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INVASIVE SPECIES METHOD STATEMENT & BIOSECURITY RISK ASSESSMENT

For

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1 INTRODUCTION

1.1 Author and qualifications

This report is written and compiled by Toby Leverett BSc MSc, Graduate Ecologist for United Environmental Services Ltd (UES).

The report has been verified by Robert Mooney, UES Ecologist.

1.2 Proposed development

The applicant has been granted full planning permission (reference: P/2024/1638) by Wrexham County Borough Council for the siting of portakabin to act as an office at Entrec, Wrexham.

1.3 Report objectives and structure

This document has been prepared in order to discharge condition 6 of planning permission P/2024/1638:

6. *No development, including site clearance, shall commence until a Biosecurity Risk Assessment, and Method Statement that considers invasive non-native species and specific diseases (e.g. Chytrid) has been submitted to and approved in writing by the Local Planning Authority. The risk assessment shall include measures to prevent the introduction of and where present control, removal or for the long-term management of invasive species both during construction and operation. The risk assessment shall consider landscaping and other related plans. The Biosecurity Risk Assessment shall be carried out in accordance with the approved details.*

This document sets out all the necessary procedures, timings and mitigation measures to avoid the spread of invasive species as well as the biosecurity measures relating to Chytrid during works on site and avoid any potential breaches of legislation. As no invasive species have been recorded on site, this report covers measures for the eradication of eight of the most common invasive species which may be encountered on site. This report should be read in conjunction with appendices 1 – 7.

2 RISK ASSESSMENT

2.1 Background

2.1.1 Himalayan balsam

First introduced as a garden plant in Britain in 1839, it now rapidly colonises river banks and areas of damp ground. It grows up to 3m high and the stems are pinkish-red, hollow and often jointed with shiny, dark green, lanceolate leaves. The characteristic purplish-pink slipper shaped flowers appear from June to October.

When touched, the mature seed pods of Himalayan balsam explode, scattering the seeds up to 7m away. The seeds can be transported by water or wind, remaining dormant for up to 2 years before germination and can remain viable for 18 and 36 months.

Himalayan balsam out competes all native plants as it colonises quickly and creates tall dense stands shading any plants below. It also produces much more nectar and therefore attracts pollinating insects, possibly to the detriment of native flowering plants. It has no natural forms of control in Britain.

2.1.2 Japanese knotweed

Introduced into the UK as an ornamental garden plant in the mid-nineteenth century, it has spread rapidly, particularly along watercourses, transport routes and infested waste areas. It is a perennial plant with hollow, bamboo-like stems covered in purple speckles, which can reach heights of 2-3m. The leaves are up to 120m in length with a flattened base and pointed tip arranged in a zig-zag pattern. Small creamy-white flowers can be seen late in the season (August to October) hanging in clusters.

Japanese knotweed produces underground stems or rhizomes which are thick and woody, extending to a depth of at least 2m and 7m laterally from a parent plant. During winter, the leaves die back to reveal orange/brown coloured woody stems which may stay erect for several years. In the UK the plant is mainly spread through rhizome fragments or cut stems and is dispersed by both human and natural means; through watercourses, fly-tipping, garden waste, contaminated topsoil, or machinery. Rhizome material as little as 10mm in length is enough to produce a new plant within 10 days, or can remain dormant for long periods, possibly as long as 20 years.

The plant damages the urban environment by pushing up through tarmac and paving. It will also out-compete other species as it forms a dense canopy, shading plants underneath it.

2.1.3 Cotoneaster

Native to East Asia and introduced in Britain as an ornamental garden plant in 1824, this group of species are now established and widespread across the UK. There are over 100 cotoneaster species known to be present within the UK, however only the six most common and widespread are listed as Schedule 9 species. The cotoneaster species all have different features but can be hard to identify to species level. All cotoneaster species are thornless and have leaves with a slightly downy underside and a hairless shiny upper surface. All species produce small pink or white flowers in the spring or summer followed by orange or red berries in the winter.

Cotoneaster is spread into the wild through seeds which are contained within the berries. These berries provide an attractive food source and are regularly eaten by birds and spread in their droppings. Birds can easily spread the seeds over large areas which can then remain dormant for many years before germinating.

Cotoneaster out competes native plants as it colonises quickly and can be dispersed over a large area by birds. It produces an extensive roost system which can be difficult to remove. It has very few natural forms of control in Britain.

2.1.4 Montbretia

Montbretia is a hybrid plant that was originally created in France from parent plants of South African origin. Introduced to the UK in 1880 as a garden plant, it had escaped by 1911 both naturally and through the dispersal of garden waste and spread rapidly across the UK in the latter part of the 20th century.

Montbretia can completely dominate habitats where it grows, often outcompeting and excluding native plant species. The plant spreads mainly by rhizomes, and rarely by seed. Key identifying features include the orang tubular flowers in clusters at the end of a long spike. Leaves are less than 3cm wide, long, flat and spear shaped.

2.1.5 Japanese Rose

Originally introduced in the late 18th century it wasn't until the mid-18th century that it was successfully grown. After this it became popular in gardens, parks and other communal areas. It was not until 1927 that it started growing in the wild.

Japanese rose is a deciduous shrub with stems densely covered in slender thorns. The flowers are large and are pink to purple in colour and are easily distinguishable from other wild roses. The upper surface of the leaves is shiny and the underside is downy.

2.1.6 *Rhododendron*

Rhododendron is a large evergreen shrub (that can grow up to 8m tall) that was introduced to the UK as an ornamental plant in the 18th Century from Asia. It has dark green waxy, oblong leaves and pink or purple flowers on 2 to 4cm stalks. Flowering occurs in spring and summer with plants capable of producing large quantities of viable seed, which can persist to create a seedbank in the soil. *Rhododendron* can also propagate itself by vegetative means, both by suckering from roots and by layering wherever branches touch the ground.

Rhododendron is a very popular garden ornamental plant and has been extensively planted within gardens, along the edges of fields and within woodlands. *Rhododendron* is a hardy plant and can thrive in many habitats outcompeting many native plants. These characteristics allow it to establish all over the UK.

2.1.7 Variegated yellow archangel

Variegated yellow archangel is a widely cultivated plant of uncertain origin. Advertised in the UK as a prized garden plant by the 1940s, it was first recorded in the wild in Oxfordshire in 1974. It has spread rapidly in lowland Great Britain over recent decades, mostly in shady sites: woodland (usually on margins), scrub, hedgerows, verges and stream sides, mostly with a degree of shade.

It is a low-growing "dead-nettle" with leafy runners, leaves boldly variegated (leaves that are edged with a second colour, in this case white) in all seasons (unlike the native woodland yellow archangel *L. galeobdolon*), and whorls of yellow two-lipped flowers streaked with brown. It rapidly spreads and carpets the understorey, to the exclusion of other plants.
Variegated yellow archangel can completely dominate habitats where it grows, often outcompeting and excluding native plant species. The plant spreads mainly by spreading stems (stolons); the smallest stolon fragment with just one pair of leaves can grow into a new colony, and stolons break readily if the plant is pulled up.

2.1.8 Giant Hogweed

First introduced as an ornamental plant in the 19th century, it is now common along riverbanks, wet meadows and waste ground. It grows up to 5m high and the stems contains purple blotches. The plant contains a large umbel flower head which measures up to 50cm in diameter and flowers between June and July.

The seed heads contain up to 50,000 seeds which are distributed up to 4m away and results in the formation of dense giant hogweed stands. However, the seeds can also be transported much further by water, wind, vehicles, livestock, and human activities, and can remain dormant within the ground for years.

Giant hogweed outcompetes native plant species as it creates tall dense stands shading any plants below. In addition, it increases the risk of riverbank erosion and the risk of flooding.

There are health and safety hazards associated with giant hogweed, as it contains a phytotoxic sap which can cause severe burns and blistering to human skin.

2.1.9 Amphibian diseases

Numbers and incidences of amphibian diseases have increased in the UK in recent years. The most notable of these are chytridiomycosis and ranavirus. Chytridiomycosis is caused by two species of microscopic fungi *Batrachochytrium dendrobatidis* (“Bd”) and B. *salamandrivorans* (“Bsal”), which are often simply referred to as “chytrid”. Chytrid infection has been responsible for mass mortalities of amphibians with declines and extinctions in some species on six continents, including Europe. Ranavirus (ranaviral disease), caused by infection with one of many types of ranavirus, also has a global distribution, though it appears to cause population declines less frequently than chytrid. Other infectious agents are present in amphibians, such as herpesvirus and the parasitic infections *Amphibiocystidium* and *Ribeiroia*, however much less is known about them and they are not considered to be as widespread.

Ranavius is now commonly reported from parts of the UK and infection can lead to local population declines of up to 80% in common frogs *Rana temporaria*. Whilst Bd caused chytrid

is now known to be widespread in the UK, it does not appear to have caused the types of mass die-offs reported in Europe. However, such events can be difficult to detect even when they are occurring and it can take many years for the full effects of disease introduction to manifest. Whilst Bsal is known to be present in captive amphibians in the UK, it has not yet been detected in the wild. However, it is believed to be a major potential threat to newt health should it become established, particularly the great crested newt which is known to be highly susceptible.

Amphibian diseases are frequently found to be spread by human activity and the introduction of non-native species.

