Alien Plants and the Human Touch

Ian D. Rotherham,
Sheffield Hallam University

Introduction

"A terror to botanists, deceitful above all plants, and desperately wicked" Sir J.D. Hooker, aged 82 on Himalayan balsam.

Whilst the issues of invasive alien or exotic plants are increasingly of concern to conservationists, the causes of escapes and their impacts are often ignored. The issues raised and the tensions generated are worth further sociological and ecological investigation. A starting point is perhaps the often invisible escape, establishment and subsequent spread of the invasive plant. Most fail to survive or do so in a low-key and unthreatening way. However, it is also the case that then human response to many exotic species – both animals and plants – is to a significant degree subjective. We somehow like leopard’s bane and sweet cicely, but we detest Japanese knotweed and Himalayan balsam; or at least so it seems. There is a problem though in that despite the clear evidence that some (but by no means all) these species cause major adverse impacts on native plants, the public not only like them, but spend their leisure hours proliferating them. In attempting to control exotic species we cannot assume that the public are with us. Furthermore, we should not assume that they are prepared to be educated to so do. In many cases they like the exotics.

It is worth considering observations on plants and changes, and referring to some of the better known examples of invaders in Britain. Himalayan balsam (*Impatiens glandulifera*) is a good example. Perring (1974) addressing changes in the British flora focused primarily on the decline of native species, particularly rarities. He also noted how in the previous twenty years ‘Our river banks have become Balsam highways, covered with *Impatiens* spp.,------.’

Rob (1973) discussing issues of garden escapes and naturalised plants in Britain noted that over the years plants have been introduced to Britain, and some escaped to form part of the flora. Competing with native plants, some of these escapes at times overpower and replace them. Many of the most striking escaped plants are those which were grown in gardens for themselves alone, for beauty or interest, rather than for some other use. Importantly Rob describes how botanists have often overlooked naturalised or escaped species, and not recorded them. This seems to be for two reasons. The first is that common escapes were not deemed worthy of note. The second is that rare escapes may be hard to identify. This failure to appreciate the importance of some introduced plants makes tracing their early history difficult, if not impossible. This problem was noted for *Rhododendron* and for *Impatiens* (Rotherham, 1986 and 2001). Many floras simply fail to note these plants until thoroughly established. The interesting and important stages of early introduction and spread are often ignored, although early gardening literature may prove a valuable source of information.

Rob comments on the status of *Impatiens glandulifera* in the industrial north of England:

‘Very abundant in the industrial north it grows quite happily by rivers thick with detergent foam, colonizing ground where few plants could survive.’

He describes Himalayan balsam’s increased coverage from twenty-seven vice counties in 1932, to forty-seven by 1962. The plant was actively spreading up the Yorkshire Dales,
leaving the riversides and colonising wet areas in the hills. He suggests that it was less invasive in North East Yorkshire, perhaps due to lower rainfall. He also describes the accidental arrival of a single seedling in his driveway, which produced several thousand plants in four years; a story since matched by many other observers and gardeners!

The ecology and the history of spread of Himalayan balsam (*Impatiens glandulifera*) in the British Isles have been well documented. Usher (1986) gave a useful introduction to the history and spread of the plant in the British Isles, and Beerling and Perrins (1993) summarise the key information to date, and authors such as Prach (1994) address key issues of dynamics of spread along watercourses. Other studies such as Pysek and Prach (1995) have addressed similar issues in other European countries. A recent paper by Maule et al. (2000) highlights the range of environments which balsam may invade. Its plasticity in woodlands (with the ability to thrive under a range of irradiance from <1% to 100% ambient light for example) helps in its success. They also address the impact of Himalayan balsam on native woodland species. Gwynn Ellis (1993) provides a useful popular account, and interestingly he describes Himalayan balsam as: ‘Arguably one of our most attractive plants and with the added interest of exploding fruits’.

A similar situation occurs with *Rhododendron ponticum* in Britain. It is widespread and pernicious – a weed and the most problematic alien, invasive plant (Cross, 1975; Shaw, 1984; Rotherham, 1983 and 2001). Its native distribution is at the extremes of the Mediterranean, and its behaviour varies with environmental conditions. Restricted to higher ground and / or sheltered valleys in Spain, Portugal and Gibraltar, it is highly invasive and problematic in managed forest areas of the Turkish Black Sea Mountains, yet limited in high ground west of Turkey by the Bulgarian border. Northern parts of the Black Sea Mountains hold pockets of ancient *Rhododendron* forest (Colak et al., 1998). In Bulgaria and in the Lebanon it is of Red Data Book status. The first British introduction was probably at Lyndhurst in Hampshire, and then popular as a spectacular landscape plant, *Rhododendron ponticum* found favour for game cover, wildlife habitat, windbreaks and dramatic vistas. Extensively as rootstock for other rhododendrons, it was deliberately hybridised in cultivation to maximise hardiness. This was mainly with the American species *R. catawbiense* and *R. maximum*.

In favourable environments it spreads quickly with extensive vegetative layering and massive amounts of seed dispersing on the wind it is now common and familiar in Britain. Rotherham and Read (1988) present the ecological reasons for its success, and its impact on the landscape and wildlife habitat can be massive as a dominant feature of many areas. Now established in diverse environments it is especially abundant in western Atlantic zones such as Ireland (notably Killarney), Exmoor, North Wales, the English Lake District, Western Scotland, and the Peak District (Rotherham, 1986). It often impacts on both wildlife and tourism sites.

The scale of impact and frequently the dominance of *Rhododendron ponticum* mean its effects on native fauna and flora are dramatic, with sometimes total loss of original vegetation. Dense stands give few indications of decline after two centuries of establishment and research in Turkey suggests that decline is unlikely. The over-riding opinion of nature conservationists and foresters is that invasion is detrimental, and many wildlife taxa have few species associated with the plant (Shaw, 1984; Judd and Rotherham, 1992). Yet the situation is not clear-cut, and dense stands of *Rhododendron* may be excellent roosting and breeding habitat for birds. Mammals such as deer, badger and otter also benefit from this unique habitat (Rotherham, 1986 and 2001).

