Leash Fen

[SK 296 741]

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Introduction

Leash Fen, Derbyshire, a deep (*c.* 6 m) topogenous peat deposit on the Southern Gritstone Moors, is a key site in the context of reconstructing mid- and late Flandrian environmental changes. The pollen record from this site was the first to be radiocarbon dated in the southern Pennines and details an important chronology of successive woodland clearance phases in this area. Hicks (1971) compared Leash Fen with other sites in the south-eastern Pennines and found that it typified environmental changes in this region. Comparison with other work in the southern Pennines as a whole reveals a series of anthropogenic disturbances and climatic perturbations common throughout the area, although data obtained from Leash Fen reveal important differences between sites during and after the Roman occupation.

Description

Leash Fen, previously referred to as 'Leashfield Moss' (e.g. Farey, 1813) is located in the Southern Gritstone Moor area, known also as the 'East Moors' (Coles, 1985) of the south-east Pennines. It lies on the Lower Coal Measures at an altitude of 283 m OD. Prior to peat initiation the Southern Gritstone Moors were covered by a mixed oak forest with occasional breaks in the forest canopy, where areas of damp heath and alder and birch carr occurred (Conway, 1954). The onset of a wetter climate during the Atlantic period (*c.* 8000–5000 BP) coupled with the topography and elevation of Leash Fen probably shifted the local precipitation–evaporation regime to one that was conducive to peat initiation (Moore, 1993). The final stimulus that allowed peat inception, however, has been linked to human activity in the southern Pennines. Tanis and Switsur (1990) suggested that clearance of scrub by fire led to peat initiation at Leash Fen, with the onset placed at 6300 ± 150 BP (4300 ± 150 BC; Hicks, 1971).

Several sites were studied in the south-east Pennines by Hicks (1971). Leash Fen was one of the largest sites in the study and the environmental changes preserved in the pollen record here reflect to a certain extent south-east Pennine landscape changes as a whole. Similar studies at Rishworth Moor, approximately 55 km north-west of Leash Fen, reveal a broadly similar record of environmental change during the mid-and late Flandrian, although there are important local differences, especially during and after the Roman period. Therefore, although the pollen record at Leash Fen could tentatively serve as a record of environmental change for the southern Pennines as a whole, significant local variation does occur.

A detailed pollen record from Leash Fen is shown in (Figure 8.64). Based on significant vegetation changes and associated archaeological periods the pollen diagram has been divided into three major zones, A, B and C. Zone A represents woodland clearance in the Neolithic and Bronze Ages, zone B woodland clearance in the Iron Age and in Roman times and zone C vegetation changes after the Roman occupation.

Interpretation

Evidence of human disturbance

Zone A – Neolithic and Bronze Age

Zone A, from 6300 ± 150 BP to 2340 ± 100 BP, records a series of woodland clearances in the area (Figure 8.65). Clearance phases, all of which are radiocarbon dated are identified by successive peaks of *Plantago lanceolata,* an open-habitat indicator (Behre, 1981) with associated rises in one or all of Poaceae, Cyperaceae and Ericaceae and also of cultural indicators such as *Rumex acetosa* type. A small-scale clearance is recorded at 4120 ± 100 BE In (Figure 8.64)

this is indicated by the first rise in *P. lanceolata* at 500 cm, together with rising values of Cyperaceae and appreciable values of Ericaceae. This has been related to the activity of Middle and Late Neolithic herdsmen based on the findings of polished stone axes near Hathersage, approximately 10 km north-west of Leash Fen, dated to between *c.* 4500 and 3800 BP (Hicks, 1971).

At 3790 ± 100 BP a further clearance is recorded (Figure 8.64). Here, Poaceae reaches values of 20% TLP (total land pollen). Hicks (1971) has attributed this clearance phase to the 'Food Vessel People' based on the recovery of food vessels dated to 3490 ± 150 BP (Riley, 1966) from Beeley Moor, approximately 5 km south-west of Leash Fen. A more extensive woodland clearance of the Southern Gritstone Moors follows at 3500 ± 110 BP. Together with the presence of *P. lanceolata* and Poaceae, *Rumex acetosa*-type first appears and Ericaceae and Cyperaceae attain values of around 25% and 15% TLP respectively. This clearance episode has been linked to the Early and Middle Bronze Age people, whose presence is evident by the recovery and dating of collared urns in the area (Hicks, 1971).

Woodland still dominates zone A and, together with the small values of Poaceae, indicates the small scale nature of the clearances. Despite evidence of some woodland regeneration after each clearance phase, illustrated in (Figure 8.65) as a slight recovery of tree pollen after a period of decline, the trend is one of a move towards a progressively more open landscape, as reflected in the fall of tree pollen from approximately 65% to 40%. The clearances of zone A were probably associated with pastoralism (Hicks, 1971). It is possible that such an agricultural economy was common to the southern Pennines as a whole, as Bartley (1975) also finds a similar pattern of woodland clearance at Rishworth Moor and he too concludes evidence of a pastoral economy.

