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Analecta Praehistorica Leidensia 40 / Between foraging and farming : an extended broad spectrum of papers presented to Leendert Louwe Kooijmans

Fokkens, Harry; Coles, Bryony; Gijn, Annelou van; Kleijne, Jos; Ponjee, Hedwig; Slappendel, Corijanne et al.; Fokkens, Harry; Coles, Bryony; Gijn, Annelou van; Kleijne, Jos; Ponjee, Hedwig; Slappendel, Corijanne

Citation

Fokkens, H. ; C. , B. ; G. , A. van; K. , J. ; P. , H. ; S. , C. et al. (2008). Analecta Praehistorica Leidensia 40 / Between foraging and farming : an extended broad spectrum of papers presented to Leendert Louwe Kooijmans. Retrieved from <https://hdl.handle.net/1887/32994>

Version: Not Applicable (or Unknown)

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Note: To cite this publication please use the final published version (if applicable).

ANALECTA PRAEHISTORICA LEIDENSIA

40

This article appeared in:

PUBLICATION OF THE FACULTY OF ARCHAEOLOGY
LEIDEN UNIVERSITY

BETWEEN FORAGING AND FARMING

AN EXTENDED BROAD SPECTRUM OF PAPERS
PRESENTED TO LEENDERT LOUWE KOOIJMANS

EDITED BY

HARRY FOKKENS, BRYONY J. COLES, ANNELOU L. VAN GIJN,
JOS P. KLEIJNE, HEDWIG H. PONJEE AND CORIJANNE G. SLAPPENDEL



LEIDEN UNIVERSITY 2008

Series editors: Corrie Bakels / Hans Kamermans

Copy editors of this volume: Harry Fokkens, Bryony Coles, Annelou van Gijn,
Jos Kleijne, Hedwig Ponjee and Corijanne Slappendel

Editors of illustrations: Harry Fokkens, Medy Oberendorff and Karsten Wentink

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ISSN 0169-7447

ISBN 978-90-73368-23-1

Subscriptions to the series *Analecta Praehistorica Leidensia*
and single volumes can be ordered exclusively at:

Faculty of Archaeology
P.O. Box 9515
NL-2300 RA Leiden
The Netherlands

A southern view on north-south interaction during the Mesolithic-Neolithic transition in the Lower Rhine Area

Bart Vanmontfort

8.1 INTRODUCTION

During the past few decades, the neolithisation process in Europe has been recognised not to be a single and large scale process, but rather a mosaic of multiple regional processes (e.g. Tringham 2000; Whittle/Cummings 2007). In the wetlands of the Lower Rhine Area, recent data has yielded new insights in the nature of the process. It has become clear that the successors of the local Late Mesolithic gradually adopted typically Neolithic elements, and the entire process of *extending the broad spectrum economy*, as discussed by Leendert Louwe Kooijmans in 1993, first with pottery, and only later with domestic stock and cereals, spanned a period of at least a millennium. Still within the Lower Rhine Area (LRA), the loess region presents a different case to the wetlands. Here, after its first appearance the Neolithic displays several hiatuses, one of which occurs at around the mid 5th millennium cal BC (Vanmontfort 2007). This hiatus has been claimed to be merely one in knowledge, rather than corresponding to an actual lack of occupation, but whichever it was, the processes at work during this phase seem to have been crucial for the neolithisation of the region (*ibid.*). Until more evidence is uncovered, the gap can only be filled by indirect arguments, such as the one to be developed in this paper.

The indirect way taken here to approach the problem, and to confirm continuity in human activity in the southern LRA, is through the exploration of interregional exchange. First, I will outline the geographical and chronological context, followed by an introduction to the evidence for exchange, before a more detailed consideration of the changing patterns from before the arrival of farmers, through their arrival and the hiatus, to the time when neolithisation can be said to have occurred. In this way, the particular local character of the neolithisation process will, it is hoped, be revealed.

8.2 THE LOWER RHINE AREA

The Lower Rhine Area as defined here encompasses the Lower Rhine basin as well as parts of the Scheldt and Meuse basins and the westernmost extension of the North European Plain (fig. 8.1). It is an area characterised by important differences in physiography and consequently also in the nature and resolution of the archaeological data. Three physiographic

regions can be distinguished: the Holocene wetlands in the north and west, the hilly, loamy region of the loess belt in the south, and the flat coversand area in between. The boundaries between those regions are not abrupt: wetlands extend into the coversand region and even into the loess region in the form of floodplains, and the coversand and loess regions are connected through a substantial intermediate sandloamy region.

Different taphonomic and post-depositional processes are at work in these regions and result in contrasting archaeological records. By far the most complete picture is derived from the wetlands. Progressive deposition of Holocene alluvial and marine deposits makes the sites in this region difficult to identify, and research at those sites costly, but the data from the fairly low number of investigated sites is of a high resolution. Parts of these sites are well stratified and yield large quantities of secondary refuse (*sensu* Schiffer 1987, 47 ff.) in primary context, and the stone and pottery artefacts are associated with large amounts of organic remains, yielding important ecological data. Less information is known from the coversand and loess regions.

In the flat coversand region the surface has remained relatively undisturbed since the beginning of the Holocene period. As people repeatedly visited the same locations throughout the Mesolithic period, this resulted in the creation of enormous palimpsests of occupation debris and very few single occupation sites. Organic matter is generally not preserved. Charcoal and charred hazelnut shells are found intermingled with the artefacts, but the palimpsest situation often makes it difficult to reliably connect them with particular occupation remains.