Most people, much to the chagrin of conservationists, actually like Rhododendrons, and some travel many miles to see spectacular shows of flowers in May and June. In the created
landscapes of the parks and gardens of the 1700 and 1800s, *Rhododendron ponticum* is one alien often in a sea of aliens and as such part of a palimpsest of history along with other garden species. In the eyes of conservationists however, William Robinson and the Victorian ‘wild gardeners’ have much to answer for. Escaping to the wild it wreaks havoc on native communities, but can add value too. To address the problems more effectively, a more structured and strategic approach is required, informed by the fact that eradication is neither possible nor desirable. Sometimes and in some places, this exciting plant contributes positively to the British landscape. It is also part of a taxonomic group of plants that is hugely important around the world. British *Rhododendron ponticum* is actually largely a hybrid population (now confirmed by Richard Milne and co. at St Andrew’s (Abbott and Milne, 1995)) and is an alien species that attracts the wrath of site managers. In Turkey it may be problematic in managed forests, but in parts of Turkey, in Bulgaria, and in Iberia, it is a neglected native.

This leads me into the main thrust of this paper: the interaction between these plants and the public. There is often something at the core of their success and which is a problem to be faced if we wish to constrain their spread. People like them!

Returning to Himalayan Balsam, our case study research gives insight into some difficult issues.

**Garden origins and the great escape**

The common balsam (*I. balsamina*) was known to English gardeners since Tudor times. A native of tropical Asia, it is an annual which was formerly used very widely for summer bedding. Today it is mostly used for indoor growing (Genders, 1969). The *Impatiens* grown in seventeenth century gardens, like many other plants of the time, have unknown or incomplete histories. *Impatiens balsamifera* from India had been in China since at least the seventh century and in the English garden flora would have been a garden cultivar rather than the pure species (Girling, 1988). Wilson in 1847, describes *Impatiens* as a genus of ornamental plants with one species growing wild in England, and about sixteen species introduced. He notes the yellow or touch-me-not impatiens growing wild in shady and humid places. He also writes of the tawny flowered or two-flowered impatiens (*Impatiens fulva* or *biflora*) as wild in some parts of Surrey and elsewhere in England, introduced at some unknown point from North America. Although it occurs apparently as a native, it is really only as an ‘outcast’ from some garden. Amongst the remaining hardy *Impatiens* introduced by this time, he discusses a species called *Impatiens glanduligera*, with deep rosy purple colour flowered and from six to twelve feet high. This is presumably Himalayan balsam, but with no hint of what was to come!

Williams (1946) describes *Impatiens fulva* as another alien now frequent in some parts of England, especially in the Home Counties, spreading along rivers and streams. According to McClintock (1961), in 1822 the then sixteen year old John Stuart Mill (amongst other things) a botanist of Surrey, was the first person to record the American balsam (*Impatiens capensis* or *I. fulva*) wild in Britain. Described as: ‘now gaily spread far and wide’.

Growing by the River Tillingbourne at Abury in Surrey, it had escaped from cultivation in the gardens of Albury Park. From there, by the 1940s, it had spread both up and down the Tillingbourne, along the Wey, and so to the Thames and to the Middlesex Rivers and beyond. (According to Dunn (1905), by the early 1900s, it was already completely naturalised along this watercourse). It was noted in great quantity by the Thames at Kew, along with, though in smaller quantity, the bigger cousin *Impatiens roylei* or *glandulifera*. 

(Interestingly, Williams makes the mistake of assuming that Himalayan balsam was actually a perennial). Along with it in the Thames area, he had also recorded it thoroughly naturalised along the Teign in Devon.

Small-flowered balsam (*Impatiens parviflora*) is noted by Salisbury (1961) as occupying similar environments in Britain to those of its native locations in central Asia. Introduced to Britain from Russia during the mid 1800s, he describes its spread as discontinuous, being first found in Middlesex (Dunn (1905) suggests it was first found by a Mr Irvine at Battersea in 1851), then Derbyshire, Hertfordshire, and Suffolk (in the 1870s), and later from Glamorgan, Devon, and Wiltshire. It had previously been displayed in 1831, in the Botanic Garden in Geneva. Salisbury suggests that by the 1960s it was found in around three-quarters of the counties of England and Wales. An abundant weed on richer soils in shady situations in gardens, it had by 1867, achieved the status of ‘an ineradicable weed’ in the Oxford Botanic Garden. Salisbury gives figures of seed production by the explosive capsules, of up to c.1800 per plant. He makes the suggestion that whilst the explosive pods explain the shorter distance dispersal, longer distances may be achieved by human agency such as transfer of soil attached to plant roots or attached to implements. He suggests this accidental introduction to gardens as a precursor to escape into the wild. In 1905, Dunn suggested that the horticultural trade was the cause of this plant’s distribution, a thought supported by Salisbury in 1961.

Salisbury discusses the Himalayan balsam or Policeman’s Helmet, as the most recent arrival from the genus, introduced as a garden plant about 1839 and being described already in 1898 (by Mrs Earle) as ‘another terrible weed’. He suggests that its naturalisation on river banks is a much more recent phenomenon. By the 1960s it was noted in thickets along considerable stretches of the Exe in Devon and the Tweed in Berwickshire. He notes it in nearly half the counties of Britain, with an individual plant producing up to 800 seeds.

McClintock notes the explosive seed capsules dispersing the seeds to then be carried downstream by water, but raises the issue of dispersal to new river catchments. He suggests birds or perhaps fishermen as the accidental agents of such spread. In describing Himalayan balsam, he notes how it is said to grow more finely in the UK than in its native haunts. He also observes that it will grow in rubble areas as well as by watersides. With a date of first introduction given as 1839, within sixteen years it was established in the wild. McClintock also states the fact that there are over 900 species of *Impatiens* around the world. (Hopefully not all suited to growing wild in Britain).

The role of the Victorian wild gardeners

When William Robinson published his book ‘The Wild Garden’ in 1870, the practices he described and advocated were already well established. These included in particular, the embellishment of woodlands, utilising the naturalisation of exotics in the landscape, along with the admixture of plants from the sub-tropical garden, with an emphasis on foliage groupings. This was the basis for wild gardening throughout the 1870s and 1880s (Elliott, 1986). To be practiced on a large scale, wild gardening required species capable of spreading themselves in large masses. Plants such as *Rhododendron ponticum*, *Heracleum mantegazzianum* (giant hogweed), *Polygonum* sp. (Japanese and giant knotweeds), and of course Himalayan balsam, were all ideal. Such wild garden favourites are widely recognised as later becoming the scourge of conservationists. Locations such as Chatsworth Park in Derbyshire were used to juxtapose the garden flowers, forest trees and wild undergrowth. At Chatsworth, the rhododendrons, balsam and indeed the giant hogweed, remain, and have gone
on to bigger and better things! Robinson stated that the principle of wild gardening was ‘----naturalizing or making wild innumerable beautiful natives of many regions of the earth in our woods, wild and semi-wild places, rougher parts of pleasure grounds, etc.’

