



Himalayan balsam

Correct name: Indian balsam (widely referred to as Himalayan balsam)

Scientific name: *Impatiens glandulifera*

What is Himalayan balsam?

Himalayan balsam is the most common of three introduced balsam species present in the UK:

- 1 Himalayan balsam (*Impatiens glandulifera*)
- 2 Small balsam (*I. parviflora*)
- 3 Orange balsam (*I. capensis*)

As the name suggests, Himalayan balsam was introduced to the UK from the western Himalayas, while Small balsam was introduced from Central Asia and Orange balsam was introduced from North America.

Where do introduced balsams grow?

All introduced balsam species preferentially grow along rivers and canals, around waterbodies and in other damp places. Himalayan balsam is frequently found growing on waste ground and it is increasingly found growing in dryer areas such as roadsides, railway embankments and field margins.

How does Himalayan balsam spread?

Rapid spread is the result of high seed production (up to 2,500 small seeds per plant), explosive seed dispersal from the parent plant (dehiscence) and floating (buoyant) seeds. Each seed pod held on the mature plant contains 4-16 seeds; when these are touched, the seed pod explodes, propelling the seeds up to 7m from the parent plant. Seeds can then float downstream, be carried by attachment to animals (and people) and/or moved in contaminated soil.

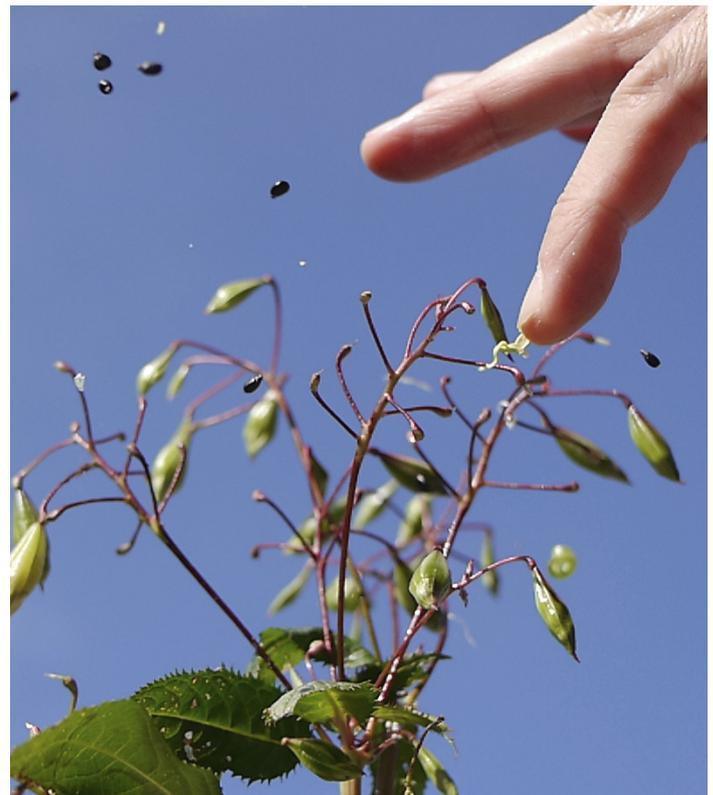
Legislation

Because of negative impacts on the UK environment and economy, Himalayan balsam is listed as a species of special concern under retained European Union (EU) law. This means it is an offence to plant or cause these plants to grow in the wild, or intentionally release them into the environment. Schedule 4 of the Invasive Alien Species (Enforcement and Permitting) Order 2019 removes plants listed under the EU IAS Regulation from Schedule 9 of The Wildlife and Countryside Act 1981, although the same offence applies. Also, Himalayan balsam plant material (including soil contaminated with seeds) is a 'controlled waste' under the Environmental Protection Act 1990 which means it can only be transported by a registered waste carrier to suitably permitted or exempt sites. Transfer notes shall be kept for each load for a minimum of 2 years.

Why control Himalayan balsam?

Himalayan balsam plants are short-lived (annual), ruderal competitive dominants and are the tallest annual plants in Europe. Rapid growth early in the growing season and a dense, compact canopy restricts native plant species access to light. Competitive growth causes negative ecological and socioeconomic impacts, including:

- **Reduced habitat availability and quality** – reduction of native plant, invertebrate and vertebrate species diversity, altered soil conditions and reduced ecosystem services.
- **Habitat alteration and degradation** – direct negative impacts upon terrestrial and freshwater food webs, particularly via siltation of watercourses.
- **High management costs** – estimated at approximately £1 million per annum UK-wide.
- **Limited soil binding capacity** – shallow-rooting Himalayan balsam does not bind soil as effectively as the root systems of native flora, significantly increasing erosion risk; this is greater in the winter and spring months when balsam dies back (reducing soil binding capacity further) and rainfall is higher.
- **Access restriction** – amenity areas may become inaccessible due to uncontrolled growth (e.g. loss of riverbanks for fishing).