The loess region presents a different problem again. Its more pronounced relief and more intense agricultural history has resulted in a significant amount of erosion and related footslope sedimentation. These processes progressively increased with the introduction of new agricultural techniques and the spatial extension of agriculture from the Neolithic onwards, especially since the early 20th century. Mesolithic sites, with generally only 'surface remains' and no features dug into the ground, are easily washed away or covered, while shallow features at Neolithic sites are often severely affected by the soil loss. Moreover, the acidity of

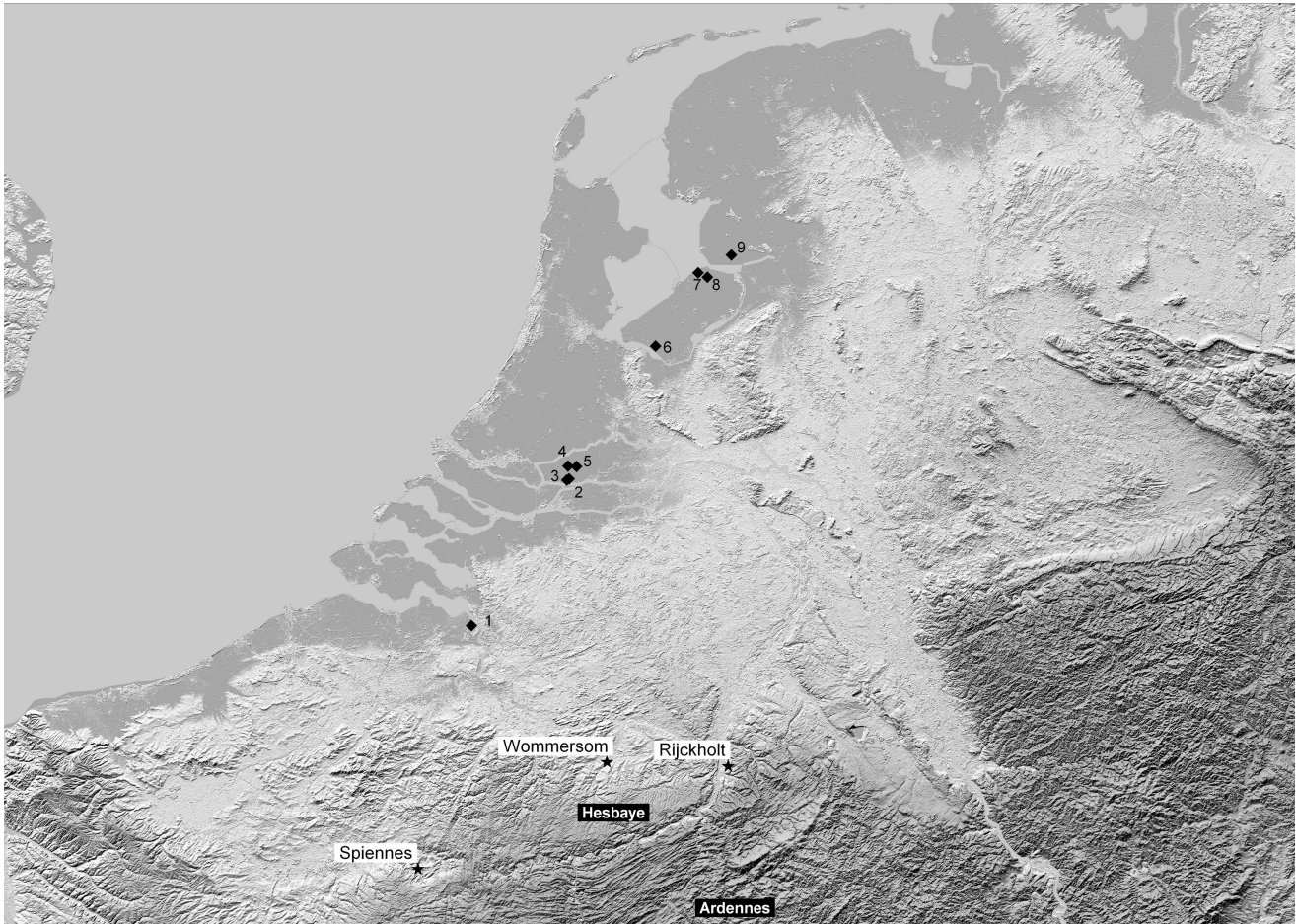


Figure 8.1 Map of the Lower Rhine Area with sites mentioned in the text.

- | | |
|------------------------------------|------------------|
| 1 Doel Deurganckdok | 6 Hoge Vaart A27 |
| 2 Hardinxveld-Giessendam Polderweg | 7 Swifterbant S2 |
| 3 Hardinxveld-Giessendam De Bruin | 8 Swifterbant S3 |
| 4 Brandwijk Het Kerkhof | 9 Schokland P14 |
| 5 Hazendonk | |

these loam soils does not allow for the preservation of organic remains, apart from charred macrobotanical remains.

Apart from these different processes at work and the variable resolution of the image derived from the archaeological data, the ecological conditions in these regions resulted in diverse human behaviour in the past, even in different worlds (Louwe Kooijmans 2006, fig. 27.15; Raemaekers 1999). Traditionally, the Neolithic in the south of the LRA has been regarded as a phenomenon of Central European origin without much hunter-gatherer influence, while in the north demographic continuity is more evident and the Neolithic is viewed as a local phenomenon.

In the wetland region of the north and west, the role of the Swifterbant culture in the transition process has become

much more tangible in the last decade (Crombé *et al.* 2002; Crombé/Vanmontfort 2007; De Roever 2004; Louwe Kooijmans 2007; Peeters 2007; Raemaekers 1999; Sergant *et al.* 2006). In its origins very much a Final Mesolithic phenomenon, it gradually adopted elements typically associated with the Neolithic and extended its broad spectrum economy (Louwe Kooijmans 1993). Starting with the introduction of pottery around 5000 cal BC, domestic stock and cereals followed respectively a few centuries and a millennium later (Van Gijn/Louwe Kooijmans 2005a).