2.2 Legislation

Relevant Legislation regarding invasive species, including Japanese knotweed, Himalayan balsam, montbretia, Japanese rose, Rhododendron, Yellow Variegated Archangel, Giant Hogweed, Himalayan cotoneaster and wall cotoneaster include:

- *Wildlife & Countryside Act 1981 (as amended);*
  Section 14(2) of the Wildlife and Countryside Act 1981 (WCA 1981) states that "…if any person plants or otherwise causes to grow in the wild any plant which is included in Part II of Schedule 9, he shall be guilty of an offence." Japanese knotweed, wall cotoneaster, Himalayan cotoneaster, montbretia, Japanese rose, Rhododendron, Yellow Variegated Archangel, Giant Hogweed and Himalayan balsam are listed in Schedule 9. Anyone convicted of an offence under Section 14 of the WCA 1981 may face a fine of £5,000 and/or 6 months imprisonment, or 2 years and/or an unlimited fine on indictment.

- Invasive Alien Species (Enforcement and Permitting) Order 2019*;*
  Section 3 of the Invasive Alien Species (Enforcement and Permitting) Order 2019 (IASO 2019) states that "…any person who plants or otherwise causes to grow in the wild any specimen which is of a species of plant which is included in Part 2 of Schedule 2 is guilty of an offence". Himalayan balsam and Giant Hogweed are listed in Schedule 2. Anyone convicted of an offence under Section 3 of the IASO 2019 may face a fine and/or 6 months imprisonment, or 2 years and/or a fine on indictment.

- *The Environmental Protection Act 1990 (EPA, 1990);*
  The EPA 1990 contains a number of legal provisions concerning "controlled waste", which are set out in Part II. Any soil or plant material contaminated with Japanese knotweed, Himalayan balsam, Japanese rose, Rhododendron, Giant Hogweed, Yellow Variagated Archangel or cotoneaster that you discard, intend to discard or are required to discard is likely to be classified as controlled waste. The most relevant provisions in the EPA are in section 33 (1) (a) and (1) (b). These create offences to do with the deposit, treating, keeping or disposing of controlled waste without a permit. Section 33 (1) (c) makes it an offence to keep, treat or dispose of controlled waste in a manner likely to case pollution of the environment or harm to human health. Section 34 places duties on any person who imports, produces, carries, keeps, treats or disposes of controlled waste. Waste must be handled responsibly and in accordance with the law at all stages between its production and final recovery or disposal.

- *Control of Pesticides Regulations 1986;*

The Control of Pesticides Regulations 1986 require any person who uses a pesticide to take all reasonable precautions to protect the health of human beings, creatures and plants, safeguard the environment and in particular avoid the pollution of water.

- *Hazardous Waste Regulations 2005 (HWR 2005);*
  The HWR 2005 contain provisions about the handling and movement of hazardous waste. Hazardous wastes are defined by reference to regulation 6 of the HWR 2005. Consignment notes must be completed when any hazardous waste is transferred, which include details about the hazardous properties and any special handling requirements. If a consignment note is completed, a waste transfer note is not necessary. Untreated Japanese knotweed is not classed as hazardous waste, but material containing knotweed which has been treated with certain herbicides, may be classified as hazardous waste.

- *Waste (England and Wales) Regulations 2011;*
  Waste must be transferred to an authorised person, in other words a person who is either a registered carrier or exempted from registration by the Waste Regulations. A waste transfer note must be completed and signed giving a written description of the waste as per regulation 35 of the Waste Regulations. This must be sufficient to enable the receiver of the waste to handle it in accordance with their own duty of care. Failure to comply with these provisions is an offence.

- *Environmental Permitting (England and Wales) Regulations 2010 (EPR 2010);*
  The EPR 2010 includes reference to the 'Exercise of relevant functions' in Schedule 9, paragraph 4. These objectives are derived from Article 13 of the European Waste Framework Directive. These objectives states that necessary measures shall be taken to ensure that waste is recovered or disposed of "*without endangering human health and without using processes or methods which could harm the environment and in particular without – risk to water, air, soil, plants or animals; or causing nuisance though noise or odours; or adversely affecting the countryside or places of special interest*"

2.3 Impact without mitigation

Japanese knotweed, Himalayan Balsam, Japanese rose, montbretia, Yellow variegated Archangel, Giant Hogweed, Rhododendron and Cotoneaster are listed under Schedule 9 of the Wildlife and Countryside Act 1981 and Himalayan balsam and Giant Hogweed are listed under Schedule 2 of the Invasive Alien Species (Enforcement and Permitting) Order 2019. As such, it is an offence to plant or otherwise cause these species to grow in the wild.

Without mitigation, site clearance and setting out could result in the disturbance and dispersal of Japanese knotweed, Himalayan Balsam, Japanese rose, montbretia, Yellow variegated Archangel, Giant Hogweed, Rhododendron and Cotoneaster on and off site. This could result in a breach of legislation.

Japanese knotweed is also highly invasive and can result in damage to foundations, structures and roads.

In addition, there are health and safety risks associated with the phytotoxic sap of giant hogweed, which can cause severe burns and blisters upon contact with the skin.

Without mitigation, site clearance and ongoing site works could result in the introduction of amphibian diseases. However, this is unlikely given the scope of the works and the lack of suitable amphibian habitat on the site.

3 MITIGATION MEASURES

The following measures are designed with the primary objective of eradicating invasive species from the development site, prior to any works being carried out. They will ensure that the construction personnel have a high level of understanding about the invasive species and the legislation which requires them to be removed and eradicated from site.

3.1 Preventing spread

1. In order to avoid contamination around the site, all site operatives should receive training in invasive species identification and best practice procedures for avoidance of spreading any species throughout the site.

2. Good site hygiene should be maintained:

    - Any stands of the invasive species should be recorded, isolated and fencing erected around the contaminated area to restrict access.
    - Stockpiles of contaminated soil should be clearly marked and isolated.
    - Avoid the used of vehicles within the contaminated areas where possible, if not, vehicles should be washed at a designated area to remove any plant fragments and soil, taking care that contaminated waste water does not spread off site.

3. Avoid any new contamination to the site by minimising the risk of fly-tipping waste onto the development, not importing infested topsoil for use on site, and inspecting new vehicles entering the site, particularly any caterpillar tracks.

4. Reusing treated soils onsite is possible without the need for a waste management licence. However, to minimise the potential problems there could be if the soil was not treated adequately, soul should only be reused where there is little risk of spreading such as away from watercourses, amenity lawns and gardens, away from boundaries with other properties and in an area what is not disturbed heavily by people or livestock.

3.2 Treatment

As there is the possibility that these species could be disturbed by contractors throughout the construction period, any invasive species should be removed prior to start on site. The following procedures should be followed:

1. Identify all existing and emerging stands within the site area and mark all clumps with a single stake (for small clumps), 2 or 3 stakes (for bigger clumps). Each stake shall be driven until firm by hand. All stakes shall be 75mm diameter x 2.5m long peeled, tanalised softwood with the top painted for ease of identification. Stake on the edge of all identified clumps. Mark all areas on a site plan and take a photographic record.

2. A 3m exclusion zone around each clump will be marked out on site.

3. Access to all infected areas shall be on foot at all times. No plant or vehicles shall pass within 3m of the identified stands or staked areas.

4. No excavation or tipping of any material shall be allowed within 5m of any identified stands or staked areas.

5. All site staff shall be briefed upon the identification of invasive species and the need to avoid contact or cross contamination within the site, including points 2, 3 and 4 above. The following steps then need to be followed according to each invasive species.

3.2.1 Himalayan balsam

6. If possible, removal works are not to take place during the period when the plants are in seed, as this could result in the spread of seeds off the site (skip to step 7). If this is not possible, the Himalayan balsam should be sprayed using an appropriate herbicide, at an appropriate concentration by a competent person.

7. If no seeds are present on the plants, they may be removed by pulling the plants by hand, as this is the preferred removal technique. The cleared vegetation should then be transported as contaminated waste to a landfill site.

8. New stands that grow in the future should be pulled early in the season before the seed head develops, ensuring that no seeds are inputted into the seed bank. This process will require ongoing management to fully eradicate Himalayan balsam from site.

3.2.2 Japanese knotweed

6. All stands of Japanese knotweed will be sprayed with an appropriate herbicide treatment, at an appropriate concentration. Stem injection is usually the preferred method of chemical control however it is not appropriate in this case due to the large quantity of Japanese knotweed that is present on site.

   Chemical treatment is most effective when applied to mature uncut growth as this provides the greatest surface area for herbicide to be translocated down to the rhizome.

7. Herbicide treatment is most effective when applied in August to September and the first herbicide application will be carried out 2018, with a second application in early 2019, prior to works commencing on site.

8. Any regrowth will be assessed prior to works commencing onsite, and an additional herbicide treatment may be required.

9. If works need to occur within the Japanese knotweed exclusion zone prior to confirmation that the Japanese knotweed has been eradicated, a dig and bund method may be used which will be agreed with the Environment Agency. This method involves excavating the Japanese knotweed zone to a depth of at least 5 metres, however the exact depth will be confirmed by the competent contractor. The excavation will be lined with a root barrier membrane and the Japanese knotweed material will be covered with the root barrier membrane to prevent growth.

10. Works are to be carried out by NPTC certified personnel with the appropriate safety equipment and procedures to be used during the course of chemical application and mixing.

3.2.3 Cotoneaster

6. If possible, removal works are not to take place during the period when the plants are in seed, as this could result in the spread of seeds off the site. If no berries are present, the plant(s) may be removed by excavating the plant. This excavation should include the entire root mass and surrounding soil. The cleared vegetation should then be chipped or burnt on site or transported as contaminated waste to a landfill site.

7. If berries and seeds are present, the plant should be bagged and sealed prior to removal to minimise the risk of seeds being spread off or across site during removal.

8. New stands that grow in the future should be excavated early in the spring or summer before the berries develop, ensuring that no seeds are inputted into the seed bank.