Grindon’s *Manchester Flora* (1859) and *British Garden Botany* (1864), clearly indicate it naturalised in Manchester by these dates, and indeed beyond (Ian Fitch pers. comm.). In the *Manchester Flora*, Grindon describes: ‘The *Impatiens coccinea*, a tall and weedy plant, with flowers of a dull red colour, is rapidly disseminating itself, growing like its congeners, wherever a seed is dropped.’ In the *British Garden Botany*, he states that: ‘The *Impatiens glanduligera*, a tall and weedy plant, is common in gardens, and fast disseminating itself over the country.’

This use in gardens and the resulting escapes into the wider environment, continued into the 1900s. Wright (1909) highlights the value of Himalayan balsam as a species for decorative gardening. Described as a Himalayan plant now naturalised in Britain and common in country gardens, it is noted as useful for covering unsightly places, or producing an effect on the edge of a wood. Dunn in 1905, describes *Impatiens Roylei* as: ‘Rather a favourite cottage-garden plant in some parts of England, which has appeared in a semi-naturalised state in several localities.’

Another example is the variegated yellow archangel or *Lamiastrum galeobdolon* var. *argentatum*; a popular ground-cover species, particularly for shady gardens. However, not only is this plant excellent and attractive cover for gardens, with stunning yellow flowers and dense masses of showy leaves, it is a plant with a past and an interesting future. It is the cousin of, and indeed descended from the native Yellow Archangel (*Lamiastrum galeobdolon*); a species typical of ancient, deciduous woodlands.

The variegated form is sometimes recognised as a sub-species, sometimes as a variety. It is also suggested to have arisen in cultivation as a ‘sport’, sometime in the mid-late 1900s, probably in Central Europe. From these origins it was introduced to the UK supposedly in the 1960s, and from gardens has escaped into the wild. It now colonises into roadsides, hedgerows, woodland edge, and increasingly into the core of our ancient woodlands. It is sometimes deliberately introduced to wild areas, but more frequently is an inadvertent result of garden rubbish being jettisoned into the countryside. From these humble origins the plant encroaches stealthily and often unnoticed to dominate large areas of woodland in only a few years. For example, a site in Sheffield with Variegated Archangel introduced in 1998, by 2000 had an area of around 100 square metres densely covered.

The very properties that make this a wonderful ground cover also make it a problem for native woodland plants. Its growth form is very robust and its foliage very dense with a tendency to form single-species clumps covering many square metres of ground. In woodland this may spell doom for native archangel, bluebell, wood sorrel and other woodland plants. It seems to do less well under dense shade, and best under the semi-shade of a woodland edge. So far at least it seems to spread only by broken stolons which root very freely. This certainly allows rapid spread within a site. It appears to not set viable seed, and movement between sites is entirely due to people.

The origins and introduction of the plant along with some basic aspects of its ecology are still shrouded in mystery but this is gradually being unravelled. It was present in gardens in Sheffield in the early 1950s, and was described as a very special garden plant in the 1940s and 1950s. As a wild flower it has been noted in Britain since the 1960s. However, it seems to have been in garden cultivation for longer than most botanists realise. Indeed references to a
variegated form of Lamium in Victorian gardening literature (for example a gardening encyclopaedia in 1885) are almost certainly to this plant. This would suggest that the origins of this up-and-coming invader are as a garden variety cultivated during the Victorian enthusiasm for variegated forms of plants.

Sheffield Himalayan Balsam Surveys in the 1990s and subsequently

The early work was done at the Sheffield City Ecology Unit with the only information available from Clapham’s 1969 Flora of Derbyshire, or Shaw’s 1988 A Flora of the Sheffield Area. Neither gave much detailed information though the latter provided records for 1 km squares, and the former does gives some information on time of origins of some species.

For Himalayan balsam Clapham gives a date about 1930 for the first record, and describes it as already: ‘well established on stream-banks and moist or shaded roadsides and in waste places. Locally abundant’. Records for the Sheffield flora, held by the Sorby Natural History Society seemed to go back no further than the 1960s. Oliver Gilbert (1989) attributed the bulk of the riverside spread of both balsam and knotweed to the period from the late 1960s to the late 1980s, and the records available at the time supported this. The earliest for balsam Oliver Gilbert found for the River Don, being 1963.

However, observations on the River Sheaf in the 1960s suggested that both species were already well established and locally dominant even by this early date. The widespread occurrence and a few confirmations of earlier locations, led us to question the received wisdom. Furthermore, a re-evaluation of this could affect the interpretation of rates of spread and any associated conservation management.

As a slight aside, it is interesting how botanists have often overlooked invasive aliens during the key early years, and how conservationists sometimes assume dates of arrival on very thin evidence, or indeed on a lack of evidence. Lack of records does not necessarily equate with an absence of the plant. Griffiths (1999) writing about the River Don in Sheffield states with somewhat false authority that Himalayan balsam was introduced to Sheffield in the 1960s. If this had been the case, then the subsequent spread was not only impressive but incredible!

Balsam in Ecclesall Woods - a Local Urban Woodland

A local woodland in Sheffield provided the starting point for what was to become the first of a series of national surveys. We wanted to know whether anybody could remember when they first recorded or saw Himalayan Balsam in the Woods. We had an ancient woodland apparently under threat from invasive aliens and wanted to know how quickly and for how long the invasion had been happening.

A local press release asked for information and observations on Himalayan balsam in the area. Two remarkable things happened. Firstly, we received almost no information on the large and heavily used woodland itself. Secondly, the survey was picked up by first local and then national media (especially the gardening press). As a result, we then received over two hundred letters with information, dates etc., plus phone calls to ourselves and directly to the gardening magazines. These were from people all over the Sheffield area, and then from around the UK; some going back to the 1800s.

Results of the Himalayan Balsam Surveys
Some examples of the responses and of the information received are given below.

- Mrs X, a young horticultural student in 1961, collected it from the garden of a cottage on the Isle of Skye, and took a plant to her mother’s home in Leicestershire. From there she took it to her own home when she married, but eventually had to try and eliminate it. She now likes it in the countryside, but never again in her garden.

- Miss Y in 1948, collected seed from Beauchief in Sheffield, and took it to the Isle of Wight. Here she released it to the riverside at Newport.