The situation is less clear in the neighbouring coversand region, from which a large number of Mesolithic sites are known but informative Early Neolithic sites are absent. The particular taphonomic processes in this region, namely the

palimpsests, are responsible for the absence of unambiguous associations of Mesolithic and Neolithic elements (Amkreutz *et al.* forthcoming) and for the difficulties in dating and characterising the final Mesolithic occupation of the region (*e.g.* Crombé *et al.* 1999; Vermeersch 2006). Crombé *et al.* have shown that the Swifterbant extended at least to the Lower Scheldt and perhaps even more to the south (Crombé/Sergant, this volume; Crombé *et al.* 2005; 2002). Here on the coversand, the gradual uptake of Neolithic elements is most likely also the basis of the neolithisation process. As in the northern Swifterbant regions, however, it remains a question as to how far these Swifterbant communities ventured on the coversand regions, and to what extent groups other than Swifterbant populated these environments.

This leaves a chronological hiatus between the 6th millennium cal BC Late Mesolithic and the Neolithic sites of the 4th millennium cal BC in much of the coversand region.

In the southern loess region, a Mesolithic presence is mainly attested by small surface scatters or isolated microliths. This exploitation can be visualised spatially and chronologically (Vanmontfort forthcoming), but it remains difficult to link the evolution with the Mesolithic-Neolithic transition. This is also due to the discontinuity, in the middle of the 5th millennium cal BC, in the Neolithic culture history of the region. The first farmers of the Linearbandkeramik culture (LBK) and their successors of the Blicquy/Villeneuve-Saint-Germain culture (BQY-VSG) were not immediately succeeded by any other known Neolithic tradition. In the eastern part of the LRA, remains of the Rössen culture connect the LBK and Michelsberg culture (see also Bakels, this volume) and to the southwest of the LRA the Cerny culture fills that space. Neither Rössen nor Cerny sites have been reported, however, from the south-western part of the LRA (Crombé/Vanmontfort 2007). Archaeological data for the presence of farming groups only reappears at the end of the 5th millennium, after a gap of *c.* 500 years (Vanmontfort 2007).

It is unlikely that the chronological and spatial gaps in the coversand and loess regions correspond to an actual lack of occupation, as the particular taphonomy of these specific regions can be invoked to explain the absence of data. The hiatuses are thus more likely to correspond to gaps in present-day knowledge. Unfortunately, the key to understand the neolithisation process in these regions lies within this chronological and spatial gap (Vanmontfort 2007). The Middle Neolithic occupation of the region, after the hiatus, may have been the result of a second influx of Neolithic (Early Michelsberg) communities from the northern Paris Basin (Jeunesse *et al.* 2003), but current ideas, developed on the basis of stylistic analysis of Ch/MK remains and on the spatial distribution of Late Mesolithic, Early and Middle Neolithic sites, suggest a local development of the Middle

Neolithic on top of a native, Mesolithic-rooted substratum (Vanmontfort 2007).

Another way to confirm human activity in the southern LRA during the above-mentioned hiatus and eventually to determine the processes at work during those phases, is through scrutiny of the indications for exchange relations with the southern LRA in neighbouring regions. In contrast to the coversand region where particular artefact associations are often difficult to confirm, the wetlands north of the Scheldt basin seem particularly apt to such an approach. First of all, stone raw material was virtually absent in this region and had to be imported (Louwe Kooijmans 2006; Van Gijn/Louwe Kooijmans 2005b). Second, the resolution of the data allows a detailed recording of exchange indications. Thirdly, the existence of contact lines to the south from these regions has been observed at a number of occasions, on sites dated from the Late Mesolithic (Louwe Kooijmans 2003) to the Late Middle Neolithic (Louwe Kooijmans 2006). This is especially the case for sites of the Dutch River Delta, while sites located more to the north seem to have been orientated to the northern hinterland (*e.g.* Beuker 2005; Raemaekers 1999). Finally, during the hiatus on the coversand and loess, the wetlands are characterised by cultural continuity. Therefore, this paper focuses on the artefacts of southern origin that were found in Swifterbant contexts, mainly in the Dutch River Delta. The ultimate aim of this method is to approach the study of changes in human activity in the southern LRA on the basis of variations in the observed exchange networks of the broader region.

8.3 INTERPRETING THE MOVEMENT OF GOODS

Identifying the nature of the exchange system behind artefact distribution patterns is impeded by several factors. First, the archaeological record is biased by taphonomic and (post-) depositional processes. In particular, objects in perishable materials will have been part of an exchange system (Zvebil 1998), but are rarely preserved. Most archaeological indicators for interaction are imperishable, artefacts such as stone and pottery, or consist of more indirect elements such as stylistic influences on locally produced artefacts. Moreover, the way these artefacts entered the archaeological record depends upon their life-cycle and the value placed on them after exchange. Prestigious items, for instance, can only rarely be expected in domestic waste context.

Secondly, pinpointing the raw material sources is rarely possible. For the Lower Rhine Area, exchanged raw materials include flint and stone types that occur in primary position in the southern loess or Ardennes regions. Some of those raw materials, however, can also be found in secondary position more to the north and closer to the Swifterbant sites of the Dutch river district, in Meuse terrace gravels (*e.g.* Van Gijn/Houkes 2001). Rijckholt and grey Hesbaye flint (also known

as grey Belgian flint) are also difficult to pinpoint to source, but their origin in the southern LRA seems beyond any doubt. The source of Wommersom sandstone or quartzite can be pinpointed to a single known outcrop in the Kleine Gete river basin near the present-day town of Tienen. Thirdly, the question may be raised as to what extent a single artefact or a mere handful can prove the existence of exchange and trade or illuminate the behavioural context of the exchange. As Peeters (2007, 198) rightly states, these artefacts confirm the transport of raw materials, but rarely shed a light on how they entered the archaeological record.

