Journal of Archaeological Science xxx (2013) 1–25

Contents lists available at ScienceDirect

Journal of Archaeological Science

journal homepage: http://www.elsevier.com/locate/jas

Neolithic agriculture on the European western frontier: the boom and bust of early farming in Ireland

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ARTICLE INFO

Article history:
Received 9 September 2012
Received in revised form
4 August 2013
Accepted 7 August 2013

Keywords:
Neolithic Ireland & Britain
Early agriculture
Archaeobotany
Pollen
Palaeoecology
C14 dating
Bayesian chronologies
Neolithic rectangular houses
Neolithic settlement
Elm Decline
Plantago lanceolata
Neolithic environmental change
Human adaptation & resilience

ABSTRACT

A multi-disciplinary study assessing the evidence for agriculture in Neolithic Ireland is presented, examining the timing, extent and nature of settlement and farming. Bayesian analyses of palaeoenvironmental and archaeological ^{14}C data have allowed us to re-examine evidential strands within a strong chronological framework. While the nature and timing of the very beginning of the Neolithic in Ireland is still debated, our results – based on new Bayesian chronologies of plant macro-remains – are consistent with a rapid and abrupt transition to agriculture from c. 3750 cal BC, though there are hints of earlier Neolithic presence at a number of sites. We have emphatically confirmed the start of extensive Neolithic settlement in Ireland with the existence of a distinct 'house horizon', dating to *3720–3620 cal BC*, lasting for up to a century. Cereals were being consumed at many sites during this period, with emmer wheat dominant, but also barley (naked and hulled), as well as occasional evidence for einkorn wheat, naked wheat and flax. The earliest farmers in Ireland, like farmers elsewhere across NW Europe, were not engaged in shifting cultivation, but practised longer-term fixed-plot agriculture. The association between early agriculture and the Elm Decline seen in many pollen diagrams shows that this latter event was not synchronous across all sites investigated, starting earlier in the north compared with the west, but that there is a strong coincidence with early agriculture at many sites. After this early boom, there are changes in the nature of settlement records; aside from passage tombs, the evidence for activity between 3400 and 3100 cal BC is limited. From 3400 cal BC, we see a decrease in the frequency of cereal evidence and an increase in some wild resources (e.g. fruits, but not nuts, in the records), alongside evidence for re-afforestation in pollen diagrams (3500–3000 cal BC). Changes occur at a time of worsening climatic conditions, as shown in Irish bog oak and reconstructed bog surface wetness records, although the links between the various records, and assessment of causes and effects, will require further investigation and may prove complex. This period seems to have been one of environmental, landscape, settlement and economic change. The later 4th millennium BC emerges as a period that would benefit from focused research attention, particularly as the observed changes in Ireland seem to have parallels in Britain and further afield.

1. Introduction

How did farming practices evolve and develop over the course of the Neolithic and what were their associated landscape contexts and impacts? How did the nature of settlement develop? What was the environmental and climatic backdrop to this period? These are some of the questions we set out to address with reference to Neolithic Ireland. We define the 'Neolithic' in Ireland

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0305-4403/$ – see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.jas.2013.08.009

as a subsistence economy dominated by domestic plants and animals (Zvelebil and Rowley-Conwy, 1984), alongside the presence of pottery, polished stone and flint axes, rectangular structures and monumental architecture.

The origins and spread of Neolithic agriculture in Europe, and its associated societal impacts continue to remain a major focus in world archaeology. This period is one of the most important transitions in human history and is defined by profound cultural, socioeconomic and technological changes that initiated significant effects on the wider environment and its associated ecosystems and biota, leading to major anthropogenic changes in land cover and use (Kaplan et al. 2010). On the western fringes of Europe, Ireland is often absent from discussions of Neolithic archaeology, except as a subsidiary to British research (but see Cooney et al. 2011 for recent advances). Distinct differences in the Neolithic archaeology of Britain and Ireland have been demonstrated (cf. Cooney, 2000; Bradley, 2007), although they are, clearly, not unconnected. Some British researchers have emphasized continuity in both settlement and economy from the Mesolithic to the Neolithic (Thomas, 1999, 2004, 2008; cf. Hodder, 1990), whilst others have advocated a rapid shift towards domesticated resources coincident with the abrupt appearance of distinct Neolithic material culture and practices (Richards et al. 2003; Rowley-Conwy, 2004, 2011; Jones and Rowley-Conwy, 2007), perhaps associated with 'colonising farmers' (*cf.* Childe, 1936; Collard et al. 2010). Crop husbandry practices in Early Neolithic Britain suggest the permanent and intensive nature of cultivation (Bogaard and Jones, 2007), parallelling results from the Continent (Bogaard, 2004; Kreuz et al. 2005). The evidence emerging from many parts of Europe suggests a 'settled' Neolithic, but it has been unclear where Ireland fits into this wider European context.

While there has been much debate about the mechanisms associated with the transition to early agriculture (e.g. Thomas, 1999, 2008; Sheridan, 2004, 2007), there has been less emphasis on what happened after this event. What were the situations in which crops and animals were consumed and deposited, and did these change over the course of the Neolithic? In Ireland, we know that the main crops were emmer, einkorn wheat and barley (Monk, 2000), but we know little about their relative importance, production methods and intensity of cultivation, and variation in crops through space and time.

