

Confusing urban mosses part 1: ground-dwellers

Sharon Pilkington continues her column for beginners with the first of two articles describing how to differentiate the array of mosses likely to be encountered in urban environments.

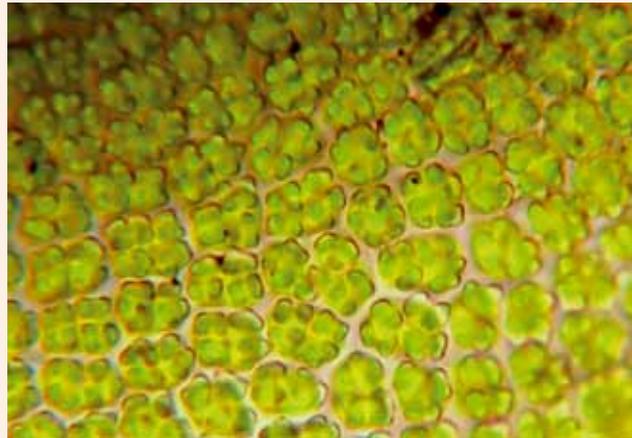
Take a walk through any lowland village or town centre and the chances are you'll be treading over an array of small urban mosses. Often very small, and seeming to lack any distinguishing features, they can appear devilishly difficult to identify. Arguably the most confusing are a number of small mosses which have tapering leaves without hairpoints. They form small patches or extensive turfs from 0.5 to several centimetres high on the ground – on compacted soil, tarmac and concrete. In this article, I hope to demystify some of these ubiquitous urban ground-dwellers. In Part 2 (to be published in *Field Bryology* 105) I will look at related species which are more characteristic of walls and hard structures in urban areas.

As with so many things, identification becomes much easier with practice. Get familiar with some of the 'jizz' characters of these mosses and suddenly you'll be seeing them everywhere. However, microscopic characters can be very helpful in verifying identifications, and are essential at first.

THE *DIDYMODON* GROUP

Shared characters

Ground-dwelling (terricolous) species of *Didymodon* are often gregarious and may form extensive low turfs with several species growing together. They are generally plants of neutral to calcareous places and avoid very acidic soils. Plants are erect and little-branched, with roughly triangular leaves that



△ Fig. 1. Strongly papillose upper leaf cells of *Barbula unguiculata*. S. Pilkington

taper gradually from the base to the tip; the nerve disappears in the leaf apex. Upper-leaf cells usually have relatively thick walls, rounded cavities (lumens) and small protuberances (papillae) (see Fig. 1) which reflect the light in many different directions, making leaf surfaces appear dull, even under a hand lens. In most species the lower leaf cells are different – they are roughly rectangular and lack papillae.

Tip: To make leaves lie flat on a microscope slide, slice them in half transversely with a razor first.

Didymodon fallax

This moss is very common, but rather lacking in distinctive features. Plants grow in loose tufts and patches in well-lit places and are often dull mid-

green to dull orange. Leaves are relatively short and triangular, and the margins are narrowly recurved for much of their length. They are bent back from the stem in a characteristic way (Fig. 2) and this is a useful character for separating *D. fallax* from closely related species in the field. When dry, the leaves are lightly twisted and appressed, giving shoots a chain-like appearance.

Erect, cylindrical capsules sometimes form on a red seta. When ripe, long, orange peristome teeth twist around each other like a paintbrush.

