

RARE AND ENDANGERED SPECIES OF LATVIA IN THE BOTANICAL GARDEN OF THE UNIVERSITY OF LATVIA

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The mission of botanical gardens is securing plant diversity for the well-being of people and the planet. According to the 2020 Targets of the Global Strategy for Plant Conservation at least 75 % of threatened plant species must be in *ex situ* collections, preferably in the country of origin. To contribute to the implementation of it the Botanical Garden of the University of Latvia is collecting and maintaining living plant accessions of rare and endangered species of Latvia. There are 86 species in the collections: 82 listed in Red Data Book of Latvia and 54 species listed in Cabinet Regulations No. 396 (14.11.2000). The Red Data Book is represented by 1 taxa from the Category 0, 21 taxa – from the Category 1, 21 taxa from – the Category 2, 30 taxa - from the Category 3 and 9 taxa from the Category 4. Mainly there are herbaceous plants, however woody plants and ferns are also. Only 54 are species of Latvia origin. Therefore the the challenge for the future is to collect species of Latvia origin, and to increase the representation of rare species in the collections.

Key words: Conservation *ex situ*, Botanical garden, rare and endangered plants.

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INTRODUCTION

The mission of botanical gardens is securing plant diversity for the well-being of people and the planet, and this role is likely to become increasingly important as climate change becomes more severe and humans living far beyond the carrying capacity of Earth (Wyse Jackson & Sutherland 2000, Chen & Sun 2018, Sharrock & Jones 2009). Anyway, the threat to species has never been as great as it is today. The International Agenda for Botanic Gardens in Conservation provides a global framework for

the development of botanic garden policies and programs for the implementation of international treaties and national laws, policies and strategies relevant to biodiversity conservation (Wyse Jackson & Sutherland, 2000). According to the 2020 Targets of the Global Strategy for Plant Conservation (GSPC) Target 8: at least 75 % of threatened plant species must be in *ex situ* (preservation and maintenance of samples of living organisms outside their natural habitat, in the form of whole plants, seed, pollen, vegetative propagules, tissue or cell cultures) collections, preferably in the country of origin (Consolidated

update of GSPC 2010) (Paunescu 2008, Wyse Jackson & Sutherland 2000). To contribute to the implementation of it the Botanical Garden of the University of Latvia (BGUL) is collecting and maintaining living plant accessions of rare and endangered species of Latvia.

In total, 319 species of vascular plants are included in the Red Data Book of Latvia (Andrušaitis 2003) and 232 in the Annex of the Regulation of the Cabinets of Ministers No. 396 "Regulations of the list of specially protected species and specially protected species of limited use" (Cabinet Regulations No. 396).

For different reasons, some plants that are included in the Cabinet Regulations No. 396 are not included in the Red Data Book and vice versa.

The aim of the investigation is the revision of the rare and endangered species in the collections of BGUL.

MATERIAL AND METHODS

The examined species are cultivated in BGUL. The information about the accessions was analyzed according to the data collected in the electronic plant database of BGUL *LU Augi*.

RESULTS AND DISCUSSION

There are 86 species of rare and endangered plants in the collections:

- 82 listed in the Red Data Book of Latvia (26% from 319 vascular plant species),
- 54 species listed in the Cabinet Regulations No. 396 (23% from 232 vascular plant species).

The Red Data Book is represented by 1 taxon from the Category 0 (extinct), 21 taxa from the Category 1 (endangered), 21 taxa from the Category 2 (vulnerable), 30 taxa from the Category 3 (rare) and 9 taxa from the Category 4 (undetermined) (Table 1). There are 39 families represented in the collection: mainly herbaceous

plants, however woody plants and pteridophytes are also represented. The last revision about endangered plants in the BGUL was made in 2011 (Vishnevskā et al. 2011) when there were 60 species of rare and endangered plants (60 listed in Red Data Book of Latvia (18%), 42 species listed in Cabinet Regulations No. 396 (17,6%)). The number of plants listed in the Red Data Book of Latvia has increased by 8% and numbers of species listed in Cabinet Regulations by 5,4%. During the last 8 years 6 species has disappeared from the collection. Although changes in numbers are not significant, there are positive trends in the development of the collection.

