

## BRYOPHYTES IN THE SPANISH LAW

Marta Infante & Patxi Heras

Museo de Ciencias Naturales de Alava, Siervas de Jesús 24, 01001 Vitoria.

E-mail: bazzania@arrakis.es

Spain occupies most of the Iberian Peninsula, besides the Balearic and Canary Islands, and contains a high bryophyte biodiversity in the European context. It might not be the best known region in Europe, but it currently maintains one of the highest numbers of active bryologists, which has allowed a spectacular improvement in the knowledge of its bryoflora in the latest 40-50 years. Depending on the number of infraspecific taxa accepted, the number of bryophyte taxa in Spain ranges between 1.090 and 1.300.

Spain shares with the rest of Europe a deep and old anthropogenic alteration of its territory and a low rate of endemism in bryophytes. There are no endemic genera and just six of the endemic Iberian species are exclusively present in peninsular Spain (a scarce 0'5%, and all mosses): *Acaulon casasianum*, *A. dertosense*, *Didymodon erosus*, *Microbryum longipes*, *Orthotrichum casasianum* and *Pleuridium serrulatum*. Endemism is much higher in the Canary Islands, with a total of ten endemic species (*Riccia teneriffae*, *Aloina humilis*, *Bryum icodense*, *Entosthodon krausei*, *Grimmia curviseta*, *Orthotrichum handiense*, *Platyhypnidium torrenticola*, *Rhynchostegiella bourgeana*, *R. trichophylla* and *Tortula ampliretis*), in other words, 2'1% of the Canaries' bryoflora is endemic, which raises the Spanish total to roughly 1'3%.

Nevertheless, a noticeable number of non-endemic taxa occur in Spain but otherwise are either absent or poorly represented in the rest of Europe. For instance, the following: genus *Exormotheca*, *Jubula hutchinsiae*, *Jungermannia handelii*, *Lejeunea mandonii*, *Marchesinia mackaii*, *Plagiochasma appendiculatum*, *Riccia crustata*, genus *Riella*, *Anacolia menziesii*, *Anomobryum lusitanicum*, *Crossidium aberrans*, *Didymodon sicculus*, *Goniomitrium seroi*, *Gymnostomum lanceolatum*, *Oedipodiella australis*, *Orthotrichum hispanicum*, *O. ibericum*, *O. scanicum*, *O. tortidontium*, *O. vittii*, *Phascum vlassovii*, *Pterygoneurum squamosum*, *P. sampaianum*, *P. subsessile*, *Racomitrium hespericum*, *Schizymenium pontevedrensis*, *Thamnobryum maderense*, *Triquetrella arapilensis*, etc.

Consequently, with a bryoflora equivalent to approximately two thirds of the total European bryoflora, Spain has a great responsibility in respect to bryophyte conservation.

## PRESENCE OF BRYOPHTES IN THE LAWS

### A- BERNA CONVENTION AND HABITAT DIRECTIVE

One of the first actions taken by the European Committee for the Conservation of Bryophytes (ECCB) after its foundation in 1990 was recommending the addition of a selection of bryophyte species to Appendix I in Berna Convention.

<b>Hornworts:</b>	<i>Riella helicophylla</i>	<i>Dicranum viride</i>
<i>Notothylas orbicularis</i>	<i>Scapania massalongi</i>	<i>Distichophyllum carinatum</i>
<b>Liverworts:</b>	<b>Mosses:</b>	<i>Echinodium spinosum</i>
<i>Cephalozia macounii</i>	<i>Atractylocarpus alpinus</i>	<i>Hamatocaulis vernicosus</i>
<i>Frullania parvistipula</i>	<i>Bruchia vogesiaca</i>	<i>Meesia longiseta</i>
<i>Jungermannia handelii</i>	<i>Bryoerythrophyllum machadoa-</i>	<i>Orthotrichum rogeri</i>
<i>Mannia triandra</i>	<i>num</i>	<i>Pyramidula tetragona</i>
<i>Marsupella profunda</i>	<i>Buxbaumia viridis</i>	<i>Sphagnum pylaesii</i>
<i>Petalophyllum ralfsii</i>	<i>Cynodontium suecicum</i>	<i>Tayloria rudolphiana</i>
<i>Riccia breidleri</i>	<i>Dichelyma capillaceum</i>	<i>Thamnobryum fernandesii</i>

In 1992, Annex II in Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (*Directiva 92/43/CEE relativa a la conservación de los hábitats naturales y de fauna y flora silvestres*) includes primarily 24 bryophyte species, a number subsequently enlarged to 31 (Directive 97/62/EC of 27 October 1997 adapting Directive 92/43/EEC to scientific and technical progress / *Directiva 97/62/CE, del 21 de Mayo, por la que se adapta al progreso científico y técnico la Directiva 92/43/CEE*). All of these species must be taken into account when establishing a coherent network of special areas for conservation.