3.2.4 Japanese Rose

6. If possible, removal works are not to take place during the period when the plants are in seed, as this could result in the spread of seeds off the site. If no rosehips are present, the plant(s) may be removed by excavating the plant. This excavation should include the entire root mass and surrounding soil. The cleared vegetation should then be chipped or burnt on site or transported as contaminated waste to a landfill site.

7. If rosehips are present, the plant should be bagged and sealed prior to removal to minimise the risk of seeds being spread off or across site during removal.

8. New stands that grow in the future should be excavated early in the spring before the rosehips develop, ensuring that no seeds are inputted into the seed bank.

3.2.5 Montbretia

6. Montbretia plants may be removed at any time of year by digging and removing all vegetative material and corms (root / rhizome like structures). Alternatively, it can be removed chemically though the application of a glyphosate weedkiller in the growth season (spring and summer).

7. Excavated and infected material removed from site must be treated as controlled waste and disposed of accordingly via a licenced handler or at a licenced facility.

8. If excavation is the chosen eradication method, it must be ensure that all of the plants' corms are removed by excavating and removing all soil within a 1m radius of the plant to a depth of 0.5m.

9. If herbicide treatment is the chosen eradication method, individual plants are to be treated with a glyphosate-based herbicide. The manufacturer's instructions are to be consulted to determine the appropriate dosage of herbicide.

10. Herbicide may be applied directly to the foliage using knapsack sprayer or small weed wiper. The weed wiping technique will help to minimise the impact on non-target species through herbicide drift.

3.2.6 Rhododendron

6. If possible, removal works are not to take place during the period when the plants are in seed, as this could result in the spread of seeds off site. The recommended time of the year for removal is late winter and early spring, as this is the time that no seeds will be present on the plants. Handling / disturbance of plants with seeds will result in further dispersal of the seeds.

7. If no seeds are present on the plants, the stems should be cut and removed by hand or chainsaw, leaving the stump exposed. Glyphosate encapsulated Ecoplugs should then be applied into the stump as this is the preferred removal technique. Ecoplugs can be used anytime of the year and in any weather condition. It is recommended that Ecoplugs are applied within 2 days of cutting.

8. The cleared vegetation should then be transported as contaminated waste to a landfill site.

9. Repeat visits to control subsequent growth is recommended.

3.2.7 Variegated yellow archangel

6. Variegated yellow archangel may be treated by chemical control in the growth season (spring and summer). Digging and removal of all vegetative material is possible at any time of the year as the plant is shallow rooting, however extreme care must be taken not to leave any vegetation; the smallest stolon fragment with just one pair of leaves can grow into a new colony, and stolons break readily if the plant is pulled up.

7. Excavated material proposed to be removed from site must be treated as controlled waste and disposed of accordingly via a licenced handler or at a licenced facility.

8. If chemical treatment is the chosen method of control, care should be taken to minimise off target application of herbicide to the adjacent residential properties and river.

9. Individual plants should be treated with a glyphosate-based herbicide. The manufacturer's instructions should be consulted to determine the appropriate dosage of herbicide.

10. Herbicide may be applied directly to the foliage using knapsack sprayer or small weed wiper.

3.2.8 Giant Hogweed

6. Any growth of giant hogweed is to be sprayed, during suitable weather conditions (low wind speed and clear of rain for 24 hours) by a qualified and certificated operative using Roundup Pro Biactive or similar glyphosate herbicide, applied at the manufacturer's recommended dosage and application rates.

7. All herbicide shall have a wetting agent and dye marker added prior to application.

8. All herbicide shall be mixed into a diluted form off site or only within a controlled area away from watercourses. All spraying shall be via knapsack and all operatives shall be

made aware of the need to avoid spray drift to identified and adjacent flora and watercourses.

9. All stands will be sprayed repeatedly until an experienced ecologist or contractor has inspected the site and giant hogweed is no longer present.

10. Under no circumstances should the area be strimmed, as this can spread the toxic sap as well as the seeds.

11. Another control option given the localised nature of the affected areas is to bury the stand. Again, this must only be done provided the plant has not yet started seeding, and should ideally be buried at a depth of one metre or more. Subsequent chemical treatment of previously affected areas may still be required due to the disturbance of seeds within the soil.

3.3 Amphibian Diseases

ARG UK consider that controlling outbreaks of amphibian diseases in the wild is practically impossible except under very particular circumstances, and so prevention is the best strategy. Alongside prevention, ARG UK highlight the importance of reporting signs of infection, so that we can learn more about diseases and their effects and develop an early warning system for detection of novel threats.

3.3.1 Biosecurity measures during construction phase

The following biosecurity mitigation measures are to be implemented during the construction phase of the development:

- All contractors attending site must ensure their boots are washed prior to access as detailed in the disinfection procedure below.

- For any construction vehicles entering the site, all wheels will be washed using the disinfection procedure detailed below.

3.3.2 Biosecurity measures during operational phase

To reduce the risk of spreading disease onto site, the following biosecurity mitigation measures are to be implemented during the operation of the site:

- All workers attending site must read this risk assessment and agree to implement all biosecurity measures.

- The handling of amphibians will only be undertaken when necessary, which is considered to be when moving amphibians to areas of safety during operation of the site.

- If handling amphibians is necessary, powder-free disposable vinyl gloves will be used and will be rinsed before contact with the amphibians. Vinyl will be used rather than latex or nitrile because the latter two may be harmful to amphibians.

- Following exposure to amphibians, all clothing is to be washed on a 40°C cycle with biological detergent.

- Any dead or obviously sick amphibians will be treated as a high infection risk and will not be handled unless necessary. Any suspected diseased amphibians will be reported via The Garden Wildlife Health project (www.gardenwildlifehealth.org), which has been established to investigate disease in a range of native wildlife species in Great Britain. Photographs of the affected animal(s), the location and details of the symptoms observed are key pieces of information to report.

3.3.3 Disinfection procedure

The following procedure will be followed when disinfecting construction vehicle wheels and boots upon entry onto the site during the construction phase:

1. Use brush to scrub off any debris, plant fragments, mud etc.
2. Rinse with water.
3. Soak in 4% bleach solution for at least 5 minutes, or Virkon for at least one minute.
4. Rinse with clean water. Vehicles wheels should instead be sprayed with disinfectant and allowed left for 5 minutes prior to entry.
5. Allow to dry before next use (though this will not be possible if multiple sites are being visited in a single day or for vehicle wheels).

Disinfection of boots can be undertaken anywhere prior to visitation. Disinfection of vehicle wheels must be undertaken at the site boundary immediately prior to entry onto site.

Disinfectant solutions should be disposed of following the supplier's instructions. Unless otherwise stated, used disinfectant solutions should be poured directly into a drain connected to the sewerage system and flushed with clean water (note that not all drains are connected to sewerage systems), or disposed of as hazardous waste.

3.3.4 Disease identification

Chytrid

Chytrid is known to infect all UK amphibian species and whilst it can often be symptomless, it is characterised by multiple skin erosions and ulcerations all over the body, particularly the tips of the toes.
Additional symptoms can also include:

- Excessive shedding of skin
- Reddening or discoloured skin
- Abnormal posture
- Unusual behaviour such as nocturnal species being active during the day or remaining out in the open for long periods of time.

Ranavirus

All species of amphibian in the UK are considered to be susceptible to ranavirus infection, but the common frog and the common toad *Bufo bufo* are most frequently reported with the disease.

Ranavirus can be tricky to diagnose without a post-mortem, but animals may display one or more of the following symptoms:

- Abnormal wasting (emaciation)
- Redness of the skin (erythema)
- Skin ulcers or sores
- Bleeding (systemic haemorrhaging), especially from mouth/anus
- Breakdown of limbs (limb necrosis)
- Eye problems

The most common symptom is simply to find a large number of dead frogs in a short space of time. The animals are often thin and lethargic before death.

3.4 Future contamination, monitoring and responsibility

These invasive species, particularly Japanese knotweed and Himalayan balsam can redevelop on site after treatment through subsequent growth of dormant seeds and rhizomes or through future contamination of the site.

It is important that regular monitoring be undertaken to assess any regrowth and prevent the spread of any invasive species.

Responsibility for the initial treatment and future monitoring rests solely with the development company and any appointed contractors. The effectiveness of monitoring will be increased through onsite training given to the site operatives. Any regrowth will be further assessed, and an appropriate method of treatment carried out.

If the developed site is sold, the responsibility for future monitoring and treatment of invasive species will also be passed on to the new site owners.

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Non-native species secretariat. Available at: www.nonnativespecies.org

Zoological Society of London (Garden Wildlife Health project) Available at: www.gardenwildlifehealth.org

APPENDICES

Appendix 1 – Rhododendron information leaflet

www.nonnativespecies.org

Produced by Olaf Booy, Max Wade and Vicky White of RPS

Rhododendron

Species Description

Scientific name: *Rhododendron ponticum*
AKA: Rhododendron
Native to: South-west Europe and south-west Asia. UK's stock is believed to come from Spain.
Habitat: Common on acid, peaty or sandy soils in woodland, heathland, rocky hill-sides, river banks, gardens and parks



A large evergreen shrub with leathery leaves, attractive purple to pink flowers and solid stems forming into a trunk when mature. Relatively easy to identify, but can be confused with cherry laurel or horticultural varieties of rhododendron. However, horticultural varieties of rhododendron are relatively rarely found in the wild. Spreads by suckers and seed, which are small and carried long distances by wind.

