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PLANT FOSSILS FROM THE LATE DEVONIAN TOE HEAD SANDSTONE FORMATION, WEST CORK, IRELAND: A PRELIMINARY REPORT

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ABSTRACT. Three plant fossil localities from the late Famennian Toe Head Sandstone Formation (LL-LE Miospore Biozone) at the type area of Toe Head, west Cork, Ireland have yielded good carbonised compressions. One of these localities proved prolific and it is this locality which is described in this report. The assemblage at Toe Head comprises three distinct components. Initial studies reveal these to be; (1) Disarticulated fertile and vegetative examples of the progymnosperm genus *Archaeopteris*, (2) Megaphyllous leaves of a Sphenopterid type, (3) Cupulate preovules. Plants are preserved within a very finely laminated muddy siltstone. The plant bearing horizon is interpreted as representing quiet deposition in ephemeral lakes or ponds within an extensive coastal plain environment.

KEY WORDS: fossil plants, Famennian, Toe Head, Ireland

INTRODUCTION

This paper describes a new fossil locality within the late Devonian (Famennian) Toe Head Sandstone Formation, which forms part of the Old Red Sandstone facies of southern Ireland, situated within the Munster Basin (Capewell 1957) (Fig. 1). The Toe Head Formation was first described by Graham (1972, 1975) from the type section at Toe Head in west Cork. and is regarded as a transitional coastal plain unit lying conformably between the continental Old Red Sandstone facies of the underlying Castlehaven Formation and the overlying shallow marine Old Head Sandstone Formation. The Toe head Formation has been palynologically dated as late Famennian LL-LE Miospore Biozone by O'Liathain (1992).

LOCALITY

The fossil locality is situated within a cove on the southern end of the Toe Head Peninsula (Grid Ref. W147262) (Fig. 2). The outcrop is cut off at high water, thus making accessibility precarious and limited to approximately one and a half hours either side of low tide. The plant bearing sediments comprise a thinly bedded sequence of grey sandstones and siltstones with minor mudstone units approximately 60 m above the base of the formation. The fossiliferous unit is an isolated lenticular muddy siltstone, pale grey in colour and finely laminated. Plant fossils are preserved as black carbonised compressions which contrast well with the pale grey of the matrix. Fossil material is preserved parallel to the laminations and exhibits no obvious alignment.

PLANT DESCRIPTIONS

A brief outline of the Toe Head assemblage is presented here along with accompanying illustrations.

Archaeopteris

Two species of *Archaeopteris* are present within the assemblage; *Archaeopteris hibernica* (Forbes) Dawson 1871, which exhibits characteristic broad vegetative leaves which terminate in a slight crenulation of the distal margin (Pl. 1, fig. 1a). Fertile material of *Archaeopteris* is also present and exhibits rows of fusiform pedicellate sporangia. However no fertile material is present attached to the vegetative leaves which makes it difficult to identify this material to species level. A beautifully preserved example of *Archaeopteris macilenta* Lesquereux, 1884 is also present and differs markedly from *hibernica* in that the vegetative leaves display deeply dissected distal margins (Pl. 1, figs. 2–3).

Sphenopterid foliage

Megaphyllous leaves of a Sphenopterid type are present within the assemblage although they are not as abundant as the other components. This fern like material comprises isolated pinnae or clusters of pinnae attached