In 2011 a large part of the plants was of unknown or of foreign origin. During the last years the representation of the threatened plants has been updated and today 70% of all species are known to have Latvian origin - the accessions were collected in the wild. For 22% of the species origin is from other countries, botanical gardens or private collectors, but for 8% origin is unknown. Since the plant genetic material is the crucial role (Sharrock & Jones 2009) and the most important function of botanical gardens is to protect regional biodiversity, BGUL challenge for the future is to collect species of Latvia wild origin and to increase the representation of rare species in the collections. It should be noted that many species cannot be grown in BGUL due to local uniformity of growth conditions: sandy soil and drought. As well as many botanical gardens have areas of natural vegetation within their boundaries or in adjunct campuses (Guerrant et al. 2004). But the territory of BGUL is 15 ha located close to the city center in Riga with low natural vegetation. Therefore rare and endangered plants are hosted mainly by the collections. However 7 species are found in the territories out of the plantings of the collections or expositions: *Alliaria petiolata* (M. Bieb.) Cavara et Grande, *Allium ursinum* L., *Cardamine hirsuta* L., *Ceratophyllum submersum* L., *Dactylorhiza baltica* N. I. Orlova, *Jovibarba globifera* (L.) J. Parn. and *Vincetoxicum hirundinaria* Medik.).

Table 1. List of the rare and endangered species of Latvia in the Botanical Garden of the University of Latvia

Species	Red Data Book of Latvia					Regulation of the Cabinet of the Ministers of Latvia No. 396
	0 cat.	1 cat.	2 cat.	3 cat.	4 cat.	
<i>Teucrium chamaedrys</i> L.	x					
<i>Aconitum lasiostomum</i> Rehb.		x				x
<i>Armeria maritima</i> (Mill.) Willd.		x				x
<i>Armeria vulgaris</i> Willd.		x				
<i>Asperula tinctoria</i> L.		x				x
<i>Crambe maritima</i> L.		x				
<i>Equisetum telmateia</i> Ehrh.		x				x
<i>Erica tetralix</i> L.		x				x
<i>Eryngium maritimum</i> L.		x				x
<i>Geranium molle</i> L.		x				
<i>Hedera helix</i> var. <i>baltica</i> Rehder		x				
<i>Ligularia sibirica</i> (L.) Cass.		x				x
<i>Pentaphylloides fruticosa</i> (L.) O. Schwarz		x				x
<i>Polystichum braunii</i> (Spenn.) Fèe		x				x
<i>Potentilla crantzii</i> (Crantz) Beck ex Fritsch		x				x
<i>Prunella grandiflora</i> (L.) Scholler		x				x
<i>Scrophularia umbrosa</i> Dumort.		x				x
<i>Sorbus intermedia</i> (Ehrh.) Pers.		x				
<i>Taxus baccata</i> L.		x				x
<i>Trifolium fragiferum</i> L.		x				x
<i>Valerianella locusta</i> (L.) Laterr.		x				
<i>Viola elatior</i> Fr.		x				x
<i>Ajuga genevensis</i> L.			x			x
<i>Ajuga pyramidalis</i> L.			x			x
<i>Arenaria procera</i> Spreng.			x			x
<i>Astrantia major</i> L.			x			x
<i>Betula nana</i> L.			x			x
<i>Carpinus betulus</i> L.			x			x
<i>Ceratophyllum submersum</i> L.			x			
<i>Delphinium elatum</i> L.			x			
<i>Dracocephalum ruyschiana</i> L.			x			x
<i>Euphorbia palustris</i> L.			x			x
<i>Geranium bohemicum</i> L.			x			
<i>Gratiola officinalis</i> L.			x			x
<i>Gypsophila paniculata</i> L.			x			

