British Red Data Books

mosses and liverworts

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Appendix 1

The IUCN criteria for Critically Endangered, Endangered and Vulnerable species (World Conservation Union 1994)

Critically Endangered (CR)

A taxon is *Critically Endangered* when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the following criteria (**A–E**):

A Population reduction in the form of either of the following:

(1) An observed, estimated, inferred or suspected reduction of at least 80% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

(a) direct observation
(b) an index of abundance appropriate for the taxon
(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
(d) actual or potential levels of exploitation
(e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites

(2) A reduction of at least 80%, projected or suspected to be met within the 10 years or three generations, whichever is the longer, based on (and specifying) any of b, c, d or e above

B Extent of occurrence estimated to be less than 100 km^2 or areas of occupancy estimated to be less than 10 km^2, and estimates indicating any two of the following:

(1) Severely fragmented or known to exist at only a single location.

(2) Continuing decline, observed, inferred or projected, in any of the following:

(a) extent of occurrence
(b) area of occupancy
(c) area, extent and/or quality of habitat
(d) number of locations or sub-populations
(e) number of mature individuals

(3) Extreme fluctuations in any of the following:

(a) extent of occurrence
(b) area of occupancy
(c) number of locations or sub-populations
(d) number of mature individuals

C Population estimated to number less than 250 mature individuals and either:

(1) An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, or

(2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:

(a) severely fragmented (i.e. no sub-population estimated to contain more than 50 mature individuals)
(b) all individuals are in a single sub-population

D Population estimated to number less than 50 mature individuals

E Quantitative analysis showing the probability of extinction in the wild at least 50% within 10 years or three generations, whichever is the longer

Endangered (EN)

A taxon is *Endangered* when it is not *Critically Endangered* but is facing a very high risk of extinction in the wild in the near future, as defined by any of the following criteria (**A–E**):

A Population reduction in the form of either of the following:

(1) An observed, estimated, inferred or suspected reduction of at least 50% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

(a) direct observation
(b) an index of abundance appropriate for the taxon
(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
(d) actual or potential levels of exploitation
(e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

(2) A reduction of at least 50%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of b, c, d or e above.

B Extent of occurrence estimated to be less than 5,000 km^2 or area of occupancy estimated to be less than 500 km^2, and estimates indicating any two of the following:

(1) Severely fragmented or known to exist at no more than five locations.

(2) Continuing decline, inferred, observed or projected, in any of the following:

(a) extent of occurrence
(b) area of occupancy
(c) area, extent and/or quality of habitat
(d) number of locations or sub-populations
(e) number of mature individuals.

(3) Extreme fluctuations in any of the following:

(a) extent of occurrence
(b) area of occupancy
(c) number of locations or sub-populations
(d) number of mature individuals.

C Population estimated to number less than 2,500 mature individuals and either:

(1) An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, or

(2) A continuing decline, observed, projected or inferred, in numbers of mature individuals and population structure in the form of either:

(a) severely fragmented (i.e. no sub-population estimated to contain more than 250 mature individuals)
(b) all individuals are in a single sub-population.

D Population estimated to number less than 250 mature individuals

E Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer

Vulnerable (VU)

A taxon is *Vulnerable* when it is not *Critically Endangered* or *Endangered* but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the following criteria (**A–E**):

A Population reduction in the form of either of the following:

(1) An observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

(a) direct observation
(b) an index of abundance appropriate for the taxon
(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
(d) actual or potential levels of exploitation
(e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites

(2) A reduction of at least 20%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of b, c, d or e above

B Extent of occurrence estimated to be less than 20,000 km² or area of occupancy estimated to be less than 2,000 km², and estimates indicating any two of the following:

(1) Severely fragmented or known to exist at no more than 10 locations.

(2) Continuing decline, inferred, observed or projected, in any of the following:
- (a) extent of occurrence
- (b) area of occupancy
- (c) area, extent and/or quality of habitat
- (d) number of locations or sub-populations
- (e) number of mature individuals.

(3) Extreme fluctuations in any of the following:
- (a) extent of occurrence
- (b) area of occupancy
- (c) number of locations or sub-populations
- (d) number of mature individuals.

C Population estimated to number less than 10,000 mature individuals and either:

(1) An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, or

(2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
- (a) Severely fragmented (i.e. no sub-population estimated to contain more than 1,000 mature individuals)
- (b) All individuals are in a single sub-population.

D Population very small or restricted in the form of either of the following:

(1) Population estimated to number less than 1,000 mature individuals

(2) Population is characterised by an acute restriction in its area of occupancy (typically less than 100 km²) or in the number of locations (typically less than five). Such a taxon would thus be prone to the effects of human activities (or stochastic events whose impact is increased by human activities) within a very short period of time in an unforeseeable future, and is thus capable of becoming *Critically Endangered* or even *Extinct* in a very short period.

E Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years

Definitions

Extent of occurrence

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary that can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g. large areas of obviously unsuitable habitat) (but see 'area of occupancy'). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

Area of occupancy

Area of occupancy is defined as the area within its 'extent of occurrence' (see definition) which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may, for example, contain unsuitable habitats. The area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon (e.g. colonial nesting sites, feeding sites for migratory taxa). The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon. The criteria include values in km², and thus to avoid errors in classification, the area of occupancy should be measured on grid squares (or equivalents) which are sufficiently small.

Endangered (EN)

A taxon is *Endangered* when it is not *Critically Endangered* but is facing a very high risk of extinction in the wild in the near future, as defined by any of the following criteria (**A–E**):

A Population reduction in the form of either of the following:

(1) An observed, estimated, inferred or suspected reduction of at least 50% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

(a) direct observation
(b) an index of abundance appropriate for the taxon
(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
(d) actual or potential levels of exploitation
(e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

(2) A reduction of at least 50%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of b, c, d or e above.

B Extent of occurrence estimated to be less than 5,000 km^2 or area of occupancy estimated to be less than 500 km^2, and estimates indicating any two of the following:

(1) Severely fragmented or known to exist at no more than five locations.

(2) Continuing decline, inferred, observed or projected, in any of the following:

(a) extent of occurrence
(b) area of occupancy
(c) area, extent and/or quality of habitat
(d) number of locations or sub-populations
(e) number of mature individuals.

(3) Extreme fluctuations in any of the following:

(a) extent of occurrence
(b) area of occupancy
(c) number of locations or sub-populations
(d) number of mature individuals.

C Population estimated to number less than 2,500 mature individuals and either:

(1) An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, or

(2) A continuing decline, observed, projected or inferred, in numbers of mature individuals and population structure in the form of either:

(a) severely fragmented (i.e. no sub-population estimated to contain more than 250 mature individuals)
(b) all individuals are in a single sub-population.

