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Europe's wood pastures – rich in saproxylics but threatened by ill-conceived EU instruments

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Abstract

Wood pastures are land management systems which combine grazing large herbivores with trees and/or shrubs. They are unique mosaic habitats with conservation interests arising from both the pasture (grassland and/or heathland types) and the trees; they are of outstanding importance for saproxylic organisms. However, they are variously regarded as either i) a minor subset of 'woodlands' or 'forest' by conservation professionals, or ii) treated as pastures which are being threatened by growth of trees and shrubs; either way their management needs are all too often misunderstood as a result, and damage to biodiversity results. A policy seminar was organised at the European Parliament on the 17th November 2015 specifically to raise awareness of the problems arising from the EU Common Agricultural Policy (CAP) and a series of case studies were presented from Spain, Sweden and Romania. A Wood Pastures Manifesto has also been launched.
In this article I shall demonstrate how the sub-fossil beetle fauna clearly shows that the post-glacial 'forests' of Britain were actually open wood pastures in structure; thus wood pasture is the original natural vegetation cover of much of Europe. This calls into serious question the common assumption that simplified vegetation types – 'woodland' or 'grassland' - provide an adequate framework for conservation planning. Wood pasture is clearly an important habitat type in its own right and requires special treatment within the EU Habitats Directive and sympathetic conservation management through CAP. As specialists researching into the ecology and conservation requirements of saproxylic beetles, we need to be promoting a greater understanding of wood pasture and its conservation.

Keywords: wood-pasture, saproxylic, conservation, mosaics, EU policy.

Introduction

Wood pastures are long-established and traditional land management systems which combine grazing large herbivores (livestock such as cattle, deer, sheep or horses) with trees and/or shrubs which may be used as sources of timber, firewood, etc. They are of particular importance to saproxylic biodiversity for the presence of open-grown trees, and especially veteran and ancient trees, providing a wide variety of decaying wood situations. They are unique mosaic habitats with conservation interests arising from both the pasture (grassland and/or heathland types) and the woody growth; they are of outstanding importance for saproxylic organisms.
However, much of nature conservation in Europe uses defined vegetation types as a framework underpinning policy and practice. Mosaic type habitats automatically become at best neglected, or at worst misclassified and regarded as a mismanaged form of another vegetation type. Wood pasture is a particular case where this situation has been – and continues to be - particularly damaging to conservation interests (PLIENINGER *et al.*, 2015). The aim of this article is to raise awareness of the issues and to demonstrate the value of treating wood pasture as a habitat type in its own right.
Europe is very much a cultural landscape, with thousands of years of human activity, and the author would argue that attempts to distinguish 'natural' from 'artificial' man-made or man-influenced processes may well be of academic interest but have little or no relevance in modern ecology-based nature conservation. Wood pasture exists in many forms across the continent and supports very significant and special nature conservation interests and values; it urgently needs recognition through

EU policy and practice. The EU Habitats Directive does not currently cover the habitat type and the Common Agricultural Policy is creating anomalies in site management which are causing damage within the Natura 2000 network and beyond. Although the habitat is notably scarce in Belgium (A. Thomaes, pers. comm.), the characteristic features do survive in traditional orchards.

Definition of wood pasture

The basic definition of wood pasture is simply pastures with trees. The most important examples for nature conservation are those with a long and unbroken history of trees and pasturing, and especially large old trees (ALEXANDER, 1998). The presence of open-grown trees is of especial significance. In open pastures a tree is able to make full use of the available resources, developing broad crowns with extensive lateral branch development. This results in the full range of saproxylic habitats, with fungal decay of dead woody tissues progressing within the dead heartwood of living trees, within dead lateral branches as well as those in the high crown, in dead roots, etc. In contrast, trees growing under closed-canopy conditions develop very limited lateral growth and grow tall and thin trunks which are less stable in strong winds; as the tree ages it become out-competed by neighbouring younger and more vigorous trees, and dies relatively young, before heartwood decay has developed to its full potential. Another significant feature of open wood pastures is the presence of flowering trees and shrubs which are able to blossom in profusion and provide nectar and pollen to a wide range of flying insects. Under closed canopy conditions such trees and shrubs are suppressed and unable to flower. Thorn scrub is a vital part of the ecology of open wood pastures, acting as a nurse to developing young trees which are protected from browsing by the thorns. So a self-sustaining wood pasture contains not only pastures with trees but also thorn scrub, and the system is dynamic: the thorn scrub expanding across open pastures, old thorn scrub being out-shaded by the nursed trees, and old trees collapsing and creating new areas of open ground. These natural processes have been well-described by VERA (2000).