Zone B – Iron Age and Roman occupation

The zone A–B boundary at 2340 ± 100 BP marks a significant decrease in tree pollen values (Figure 8.65), together with an increase in clearance indicators such as *P. lanceolata* and Poaceae (Figure 8.64). From 2340 ± 100 BP to 2160 ± 100 BP, Hicks (1971) has attributed the large-scale woodland clearance to Iron Age occupation, although local archaeological evidence for Iron Age settlement is scarce. Hicks (1971) suggested that pastoralism was still very important, with grazing of the cleared areas acting to prevent tree regeneration (Buckland and Edwards, 1984). The date 2160 ± 100 BP should be treated with caution, however, as it is slightly older than the dated horizon nearly 1 m below, 2140 ± 100 BP (Figure 8.64). The change in stratigraphy to a less humified fresher peat between these two dates could indicate a change to a much faster accumulation of peat. A similar change in stratigraphy is seen at Lucas Fen, where a change to a wetter climate is thought to be the possible cause (Long, 1994).

From 1960 ± 100 BP the clearance of woodland continued. Significantly, arable farming became prominent, as suggested in (Figure 8.64), with an increase in Cerealia pollen from values close to zero at 140 cm to a peak of 3% TLP at 110 cm. This agricultural practice is seen to occur at other sites on the Southern Gritstone Moors at a similar time, for example, at Stoke Flat (Long, D.J. *et al.,* 1998). Hicks (1971) suggested that the adoption of arable farming could be correlated with the onset of the Roman occupation, with the Romans introducing new crops brought from the continent, such as rye. Rishworth Moor also shows the same general pattern. Here, a pastoral farming economy in the Iron Age was replaced by arable farming, which reached its maximum intensity during the Roman occupation (Bartley, 1975). A mixed farming economy succeeded the dominantly arable economy after the Roman occupation (Hicks, 1971) and continued to the zone B–C boundary.

Throughout zone B it appears that clearance of woodland continued on a larger scale (Figure 8.65). As outlined above, this largely reflects increasing population pressure. Although archaeological evidence reflecting such pres sures is limited, fortified hill-top sites are present in the surrounding area (see Butterworth and Lewis, 1968). Varley (1964) stated that these fortified hill-top sites, constructed by Iron Age people between 2100 and 2200 BP, suggest a large organized labour force. Zone B increasingly reflects vegetation changes in the upland as a whole (Figure 8.65). This is a result of the relationship between the presence of woodland and the spatial extent of pollen received. For example, throughout zone A woodland was cleared on a small scale. The pollen diagram at Leash Fen essentially reflects changes in the local vegetation. Zone B, however, increasingly reflects changes in the more regional vegetation. This is a result of the clearance of local woodland, allowing receipt of pollen rain from an extended area (Tauber, 1965).

Zone C – post-Roman occupation

Hicks (1971) has tentatively dated the onset of zone C to between AD 860 and AD 1060. The sharp rise in *P. lanceolata* (Figure 8.64) and continued fall in tree pollen (Figure 8.65) that characterize this boundary reflect the intense woodland clearances attributed to the 10th century Norse invaders (Tallis and Switsur, 1973). As reflected in (Figure 8.65), Leash Fen records an upland landscape that is almost treeless. The rising Ericaceae and Poaceae pollen mark the increasing encroachment of grass and heather moorland (Figure 8.64), culminating in a landscape that probably was similar in appearance to that of today. Further small increases in *Pinus, Ulmus* and *Fraxinus* respectively indicate secondary woodlands and plantations (Hicks, 1971).

Correlation across the southern Pennines

Tanis (1964a) studied several Southern Pennine blanket peat sites and through pollen analysis picked out several horizons (A to E) marking either climate fluctuations or anthropogenic disturbance that were common to each of these sites. Based on the pollen assemblage and associated radiocarbon date of each of these horizons (Tanis and Switsur, 1973) several of these horizons can be detected at Leash Fen. That such correlation between sites is possible throughout the Southern Pennines suggests periods of extensive environmental change.

Horizons A, B, C and E can all be detected in the pollen diagram at Leash Fen (Figure 8.64). Horizon A denotes a climate deterioration that produced a marked rejuvenation of bog growth throughout the southern Pennines (Tallis, 1964a). Difficulty in obtaining a date for this horizon at Featherbed Moss, the site where it was first recognized, has necessitated tentative correlation of its *Plantago* pollen values with those of Leash Fen. Here, Tallis and Switsur (1973) found the best correlation suggested a date of 3500 ± 110 BP Horizon B marks a second phase of bog rejuvenation at 2870 BP (Tallis and Switsur, 1973) and is recorded at Leash Fen at a depth of 380 cm (Figure 8.64). Further, based on a significant rise in *Betula* pollen concomitant with a decline in *Alnus* values, Horizon B has been correlated with the Grenzhorizont (Tallis, 1964a), a prominent recurrence surface found in many peat profiles throughout northwest Europe.

