IUCN
The World Conservation Union

Volume 8 • 2005
Invasive Alien Species in Pan-Europe

ROfE Regional Office for Europe

Moscow • Warsaw • Brussels • Belgrade

## Inside this issue...



# Biological invasions: a major threat to the biodiversity of Europe and a challenge for the World Conservation Union

**Piero Genovesi, Chair, European section of the IUCN *Invasive Species Specialist Group* (ISSG)**

Invasive alien species are now acknowledged as a major threat to biological diversity and human well-being throughout Europe. The dramatic increase in the numbers of biological invasions is largely a consequence of the globalization of the economy, which is causing an explosive growth of trade, transport and tourism. As a result, some of the rarest European species are threatened by introduced organisms. The European mink (*Mustela lutreola*) – one of the only two endemic carnivores of Europe – is at risk of extinction from competition with the American mink (*M. vison*); the rare white-headed duck (*Oxyura leucocephala*) is highly threatened through hybridization with the introduced ruddy duck (*O. jamaicensis*); and the American grey squirrel (*Sciurus carolinensis*) is outcompeting the native red squirrel (*S. vulgaris*) in Europe posing, in the long term, a severe threat to the forest ecosystems of the whole of Eurasia. But biological invasions do not only threaten biodiversity, they also affect the economy and well-being of Europe. Parasites introduced in Scandinavia have caused dramatic decreases in the fisheries of several Nordic States and the introduction of the American comb jelly (*Mnemiopsis leydii*) into the Black and Azov Seas caused the near extinction of the anchovy and sprat fisheries in the region. And the giant hogweed (*Heracleum mantegazzianum*) – an invasive that exudes a sap that causes blistering and painful dermatitis – is causing increasing public health problems in central Europe.

Despite the fast-growing impacts of alien species and despite the rich economy and solid scientific background of Europe, our region is still well behind other areas of the world – including many developing countries – in the establishment of effective responses to biological invasions. Developing a comprehensive pan-European policy on invasive alien species is indeed complicated by the free trade system of Europe, with the consequent ease of introduction of new alien species into the European Community, the lack of border controls within the EU, and the inadequate inspection and quarantine system. But this is not the only reason for Europe's inaction over biological invasions. The general indifference and lack of awareness of the decision makers, the limited knowledge of the public, inadequate data circulation, the lack of established emergency response measures, inadequate coordination with industry and other stakeholders, the difficulty of coordinating different government agencies, as well as a lack of coordination between countries all contribute to the limited ability of Europe to

*Continued on page 3...*

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### Box 1: IAS Definition

"Invasive alien species are species introduced deliberately or unintentionally outside their natural habitats where they have the ability to establish themselves, invade, outcompete natives and take over the new environments. They are widespread in the world and are found in all categories of living organisms and all types of ecosystems. However, plants, mammals and insects comprise the most common types of invasive alien species in terrestrial environments."

*Source*: CBD website **(www.biodiv.org/programmes/cross-cutting/alien/default.asp)**

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**Produced by:**
IUCN PSU, Cambridge
IUCN Regional Office for Europe Newsletter
Volume 8 • 2005
**ISSN:** 1728-8908 - English




# Letter from the Regional Director

Tamás Marghescu

Photo: ROfE

Dear reader

Welcome back from summer holidays and to the 8th Volume of ROfE Newsletter which looks at "Invasive Alien Species in pan-Europe". I was first confronted with the issue, when I worked as a forestry and nature conservation adviser at the Ministry of Environment in Hungary. The natural regeneration of the rare river floodplain forests was endangered by the displacement of natural species through the aggressive invasion of boxelder (*Acer negundo*) originally from the US. In 2002, I was invited to make a presentation at a conference organized by the World Customs Organisation and when I drew the attention to a forthcoming challenge to customs in relation to invasive alien species, I was looked at as if I was coming from the moon. Today, IAS are considered the second most important threat to biodiversity and we are very pleased to have Piero Genovesi, European Chair of IUCN Invasive Species Specialist Group (ISSG) provide a succinct overview of this topic of ever increasing global concern. Additionally we are delighted to have the valuable insight of ISSG Coordinator Dr Maj De Poorter who among other things provides some very useful case studies on IAS on pages 12-13.

In this issue we asked English Nature to fill us in on their work with IAS (pages 8-9) and also have for you an interesting table on some of the associate costs of IAS around the world (page 7). Wojciech Solarz and Tadeusz Zajac have prepared an informative article which looks at regional cooperation in Europe on IAS (page 5) and The Severtsov Institute of Ecology and Evolution on page 14 provides a useful overview of some of the key factors in Russia that are favouring the spread of IAS.

Additionally you will find some summaries of major articles related to IAS in our "From the Field: Science News and Updates" on pages 10-11 and of course information on some new publications and a useful new Access and Benefit Sharing Portal (page 4). This edition of "Brussels in Brief" examines European policies related to IAS.

We are already working on our next edition of this newsletter which will have 'Pan-European Trade and Global Biodiversity" as a theme.

May I wish you happy reading,

Tamás

... Continued from page 1

prevent new invasions and mitigate the impacts of invasive alien species. Although all these difficulties need to be seriously taken into account when dealing with biological invasions, they should not be used as an excuse for not taking decisive action. Conversely, the complexity of the issue calls for an extraordinary effort by states, the academic world and the whole society. IUCN can play a major role in this direction; the Union has substantially contributed – through the technical work of the Invasive Species Specialist Group – to the development of the "European Strategy on Invasive Alien Species" that was formally adopted by 42 European States and the European Community in December 2003. This document – also welcomed by the European Council and by the Convention on Biological Diversity – calls for a coordinated pan-European policy on invasive alien species, based on a hierarchical approach: priority to prevention of new unwanted introductions, early eradication of alien species if prevention fails, and control of the most harmful alien species when this is a reasonable option.

The last World Conservation Congress approved a recommendation on "Implementation of the European Strategy on Invasive Alien Species", calling the countries of Europe to develop and implement national strategies or action plans based on the pan-European strategy and to increase cooperation in addressing the threats posed by invasive alien species. Furthermore, the European Union is called to support the implementation of the Strategy at the regional level and to strengthen regional capacity and cooperation to deal with invasive alien species issues.

Meeting this objective requires an extraordinary effort by IUCN, that can play a leading role in fighting the homogenization of European biodiversity, by involving governments, the academic world and the entire European society to increase efforts to mainstream invasive alien species management in the field of conservation.

*Piero Genovesi, European Chair of IUCN ISSG*

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**The Invasive Species Specialist Group (ISSG) is part of the Species Survival Commission (SSC) of IUCN – The World Conservation Union. The ISSG is a global group of 146 scientific and policy experts on invasive species from 41 countries. Membership is by invitation from the group chair, but everyone's participation in the discussion on invasives is encouraged. In addition to its headquarters in Auckland, New Zealand, ISSG has three regional sections in North America, Europe and South Asia.**

## Box 2: IUCN IAS Guidelines

In February 2001, IUCN published on-line the *Guidelines for the Prevention of Biodiversity Loss caused by Alien Invasive Species*. These guidelines were prepared by ISSG in collaboration with other experts on alien invasive species and the IUCN Commission on Environmental Law. They were formally adopted by IUCN at its 51st Council Meeting in February 2000. The guidelines were designed to help countries, conservation agencies and concerned individuals to reduce the threats posed by invasive alien species to global biodiversity. Currently English, Spanish and French versions are available. A printed version of the guidelines was published by ISSG as a lift-out of issue 12 of Aliens newsletter. Around 650 copies were distributed worldwide to interested readers. The printed version of the guidelines can be obtained from ISSG.

