

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 sparganiifolius 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