



Universiteit
Leiden

The Netherlands

Going against the grain? The transition to farming in the Dutch wetlands re-examined (5000-4000 BCE)

Raemaekers, D.; Brusgaard, N.Ø.; Dreshaj, M.; Erven, J.; Dee, M.; Peeters, H.; ... ; Rothstein, M.

Citation

Raemaekers, D., Brusgaard, N. Ø., Dreshaj, M., Erven, J., Dee, M., & Peeters, H. (2023). Going against the grain?: The transition to farming in the Dutch wetlands re-examined (5000-4000 BCE). In D. Groß & M. Rothstein (Eds.), *Changing identity in a changing world* (pp. 225-233). Leiden: Sidestone Press. doi:10.59641/pfm7c6gh

Version: Publisher's Version

License: [Leiden University Non-exclusive license](#)

Downloaded from: <https://hdl.handle.net/1887/3714093>

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



CHANGING IDENTITY IN A CHANGING WORLD

*Current Studies on the Stone Age
around 4000 BCE*

Daniel Groß and Mikael Rothstein (eds.)



This is a free offprint – as with all our publications the entire book is freely accessible on our website, and is available in print or as PDF e-book.

www.sidestone.com

CHANGING IDENTITY
IN A CHANGING WORLD

*Current Studies on the Stone Age
around 4000 BCE*

Daniel Groß and Mikael Rothstein (eds.)

© 2023 Individual authors

Published by Sidestone Press, Leiden
www.sidestone.com

Lay-out & cover design: Sidestone Press
Cover image: Sune Elskær, © Museum Lolland-Falster

ISBN 978-94-6426-167-7 (softcover)
ISBN 978-94-6426-168-4 (hardcover)
ISBN 978-94-6426-169-1 (PDF e-book)

DOI 10.59641/pfm7c6gh

Supported by:



AUGUSTINUS FONDEN

STIFTET 25. MARTS 1942

Contents

Foreword	9
Introduction: Changing Identity in a Changing World	11
Daniel Groß and Mikael Rothstein	
CHANGING WORLDS	19
The Femern project. A large-scale excavation of a Stone Age landscape	21
Bjørnar Tved Måge, Daniel Groß and Marie Kanstrup	
Environmental changes after the last deglaciation, southern Lolland, Denmark	33
Ole Bennike and Catherine Jessen	
Niche construction. Hard-working settlers and a neglected principle in understanding the early Neolithic of southern Scandinavia	43
Niels N. Johannsen	
Estuary and lacustrine fishing with stationary wooden structures in Neolithic Finland. Evidence from waterlogged sites	53
Satu Koivisto	
How to build a Neolithic? Perspectives on megalith building practices and landscape perception during the Funnel Beaker period in northern Germany	63
Maria Wunderlich	
Tombs and Settlements, Bog and Sea. The influence of landscape change on Neolithic life in the Ahlen-Falkenberger Moor, Germany	73
Moritz Mennenga, Anja Behrens, Martina Karle and Steffen Wolters	

LOSING BOUNDARIES	87
Duality in the Early Neolithic on Lolland-Falster and in south Scandinavia	89
Theis Zetner Trolle Jensen and Lasse Vilien Sørensen	
Long-term perspectives on Neolithisation. Pottery use in the Ertebølle Culture and its connection to the development of settlement patterns and hunter-gatherer complexity	109
Ann-Katrin Meyer	
Changing diet in a changing world	127
Bente Philippsen	
Mesolithic persistence and Neolithic emergence at Syltholm II (MLF00906-III). Osseous artefacts before and after 4000 BCE on the coast of Lolland, Denmark	149
Solveig Chaudesaigues-Clausen	
Neolithisation in Denmark from a depositional perspective	165
Søren Anker Sørensen	
Lola's people hunted wild boar; their neighbours kept domestic pigs. Analysis of the Syltholm pigs	177
Peter Rowley-Conwy	
Neolithic farming in forager-resource systems. A case from southern Norway	189
Svein Vatsvåg Nielsen and Jo-Simon Frøshaug Stokke	
IDENTITIES OF CHANGE	199
Mesolithic hunters in mixed oak forests. Differences in hunting strategy and hunting behaviour	201
Ulrich Schmölcke	
Changing diet during the Mesolithic-Neolithic transition. An examination of the carbon and nitrogen isotope ratios of late Mesolithic and early Neolithic humans in Denmark	213
Rikke Maring, Jesper Olsen and Marcello A. Mannino	
Going against the grain? The transition to farming in the Dutch wetlands re-examined (5000–4000 BCE)	225
Daan C. M. Raemaekers, Nathalie Ø. Brusgaard, Merita Dreshaj, Jolijn Erven, Michael W. Dee and J. Hans M. Peeters	