A wood pasture is as much part of the cultural landscape as is forest. An unenclosed and grazed area of forest is by definition a wood pasture. Such places have been celebrated for their nature conservation values – the New Forest in southern England is a famous example. The distinctions between wood pasture, forest and woodland are often unclear and this has led to much confusion (ALEXANDER, 2008a). Parts of the New Forest, for example, are enclosed for timber production, and so - in England at least – a forest may contain both wood pasture and enclosed woodland. The distinction between woodland and pasture in England is a relatively recent thing, arising from the Statute of Merton (1217) – this Governmental instrument introduced legal provision for enclosing previously unenclosed land for the purpose of forestry, whereas woodlands had largely been unenclosed up to that time and had been considered legitimate places for grazing livestock – 'woodlands' had previously been wood-pastures. One result has been increased polarisation of land-use, with pasture and woodland become very distinct and with hard interfaces; mosaic landscapes largely disappeared as a result of this change in legislation.

In many European countries the term 'forest' is used primarily for enclosed woodlands, where livestock grazing is excluded and where wild large herbivores are often unwelcome and actively hunted as pests. Bialowieza Forest in eastern Poland has been claimed to be pristine forest but has actually had a long history of management by the local communities; has been grazed by livestock for centuries until relatively recently. It has a long history of wood pasture. However, with exclusion of livestock grazing, the woodland has become denser and there is no longer adequate grazing within the forest for wild large herbivores such as the re-established herd of European bison. Bison are inhabitants of open forest not closed forest. They are the wild equivalent of domestic livestock. They are characteristic of wood pasture type forest rather than closed canopy forest.

The structure of the post-glacial forest

The author has long argued that the post-glacial forest structure must have included extensive very open landscapes with scattered trees as well as denser areas. This conclusion is based on the presence of particular saproxylic beetle species which in today's landscapes occupy open forest or open wood pasture situations (ALEXANDER, 2005a, 2012 & in press). Other writers have consistently assumed continuous closed canopy high forest conditions without adequate testing of the hypothesis. SANDOM

et al. (2014) has recently collated a very large data set of beetles from dated deposits using the BUGS database (BUCKLAND & BUCKLAND, 2006). Unfortunately, the data has been misinterpreted through unreliable habitat association and been used by the authors to demonstrate a prevalence of closed woodland in the early Holocene (10 000 – 5 000 years BP); when the data is analysed objectively a very different picture emerges. The UK Government's nature conservation agency for England – Natural England – have been developing a computerised analytical tool which can translate a sample species list of invertebrates into a series of distinct and well-defined invertebrate assemblage types (DRAKE *et al.*, 2007). SANDOM's raw data is available on-line and the present author has entered SANDOM's species lists into the Natural England system with very interesting results (Table 1).

Table 1. Percentage species composition of sub-fossil beetles from four palaeo-ecological time periods, with breakdown by ecological assemblage types (based on records from 245 beetle species)

Beetle assemblage type	**Last Interglacial**	**Last glacial**	**Early Holocene**	**Late Holocene**
Grassland & scrub	35	69	28	44
Arboreal	18	10	13	11
Wood decay	34	0	47	34
Mineral marsh	4	9	3	3
Shaded field layer	0	0	2.5	2.5
Unshaded early successional mosaic	0	0	1	3

The striking features of this analysis are that during the early Holocene period:

- species requiring shade are present at a very low level (2.5%), whereas the closed canopy hypothesis would suggest that this group of beetles should be a strong feature;
- while tree associated fauna is prominent, so is grassland and scrub fauna, suggesting more of a mosaic vegetation structure - an open wood pasture with grasslands, scrub, trees and woodland - rather than continuous closed canopy.