In an attempt to provide a framework for the analysis of exchange relationships, Zvelebil (2006) distinguishes between three spatial levels of exchange predominantly associated with particular modes of procurement or exchange: a regional level that is predominantly characterised by direct procurement of non-exotic utilitarian items of which the circulation is difficult to identify archaeologically, an inter-regional level with distances between 100 and 300 km and with socially contextualised exchange between reciprocal partners and, finally, a long-distance level over vast distances with specialised trade dominated by an elite or specialised traders. Within this framework, the modes of distribution are likely to be reflected in the quantities and dimensions of the artefacts and the distance and distribution pattern relative to the source (Louwe Kooijmans 2006), evidently taking into account the possible ways of transport (cf. Louwe Kooijmans/Verhart 2007). Other elements to be involved in the argument are the archaeologically deduced social boundaries, the nature of the item and the spatial expression of its *chaîne opératoire* (Bergsvik/Bruen 2003; Fischer 2003a;b). The combination of these elements can suggest whether artefacts reached a particular site as the result of direct procurement or of exchange. Unfortunately, even within this framework, it often remains difficult to distinguish between direct procurement or robbing and exchange, be it personalised exchange, down-the-line contact or specialised trade (Fischer 2003a; Verhart/Wansleben 1997; Verhart 2000a).

Nevertheless, while accepting the difficulties in identifying the individual process at work in the movement of a particular artefact, in this paper the available data will be examined and interpreted within the above-mentioned framework.

8.4 A CHRONOLOGICAL ANALYSIS OF INTERACTIONS BETWEEN THE WETLANDS AND THE SOUTHERN UPLANDS OF THE LRA

Below, the analysis of the available data is structured in four phases, defined on the basis of the Neolithic developments in the south of the LRA. These phases coincide with a pre-Neolithic (mid 6th millennium cal BC), a Danubian Neolithic (5300-4850 cal BC), a Neolithic hiatus (4850-4300 cal BC)

and a Middle Neolithic phase (c. 4300-3800 cal BC). Only data for which the chronological position is clear and that can be attributed to one of the defined phases are taken into account (fig. 8.2).

8.4.1 Phase 1: the pre-Neolithic

Before the arrival of LBK communities in the south of the Lower Rhine Area, the Mesolithic of the Netherlands is characterised by a rough north-south division running north of the Dutch river district (e.g. Deeben/Van Gijn 2005). Whereas the northern Mesolithic was oriented towards the north, both in terms of raw material provision and in terms of technological affinities, the southern Mesolithic was part of a predominantly southern interaction sphere (e.g. Gendel 1984). In view of the scope of this paper, the focus thus lies on the southern wetland sites.

The southern interaction sphere of the southern Netherlands Late Mesolithic is shown by the data collected at Hardinxveld-Giessendam Polderweg. The first phase at this site slightly predates or coincides with the commonly accepted date for LBK arrival in the LRA of 5300 cal BC, and predates the newly proposed LBK arrival date of 5220 cal BC (Van de Velde, this volume). Objects from this phase found at Hardinxveld include Wommersom artefacts and a large precore in Rijckholt flint that must have been extracted in southern Limburg, pieces of pyrite possibly imported from the Ardennes, and some larger pieces of quartzitic rock mostly extracted in primary position in the Ardennes region (Louwe Kooijmans 2003; Van Gijn *et al.* 2001a).

Although direct procurement by special task forces cannot be excluded, the large stone blocks were most likely obtained by exchange: social boundaries had to be crossed in the procurement and the absolute distance between the site and the source of the raw material, exceeding 100 km as the crow flies, corresponds to the inter-regional level of Zvelebil's (2006) framework (see above). It is likely that the pyrite and some of the other raw materials were part of the same contact network.

The presence in the wetland Mesolithic sites of Wommersom sandstone or quartzite, a favoured raw material during the Late Mesolithic, suggests exchange with southern populations that were not part of the same cultural or social group. Arguments in favour of a different cultural attribution are for instance the general differences in lithic processing techniques and the differential occurrence of Wommersom at the Late Mesolithic sites of the intermediate coversand region (Amkreutz in prep.). Even if the nature of the exploitation is as yet unknown, it is likely that the few Wommersom artefacts found in wetland context were the result of exchange with these Late Mesolithic communities of the coversand region, directly exploiting the source. The distance of c. 100 km as the crow flies between Polderweg and the

