

# 1. Cultivating societies: new insights into agriculture in Neolithic Ireland

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*Illus. 1—When incorporated into a fire, plant components can become charred and survive in the archaeological record. Neolithic charred wheat grains from Kerloge, Co. Wexford, are shown on the left (Meriel McClatchie).*

The earliest evidence for agriculture in Ireland has been dated to the Early Neolithic period, beginning around 4000 BC. From the outset of the Neolithic, previous food procurement strategies—including hunting, fishing and gathering—began to be replaced by plant and animal husbandry. Archaeological texts often mention the ‘first farmers’ when referring to the Neolithic period. While the main crops are known to have been wheat and barley, far less is known about the balance between them, the relative importance of different varieties within these crops, the methods used in crop production and the intensity of agricultural activity. This paper will examine the evidence for cereal cultivation in Neolithic Ireland—based upon archaeobotanical studies—and introduce a new research project that aims to investigate the timing, nature and effects of the introduction of agriculture into Ireland.

## **Archaeobotany and the preservation of ancient plants**

Archaeobotany is the study of past societies and environments through the analysis of preserved plant remains, the remains usually being derived from archaeological deposits. A broad range of plant remains can be studied in archaeobotany, including seeds and fruits of higher plants, vegetative components of plants, parenchymatous tissues (underground storage organs of plants, such as roots and tubers), fibres, phytoliths (plant opal silica bodies), wood, pollen and starch granules, as well as lower plants, such as mosses and fungi. This paper will focus on non-wood plant macro-remains, such as cereal grains and chaff.

Fragmentary remains of plants can survive for thousands of years if subjected to certain processes. Many archaeological sites reveal traces of past fires. If plant components are incorporated into a fire and burnt when the supply of oxygen is insufficient for combustion to occur, they can become charred and survive in the archaeological record (Illus. 1). Charring is the most common method of plant preservation in Neolithic archaeological deposits, and can result from a range of actions, which may be accidental or purposeful. Accidental burning can occur when cereals are dried in the vicinity of a fire following a damp harvest, prior to storage, during the separation of grains from chaff or in association with malting. Accidental charring of plant components can also occur as a result of catastrophic fires, such as the burning of grain stores or house and roofing structures. Purposeful burning may result from actions such as the burning of an enemy's fields or stored crops, as well as the burning of stubble in fields and other traditional agricultural techniques. The burning of domestic waste—including floor sweepings and food debris—as fuel or simple rubbish disposal can also lead to the preservation of plant remains. Plants that are more likely to come into contact with fire during food processing, preparation and disposal activities—such as cereals, pulses, arable weeds and nutshells—often dominate assemblages of charred plant macro-remains.

Another method of preservation occurs when material is incorporated into anoxic conditions, whereby oxygen is excluded from deposits and plant tissues do not break down. Anoxic preservation is also referred to as waterlogging and anaerobic preservation, and can occur in areas with a high water-table, in deposits of a very organic nature, and occasionally when archaeological deposits are well sealed, for example by a heavy clay. Anoxic preservation is often encountered in natural deposits from environments such as peatlands, rivers and lakes. Relatively few Neolithic archaeological sites in Ireland have, however, produced waterlogged non-wood plant macro-remains.

## **Cereal types of Neolithic Ireland**

The recovery of charred barley and wheat remains from Neolithic archaeological deposits indicates that these crops were the first plants to be cultivated in Ireland (Illus. 2). Barley spikelets (each spikelet contains a grain) are arranged in groups of three placed alternately along the stalk. In two-row barley only the middle spikelet in each group produces a ripe grain, and so the head appears to have two rows. In six-row barley all of the spikelets ripen. Two main varieties of two-row and six-row barley have been recorded in archaeological deposits in Ireland: hulled and naked. In the case of hulled barley, the husks (chaff) are actually fused onto the grains. With naked barley, the husks just enclose the grains rather than being fused—in this case the grain is more easily released from the chaff.



