

Ceratodon conicus: Scarce Redshank or Common Patio Moss?

Having found the first British record of this moss since 1990, Peter Martin tells us where to look for *C. conicus* and how to distinguish this species from *C. purpureus*

Ceratodon conicus (Hampe) Lindb. was first found in Britain at Duston in August 1884 by H.N. Dixon. Since then it has been found in the belt of limestone that runs NE from North Somerset across Gloucestershire, Oxfordshire and beyond. It was more abundant in Oxfordshire and Northamptonshire although never common.

Approximately 70 records have been made by a limited number of bryologists with 43 of these

being attributed to H.N. Dixon, H.H. Knight and in more recent times Eustace Jones. Most of the later records were by Eustace Jones in Oxfordshire between 1946 and 1990, where it was last seen, discussed by Ron Porley (2013).

It is a species of mud capped walls produced in the days of the horse and accompanied by other rarities such as *Pterygoneuron lamellatum* and *P. ovatum* which have similarly declined or disappeared. It is also known from paths and





<Right top, Fig. 1: *Ceratodon conicus* showing leaves with excurrent hair point growing with *Didymodon* spp. Right bottom, Fig. 2: Lamplighters Marsh Nature reserve showing concrete bases. This page above, Fig. 3: Concrete bases supporting *C. conicus* (M5 view). P Martin

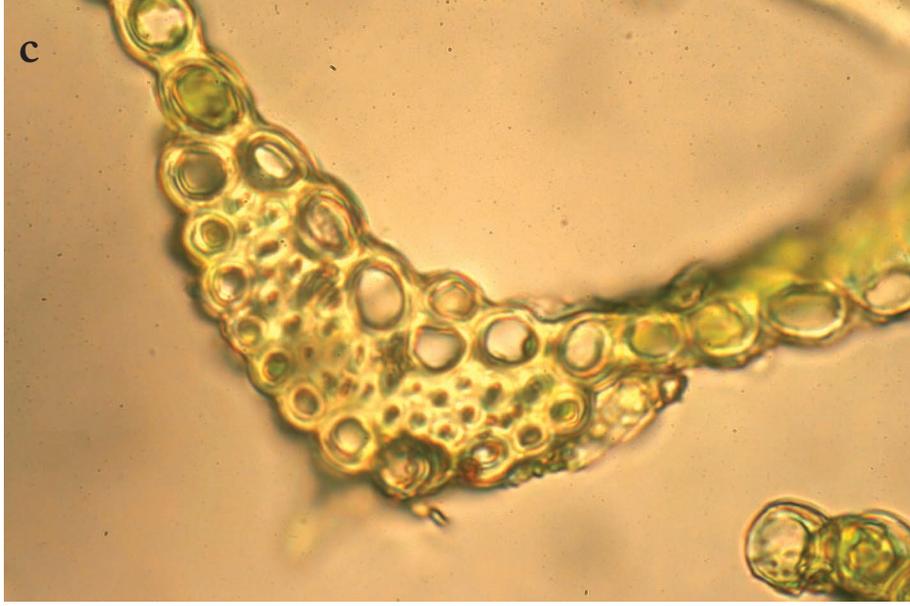
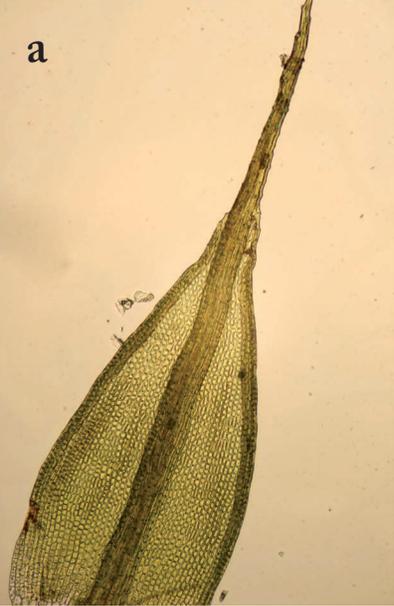
quarry floors. Its decline is clearly seen in the series of open circles denoting old records in the 1992 Atlas (Hill *et al.*, 1992). It would appear that most of these records are unlikely to be re-found following the loss of the mud capped walls. In Gloucestershire H.H. Knight was responsible for all but one record in 5 sites between 1911 and 1914; the other was from Cliff Townsend in Cheltenham in 1958.

