Spider diversity of an upland calcareous grassland habitat in the Brecon Beacons National Park, UK

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Summary

The spider community of an upland calcareous grassland habitat was sampled using a semi-quantitative protocol involving suction sampling and limited pitfall trapping. The sites selected included sheep grazed grassland, non-grazed areas protected by an enclosure, and limestone sinkholes. All adults were identified to species level and the results used to explore the differences in the spider communities from the different microhabitats sampled. The results identified a number of species of potential conservation concern. Statistical analysis showed one of the grassland spider communities to be significantly different from the other sites sampled. Cluster analysis was used to further explore the similarities and differences in the spider species assemblages across the sampled sites.

Introduction

Upland biotopes have a conservation importance for their typical plant and animal species (Usher & Thompson, 1988; Dennis et al., 2008). However, the conservation status of such areas is usually derived from botanically determined parameters and not from arthropod assemblages (Telfer & Eversham, 1996). This is a consequence of the difficulty in collecting and identifying arthropod faunas, although with groups such as the spiders this has been partly alleviated with the publication of improved taxonomic guides (e.g. Roberts, 1985, 1987) which has resulted in an increase in ecological interest in the group (Bell et al., 2001). As spiders are carnivorous, they should be indifferent to plant species composition, although plant architecture can be important in providing a range of foraging habitats (Gibson et al., 1992). As spiders are sensitive to changes in habitat structure (Duffley, 1993) they are potentially a good indicator group for some aspects of management effects. Thus spiders and other invertebrate assemblages have been used to consider the effects of livestock grazing on species diversity in upland semi-natural grassland habitats (e.g. Gibson et al., 1992; Cole et al., 2005; Dennis et al., 2008). Bell et al. (2001) provide a comprehensive review of grassland and heathland management for the conservation of spider communities.

This small-scale study reports on the spider biodiversity and that of the harvestmen and pseudoscorpions, found in a number of microhabitats on an upland calcareous grassland community. The site is a National Nature Reserve (NNR) designated for its geological features and botanical composition. Before this study, no detailed investigation of the surface invertebrate assemblages is known to have been done. Consideration is given to the spider communities sampled from each of the studied sites, comparing sites open to sheep grazing with sites protected from grazing.

Material and methods

Study area

The study was carried out on the Ogof Ffynnon Ddu National Nature Reserve (OFD), which covers about 413 ha and is located above the 300 m contour in the western part of the Brecon Beacons National Park (51°49′49″N, 03°38′44″W, grid ref. SN8615), situated in South Wales, UK. The area was designated as an NNR in 1975 and was established to protect a major portion of the UK’s deepest cave system, Ogof Ffynnon Ddu (O’Reilly et al., 1969). Since its discovery the cave has been the subject of much research on its formation, its geology and its underground biology (Haycock, 1984; Waltham et al., 1997; Jefferson et al., 2004). The surface geology and ecology are also important features of the reserve (Haycock, 1984). The surface geology of the