*Source*: **www.issg.org/IUCNISGuidelines.html#Guidelines**

## Box 3: For More Information on IAS

- The Global Invasive Species programme **www.gisp.org/**
- IUCN Invasive Species Specialist Group **www.issg.org/**
- Global Invasive Species Database (and Early Warning System) **www.issg.org/database/welcome/**
- *Aliens* is the bi-annual newsletter of the Invasive Species Specialist Group (ISSG) **www.issg.org/newsletter.html#Aliens**
- IUCN Guidelines: The IUCN Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species (As approved by 51st Meeting of Council, February 2000 ) can be obtained from the ISSG office, or **http://iucn.org/themes/ssc/pubs/policy/invasivesEng.htm**

# New news

## New Portal ABS

IUCN ROfE has implemented a project funded by EC DG Environment which aimed to establish a European network of actors involved in the **Access and Benefit Sharing (ABS)** section of the Convention on Biological Diversity.

The main output of the project has been the "EC ABS Portal" where you can download accessible and up-to-date information on EC policy and legislative measures related to ABS as well as links to web pages of international organizations active in this field.

On the "Interactive Map" you will also find details of contact points in all the Member States of the European Union and links to information on ABS in the Member States. We are also in the process of uploading stakeholder profiles. We envisage that a number of European stakeholders will register on this portal and post here their policies, codes of conduct and other relevant documents which relate to ABS. This portal is aimed at raising your awareness and giving you the chance to present what you have been doing. Use it now and make it a success! Please go to: **http://abs.eea.eu.int/**

## New appointment

**Head of the Countdown 2010 (C2010) Secretariat**

**Mr Sebastian Winkler** (Sebastian.winkler@iucn.org), a Mexican-German national who grew up in French-speaking Africa, has joined IUCN's Regional Office for Europe from IUCN headquarters to take up the post of Senior Advisor European Policy and Head of the Countdown 2010 Secretariat. His major task will be to further establish the Countdown 2010 Secretariat, which is currently functioning as a Pan-European Alliance advancing the 2010 commitments of halting the loss of biodiversity into concrete action. **www.countdown2010.net**

## New publications

**Available from IUCN Programme Office for the Commonwealth of Independent States** (www.iucn.ru)

- IUCN. 2005. *The Beginning of the ENA-FLEG Process in Russia: Civil Society Insights*. IUCN, Moscow, Russia.

A collection of documents and reports relating to the first stages of the Europe and North Asia Forest Law Enforcement and Governance process (ENA-FLEG), primarily emerging from the project entitled: "ENA-FLEG: Optimizing Russian forest resilience to climate change through improved forest governance arrangements – Pilot phase". This project was carried out with financial support from the United Kingdom Foreign and Commonwealth Office, through its Global Opportunity Fund, and the United States, through its Voluntary Contribution to IUCN.

- IUCN. 2005. *The Beginning of the ENA-FLEG Process in Russia: Civil Society Insights. Materials for Ministerial Conference (Russia, 2005)*. IUCN, Moscow, Russia.

A summary of some of the results from the first stages of the Europe and North Asia Forest Law Enforcement and Governance process (ENA-FLEG).

**Available from IUCN Programme Office for Central Europe** (www.iucn-ce.org)

- IUCN. 2005. *Implementation of Natura 2000 in New EU Member States of Central Europe: Assessment Report.* IUCN, Warsaw, Poland.

The text of the report is based upon questionnaires sent out to NGOs in eight of the new Central European Member States of the EU. It assesses the procedure and methods of Natura 2000 site designation, involvement of NGOs and local communities in the process, as well as national and transboundary cohesion of the network. It further covers the sources of financing for Natura 2000 sites and the adaptation of national legislation for successful implementation of the Birds and Habitats Directives.

# Regional and subregional cooperation on IAS in Europe

**Wojciech Solarz and Tadeusz Zajac,**

**Polish Academy of Sciences, Institute of Nature Conservation, Polish National Committee of IUCN**

In some respects, the European experience with alien species is unique. From the management point of view, one of the greatest challenges here is the large number of sovereign states, each with their own national regulatory framework on alien species. The large number of borders constitutes a problem in controlling the movement of alien species between countries. At the same time, there is free movement of goods and people across a significant part of the continent.

One of the key elements of an effective solution to the alien species problem is a consistent regional and subregional approach, with common strategies, action plans and initiatives aimed at minimizing the effects of alien species invasions. At the European scale, the most important document recommending cooperation at the regional and subregional scales is the Bern Convention. The "European Strategy on Invasive Alien Species", developed by the Convention, established a common platform for addressing the problem at the continental scale. Adoption of the Strategy by parties to the Convention in 2003 should have been an incentive for undertaking actions at a regional level. However, a survey carried out by the Convention Secretariat two years after the adoption of the Strategy revealed that nearly 60% of the countries have not developed any subregional initiatives on invasive alien species.

One of the few examples of regional cooperation in Europe is the NOrdic-BAltic Network on Invasive Species (NOBANIS). The aim of the project is to develop a distributed but integrated network of common databases encompassing national and regional databases on alien species in the Nordic/Baltic countries, that is: Norway, Sweden, Finland, Russian Federation, Estonia, Latvia, Lithuania, Poland, Germany, Denmark and Iceland. A common portal will facilitate access to the IAS-related data, information and knowledge in the region. NOBANIS will provide administrative tools for making the precautionary approach operational in preventing the unintentional dispersal of invasive alien species and mitigating the adverse effects of IAS on biological diversity. NOBANIS will include searchable lists of alien species, a catalogue of experts on alien species, species accounts, species distributions and recommended preventative, eradication and control measures. The lists of introduced species in NOBANIS will be used to identify species that are invasive at present and species that may in the future become invasive. NOBANIS will also provide the foundation for the future development of an early warning system for invasive alien species.

There is a need to develop similar initiatives covering other biogeographical areas in Europe. Examples of such areas include large river basins, such as the Danube and Rhine, or large mountain ranges, such as the Alps or Carpathians. Spreading across different countries of the continent, they may play an important role as invasion corridors. Despite this fact, the alien species problem in these areas is usually addressed on a country level, with little or no cooperation with countries belonging to the same biogeographical region. The efficiency of country-oriented solutions in areas of biogeographical continuum may be fairly low. For instance, a ban on the introduction of an alien species into an international river system imposed only in one country is unlikely to prevent this country from invasion if introductions of this species are allowed in other countries within the same river system.

It seems that the low number of regional initiatives on invasive alien species, especially in the eastern part of the continent, is due to underestimation of the problem. Consequently, there is a shortage of international projects, which would activate scientific and NGO communities. The development of initiatives similar to NOBANIS in other subregions would allow for quick situation analyses and the preparation of relevant conservation measures. There is no doubt that IAS are a challenge to biodiversity conservation in Europe and IUCN should facilitate initiatives dealing with this serious problem. The first step should be the promotion of mutual cooperation among IUCN members.

