

*Dioscorea bulbifera* [简体中文](#) [正體中文](#)

**System:** Terrestrial

| Kingdom | Phylum        | Class      | Order    | Family        |
|---------|---------------|------------|----------|---------------|
| Plantae | Magnoliophyta | Liliopsida | Liliales | Dioscoreaceae |

**Common name** Yamswurzel (German), pousse en l'air (French), papa voladora (Spanish), Brotwurz (German), hoei-oepas (English, India), igname bulbifère (French), inhame (Portuguese, Brazil), hoi (Hawaiian, Hawaiian Islands), potato yam (English), yam (English), kaile (Fijian, Fiji Islands), belloi (Palauan, Palau Islands), air yam (English), hoi (Tongan, Tonga Islands), hoi (Niuean, Niue Island), cheeky yam (English), wild yam (English), magnaheugo (Chamorro, Guam Island), pureka (English, Namoluk -Nómwunuuk- Atoll), kaile manu (Fijian, Fiji Islands), kaile ndranu (Fijian, Fiji Islands), soi (Samoan, American Samoa Islands), mata (Marshallese, Marshall Islands), sarau (Fijian, Fiji Islands), yoi (Yapese, Yap (Waqab) Island), bitter yam (English), ellal (English, Kosrae Island), dau kwasi (English, Solomon Islands), dau fasia (English, Solomon Islands), hoi (English, Tahiti Island), rook (Yapese, Yap -Waqab- Island), ápwereka (English, Chuuk Islands), air-potato (English), puruka (English, Satawan Atoll), palai (English, Pohnpei Island), pwereka (English, Chuuk Islands), pwer (English, Satawan Atoll), aerial yam (English), 'oi (English, Cook Islands), ñame de gunda (Spanish), pwerh (English, Puluwat - Pwonowót- Atoll), pi'oi (Hawaiian, Kaua'i Island)

**Synonym** *Dioscorea hoffa* , Cordem.  
*Dioscorea tamnifolia* , Salisb.  
*Helmia bulbifera* , (L.) Kunth  
*Dioscorea bulbifera* , L. var. *vera* Prain & Burkill  
*Dioscorea crispata* , Roxb.  
*Dioscorea dicranandra* , Donn.Sm.  
*Dioscorea heterophylla* , Roxb.  
*Dioscorea pulchella* , Roxb.  
*Dioscorea tenuiflora* , Schltldl.  
*Smilax decipiens* , Spreng.

**Similar species** *Dioscorea alata*, *Dioscorea sansibarensis*

**Summary** *Dioscorea bulbifera* is a highly invasive plant and presents a management problem in many parts of the world. Despite some medicinal and agricultural uses, *D. bulbifera* is widely characterized as an organism that outcompetes and smothers native vegetation.



[view this species on IUCN Red List](#)

## Species Description

*Dioscorea bulbifera* is a monocotyledonous, dioecious, herbaceous perennial vine. Its annual stems, which arise from tubers, twine counterclockwise (Schultz, 1992). Langeland (undated) writes that "stems are round or slightly angled in cross section...[and] leaves are long petioled [with] blades to 8 in or more long." *D. bulbifera* has simple, alternate, ovate leaves, characterized by their distinct heart shape and veined pattern. Aerial tubers, or bulbils, arise from the axils of the plant and are usually smooth and subspherical. *D. bulbifera* is identifiable especially by its aggressively climbing, twining stems, which reaching lengths of 60 feet or more, and its "large heart shaped leaves...and potato like aerial tubers from the leaf stems" (Schultz, 1992).

## Notes

In an analysis of 4 wild Nepalese yam species, including *Dioscorea bulbifera*, Bahndari and Kawabata (2004) found that constituent chemicals in the yams "tend to imply that...wild yams may present a health hazard potential, which in turn demands proper processing before consumption to eliminate the effects of the antinutrients." Another study, by Beck *et al* (1984), evaluated traditional preparation methods of wild yams by Australian aboriginals. The process of baking, slicing, and leaching the yams overnight in running water removed the bitter compound diosbulbin D, making the yams palatable. Plant microfossil analysis from the Me' Aure' Cave in Moindou, New Caldaonia, and the Yuku rock shelter in Papua New Guinea suggests that *D. bulbifera* or a closely related precursor was present in these regions between 2700-18000 YBP (Horrockset *al*, 2007a;Horrockset *al*, 2007b).

