

# *Rhytidiadelphus subpinnatus* in Wales

*Rhytidiadelphus subpinnatus* is one of a small number of bryophytes that are much less common in Britain than in continental Europe. Like *Homomallium incurvatum* (Blockeel, 2007), another of these British rarities, its identification features seem to have been forgotten by a generation of bryologists. **Sam Bosanquet** and **Graham Motley** remind us of this species' characteristics and report some recent records in Wales.



The *Red Data Book* (Church *et al.*, 2001) reports just two extant colonies of *Rhytidiadelphus subpinnatus* and suggests that there has been a significant decline in this species, especially in northern England. Only populations at Torrent Walk, near Dolgellau in Meirionydd (v.-c. 48) (Holyoak, 2001) and at Roeburndale in the north-eastern part of West Lancashire (v.-c. 60) had been seen since 1950. Atmospheric pollution was blamed for this decline (Hodgetts in Hill *et al.*, 1994) and was linked to a general decline in *Rhytidiadelphus* species in polluted districts.

Dixon (1924) described *R. subpinnatus* (as *R. squarrosus* var. *calvescens*) as 'very rare' and mentions a specimen from Dolgellau (Dolgelly sic.). The *Atlas* (Hill *et al.*, 1994) shows records from 12 British hectads (10×10 km squares) – mostly in north-west England, with three in Wales and one in Herefordshire – and one Irish hectad. Its European distribution is Circumpolar Boreal-montane (Hill & Preston, 1998), which is somewhat at odds with its essentially lowland British distribution with, until recently, no confirmed records from Scotland. The 2007 Scottish colony, in southern Stirlingshire, is at 100 m altitude in the central belt, so is also lowland.



◁ *R. subpinnatus*. Sam Bosanquet

### Recent records

During tetrad-bashing for *The Mosses and Liverworts of Carmarthenshire* in 2005, SDSB found a large colony of *R. subpinnatus* in woodland by the Afon Tywi in Carmarthenshire (Bosanquet *et al.*, 2005). Shortly afterwards, GSM found another Carmarthenshire population more than 20 km to the east in the Sawdde Gorge, followed by the first Breconshire record in the Nedd Fechan valley near Ystradfellte. Subsequent recording and survey work in the Nedd and Mellte Valleys has revealed this to be a hotspot for the species, with at least three separate subpopulations split between three

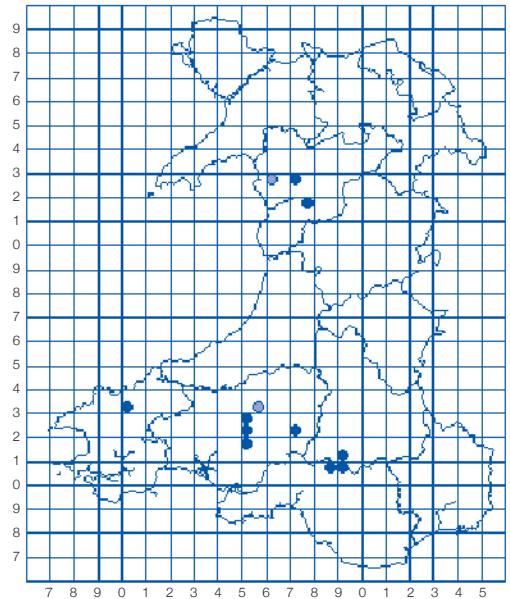
hectads and the vice-counties of Breconshire and Glamorgan. Tetrad recording in Pembrokeshire in early 2008 produced a colony in the Gwaun Valley, whilst a serendipitous stop by the Afon Eden in Meirionydd revealed a new population about 20 km north of the known site at Torrent Walk. A family walk near Brechfa turned up a fourth Carmarthenshire population just before Christmas 2008. These records combine with lost sites in Cwm Nantcol, Meirionydd and near Abergorlech, Carmarthenshire, to give four areas of Wales where *R. subpinnatus* grows or grew. From south-west to north-east these are:

- 1 **Cwm Gwaun, Pembrokeshire (SN0233–SN0333) (v.-c. 45).** This is the smallest colony in Wales. Six patches grow on a bank by the footpath that runs along the bottom of Allt Pontfaen, which is set back from the Afon Gwaun by about 10 m.
- 2 **Afonydd Tywi (SN5019–SN5020), Cothi (SN5328 & SN5833) & Sawdde (SN7224–SN7323), Carmarthenshire (v.-c. 44).** Three river valleys in eastern Carmarthenshire. The Tywi colony comprises at least 66 patches in steep riverside woodland at Allt Ffynnant. The western Cothi colony, near Horeb, was spotted in late 2008 and is made up of just four patches; the eastern Cothi colony, at Abergorlech, was found by E.W. Jones in 1945 and has not been relocated despite four specific searches, the last

in late 2008. The Sawdde colony is widespread between Turkey Cottage and Pont ar Llechau in mossy turf on ledges by the river. The Tywi and Sawdde colonies have the largest number of patches known in Wales and the Sawdde colony is the only one where non-hybrid sporophytes have been found (see *Ecology and status*, below).