*Illus. 2—Left: six-row hulled barley; middle: emmer wheat; right: two-row hulled barley (Meriel McClatchie).*

Wheat also can be divided into hulled and naked varieties. Like barley, when wheat is hulled the husks are fused to the grain. With naked wheat the grain is more easily released. Hulled wheats—including emmer and spelt wheat—are rarely grown today and are often viewed as ‘ancient’ crop types. In recent years, however, spelt wheat has enjoyed something of a revival. Naked wheats—including bread wheat—are sometimes thought to be more modern than hulled wheats. It should, however, be noted that evidence for naked wheats has been recorded, albeit in small quantities, from Neolithic Ireland (for example Groenman van Waateringe 1984, 327), while substantial deposits of naked wheat were recorded at a Neolithic structure in Balbridie, Scotland (Fairweather & Ralston 1993).

Oat grains are occasionally found in Neolithic deposits, but are thought to represent arable weeds at this time rather than being cultivated in their own right. Cultivation of rye is also unlikely to have occurred until thousands of years later. Rye grains do not appear in the archaeological record in Ireland until the Middle Bronze Age (after 1700 BC), when they are also likely to have been arable weeds, perhaps not being cultivated until the historic period.

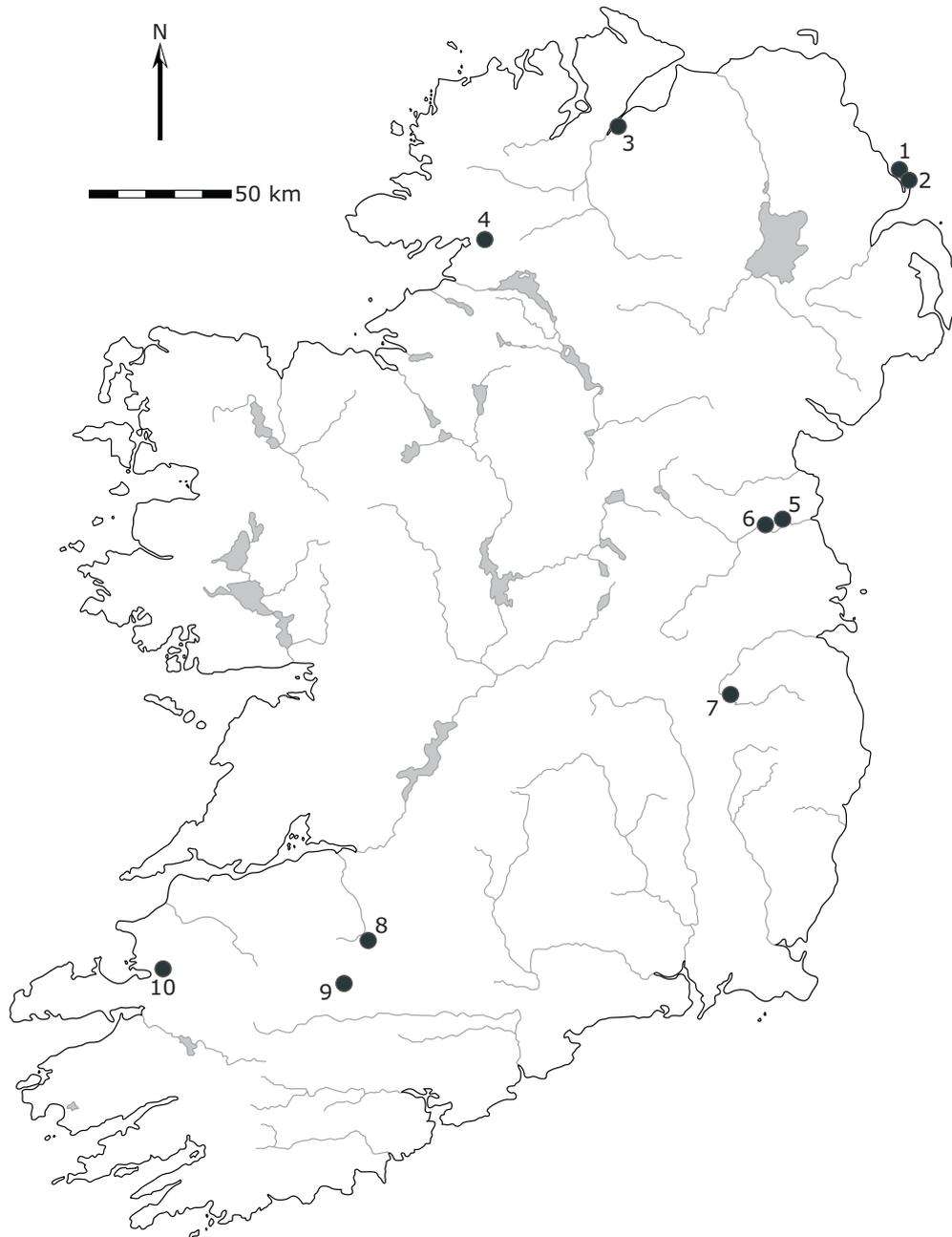
## **Where have the cereal remains been found?**