## Lifecycle Stages

Morisawa (1999) writes that tubers and bulbils of *Dioscorea bulbifera* usually sprout during spring, using dead vegetation from the previous years' growth to gain access to the canopy. Bulbils, which can lie dormant for up to a year, are produced in mid-summer and drop to the ground in the late summer/early fall (Schultz, 1992). Stems begin to die back in the early fall. Morisawa (1999) notes that "raccoons, wild hogs and other animals do not seem to feed upon the bulbils," a factor which contributes to *D. bulbifera*'s rampant growth.

## Uses

Schultz (1992) notes that "*Dioscorea bulbifera* is one of the most common and widespread food yams and can be found in every hot, humid tropical region of the world." *D. bulbifera* is high in diosgenin, and is collected in the wild for steroidal drug hormones. Chemicals derived from *D. bulbifera* are also used in contraceptive pills. (University of Wisconsin-Madison, 1999).

## Habitat Description

*Dioscorea bulbifera* demonstrates aggressive growth in a variety of mesic habitats, especially thickets, disturbed areas, fence rows, and hardwood hammocks. *D. bulbifera* does not inhabit coastal areas due to its salt intolerance, and it is rarely found in pinelands (Morisawa, 1999). In tropical hammocks, *D. bulbifera*'s growth is most concentrated in canopy gaps (Shultz, 1992).

## Reproduction

*Dioscorea bulbifera* is vegetatively propagated. By producing an abundance of bulbils (aerial tubers) in its leaf axils, *D. bulbifera* assures its continuation, especially since soil contact is not necessary for stem production (Morisawa, 1999).

## General Impacts

As an invasive plant, *Dioscorea bulbifera* has a variety of negative impacts. *D. bulbifera* interrupts natural ecosystem function by forming a mat of vines impenetrable by other plants or sunlight. *D. bulbifera* can smother both seedlings as well as full grown trees (Shultz, 1992) *D. bulbifera* also impacts wildlife species dependant on native vegetation. Economically, extra taxes and fees sometimes must be levied to help pay for control and eradication efforts. (Invasive.org, 2002).



# GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: *Dioscorea bulbifera*

## Management Info

Management of *Dioscorea bulbifera* is generally labor intensive, expensive, and requires multiple visits to control sites. Horvitz and Koop (2001) participated in a study which investigated the relationship between native and non-native vine behaviour in the Miami-Dade area. Their intensive control program for *D. bulbifera* included: pruning native vines for better access to non-natives; cutting non-native vines; hand application of herbicide to non-native vines; hand pulling non-native seedlings/tubers; and positioning and pruning native species to facilitate growth and canopy access. Sites were revisited within 6 months for recutting, reapplication of herbicides, and "hand removal of seedlings or other regenerative organs" (Horvitz and Koop, 2001). Horvitz and Koop (2001) note that "management significantly reduced seedling recruitment by non-native vines." Other researchers cite similar active management techniques for *D. bulbifera*, whose bulbils/tuber system is notoriously difficult to eradicate. Shultz (1992) notes the importance of disposing removed plant material in a secure location to avoid re-germination.

**Preventative measures:** *D. bulbifera* should not be recommended as an ornamental plant. It is classified as a Class A Noxious Weed in Alabama and as a noxious weed in Florida (NRCS, 2007).

**Chemical:** Morisawa (1999) writes that "RoundUp, a nonselective herbicide, will kill the vines but the tuber will most likely resprout...Garlon 4 applied at a 10% concentration provides good control when applied with the basal application method. Completely encircle the lowest 30-61cm of the stem or trunk with the herbicide and form a band at least 15cm wide. Garlon 4 (10% concentration) and Garlon 3A (50% concentration) provide excellent control when applied to a cut surface." Wound vines with a hatchet and apply herbicide during the growing season (Morisawa, 1999).

