

We have introduced some of them.... Do we take the responsibility to eradicate them?

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Abstract

Invasive species have been spread from private gardens, parks and in many other ways, among them from botanic gardens. Several of these involuntary introductions of alien species into the nature have now become a severe threat to biodiversity. One of the new duties for botanic gardens is to inform our visitors about alien species, cooperate with the authorities in how to deal with the problematic invasive plant species, and take an active role in eradication programmes. The botanic gardens have been guilty in introductions of problematic alien plant species into nature and must feel their responsibility. Some examples of how the Botanic Garden in Oslo, Norway, has started to deal with the problem are given.

Keywords

Invasive alien species, demonstration area, eradication, responsibility

In Norway the Norwegian Biodiversity Information Centre is responsible for our Red List Database and Alien Species Database. They collect and coordinate facts from all researchers and produce the Norwegian Red List and the Norwegian Black List. The first Norwegian Red List came out in 1999, the second in 2006 and now in 2010 a third revised version will be published. The first Norwegian Black List came out in 2007 and we will get the next revised version in 2011.

But lists and databases don't reach out to the public. It is here we – the botanic gardens – have an excellent opportunity. We are reaching the public, we provide guided tours and educational programmes and we have the knowledge of rare threatened indigenous plants, as well as introduced problematic species. And - as we must admit that we are responsible of several introductions of plant species that have escaped into the nature - we must take this opportunity of spreading knowledge about the topic “problematic alien species are a considerable threat to indigenous species” seriously as well as compensating our own faults.

The little *Noccaea caerulescens* is a central European crucifer. It came to Norway with seed mixtures sent to the Botanic Garden in Oslo in the early 19th century. It was first found growing wild outside the Botanic Garden in 1874 and spread slowly until 1900. Since then it has become naturalised in most of our long and narrow country. This is a tiny harmless plant that wilts down after flowering, and it does not compete with the indigenous flora. Not many escapes from botanic gardens are so exactly documented as this, and we must admit that we don't know how many species have escaped from our gardens. Ongoing studies divide introduced plant species into different categories, from very harmful and strongly competitive, to harmless and - so far - nothing to bother about.

The Botanic Garden has excellent opportunities to be community-oriented through:

1. Information to our visitors about both threatened, indigenous plants as well as problematic, alien species.
2. Include threatened wild plant species and alien species into our educational programmes.
3. Cooperation with the authorities (locally, regionally and nationally), in species identifications, education, training of staff and eradication plans.
4. Active participation in combating alien species.
5. Conducting experiment with eradication of alien species not problematic in other parts of the world.

This is how the Botanic Garden, Natural History Museum, in Oslo has started to take this topic seriously, listed by the five above mentioned pathways:

1. Regarding the information aspects, the Botanic Garden in Oslo has built a demonstration area of alien as well as threatened Norwegian plant species. Alien species have black labels; threatened species have red labels, according to our Norwegian Black and Red List. The area was officially opened by our Minister of Environment at the Biodiversity Day in 2010. The alien plants grow in circular cement holders so they don't spread vegetatively. All seeds are collected after flowering in order to prevent seed dispersal.

In cooperation with the Garden Society, the County Governor's Office and the Norwegian Food Safety Authority we have made a brochure with information about plants that escape from gardens and become a threat to the indigenous vegetation. It is widely distributed from our Botanic Garden, Garden Shops, museums and art galleries, as inserted in magazines etc.

2. Discussions during guided tours in the Botanic Garden at the demonstration area of alien and threatened species give awareness. We have had some courses for teachers and workers at the Municipality of Oslo in natural sites outside the Botanic Garden, where both invasive alien species and threatened indigenous vegetation have been highlighted.

3. In nature, in and near Oslo, the following plant species are regarded as a threat to biodiversity: *Solidago canadensis*, *Rosa rugosa*, *Heracleum mantegazzianum*, *Fallopia japonica*, *Impatiens glandulifera*, *Lupinus polyphyllus*, *Vincetoxicum rossicum*, *Vinca minor*, *Lysimachia punctata*, *Bunias orientalis*, *Acer pseudoplatanus*, *Syringa vulgaris*, *Cotoneaster lucidus* and several other *Cotoneaster* species, *Phedimus spurius*, *P. hybridus*, *Cerastium tomentosum*, *Laburnum alpinum* and *L. anagyroides*. The Municipality of Oslo and the County Governor now employ 4 people during the summer months to eradicate the majority of these species, especially in nature reserves and along the sea shores. The Natural History Museum provides courses each spring and supervises the job. During 2009-2010 we were in the working group, together with marine biologists, limnologists and the authorities, to make a Regional Action Plan for how to deal with alien species in our region of the country.

4. Six years ago we started the eradication of *V. rossicum* and marked on maps where it is growing. Each summer we have been involved in the combat against this plant. The Natural History Museum has made a TV film about one of the species rich islands just outside Oslo and there we demonstrate, among other topics, how *V. rossicum* is manually removed

5. Experiments with eradication: The two problematic alien species the Natural History museum have been working with are *V. rossicum* and *Phedimus spurius*, two introduced plant species growing on open habitats on calcareous soils near Oslo, where the biodiversity is very high and there are many rare and endangered species. These two alien species are not observed or considered as a severe problem in other parts of Europe and no manual for eradication was available for the authorities. The methods studied are: manual picking, burning, herbicides and covering with black plastic so no light reaches the earth surface.

Some botanic gardens have started demonstration areas and provide information about problematic alien species. I hope that the above mentioned list of our start projects can function as an inspiration for the botanic gardens around the world that still have not begun the combat against alien species. Each region has there own problematic species. Each botanic garden has thus different problematic species to inform about.

The big question is now how to handle our collections and how to prevent spreading from botanic as well as private gardens. In the gardens we have hundreds of species potentially capable of escape. The basic function for botanic gardens has been to highlight biodiversity

and display as many species as possible from all parts of the world. In the Botanic Garden in Oslo we have started by having problematic plants that we want to show the public in this new special area for demonstration. At other places in the garden they are removed. But we have many species of *Cotoneaster* and *Sorbus*, whose fruits are spread by birds. How shall we deal with this fact, remove them all or close our eyes?

Our new function will be, in addition to highlighting worldwide biodiversity, to preserve the indigenous diversity, give information about alien species that are or have the possibility of becoming a threat, cooperate with the municipality in eradication work and participate in restoration projects.