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# Yew Tree Farm

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## Highlights

Yew Tree Farm, Avon, is of considerable significance for its diverse non-marine mollusc faunas dating from Oxygen Isotope Stage 15. The interglacial deposits here overlie glacial outwash deposited during a pre-Anglian glaciation, giving the site considerable stratigraphic significance. It is proposed as the type-site of the Yew Tree Formation.

## Introduction

At Yew Tree Farm, estuarine silts of Holocene age overlie fine red silty sands. These in turn overlie gravels and then richly fossiliferous interglacial deposits which lie on coarse cobbly gravels.

Pleistocene gravels have been known in the Kenn area since the work of Woodward (1876) and Greenly (1921). Gilbertson and Hawkins (1978a) described the stratigraphy of the Quaternary deposits at Yew Tree Farm. They also carried out detailed studies on the freshwater and terrestrial molluscs from the site, and described three very small pollen assemblages. They regarded the palaeobiology of the site as indicative of the late stages of an interglacial, probably the Ipswichian. Hunt (1981) described a pollen and organic-walled microplankton assemblage from the site. The pollen was comparable with Ipswichian II–III assemblages. The organic-walled microplankton included both marine and freshwater forms, suggesting estuarine conditions. Andrews *et al.* (1984) and Bowen *et al.* (1989) presented amino-acid ratios derived from *Corbicula* shells from Yew Tree Farm. These are suggestive of an age of 400 to 600 ka BP. The site is proposed as the type-locality of the Yew Tree Formation by Campbell *et al.* (*in prep.*).

## Description

At Yew Tree Farm [ST 4225 6927], Gilbertson and Hawkins (1978a) recorded the following sequence (maximum bed thicknesses in parentheses).

5. Grey estuarine silts of Holocene age. (0.6 m)
4. Fine red silty sands — Brean Member. (0.5 m)
3. Silty, sandy and cobbly gravels. (1.06 m)
2. Pale-grey, laminated and cross-bedded shelly sandy silt — Yew Tree Formation. (0.3 m)
1. Coarse cobbly gravels containing erratics Nightingale Member.

A chalk clast from the Kenn gravels (bed 1) yielded foraminifera identified by Dr A. Bahafzallah as *Valvulinaria californica* Cushman, *Gyroidina umbilicata* d'Orbigny and *Atoxoophriagmium subsphaerica* (Marie) (Gilbertson, pers. comm., 1995). These taxa are only present onshore in the British Isles in the highest units of the Chalk of Northern Ireland.

The Yew Tree Formation (bed 2) contains a diverse mollusc assemblage, with over 40 taxa recorded (Gilbertson and Hawkins, 1978a; (Table 10.2)). The fauna is dominated by *V. piscinalis* and *B. tentaculata* with some *L. peregra*, *G. laevis*, *B. marginata*, *A. crista* and *Pisidium* spp. Other taxa are comparatively rare. Estuarine foraminifera are present in the deposit (Gilbertson and Hawkins, 1978a). The pollen assemblage (Hunt, 1981) contains abundant tree pollen, including *Quercus*, *Alnus*, coryloid, *Pinus*, *Betula*, and *Tilia*, together with pollen of herbs, marsh plants and aquatics, and cryptogam spores. The algal microfossil assemblage (Hunt, 1981) is species-poor and dominated by the marine dinoflagellate cyst *Achomosphaera andalusiense* Jan du Chene (= *Spiniferites septentrionalis*) with smaller numbers of

*Operculodinium centrocarpum* (Deflandre and Cookson). Molluscs from the interglacial deposit have yielded amino-acid ratios of 0.378 (Andrews *et al.*, 1984; Bowen *et al.*, 1989).

## Interpretation

The stratigraphy and palaeobiology of the site have been interpreted by Gilbertson and Hawkins (1978a) and Hunt (1981). Andrews *et al.* (1984), Bowen *et al.* (1989) and Campbell *et al.* (in prep.) have reassessed the stratigraphical significance of the site.

The grey silts (bed 5) at the top of the section were laid down in estuarine conditions in the later Holocene (cf. Butler, 1987). The red silty sands (bed 4) underlying the estuarine silts were interpreted by Gilbertson and Hawkins (1978a) as coversands of aeolian origin. The underlying gravels (bed 3) were regarded by them as cold-climate fluvial deposits. They demonstrate the occurrence of cold-stage fluvial activity at the site after the Yew Tree interglacial.

In the Yew Tree Formation (bed 2), several of the mollusc taxa, including *B. marginata*, *C. fluminalis*, *Anisus vorticulus* (Troschel), *Hippentis complanata* (Linné) and *A. lacustris*, require interglacial conditions, with July temperatures perhaps 2°C warmer than today. The interglacial deposit was regarded as of fluvial origin by Gilbertson and Hawkins (1978a), since most of the Mollusca are freshwater taxa, with the most abundant environmental group being taxa typical of moving water such as *B. tentaculata* and *V. piscinalis*. They recorded possible traces of salinity stress in the molluscan assemblages, but no characteristically estuarine or marine species.