**Biological:** An ongoing study by Sambura and Pemberton (ARS, 2007) seeks to identify natural insect herbivores of *D. bulbifera* in Nepal. So far the researchers' have identified a possible biological control agent in the Nepalese air potato beetle, *Lilioceris* spp.

## Pathway

**Principal source:** [Schultz, 1992](#);

[Morisawa, 1999](#);

Horvitz and Koop, 2001.

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

**Review:** Forest Starr and Kim Starr, Botanical Research Associates United States Geological Survey Biological Resources Division Makawao, Maui, Hawaii USA

**Publication date:** 2008-01-14

## ALIEN RANGE

[5] AMERICAN SAMOA  
[7] FRENCH POLYNESIA  
[1] MEXICO  
[1] NIUE  
[7] TONGA  
[1] WALLIS AND FUTUNA

[4] FIJI  
[1] GUATEMALA  
[1] NICARAGUA  
[4] PALAU  
[14] UNITED STATES

## BIBLIOGRAPHY

18 references found for *Dioscorea bulbifera*

### Managment information

[Agriculture Research Service \(ARS\) 2007. Online database. \*Dioscorea bulbifera\*](#)

**Summary:** This source provides information on possible biological control agents for *D. bulbifera*.

Available from: [http://www.ars.usda.gov/research/projects/projects.htm?accn\\_no=407144](http://www.ars.usda.gov/research/projects/projects.htm?accn_no=407144) [Accessed 16 May 2007]

Global Invasive Species Database (GISD) 2024. Species profile *Dioscorea bulbifera*. Available from: <https://www.iucngisd.org/gisd/species.php?sc=1220> [Accessed 20 September 2024]

Horvitz, C. and Koop, A., 2001. Removal of Nonnative Vines and Post-Hurricane Recruitment in Tropical Hardwood Forests of Florida. *Biotropica*.

**Summary:** This article details an exhaustive management scheme for removal of non-native vines in Florida. It encompasses mechanical and chemical control methods.

Available from:

<http://www.blackwell-synergy.com/doi/abs/10.1111/j.1744-7429.2001.tb00178.x?prevSearch=allfield%3A%28dioscorea+bulbifera%29> [Accessed 16 May 2007]

[Invasive.org \(Invasive and Exotic Species\). Online database \*Dioscorea bulbifera\*](#)

**Summary:** Provides detailed list of impacts of invasive species, including *D. bulbifera*. Also provides identification clues and a summary of management techniques.

Available from: <http://www.invasive.org/library/FLFSNoxWeeds/airpotato.html> [Accessed 15 May 2007].

[ISB \(Institute for Systematic Botany\). 2007. Online database. \*Dioscorea bulbifera\*](#)

**Summary:** This website provides a basic physical description and management techniques as well as an exhaustive list of alternate taxonomic and common names.

Available from: <http://www.plantatlas.usf.edu/synonyms.asp?plantID=1726> [Accessed 16 May 2007]

[Langeland, K., Undated. Natural Area Weeds: Air Potato \(\*Dioscorea bulbifera\*\). UF/IFAS.](#)

**Summary:** Detailed account of species physical appearance and habits in Florida habitats. Provides some management information and Florida distribution.

Available from: <http://edis.ifas.ufl.edu/AG112> [Accessed 15 May 2007]

[Space, J., Flynn, T. 2000. Report to the Government of Niue on Invasive Plant Species of Environmental Concern. USDA, Pacific Southwest Research Station.](#)

**Summary:** This paper provides management information for Pacific Island locations as well as distribution information.

Available from: [http://www.hear.org/alienspeciesinhawaii/articles/pier/pier\\_niue\\_report.pdf](http://www.hear.org/alienspeciesinhawaii/articles/pier/pier_niue_report.pdf) [Accessed on 16 May 2007].

## General information

Bhandari M.R. Kawabata J., 2004. Assessment of antinutritional factors and bioavailability of calcium and zinc in wild yam (*Dioscorea* spp.) tubers of Nepal. *Food Chemistry*. 2004.

