

## Critical assessment of public policies to manage invasive species

**Water primrose, oxygen weed and Reynoutria are invasive species that have been monitored for years in the framework of biodiversity conservation and management policies. How effective have these policies been with respect to these invasive species?**



The affirmation that biological invasions are one of the main causes of biodiversity loss around the world has become, in just a few years, a true refrain that is found at the beginning of many documents addressing biodiversity or biological invasions (similar to this text). This affirmation would seem so evident that its origin is not always mentioned, yet is it truly so obvious?

Whether obvious or not, it is certainly a generalisation because it disregards the fact that the pressures exerted by invasive alien species (IAS) on ecosystems vary in different parts of the world and depending on the sensitivity of each environment and host community. And that the situation for islands is certainly much worse than that of the mainland.

It also neglects the fact that damage to biodiversity and the disturbances to human activities caused by these species can be rationally analysed only on the scale of the concerned ecosystem or anthroposystem. Any generalisations on wider geographic scales require caution and the intended message must maintain an often delicate balance between media dramatisation containing frequent errors and scientific rigour offering little in terms of audience.

Another rarely contested affirmation more directly concerns biological invasions and their management. It states that preventive measures are the best way to manage biological invasions. It would be perfectly true if it did not neglect two important factors in this particular field.

The first is the simple observation that biological invasions are already well underway with many species already in place (see photo ❶) and causing damages worldwide that we are learning to better evaluate, including in economic terms. It follows that the ideal prevention solution could apply only for future invasions.

The second is the difficulty to control and monitor all human activities that may directly or indirectly cause the introduction of species in order to avoid or at least significantly reduce the flows of transported species. We will see below that, to date, the regulations established for that purpose have not been particularly effective.

We will not discuss here what biodiversity is (or is supposed to be) or enter into the regular and somewhat pointless debates on the definition of IASs. However, because a definition is required, we will use that proposed by the European commission in its communication dated 12 December 2008 (Commission of the European Communities, 2008), titled *Towards an EU strategy on invasive species*. That definition reads, "The term 'invasive species' used throughout this document encompasses the terms 'invasive alien species' as used by the Convention on biological diversity and 'invasive non-native species'. Invasive species are broadly defined as species whose introduction and/or spread threaten biological diversity or have other unforeseen consequences."

However, the point here is not to minimise the impacts of biological invasions on biodiversity, the economy and human health, nor the great efforts in terms of study, drafting of regulations and action already undertaken to



① Japanese Knotweed (*Fallopia japonica*), a large, herbaceous perennial plant, native to eastern Asia has been classified as an invasive species in several countries.

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manage this planetary phenomenon. We will see below the importance of recent progress in developing strategies on the European and national scales, of the existing national regulatory corpus in this field and the efforts launched to attempt to manage certain invasions. The discussion will be based on an analysis of the current limitations of the regulatory corpus, notably its coordination on the various geographic and administrative levels, before looking at how to improve current strategies.

## IASs, a long-standing concern for world and European regulators

### On the international level

Since its creation, the IUCN (International union for the conservation of nature) has played an important role in raising awareness worldwide for the issues of biological invasions and biodiversity losses. A group of experts on invasive species, the ISSG (Invasive Species Specialist Group) created in 1994, has participated extensively in the subsequent work on the topic.

For decades, efforts have been made on the international level to improve IAS policies on the worldwide scale via international conventions including a large number ratified by France. The most important are the Ramsar convention on wetlands in 1971, the Washington convention on international trade in endangered species of wild fauna and flora in 1973, the Bonn convention on the conservation of migratory species of wild animals in 1979, the Berne convention on the conservation of European wildlife and natural habitats in 1979 and the Convention on biological diversity (CBD) in 1992.

The CBD, in its article 8 h, stipulates that "Each Contracting Party shall, as far as possible and as appropriate... Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species". IAS impact on biodiversity is clearly a central concern.

Other international conventions deal primarily with certain IAS groups, introduction channels or particular parts of the world. Examples are the International plant protection convention (IPPC) in 1952, the International convention pour le control and management of Ships' ballast water and sediments, established by the International maritime organisation (IMO) in 2004, and various regional conventions on environmental protection concerning French overseas territories (Caribbean, Pacific, Antarctic, Indian ocean) and containing regulations on IASs.