- In the early 1990s, Mrs Z of Reading collected seed from a friend’s garden, introduced it to her own garden, and from there spread it to other gardens and to local hedgerows. She considers it very useful for filling in empty spaces and providing background for planting.

- Mrs A of Newcastle-upon-Tyne, in the 1990s collected seeds from her son’s garden in Snettisham in Norfolk, for her cottage garden at Belsay in Newcastle. ‘Now I am gradually furnishing all the gardens in the village with these plants for the seed fly everywhere.’

- Mrs B of Birmingham recalls balsam in their garden c. 2 miles from the centre of Birmingham in 1917. In the late 1950s she took it to a garden in Ledbury (Herefordshire). She also transferred it in the 1990s, from the River Trothy in Monmouthshire, to a garden in Solihull.

- Someone also recalled in on the River Usk in Monmouthshire, in the 1890s.

- Mr C in Walkley in Sheffield recalls his grandfather’s Victorian worker’s cottage had a small garden. In this in the 1890s, amongst other plants, he grew balsam. This was probably collected from the big house nearby, and Mr Bedford remembers as a small child (in c. 1912), taking the seeds and releasing them into the nearby Walkley Cemetery.

- Q of Thetford was told that his great grandmother grew it in 1842, with seed given to her by a gypsy herbalist. It was still growing in his father’s garden at Holme Hale near Swaffham, in the 1920s and 30s.

- Miss T took rooted seedlings from local people into a garden in Fraserburgh, Aberdeenshire, and then took it south to Leicestershire.

- Mr R of Barnsley, collected seed from the moorland edge near Dore in Sheffield in the late 1930s, to his home garden. In the 1990s a visitor from Hungary took seeds home with him and they grow well in his Hungarian garden.

- In 1960, seeds were brought from Spain by a member of the Parks Department of Crewe Council.

- In the 1990s Mrs H of St. Albans received one plant for her garden from a neighbour, apparently from seed from St Lucia, and has since sent it to Redbourn, to Essex, and to Luton.
• In Sheffield, in the late 1940s (1946-48) Sir Hans Krebs collected seeds from a friend’s garden in Nether Edge, Sheffield, and released in along the River Sheaf at Millhouses, and along the Derbyshire Derwent in the Peak District.

• Mr P from Manchester, in the 1940s, sent seed to Dingwall in Aberdeenshire, from where it was released around Black Isle.

In the 1990s, Mrs J of Camberley in Surrey received seeds from a neighbour’s garden.

Bag of seeds to a market gardener friend in Ireland.

- Introduced to ‘spare land’.
- Given away to passers by.
- Given to a work colleague to introduce to a stream behind her garden.
- Introduced to local woods.

Carried on holidays to France and Spain.

Her family aims to spread them as far and wide as possible!

The Story of Himalayan Balsam in Sheffield

The date of known introduction to the Sheffield area was taken back to the late 1800s, with good descriptions of the process. We are now able to track at least some of the progress of the plant across the City. Long distance transfers from Sheffield to other regions and even other countries were also demonstrated. Other information produced dates and mechanisms for introduction and spread to other sites across the region. Finally, we have documented examples across the UK, of early introductions, and interestingly of multiple and sequential transfers across long distances.

Common Names and Culture

Another indication of the cultural interest in this plant is in the proliferation of common names over a relatively short time-span. These include (along with Himalayan balsam or Indian balsam):
Other interesting observations included that the seeds quite often arrived in packet collections of garden ‘annuals’, and that they are also sold in pots in garden centres. They are even now being sold as ‘Mr Men’ novelty gifts for children as ‘Mr Noisy’s Exploding Plant – fun to grow! Bang!’ The instructions are: ‘Touch its seed pods and they explode!’ Well they wouldn’t they. Available incidentally, from the shop at the Birmingham Botanical Gardens for the bargain price of £2.15p. (Or of course free from Mrs Norris of Camberley, in Surrey!). (Thanks to Ed Darby for the information and to the generous gift from the shop, from one of the Conference delegates). A friend recently bought Himalayan Balsam seeds from a local garden centre, and we have even found plants for sale.

**Discussion and Conclusions**

Along with the Balsam Surveys and earlier work on *Rhododendron ponticum*, we have now undertaken research on exotic plants and people for several other species – notably Buddleia and variegated archangel. The survey results show quite clearly some key aspects of the interaction between people and plant. All these species have been deliberately introduced into the wild by enthusiastic gardeners doing their bit to improve nature. Understanding this relationship may be vital if any attempts at control are to be successful in the long-term. It is also important to have this information in order to gauge the rate of spread and to assess the relative importance of the various potential mechanisms for dispersal.

The research shows how individual people may cause both long distance spread (dispersal) to new areas, and localised introductions to new sites within an area. This is linked to interest in, and liking for, exotic and exciting plants; a tradition which goes back in our culture to the earliest days of gardening, and which found its most obvious expression in the Victorian wild garden movement. Bee keepers also like the plant and may deliberately spread it to new sites. In Sheffield variegated archangel was introduced to a local bluebell wood in 1998, having been collected from a friend’s garden in Snowdonia five years earlier. It now covers three areas; the largest being around 100 square metres.

There is a real issue for conservationists seeking to establish strategies, and to implement control programmes and eradication work. The overall human cultural situation may favour wider spread and indeed the introduction of more and more potential invaders from around the World and via the horticultural trade and people’s gardens. People will and are spreading these plants over distances of hundreds of kilometres at a time. From the ‘nodes’ of introduction, they are then being actively dispersed into the local countryside, urban and rural. Rapid colonisation can occur, precipitating non-human modes of spread, and leading to effective establishment throughout suitable environments. One serious consequence of this process is that it is unpredictable and therefore hard to plan for or react to. Indeed its lack of predictability is perhaps its most predictable feature!

Oliver Gilbert suggested to me that we may just have to learn to love them. Our urban oak – bluebell woods may become sycamore – balsam woods. Urbanisation, eutrophication, disturbance, and climate change are all doing there but to make this happen.

**Acknowledgements**

Colleagues in the media are thanked for their vital role in promoting the surveys, and above all I thank all the correspondents, many into their 80s, and a few into their 90s, for their memories and anecdotes freely shared.

**References**


Grindon, L.H. (1864) *British Garden Botany*.


**Alien Plants and the Human Touch**

**Ian D. Rotherham,**  
Sheffield Hallam University

**Introduction**

‘A terror to botanists, deceitful above all plants, and desperately wicked’ Sir J.D. Hooker, aged 82 on *Himalayan balsam*.

