

Tortula amplexa in a sand-and-gravel pit in Shropshire

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In late 2006, ML was asked by Dan Wrench, Biodiversity Officer for Shropshire County Council, to survey the mosses and liverworts at a number of quarries and pits in Shropshire (v.-c. 40). One visit, in early December, took him to Eardington sand-and-gravel pit, two miles south of Bridgnorth, where river terrace gravels from the Severn were extracted in the 1960s and 70s. Ground is still frequently disturbed by vehicles and other machinery there, although operations have been much scaled down.

A small acrocarpous moss collected from the pit, superficially resembling a member of the Meesiaceae, but with large leaf cells, recurved margins and a nerve ending well below a blunt leaf apex, proved puzzling. ML sent his gathering to SB, who noticed low c-shaped papillae on the lamina cells, suggesting it was an unfamiliar member of the Pottiaceae. The combination of characters seemed only to fit one species – *Tortula amplexa* – but that seemed unlikely, because its only European records came from three clay pits in a single 10 km square in Leicestershire, more than 50 miles from Eardington. However, examination of the rhizoids revealed a small number of the characteristic tubers (Figure 1) and allowed a confident identification.

Unfortunately, the initial gathering comprised only five young plants. The logical way to get a better voucher was to revisit the site, so the four of us convened there on 28th December 2006.

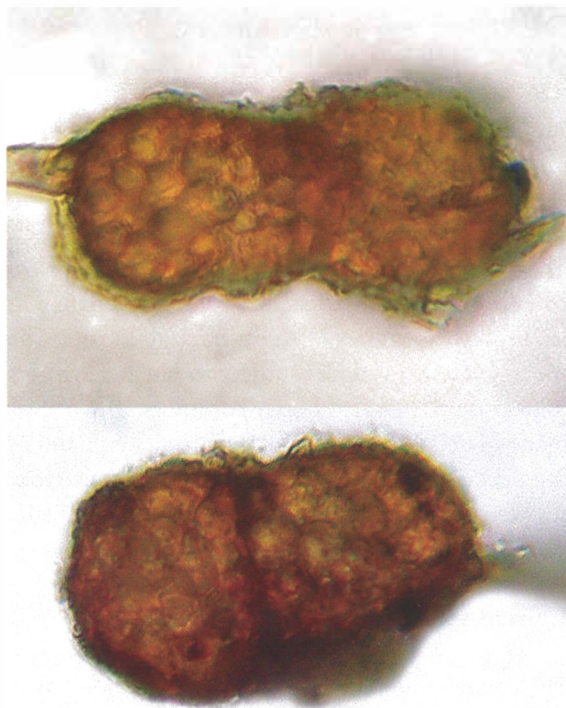


Figure 1. Rhizoidal tubers of *Tortula amplexa*. Photo: Des A. Callaghan

The first half hour of searching, in the area where ML made his original collection, revealed just one or two putative young shoots of the same plant, mixed among abundant acocarps. The substrate seemed worryingly calcareous, compared with the acidic clay at Moira, Leicestershire (Side & Whitehouse, 1974; Porley & Hodgetts, 1995), and also more sandy than might have been expect-



Figure 2. Habitat of *Tortula amplexa* at Eardington. Photo: Martin F. Godfrey.

ed given the habitat favoured by *Tortula amplexa* at its Leicestershire sites. The search was widened to take in other parts of the pit, including one very clayey hollow, criss-crossed by vehicle ruts, at SO72418995 (Figure 2). Almost immediately, patches of female *T. amplexa* were found among the sparse bryophytes on the sides of these ruts. Most of these stood out from the associated bryophytes because of their red-brown colour (Figure 3) and blunt-tipped, lingulate leaves, although a few were pale green (Figure 4). Outside the clayey hollow, the ground became sandy again and *T. amplexa* disappeared, although two patches were noted a little way to the north (on the edge of the sand pit at SO72469003).

Tortula amplexa was concentrated on the north-facing sides of ruts in a clayey shallow hollow about 10 x 15 metres across (Figure 2), near the middle of the sand-and-gravel pit, although a few patches were noted on south-facing sides of ruts and on flat ground. It occupied a wide range of slopes, from vertical to horizontal, but was most common on slopes of *ca.* 45°. The substrate was a mix of sticky brownish clay (pH 8.2) and rounded pebbles, with very little sand. Cracks in the clay indicated periodic inundation and drying out of the substrate supporting *T. amplexa*. Associates in-

cluded *Aloina aloides* (rare), *Barbula unguiculata* (rare), *Bryum dichotomum** (frequent), *B. gemmiferum** (frequent), *Dicranella varia* (abundant), *Funaria hygrometrica** (frequent), *Pseudocrossidium hornschurchianum* (rare) and scattered vascular plants, including *Arenaria serpyllifolia*, *Reseda luteola* and some unidentified seedlings, although all were sparse and there was much bare clay. A few 10s of patches of *T. amplexa* were seen in total, although no accurate count was attempted. The habitat is roughly comparable to that described from Leicestershire, but is more calcareous so the range of associates is slightly different (those marked * in the above list of species were associates at both sites). It is also not dissimilar to the species' American habitat: "soil, stones, near springs, dry washes, lowlands; low elevations" (Zander & Eckel, 2005). The calcareous nature of many parts of the site, where the river terrace gravels would naturally give a low pH, is due to the importation of cement for mixing with gravels to produce readymix concrete for distribution in lorries.

