Special Feature for Ecological Risk Assessment of Introduced Bumblebees

Japan's Invasive Alien Species Act

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Abstract

The 2004 Japanese Invasive Alien Species Act was enacted to control invasive alien species (IASs) and to prevent damage caused by IASs to ecosystems. The Act defines alien species recognized as or suspected of causing damage to ecosystems, human safety, agriculture, forestry and fisheries. IASs are regulated: raising, planting, keeping or transporting them is prohibited without the express permission of the relevant minister. The Act represents a revolutionary advance for biological conservation in Japan. However, enforcing the Act is problematic; dealing with the European bumblebee required resolving a bitter dilemma between biological conservation and agricultural productivity. The difficulties in the control of alien species in Japan stem from the reliance of the country on imports.

Key words: Alien species; Invasive Alien Species Act; Bombus terrestris; regulations; control

INTRODUCTION

Japan is an island country with unique ecosystems. In particular, the Ryukyu Islands and the Ogasawara (Bonin) Islands, to the southwest and the south, support several endemic species, but their local ecosystems are so fragile that endemism could easily be affected by invasive alien species (IASs).

As a nation Japan depends on international trade, importing massive volumes of goods, including living organisms. Many unwanted species are unintentionally brought into the country, both with the imported goods and in the transporting containers.

The present Japanese quarantine system was set up within the framework of the International Plant Protection Convention and World Organization for Animal Health. It is designed to prevent adverse effects of IASs on agriculture, forestry and fisheries but does not apply to wild fauna and flora and ecosystems. In light of this situation and with the intent to implement the provisions of Article 8(h) of the Convention on Biological Diversity (1992) and the guiding principles for the implementation of Article 8(h) adopted as COP 6 decision VI/23 (Sixth Ordinary Meeting of the Conference of the Parties to the Convention on Biological Diversity, The Hague, Netherlands, 7–19 April 2002), the Japanese Government created a new Act in 2004 addressing IASs.

FRAMEWORK OF THE INVASIVE ALIEN SPECIES ACT

The Invasive Alien Species Act was approved in 2004 and came into force in July 2005. It aims to control IASs and to prevent damage caused by IASs to ecosystems. It defines alien species recognized as or suspected of causing damage to ecosystems, human safety, agriculture, forestry and fisheries as IASs. The full text of the Act and the basic policy are available at http://www.env.go.jp/en/nature/as.html

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Relevant ministers have the responsibility of assessing and deciding, based on advice from scientific experts, which species should be designated as IASs (Fig. 1). Species are assessed on whether they will:

- predate native species
- compete with native species for ecological niches
- disturb reproduction of native species by interspecies crosses
- destroy native ecosystem bases (for example, weeds).

Species considered alien are limited to those that have been introduced into Japan since the Meiji era (ca. 1868) when Japan's trade with the rest of the world markedly increased and there was a rapid increase in introduced alien species.

IASs are subject to various regulations: raising,

\[\text{OUTLINE of the INVASIVE ALIEN SPECIES ACT}\]

**Objectives**

The objectives of this act are to regulate various actions such as raising, planting, storing, carrying and importing invasive alien species (IAS) in addition to mitigating IAS that are already existing in Japan, and thus to contribute to preventing damages against biodiversity, human safety, or agriculture in Japan. IAS do not include living modified organisms in this Act.

**Official Announcement of the Basic Policy by the Japanese Cabinet**

- **Invasive Alien Species (IAS)**
  - Alien species designated in the Cabinet Ordinance of the Act that pose risks to cause damages to biodiversity, human safety, or agriculture in Japan
  - Ban of various actions with regard to IAS
    - Actions of raising, planting, storing, or carrying IAS in Japan are to be prohibited without permission from the competent ministers, except for the actions being categorized in specific occasions that will publicly be announced by the ordinance of this Act.
    - Various actions such as importing or transferring IAS are to be prohibited without the permission described above. Discarding IAS is prohibited under any condition.

- **Uncategorized Alien Species (UAS)**
  - Alien Species designated in the ministerial ordinance of this Act that have the possibility to be categorized as IAS through detailed investigation
  - Restriction on importation
    - UAS need the detailed investigation by the Japanese government in order to be allowed to be imported into Japan.
    - The period for deciding the categorization shall be within six months from requests by importers or exporters of UAS into Japan.