Whilst the issues of invasive alien or exotic plants are increasingly of concern to conservationists, the causes of escapes and their impacts are often ignored. The issues raised and the tensions generated are worth further sociological and ecological investigation. A starting point is perhaps the often invisible escape, establishment and subsequent spread of the invasive plant. Most fail to survive or do so in a low-key and unthreatening way. However, it is also the case that then human response to many exotic species – both animals and plants – is to a significant degree subjective. We somehow like leopard’s bane and sweet cicely, but we detest Japanese knotweed and Himalayan balsam; or at least so it seems. There is a
problem though in that despite the clear evidence that some (but by no means all) these species cause major adverse impacts on native plants, the public not only like them, but spend their leisure hours proliferating them. In attempting to control exotic species we cannot assume that the public are with us. Furthermore, we should not assume that they are prepared to be educated to so do. In many cases they like the exotics.

It is worth considering observations on plants and changes, and referring to some of the better known examples of invaders in Britain. Himalayan balsam (Impatiens glandulifera) is a good example. Perring (1974) addressing changes in the British flora focused primarily on the decline of native species, particularly rarities. He also noted how in the previous twenty years: ‘Our river banks have become Balsam highways, covered with Impatiens spp.,------.’

Rob (1973) discussing issues of garden escapes and naturalised plants in Britain noted that over the years plants have been introduced to Britain, and some escaped to form part of the flora. Competing with native plants, some of these escapes at times overpower and replace them. Many of the most striking escaped plants are those which were grown in gardens for themselves alone, for beauty or interest, rather than for some other use. Importantly Rob describes how botanists have often overlooked naturalised or escaped species, and not recorded them. This seems to be for two reasons. The first is that common escapes were not deemed worthy of note. The second is that rare escapes may be hard to identify. This failure to appreciate the importance of some introduced plants makes tracing their early history difficult, if not impossible. This problem was noted for Rhododendron and for Impatiens (Rotherham, 1986 and 2001). Many floras simply fail to note these plants until thoroughly established. The interesting and important stages of early introduction and spread are often ignored, although early gardening literature may prove a valuable source of information.

Rob comments on the status of Impatiens glandulifera in the industrial north of England:

‘Very abundant in the industrial north it grows quite happily by rivers thick with detergent foam, colonizing ground where few plants could survive.’

He describes Himalayan balsam’s increased coverage from twenty-seven vice counties in 1932, to forty-seven by 1962. The plant was actively spreading up the Yorkshire Dales, leaving the riversides and colonising wet areas in the hills. He suggests that it was less invasive in North East Yorkshire, perhaps due to lower rainfall. He also describes the accidental arrival of a single seedling in his driveway, which produced several thousand plants in four years; a story since matched by many other observers and gardeners!

The ecology and the history of spread of Himalayan balsam (Impatiens glandulifera) in the British Isles have been well documented. Usher (1986) gave a useful introduction to the history and spread of the plant in the British Isles, and Beerling and Perrins (1993) summarise the key information to date, and authors such as Prach (1994) address key issues of dynamics of spread along watercourses. Other studies such as Pysek and Prach (1995) have addressed similar issues in other European countries. A recent paper by Maule et al. (2000) highlights the range of environments which balsam may invade. Its plasticity in woodlands (with the ability to thrive under a range of irradiance from <1% to 100% ambient light for example) helps in its success. They also address the impact of Himalayan balsam on native woodland species. Gwynn Ellis (1993) provides a useful popular account, and interestingly he describes Himalayan balsam as: ‘Arguably one of our most attractive plants and with the added interest of exploding fruits’.
A similar situation occurs with *Rhododendron ponticum* in Britain. It is widespread and pernicious—a weed and the most problematic alien, invasive plant (Cross, 1975; Shaw, 1984; Rotherham, 1983 and 2001). Its native distribution is at the extremes of the Mediterranean, and its behaviour varies with environmental conditions. Restricted to higher ground and/or sheltered valleys in Spain, Portugal and Gibraltar, it is highly invasive and problematic in managed forest areas of the Turkish Black Sea Mountains, yet limited in high ground west of Turkey by the Bulgarian border. Northern parts of the Black Sea Mountains hold pockets of ancient *Rhododendron* forest (Colak et al., 1998). In Bulgaria and in the Lebanon it is of Red Data Book status. The first British introduction was probably at Lyndhurst in Hampshire, and then popular as a spectacular landscape plant, *Rhododendron ponticum* found favour for game cover, wildlife habitat, windbreaks and dramatic vistas. Extensively as rootstock for other rhododendrons, it was deliberately hybridised in cultivation to maximise hardiness. This was mainly with the American species *R. catawbiense* and *R. maximum*.

In favourable environments it spreads quickly with extensive vegetative layering and massive amounts of seed dispersing on the wind it is now common and familiar in Britain. Rotherham and Read (1988) present the ecological reasons for its success, and its impact on the landscape and wildlife habitat can be massive as a dominant feature of many areas. Now established in diverse environments it is especially abundant in western Atlantic zones such as Ireland (notably Killarney), Exmoor, North Wales, the English Lake District, Western Scotland, and the Peak District (Rotherham, 1986). It often impacts on both wildlife and tourism sites.

The scale of impact and frequently the dominance of *Rhododendron ponticum* mean its effects on native fauna and flora are dramatic, with sometimes total loss of original vegetation. Dense stands give few indications of decline after two centuries of establishment and research in Turkey suggests that decline is unlikely. The over-riding opinion of nature conservationists and foresters is that invasion is detrimental, and many wildlife taxa have few species associated with the plant (Shaw, 1984; Judd and Rotherham, 1992). Yet the situation is not clear-cut, and dense stands of *Rhododendron* may be excellent roosting and breeding habitat for birds. Mammals such as deer, badger and otter also benefit from this unique habitat (Rotherham, 1986 and 2001).

Most people, much to the chagrin of conservationists, actually like Rhododendrons, and some travel many miles to see spectacular shows of flowers in May and June. In the created landscapes of the parks and gardens of the 1700 and 1800s, *Rhododendron ponticum* is one alien often in a sea of aliens and as such part of a palimpsest of history along with other garden species. In the eyes of conservationists however, William Robinson and the Victorian ‘wild gardeners’ have much to answer for. Escaping to the wild it wreaks havoc on native communities, but can add value too. To address the problems more effectively, a more structured and strategic approach is required, informed by the fact that eradication is neither possible nor desirable. Sometimes and in some places, this exciting plant contributes positively to the British landscape. It is also part of a taxonomic group of plants that is hugely important around the world. British *Rhododendron ponticum* is actually largely a hybrid population (now confirmed by Richard Milne and co. at St Andrew’s (Abbott and Milne, 1995)) and is an alien species that attracts the wrath of site managers. In Turkey it may be problematic in managed forests, but in parts of Turkey, in Bulgaria, and in Iberia, it is a neglected native.