In 2010, Justin Smith organised a bryology meeting at the Lamplighters Nature Reserve in Bristol, where I collected a specimen of *Ceratodon* that superficially looked like *C. conicus*. Despite Tom Blockeel agreeing it was a possibility for that species, no fruit was found on the day or subsequent visits to prove it one way or the other. In 2012 David Bell working at the Royal Botanic Garden, Edinburgh, examined the specimen in terms of comparative DNA analysis with *C. purpureus* and concluded the specimen was *C. conicus* (Bell, Long & Holligsworth, 2013) making it the only British record since 1990 and Lamplighters Nature Reserve the only British locality where plants are now known (Fig. 2).

Lamplighters Nature Reserve

The reserve of 20 acres is located at Shirehampton in Bristol, overlooked at one end by the M5 and stretching along in a narrow belt between the railway line on one side and the River Avon on the other (Fig. 2). The area was formerly used as railway sidings and subsequently as a base for a construction site when the M5 was being built and then again when widening work was carried out. In Fig. 3 the gravel area in view was used for car parking and the concrete bases accommodated a crane gantry used to assemble pre-fabricated stiffened panels into the box sections which ultimately comprise the bridge spans. These concrete bases would have been exposed throughout the construction period (from 1969 to 1974 when the bridge was opened). The crane gantry was then removed from the bases during the first half of 1974.

The reserve, particularly near the western end (Fig. 3) is known for locally notable higher plants such as Moth Mullein (*Verbascum blattaria*), Distant Sedge (*Carex distans*) and Viper's Bugloss (*Echium vulgare*), and it is here on the concrete bases where *C. conicus* grows. It is most common

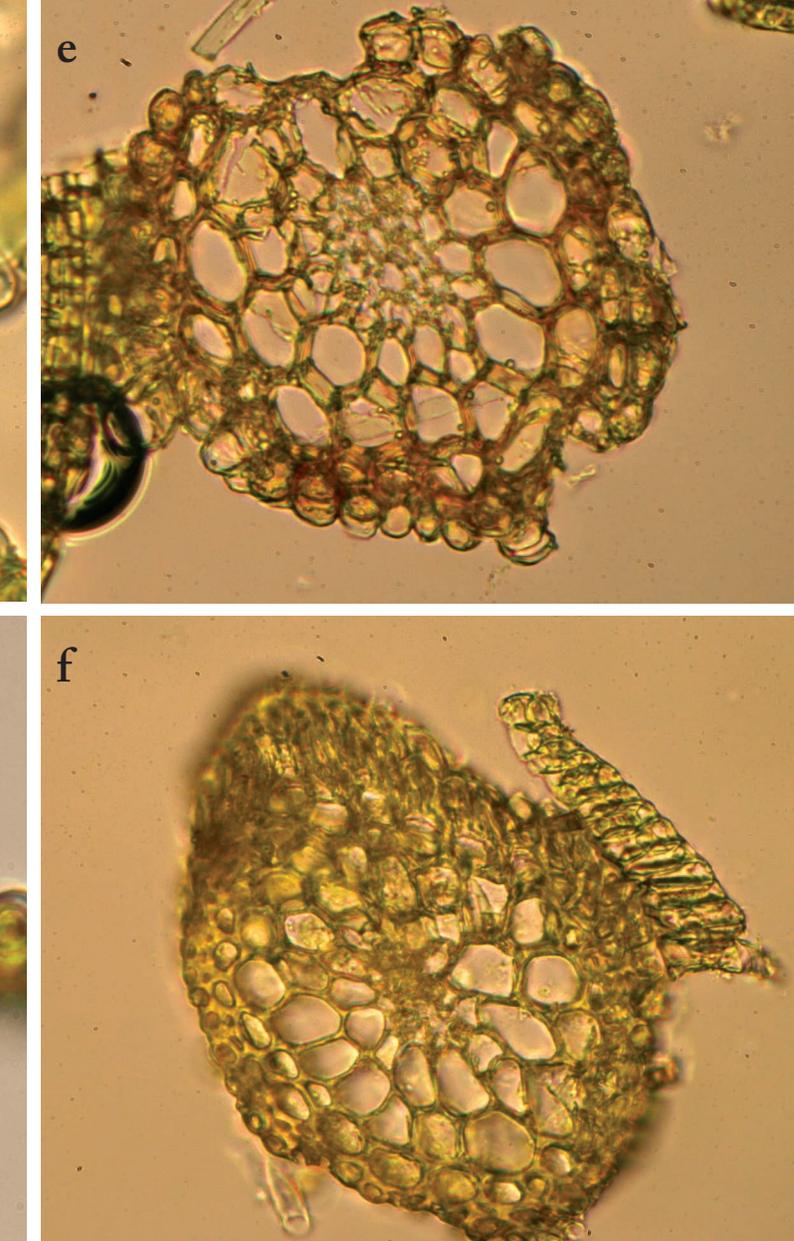


on the edges of the large moss dominated areas where the overlying soil is thinnest. Moving inwards, as the soil becomes increasingly thicker, *C. conicus* gradually disappears with only a few scattered shoots. The large colonies by the edge are closely associated with *Didymodon luridus* and *Didymodon insulanus* with small amounts of *Syntrichia ruralis* and *S. ruraliformis* (new to vc34 on our original visit), *Bryum capillare*, *Pseudocrossidium hornschurchianum*, *Barbula convoluta* and *Barbula sardoa*. The inner areas where the thicker soil layer promotes *Sedum* has extensive patches of *Syntrichia ruralis*,

