



Some unexpected mires and flushes in Exmoor

Andrew Branson reports on some new findings in this largely unrecorded part of south-west Britain

The distributions of several bryophytes which are indicator species of basic mires, such as *Hamatocaulis vernicosus*, *Scorpidium cossonii* and *Sphagnum contortum*, in western Britain extend south to central and southern Wales but then appear to more or less stop at the Bristol Channel. I always thought this was because the upland areas in the south west, such as Exmoor, did not contain suitable habitats for these species. Recent early survey work for a bryophyte flora of Somerset has changed my view on this.

Searching for needles

With an area of less than 700 km², Exmoor is one of the smaller National Parks. Much of it

△ Figure 1. Madacombe, north of Exford, Exmoor, with a species-rich flushed area in the centre of the photograph. All photographs Andrew Branson

has been modified over the centuries and the areas of open moorland and blanket bog are now quite limited, with large areas of poor quality, sheep- and cattle-grazed, semi-improved pasture dominating, even in the more upland parts of the National Park. In the past, most visiting bryologists have focussed on well-known areas such as Horner Woods, near Porlock, with the highest point in Exmoor at Dunkery Beacon (519 m) nearby, and the Barle valley woodlands in the south of the National Park. However, one of the benefits of recording for an atlas is that you tend to think in terms of unrecorded 'squares' rather than just revisiting species-rich sites. So,

recently I have found myself tramping out across unpromising acid grassland, recording card in hand, looking out for valleys and streams that provide structural diversity in the hope that they might indicate some extra species to record (Fig. 1). Much to my surprise, I started to find that the sides of some of Exmoor's headwater rivers and their tributaries had plenty of interesting flushed sites, particularly north of Simonsbath and Exford (SS74 and SS84) in the far west of South Somerset (vc 5). Even more of a surprise was that some of these were quite base-rich. The geology of the region is mostly acidic Devonian slates and shales, but there are evidently some more base-rich influences. Locally, there are rocks that form part of the Ilfracombe Series that include Combe Martin Slates which have a calcareous shaley element, and it could be these that are influencing some areas of this part of Exmoor.

Initial discoveries

I first realised that there was more to the valleys than had previously been recognised when in July 2020 I came across a good population of *Scorpidium cossonii* near the hamlet of Oareford. This was beside a headwater of the East Lyn River, known as Chalk Water – the name itself was an indication that perhaps there was something different here. Previously, the only records for this species in south-west England were from a couple of M13 *Schoenus nigricans* – *Juncus subnodulosus* mires near Taunton, from base-rich flushes at Prewley Moor and Sourton Tors in North Devon (vc 4), which were surveyed during the 2019 BBS Spring meeting, and on the Serpentine of the Lizard peninsula.

In November 2020 I discovered a flushed area rich in 'brown mosses' and other species of base-rich habitats beside the River Exe near Simonsbath. This had an intriguing mix of species, including *Palustriella falcata* and

P. commutata, *Sarmentypnum exannulatum*, *Campylium stellatum*, *Ctenidium molluscum*, and a rich mix of Sphagna including *Sphagnum contortum*, *S. teres* and *S. inundatum*. On the slopes above there were large cushions of *Breutelia chrysocoma*. There was also a good population of *Scorpidium cossonii*, mostly in the more saturated peaty areas, with *S. revolvens* creeping through the flushed edges of the site. As mentioned by Blockeel *et al.* (2014), these two species are sometimes found on the same site, but appear to have slightly different ecological requirements. Several of the species in this site, e.g. *Sphagnum teres*, *S. contortum*, *Palustriella falcata*, have few records in south-west England and have not been recorded in Exmoor in recent decades, if at all. An added bonus in April 2021 at the same site was a small population of *Blindia acuta* on dripping rocks. This species was found new to South Somerset a mile or so further upstream during a visit with Sharon Pilkington in October 2020.