D Population estimated to number less than 250 mature individuals

E Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer

Vulnerable (VU)

A taxon is *Vulnerable* when it is not *Critically Endangered* or *Endangered* but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the following criteria (**A–E**):

A Population reduction in the form of either of the following:

(1) An observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

(a) direct observation
(b) an index of abundance appropriate for the taxon
(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
(d) actual or potential levels of exploitation
(e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites

(2) A reduction of at least 20%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of b, c, d or e above

B Extent of occurrence estimated to be less than 20,000 km² or area of occupancy estimated to be less than 2,000 km², and estimates indicating any two of the following:

(1) Severely fragmented or known to exist at no more than 10 locations.

(2) Continuing decline, inferred, observed or projected, in any of the following:
- (a) extent of occurrence
- (b) area of occupancy
- (c) area, extent and/or quality of habitat
- (d) number of locations or sub-populations
- (e) number of mature individuals.

(3) Extreme fluctuations in any of the following:
- (a) extent of occurrence
- (b) area of occupancy
- (c) number of locations or sub-populations
- (d) number of mature individuals.

C Population estimated to number less than 10,000 mature individuals and either:

(1) An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, or

(2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
- (a) Severely fragmented (i.e. no sub-population estimated to contain more than 1,000 mature individuals)
- (b) All individuals are in a single sub-population.

D Population very small or restricted in the form of either of the following:

(1) Population estimated to number less than 1,000 mature individuals

(2) Population is characterised by an acute restriction in its area of occupancy (typically less than 100 km²) or in the number of locations (typically less than five). Such a taxon would thus be prone to the effects of human activities (or stochastic events whose impact is increased by human activities) within a very short period of time in an unforeseeable future, and is thus capable of becoming *Critically Endangered* or even *Extinct* in a very short period.

E Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years

Definitions

Extent of occurrence

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary that can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g. large areas of obviously unsuitable habitat) (but see 'area of occupancy'). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

Area of occupancy

Area of occupancy is defined as the area within its 'extent of occurrence' (see definition) which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may, for example, contain unsuitable habitats. The area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon (e.g. colonial nesting sites, feeding sites for migratory taxa). The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon. The criteria include values in km², and thus to avoid errors in classification, the area of occupancy should be measured on grid squares (or equivalents) which are sufficiently small.

Appendix 2

Species assigned to IUCN threat categories

Liverworts and mosses are listed separately within each category, in alphabetical order. The criteria (A–D) used to assign species to categories are indicated for each species in the *Critically Endangered*, *Endangered* and *Vulnerable* categories.

Extinct

Species	***Threat category***
Liverwort	
Fossombronia crozalsii	EX
Mosses	
Bryum lawersianum	EX
Bryum turbinatum	EX
Cynodontium fallax	EX
Encalypta brevicollis	EX
Grimmia anodon	EX
Grimmia elatior	EX
Gyroweisia reflexa	EX
Helodium blandowii	EX
Lescuraea saxicola	EX
Neckera pennata	EX
Orthotrichum gymnostomum	EX
Paludella squarrosa	EX
Pterygoneurum lamellatum	EX
Sphagnum obtusum	EX
Tortella limosella	EX
Trematodon ambiguus	EX
Weissia mittenii	EX

Critically Endangered

Species	***Threat category***	***Criteria sub-heads***			
		A	***B***	***C***	***D***
Liverworts					
Cephaloziella dentata	CR		B1+2c		
Jungermannia leiantha	CR		B1+2bd		
Mosses					
Amblystegium radicale (*A. saxatile*)	CR		B1+2bcd	C2ab	D
Aplodon wormskjoldii	CR	A1c			
Bartramia stricta	CR		B1+2bd		
Brachythecium trachypodium	CR		B1+2bd		
Bryum mamillatum	CR		B1+2bcd		

Bryum schleicheri	CR		B1+2bd	C2b	D
Bryum uliginosum	CR	A1ac			
Dicranum elongatum	CR	A1ac			
Didymodon glaucus	CR		B1+2bd		
Didymodon mamillosus	CR				D
Ephemerum cohaerens	CR	A1ac			
Homomallium incurvatum	CR		B1+2bd		
Hygrohypnum styriacum	CR			C2b	D
Micromitrium tenerum	CR		B1+2bcd		
Orthotrichum pumilum	CR			C2a	
Philonotis cernua	CR	A1ac			
Plagiothecium piliferum	CR		B1+2bd		
Rhynchostegium rotundifolium	CR			C2a	D
Seligeria carniolica	CR		B1+2bcd	C2b	
Tayloria tenuis	CR		B1+2bd		
Tetrodontium repandum	CR	A1ac			
Thamnobryum angustifolium	CR		B1+2bd		D

Endangered

Species	***Threat category***		***Criteria sub-heads***		
		A	***B***	***C***	***D***
Liverworts					
Cephaloziella baumgartneri	EN		B1+2bd		
Jamesoniella undulifolia	EN	A1ac	B1+2bcd	C1+2a	
Leiocolea rutheana	EN		B1+2bcd		
Lejeunea mandonii	EN		B1+2bd		
Phaeoceros carolinianus	EN		B1+2c		
Mosses					
Acaulon triquetrum	EN		B1+2bd		
Anomodon attenuatus	EN		B1+2bd		D
Atrichum angustatum	EN		B1+2bd		
Blindia caespiticia	EN		B1+2bd		
Bryum cyclophyllum	EN		B1+2bd		
Bryum gemmiparum	EN		B1+2bd		
Bryum marratii	EN		B1+2bd		
Bryum neodamense	EN		B1+2bd		
Buxbaumia viridis	EN		B1+2bd		D
Campylophyllum (Campylium) halleri	EN		B1+2bd		
Ceratodon conicus	EN		B1+2bcd		
Cyclodictyon laetevirens	EN				D
Ditrichum cornubicum	EN		B1+2bcd		
Ephemerum stellatum	EN		B1+2bcd		
Eurhynchium pulchellum	EN		B1+2bcd		
Habrodon perpusillus	EN			C2a	
Hygrohypnum polare	EN				D
Hypnum revolutum	EN				D
Myurella tenerrima	EN		B1+2bd		
Orthotrichum obtusifolium	EN		B1+2bcd	C2a	
Orthotrichum pallens	EN		B1+2bcd	C2a	
Philonotis marchica	EN		B1+2bd		
Physcomitrium eurystomum	EN		B1+2bcd		
Plagiobryum demissum	EN		B1+2bd		
Pohlia obtusifolia	EN		B1+2bd		
Rhytidiadelphus subpinnatus	EN		B1+2bd		
Sematophyllum demissum	EN		B1+2bd		

Sphagnum balticum	EN		B1+2bcd		
Tayloria lingulata	EN		B1+2bd		
Timmia austriaca	EN		B1+2bd		D
Tortula cernua (*Desmatodon cernuus*)	EN		B1+2bcd		
Tortula (*Pottia*) *wilsonii*	EN	A1ac			
Weissia levieri	EN		B1+2bd		
Weissia multicapsularis	EN		B1+2bd	C2a	
Weissia squarrosa	EN		B1+2bd		
Zygodon forsteri	EN		B1+2bd	C2a	
Zygodon gracilis	EN		B1+2bd		

