Microbryum davallianum (Sm.) R.H.Zander in Britain and Ireland

Sharon Pilkington explains the current taxonomic treatment of this variable species.

Publication of the new checklist of British and Irish bryophytes (Blockeel *et al.*, 2021) has resulted in numerous nomenclatural changes and the addition or reinstatement of a number of taxa. These include a revised circumscription of a familiar moss, *Microbryum davallianum*, which is now recognised as having three varieties, one more than was recognised previously (Hill *et al.*, 2008).

△ Figure 1. *M. davallianum* var. *conicum* on soil in a flowerbed, Westbury, vc 8.
All photographs Sharon Pilkington

Microbryum davallianum (Fig. 1) is a small winter annual in the Pottiaceae. It belongs to a difficult complex that has challenged taxonomists for many years, and which has variously been split into two or three narrowly defined species with or without subspecies and varieties. As a result, many of the floras and other books used

by modern bryologists, including Smith (2004), do not include the currently recognised concept of *M. davallianum*.

This article aims to update the concept of *M. davallianum*, to provide a new key to British and Irish *Microbryum* taxa and to encourage the submission of voucher material where it is lacking in certain vice-counties.

Taxonomic background

Long-standing taxonomic confusion in this complex exists because its gametophyte characters are homogeneous but its sporophyte characters, which are normally regarded as more important for taxonomy, are highly variable and cannot always be relied upon.

Following his PhD research into the genus *Pottia*, Chamberlain (1969) published a short note proposing new nomenclatural combinations in *Pottia starckeana* (Hedw.) Müll. Smith (1978) adopted the majority of these in his treatment of *Pottia* for the first edition of his British and Irish moss flora. At that time, *Pottia* included 12 British and Irish species, all later transferred to other genera. Chamberlain's treatment of the species now regarded as *Microbryum davallianum* and *M. starckeanum* included three subspecies of *P. starckeana* – *conica*, *minutula* and *starckeana* – and recognised *P. commutata*, which had a well-developed peristome, as a distinct species.

In his major work on the Pottiaceae, Zander (1993) transferred *Pottia commutata* and *P. starckeana* into the genus *Microbryum* Schimp. Blockeel & Long (1998) adopted his concepts and also followed Ros *et al.* (1996) in recognising two broadly defined species based solely on spore characters: *Microbryum starckeanum* and *M. davallianum*. The various taxonomic combinations published by Chamberlain (1969) were sunk into these species, as was *Pottia commutata*.

Problems remained with the definition of *M. davallianum*, however, mainly because of the variability of the peristome character. Smith (2004) agreed with Guerra & Cano (2000) in restoring it along with *M. starckeanum* to *Pottia*. However, Hill *et al.* (2008) did not agree and also considered forms with long peristomes, formerly known as *P. commutata*, too distinctive to be completely subordinated to *Microbryum davallianum*. The 2008 checklist therefore listed two varieties of *M. davallianum* – var. *commutatum* and var. *davallianum*.

Current views

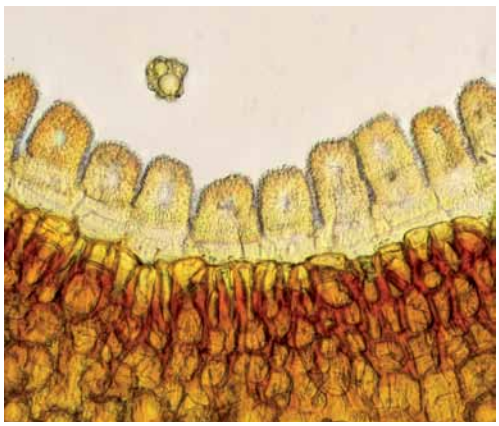
Five of the eight recognised European species of *Microbryum* are found in Britain and Ireland and Blockeel *et al.* (2021) follow Hodgetts *et al.* (2020) in recognising two species with long, erect setae and dehiscent capsules. These are *M. starckeanum* and *M. davallianum*, the latter now represented by the three varieties *conicum*, *commutatum* and *davallianum*.