From the same bed, Hunt (1981) described palynological evidence for an interglacial climate, with abundant pollen of broad-leaved trees (29%, including 19% *Quercus*), and some marine influence, indicated by the abundant pollen of Chenopodiaceae and *Plantago maritima* and the presence of marine dinoflagellate cysts. The interglacial deposit may have been laid down in a coastal lagoon or in the backwaters of an estuary. The amino-acid ratio is suggestive of Oxygen Isotope Stage 15 and an age of 400 to 600 ka BP (Andrews *et al.*, 1984; Bowen *et al.*, 1989), although Bowen (pers. comm., 1995) urges caution in interpreting ratios derived from *Corbicula*.

The presence of erratics such as the chalk clast, a non-durable lithology most probably derived from Northern Ireland, is strongly suggestive of a Celtic Sea glacial origin for the Kenn gravels (bed 1). These were regarded as glacial outwash deposits of a sandur plain by Gilbertson and Hawkins (1978a) and this interpretation was accepted by Campbell *et al.* (in prep.).

## Conclusion

Yew Tree Farm is an important site for the Pleistocene palaeobiology and stratigraphy of the British Isles. The deposits here preserve a temperate-stage river channel-fill and a complex of cold-stage sediments. In the temperate-stage deposits, molluscs, pollen, dinoflagellate cysts and foraminifera suggest interglacial conditions and a depositional environment at the margins of marine influence. A number of amino-acid ratios have been determined from molluscs in these deposits. These suggest correlation with Oxygen Isotope Stage 15. The fossil remains from the channel-fill at Yew Tree Farm are diverse and abundant and offer great potential for future investigation, since the palaeobiology of the temperate stage which they reflect is as yet very poorly known. The interglacial deposits at Yew Tree Farm and its correlative site at Kennpier, rest on gravels suggested by Gilbertson and Hawkins (1978a) to be of glaciofluvial origin. If, as seems very probable, these gravels are glacial, then they must represent an extremely ancient glacial episode, which is very poorly known elsewhere in the British Isles.

## [References](#)

<i>Species</i>	<i>Number</i>
<i>Valvata cristata</i> Müller	12
<i>Valvata piscinalis</i> (Müller)	3324
<i>Belgrandia marginata</i> (Michaud)	970
<i>Bitbynia tentaculata</i> (Linné) shells	1039
<i>Bitbynia tentaculata</i> (Linné) opercula	1755
<i>Carychium minimum</i> Müller	2
<i>Lymnaea truncatula</i> (Müller)	192
<i>Lymnaea palustris</i> (Müller)	1
<i>Lymnaea peregra</i> (Müller)	886
<i>Planorbis planorbis</i> (Linné)	25
<i>Anisus vorticulus</i> Troschel	147
<i>Anisus leucostoma</i> Müller	141
<i>Gyraulus laevis</i> Alder	1613
<i>Armiger crista</i> (Linné)	615
<i>Planorbis</i> spp.	3
<i>Hippentis complanata</i> (Linné)	21
<i>Acroloxus lacustris</i> (Linné)	8
<i>Oxytoma</i> cf. <i>pfeifferi</i> Rossmässler	6
<i>Cochlicopa lubrica</i> (Müller)	2
<i>Pupilla muscorum</i> (Linné)	2
<i>Vallonia costata</i> (Müller)	4
<i>Vallonia pulchella</i> (Müller)	6
<i>Vallonia</i> spp.	1
<i>Cepaea nemoralis</i> (Linné)	1
<i>Trichia bispida</i> (Linné)	3
<i>Punctum pygmaeum</i> Draparnaud	1
<i>Zonitoides nitidus</i> (Müller)	4
<i>Agrolimax</i> cf. <i>agrestis</i> (Linné)	6
<i>Agrolimax</i> spp.	42
<i>Spbaerium corneum</i> (Linné)	1
<i>Corbicula fluminalis</i> (Müller)	72
<i>Pisidium amnicum</i> (Müller)	44
<i>Pisidium casertanum</i> (Poli)	7
<i>Pisidium obtusale</i> (Lamarck)	10
<i>Pisidium milium</i> Held	56
<i>Pisidium subtruncatum</i> Malm	138
<i>Pisidium benslowanum</i> (Sheppard)	24
<i>Pisidium nitidum</i> Jenyns	270
<i>Pisidium pulchellum</i> Jenyns	2
<i>Pisidium moltessterianum</i> Paladilhe	3
<i>Pisidium</i> spp.	190
Total	11 649

(Table 10.2) Fossil molluscs from the interglacial deposit at Yew Tree Farm (after Gilbertson and Hawkins, 1978a).