## Box 4: Western Cornroot beetle

In the early 1990s, Serbian scientists discovered the western corn rootworm (a beetle *Diabrotica vigifera*, whose worm-like larvae feed on the roots of maize plants) near Belgrade airport, apparently inadvertently flown in on military aircraft from the USA. Vigorous international action might have curbed this pest's first known venture outside North America, but the turmoil of war prevented such a collaboration and now it is too late. By 1995, the pest had spread into Croatia and Hungary, subsequently spreading to Romania, Bosnia-Herzegovina, Bulgaria and Italy (Enserink, 1999). It is likely eventually to spread into every maize-planting country in Europe, and perhaps eventually into Asia, forcing farmers to use chemical pesticides. A problem that would have been relatively easy and cheap to solve if addressed quickly was prevented from being controlled due to the human factor of war that blocked the necessary collaboration, and now has serious economic impacts.

*Source:* McNeely J.A. (2001). An introduction to human dimensions of invasive alien species. In: McNeely, J.A. (Ed.) *The Great Reshuffling: Human Dimensions of Invasive Alien Species.*

# How guilty are IAS?

## Two recent articles assess the role of IAS in species extinctions

A commonly cited introduction to many articles on invasive alien species (IAS) is that after habitat loss, they present the single greatest threat to biodiversity. However, in an article published in *Trends in Ecology and Evolution*, Jessica Gurevitch and Dianna Padilla took a critical look at this statement and tried to assess the real role of IAS in species extinctions. They argue that very few extinctions are the direct results of the introduction of an alien species and the evidence for IAS being a leading cause of extinction is often anecdotal or based on little data. This is indeed a controversial conclusion, and one that has spurred considerable debate. But their point is not to deny that invasive species have a massive impact on native species and communities, but that conservationists must be careful when prioritizing their recovery or management plans and must be as specific as possible when addressing threats.

In many cases the spread of invasive species is correlated with declines in native species. However, severe habitat modification is also often correlated with the introduction of an invasive species and the decline of native species. Examples of this include the well-known invasives the Zebra Mussel (*Dreissena polymorpha*) and the Nile Perch (*Lates niloticus*). The Zebra Mussel, introduced into freshwater ecosystems of North America through the ballast tanks of cargo ships, was identified as the leading cause of extinction for freshwater unionid bivalves. Out of 281 species, 19 are known to be extinct, 21 are thought to be extinct, 77 are endangered, 43 are threatened and 72 are of special concern. The Zebra Mussel, requiring a hard substrate to bind to, not a common feature of muddy lake bottoms, attaches to the bivalve and limits its ability to feed, respire and reproduce. However, declines in these bivalve species most likely started in the 1920s, some 60 years before the introduction of the Zebra Mussel. These declines are most likely linked to habitat destruction from water diversion, erosion, eutrophication, pollution from chemical inputs and a reduction in the species required for their parasitic larvae to develop. A similar situation occurs with the Nile perch, whose introduction to Lake Victoria is associated with dramatic declines in cichlid populations. However these populations were already declining due to the development and urbanization of the lake banks and pollution in the water. The removal of the Perch and the other major invasive, the water hyacinth (*Eichhornia crassipes*) would not necessarily halt their declines.

There are of course well publicised examples of the direct effects of introduced species such as the brown tree snake (*Boiga irregularis*) in Guam and the accidental introduction of Caulerpa seaweed (*Caulerpa taxifolia*) into the Mediterranean Sea, but in many cases the impacts of invasive species are unclear, either being inferred or correlated with other factors. Most endangered species face multiple threats, and untangling these threats and the relationships between them is complex. However the authors argue more work is required to understand the direct role invasives play in pushing species to extinction and what systems are vulnerable to invasives, and vice versa what species are likely to become invasive.

Gurevitch, J. and Padilla, D.K. 2004. Are invasive species a major cause of extinctions? *Trends in Ecology and Evolution* **19(9):** 470–474.

Miguel Clavero M. and Garcia-Berthou, E. 2005. Invasive species are a leading cause of animal extinctions. *Trends in Ecology and Evolution* **20 (3):** 110.

## CASE STUDY:

### Ruddy duck *(Oxyura jamaicensis)*

**Category of introduction:** unintentional, but as a consequence of deliberate importation of the species.

**Reason(s) for introduction:** recreational and aesthetic for ornamental wildfowl collections. Pathway for the introduction: birds escaped from wildfowl collections and the species became established in the wild. It was therefore introduced as a direct result of deliberate imports of the species. After escaping from captivity, ruddy ducks first bred in the wild in 1960 and increased to about 5,000 birds by 2000. The birds are beginning to spread across Europe.

**Problems caused by the introduction:** The North American ruddy duck has been identified as the primary threat to the long-term survival of the white-headed duck Oxyura leucocephala, a globally threatened species. Its Western Mediterranean population is recovering from a historical minimum of 22 birds counted in Spain in the 1970s. Over 20 years of active conservation efforts have resulted in a population increase in Spain to over 4,000 in 2001. However, in the mid-1980s, a new threat to this species appeared from the ruddy duck. Ruddy ducks from the feral UK population began to reach Spain and breed with white-headed ducks, giving rise to fertile offspring with predominantly ruddy duck characteristics. Without control, ruddy ducks are therefore expected to colonize continental Europe and threaten the white-headed duck with extinction through hybridization and competition.

**Action taken:** An international white-headed duck action plan prepared by BirdLife International, and endorsed by the Bern Convention on Conservation of European Wildlife and Habitats and by the European Commission, highlights the need for control,

Joe Blossom/WWT

and ultimately eradication, of both wild and captive populations of ruddy ducks (particularly the UK source population) in order to safeguard the future of the white-headed duck. A number of countries are working to implement this action plan.

The UK Government has undertaken a regional control trial of ruddy ducks, to investigate the feasibility and cost of a national eradication programme for this species, and is considering next steps. The control trial concluded that the UK ruddy duck population can be reduced to very low numbers at a cost of £3.6 million to £5.4 million over four to six years. This demonstrates the high cost and difficulty of undertaking control or eradication programmes once invasive non-native species have become established. Such control measures may also be unpopular with the public, hence the need for greater public understanding of the issue, including the importance of not allowing introduction of further new species.