This leads me into the main thrust of this paper: the interaction between these plants and the public. There is often something at the core of their success and which is a problem to be faced if we wish to constrain their spread. **People like them!**

Returning to Himalayan balsam, our case study research gives insight into some difficult issues.

**Garden origins and the great escape**

The common balsam (*I. balsamina*) was known to English gardeners since Tudor times. A native of tropical Asia, it is an annual which was formerly used very widely for summer bedding. Today it is mostly used for indoor growing (Genders, 1969). The *Impatiens* grown in seventeenth century gardens, like many other plants of the time, have unknown or incomplete histories. *Impatiens balsamifera* from India had been in China since at least the seventh century and in the English garden flora would have been a garden cultivar rather than the pure species (Girling, 1988). Wilson in 1847, describes *Impatiens* as a genus of ornamental plants with one species growing wild in England, and about sixteen species introduced. He notes the yellow or touch-me-not impatiens growing wild in shady and humid places. He also writes of the tawny flowered or two-flowered impatiens (*Impatiens fulva* or *biflora*) as wild in some parts of Surrey and elsewhere in England, introduced at some unknown point from North America. Although it occurs apparently as a native, it is really only as an ‘outcast’ from some garden. Amongst the remaining hardy *Impatiens* introduced by this time, he discusses a species called *Impatiens glanduligera*, with deep rosy purple colour flowered and from six to twelve feet high. This is presumably Himalayan balsam, but with no hint of what was to come!

Williams (1946) describes *Impatiens fulva* as another alien now frequent in some parts of England, especially in the Home Counties, spreading along rivers and streams. According to McClintock (1961), in 1822 the then sixteen year old John Stuart Mill (amongst other things) a botanist of Surrey, was the first person to record the American balsam (*Impatiens capensis* or *I. fulva*) wild in Britain. Described as: ‘now gaily spread far and wide’.

Growing by the River Tillingbourne at Abury in Surrey, it had escaped from cultivation in the gardens of Albury Park. From there, by the 1940s, it had spread both up and down the Tillingbourne, along the Wey, and so to the Thames and to the Middlesex Rivers and beyond. (According to Dunn (1905), by the early 1900s, it was already completely naturalised along this watercourse). It was noted in great quantity by the Thames at Kew, along with, though in smaller quantity, the bigger cousin *Impatiens roylei* or *glandulifera*.

(Interestingly, Williams makes the mistake of assuming that Himalayan balsam was actually a perennial). Along with it in the Thames area, he had also recorded it thoroughly naturalised along the Teign in Devon.

Small-flowered balsam (*Impatiens parviflora*) is noted by Salisbury (1961) as occupying similar environments in Britain to those of its native locations in central Asia. Introduced to Britain from Russia during the mid 1800s, he describes its spread as discontinuous, being first found in Middlesex (Dunn (1905) suggests it was first found by a Mr Irvine at Battersea in 1851), then Derbyshire, Hertfordshire, and Suffolk (in the 1870s), and later from Glamorgan, Devon, and Wiltshire. It had previously been displayed in 1831, in the Botanic Garden in Geneva. Salisbury suggests that by the 1960s it was found in around three-quarters of the counties of England and Wales. An abundant weed on richer soils in shady situations in gardens, it had by 1867, achieved the status of ‘an ineradicable weed’ in the Oxford Botanic Garden. Salisbury gives figures of seed production by the explosive capsules, of up to c.1800 per plant. He makes the suggestion that whilst the explosive pods explain the shorter distance dispersal, longer distances may be achieved by human agency such as transfer of soil attached to plant roots or attached to implements. He suggests this accidental introduction to gardens

as a precursor to escape into the wild. In 1905, Dunn suggested that the horticultural trade was the cause of this plant’s distribution, a thought supported by Salisbury in 1961.

Salisbury discusses the Himalayan balsam or Policeman’s Helmet, as the most recent arrival from the genus, Introduced as a garden plant about 1839 and being described already in 1898 (by Mrs Earle) as ‘another terrible weed’. He suggests that its naturalisation on river banks is a much more recent phenomenon. By the 1960s it was noted in thickets along considerable stretches of the Exe in Devon and the Tweed in Berwickshire. He notes it in nearly half the counties of Britain, with an individual plant producing up to 800 seeds.

McClintock notes the explosive seed capsules dispersing the seeds to then be carried downstream by water, but raises the issue of dispersal to new river catchments. He suggests birds or perhaps fishermen as the accidental agents of such spread. In describing Himalayan balsam, he notes how it is said to grow more finely in the UK than in its native haunts. He also observes that it will grow in rubble areas as well as by watersides. With a date of first introduction given as 1839, within sixteen years it was established in the wild. McClintock also states the fact that there are over 900 species of *Impatiens* around the world. (Hopefully not all suited to growing wild in Britain).

**The role of the Victorian wild gardeners**

When William Robinson published his book ‘*The Wild Garden*’ in 1870, the practices he described and advocated were already well established. These included in particular, the embellishment of woodlands, utilising the naturalisation of exotics in the landscape, along with the admixture of plants from the sub-tropical garden, with an emphasis on foliage groupings. This was the basis for wild gardening throughout the 1870s and 1880s (Elliott, 1986). To be practiced on a large scale, wild gardening required species capable of spreading themselves in large masses. Plants such as *Rhododendron ponticum*, *Heracleum mantegazzianum* (giant hogweed), *Polygonum* sp. (Japanese and giant knotweeds), and of course Himalayan balsam, were all ideal. Such wild garden favourites are widely recognised as later becoming the scourge of conservationists. Locations such as Chatsworth Park in Derbyshire were used to juxtapose the garden flowers, forest trees and wild undergrowth. At Chatsworth, the rhododendrons, balsam and indeed the giant hogweed, remain, and have gone on to bigger and better things! Robinson stated that the principle of wild gardening was ‘---- naturalizing or making wild innumerable beautiful natives of many regions of the earth in our woods, wild and semi-wild places, rougher parts of pleasure grounds, etc.’