Identification

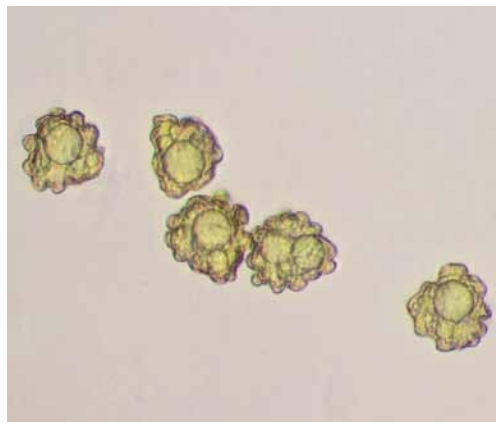
Recognition of *Microbryum* as a genus is relatively straightforward. Zander (1993) describes it as distinctive in the combination of small size, red KOH (2% Potassium hydroxide solution) reaction of the lamina, a single round to semi-circular stereid band in costal transverse section, capsules apiculate when cleistocarpous (*M. curvicollum, M. floerkeanum* and *M. rectum*), peristome teeth, if present, usually truncate at the apex and large for the size of the capsule and calyptrae often rough, with low papillae. *M. davallianum* and *M. starckeanum* differ from the other three species in having dehiscent capsules and long setae.

M. davallianum and *M. starckeanum* resemble *Tortula* species, especially *T. truncata*, but are smaller, lack the smooth calyptrae and have

A new key to British and Irish *Microbryum* species		
1	Seta to 1.5 mm long, capsule immersed or exserted, cleistocarpous	**2**
	Seta 1–4 mm long, capsule exserted, dehiscent	**4**
2	Capsule immersed	***M. floerkeanum***
	Capsule exserted	**3**
3	Seta straight, capsule globose	***M. rectum***
	Seta cygneous, capsule ovoid	***M. curvicollum***
4	Spores warty-looking, peristome well-developed	***M. starckeanum***
	Spores with a regular outline, peristome absent, rudimentary or well-developed	**5**
5	Capsule widest at the mouth, 1(2) row(s) of differentiated cells below mouth, peristome absent	***M. davallianum* var. *davallianum***
	Capsule widest at the middle, 1–4 rows of differentiated cells below mouth, peristome absent, rudimentary or well-developed	**6**
6	Peristome absent or rudimentary	***M. davallianum* var. *conicum***
	Peristome well-developed	***M. davallianum* var. *commutatum***



△ Figure 2. Capsule mouth of *M. starckeanum*, Cheddar Gorge, vc 6.



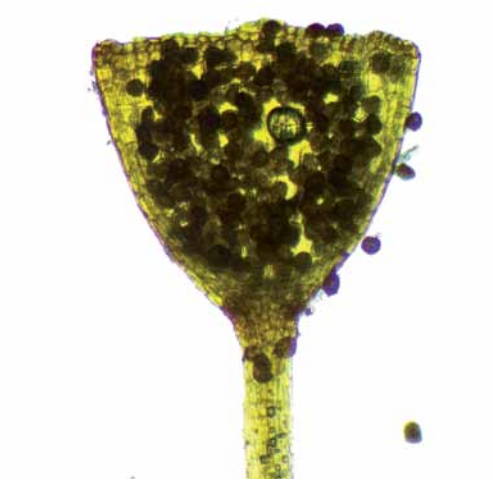
△ Figure 3. Lumpy/warty-looking spores of *M. starckeanum*, Cheddar Gorge, vc 6.

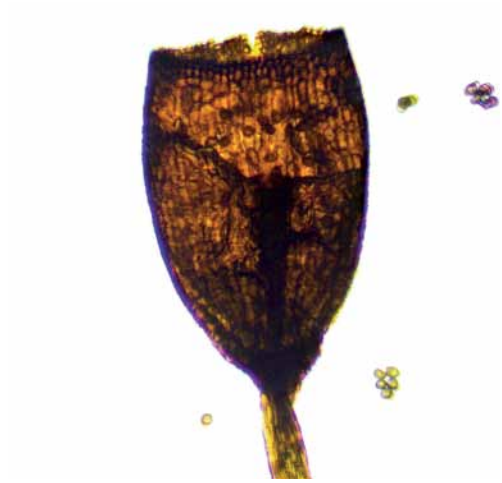
conical or mamillate, not rostrate, capsule lids. The KOH laminal reaction of *Tortula* is yellow, not red. Sporophytes typically mature between November and May.