*Source: Review of non-native species policy: report of the working group* (Defra, 2003)

## Table 1. Indicative costs of some alien invasive species (costs in US$)

| Species | Economic Variable | Economic Impact | Reference |
|---|---|---|---|
| Introduced disease organisms | Annual cost to human, plant, animal health in USA | $41 billion per year | Daszac *et al.*, 2000 |
| A sample of alien species of plants and animals | Economic costs of damage in USA | $137 billion per year | Pimentel *et al.*, 2000 |
| Salt Cedar (*Tamarix*) | Value of ecosystem services lost in western USA | $7–16 billion over 55 years | Zavaleta, 2000 |
| Knapweed (*Centaurea* spp.) and leafy spurge (*Euphorbia escula*) | Impact on economy in three US states | $40.5 million per year direct costs $89 million indirect | Bangsund, 1999; Hirsch and Leitch, 1996 |
| Zebra mussels (*Driessana polymorpha*) | Damages to US and European industrial plants | Cumulative costs 1989–2000 = $750 million to 1 billion | National Aquatic Nuisances Clearinghouse, 2000 |
| Most serious invasive alien plant species | Costs of herbicide control in Britain, 1983–92 | $344 million/year for 12 species | Williamson, 1998 |
| Six weed species | Costs in Australian agroecosystems | $105 million/year | CSIRO, 1997 cited in Watkinson, Freckleton and Dowling, 2000 |
| Pinus, Hakea, Acacia, and lowland acacias | Costs on South African fynbos to restore pristine conditions | $2 billion | Turpie and Heydenrych, 2000 |
| Water hyacinth (*Eichornia crassipes*) | Costs in 7 African countries | $20–50 million/year | Joffe-Cook, 1997, cited in Kasulo, 2000 |
| Rabbits (*Oryctolagus*) | Costs in Australia | $373 million/year (agricultural) | Wilson, 1995, cited in White and Newton-Cross, 2000 |
| Varroa mite | Economic cost to beekeeping in New Zealand | $267–602 million | GISP, 2001 |
| Golden apple snail (*Pomacea canaliculata*) | Impact on rice in the Philippines | $28–45 million per year | Naylor, 1996 |

*Source*: McNeely J.A. (2001). An introduction to human dimensions of invasive alien species. In: McNeely, J.A. (Ed.) *The Great Reshuffling: Human Dimensions of Invasive Alien Species*.

# English Nature has pledged to raise awareness of the impacts of invasive non-native species

Interview with **Dr Ruth Waters, Senior Species Officer, English Nature,** by Rebecca Wardle (IUCN ROfE)

Dr Ruth Waters

***IUCN: How does English Nature define invasive alien species (IAS) and why are they a threat to biodiversity in England?***

RW: Non-native species are those found outside their natural range due to direct or indirect introduction by humans. Invasive non-native species are non-native species which have the ability to establish themselves and spread, out-competing natives and taking over new environments.

***IUCN: The threat to biodiversity due to IAS is considered second only to that of habitat loss. Are people in England aware of the dangers that IAS involve?***

RW: Some people in England are aware of the dangers that IAS involve but it is probably fair to say that most people don't fully understand the implications. Awareness-raising was identified by the 'Review of policy on non-native species' (undertaken by a working group on behalf of Defra, the Department for Environment, Food and Rural Affairs) as one of the eight recommendations to Government. English Nature has pledged to raise awareness of the impacts of invasive non-native species on biodiversity, sustainable development and resource management, and the wider environment.

***IUCN: What steps are English Nature taking towards minimizing the impacts of IAS?***

RW: English Nature is currently involved in a broad range of work associated with invasive non-native species, for example:

a. English Nature controls invasive non-native species on a number of NNRs and SSSIs*. These include Australian swamp stonecrop (*Crassula helmsii*), Himalayan balsam (*Impatiens glandulifera*) and Japanese knotweed (*Fallopia japonica*);

b. We provide financial support to projects carried out by others for the control of invasive non-native species such as rat control on Lundy, or control of African clawed toad (*Xenopus laevis*) in North Lincolnshire;

c. English Nature funds research into methods of controlling species such as Topmouth gudgeon (*Pseudorasbora parva*) and Japanese knotweed (*Fallopia japonica*);

d. We have developed internal working policies for dealing with some individual species e.g. grey squirrel (*Sciurus carolinensis*);

e. We undertake direct action to prevent establishment of non-native species e.g. bullfrog (*Rana catesbeiana*);

f. We contribute to *Flora locale*, which is a non-governmental organization which aims to promote the use of appropriate native plant species for projects;

g. We contribute to and participate in a number of strategic invasive plant control projects such as the Cornish Knotweed Forum and the Tweed Invasives Project.

We have pledged to do the following:

- Raise awareness of the impacts of invasive non-native species on biodiversity, sustainable development and resource management, and the wider environment;
- Work with Government to ensure that the impacts of invasive non-native species on biodiversity and sustainable outcomes are addressed in a prioritized way;
- Advise Government on the level of authority and resourcing to ensure the co-ordinating body is effective;
- Collate, assess and prioritize threats from invasive non-native species on biodiversity and sustainable outcomes in England, and advise on these threats;
- Contribute to relevant monitoring for invasive species, either as a tool to aid prevention, or as feedback for containment and control measures;
- Support relevant research into control methodologies for invasive non-native species impacting on natural environments and landscapes;
- Develop management options for invasive non-native species impacting on biodiversity and the landscape, and contribute to national management plans;
- Seek to eliminate threats from invasive non-native species to protected species and special sites, either through direct action ourselves or through working with partners;
- Call for and contribute to developing new rules, codes of conduct and, where necessary, legislation to reduce the risk of future introductions, and enable rapid action if an introduction occurs. In doing so, we will consider the wider sustainability context of such measures;
- Contribute to the development and implementation of an agreed national action plan which will tackle prevention, rapid action and control for the top priorities.

***IUCN: In which ways are IAS hindering the achievement of the 2010 target to "halt the loss of biodiversity" in England?***

RW: In England, invasive non-native species cause significant damage to native biodiversity. There are a number of mechanisms by which damage occurs, but the most common are competition, predation, habitat destruction and disease vectors. The impacts of invasive non-native species can be seen both at national and local level. Changes in species compositions of ecosystems can cause a loss of local distinctiveness.

*Editors Note: NNRs = National Nature Reserves, SSSIs = Sites of Special Scientific Interest

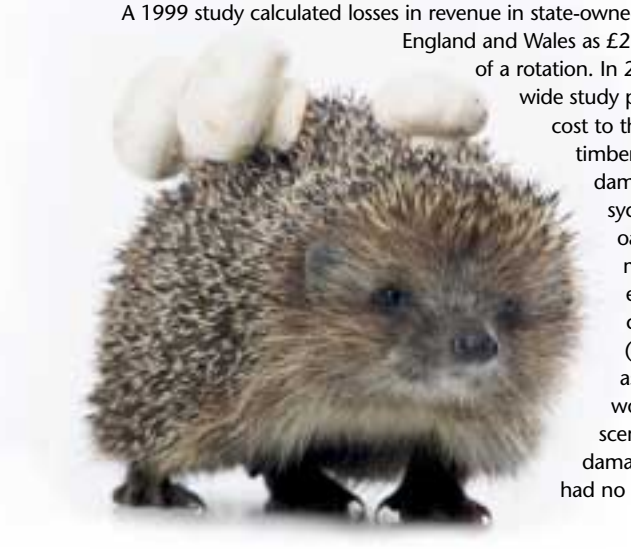
Within the UK Biodiversity Action Plan, non-native species issues were cited as threatening factors in 17 habitat action plans (23% of the action plans), and 46 species action plans (12%). Impacts include competition (62%), habitat loss or degradation (18%), predation (12%) and disease (8%). Well-known examples of invasive non-natives include grey squirrel (*Sciurus carolinensis*), Chinese mitten crab (*Eriocheir sinensis*), Japanese knotweed (*Fallopia japonica*), New Zealand flatworm (*Arthurdendyus triangulatus*) and Australian swamp stonecrop (*Crassula helmsii*). In addition to problems caused by species not native to the UK, the movement of native species outside their natural range, particularly to islands and lakes, can also cause significant conservation problems. A good example of this is the impact of introduced hedgehogs on ground-nesting waders in the Hebrides.