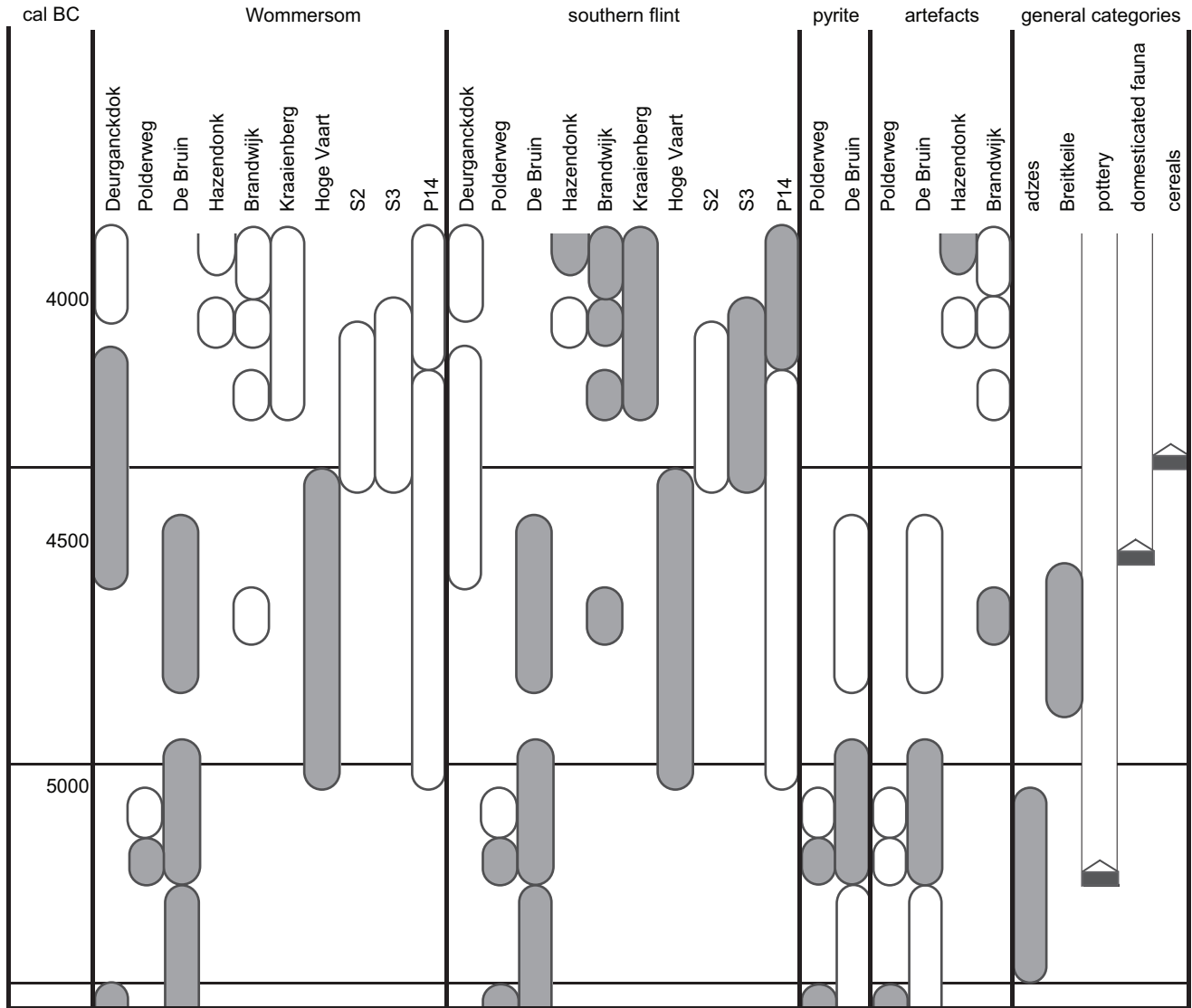


Figure 8.2 Indications for southern elements imported in wetland context. Per site the occupation phases are given as well as the presence/absence of exchanged items.

outcrop of Wommersom fits with the distances indicated by Zvelebil and the crossing of archaeologically known social boundaries (see above) and is also confirmed by the nature of the artefacts, in particular the absence of indications for a local processing of Wommersom at Polderweg (Van Gijn *et al.* 2001a). The low number of Wommersom artefacts at these wetland sites suggests the sporadic nature of their exchange, which fits with the peripheral position of the Dutch River delta to the known distribution of this raw material, but it

could also be the result of the high value attributed to artefacts produced in this raw material, due to which few were deposited in domestic contexts.

It is reasonable to assume that these contacts and the related movement of people between the regions also resulted in the first indirect or direct contact with the farming populations of the LBK. This explains the presence of an LBK arrowhead around 5300 cal BC in Hardinxveld-Giessendam Polderweg.

8.4.2 Phase 2: the Early, Danubian Neolithic

During the subsequent, Danubian Neolithic phase, sites in the Dutch River delta are characterised by an increasing importance of so-called northern flint, that can have been found fairly close by in the Utrechtse heuvelrug region, at less than 50 km as the crow flies from Polderweg and De Bruin, but also the southern contact lines continue to be in existence. Data from Swifterbant sites located more to the north, such as the eponymous location of Swifterbant (Devriendt in prep. and pers. comm. Dec. 2007), include fewer indications for southern interaction and thus show the persistence of the general north-south distinction.

Unfortunately, no sites are known from the Lower Scheldt valley. A single hazelnut shell sample in Verrebroek Dok 1 yielded a reliable radiocarbon date between 5370 and 5080 cal BC, but no artefacts could be associated with this date (Van Strydonck/Crombé 2005). At Hardinxveld-Giessendam Polderweg and De Bruin (fig. 8.2), the southern interaction is indicated by the presence of some Wommersom, grey Hesbaye flint and Rijckholt artefacts and few pieces of pyrite found in the phase 2 deposits of both sites.

The Wommersom, pyrite and some of the southern flint was possibly imported through the same contact networks as those of the previous phase. Some of the southern elements can however also have been obtained through exchange with the newly arrived Neolithic communities, as Rijckholt flint, grey Hesbaye flint and even Wommersom were part of the LBK raw material spectrum.¹

Adzes, found in particular in the eastern part of the LRA (Verhart 2000b; Verhart 2003; Verhart in prep), support the idea of indigenous contacts with LBK communities in the south. These are mainly stray finds and as yet no LBK adze has been found in unambiguous Swifterbant context, but this should not prove the absence of Swifterbant – LBK contact. Their absence may also confirm the high value of these artefacts due to which they are not frequently expected in a domestic waste context. There are other indications that suggest a direct Swifterbant – Danubian Neolithic connection. These include an LBK arrowhead from Polderweg's first phase, and pottery of the Groupe de Blicquy (BQY) and possibly also Grossgartach culture (GGK) (Lüning pers comm.; Feb 2007) in the second phase of Hardinxveld-Giessendam De Bruin (Raemaekers 2001).