Stone Age Fishing in the prehistoric Syltholm Fjord	235
Terje Stafseth and Daniel Groß	
The Unbeknownst Pottery Craft at Alvastra Pile Dwelling	249
Nathalie Hinders	
Evidence of a base model for Neolithic depositions in Central and Northern Europe	265
Michael Müller	
People, contacts and identities The sixth-fifth millennium BCE south of the western Baltic Sea	279
Thomas Terberger, Andreas Kotula and Henry Piezonka	
Perceptions of Stone Age Landscapes? A note on how humans of the Stone Age may have experienced their surroundings	299
Mikael Rothstein	

Going against the grain?

The transition to farming in the Dutch wetlands re-examined (5000–4000 BCE)

Daan C. M. Raemaekers, Nathalie Ø. Brusgaard,
Merita Dreshaj, Jolijn Erven, Michael W. Dee
and J. Hans M. Peeters

Abstract

In general, the fifth millennium BCE in the Dutch wetlands and southern Scandinavia might be described in similar terms regarding the presence of ceramic hunter-gatherers who evidently had contacts of some kind with central European farming communities. Whereas the end of this millennium saw a relatively swift transition to farming in southern Scandinavia, the Dutch wetlands seem to have taken a different route. Here, the dominant opinion is that of a gradual and earlier start of animal husbandry and cereal cultivation, albeit of a limited economic importance. This contribution will question the Dutch dataset and discuss new data on the use of ceramics and the date and scale of the start of animal husbandry and cereal cultivation. We conclude that the transition to farming (cereal cultivation and animal husbandry) occurred around 4200 BCE, predating the transition to farming in the UK and southern Scandinavia.

Neolithisation; Swifterbant Culture; zooarchaeology; archaeobotany; ceramics

Introduction

Mapping the transition to farming might seem a rather straightforward process: one simply maps the earliest presence of domesticated plants and/or animals in a certain area. Nevertheless, for the Dutch wetlands there are currently three competing models to describe the transition to farming, notwithstanding the relatively high resolution of our dataset. The first model is the Long Transition Model (LTM), advocated by Louwe Kooijmans from the 1970's onwards and adopted by his Leiden-based pupils (*e.g.* Amkreutz 2013; Amkreutz and Dusseldorp 2020; Louwe Kooijmans 1976; 1993; Raemaekers 1999; Verhart 2000).

Central to this model is the presence of sites in the wetlands with a low percentage of bones from domesticated animals until at least the end of the fourth millennium BCE (Vlaardingen-Stein Culture), creating a transition period of more than 1000 years.

The second model, the (Early) Short Transition Model (Raemaekers 2003), interprets these 'semi-Neolithic' sites as wetland elements of a logistical mobility system: throughout the 1000 years under study in the LTM, the bone assemblages of the wetland sites are rather similar, with 'true Neolithic' sites restricted to the coastal dune area. Because the fifth millennium coastal zone has been eroded, this allows for hypothetical early 'true Neolithic' sites on the coast, cutting down the long transition to a swift, fifth millennium transition (see Amkreutz 2013, 407–408 for a rebuttal).

The third model, the Late Short Transition Model, dismisses all fifth millennium finds of domestic animals (Rowley-Conwy 2016), and positions the transition to farming at the start of the fourth millennium. It is especially this third model that ties in very well with the renewed view of the transition to farming as a change driven by demography. Shennan's 2018 continental overview identifies the Dutch wetlands as a singular exception to his demographic narrative. When one dismisses the fifth millennium Neolithic assemblages, the singular position can be dismissed as well. These three competing models imply that the dataset is difficult to interpret (Çakırlar *et al.* 2020). What are the underlying problems?