**3 Dyffrynnoedd Nedd a Melte (Neath Waterfalls area), Breconshire (v.-c. 42) & Glamorgan (v.-c. 41) (SN8908, SN9108, SN9110).** An extensive area of oak and ash woodland along four main river valleys, with colonies of *R. subpinnatus* recorded in two of these. The colony by the Nedd Fechan above Pont Melin-Fach consists of 12 patches growing on a steep bank by the main footpath in oak woodland. Further down the valley, near Pontneddfechan, below where the Afon Pyrddin joins the Nedd Fechan to form the Afon Nedd, *R. subpinnatus* grows on both the Breconshire and Glamorgan sides of the river, again immediately adjacent to the main footpaths and in oak woodland. The Glamorgan colony consists of a single patch with some scattered shoots, but on the Breconshire side more than 15 patches have been noted. A further colony occurs scattered along the eastern side of the Afon Melte below Craig y Ddinas in both oak and ash woodland. Here, 14 patches occur alongside the footpath and also in a less vulnerable position high above the path. Most of the colonies in the ‘Waterfalls’ area have been casual finds whilst visiting the site for reasons other than for purely bryological survey – it seems likely that a targeted survey could find this species to be more widespread throughout these river valleys.

**4 Dolgellau & Rhinogs (SH62–SH72), Meirionydd (v.-c. 48).** This is the area of Wales



△ Distribution of *R. subpinnatus* in Wales plotted at the 5-km level. Pale blue dots, pre-1970 records; dark blue dots, post-1970 records. Sam Bosanquet

from which *R. subpinnatus* has been known for longest. It was collected several times from Cwm Artro and Cwm Nantcol (SH6427) between 1904 and 1912, but has not been seen there since. Holyoak (2001) revisited the well-known site at Torrent Walk (SH7518), where *R. subpinnatus* was discovered in 1876, and reported it ‘on a bank above the Torrent Walk’. SDSB stopped by the Afon Eden north of Ganllwyd (SH7226) during a journey to north Wales and found frequent patches on flat ground on the east bank of the river.

#### Identification

Smith (1978) says that about half the 20th century specimens collected as *R. subpinnatus* were *R. squarrosus*, and it is clear that there has been considerable confusion over the identification of *R. subpinnatus*. This appears

to be because British bryologists have come to think of *R. subpinnatus* as looking like a small *R. squarrosus*, rather than having its own distinctive appearance. Dixon (1924) points out the ‘great resemblance in its strongly marked forms to *Hylocomium brevirostre*’, which seems to have been forgotten in subsequent decades and was not mentioned by Smith (1978, 2004). Its distinctive appearance – with wide, short leaves on most branches, but strongly squarrose leaves at the shoot tip and on some branch tips – makes plants of *R. subpinnatus* look like *Loeskeobryum* (= *Hylocomium*) *brevirostre* but with *R. squarrosus* tips (see photos). Closer examination reveals squarrose stem leaves, which are like those of *R. squarrosus* but spread out from the base, rather than clasping the stem. This makes the red stem stand out more than that of *R. squarrosus*, and also reveals a lack of paraphyllia, distinguishing *R. subpinnatus* from *L. brevirostre*. Individual stems are, as the name suggests, subpinnate, although often with irregularly branched sections. The overall colour of dry patches tends to be pale green, sometimes with greyish or even salmon pink tones; with moist plants the stems appear bright red. Forms of *R. squarrosus* in which branch leaves are not particularly squarrose are sometimes encountered. These plants often look rather etiolated, with individual branches rather thin, rounded and tapering towards the tip, unlike the more robust and sometimes complanate appearance of *R. subpinnatus* branches.

