

Flora Protection Order - bryophytes

Hamatocaulis vernicosus

Status: Near Threatened; listed on the Flora Protection Order, Bern Convention & EU Habitats Directive

Location: Gortachalla Lough, Co. Galway

Species Records

Taxon	Vice County number	Taxon Site	Locality / habitat	Grid Reference	Date	Recorder	Protected site
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M222375	2004.	Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough: extensive patches at base of sparse sedges in wet intermediate fen, unshaded, ca 10 m alt.	M22523753	2004.06.25	Holyoak, D.T.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2243037645	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2243437666	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2244237638	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2244337641	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2244837673	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2244937656	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2248637631	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2249537696	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2249537615	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2249537702	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2251637595	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2251937521	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2252037579	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2252637521	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2252937563	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2252937557	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2253537559	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297
<i>Hamatocaulis vernicosus</i>	16	07	NW of Gortachalla Lough	M2254337536	2009.08.07	Campbell, C. & Lockhart, N.	SAC000297

Aerial photographs, field notes, plot data and site photographs are taken from:

Campbell, C., Hodgetts, N. & Lockhart, N. (2015) Monitoring methods for *Hamatocaulis vernicosus* Mitt.

Hedenäs (Slender Green feather-moss) in the Republic of Ireland. *Irish Wildlife Manuals*, No. 91.

National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.

Campbell, C. (2013). *Conservation of selected legally protected and Red Listed bryophytes in Ireland*. Ph.D. Thesis, University of Dublin, Trinity College.

Location (1:50,000 Discovery map)



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Field notes from David Holyoak, 25 June 2004:

Extensive intermediate fen NW of Gortachalla Lough. Area bounded to the west by acid bog, with a variety of interesting transitional habitats along the boundary. Abundant *Calliergon trifarium*, recorded almost continuously from M22473740 to M22493763. Also (M22493763) *C. trifarium* growing among unshaded *Scorpidium scorpioides* and sparser *C. stellatum* in a mat in shallow water of intermediate fen, with rather sparse cover of *Carex lasiocarpa*, with *Eriophorum angustifolium*, *Carex viridula* ssp. *brachyrrhyncha*, *Equisetum palustre*, *Mentha aquatica*, *Ranunculus flammula*, *Carex panicea*, *Eleocharis multicaulis*. Strong population of *H. vernicosus* at M22523753 at base of sparse sedges in unshaded wet intermediate fen. A varied flora of vascular plants in the fen and on the bog close by included *Rhynchospora fusca*.

Field notes from Neil Lockhart & David Holyoak, 5 July 2004:

Vegetation is a tall (to 50 cm) sward of mainly *Carex nigra*, with lots of *Holcus* and *Equisetum palustre*. *H. vernicosus* is dominant in the moss layer over several 10s of m². Widespread around the margins of this fen - a very large and significant population in the national context. Associates species:

Anagallis tenella
Briza media
Calliergon giganteum
Calliergonella cuspidata
Campylium stellatum
Carex hostiana
Carex nigra
Carex panicea
Carex pulcaris
Cirsium palustre
Cynosurus cristatus

Eleocharis multicaulis
Eleocharis palustris
Eleocharis quinqueflora
Equisetum palustre
Eriophorum angustifolium
Galium palustre
Holcus lanatus
Hydrocotyle vulgaris
Juncus acutiflorus
Juncus bulbosus
Juncus conglomeratus

Juncus effusus
Lythrum salicaria
Mentha aquatica
Myosotis laxa
Poa trivialis
Ranunculus flammula
Senecio aquaticus
Succisa pratensis
Trifolium repens
Triglochin palustris

Field Data Sheet – Rare and Threatened Bryophyte Survey 2004

2004-063

Species <u>Hamatocaulis vernicosus</u>		Vice-county number H 16		Vice-county West Galway	
Locality NW. of Gortachalla Lough		Land Owner/Occupier		cSAC/pNHA? no. 10	
Grid Ref. M2252/3753	GPS? <input checked="" type="checkbox"/>	alt. (m) ca 10	Date d/m/y 25. Vi. 2004	Recorder D.T. Holyoak	
Sketch Map of Site showing Location of Species: indicate North (arrow) and scale			Describe substrate(s), e.g. rock/ soil/ tree type; wet/moist/dry, sunny/shaded habitat features e.g. aspect, slope, vegetation cover/height at base of sparse sedges in wet intermediate- fen, unshaded		
Size of Population extensive patches, Sporophytes present (stage) none covering several square metres					
Locality Map (1:50 000 if possible) [or copy of part of 1:50 000 sheet no. 45 attached to this page]			Associated Species Detailed list recorded by Neil Lockhart on subsequent visit.		
Photographs _____			Threats and proposed Conservation Measures Site immediately threatened: yes / no		
New record at this site / older record refound					
Voucher specimen no. DTH 04-302					

Aerial photograph

The aerial photograph is taken from the National Parks and Wildlife document *Hamatocaulis vernicosus* (Mitt.) Hedenäs (slender green feather-moss) in the Republic of Ireland (Campbell et al. 2013).