Problems with the dataset

Dating evidence

The dataset comprises wetland sites embedded in Holocene sediments. As a result, focus has been on dating the sites or the phases of these sites by means of context dates. In other words, there are hardly any direct dates for the bones of domesticated animals or cereal grains. When we realise that the proposed early start of animal husbandry is based on small numbers of bones from domesticated animals, how can we be certain that these bones are an integral part of the (phase of) sites? How certain are we that they were not added to the assemblage at a later date as a result of site formation processes or revisits?

Dating precision

All available ¹⁴C dates predate the current standards of high-precision dating and thus have relatively large margins of error. On top of that, there are relatively small sets of dates per site, presented with little attention to their quality and without statistical analysis (Bayesian modelling). Moreover, the crucial final part of the fifth millennium BCE is characterised by a plateau in the calibration curve. The resulting chronology is therefore rather coarse (Dreshaj *et al.* 2022).

Ambiguity of the zooarchaeological remains

Until recently, the start of animal husbandry was solely based on traditional zooarchaeological methods, such as size measurements and kill-off patterns. The fact that, in our area, aurochs and wild boar occur implies that we need to be very cautious in dating the start of animal husbandry by these methods alone. The Rosenhof assemblage is the best cautionary tale: aDNA analysis of the *Bos* bones made clear that the small bones

found there were not from domestic cattle but from small female aurochs (Scheu *et al.* 2008). Another cautionary tale is the fact that there was interbreeding between incoming domestic pigs and local European wild boar, making size measurements alone not sufficient to determine domestic status (Frantz *et al.* 2019).

The EDAN project

We used the Rowley-Conwy 2016 paper as a wakeup call: the relevance of the Dutch dataset for the international debate on the transition to farming required action. The Dutch Research Council (NWO) funded a large project that focused on the fifth millennium dataset. It allowed us to study the chronology (with new dates and Bayesian modelling), aDNA, and diet (C and N isotopes) of *Bos* and *Sus* from this period. Major sites are the two Late Mesolithic sites at Hardinxveld-Giessendam (Louwe Kooijmans 2003), covering the period 5400–4250 BCE. The final centuries of this millennium were studied on the basis of the Swifterbant site cluster, especially the largest assemblage, S3 (Zeiler 1997). The Emergence of Domestic Animals in the Netherlands project (EDAN) is taking place in the period 2020–2024. Here, we present our preliminary results (fig. 1).

Stage 1: Ceramic Late Mesolithic

Our analysis is based on the two sites of Hardinxveld-Giessendam (Polderweg and De Bruin). The new ¹⁴C analysis re-dates these phased sites to the period 5400–4650 BCE (Dreshaj *et al.* 2023). Size measurements on the *Sus* from this period indicate they were wild boar, which is substantiated by their aDNA and isotopic signals. There is no isotopic evidence for animal husbandry in this period. Interestingly, the kill-off patterns of the various phases are not the same, indicating that people varied their hunting practices through time, perhaps according to the changing environmental conditions (Brusgaard *et al.* 2022). The pots were used to cook meals that consisted of fish and ruminants (Demirci *et al.* 2021). We have no evidence for cereal cultivation at this stage.

Stage 2: Mist in the middle

The final stage of De Bruin (phase 3) is re-dated to 4450–4250 BCE (Dreshaj *et al.* 2023). It is difficult to interpret because it concerns a small assemblage and the aDNA analysis failed to produce any useful data. The stable isotope results of the *Sus* are congruent with a wild boar diet. However, the size measurements indicate a number of significantly small suids at the site in this period, which would be domestic pigs (or butchered parts thereof) (Brusgaard *et al.* 2022). One of the pots of this phase may have been used for dairy (Demirci *et al.* 2021). We have no evidence for cereal cultivation at this stage.

