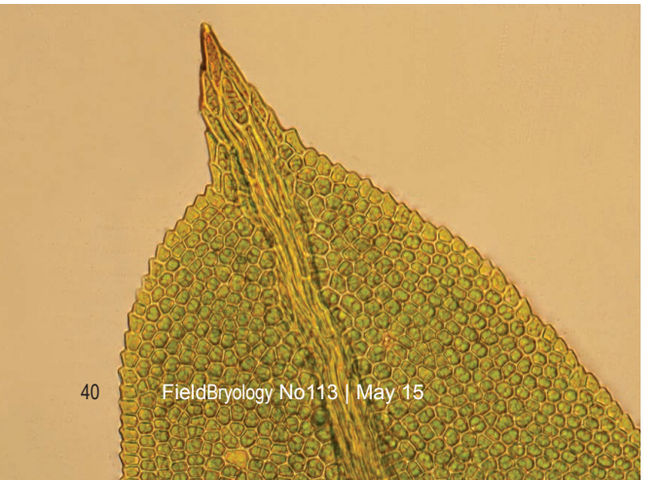
Fissidens: a few shortcuts

The return of Beginner's Corner sees **Sharon Pilkington** take a closer look at a familliar yet challenging genus

△Fig. 1: Elongated border cells of *F. pusillus*. P. Martin

As far as mosses go, the members of the genus *Fissidens* are usually immediately recognisable. All have flattened shoots with alternate, two-ranked leaves which have a unique clasping portion structure, hence the common name 'pocket-mosses'. Twenty British and Irish species are currently recognised; four of these – *F. monguillonii*, *F. curvatus*, *F. polyphyllus* and *F. serrulatus* – are rare and unlikely to be encountered, leaving sixteen more widespread species.

Until considerable experience of the more common species is gained, identification of many *Fissidens* can seem challenging and use of a compound microscope is strongly advised. Although the taxonomy is now a little dated, Smith (2004) probably remains the most comprehensive keys to all of our species of *Fissidens*. With a little practice, some species can also be recognised (or at least suspected) through a combination of useful field and microscope characters, some of which are outlined in this article.



Breaking down the species

Do the leaves have a border of pale, narrow elongate cells (Fig. 1)? How big are the plants? What kind of habitat does it grow in? If capsules are present characters such as whether the seta arises terminally (from the tip of a shoot) or laterally (from between leaves lower down) and the capsule orientation can also be helpful.

SPECIES WITHOUT BORDERED LEAVES

Six widespread species belong in this group, including *F. taxifolius*, much the commonest British and Irish plant. For convenience, the group can be further divided by size, into plants typically greater than 5mm tall (excluding any capsules) and those smaller than this.

◁Fig. 2: Stout excurrent nerve of *F. taxifolius* var. *taxifolius*. P. Martin

△Fig. 3: *F. dubius* leaf – opaque patches on the lamina show bistratose areas. P. Martin

Robust species (usually > 5mm tall)

F. taxifolius is typically 1 – 2 cm tall and is a lowland plant, with two varieties currently accepted in the British Isles. The commonest, **var. *taxifolius***, is usually a soil-dwelling plant and most characteristic of clayey shaded woodland banks. However, it also grows in cultivated ground, calcareous grassland and other shaded situations. It has more or less parallel-sided leaves with a nerve that is shortly but distinctly excurrent (Fig. 2), a unique character among British species that lack a border.