LBK or LBK-like arrowheads are in fact often found north of the loess, up to 100 km from the nearest known LBK settlement. Whether these also result from direct interaction between Mesolithic and Neolithic people is open to debate. An ongoing study on late and final Mesolithic arrowheads alongside LBK arrowheads is expected to shed more light to this problem (Robinson in prep.). As it is, the morphological and technological characteristics of one arrowhead at Polderweg seem until further notice to confirm its LBK

origin, in contrast to two other 'LBK-like' arrowheads from the same site (Van Gijn *et al.* 2001a). In the light of these Mesolithic/Swifterbant – Neolithic contacts, the appearance of Swifterbant pottery at the end of the 6th millennium cal BC should be mentioned. From the beginning onwards, Swifterbant pottery is a local tradition, not necessarily to be related to a southern, Neolithic pottery tradition. It may have been the westernmost extension of the Boreal pottery traditions that travelled west over the north European plain, but it can also have been inspired by Early Neolithic examples (Louwe Kooijmans 2003; 2007; Louwe Kooijmans forthcoming; Raemaekers/De Roever in prep.).²

8.4.3 Phase 3: the Neolithic hiatus

After *c.* 4850 cal BC, the provision in 'northern flint' (cf. *supra*) of the Dutch river delta continues, and at Hardinxveld-Giessendam De Bruin even gains in importance (Louwe Kooijmans 2003; Van Gijn *et al.* 2001b). In all phases of that site, flint imported from the fairly nearby Meuse terraces dominates the assemblage, and northern flint is better represented than raw materials imported from the south of the LRA. In this phase, the proportion of northern flint increases to reach a total of 47% of all the flint artefacts. A few Wommersom artefacts were found at the sites of Doel Deurganckdok (Crombé *et al.* 2000; Sergant *et al.* 2006) and De Bruin (phase 3, Van Gijn *et al.* 2001b), and even in the more northerly site at Hoge Vaart phase 3 (Peeters 2007, 112 ff.). At De Bruin, this material cannot entirely be excluded to be residual from previous occupation phases, but this is not the case for Doel and Hoge Vaart, where its presence confirms the continuation of Wommersom exploitation and exchange during this phase. As in the previous phases, and using the same arguments, the Wommerson finds are likely to represent an inter-regional and cross-cultural exchange rather than direct procurement.

Southern flint is also frequently found in the Swifterbant contexts of the River district. At Hardinxveld several long blades were produced in Rijckholt flint. At Brandwijk, the small flint assemblage dated to this period (stratigraphical phase L30, *c.* 4610-4550 cal BC) contains a single Rijckholt and a single grey Hesbaye flint artefact (Raemaekers 1999, 42 ff.; Van Gijn/Verbruggen 1992). The same context also yielded a small sherd decorated with a triple pointed spatula that could not be attributed with certainty to a known pottery tradition, but which does suggest a southern Neolithic connection (Raemaekers 1999, 44-45). No information on raw material or other networks is available as yet for other sites that have occupation phases dated in the mid 5th millennium cal BC, such as Bronneger (Kroezenga *et al.* 1991), Rommertsdonk (Verbruggen 1992) and Rotterdam Groenenhagen-Tuinhoven (Meirsmans/Dorst 2005; Meirsmans/Peters 2006).

North of the River district, there are fewer indications for southern raw material procurement networks. A few southern Limburg flint artefacts were found at Hoge Vaart, phase 3 dated between 4900 and 4300 cal BC (Peeters 2007, 112 ff.). In layer A of Schokland P14, another northern Swifterbant site with middle 5th millennium cal BC occupation, most flint artefacts were produced in a raw material that can be found in the local moraines (Van der Kroft 1997, Ten Anscher pers. comm. Jan 2008). At the eponymous Swifterbant sites, the importance of southern import seems much more restricted and the few southern raw materials found at these sites could well have been collected in secondary position from the Meuse terrace deposits of middle Netherlands rather than in primary position in the southern LRA (Devriendt in prep. and pers. comm. Dec 2007). No information is available for the raw material procurement at Nagele J112 (Hogestijn 1991; Raemaekers 1999); (see also site catalogue in Amkreutz in prep).

On a larger spatial scale, the continuation of interaction between populations on the loess and off it to the north is confirmed by the spatial distribution of Rössen *Breitkeile*, covering the Dutch coversand landscape and even extending to southern Scandinavia (Verhart 2000a, 39; 2000b; Verhart 2003; Verhart in prep). Their presence suggests the existence of at least indirect (Verhart in prep.) contact and exchange with the farmers of the Rössen culture. These contacts may have been responsible for the introduction of the first domesticated fauna in Swifterbant contexts. The first known cattle, pig, goat and sheep remains are those recovered from the occupation deposits of De Bruin phase 3 (Louwe Kooijmans 2003; Oversteegen *et al.* 2001) and they must have been obtained before 4450 cal BC.

Whereas these arguments remain indirect indications for southern Swifterbant interaction with the Rössen culture, the Breitkeil fragment found at Swifterbant S3 (Louwe Kooijmans 1976, note 110) presents a more direct argument for the northern Swifterbant.

8.4.4 Phase 4: the Middle Neolithic

By the end of the 5th millennium cal BC, people attributed to the Michelsberg culture occupied a dune top at Doel Deurganckdok (Crombé/Sergant this volume; Sergant *et al.* 2006), this being the first actual campsite of southern Neolithic communities in this environment. No contemporaneous Swifterbant occupation has yet been reported in this region. As can be expected, the lithic assemblage of the Michelsberg occupation at Doel fits well with that of what is known for the Chasséen/Michelsberg culture in the southern loess region. Apart from locally available raw material, a number of artefacts on high quality flint were imported from the south, most probably from one of the then active flint exploitation sites (*ibid.*). Wommersom exchange is no longer

attested during this phase. Southern flint on the other hand is still present on sites in the Dutch River district, like Hazendonk (Louwe Kooijmans 1981). At Brandwijk (layers L50 and L60 the import of mined, southern flint and the typological affiliation with Michelsberg culture lithic assemblages have been confirmed (Raemaekers 1999, 42 ff.). While Raemaekers (*e.g.* 1999, 123 ff.) interpreted this affiliation as a reflection of Michelsberg influence in the southern Swifterbant, Peeters (2007, 230-231) leaves open the possibility of a palimpsest of Swifterbant and Michelsberg occupations, similar to the situation identified in Doel.