Stage 3: Early Neolithic wetland farmers

Our analysis focused on two sites of the Swifterbant cluster, namely S3 and S4. The new ¹⁴C analysis has tackled the problems with the plateau in the calibration curve by making use of high-precision dating, smart sampling, the minimal age difference between all the new ¹⁴C dates and Bayesian modelling. It is now clear that S4 dates to 4250–4150 BCE, whereas S3 has a slightly younger date range of 4200–4000 BCE (Dreshaj *et al.* in prep.). The pig data are as of yet difficult to interpret. The assemblage consists of relatively small *Sus*, including many piglets, and had a diffuse isotope signature, while the aDNA results

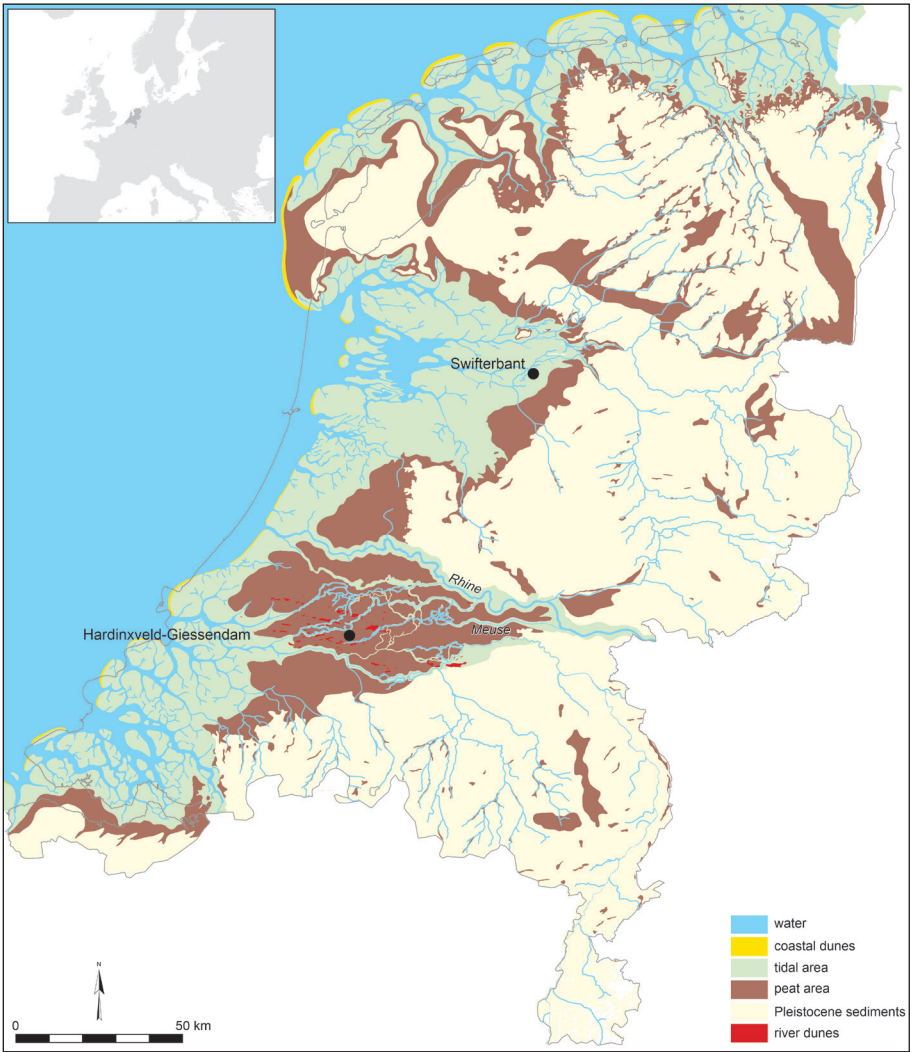


Figure 1. Palaeogeographic setting of the sites discussed (after Vos 2015).