Identification - Himalayan balsam

What does it look like?

Images A-H below show what Himalayan balsam looks like throughout the year.

Where: **A** = full growth in mid-summer (height 2m); **B** = riverbank shown in A during winter months (note dead stems at right and limited native plant cover); **C** = early seeding emergence (cotyledon shown at left, first leaves at right); **D** = immature plant; **E** = dense growth of immature plants (note whorl leaf arrangement and red stem); **F** = mature pinkish, fleshy (succulent) stem (note opposite leaf arrangement at stem nodes) – stems are often branched; **G** = flowers (strongly scented; insect pollinated); **H** = ripe seed pods (c.2-3cm long).

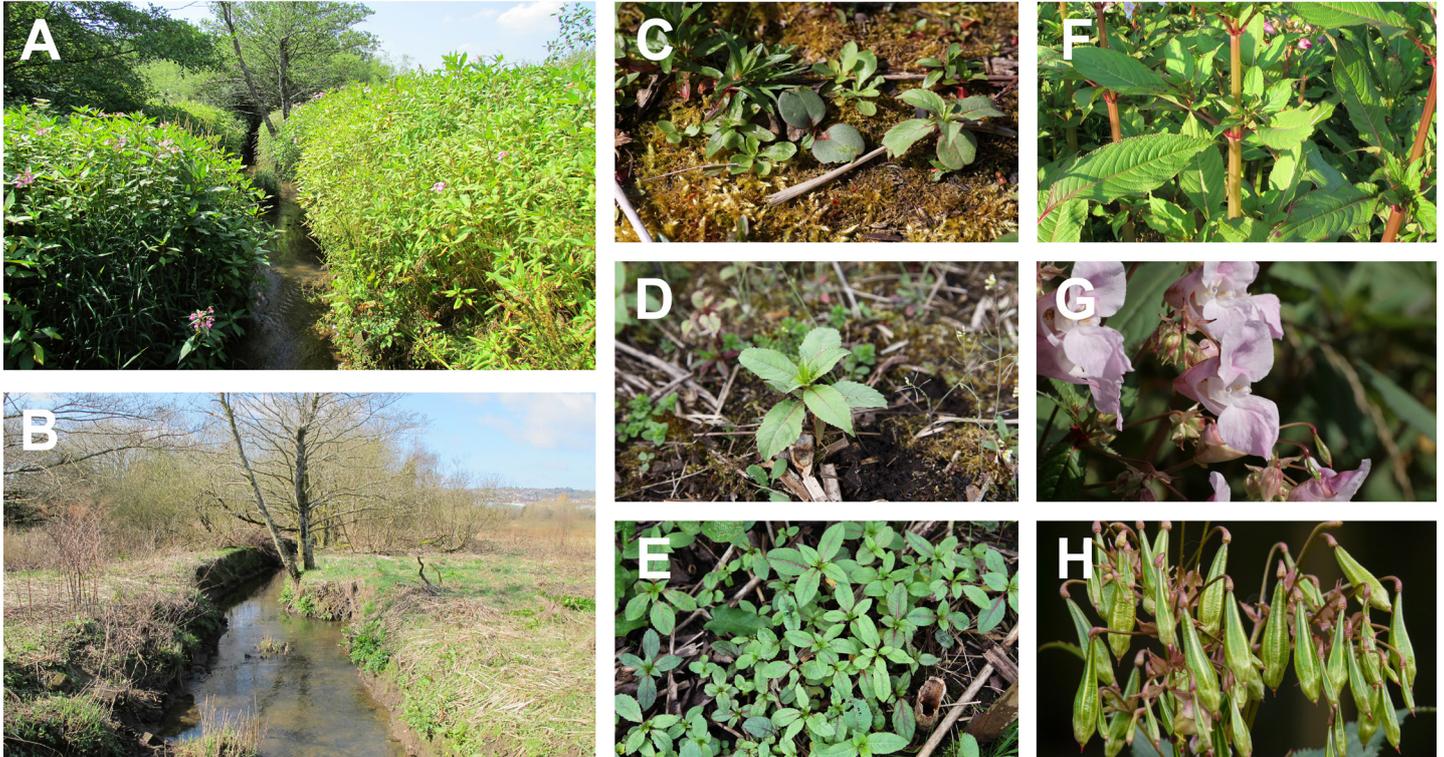


Image acknowledgements (this page and following page)

Small balsam leaf arrangement: © André Karwath 2005 – link: [https://commons.wikimedia.org/wiki/File:Impatiens_parviflora_-_blossom_front_\(aka\).jpg#/media/File:Impatiens_parviflora_-_plant_\(aka\).jpg](https://commons.wikimedia.org/wiki/File:Impatiens_parviflora_-_blossom_front_(aka).jpg#/media/File:Impatiens_parviflora_-_plant_(aka).jpg)

