ESCAPE Ex situ conservation of Finnish Native Plants LIFE11 BIO/FI/917

Principles for the selection of 100 vascular plant taxa of top priority for ex-situ conservation

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INTRODUCTION

One of the first tasks in the project ESCAPE (see www.luomus.fi/escape) was the selection of 100 Finnish native vascular plant taxa to be conserved ex-situ. Ryttäri (2013) compiled the priority list based on numeric values given for twelve criteria. The principles for species selection are published here as a milestone of the Action A.1 of the ESCAPE project. The criteria for species selection are elaborated and associated sources of information are given.

THE CRITERIA FOR THE SELECTION OF THREATENED TAXA

The numeric values for the index used in the assessment of the priority rank were selected so, that high values correlate with high priority. The criteria basically correspond to those used for species red-listing according to the IUCN criteria, the main components containing species **distribution**, including Finland´s international responsibility species with a significant proportion of European distribution in Finland and local endemics, **biological characteristics** causing enhanced risk of extinction, **species population traits** causing increased risk for decline, and quite strongly the **red-list status** both in Finland, neighboring areas and in Europe, inclusion on the **EU Habitats Directive Annex II species list,** and finally, the species listed as important **crop wild relatives** (Fitzgerald et al. 2013). The **sensitiveness of a taxon to climatic change** was used according to Rassi et al. (2010).

DESCRIPTIONS OF THE 12 CRITERIA

1. **The red-list status of the taxon in Finland** is based on the latest evaluation of species risk of extinction in Finland (Rassi et al. 2010), which applied the threat criteria of IUCN (2012): The numeric values are set by red-list categories as follows: near-threatened NT: 0,5 points, vulnerable VU: 1 point, endangered EN: 2 points, critically endangered CR: 3 points.
2. **Low reproductive capacity** as a consequence of poor seed production or relying only to vegetative growth is scored as numeric value 1. This criteria is used in cases such information is available (see e.g. in Ryttäri et al. 2012). If reproduction is not considered as a problem, or if there is no information available, the numeric value is set as 0.
3. The **population size of the taxon** effects the index values on the basis of scores 1 for small population size, specifically on the basis of estimation as red-listed on the basis of IUCN D-criteria (Rassi ym. 2010, see IUCN 2012), and score 0, if the population size is not particularly small.
4. **Fragmented distribution area** resulted in score 1 on the index calculation. The estimation of fragmentation is based on the use of IUCN Ba criteria (Rassi ym. 2010, see IUCN 2012). If the species distribution is not particularly fragmented the score is 0.
5. **Species red-list status in areas neighboring Finland**, especially in Baltic region (see Ryttäri et al. 2012) is used for index valuing. The numeric value is based on the red-list status in three surrounding areas consisting of Russia, Baltic area and Scandinavia. For species in category near-threatened (NT) in Finland, the status on the Swedish (Gärdenfors 2010), Norwegian (Kålås et al. 2010) and Estonian (http://elurikkus.ut.ee/prmt.php?lang=eng) red-lists are used with the red-data

books of Leningrad region (Anon. 2000), Karelia (Anon. 2007) and Murmansk regions (Anon. 2003) in Russia. The species red-listed in one of the three areas scores 0.5 points, in two areas scores 1 point, and in three areas 1.5 points.