Typical species of open grassland and present in the Early Holocene include *Prosternon tessellatum* (Linnaeus, 1758), *Athous vittatus* (Fabricus, 1792) and *Bruchus loti* Paykull, 1800. The wood decay fauna in the Early Holocene includes species which require large old hollow or hollowing trees such as *Dryophthorus corticalis* (Paykull, 1792) and *Prionychus melanarius* (Germar, 1813), as well as species requiring large old lateral branches such as *Pseudeuparius sepicola* (Fabricus, 1792). Finding this combination of species in a modern landscape would indicate open grassland and the presence of old open-grown trees. Modern situations with this combination of beetle species might include in-field and hedgerow trees, woodland edge trees, or wood-pasture, but certainly not the continuous closed-canopy that palynologists envisage. Why do palaeo-ecologists interpret their data so badly?
The data in Table 1 holds considerable interest and merits further close examination. Late Holocene refers to the period when human activity was greatest and here we find an increased proportion of grassland and scrub fauna as might be expected, with a decrease in prominence of wood decay fauna, as might also be expected. The forest canopy was opened-up, but from a relatively open starting point rather than a closed canopy. Indeed, the differences between the proportion of i) grassland and scrub species, ii) arboreal species, and iii) wood decay species, are not very great in either the Last Interglacial, Early Holocene and Late Holocene. The differences are subtle rather than gross. Only the Last Glacial period stands out as being dominated by the grassland and scrub invertebrate assemblage, with low presence of tree canopy fauna and no wood-decay species, the trees and shrubs presumably being dwarf species such as willow and birch – tundra does not have large old trees with varied wood-decay habitats.

Wood pastures across Europe

The EU habitats Directive and the Natura 2000 network are based on vegetation types and so do not acknowledge mosaic sites such as wood pastures as having significance at a European level. Wood pastures do feature in a minor way, e.g. as 'Mediterranean wood-pastures with evergreen oaks' and

'Fennoscandian wooded meadows', but the vast majority are not covered. Wood-pastures are a Cinderella habitat, not recognised as habitat in their own right. It is left to country agencies to decide on whether or not to include wood pastures as 'woodland' or 'grassland' sites, but this has consequences for their conservation management (discussed later).
The author has visited and explored a wide range of wood pasture sites across Europe – from west to east - and found them to be notably rich in rare and threatened invertebrates associated with large old and open-grown trees. Wood-pasture is a significant feature of the common pastures of the Cordillera Cantabrica, of Cantabria and Asturias in northern Spain – the land above the enclosed forests is used for rough grazing by local people and there is a transition from grazed woodlands, through wood pastures, and the open hillsides. The wood pasture trees – mostly oak or beech – are extremely rich in saproxylics (ALEXANDER, 2005b, 2008b, 2009):

- Hermit beetle *Osmoderma eremita* (Scopoli, 1763) – a European Protected Species under Annexes II and IV of the Habitats Directive – appears to be widespread in the area;
- *Prostomis mandibulata* Fabricus, 1792 and *Elater ferrugineus* Linnaeus, 1758, both Near Threatened in the IUCN European Red List of Saproxylic Beetles (NIETO & ALEXANDER, 2000);
- *Pocota personata* (Harris, 1780) and *Pandivirilia melaleuca* (Loew, 1847) both long overlooked and only recently added to the Spanish fauna from this area; they are rare species of ancient wood pasture situations.

But so far the only SAC is the Picos de Europa National Park which is actually relatively poor in wood-pasture habitat and appears to have no published records for Hermit Beetle. Many areas of old wood pasture are being abandoned and succession to scrub and secondary woodland is occurring; other areas have been converted to forestry land and the large old trees are disappearing from crown competition and being replaced by dense high forest of more limited value for saproxylics.
Similar wood pastures also occur in Transylvania, Romania - on the far eastern side of Europe - where large areas of common grazing occur above the meadows and cultivated land in each village. Large old open grown oaks feature across these pastures and support similar assemblages of rare and threatened saproxylic beetles. Three European Protected Species -Hermit beetle, Stag beetle *Lucanus cervus* (Linnaeus, 1758) and Capricorn beetle *Cerambyx cerdo* Linnaeus, 1758 - occur here within designated SACs although designated for their grassland or woodland vegetation rather than their trees. These three have NT status in the European Red List (NIETO & ALEXANDER, 2000) as do other species present such as *Gnorimus variabilis* (Linnaeus, 1758), *Ampedus cardinalis* (Schiödte, 1865) and *A. elongatulus* (Fabricus, 1787). At the Breite Ancient Oak Tree Reserve woodland is expanding into the old oak wood pasture areas and shade-tolerant trees such as hornbeam are becoming dominant and killing the old oaks through crown competition – this is a woodland SAC and so it has been assessed as being in favourable condition as the woodland interest feature is expanding, albeit to the detriment of Annex II saproxylic beetles. The grassland SACs are being stripped of the thorn scrub necessary to nurse next generation tree in order to maintain grassland condition. The veteran oaks are subject to fires lit by shepherds. Effectively the Transylvanian ancient wood pastures are under severe threat despite their protective designations.
Similar problems are occurring elsewhere. The Hasbruch in Germany is no longer grazed and secondary woodland threatens the survival of the few remaining ancient oaks – which support Hermit Beetle and other rare and threatened saproxylics. Fontainebleau Forest in France has not been grazed for many decades and again the ancient oaks are disappearing to be replaced by the shade tolerant beeches, causing irreparable damage to saproxylic interests.
Nicklas Jansson (JANSSON & COSKUN, 2008) has been studying the oak wood pastures of Sweden and Turkey, providing a north-south demonstration of the geographical range of the habitat.
The European Protected Species (Listed in Annexes II and IV) were intended to bring sites outside of the vegetation classification into the Natura 2000 network. This may work for say Hermit Beetle where it occurs along avenues or hedgerows, but it does not resolve the inherent conflicts where this protected species occurs in trees in sites designated for their grassland or woodland interest.