Orange balsam leaf shape & size: © British Nature Guide 2014

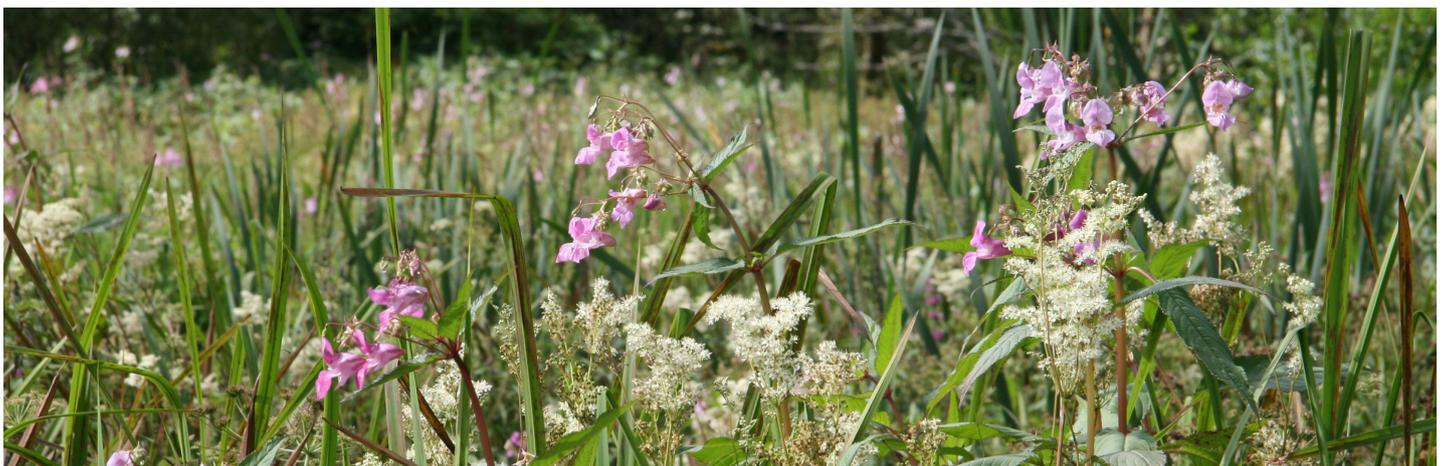
Orange balsam leaf arrangement: © Robert Flogaus-Faust 2013 – link: <https://www.biolib.cz/en/taxonimage/id395730/>

Orange balsam flower structure & colour: © Trevor Renals 2021

Touch-me-not balsam leaf shape & size: © Herbarium Online 2021

Touch-me-not balsam leaf arrangement: © Tatiana Gerus 2012 – link: [https://commons.wikimedia.org/wiki/File:Impatiens_noli-tangere_\(7818663064\).jpg](https://commons.wikimedia.org/wiki/File:Impatiens_noli-tangere_(7818663064).jpg)

Touch-me-not balsam flower structure & colour: Peter Follett 2005 British Wild Flowers – link: <http://www.british-wild-flowers.co.uk/B-Flowers/Balsam,%20Touch-me-not.htm>



Identification - distinguishing between introduced and native balsams

Key identification features

Introduced and native balsams look quite similar, though there are clear differences in leaf shape and arrangement and flower colour and size. All balsams have stems with distinctive nodes (stem segments); at each node, leaves may be paired opposite, attached alternatively upwards along the stem (i.e., the leaves are not paired opposite one another at each node), or held in whorls of three. **The nationally scarce native balsam, Touch-me-not balsam (*I. noli-tangere*) is included here for reference.** Note that measurements not in brackets are sizes commonly achieved; those in brackets are occasionally observed.

Common name	Himalayan balsam	Small balsam	Orange balsam	Touch-me-not balsam
Height	Up to 2.0(3.0)m in height	Up to 0.6(1.0)m in height	Up to 0.6(1.5)m in height	Up to 0.6(1.0)m in height
Lower leaf shape & size	 Up to 15cm long	 Up to 10cm long	 c.10cm long	 c.10cm long
Lower leaf description	Lanceolate (lance tip); dark green at maturity; reddish midrib and teeth; finely serrated teeth (24-75 teeth per side)	Oval to lanceolate; finely serrated teeth (20-30 teeth per side)	Oval to lanceolate; coarse teeth (6-12 teeth per side)	Oval to lanceolate; coarse teeth (6-15 teeth per side)
Leaf arrangement	 Opposite (above) or whorl (below)	 Alternate	 Alternate	 Alternate
Flower shape, colour & size	 Pink, purple, white; 4.0cm	 Pale yellow; 0.6-1.8cm	 Orange with red/brown spots; 2-3.5cm	 Yellow with brownish spots; 2-3.5cm
Flowering period	June-November	June-October	June-September	June-September

