

Assessing invasive potentials of plant species cultivated in botanic gardens in Central Europe

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Abstract

Botanic gardens can be potential hotbeds for future plant invasions, but they are also well suited as observation areas for potential invasiveness of cultivated, non-native species. This paper presents a diploma work actually carried out at the University of Vienna as part of the activities of the Austrian Botanic Gardens Working Group to mitigate negative influences of invasive plant species originating from botanic gardens. The work aims to assess invasive potentials of plant species in botanical garden collections and look at the establishment of an early warning system and an identification tool for such species.

Key words

Assessment of invasiveness, botanical Gardens, Central Europe, early warning system, identification tools, invasive alien plant species

Background of the project

Invasive alien species are known to cause great economic, health and ecological problems all around the globe.

Numerous invasive plant species (like *Impatiens parviflora* or *Heracleum mantegazzianum*) have started from botanical collections. Thus botanic gardens have a high responsibility to monitor their holdings carefully for potential invasives.

The Austrian Botanic Gardens Working Group has already been working for several years on best practice strategies to mitigate potential negative influences of invasive neophytes in botanic gardens. As part of these activities, voluntary guidelines for botanic gardens related to potentially invasive neophytes were adopted and published in collaboration with the Association of Botanic Gardens of the German speaking countries (Kiehn & al., 2007).

Data collection and first results

Last year, the Austrian Botanic Gardens Working Group started to collect data on potentially invasive plant species cultivated in its member gardens with the aim to provide this information on standardized information sheets to other botanic gardens, (ornamental) plant traders, market-gardens, amateur gardeners and all interested parties. As part of these activities, data collection about observed invasiveness of plant species in cultivated botanic gardens is performed by a questionnaire in the context of a diploma thesis (M. Lechner).

These investigations are focused on non-native species that have shown obvious colonization and expansion patterns during the past decade. That way, the collected data allows the detection of species at the threshold of invasiveness – the narrow time window between an (eventually) long-term steady-state situation and an exponential population growth.

The questionnaire was distributed via e-mail to botanic gardens in Austria, Germany and Switzerland. It contained questions about species with tendencies to spread uncontrolled in a botanic garden, their occurrence, their spreading pattern, and, if applicable, their management. This way, a network of relevant information was set up.

For 75 non-native species, the questionnaire and additional contact work revealed a potential to become invasive in at least one botanic garden in Austria or Germany.

Amongst those, the investigation revealed several species of concern. Some of them are intensively spreading, but are already worked on or documented by other research groups. Others lack essential features for “long distance” invasiveness, but are aggressively expanding on a local scale and therefore should not be planted in botanic gardens in their own interest. Examples for such taxa are *Aster novi-belgii*, *Duchesnea indica*, *Eschscholtzia californica*, *Geranium sibiricum*, *Lysimachia vulgaris*, *Solidago flexicaulis*, *Solidago graminea* and *Stachys affinis*.

Actual and further steps

Several other species have been selected to be published in the form of information sheets. A publication introducing the aim of these sheets (Eberwein & al., 2010), as well as a first information sheet (on *Pinellia ternata*, Araceae; Eberwein & Berg 2010) have meanwhile been published. Additional six taxa hitherto not considered to be invasive in Austria or Germany were selected for the next series of information sheets: *Campsis radicans*, *Echinops exaltatus*, *Impatiens flemingii*, *Inula magnifica*, *Oxalis corniculata* (and other *Oxalis* ssp.) and *Verbena bonariensis*. Data collection on cultivated taxa is also continued (e.g., for *Toxicodendron radicans*, a species with invasive potential causing health problems – please report observations for this species to michael.kiehn@univie.ac.at).

References

- Eberwein R.K., Berg C., 2010: Pflanzen mit invasivem Potential in Botanischen Gärten I: *Pinellia ternata* (Araceae). – Carinthia II 200/120: 81-86.
- Eberwein R.K., Berg C., Lechner M., Kiehn M., 2010: Pflanzen mit invasivem Potential in Botanischen Gärten. Initiativen der ARGE Österreichischer Botanischer Gärten. – Carinthia II 200/120: 77-80.
- Kiehn M., Lauerer M., Lobin W., Schepker H., Klingenstein F., 2007: Grundsätze im Umgang mit invasiven und potentiell invasiven Pflanzenarten in Botanischen Gärten. – Gärtn. Bot. Brief 169: 39–41. (also available online at <http://www.biologis.de/vbg/pdf/neophyten2008.pdf>).

Web-Page: <http://www.botanik.univie.ac.at/hbv/index.php?nav=83b>