Another trip in April 2021 with Sharon to the remote line of hills called The Chains, north of Simonsbath, added a further species of interest and new to South Somerset: *Hamatocaulis vernicosus*, found in a spongy upwelling by Hoar oak Water, a small river that flows northwards to join the East Lyn River at Watersmeet, near Lynmouth. This was not entirely unexpected as *Hamatocaulis* had been found further north along Hoar oak Water in North Devon (vc 4) in 1995 by Ken May (Perry, 2001). *Palustriella falcata* was also found nearby on this trip. These hills reach a height of 487 m at Chain Barrow, but are mostly unproductive degraded pasture with large areas of dense *Molinia caerulea* (Purple Moor-grass). Of note, however, was the exciting discovery in November 2021 of *Bryum riparium* on a shaley north-facing flushed slope above the stream in The Chains Valley, growing with much *Scapania undulata* and *Dichodontium palustre*. This is



△ Figure 2. *Sphagnum contortum* growing beside the Weir Water, Oareford.



△ Figure 3. *Sphagnum teres* growing beside the Weir Water, Oareford.

considerably south of this *Bryum*'s main range in Britain.

A Wessex Bryology Group meeting in December 2021 and an earlier reccé of the site along the Weir Water to the east of Oareford produced another excellent range of bryophytes, including good populations of *Sphagnum contortum* (Fig. 2), *S. teres* (Fig. 3), *Scorpidium cossonii* and much else. The short walk along the Weir Water on the day of the meeting gave a total of more than 130 species. So the number of interesting flushed sites was beginning to build up, but 2022 was to bring yet more surprises.

More species-rich communities

In 1971 the BBS held its spring meeting at Dulverton, in the south of Exmoor, and visited many sites in the area. One afternoon some of the participants stopped at a 'marshy area' called Madacombe, which is one of the main headwaters of the Chalk Water. Sadly, the only species specifically noted for this site

(the records included another location in the same hectad) was *Bryum pseudotriquetrum*. However, intriguingly, Perry (2001) includes a 1936 record made by Dr Walter Watson, an important Somerset bryologist and lichenologist in the first half of the 20th century, of *Palustriella falcata* from Alderman's Barrow. This is a remote upland site (447 m), north of Exford and near Madacombe. In April 2022 I visited this area hoping to find some interesting communities. At first the valley seemed to hold little that was unusual, with a few species, such as *Calliergonella cuspidata*, indicating more basic conditions. The presence, however, of many mature clumps of *Carex paniculata* (Greater Tussock-sedge) was an indication that this was not a typical Exmoor stream (Fig. 4). Eventually I stopped for lunch by a small mound near the stream. I soon realised that I was sitting next to a large patch (4 × 3 m) of an unfamiliar rather untidy moss. On closer inspection it became quickly apparent it was *Tomentypnum nitens* (Fig. 5), a long way south



△ Figure 4. A species-rich flushed slope along the stream at Madacombe, with *Carex paniculata* dominating the watercourse in the foreground.

of its existing British and Irish populations. This is a Red Listed (Vulnerable) species (Callaghan, 2023) of ‘open calcareous mires and flushes with gently flowing water of around pH6 or more’

(Blockeel *et al.*, 2014). Growing alongside was a rich community including much *Plagiomnium elatum* (very rare in the south-west of England) (Fig. 6), *Hamatocaulis vernicosus* (Fig. 7),

▽ Figure 5. *Tomentypnum nitens* growing at Madacombe.

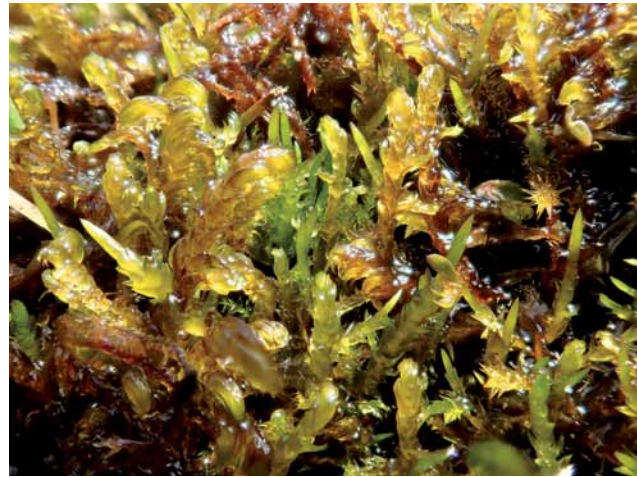




△ Figure 6. *Plagiomnium elatum* growing profusely along a flushed area of Madacombe.