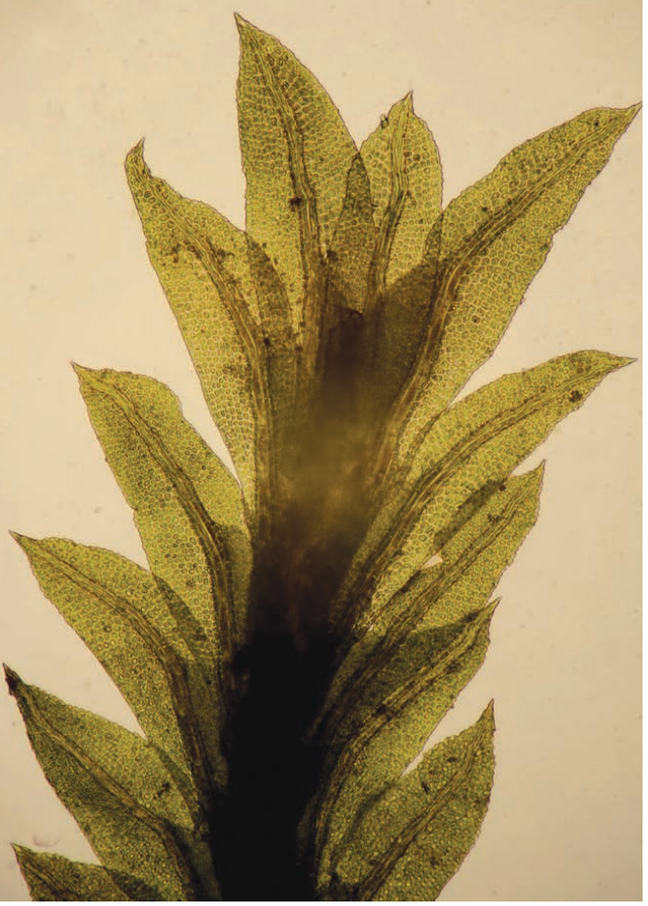
F. adianthoides and ***F. dubius*** are, as a species pair, relatively easy to identify in the field, although close examination with a microscope may be required to differentiate them. Both are usually robust, typically exceeding 2 cm tall. With a hand-lens, look for a combination of a pale marginal band of cells and large, irregular teeth near the leaf apex (Fig. 3) – no other species have these characters together. Both species are calcicoles, *F. dubius* preferring drier places e.g. dry calcareous grassland and limestone exposures than *F. adianthoides,* which grows in a wide variety of damp or wet habitats, including dripping rock faces, dune slacks, marshes, fens, flushes and damp grassland. The leaves of *F. adianthoides* are uniformly one cell thick whereas mottling on the leaves of *F. dubius* indicates where leaves are partially thickened (bistratose).

F. osmundoides is a distinctive, robust species of hilly districts in the north and west, where it often grows on base-rich rock on cliff ledges in ravines and gullies. It often has an abundance of striking reddish capsules borne on purple setae. Like *F. taxifolius*, these emerge from the tip of the shoot, in contrast to the laterally-borne capsules of *F. dubius* and *F. adianthoides*. The shoots have relatively short untoothed leaves which usually curve down at the tip, making the whole plant look characteristically round-backed.

Small species (< 5mm tall)

Only two very small *Fissidens* species lack a leaf border. ***F. celticus*** is a diminutive, elegant plant that is easily recognised once known. It grows on shaded, often eroded acid soil beside streams and ditches in woodland in the north and west, a niche often occupied by *F. bryoides* var. *bryoides* in the south and east. It has narrow, parallel-sided shoots a few millimetres tall with numerous (often more than ten) pairs of short leaves. It is hard to confuse *F. celticus* with anything else but it has a further distinguishing feature visible with a hand-lens: the nerve has a distinct bend in it roughly halfway along (Fig. 4).

F. exilis is a minute plant with only 2-4 pairs of leaves, in which the nerve ends below the tip. The lower leaves are much smaller than the upper ones and this is a very useful field character. *F. exilis* is an ephemeral species of lightly disturbed soil in sheltered, shady places, such as steep stream or lane banks and woodland. It is so small that it is very easy to miss, except from autumn to spring when erect capsules borne on red setae catch the eye.



△Fig. 4: *Fissidens celticus* plant showing bent nerve. P. Martin

▽Fig. 5 : Long and narrow perichaetial leaves of *F. pusillus*. P. Martin

SPECIES WITH BORDERED LEAVES

Most species belong to this group, which can be made more manageable by splitting it into species of terrestrial and aquatic habitats.