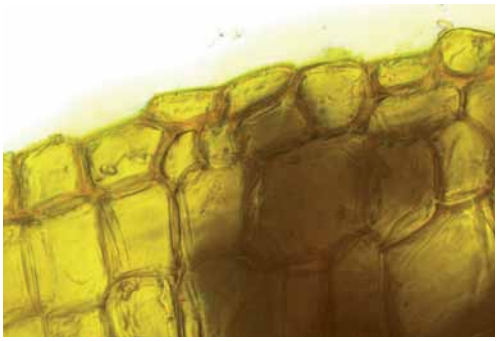
Spore morphology is currently considered to be the most important character in delimiting *M. davallianum* and *M. starckeanum*, while their peristome characters are not considered useful except at a varietal level in *M. davallianum*.

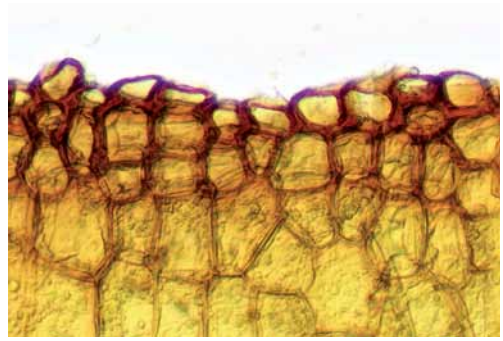
***Microbryum starckeanum* (Hedw.) R.H.Zander (*Pottia starckeana* (Hedw.) Müll. Hal.)**

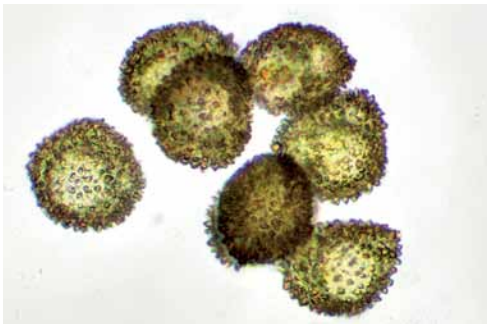
The current concept of *M. starckeanum* is relatively well defined. It has a well-developed, often strikingly pale peristome and spores that are warty-looking in outline (Figs 2, 3). It is a nationally scarce species and is mainly, but not exclusively, associated with shallow, often disturbed soil near the coast. Unlike

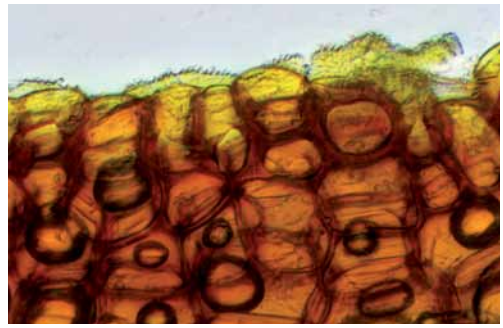












△ Figure 4. Top *M. davallianum* var. *davallianum* capsule, Gargrave, vc 63.

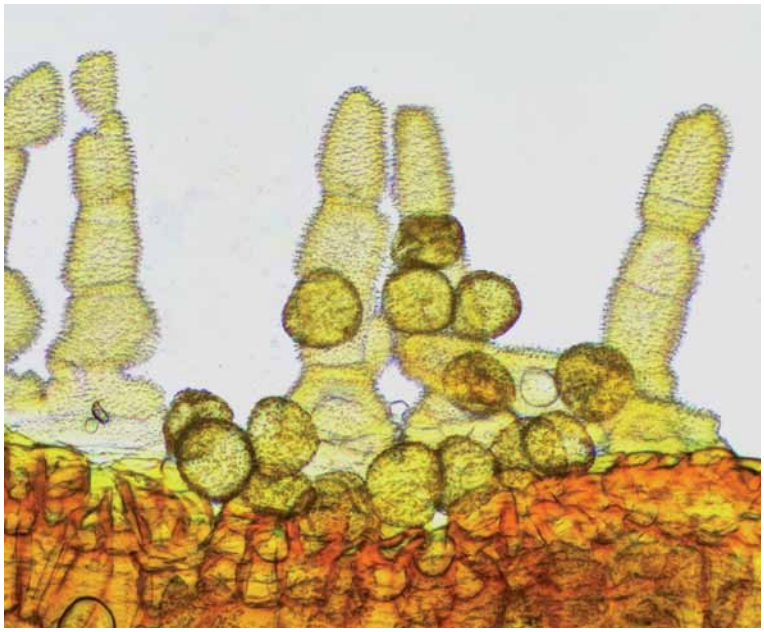
△ Figure 5. Middle Capsule mouth of *M. davallianum* var. *davallianum*, Gargrave, vc 63.