Vulnerable

Species	***Threat category***	***Criteria sub-heads***			
		A	***B***	***C***	***D***
Liverworts					
Adelanthus lindenbergianus	VU				D2
Cephaloziella calyculata	VU		B1+2bd		
Cephaloziella integerrima	VU		B1+2bd		
Cephaloziella massalongi	VU			C2a	
Cephaloziella nicholsonii	VU			C2a	
Dumortiera hirsuta	VU		B1+2bd		D1
Geocalyx graveolens	VU		B1+2bd		
Gymnocolea acutiloba	VU				D2
Gymnomitrion apiculatum	VU				D1+2
Herbertus borealis	VU				D2
Lejeunea holtii	VU				D2
Lophozia capitata	VU		B1+2bd		
Marsupella arctica	VU				D2
Marsupella profunda	VU		B1+2bd		
Marsupella sparsifolia	VU				D2
Pallavicinia lyellii	VU	A1ac	B1+2bd	C1	
Radula carringtonii	VU				D1
Riccia bifurca	VU				D2
Riccia canaliculata	VU		B1+2bd		
Riccia huebeneriana	VU		B1+2c		
Riccia nigrella	VU				D2
Scapania praetervisa	VU				D2
Southbya nigrella	VU				D2
Sphaerocarpos texanus	VU		B1+2C		
Telaranea nematodes	VU				D2
Mosses					
Andreaea frigida	VU		B1+2bd		
Anomodon longifolius	VU		B1+2bd		
Brachythecium starkei	VU				D2
Bryum calophyllum	VU		B1+2bcd		
Bryum knowltonii	VU		B1+2bcd		
Bryum salinum	VU		B1+2bcd		D2
Bryum stirtonii	VU		B1+2bd		D2
Bryum warneum	VU		B1+2bcd		
Cinclidotus riparius	VU				D2
Cryphaea lamyana	VU				D1
Ctenidium procerrimum	VU				D2
Daltonia splachnoides	VU		B1+2bd		
Dicranum bergeri	VU	A1ac			
Dicranum leioneuron	VU				D2

Dicranum spurium	VU	A1ac			
Didymodon cordatus	VU				D2
Eurhynchium meridionale	VU				D2
Fissidens serrulatus	VU				D2
Grimmia ovalis	VU		B1+2bd	C2a	
Grimmia tergestina	VU				D2
Grimmia ungeri	VU				D2
Grimmia unicolor	VU				D2
Heterocladium dimorphum	VU				D2
Hygrohypnum molle	VU				D2
Hypnum vaucheri	VU				D2
Leptodontium gemmascens	VU		B1+2bcd		
Mielichhoferia elongata	VU				D2
Mielichhoferia mielichhoferiana	VU				D2
Orthodontium gracile	VU		B1+2bcd		
Paraleucobryum longifolium	VU		B1+2bd		
Pohlia crudoides	VU				D2
Pseudoleskeella nervosa	VU				D1+2
Saelania glaucescens	VU			C2a	D2
Scorpidium turgescens	VU				D2
Seligeria brevifolia	VU				D2
Sphagnum majus	VU		B1+2bd		
Syntrichia (Tortula) norvegica	VU				D1+2
Thamnobryum cataractarum	VU				D2
Tortula cuneifolia	VU		B1+2bd		
Tortula (Desmatodon) leucostoma	VU				D2
Weissia condensa	VU		B1+2bd		D2

Lower Risk (near threatened)

Species	***Threat category***
Liverwort	
Acrobolbus wilsonii	LR – nt
Anastrophyllum joergensenii	LR – nt
Anastrophyllum saxicola	LR – nt
Barbilophozia kunzeana	LR – nt
Barbilophozia quadriloba	LR – nt
Cephaloziella turneri	LR – nt
Fossombronia fimbriata	LR – nt
Fossombronia maritima	LR – nt
Gongylanthus ericetorum	LR – nt
Gymnomitrion corallioides	LR – nt
Jungermannia caespiticia	LR – nt
Jungermannia polaris	LR – nt
Leiocolea fitzgeraldiae	LR – nt
Leiocolea gillmanii	LR – nt
Lophozia perssonii	LR – nt
Lophozia wenzelii	LR – nt
Marsupella boeckii	LR – nt
Marsupella condensata	LR – nt
Odontoschisma macounii	LR – nt
Radula voluta	LR – nt
Riccia crystallina	LR – nt
Scapania gymnostomophila	LR – nt
Scapania paludicola	LR – nt
Southbya tophacea	LR – nt

Mosses	
Andreaea blyttii	LR – nt
Andreaea nivalis	LR – nt
Aongstroemia longipes	LR – nt
Brachythecium appleyardiae	LR – nt
Bryoerythrophyllum caledonicum	LR – nt
Bryum dixonii	LR – nt
Bryum muehlenbeckii	LR – nt
Cheilothela chloropus	LR – nt
Cirriphyllum cirrosum	LR – nt
Cynodontium strumiferum	LR – nt
Cynodontium tenellum	LR – nt
Dicranella grevilleana	LR – nt
Dicranum (*Dicranodontium*) *subporodictyon*	LR – nt
Didymodon icmadophilus	LR – nt
Didymodon tomaculosus	LR – nt
Ditrichum plumbicola	LR – nt
Ditrichum subulatum	LR – nt
Ephemerum sessile	LR – nt
Fissidens curvatus (*F. algarvicus*)	LR – nt
Fissidens exiguus	LR – nt
Fissidens monguillonii	LR – nt
Funaria pulchella	LR – nt
Grimmia arenaria	LR – nt
Grimmia elongata	LR – nt
Hygrohypnum smithii	LR – nt
Hymenostylium insigne	LR – nt
Mnium ambiguum	LR – nt
Mnium spinosum	LR – nt
Myrinia pulvinata	LR – nt
Oncophorus wahlenbergii	LR – nt
Orthotrichum speciosum	LR – nt
Palustriella (*Cratoneuron*) *decipiens*	LR – nt
Physcomitrium sphaericum	LR – nt
Plagiomnium medium	LR – nt
Pohlia andalusica	LR – nt
Pohlia scotica	LR – nt
Pseudoleskea incurvata	LR – nt
Pseudoleskeella rupestris (*P. sibirica*)	LR – nt
Ptychodium plicatum	LR – nt
Racomitrium macounii	LR – nt
Sanionia orthothecioides	LR – nt
Schistidium agassizii	LR – nt
Sphagnum lindbergii	LR – nt
Splachnum vasculosum	LR – nt
Stegonia latifolia	LR – nt
Timmia norvegica	LR – nt
Tortella fragilis	LR – nt
Tortula freibergii	LR – nt
Tortula solmsii	LR – nt
Tortula vahliana	LR – nt
Weissia rostellata	LR – nt
Weissia sterilis	LR – nt

Data Deficient

Species	***Threat category***
Liverwort	
Athalamia hyalina	DD
Cephalozia ambigua	DD
Lophozia longiflora	DD
Nardia insecta	DD
Plagiochila norvegica	DD
Scapania parvifolia	DD
Mosses	
Andreaea alpestris	DD
Brachythecium erythrorrhizon	DD
Bryum archangelicum	DD
Bryum arcticum	DD
Bryum gemmilucens	DD
Cynodontium polycarpon	DD
Dichodontium flavescens	DD
Ditrichum flexicaule	DD
Grimmia alpestris	DD
Grimmia crinita	DD
Hedwigia ciliata	DD
Orthotrichum consimile	DD
Pictus scoticus	DD
Racomitrium himalayanum	DD
Seligeria campylopoda	DD
Seligeria diversifolia	DD
Sematophyllum substrumulosum	DD
Sphagnum skyense	DD

Appendix 3

Bryophytes protected by legislation

Liverworts and mosses are listed separately, in alphabetical order.

