

A time to burn

Burch, J. (2008). The relationship of bryophyte regeneration to heather canopy height following moorland burning on the North York Moors. *Journal of Bryology* 30, 208–216.

The management of heather is of fundamental importance to the biodiversity of heathland habitats. The composition of heathland flora and fauna are greatly influenced by the availability of the various microhabitats created by heather plants at different stages of their development, and it is consequently important to maintain age diversity in the vegetation to increase biodiversity. One of the commonest practices used for maintaining the age structure of heather is controlled burning of small areas of heath at specific time intervals. This practice interrupts the ageing process of the heather, keeping it young, productive and in a nutritious state, prevents the transition from heathland to scrub or woodland, and releases nutrients into a this nutrient-poor system.

A well-developed bryoflora, particularly one containing pleurocarpous mosses in dry heath, and one with pleurocarpous mosses and *Sphagnum* species in wet heath is important. The high water-holding capacities of these plants may reduce the temperature of the burn at the peat surface, thus reducing damage of the peat surface, and providing favourable conditions for bryophyte recolonization. Clearly, the interval between periods of burning is critical – it must be long enough for successful bryophyte development, but not so long that excessive dry plant matter accumulates, as this can result in hot burns that damage the peat surface and cause erosion. But how does one assess when is the right time to burn?

Research conducted by Jane Burch (funded by Natural England) has been aimed at finding a simple and reliable method for determining when the optimum balance between moorland regeneration and dry matter accumulation has been reached for burning to occur, using bryophyte regeneration as the indicator of habitat recovery.

On a number of different sites on Spaunton Moor in North Yorkshire (4 dry heath and 3 wet heath sites with varying ages of heather between 1 and 25 years), the author recorded the overall vegetation height, bryophyte species present and the number of bryophyte growing tips.

In total, 39 species were found; 23 in dry heath and 30 in wet heath. In the dry heath sites, *Hypnum jutlandicum* was observed to increase in abundance with the increasing age of the heather, whereas *Campylopus introflexus* decreased in abundance. The greatest number of *C. introflexus* stems was recorded when the canopy height was below 30 cm. *H. jutlandicum* was most prominent when the canopy height was 45–55 cm. Interpretation of the data collected showed that in dry heath a canopy height of 40–55 cm allows for recovery of the bryoflora to a point where *C. introflexus* remains as a minimal component, and for *Hypnum jutlandicum* to be consistently present. Therefore, burning may be most desirable when the canopy height is 41–54 cm in dry heath.

In wet heath, *Sphagnum* species and *C. introflexus* were most abundant when the canopy height was below 30 cm; *H. jutlandicum* was consistently recorded at canopy heights over 20 cm but reached its maximum abundance when the canopy height reached 50 cm. Given that the greatest numbers of *C. introflexus* stems were recorded when the canopy height was below 25 cm, the most appropriate canopy height for burning wet heath to occur may be 25–30 cm.

However, depending on environmental conditions, such canopy heights are reached between 5 and 25 years post-burn. So it is clear that age alone, on which the decision to burn is currently made, is not a reliable criterion for assessing the time to burn. In light of this, it may be a better to use canopy height rather than age as a direct indicator of when recovery of the heathland is sufficient for burning to be repeated – a measure which has the advantage of negating any environmental effects on the rate of heather development.

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