Data from NPWS-funded PhD on Rare & Threatened Bryophytes 2008-2012

Field notes from Christina Campbell & Neil Lockhart, 7 August 2009 & 27 August 2010 (with Rebecca Teesdale):

The site at NW of Gortachalla Lough occurs in a former lake basin where acid bog and transitional fen habitats overlie limestone. *H. vernicosus* occurs here to the east of the bog area, in areas of transitional fen, with a very deep root-mat. The Red Listed moss *Pseudocalliergon trifarium*, which is Vulnerable in Ireland, also occurs here and, like *H. vernicosus*, is a plant of lowland fens, including intermediate ones with low calcium levels. Light grazing occurs at the locality, mainly by rabbits. Four plots (2 x 2 m) were recorded at this population. Plot 1 was recorded in transition mire to the south of the area of occupancy. Plot 2 was very wet with a high cover of *Hippuris vulgaris* and *Equisetum palustre*. Plots 3 and 4 were recorded in transition mire.

NW of Gortachalla Lough	Plot 1	Plot 2	Plot 3	Plot 4
Date	07.08.2009	07.08.2009	27.08.2010	27.08.2010
GPS	M2252037554	M2249437702	M2249437614	M2241137636
Altitude (m.s.l.)	6.54	13.92	8.49	9.05
Slope (degrees)	0	0	0	0
Aspect	0	0	0	0
Surface water depth (cm)	6.8	14.2	-1.0	1.5
Surface water pH	5.44	5.55	5.89	5.65
Surface water conductivity (µS/cm)	105.0	135.5	133.0	78.0
Ammonium (NH ₄) (mg/l)	0.07	0.07	0.06	0.07
Nitrate (NO ₃) (mg/l)	0.09	0.09	0.15	0.11
Orthophosphate (O-P) (mg/l)	0.005	0.005	0.005	0.005
Total phosphate (TP) (mg/l)	0.118	0.028	0.019	0.055
Peat depth (cm)	20	240	54	30.5
No. of shoots in 10 x 10 cm area	873	491	229	54
<i>Hamatocaulis vernicosus</i> cover (%)	85	67	85	8
Mean vegetation height (cm)	60.4	50.7	23.8	25
Max. vegetation height (cm)	69	87	62	88
Cover (Domin):				
Total cover	10	10	10	10
Shrub cover	0	0	0	1
Grass cover	4	2	0	4
Rush cover	4	4	3	3
Sedge cover	7	3	8	8
Forb cover	5	8	2	3
Fern/ fern allies cover	0	7	1	1
Bryophyte cover	9	10	9	7
Litter cover	6	3	5	6
Surface water cover	4	4	0	+
Associated species cover (Domin):				
<i>Agrostis stolonifera</i>	1	2	0	0
<i>Anthoxanthum odoratum</i>	2	0	0	0
<i>Bryum pseudotriquetrum</i>	0	0	2	1
<i>Calliergonella cuspidata</i>	3	0	0	0
<i>Calliergon giganteum</i>	4	6	2	3
<i>Campylium stellatum</i>	0	0	0	2
<i>Cardamine pratensis</i>	+	1	0	0
<i>Carex echinata</i>	0	2	8	7
<i>Carex nigra</i>	7	0	0	0
<i>Carex panicea</i>	2	0	3	4
<i>Carex pulicaris</i>	1	0	0	0