There has been increasing concern over non-native genotypes. Although the impacts on biodiversity are still unclear due to the paucity of data, possible problems include the loss of existing genetic diversity, different capacity of introduced species to survive, and different palatability to insects. For example, some bumblebees are unable to feed from certain cultivars of red clover, due to these having a different flower shape from the native genotype.

***IUCN: Can you give us an example of IAS in England and the resulting environmental and economic impacts?***

RW: Grey squirrels (*Sciurus carolinensis*) were deliberately introduced into Britain from North America at the end of the 19th century and beginning of the 20th century for aesthetic reasons. The grey squirrel is a long-established invasive non-native species which has impacted significantly on native wildlife, and which also causes significant economic damage. Following introduction, grey squirrels spread rapidly in the lowlands and are now common throughout most of England and Wales and southern Scotland, displacing the native red squirrel (*Sciurus vulgaris*). They are still absent from parts of north-eastern and north-western England, a few parts of Wales and much of highland Scotland. Their spread has everywhere been accompanied by a reduction in numbers of the red squirrel. Competition between the two species is thought to be one factor in this, but recent research has suggested that the grey squirrel may act as a carrier for a virus disease (parapox) to which red squirrels are extremely susceptible. Extinction of the red squirrel in England and Wales is a likelihood in the foreseeable future, although it is more secure in Scotland.

The decline of the native red squirrel is the most serious conservation impact caused by the spread of grey squirrels. However, they also cause significant economic damage to tree crops by stripping bark from a wide range of broadleaved and coniferous species. The risk of severe damage may discourage landowners from planting broadleaved trees in parts of Britain, and this hinders the achievement of government objectives for expanding the area of native woodland in the lowlands. Grey squirrel damage to woodlands is a cause of major concern to landowners. The Forestry Commission has made various estimates of the loss of timber value to British forests. This is a difficult process because damage is cumulative and accurate data scarce. A 1999 study calculated losses in revenue in state-owned forests in England and Wales as £2m at the end of a rotation. In 2000, a GB-wide study put the total cost to the British timber industry of damage to beech, sycamore and oak as £10 million at the end of the current rotation (both studies assumed the worst-case scenario that damaged timber had no value).



***IUCN: In England, is the focus on management of existing IAS, or avoiding new invasive species from entering? Would you change this approach?***

RW: Currently the focus is both on prevention of new invasive species from entering, and management of existing IAS. The Government is looking to set up a co-ordinating body which would seek to ensure policy and action on non-natives is joined up across government and its agencies. This body will look to address prevention, rapid action, and containment and control. In addition, proposed changes in legislation are being progressed to make it easier to control certain species from entering. Codes of conduct are being drawn up with stakeholders to also help all aspects of managing invasive non-native species including issues around prevention.

***IUCN: Are IAS management plans in England being successful?***

RW: The main problem in England has been the lack of a co-ordinating body to ensure consistency of application of non-native species policies and actions and clear agreed responsibilities and priorities. It is hoped that the new co-ordinating body (see above) will address this.

***IUCN: Some would argue that IAS are part of evolution – how would you respond?***

RW: Biodiversity is the variety of life. Invasive non-native species diminish this variety and we have a responsibility to pass a healthy and biodiverse environment to our future generations.

***IUCN: Please complete the following sentence: "In 2010 I would like IAS to…"***

RW: In 2010, I hope that the general public and all stakeholders will have a much better understanding of IAS and their implications. I hope that there will be effective and co-ordinated actions to prevent, control and contain these problematic species.

**English Nature champions the conservation of wildlife, geology and wild places in England. It is a Government agency set up by the Environment Protection Act 1990 and is funded by the Department for Environment, Food and Rural Affairs.**

**In 2007 English Nature, the environment activities of the Rural Development Service and the Countryside Agency's Landscape, Access and Recreation division will be united in a single body (Natural England) with responsibility for enhancing biodiversity and England's landscapes and wildlife in rural, urban, coastal and marine areas; promoting access, recreation and public well-being, and contributing to the way natural resources are managed – so they can be enjoyed now and for future generations.**

**Dr Ruth Waters**
**Senior Species Officer**
**English Nature**
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ENGLISH NATURE

# From the Field: Invasive species

**In this review of scientific research that is relevant to conservation biology in Europe, we take a look at the importance of considering evolution as a rapid process affecting species and we highlight a specific example from studies of species distributions in the North Atlantic that are responding to changes in climate. Secondly we highlight a couple of papers that have looked further at the impacts of agriculture on biodiversity; the first attempts to identify some of the mechanisms that have caused the widespread declines in bird species on agricultural lands, and the second compares organic and non-organic farms for biodiversity.**

## Speeding up evolution

It is recognised that anthropogenic changes to the environment have exerted a massive evolutionary pressure on species. Indeed, conservation efforts are underpinned by the principles of evolution by natural selection, for example the CBD sets out to protect all diversity from the genetic to the ecosystem level. Also in general we are used to thinking about evolution as a slow process taking centuries or longer to manifest itself in observable differences. However in recent years a new school of thought has developed around the concept of 'contemporary evolution', which is the selection of heritable traits occurring over observable time (years and decades). Could contemporary evolution be an important factor for conservation biology and could it shape the way in which we establish priorities for the protection of species and diversity?

Although initially thought to be rare, this rapid evolution is being observed in an increasing number and variety of taxa, and the links with conservation biology are more and more evident. The harvesting of species provides a good example. Generally harvesting is selective towards a specific trait, such as fish size for fisheries (e.g. Conovar, 2002) and horn size for trophy hunting (e.g. Coltman *et al.*, 2003). Harvesting in these cases not only removes an important component of the population, it also changes the choices of the remaining population members and therefore reduces the presence of these desired traits in the population. This means that stopping the pressure, e.g. banning fishing or hunting, may not mean that populations recover to historic levels.

Many examples of contemporary evolution are associated with the introduction of exotic species to a community, and it is likely that it plays an important role in the invasion biology of a species. For example invasive species, such as the Zebra Mussel (*Dreissena polymorpha*), often spend a period of time in low numbers after becoming established in an area and before exploding in population size. Understanding this process of colonization will help managers control such species. Indeed the study of the evolutionary processes affecting species is becoming increasingly important to understanding the invasion dynamics of a species and therefore possible control or prevention measures (generally by showing how invasive species may respond to certain control measures). In these and many other cases, conservation biologists and policy makers are going to have to consider evolution as an important factor that is shaping species and ecosystems in the short term as well as the long term.

Based on:

Stockwell, C.A., Hendry, A.P. and Kinnison, M.T. 2003. Contemporary evolution meets conservation biology. *Trends in Ecology & Evolution* **18(2):** 94–101.

See also:

Coltman, D.W., O'Donoghue, P., Jorgenson, J.T., Hogg, J.T., Strobeck, C. and Festa-Bianchet, M. 2003. Undesirable evolutionary consequences of trophy hunting. *Nature* **426:** 655–658.

Conovar, D.O. 2002. Sustaining fisheries yields over evolutionary time scales. *Science* **297:** 94–96.

