GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Hedychium gardnerianum***

Hedychium gardnerianum 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Liliopsida	Zingiberales	Zingiberaceae

Common name longose (French, Reunion), kopi (English, Cook Islands), Girlandenblume (German), cevuga dromodromo (English, Fiji), conteira (Portuguese, Azores), kahili (English, Hawaii), Jin jiang hua (Chinese, China), awapuhi kahili (English, Hawaii), sunkevara (Nepali, Nepal), sinter weitahta (English, Pohnpei), kahila garland-lily (English), kahili ginger (English), wild ginger (English)

Synonym

Similar species *Hedychium flavescens*

Summary Hedychium gardnerianum is a showy ornamental which grows over a metre tall in wet climates and grows from sea level to an altitude of 1700 metres. It displaces native plants, forms vast, dense colonies and chokes the understorey vegetation. It can also block stream edges, altering water flow. It is dispersed by birds over short distances and by man over long distances (in garden waste or via the horticultural industry). Even small root fragments will re-sprout, making it difficult to control.

view this species on IUCN Red List

Species Description

Hedychium gardnerianum is a coarse perennial herb with leafy shoots 1.5-2m tall. It grows from large branching rhizomes (tuberous shoots) of up to 3.5cm in diameter. Rhizomes are internally pale and fragrant (Wagner *et al*., 1999, in PIER, 2002). Rhizomes grow vertical stems, grow up to 10cm long and form rhizome beds of up to a metre thick (Mather, Environment B.O.P). Leaves are oblong to lanceolate, 20-45 (-60)cm long, 5-10 (-12.5)cm wide, upper surface glabrous, lower surface sparsely pubescent, apex acuminate, sessile, ligules membranous, (1-) 2-4cm long, entire, pubescent, sheaths glabrous. Flowers fragrant, inflorescences erect, basically ovoid, 15-20cm long, ca. 8cm wide, primary bracts green, membranous along margins, loosely imbricate, broadly ovate to elliptic, 5-8cm long, ca. 3.5cm wide, apex usually obtuse, pubescent to glabrate, rachis permanently concealed, cincinni usually 4-flowered, calyx cylindrical, 4-5cm long, pubescent or rarely glabrate; corolla yellow, the tube slender, 8-9cm long, the lobes linear to linear-lanceolate, 4-5cm long; labellum often centrally flushed with dark yellow, broadly obovate, about as long as staminodes, (2.5-) 3-4cm wide, the base tapered into a claw; stamen yellow, about as long as labellum or slightly longer; lateral staminodes white, spatulate to lanceolate, (2.5-) 4-6cm long. Capsules unknown (Wagner *et al*., 1999, in PIER, 2002)

Notes

A major invader of native forests in New Zealand. Also a problem species in South Africa and La Réunion. (PIER, 2002)

Uses

After kava and noni, the lead Pacific Islands herb products, all produced in small quantities, are wild ginger, coconut, gardenia, red algae, and hibiscus (Keith-Reid 2002).

Habitat Description
Hedychium gardnerianum grows in open light environments, preferring a warm moist climate; however it will readily grow in full shade beneath a forest canopy (Environment B.O.P).

Reproduction
Rhizomes are a primary form of spread; conspicuous, fleshy red seeds are dispersed by fruit-eating birds. The plant also exhibits clonal reproduction, with even small root fragments containing the potential to resprout (Smith, 1985, in PIER, 2002). Seeds are a bright scarlet red, measure 6mm by 4mm, and over 100 seeds may be produced per flower head (Buddenhagen, DOC).

General Impacts
Kahili ginger can form dense growth in native forests, smothering young native seedlings and preventing them from establishing. This may result in the alteration of native forest habitats and ecosystems and in the degradation of native forest communities. In some instances forest regeneration may be completely prevented (Environment B.O.P). \r\n
First collected in 1954 at Hawaii Volcanoes National Park (HVNP) (Wester, 1992), populations are now found on all islands in Hawaii (Smith, 1985). It exhibits aggressive growth and shade-tolerance, and forms dense thickets on undisturbed sites in the understory of open and closed-canopy ohia-lehua (*Metrosideros polymorpha* Gaud.) rain forests as well as in open habitats and forest edges around the National Park. It threatens the viability of such natural forests by preventing their regeneration (Anderson and Gardner 1999).\r\n
Aircraft-based analysis has found that ginger reduces the amount of nitrogen in the *Metrosideros* forest canopy in Hawaii, a finding later corroborated by ground based sampling (*Stanford Report March 9* 2005). Such alteration in natural ecosystem processes could alter the type of fauna able to inhabit such a habitat.