The sampling of archaeological deposits for ancient cereal remains became more common in Ireland from the 1970s, and well over 100 Neolithic sites have been excavated since this time. While studies of the morphology and architectural arrangement of Neolithic structures and enclosures have been published (for example Grogan 2002; Smyth 2006), evidence for the cereal remains recovered from these sites has rarely been fully published and is not well understood. A recent study carried out by Jones and Rowley-Conwy (2007, 396) identified 10 Neolithic sites in Ireland where cereal remains have been found (Illus. 3). Although cereal remains have been recorded from many more sites, the evidence is not easily accessible, mainly owing to a lack of publication. As a result, Ireland is often conspicuously absent from discussions relating to the earliest farmers in Europe. Where Ireland is referred to in general European studies, it is often mentioned as an adjunct to Britain, thereby linking production and consumption practices between these two areas. This is despite the fact that the general archaeological evidence for the Neolithic differs in many respects between Ireland and Britain (Cooney 2000).

The cereal remains from an Early Neolithic rectangular house at Tankardstown South, Co. Limerick (Gowen 1988; Monk 1988), are often interpreted as representing a typical assemblage from Neolithic Ireland. At Tankardstown South hundreds of wheat remains—including grains and chaff fragments—were found. Where identifiable to species, the wheat remains are thought to represent emmer wheat. There is no definite evidence for barley at Tankardstown South. This site is very often drawn upon when we talk about the ‘first farmers’, but is it representative of crop cultivation throughout Neolithic Ireland? In order to test this hypothesis, McClatchie (forthcoming) carried out a brief review of cereal remains from Neolithic Ireland, which incorporated evidence from recently excavated sites that have not yet been published. This resulted in evidence of cereal remains from a total of 24 sites, a significant increase compared with previous studies. While wheat was predominant at many sites, barley (often the naked variety) was also recorded at more than half of all sites, suggesting more variation in the cereal types being used than was previously assumed. Furthermore, the presence of cereals at a substantial range of site types highlights the potential for gaining a better understanding of the different ways that foods may have been prepared and consumed in different situations.

## **A new research project on Neolithic agriculture in Ireland**

McClatchie’s study was presented at a conference in 2007 entitled *Living Landscapes: exploring Neolithic Ireland and its wider context*. The conference—which was held at Queen’s University, Belfast, and sponsored by the NRA—brought together international researchers, including specialists in landscapes, plants, animals and other types of material remains, such as pottery. It highlighted a range of issues relating to early agriculture that needed further study, and a research project was formulated in order to address these issues. Commencing in June 2008 and entitled *Cultivating Societies: assessing the evidence for agriculture in Neolithic Ireland*, the project was funded by the Heritage Council under the 2008 Irish National Strategic Archaeological Research programme, or INSTAR. The project’s main aim is to explore the timing, nature and effects of the introduction of agriculture in Ireland, and to compare this evidence with other areas in Europe.



1 Island Magee, Co. Antrim; 2 Ballyharry, Co. Antrim; 3 Enagh, Co. Derry; 4 Drummenny Lower, Co. Donegal; 5 Townleyhall, Co. Louth; 6 Knowth, Co. Meath; 7 Corbally, Co. Kildare; 8 Tankardstown South, Co. Limerick; 9 Pepperhill, Co. Cork; 10 Cloghers, Co. Kerry.

