Threats of Invasive Species for China Caused by Expanding International Trade

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Biological invasion, which has caused grave disasters in history, particularly by infectious pathogenic microorganisms, is intimately associated with international trade. As economic globalization becomes enhanced, the risks of biological invasion have become increasingly acute, threatening ecological security, public health, and sustainable agriculture. According to studies in Europe and North America, 10–15% of the human population is sensitive to the pollen of ragweed, which can cause rhinitis, oculorhinitis, asthma, and dermatitis.^{1,2} In Europe, over 10 000 non-native species are included in the Delivering Alien Invasive Species Inventories for Europe (DAISIE) database, 1094 of which have been reported to have ecological impacts.³ To prevent and mitigate this situation, the international community has been taking actions to tackle the problem since the 1950s, such as the endorsement of Convention on Biological Diversity and International Plant Protection Convention, and the issue of customized handbooks by International Union for Conservation of Nature and Natural Resources (IUCN). Relevant agreements and countermeasures have been initiated by Office International Des Epizooties, Committee of Agreement on the Application of Sanitary and Phytosanitary Measures and International Maritime Organization. All of the World Trade Organization's (WTO) 143 contracting parties and Food and Agriculture Organization's (FAO) 187 member countries have strengthened agriculture quarantine inspection monitoring.

China is also confronted with severe environmental challenges due to the prevalence and sprawling of invasive species, such as notorious water hyacinth, tent caterpillars, and red-bellied piranha. Census of alien species has been conducted by experts from all fields in China since 2008.⁴ The results show that about 488 alien species are assured, among which alien plants (265 species) account for the largest portion (54.30%), followed by animals, fungi, viruses, and prokaryotes. How to control or even eradicate the existing invasive species and prevent new ones in the future has become an urgent program for the Chinese government.

As a major agricultural country, China has been confronted with high risks and numerous challenges, especially after its entry into the WTO. With its long-standing net imports of agricultural commodities, China has faced and will continue to face huge impacts from the consequences of biological invasion on the local ecosystem and public health. From 2003 to 2011, alone in grain trades, a total of 1060 species/genus and 72 160 batches, which were originated from 54 importing countries, were intercepted at all the ports of Entry–Exit Inspection and Quarantine Bureau in China. Among these batches, non-native plants accounted for the largest portion of the total (66.64%), irrespective of weeds or woody species, with 635 species/genus and 48 090 batches, respectively, which were followed by insects, fungi, nematodes, and others (Figure 1).⁵ Non-native plants would be a major source of biological risks. According to the category of goods, wheat had the largest number of intercepted batches, for which four countries (Australia, United States, Canada, France) stood out from the 11 allowable importing countries (Australia, Canada, France, Denmark, Argentina, Kazakhstan, Hungary, United Kingdom, United States, Salvia, Mongolia) with large number of records, while two countries (Hungary, Salvia) had none. The second largest number of batches was from soybean and maize, with the main countries being the United States, Canada, and Thailand, all of which are major grain exporting countries in the world.

To alleviate the problem in the future, trade policies should be reinforced among all countries, for example, raising the standards to exclude weed seeds and other invasive species in the goods or through personnel exchanges. Additionally, the international community should strictly require that importers transport goods through regular routes and undertake supervising responsibilities. In view of quarantine inspection, it is also necessary to explore environmentally safe measures and systems to quickly and accurately detect and inactivate alien species. Based on the investigation of their physical life habits and comfortable zones, it is imperative to eradicate the weeds

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Figure 1. Intercepted batches of alien species from importing grain in China, 2003–2011.

and other pests at their “lag time” to the greatest extent to effectively control the invasive species. It is also recommended to apply safe and appropriate herbicides and pesticides, introduce natural enemies, and adopt other eco-friendly preventing measures. Without any doubt, all measures should be taken in a manner that would cause the least damage to the environment, diversity of species, and human health.

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Notes

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