Grindon’s *Manchester Flora* (1859) and *British Garden Botany* (1864), clearly indicate it naturalised in Manchester by these dates, and indeed beyond (Ian Fitch pers. comm.). In the *Manchester Flora*, Grindon describes: ‘The *Impatiens coccinea*, a tall and weedy plant, with flowers of a dull red colour, is rapidly disseminating itself, growing like its congener, wherever a seed is dropped.’ In the *British Garden Botany*, he states that: ‘The *Impatiens glanduligera*, a tall and weedy plant, is common in gardens, and fast disseminating itself over the country.’

This use in gardens and the resulting escapes into the wider environment, continued into the 1900s. Wright (1909) highlights the value of Himalayan balsam as a species for decorative gardening. Described as a Himalayan plant now naturalised in Britain and common in country gardens, it is noted as useful for covering unsightly places, or producing an effect on the edge of a wood. Dunn in 1905, describes *Impatiens Roylei* as: ‘Rather a favourite cottage-garden plant in some parts of England, which has appeared in a semi-naturalised state in several localities.’
Another example is the variegated yellow archangel or *Lamiastrum galeobdolom* var. *argentatum*; a popular ground-cover species, particularly for shady gardens. However, not only is this plant excellent and attractive cover for gardens, with stunning yellow flowers and dense masses of showy leaves, it is a plant with a past and an interesting future. It is the cousin of, and indeed descended from the native Yellow Archangel (*Lamiastrum galeobdolom*); a species typical of ancient, deciduous woodlands.

The variegated form is sometimes recognised as a sub-species, sometimes as a variety. It is also suggested to have arisen in cultivation as a ‘sport’, sometime in the mid-late 1900s, probably in Central Europe. From these origins it was introduced to the UK supposedly in the 1960s, and from gardens has escaped into the wild. It now colonises into roadsides, hedgerows, woodland edge, and increasingly into the core of our ancient woodlands. It is sometimes deliberately introduced to wild areas, but more frequently is an inadvertent result of garden rubbish being jettisoned into the countryside. From these humble origins the plant encroaches stealthily and often unnoticed to dominate large areas of woodland in only a few years. For example, a site in Sheffield with variegated archangel introduced in 1998, by 2000 had an area of around 100 square metres densely covered.

The origins and introduction of the plant along with some basic aspects of its ecology are still shrouded in mystery but this is gradually being unravelled. It was present in gardens in Sheffield in the early 1950s, and was described as a very special garden plant in the 1940s and 1950s. As a wild flower it has been noted in Britain since the 1960s. However, it seems to have been in garden cultivation for longer than most botanists realise. Indeed references to a variegated form of *Lamium* in Victorian gardening literature (for example a gardening encyclopaedia in 1885) are almost certainly to this plant. This would suggest that the origins of this up-and-coming invader are as a garden variety cultivated during the Victorian enthusiasm for variegated forms of plants.

**Sheffield Himalayan Balsam Surveys in the 1990s and subsequently**

The early work was done at the Sheffield City Ecology Unit with the only information available from Clapham’s 1969 *Flora of Derbyshire*, or Shaw’s 1988 *A Flora of the Sheffield Area*. Neither gave much detailed information though the latter provided records for 1 km squares, and the former does give some information on time of origins of some species.

For Himalayan balsam Clapham gives a date about 1930 for the first record, and describes it as already: ‘well established on stream-banks and moist or shaded roadsides and in waste places. Locally abundant’. Records for the Sheffield flora, held by the Sorby Natural History Society seemed to go back no further than the 1960s. Oliver Gilbert (1989) attributed the bulk of the riverside spread of both balsam and knotweed to the period from the late 1960s to the
late 1980s, and the records available at the time supported this. The earliest for balsam Oliver Gilbert found for the River Don, being 1963.

However, observations on the River Sheaf in the 1960s suggested that both species were already well established and locally dominant even by this early date. The widespread occurrence and a few confirmations of earlier locations, led us to question the received wisdom. Furthermore, a re-evaluation of this could affect the interpretation of rates of spread and any associated conservation management.

**The Sheffield Spread**

As a slight aside, it is interesting how botanists have often overlooked invasive aliens during the key early years, and how conservationists sometimes assume dates of arrival on very thin evidence, or indeed on a lack of evidence. Lack of records does not necessarily equate with an absence of the plant. Griffiths (1999) writing about the River Don in Sheffield states with somewhat false authority that Himalayan balsam was introduced to Sheffield in the 1960s. If this had been the case, then the subsequent spread was not only impressive but incredible!

**Balsam in Ecclesall Woods – an Urbanising Woodland**

A Sheffield wood provided the starting point for what was to become the first of a series of national surveys. We wanted to know whether anybody could remember when they first recorded or saw Himalayan Balsam in the Woods. This ancient woodland was apparently under threat from invasive aliens, and we wanted to know how quickly, and for how long, the invasion had been happening.

A local press release asked for information and observations on Himalayan balsam in the area. Two remarkable things happened. Firstly, we received almost no information on the large and heavily used woodland itself. Secondly, the survey was picked up by first local and then national media (especially the gardening press). As a result, we then received over two hundred letters with information, dates *etc.*, plus *phone* calls to ourselves and directly to the
gardening magazines. These were from people all over the Sheffield area, and then from around the UK; some going back to the 1800s.

**Results of the Himalayan Balsam Surveys**

Some examples of the responses and of the information received are given below.

- Mrs X, a young horticultural student in 1961, collected it from the garden of a cottage on the Isle of Skye, and took a plant to her mother’s home in Leicestershire. From there she took it to her own home when she married, but eventually had to try and eliminate it. She now likes it in the countryside, but never again in her garden.

- Miss Y in 1948, collected seed from Beauchief in Sheffield, and took it to the Isle of Wight. Here she released it to the riverside at Newport.

- In the early 1990s, Mrs Z of Reading collected seed from a friend’s garden, introduced it to her own garden, and from there spread it to other gardens and to local hedgerows. She considers it very useful for filling in empty spaces and providing background for planting.

- Mrs A of Newcastle-upon-Tyne, in the 1990s collected seeds from her son’s garden in Snettisham in Norfolk, for her cottage garden at Belsay in Newcastle. ‘Now I am gradually furnishing all the gardens in the village with these plants for the seed fly everywhere.’

- Mrs B of Birmingham recalls balsam in their garden c. 2 miles from the centre of Birmingham in 1917. In the late 1950s she took it to a garden in Ledbury (Herefordshire). She also transferred it in the 1990s, from the River Trothy in Monmouthshire, to a garden in Solihull.

