

The impacts of feral boar on woodland flora and fauna in Great Britain

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Abstract

Feral boar have relatively recently become established in woodlands in Great Britain, but the long-term effect of their presence, in particular rooting activity, on woodland habitats and biodiversity is unknown. Protocols to investigate boar presence, densities and impacts to inform policy makers and practitioners are being investigated within a collaborative project by Forest Research and The Food and Environment Research Agency, funded by Forestry Commission and Defra. Results are presented from initial studies on plants and invertebrates carried out in a series of woodlands in south east England.

Keywords: biodiversity, feral boar, impacts, *Sus scrofa*, woodland

Introduction

Although feral boar (*Sus scrofa* L.) are well established throughout most of the rest of Europe, in Great Britain breeding populations have only recently become established in the wild through escapes/releases from captive and farmed populations (Spitz, 1999). In woodlands their rooting activity can be visually very obvious but the effect of this disturbance of soil and litter on woodland biodiversity and ecosystem services is unknown. Studies are ongoing to develop protocols with which to evaluate boar impacts on biodiversity (positive and negative) within specific habitats in woodlands in Britain.

Materials and methods

Twelve broadleaved woodland sites in the south of England, with differing levels of boar activity, were selected. Invertebrates active on the ground and in the litter layer were sampled using 10 pitfall traps per site, in two transects of 5 traps placed at 10 m intervals. Transects were located in areas of differing rooting activity where possible, and protected to limit the effect of direct interference by boar on sample collection. Numbers of individuals in each of the main invertebrate groups were recorded, and ground beetles (Carabidae) identified to species. Ground vegetation was assessed during May and August in triplets of 2x2 m quadrates located at 10 m intervals along the transects used for pitfalls. The middle quadrate of each triplet was placed over the pitfall trap; an additional quadrate triplet was located 10 m beyond the last pitfall trap.

Stand characteristics and bluebells (*Hyacinthoides non-scripta*) were assessed during May using 30 4x4 m quadrates placed at 30 m intervals along parallel transects 30 m apart. The percentage of bluebell cover was assessed along with an index of level of presence of bramble (*Rubus fruticosus* agg.), bracken (*Pteridium aquilinum* L.), grasses and sedges (*Graminae* and *Cyperaceae*), rushes (*Juncaceae*), ericaceous (*Ericaceae*) species, shrubs <2 m, other herbaceous vascular plants. The dominant tree species in the under-storey and over-storey were recorded within 10 m of the quadrate centre, and the stand structure recorded.

Presence and level of rooting activity within the pitfall transects was recorded on alternate visits, during August for the quadrate triplets, and during assessment of the bluebell quadrates.

Results

The sites were generally unmanaged coppice growing on clay soils with oak (*Quercus* sp.) and sweet chestnut (*Castanea sativa* Mill.) the main over-storey species, and hornbeam (*Carpinus betulus* L.) and sweet chestnut the under-storey. In May, the ground flora was dominated by herbs, mainly bluebell and anemone (*Anemone nemorosa*) which senesce in June, hence ground cover in summer for all sites was very sparse. Vegetation along pitfall transects in May was similar with mean site cover 50%, but by August this had declined to <10%. A total of 50 plant species (12-27 within a woodland) were recorded along the pitfall transects, with fewer species recorded in May than August. Bluebell and anemone were the most common species.

Extensive rooting activity was recorded during spring when sites and location of transects were decided and recently rooted areas were readily identified. It became progressively more difficult to distinguish between recent and old rooting. There was great variation between and within sites in the amount and distribution of rooting, in terms of numbers of quadrates rooted (13-100%) and area of rooting in each quadrate (<1-40%).

Most rooting was recorded beneath neglected coppice with standards. This was marginally significant ($p \leq 0.05$), and probability of rooting was greater where oak and sweet chestnut were the dominant over-storey ($p \leq 0.05$). There was no relationship with under-storey species. Although the frequency of rooting along the pitfall transects was low it reflected the general amount of rooting recorded across each site as a whole.

There were large differences within and between sites in the amount and distribution of bluebells. Presence of bluebells ranged from 20-100% of quadrates in a site, with cover within quadrates ranging from 2-45%. There was no significant association between the occurrence of overall disturbance within a quadrate and the presence or absence of bluebells.

Large numbers of invertebrates were captured with 67,449 being identified to species, family or order; ants were the most common (36% of individuals). Beetles were the next most abundant with >50% of these being ground beetles. Although 33 ground beetle species were caught (12,629 individuals) only *Abax parallelepipedus* and *Pterostichus madidus* were abundant. Between 10 and 20 ground beetle species occurred at each site with 4 species occurring at every site. Although the total number of beetles caught was related to the amount of rooting, the number of species found at a site was not. Total numbers of ground beetles were also related to the % cover of bluebells.

Total numbers of *Geotrupidae*, *Staphylinidae*, *Curculionidae*, and *Silphidae* were not related to % rooting or bluebell cover either at the site or trap level.

Discussion

There is evidence for some significant associations between feral boar rooting and woodland structure and species, and the presence of bluebells. This is consistent with the expectation that rooting will be greater where the habitat contains species producing large fruits such as oak and sweet chestnut, and that rooting will have an adverse effect on bluebells. However, clear conclusions are not possible due to large variation within and between sites and the short term of the study.

The positive relationship between total numbers of ground beetles and percentage rooting at the site level probably reflects a tendency for boar to root more frequently in sites where large numbers of ground beetles are already present. The species richness and diversity of ground beetle community showed no relationship with rooting.

We have developed an effective method for sampling ground dwelling invertebrates in the presence of boar (Harmer et al., in press). Studies are continuing, focusing on other woodland habitats and priority species groups such as pollinators.

References

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