



The 16-month reproductive cycles of *Polytrichum formosum* and *P. juniperinum*

One-off field observations, or scrutiny of single herbarium specimens, can lead to highly erroneous assumptions about the dynamics of moss reproductive cycles, as many features persist long after maturation, e.g. the dehisced capsules and prominent male inflorescences of *Aulacomium palustre*, *Mnium hornum* and *Polytrichum* species. Sequential observations throughout the year are essential.

The duration of the reproductive cycles, from fertilisation to spore release, in most perennial mosses is from nine months to a year. In ephemeral mosses in culture it can be as short as 60 days. In contrast, it takes around 16 months in *Polytrichum formosum* and *P. juniperinum*. Although we are all familiar with male inflorescences in spring, the long persistent calyptras in winter and dehisced capsules in the summer, what happens along this road is much less well known.

Fertilisation occurs in the spring with percurrent growth through the male inflorescences signalling the end of antheridium production. The young embryos remain encased in the parent gametophytes until setal

△ Capsules of *Polytrichum juniperinum* on 10 June (left), 30 June (centre) and 1 August 2023 (right) at Thursley Common. Jeff Duckett

emergence in the autumn. Calyptra-covered setal spears are ubiquitous through the winter months, but it is not until the spring that the capsules expand and mature, though still covered by the calyptras and remaining vertical. From late April the capsules begin to dry out and suddenly, towards the end of June, capsule orientation changes to horizontal and the calyptras split and fall off or are washed off by rain. This is quickly followed by lid shedding and spore dispersal facilitated by movements of the epiphragm. Since raindrops cannot fall on the now vertical epiphragms spore dispersal is mediated by air pressure changes, not rain. To our supreme shame as devout field bryologists we confess that before 2023 we never witnessed these final rapid changes in the *Polytrichum* reproductive cycle.

Naturally, new information always leads to new questions. Is *Polytrichum* unique in the maturational change in capsule orientation? How might we account for the 16 month annual cycle in *Polytrichum*?

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