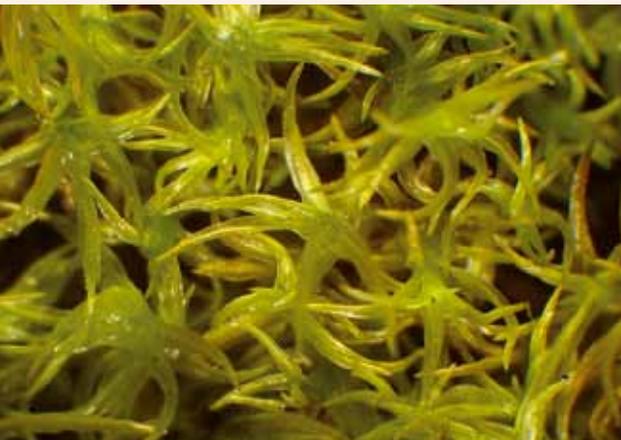


Didymodon insulanus

D. insulanus grows in similar places to *D. fallax* and is also very common. It is usually dull green and forms lax tufts or turfs on the ground. It has much longer, narrower leaves than *D. fallax* and they are recurved along most of their length. A useful microscopic character is the single, well-defined cell in the very tip of the leaf. The upper leaves are much longer than the lower ones, and when wet are held in a characteristic spiral pattern when seen from above (Fig. 3). When dry, the leaves curl inwards. Capsules appear to be rare.

Didymodon sinuosus

Once known, this is an easy plant to identify. It likes damp, shady places and prefers growing on hard substrates such as concrete. It can often be found around shaded wall bases on pavements. It is almost always a dark green plant (without any reddish tints) and forms low turfs. Plants have long, gradually tapering, narrow leaves with markedly wavy margins. The leaves are quite fragile and plants are almost always encountered with missing leaf tips and notched margins (Fig. 4). The leaves appear to be shinier than, say, *D. insulanus*. British plants are all female and capsules are unknown.



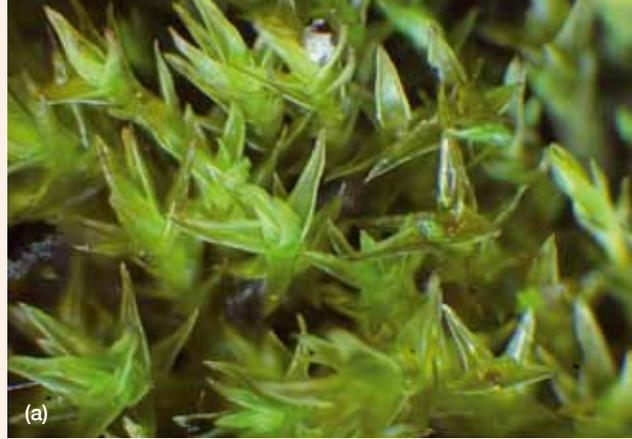
△ Fig. 2 (top). *Didymodon fallax* showing how the leaves bend back from the stem. Michael Lüth

△ Fig. 3 (bottom). *Didymodon insulanus*. S. Pilkington

△ Fig. 4. *Didymodon sinuosus* – note the missing leaf tips and shiny leaves. S. Pilkington

Didymodon nicholsonii

This is a highly characteristic species of shaded damp pavements and driveways where it forms extensive, olive-green sheets. Its leaves are relatively short and broadly triangular, a bit like *D. fallax*; however, they are erect to spreading (Fig. 5a), not bent back as in that species. When dry, they lie appressed to the stem. Under a hand lens, the leaf margins appear to have an ill-defined border near the tip of the leaf (Fig. 5b) – this is in fact due to the presence of two layers of cells along the margins (bistratose margins); the lower margin is recurved. This species is almost certainly under-recorded; it used to be considered rare but is now common in towns and villages in many lowland areas. It might be confused with *D. luridus* at times, but that species has a blunter leaf apex and more obviously concave leaves. *D. nicholsonii* almost always occurs without capsules.



△ Fig. 5. (a) *Didymodon nicholsonii*. (b). Upper leaf of *D. nicholsonii* showing the bistratose margin. S. Pilkington

Didymodon luridus

A characteristic small moss of hard, calcareous substrates, *D. luridus* frequently grows in small tufts on concrete paths, bridges and pavements. It is usually dull olive green (Fig. 6), and with a hand lens its short, broadly triangular leaves with recurved lower margins can be seen to taper to a distinctly blunt point, setting it apart from the similar

D. nicholsonii. Furthermore, the leaves are distinctly concave and erect to spreading when wet. When dry, they lie against the stem and overlap each other. Unlike many other species of *Didymodon*, the thick-walled, isodiametric, papillose leaf cells are barely altered at the base of the leaf. Capsules are very rare.