Contact and exchange between the southern Swifterbant people and Neolithic groups to the south can also be observed in the presence of polished flint axes northwest of the known Neolithic exploitation areas, for instance at Hazendonk (Louwe Kooijmans 1981). Again, the most likely interpretation is the existence of inter-regional and cross-cultural exchange rather than direct procurement. This is substantiated by the presence of elements typical of Michelsberg culture pottery, including both decoration types and vessel shapes and of Michelsberg type arrowheads in southern Swifterbant contexts (Raemaekers 1999, 111).

The northern Swifterbant sites again show a different picture, with a less firm southern exchange network. Southern flint is in general absent, except perhaps for a single artefact from Swifterbant S3 (Raemaekers 1999, 37), although it is not clear whether it was indeed produced on flint extracted in primary position, and some of the polished flint axes of variable raw material, including a Lousberg flint example, found in Schokland P14 (Van der Kroft 1997; Ten Anscher pers. comm.). In this region there seems to have been no Michelsberg influence on pottery morphology or arrowhead production, as is observed in the Swifterbant sites of the River district. The arrowheads of the northern Swifterbant sites are trapezes and transverse arrowheads.

The start of cereal use by people of the Swifterbant culture has been attested in this phase. Cereals appear from 4100 cal BC onwards (Out accepted; in prep), *e.g.* at Brandwijk, Doel Deurganckdok, Hazendonk (Bakels 1981), Schokland P14 and Swifterbant S3 (Van Zeist/Palfenier-Vegter 1981).³ Evidence for local agriculture also dates from the same period, in the form of pollen data from Gietsenveentje on the Drenthe Plateau in the northern LRA (Bakker 2003) and perhaps even in pedological indications for a field that should be dated between around 4300/4000 cal BC (Raemaekers pers. comm. Dec. 2007).

The import of southern flint artefacts continues after 3800 cal BC, *i.e.* after the end of the local Ch/MK in the Scheldt basin (Vanmontfort 2004, 285 ff.) and after the start of the Hazendonk group in the Dutch River delta. It is observed in the coversand landscape east of the wetlands (*e.g.* Louwe Kooijmans 1980; Louwe Kooijmans/Verhart

1990; Verhart/Louwe Kooijmans 1989) and also in the wetland region, for instance in the recently excavated and very well documented site of Schipluiden (Van Gijn/Houkes 2006; Van Gijn *et al.* 2006). Southern flint mainly consists of Spiennes/Rijckholt type flint, but also Rullen, grey Hesbaye and Valkenburg flint occur. For the Rijckholt flint there are indications that it was at least partially imported as rough-outs and finished tools, produced on mined flint at source.

8.5 DISCUSSION

The southern wetlands, including the Dutch river delta, were part of a southern interaction sphere during the entire phase under study here. Sites located to the north of the river delta seem to have been much more oriented towards the north. The data show that materials were transported over distances and across cultural boundaries, suggestive of the existence of inter-regional and cross-cultural interaction.

Such interaction took place well before the arrival of the first farmers of the LBK. The distribution of the Late Boreal invasively retouched points even suggests that the Dutch river district and the coversand region to the south were closely related culturally (*e.g.* Gendel 1984). As is shown by the distribution of Wommersom quartzite, a relationship persisted during the Early Atlantic period. Large blocks of flint and stone, extracted in primary position in the southern part of the Lower Rhine Area, were obtained by direct access or more likely through the integration of the south into the provision network of the River delta via an exchange relationship.

The arrival of farming communities in the south of the LRA from the late 6th millennium cal BC onwards had an influence on the interregional relations. The proportion of 'northern flint' in De Bruin increases, and large blocks of southern flint and stone are no longer attested. Wommersom and southern flint artefacts throughout the 5th and early 4th millennia cal BC confirm the continuation of inter-regional artefact transport, but overall the focus on the south seems to have become less firm following the arrival of farmers there. At the same time, finds from Polderweg and De Bruin confirm some level of interaction with the newly arrived LBK and especially later on with the Groupe de Blicquy and Grossgartach people.

During the subsequent phase, the distinction in exchange network between Swifterbant sites of the River district and those to the north of it persists. The River district sites are characterised by the presence of southern flint and Wommersom, but the absence of typical Rössen imports like Rullen flint. Contrary to Rullen, Wommersom and grey Hesbaye flint were not part of the Rössen raw material spectrum (Van Gijn/Louwe Kooijmans 2005a) and those raw materials must have been procured either directly from source or acquired from non-Rössen populations that did

continue to exploit them. As no local processing of these raw materials is attested, the second option seems the most likely. The absence of Rullen flint even makes it unlikely that the Rössen culture intervened in the provision of Rijckholt flint at the Swifterbant sites, even if Rijckholt flint was part of the Rössen flint spectrum (Van Gijn/Louwe Kooijmans 2005a). The Rijckholt flint reported at these sites may even have been imported from the Spiennes region, since Rijckholt and Spiennes flint are difficult to distinguish. The northern sites, on the contrary, were not part of that southern exchange network.

From the late 5th millennium cal BC onwards, interaction with the Chasséen/Michelsberg culture has been attested in the River district sites but is absent to the north of it.

The long 'availability phase', when farming and non-farming groups were in contact but remained distinct, indicates the existence of a symbiotic relationship, chosen by the native populations and leading to a gradual uptake of selected Neolithic elements (Louwe Kooijmans 2007; Raemaekers 1999).

The question remaining is how to approach the processes behind the exchanged artefacts. According to Peeters (2007, 198) the archaeological particularity of the Wommersom spatial distribution area, for instance, is a reflection of its recognisability vis-à-vis other raw materials and is not very explicative a priori on the existence of exchange networks. Although this is certainly true with regard to the present-day identification of the raw material in archaeological context, it can be assumed that also during Mesolithic and Neolithic times artefacts produced in that particular raw material will have been easily recognised and valued. In this respect, the Wommersom distribution pattern may still be regarded as indicative for past exchange networks despite the fact that it should be regarded as "an aggregate of which the formational dynamics are unknown" (Peeters 2007, 198) and despite the need for more research on the cultural meanings of raw material and material culture distributions (Robinson 2007). What is remarkable is the presence on most southern Swifterbant sites of no more than a handful of southern flint and stone artefacts. These small numbers are an indication of the processes involved in the acquisition of these artefacts, and may also reflect their value. Apparently these raw materials were not transported to the site as part of the dominant raw material provision network, but their presence is more than coincidental and seems the result of sustained direct exchange relations. They should be envisioned as markers of (reciprocal) exchanges connected to established social networks.