△ Figure 6. Bottom Regular spores of *M. davallianum* var. *conicum*, Pibsbury, vc 6.

△ Figure 7. Top *M. davallianum* var. *conicum* capsule, Westbury, vc 8.

△ Figure 8. Middle *M. davallianum* var. *conicum*, Pibsbury, vc 6. This plant has no peristome and 2–3 rows of smaller, thickened cells at the mouth.

△ Figure 9. Bottom *M. davallianum* var. *conicum*, Barrow Gurney, vc 6. This plant has a rudimentary peristome and 1–2 rows of smaller, thickened cells at the mouth.



◁ Figure 10. *M. davallianum* var. *commutatum*, Pen-y-holt Down, vc 45. This has well-developed peristome teeth and two rows of thick-walled cells at the peristome mouth. Unlike *M. starckeanum*, the spores have a regular outline.

M. davallianum, it is rarely found in arable fields or other cultivated ground.

***Microbryum davallianum* (Sm.) R.H.Zander (*Pottia davalliana* (Sm.) C.E.O.Jensen)**

At species level, *M. davallianum* is recognised primarily by its spores which have a round (not warty-looking) outline with variable surface ornamentation (Fig. 6). The peristome is long, rudimentary or absent and is regarded as important only in defining the varieties. *M. davallianum* is an early colonist of disturbed calcareous and circumneutral soil; it is found in a wider range of habitats than *M. starckeanum*, including compacted paths, tracks, woodland rides, shallow soils around limestone outcrops, barish patches in grassland and, commonly, in stubble fields and horticultural situations such as herbaceous borders.

var. *davallianum* (Sm.) R.H.Zander

M. davallianum var. *davallianum* was recognised by Chamberlain (1969) as *Pottia starckeana* subsp. *minutula*. Plants lack a peristome and have a wide-mouthed capsule that has a single row of small, differentiated (typically thick-walled) cells just below the mouth (Figs 4, 5). Spores of this variety have spiny projections.

var. *conicum* (Schleich. ex. Schwägr.) R.H.Zander (*Pottia starckeana* (Hedw.) Müll. Hal. subsp. *conica* (Schleich. ex. Schwägr.) D.F.Chamb.)

M. davallianum var. *conicum* was recognised by Chamberlain (1969) as *Pottia starckeana* subsp. *conica*. It has not yet been studied at a molecular level and its status is uncertain, but it was accepted by Blockeel *et al.* (2021) as having enough morphological definition to merit varietal status. Plants of var. *conicum* have a capsule that is widest around the middle, so appearing to narrow at the mouth (Fig. 7). There are 1–4 rows of small, differentiated cells immediately below the mouth (Fig. 8). The peristome is either

rudimentary (Fig. 9) or absent and spores have short spines, papillae or tubercles on the surface (Fig. 6).

Many continental bryologists consider that there is an additional variety/species, var. *muticum.* It is close to var. *conicum,* and separation relies on capsule shape, number of rows of differentiated cells below the peristome mouth and degree of papillosity of upper leaf cells. Recognition of this variety may account for some forms of *M. davallianum* that come close to var. *davallianum.* *Microbryum davallianum* var. *muticum* is not currently recognised in Britain and Ireland, but for more information see Nebel & Philippi (2000).

var. *commutatum* (Limpr.) R.H.Zander

Once regarded as a distinct species (*Pottia commutata*), *M. davallianum* var. *commutatum* is relatively well-defined. It has a well-developed peristome but differs from the modern concept of *M. starckeanum* in having spores with a regular, not warty-looking outline (Fig. 10).

Distribution

Even a quick glance at the current Census Catalogue will show that the known distribution of the three varieties of *M. davallianum* is incomplete. Var. *conicum* is likely to be common in the south, becoming scarcer in the north, but vouchers are still needed for many vice-counties. Var. *davallianum* is thought to be less common than var. *conicum*, although it may grow with that species on basic soils at inland sites (Smith, 1978). Var. *commutatum* is found in similar habitats to the other varieties, but is likely to be rare and restricted to southern coastal areas.

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