Failure of European conservation structures

Wood-pastures clearly occur throughout Europe and support saproxylic faunas of international quality, but conservation is currently failing them. There is a need for the Habitats Directive to include wood-pasture systems as a major habitat type in its own right, and for the CAP to be promoting good conservation management of these wood pasture systems. Europe has cultural landscapes and it is counter-productive for conservation to focus on vegetation types as if they are somehow natural rather than having evolved over centuries, millennia even, along with people who have selectively exploited their resources and in so doing have modified their nature significantly. No woodland or grassland in Europe is entirely natural and this should not matter, it is the land management systems which have created the rich habitats we value today that should be the focus for conservation action.
There are two key problem areas: the EU Habitats Directive and the CAP. The Habitats Directive does not currently recognise wood-pasture as a key habitat type, sites must be woodland or grassland, and this has serious implications for favourable condition assessment – as explained above. It shouldn't be too challenging to include wood-pasture systems as an additional habitat type; it just needs the key authorities to act. Similarly, with the CAP; trees and shrubs are currently seen as a sign of neglect or non-productive farming, there is financial pressure on land managers to reduce woody growth; if they don't clear scrub then they are deemed to be non-compliant, will lose their subsidies and may even be fined. Again, this should be straightforward to correct, given the willingness of the authorities.

Current initiatives

A Policy Seminar was held at the European Parliament on 17 November 2015 entitled: Europe's wood pastures: condemned to a slow death by the CAP? A test case for EU agriculture and biodiversity policy. The organisers were the European Forum for Nature Conservation and Pastoralism (EFNCP), Pogány-havas Association and Birdlife Europe, with support from SÓGOR Csaba MEP, Remarkable Trees of Romania, British Ecological Society Forest Ecology Group, Royal Society of Biology, DG ENV (European Commission), Arcadia Fund and Asociación Transhumancia y Naturaleza. The seminar was introduced by Ted Green of the UK's Ancient Tree Forum and case studies were presented from three member states: Romania, Sweden and Spain. The seminar was very well-attended and it is hoped will have had some influence.
The Seminar has been followed up by publication of a Wood Pastures Manifesto on the EFNCP website www.efncp.org/policy/wood-pastures-manifesto. This draws the attention of the EU institutions and Member States to the following facts (a shortened version is provided here; for the full version visit the website):

- Wood pastures are genuine productive farming landscapes, and for many farmers they are crucial for the farm economy;
- Trees and shrubs on pastures are an important source of forage, in particular they play an essential role in overcoming the lack of grass in summer and early autumn;
- Trees and shrubs have other agronomic functions, such as pumping nutrients from deep in the soil, extending the grass-growing season, provide buffers from climate change;
- Wood pastures are among the most valuable type of farmland for public goods and ecosystem services, including biodiversity, landscape, carbon storage, soil protection, water management and cultural values;
- They depend on grazing animals to maintain their conservation values;
- The present situation runs directly against the aims of EU environmental policies.

The Manifesto goes on to appeal for:

- More coherent, common-sense policy for wood pastures;
- Full eligibility for CAP direct payments;
- Urgent evaluation of impacts of new CAP eligibility rules;

- Full use of rural development programme measures for supporting positive management of wood pastures.

As saproxylic entomologists and conservationists, with interests in maintaining and enhancing saproxylic habitats across Europe, we should be supporting these new initiatives and I urge all readers to visit the efncp website and to sign up as supporters.

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