Rhizoidal tubers in *Pleuridium acuminatum*

**Nick Law** and **Tom Blockeel** report the discovery of rhizoidal tubers in this moss in Britain in a stubble field in South Derbyshire.

**Introduction**

Risse (1987) provided a review of the published knowledge of tubers (rhizoidal gemmae) in mosses from the time of their probable first description by T.F.L. Nees von Esenbeck in 1818 up to March 1987. This review encompassed key papers such as that by Whitehouse (1966), which described and illustrated the rhizoidal tubers of twenty-nine species of European mosses. Risse’s review (1987) listed 82 European mosses and 36 extra-European mosses from which tubers had been confirmed. Neither of these lists included *Pleuridium acuminatum* although, as noted by Risse, H. Koch had long before reported the occurrence of tubers within the genus (Koch, 1842). Their occurrence within European populations of *P. acuminatum* was confirmed by Arts & Risse (1988), following the discovery by R. Düll in 1986 of a tuber-bearing herbarium specimen of *P. acuminatum*, collected by F. Neu and originally determined as *P. subulatum*. Arts & Risse detected rhizoidal tubers in 11 out of 15 specimens of *P. acuminatum* but were unable to find them in 28 specimens of *P. subulatum* that they examined.

Smith (2004) indicates that rhizoidal tubers sometimes occur in *P. acuminatum* and provides a description of them, but he does not indicate whether this observation is based on material from Britain or continental Europe, and he does not illustrate the tubers. Porley (2008) stated that “large, brown, variably-shaped tubers, surrounded by a hyaline layer, occur commonly on continental specimens of *P. acuminatum* but have not been reported in the British Isles and should be looked out for”. He provided a photomicrograph of a tuber from a Portuguese specimen. Finch & Blockeel (in Blockeel et al., 2014) also highlight the frequency of rhizoidal tubers on continental specimens and suggest that they “…doubtless occur in Britain”.

**Pleuridium species in arable land**

Both *P. acuminatum* and *P. subulatum* occur within arable fields but *P. acuminatum* appears to do so less frequently according to the results of the Survey of Bryophytes on Arable Land.
detect any dwarf axillary buds and subsequent microscopic examination of a cross-section of the leaves showed them to be bistratose at the shoulder (Fig. 2), confirming the identification as *P. acuminatum*. Whilst separating and washing out individual shoots to prepare a voucher for confirmation, NJL noted rhizoidal tubers on a couple of shoots. TLB subsequently examined the gathering and confirmed the identification. He detected solitary axillary buds on two separate shoots, raising initial suspicion that they might belong to *P. subulatum*. However these tiny buds appeared not to contain antheridia, whereas the remains of solitary antheridia were observed in the axils of the perichaetial leaves. The function of the apparently empty buds is unknown but they are a potential source of confusion in the identification of the two *Pleuridium* species.

The tubers of the Derbyshire plant are attached to short rhizoid branches; they are brown in colour, multicellular, roughly ovoid in shape, reaching 400 µm long. They reported that the tubers were “wrapped by a hyaline layer 3 to 8 µm thick”, but we have not been able to detect this in our material. We believe this to be the first confirmation of the presence of rhizoidal tubers in *P. acuminatum* in Britain and Ireland.

Both of us enjoy visiting arable stubble fields. They are generally good for boosting species totals when ‘tetrad bashing’. They have their own unique assemblage of species but are variable in both species composition and overall species diversity from field to field. Importantly, stubble fields represent a transient habitat; miss an opportunity to record a field of over-wintered stubble and it can be many years before the crop rotation presents the opportunity again.

Therefore when one of us (NJL) recently noticed some stubble at Caldwell in South Derbyshire, on land whose owner was known to him, the opportunity for recording was not to be overlooked. Access permission was obtained and a survey was undertaken by NJL on 7 February 2015.

The survey area involved one large field of over-wintered stubble and a second smaller adjacent field (Fig. 1). The centres of both fields were largely devoid of any bryophytes but the field margins supported a good cover. The majority of the assemblage was formed by a small number of common species dominated by *Barbula unguiculata*, *Bryum dichotomum*, *B. rubens*, *Dicranella staphylina* and *Tortula truncata*. A good range of other species was also present, albeit in lesser quantity, including *Bryum klinggraeffii*, *B. violaceum*, *Riccia glauca*, *R. sorocarpa*, *Riccardia chamedryfolia* and a species of *Pleuridium*. The *Pleuridium* occurred along the north headland of the large field, an area where *Ephemerum minutissimum* was particularly abundant. A collection of the *Pleuridium* was made at SK25781769. In total 21 species were recorded.

Examination of the *Pleuridium* failed to

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**Fig. 1.** Habitat of *Pleuridium acuminatum* at Caldwell, Derbyshire. N.J. Law

**Fig. 2.** Leaf section of *Pleuridium acuminatum* at shoulder of perichaetial leaf. T.L. Blockeel

**Fig. 4.** Close-up of tuber of *Pleuridium acuminatum*. T.L. Blockeel
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The future for arable bryophytes in Britain

Preston et al. (2010) highlight the fact that prior to the SBAL our historic knowledge of the distribution of arable bryophytes was imperfect. Agricultural practice has certainly undergone many changes since the 1960s when bryologists like H.L.K. Whitehouse began to take a particular interest in the bryoflora of arable fields. Developments in plant breeding and agricultural machinery combined with agricultural payments that became available after Britain joined the European Community in 1973 resulted in a significant trend from a more mixed cropping system involving autumn- and spring-sown combinable crops to one of predominantly autumn-sown crops and consequently a decline in the amount of over-wintered stubble. Inevitably, this must have had an impact on arable bryophytes due to the very short period of time between harvesting of one crop and establishment of the next.

Now, four decades later, the most recent reform of the Common Agricultural Policy will potentially give a boost for arable bryophytes. Under the new ‘greening rules’ there will be a requirement for many arable farms to meet new ‘crop diversification rules’ and meeting these rules will almost certainly see an increase in the area of spring-sown combinable crops (DEFRA, 2014). So for those of us who do not, in the words of Preston et al. (2010), consider arable land to be ‘unglamorous’, the next decade may provide more opportunities to make further interesting discoveries whilst boosting our tetrad species lists with a healthy component of arable specialists.

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References


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