EDITORIAL



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How can 'exotic pets' be dealt with in the context of one world, one health?



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Currently, there is a lack of clarity in defining 'Exotic pets', inadequate monitoring and testing facilities, limited ability for consumers to discriminate exotic pets from other animals, and suboptimal conditions in disease diagnosis and treatment for exotic pets. To effectively address the current situation, it is imperative for the government, society, and veterinary community to take comprehensive actions. Here, we call for more attention to the risks and hazards of 'Exotic pets'.

'Exotic pets' refer to exotic species other than ordinary traditional dogs and cats that are kept and viewed as pets. Most of them originate from the wild or from the offspring of artificially bred specimens and are often sourced from various countries and regions, which include a wide range of species, such as fish, amphibians, reptiles, birds, and mammals. With the advancement of global trade and the rapid growth of domestic ecommerce, pet trade has been recognized as one of the primary pathways for introduction of invasive species (Scheffers et al. 2019). The World Society for the Protection of Animals released an inaugural report on the global trade of wildlife in 2019. The annual turnover of this trade ranges from 30 to 42 billion US dollars, with an estimated illegal market

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² State Key Laboratory of Agricultural Microbiology, College of Veterinary Medicine, Huazhong Agricultural University, Wuhan 430070, Hubei, China ³ College of Veterinary Medicine, Shandong Agricultural University, Taian 271018, Shandong, China value reaching as high as 20 billion US dollars. Notably, a significant portion of these profits are derived from the trafficking of endangered and protected species for 'exotic pet' purposes. The global trade in 'exotic pets' has experienced significant growth since the beginning of the 21st century, with over 500 species of birds and reptiles now being traded worldwide. It has been reported that over 500 primates are traded within a single year (Seaboch and Sydney 2021).

According to the 2020 Bulletin on the Status of China's Ecology and Environment released by the Ministry of Ecology and Environment, a total of more than 660 invasive alien species have been identified in China. Among them, 71 species have been included in China's list of invasive alien species that potentially pose threats to natural ecosystems. The national nature reserve has been invaded by 219 instances of alien invasive species, including 48 species listed on China's List of Invasive Species (Bulletin on the State of China's Ecological Environment 2020). The lack of natural predators as well as the inherent traits of high reproductive capacity and adaptability make alien species prone to invasion when abandoned, escaped, or inadvertently released, posing a significant threat to the country's ecosystem and biodiversity.

The Ministry of Agriculture and Rural Affairs issued a document titled "The Implementation Opinions of the Ministry of Agriculture and Rural Affairs on the Key Work Deployment for Comprehensive Promotion of Rural Revitalization in 2023". The document stated that "We will enhance efforts to combat the illegal introduction of exotic species, implement measures for the prevention and control of invasive species, and strengthen regulations pertaining to the trade and release of exotic pets." The inclusion of exotic species in China's national



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document for the first time signifies the importance that China places on these nonindigenous animals, highlighting our commitment to address global pet ownership as a shared responsibility within the international community.

An increasing number of 'exotic pets' are being bred; however, disease surveillance and treatment facilities remain suboptimal, resulting in a lack of detection of pathogenic microorganisms, some of which can be highly life-threatening, such as the rabies virus. A classic example is the occurrence of monkeypox following the import and export of marmots in the United States (Centers for Disease Control and Prevention 2003). In addition, the public may lack the ability to discern whether certain wild animals are valuable or endangered species, determine the legitimacy of their sources (such as whether they are exotic species), and understand their natural behavior patterns and long-term care requirements (including disease management capabilities).

The current lack of clarity in defining 'exotic pets', inadequate monitoring and testing facilities, consumers' limited ability to discriminate exotic pets from other animal species and suboptimal conditions for disease diagnosis and treatment. To address the current situation effectively, it is imperative for the government, society, and veterinary community to take comprehensive actions from multiple perspectives. Thus, the authors propose the following suggestions on the basis of the oneworld one-health concept: 1. To adopt a unified global and national "positive list" system, countries should specify which species can be legally bred, traded, and kept as pets. 2. To strengthen the supervision of online transactions, strict seller verification, transaction reporting, and automated detection of illegal species. 3. To develop AI-driven methods for pathogen surveillance and early warning and tracking emerging disease threats from exotic pets. 4. To require mandatory education for exotic pet owners, such as training courses on animal welfare, disease prevention, and responsible ownership. It is also advisable to expand veterinary curricula to include specialized training in exotic pet medicine.

'Exotic pet' breeding has become an undeniable reality; thus, we must take urgent action on the issue of exotic pet animals.

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Declarations

Competing interests

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