European Community Directive

on the Conservation of Natural Habitats

and of Wild Fauna and Flora

(92/43/EEC)

Second Report by the United Kingdom under Article 17

on the implementation of the Directive

from January 2001 to December 2006

Conservation status assessment for :

S1421: *Trichomanes speciosum* - Killarney fern

S1421 *Trichomanes speciosum* Killarney fern

Audit trail compiled and edited by JNCC and the Plant Conservation Working Group

This document is an audit of the data and judgements on conservation status in the UK's report on the implementation of the Habitats Directive (January 2001 to December 2006) for this species. Superscript numbers accompanying the headings below, cross-reference to headings in the corresponding Annex B reporting form. This supporting information should be read in conjunction with the UK approach for species (see 'Assessing Conservation Status: UK Approach').

1. Range Information[2.3]

1.1 Surface area of range[2.3.1]
32,249km²
The above estimate was calculated within Alpha Hull software, using extent of occurrence as a proxy measure for range (as shown in Map 1.1). The value of alpha was set at 20 km to reflect the dispersal capacity of this species, and it was clipped to include terrestrial areas only.

Map 1.1, and hence the alpha hull calculation, includes records of both the gametophyte and sporophyte life stages. However, it should be noted that the latter is far more restricted due to its exacting habitat requirements; gametophytes are relatively widespread in comparison.

Map 1.1 Current extent of occurrence and occupied 10-km squares (1987-1999)

Data sources provided in Section 6
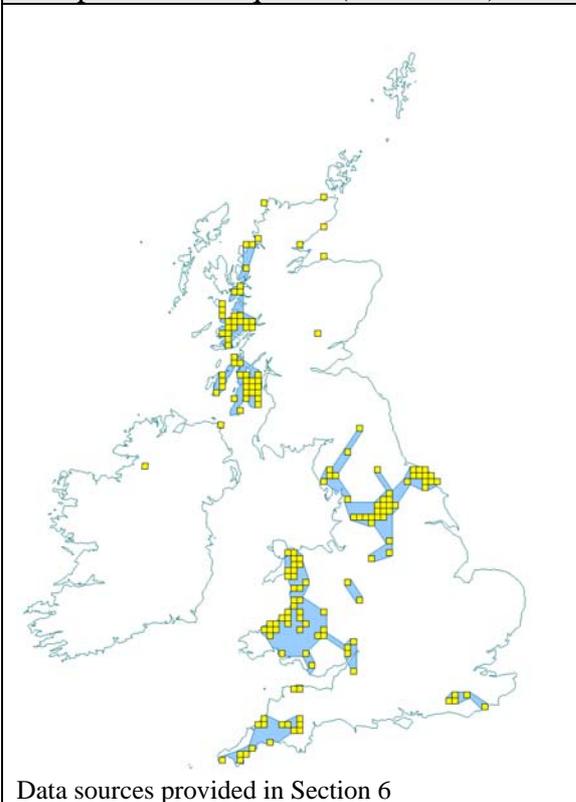
1.2 Date of range determination[2.3.2]
1987 – 1999
The range estimate was calculated using records from Preston *et al.* (2002), the most recent date class in which is 1987-1999. Records from this time period provide the best representation of current range as it is understood by species specialists.

1.3 Quality of range data[2.3.3]
Moderate
Preston *et al.* (2002) provides good coverage for the whole of the UK. However, *Trichomanes. speciosum* gametophytes are difficult to recognise, and under-recording has been, and is likely to continue to be a problem. For this reason, data are reported as moderate.

1.4 Range trend[2.3.4] & Range trend magnitude[2.3.5]
Unknown
Historically, the independent gametophyte populations were unknown, and only sporophytes were recorded in the UK. Records suggest that the sporophytes have always had a restricted distribution. This has been attributed to their sensitivity to frost and sunlight.

T. speciosum gametophytes were not discovered in the UK until the 1980s. Since this time, they have been found in a small number of new sites every year and are now thought to be relatively widespread.