### Ecology and status

All of the Welsh colonies of *R. subpinnatus* are in steep-sided, wooded river valleys in hilly districts. Patches up to 100×80 cm in size grow on banks or over rocks or well-rotted tree stumps, sometimes forming mounds that are intermixed with other bulky pleurocarpous mosses. Typical associates include *Brachythecium*



△ Habit and close-ups of *R. subpinnatus*. Sam Bosanquet

*rutabulum*, *Cirriphyllum piliferum*, *Eurhynchium striatum*, *Kindbergia praelonga*, *R. loreus*, *R. triquetrus*, *Thuidium tamariscinum* and the liverwort *Plagiochila asplenoides*. All colonies are on the floor of broadleaved woodlands with ash (*Fraxinus excelsior*), hazel (*Corylus avellana*) and oak (*Quercus* sp.) as the principal trees. Three distinct niches on the woodland floor



△ Habitats of *R. subpinnatus* in Nedd Fechan (top) and the Cwm Gwaun valley (bottom). Sam Bosanquet

are exploited: flat ground immediately adjacent to a river, where flooding is likely to be annual; steep ground above the river, with records up to 20 m above the river level; and steep banks by footpaths, which tend to be just above the flood zone. The last of these niches is highly vulnerable to any footpath diversions or widening works.

The *Atlas* (Hill *et al.*, 1994) says that the sporophytes of *R. subpinnatus* are unknown in Britain. Holyoak (2001) reported a small, shrivelled capsule at Torrent Walk, where all the *R. subpinnatus* population is female. The nearest male *Rhytidiadelphus* was *R. loreus*, and Holyoak suggests this was most probably the male parent of the therefore hybrid sporophyte. However, GSM found several patches of *R. subpinnatus* in Cwm Sawdde with healthy looking sporophytes that had dehisced by mid-April 2005 (Bosanquet *et al.*, 2005). Male plants were present both there and at the other extant Carmarthenshire site by the Afon Tywi. Given the strength of the Cwm Sawdde population and the presence of both male and female plants, it seems clear that the sporophytes there are not of hybrid origin, so they represent the first confirmed fruiting of *R. subpinnatus* in Britain.

The main threats to *R. subpinnatus* appear to be livestock grazing and forestry works. The last colony to be discovered, by the Afon Cothi near Horeb, is in a typical situation on narrow river flats at the foot of a very steep wooded slope, but the ground is much grassier than would be expected. *R. squarrosus* is abundant in this grassy turf, mixed with more typical woodland mosses, such as *Atrichum undulatum*, *C. piliferum*, *R. loreus*, *R. triquetrus* and *T. tamariscinum*, and *R. subpinnatus* is limited to four patches. This wood is regularly sheep-grazed, which is thought to encourage grass growth and *R. squarrosus*, and it seems as though this is causing an active

shift from a riparian woodland ground layer in which *R. subpinnatus* can grow, to a flora more akin to a pasture, which is unsuitable for this rare moss. It is worth noting that the two strongest populations, by the Afonydd Tywi and Sawdde, are in narrow strips of woodland between the river and a road, which have probably not seen a sheep for decades.

The other Cothi Valley site, where E.W. Jones found *R. subpinnatus* in 1945, has been extensively modified by forestry operations. The north bank is now largely occupied by an ash plantation, the floor of which is strewn with branch debris from a recent thinning, whilst the south bank has been coniferized apart from a narrow strip by the river. Two visits to each bank have failed to produce *R. subpinnatus*, and it seems to have disappeared, perhaps because of changes in humidity or light levels.

Recent records of *R. subpinnatus* in four widely separated areas of Wales suggest that the decline suggested by the *Red Data Book* and the *Atlas* may not have been as dramatic as was first thought. Indeed, it seems highly likely that the loss of knowledge of the appearance and specific habitat of *R. subpinnatus* in Britain caused this apparent decline, as was the case with *Homomallium incurvatum* (Blockeel, 2007). Nevertheless, it is far from ubiquitous in Wales and is likely to be a genuinely scarce, if not rare, species in Britain as a whole. SDSB consciously searched for it for 3 years in Pembrokeshire before finally discovering a colony, and several searches in apparently suitable habitat in Cardiganshire have failed to produce any colonies. Remarkably, all of the Welsh populations of *R. subpinnatus* are protected by SSSIs, all but one of which were designated before the species was found, and several of which include bryophyte assemblages as qualifying features. Providing landowners and people maintaining footpaths in these valley woodlands

are made aware of the presence of *R. subpinnatus*, its continued existence in Wales seems assured.

It seems very unlikely that *R. subpinnatus* should be relatively widespread in Wales but restricted to a single site in England. Perhaps English bryologists could seek it specifically in humid, wooded river valleys, bearing its resemblance to *Loeskeobryum brevirostre* in mind.

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