

## BIODIVERSITY AND CONSERVATION

## Taxonomic monographs in relation to global Red Lists

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Upon comparison with recent monographs of Juncaceae and Potamogetonaceae, the 1997 IUCN Red List of Threatened Plants is shown to be an inadequate information source for conservation decisions. A substantial proportion of names listed in the IUCN RL represent synonyms, often belonging to widespread taxa, or remain doubtful taxonomically. If a new Red List is derived from the two new monographic accounts, and compared with the 1997 IUCN RL, the correct data from the latter represent 10–25% of the former. It may be concluded that the overall accuracy of the IUCN list is rather low. The importance of global taxonomic monographs as a source of basic data for the accurate compilation of Red Lists is stressed.

**KEYWORDS:** conservation, IUCN, Juncaceae, Potamogetonaceae, Red Lists, taxonomy.

## INTRODUCTION

Red lists (RLs) of threatened plants represent an important information source for policy-makers and governmental nature conservation authorities. Local and regional RLs use the IUCN criteria of classification of plants into categories of threat, and they are therefore easy to compare or summarize. One of the most important RLs, essential for making decisions at the international level, is The 1997 IUCN Red List of Threatened Plants (Walter & Gillett, 1998). It gives, family by family, a complete list of plants considered to be threatened over their whole geographical range, with IUCN categories and references to regional RLs. Additional data include number of genera and species in each family, and number of threatened species recorded (with percentage of threatened taxa out of the total).

The level of threat is assessed according to the situation at the regional level, but it remains questionable whether a global list should not be based upon a global summary of taxonomic and geographical information, whenever available. In the following text, examples are given documenting the importance of global taxonomic monographs as a source of basic data inevitable for the accurate compilation of RLs of plants.

## JUNCACEAE, POTAMOGETONACEAE

Within the framework of the Species Plantarum Project (Brummitt & al., 2001), a taxonomic account of Juncaceae of the world has been completed by a team of specialists co-ordinated by J. Kirschner. The specialists

come from all over the world and cover the main diversity centres and complicated groups of the family. They are: Aaron Wilton (New Zealand), Adolf Ceska (Canada), Barbara Ertter (California), Carmen Fernandez Carvajal (Spain), Futoshi Miyamoto (Japan), Henrik Balslev (Denmark), Henry Noltie (Scotland), Janice Coffey-Swab (N. Carolina), Karen Wilson (Australia), Lazaro J. Novara (Argentina), Leena Hämet-Ahti (Finland), Steven Clemants (New York), Sven Snogerup (Sweden), Vladimir S. Novikov (Russia), and Zdenek Kaplan (Czech Republic). The monographic account of the family is currently being edited for publication (Kirschner & al., in press). It is a family of seven genera and c. 440 species, with highest diversity in temperate regions of both hemispheres but represented worldwide. The fact that the actual number of species recognized in the family exceeds even the highest previous estimates by 70 to 140 (i.e., by 15–30%) is not surprising because in most of the recent taxonomic accounts a similar increase was observed (R. Govaerts, D. Frodin, pers. comm.). For instance, the IUCN list gives 300 species for Juncaceae.

A similar project, in an earlier stage, concerns Potamogetonaceae (Z. Kaplan, in prep.), another cosmopolitan family of water plants with 2–3 genera and 70 to 80 species with additionally at least 50 hybrids sometimes considered to be separate species in the past (100 species given in the IUCN list).

**The 1997 IUCN Red List and monographic study of Juncaceae and Potamogetonaceae.** — Detailed comparison of the IUCN RL of threatened plants with the taxonomic monographs of the above two families shows striking discrepancies between them. In