- Another person recalled it on the River Usk in Monmouthshire, in the 1890s.

- Mr C in Walkley in Sheffield recalls his grandfather’s Victorian worker’s cottage had a small garden. In this in the 1890s, amongst other plants, he grew balsam. This was probably collected from the big house nearby, and Mr Bedford remembers as a small child (in c. 1912), taking the seeds and releasing them into the nearby Walkley Cemetery.

- Q of Thetford was told that his great grandmother grew it in 1842, with seed given to her by a gypsy herbalist. It was still growing in his father’s garden at Holme Hale near Swaffham, in the 1920s and 30s.

- Miss T took rooted seedlings from local people into a garden in Fraserburgh, Aberdeenshire, and then took it south to Leicestershire.

- Mr R of Barnsley, collected seed from the moorland edge near Dore in Sheffield in the late 1930s, to his home garden. In the 1990s a visitor from Hungary took seeds home with him and they grow well in his Hungarian garden.

- In 1960, seeds were brought from Spain by a member of the Parks Department of Crewe Council.
• In the 1990s Mrs H of St. Albans received one plant for her garden from a neighbor, apparently from seed from St Lucia, and has since sent it to Redbourn, to Essex, and to Luton.

• In Sheffield, in the late 1940s (1946-48) Sir Hans Krebs collected seeds from a friend’s garden in Nether Edge, Sheffield, and released in along the River Sheaf at Millhouses, and along the Derbyshire Derwent in the Peak District.

• Mr P from Manchester, in the 1940s, sent seed to Dingwall in Aberdeenshire, from where it was released around Black Isle.

In the 1990s, Mrs J of Camberley in Surrey received seeds from a neighbor’s garden.

- Introduced to ‘spare land’.
- Given away to passers by.

Bag of seeds to a market gardener friend in Ireland.

- Given to a work colleague to introduce to a stream behind her garden.

- Introduced to local woods.

Carried on holidays to France and Spain.

**Her family aims to spread them as far and wide as possible!**

The Story of Himalayan Balsam in Sheffield

The date of known introduction to the Sheffield area was taken back to the late 1800s, with good descriptions of the process. We are now able to track at least some of the progress of the plant across the City. Long distance transfers from Sheffield to other regions and even other countries were also demonstrated. Other information produced dates and mechanisms for introduction and spread to other sites across the region. Finally, we have documented examples across the UK, of early introductions, and interestingly of multiple and sequential transfers across long distances.
Common Names and Culture

Another indication of the cultural interest in this plant is in the proliferation of common names over a relatively short time-span. These include (along with Himalayan balsam or Indian balsam):

- Jumping Jack.
- Poor Man’s Orchid.
- Policeman’s Helmet.
- Fireman’s Hats.
- Touch-me-not.
- Bee Flower.
- Bobby’s Helmet
- Triffid.

Other interesting observations included that the seeds quite often arrived in packet collections of garden ‘annuals’, and that they are also sold in pots in garden centres. They are even now being sold as ‘Mr Men’ novelty gifts for children as ‘Mr Noisy’s Exploding Plant – fun to grow! Bang!’ The instructions are: ‘Touch its seed pods and they explode!’ Well they wouldn’t they. Available incidentally, from the shop at the Birmingham Botanical Gardens for the bargain price of £2.15p. (Or of course free from Mrs Norris of Camberley, in Surrey!). (Thanks to Ed Darby for the information and to the generous gift from the shop, from one of the Conference delegates). A friend recently bought Himalayan Balsam seeds from a local garden centre, and we have even found plants for sale.

Discussion and Conclusions

Along with the Balsam Surveys and earlier work on *Rhododendron ponticum*, we have now undertaken research on exotic plants and people for several other species – notably *Buddleia*, giant hogweed, *Crassula helmsii*, and variegated archangel. The survey results show quite clearly some key aspects of the interaction between people and plant. All these species have been deliberately introduced into the wild by enthusiastic gardeners doing their bit to improve nature. Understanding this relationship may be vital if any attempts at control are to be successful in the long-term. It is also important to have this information in order to gauge the rate of spread and to assess the relative importance of the various potential mechanisms for dispersal.

The research shows how individual people may cause both long distance spread (dispersal) to new areas, and localised introductions to new sites within an area. This is linked to interest in, and liking for, exotic and exciting plants; a tradition which goes back in our culture to the earliest days of gardening, and which found its most obvious expression in the Victorian wild garden movement. Bee keepers also like the plant and may deliberately spread it to new sites. In Sheffield variegated archangel was introduced to a local bluebell wood in 1998, having been collected from a friend’s garden in Snowdonia five years earlier. It now covers three areas; the largest being around 100 square metres.

Regional studies on changing deer populations have also indicated the same sort of impact of species enthusiasts. Muntjac deer are known to have been dispersed widely across the region in the back of people’s vans! (Rotherham, 2003). Similarly our regional populations of signal crayfish have arisen from deliberate introductions, and of course the early introductions of grey squirrel are well documented.
There is a real issue for conservationists seeking to establish strategies, and to implement control programmes and eradication work. The overall human cultural situation may favour wider spread and indeed the introduction of more and more potential invaders from around the World and via the horticultural trade and people’s gardens. People will and are spreading these plants over distances of hundreds of kilometres at a time. The same process also applies to animals from - the ‘nodes’ of introduction, they are then being actively dispersed into the local countryside, urban and rural. Rapid colonisation can occur, precipitating non-human modes of spread, and leading to effective establishment throughout suitable environments. One serious consequence of this process is that it is unpredictable and therefore hard to plan for or react to. Indeed its lack of predictability is perhaps its most predictable feature!

Oliver Gilbert suggested to me that we may just have to learn to love them. Our urban oak – bluebell woods may become sycamore – balsam woods. Urbanisation, eutrophication, disturbance, and climate change are all doing there but to make this happen.

Acknowledgements

Colleagues in the media are thanked for their vital role in promoting the surveys, and above all I thank all the correspondents, many into their 80s, and a few into their 90s, for their memories and anecdotes freely shared.

References


Grindon, L.H. (1864) *British Garden Botany*.


***************************************************************************
Dr Ian D. Rotherham is Reader in Tourism Leisure and Environmental Change at Sheffield Hallam University. He is an ecologist, landscape historian, and environmental economist with a long-standing interest in exotic and alien plants and animals.

Some Examples of the Deliberate Spread of Himalayan Balsam: