

# Flora Protection Order - bryophytes

## *Paludella squarrosa*

**Status:** Critically Endangered; listed on the Flora Protection Order

**Location:** Formoyle, Co. Mayo

### Species Records

Taxon	Vice County number	Taxon Site	Locality / habitat	Grid Reference	Date	Recorder	Protected site
<i>Paludella squarrosa</i>	27	01	Bellacorick Bog: scattered amongst Homalothecium nitens, Aulacomnium palustre and Sphagnum spp. with Leiocolea rutheana in quaking lawn beside pool system in rich fen, 70 m alt.	G02	1998.	Lockhart, N.	SAC001922
<i>Paludella squarrosa</i>	27	01	E of Formoyle: wet hollow in extensive calcareous fens, ca 75 m alt.	G02	2003.05.19	Lockhart, N. & Holyoak, D.T.	SAC001922
<i>Paludella squarrosa</i>	27	01	Formoyle	G02	2009.10.14	Campbell, C. & Lockhart, N.	SAC001922
<i>Paludella squarrosa</i>	27	01	Formoyle	G02	2010.10.20	Campbell, C. & Lockhart, N.	SAC001922

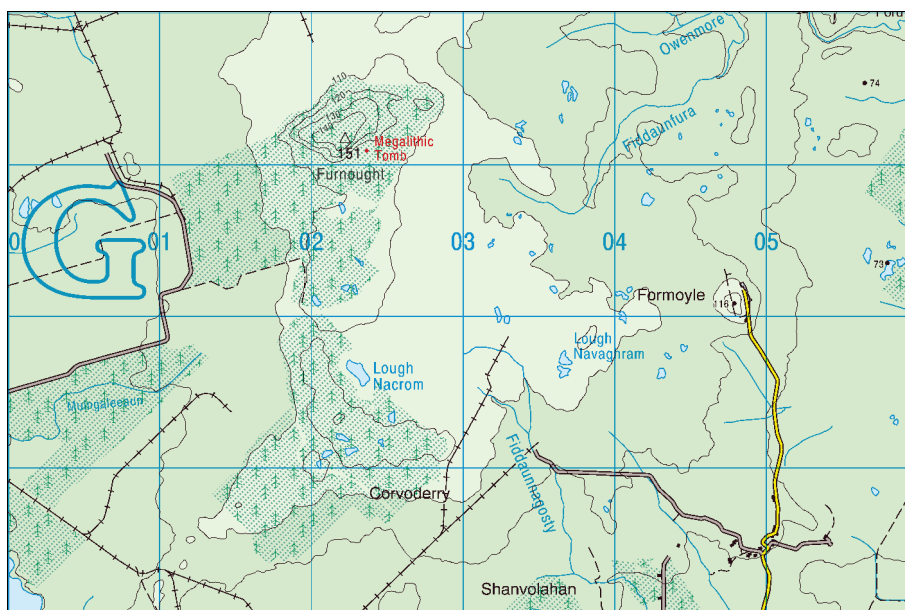
This is the only known extant site in Ireland and indeed the British Isles for this species.

#### References:

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

Lockhart, N.D. (1999) *Paludella squarrosa* (Hedw.) Brid., a Boreal relic moss new to Ireland. *Journal of Bryology* **21**: 305–308.

### Location (1:50,000 Discovery map)



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Field Data Sheet - Rare and Threatened Bryophyte Survey 2003

2003-324

Species <u>Paludella squarrosa</u>		Vice-county number H 27		Vice-county West Mayo	
Locality E. of Formoyle		Land Owner/Occupier		cSAC/pNHA? <input checked="" type="checkbox"/> no. 1922	
Grid Ref.	GPS?	alt. (m)	Date d/m/y 19/5/03	Recorder N. Lockhart & 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  Wet transitional fen / flushes		
Size of Population		Sporophytes present (stage)			
small amounts over a few m <sup>2</sup> in two nearby locations		none			
Locality Map (1:50 000 if possible)  [or copy of part of 1:50 000 sheet no. attached to this page]			Associated Species		
Photographs			Threats and proposed Conservation Measures Site immediately threatened: <u>yes</u> / no		
New record at this site / older record refound Discovered here by N. Lockhart					
Voucher specimen no.					

## Aerial photograph

No aerial photograph available.

## Site photographs



Photograph of plot containing *Paludella squarrosa* at Formoyle, October 2009.

## Management & Conservation

### General

- This species needs precise hydrological and chemical conditions to survive
- Drainage, water pollution, overgrazing, undergrazing and afforestation all pose threats to this species
- Physical damage to the wet fen habitat from botanists or conservation workers doing monitoring
- Thoughtless specimen collecting

### Potential site-specific threats/issues

- This site is regarded as confidential
- The site is very fragile and requires ongoing protection and conservation management

Excerpt from:

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

RARE AND THREATENED BRYOPHYTES OF IRELAND

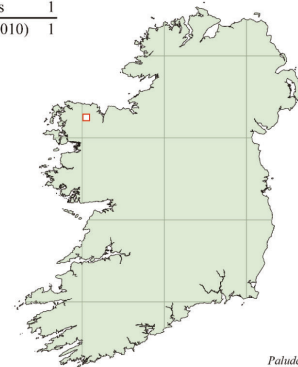
*Paludella squarrosa* (Hedw.) Brid.

Tufted Fen-moss

**Status in Ireland:** Critically Endangered (B2a, biii, D); **Status in Europe:** Least Concern



Number of Hectads  $\frac{1}{1}$   
 Recent (1970–2010)  $\frac{1}{1}$



*Paludella squarrosa*

**Identification**

This is a very distinctive light green acrocarpous moss that grows as dense matted tufts up to 150 mm high, or as scattered stems among other bryophytes. The leaves are strongly squarrose-recurved, five-ranked, ovate, acute, decurrent at the base, sharply toothed above, with costa ending below the apex. Cells in mid-leaf are rounded-hexagonal, coarsely mamillate, with incrassate cell walls. Capsules are erect but curved, ellipsoid and long-exserted on a seta up to 100 mm high. The squarrose-recurved leaves are suggestive of *Meesia triquetra*, but that species has narrower leaves in three ranks with smooth cells.

**Distribution in Ireland**

Known only in a small area of W. Mayo in part of the Bellacorick Bog Complex near Crossmolina, where it was discovered in 1998 (Lockhart 1999) and is now known at two closely adjoining localities. The species had previously been reported from Ireland only as a Littletonian (postglacial) fossil, in Londonderry (Smith 1958) and Kildare (Barry & Synnott 1984, 1987).

**Ecology and biology**

It is restricted to small areas in the wettest parts of a rich fen within an extensive area of blanket bog. The largest population occurs beside a pool system amongst a very wet and quaking moss lawn dominated by *Tomentypnum nitens*, *Sphagnum contortum* and *Aulacomnium palustre*, with some *Schoenus nigricans*, *Molinia caerulea*, *Vaccinium*

*oxycoccus* and stunted *Betula pubescens*. Surface water pH at the sites ranges from 6.50 to 7.67 and the pools are heavily iron-stained (Lockhart 1999). Elsewhere in Europe, *P. squarrosa* is reported from fens, marshes and spring bogs which have some base but are not highly calcareous. Mårtensson (1956) noted that in the Torneträsk area of N. Sweden, it is a characteristic species of the intermediate and richer types of fen but does not occur in extremely poor fens.

Tufts of the species probably live for several years, but details are unknown. The species is dioicous and infrequently produces capsules (which are unknown in Ireland; recorded once in Britain). Tubers and gemmae are unknown, so propagation and dispersal are most likely to occur from shoot or leaf fragments.

**World distribution**

In Europe, it is widespread in arctic and boreal regions of Svalbard, Iceland and Fennoscandia, occurring much more sparsely southwards to the Alps and Carpathians. In Britain, it was formerly known at three localities in N. England but was last recorded in 1916 and is now considered to be *Extinct*. However, it was much more widespread in Britain and locally abundant as a Flandrian (postglacial) fossil (Dickson 1973). *P. squarrosa* is listed as *Extinct* in the Netherlands, *Critically Endangered* in the Czech Republic and Germany and *Vulnerable* in Switzerland. It is assigned to a Circumpolar Boreo-arctic montane floristic element in Europe. Elsewhere, the

*Mosses*

species occurs in Asia (Arctic south to Kazakhstan, Mongolia and Japan), N. America (south to northern USA) and Greenland.

**Threats**

Survival of the small relic populations that have remained in Ireland depends on maintenance of rather precise hydrological and chemical conditions. Drainage, water pollution, overgrazing, undergrazing or afforestation could all pose threats. However, the greatest risk is probably from botanists and bryologists since the wet fen habitat is very fragile and at risk from damage due to

trampling. The populations of *P. squarrosa* are also too small to withstand thoughtless (and illegal) specimen collecting.

**Conservation**

*P. squarrosa* is protected in the Republic of Ireland by the Flora (Protection) Order, 1999. Its populations are all on protected land.

**Protected sites with recent records:** Bellacorick Bog Complex SAC; **Unprotected sites with recent records:** none.

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