**Table 1. Analysis of the IUCN RL data for Juncaceae.**

IUCN name	Correct name	Taxonomic status	Threat
<i>Juncus arianus</i> V. Krecz.	<i>Juncus fontanesii</i> subsp. <i>kotschy</i> (Boiss.) Snogerup		not threatened
<i>Juncus caesariensis</i> Coville			V
<i>Juncus chlorocephalus</i> Engelm.			R
<i>Juncus guadeloupensis</i> Buchenau & Urban			E
<i>Juncus hizenensis</i> Satake	<i>Juncus prismatocarpus</i> var. <i>leschenaultii</i> (J. Gay) Buchenau		not threatened
<i>Juncus leiospermus</i> F.J. Herm.			V
<i>Juncus leiospermus</i> var. <i>ahartii</i> Ertter		doubtful	data deficient
<i>Juncus megaspermus</i> F.J. Herm.	<i>Juncus triformis</i> Engelm.		data deficient
<i>Juncus sikkimensis</i> Hook. f.			not threatened
<i>Juncus triformis</i> Engelm.			data deficient
<i>Juncus tweedyi</i> Rydb.	<i>Juncus brevicaudatus</i> (Engelm.) Fernald		not threatened
<i>Juncus valvatus</i> Link			R
<i>Juncus yakesidakensis</i> Satake	<i>Juncus prismatocarpus</i> var. <i>leschenaultii</i> (J. Gay) Buchenau		not threatened
<i>Luzula canariensis</i> Poir.			V
<i>Luzula castellanosi</i> Barros	<i>Luzula excelsa</i> Buchenau		not threatened
<i>Luzula crenulata</i> Buchenau			R
<i>Luzula deflexa</i> Kozhukh.	<i>Luzula alpinopilosa</i> subsp. <i>deflexa</i> (Kozhukh.) Kirschner		not threatened
<i>Luzula elegans</i> Lowe			R
<i>Luzula hieronymi</i> var. <i>pusilla</i> Castillon	<i>Luzula excelsa</i> Buchenau		not threatened
<i>Luzula longiflora</i> Benth.			R
<i>Luzula masafuerana</i> Skottsbo.			R
<i>Luzula seubertii</i> R.T. Lowe			R
<i>Microschoenus duthiei</i> C.B. Clarke	<i>Juncus duthiei</i> (C.B. Clarke) Noltie	unclear	probably not threatened

the IUCN Red List 22 names are listed as species threatened on a global basis in Juncaceae (see also Table 1). As many as nine of these are considered in the taxonomic revision to be mere synonyms, mostly of names of widespread taxa. A further two names belong to taxonomically doubtful or not satisfactorily understood taxa. Of the 22 names, nine apply to taxa not threatened at all, and an additional two remain unclear from this point of view. Only 11 names apply to taxa under various levels of threat, i.e., only 50% of the list. A preliminary examination of the accepted taxa in the taxonomic monograph shows that an additional 34 taxa ought to have been listed as threatened (e.g., very local endemics in potentially vulnerable areas and/or plant communities). The overall accuracy of the RL is thus only 11 out of 45, or about 25%.

In Potamogetonaceae, for which a preliminary version of an account for the Species Plantarum Project compiled by Ž. Kaplan is now available, a similar situation can be observed (Table 2). In the Red List nine names are listed as threatened. Of these, four (44%) represent wide-

spread, not threatened taxa, one is taxonomically doubtful, two may be hybrids, and only two represent threatened taxa under correct names.

The new taxonomic and phytogeographical analysis of the family shows that 20 taxa should be listed as threatened, and an additional eight taxa would be classified as I (Indeterminate), potentially threatened.

Consolidated lists of threatened members of the two families are given in the Appendix.

## CONCLUSIONS

If we extrapolate results of the analysis of these two cosmopolitan families to the whole Red List, we have to express serious doubts about the quality of conservation decisions based upon this information. We do not blame the compilers of the List, who were working as best they could with inadequate literature. However, the comparison clearly shows the importance of detailed taxonomic monographs of families or their subdivisions, the main

**Table 2. Analysis of the IUCN RL data for Potamogetonaceae.**

IUCN name	Correct name	Taxonomic status	Threat
<i>Potamogeton clystocarpus</i> Fernald		doubtful	
<i>Potamogeton floridanus</i> Small		doubtful, perhaps a hybrid	
<i>Potamogeton hillii</i> Morong			V
<i>Potamogeton hoggarensis</i> Dandy	<i>P. pusillus</i> L. s. l.		not threatened, wide-spread
<i>Potamogeton latifolius</i> Morong	<i>P. striatus</i> Ruiz & Pav.		not threatened, wide-spread in South America
<i>Potamogeton mariannensis</i> Cham. & Schldl.	<i>P. nodosus</i> Poir.		not threatened, wide-spread
<i>Potamogeton ogdenii</i> Hellq. & R.L. Hilton		fertile intermediate between putative parents, a hybrid?	
<i>Potamogeton subsibiricus</i> Hagstr.	<i>P. sibiricus</i> A. Benn.		data deficient but more wide-spread then assumed
<i>Potamogeton tennesseensis</i> Fernald			V

goal of the Species Plantarum Project, for the management of the plant resources of the world.