Species	Red Data Book of Latvia					Regulation of the Cabinet of the Ministers of Latvia No. 396
	0 cat.	1 cat.	2 cat.	3 cat.	4 cat.	
<i>Iris sibirica</i> L.			x			x
<i>Lathyrus maritimus</i> (L.) Bigelow			x			x
<i>Lithospermum officinale</i> L.			x			x
<i>Onobrychis arenaria</i> (Kit.) DC.			x			x
<i>Primula farinosa</i> L.			x			x
<i>Sanguisorba officinalis</i> L.			x			x
<i>Silene otites</i> (L.) Wibel			x			x
<i>Trifolium alpestre</i> L.			x			
<i>Alliaria petiolata</i> (M. Bieb.) Cavara et Grande				x		
<i>Allium schoenoprasum</i> L.				x		
<i>Allium scorodoprasum</i> L.				x		
<i>Allium ursinum</i> L.				x		x
<i>Allium vineale</i> L.				x		
<i>Alopecurus arundinaceus</i> Poir.				x		
<i>Alyssum gmelinii</i> Jord.				x		x
<i>Carex montana</i> L.				x		
<i>Carex ornithopoda</i> Willd.				x		
<i>Corynephorus canescens</i> (L.) P. Beauv.				x		
<i>Crepis praemorsa</i> (L.) Tausch				x		x
<i>Digitalis grandiflora</i> Mill.				x		
<i>Gentiana cruciata</i> L.				x		x
<i>Helianthemum nummularium</i> (L.) Mill.				x		x
<i>Hypericum hirsutum</i> L.				x		x
<i>Lathyrus niger</i> (L.) Bernh.				x		x
<i>Lonicera pallasii</i> Ledeb.				x		x
<i>Myosotis sparsiflora</i> Pohl				x		x
<i>Myrica gale</i> L.				x		
<i>Peucedanum oreoselinum</i> (L.) Moench				x		
<i>Pimpinella major</i> (L.) Huds.				x		
<i>Polygonatum verticillatum</i> (L.) All.				x		x
<i>Ranunculus bulbosus</i> L.				x		x
<i>Rosa rubiginosa</i> L.				x		x
<i>Serratula tinctoria</i> L.				x		x
<i>Seseli libanotis</i> (L.) W. D. J. Koch				x		
<i>Silene tatarica</i> (L.) Pers.				x		
<i>Trifolium campestre</i> Schreb.				x		
<i>Trifolium dubium</i> Sibth.				x		

Species	Red Data Book of Latvia					Regulation of the Cabinet of the Ministers of Latvia No. 396
	0 cat.	1 cat.	2 cat.	3 cat.	4 cat.	
<i>Vincetoxicum hirundinaria</i> Medik.				x		
<i>Anemone sylvestris</i> L.					x	
<i>Dactylorhiza baltica</i> (Klinge) N. I. Orlova					x	x
<i>Diphasiastrum complanatum</i> (L.) Rothm.					x	x
<i>Huperzia selago</i> (L.) Bernh. ex Schrank et Mart.					x	
<i>Lunaria rediviva</i> L.					x	x
<i>Lycopodium clavatum</i> L.					x	
<i>Platanthera bifolia</i> (L.) Rich.					x	x
<i>Pulsatilla patens</i> (L.) Mill.					x	x
<i>Pulsatilla pratensis</i> (L.) Mill.					x	x
<i>Cardamine hirsuta</i> L.						x
<i>Dianthus arenarius</i> L.						x
<i>Euonymus verrucosa</i> Scop.						x
<i>Jovibarba globifera</i> (L.) J. Parn.						x

CONCLUSIONS

In *ex situ* collections in the BGUL there are 86 species of rare and endangered plants of Latvia. 82 of them are listed in the Red Data Book of Latvia which is 26% from 319 vascular plant species, 54 species are listed in Cabinet Regulations No. 396 which is 23% from 232 vascular plant species. This is 49% and 52% less than it was noted in GSPC as a goal to be reached until the end of 2020. However in Latvia the result of the Target 8 of GSPC have to be assessed by summing up three *ex-situ* collections: the National Botanic Garden of Latvia, Kalsnava arboretum and the Botanical Garden of the University of Latvia.

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