These species are practically the same as those previously included in the Berna Convention.

<b>Hornworts:</b>	<b>Mosses:</b>	<i>Hamatocaulis lapponicus</i>
<i>Notothylas orbicularis</i>	<i>Bruchia vogesiaca</i>	<i>Herzogiella turfacea</i>
<b>Liverworts:</b>	<i>Bryhnia novae-angliae</i>	<i>Hygrohypnum montanum</i>
<i>Cephalozia macounii</i>	<i>Bryoerythrophyllum campylo-</i>	<i>Meesia longiseta</i>
<i>Jungermannia handelii</i>	<i>carpum (=B. machadoa-</i>	<i>Orthothecium lapponicum</i>
<i>Mannia triandra</i>	<i>num)</i>	<i>Orthotrichum rogeri</i>
<i>Marsupella profunda</i>	<i>Buxbaumia viridis</i>	<i>Plagiomnium drummondii</i>
<i>Petalophyllum ralfsii</i>	<i>Cynodontium suecicum</i>	<i>Sphagnum pylaesii</i>
<i>Riccia breidleri</i>	<i>Dichelyma capillaceum</i>	<i>Tayloria rudolphiana</i>
<i>Riella helicophylla</i>	<i>Dicranum viride</i>	<i>Tortella rigens</i>
<i>Scapania massalongi</i>	<i>Distichophyllum carinatum</i>	<i>Echinodium spinosum</i>
	<i>Hamatocaulis vernicosus</i>	<i>Thamnobryum fernandesii</i>
	<i>Encalypta mutica</i>	

Besides Annex II, Annex V in the Habitat Directive deals with the exploitation of some commercial species. Respecting the Bryophytes, this annex only affects the genera *Sphagnum* and *Leucobryum*, establishing not the ban of their exploitation but just its monitoring.

Of all these species, only ten have been found in Spain:

*Jungermannia handelii*

*Marsupella profunda* (Canary Islands)

*Petalophyllum ralfsii*

*Riella helicophylla*

*Bruchia vogesiaca*

*Buxbaumia viridis*

*Hamatocaulis vernicosus*

*Orthotrichum rogeri*

*Sphagnum pylaesii*

*Echinodium spinosum* (Canary Islands)

Member states in the European Union are obligated to observe this Directive, but, despite its importance for being the first time that bryophytes are included in legislation for several states, Habitat Directive's repercussion in Spain is relatively small. It nevertheless cannot be denied a positive effect, for the inclusion of these species has at least promoted some studies on them. For example, in Aragón the status of four of these species was revised (*Hamatocaulis vernicosus*, *Riella helicophylla*, *Orthotrichum rogeri* and *Buxbaumia viridis*), with mixed results for each (Heras & Infante 2000, Infante & Heras 2001) all inside a larger LIFE project (Puente 2002); and it has even inspired an ongoing doctoral thesis.

## **B- NATIONAL CATALOGUE OF THREATENED SPECIES (CATÁLOGO NACIONAL DE ESPECIES AMENAZADAS).**

This catalogue was started in 1990 (Real Decreto 439/1990); it was derived from Law 4/1989 for the Conservation of Natural Sites and Wild Flora and Fauna (*Ley 4/1989 de Conservación de los Espacios Naturales y de la Flora y Fauna Silvestres*). It includes a vast number of vascular plants. Nevertheless, bryophytes, along with the rest of cryptogams, were not treated.

Therefore, excepting the European Habitat Directive, Spain lacks a specifically protecting legislation for threatened bryophytes.

## **C- REGIONAL CATALOGUES OF THREATENED SPECIES (CATÁLOGOS REGIONALES DE ESPECIES AMENAZADAS)**

Most of the seventeen Autonomous Communities have already created their own Regional Catalogue of Threatened Species or, if not, the protection of particular species is observed in some way (for example, Plan for Interesting Natural Areas in Catalonia, known as PEIN - Pla

d'Espais d'Interès Natural de Catalunya). Then again, as in the National Catalogue, cryptogams (with the exception of ferns) are generally excluded. With respect to bryophytes, the situation is especially poor, since just five Autonomous Communities include some species (Table 1).