*Illus. 3—Map of Ireland displaying 10 Neolithic sites mentioned by Jones & Rowley-Conwy (2007, 396) from which cereal remains were recovered (the authors).*

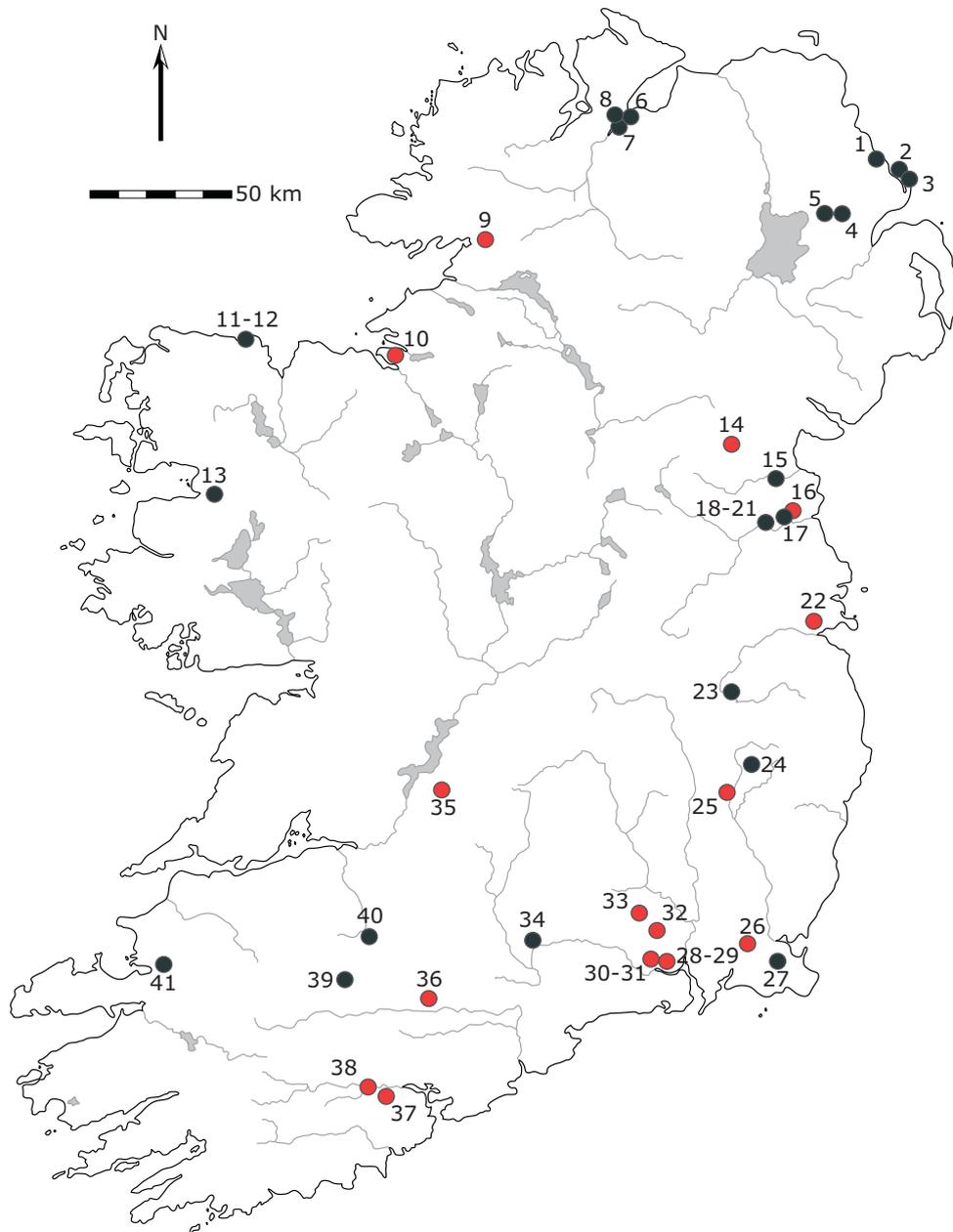
As part of the project, a comprehensive database is being established, recording the published and unpublished evidence for plant macro-remains in Neolithic Ireland (including cereal grains and chaff, nuts and nutshell, and weed and fruit seeds). Extensive radiocarbon dating of cereal remains is planned in order to establish the chronology of crop introduction and the spread of agriculture over the island. In terms of ancient farming practices, we will attempt to identify manuring and other management strategies. Manuring enriches the ratio of the heavier to the lighter stable isotope of nitrogen ( $\delta^{15}\text{N}$ ) in the soil, which is then taken up by crops and can be detected through the analysis of surviving cereal remains (Bogaard et al. 2007). This is an innovative approach—representing the first time that such a study will be carried out on Irish material of any date—and will also contribute towards a wider European project examining this issue (entitled *Crop stable isotope ratios: new approaches to palaeodietary and agricultural reconstruction* and led by Bogaard). Analysis of arable weeds found alongside the cereal grains will also provide complementary insights into the nature, appearance, sowing regimes and longevity of ancient fields.