Bryophytes listed on Schedule 8 of the Wildlife and Countryside Act, 1981

Liverworts	
Adelanthus lindenbergianus	Lindenberg's leafy liverwort
Geocalyx graveolens	Turpswort
Gymnomitrion apiculatum	Pointed frostwort
Jamesoniella undulifolia	Marsh earwort
Leiocolea rutheana	Norfolk flapwort
Marsupella profunda	Western rustwort
Petalophyllum ralfsii	Petalwort
Riccia bifurca	Lizard crystalwort
Southbya nigrella	Blackwort
Mosses	
Acaulon triquetrum	Triangular pygmy-moss
Anomodon longifolius	Long-leaved anomodon
Bartramia stricta	Rigid apple-moss
Bryum mamillatum	Dune thread-moss
Bryum neodamense	Long-leaved threadmoss
Bryum schleicheri	Schleicher's thread-moss
Buxbaumia viridis	Green shield-moss
Cryphaea lamyana	Multi-fruited river-moss
Cyclodictyon laetevirens	Bright-green cave-moss
Didymodon cordatus (*Barbula cordata*)	Cordate beard-moss
Didymodon glaucus (*Barbula glauca*)	Glaucous beard-moss
Ditrichum cornubicum	Cornish path-moss
Grimmia unicolor	Blunt-leaved grimmia
Hamatocaulis vernicosus (*Drepanocladus vernicosus*)	Slender green feather-moss
Hygrohypnum polare	Polar feather-moss
Hypnum vaucheri	Vaucher's feather-moss
Micromitrium tenerum	Millimetre moss
Mielichhoferia mielichhoferiana (*M. mielichhoferi*)	Alpine copper-moss
Orthotrichum obtusifolium	Blunt-leaved bristle-moss
Plagiothecium piliferum	Hair silk-moss
Rhynchostegium rotundifolium	Round-leaved feather-moss
Saelania glaucescens	Blue dew-moss
Scorpidium turgescens	Large yellow feather-moss
Sphagnum balticum	Baltic bog-moss
Thamnobryum angustifolium	Derbyshire feather-moss
Tortula cernua (*Desmatodon cernuus*)	Flamingo moss
Zygodon forsteri	Knothole moss
Zygodon gracilis	Nowell's limestone-moss

Appendix 4

List of European Red List species in Britain

The European Red List (European Committee for the Conservation of Bryophytes 1995) used the old IUCN threat categories (*Extinct, Endangered, Vulnerable, Rare*). Only those species in the old categories *Extinct, Endangered* and *Vulnerable* are included here, as many of the *Rare* species would be categorised as *Lower Risk* (*near threatened*) using the revised criteria. Species also occurring in Northern Ireland are indicated by (NI). Liverworts and mosses are listed separately, in alphabetical order.

Liverworts

Acrobolbus wilsonii
Adelanthus lindenbergianus
Herbertus borealis
Jamesoniella undulifolia
Marsupella profunda
Pallavicinia lyellii
Petalophyllum ralfsii (NI)

Mosses

Brachythecium appleyardiae
Bryum lawersianum
Bryum neodamense
Buxbaumia viridis
Cryphaea lamyana
Daltonia splachnoides
Didymodon glaucus (*Barbula glauca*)
Didymodon mamillosus (*Barbula mamillosa*)
Ditrichum cornubicum
Ditrichum plumbicola
Ephemerum cohaerens
Ephemerum stellatum
Micromitrium tenerum
Neckera pennata
Orthodontium gracile (NI)
Orthotrichum consimile
Pterygoneurum lamellatum
Seligeria carniolica
Thamnobryum angustifolium
Thamnobryum cataractarum
Tortella limosella
Tortula cernua (*Desmatodon cernuus*)
Tortula freibergii
Weissia multicapsularis
Zygodon forsteri
Zygodon gracilis

Appendix 5

Red List, Data Deficient and Lower Risk (near threatened) species

All species are listed in alphabetical order. Two additional *Nationally Scarce* species (*Hamatocaulis vernicosus* and *Petalophyllum ralfsii*) are also included, as they are listed on Schedule 8 of the Wildlife & Countryside Act and included in international legislation.

Key to abbreviations

Revised IUCN categories (Britain)

EX	*Extinct*
CR	*Critically Endangered*
EN	*Endangered*
VU	*Vulnerable*
DD	*Data Deficient*
LR(nt)	*Lower Risk (near threatened)*
NS	*Nationally Scarce*

Old IUCN categories (Europe)

Ex	*Extinct*
E	*Endangered*
V	*Vulnerable*
R	*Rare*
K	*Insufficiently known*
NT	*Not threatened*

WCA	Listed on Schedule 8 of the Wildlife and Countryside Act 1981
M	Moss
L	Liverwort

	Species	*Status in Britain*	*Status in Europe*[2]	*Legal protection*
M	*Acaulon triquetrum*	EN	NT	WCA
L	*Acrobolbus wilsonii*	LR(nt)	V	
L	*Adelanthus lindenbergianus*	VU	V	WCA
M	*Amblystegium radicale* (*A. saxatile*)	CR	R	
L	*Anastrophyllum joergensenii*	LR(nt)	R	
L	*Anastrophyllum saxicola*	LR(nt)	NT	
M	*Andreaea alpestris*	DD	NT	
M	*Andreaea blyttii*	LR(nt)	NT	
M	*Andreaea frigida*	VU	NT	
M	*Andreaea nivalis*	LR(nt)	NT	
M	*Anomodon attenuatus*	EN	NT	
M	*Anomodon longifolius*	VU	NT	WCA
M	*Aongstroemia longipes*	LR(nt)	NT	
M	*Aplodon wormskjoldii*	CR	NT	
L	*Athalamia hyalina*	DD	NT	
M	*Atrichum angustatum*	EN	NT	