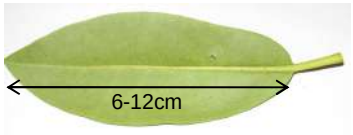
Introduced by gardeners in the late 18th century into parks and woodlands, where it was also used for game cover. Still widely planted, particularly by gardeners. Often grows in ecologically sensitive habitats, such as heath, broad-leaved woodland and dunes, where dense growth can considerably alter the structure of the habitat.

For details of legislation go to www.nonnativespecies.org/legislation.

Key ID Features



Leathery leaves with dull green upper surface



Pale underside









Identification throughout the year

Varies little throughout the year as leaves are evergreen and woody stems remain the same. Flowers appear May to June followed by seed pods.

Distribution

Widespread across the whole of the UK, most common in the south and west.



Source: NBN Gateway. Check website for current distribution

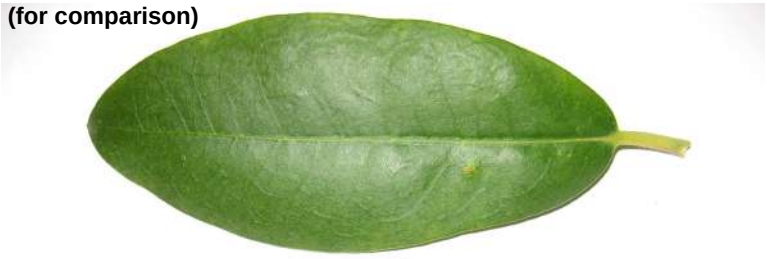
Similar Species

Cherry laurel
Non-native
(*Prunus laurocerasus*)





***Rhododendron* leaf (for comparison)**



Cherry laurel leaf



Varieties of Rhododendron

There are a large number of highly sought after species and varieties of rhododendron, of which the invasive *Rhododendron ponticum* is just one. It is unusual to encounter other varieties or species outside of planted habitats.

References in the further reading list can be used to distinguish between the different varieties if necessary.

Examples of rhododendron varieties:







References and further reading:

Cullen, J (2005) *"Hardy rhododendron species: a guide to identification".* Collins

Preston, C D and Croft, J M (1997) *"Aquatic plants in Britain and Ireland".* Harley Books

Preston, C D, Pearman, D A and Dines, T A (editors) (2002) *"New Atlas of the British and Irish Flora".* Oxford University Press

Stace, C (1999) *"Field Flora of the British Isles".* Cambridge University Press

Photos from: Olaf Booy, David Fenwick, Mike McCabe, Helen Parish

Appendix 2 – Himalayan balsam information leaflet

For more information visit **www.nonnativespecies.org**

Produced by Olaf Booy, Max Wade and Vicky White of RPS

Himalayan Balsam

Species Description

Scientific name: *Impatiens glandulifera*
AKA: Policeman's Helmet, Indian Balsam, Jac y Neidiwr (Welsh)
Native to: West and central Himalayas
Habitat: Found mostly on river banks and in damp woodland, can grow in other damp habitat

A tall, attractive, annual herb with explosive seed heads. Although easy to identify as a mature plant with its pink-purple flowers, fleshy stem and characteristic leaves, the seedlings and last year's dead stems of this annual are more difficult to spot.

Introduced as a garden plant in the early 19th century and first recorded in the wild in 1855. Often favoured by the general public for its aesthetic appeal and is still deliberately planted on occasion. Now widespread in the UK, especially along urban rivers. Spreads solely by seeds, which are small and easily carried by wind or water.

Out-competes native species in ecologically sensitive areas, particularly river banks. Where it grows in dense stands along river banks it can impede flow at times of high rainfall, increasing the likelihood of flooding. Die back of extensive stands over winter can leave river banks bare and exposed to erosion.

Himalayan balsam is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England and Wales. As such, it is an offence to plant or otherwise allow this species to grow in the wild.

For details of legislation go to www.nonnativespecies.org/legislation.



Key ID Features



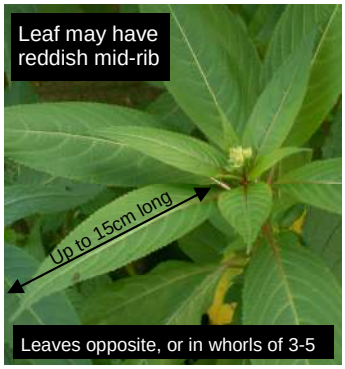


















Identification throughout the year

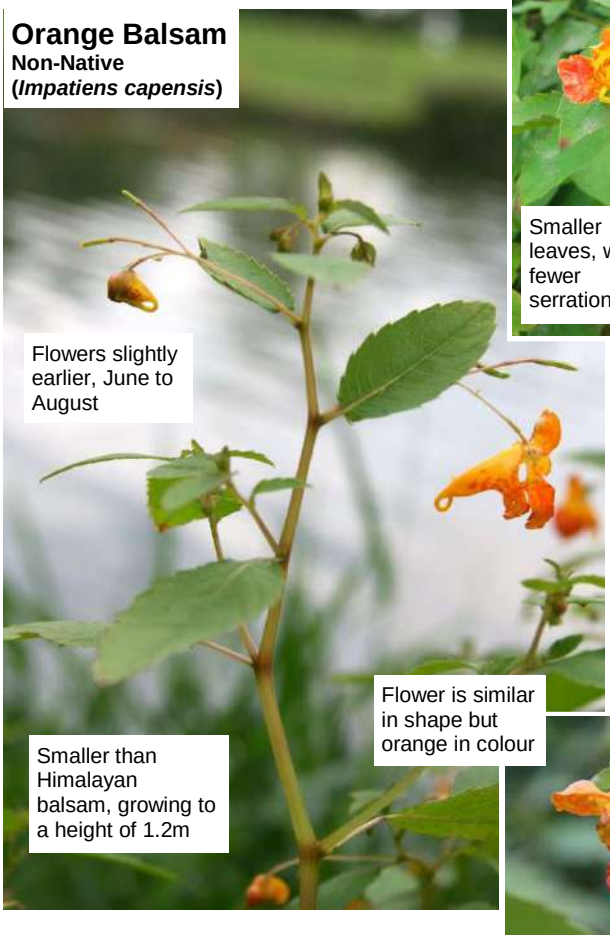
Can be identified at most times of the year: March-June by its seedlings, stem and leaf shape, from July to September by its stem, leaf shape and flowers. More difficult to identify over winter (October to February), look for hay like remains and distinctive root structure.





Similar Species

Orange Balsam
Non-Native
(*Impatiens capensis*)





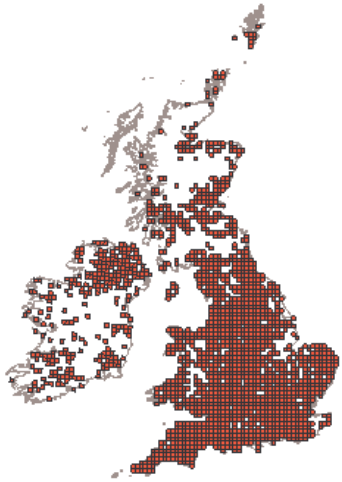
Orange balsam is much less aggressive than Himalayan balsam, forming smaller less dense stands

Flower is similar in shape but orange in colour



Distribution

Widespread and common across the whole of the UK. Primarily on riverbanks and in other damp areas.



Source: NBN Gateway. Check website for current distribution

References and further reading:

Blamey, M, Fitter, R and Fitter, A (2003) *"The Wild Flowers of Britain and Ireland. The Complete Guide to the British and Irish Flora".* A & C Black

Preston, C D, Pearman, D A and Dines, T A (editors) (2002) *"New Atlas of the British and Irish Flora".* Oxford University Press

Stace, C (1999) *"Field Flora of the British Isles".* Cambridge University Press

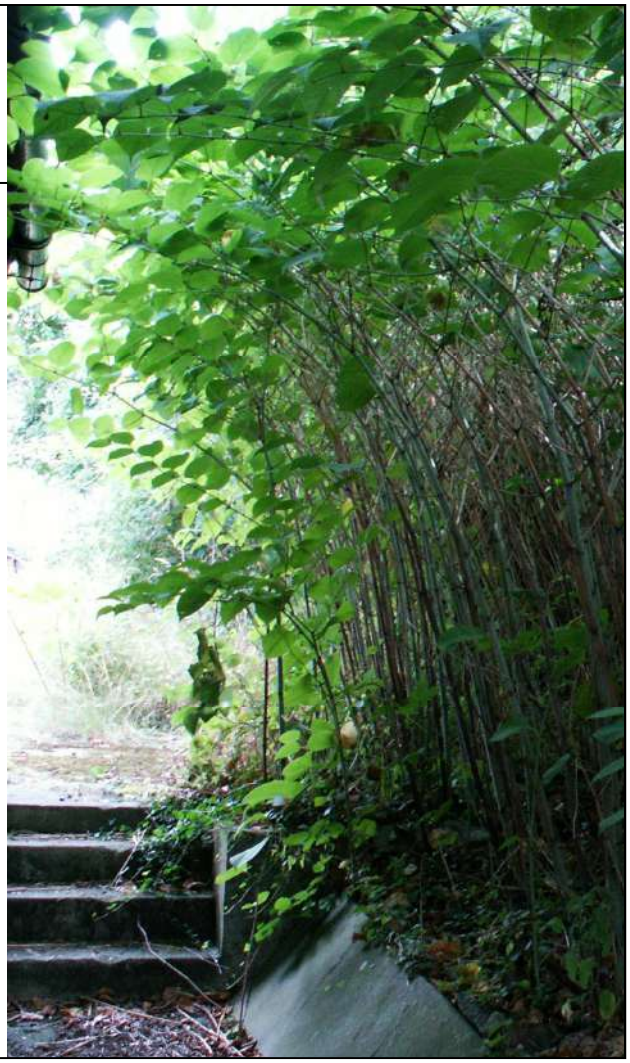
Photos from: Olaf Booy, Mike Harris, Max Wade

Appendix 3 – Japanese knotweed information leaflet

www.nonnativespecies.org

Produced by Olaf Booy, Max Wade and Vicky White of RPS

Japanese Knotweed



Species Description

Scientific name: *Fallopia japonica*
AKA: Japanese Bamboo, Pysen saethwr (Welsh), *Polygonum cuspidatum*, *Reynoutria japonica*
Native to: Japan, Taiwan, northern China
Habitat: Common in urban areas, particularly on waste land, railways, road sides and river banks

Tall herbaceous perennial with bamboo like stems. Often grows into dense thickets. Characteristic leaves and stems, persistence of last year's dead canes and distinctive rhizome (underground root-like stems) enables year round identification.