Autonomous Community	Catalogue or similar, including vascular plants	Catalogue or similar including bryophytes
Andalucía	YES	NO
Aragón	YES	YES
Asturias	YES	YES
Baleares	YES	NO
Canarias	YES	NO
Cantabria	NO	NO
Castilla-La Mancha	YES	YES
Castilla-León	NO	NO
Cataluña	YES	YES
Extremadura	YES	NO
Galicia	NO	NO
La Rioja	YES	NO
Madrid	YES	YES
Murcia	YES	NO
Navarra	YES	NO
País Vasco	YES	NO
Valencia	YES	NO

**Table 1.** Presence of plants in general and bryophytes in particular in the legislation of Autonomous Communities.

In the following paragraphs, there is detailed legislation of each of the five mentioned Autonomous Communities. A compilation is offered in Table 2.

### **Aragón (Gobierno de Aragón)**

Decree 49/1995, March 28th, by Diputación General de Aragón, ruling Aragon's Catalogue of Threatened species (*Decreto 49/1995, de 28 de Marzo, de la Diputación General de Aragón, por el que se regula el Catálogo de Especies Amenazadas de Aragón. Boletín Oficial de Aragón B.O.A. n° 42, de 07.04.1995*).

Order March 4th, 2004, by Diputación General de Aragón, Environment Department, including several species, subspecies and populations of flora and fauna in Aragon's

Catalogue of Threatened Species, some species change categories and others are excluded from this Catalogue. (*Orden de 4 de Marzo de 2004, del Departamento de Medio Ambiente, por la que se incluyen en el Catálogo de Especies Amenazadas de Aragón determinadas especies, subespecies y poblaciones de flora y fauna y cambian de categoría y se excluyen otras especies ya incluidas en el mismo. Boletín Oficial de Aragón B.O.A. n° 34, de 22.03.2004*).

In Aragón, decree 49/1995 establishes five bryophytes as «Endangered» («En Peligro de Extinción») (*Crossidium aberrans*, *Orthotrichum rogeri*, *Pottia pallida*, *Pterygoneurum subsessile* and *Riella notarisii*); and two as «Of Special Interest» («De Interés Especial») (*Pterygoneurum sampaianum* and *Riccia crustata*). There are modifications to this by order of 4 March 2004, which includes *Buxbaumia viridis* as «Endangered» and *Riella helicophylla* as «Sensitive to its habitat alteration» («Sensible a la alteración de su hábitat»). In all, Aragonian law includes nine bryophytes.

*Buxbaumia viridis*, *Orthotrichum rogeri* and *Riella helicophylla* are in the Habitat Directive, which is basically the reason why they were included. *Buxbaumia viridis* lives in the Aragonian Pyrenees exclusively on coniferous dead trunks and its protection undoubtedly will have a positive impact on a good number of other lignicolous species of restricted distribution in Spain and affected by the same problem of habitat elimination as *B. viridis*. *Orthotrichum rogeri* is an epiphyte whose ecological exigencies are still not known in detail, and which has been detected at a few sites in the Pyrenees. It is remarkable the effort made for the protection of species from the saline wet areas in the Ebro Valley (*Riella helicophylla*, *R. notarisii*, *Pterygoneurum subsessile*, *Pottia pallida* and *Riccia crustata*) or semiarid habitats (*Pterygoneurum sampaianum*, *Crossidium aberrans*), following previous concerns (Casas *et al.* 1992, Sainz-Ollero *et al.* 1996).

### **Asturias (Principado de Asturias)**

Decree 65/1995, April 27th, creating the Regional Catalogue of Threatened Species of Asturias and dictating rules for their protection. (*Decreto 65/1995, de 27 de Abril, por el que se crea el Catálogo Regional de Especies Amenazadas de la Flora del Principado de Asturias y se dictan normas para su protección. Boletín Oficial del Principado de Asturias B.O.P.A. n° 128, de 05.06.1995*).

The catalogue for Asturias compiles just one bryophyte, *Sphagnum pylaesii*, which is included in the Habitat Directive in the category «Of Special Interest». In this instance, this is an oceanic species in peat bogs and other wet areas.

## Castilla-La Mancha (Junta de Comunidades de Castilla-La Mancha)

Decree 33/1998, May 5th, creating the Regional Catalogue of Threatened Species of Castilla-La Mancha. (*Decreto 33/1998, de 5 de Mayo, por el que se crea el Catálogo Regional de Especies Amenazadas de Castilla-La Mancha. Diario Oficial de Castilla-La Mancha D.O.C.M. n° 22, de 15.05.1998*).