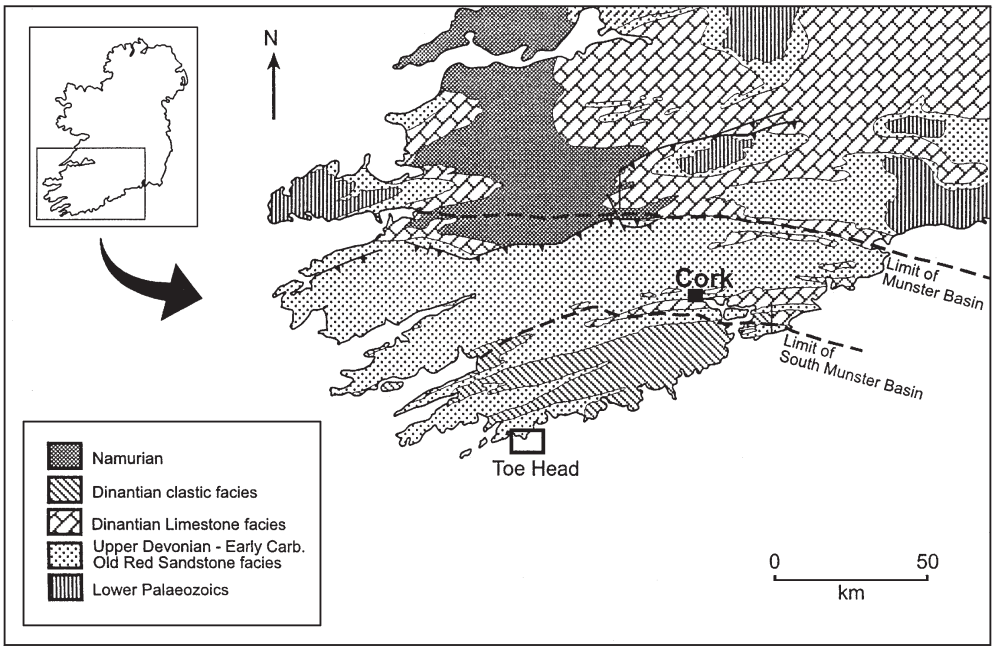

Fig. 1. Geological map of southern Ireland illustrating the position of the Toe Head Peninsula. (Modified from Williams *et al.* 1988)

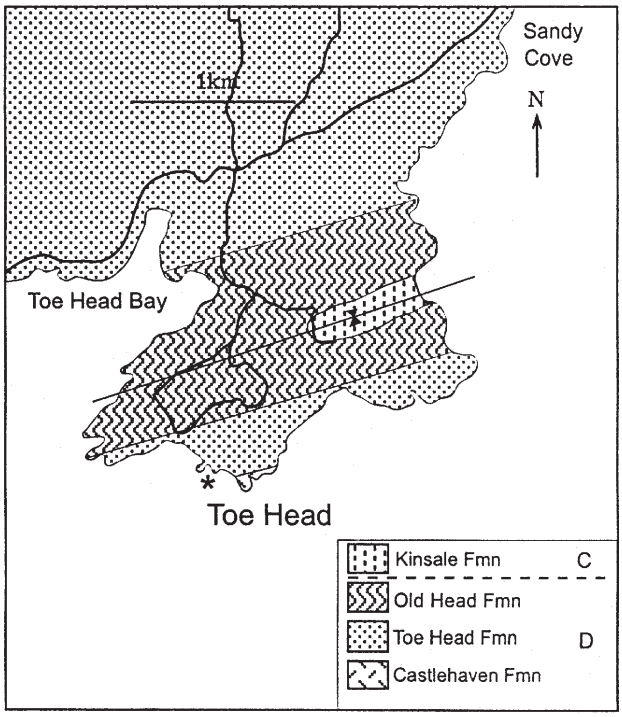

Fig. 2. Simplified geological map of the Toe Head Peninsula. Fossil locality indicated by * (Modified from Graham 1975)

to distal rachises (Pl. 1, fig. 1b). The disarticulated nature of the material makes identification difficult.

Cupulate preovules

A number of terminal cupules structures are present (Pl. 1, fig. 4) some of which contain preovules. These are presently being studied in detail and have yet to be to be assigned to a genus.

DISCUSSION

Fossil plants have long been known from the Old Red Sandstone of central Ireland and include assemblages from Ballyheigue, Co. Kerry (Matten *et. al.* 1984), Hook Head, Co. Wexford (Matten 1995) and Kiltorcan Hill, Co. Kilkenny Chaloner (in Holland 1981). This report however, is the first detailed record of an assemblage from the South Munster Basin, and is unusual in an Irish context in that it contains two species of *Archaeopteris*. Current work develops the palynology and palynofacies of the plant bearing sediments. This information will be integrated with the sedimentological and palaeobotanical data to establish a detailed vegetational and depositional model for the region.