Most gametophytes do not produce sporophytes – probably because the environmental conditions are not optimal for this.

1.5 Range trend period [2.3.6]
1994 – 2006

1.6 Reasons for reported trend in range[2.3.7]
Not applicable

1.7 Favourable Reference Range[2.7.1]
32,249km^2 (Equal to current)
The decision tree in Note 1 has been used as a guide in determining the favourable reference range estimate (see 'Assessing Conservation Status: UK Approach').

The current trend is unknown, although it is believed more gametophyte populations are showing a tendency to produce sporophytes currently. This is not due to intensive conservation management. The current range is not restricted, and therefore it is appropriate to set the current range as the favourable reference range. Seventeen years ago it was thought that the species was heading towards extinction. The current range is believed to be adequate to ensure the long term survival of the species.

1.8 Range Conclusion[2.8]
Favourable
The assessment is given as favourable, despite the trend being unknown, since the current range is equal to the favourable reference range.

2. Population of the species[2.4]

2.1 Population estimate[2.4.1]
162 occupied 10-km squares
For such a widespread species, and with the impossibility of defining an 'individual' within a gametophyte population, the appropriate proxy to use is the number of occupied 10-km squares. Within this large gametophyte population, there are 17 known sporophyte sites: 5 in England, 5 in Scotland, 5 in Wales, and 2 in Northern Ireland.

2.2 Date of population estimate[2.4.2]
1987 – 1999
Similar to range, the population estimate was calculated using records from Preston *et al.* (2002), the most recent date class in which is 1987-1999.

2.3 Method of population estimate[2.4.3]
2 = extrapolation from surveys of part of the population, sampling
Species presence within 10-km squares is used as a proxy. No extrapolation has occurred, so the number of 10-km squares is reported according to the records that exist. However, it would be incorrect to refer to this as a 'comprehensive inventory'.

2.4 Quality of population data[2.4.4]
Moderate
Preston *et al.* (2002) provides good coverage for the whole of the UK. However, *T. speciosum* gametophytes are difficult to recognise, and under-recording has been, and is likely to continue to be a problem. Further, although the surrogate measure of 10-km squares is useful where more detailed population data is lacking, it is essentially a coarse measure of distribution; it does not offer a true insight into populations at a local level. Data quality is therefore reported as moderate, rather than good.

2.5 Population trend[2.4.5] & Population trend magnitude[2.4.6]
Unknown
There is a poor sporophyte to gametophyte ratio, probably climatically induced. Some sporophyte losses have been balanced by the discovery of sporophytes in large numbers in Yorkshire, and also the re-emergence of sporophytes at other sites (including at least 3 in Cumbria). Trends in the gametophyte populations are unknown.

2.6 Population trend period[2.4.7]
1995 – 2006
During this period, many of the sporophyte populations have received relatively regular monitoring. Trends in gametophytes are unknown.

2.7 Reasons for reported trend in population[2.4.8]
Not applicable

2.8 Justification of % thresholds for trends[2.4.9]
Not applicable

2.9 Main pressures[2.4.10]
250 Taking / Removal of flora, general
251 Pillaging of floristic stations
164 Forestry clearance
165 Removal of undergrowth
850 Modification of hydrographic functioning, general
Botanical collection, including trampling and vegetation removal associated with photography.
Trees being felled and reducing humidity but mainly through extraction (hydroelectric schemes reducing the amount of water in streams and reducing humidity)

2.10 Threats[2.4.11]
250 Taking / Removal of flora, general
251 Pillaging of floristic stations
164 Forestry clearance
165 Removal of undergrowth
850 Modification of hydrographic functioning, general
Trees being felled and reducing humidity
Hydroelectric schemes reducing the amount of water in streams and reducing humidity
Threat of quarrying
Aerial spraying of bracken

2.11 Favourable Reference Population[2.7.2]
162 occupied 10-km squares (Equal to current)
The decision tree in Note 1 has been used as a guide in determining the favourable reference population estimate (see 'Assessing Conservation Status: UK Approach').

