

controlling Himalayan balsam

An environmentally damaging weed





Surveying for biocontrol agents

Himalayan balsam is an invasive non-native species which is environmentally damaging and is virtually impossible to eradicate on a large scale using traditional control methods. A novel solution is on the horizon in the form of a natural biological control agent. This brochure introduces a project that is investigating the potential for the biological control of Himalayan balsam.

what are invasive non-native species?

An invasive non-native species is any animal or plant that has been introduced (by human action) outside its natural past or present distribution and has the ability to spread causing damage to the environment, the economy and the way we live.

The impacts of invasive non-native species are far-reaching. They act as a main driver of global biodiversity loss, affect human health and threaten economic activities such as agriculture, forestry and fisheries. In Britain alone, they cost the economy an estimated £1.7 billion a year.



Himalayan balsam invading pasture land in Cornwall, UK

what is Himalayan balsam?

Introduced as a garden ornamental in the mid-19th century, Himalayan balsam (*Impatiens glandulifera*) has become one of the UK's most widespread invasive weed species. It is mainly associated with river banks but can also be found on waste ground and in damp woodland. This tall (up to 3m), annual herb is easy to identify when mature, owing to its hollow stem, serrated leaves, its pink-purple flowers that are produced from June to October long after most native annual plant species – and its explosive seed heads.



Surveying Himalayan balsam in the native range

why is Himalayan balsam a problem?

Single plants can produce up to 4,000 seeds, which can result in Himalayan balsam forming dense thickets that compete with native plant species for space, light, nutrients and pollinators; reducing native biodiversity.

The plants die back in winter, which can leave river banks vulnerable to erosion. Dead plant material can also increase the risk of flooding through debris entering the river.

The natural enemies that help to keep Himalayan balsam in check in its native range are absent from the UK. This allows it to grow more aggressively and has a greater ability to reproduce, giving it an advantage over native species.

distribution

Himalayan balsam seeds are readily spread along water bodies and it now occupies over 13% of the UK's rivers according to the Environment Agency. Naturalized throughout the UK, the weed is present in over 50% of the UK's 10 x 10km recording squares (see map) and only absent from the higher altitudinal regions of the Lake District and Scottish Highlands.

current control methods

Traditional management methods are either prohibitively expensive or impractical, owing to the fact that it grows across large areas, often in inaccessible areas or sites of high conservation status where chemical or manual control are not favoured.

the proposed solution

We were asked to find a reliable and safe natural enemy to help control Himalayan balsam by Defra, the Environment Agency and the Scottish Government. This approach will help support ecosystem restoration and avoid negative impacts on non-target species.

CABI researchers have conducted surveys throughout the plant's native range since 2006, in order to identify natural enemies that could be considered as biocontrol agents in the UK. Many of the natural enemies, both fungal and arthropod species, collected and identified during surveys were rejected as suitable control agents as the risks were deemed too high. We undertook safety testing procedures in our UK quarantine facility, and found most attacked other plants closely related to Himalayan balsam. However, we found a rust fungus (a *Puccinia* species) with a very close host relationship with Himalayan balsam, which looks to be safe for release. Early infection with the rust can cause Himalayan balsam plants to collapse and die, infection of leaves later in the season then reduces the plant's photosynthetic area slowing its growth rate and vigour.

CABI have tested the safety of this Himalayan balsam rust following strict internationally recognized testing procedures. So far, we have tested over 70 plant species for susceptibility to the rust fungus including native, ornamental and economically important species; including crop and fruit. We still have some plants to test, to ensure that the rust is a specialist of Himalayan balsam but it is looking very promising.

Under quarantine conditions, our research has clarified the lifecycle of the rust. This has confirmed that all of the spore stages observed on Himalayan balsam in the native range belong to the same species. This has been backed up with molecular evidence.

Interestingly, our UK research identified the rust we collected from native Himalayan balsam was previously unknown to science – and will be allocated a Latin name in line with the International Code of Nomenclature.



UK distribution of Himalayan balsam.
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Himalayan balsam infected with the aecial stage of rust infection



Himalayan balsam leaf infected with the urediniospore stage of rust infection

what next?

The regulators (FERA) will review the scientific research and make recommendations. Depending on the outcome of this process we may have to carry out further research before the rust can be released.

If and when the rust is released Himalayan balsam should eventually pose less of a threat to our environment. Our goal is to provide the opportunity for native species to recolonize areas previously choked with Himalayan balsam and save money by using a cost effective biocontrol solution.



River free of Himalayan balsam

www.himalayanbalsam.cabi.org

funders

Defra (primary funder)
Network Rail
West Country Rivers Trust
Environment Agency
Scottish Government

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