Management Info
Preventative measures: A Risk Assessment of *Hedychium gardnerianum* for Hawai‘i and other Pacific islands was prepared by Dr. Curtis Daehler (UH Botany) with funding from the Kaulunani Urban Forestry Program and US Forest Service. The alien plant screening system is derived from Pheloung *et al*. (1999) with minor modifications for use in Pacific islands (Daehler *et al.* 2004). The result is a score of 16 and a recommendation of: \"Likely to cause significant ecological or economic harm in Hawai‘i and on other Pacific Islands as determined by a high WRA score, which is based on published sources describing species biology and behaviour in Hawai‘i and/or other parts of the world.\"
Remote sensing techniques and new technologies may help map the potential spread of invasive species such as kahili ginger. Recently, Scientists from Stanford and the Carnegie Institution developed an imaging method based on NASA Airborne Visible and Infrared Imaging Spectrometer (AVIRIS) that detects changes in nitrogen levels and water content (measured from a high altitude sircraft). The detection of the exotic kahili ginger plant (*Hedychium gardnerianum*) in Hawaii (where the study was conducted) is based on the premise that it has relatively high water content compared with native forest plant species (ie: the native 'ohi'a (*Metrosideros polymorpha*) trees (*Stanford Report March 9* 2005). Identifying the actual and potential range of an invasive plant before it dominates a landscape can be an important step in the control of an invasive understory species.
Physical: Manual removal is another option for controlling local infestations (ie: in gardens). Small seedlings can be pulled out by hand. Removing the flower heads from Kahili ginger does not kill the plant but does slow down its spread. If the seeds are not fully formed the flowers can be left on the ground. If the seeds have formed, remove the flowers and put them out for disposal in your rubbish bags. Isolated small plants can be grubbed out and the rhizomes should also be removed. Stalks and roots are hard to burn and should not be composted. Take them to your council dump or transfer station or put them out for domestic rubbish collection.
Chemical: Common herbicides that are suitable include Escort, Roundup and Amitrole. Use the concentrations as recommended by the manufacturer. Apply from spring to late autumn. Spray lightly on the leaves and roots. Do not remove the leaves or stalks until they have gone brown and dried out. This will take three to four months. In terms of chemical control, it is cost effective to use Escort (metsulfuron-methyl) which is the most effective herbicide for use against kahili ginger (Harris *et al*. 1996, in Anderson and Gardner 1999). However, when large infestations are the case (such as in Hawaii) chemical control is considered environmentally safe only for small intensively managed areas with a high conservation value (Tunison and Stone 1992, in Anderson and Gardner 1999). This is because of the many side effects of Escort (which include soil leaching, ground water contamination and effects on non-target native plants).
In the summer of 1998, kahili ginger was removed from certain parts of Hawaii Volcanoes National Park (HAVO) by the use of Escort with a concentration of 1.5 g/l. The herbicide was applied aerially after epigeal sprouts had been cut down. It is absorbed by the plants through roots and foliage, and inhibits cell division in roots and shoots, which leads to rapid wilting and death. Escort might cause environmental damage, such as soil leaching and ground water contamination and might possibly affect non-target native species (Minden *et al* 2010)
Biological: Biological control is considered the only practical approach for the long-term management of large kahili ginger infestations in native forests. The ability of the bacterium *Ralstonia (=Pseudomonas) solanacearum* to cause bacterial wilt in kahili ginger *H. gardnerianum* in the field, together with its lack of virulence in other ginger species, contributes to its potential as a biological control agent (Anderson and Gardner 1999).

Pathway
Ornamental gingers (*Hedychium* spp.) are spread via the horticulture industry. For example, Kahili ginger (*H. gardnerianum*) was spread to Hawaii via this route (Anderson and Gardner 1999).

Principal source: Pacific Islands Ecosystems at Risk (PIER), 2002. *Hedychium gardnerianum*

Compiler: IUCN SSC Invasive Species Specialist Group
Updates with support from the Overseas Territories Environmental Programme (OTEP) project XOT603, a joint project with the Cayman Islands Government - Department of Environment

Review: Dr Rob Anderson

Pubblication date: 2010-10-04

ALIEN RANGE

[2] COOK ISLANDS
[1] JAMAICA
[1] NEW CALEDONIA
[1] PORTUGAL
[1] SOUTH AFRICA
[8] UNITED STATES
[1] FRENCH POLYNESIA
[1] MICRONESIA, FEDERATED STATES OF
[14] NEW ZEALAND
[1] REUNION
[1] SWAZILAND

Red List assessed species 5: CR = 3; EN = 1; VU = 1;

Hemignathus lucidus **CR**
Palmeria dolei **CR**
Pyrrhula murina **EN**
Juniperus brevifolia **VU**
Pseudonestor xanthophrys **CR**

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Asner, G.P., and P.M. Vitousek. 2005. Remote analysis of biological invasion and biogeochemical change. Proceedings of the National Academy of Sciences (USA) 102(12):4383-4386.

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Summary: A study on the use of a screening system to assess proposed plant introductions to Hawaii or other Pacific Islands and to identify high-risk species used in horticulture and forestry which would greatly reduce future pest-plant problems and allow entry of most nonpests.

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Summary: Synth�se des m�thodes de lutte employ�es par l ONF & la R�union contre une vingtaine de plantes exotiques envahissantes.

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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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Minden, Vanessa; Klaus Josef Hennenberg; Stefan Porembski & Hans Juergen Boehmer, 2010. Invasion and management of alien *Hedychium gardnerianum* (kahili ginger, Zingiberaceae) alter plant species composition of a montane rainforest on the island of Hawai'i. Plant Ecol (2010) 206:321–333

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Summary: The National Pest Plant Accord is a cooperative agreement between regional councils and government departments with biosecurity responsibilities. Under the accord, regional councils will undertake surveillance to prevent the commercial sale and/or distribution of an agreed list of pest plants.

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General information

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