The Irish pollen record is abundant and regionally diverse, providing an opportunity to examine the wider landscape context of this period. Despite a long tradition of Irish palaeoecology, these records, as elsewhere, have seldom been explored in tandem with plant and animal economic data, an essential linkage if we are to fully understand the nature of Neolithic farming. Parker-Pearson (2003, 1) has rightly highlighted that environmental archaeologists have been reluctant to step out of their specialisms to provide over-arching narratives that attempt to marry a range of proxy data from a diverse range of environmental sub-disciplines. The integration of these records with other aspects of the archaeological record provides an opportunity to investigate the creation, appearance and local perceptions of Neolithic landscapes. Precise chronological control is key to integrating these records; recent developments using Bayesian approaches offer potential for such lines of enquiry at human time-scales (e.g. Buck et al. 1994, 1996; Bronk Ramsey, 2009a,b). These records allow us to focus on the *pathways* of early farming during this period, rather than on the vexed question of the origins and introduction of agriculture and the role of migration versus indigenous acculturation. Whilst of central importance to the Neolithic, this focus on origins has drawn attention away from the centuries following the initial appearance of farming and the changing nature of the economic, archaeological and landscape record, as groups settled into new subsistence economies.

The aim of this contribution is to discuss the findings of a major research programme funded by the Heritage Council, Republic of Ireland (2008–2010). The project was concerned with examining the extent and nature of Neolithic farming in Ireland by drawing upon unpublished and published data from the private, state and academic sectors. A particular focus was the collection of data emanating from the 'grey' and unpublished literature associated with archaeobotanical and palaeoecological data, within the context of a ^{14}C dating programme and Bayesian re-evaluation of existing chronological data from archaeological and palaeoecological sites. Regrettably, there is a limited faunal record for this period, although we have considered these data where possible. We have examined the relationships between plant economies, environment, landscape and settlement against their wider palaeoenvironmental (including climatic) backdrop.

1.1. Existing state of knowledge

Ireland has produced the earliest evidence for the presence of reportedly domesticated animals for the islands of Ireland and Britain, from Ferriter's Cove, Co. Kerry (Fig. 1), where cattle bone is directly dated to 4450–4270 cal BC (5510 ± 70 BP, OxA-3869) (Woodman et al. 1999). Its presence suggests the possibility of an

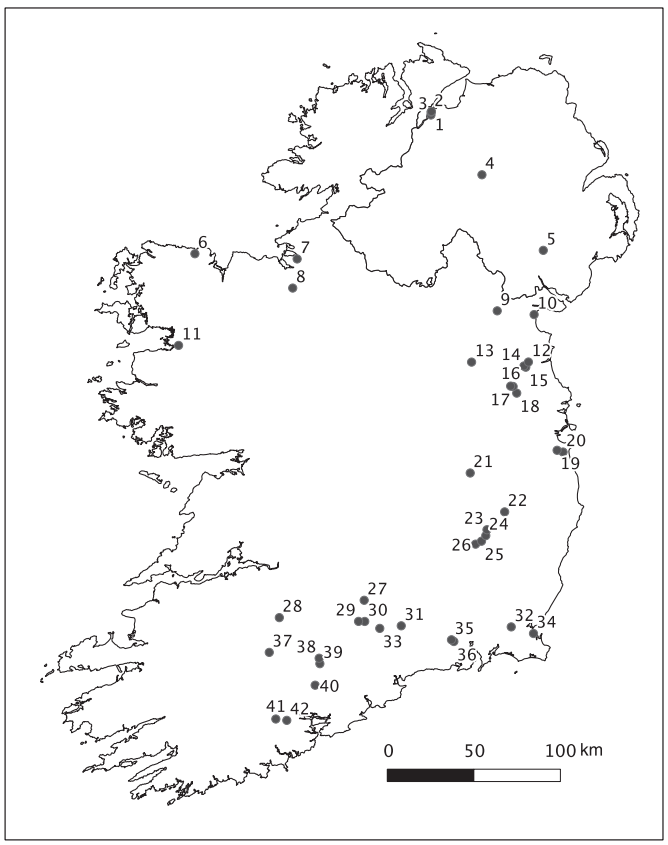

Fig. 1. Location map of archaeological sites mentioned in the text; palaeoecological sites are shown in Fig. 15. Key to sites: 1. Enagh, 2. Gransha, 3. Caw, 4. Ballynagilly, 5. Ballintaggart, 6. Ballyglass, 7. Magheraboy, 8. Rathdooney Beg, 9. Monanny, 10. Haggardstown, 11. Gortaroe, 12. Townleyhall, 13. Drumbaragh, 14. Knowth, 15. Newgrange, 16. Castletown Tara, 17. Lismullin, 18. Clowanstown, 19. Kilgobbin, 20. Carrickmines Great, 21. Cherryville, 22. Pinnacle, Coolinarrig Upper and Tuckmill Hill, 23. Russellstown, 24. Busherstown, 25. Tinryland, 26. Ballybannon, 27. Lough Feedora, 28. Tankardstown South, 29. Caherabbey Upper, 30. Suttonrath, 31. Kilsheelan, Poulakerry and Cloghcarigeen East, 32. Harristown Big, 33. Marlfield, 34. Kerloge, 35. Granny, 36. Newrath, 37. Pepperhill, 38. Ballinglanna North, 39. Gortore, 40. Curraghprevin, 41. Barnagore, 42. Ballinaspig More.

Please cite this article in press as: Whitehouse, N.J., et al., Neolithic agriculture on the European western frontier: the boom and bust of early farming in Ireland, Journal of Archaeological Science (2013), http://dx.doi.org/10.1016/j.jas.2013.08.009