	Species	Status in Britain	Status in Europe[2]	Legal protection
L	*Barbilophozia kunzeana*	LR(nt)	NT	
L	*Barbilophozia quadriloba*	LR(nt)	NT	
M	*Bartramia stricta*	CR	NT	WCA
M	*Blindia caespiticia*	EN	NT	
M	*Brachythecium appleyardiae*	LR(nt)	V	
M	*Brachythecium erythrorrhizon*	DD	NT	
M	*Brachythecium starkei*	VU	NT	
M	*Brachythecium trachypodium*	CR	NT	
M	*Bryoerythrophyllum caledonicum*	LR(nt)	R	
M	*Bryum archangelicum*	DD	NT	
M	*Bryum arcticum*	DD	NT	
M	*Bryum calophyllum*	VU	R	
M	*Bryum cyclophyllum*	EN	NT	
M	*Bryum dixonii*	LR(nt)	R	
M	*Bryum gemmilucens*	DD	NT	
M	*Bryum gemmiparum*	EN	NT	
M	*Bryum knowltonii*	VU	NT	
M	*Bryum lawersianum*	EX	Ex	
M	*Bryum mamillatum*	CR	R	WCA
M	*Bryum marratii*	EN	NT	
M	*Bryum muehlenbeckii*	LR(nt)	NT	
M	*Bryum neodamense*	EN	V	WCA
M	*Bryum salinum*	VU	NT	
M	*Bryum schleicheri*	CR	NT	WCA
M	*Bryum stirtonii*	VU	K	
M	*Bryum turbinatum*	EX	NT	
M	*Bryum uliginosum*	CR	NT	
M	*Bryum warneum*	VU	R	
M	*Buxbaumia viridis*	EN	V	WCA
M	*Campylophyllum (Campylium) halleri*	EN	NT	
L	*Cephalozia ambigua*	DD	NT	
L	*Cephaloziella baumgartneri*	EN	NT	
L	*Cephaloziella calyculata*	VU	R	
L	*Cephaloziella dentata*	CR	NT	
L	*Cephaloziella integerrima*	VU	NT	
L	*Cephaloziella massalongi*	VU	R	
L	*Cephaloziella nicholsonii*	VU	R	
L	*Cephaloziella turneri*	LR(nt)	NT	
M	*Ceratodon conicus*	EN	NT	
M	*Cheilothela chloropus*	LR(nt)	NT	
M	*Cinclidotus riparius*	VU	NT	
M	*Cirriphyllum cirrosum*	LR(nt)	NT	
M	*Cryphaea lamyana*	VU	V	WCA
M	*Ctenidium procerrimum*	VU	NT	
M	*Cyclodictyon laetevirens*	EN	R	WCA
M	*Cynodontium fallax*	EX	NT	
M	*Cynodontium polycarpon*	DD	NT	
M	*Cynodontium strumiferum*	LR(nt)	NT	
M	*Cynodontium tenellum*	LR(nt)	NT	
M	*Daltonia splachnoides*	VU	V	
M	*Dichodontium flavescens*	DD	NT	
M	*Dicranella grevilleana*	LR(nt)	NT	
M	*Dicranum bergeri*	VU	NT	
M	*Dicranum elongatum*	CR	NT	
M	*Dicranum leioneuron*	VU	NT	
M	*Dicranum spurium*	VU	NT	

	Species	Status in Britain	Status in Europe[2]	Legal protection
M	*Dicranum (Dicranodontium) subporodictyon*	LR(nt)	R	
M	*Didymodon cordatus (Barbula cordata)*	VU	NT	WCA
M	*Didymodon glaucus (Barbula glauca)*	CR	V	WCA
M	*Didymodon icmadophilus*	LR(nt)	NT	
M	*Didymodon mamillosus*	CR	V	
M	*Didymodon tomaculosus*	LR(nt)	K	
M	*Ditrichum cornubicum*	EN	E	WCA
M	*Ditrichum flexicaule*	DD	NT	
M	*Ditrichum plumbicola*	LR(nt)	V	
M	*Ditrichum subulatum*	LR(nt)	NT	
L	*Dumortiera hirsuta*	VU	R	
M	*Encalypta brevicollis*	EX	NT	
M	*Ephemerum cohaerens*	CR	E	
M	*Ephemerum sessile*	LR(nt)	R	
M	*Ephemerum stellatum*	EN	V	
M	*Eurhynchium meridionale*	VU	NT	
M	*Eurhynchium pulchellum*	EN	NT	
M	*Fissidens curvatus (F. algarvicus)*	LR(nt)	K	
M	*Fissidens exiguus*	LR(nt)	NT	
M	*Fissidens monguillonii*	LR(nt)	R	
M	*Fissidens serrulatus*	VU	NT	
L	*Fossombronia crozalsii*	EX	R	
L	*Fossombronia fimbriata*	LR(nt)	R	
L	*Fossombronia maritima*	LR(nt)	NT	
M	*Funaria pulchella*	LR(nt)	NT	
L	*Geocalyx graveolens*	VU	NT	WCA
L	*Gongylanthus ericetorum*	LR(nt)	NT	
M	*Grimmia alpestris*	DD	-	
M	*Grimmia anodon*	EX	NT	
M	*Grimmia arenaria*	LR(nt)	K	
M	*Grimmia crinita*	DD	NT	
M	*Grimmia elatior*	EX	NT	
M	*Grimmia elongata*	LR(nt)	NT	
M	*Grimmia ovalis*	VU	NT	
M	*Grimmia tergestina*	VU	NT	
M	*Grimmia ungeri*	VU	-	
M	*Grimmia unicolor*	VU	NT	WCA
L	*Gymnocolea acutiloba*	VU	NT	
L	*Gymnomitrion apiculatum*	VU	NT	WCA
L	*Gymnomitrion corallioides*	LR(nt)	NT	
M	*Gyroweisia reflexa*	EX	K	
M	*Habrodon perpusillus*	EN	NT	
M	*Hamatocaulis (Drepanocladus) vernicosus*	NS	K	WCA
M	*Hedwigia ciliata*	DD	NT	
M	*Helodium blandowii*	EX	NT	
L	*Herbertus borealis*	VU	V	
M	*Heterocladium dimorphum*	VU	NT	
M	*Homomallium incurvatum*	CR	NT	
M	*Hygrohypnum molle*	VU	NT	
M	*Hygrohypnum polare*	EN	NT	WCA
M	*Hygrohypnum smithii*	LR(nt)	NT	
M	*Hygrohypnum styriacum*	CR	R	
M	*Hymenostylium insigne*	LR(nt)	R	
M	*Hypnum revolutum*	EN	NT	
M	*Hypnum vaucheri*	VU	NT	WCA
L	*Jamesoniella undulifolia*	EN	E	WCA

