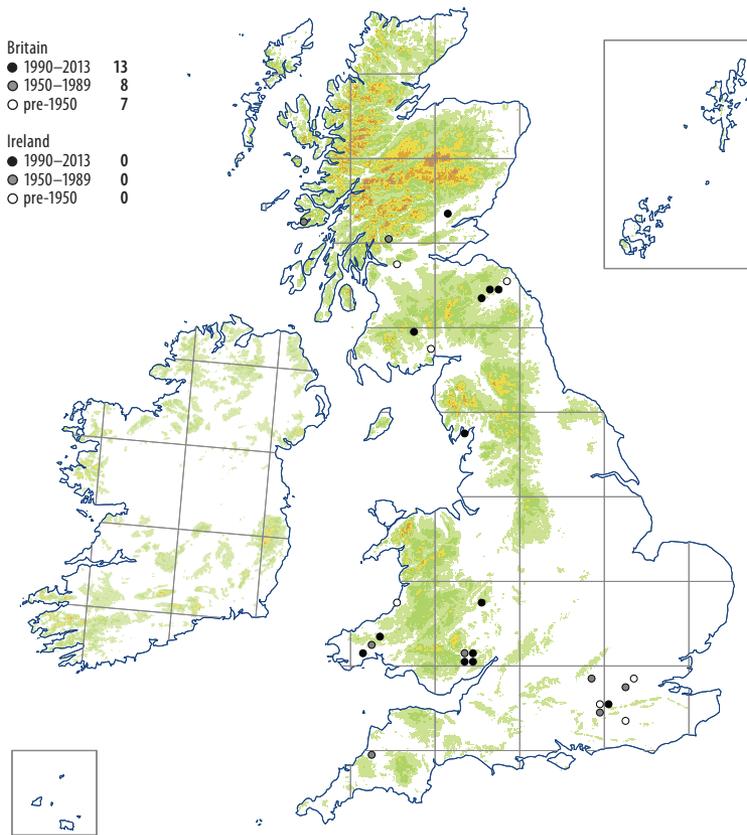
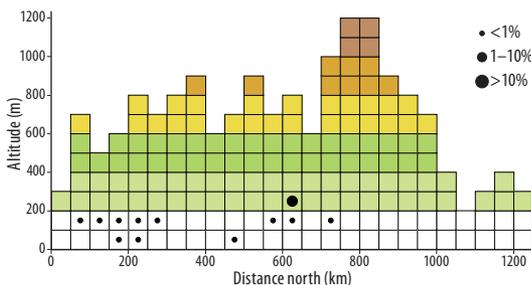


## Phaeoceros carolinianus



Almost all British records of *Phaeoceros carolinianus* come from cereal stubble fields, with a few from grass leys or fallow fields. Most fields in which this species grows are bryophyte-rich, and they often support *Anthoceros agrestis*, *Fossombronia* spp. and *Riccia* spp. as well as a wide range of arable mosses. The species is concentrated in spring-sown fields and is seldom found in fields that are routinely cultivated in autumn. Observations suggest that fields in their second fallow winter support the largest colonies, and that its abundance decreases as vascular plants become dominant in long-term set-aside. There are also records from a garden and a shaded woodland path. Altitudinal range: 30–215 m.

This species is better-recorded in recent years than at the time of the 1991–1994 Atlas, especially because of the BBS



Survey of the Bryophytes of Arable Land. There have been notable range extensions into the Scottish Borders and W Wales. The considerable increase in the number of records is the result of focused survey effort in arable habitats and is likely to mask an overall decline in *P. carolinianus* because of the shift from spring cultivation to autumn cultivation in most of Britain. It is known to have declined in C Europe (Bisang *et al.*, 2009).

Monoicous and only identifiable when fertile; sporophytes common, September to January and May. In Switzerland spores germinate in standing crops before harvest. Like *Anthoceros agrestis*, plants may produce sporophytes within a few weeks of germination but individual gametophytes of *P. carolinianus* live longer than those of *A. agrestis* (Bisang, 2003). Like *A. agrestis*, it has reappeared in Swiss fields after several years of unfavourable management, presumably from a persistent spore bank (Bisang, 1998).

Non-fertile plants of *Phaeoceros* cannot be identified to species level, so both species are under-recorded.

European Temperate. N and E Europe south-west to Portugal; Macaronesia; northern, tropical and southern Africa; Yemen, China, Korea, Japan, Taiwan, Himalaya, Sri Lanka, SE Asia; Australia, New Zealand; N America, Caribbean, Andean, eastern and southern S America.

S.D.S. Bosanquet