- **Other Alien Species**
  - No restriction
    - Investigation by the competent ministers
      - With risks
      - Without risks
        - New scientific knowledge

**Mitigation**

Competent ministers and other interest groups such as local governments shall take some measures for the mitigation of IAS.

**Other measures**

Obligation to indicate species' names as part of an importation procedure, provisions for penalties and interim measures, and so forth.

Fig. 1. Outline of Invasive Alien Species Act.
planting, keeping, or transporting them is prohibited without the express permission of the relevant ministers. Permission is a prerequisite for importing IASs and releasing them to the wild is not allowed at any time.

The Act additionally defines species related to IASs as uncategorized alien species (UASs); species belonging to the same genus or family as an IAS can be defined as UASs because of the possibility of similar ecological impacts. For example, the Taiwan macaque (*Macaca cyclopis*) is designated as an IAS, so most other species in the genus *Macaca* are designated as UASs. Before importing UASs into Japan, importers must notify the relevant ministers of their intention and provide information on the ecological properties of the UASs. The species are evaluated by experts within 6 months of the application. UASs evaluated as posing a risk are immediately designated as IASs, while those posing no risk are permitted. By this process, six reptile and six amphibian UASs were judged to be IASs in 2008.

Although the *IAS Act* imposes controls on the importation of designated species, it would be more effective to prohibit all alien species. In Australia and New Zealand, the importation of all alien species is prohibited except for species designated as safe. We call this quarantine system a “white-list system”. In contrast, we call the Japanese system a “black-list system”. Although Japan would benefit from adopting a white list, Japan’s economic situation would make this difficult as most of the natural resources on which Japan depends are imported from many countries. The introduction of a white-list system could impose obstacles on natural resource supply and the economy.

**IMPLEMENTATION OF THE ACT**

**Selection of IAS**

The first selection of IASs was started in 2004. A general expert meeting and six working groups were established to deal with each group of alien species (mammals and birds, reptiles and amphibians, fish, insects, other invertebrates, and plants) and discuss which species should be designated as IASs. In addition, two special working groups were set up to discuss the largemouth bass (*Micropterus salmoides*) and the European bumblebee (*Bombus terrestris*). Largemouth bass were illegally released into lakes and ponds throughout Japan for game fishing and cause damage to fisheries and native fish species; European bumblebee have been widely used in greenhouses as pollinators. The sports fishing industry and the farming industry were greatly concerned about the designation of those species as IASs because designation meant prohibition of their use. It was necessary to discuss the issue among stakeholders in special working groups to reach a conclusion.

Each working group convened and made draft recommendations, and the general expert meeting decided on the final recommendation to the ministers. After public consultation, the ministers finalized the decision. More than 110,000 comments were received from the general public; most were against the designation of the largemouth bass as an IAS. Newspapers and other media reported the conflict widely, resulting in a rapid increase in public awareness of the *IAS Act*.

In the process of designation, proposed species were selected by identifying species whose adverse effects had already been reported by international scientific publications. As a result, about 100 species were selected as IASs, a list of which is available at [http://www.env.go.jp/nature/intro/1outline/files/siteisyu_list_e.pdf](http://www.env.go.jp/nature/intro/1outline/files/siteisyu_list_e.pdf)

**Designation of the European bumblebee**

The basic policy of the *IAS Act* was formed by a Cabinet decision in 2005. Section 2.3 of the policy states that alien species causing damage or posing risks shall be considered along with the social and economic consequences of their designation. The process for the designation of the European bumblebee provides an example.

The European bumblebee has been used widely as a pollinator in greenhouses since its commercial introduction in 1992. In 2003, about 70,000 hives were found throughout Japan (see Goka, 2010, this issue), and 43% of greenhouse tomato producers used it as a pollinator (Ministry of the Environment, unpublished data). However, reports of bees escaping from greenhouses increased, and competition with native bumblebees and cross-breeding with closely related species became concerns.

