

Bryophytes growing on leaves and on the fruiting bodies of fungi may be a very rare sight outside of tropical rainforests. But a recent excursion to Hampstead Heath, near central London, has uncovered both phenomena right here in Britain, as **Jeff Duckett** describes.

Epiphyllic and epifungal liverworts on Hampstead Heath, London

The recolonization of Middlesex by epiphytic bryophytes since the Clean Air Acts of 1956 and 1968 is detailed by Gardiner & Bowlt (1983), Wiltshire & Ellis (1995), Rieser (1998) and Kent (2000). The reappearance of taxa on the fringes of north-west Middlesex has been followed by their discovery on Hampstead Heath less than 5 miles from central London; for example *Frullania dilatata* in 1983 and 1989, respectively, *Radula complanata* in 1996 and 2006, and *Orthotrichum pulchellum* in 1992 and 2005. *Metzgeria fruticulosa* and *M. temperata* had single recent records, both from 1996, and it was not until 2005 and 2006 that they were discovered as solitary isolated colonies on Hampstead Heath alongside the first Middlesex record for *Microlejeunea ulicina*. Regular visits to Hampstead Heath in 2007

produced further localities for the two *Metzgeria* spp. and *Microlejeunea ulicina* on a range of trees, including elder, *Prunus*, turkey oak and willows, but always in small quantity.

A bryological excursion by the Hampstead Heath Flora Group of the London Naturalists on 30 March 2008 revealed a dramatic increase in these three species with extensive patches, not only on all the aforementioned trees, but also on gorse. Most remarkable of all, however, was a discovery on ivy and elders growing by the stream in perhaps the most sheltered valley of the Heath below the so-called 'Bird Viaduct'. In this secluded dell, the adaxial surfaces of dozens of leaves of *Hedera helix* subsp. *hibernica* (G. Kirchn.) D.C. McClint were almost completely covered with *Metzgeria fruticulosa* and *Lejeunea ulicina* creeping over its highly



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△ Fig. 1. Leaf of *Hedera helix* subsp. *hibernica* almost covered with *Metzgeria fruticulosa*. Jeff Duckett

△ Fig. 2. *Metzgeria fruticulosa* growing over fruiting bodies of the bracket fungus *Trametes hirsuta* on a dead branch of *Sambucus*. Jeff Duckett

gemmiferous thalli (Fig. 1). The same two liverworts had also spread from dead elder branches onto the fruiting bodies of the bracket fungus *Trametes hirsuta* (Wulfen) Pilát (Fig. 2). As far as I am aware, these are the first records for these liverworts growing on angiosperm leaves and on fungi.

Epiphylls are a characteristic feature of lowland and montane tropical rainforest trees, particularly near water (Pócs, 1982a), but outside the tropics are extremely rare (Porley, 1996; Porley & Hodgetts, 2005). Indeed, in Britain the only recorded instances are of *Metzgeria fruticulosa* growing on leaves of box (*Buxus*) in the Chilterns

and on Exmoor. Elsewhere in Europe the same has been noted in the Pyrenees and the Caucasus (Pócs 1982b). There are, however, numerous records of bryophytes growing on the long-lived leaves of filmy ferns, not to mention the frequent occurrence of members of the Lejeuneaceae on other bryophytes (Hill *et al.*, 1991, 1994).

Colonization of *Buxus* leaves by *Metzgeria* is a combination of direct establishment via gemmae and thallus growth from stems onto the petioles and leaf laminae (Porley, 1996). The absence of *Metzgeria* from the petioles and stems of the Hampstead Heath *Hedera* indicate the former as the sole route, whereas *Lejeunea ulicina*, where

sexual reproduction is unknown and gemmae are absent (Paton, 1999), could only have arrived from caducous stem fragments. The epifungal *Metzgeria* almost certainly spread there from the adjacent elder branches.

Leaf longevity and durability are key factors predisposing tropical trees to epiphyllly. The leaves of *Buxus* clearly meet these criteria, though Porley (1996) did not determine their actual longevity. Examination of the growth rings on the *Hedera* on Hampstead Heath revealed that its liverwort-invested leaves were only 2–3 years old. Thus, their colonization by *Metzgeria* and *Lejeunea* must have been very recent and rapid, a conclusion closely in line with the very recent dramatic increase in the abundance of these two species on Hampstead Heath. The most likely explanation for both their spread and colonization of unusual habitats is the very wet summer of 2007 followed by the mild wet winter of 2007–8, both allowing almost continuous bryophyte growth. Against climate change predictions of wetter summers and mild winters in southern England, bryophyte monitoring programmes should perhaps embrace recording of usual habitats as well as traditional recording of distribution patterns.

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