### On the European level, a strategy in the making

Over the past 30 years, a number of European directives dealing more or less directly with IASs have been voted.

Among them, the 1979/409/EEC Birds directive mentions regulating the introduction of alien bird species, the 1992/43/EEC Habitats directive addresses the need to regulate intentional introductions of species and the 2000/29/EC directive on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community. The latter stipulates the rules to be imposed by the Member States concerning the "introduction and spread of plants, plant products and other objects in their territory" and invasive alien plants are among the harmful organisms mentioned.

The 2000/60/EC Water framework directive (WFD) sets a framework for European water policy where the main objective is to achieve "good ecological status" of aquatic environments by 2015. IASs were obviously listed among the "pressures" weighing on the ecological functioning of environments and their inclusion in assessment techniques for the ecological status is currently under discussion.

To varying degrees, other texts also make references to IASs, e.g. the 2008/56/EC Marine strategy framework



► directive or the 708/2007 European regulation "concerning use of alien and locally absent species in aquaculture" in 2007.

In addition to these regulatory documents, two EU research programmes have produced large amounts of information on the current status of biological invasions in the EU. The goal of a programme called ALARM (Assessing large-scale environmental risks for biodiversity with tested methods) was to improve knowledge on terrestrial and aquatic biodiversity and on ecosystem functioning. More recently, the main goal of the DAISIE (Delivering alien invasive species inventories for Europe) programme was to inventory IASs in terrestrial, freshwater and marine ecosystems.

An initial version of a European strategy was proposed in the framework of the Bern convention (Genovesi, Shine, 2004). It included various points covering all IAS-management issues, from awareness raising and information to implementation of action programmes, without neglecting preventive measures and coordination, etc.

This proposal produced no direct effects. To our knowledge, during the subsequent discussions, the European commission encountered significantly diverging opinions on the part of the Member States, which blocked progress toward a regulation or a directive.

A public consultation via an internet site managed by the Commission (Public consultation on your voice), titled *Invasive Alien Species - A European Concern*, took place from March to May 2008 to assess the needs in this field.

Following the consultation, the Commission adopted a document on 3 December 2008, proposing a European strategy to manage invasive alien species (Commission of the European communities, 2008).

The text presented four possible options for setting up a regulatory strategy. The options have increasing levels of complexity and cost. The first is simply the status quo, which could serve as a baseline for the other options. It has made amply clear its ineffectiveness. The fourth would put forward a new legislative proposal covering all aspects of invasive alien species and could take the form of a directive.

According to recent news, the divergent positions of the EU Member States on IAS issues would not seem to have changed significantly in spite of the June 2009 report of the Council of Europe on the results at the half-way point in the action plan for biodiversity and the IAS strategy, in which the council "invited" the commission to "proceed urgently with the implementation of the EU Action Plan to 2010 and Beyond proposed by the Commission, as appropriate, and which *inter alia* called for an EU strategy on invasive alien species (IAS)".

### Caught between regulations and action, are IASs a French national priority?

The French National biodiversity strategy launched in 2004 lists the "threats weighing on biodiversity", including the "introduction of species" and requests preparation of an action plan for "introduced invasive species" where "the main goal is to halt the arrival of invasive alien species in the natural environment". Among the guidelines in the strategy were, in addition to awareness

raising of the public and education, harmonisation and adaptation of national regulations and the creation of an observatory for invasive alien species.

IASs and the need for management are also present in other documents such as those presenting the regional guidelines for management of fauna and habitat quality (ORGFH).

Various articles in the Environmental code (CE) and the Rural code (CR) directly concern IASs.

For example, article L. 411-3 CE forbids "the introduction in the natural environment, whether voluntary, through negligence or imprudence" of animal or plant species "non-native to the area of introduction and not domesticated". Its application decree dated 4 January 2007 foresaw the drafting of inter-ministerial orders listing species whose introduction in the natural environment and trade were to be forbidden. To date, only one decision was issued on 2 May 2007 concerning two species of water primrose (*Ludwigia grandiflora* – see photo 📷 – and *Ludwigia peploides*). Since then, no other orders have been issued, but another is said to be in the preparation stage.

Other articles (L 412-1 and L.413-2 to 3 [CE], L 201-1 and following, L 251-1 and following [CRI]) list the conditions for production, holding, sale, transport, export and import, and regulation of animals and plants, as well as the penalties for offenders and the goals set for the biological surveillance of the country.