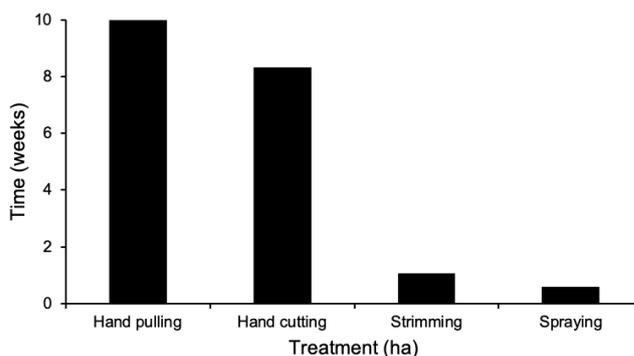
Project planning & biosecurity

Invasive plant management programme goal setting, health & safety, biosecurity and survey information is provided in detail in the Welsh Government document [Information for community and voluntary groups in Wales: Practical control of Japanese knotweed](#). **Note that biosecurity considerations are especially important for Himalayan balsam as all spread is via small seeds (in contrast with Japanese knotweed).**

Research

Published information about effective, sustainable Himalayan balsam management control is limited as there have been few field studies investigating its control. Lack of information may lead to excessive herbicide use, and costly, labour intensive and unsuccessful management strategies. No control treatment is without its drawbacks. Control programmes that do not involve herbicide use may be characterised by high carbon dioxide (CO₂) emissions, labour and cost requirements. The primary focus of any management programme should be to bring the invasive plant under control, followed by vegetation recovery so passive recolonisation by native plants can occur. Ultimately, a control method is unsustainable where the likelihood of success is low, the management process is indefinite, and recovery of native vegetation is limited. Key control and management terms, including plant protection product (PPP or herbicide) descriptions are provided in Annex 1.

While many control methods are effective for Himalayan balsam, the requirement for a long-term management strategy (3-5 years) means that many methods are only suitable for small populations (<1,000m²); for larger areas project resources to successfully meet the objectives of the management programme (management and/or local eradication) may be insufficient. To illustrate this, the following graph shows estimates for how long it would take to hand pull, hand cut, trim and spray 1 hectare (10,000m²) of balsam. This is based on unpublished field testing data at the 25m² scale (Jones pers comm. 2022).



Projected treatment times by method per hectare (ha). Where: hand pulling = 10.0 weeks; hand cutting = 8.3 weeks; strimming = 1.1 weeks; spraying = 0.6 weeks. Weeks are defined as a one person working a 40hr week.



Himalayan balsam lifecycle - control and management

Timing of Himalayan balsam growth stages and treatment application												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Growth stages: approximate - species, weather and altitude dependent												
Primary germination												
Secondary germination												
Seedling plant growth												
Maturity (max. height)												
Flowering												
Seed production												
Die back												
Treatment application – physical												
Cutting & pulling												
Treatment application – biological (host and non-specific)*												
Grazing												
Treatment application – chemical												
Selective												
Non-selective, non-residual (glyphosate)												
Non-selective, residual												
*Note: trials of the host-specific biocontrol agent for Himalayan balsam (rust fungus, <i>Puccinia komarovii</i> var. <i>glanduliferae</i>) are ongoing and to achieve control additional rust strains are required. Specifications for the application of non-specific grazing animals (livestock) for balsam control are not provided in this document as this is a complex and highly site-specific process and formal guidance has not yet been published.												

Importance of the Himalayan balsam lifecycle

To achieve effective management of invasive plants such as Himalayan balsam which spread rapidly by seed, flowering must be prevented for several years to deplete the soil seed bank. The quicker that depletion is achieved, the fewer treatments will be required in the longer-term, reducing overall project costs, herbicide use and CO₂ emissions. Himalayan balsam populations have a reservoir of seeds (propagules) in the upper layer of the soil (30,000 seeds m²) which remain viable for up to 3 years. In certain settings, local eradication of Himalayan balsam populations can be achieved, though there always remains some risk of reinvasion from other areas and/or upstream during flooding.

Evidence-based recommendations provided below draw on Advanced Invasives unpublished field research combined with biological understanding of Himalayan balsam (i.e., lifecycle processes). Recommendations are further supported through consultation with expert practitioners who have worked extensively with Himalayan balsam in the UK. Timings of Himalayan balsam growth stages are shown above along with recommended treatment timings. While all methods of chemical and physical (mechanical) control are effective, these must be applied three times per year to ensure that no seed is set; where this is not achieved, population recovery and management failure will result. Note that the growth stages in the diagram above are approximate and dependent upon weather conditions and altitude. Also note that the earlier in the growing season that control methods are applied, the less likely that balsam plants will reach maturity, flower and set seed – **do not leave treatment too late in the**

growing season as time and resources will be wasted and inter-season management will be ineffective. Also note that management of the population at an early stage of establishment will be easier and more labour- and cost-effective.