There have been concerns that very old gametophyte populations may have lost the ability to produce sporophytes. Further, many of the sporophyte populations are very small, and can be impacted by climatic conditions. However, based on expert opinion, the number of gametophyte populations is probably sufficient to ensure long-term viability, particularly if more of them start to produce sporophytes. The favourable reference population has therefore been set as equal to the current population.

2.12 Population Conclusion[2.8]
Favourable
The assessment is Favourable based on an adequate population to ensure long-term viability. There is no particular reason to believe that the current sporophyte to gametophyte ratio is unusual or detrimental to the long-term viability of the species, and hence this aspect of the biology does not affect the Favourable conclusion.

3. Habitat for the species in the Biogeographic region or sea[2.5]
Preston *et al.* (2002) states: "The sporophyte occurs only in constantly damp, shaded localities, usually on acidic, but often base-flushed rocks, rarely on damp humic banks, and exceptionally as an epiphyte."

"The gametophyte of *T. speciosum* grows deep in clefts, crevices and natural rock hollows on a range of acidic to neutral rocks. Such sites are dark (less than 1% ambient light) and are

often humid, being located on sea-cliffs, river-cliffs or streamsides, or are kept damp through soil capillary action."

3.1 Surface area of habitat[2.5.2]
Unknown
No estimates exist for the coverage of the habitats described above.

3.2 Date of estimation[2.5.3]
Not applicable

3.3 Quality of data on habitat area[2.5.4]
Poor

3.4 Habitat trend[2.5.5]
Stable
There have been no reports of loss in habitat since the gametophyte populations were described.

3.5 Habitat trend period[2.5.6]
1994 – 2006

3.6 Reasons for reported trend in habitat[2.5.7]
Not applicable

3.7 Suitable habitat for the species (in km^2)[2.7.3]
Unknown

3.8 Habitat conclusion[2.8]
Favourable
The area of habitat is believed to be stable, and is sufficient to maintain the favourable reference range and favourable reference population.

4. Future Prospects[2.6]
Good prospects
Species expected to survive and prosper.

There are currently no significant threats. The sporophyte/gametophyte ratio makes it vulnerable to climate change. However, it could potentially benefit from climatic changes in the short to medium term. The species is vulnerable to any changes to the flow or chemical composition of the water or to its habitat and microclimate.

4.1 Future prospects conclusion[2.8]
Favourable

5. Overall Conclusion [2.8]
Favourable
All parameters have been assessed as Favourable. In accordance with guidance, the overall conclusion is therefore also Favourable.

Table 5.1. Summary of conclusions

Parameter	Judgement	Grounds for Judgement (in accordance with Annex C)	Reliability*
Range	Favourable	Current range is equal to the favourable reference range and stable	1
Population	Favourable	Population is not lower than favourable reference population	2
Habitat	Favourable	Area of habitat is sufficiently large (and stable) and habitat quality is suitable for the long term survival of the species	2
Future Prospects	Favourable	Main pressures and threats to the species not significant; species will remain viable on the long-term	1
Overall Assessment	Favourable	All Favourable	1

*1=High, 2=Moderate, 3=Low

High – Expert opinion is that the concluding judgement accurately reflects the current situation based on a professional understanding of the species. For range, population, and habitat, quality of data used to establish the current estimate has been identified as "good"; data used to inform trends is comprehensive and up to date.

Moderate – A greater understanding of the feature, or the factors affecting it, is required before a confident concluding judgement can be made by experts. For range, population, and habitat, the current estimate and/or trend are based on recent, but incomplete or limited survey data; or alternately, a comprehensive, but outdated (pre-1994) review.

Low – Judgements, and comprising estimates, are based predominately on expert opinion.

N/A – Assessment conclusion is "unknown", on the basis of insufficient reliable information.

6. References

PRESTON, C.D., PEARMAN, D.A. & DINES, T.D. 2002. *New Atlas of the British & Irish Flora*. Oxford University Press.

Map Data Source

Vascular Plant Database, Botanical Society of the British Isles (via the NBN Gateway).