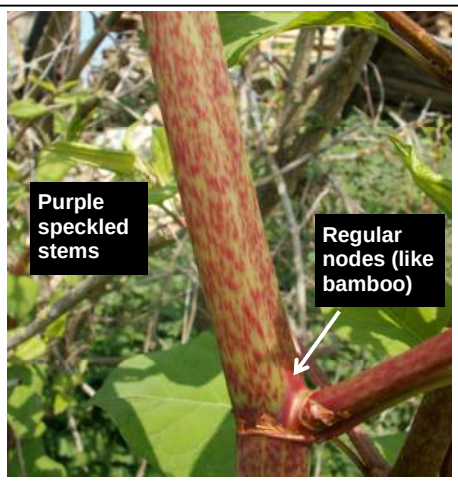
Introduced in the early 19th century as an ornamental plant. Now common and wide-spread across the UK. Spreads rapidly in the wild by natural means and as a result of spread by humans. Spread is solely by vegetative means, either fragments of rhizome or stem. Does not produce seed in the UK. Negative impacts include outcompeting native flora, contributing to river bank erosion and increasing the likelihood of flooding. Can also cause significant delays and cost to development as well as structural damage (it can grow through asphalt and some other surfaces).

Japanese Knotweed is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England, Wales and Scotland. As such it is an offence to plant of other-wise cause Japanese knotweed to grow in the wild. Under the Environmental Protection Act 1990, Japanese Knotweed is classified as controlled waste.

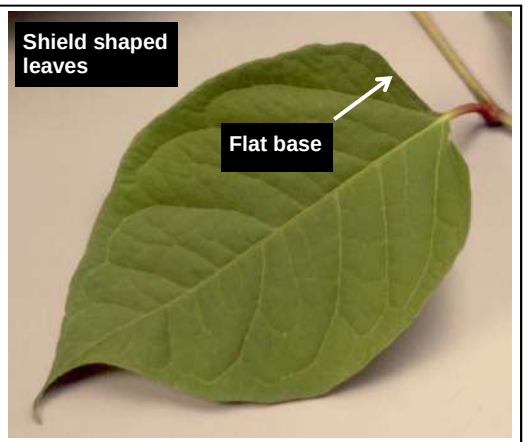
For details of legislation go to www.nonnativespecies.org/legislation.

Key ID Features





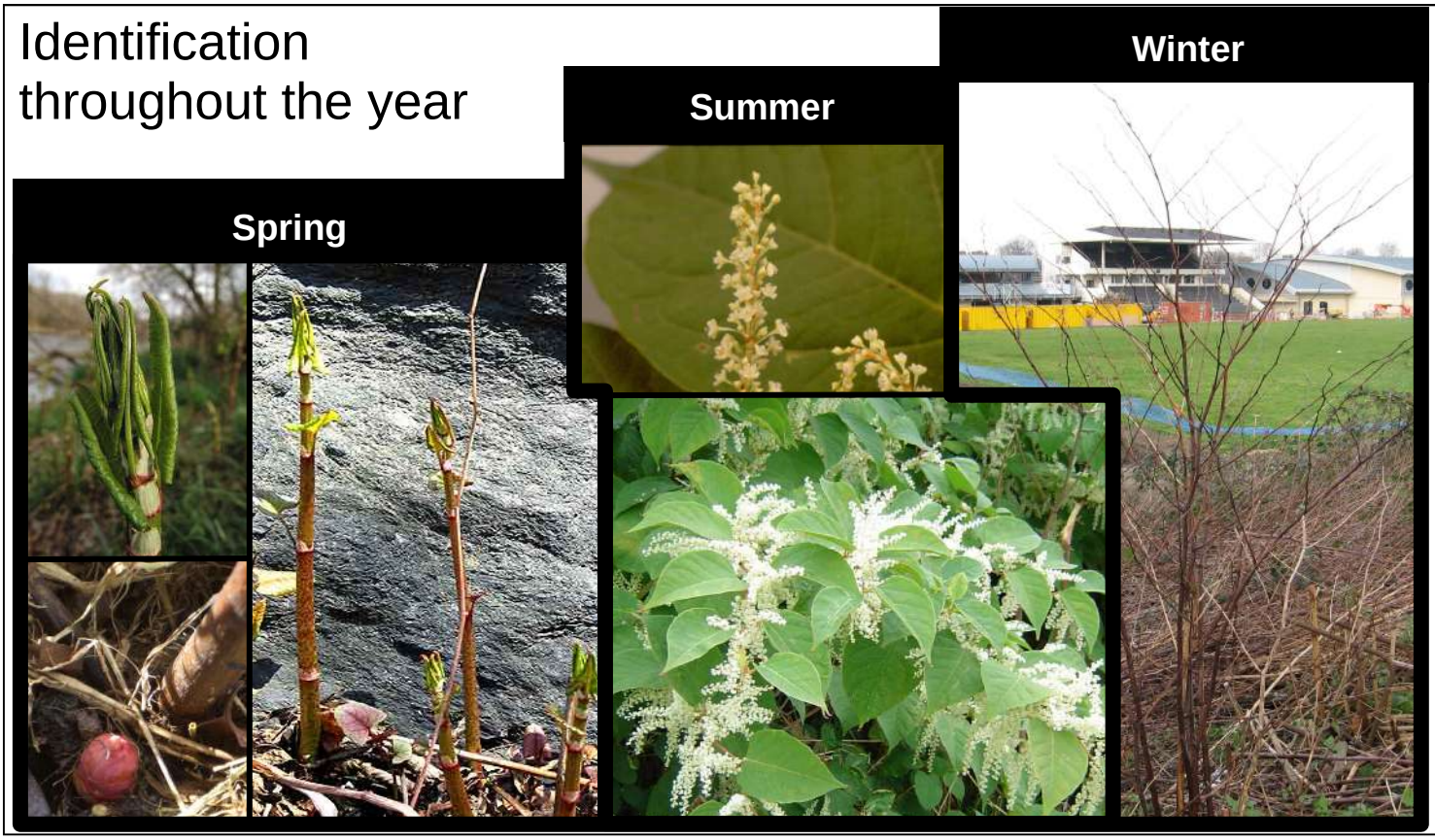






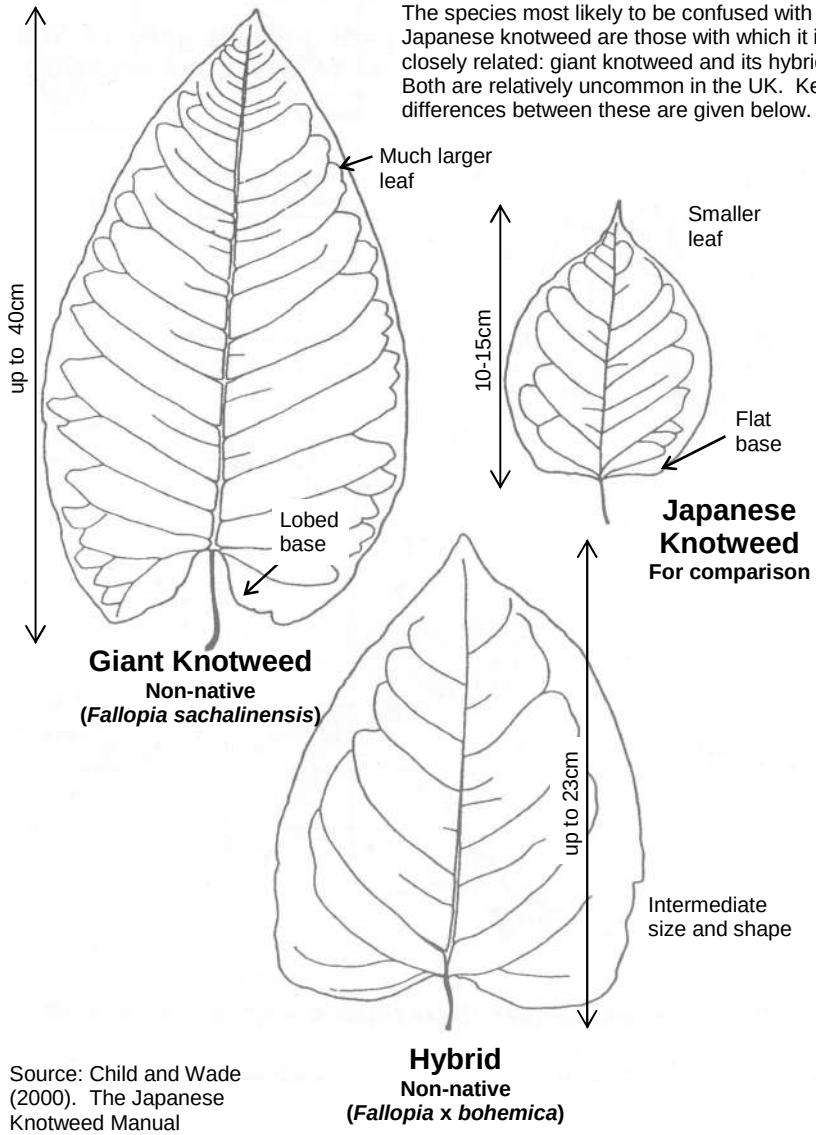


Identification throughout the year



Similar Species

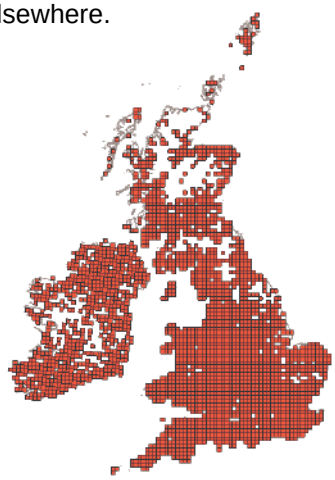
The species most likely to be confused with Japanese knotweed are those with which it is closely related: giant knotweed and its hybrid. Both are relatively uncommon in the UK. Key differences between these are given below.