	Species	Status in Britain	Status in Europe[2]	Legal protection
L	*Jungermannia caespiticia*	LR(nt)	NT	
L	*Jungermannia leiantha*	CR	NT	
L	*Jungermannia polaris*	LR(nt)	NT	
L	*Leiocolea fitzgeraldiae*	LR(nt)	NT	
L	*Leiocolea gillmanii*	LR(nt)	NT	
L	*Leiocolea rutheana*	EN	NT	WCA
L	*Lejeunea holtii*	VU	NT	
L	*Lejeunea mandonii*	EN	R	
M	*Leptodontium gemmascens*	VU	R	
M	*Lescuraea saxicola*	EX	NT	
L	*Lophozia capitata*	VU	NT	
L	*Lophozia longiflora*	DD	NT	
L	*Lophozia perssonii*	LR(nt)	NT	
L	*Lophozia wenzelii*	LR(nt)	NT	
L	*Marsupella arctica*	VU	R	
L	*Marsupella boeckii*	LR(nt)	NT	
L	*Marsupella condensata*	LR(nt)	NT	
L	*Marsupella profunda*	VU	V	WCA
L	*Marsupella sparsifolia*	VU	NT	
M	*Micromitrium tenerum*	CR	V	WCA
M	*Mielichhoferia elongata*	VU	K	
M	*Mielichhoferia mielichhoferiana* (*M. mielichhoferi*)	VU	K	WCA
M	*Mnium ambiguum*	LR(nt)	NT	
M	*Mnium spinosum*	LR(nt)	NT	
M	*Myrinia pulvinata*	LR(nt)	NT	
M	*Myurella tenerrima*	EN	NT	
L	*Nardia insecta*	DD	NT	
M	*Neckera pennata*	EX	V	
L	*Odontoschisma macounii*	LR(nt)	NT	
M	*Oncophorus wahlenbergii*	LR(nt)	NT	
M	*Orthodontium gracile*	VU	E	
M	*Orthotrichum consimile*	DD	Ev	
M	*Orthotrichum gymnostomum*	EX	NT	
M	*Orthotrichum obtusifolium*	EN	NT	WCA
M	*Orthotrichum pallens*	EN	NT	
M	*Orthotrichum pumilum*	CR	NT	
M	*Orthotrichum speciosum*	LR(nt)	NT	
L	*Pallavicinia lyellii*	VU	V	
M	*Paludella squarrosa*	EX	NT	
M	*Palustriella* (*Cratoneuron*) *decipiens*	LR(nt)	NT	
M	*Paraleucobryum longifolium*	VU	NT	
L	*Petalophyllum ralfsii*	NS	V	WCA
L	*Phaeoceros carolinianus*	EN	NT	
M	*Philonotis cernua*	CR	R	
M	*Philonotis marchica*	EN	NT	
M	*Physcomitrium eurystomum*	EN	NT	
M	*Physcomitrium sphaericum*	LR(nt)	R	
M	*Pictus scoticus*	DD	K	
M	*Plagiobryum demissum*	EN	NT	
L	*Plagiochila norvegica*	DD	E	
M	*Plagiomnium medium*	LR(nt)	NT	
M	*Plagiothecium piliferum*	CR	NT	WCA
M	*Pohlia andalusica* (*P. rothii*)	LR(nt)	NT	
M	*Pohlia crudoides*	VU	NT	
M	*Pohlia obtusifolia*	EN	NT	
M	*Pohlia scotica*	LR(nt)	R	

	Species	Status in Britain	Status in Europe[2]	Legal protection
M	*Pseudoleskea incurvata*	LR(nt)	NT	
M	*Pseudoleskeella nervosa*	VU	NT	
M	*Pseudoleskeella rupestris* (*P. sibirica*)	LR(nt)	K	
M	*Pterygoneurum lamellatum*	EX	V	
M	*Ptychodium plicatum* (*Lescuraea plicata*)	LR(nt)	NT	
M	*Racomitrium himalayanum*	DD	K	
M	*Racomitrium macounii*	LR(nt)	NT	
L	*Radula carringtonii*	VU	R	
L	*Radula voluta*	LR(nt)	R	
M	*Rhynchostegium rotundifolium*	CR	R	WCA
M	*Rhytidiadelphus subpinnatus*	EN	NT	
L	*Riccia bifurca*	VU	NT	WCA
L	*Riccia canaliculata*	VU	NT	
L	*Riccia crystallina*	LR(nt)	NT	
L	*Riccia huebeneriana*	VU	R	
L	*Riccia nigrella*	VU	NT	
M	*Saelania glaucescens*	VU	NT	WCA
M	*Sanionia orthothecioides*	LR(nt)	NT	
L	*Scapania gymnostomophila*	LR(nt)	NT	
L	*Scapania paludicola*	LR(nt)	NT	
L	*Scapania parvifolia*	DD	NT	
L	*Scapania praetervisa*	VU	NT	
M	*Schistidium agassizii*	LR(nt)	NT	
M	*Scorpidium turgescens*	VU	NT	WCA
M	*Seligeria brevifolia*	VU	K	
M	*Seligeria campylopoda*	DD	K	
M	*Seligeria carniolica*	CR	E	
M	*Seligeria diversifolia*	DD	NT	
M	*Sematophyllum demissum*	EN	R	
M	*Sematophyllum substrumulosum*	DD	NT	
L	*Southbya nigrella*	VU	NT	WCA
L	*Southbya tophacea*	LR(nt)	NT	
L	*Sphaerocarpos texanus*	VU	NT	
M	*Sphagnum balticum*	EN	NT	WCA
M	*Sphagnum lindbergii*	LR(nt)	NT	
M	*Sphagnum majus*	VU	NT	
M	*Sphagnum obtusum*	EX	NT	
M	*Sphagnum skyense*	DD	K	
M	*Splachnum vasculosum*	LR(nt)	NT	
M	*Stegonia latifolia*	LR(nt)	NT	
M	*Syntrichia* (*Tortula*) *norvegica*	VU	NT	
M	*Tayloria lingulata*	EN	NT	
M	*Tayloria tenuis*	CR	NT	
L	*Telaranea nematodes*	VU	R	
M	*Tetrodontium repandum*	CR	NT	
M	*Thamnobryum angustifolium*	CR	V	WCA
M	*Thamnobryum cataractarum*	VU	V	
M	*Timmia austriaca*	EN	NT	
M	*Timmia norvegica*	LR(nt)	NT	
M	*Tortella fragilis*	LR(nt)	NT	
M	*Tortella limosella*	EX	Ex	
M	*Tortula cernua* (*Desmatodon cernuus*)	EN	V	WCA
M	*Tortula cuneifolia*	VU	NT	
M	*Tortula freibergii*	LR(nt)	V	
M	*Tortula* (*Desmatodon*) *leucostoma*	VU	NT	
M	*Tortula solmsii*	LR(nt)	R	

	Species	*Status in Britain*	*Status in Europe*[2]	*Legal protection*
M	*Tortula vahliana*	LR(nt)	NT	
M	*Tortula* (*Pottia*) *wilsonii*	EN	NT	
M	*Trematodon ambiguus*	EX	NT	
M	*Weissia condensa* (*W. tortilis*)	VU	NT	
M	*Weissia levieri*	EN	R	
M	*Weissia mittenii*	EX	NT	
M	*Weissia multicapsularis*	EN	E	
M	*Weissia rostellata*	LR(nt)	R	
M	*Weissia squarrosa*	EN	R	
M	*Weissia sterilis*	LR(nt)	R	
M	*Zygodon forsteri*	EN	V	WCA
M	*Zygodon gracilis*	EN	V	WCA

[2] According to the published *Red Data Book* (European Commission for the Conservation of Bryophytes 1995). Many of these statuses are clearly out of date, and the European Red List is now being revised according to the new IUCN criteria.

