Regional variation in the use of the earliest pottery in North-western Europe: organic residue analysis of Swifterbant pottery (5000 - 4000 cal. BC)
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CHAPTER 1

Introduction

Pottery is one of the oldest human inventions that have been used worldwide from prehistoric times to the present for various utilitarian or non-utilitarian purposes, including storage, transportation of goods, processing and/or cooking (Rice 1987). Due to its low susceptibility to degradation (Schneider 2016), pottery is usually the best-preserved and the most common type of artefact found in archaeological contexts. Whilst its morphological and technological characteristics have traditionally been used to construct general chronologies between different cultures (Jordan and Zvelebil 2009; Damm 2012), studies on its possible use and importance have been providing information on the everyday lives of past cultures, human subsistence as well as culinary practices (Stilborg et al. 2002).

Pottery technology was initially thought to be a central component of the Neolithic package, first made by settled early farming communities in the Near East. It had been accepted as part of the cultural trait that was introduced, developed and spread together with agriculture and more sedentary lifestyle. However, this assumption has been discredited as the earlier examples of pottery, dating between 20,000 and 12,000 years cal BC, from Late Pleistocene mobile or semimobile hunter-gatherer contexts across northern Eurasia, in particular from East Asia - South China, Japan, and the Russian Far East, were abundantly discovered (Galili et al. 2002; Kubo 2004; Dolukhanov et al. 2005; Jordan and Zvelebil 2009; Wu et al. 2012; Craig et al. 2013; Hommel 2014; Jordan et al. 2016; Kuzmin 2017; Hommel, 2018). On the basis of evidence from these areas, it is now widely accepted that pottery production precedes the introduction of farming and has been abundantly present in the hunter-gatherer societies extending beyond Europe and the Near East.

The discussion on origins, adoption and dispersal of pottery in the hunter-gatherer societies have occupied a central place in archaeological debate for over a century as several regional case studies focusing on East Asia, North Africa, the Americas as well as Northern Europe have explored the emergence and dispersal of pottery technology (Bakels 2009; Hauzeur 2009; Piezonka et al. 2011; Oras et al. 2017; Lucquin et al. 2018; Bondetti et al. 2019, 2020; Kherbouche et al. 2016; Morisaki 2020; Admiraal et al. 2020)

As the invention of pottery introduced fundamental shifts in cooking practices and human subsistence, understanding the use of pottery in the hunter-gatherer contexts is required to understand the motivation of innovation and/or adoption of this new material culture into hunter-gatherer societies. Indeed, several studies have focused on the functional analyses of hunter-gatherer as well as early farmer pottery in Northern Europe to understand the reason behind adoption of, its use and its relationship to changing
subsistence strategies through time (Zvelebil & Dolukhanov 1991; Craig et al., 2007, 2011; Cramp et al. 2014; Povlsen, 2014; Robson 2015; Robson et al. 2018; Cubas 2019; Courel et al. 2020). Although, hunter-gatherer pottery in Northern Europe have been studied extensively, there has been a gap in terms of extensive and detailed research on pottery function of Swifterbant culture and its relation to neighbouring cultures, both hunter-gatherers and early farmers.

Swifterbant culture (c. 5000-4000/3400 cal BC) is a hunter-gatherer-fisher society located between the Scheldt valley (Belgium) and Lake Dümmer (Lower Saxony, Germany) (Raemaekers 1999; Amkreutz 2013). The research area of this thesis specifically focuses on the Swifterbant culture located in the Dutch Wetlands. In this region, pottery production was invented or adopted by the hunter-gatherer communities of Swifterbant culture from c. 5000 cal BC (Peeters 2010; Raemaekers 2011). The first evidence for the introduction of domesticated animals and cereals do not appear in the sequence until ca. 4500 and 4300 cal BC, respectively (Cappers & Raemaekers 2008; Out 2008; Çakırlar et al. 2020).

Unlike most other parts of Europe, the transition to farming in the Dutch Wetlands which started prior to that of neighbouring areas in northwest Europe, e.g. the British Isles and southern Scandinavia (e.g. Zvelebil & Rowley-Conwy 1986; Richards & Hedges 1999; Shennan 2018) did not necessarily lead to large-scale changes in material culture or economic practices in the Swifterbant culture. The data from the Swifterbant culture demonstrates a continuation of hunter-gatherer subsistence strategies alongside a gradual shift towards agricultural cultivation and domestic food production.

Studies on adoption of early pottery and its use suggest that although cooking was the primary technofunctional driver for pottery adaptation in the hunter-gatherer societies, the contents of these early pottery indicate substantial differences in the use of pottery which cannot be just explained by the subsistence economies and resource availability (e.g. Courel et al. 2020). This further indicate different processes and motives for the uptake of pottery. In the light of these, understanding the function of Swifterbant pottery and its relationship to subsistence strategies through the Neolithisation process in the Dutch Wetlands is necessary to further develop knowledge about what ceramics in this region were used for, and whether intra- and/or inter-regional variations occurred contributing to the previous discussions.