Stockwell, C.A. and Ashley, M.V. 2004. Rapid adaptation and conservation. *Conservation Biology* **18(1):** 272–273.

## Climate change and biodiversity

There is a growing literature showing that species distributions are being dramatically affected by climate change. Predictions state that as the earth warms, species will move towards the poles and this could have dangerous consequences for range-limited species or for those with specific habitat requirements. Changes in climate have been predicted to cause changes in the distribution, growth, survival, reproduction, and responses to other trophic levels for marine species. Those species with a higher turnover of generations will by extension show the most rapid changes. Perry *et al.* studied the distributions of 36 species of demersal (bottom-living) fish and found that two-thirds had changed their centre of distribution in latitude, depth or both. In a sub-sample of 20 species, the authors assessed whether species also changed their range boundaries and found that over half had moved significantly with surface temperature warming. The largest range-boundary change came from blue whiting (*Micromesistius poutassou*) which moved further north into heavily fished areas of the North Sea. The mean annual rate of movement was estimated at 2.2km per year for six species. This can be compared with estimates generated for alpine herbs, birds and butterflies which showed a mean response of 0.99km per year. This would indicate that although there are fewer boundaries to movement for marine fish, they could also be severely impacted by climate change. Also, as predicted, the study showed that those species with the fastest generation time were the quickest to shift their distribution. It is clear from this study and others like it that climate is having serious impacts on the life histories and distributions of marine fish and, with over-fishing pressures in areas such as the North Sea, could have unpredictable impacts on marine biodiversity.

Perry, A.L., Low, P.J., Ellis, J.R. and Reynolds, J.D. 2005. Climate Change and distribution shifts in Marine Fishes. *Science* **308:** 1912–1915.

## Grazing pressure and avian biodiversity

The negative impacts of intensive farming practices on avian biodiversity have been clearly shown by BirdLife International's farmland bird index, which highlighted dramatic declines in farmland bird populations in the 80s and 90s. Also there is a body of evidence showing the impacts of grazing pressure on farmland birds, however the mechanisms causing this impact have remained unclear. Darren Evans and his colleagues addressed this problem by monitoring egg laying in the Meadow pipit (*Anthus pratensis*) within field plots grazed with differing sheep densities. The meadow pipit is an insectivorous passerine which has shown moderate declines in the UK over the last 25 years. The authors chose to measure the volume of eggs laid by pipits, as larger eggs tend to lead to larger chicks which have a better chance of surviving to fledge. The results of the experiment showed that although a low level of grazing seemed to improve egg volume when compared to no grazing, egg volume decreased as the grazing intensity increased. The authors suggest the most plausible hypothesis to explain this relationship is that grazing reduces prey availability and abundance. Could this be providing one of the mechanisms that is affecting bird numbers in agricultural landscapes? Further experiments will have to tease apart the different hypotheses for the changes in egg size and to look at how longer-term pressures may affect adult reproductive success or fitness.

Evans, D.M., Redpath, S.M., Evans, S.A., Elston, D.A. and Dennis, P. 2005. Livestock grazing affects the egg size of an insectivorous passerine. *Biology Letters* [in press].

## Going organic is better for nature

As consumers and conservationists, we are placing greater importance on organically grown produce as a better approach to farming for biodiversity than intensive methods. However to date, evidence to support this has not been very strong and studies were often limited in their scope and taxonomic depth. Now a five-year study has systematically compared 89 pairs of organic and non-organic farms in the UK, to identify whether they differ in biodiversity and whether this is linked to the habitat structure and management in each farm. The authors surveyed the habitat structure, plant composition, invertebrate diversity, bird and bat numbers during a three-year period. In terms of habitat structure the study found that organic farms had more and larger hedgerows, smaller fields, and relatively more grassland than non-organic farms. Farmers on organic land sowed crops later and each field had at least one ley period as part of a crop rotation. No differences were found in absolute farm size, woodland or pond area, or the management of permanent pastures. Generally organic farms had a greater density and abundance of plant and animal species, with an estimated 68–105% more plant species, 16–62% more birds, and 6–75% more bats. It is therefore clear that supporting the development of organic farms improves the heterogeneity of farmland habitats, and makes a significant contribution to the restoration of biodiversity in agricultural landscapes.

Fuller, R.J, Norton, L.R., Feber, R.E., Johnson, P.J., Chamberlain, D.E., Joys, A.C., Mathews, F., Stuart, R.C., Townsend, M.C., Manley, W.J., Wolfe, M.S., Macdonald, D.W. and Firbank, L.G. 2005. Benefits of organic farming to biodiversity vary among taxa. *Biology Letters* doi:10.1098/rsbl.2005.0357 [in press].

# Euromenace: Invasive alien species

By Dr Maj De Poorter, Coordinator Invasive Species Specialist Group (ISSG) www.issg.org

## Introduction

Organisms, from the tiniest to the large, can spread in terrestrial, freshwater or marine environments once they have been introduced (moved through human agency to an ecosystem where they are not native). The Convention on Biological Diversity (CBD) recognises the importance of this global issue and calls on contracting parties to: *"prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats and species"* Article 8 (h). Invasive alien species (IAS), as defined by the CBD are those alien species whose introduction and/or spread threaten biological diversity. One infamous example is the aquarium-bred strain of the tropical alga *Caulerpa taxifolia* in the Mediterranean Sea. This is thought to have entered the Mediterranean accidentally via Monaco Aquarium, where they were used as attractive-looking algae in the tanks. The resulting "escape", establishment and infestation in the wild has been devastating to native species and has in some cases severely affected livelihoods. Another striking example is provided by the North American comb jelly (*Mnemiopsis leydi*) which was most probably introduced into the Black Sea and Sea of Azov with ships' ballast water in the early 1980s. The jellyfish preyed on large amounts of zooplankton – including the young of plankton-eating fish such as anchovies, and by 1994 the anchovy fishery had almost disappeared.

## Europe

Due to the ancient history of human settlement in Europe, such alien species have naturalized and become "integrated" in many ecosystems, and this often leads to a belief that alien species are now all harmless, and not an issue in Europe. Nothing could be further from the truth. The viperine grass snake (*Natrix maura*), probably introduced in Roman times in Majorca and Minorca, still constitutes a threat of extinction to the Mallorcan midwife toad in those islands. The restoration plan for this toad hence must include systematic control of the snake. Another factor that must be considered is that given the exponential increase in trade transport, and travel in the last century or two, there has been a tremendous increase in the introduction of species to ecosystems where they are alien. For example, the presence of exotic plants in Portugal has increased probably more than 1000% during the last two centuries.


NZ Ministry of Fisheries

The examples above illustrate that biological invasion can result from unintentional introductions (ballast water, "hitchhikers" in trucks, containers, soil, etc) but also from intentional introductions of alien species e.g. for agriculture and forestry, horticulture, aquaculture/ mariculture, aquarium trade, sports fishing. For example, more than 60% of non-native species in the wild in Scotland originated as garden escapes, and the resulting invasion of the countryside has become such a problem that a new horticultural code of practice has just been launched by the Ministry of the Environment (May 2005) to combat further spread.

The solution is to only allow introductions of alien species after risk assessment has determined that they will be "safe". This approach must also be applied to alien species intended for biological control – otherwise many more nasty surprises might result.