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## APPENDIX

A. Red List of threatened species of Potamogetonaceae (for data on distribution see Wiegand & Kaplan, 1998).

### Extinct/Endangered

- Potamogeton parmatus* Hagstr.  
*Potamogeton recurvatus* Hagstr.  
*Potamogeton stenostachys* K. Schum.

### Endangered

- Potamogeton juzepczukii* Potamogeton Dorof. & Tzvelev  
*Potamogeton manchuriensis* (A. Benn.) A. Benn.  
*Potamogeton montevidensis* A. Benn.  
*Potamogeton papuanicus* Wiegand  
*Potamogeton solomonensis* Wiegand

### Vulnerable

- Potamogeton amblyphyllus* C.A. Mey.  
*Potamogeton bicupulatus* Fernald  
*Potamogeton cristatus* Regel & Maack  
*Potamogeton hillii* Morong  
*Potamogeton oakesianus* J.W. Robbins  
*Potamogeton polygonus* Cham. & Schldl.  
*Potamogeton rutilus* Wolfg.  
*Potamogeton sarmaticus* Mäemets  
*Potamogeton tennesseensis* Fernald

### Rare

- Potamogeton groenlandicus* Hagstr.  
*Potamogeton suboblongus* Hagstr.

### Indeterminate

- Potamogeton australiensis* A. Benn.  
*Potamogeton drummondii* Benth.  
*Potamogeton furcatus* Hagstr.  
*Potamogeton sclerocarpus* K. Schum.  
*Potamogeton sibiricus* A. Benn.  
*Potamogeton tepperi* A. Benn.  
*Potamogeton tricarinatus* F. Muell. & A. Benn.  
*Potamogeton ulei* K. Schum.

B. List of threatened species of Juncaceae (IUCN categories not given).

- Juncus anatolicus* Snogerup  
*Juncus brasiliensis* Breistr.  
*Juncus caesariensis* Coville  
*Juncus chlorocephalus* Engelm.  
*Juncus emmanuelis* A. Fern. et J.G. García  
*Juncus engleri* Buchenau  
*Juncus guadeloupensis* Buchenau & Urban  
*Juncus kleinii* Barros  
*Juncus leiospermus* F.J. Herm.  
*Juncus longistamineus* A. Camus  
*Juncus luciensis* Ertter

*Juncus nupela* Veldkamp  
*Juncus obliquus* Adamson  
*Juncus pervetus* Fernald  
*Juncus pictus* Steud.  
*Juncus ramboi* Barros  
*Juncus rupestris* Kunth  
*Juncus scabriusculus* Kunth  
*Juncus sparganiiifolius* Buchenau  
*Juncus stenopetalus* Adamson  
*Juncus triformis* Engelm.  
*Juncus valvatus* Link  
*Luzula acutifolia* subsp. *Potamogeton nana* Edgar  
*Luzula atlantica* Braun-Blanq.  
*Luzula atrata* Edgar  
*Luzula australasica* subsp. *dura* (Edgar) M.E. Jansen  
*Luzula calabra* Ten.  
*Luzula canariensis* Poir.  
*Luzula celata* Edgar  
*Luzula crenulata* Buchenau  
*Luzula elegans* Lowe  
*Luzula leptophylla* Buchenau & Petrie  
*Luzula longiflora* Benth.  
*Luzula masafuerana* Skottsbo.  
*Luzula ostenii* (Mattfeld) Herter  
*Luzula philippinensis* M.E. Jansen  
*Luzula purpureosplendens* M. Seubert  
*Luzula seubertii* R.T. Lowe  
*Luzula subcapitata* (Rydb.) H.D. Harr.  
*Luzula traversii* var. *tenuis* Edgar  
*Luzula ulei* Buchenau  
*Luzula ulophylla* (Buchenau) Cockayne & Laing  
*Oxychloe castellanosi* Barros  
*Oxychloe mendocina* Barros  
*Rostkovia tristanensis* Christoph