**Aims and objectives**

This thesis aims to examine the ceramic tradition of Swifterbant culture, by specifically establishing a well-illustrated functional classification of its pottery in attempt to investigate culture-specific responses towards regional resources. What was the function of Swifterbant pottery? Why was the drive behind its adoption into the culture? Was there any functional variation between the use of Swifterbant pottery?
To answer these main research questions, this study focused on several objectives. These are: 1) to investigate the research context and review existing literature on Swifterbant pottery to provide general information on the pottery tradition, its chronology, its distribution area, and the previous debates on its function; 2) Produce a new and extended dataset through lipid residue analysis to determine the pottery function and illustrate any possible functional variation across the Mesolithic-Neolithic transition in the Dutch Wetlands; and 3) to form a comparative discussion around the Swifterbant dataset specifically produced for this study and the late Ertebølle and early Funnel Beaker datasets to expand our understanding on regional differences of pottery use and its relationship to subsistence strategies through time in Northern Europe.

These objectives were addressed through a systematic application of lipid residue analysis of the pottery remains from eight archaeological sites in three different regions of Northwest European Lowlands dating to the 5th and early 4th millennium BC (Fig. 1). The findings are presented as four journal papers of which two are published, one accepted for publication and one drafted.

**Thesis structure**

This study starts with providing an overview on Swifterbant, Ertebølle, and Funnel Beaker pottery traditions as well as detailed explanation of the method of lipid residue analysis on ancient pottery (chapter 2).

The following three chapters form the three main case-studies of this study. The study of pottery use in the Swifterbant culture was approached through these three separate case studies, each focusing on different regions in North-western Europe (Fig. 1). In the first case-study (chapter 3), function of Swifterbant pottery from the three main Swifterbant type sites, S2, S3, and S4 (ca. 4300–4000 BC), in Oostelijk Flevoland, the Netherlands, was investigated through lipid residue analysis. The main aim is to understand the role of pottery in terms of its relation to hunter-gatherer-fisher lifestyle, and the change in available food resources brought about by the arrival of domesticated animal and plant products. For this study, a total of 62 sherds were sampled and subjected to lipid residue analysis. Results were published in the *Journal of Archaeological and Anthropological Sciences* under the title of *First lipid residue analysis of Early Neolithic pottery from Swifterbant (the Netherlands, ca. 4300–4000 BC).*

The second case-study (chapter 4) focuses on the functional analysis of Swifterbant pottery (c. 5000–3800 cal BC) from sites Hardinxveld-Giessendam Polderweg, Hardinxveld-Giessendam De Bruin, Brandwijk-het Kerkhof and Hazendonk in the Lower Rhine-Meuse area, the Netherlands. It aims to examine pottery use across the transition to agriculture and aims to assess temporal changes in human-animal relations during the 5th millennium BC in the Lower Rhine-Meuse area through lipid residue analysis. For this study, a total of 49 sherds were sampled and subjected to lipid residue analysis. Results
were published in the *Journal of Archaeological Science: Reports* under the title of *Lipid residue analysis on Swifterbant pottery (c. 5000–3800 cal BC) in the Lower Rhine-Meuse area (the Netherlands) and its implications for human-animal interactions in relation to the Neolithisation process.*

**Fig. 1** Location of the studied archaeological sites: Swifterbant type sites S2, S3, and S4; Polderweg, De Bruin, Brandwijk, and Hazendonk in the Lower Rhine-Meuse area; and Hüde I in the Lower Saxony. Insert map showing the location of research area in relation to Europe

The third case-study (chapter 5) was designed as a pilot study aiming to question the use and function of the pots from Hüde I (4700-3500 cal BC), in Lower Saxony, Germany, while contributing to the discussion of the Mesolithic-Neolithic transition in Northern Europe. Due to its crucial position and its long occupation span in between the hunter-gatherer and farming communities, Hüde I has a key role in in reference to the transition from the Ertebølle culture to the Funnel Beaker culture in Southern Scandinavia and Northern Germany, but also in reference to the Swifterbant culture chronology that
spans the Mesolithic-Neolithic transition. For this study, a total of 35 sherds were sampled and analysed through lipid residue analysis. Results were accepted for publication in *Stone Age Borderland Experience. Mesolithic and Neolithic Parallel Societies in the North European Plain* (forthcoming), edited by Florian Klimscha, Marion Heumüller, Daan Raemaekers, Hans Peters and Thomas Terberger.

Chapter 6 of this study brings the entire Swifterbant dataset produced for this study together and compares it with late Ertebølle and early Funnel Beaker datasets with the aim of completing a diachronic comparison of pottery use across inland sites in the Dutch wetlands and Southern Scandinavia that encompasses the transition to farming. By comparing ceramic traditions, pottery use, animal bone assemblages and stable isotope data from human bones, this concluding chapter aims to answer two main questions: (1) Did Late Mesolithic foragers of Southern Scandinavia and the Dutch wetlands have similar uses of pottery? and (2) How did Late Mesolithic foragers respond to the arrival of farming? Results that are presented in this paper is in the preparation for submission to *Journal of Anthropological Archaeology* in the very near future.

Finally, the last chapter (Chapter 7) presents the overall conclusions on the functional analysis of Swifterbant pottery by providing an overview of the most important results of this study together with some implications for further research on Swifterbant pottery.

**References**