Appendix 6

Glossary

Acrocarp, adj. acrocarpous	having the archegonia at the tip of a stem — usually easily distinguished by their tuft-like growth, unbranched or little-branched stems and capsules arising from the stem tips.
Alar cells	group of differentiated cells at basal angles of leaf.
Apiculus (of leaf or sporophyte)	small pointed projection at apex.
Apophysis	swollen base of capsule, below spore-producing urn.
Appressed (of leaves)	held close to the stem.
Autoecious	having the male and female sexual organs in separate inflorescences on the same plant.
Bistratose (of cells)	arranged in two layers.
Bulbil	small, bulb-shaped structure of vegetative reproduction, usually produced in leaf axils.
Calcicole, adj. calcicolous	species favouring substrates rich in calcium.
Calyptra	hood-like protective covering of the capsule in mosses.
Chionophilous	favouring areas of late snow-lie.
Cilia, adj. ciliate	hairlike appendages — here used to describe structures in the peristome of *Bryum* and on the perianth of *Lophozia*.
Complanate (of leaves)	flattened in one plane.
Decurrent	describes leaf base margins extending down the stem.
Denticulate	minutely toothed.
Dioecious	having male and female reproductive organs on separate plants.
Distal	farthest away from point of attachment (ant. proximal).
Dorsal	in mosses, the back of a leaf, usually the convex side (abaxial), closest to the substrate if shoot is erect; in liverworts, the upper (i.e. farthest from the substrate) surface of a leaf and/or shoot.
Excurrent	projecting beyond lamina.
Fascicle	bunch of branches attached at almost the same point (*Sphagnum*).
Filiform	threadlike.
Flagelliform shootlets	long, thin shoots with reduced leaves.
Fusiform	spindle-shaped.
Gametophyte	the vegetative, haploid generation of the bryophyte life cycle.
Gemma, pl. gemmae	few-celled structures used for vegetative reproduction, produced on various parts of the plant.
Glaucous	bluish-grey.
Hair-point	colourless or whitish hair-like tip to a leaf, often formed of an extension of the nerve.
Hectad	a 10 km^2 x 10 km^2 grid square.
Hyaline (usually of cells)	clear and colourless.
Hyalocyst	specialised hyaline cell in *Sphagnum* leaf.
Imbricate (of leaves)	overlapping closely and pressed to stem.
Incurved	curved upwards and inwards.
Involucre	a thalloid structure sheathing the reproductive organs in liverworts (replacing or additional to the perianth).
Julaceous (of leaves)	very closely overlapping, giving shoots a swollen, cylindrical appearance.
Keel	fold-line or crease, such as the line separating the lobes of the leaves of some liverworts.

Lamella, pl. lamellae	flat plates of cells perpendicular to the plane of the leaf or thallus.
Lanceolate	lance-shaped.
Lobule	the small ventral leaf lobe of some leafy liverworts (e.g. *Lejeunea*).
Mamilla, pl. mamillae, adj.	hollow protrusion of cell surface. mamillose (of cells)
Monoecious	having both male and female sexual organs on the same plant.
Nerve (syn. Costa)	the midrib of the leaf.
Obovate	egg-shaped in outline with the widest part above the middle.
Oil bodies	oil-containing structures in the leaf cells of liverworts.
Ovate	egg-shaped in outline with the widest part below the middle.
Papilla, pl. papillae, adj. papillose	small, rounded protuberances on the outer wall of the cell; papillose — covered with papillae.
Paraphyllia	small filamentous or leaf-like growths on stem, among the leaves.
Paroecious	having male and female sexual organs close together on the same plant, but not mixed in the same inflorescence.
Perianth	tubular structure in liverworts, formed by the fusion of two leaves surrounding the archegonia.
Perichaetial	describing the leaves immediately enclosing the archegonia and often surrounding the base of the seta.
Peristome	tooth-like fringe surrounding the mouth of the moss capsule.
Pinnate	branched like a feather, i.e. with branches arising on either side along a main stem.
Pleurocarp, adj. pleurocarpous	bearing the archegonia on short lateral side branches — usually easily distinguished by their prostrate mat-like growth, pinnately branched stems and capsules produced on side branches.
Protonema, adj. protonemal	thread-like or sometimes thallose structure produced from the germi nation of a spore. Can give rise to protonemal gemmae.
Pseudoperianth	a hyaline sheath enclosing the sporophyte in some thalloid liverworts (Marchantiaceae).
Recurved	curving backwards and outwards.
Rhizoids	hair-like structures which usually anchor the plant to the substrate.
Seta, pl. setae	the stalk bearing the capsule in a moss.
Sporophyte	the spore-producing, diploid generation of the bryophyte life cycle.
Squarrose	with the leaves very strongly curved back on themselves.
Stereid band	band of long, narrow, thick-walled cells in the nerves of some mosses.
Stoma, pl. stomata	pore with two guard cells, sometimes present on sporophytes.
Subula, adj. subulate	a long, thin point. (usually of leaves)
Terete (of shoots)	smooth, cylindrical.
Thallus, pl. thalli, adj. thalloid	flattened shoot of plant without stem or leaves.
Tomentose	thickly felted with long rhizoids, giving a hairy appearance.
Underleaves	the third and usually smaller row of leaves on the underside of the stems of many liverworts.
Ventral	in mosses, the inner, uppermost surface of a leaf, usually the concave side (adaxial); in liverworts, the lower (i.e. closest to the substrate) surface of a leaf and/or shoot.

Appendix 7

Localities mentioned in the text

The following list includes all localities mentioned in the accounts of species, together with the vice-county and the Ordnance grid square in which they occur.