▽ Fig. 6. *Didymodon luridus*. S. Pilkington



THE *BARBULA* GROUP

Shared characters

Three species of *Barbula* are all that is left of a large genus which used to include the species now placed in *Didymodon* and *Pseudocrossidium*, and all three are widespread in urban situations. They are similar to *Didymodon* in some respects, including having separate male and female plants (dioicous). Leaf cells are opaque, strongly papillose and somewhat square in the upper leaf, and shortly rectangular and transparent close to the leaf base. Because of this, leaf surfaces lack any kind of sheen (but see *Barbula sardo*a below). They tend to have



< Fig. 7. The spirally twisted peristome teeth typical of *Barbula* species. Des Callaghan

broad, less tapering leaves than terrestrial species of *Didymodon*.

In the field, one of the best clues pointing in the general direction of *Barbula* is the colour of the plants, which are usually a distinctive bright yellow-green. Populations often form small patches among other acrocarpous mosses in calcareous to neutral situations.

Did you know? The name *Barbula* is derived from *barba*, Latin for beard, alluding to the very long and spirally twisted peristome teeth (Fig. 7).

B. unguiculata

This is the largest of the three, although it is typically only a centimetre or two in height. It forms vivid yellow-green patches (Fig. 8a) on well-lit soil and is very common, especially in limestone districts. Its matt leaves are broadest in the lower part and are nearly parallel-sided for much of their length, tapering to a blunt tip. The leaf margins are narrowly recurved for much of their length and the nerve is stout and yellow, extending a little through the leaf apex into a short point (Fig. 8b). When dry, the leaves corkscrew characteristically around the stem and the back of the nerve can be seen to be very shiny. Female plants often bear erect cylindrical capsules borne on a reddish seta.

B. convoluta

Like a smaller version of *B. unguiculata*, this moss is very common and sometimes grows in great abundance. Important vegetative differences from *B. unguiculata* include the nerve, which disappears in the tip of the leaf, and the form of the leaf apex itself, which is blunt with a short protruding point (Fig. 9). Leaves tend to be shorter and taper more obviously to the tip, and the leaf margins are only slightly recurved near the base. When fertile, female plants bear erect cylindrical capsules on



△ Fig. 8. (a) *Barbula unguiculata* with capsules. (b) Leaf of *B. unguiculata* showing stout, excurrent nerve. Richard Lansdown (a) & S. Pilkington (b)

▽ Fig. 9. *Barbula convoluta*. Sean Edwards



yellowish setae. Around the base of the seta, it has unmistakable long, folded, sheathing (convolute) perichaetial leaves that resemble a shiny tube and from which it derives its specific name.



(a)

OTHER SIMILAR-LOOKING MOSSES

Ceratodon purpureus

C. purpureus is a very common plant of open, consolidated ground, and at first glance it looks very similar to sharp-leaved species of *Didymodon*. Knowledge of the substrate type can provide identification clues: it is a calcifuge and hence is most frequently found on acidic soils. Its leaves are triangular and rather concave, and taper gradually from the base to a sharp tip; they have obviously recurved margins (Fig. 11a). The uppermost leaves

▽ Fig. 11. Leaf of *Ceratodon purpureus* (a), and its angular cells (b). S. Pilkington



(b)

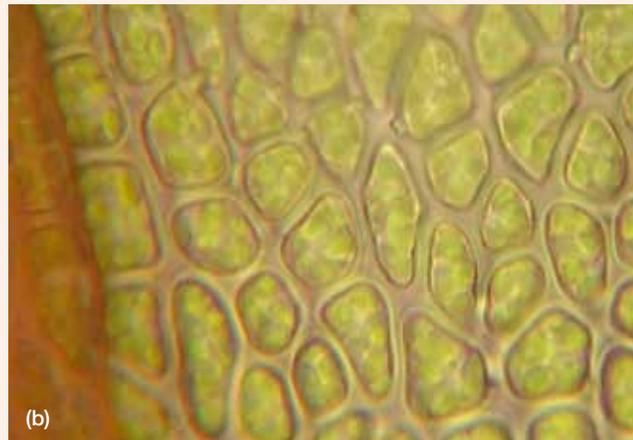
△ Fig. 10. *Barbula sardoa* under the microscope (a) and in the field (b). S. Pilkington (a) & Fred Rumsey (b)