**Summary:** This article provides information on possible toxins present in *D. bulbifera*.

Coursey, D. G. ; J. Alexander, and Stephen L. Wiesenfeld African Agricultural Patterns and the Sickle Cell. *Science* 28 June 1968: Vol. 160. no. 3835, pp. 1474 - 1475

**Summary:** This article provides information pertaining to the native distribution of *D. bulbifera*.

Horrocks, M.; J. Grant-Mackie and E. Matisoo-Smith, 2007. Introduced taro (*Colocasia esculenta*) and yams (*Dioscorea* spp.) in Podtanean (2700-1800 years BP) deposits from M<sup>1</sup> Aur<sup>1</sup> Cave (WMD007), Moindou, New Caledonia *Journal of Archaeological Science*. 2007.

**Summary:** This article presents a plant microfossil analysis of remnants found in the Me Aure Cave.

Horrocks, M.; S. Bulmer and R.O. Gardner., 2008. Plant microfossils in prehistoric archaeological deposits from Yuku rock shelter, Western Highlands, Papua New Guinea. *Journal of Archaeological Science*, Volume 35, Issue 2, February 2008, Pages 290-301

**Summary:** This article presents a plant microfossil analysis of remnants found in the Yuku rock shelter

[ITIS \(Integrated Taxonomic Information System\), 2005. Online Database \*Dioscorea bulbifera\*](#)

**Summary:** Detailed taxonomic information and useful links to other sites. 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.itis.gov/servlet/SingleRpt/SingleRpt?search\\_topic=TSN&search\\_value=43369](http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=43369) [Accessed 15 May 2007]

Morisawa, TunyaLee. *Weed Notes: Dioscorea bulbifera, D. alata, D. sansibarensis*. The Nature Conservancy. September 1999.

**Summary:** Detailed physical description of *Dioscorea bulbifera* and two closely related species, *D. alata* and *D. sansibarensis*. Also provides management information and impacts.

[Natural Resource Conservation Service \(NRCS\) 2007. Online database. \*Dioscorea bulbifera\*](#)

**Summary:** This database provides information about the species including distribution, noxious weed classifications, taxonomy, as well as links to related sites.

Available from: <http://plants.usda.gov/java/profile?symbol=DIBU> [Accessed 16 May 2007]

[PIER \(Pacific Island Ecosystems at Risk\). 2007. \*Dioscorea bulbifera\*](#)

**Summary:** This site provides extensive information about *D. bulbifera*'s habitat, ecology, distribution, and common names.

Available from: [http://www.hear.org/pier/species/dioscorea\\_bulbifera.htm](http://www.hear.org/pier/species/dioscorea_bulbifera.htm) [Accessed 16 May 2007]

[Schultz, Gary. Element Stewardship Abstract for \*Dioscorea bulbifera\* The Nature Conservancy, Arlington, Virginia. 1992.](#)

**Summary:** Detailed account of species physical appearance and habits. Also contains detailed management information for North America.

Available from: <http://tncweeds.ucdavis.edu/esadocs/documnts/diosbul.pdf> [Accessed 15 May 2007]

[University of Wisconsin-Madison Botany Green House. Online database. \*Dioscorea bulbifera\*](#)

**Summary:** Provides a brief description of *D. bulbifera* as well as medicinal uses of the plant.

Available from: <http://www.botany.wisc.edu/greenhouse/Roomthree-Di.html> [Accessed 16 May 2007]

[USDA, ARS. 2007. \*Dioscorea bulbifera\* National Genetic Resources Program. Germplasm Resources Information Network - \(GRIN\) \[Online Database\]. National Germplasm Resources Laboratory, Beltsville, Maryland](#)

**Summary:** Information for species including common names, distribution, uses.

Available from: <http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?14186> [Accessed 15 May 2007]

Webster, Judy; Wendy Beck, and Bela Ternai, 1984. Toxicity and bitterness in Australian *Dioscorea bulbifera* L. and *Dioscorea hispida* Dennst. from Thailand. *J. Agric. Food Chem.*; 1984; 32(5) pp 1087 - 1090;

**Summary:** This article examines the preparation techniques used by Australian aboriginals to ready *D. bulbifera* for consumption.