indicate that one *Sus* had a small percentage of domestic ancestry, indicating either contact with neighbouring domestic pig populations or perhaps that this *Sus* was heavily interbred with local European wild boar. In contrast, the *Bos* data clearly point to domestic cattle. The size of the bones is consistent with domestic cattle populations and aDNA analysis points at genetically domestic animals. The isotopic analysis reveals that some of the cattle were herded in an environment with elevated nitrogen values, while another part of the herd has a local nitrogen signal (Brusgaard *et al.* in prep). The lipid analysis of the S3 pottery suggests that meals with pork or beef were not produced in pots – we only have evidence of meals with fish (Demirci *et al.* 2020). Plant remains in pots (using SEM analysis) testify to the presence of emmer wheat in these same pots (Raemaekers *et al.* 2013), giving a more complete view of the cuisine at this site. The importance of cereal cultivation is clear from

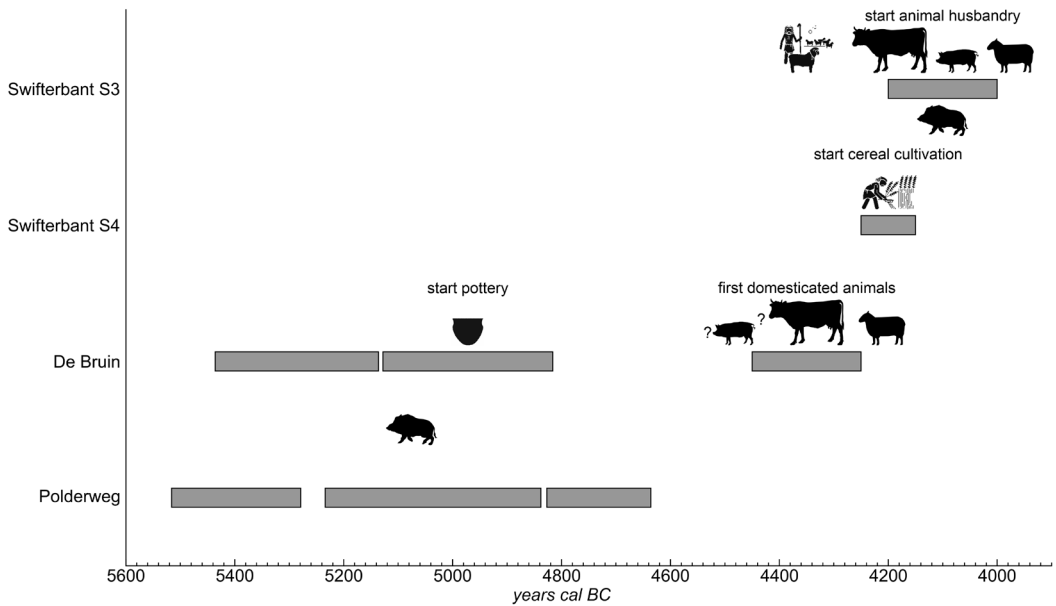


Figure 2. Overview of developments in animal husbandry and cereal cultivation in the fifth millennium BCE in the Dutch wetlands (figure: E. Bolhuis).

the presence of cultivated fields (Huisman *et al.* 2009; Raemaekers and De Roever 2020), botanical macroremains (see Schepers and Bottema-Mac Gillavry 2020 for the most recent overview) and coprolites (Kubiak-Martens and Van der Linden 2022).

Conclusions

The EDAN project has put flesh on the bones. The various types of analyses point to a start of both animal husbandry and cereal cultivation from c. 4200 BCE onwards (fig. 2). The domestic character of the *Bos* at Swifterbant is based on the small bone size, the stable isotopes and aDNA. Moreover, the isotopes suggest that there were two herds, one of which grazed in an area with high nitrogen values and was transported to Swifterbant. These high values are consistent with herbivores grazing in a salt-marsh region (Britton *et al.* 2008; Prummel *et al.* in prep.), which would make these bones the first clues of coastal exploitation at the end of the fifth millennium BCE – a landscape zone that cannot be studied directly due to its erosion. The isotope analysis included some sheep/goat bones with a similar ‘coastal’ signature, suggesting that pastoralism was an activity that included both types of animals. The *Sus* at Swifterbant remain difficult to interpret in terms of wild or domestic: both the isotopes and the aDNA are highly variable. These patterns might suggest a palimpsest of different human-pig relations or individual pig life histories, or both. Cereal cultivation is attested from the same time onwards.