Castilla-La Mancha includes as «Of Special Interest» the liverworts *Riella helicophylla*, *R. notarisii* and *R. cossoniana*, along with the genus *Sphagnum*, which holds the following nine species in the community, according to Brugués *et al.* (2004): *S. angustifolium*, *S. capillifolium*, *S. compactum*, *S. denticulatum*, *S. flexuosum*, *S. palustre*, *S. papillosum*, *S. subnitens* and *S. subsecundum*. Again, species representatives of wet areas are those which receive attention. It is worth noting the interest of protecting genera with species with similar ecological exigencies, as *Sphagnum*, since this allows predicting the finding of new species and thus avoiding their long inclusion process, and at the same time, it allows giving a global cover to their habitat.

Then again, the influence of the Habitat Directive is obvious, having observed *Riella helicophylla*.

There is a second decree affecting the regional catalogue of Castilla-La Mancha (Decree 200/2001, November 6<sup>th</sup>, modifying the Regional Catalogue of Threatened species / *Decreto 200/2001, de 6 de Noviembre, por el que se modifica el Catálogo Regional de Especies Amenazadas, D.O.C.M. n° 119, de 13.11.2001*), but it does not introduce any modification respecting bryophytes.

## Catalonia (Generalitat de Catalunya)

Included within the creation of PEIN (Plan for Interesting Natural Areas in Catalonia, *Pla d'Espais d'Interès Natural de Catalunya*), the Generalitat, by means of its Direcció General del Medio Natural in the Departamento de Agricultura, Ganadería y Pesca, includes in 1992 (Decree 328/1992) a list of protected plants in Annex III. It appoints specific geographical areas for the following seven bryophyte species and two genera:

<i>Scorpidium scorpioides</i> (Naut Aran)	<i>Oedipodiella australis</i> (cap de Creus, massís de l'Albera)
<i>Sphagnum subnitens</i> (massís de Cadiretes)	<i>Ptilium crista-castrensis</i> (capçaleres del Ter i Freser, eth Portillon)
<i>Sphagnum</i> spp. (capçalera de la Noguera Ribagorçana, capçalera de la Noguera de Vallferrera i de Cardós, massís del Montseny, Naut Aran)	<i>Leucobryum juniperoideum</i> (penya-segats de la Muga)
<i>Entosthodon durieui</i> [var. <i>mustaphae</i> ] (= <i>Funaria mustaphae</i> ) (cap de Creus)	<i>Bryoerythrophyllum inaequalifolium</i> (capçaleres del Ter i Freser)
	<i>Tortula</i> sp. (vall del riu Llobregós)

In this instance, the Habitat Directive shows no influence. The southernmost populations of some species, as *Ptilium crista-castrensis* and *Scorpidium scorpioides*, are included, as well as the only populations in continental Europe of *Bryoerythrophyllum inaequalifolium*. Also included are a considerable number of the known populations in the Northern Hemisphere for *Oedipodiella australis*, along with species from wet areas (*Sphagnum*).

CATEGORY	AUTONOMOUS COMMUNITY				
	Aragón	Asturias	Castilla-La Mancha	Catalonia	Madrid
<b>Endangered</b>	<b>6 species:</b> <i>Buxbaumia viridis</i> <i>Crossidium aberrans</i> <i>Orthotrichum rogeri</i> <i>Pottia pallida</i> <i>Pterygoneurum subsessile</i> <i>Riella notarisii</i>				
<b>Sensitive to its Habitat Alteration</b>	<b>1 species:</b> <i>Riella helicophylla</i>				<b>1 species:</b> <i>Riccia fluitans</i>
<b>Of Special Interest</b>	<b>2 species:</b> <i>Pterygoneurum sampaianum</i> <i>Riccia crustata</i>	<b>1 species:</b> <i>Sphagnum pylaesii</i>	<b>3 species and 1 genus:</b> <i>Riella cossoniana</i> <i>R. helicophylla</i> <i>R. notarisii</i> genus <i>Sphagnum</i>		
<b>Others (PEIN)</b>				<b>7species and 2 genera:</b> <i>Scorpidium scorpioides</i> <i>Sphagnum subnitens</i> <i>Entosthodon durieui</i> <i>Oedipodiella australis</i> <i>Ptilium crista-castrensis</i> <i>Leucobryum juniperoideum</i> <i>Bryoerythrophyllum inaequalifolium</i> <i>Sphagnum</i> spp. <i>Tortula</i> spp.	
<b>TOTAL</b>	9 species	1 species	3 species and 1 genus	7 species and 2 genera	1 species