Palustriella falcata, *Brachythecium rivulare*, *Cratoneuron filicinum*, *Climacium dendroides* and *Sphagnum flexuosum* (Fig. 8). The slopes are grazed by sheep and, in the summer of 2022, a roaming herd of Highland Cattle.

Further along the valley was an area of flushed land dominated by carpets of *Hamatocaulis*, together with *Sphagnum contortum*. An adjoining



△ Figure 7. *Hamatocaulis vernicosus*, Madacombe.

small valley, Hoscombe, also contained a few small flushed areas with more *Hamatocaulis*, *Palustriella falcata*, *Scorpidium cossonii*, *S. revolvens*, *Sarmentypnum exannulatum*, *Sphagnum contortum* and *Climacium dendroides*.

Interestingly, on a revisit to Weir Water in April 2023 I found some further populations of *Hamatocaulis* growing with *Scorpidium cossonii*, and *Palustriella falcata*. During my visit some these flushes had naturalised populations of *Pinguicula grandiflora* (Large-flowered Butterwort) in flower, making quite an arresting sight (see Fig. 9). Later in April 2023, a search along the banks of the upper reaches of the Weir Water produced a few more flushed areas with yet more communities with *Hamatocaulis*, *Palustriella falcata*, *Sphagnum inundatum*, and a small amount of *Plagiomnium elatum*.

Some provisional thoughts

As can be seen, a picture was evolving of a scatter of species-rich flushes along these headwaters

◁ Figure 8. A carpet of 'brown mosses' including *Hamatocaulis vernicosus*, Madacombe.

▷ Figure 9. Introduced *Pinguicula grandiflora* growing in a species-rich flushed area at Weir Water, with sporophytes of *Philonotis fontana* in the foreground.



(see Fig. 10; Table 1). This raises several questions. Had these been missed in the past, which is quite possible as many of the locations are in remote parts of Exmoor which are rarely visited? Yet the communities along parts of the Weir Water near the car park at Robber's Bridge are comparatively accessible. Have conditions changed that have made the sites more favourable to these communities? However, the size of the populations of some of the rarer plants indicates that they are not a recent occurrence.

The presence of *Toментypnum* at its most southerly site in the UK is intriguing as it

is considered as a declining member of the 'Circumpolar Boreo-Arctic Montane element' (Porley, 2013) and is essentially a post-glacial relict throughout most of the UK. Porley (2013) describes a study in Sweden that links

▽ Figure 10. Map of the north part of Exmoor showing the locations described and positions of some of the species-rich flushes (stars). Satellite image © Google, DigitalGlobe.



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Species	Exe Cleave	Mada- combe	Hos- combe	Weir Water	Upper Weir Water
<i>Aneura pinguis</i>	•		•	•	•
<i>Aulacomnium palustre</i>	•	•		•	•
<i>Blindia acuta</i>	•				
<i>Brachythecium rivulare</i>	•	•		•	•
<i>Bretelia chysocoma</i>	•				
<i>Bryum pseudotriquetrum</i>	•	•		•	•
<i>Calliergonella cuspidata</i>	•	•	•	•	•
<i>Campylium stellatum</i>	•		•	•	
<i>Campylopus flexuosus</i>	•	•		•	
<i>Chiloscyphus polyanthos</i>		•	•	•	•
<i>Climacium dendroides</i>		•	•	•	
<i>Cratoneuron filicinum</i>		•		•	•
<i>Ctenidium molluscum</i>	•			•	
<i>Dichodontium palustre</i>	•	•	•	•	•
<i>Dichodontium pellucidum s. l.</i>	•			•	•
<i>Dicranum bonjeanii</i>	•				•
<i>Dicranum scoparium</i>	•	•	•	•	•
<i>Fissidens adiantoides</i>	•			•	•
<i>Hamatocaulis vernicosus</i>		•	•	•	•
<i>Hookeria lucens</i>				•	
<i>Hylocomium splendens</i>	•	•	•	•	•
<i>Kindbergia praelonga</i>		•	•	•	
<i>Palustriella commutata</i>	•			•	
<i>Palustriella falcata</i>	•	•	•	•	•
<i>Pellia endiviifolia</i>				•	
<i>Pellia epiphylla</i>	•	•	•	•	•
<i>Pellia neesiana</i>		•			
<i>Philonotis fontana</i>	•	•	•	•	•
<i>Plagiomnium elatum</i>		•			•
<i>Polytrichum commune</i>	•	•	•	•	•
<i>Polytrichum strictum</i>		•		•	
<i>Pseudoscleropodium purum</i>	•	•			•

