

Combining biodiversity enhancement of temperate grassland with sustainable organic production of traditional breed livestock

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Introduction Since 2004 wildlife conservation initiatives have been combined with sustainable organic rare breed livestock and woodland production on Mabley Farm, which occupies 80 ha on the Woolhope Dome—a Biodiversity Enhancement Area in Herefordshire near the England-Wales border. Financial incentives come from the Higher Level Environmental Stewardship scheme of the England Rural Development Programme. The climate is temperate oceanic. The soil is base-rich brown earth derived from Silurian limestone, pH 5.4–6.0. The estate comprises parkland and wood-pasture (24 ha), permanent grassland (17 ha), water-meadow (6 ha), semi-natural coppice-with-standards woodland (17 ha), coniferous plantation (13 ha) and orchard (3 ha). Management was designed to enhance biodiversity by grazing and mowing, recycling soil nutrients via urine and dung, and microhabitat creation by poaching. The livestock are Old English Longhorn cattle and Wiltshire Horn sheep. These are traditional breeds, which are well adapted to utilising species-rich meadows, have higher infestation resistance and cold weather tolerance than modern breeds, and produce large carcasses of succulent meat. Stocking rates are lenient, at 0.5 cattle or 4 sheep per ha. Excess herbage is harvested as hay for winter feed and for sale. Pasture and woodland management are integrated—the woodland supplying fencing for the fields as well as sustainable yields of timber, coppice materials, firewood and charcoal for sale. Habitat diversity has been enhanced by pond restoration and hedgerow management. The Farm also acts as an “open-air classroom”, hosting a programme of educational visits. The flowering plant flora and the invertebrate and vertebrate fauna of the grasslands have been continually monitored from 2004 to 2007. Variations in species frequency have been noted with particular attention given to species of conservation importance.

Results 261 species of flowering plants (excluding grasses and sedges) were recorded late 2007. 4 species were new records since 2004, including the Red Data species *Orchis morio*. 46 spp. showed substantial increases (x2–x3) in frequency, whilst a further 65 spp showed smaller increases. Individual fields showed between 1.2% and 8.3% increases in species-richness. The greatest increases (x10–x100) were shown by *Cirsium acaulon*, *Lotus corniculatus*, *Mentha aquatica*, *Plantago lanceolata*, *Prunella vulgaris*, *Succisa pratensis* and also by the pteridophyte *Ophioglossum vulgatum*. Substantial decreases (>50%) were shown by 9 spp, and smaller decreases by 11 spp. 25 taxa of the fungal genus *Hygrocybe* (characteristic indicators of unimproved species-rich meadows) were recorded, including the rare species *H. citrinovirens*, *H. intermedia*, *H. olivaceous*, and *H. punicea*. Other taxa were: Lepidoptera 43 spp.; Aves 22 spp., including the rare species *Athene noctua*, *Emberiza schoeniculus*, *Picus viridis* and *Tyto alba*; Amphibia 5 spp., including *Titurus cristatus*; Mammalia 15 spp., including 3 spp. Chiroptera. Livestock production was calf yields at close to 100 per 100 cows, and lamb yields at an average of 180 per 100 ewes. Hay was harvested at ca 4500 kg/ha.

Conclusions The results show that significant biodiversity gains can accrue in just three years under this grazing and hay cutting regime. Floristic species showing increased frequency are those known to benefit from lenient grazing or mowing (Wells & Cox, 1993). Our observations contrast with the equivocal results of the EU Forbioden Project (Scimone et al., 2007), where lenient grazing did not always produce gains in species richness. However, our faunal records are consistent with its findings (Wallis De Vries et al., 2007). The records of *Hygrocybe* spp suggest that the site may be rated as of national importance, using the mycological indicator scheme of Rald (1985).

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