Source: Child and Wade (2000). The Japanese Knotweed Manual

Distribution

Widespread and common across the UK. Notably extensive infestations are found in the south-west of England, south Wales and Greater London, however similarly extensive populations can also be found elsewhere.



Source: NBN Gateway. Check website for current distribution

References and further reading:

Blamey, M, Fitter, R and Fitter, A (2003) *"The Wild Flowers of Britain and Ireland. The Complete Guide to the British and Irish Flora."* A & C Black

Child, L E and Wade, P M (2000) "The Japanese Knotweed Manual". Packard

Environment Agency (2006) "*The Japanese Knotweed Code of Practice".* Environment Agency

Preston, C D, Pearman, D A and Dines, T A (editors) (2002) *"New Atlas of the British and Irish Flora".* Oxford University Press

Stace, C (1999) *"Field Flora of the British Isles".* Cambridge University Press

Photos from: Olaf Booy, Helen Parish, Max Wade, Vicky White

Appendix 4 – Cotoneaster information leaflet

Produced by Kevin Doidge, Max Wade, Vicky Ames and Kelly McKee of RPS

Cotoneaster

Species Description

Scientific name: *Cotoneaster* species
AKA: Cotoneasterau (Welsh)
Native to: Majority of species originate from east Asia
Habitat: Rough ground

A large group of small trees and prostrate shrubs that can be either evergreen or deciduous. They are becoming increasingly naturalised due to birds which eat the small red berries and spread the seed. There is one native species, wild Cotoneaster (*Cotoneaster cambricus*) which occurs as a few individuals in North Wales. This ID sheet includes those introduced species which are relatively common. Where they become established they can become dominant to the exclusion of native species.

Himalayan cotoneaster (*Cotoneaster simonsii*) is an erect deciduous shrub 3-4 metres high with 1.5-2.5 cm long leaves; small-leaved cotoneaster (*Cotoneaster microphyllou*) is an evergreen low-growing shrub with very small leaves (0.5-0.8cm long) and tree cotoneaster (*Cotoneaster frigidus*) is a deciduous or semi-evergreen shrub or small tree with leaves between 6-15 cm long and flowers in dense clusters. All these species have leaves which are shiny and hairless on the upper surface and slightly hairy on the lower surface. Cotoneaster species do not have thorns.

Wall cotoneaster (*Cotoneaster horizontalis*) is the most widely recorded species and is distinctive in having stems that spread horizontally in flattened herring-bone like branches and bears single flowers. Unlike the other cotoneasters mentioned, the underside of leaves of this species are relatively hairless.

Cotoneasters have been in cultivation in GB since 1824 and there are over 100 species now widely cultivated in the UK. Other species could also become naturalised.

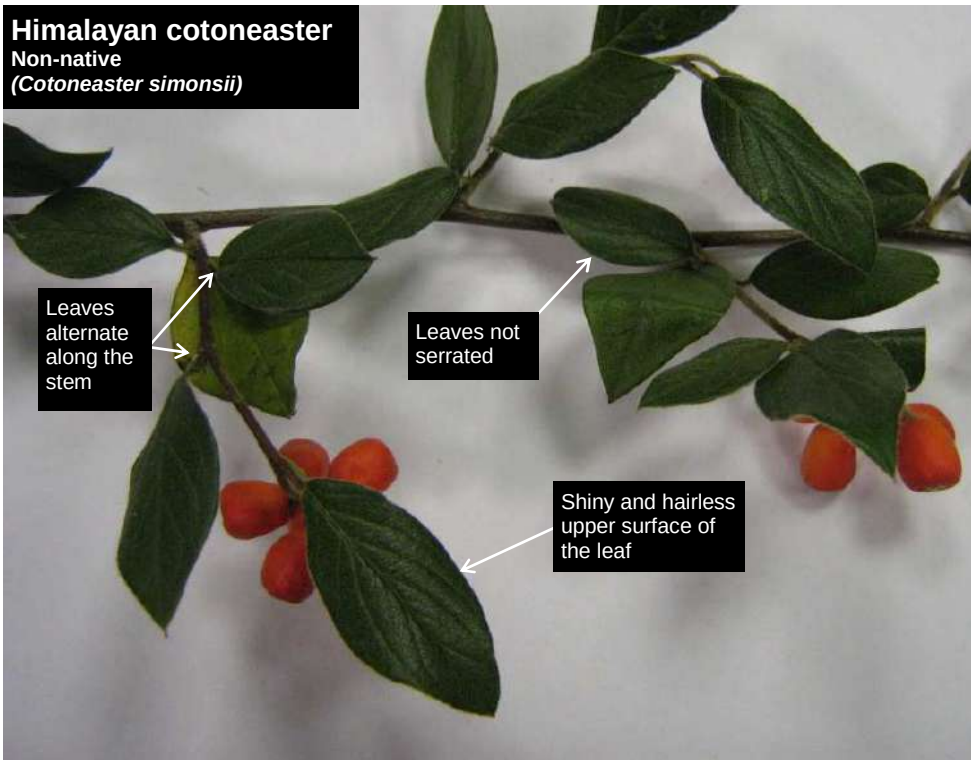
Cotoneaster species are listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England and Wales. As such, it is an offence to plant or otherwise cause these species to grow in the wild.

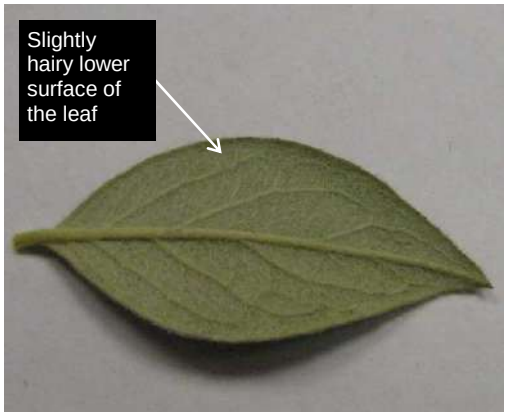
For details of legislation go to www.nonnativespecies.org/legislation.

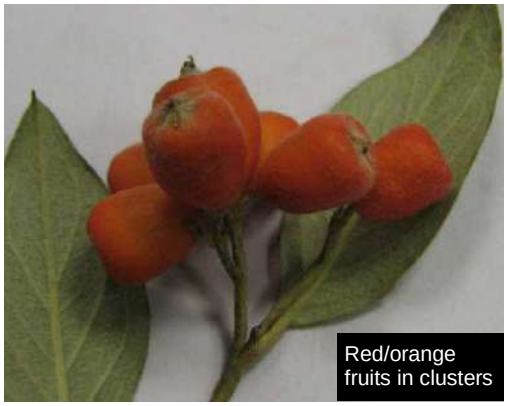


Himalayan cotoneaster (*Cotoneaster simonsii*)

Key ID Features







Identification throughout the year

Evergreen species such as the small-leaved cotoneaster can be identified throughout the year by its leaves. Deciduous species can be identified by the presence of the red berries which can remain throughout winter and, in the case of wall cotoneaster, by the distinctive herringbone-shaped branches.



Similar Species

Firethorn
Non-native
(*Pyracantha coccinea*)





A shrub with small serrated leaves that alternate along the stem, which has long thorns

Wilson's honeysuckle
Non-native
(*Lonicera nitida*)



Similar to the small leaved cotoneasters, leaves opposite not alternate

Aromatic wintergreens
Non-native
(*Gaultheria* species)



An evergreen shrub with alternate leaves and bell shaped flowers, unlike the five petalled flowers of cotoneasters

Other similar species which may be confused with cotoneaster include:

Escallonia *(Escallonia macrantha)* - an evergreen shrub which has alternate serrated leaves and numerous pinkish-red flowers, no thorns;
Barberry *(*Berberis vulgaris)* - a thorny shrub with small serrated leaves, yellow flowers and red lozenge-shaped berries; and
Sea buckthorn *(Hippophae rhamnoides)* - a thorny densely branched shrub with alternate long thin leaves with bright orange berries on female plants.

Distribution

Cotoneaster species are widespread throughout Britain.



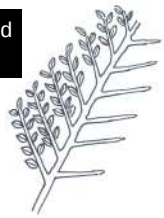
Source: NBN Gateway. Check website for current distribution.