Terrestrial species

F. bryoides* var. *bryoides is a very common small or medium-sized species which grows in similar habitats to *F. taxifolius*. It has a leaf border that meets the nerve in the tip of the leaf. If plants are fertile, look for bud-like male branches in the leaf axils low down on the stem. This combination of characters sets *F. bryoides* var. *bryoides* apart from other small terrestrial *Fissidens*.

On calcareous soil in lowland districts, ***F. incurvus*** is a small species that is often encountered. Identification is straightforward when plants have capsules, as, unlike similar-looking bordered species, they are inclined or horizontal (and often curved), rather than erect. Look for this species in arable fields, waste ground and calcareous grassland.

Four other minute species are part of a difficult complex of plants which should always be identified with the help of a microscope. Their diminutive stature provides clues to identity and they can all be distinguished from *F. bryoides* var. *bryoides* in typically bearing male organs on short basal branches and from *F. incurvus* in their erect capsules.

Several of these minute *Fissidens* have perichaetial leaves which are much longer and narrower than the stem leaves. Two of these characteristically grow on rock, including ***F. gracilifolius***, which favours fragments of calcareous rock (such as chalk talus) in sheltered woodland. The perichaetial leaves of F. *gracilifolius* are 7-9 times as long as wide. ***F. pusillus*** is another rock-dweller and although in some areas it frequently grows on rocks

▷Fig. 6: *F. rivularis* has a thickened yellow border and excurrent nerve. P. Martin

in streams, it is not regarded as a true aquatic species. The perichaetial leaves of *F. pusillus* (Fig. 5) are only 4-6 times as long as wide.

F. crispus also has elongated perichaetial leaves but tends to grow on soil rather than rock and also has bulging upper leaf cells, which can only be seen microscopically. ***F. viridulus*** is also a soil-dweller but it has perichaetial leaves that are similar in shape to the stem leaves, although larger.

Aquatic species

This small group of species is typically associated with streams and rivers, or other permanently wet places and includes a number of distinctive plants.

Unlike its common terrestrial relative (*F. bryoides* var. *bryoides*) ***F. bryoides* var. *caespitans*** (formerly *F. curnovii*) prefers rock surfaces in wet places where it is frequently splashed, submerged or irrigated. It is a plant of high rainfall districts in the north and west and is virtually absent from the east. An excellent field character to look for is the presence of matted deep violet-red rhizoids on older stems. Like var. *bryoides*, this plant bears male and female organs on the same plant (monoicous).

F. rivularis is a very distinctive but quite scarce species, found on rocks in fast-flowing streams, mostly in south Wales and south-west England. It can grow up to 2 cm tall and is immediately distinguished from all other species of *Fissidens* by its thickened yellow leaf border which joins up with the nerve just below a stout excurrent point (Fig. 6).

F. crassipes and ***F. rufulus*** are medium-sized dark green plants with numerous pairs of leaves which grow on rocks, bridge abutments and other hard substrates in streams and rivers

where they are frequently inundated or splashed. *F. crassipes* is very common and often present in lowland watercourses with a degree of nutrient enrichment. *F. rufulus* is a scarce plant of fast-flowing upland streams and rivers. Unlike *F. bryoides* var. *caespitans*, these two species are dioicous (separate male and female plants) and have only a few brownish stem rhizoids. They can only be reliably separated from each other by examining microscopic characters including leaf cell size and width of peristome teeth.

F. fontanus (formerly *Octodiceras fontanum*) is a most distinctive aquatic moss; though nowhere common, it grows submerged on clean or slightly polluted water in sluggish lowland rivers, canals and occasionally lakes. It colonises all kinds of submerged substrates and can grow to 3cm tall, though it is often encrusted with silt and/or algae. This plant differs from all other British *Fissidens* in the sheathing lamina (the 'pocket') being less than 1/3 of the total leaf length (in other species it is around 1/2 of the leaf length).

Acknowledgements

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References

Smith A.J.E. (2004) [2006]. *The Moss Flora of Britain and Ireland* (2nd Edition, with corrections). Cambridge: Cambridge University Press.

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