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PLATE

Plate 1

1a. Detail of the sterile leaves of *Archaeopteris hibernica* demonstrating the broad leaf shape and dense venation terminating in a slight crenulation of the distal margin (scale bar at cm intervals)

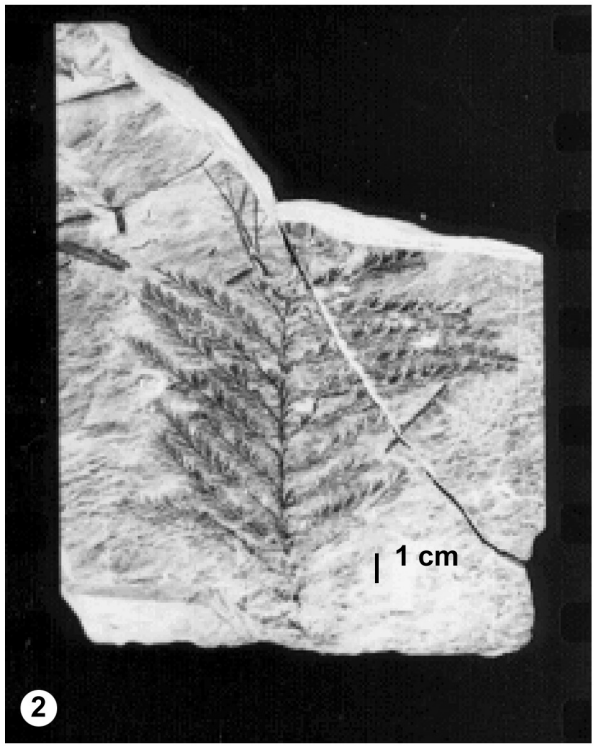
1b. Fern like foliage of a Sphenopterid type (scale bar at cm intervals)

2. Penultimate branch of *Archaeopteris macilenta* bearing sterile ultimate branches

3. Detail of the sterile leaves of *Archaeopteris macilenta* (scale bar at cm intervals)

4. View of apical section of cupule system


b
a
1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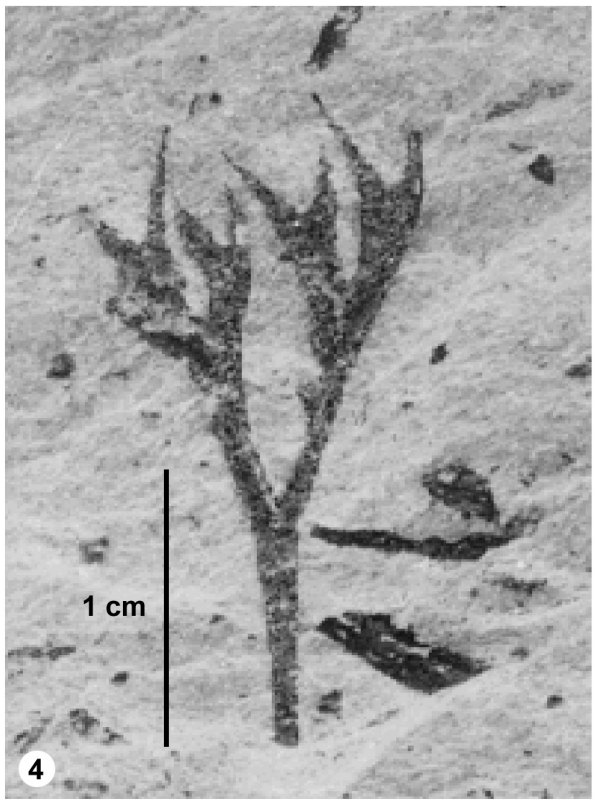
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