Full treatment specifications

Three physical (one based on powered equipment, two based on labour) and three Integrated Pest Management (IPM) systems are recommended for the sustainable management of Himalayan balsam. Note that in the fourth and fifth years of an effective 5-year balsam management programme based on IPM systems, herbicide application frequency can be reduced, as the few remaining balsam plants can be managed quickly by cutting using powered equipment (though this will increase project costs). **Note that cutting should not be used where balsam is growing amongst Japanese knotweed as this will result in knotweed spread and reduce the efficacy of knotweed control when using glyphosate-based herbicides.**

Himalayan balsam - treatment specifications

Treatment 1: Physical management system - Cutting

- **Use near water:** Yes
- **Frequency:** Cutting three times per year, all years of treatment
- **Herbicide:** N/A
- **Method:** Cutting using powered equipment (e.g. brush cutter, mower, flail) below the 1st stem node; plants cut above this point will continue to grow in a branching pattern and will flower and set seed. Note that access must be considered for larger equipment.
- **Rate:** N/A
- **Timing:** Apply from time that plants are large enough that the plant can be cut accurately below the 1st stem node (c.50cm tall) from March/April; apply all three control methods between March/April and August. Undertake the first cut in March/April, the second cut between May and July and the third cut in July/August.

Treatment 1: Control method application timings. Where: green = 1st application; blue = 2nd application; red = 3rd application.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Treatment 1: Physical management system - Cutting												
Cutting 1 st treatment												
Cutting 2 nd treatment												
Cutting 3 rd treatment												

Treatment 1: Notes

- Aim to undertake all treatments as early as possible to minimise flowering and seed pod formation. Note that viable seed can be produced on intact flowering plants following cutting.
- Clean down equipment in a designated wash down area (away from water) prior to moving offsite.
- Higher labour requirements and CO₂ emissions compared with IPM system treatments recommended.
- Himalayan balsam herbicide resistance development is not relevant.



Himalayan balsam - treatment specifications

Treatments 2 & 3: Physical management systems - Labour-based hand pulling & cutting

For smaller areas of Himalayan balsam less than 1,000 m² in extent, hand pulling and cutting may be appropriate in cases where there is a coordinated, motivated volunteer workforce. While other treatments recommended can be applied three times per year, hand pulling and cutting using a volunteer workforce should be considered a continuous control method, the efficacy of which is dependent upon effective onsite monitoring with ongoing treatment of balsam growth as and when it is found. Note that hand pulling and cutting treatments are physically demanding and not suitable for all volunteers. Also, it can be hard to retain volunteer interest as it is very repetitive work. When planning the management programme, these limitations must be considered, otherwise management programme failure will result.

- **Use near water:** Yes
- **Frequency:** Continuous within-season application, all years of treatment
- **Herbicide:** N/A
- **Rate:** N/A

- **Pulling method:** Pull whole plant out along with the root; grasp stem firmly and draw upwards deliberately to prevent the stem breaking above the 1st stem node; plants breaking above this point will continue to grow in a branching pattern and will flower and set seed.
- **Pulling timing:** Apply when plants are large enough that the plant can be pulled out of the ground intact (c.50cm tall) from March/April to August; ongoing treatment to minimise flowering and seed pod formation. Minimum treatment frequency of once per month.

- **Cutting method:** Cut using hand-held equipment (e.g. machete, scythe) below the 1st stem node; plants cut above this point will continue to grow in a branching pattern and will flower and set seed.
- **Cutting timing:** Apply when plants are large enough that the plant can be cut accurately below the 1st stem node (c.50cm tall) from March/April to August; ongoing treatment to minimise flowering and seed pod formation. Minimum treatment frequency of once per month.

Treatments 2 & 3: Control method application timings. Where: green = continuous application.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Treatment 2: Physical management systems - Labour-based hand pulling & cutting												
Pulling/cutting treatment												