## Benefits of management

Ecosystem restoration, or recovery of native species, will often require control or eradication of invasive alien species. Even eradication of "ancient" invasive alien species can result in major biodiversity gains: eradication of the Ship's rat (*Rattus rattus*) from Lavezzi island off Corsica resulted in a significant improvement in the breeding success of the Cory's shearwater (*Calonectris diomedea*).

It is very hard to eradicate a species that has established – but not impossible. In the UK, an 11-year campaign saw the successful eradication of coypu (*Myocastor coypus*), from East Anglia. Eradication in the UK cost 5 million Euro. Such large costs tend to frighten decision makers – but one should consider the alternative: in Italy, coypu damage crops, weaken riverbanks, and affect biodiversity. Authorities are controlling the species (keeping numbers down, but not eradicating). A recent survey found that in six years the total costs suffered were more than 14 million Euro – and, without eradication, similar costs will be ongoing. This shows that eradication of an invasive alien species, even if very costly, is by far the best solution in the long term. Of course, eradication is not always possible, and in those circumstances, ongoing sustained control will be required. The overall picture is clear: prevention is the key, coupled with early detection and rapid response. When even that fails, eradication or long-term control of invasive alien species should be seriously considered.

## Precaution:

Many, if not most, alien species will **not** become invasive, but by the time invasiveness is noticed, it is often too late to act. This underpins the need to apply the precautionary approach/principle throughout: in the context of alien species, unless there is a reasonable likelihood that an introduction will be harmless, it should be treated as likely to be harmful (*IUCN Guidelines*[1] *for the Prevention of Biodiversity Loss Caused by Alien Invasive Species*).

Microsoft Clipart

[1] Approved by 51st Meeting of the IUCN Council, February 2000. Full text: http://iucn.org/themes/ssc/pubs/policy/invasivesEng.htm

## SURPRISING IMPACTS

### Alien parasites : new stress for endangered mega-fauna

The alien Sika deer (*Cervus nippon*) were released in Ukraine and Slovakia. It is postulated that they infected local European deer (*Cervus elaphus*) with an internal parasite – when some of these deer migrated into Poland, the parasite came with them and infested Polish deer. It is further postulated that this in turn led to infestation in European bison – a globally threatened species. While this pathway has not been definitely confirmed yet, what is certain is that most if not all individual bison in SE Poland are affected, and also already some in Bialowieza, where the largest population in the world lives. After WW II the bison was saved from the verge of extinction, and it is still globally threatened. This new stress, up to 4000 parasites in 1 bison, must be taken very seriously.

### Alien ladybug threatens invertebrates – and the wine industry

*Harmonia axyridis* – the multicoloured Asian ladybird was introduced from Asia for biological control of aphids on crops. It has swept across North America and Western Europe, becoming locally the most common ladybird species. Its voracious appetite means that it can impact heavily on native invertebrates. The bug likes to winter in houses where it is a nuisance to people – large overwintering aggregates are regularly reported in Belgium since 2002. In the USA, this lady bird has been reported to impair wine quality. Damage to grapes by birds or wasps accelerates infestation by *H. axyridis* on grapes. Subsequently, some may be processed with the grapes, resulting in unmarketable, tainted wine. The modification of both wine aroma and flavour characteristics, often described as rancid peanut butter or putrefied spinach, already occurs at densities of 1 beetle/L . Given the rapid spread of this exotic ladybird on the European continent, similar problems are to be expected. It is staggering that a species like this is still on sale in the US and in continental Europe as a biological control agent.

## Conclusion

Conservation practitioners in Europe are increasingly aware of the threat posed by invasive alien species, and of the possibilities to "fight back". However, decision makers are still only just waking up to the issue – the Council of Europe's adoption of a European Strategy in December 2004 was a recent milestone achievement and several countries (e.g. UK, Poland, Germany) have started to develop national strategies and/or legislation. However, at EU level, and at many national government levels, there is still a lack of awareness and understanding among decision makers, and hence a lack of action at national and regional level. Without institutional and legal support, and especially without sufficient resources and funding, practitioners are limited in what they can achieve. This is not a time for complacency – initiatives towards biodiversity conservation, including under the *2010* banner, must take this opportunity to fight back against the tide of biological invasion.

**For further information contact Dr Maj De Poorter, Coordinator Invasive Species Specialist Group (ISSG): m.depoorter@auckland.ac.nz or Piero Genovesi, regional coordinator for ISSG Europe: piero.genovesi@infs.it**

**Acknowledgement: The information in this article on invasive alien species in Europe has been sourced in many personal communications, publications, presentations or websites, from the following ISSG members in Europe: J. Mayol Serra, J. Orueta, J. Almeida, E. Marchante and H. Marchante, H. Freitas, S. Gollash, P.Genovesi, B. Gallil, T. Adriaens and E. Branquart, B.Hughes, W. Solarsz, B. Zilletti, L. Capdevila-Arguelles and M.Pascal.**

# Biological invasions of alien species in Russia

By Yury Yu. Dgebuadze, Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow

According to the Convention on Biological Diversity, the countries that signed it must "prevent introduction of alien species, which threaten ecosystems, habitats or species and control or eradicate such alien species". Biological invasions (transfer, establishment and dispersal) of alien species from various groups of organisms outside their primary natural home range is becoming a global phenomenon.

Invasions of invasive alien species (IAS) have always produced a strong impact on ecosystems of Russia. These impacts became particularly evident in the second half of the 20th century, when the process of expanding of natural ranges and penetration of living organisms into new communities happened during global climatic and anthropogenic changes. In many cases, alien species substantially transform the structure of ecosystems through contact with populations of aboriginal species.

The importance of the problem is illustrated by such examples as the potato beetle, weeds of genus *ambrosia*, golden nematode, phytopathogenic fungus *phomopsis* of the sunflower, zebra mussel, comb jelly and Amur sleeper (rotan). The area occupied by the potato beetle has reached 3 million hectares. The allergic weed *ambrosia* has already covered 6 million hectares. The invasion of comb jelly into the Black and Caspian Seas has brought a significant reduction in pelagic fish catches.

A number of dangerous aliens are approaching the Russian border at present. Among them are the maize beetle or *diabrotica*, which has already occupied 13 European countries for 10 years including the Ukraine, and dangerous North American species of insect-pests of greenhouse and decorative plants etc. as well as many alien plants and phytopathogenic fungi.

New ways of invasions of dangerous aliens are constantly arising. They are brought to Russia in threatening amounts with imported agricultural and flower products, decorative shrubs and trees, and ballast waters.

