

## ***Cardamine flexuosa***

**System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae

**Common name** wavy bittercress (English), wavy-leaved bittercress (English), woodland bittercress (English), wood bittercress (English)

**Synonym** *Cardamine hirsuta* , ssp. *flexuosa* (With.)  
*Cardamine konaensis* , (St. John)

**Similar species** *Cardamine fallax*, *Cardamine hirsuta*

**Summary** Woodland bittercress, *Cardamine flexuosa* is a highly variable perennial herb which flowers vigorously and forms dense root mats that can exclude other species. Seeds possibly remain viable in the seed bank for up to seven years requiring intensive management for control/eradication.



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

## Species Description

A low but upright herbaceous plant, normally shorter than 30 cm but can grow taller in marshland. Stem arises from basal rosette of leaves that have about 5 roundish stalked leaflets on each side and a larger one at the end. Stem leaves are similar but smaller and often with narrower leaflets. Flowers are always white, and normally have 6 stamens (Framer, 2002). Ripe side pods are about 12 - 25 mm long and explode when ripe, dispersing seeds up to 500 m (Varnham, 2006). Usually perennial but can be annual or biannual depending on environmental conditions.

## Notes

*Cardamine flexuosa* is sometimes regarded as a subspecies of *Cardamine hirsuta* (ITIS, 1998). Morphological resemblances are very strong and the two species are known to hybridise in the wild in Austria (Ellis & Jones, 1969).

## Uses

The leaves and roots of *Cardamine flexuosa* can be eaten raw or cooked (Plants for a Future, 2008).

## Habitat Description

*Cardamine flexuosa* is capable of growing in a variety of environments over a wide range of light and disturbance conditions (Kudoh et al., 1993). Capable of growing in a variety of soil types and acidities but requires it to be moist or wet. In Japan, *Cardamine flexuosa* is often found as an agricultural weed in paddy fields, crop fields and orchards (Kudoh et al., 1993).

## Reproduction

*Cardamine flexuosa* is a hemaphrodite capable of self-pollination (Plants for a Future, 2008). Hundreds of small seeds are produced in small pods which explode when disturbed (Shanklin, 2006; Varnham, 2006) and can remain viable in the ground for up to 7 years (South Georgia Newsletter, 2005a).

## General Impacts

*Cardamine flexuosa* flowers vigourously and forms dense understory root mats (South Georgia Newsletter, 2004). These could potentially alter successional processes and displace native plant species. *C. flexuosa* is also known as a common agricultural weed in paddy fields, crop gardens and orchards (Kudoh *et al.*, 1993).

## Management Info

Physical control: Digging out of *Cardamine flexuosa* appears to be the most effective form of control at present for the removal of plants and prevention or seeding (South Georgia Newsletter, 2008). Disposal of seed contaminated soils in the sea and weed matting have also been attempted, with a combination of spraying and weed matting recommended for control on South Georgia at present (Varnham, 2006).

Chemical control: *Cardamine flexuosa* is resistant to many types of herbicide. A recent study indicates that Weedol2 provides the best initial results while glyphosate gives longer lasting control (Varnham, 2006). As seeds may remain viable in the seed bank for up to seven years, continued spraying may be required for long periods of time (South Georgia Newsletter, 2005a).

## Pathway

*Cardamine flexuosa* was possibly transported in stores or footwear from the Falkland Islands where it grows abundantly. Seeds are sticky when wet and can be easily spread on clothing or animals. *Cardamine flexuosa* was possibly introduced to King Edward Point on vehicles brought in for rebuilding in 2000. *Cardamine flexuosa* was possibly transported in stores or footwear from the Falkland Islands where it grows abundantly. Seeds are sticky when wet and can be easily spread on clothing or animals.

## Principal source:

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

## Review:

**Publication date:** 2010-06-02

## ALIEN RANGE

<b>[6]</b> AUSTRALIA	<b>[1]</b> BAHAMAS
<b>[1]</b> BANGLADESH	<b>[1]</b> BHUTAN
<b>[4]</b> CANADA	<b>[1]</b> CHINA
<b>[1]</b> COSTA RICA	<b>[1]</b> CUBA
<b>[1]</b> EL SALVADOR	<b>[1]</b> FALKLAND ISLANDS (MALVINAS)
<b>[1]</b> GUATEMALA	<b>[1]</b> HAITI
<b>[1]</b> INDIA	<b>[1]</b> INDONESIA
<b>[1]</b> JAPAN	<b>[1]</b> KOREA, DEMOCRATIC PEOPLE'S REPUBLIC OF
<b>[1]</b> KOREA, REPUBLIC OF	<b>[1]</b> LAO PEOPLE'S DEMOCRATIC REPUBLIC
<b>[1]</b> MALAYSIA	<b>[1]</b> MEXICO
<b>[1]</b> MYANMAR	<b>[1]</b> NEPAL
<b>[1]</b> NEW ZEALAND	<b>[1]</b> PAKISTAN
<b>[1]</b> PANAMA	<b>[1]</b> PHILIPPINES
<b>[1]</b> PUERTO RICO	<b>[3]</b> SOUTH AFRICA
<b>[2]</b> SOUTH GEORGIA AND THE SOUTH SANDWICH ISLANDS	<b>[1]</b> THAILAND
<b>[18]</b> UNITED STATES	<b>[1]</b> VENEZUELA