Treatments 2 & 3: Notes

- Can be used near water but hand pulling treatment in particular may increase erosion risk; reinvasion from upstream is also likely, and progress along riverbanks using this treatment will be very slow.
- Note that viable seed can be produced on intact flowering plants following pulling.
- Additional equipment requirement: rakes, forks and wheelbarrows.
- Aim to 'forward-load' management early in the growing season while plants are more accessible and there are fewer bees (avoid stings!); **don't leave treatment until the last minute.**
- Ensure good waste management processes are agreed before beginning this treatment method as large volumes of waste will be generated. Create access routes and disposal areas away from water to prevent waste piles containing soil and seed from previous growing seasons being washed downstream during flooding. **Do not dispose of any waste material in general compost.**
- Himalayan balsam plant material (including soil contaminated with seeds) is a 'controlled waste' under the Environmental Protection Act 1990 which means it can only be transported by a registered waste carrier to suitably permitted or exempt sites; **do not move any plant or soil waste generated by management from the area where it produced.**
- Check waste piles periodically for any plants re-rooting from roots and stem nodes, as these will flower and seed.
- **Himalayan balsam should not be allowed to flower or set seed.** However, in certain limited circumstances, flowers and seed pods can be carefully bagged by dipping the top of the plant into a large transparent bag (so you can see what you are doing!) and pulling it off – minimise this procedure as it takes a lot of time and some seeds will inevitably escape. Dispose of flowers and seed pods along with other waste away from water following good biosecurity procedures as sticky seeds will adhere to boots and clothing.
- Clean down equipment in a designated wash down area (away from water) prior to moving offsite.
- Hand pulling and cutting have the highest labour requirements of all treatments recommended, and significant CO₂ emissions are associated with frequent volunteer transport.
- Himalayan balsam herbicide resistance development is not relevant.

Himalayan balsam - treatment specifications

Treatment 4: Integrated Pest Management (IPM) system - Glyphosate + cutting

- **Use near water:** Yes
- **Frequency:** Glyphosate twice per year, cutting once per year, all years of treatment
- **Herbicide:** Glyphosate
- **Method:** Foliar spray using hand-held, knapsack or large volume sprayers – weed wiping may also be suitable; cutting using powered equipment (e.g. brush cutter, mower, flail) below the 1st stem node; plants cut above this point will continue to grow in a branching pattern and will flower and set seed. Note that access must be considered for larger equipment.
- **Rate:** Half of maximum permitted application rate (see product label), twice per year.
- **Timing:** Apply all three control methods between March and August. Undertake the first glyphosate application between March and May and the second glyphosate application between April and June. Cutting of remaining Himalayan balsam plants should be undertaken between June and August, one month after the final herbicide treatment and before seed pod formation.

Treatment 4: Control method application timings. Where: green = 1st application; blue = 2nd application; red = 3rd application.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Integrated Pest Management (IPM) system - Glyphosate + cutting												
Glyphosate 1 st treatment			█	█	█							
Glyphosate 2 nd treatment				█	█	█						
Cutting						█	█	█				

Treatment 4: Notes

- Can be applied effectively earlier than cutting, as plants can be treated with herbicides before they reach a height of 50cm in March/April.
- Aim to undertake all treatments as early as possible to minimise flowering and seed pod formation. Note that viable seed can be produced on intact flowering plants following cutting and ineffective herbicide application.
- Clean down equipment in a designated wash down area (away from water) prior to moving offsite.
- Higher labour requirements and CO₂ emissions than other IPM systems.
- Himalayan balsam herbicide resistance development should be considered, ensure total within-season control of whole population.



Himalayan balsam - treatment specifications

Treatment 5: Integrated Pest Management (IPM) system - Residual + glyphosate + cutting

- **Use near water:** No
- **Frequency:** Residual once per year, glyphosate twice per year, years 1 & 2; Glyphosate twice per year, cutting once per year, years 3 to 5.
- **Herbicide:** Residual (e.g. flazasulfuron) + glyphosate
- **Method:** Soil and foliar spray using hand-held, knapsack or large volume sprayers.
- **Rate:** Residual herbicide at full (maximum permitted) application rate (see product label), once per year; glyphosate at half of maximum permitted application rate (see product label), twice per year.
- **Timing:** Apply all control methods between February and August.
Years 1 & 2: Undertake the residual application between February and April. Undertake the first glyphosate application between April and June and the second glyphosate application between June and August.
Years 3 to 5: Undertake the first glyphosate application between March and May and the second glyphosate application between April and June. Cutting of remaining Himalayan balsam plants should be undertaken between June and August, one month after the final herbicide treatment and before seed pod formation.

Treatment 5: Control method application timings. Where: green = 1st application; blue = 2nd application; red = 3rd application.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Integrated Pest Management (IPM) system - Residual + glyphosate + cutting												
Years 1 & 2												
Residual		Green	Green	Green								
Glyphosate 1 st treatment				Blue	Blue	Blue						
Glyphosate 2 nd treatment						Red	Red	Red				
Years 3 to 5												
Glyphosate 1 st treatment			Green	Green	Green							
Glyphosate 2 nd treatment				Blue	Blue	Blue						
Cutting						Red	Red	Red				