6. **Marginal or disjunct** population in relation to its total range yielded score 1, while populations in the main distribution area scored 0. The population´s occurrence is estimated by investigating species distribution maps in Hultén & Fries (1986). The digitized maps are available also at Den Virtuella Floran (http://linnaeus.nrm.se/flora/).
7. Some taxa easily cross with close relatives, and therefore their genetic uniqueness is **threatened by hybridization**. For taxa considered as threatened by hybridization as evaluated in Rassi et al. (2010), the index score is 1, while the others score 0.
8. **Climate change** may cause threat to a species in many ways. The direct threat by changing climate has been shown only for few Finnish native plants so far, but for many species it may cause serious trouble in near future. For the taxa considered as threatened by climate change by Rassi et al. (2010) the index score is 1. For those considered as tolerant to climate change the score is 0.
9. The **species listed in the EU Habitats Directive Annex II** (Directive 92/43/EEC of the Council of Europe, 21.5.1992), with status considered unfavorable or bad in Finland's report to the EU Habitats Directive in 2006, or listed either threatened or near-threatened **on the EU red-list** (Bilz ym. 2011) score 1 in the index valuing, while those species not listed on the before-mentioned lists score 0.
10. The Finnish native plant taxa with **European or North-European endemic** distribution (see e.g. Hultén & Fries 1986) score 1, while those with wider distribution score 0 in the index valuing.
11. Finland's **international responsibility species** as evaluated by Rassi et al. (2001) score 1, while those without status as Finland´s responsibility species score 0 in the index valuing.
12. Species classified as particularly valuable **Crop Wild Relative** on the basis of classification by Fitzgerald et al. (2013) score 1, while those with less valuable status or not belonging to CWR list score 0.

DISCUSSION

The prioritization index for evaluation of species urgency and suitability for *ex situ* –conservation calculated for altogether 322 Finnish native plants is created as a tool for species selection as suitable for *ex situ* -methods ensuring their storing, survival and source for reintroductions and other measures facilitating their future occurrence in Finland. The maximum index value adds up to 14.5, but the highest score for the prioritization list species is 9.0. Altogether 116 plants exceeding index value 5.0 are selected on the first version of the priority list of the species to be included in *ex situ* –collections (Ryttäri 2013). This prioritization list based on calculated index values is developed particularly for the purposes within ESCAPE project, and its feasibility will be tested in practice during the course of the project. The index, and consequently the priority list, will be up-dated along the course of the project.

The basis for the species selection on this list is focused on the national red-listing (Rassi et al. 2010) bringing out the emphasis on IUCN red-listing criteria (see IUCN 2012) with highest possible score for an individual criterion up to 3 in the criterion 1. As **IUCN based criteria** are used also for criteria 3, 4 and 8, the effect of background red-listing criteria accumulates uo to 45% of the maximum index value added by the red-list status in the neighboring areas in the Baltic region, northwestern Russia and Fennoscandia (criterion 5). The criteria representing **biological traits** of the species (criteria 2, 3 and 7) contribute to **21%** of the maximum index value, as do also the criteria 4, 6 and 10 which represent the effects of **restricted distribution areas** of the species. The index valuing by both inclusion on the EU Habitats Directive Annex II list and/or on the EU red-list combined with the European or North-European endemic distribution (criteria 9 and 10), **EU added value** forms 14% of the maximum index value. The species inclusion on the list of international responsisbility species (Rassi et al. 2001, criterion 11) and on the list of important crop wild relatives (Fitzgerald et al. 2013, criterion 12) both represent 7% of the maximum index value.

The plant *ex situ* –conservation priority index (Ryttäri 2013) gives high priority for species with worst situation in their natural environments in Finland. In the first version of the prioritization index, however, the status in *ex situ* –conservation was not considered. This is admittedly a shortcoming in the treatment causing trouble with species status on the list after inclusion to *ex situ* –collections, which needs to be considered in the coming up-dated prioritization list. The coming correction will increase the sensitivity of the index for changes in the species status. The re-calculated prioritization list will be published later on ESCAPE project website

www.luomus.fi/escape. Similar corrections improving the prioritization sensitivity are needed also for instance in cases the species population size increases and/or other positive events improve the species conditions in the nature or as a consequence of active conservation efforts. Also the opposite case of new species rising on the prioritization list as a consequence of deteriorating situation needs to be considered. Therefore, the prioritization list cannot be stabilized but open to possible changes in the species *ex situ* –conservation status. The criteria presented here and the prioritization list by Ryttäri (2013) is, however, used as an ESCAPE project decision-making tool for the selection of priority target species.

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