**[1] VIET NAM**

## BIBLIOGRAPHY

20 references found for ***Cardamine flexuosa***

### Management information

[IUCN/SSC Invasive Species Specialist Group \(ISSG\).. 2010. A Compilation of Information Sources for Conservation Managers.](#)

**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.

[South Georgia and South Sandwich Islands Wiki. Alien Species. This page was last modified 17:07, 19 January 2008.](#)

**Summary:** Available from [http://sgwiki.gs/mediawiki/index.php/Alien\\_species](http://sgwiki.gs/mediawiki/index.php/Alien_species) [Accessed 9 June 2010]

[South Georgia Newsletter, December 2004](#)

**Summary:** Available from <http://www.sgisland.gs/pages/main/news17.htm> [Accessed 30 March 2010]

[South Georgia Newsletter, January 2008. South Georgia and South Sandwich Islands.](#)

**Summary:** Available from [http://www.sgisland.gs/index.php/\(h\)South\\_Georgia\\_Newsletter\\_January\\_2008](http://www.sgisland.gs/index.php/(h)South_Georgia_Newsletter_January_2008) [Accessed 9 June 2010]

### General information

Bleeker, W., Klausmeyer, S., Peininger, M., & Deinst, M. 2008. DNA sequences identify invasive alien *Cardamine* at Lake Constance. *Biological Conservation*, 141, 692-698.

Ellis, R.P., & Jones, B.M.G. (1969). The origin of *Cardamine flexuosa* with evidence from morphology and geographical distribution. *Watsonia*, 7(2), 92-103.

[Flora of China \(eFlora\). 2010. \*Cardamine flexuosa\* Accessed 31 March 2010.](#)

**Summary:** Available from [http://www.efloras.org/florataxon.aspx?flora\\_id=2&taxon\\_id=200009301](http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200009301) [Accessed 31 March 2010]

[Framer, C. 2002. Skye Flora. \*Cardamine flexuosa\*. Accessed 31 March 2010.](#)

**Summary:** Available from <http://www.plant-identification.co.uk/skye/cruciferae/cardamine-flexuosa.htm> [Accessed 31 March 2010]

[Integrated Taxonomic Information System \(ITIS\). 1998. \*Cardamine flexuosa\*](#)

**Summary:** Taxonomic information for *Cardamine flexuosa*.

Available from [http://www.itis.gov/servlet/SingleRpt/SingleRpt?search\\_topic=TSN&search\\_value=22795](http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=22795) [Accessed 30 March 2010]

Kudoh, H., Ishiguri, Y., & Kawano, S. 1993. Phenotypic variability in life history traits and phenology of field populations of *Cardamine flexuosa* and *C. Fallax* (Cruciferae) in Honshu, Japan. *Plant Species Biology*, 8, 7-20.

Lihova, J., Marhold, K., Kudoh, H., & Koch, M.A. 2006. Worldwide phylogeny and biogeography of *Cardamine flexuosa* (Brassicaceae) and its relatives. *American Journal of Botany*, 93, 1206-1221.

[Plants for a Future database report. 2008. \*Cardamine flexuosa\*. Accessed 31 March 2010.](#)

**Summary:** Available from <http://www.pfaf.org/database/plants.php?Cardamine+flexuosa> [Accessed 31 March 2010]

[Shanklin, Jonathan.. 2006. The flora of King Edward Point & Grytviken. Updated 2006 March 29](#)

**Summary:** Available from [http://www.antarctica.ac.uk/met/jds/natural\\_history/bird\\_island/KEP\\_FLORA.htm](http://www.antarctica.ac.uk/met/jds/natural_history/bird_island/KEP_FLORA.htm) [Accessed 9 June 2010]

[South Georgia Newsletter, December 2009 \(2009b\)](#)

**Summary:** Available from [http://www.sgisland.gs/index.php/%28h%29South\\_Georgia\\_Newsletter%2C\\_Dec\\_2009](http://www.sgisland.gs/index.php/%28h%29South_Georgia_Newsletter%2C_Dec_2009) [Accessed 18 May 2010]

[South Georgia Newsletter, Feb 2005 \(2005a\)](#)

**Summary:** Available from <http://www.sgisland.gs/pages/main/news20.htm> [Accessed 18 May 2010]

[South Georgia Newsletter, March 2009 \(2009a\)](#)

**Summary:** Available from [http://www.sgisland.gs/index.php/%28h%29South\\_Georgia\\_Newsletter%2C\\_March\\_2009](http://www.sgisland.gs/index.php/%28h%29South_Georgia_Newsletter%2C_March_2009) [Accessed 18 May 2010]

[South Georgia Newsletter, May 2005 \(2005b\)](#)

**Summary:** Available from <http://www.sgisland.gs/pages/main/news23.htm> [Accessed 18 May 2010]

[Terrestrial flora of South Georgia and Antarctica](#)

**Summary:** Available from <http://www.antarctica.ac.uk/met/jds/baslocal/South%20Georgia.pdf> [Accessed 9 June 2010]

[USDA, NRCS. 2008. \*Cardamine flexuosa\* With. The PLANTS Database \(<http://plants.usda.gov>, 5 November 2008\). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.](#)

**Summary:** Available from <http://plants.usda.gov/java/profile?symbol=CAFL14>

Varnham, K. 2006 (Updated 2009). Database of non-native species occurring in UK Overseas Territories. JNCC Report 372, Peterborough, United Kingdom.