

Biodiversity studies of six traditional orchards in England

The biodiversity of six traditional orchards in England was surveyed to help fill significant gaps in information about this habitat. The project was commissioned by English Nature (now Natural England). The results are valuable for informing orchard managers and advisers about orchard biodiversity, for the development of condition assessment methods and for the consideration of research priorities, particularly now that traditional orchards are a UK priority habitat in the Biodiversity Action Plan.

What was done

Six sites were chosen for survey from English counties which have the main concentrations of orchards:

- Slew Orchard, Devon, 1.3 ha cherry orchard.
- Luscombe Farm Orchards, Devon, 1.6 ha apple orchards.
- Colston Farm Orchards, Devon, 1.9 ha apple orchards.
- Broadway Farm Orchards, Gloucestershire, 21 ha mixed apple, pear and plum orchards.
- Rummings Lane Orchards, Cambridgeshire, 8.3 ha mixed apple and plum orchards.
- Park Farm Orchard, Kent, 2.5 ha cherry orchard.

The main survey work took place in 2004, but information about Broadway Farm Orchards from 2001-2003 was also incorporated into the project.

The species groups surveyed in detail were fungi, invertebrates, and the lichens and bryophytes (mosses and liverworts) growing on trees (ie epiphytes). Fungus species were recorded in spring and autumn from orchard trees, fallen dead wood, the orchard floor and boundary features. Invertebrates were recorded mainly from the canopies, epiphytes and wood-decay features of the trees, the ground and field layers of the orchard floor and orchard hedgerows. Invertebrate survey methods

included manual searching, suction sampling, sweeping, and beating. The main groups covered included Coleoptera, Heteroptera, Aculeate Hymenoptera, Psocoptera, Orthoptera and some Diptera.

Habitat survey and collection of management information provided the context for the detailed survey of the chosen species groups. The habitat surveys of each orchard included recording a sample of orchard trees for girth size and veteran tree features, assessing the plant species composition of the orchard floor vegetation and the orchard boundaries and noting the presence of associated features such as ponds. Contextual information was gathered from a variety of different data sets including ancient woodland inventories, First Edition Ordnance Survey maps and recent aerial photographs. Historical and management information was supplied by orchard owners and managers.

Results and conclusions

The species and habitat results were evaluated with reference to the richness, rarity and conservation status of habitats and species present, including BAP priority habitats and species and threatened species listed in Red Data Books. In addition, Indicators of Ecological Continuity were identified in the lichen and invertebrate data sets, using published lists of these indicators.

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The overall numbers of species found in the species surveys were: 131 epiphytic lichens, 50 epiphytic bryophytes, 175 fungi and 522 invertebrate species. Different orchards had particular biodiversity value for different groups, for example Slew Orchard was the richest for lichens, and Rummings Lane Orchards had the most bryophytes, while saproxylic (wood-decay) invertebrate faunas were particularly rich in Broadway Farm Orchards. The surveys showed that conservation of orchards as series of sites is required to conserve the full range of biodiversity they support.

An array of nationally rare and scarce species was found across all species groups surveyed with the exception of bryophytes, though locally rare bryophyte species were present in Rummings Lane Orchards. Priority BAP species occurred at 3 sites and priority BAP grassland and hedgerow habitats occurred singly or together at all sites except Rummings Lane Orchards. Among the epiphytic lichens, 16 nationally rare or scarce species were found, including one species on Schedule 8 of the Wildlife and Countryside Act 1981, while 13 provisional Red Data List or rare fungi species were found. A total of 45 nationally rare or scarce invertebrates were recorded. All sites had some nationally rare or scarce invertebrate species, primarily from the saproxylic (wood-decay) assemblage and all sites had lichen and / or beetle Indicators of Ecological Continuity. Long-term conservation of such orchard species depends on constant renewal of the tree population, either within one orchard or a series of orchards in a landscape and, for saproxylic invertebrates in particular, on the presence of veteran fruit trees.

The factors that appeared to affect the biodiversity of the orchards operated at a range of scales, from the national scale to the site scale. For example, the richest lichen floras were in the Devon sites, which had not suffered from air pollution in the past in contrast to the other sites. The richest saproxylic faunas were found in sites with large trees and trees with relatively high amounts of veteran tree features, such as hollows and split bark. The study indicated that several attributes of the orchard trees such as age structure and presence and

abundance of veteran tree features are likely to be useful in the development of a condition assessment method for orchards. The survey results suggested that existing condition assessment methods for hedgerows and lowland grasslands are relevant to orchard habitat mosaics but that species-specific management objectives and condition assessment attributes are also required.

Recommendations for additional work to increase knowledge about orchard biodiversity and how it can be conserved include surveys of species groups not covered in detail by the current project, investigation of the ecological impact of scrub growth around orchard trees, increase in knowledge of the demography of orchard fruit trees and research to investigate the landscape level role of orchards in conserving biodiversity.

Natural England's viewpoint

This biodiversity survey of six traditional orchards is a significant addition to our knowledge about this priority BAP habitat, which has received relatively little attention from naturalists and conservationists in the past. The surveys also contribute to a better understanding of the conservation needs of the habitat. This aspect is of particular importance given that a national Habitat Action Plan is now being drawn up. The Plan will cover condition and restoration targets and so methods of monitoring these targets will be required. The project results will be useful in developing condition assessment methods as well as informing how site-based conservation objectives should take account of particular species groups.

Selected references

ROBERTSON, H. & WEDGE, C. 2008. Traditional orchards and the UK Biodiversity Action Plan. In: Rotherham, I. D. ed. *Orchards and groves: their history, ecology, culture and archaeology*, 109-118. Sheffield: Wildtrack Publishing.

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Further information

For the full details of the research covered by this information note see Natural England Research Report NERR025 - *Biodiversity studies of six traditional orchards in England*.

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