Ecology vs. Beauty. How does progressing urbanization affect plant invasion?

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Introduction

Due to a high and still developing level of globalization and global trading mechanisms, plants are easily brought into new regions where they are able to settle, grow and rival with indigenous flora. These plants are often invasive and establish in a distribution area outside of their natural habitat. An example is the China native *Buddleja davidii*, which has been brought to Europe for ornamental purposes and spread from urban areas to quarries and floodplains.

The invasive Butterfly Bush poses a threat to naturally occurring plants and the sustainable and ecological future of affected areas. The theory on the phases of invasion (Fig. 1) grants insight into the development of the establishment of the plant and suggests management measures that provide possibilities to deal with the invasion and its consequences. The aim is to understand the phases of invasion, regard various management approaches and discuss the role of urban spaces as part of the discourse.

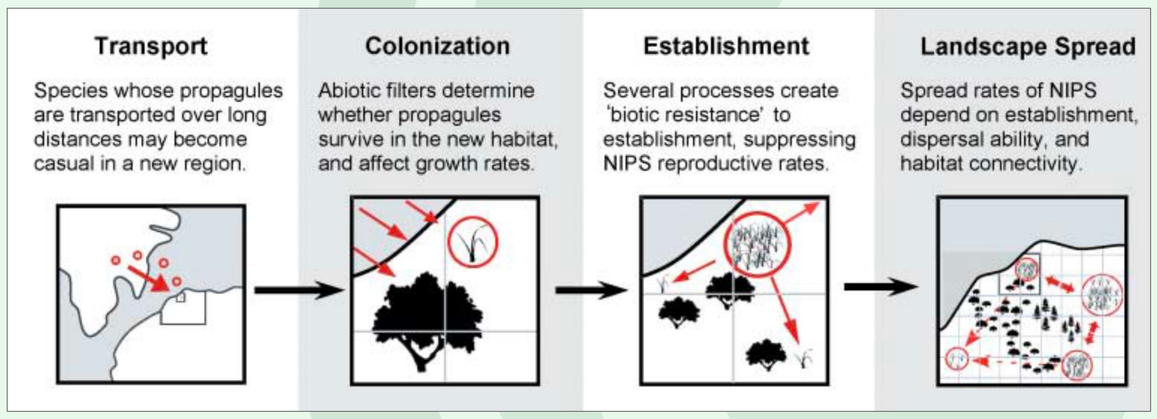

Fig 1: Phases of invasion; NIPS are non-indigenous plant species (Theoharides & Dukes, 2007).

Results

Due to the plant's reproductive character and an increase in private gardening, the Butterfly Bush became established outside of gardens and parks. The plant found its way out of said areas to settle in natural habitats where it can be found to this day. Because of biological features of the Butterfly Bush, the plant needs to be fully removed from protected habitat to achieve a decrease in population density. Management measures imply strict and regular monitoring, especially for smaller populations. However, the plant is widely regarded as being very attractive for aesthetic and environmental reasons. Conflicts emerge between ecological and decorative perspectives.

Discussion

Buddleja davidii is a fitting example of human influence on plant expansion. Especially management in urban areas reveals complexities due to conflicting interests. While the plant threatens the ecosystem stability and indigenous biodiversity, other benefits like aesthetic value or sustenance for pollinators have to be taken into account. The true challenge of the urban management of invasive species like the Butterfly Bush lies in preserving the positive services of the plant while mitigating and controlling possible long-term damages to domestic species. Management efforts in urban areas require uniquely tailored strategies, public awareness and precise communication to allow effective invasive species control and to avoid high management expenses (Fig. 2). The role of cities not just as challenges but also as opportunities for biodiversity and conservation through urban planning and community engagement needs to be emphasized in that discussion.

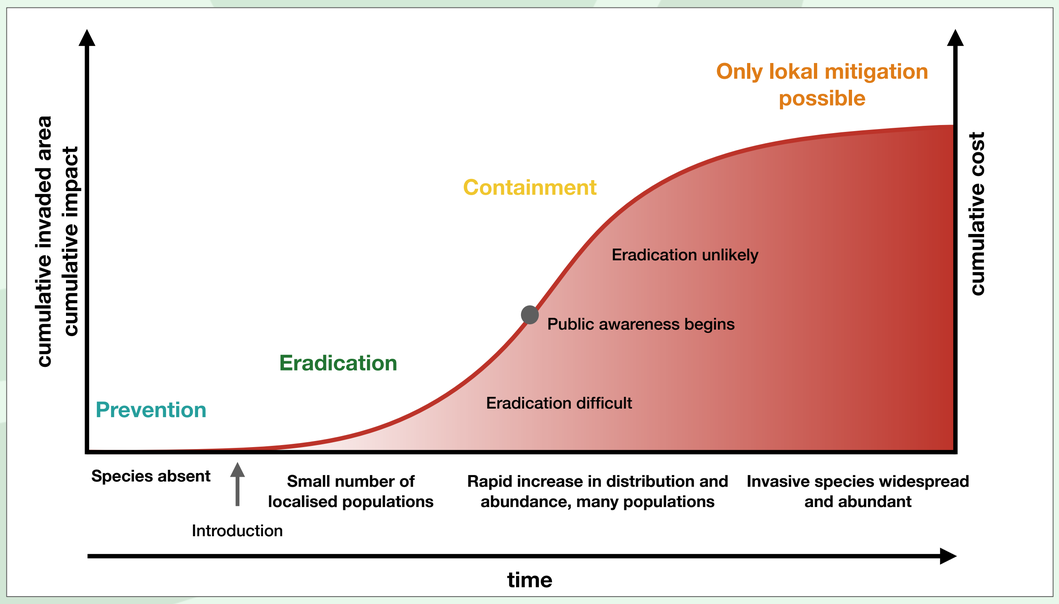

Fig 2: Management expanses of invasive species over time as well as strategies for certain phases of invasion (adapted by The State of Victoria, Department of Primary Industries 2010 (Ahmed et al. 2022)

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Literature

Theoharides KA, Dukes JS (2007) Plant invasion across space and time: factors affecting nonindigenous species success during four stages of invasion. New Phytol. 176, 256-273

Lindemann-Matthies P (2016) Beasts or beauties? Laypersons' perception of invasive alien plant species in Switzerland and attitudes towards their management. NeoBita 29, 15-33

Gräser P, Ries C (2020) Occurrence of invasive neophytes in managed biotopes in the former open-cast mining areas of Louxemberg. Bulletin de la Société des naturalists luxembourgeois 122, 153-16

Ahmed DA, Hudgins EJ, Cuthbert RN, et al (2022) Managing biological invasions: the cost of inaction. Biol Invasions 24:1927–1946