The discovery of *Tortula amplexa* in Shropshire raises the question of its status in Britain. It has



Figure 3. *Tortula amplexa* at Eardington. Photo: Martin F. Godfrey.



Figure 4. Close-up of *Tortula amplexa* at Eardington. Photo: Graham S. Motley.

a very restricted global range, currently thought to comprise western Canada (British Columbia & Manitoba), the western USA (Arizona, California & Washington) and the UK (Zander & Eckel, 2005) [incidentally, Zander & Eckel return it to *T. amplexa*, following Cano & Gallego (2003), rather than *Syntrichia amplexa* where Zander referred it in 1993]. When its only known European colonies were in clay pits in one tiny area in central England, owned at one time by firms with links to north America, it seemed almost inevitable that *T. amplexa* was an introduction to Britain, possibly arriving on imported quarrying machinery (English Nature introduced species audit, from www.brc.ac.uk). The Shropshire colony could easily have originated from Leicestershire, as the French-owned company that owns the Eardington pit operates numerous sand and clay pits throughout Britain, including Leicestershire; indeed it may have come in directly with clay and gravel for readymix production. Alternatively, though, *T. amplexa* could be a rare native plant of bare, clayey ground that has been overlooked as an odd, non-fertile *Pottia* or a large *Barbula*. The disjunct distribution of *T. amplexa*, comprising Western Europe and Western North America, is shared by several species, albeit mostly with southerly distributions, including *Tortula bolan-*

deri, *Scleropodium tourettii*, *Antitrichia californica* (Schofield, 1988), *Schistidium occidentale* (Casas *et al.*, 2001), *Microbryum fossbergii* (Ros *et al.*, 2005) and *Didymodon bistratosus* (Zander *et al.*, 2005). The most similar plant, in terms of ecology and distribution, is *Hennediella stanfordensis*, which Smith (2004) suggested might be native to Britain. The lack of any records of *T. amplexa* during the Survey of the Bryophytes of Arable Land (SBAL), when the bryophytes of 118 clayey fields were recorded, makes it difficult to argue that it is a native specialist of disturbed clay, especially given that all of its associates at Eardington were found during SBAL. Overall, it seems unlikely that *T. amplexa* is a native European moss, but it is impossible to be sure one way or the other. If it has arrived in Britain recently, it would be interesting to see whether it spreads into other habitats and districts in the future. There is every chance that further colonies already await discovery in clay pits in the English Midlands, not least because these sites are very rarely open to the public, and *T. amplexa* is easy to overlook.

Acknowledgements

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Riccia huebeneriana in South Lancashire

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Introduction

Although *Riccia huebeneriana* is a widespread plant in Europe, it is rare (Damsholt 2002) and is listed as such in the European Red Data Book (ECCB, 1995). In the UK it is scarce (Preston, 2006), being categorised as ‘Vulnerable’ in the British Red Data Book (Church *et al.*, 2001). The plant is one of eleven liverwort species that are recognised as being of principal importance for conservation in England, under Section 74 of the Countryside and Rights of Way Act 2000, and is included as a priority species within the UK Biodiversity Action Plan.

The habitat of *R. huebeneriana* is very characteristic, the plants being confined to exposed, non-calcareous soil at the edge of freshwater bodies, especially reservoirs (Paton, 1999). Other bryophytes that have been noted as growing within close proximity of this liverwort include *Aphanorhagma patens*, *Dicranella staphylina*, *Fossombronia wondraczekii*, *Leptobryum pyriforme*, *Pseudephemerum*

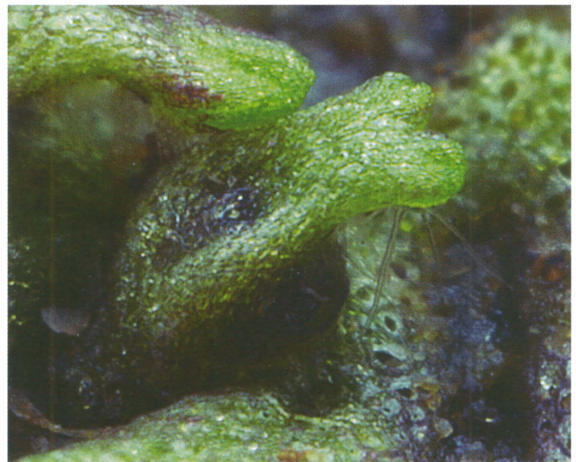


Figure 1. *Riccia huebeneriana* showing development of sporophyte on underside of thallus. Photo: Des A. Callaghan.

nitidum and *Riccia glauca* (Hill *et al.*, 1991; Holyoak, 2001, 2002).

R. huebeneriana is a classic annual shuttle species (*sensu* During, 1979, 1992), with a short lifespan and very frequent sporophytes producing an