Species	Exe Cleave	Mada- combe	Hos- combe	Weir Water	Upper Weir Water
<i>Rhizomnium punctatum</i>				•	•
<i>Rhytidiadelphus squarrosus</i>	•	•		•	•
<i>Riccardia multifida</i>				•	
<i>Riccardia chamedryfolia</i>	•		•	•	
<i>Sarmentypnum exannulatum</i>	•	•	•	•	•
<i>Scapania undulata</i>	•	•	•	•	•
<i>Scorpidium cossonii</i>	•		•	•	
<i>Scorpidium revolvens</i>	•		•		
<i>Sphagnum angustifolium</i>		•			
<i>Sphagnum auriculatum</i>	•	•	•	•	•
<i>Sphagnum capillifolium</i>		•		•	
<i>Sphagnum contortum</i>	•	•	•	•	
<i>Sphagnum cuspidatum</i>		•	•		•
<i>Sphagnum fallax</i>	•	•	•	•	
<i>Sphagnum flexuosum</i>		•			
<i>Sphagnum inundatum</i>					•
<i>Sphagnum palustre</i>	•	•	•	•	•
<i>Sphagnum papillosum</i>	•	•			•
<i>Sphagnum quinquefarium</i>			•	•	•
<i>Sphagnum rubellum</i>	•				
<i>Sphagnum squarrosus</i>		•			
<i>Sphagnum subnitens</i>	•	•		•	•
<i>Sphagnum teres</i>	•			•	
<i>Straminergon stramineum</i>		•		•	
<i>Thuidium</i>	•	•		•	•
<i>tamariscinum</i>					
<i>Tomentypnum nitens</i>		•			
<i>Tortella tortuosa</i>	•				
<i>Trichocolea tomentella</i>	•			•	•

△ **Table 1.** Some of the species recorded in flushes in Exe Cleave, near Warren Bridge (SS8040), Madacombe (SS8243), Hoscombe (SS8244), Weir Water, near Oareford (SS8246) and Upper Weir Water (SS8344).

its decline with increasing temperatures. That it has survived so far south in the UK is therefore especially interesting. It is also worth noting that the habitat is quite unlike the East Anglian fenland sites (Masson & Stevenson, 2014), and is more similar to some of the northern UK and Irish sites (Lockhart *et al.*, 2012) in that the population is growing on a sloping flushed

bank in an area of degraded blanket bog (altitude approx. 410 m) (Fig. 11); pH readings at the site ranged from 6.5 to 7.1.

I would characterise these flushes as near to the ‘Neutral Flush’ community, as described in Stevens *et al.* (2010), but some are perhaps more aligned with M10 *Carex dioica* – *Pinguicula vulgaris* mire communities. However, more work



△ Figure 11. The bank with *Tomentypnum* which can be seen in the foreground as the darker moss.

is needed to determine these.

As with many of the open sites in this part of Exmoor, it was not uncommon to find the surface water of streams and flushed areas covered in a thick algal scum. Whether this pollution effect is the result of attempts to improve the grazing quality of the grassland, or a more general product of aerial pollution, is not easy to say. But even in the decade or so that I have been visiting these areas I have noticed an increase in the frequency of this pollution. All the sites described here are within the North Exmoor Site of Special Scientific Interest, although none of the features mentioned here are given in the citation.

Conclusion

To find these plants tucked away in a seemingly unpromising area is a testament to the tenacity of these communities to survive, and tells us something about the intricate patterns of topology and geology in these big landscapes that can so often be missed. The next stage is to find out more about their extent, to monitor the populations and to work with others to try to ensure their survival.

Acknowledgements

My thanks to Sharon Pilkington for her excellent company on many trips to the 'wild west of Somerset' and for helpful comments on a draft of this article.

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