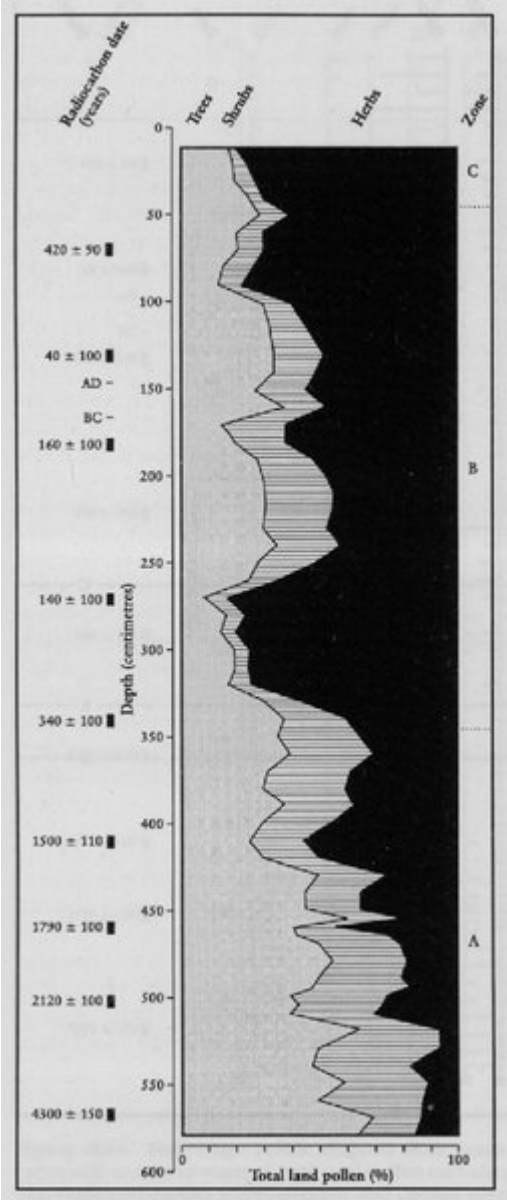
Horizon C, 2301 ± 50 BP (Tanis and Switsur, 1973) represents a widespread woodland clearance phase and is linked with Iron Age occupation. It is reflected in the pollen record with a substantial and sustained rise in *Plantago* and Poaceae pollen, the first appearance of Cerealia pollen (Figure 8.64) and a marked reduction in tree pollen (Figure 8.65). This horizon is seen to occur at Leash Fen at a depth of approximately 310 cm (Figure 8.64). Leash Fen itself, in zone B, records Iron Age clearances dating from 2340 ± 100 BE Horizon D, a period of woodland recovery related to the end of the Roman occupation (Tallis, 1964a), is not apparent in the Leash Fen pollen record. Instead there is evidence of a mixed farming economy continuing throughout the period to the time of the Norman Conquest. This reiterates the point of Bartley (1975), who states that variations between sites in the southern Pennines are particularly noticeable during and after the Roman occupation. Horizon E (AD 927 ± 50), marking the lower limit of intense woodland clearance related to the 10th century Norse invaders (Tallis and Switsur, 1973), is tentatively correlated with the start of zone C in the Leash Fen diagram ((Figure 8.64) and (Figure 8.65)). Although radiocarbon dates are lacking, Hicks (1971) suggests a date of between AD 860 and AD 1060 for the onset of zone C. It is the dramatic increase in *P. lanceolata* pollen values, however, together with the associated decrease in tree pollen values (Figure 8.65), suggestive of a period of intensive clearance, that facilitates correlation between records.

Conclusions

The fossil pollen record of Leash Fen, interpreted within a radiocarbon dated framework, provides detailed information of landscape changes as a consequence of both anthropogenic disturbance and climatic fluctuations during the mid-and late Flandrian. Leash Fen records the progression from localized woodland clearances for pastoralism during the Neolithic and Bronze Age to the more intensive and larger-scale clearances reflecting population pressure in the area and the changes from an arable to a pastoral farming economy during the Iron Age and the Roman occupation. Further widespread and intensive woodland clearances follow, which were associated with the 10th century Norse invaders. Comparison with other sites throughout the southern Pennines reflects essentially similar stages of clearance, but with important differences during and after the Roman occupation highlighted at Leash Fen.

References

(Figure 8.64) Percentage pollen diagram from Leash Fen covering the mid- to late Flandrian. Values are expressed as a percentage of total land pollen excluding aquatic pollen and spores. Several horizons are shown that mark widespread anthropogenic and climate events in the southern Pennines (after Hicks, 1971). Dates are given in years BC and AD.



(Figure 8.65) Cumulative pollen diagram from Leash Fen summarizing changes in tree, shrub and herb pollen (modified from Hicks, 1971).