Abernethy Forest, Easterness, NJ01
Afon Teifi, Cardiganshire, SN
Alderley Edge, Cheshire, SJ87
Ampleforth, North-east Yorkshire, SE57
Aonach Beag, Westerness, NN47
Arenig Fawr, Merioneth, SH83
Arisaig, Westerness, NM68
Arthur's Seat, Edinburgh, Midlothian, NT27
Arundel, West Sussex, TQ00
Balquhidder, West Perthshire,
Beinn a'Bhuird, South Aberdeenshire, NJ10, NO09
Beinn Dearg, East/West Ross, NH28
Beinn Dorain, Argyll, NN33
Beinn Eighe, West Ross, NG96, NH06,
Beinn Gaire, Westerness, NM77
Beinn Riabhach, West Inverness, NN17
Ben Alder, Westerness, NN47, 57
Ben Lawers, Mid Perthshire, NN64
Ben Ledi, West Perthshire, NN50
Ben Lomond, Stirlingshire, NN30
Ben Nevis, West Inverness, NN17
Ben Vorlich, West Perthshire, NN61
Bizzle Burn, North Northumberland, NT82
Black Burn, Newcastleton, Roxburghshire, NY48
Box Hill, Surrey, TQ15
Braemar, South Aberdeenshire, NO19
Braunton Burrows, North Devon, SS43
Breadalbane Mountains, Perthshire, NN
Brean Down, North Somerset, ST25
Breckland, West Norfolk/West
Suffolk/Cambridgeshire, TF, TL
Burnham Beeches, Buckinghamshire, SU98
Buxton Heath, East Norfolk, TG12
Caenlochan Glen, Angus, NO17
Cairngorms, NH, NJ, NN, NO
Chepstow, Monmouthshire, ST59
Cleethorpes, North Lincolnshire, TA30
Coire Cheap, Westerness, NN47
Coire Fee, Angus, NO27
Cotswolds, Gloucestershire, SP
Craven district, Mid-west Yorkshire, SD
Creag an Dail Bheag, South Aberdeenshire, NO19
Den of Airlie, Angus, NO25
Don valley, South-west Yorkshire, SE50
Edinburgh, Midlothian, NT27
Edzell, Kincardineshire, NO57
Elcho, Mid Perthshire, NO12
Epping Forest, South Essex, TQ49
Falkirk, Stirlingshire, NS88
Fettercairn, Kincardineshire, NO67
Flow Country, Caithness/Sutherland, NC
Fothringham, Angus, NO44
Frilford Bog, Berkshire, SU49
Glas Maol, East Perthshire/Angus, NO17
Glas Tulaichean, East Perthshire, NO07
Glen Affric, Easterness, NH12
Glen Banchor, Easterness, NH60
Glen Clova, Angus, NO37
Glen Coe, Argyll, NN15
Glen Doll, Angus, NN17, 27
Glen Feshie, Easterness, NN89
Glen Isla, Angus, NO17
Glen Lee, Angus, NO37
Glen Lochay, Mid Perthshire, NN
Glen Nevis, West Inverness, NN16
Glen Shee, East Perthshire, NO17
Goonhilly Downs, West Cornwall, SW71
Gower Peninsula, Glamorgan, SS48
Great Monk Wood, Epping Forest,
South Essex, TQ49
Hatton, Warwickshire, SP26
Hawick, Roxburghshire, NT41
Hirta, St Kilda, Outer Hebrides, NA00, 10,
NF09, 19
Ingleborough, Mid-west Yorkshire, SD77
Ingleton, Mid-west Yorkshire, SD67
Islay, South Ebudes, NR
Isle of Islay, South Ebudes, NR
Isle of Jura, South Ebudes, NR
Isle of Mull, Mid Ebudes, NM
Isle of Portland, Dorset, SY66, 67, 77
Isle of Skye, North Ebudes, NG
Isles of Scilly, SV
Jura, South Ebudes, NR

Killin, Mid Perthshire, NN53
Kindrogan, East Perthshire, NO06
Kirkton Glen, West Perthshire, NN52
Knapdale, Kintyre, NR76
Kynance Cove, West Cornwall, SW61
Lake District, Westmorland/Cumberland, NY, SD
Lizard Peninsula, West Cornwall, SW61, 71
Loch Loch, East Perthshire, NN97
Loch Morlich, Easterness, NH90
Loch Sunart, Westerness, NM75
Lochnagar, South Aberdeenshire, NO28
Lulworth Cove, Dorset, SY88
Malham, Mid-west Yorkshire, SD86, 96
Marros, Carmarthenshire, SN20
Meall nan Tarmachan, Mid Perthshire, NN53
Mendip Hills, North Somerset, ST
Monadhliath Hills, Easterness, NH
Morrone Hill, South Aberdeenshire, NO18, 19
Mull, Mid Ebudes, NM
New Forest, South Hampshire, SU, SZ
Newborough Warren, Anglesey, SH46
Newcastleton, Roxburghshire, NY48
Nuneaton, Warwickshire, SP39
Old Man of Storr, Skye, North Ebudes, NG55
Peak District, Derbyshire, SK
Peckforton Hills, Cheshire, SJ55
Pen-y-ghent, Mid-west Yorkshire, SD87
Plock of Kyle, West Ross, NG72
Port Eynon Point, Gower Peninsula,
Glamorgan, SS48
Reeky Linn, Angus, NO25
Rhinog Mts., Merioneth, SH
River Bovey, South Devon, SX
River Braan, Mid Perthshire, NN94
River Dart, South Devon, SX
River Findhorn, Moray, NH, NJ
River Islay, Angus, NO25
River North Esk, Kincardineshire, NO57
River Tamar, East Cornwall/South Devon, SX
River Taw, North Devon, SS62
River Tees, County Durham, NY, NZ
River Teme,
Herefordshire/Shropshire/Worcestershire, SO
River Usk, Monmouthshire/Breconshire, SN, SO
Rockram Wood, New Forest, South Hampshire, SU21
Roslin Glen, Midlothian, NT26
Rufus Stone, New Forest, South Hampshire, SU21
Rum, North Ebudes, NG30, 40, NM39, 49
Sand Point, North Somerset, ST36
Schiehallion, Mid Perthshire, NN75
Sefton coast, South Lancashire, SD
Seven Linns, South Northumberland, NY78
Sgurr na Lapaich, East Ross, NH13
Sgurr nan Conbhairean, Easterness, NH11
Shanklin, Isle of Wight, SZ58
Silwood Park, Berkshire, SU96
Skye, North Ebudes, NG
Snowdon, Caernarvonshire, SH55, 65
Solway mosses, Cumberland/Dumfriesshire, NY
St Kilda, Outer Hebrides, NA00, 10, NF09, 19
Strath Suardal, Skye, North Ebudes, NG62
Teesdale, NY, NZ
Thorne Moors, South-west Yorkshire, SE71
Torquay, South Devon, SX96
Torridon, West Ross, NC, NG, NH
Touch Hills, Stirlingshire, NS78
Treviscoe, East Cornwall, SW95
Tring, Hertfordshire, SP91
Trotternish Peninsula, Skye, North Ebudes, NG
Weald, Sussex/Kent, TQ
Weardale, County Durham, NY, NZ
Wells, North Somerset, ST54
Wharfedale, Mid-west Yorkshire,
Wimbledon Common, Surrey, TQ27
Worms Head, Gower Peninsula, Glamorgan, SS38
Wye Valley, Gloucestershire/Monmouthshire,
SO, ST
Ynyslas, Cardiganshire, SN69
Yorkshire Dales, Mid-west Yorkshire, SD, SE

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