Furthermore, the project aims to collate published mammal bone evidence, as well as dietary evidence from human bone analyses, primarily stable isotopes but also dental pathologies such as caries rates, which relate in part to the consumption of carbohydrates. A re-evaluation of the Irish palaeoecological record—especially pollen studies and dendrochronological evidence—is in the process of being undertaken to examine the environmental (including climatic), chronological and landscape context of Neolithic farming. Available Neolithic and later radiocarbon dates in Ireland have been collated and analysed to explore the timing and intensity of activities throughout this period (Barratt et al., in prep.). Finally, we aim to re-examine available archaeological evidence relating to settlement and landscapes in the context of the above analyses. An important aspect of the project is the integration of environmental and archaeological evidence, which we anticipate will provide clearer insights into ancient farming practices, the environmental context of farming and the structuring of activities during the Neolithic period.

A wide range of analyses and approaches are being employed in this project, which requires expertise from many different areas of archaeological and related practice. We have therefore established a large project team to tackle these issues, consisting of researchers from a range of different sectors in archaeology and palaeoecology (including the state sector, an archaeological consultancy, and a range of Irish and British institutions).

### **Initial results from the newly established project**

Since the project commenced, we have been collating evidence for cereal and other plant macro-remains from published and unpublished Neolithic archaeological excavations throughout Ireland. It has now been established that cereal remains have been recorded from a total of 41 sites of this period (Illus. 4), and this figure is likely to increase as work continues in tracking down unpublished data. It was previously noted that the most recent publication on this topic (Jones & Rowley-Conwy 2007) recorded cereal remains from only 10 Neolithic sites in Ireland; the new figure of 41 sites underlines the apparent widespread use of cereals in the past. A substantial number of these archaeological sites have been excavated in association with infrastructural projects carried out under the auspices of the NRA. As well as greatly increasing the number of known Neolithic houses and other



1 Ballygalley, Co. Antrim; 2 Island Magee, Co. Antrim; 3 Ballyharry, Co. Antrim; 4 Lyles Hill, Co. Antrim; 5 Donegore Hill, Co. Antrim; 6 Gransha, Co. Derry; 7 Enagh, Co. Derry; 8 Thornhill, Co. Derry; 9 Drummenny Lower, Co. Donegal; 10 Magheraboy, Co. Sligo; 11-12 (multi-phase) Ballyglass, Co. Mayo; 13 Gortaroe, Co. Mayo; 14 Monanny, Co. Monaghan; 15 Richardstown, Co. Louth; 16 Balgatheran, Co. Louth; 17 Townleyhall, Co. Louth; 18-21 (multi-phase) Knowth, Co. Meath; 22 Kilshane, Co. Dublin; 23 Corbally, Co. Kildare; 24 Baltinglass Hill, Co. Wicklow; 25 Russellstown, Co. Carlow; 26 Harristown Big, Co. Wexford; 27 Kerloge, Co. Wexford; 28-29 Newrath, Co. Kilkenny; 30-31 Granny, Co. Kilkenny; 32 Earlsrath, Co. Kilkenny; 33 Kilkeasy Co. Kilkenny; 34 Marlfield, Co. Tipperary; 35 Tullahedy, Co. Tipperary; 36 Gortore, Co. Cork; 37 Ballinaspig More, Co. Cork; 38 Barnagore, Co. Cork; 39 Pepperhill, Co. Cork; 40 Tankardstown South, Co. Limerick; 41 Cloghers, Co. Kerry.

*Illus. 4—Map of Ireland displaying 41 Neolithic sites from which cereal remains were recovered. Sites excavated under the auspices of the NRA are marked in red (the authors).*

settlement evidence, these NRA excavations have also uncovered more unusual sites, such as a causewayed enclosure at Magheraboy, Co. Sligo (MacDonagh 2005, 17–20; Danaher 2007, 89–127), and a possible causewayed enclosure at Kilshane, Co. Dublin, interpreted as a henge by the excavator (FitzGerald 2006, 33–5; Danaher 2007, 121). Analysis of remains from such a wide range of site types will enable an improved understanding of how cereals were used in a variety of circumstances. Work is ongoing and initial results from this and other aspects of the project are being prepared for publication (Whitehouse et al., in prep.).

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