Brachythecium albicans and *Homalothecium lutescens*. A small amount of *Ceratodon purpureus* is also recorded at the site.

Nomenclature of *C. conicus* since 1887

The two species have traditionally been distinguished by leaf shape (Fig. 4a/ 4b), the form and inclination of the capsule (inclined in *C. conicus* and erect in *C. purpureus*) and that *C. conicus* is calcicole and *C. purpureus* calcifuge. Braithwaite (1880-1887) wrote that *C. conicus* was rare, known from walls and waste ground, and “not infrequent” on the south coast as it had



◁ Fig. 4, top row: *Ceratodon conicus*. Bottom row: *Ceratodon purpureus*. a, b. Note the strong excurrent nerve in *C. conicus* (a) compared with *C. purpureus* (b). c, d. Comparison of nerve cross section - note the 1 layer of stereid cells in *C. conicus* (c) while in *C. purpureus* there are 2 (d). e, f. Differences in stem cross section. In *C. conicus* the single outer layer comprises large, thin-walled cells (e), while in *C. purpureus* the outerlayer is two cells thick and consists of smaller, thick-walled cells (f).
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probably been overlooked in the absence of fruit.

Dixon (1896) treated *C. conicus* as a sub-species, examining many specimens at the time and was not convinced it should rank higher than sub-species because of plants with intermediate characters. Of barren specimens he said: “..may be generally recognised with the eye alone, by the denser, neater tufts, with the shorter, aristate, upper leaves forming a comal tuft.”

Smith (1978) records *C. conicus* as *C. purpureus* subsp. *conicus* and thought that the relationship between the two sub-species required further investigation. By the time of the second edition

of the Moss Flora (Smith, 2003) this work had been done by Burley & Pritchard (1990). Burley & Pritchard’s cosmopolitan work on the genus *Ceratodon* reinstated *C. conicus* to specific rank based on a number of characters: stem length, leaf, nerve, capsule, peristome details, spores, plant and peristome colour, leaf insertion and nerve cross section.

Identification of sterile material

Comparing typical material of *C. conicus* and *C. purpureus*, shows notable differences in leaf shape, with *C. conicus* having an excurrent nerve

(Fig. 4a/4b). The cross section of nerves are different with *C. purpureus* showing 2 layers of stereid cells whereas *C. conicus* has only 1 (Fig. 4c/4d). These differences were not considered significant enough by Burley & Pritchard who state: “The angle of insertion of the leaves on the stem, their response to drying and the appearance of the nerve in cross section are useful diagnostic characters in sterile material. However, it is not possible to separate *C. conicus* from *C. purpureus* with confidence on the basis of gametophyte characters alone.”

The plants of *C. conicus* at Bristol appear distinctive though confusion might be possible with the variable *C. purpureus*. I have compared the specimen of *C. conicus* from Lamplighters with a few specimens of *C. purpureus*. The photographs of *C. purpureus* shown here are from a specimen collected in February 2014 at Troopers Hill, Hanham, Bristol. *C. conicus*, from the Lamplighters specimen, appears to differ from *C. purpureus* in that the laminal cells are frequently longer than wide in mid-leaf whereas in *C. purpureus* the mid-leaf cells are mostly quadrate or even wider than long (Fig. 4a/4b). Looking at the sections of the stems, *C. conicus* has an outer single layer of larger thin walled cells in comparison to the smaller thick walled 2 layers of cells in *C. purpureus* (Fig. 4e/4f). It should be stressed that this is only based on examination of the single specimen of *C. conicus* with 6 specimens of *C. purpureus* and needs confirming with more specimens of *C. conicus*.

Conclusion

It will be interesting to see if further records of *C. conicus* appear. I doubt that *C. conicus* will make the leap *Didymodon nicholsonii* made from riparian rarity to something people brush off their tarmac drives, but this remarkable plant is here recorded in an unremarkable habitat. It

might be discovered in similar Brownfield sites and perhaps it would do no harm, if you are in possession of a neglected patio, to give it a second look.

Acknowledgements

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**Sadly, Justin Smith passed away in March 2014.*