Treatment 5: Notes

- Can be applied effectively earlier than cutting, as plants can be treated with herbicides before they reach a height of 50cm in March/April.
- Aim to undertake all treatments as early as possible to minimise flowering and seed pod formation. Note that viable seed can be produced on intact flowering plants following cutting and ineffective herbicide application.
- Inclusion of a residual herbicide within this IPM system has the advantage of controlling Himalayan balsam populations more quickly than other recommended treatments. Residual herbicides should only be applied for 2 years to permit full recovery of native plants in years 3-5 (limiting potential for control site recolonisation by invasive plants). Note that this IPM system emits less CO₂ than other treatments and uses less herbicide over the whole 3-5 year treatment lifecycle than other IPM systems.
- Residual herbicides do not kill mature Himalayan balsam plants; early application is required to control a high proportion of seed germinating early in the growing season.
- Glyphosate-based herbicides work more slowly and are less effective when plants reach full maturity later in the growing season (July/August onwards); earlier treatments are strongly recommended. **Note that the 2nd glyphosate application window is targeted at controlling late germinating plants and plants which have escaped previous treatments.**
- Clean down equipment in a designated wash down area (away from water) prior to moving offsite.
- Himalayan balsam herbicide resistance development should be considered, ensure total within-season control of whole population.



Himalayan balsam - treatment specifications

Treatment 6: Integrated Pest Management (IPM) system - Selective + glyphosate

- **Use near water:** No
- **Frequency:** Selective once per year, glyphosate twice per year, all years of treatment
- **Herbicide:** Selective (e.g. triclopyr) + glyphosate
- **Method:** Foliar spray using hand-held, knapsack or large volume sprayers preferably with a long lance.
- **Rate:** Selective herbicide at full (maximum permitted) application rate (see product label), once per year; glyphosate at half of maximum permitted application rate (see product label), twice per year.
- **Timing:** Apply all three control methods between March and August. Undertake the selective application between March and May. Undertake the first glyphosate application between April and June and the second glyphosate application between June and August.

Treatment 6: Control method application timings. Where: green = 1st application; blue = 2nd application; red = 3rd application.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Integrated Pest Management (IPM) system - Selective + glyphosate												
Selective			█	█	█							
Glyphosate 1 st treatment				█	█	█						
Glyphosate 2 nd treatment						█	█	█				

Treatment 6: Notes

- Can be applied effectively earlier than cutting, as plants can be treated with herbicides before they reach a height of 50cm in March/April.
- Aim to undertake all treatments as early as possible to minimise flowering and seed pod formation. Note that viable seed can be produced on intact flowering plants following cutting and ineffective herbicide application.
- Selective herbicides do not kill mature Himalayan balsam plants later in the growing season (May/June onwards).
- Glyphosate-based herbicides work more slowly and are less effective when plants reach full maturity later in the growing season (July/August onwards); earlier treatments are strongly recommended. **Note that the 2nd glyphosate application window is targeted at controlling late germinating plants and plants which have escaped previous treatments.**
- Aim to undertake all treatments as early as possible to minimise flowering and seed pod formation; where herbicide treatments have been delayed and seed pods have formed, supplemental cutting of Himalayan balsam plants can be undertaken using powered equipment between July and August.
- Clean down equipment in a designated wash down area (away from water) prior to moving offsite.
- Only Treatment 5 (IPM system - Residual + glyphosate + cutting) has lower labour requirements and CO₂ emissions.
- Himalayan balsam herbicide resistance development should be considered, ensure total within-season control of whole population.



Do's and Don'ts of Himalayan balsam treatment

Do's

Improve your Himalayan balsam control results by thinking about the following:

- Always follow the information on the herbicide product label and do not exceed the specified dose on the label.
- Always ensure those who are using plant protection products (herbicides) have the necessary qualifications to do so and consider using specialist contractors. **Details of operator and contractor accreditation information is provided in the Welsh Government document [Information for community and voluntary groups in Wales: Practical control of Japanese knotweed](#).**
- **Timing** – the key to controlling Himalayan balsam is preventing it from seeding and depleting the seed bank; act early in the growing season to reduce labour and herbicide requirements later in the growing season when the plants are larger.
- **Coverage** – good coverage means getting a little herbicide onto most of the leaves – this can be achieved by continually moving the spray lance as the herbicide is applied. **You do not need to excessively apply herbicide(s) to get good results.** Attention to detail (operator performance) is critical. Apply residual herbicides to the soil surface in advance of germination and ensure even soil coverage.
- **Spray retention** – spray enhancers (also known as adjuvants/surfactants) help you to make each application count. Adjuvants improve control results by sticking the herbicide to the leaf – this allows the herbicide to absorb better and the adjuvant protects the herbicide from being washed off by unexpected rainfall.

- **Herbicide absorption** – use water conditioners to get the best performance from your glyphosate products. Glyphosate can stick to salts in water and this stops some of the herbicide working properly. Water conditioners remove salts from the water, before you mix in your glyphosate product.
- **Use the right tools for the job** – think about which of the recommended treatments will work best using the least herbicide and labour.
- Because we can kill Himalayan balsam plants and where we have managed the soil seed bank for 3-5 years, we can talk about local eradication of the plant. Note that eradication of large infestations exceeding 1,000 m² may take 3-5 years to achieve.
- Local eradication is possible and can be considered to have been achieved when all plants have been killed and the seed bank has been managed for 7-15 years.