**Table 2.** Summary of the presence of bryophytes in the autonomous legislations.

## Madrid (Comunidad de Madrid)

Decree 18/1992, March 26<sup>th</sup>, approving the Regional Catalogue of Threatened Fauna and Flora Species and creating the category «Singular Tree» in Madrid Autonomous Community (*Decreto 18/1992, de 26 de Marzo, por el que se aprueba el Catálogo Regional de especies amenazadas de fauna y flora silvestres y se crea la categoría de árboles singulares de la Comunidad de Madrid. Boletín Oficial de la Comunidad de Madrid B.O.C.M. nº 85, de 09.04.1992*).

Madrid includes only the aquatic liverwort *Riccia fluitans* in the category «Sensitive to its Habitat Alteration».

## DISCUSSION

In Spain, bryophytes are lacking in its National Catalogue, but some are observed in some autonomous legislation in a fragmentary way. In all, only nineteen bryophyte species and two genera are specifically included in Spanish law. Among them, there are only four of the ten Habitat Directive's species present in Spain (*Riella helicophylla*, *Buxbaumia viridis*, *Orthotrichum rogeri* and *Sphagnum pylaesii*).

The different autonomous legislations include five liverworts (all thallose species associated with different kinds of aquatic habitats) and fourteen mosses, along with the genus *Sphagnum* (in Castilla-La Mancha and certain areas in Cataluña) and the genus *Tortula* sp. (river Llobregós valley). (Table 3).

<b>Liverworts</b>	<b>Mosses</b>
<i>Riccia crustata</i>	<i>Bryoerythrophyllum</i>
<i>Riccia fluitans</i>	<i>inaequalifolium</i>
<i>Riella cossoniana</i>	<i>Buxbaumia viridis</i>
<i>Riella helicophylla</i>	<i>Crossidium aberrans</i>
<i>Riella notarisii</i>	<i>Entosthodon durieui</i>
	<i>Leucobryum juniperoideum</i>
	<i>Oedipodiella australis</i>
	<i>Orthotrichum rogeri</i>
	<i>Pottia pallida</i>
	<i>Pterygoneurum sampaianum</i>
	<i>Pterygoneurum subsessile</i>
	<i>Ptilium crista-castrensis</i>
	<i>Scorpidium scorpioides</i>
	<i>Sphagnum subnitens</i>
	<i>Sphagnum pylaesii</i>
	Genus <i>Sphagnum</i>
	Genus <i>Tortula</i>

**Table 3.** Species and genera included in the different autonomous legislation



It is not easy to calculate the percentage of species included in legislation out of the total number of the Spanish bryoflora, since there is no clear indication of which species in *Sphagnum* and *Tortula* are protected in the different areas, and besides, the number of accepted taxa in Spain varies largely depending on how many infraspecific taxa are accepted, but it should be around 4%.

It must be pointed out that the designation process of the different bryophytes has been quite erratic, and under the influence of at least two factors. Firstly, the influence of the Habitat Directive cannot be denied, and secondly, the interest that wetlands have long raised in the environmentalist circles must be noted, since species linked to saline and acidic wet areas constitute a great proportion of the protected species.

<b>Wetlands (fresh waters)</b>	<i>Petalophyllum ralfsii</i> <i>Riccia fluitans</i> <i>Bruchia vogesiaca</i> <i>Hamatocaulis vernicosus</i> <i>Scorpidium scorpioides</i> Genus <i>Sphagnum</i>
<b>Saline wet areas</b>	<i>Riccia crustata</i> <i>Riella cossoniana</i> <i>Riella helicophylla</i> <i>Riella notarisii</i> <i>Pottia pallida</i> <i>Pterygoneurum subsessile</i>
<b>Southernmost distribution limit</b>	<i>Buxbaumia viridis</i> <i>Orthotrichum rogeri</i> <i>Ptilium crista-castrensis</i>
<b>Very restricted European distribution area</b>	<i>Jungermannia handelii</i> <i>Marsupella profunda</i> <i>Bryoerythrophyllum inaequalifolium</i> <i>Oedipodiella australis</i> <i>Crossidium aberrans</i>
<b>Semiarid Mediterranean habitats and gypsum areas</b>	<i>Pterygoneurum sampaianum</i>
<b>Others</b>	<i>Echinodium spinosum</i> <i>Entosthodon durieui</i> <i>Leucobryum juniperoideum</i> Genus <i>Tortula</i>