Some other species of Cotoneaster

Wall cotoneaster
Non-native
(*Cotoneaster horizontalis*)



Herringbone-shaped branches



Himalayan cotoneaster
Non-native
(*Cotoneaster simonsii*)





Evergreen habit

Small-leaved cotoneaster
Non-native
(*Cotoneaster microphyllus*)

References and further reading:

Johnson, O and More, D (2004) "*Collins Tree Guide*". HarperCollins

Preston, C D, Pearman, D A and Dines, T A (editors) (2002) *"New Atlas of the British and Irish Flora".* Oxford University Press

Stace, C (1999) *"Field Flora of the British Isles".* Cambridge University Press

Photos from: Kevin Doidge, Max Wade, Mike Harris

Appendix 5 – Montbretia information leaflet

For more information visit **www.nonnativespecies.org**

Produced by Olaf Booy, Max Wade and Vicky White of RPS

Montbretia

Species Description

Scientific name: *Crocosmia* x *crocosmifolia*
Hybrid of: *Crocosmia aurea* x *Crocosmia pottsii*
AKA: Coppertips, Falling Stars, Montbresia (Welsh)
Native to: Hybrid, parent species from South Africa
Habitat: Hedgerows, road verges, banks of lakes and rivers, beside woods and waste land, widely grown in gardens



Crocosmia species are easily recognised when in flower by the distinct shape and colour of their flower heads. All are non-native in the UK. The hybrid montbretia, with relatively short stems and orange flowers, is the main species to have escaped into the wild; however, a number of other ornamental *Crocosmia* species are grown in gardens and other landscaped areas. When not in flower, *Crocosmia* species are more difficult to identify. Look for rusty brown dead leaves and remains of previous years flowering heads.

Montbretia was originally created in France from parent plants of South African origin. Introduced to the UK in 1880 as a garden plant. It escaped by 1911 both naturally and through the disposal of garden waste, and spread rapidly across the UK in the latter part of the 20th century. Can completely dominate habitat where it grows, sometimes excluding native plant species. Spreads mainly by rhizomes, rarely by seed.

Montbretia is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England and Wales. As such, it is an offence to plant or otherwise allow this species to grow in the wild.

For details of legislation go to www.nonnativespecies.org/legislation.

Key ID Features



Flowers orange and tubular in nodding clusters

Long stamens



Corm: a bulblike organ that provides the plant with energy





Grows to 60cm tall, usually found in clusters on road verges and in hedge-

Leaves less than 3cm wide, upright, flat, spear shaped and bright green

Flowers borne on long spikes

Identification throughout the year

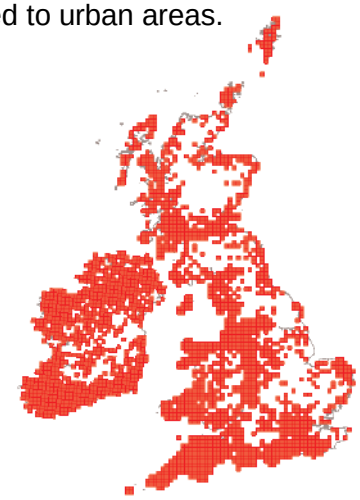
Montbretia is easily distinguished from other species when it is in flower between July and September. Identification outside of this period is more difficult. A key feature is the dense stands that it forms, which can spread to cover large areas. In addition, its smooth, upright, green leaves are relatively characteristic (although these can be confused with iris species). Green leaves are usually present from spring to autumn; dead brown leaves, dead flowering stems and seed heads are present are present throughout winter. Identification can also be checked year round by digging up the plant's corm.


Seed head


Dense stands present over winter

Distribution

Widespread, most common in western areas of England, Scotland, Wales and Ireland. Usually close to gardens. Not confined to urban areas.



Source: NBN Gateway. Check website for current distribution

Similar Species

Iris species
Native
(*various species - example shown is stinking iris*)



Iris flowers are distinctly different from montbretia

When not in flower iris (pictured) can be confused with montbretia



Similar shaped upright leaves with brown die back

Seed heads of iris differ from those of montbretia

Crocosmia species
Non-native
(*various species - example shown is 'Lucifer' variety*)



Other *Crocosmia* species are rarely found outside of the landscaped environment and rarely behave in an invasive manner. *Crocosmia* species in the wild that are invasive are most likely to be montbretia.

Flowers often different colour (this variety is a vivid red and taller than montbretia).

References and further reading:

Blamey, M, Fitter, R and Fitter, A (2003) *"The Wild Flowers of Britain and Ireland. The Complete Guide to the British and Irish Flora."* A & C Black

Preston, C D, Pearman, D A and Dines, T A (editors) (2002) *"New Atlas of the British and Irish Flora"*. Oxford University Press

Stace, C (1999) *"Field Flora of the British Isles"*. Cambridge University Press

Photos from: Olaf Booy, Joanne Denyer, Sue Hocking (Cornwall Wildlife Trust), Peter Llewellyn, Max Wade, Vicky White

Appendix 6 – Japanese rose information leaflet

Produced by Alison Jukes, Vicky Ames, Max Wade and Kelly McKee of RPS

Japanese Rose

Species Description

Scientific name: *Rosa rugosa*
AKA: Rhosyn Japan (welsh)
Native to: East Asia
Habitat: Hedgerows, sand dunes, sea-cliffs, road verges and waste ground



This vigorously suckering, deciduous shrub has many slender thorns on its stems and with its characteristic purplish-pink flowers is readily distinguishable from other roses found in the wild. Typically resulting from garden escapes or material thrown out from gardens. It is often well-naturalised, forming extensive and dense thickets, which can smother native species, so reducing biodiversity and dominating amenity planting.

Although introduced into cultivation in the UK in the late 18th century, it was not successfully grown until the mid-19th century. It is very common in gardens, parks and amenity plantings, often established in mass plantings. It was first recorded in the wild in Cumberland in 1927. Its distribution in the wild is increasing.

Japanese rose is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England and Wales. As such, it is an offence to plant or otherwise allow this species to grow in the wild.

For details of legislation go to www.nonnativespecies.org/legislation.

Key ID Features





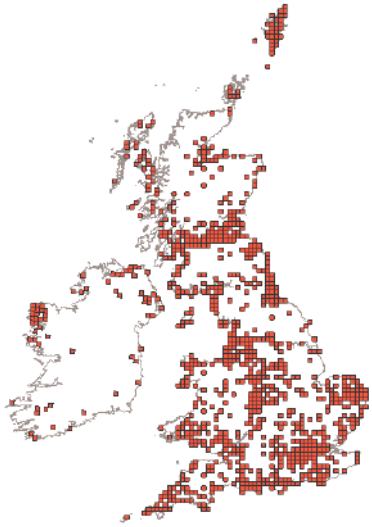


Identification throughout the year

Japanese rose is easy to identify when it is flowering in June to July or has fruits in autumn. It is more difficult to identify in winter as it is deciduous, although its upright stems with numerous slender thorns will help to distinguish it from many other species throughout the year.

Distribution

Japanese rose is scattered throughout low-land Britain, increasing in distribution.



Source: NBN Gateway. Check website for current distribution

Similar Species

There are some common native species of rose which could be confused with Japanese rose. These include:

Burnet rose *(Rosa pimpinellifolia/spinosissima),* which has many fine thorns on its stem but white flowers and purple-black fruits and produces vigorous suckers;
Dog-rose (*Rosa canina*), which has pale pink flowers, red oval fruits and curved thorns; a trailing plant of hedgerows and woodland;
Sweet-briar (*Rosa rubiginosa*), which has bright pink flowers, red oval fruits and curved thorns and grows in scrub; and
Field-rose (*Rosa arvensis*), which has white flowers, red oval fruits and curved thorns, and is a trailing plant of hedgerows and woodland.

Japanese rose also forms hybrids with other species, which can make identification difficult.

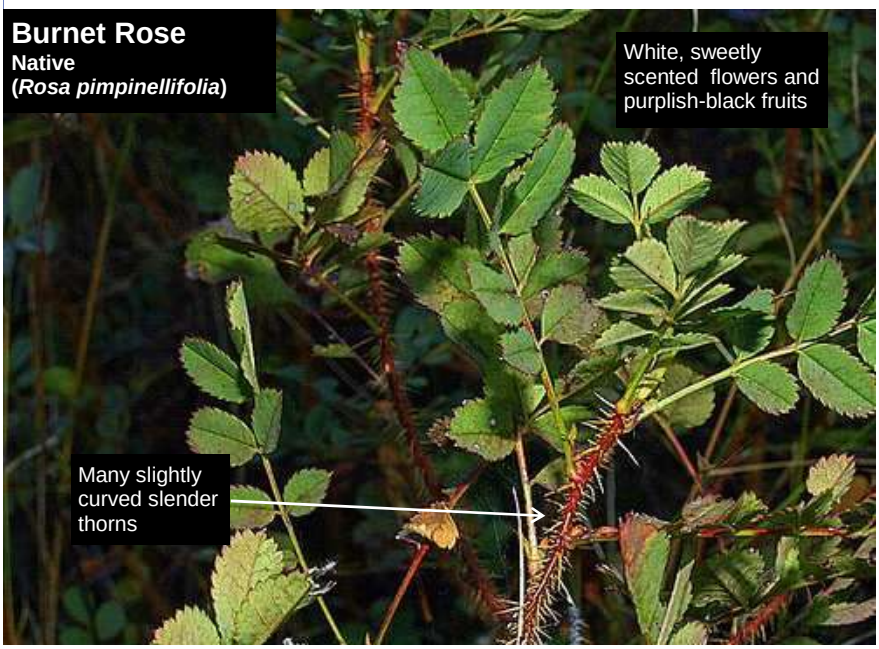


Dog-Rose
Native
(*Rosa canina*)





Burnet Rose
Native
(*Rosa pimpinellifolia*)



References and further reading:

Graham, G.G. and Primavesi, A.L. (2005) "*Roses of Great Britain and Ireland*". BSBI Handbook No. 7, BSBI, London

Preston, C D, Pearman, D A and Dines, T A (editors) (2002) "*New Atlas of the British and Irish Flora*". Oxford University Press

Stace, C (1997) "*New Flora of the British Isles*". Cambridge University Press

Photos from: J. Bognar, Kata Tolgyesi, Max Wade

Appendix 7 – Giant Hogweed information leaflet

www.nonnativespecies.org

Produced by Olaf Booy, Max Wade and Vicky White of RPS

Giant Hogweed

Species Description

Scientific name: *Heracleum mantegazzianum*
AKA: Efwr enfawr (Welsh)
Native to: Caucasus mountains in south west Russia and Georgia
Habitat: Widespread, most common on river banks

Easy to identify when fully grown by height, size of leaves and size of flowers. Can be confused with native hogweed when not fully grown or when growth is stunted (e.g. regrowth after cutting).