What is more, regular management efforts have been undertaken for a number of years on IASs that are widely present in France and for approximately ten years work groups intended to coordinate those management efforts have been progressively set up on a "sub-national" level. The first were established in the *Pays de la Loire* region by the regional environmental agency and in the Loire-Bretagne river basin by the Water agency. The second group has spread and other regional groups now exist in the Centre, Auvergne, Bretagne and Poitou-Charentes regions. These groups bring together managers, representatives of various institutions and State services, and researchers. Their work deals notably with preparing distribution maps, compiling information on species identified as invasive and drafting field data sheets on species locations and the work carried out. A technical guide was drawn up in 2004 by the group in the *Pays de la Loire* region. The guide is regularly updated and made available on specific internet pages. Other groups are now being set up in various regions.

Finally, since 2008, a work group on biological invasions in aquatic environments has been set up by Onema and Cemagref to contribute to the coordination on the national level for aquatic environments heavily affected by IASs (Dutartre *et al.*, 2009).

In the beginning of 2009, the first components of a "national" strategy were set up by the French Ecology ministry. They concern exclusively the IASs impacting on "wild" biodiversity. A road map for 2009 and 2010 was transmitted by the Water and biodiversity department of the ministry to its regional services (DREAL) in the spring of 2009. It included the creation of a monitoring network and a network of experts, drafting of a status report on current work and existing networks, continuation of work





📍 The water primrose *Ludwigia grandiflora* : an example of biological invasion in a french pond (Landes).

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on new regulations, policing activities, reinforcement of counter-measures, public awareness raising and management of the networks.

At the same time, two national operators for the strategy were appointed, the National museum of natural history (MNHN) for fauna and the Federation of national botanical conservatories (FCBN) for flora, to implement all aspects of the strategy on the national level. Their work started during the last quarter of 2009.

Finally, in line with the Grenelle environmental law voted 3 August 2009, national programmes against IASs are planned to "prevent" the settlement and extension of these species and "reduce their negative impacts". Two programmes were launched in 2009 for the red-bellied squirrel (*Callosciurus erythraeus*) and Uruguayan pampas grass (*Cortaderia selloana*). Four more are planned for 2010.

The Food, agriculture and fisheries (FAF) ministry is also active in managing IAS issues. The plant-protection services are, among other tasks, in charge of monitoring health and phytosanitary issues throughout the country. They can call on the National plant-protection laboratory (LNPNV) which, as the national reference lab in this field, is in charge of evaluating phytosanitary risks caused by all organisms "harmful to plants", ranging from viruses to mammals attacking crops. A recently appointed national rapporteur for "invasive alien plants" ensures coordination in this field.

In addition, a professional agricultural group, the National federation against harmful organisms (FNLON) coordinates the work of 22 regional federations (FREDON) in continental France, 4 federations in the overseas terri-

tories and 78 departmental federations (FDGDON), and works closely with the plant-protection services through an agreement with the ministry.

In the beginning of 2010, the FAF ministry called a meeting to reinforce the disease-surveillance networks planned in the framework of the Ecophyto 2018 programme, particularly for non-agricultural zones. An operator was appointed to coordinate the work and draft a technical guide on observation and monitoring methods for harmful organisms, including invasive alien plants affecting plants.

### Results?

The various international and European conventions on biodiversity and the ecological quality of natural environments, and the existing national regulations on IAS management constitute an important framework for study and action. This framework also amply demonstrates the long-standing awareness of the strong links between biodiversity conservation and IASs which are considered, at least since the WFD, a "pressure" on the ecological functioning of environments.

Efforts to coordinate, inform, educate, lobbying by numerous NGOs (IUCN is not alone in this field) have resulted in a very up-to-date picture of biodiversity erosion. In parallel, the IAS issue has shifted in 20 years from that of a secondary topic for environmental management to a major problem worldwide, apparently much better known to the general public than the concept of biodiversity, though certain presentation excesses in terms of "exotic" and "invasive" species (the "aliens") require some study on the ethical aspects of the topic. It has also



▶ become a scientific "fashion", as shown by the continuous increase in publications on the topic in international journals.

There is thus undeniable progress in the overall approach to IASs and biodiversity, and current efforts on all levels, from worldwide to national, are significant and can result over the mid-term in notable improvements in IAS management and thus in reducing their impact.