The start of the Neolithic in the Dutch wetlands can now clearly be interpreted as a Short Transition Model, where both animal husbandry and cereal cultivation should not be interpreted as sort of ‘play farming’ (Graeber and Wengrow 2021, 266–273). The pastoralism of cattle and sheep/goat, and the abundance of evidence for cereal cultivation, imply mobility strategies and knowledge exchange that go beyond incidental subsistence

activities as envisaged in the use of the term ‘extended broad spectrum economy’ to describe these communities at Swifterbant (Louwe Kooijmans 1993). These were not hunter-gatherers with farming carried out on the side, but wetland farmers.

The impression is that this new type of Neolithic Package is rather similar to that of the Early Neolithic Funnel Beaker Culture in terms of subsistence data (Sørensen and Karg 2014 for Denmark; Demirci 2021, chapter 6 for a comparison between the two regions). For the same time and place, Swifterbant S3 yielded ceramic vessels that fall within the morphological and technological range of Early Neolithic Funnel Beaker Culture ceramics in Denmark and northern Germany (Raemaekers 2015; Demirci *et al.* 2022 for an inter-regional comparison), but predate these by some two centuries. This raises the question of the role played by the Swifterbant communities in the transition to farming in northern Europe.

References

- Amkreutz, L.W.S.W. 2013. *Persistent Traditions. A long-term perspective on communities in the process of Neolithisation in the Lower Rhine Area (5500–2500 cal BC)*. Leiden: Sidestone.
- Britton, K., Müldner, G., Bell, M. 2008. Stable isotope evidence for salt-marsh grazing in the Bronze Age Severn Estuary, UK: implications for palaeodietary analysis at coastal sites. *Journal of Archaeological Science* 35, 2111–2118.
- Brusgaard N.Ø., Dee M.W., Dreshaj M., Erven J., Van den Hurk Y., Raemaekers, D.C.M., Çakırlar, C. 2022. Hunting before herding: A zooarchaeological and stable isotopic study of suids (*Sus* sp.) at Hardinxveld-Giessendam, the Netherlands (5450–4250 cal BC). *PLoS ONE* 17/2, e0262557.
- Brusgaard, N.Ø., Kooistra, J., Schepers, M., Raemaekers, D., Çakırlar, C. in preparation. Early animal husbandry in northern Europe: new multi-proxy evidence from Swifterbant, the Netherlands.
- Çakırlar, C., Breider, R., Koolstra, F., Cohen, K.M., Raemaekers, D.C.M. 2020. Dealing with domestic animals in the fifth millennium cal BC Dutch wetlands: new insights from old Swifterbant assemblages, in: Gron, K.J., Sørensen, L., Rowley-Conwy, P. (eds.). *Farmers at the frontier: A pan European perspective on Neolithisation*. Oxford: Oxbow books, 263–287.
- Demirci, Ö., Lucquin, A., Craig, O.E., Raemaekers, D.C.M. 2020. First lipid residue analysis of Early Neolithic pottery from Swifterbant (the Netherlands, ca. 4300–4000 BC). *Journal of Archaeological and Anthropological Sciences* 12, 105. DOI:10.1007/s12520-020-01062-w
- Demirci, Ö., Lucquin, A., Çakırlar, C., Craig, O. E., Raemaekers, D. C. M. 2021. 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. *Journal of Archaeological Science: Reports* 36, 102812. DOI:10.1016/j.jasrep.2021.102812
- Demirci, Ö., Lucquin, A., Klimscha, F., Craig O.E., Raemaekers, D.C.M. 2022. Lipid residue analysis of Hüde I (Lower Saxony, Germany): new data to understand the transition to farming), in: Klimscha, F., Heumüller, M., Raemaekers, D.C.M., Peeters, H., Terberger, T. (eds.). *Stone Age Borderland Experience: Neolithic and Late Mesolithic Parallel Societies in the North European Plain*. Rahden (Westf.): Marie Leidorf, 61–84.
- Dreshaj, M., Dee, M., Peeters, H., Raemaekers, D. 2022. Blind dates: Exploring uncertainty in the radiocarbon evidence on the emergence of animal husbandry in the Dutch wetlands. *Journal of Archaeological Science: Reports* 45, 103589. DOI:10.1016/j.jasrep.2022.103589

