



# Invasieve uitheemse onkruiden & biologische bestrijding

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www.cabi.org

**KNOWLEDGE FOR LIFE**

# Management strategies for invasives

**Prevent**



**Too late**

**Control**



**Best option**

**Eradicate**



**Too Great**

**Chemical**

**Biological**

**Mechanical**

Restricted by legislation  
and environmental  
impact

**BEST OPTION**  
Most cost effective  
and sustainable

Difficult, ineffective,  
destructive and costly,  
can be counterproductive

# Biological Control methods

**Conservation** - Protection and maintenance of existing natural enemies

**Inundative** - the “Mycoherbicide Approach” using large numbers and repeated application

**Classical** - Uses co-evolved, and highly specific natural enemies from the area of origin of the plant to provide self-sustaining control, often after a single or few releases (non-commercial)

# *Azolla filiculoides* (groot kroosvaren)

- Azolla was introduced from US as ornamental
- *Stenopelmus rufinasus* got introduced alongside
- “Untypical” example of classical biological control
- [www.azollacontrol.com](http://www.azollacontrol.com)











30/07/2008

# Azolla Control Business

Customers include:

- City/County Councils
- River & Wetland Services
- British Waterways
- Environment Agency
- The National Trust
- Stately homes
- Private individuals
- Farms



The screenshot shows the homepage of the Azolla Control website. The header features the title 'Azolla Control' in large green letters, with a navigation menu below it containing links for Home, About Azolla, About AzollaControl, Frequently asked questions, Charges, Contact us, and Links. A large background image of a weevil on a green plant is visible. The main content area has a sub-header 'Azolla control' followed by the tagline 'The end of the road for floating water fern - a safe effective biological alternative'. Below this, a paragraph explains the service: 'Looking for a cheaper more effective alternative for controlling Azolla filiculoides (water fern)? Look no further, AzollaControl from CABI offers you a comprehensive natural control option for managing this most noxious of weeds.' Another paragraph states: 'AzollaControl makes use of the North American weevil Stenopelmus rufinusus. This weevil is a highly effective natural enemy of Azolla filiculoides. The weevil, which can only feed and reproduce on Azolla spp., has proven to be an effective biological control agent in laboratory and field trials in South Africa as well as in the UK.' A section titled 'Advantages of using the weevils' lists several benefits: no need for licensing or PPE, selectivity, control of any infestation size, no maintenance required, cost-effectiveness, year-round control, single operator application, and use as a precautionary measure. A section titled 'Who uses weevils from CABI for control of Azolla?' lists various users: City and County Councils, River & Wetland Services, British Waterways, The Environment Agency, The National Trust, Angling clubs, and Stately homes/Private individuals and farms. At the bottom, a footer states: 'CABI is a not-for-profit international organization that improves people's lives by providing information and applying scientific expertise to solve problems in agriculture and the environment. Find out more here >>' and 'KNOWLEDGE FOR LIFE'.

**Azolla Control**

Home About Azolla About AzollaControl Frequently asked questions Charges Contact us Links

## Azolla control

The end of the road for floating water fern  
- a safe effective biological alternative

azollacontrol home page

### Azolla Control

Looking for a cheaper more effective alternative for controlling *Azolla filiculoides* (water fern)? Look no further, **AzollaControl** from CABI offers you a comprehensive natural control option for managing this most noxious of weeds.

**AzollaControl** makes use of the North American weevil *Stenopelmus rufinusus*. This weevil is a highly effective natural enemy of *Azolla filiculoides*. The weevil, which can only feed and reproduce on *Azolla* spp., has proven to be an effective biological control agent in laboratory and field trials in South Africa as well as in the UK.

#### Advantages of using the weevils

- No need for licensing or personal protective equipment
- It is selective, removing *Azolla* and only *Azolla* unlike current licensed chemical herbicides.
- Can control any size of infestation given time
- Once released little or no maintenance required
- Inexpensive environmentally friendly alternative
- Controls *Azolla* throughout the growing season
- Can be applied by one operator
- Can be used as a precautionary application the moment *Azolla* appears

#### Who uses weevils from CABI for control of *Azolla*?

All sorts of organisations and clubs have successfully used weevils from CABI, for example:

- City and County Councils
- River & Wetland Services
- British Waterways
- The Environment Agency
- The National Trust
- Angling clubs
- Stately homes- Private individuals and farms

CABI is a not-for-profit international organization that improves people's lives by providing information and applying scientific expertise to solve problems in agriculture and the environment. [Find out more here >>](#)

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[www.azollacontrol.com/](http://www.azollacontrol.com/)







# Japanese knotweed



*Fallopia japonica*

## First weed CBC in Europe

- Ten years of research in UK
  - numerous surveys to Japan
  - agent selection
  - host range testing (89 plant spp)
  - risk assessment
- Host specific psyllid - *Aphalara itadori*
- **First phase field trials in 2010**
- 5-yr monitoring programme in place
- Cost of research < 0.1% of damage
- Other European countries may follow

# Invasive weed biocontrol research



*Impatiens glandulifera* in flower

## Himalayan balsam

- Nine surveys conducted to the plant's native range
- Numerous natural enemies collected and identified
- Based on field observations and laboratory studies most organisms have been rejected
- One organism shows considerable promise - a plant pathogen
- Dossier for release permit submitted to UK authorities



# *Hydrocotyle ranunculoides* (grote waternavel)

Surveys in the area of origin



Listronotus elongatus (above)  
Eugaurax floridensis (below)



merci спасибо  
cảm ơn cô faleminderit  
stuh-tee  
salamat  
Assalamualikum zikomo  
asante sana  
urakoze  
ありがとう **thank you** dankuwel  
kiitos  
terima kasih ke itumetse tak  
நன்றி dhanyawaad शुक्रिया  
xie-xie mersi efharistó  
благодаря 谢谢 danke  
grazie teşekkür ederim