siderable pressure on Himalayan balsam populations in the field. Large round 'shot holes' indicative of the damage caused by the leafspot lesions punctured almost every leaf of every plant. Other pathogens, including a downy mildew (Peronosporaceae), a powdery mildew (Erysiphaceae) and a rust fungus (*Puccinia*) were not as common as the leafspot and only found in a few locations, but all were just as damaging.

The rust fungus tentatively identified as *Puccinia* c.f. *argentata* was found in one location in the Khagan valley north of Naron, though it is thought this species would be associated with Himalayan balsam throughout its native range. The 'c.f.' (close to) denotes that an exact identification of this rust was not possible and *P. argentata* was the known (described) species it most closely resembles. *Puccinia argentata* has been recorded on two *Impatiens* species in Europe, *Impatiens noli-tangere* in Central Europe and *Impatiens capensis* in the UK. The fact that this rust species has not been recorded on Himalayan balsam in the UK or mainland Europe, in the latter case where rust-infected *I. noli-tangere* plants grow mixed in with symptom-free Himalayan balsam populations, strengthens the case that either (a) the rust on Himalayan balsam in Pakistan is a different species or (b) it is a different pathotype of *P. argentata*. The potential to use this rust as a biological control agent seems high, though considerable work is required on its host range and life cycle. However, further research is warranted if consideration is given to the behaviour of other rusts on other *Impatiens* species. *Impatiens parviflora*, a non-native species introduced into Europe from Central Asia, is often infected by the highly specific co-evolved rust *Puccinia komarovii* which caught up with its host in the mid 1920s. This damaging pathogen has spread with *I. parviflora* throughout mainland Europe attacking the stems of young seedlings and reducing the seed set and reproduction potential of the plant.

Of the many arthropod species collected, two were of immediate interest due to the high levels of damage observed to be inflicted by them in the field. After initial host range testing and identification the flea beetle *Altica himensis* was rejected as a potential biocontrol agent whereas the thrip species *Taeniothrips major* could be a promising candidate, though more research is needed into its host range. A suite of other arthropods found feeding on Himalayan balsam were collected including four lepidopteran species, two species of coleopteran weevils and numerous hemipteran species. Further surveys are now needed across the whole of the native range of Himalayan balsam to compile a full inventory of the natural enemies associated with this plant species.

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Update on the Spread of an Invasive Ladybird

The spread of *Harmonia axyridis* (variously known as the harlequin, multicoloured Asian or Hallowe'en ladybird or ladybeetle) with particular reference to Europe was outlined in *BNI* in December 2004 [25(4), 81N–82N, 'Ladybird strikes discordant note']. The species had recently arrived in the UK, having flown/blown in from continental Europe, as well as arriving on produce from Europe and North America[1]. In Europe it has been sold since 1982 as a biocontrol agent of aphids and coccids on a wide range of crops and has established in the wild in Germany, Belgium, the Netherlands, France and Luxembourg[2].

Harmonia axyridis has now spread into other European countries, with first records of the species in the wild in Switzerland in 2004[3], Austria in 2006[4] and clear signs of expansion in France in 2004[5]. The species was introduced in Greece but it is not clear whether it has established there in the wild, and in Italy, where it does not seem to have established despite suitable conditions being present[6].

In the UK a detailed monitoring project, the Harlequin Ladybird Survey[7], was set up by the National Biodiversity Network Trust, Centre for Ecology & Hydrology, Anglia Ruskin University and University of Cambridge, funded through Defra (Department for Environment, Food and Rural Affairs). Online recording of the species and extensive national and local media interest enabled wide recording of the species by members of the public. By the end of 2006 over 6600 online species records had been received. Over 40% of these were able to be verified by means of a specimen or photograph. The huge rise in digital photography and use of the internet has made this web-based monitoring scheme both practical and highly successful. Projects for monitoring other invasive species in the future may wish to follow suit.

The spread of *H. axyridis* in the UK has been dramatic[1,7]. In 2004 it was recorded in 14 English counties, all but two in the southeast of the country[7]. In 2005 it was recorded in 24 counties and by the end of 2006 it was found in 41 English plus two Welsh counties[7]. Abundance is highest in the southeast, and in London *H. axyridis* is already being reported as one of the most common ladybird species.

A long-term study of the impact of *H. axyridis* on native ladybird species has begun. Sites around the UK are being surveyed regularly to establish population data on the ladybird species present.