To deal with this economically important species, a special working group, including scientists engaged in bumblebee research, distributors, and farmers’ association members, was established...
and extensive discussions were held. After the first round of discussions, it was concluded that there was a lack of clear information on impacts to ecosystems and on appropriate control measures to reduce the risks. During a 1-year suspension of discussions, some researchers collected data relating to the impacts on native species, while others studied how to prevent bumblebees from escaping (see Goka, 2010, this issue). With this new data, the special working group resumed discussions and concluded that there was clear evidence of impacts on native bumblebees but that appropriate controls could reduce the risks. The European bumblebee was designated as an IAS, and farmers continuing to use it are now obliged to follow severe restrictions.

This process proved the importance of mutual understanding of the benefits of the IAS, the potential risks, and the practical ways to manage risks. Fortunately in this case, useful scientific data could be collected relatively quickly. In the assessment of species that are beneficial to industry, it is essential to collect intelligible scientific data and to conduct rational discussions with stakeholders.

However, the IAS Act was implemented under the concept of a strict ban on IASs and does not aim to permit the restricted but widespread use of IASs. In the case of the European bumblebee, Ministry of the Environment accepted and examined applications from 12,000 farmers using the species (Fig. 2), but the administrative costs of checking this volume of applications and of monitoring applicants after giving permission pose a heavy burden. It is almost impossible to monitor all uses of the European bumblebee with the limited staff resources of regional offices, so we need to find an alternative method to pollinate crops. The Ministry of Agriculture, Forestry and Fisheries has begun recommending a native bumblebee species, Bombus ignitus, as an alternative pollinator. However, even a native species shows endemism in its population structure, so farmers are advised to set nets over glasshouses when they use the native bumblebee (see Tokoro et al., 2010, this issue).

The IAS Act is an effective tool for controlling the risks of IASs that have not yet been introduced or established in Japan but it is restricted in its reduction of damage caused by species that are already widely established.

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**Fig. 2.** Applications to use bumblebees in central Hokkaido.
CONCLUSION

In line with the guiding principles of the Convention on Biological Diversity, Japan established a system in 2005 to regulate the import and use of IASs. This legislation covers not only IASs that have not yet been introduced into Japan but also those that have been introduced and have become widespread. Therefore, when deciding which widely used species should be regulated under the Act, discussions on the risks posed by the species and methods to control such risks need to be held with stakeholders. The European bumblebee is an exceptional case under the Act in that it was already widely used and its continued use was allowed under measures to control risks to ecosystems in consideration of the socioeconomic impacts of its prohibition. The issue will be reviewed later to ascertain the effectiveness of the regulation system in controlling the risks.

The number of live animals imported into Japan fell between 2003 and 2007 (Table 1). One reason for this fall is the intensification of animal quarantine restrictions, especially against avian influenza. Another reason seems to be the enforcement of the IAS Act. Raising public awareness of the risks of importation has brought about this change.

A number of challenges are involved in preventing the adverse effects of IASs. Preparing effective measures against the unintentional introduction of such species is one essential challenge. In addition, the IAS Act does not cover the risks of infectious diseases to wild animals. To address these problems, it will be necessary to strengthen existing legislation, but monitoring the many types of living organisms and imported goods entering the country will be difficult with limited staff resources. To mitigate the risks posed by IASs, it is essential for the public to realize the precarious situation of Japan’s strong economic dependence on international trade (Goka et al., 2004).

REFERENCES

Cop6 decision VI/23 (2002) http://www.cbd.int/decision/cop/?id=7197

Table 1. Change in live animal imports (head/year) to Japan

<table>
<thead>
<tr>
<th>Category</th>
<th>2003</th>
<th>2007</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammals</td>
<td>636,337</td>
<td>335,417</td>
<td>−47.3%</td>
</tr>
<tr>
<td>Birds</td>
<td>121,114</td>
<td>35,346</td>
<td>−70.8%</td>
</tr>
<tr>
<td>Reptiles</td>
<td>713,415</td>
<td>442,550</td>
<td>−38.0%</td>
</tr>
<tr>
<td>Amphibians</td>
<td>28,912</td>
<td>4,571</td>
<td>−84.2%</td>
</tr>
<tr>
<td>Ornamental fish</td>
<td>71,073,056</td>
<td>62,928,391</td>
<td>−11.5%</td>
</tr>
</tbody>
</table>

Ministry of Finance, Trade Statistics of Japan.