However, two major types of difficulties in the same sectors must still be overcome. The first concerns all prevention efforts, the second all the concrete work to counter the IASs already present. An additional organisational limitation lies in the fact that the first must be addressed on the national scale, but the second necessarily concerns more local levels with diverse operators involved in tangible work and occasionally incurring very high costs. The existence of two organisational and response levels does not simplify matters, nor the strategies and decisions that must be implemented.

It is clear that prevention of IAS introductions requires significant changes in regulations on all the levels mentioned. One of the problems on the EU level is precisely the creation of regulations organising the general framework for future national regulations. We have noted that recent texts indicate the way forward, but the differences of opinion between the Member States risk delaying those regulations.

It is not by chance that just a few months after the European Commission published its text, the French Ecology ministry reacted by sending a road map to its regional services and by selecting two national operators in charge of making progress on all IAS-related issues. Those are the initial steps toward the indispensable strategy in this field.

Concerning regulations, it should be noted that the "water primrose" order dated 2 May 2007 has to date not been followed by any others forbidding the trade of alien plants. Yet the list that circulated at the end of 2006 and beginning of 2007 among experts in the field mentioned more than 20 species already identified as invasive (see photo ☉). A similar list is apparently now being validated in view of new orders. However, it is very regrettable that four years have passed without new ministerial orders because there is one aspect on which scientists, technicians and managers are all in agreement, that is early action against a biological invasion is probably the most important factor for the success of management efforts.

This absence of regulations is not a sign of a strong political will. We already know that the sale to the general public of numerous alien species (plants and animals) is a major source of their dissemination. Not regulating such sales is a form of institutional negligence that is due not only to an insufficient appreciation of the risks, damages and costs incurred by these species, it is also due to the lobbying of the commercial firms selling the species in an attempt to limit any restrictions.

And just as there are certainly grounds to question the perception of these "foreign" species in our societies in terms of the ethical aspects of their management, the issue of private profits resulting from activities likely to incur incomparably greater public costs for IAS control should also be raised.



☉ Myriophyllum  
aquaticum,  
an invasive plant.

Concerning strategy, we noted that the French Ecology ministry dealt exclusively with IASs impacting on biodiversity. But that is only part of the impacts caused by these species, which can also greatly affect the economy and public health. The current discussions between the French Ecology and the FAF ministries are just starting and no national coordination is yet explicitly planned in view of developing a true "national" strategy that would effectively cover all species and all their impacts. This type of coordination would, however, appear indispensable in order to set priorities for the necessary action.

Another major limit to management is directly related to the remaining gaps in the assessment of IAS impacts and of management efforts themselves. Significant work is required in terms of research.

Concerning work in progress or to be launched on IASs already present in France, it is clear that there are also gaps in the assessment of the goals and the effective value of the work carried out, if only to set priorities for work in a given area, e.g. set priorities among species (which should be controlled first) or among sites for the same species (where work should be carried out first).

Another considerable difficulty in this area concerns the large number of existing administrative entities in France that are directly involved in IAS management and the lack of coordination between these entities. If we take, for

example, an animal species such as nutria, there are many potential operators. In addition to the FAF ministry and its local services, other public agencies are concerned, e.g. ONCFS (National agency for hunting and wildlife) and Onema (National agency for water and aquatic environments), entities such as FNLON (National federation against harmful organisms) with its regional and departmental federations, FDAAPPMA (Departmental federations of certified associations for fishing and protection of aquatic environments), FDC (Departmental hunting federations), local governments, property owners, etc.

The work undertaken by the regional workgroups over the past few years has ensured better coordination of management for certain species and in certain parts of France. The road map established by the French Ecology ministry also mentions the need to set up such regional groups. However, coordination of these various levels must still be carried out.

Finally, and this will probably not be the easiest of the problems to solve, the funding required for regular management operations will certainly be considerable. Some managers are already confronted with funding difficulties for management work, particularly given that the money is not always considered well spent in light of, for example, funding needs for the ecological restoration of environments. The participation of the various potential funders, from the State on down to private land owners, must still be determined.

Finally, IAS management issues are intrinsically linked to biodiversity issues because they all bear directly on the management of our ecosystems, they all require significant efforts in fundamental and applied research, and they all bring policy makers, researchers and managers together in a continuous endeavour to study the phenomena and take action. ■

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