P. Lengyel

**There are factors specific to Russia that favour the spread of IAS:**

1. Its large territory and the absence of internal controls facilitate the transfer of organisms over the boundaries of their natural ranges.
2. The history of Russia (especially in the 20th century) is filled with continental and regional wars that have entailed intensive traffic of military and civilian freight and the translocation of large numbers of people (soldiers and refugees) between countries involved in the conflicts.
3. The policy of intentional introduction of organisms with the aim of raising the productivity of ecosystems and enlarging the assortment of goods produced by them was carried out in Russia (USSR) on a large scale.
4. A large number of civil engineering and infrastructure projects (roads, canals, bridges, tunnels) that serve as routes for organisms to spread.
5. A large number of general construction projects, creating many new habitats for organisms (agrocoenoses, reservoirs, megapolises, etc).
6. A high level of trade traffic including exchange of agricultural products, timber, oil, liquid fuel etc. that promotes the exchange of living organisms via ships' ballast waters in particular.
7. Relatively weak controls over the transfer of invaders across the borders of the country.
8. Poorly developed legislation on the introduction and transfer of organisms from other countries.
9. Lack of information on, and monitoring of, IAS (lack of databases, Internet sites, conferences, printed materials, films, CDs, etc).
10. Poor financial support of research on IAS.
11. Inadequate educational systems and services in the sphere of biological invasions.
12. A relatively large number of people with an interest in collecting and breeding exotic plants and animals.

Over the last six years, the situation regarding research into, and management of, IAS has improved. The Russian Academy of Sciences with the support of the Ministry of Education and Science of Russia is developing several projects on IAS, starting with the identification of the main invasion corridors, the preparation of a database on Russian invasive species and the establishment of a network of monitoring sites in some corridors.

**The immediate priorities are:**

1. The development of a national IAS information system
2. The development of a national monitoring system for IAS
3. Research on the environmental impacts of IAS and risk assessments of new invasions.

**The Severtsov Institute of Ecology and Evolution (which was established in 1934) is one of the leading biological institutes of Russia. The Institute is a scientific research centre on general biology, biodiversity, ethology, ecology and evolutionary morphology. The data obtained at the Institute are of wide use in various branches of the national economy (nature conservation, protection of plants from pests, fisheries and fish farming, game management, etc.). These data are the basis for the sustainable use of natural resources and conservation of natural ecosystems and wildlife. The Institute has more than 40 laboratories and thematic research groups and nine biological stations in different parts of Russia.**

# IUCN Calendar of Events September–December

The meetings listed below are events organized or sponsored by IUCN, or in which IUCN is participating.

## September

**4-8** **Ghent, Belgium**
International Symposium on Wetland Pollutant Dynamics and Control (WETPOL)
www.eea.eu.int/Events/Event_20040805130922

**5-9** **Montreal, Canada**
Ad Hoc Open-ended Working Group on the Review of Implementation of the Convention
Organized by the Convention on Biological Diversity
www.biodiv.org/

**5-12** **Katowice, Poland**
8th International Conference on the Ecology and Management of Alien Plant Invasions
E-mail: tokarska@us.edu.pl
www.emapi.us.edu.pl/index.php

**6-9** **Brisbane, Australia**
8th International River symposium
www.eea.eu.int/Events/Event_20050504091901

**12-18** **Zaragoza, Spain**
2005 World Conference on Ecological Restoration
E-mail: secretariat@ecologicalrestoration.net
www.ecologicalrestoration.net

**13-16** **Helsinki, Finland**
Ad Hoc Technical Expert Group on Biodiversity and Climate Change
Organized by the Convention on Biological Diversity
www.biodiv.org/

**14-16** **New York, United States of America**
Millennium + 5 Summit
Organized by the United Nations
www.un.org/ga/59/hl60_plenarymeeting.html

**19-23** **Adelaide, Australia**
15th IFOAM Organic World Congress
E-mail: ifoam2005@nasaa.com.au
www.nasaa.com.au/ifoam/

## Useful event calendar links:

Agenda of the EU institutions
http://europa.eu.int/news/cal-en.htm

European Centre for Nature Conservation (ECNC)
www.ecnc.nl/doc/ecnc/calendar.html

European Environment Agency (EEA)
www.eea.eu.int/Events/Calendar

International Institute of Sustainable Development (IISD)
www.sdgateway.net/events/default.asp?month=2

Sustainable Fisheries Foundation
www.sff.bc.ca/Events.html

United Nations Environment Programme (UNEP)
www.unep.org/Calendar/

United Nations Forum on Forests
www.un.org/esa/forests/calendar.html

World Bank
http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,menuPK:34482~pagePK:34380~piPK:34428,00.html

## September *Continued*

**22-23** **London, United Kingdom**
7th Annual Renewable Energy Finance Forum London 2005
www.eea.eu.int/Events/Event_20050610161051

**26-28** **Gland, Switzerland**
64th IUCN Council Meeting
www.iucn.org/

**30-6 Oct** **Anchorage, Alaska**
8th World Wilderness Congress
E-mail: info@8wwc.org
www.8wwc.org/

## October

**3-7** **Nairobi, Kenya**
Third World Congress on Conservation Agriculture
E-mail: mbwalya@africaonline.co.zw
www.act.org.zw/Congress/congress.htm

**23-27** **Geelong, Australia**
1st International Marine Protected Areas Congress
E-mail: sm@asnevents.net.au
www.impacongress.org/

**25-27** **Trondheim, Norway**
Nordic Bioenergy Conference: Bioenergy 2005
E-mail: post@nobio.no
www.bioenergy2005.no

**25-28** **Kusadasi, Turkey**
The 7th International Conference on the Mediterranean Coastal Environment – MEDCOAST 05
E-mail: medcoast@metu.edu.tr
www.medcoast.org.tr

## November

**8-15** **Kampala, Uganda**
RAMSAR COP-9
E-mail: peck@ramsar.org
www.ugandawetlands.org/Cop9/index.htm

**16-25** **Nairobi, Kenya**
8th Conference of the Parties to the Convention on Migratory Species
E-mail: secretariat@cms.int
www.cms.int

**22-25** **St Petersburg, Russian Federation**
Europe and North Asia Forest Law Enforcement and Governance Ministerial Meeting
E-mail: nkishor@worldbank.org
http://lnweb18.worldbank.org/ESSD/ardext.nsf/14ByDocName/ForestGovernanceProgramEuropeandNorthAsiaForestLawEnforcementandGovernance

**28-9 Dec** **Montreal, Canada**
1st Meeting of Parties to the Kyoto Protocol and 11th Conference of Parties to the UNFCCC
E-mail: secretariat@unfccc.int
http://unfccc.int/meetings/unfccc_calendar/items/2655.php

# IUCN's vision

A just world that values and conserves nature

# IUCN's mission

To influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

European Programme area

# ROfE's mission

To foster and fortify a European network of excellence in environmental research, policy and best practice, with the aim to:

1. Contribute to IUCN's global mission
2. Support the integration of biodiversity conservation into economic development
3. Support innovative initiatives for the multi-functional, sustainable use of natural resources

# ROfE's structure

Regional Office for Europe (ROfE) is a branch of the IUCN global network. We along with offices and commissions around the world link back to the President, Director General and Council of IUCN. For a history of IUCN and an explanation of the global structure please visit iucn.org

ROfE is comprised of four IUCN offices located in Brussels, Warsaw, Belgrade and Moscow. The head office, located in Brussels, is a meeting point where the IUCN Programme Office for Central Europe in Warsaw, the IUCN Programme Office for the Commonwealth of Independent States in Moscow and the IUCN Programme Office for South-Eastern Europe in Belgrade can disseminate information and strategies. Together as ROfE we strive to meet our goals for a sustainable Europe by utilizing local expertise and the strength of the global IUCN network.

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**Produced with the generous support of the Netherlands Ministry of Agriculture, Nature and Food Quality (LNV)**