, twining vine that has escaped from cultivation and has the ability to rapidly invade pristine habitats, especially riparian corridors. It has a swift rate of vegetative growth and a prolific rate of asexual reproduction *via* bulbils. In North American infested areas, it lowers native species richness and abundance by outcompeting and eliminating native plant species. It does this by quickly outgrowing the native herbs and seedlings, thickly blanketing all adjacent vegetation, and competitively excluding light. It may also weight-down and break branches of large trees and shrubs (similar to kudzu, *Pueraria montana*). An entire stand of native shrubs may become covered by *D. oppositifolia*, and it shades and eventually kills the stand. It is also able to completely cover the ground so that all native herbaceous ground cover is excluded.

Management Info
Preventative measures: Tu (2002) states that as with all prolific invaders, the key to the successful control of *D. oppositifolia* is to prevent new infestations or to control them as soon as possible. In North America, it has a wide range of environmental adaptability and few pests and predators. It has a high degree of asexual reproductive vigor, and is difficult to manage once firmly established. The use of manual and mechanical methods followed by another control technique (for example, periodic herbicide sprays to control for new bulbil recruitment and root sprouts) for several years should be accompanied by active restoration efforts to obtain desired results.
\r\nPhysical: Manual and/or mechanical methods of plant removal can effectively control small isolated patches. These methods, however, are extremely time and labour-intensive, as the large, deep tuber makes manual removal very difficult. All pieces of the tuber must carefully be removed or resprouting may occur. The removal of aboveground biomass appears to eventually exhaust the tuber, and indicates that perhaps a management regime of repeated grazing or burning may also work to kill the plant. These other methods, however, have not been tried. Manually picking the aerial bulbils off the vines will not kill the plant, but will prevent the further spread of *D. oppositifolia* for a growing season. Once the bulbils have dispersed, hand-pulling the young germinating bulbils from soil can be an effective control measure if the entire bulbil is removed (K. Johnson, pers. comm., in Tu, 2002). Although there are no conclusive results reported from long-term fire effects on *D. oppositifolia* yet, Kristine Johnson of the Great Smoky Mountains National Park has noted that sites burned in a wildfire from the previous fall had reduced amounts the following year.
\r\nChemical: Herbicide application appears to be the most effective means to control large infestations. One application of some herbicides can effectively kill all new germinating bulbils, but repeat treatments are probably necessary to completely kill large underground tubers that originally supported large mature vines. The herbicides glyphosate or triclopyr have been the most successful at killing the weed. Glyphosate also significantly lowered rates of plant growth from germinated bulbils as measured by stem length and numbers of leaves.
\r\nBiological: There are currently no available biocontrol agents for *D. oppositifolia*. Snails and caterpillars have been observed browsing on leaves of this species, but do not appear to damage the plants significantly. Rodents and other small mammals also consume the bulbils, but the degree of consumption and damage to the plants has not been quantified (Beyerl 2001). The exact species of these consumers have not been determined, nor has it been elucidated if they are specifically feeding on *D. oppositifolia* or are only generalist feeders.

Pathway
Tu (2002) states that it was introduced into North America as an ornamental vine. By 1986, however, it had become naturalized and was observed in areas outside of cultivation (Beyerl 2001, Tu, 2002).

Principal source: Element Stewardship Abstract for *Dioscorea oppositifolia* L. (Tu, 2002)

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

Review: Dr David Gibson. Department of Plant Biology, Southern Illinois University at Carbondale. USA
Ms Jennifer Thomas Graduate Student Department of Plant Biology, Southern Illinois University at Carb

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[24] UNITED STATES

BIBLIOGRAPHY
5 references found for **Dioscorea oppositifolia**

Managment information

Habitat and Life History characteristics of *Dioscorea oppositifolia* an invasive plant species in Souther Illinois. [Accessed 30 Dec 2003]
Summary: Detailed report on description, distribution, dispersal methods, impacts, habitats and control.
SEPPC (Southeast Exotic Pest Plant Council). Undated. *Exotic Plant Management Plan*
Summary: Summary of description, origin, similar species, habitat and control.
Tu M. 2002. *Element Stewardship Abstract for Dioscorea oppositifolia L.*. The Nature Conservancy.
Summary: An Element Stewardship Abstract containing detail report on description, distribution, dispersal methods, impacts, habitats and control.

General information
ITIS (Integrated Taxonomic Information System), 2004. Online Database *Dioscorea oppositifolia*
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.
Available from:
http://www.cbif.gc.ca/pls/itisca/taxastep?king=every&p_action=containing&taxa=Dioscorea+oppositifolia&p_format=&p_ifx=plglt&p_lang=
[Accessed December 31 2004]
USDA-ARS (United States Department of Agriculture, Agricultural Research Service). National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). [Online Database] National Germplasm Resources Laboratory, Beltsville, Maryland.
Summary: Information on common names, synonyms, distributional range of species.
[Accessed 13 May 2003].