The human nuisance factors reported previously in *BNI* have all begun to be realized in the UK, with large swarms of *H. axyridis* recorded in southern England in autumn 2006. Houses have been invaded by over-wintering ladybirds aggregating in their hundreds, with reports of damage to furnishings by the yellow reflex-blood emitted by the ladybirds as part of their defence mechanism. There have also been one or two reports of allergic reactions to the ladybirds.

The speed of range spread by *H. axyridis* is happening as predicted by Michael Majerus, scheme organizer of the UK Ladybird Survey[8]. It is expected that *H. axyridis* will continue to spread north and west in 2007 and 2008 and that the species will reach

Scotland, as well as further counties in England and Wales during this time.

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[2]Majerus, M.E.N., Strawson, V. & Roy, H.E. (2006) The potential impacts of the arrival of the harlequin ladybird, *Harmonia axyridis* (Pallas) (Coleoptera: Coccinellidae), in Britain. *Ecological Entomology* **31**(3): 207–215.

[3]Klausnitzer, B. (2004) *Harmonia axyridis* (Pallas, 1773) in Basel-Stadt (Coleoptera, Coccinellidae). *Mitteilungen der Entomologischen Gesellschaft Basel* **54**(3–4): 115–122.

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[6]Burgio, G., Santi, F. & Maini, S. (2005) Intra-guild predation and cannibalism between *Harmonia axyridis* and *Adalia bipunctata* adults and larvae: laboratory experiments. *Bulletin of Insectology* **58**(2): 135–140.

[7]Harlequin Ladybird Survey: www.harlequin-survey.org

[8]UK Ladybird Survey: www.ladybird-survey.org

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Quality Control of *Cryptolaemus montrouzieri* Rearing in Cuba

Early detection and swift action are key elements in combating invasive species. In Cuba, pre-emptive initiatives mean that the country is prepared in the event of any incursion of the pink hibiscus mealybug, *Maconellicoccus hirsutus*. This mealybug is native to Asia and has been spread to other continents such as Australia and Africa. More recently it has been introduced into the sub-region of the Caribbean and North and Central America, but so far Cuba remains free of the pest.

The Cuban national programme for the detection and control of *M. hirsutus* includes technician and farmer training and raising public awareness, exploration for promising native natural enemies in Cuba and the importation of biocontrol agents found most effective in biological control programmes against the pest elsewhere.

As part of the Cuban programme, the predatory coccinellid beetle, *Cryptolaemus montrouzieri*, was imported into Cuba from Trinidad and Tobago because it is an efficient predator for controlling mealybugs, soft scales and aphids.

Cryptolaemus montrouzieri rearing was implemented in Cuban laboratories and quality criteria such as sex ratio, adult length, predatory capacity (determined on mealybugs and aphids), adult deformities and the length of the developmental cycle (egg laying to adult emergence) were included to check the quality of reared insects.

The beetle has adapted successfully to the rearing conditions established and more than 30 generations have been obtained up to now. The laboratory population reared under the quality assessment regime showed effectiveness in aphid and mealybug control and should be maintained. Efforts should also be made to increase its reproductive capacity and thus to set up an efficient, ecologically beneficial and fast alternative to employ in protected cultivation systems and ornamental and fruit trees.

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Down But Not Out: Australian Weed Biocontrol

In less-enlightened parts of the world, weed biocontrol scientists have envied their Australian collaborators for the financial support the Australian Government gives its own scientists, including, in recent years, through the Cooperative Research Centre for Australian Weed Management (the 'Weeds CRC'). However, this changed in November 2006 when the Weeds CRC's application for a third 7-year term was rejected; funding is now due to end in June 2008. This, the Weeds CRC pointed out in a statement[1], leaves Australia "without a national organisation to coordinate weed research and to package and deliver these results to farmers, Natural Resource Management (NRM) regional bodies and other users." If successful, the Weeds CRC would have become the Invasive Plants CRC with funding for the period 2007–2014. In this era of increased invasions and heightened biosecurity concerns, the decision not to fund an Invasives CRC is out of kilter with current opinion – the more so as Australia has long been a leader in both combating plant invasions and developing effective biosecurity measures.

In the January/February 2007 (#152) issue of the respected and widely read IPM email newsletter, IPMnet NEWS[2], Editor Allan Deutsch found a worrying similarity to "events in the UK not so many decades ago", when: "A relatively small group of highly dedicated scientists with great depth of experience and international acumen had established and nurtured what became the world renowned Weed Research Organization. Even with its minuscule budget, governmental entities decided the organization was not generating enough financial payback and, despite a global outcry, summarily shut down WRO. In one ill-advised move, the UK