NW of Gortachalla Lough (continued)	Plot 1	Plot 2	Plot 3	Plot 4
Associated species cover (Domin):				
<i>Cirsium dissectum</i>	+	0	1	0
<i>Eleocharis quinqueflora</i>	2	0	3	3
<i>Equisetum fluviatile</i>	0	0	0	1
<i>Equisetum palustre</i>	0	7	1	1
<i>Eriophorum angustifolium</i>	4	3	2	4
<i>Galium palustre</i>	+	1	0	0
<i>Hippuris vulgaris</i>	0	6	0	0
<i>Holcus lanatus</i>	1	0	0	0
<i>Hydrocotyle vulgaris</i>	4	6	0	0
<i>Hylocomium splendens</i>	3	0	0	0
<i>Juncus acutiflorus</i>	4	4	1	0
<i>Juncus bulbosus</i>	0	0	1	3
<i>Juncus effusus</i>	1	0	0	0
<i>Lythrum salicaria</i>	1	1	0	0
<i>Mentha aquatica</i>	4	5	0	1
<i>Molinia caerulea</i>	4	1	0	4
<i>Myosotis laxa</i>	0	2	0	0
<i>Pedicularis palustris</i>	0	5	2	2
<i>Potamogeton polygonifolius</i>	0	0	0	1
<i>Ranunculus flammula</i>	1	1	0	2
<i>Salix cinerea</i>	0	0	0	1
<i>Schoenus nigricans</i>	0	0	2	0
<i>Scorpidium revolvens</i>	0	0	3	2
<i>Scorpidium scorpioides</i>	0	0	3	5
<i>Succisa pratensis</i>	1	0	0	1
<i>Triglochin palustris</i>	0	0	0	2
<i>Utricularia vulgaris</i>	0	1	0	0
<i>Veronica scutellata</i>	1	2	0	0
<i>Warnstorfia exannulata</i>	0	4	0	0

Site photographs



Photograph 1: Plot 1 containing *Hamatocaulis vernicosus* at Gortachalla, facing north, August 2009.



Photograph 2: Plot 2 containing *Hamatocaulis vernicosus* at Gortachalla, facing west, August 2009.

Management & Conservation

General

- Afforestation
- Peat extraction
- Drainage
- Eutrophication

Potential site-specific threats/issues

- No specific threats have been identified

Excerpt from:

Lockhart, N., Hodgetts, N. & Holyoak, D. (2012). *Rare and Threatened Bryophytes of Ireland*. Belfast: National Museums Northern Ireland Publication No. 028.

Mosses

Hamatocaulis vernicosus (Mitt.) Hedenäs

syn. *Amblystegium vernicosum* (Lindb.) Lindb., *Drepanocladus vernicosus* (Mitt.) Warnst.

Status in Ireland: Near Threatened; **Status in Europe:** Vulnerable

Varnished Hook-moss

Shining Sickle Moss

Slender Green feather-moss

Identification

A medium-sized to rather robust pleurocarpous moss with pinnately branched, procumbent to ascending stems up to 12 cm long, that grows amongst other plants or

forms green, dull green or brownish (rarely reddish) tufts or patches. Stem leaves are strongly falcato-secund (so the shoot apex is often hooked like a walking stick), ovate and tapering to an acuminate apex, with the base erect and the

RARE AND THREATENED BRYOPHYTES OF IRELAND

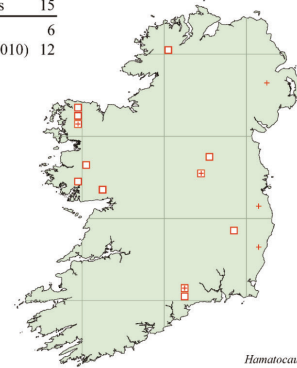


upper part of the leaf rather abruptly curved, the leaf base concave, usually strongly plicate and with a red colour often present in a transverse band. The leaf margins are plane and entire, the costa extends half to three-quarters of the way up the leaf, mid-leaf cells are linear and the alar cells are short but do not form differentiated auricles. Capsules are shortly cylindrical, curved and exserted on a long, smooth seta. *H. vernicosus* has often been misidentified in the past, but errors are easily avoided through careful attention to microscopic characters (including lack of stem hyalodermis, plicate leaves lacking differentiated alar cells) along with the characteristic erect leaf base and suddenly curved upper part of the leaf.

Distribution in Ireland

Records are accepted from 14 localities in seven vice-counties: Waterford (Sgillige Loughs, 1966–2010; beside R. Nire in Comeragh Mountains, 1963–2010; Coumtay, 2007); W. Galway (W. side of Lough Mask, 1983–2010; Maam Cross, 1987; NW of Gortachalla Lough, 2004–2010); Wicklow (E. of Yellowford Cross Roads, 1975); Meath (between Lough Bane and Drumone, 1978); Westmeath (Scragh Bog, 1946–2010); W. Mayo (ESE of Lough Nambrackkeagh, 1987; Largan More, 1999–2010; Rathavisteen, 1999; Uggool, 1999) and W. Donegal (Meentygrannagh, 1999–2010). Older records are from Wexford (Pallis Bridge, 1969); W. Mayo (between Bellacorick and Dooleeg, 1958) and Down (by River Lagan above Lisburn, 1901). In addition there are numerous known errors of identification and reports unsupported by specimens, including all reports from 12 additional vice-counties (S. Kerry, N. Kerry, Clare, NE Galway, Kildare, Longford, Roscommon, Sligo, Leitrim, E. Donegal, Antrim and Londonderry).