Barbula sardoa

In the past, *B. sardoa* has been regarded as a variety of *B. convoluta* (var. *commutata*) and in many respects it is very similar to that species. It typically grows in small tufts in more sheltered and shady places, such as on ground on the north side of a wall. Like *B. convoluta* it also grows on stonework. It differs from that species in a number of ways: it is usually a darker green, it is often taller, and it has shiny leaves with wavy margins (Fig. 10a, b). Capsules seem to occur mainly in northern parts of the country and are borne on a yellowish seta.



(a)



(b)

often curve slightly to one side when viewed from above. Usually there are a few small teeth near the leaf tip, but these can be very hard to discern with a hand lens. Critically, its leaf cells differ from *Didymodon* and *Barbula* species insofar as they lack papillae (Fig. 11b) so leaf surfaces look very shiny (Fig. 12a). In well-lit situations, plants also nearly always have reddish tints, often in the stem or leaf nerves. *C. purpureus* is dioicous. Masses of inclined to horizontal capsules on purple setae are common in spring and early summer and are very distinctive (Fig. 12b).

Pseudocrossidium hornschuchianum

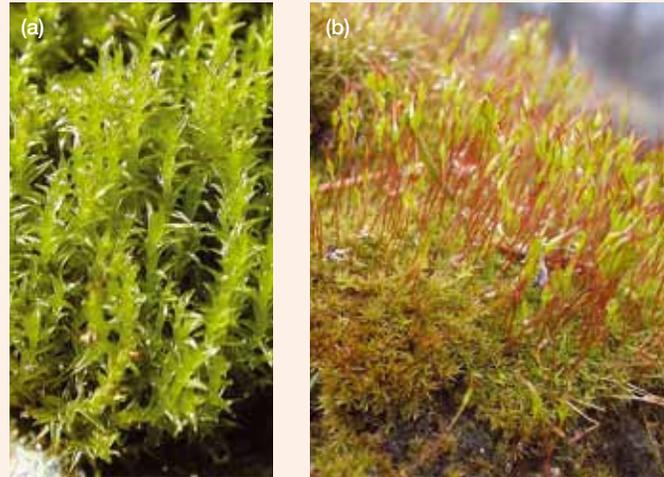
A small plant with a big name, this is quite a common small moss of compacted, open ground such as path edges. It likes calcareous soils and is relatively rare in northern Britain. It forms low-growing tufts among other acrocarps and is the same bright yellow-green as *B. unguiculata* and *B. convoluta*. However, under the hand lens it is obviously different as it has triangular leaves with very sharp tips, spreading from stems to give the whole plant a starry appearance when viewed from above (Fig. 13a). Its leaf margins are strongly and broadly recurved (Fig. 13b) and this is visible from the upper surface. It never has red colouration, but could be confused with small, green forms of *C. purpureus*. However, the leaf margins are always more broadly recurved than that species. Capsules are rare.

DON'T GIVE UP!

If you are struggling to get to grips with this group of mosses, try a slow and gradual approach and learn one or two at a time – it's amazing how quickly knowledge can accrue that way. Become familiar with the characteristics of say *B. unguiculata* and then it's a logical next step onto *B. convoluta* and *B. sardoia*. And after lots of practice, even urban *Didymodons* can be straightforward!

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△ Fig. 12. *Ceratodon purpureus* showing the shiny leaves (a) and a patch demonstrating a reddish tint and capsules (b). Michael Lüth

▽ Fig. 13. (a) *Pseudocrossidium hornschuchianum*. (b) Leaf of *P. hornschuchianum* – note the broadly recurved margins and sharp tip. S. Pilkington