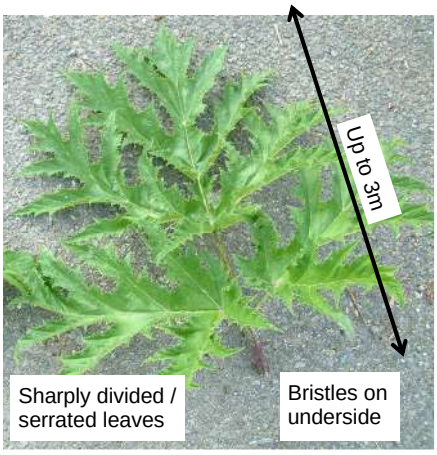
Introduced as an ornamental. First recorded wild in the UK in the late 19th century. Spreads solely by seeds, mainly through deliberate planting, wind dispersal and in water courses. Now common across much of the UK. Contact with any part of this plant must be avoided as even minute amounts of sap can cause blistering of the skin following exposure to sunlight. Other negative impacts include out-competing native flora, river bank erosion and increase in flood risk. Can cause delays/ additional costs on development sites where the plant must be removed as controlled waste in order to comply with legislation.

Giant hogweed is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England, Wales and Scotland. As such it is an offence to plant or otherwise cause this species to grow in the wild. Under the Environmental Protection Act 1990, giant hogweed is also classified as controlled waste.

For details of legislation go to www.nonnativespecies.org/legislation.



Key ID Features





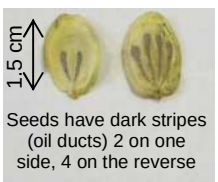




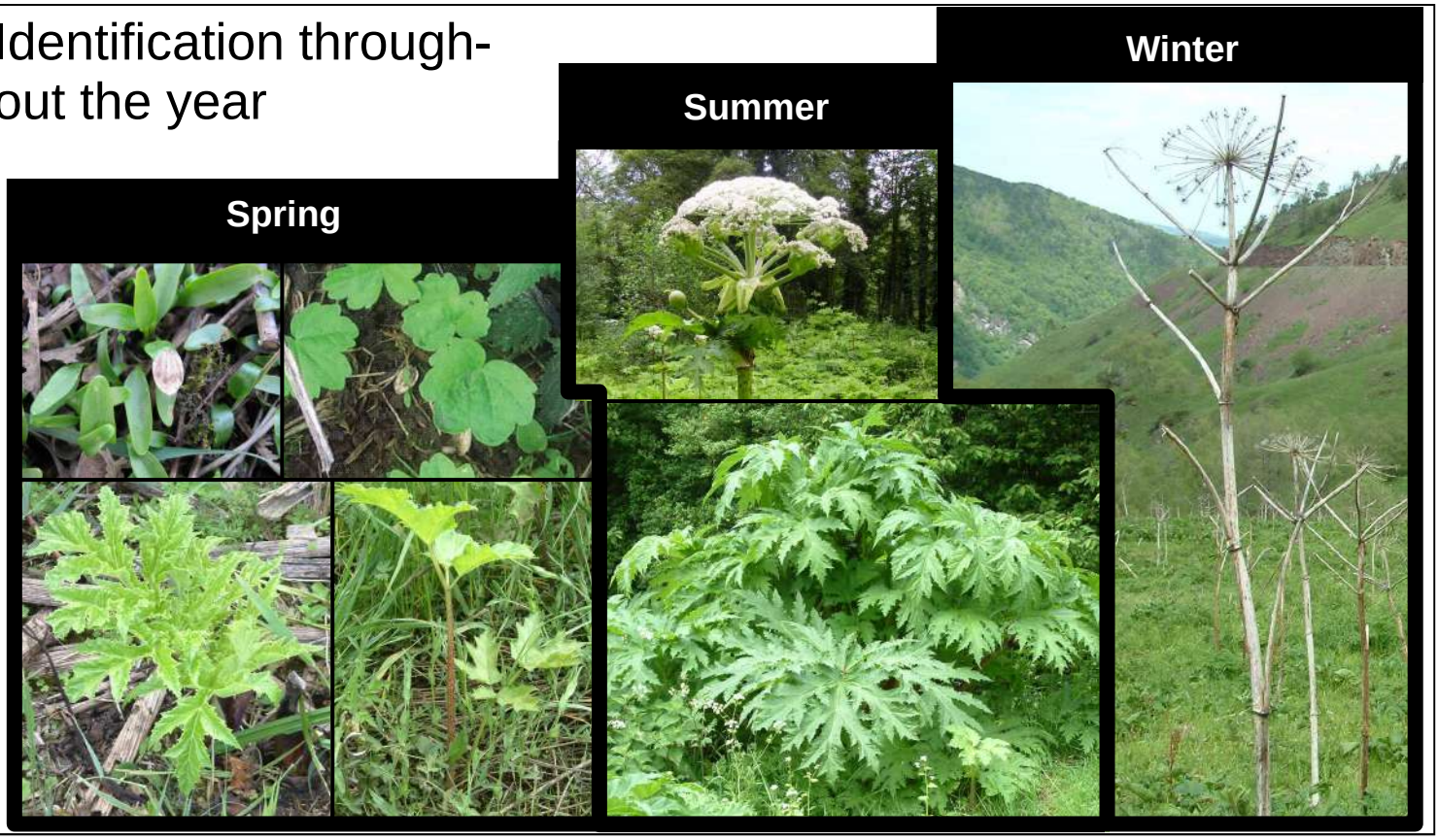








Identification throughout the year



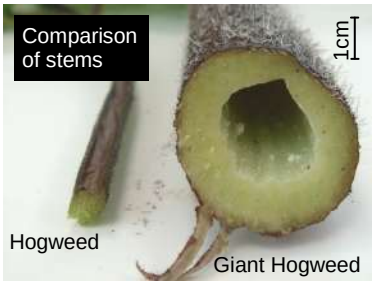
Similar Species

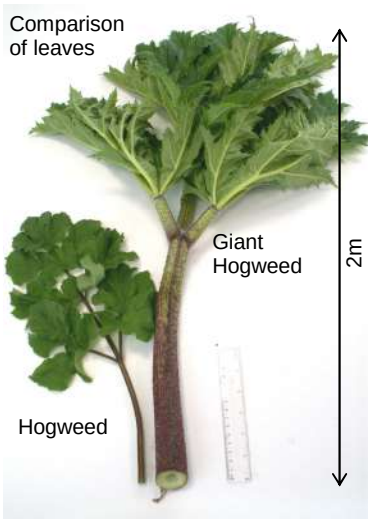
When in full height it is difficult to confuse giant hogweed with any other plant. While still growing or stunted, possibly as a result of disturbance, it can be confused with some other native plants. The most likely species with which it might confused is hogweed.

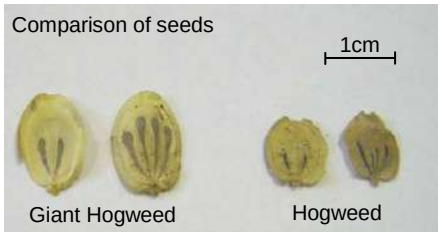
Key differences between hogweed and giant hogweed include the height, width of stem, size of leaf, size of flower head and size of seed.



Hogweed
Native
(*Heracleum sphondylium*)

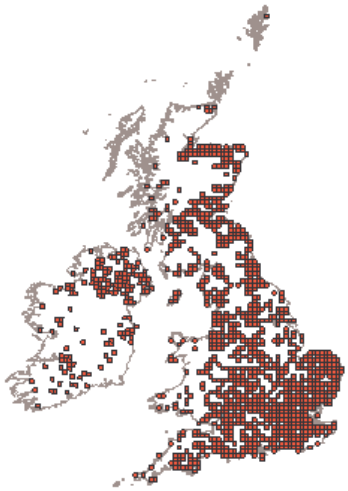






Distribution

Widespread and common across much of the UK. Extensive infestations are found particularly in Scotland and the north of England. Less abundant in Cornwall. Often associated with large rivers.



Source: NBN Gateway. Check website for current distribution

References and further reading:

Blamey, M, Fitter, R and Fitter, A (2003) *"The Wild Flowers of Britain and Ireland. The Complete Guide to the British and Irish Flora."* A & C Black

Booy, O and Wade, P M (2007) "*Giant Hogweed Management in the United Kingdom*". RPS Group plc

Pyšek P, Cock, M J W, Nentwig, W & Ravn, H P (2007) "*Ecology and Management of Giant Hogweed (*Heracleum mantegazzianum*)".* CAB International

Stace, C (1999) *"Field Flora of the British Isles".* Cambridge University Press

Photos from: Olaf Booy, Steve Smith, Vicky White