To return to the question of the introduction to this paper: can variations be observed in the materials and artefacts exchanged, and what are the implications for the Neolithic hiatus of the mid 5th millennium cal BC (phase 3 of this

paper) in the south-western part of the LRA? During this phase, continuity in the exchange of particular raw materials is apparent. The restricted numbers of such artefacts found in wetland context and the absence of indications for local processing, make it unlikely that they were obtained by systematic, direct access to the sources of those raw materials. As it is unlikely that the southern flint and Wommersom was obtained through contacts with the Rössen culture, the continuation of the interregional interaction that was at work before the arrival of the LBK farmers seems the best explanation. This assumption fits the hypothesis of a native, Mesolithic rooted population that occupied or exploited the south of the LRA during and after the passage of the LBK Neolithic. Eventually this indigenous population may have formed the basis of a subsequent regional variant of the Chasséen and Michelsberg cultures, previously labelled as 'Group of Spiere' (Vanmontfort 2001; 2007). A striking element in this respect is the absence of Wommersom artefacts at post 4300 cal BC Swifterbant sites, indicating the end of its exploitation or exchange, and the overall absence of Wommersom in Ch/MK context. What was once tentatively labelled as *ChasséoMichelsberg* (e.g. Louwe Kooijmans 1980) can in this vision be regarded as a new kind of Neolithic (*sensu* Thomas 1997), occupying a position much closer to the local Mesolithic substrate, and thus to the Swifterbant culture, than to the Danubian Neolithic (Vanmontfort 2004, 344 ff.). This newly formed Neolithic also had a more significant impact on Swifterbant material culture, as for instance shown by stylistic evolution in pottery morphology and in the leaf-shaped arrowheads of the southern Swifterbant group, which nicely fits the hypothesis.

The absence of clear indications for the reciprocal nature of these exchange relations can partially be due to the poor chronological resolution and unfavourable taphonomic conditions of the southern sites. Future research should focus on the improvement of this resolution and on the identification of northern imports and influences in the south, by means of a targeted survey for informative sites in the riverine wetlands of the southern LRA.

8.6 CONCLUSION

In this paper, the possibilities of interregional exchange have been explored in order to fill a gap in our knowledge of the Neolithic of the southern LRA. While acknowledging the problems related to characterising exchange processes on the basis of limited artefacts, some conclusions can be drawn based on an evaluation of diachronic changes in the nature of the exchanged items.

The data confirm the existence of interregional and cross-cultural exchange networks during the entire period under study. Contact between Swifterbant communities and the early farming communities of the south is confirmed, but in

addition to this, older 'Mesolithic' exchange networks with this region seem to have persisted during and after the arrival of the LBK. Some raw materials, for instance, cannot have been obtained by exchange with Neolithic communities of neighbouring regions and do not seem to have been the result of direct procurement either. This confirms the continuation of human activity and raw material exploitation in the southern loess regions of the LRA, apparently independently of the Neolithic processes of that time. From the late 5th millennium onwards, however, the southern exchange networks of the Swifterbant communities do seem to be restricted to interaction with the Chasséen/Michelsberg culture. This fits with a previously developed model in which the latter culture developed on top of a native, Mesolithic rooted substrate.

In order to further develop this topic, and to verify this hypothesis, future research should focus on the discovery and investigation of sites that illustrate the development of the local substrate. In particular sites located in the riverine wetlands of the southern LRA, such as the Scheldt valley (Crombé/Sergant this volume; Crombé *et al.* 2002; 2005), are expected to yield valuable remains to feed the discussion. Such data should also allow us to identify the extension of the Swifterbant phenomenon, and to identify the impact of northern developments on the neolithisation process in the southern LRA. It would shed a light on the nature of the interaction of the local substrate with the earliest farming communities of the LBK and on the role of the BQY in that process.

Acknowledgements

The research for this paper is funded by NWO (Netherlands Organisation for Scientific Research) within the framework of the Leiden University 'From Hardinxveld to Noordhoorn: From Forager to Farmer' project. I am indebted to L. Amkreutz, I. Devriendt, W. Out, Y. Perdaen, D. Raemaekers and T. ten Anscher for providing information invaluable in the construction of the argumentation of this paper and to L. Verhart and the editors of this volume for their valuable comments on the previous version of the paper.

Notes

1 Wommersom was attested at the sites of the Kleine Gete settlement cluster, close by the source location of Wommersom (Lodewijckx/Bakels 2000).

2 Given the date of the earliest Swifterbant pottery, an LBK inspiration seems more likely than a later Rössen one as was suggested by Raemaekers (1999, 141) and Ten Anscher (in prep. referred to in Raemaekers 1999, 141) based on the technological similarities of the pottery.

3 In Doel a single grain appears in between the remains of sector B that was dated in the previous, pre-4300 cal BC phase. If the grain also dates from this phase, it would be the earliest cereal grain found thus far in Swifterbant context. No direct dating of the grain has been performed, however, and the only certainty seems to be a *terminus ante quem* date between 3960 and 3710 cal BC (2 stdev; Bastiaens *et al.* 2005).

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B. Vanmontfort
 Faculteit der Archeologie, Universiteit Leiden
 % Eenheid Prehistorische Archeologie
 Celestijnenlaan 200 E – pb 2409
 B-3001 Leuven
 België
 bart.vanmontfort@ees.kuleuven.be