- Dreshaj, M., Dee, M., Brusgaard, N.Ø., Raemaekers, D., Peeters, H. in press. High-resolution Bayesian chronology of the earliest evidence of domesticated animals in the Dutch wetlands (Hardinxveld-Giessendam archaeological sites). *PLoS ONE* 18/1, e0280619. DOI:10.1371/journal.pone.0280619
- Dreshaj, M., Raemaekers, D., Peeters, H., Dee, M. in prep. Modelling on the calibration plateau: High precision chronology of the earliest evidence of farming and animal husbandry in the Dutch wetlands.
- Dusseldorp, G.L. and Amkreutz, L.W.S.W. 2020. A long slow goodbye – Re-examining the Mesolithic-Neolithic transition (5500–2500 BCE) in the Dutch delta. *Analecta Praehistorica Leidensia* 50, 121–142.
- Frantz, L.A.F., Haile, J., Lin, A.T., Scheu, A., Geörg, C., Benecke, N., Alexander, M., Linderholm, A., Mullin, V.E., Daly, K.G. *et al.* 2019. Ancient pigs reveal a near-complete genomic turnover following their introduction to Europe. *Proceedings of the National Academy of Sciences* 116, 17231–17238. DOI:10.1073/pnas.1901169116
- Graber, D. and D. Wengrow, 2021. *The dawn of everything. A new history of humanity.* London: Allen Lane.
- Huisman, D.J., Jongmans, A.G., Raemaekers, D.C.M. 2009. Investigating Neolithic land use in Swifterbant (NL) using micromorphological techniques. *Catena* 78, 185–197.
- Kubiak-Martens, L. and Van der Linden, M. (eds) 2022. *Neolithic Human Diet. Based on Studies of Coprolites from the Swifterbant Culture Sites, the Netherlands.* Nederlandse Archeologische Rapporten 77. Amersfoort: Cultural Heritage Agency of the Netherlands.
- Louwe Kooijmans, L.P. 1976. Local Developments in a Borderland. A survey of the Neolithic at the Lower Rhine. *Oudheidkundige Mededelingen uit het Rijksmuseum van Oudheden te Leiden* 57, 227–297.
- Louwe Kooijmans, L.P. 1993. Wetland Exploitation and Upland Relations of Prehistoric Communities in the Netherlands, in: Gardiner, J. (ed.). *Flatlands & Wetlands. Current themes in East Anglian Archaeology.* East Anglian Archaeology 50. Oxford: Oxbow books, 71–116.
- Louwe Kooijmans, L.P. 2003. The Hardinxveld sites in the Rhine/Meuse Delta, the Netherlands, 5500–4500 cal BC, in: Larsson, L., Kindgren, H., Knutsson, K., Loeffler, D., Åkerlund, A. (eds.). *Mesolithic on the Move. Papers presented at the Sixth International Conference on the Mesolithic in Europe, Stockholm 2000.* Oxford: Oxbow Books, 608–624.
- Prummel, W., Kootker, L.M., van der Plicht, J., Arnoldussen, S., Nieuwhof in preparation. The influence of salinity on $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ values in aurochs, cattle and sheep bones from the northern provinces of the Netherlands
- Raemaekers, D.C.M. 1999. *The Articulation of a 'New Neolithic'. The meaning of the Swifterbant Culture for the process of Neolithisation in the western part of the North European Plain.* Archaeological Series Leiden University 3. Leiden: Leiden University.
- Raemaekers, D.C.M. 2003. Cutting a long story short? The process of neolithization in the Dutch delta re-examined. *Antiquity* 77, 780–789.
- Raemaekers, D.C.M. and De Roever, J.P. 2020. Conclusions, in: Raemaekers, D.C.M. and De Roever, J.P. (eds.). *Swifterbant S4 (the Netherlands). Occupation and exploitation of a Neolithic levee site (c. 4300–4000 cal. BC).* Groningen Archaeological Studies 36. Groningen: Barkhuis, 107–113.