Number of Hectads	15
+ Old (pre-1970)	6
□ Recent (1970–2010)	12



Hamatocaulis vernicosus

Ecology and biology

Its typical habitats are in intermediate fens which are usually influenced by springs, often mineral-rich (but usually not rich in calcium) and often slightly nutrient-enriched, from the lowlands to at least 310 m altitude. It avoids shade, habitats that dry out and eutrophicated places. In Ireland, it has been found in upland flushes, lowland fens and on seasonally flooded lake margins. Species present close by at different Irish sites include *Calliergon giganteum*, *Pseudocalliergon trifarium*, *Campylium stellatum*, *Cinclidium stygium* and *Sphagnum contortum*, as well as *Saxifraga hirculus*, sedges and other herbs. Its habitats are very similar elsewhere in Europe (cf. Hedenäs & Kooijman 1996, Hedenäs 1999, Bosanquet *et al.* 2006, Štechová & Kučera 2007, Štechová *et al.* 2008).

The plants are perennial. It is a dioicous species and capsules are rare (perhaps unknown in Ireland), maturing in summer. Gemmae, bulbils and tubers are absent, but vegetative propagation doubtless occurs from detached leaf and stem fragments.

World distribution

Widespread in N. Europe from N. Sweden, N. Finland and arctic Russia southwards; much more local in S. Europe, where known southwards to WC Spain, the SE Alps and the Caucasus. It is listed as *Extinct* in Luxembourg, *Critically Endangered* in the Netherlands, *Endangered* in Germany and Spain, *Vulnerable* in Bulgaria, the Czech Republic and Finland, *Near Threatened* in Sweden and Switzerland and 'declining' in Norway. It is assigned to a Circumpolar Boreal-montane floristic element in Europe. Elsewhere, it is known in SW, C. and N. Asia, Japan, N. America, Greenland, Dominican

Republic and mountains of S. America (Peru). *H. vernicosus* comprises two cryptic species (see below).

Threats

Six of the eleven Irish populations that were known before 1990 (55%) had apparently been lost by 2007, one due to large-scale peat extraction, another to afforestation and the remaining four to various combinations of drainage and eutrophication. Similar factors underlie widespread declines in N. and C. Germany (Meinunger & Schröder 2007). Its extinction in E. England (E. Anglia) over the past few decades is attributed largely to eutrophication from adjoining agricultural land (Holyoak 1999). Current threats to Irish populations are probably similar to the causes of loss in the past, with eutrophication of groundwater potentially threatening even some fens on protected land.

Conservation

H. vernicosus is listed on Appendix 1 of the Bern Convention, protected under the EU Habitats Directive and covered by the Flora (Protection) Order, 1999 in the Republic of Ireland. A majority of the extant Irish populations are on protected land. In the last decade, new surveys have revealed many previously overlooked populations in some regions of Europe (e.g. C. and S.

Wales: Bosanquet *et al.* 2006) and large populations are known in the boreal zone of Fennoscandia, suggesting that despite losses of many regional populations it is not threatened in Europe as a whole. However, Hedenäs & Eldenäs (2007) have recently demonstrated that *H. vernicosus* comprises two cryptic species, one clade widespread in Europe and also occurring in the USA, the other known only south of the boreal zone in Europe but also in Peru and NE Asia. Three British samples are all referable to the latter clade; no molecular studies have been carried out on Irish plants. Štechová & Kučera (2007) analyse effects of habitat management intended to benefit the species in the Czech Republic, finding that it was positively influenced by mowing only at a site with high vascular plant cover, and that gap cutting was only beneficial at sites with a low water table.

Protected sites with recent records: Ballycroy National Park; Carrowmore Lake Complex SAC; Comeragh Mountains SAC; Connemara Bog Complex SAC; Glenamoy Bog Complex SAC; Holdenstown Bog SAC; Lough Carra/Mask Complex SAC; Lough Corrib SAC; Meentygrannagh Bog SAC; Owenduff/Nepin Complex SAC; Scragh Bog Nature Reserve; Scragh Bog SAC; **Unprotected sites with recent records:** between Lough Bane and Drumone.