**Table 4.** Groups of species protected in the different legislations.

At the time that species were included in the different catalogues it might be necessary to remark how the bryologists' community has had very little contact with the Administration and vice versa. It is worth noting that there is a sparse relationship between the location of the different institutions active in Bryology and the presence of bryophytes in each regional catalogue. For example, two out of the five communities with bryophytes in their regional catalogues have no such institutions (Aragón and Castilla-La Mancha). However, there have been many and remarkable publications in bryophyte conservation, as can be seen in the literature: especially important was the Red List of the Bryophytes of the Iberian Peninsula (Sérgio *et al.* 1994). Others, for example, are Guerra & Ros (1992), Guerra *et al.* (1995), Martínez Abaigar *et al.* (1996), Puche & Gimeno (2001), Heras & Infante (2001), Garilleti *et*

*al.* (2002) or Oliván *et al.* (2003). Nevertheless, despite the importance of these papers in scientific circles, all of them have had a scarce influence in the Administration.

After generally observing the subject, two questions come to our mind: Were at least the protected bryophyte species a good choice? and is the current number of protected bryophytes sufficient?

To find an answer to the first question, the protected species in the autonomous legislation as well as those in the Habitat Directive can be grouped as follows (Table 4).

Bearing in mind that wetlands have been altered and destroyed all over the country by changes in the agricultural and mining uses (irrigation, increase in the number and concentration of cattle, desiccation for agricultural or sanitation purposes, peat exploitation, etc.), it is doubtlessly convenient to include specific aquatic species in the protecting laws. It is especially important the case of saline wetlands, since Spain holds a good proportion of these areas in the European context. It also seems correct to include species linked to microhabitats that have suffered a great decline, such as the case of the lignicolous *Buxbaumia viridis*.

Even if some cases are arguable, for instance *Crossidium aberrans*, a frequent species inside its distribution area and whose habitat is not particularly threatened, it can be said that in general the protected species so far qualify to receive this protection.

Respecting the second question previously posed, to judge if the number of protected bryophytes is sufficient, it is useful to check what results are obtained when a more reasonable evaluation and designation process is followed (Table 5).

<b>RED LIST</b>	<b>Total bryoflora</b>	<b>Total threatened</b>
<b>European</b> (Schumacker & Martiny 1995)	aprox. 1.700	153 (9'05%)
<b>Iberian</b> (Sérgio <i>et al.</i> 1994)	1.044	108 (10'34%)
<b>Valencia Autonomous Community</b> (Puche & Gimeno 2001)	436	47 (10'77%)
<b>Aragón</b> (Infante & Heras 2003)	687	79 (11'5%)

**Table 5.** Comparison among different Red Lists.

Observing Table 5, it must be noted how the percentages of threatened species (taking into account exclusively the categories «Extinct», «Endangered», «Critically Endangered» and «Vulnerable») in their respective bryofloras do not vary greatly and range about 10%.

The red lists for Valencia and Aragón Autonomous Communities are especially significant, since they have been obtained after a detailed scrutiny of the territory, including new collecting programs and herbaria revision previously to the cataloguing of bryophytes and their contrasting evaluation according to the IUCN criteria (1994 and 2001) and additional guidelines (Hallingbäck *et al.* 1998). Both are currently under official procedure for their inclusion in their respective legislation.

These comparisons make obvious that the actual percentage of bryophyte flora included in the different legislations (the already mentioned 4%) is far from the 10% value commonly obtained by other means, at least for peninsular Spain and Balearic Islands. In the case of the Canary Islands, the percentage could be even higher, similarly to what occurs with vascular plants with a greater proportion of species in the Red List of the Spanish Vascular Flora than peninsular Spain (VV.AA. 2000).

It is not only a matter of quantity but also of quality. For instance, none of the exclusively Spanish bryophytes, either peninsular Spain or Canary Islands, is observed in the legislation. Only *Pterygoneurum sampaiianum* is found among the Iberian endemics, and it can be noted that most of the species with a large proportion of their European populations in Spain are also missing in the law. As an example for the latest, *Goniomitrium seroi* should be mentioned, since its only presence in the Northern Hemisphere is restricted to Southeastern Spain and the Canary Islands (Brugués 2003). At least all these species could eventually need some kind of protection and its status should be conveniently checked.

There is still a lot left to do...

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