Don'ts

- Research by Advanced Invasives has found acetic acid-based herbicides to be ineffective for Himalayan balsam control.
- Where spread and/or dispersal onto neighbouring land occurs, including as a result of the application of ineffective treatments, both criminal and civil liability may arise.

Acknowledgements

- Alan Abel, Director at Complete Weed Ltd
- Gethin Bowes, Invasive Plant Species Officer at Caerphilly CBC
- Prof Dan Eastwood, Swansea University Department of Biosciences
- Prof Mike Fowler, Swansea University Department of Biosciences
- Sophie Hocking, Swansea University Department of Biosciences
- Barrie Hunt, Technical Manager UK & Ireland at Gowan Crop Protection Ltd
- Brian Taylor, Director at The Knotweed Company Ltd

Please note that this leaflet is for information only. If you have any specific concerns regarding Himalayan balsam, please take professional advice.

Copyright statement

Images contained in this document unless otherwise credited are copyright of Advanced Invasives Ltd -

© Advanced Invasives Ltd | 2022. All rights reserved.

Any redistribution or reproduction of images contained in this document in any form is prohibited other than the following:

- you may print or download images to a local hard disk for your personal and non-commercial use only
- you may copy the content to individual third parties for their personal use, but only if you acknowledge this document as the source of the material

You may not, except with our express written permission, distribute or commercially exploit the images. Nor may you transmit or store the images in any other website or other form of electronic retrieval system.

Sources cited

1 Advanced Invasives Caerphilly CBC (2019) 2 Beerling & Perrins *J. Ecol.* (1993) 3 Booy et al. *Bloomsbury* (2015) 4 BSBI Species Accounts *Impatiens capensis* (2021) 5 CEH Centre for Ecology & Hydrology (2004) 6 Cockeland & Tanner *Earthscan* (2012) 7 Čuda et al. *Weed Res.* (2020) 8 EA Environment Agency (2010) 9 Ellison et al. *Weed Res.* (2020) 10 Jones & Eastwood *Pest Manag. Sci.* (2019) 11 Jones et al. *Biol. Invasions* (2018) 12 Jones *PhD Thesis* (2015) 13 Kettnering & Adams *J Appl Ecol* (2011) 14 Myers et al. *Trends Ecol. Evol.* (2000) 15 NBN Atlas *Impatiens parviflora* (2021) 16 Panetta *Weed Res.* (2015) 17 Pattison et al. *Ecosystems* (2019) 18 Pembrokeshire Coast National Park Authority (ND) 19 RAPID LIFE (2018) 20 Rose *Warne* (2016) 21 Seeney et al. *Biol. Invasions* (2019) 22 Stace *C&M Floristics* (2019) 23 Tanner & Gange *Weed Res.* (2020) 24 Tweed Invasives Project (2020) 25 Williams et al. *CABI* (2010) 26 Williams & Rich *BSBI* (1998) 27 Wood et al. *Weed Res.* (2020)

This information leaflet has been produced for the Welsh Government by Advanced Invasives Ltd

**ADVANCED
INVASIVES**

Cite as:

Jones D (2022) Public information on invasive species in Wales: Himalayan balsam. Welsh Government.

Working terms

Key control and management terms, including plant protection product (PPP or herbicide) and IPM system descriptions. Note that the following are working examples – only apply plant protection products (herbicides) and spray enhancers (also known as adjuvants/surfactants) authorised for use in the areas being treated and ensure that product application is in accordance with all label recommendations.

Non-residual selective herbicides:

- Only control broadleaf weeds from time of application

Synthetic auxin examples –

- Phenoxy-carboxylic acids (2,4-D amine)
- Benzoic acids (dicamba)
- Pyridine-carboxylic acids (triclopyr)

Non-residual non-selective herbicides:

- Control broadleaf and grass weeds from time of application

Example –

- Inhibition of EPSP synthase (glyphosate)

Residual selective herbicides:

- Remain in soil controlling broadleaf weed growth

Synthetic auxin example –

- Pyridine-carboxylic acids (aminopyralid)

Residual non-selective herbicides:

- Remain in soil controlling broadleaf and grass weed growth

Example –

- Inhibition of acetolactate synthase ALS – sulfonylurea (flazasulfuron)

Integrated Pest Management (IPM) systems can also be described more specifically based on control method integration:

- Integrated Weed Management (IWM) system – these systems are truly integrated, often combining physical with chemical control methods e.g., Treatment 2 – glyphosate + tap root cutting.
- Integrated Herbicide Management (IHM) system – these systems integrate herbicides only, often with different properties e.g., Treatment 4 – residual + glyphosate.