- Raemaekers, D.C.M., Kubiak-Martens, L., Oudemans, T.F.M. 2013. New food in old pots – charred organic residues in Early Neolithic ceramic vessels from Swifterbant, the Netherlands (4300–4000 cal. BC). *Archäologisches Korrespondenzblatt* 43/3, 315–334.
- Rowley-Conwy, P. 2016. Foragers and farmers in Mesolithic/Neolithic Europe, 5500–3900 cal. BC: beyond the anthropological comfort zone, in: Foulds, F.W.F., Drinkall, H.C., Perri, A.R., Clinnick, D.T.G., Walker, J.W.P. (eds.). *Wild things: recent advances in palaeolithic and mesolithic research*. Oxford: Oxbow books, 185–201.
- Schepers, M. and Bottema-Mac Gillavry, N. 2020. The vegetation and exploitation of plant resources, in: Raemaekers, D.C.M. and De Roever, J.P. (eds.). *Swifterbant S4 (the Netherlands). Occupation and exploitation of a Neolithic levee site (c. 4300–4000 cal. BC)*. Groningen Archaeological Studies 36. Eelde: Barkhuis, 51–75. DOI:10.2307/j.ctv13nb6ns.8
- Shennan, S. 2018. *The first farmers of Europe. An evolutionary perspective*. Cambridge: Cambridge University Press.
- Scheu, A., Hartz, S., Schmölcke, U., Tresset, A., Burger, J., Bollonigo, R. 2007. Ancient DNA provides no evidence for independent domestication of cattle in Mesolithic Rosenhof, Northern Germany. *Journal of Archaeological Science* 35, 1257–1264.
- Sørensen, L. and S. Karg 2014. The expansion of agrarian societies towards the north – new evidence for agriculture during the Mesolithic-Neolithic transition in southern Scandinavia. *Journal of Archaeological Science* 51, 98–114. DOI:10.1016/j.jas.2012.08.042
- Verhart, L.B.M. 2000. *Times fade away. The neolithization of the southern Netherlands in an anthropological and geographical perspective*. Archaeological Series Leiden University 6. Leiden: Leiden University.
- Vos, P.C. 2015. *Origin of the Dutch coastal landscape: long-term landscape evolution of the Netherlands during the Holocene, described and visualized in national, regional and local palaeogeographical map series*. Eelde: Barkhuis.
- Zeiler, J.T. 1997. Hunting, fowling and stock-breeding at Neolithic sites in the Western and Central Netherlands. Groningen: Archaeobone.

Notes on contributors

Daan C.M. Raemaekers
Groningen Institute of Archaeology
University of Groningen
Poststraat 6
9712 ER Groningen
The Netherlands
d.c.m.raemaekers@rug.nl
ORCID: 0000–0001–8665–9065

Merita Dreshaj
Groningen Institute of Archaeology
University of Groningen
Poststraat 6
9712 ER Groningen
The Netherlands
m.dreshaj@rug.nl
ORCID: 0000–0002–8758–3418

Nathalie Ø. Brusgaard
Groningen Institute of Archaeology
University of Groningen
Poststraat 6
9712 ER Groningen
The Netherlands
n.o.brusgaard@rug.nl
ORCID: 0000–0003–1085–7844

Jolijn Erven
Groningen Institute of Archaeology
University of Groningen
Poststraat 6
9712 ER Groningen
The Netherlands
j.a.m.erven@rug.nl
ORCID: 0000–0003–3620–8658

Michael W. Dee
Isotope Research
University of Groningen
Nijenborgh 6
9747 AG Groningen
The Netherlands
m.w.dee@rug.nl
ORCID: 0000-0002-3116-453X

J. Hans M. Peeters
Groningen Institute of Archaeology
University of Groningen
Poststraat 6
9712 ER Groningen
The Netherlands
j.h.m.peeters@rug.nl
ORCID: 0000-0002-9911-4694

