

Socioeconomic organisation in the Globular Amphora network during the earliest 3rd millennium BC

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Zusammenfassung

Sozioökonomische Organisation im Netzwerk der Kugelamphorenkultur im frühesten 3. Jt. v. Chr.

In diesem Artikel werden Anhaltspunkte präsentiert und verglichen, die Aufschluss über Aspekte der sozialen und wirtschaftlichen Organisation in verschiedenen Teilen des großen geografischen Gebiets in Mittel-, Ost- und Nordeuropa geben, das das Netzwerk der Kugelamphorenkultur im frühen 3. Jt. v. Chr. umfasst. Das »Kugelamphoren-Netzwerk« bezieht sich hier auf Regionen, in denen Gemeinschaften erheblich von Elementen der Kugelamphorenkultur beeinflusst wurden, unabhängig davon, ob sie das gesamte Spektrum der materiellen Kugelamphorenkultur und ihres Ritus umfassten oder nur einige Elemente. Diese Diskussion präsentiert Beispiele verschiedener archäologischer Beweislinien, die hinsichtlich der Organisation von Gruppen aufschlussreich sein können, einschließlich Aspekten wie der Strukturierung von Gräberfeldern sowie Siedlungs- und Mobilitätsmustern. In einigen Fällen war es möglich, diese Arten von Beweisen durch aDNA-Informationen über biologische Beziehungen zwischen Individuen, die in Gräbern gefunden wurden, zu ergänzen, was eine völlig neue Ebene der detaillierten Interpretation von Verwandtschaftsstrukturen eröffnete. Wie bei den meisten bekannten Varianten menschlicher sozialer Organisation dürften Verwandtschaftsstrukturen – die in erheblichem Maße, aber nicht ausschließlich in biologischen Beziehungen verwurzelt sind – für die soziale Organisation von Kugelamphorengruppen von zentraler Bedeutung gewesen sein, die wiederum wahrscheinlich eng mit der Konfiguration wirtschaftlicher Aktivitäten, Siedlungsformen, Mobilität und Austauschmustern verknüpft war. Der Beitrag veranschaulicht die Vorteile integrierter Datensätze, die molekulare und traditionelle archäologische Beweislinien verbinden und dabei helfen, das Verständnis der Organisation und sozialen Matrix dieser und anderer prähistorischer Gemeinschaften umfassender zu verstehen.

Introduction

From around 3100 BC, the Globular Amphora (GA) material culture complex – often simply referred to as the Globular Amphora Culture – spread from its centre of origin in present-day Poland to encompass large parts of Central and Eastern Europe. In addition to the distinctly shaped ceramic amphora after which it was named, it also included certain flint and bone tools, stone battle axes, a range of symbolic or ornamental amber and bone artefacts, as well as specific types of burials and animal depositions. Many communities

Summary

This article presents and compares evidence informing on aspects of social and economic organisation in different parts of the large geographical area in central, eastern and northern Europe encompassing the Globular Amphora (GA) network during the earliest 3rd millennium BC. »The GA network« here refers to regions in which communities were influenced significantly by GA cultural elements, whether including the full range of GA material culture and customs or only some elements. The discussion presents examples of different archaeological lines of evidence that may be informative regarding the organisation of groups, including such aspects as the structuring of cemeteries and settlement and mobility patterns. In some cases, it has been possible to supplement these types of evidence with aDNA information on biological relations between individuals found in graves and tombs, opening up an entirely new level of detailed interpretation of kinship structures. As in most known variants of human social organisation, kinship structures – to a significant extent but not exclusively rooted in biological relations – are likely to have been central to the social organisation of GA groups, which, in turn, was probably closely integrated with the configuration of economic activities, settlement forms, mobility and exchange patterns. The paper argues for the benefits of integrated datasets cross-cutting molecular and traditional archaeological lines of evidence, aiding more fully the understanding of the organisation and social matrix of these and other prehistoric communities.

that formed part of this supra-regional complex not only shared these stylistic elements in material artefacts and structures, but presumably also a more or less similar combination of economic strategies, social organisation and ritual practices (Szmyt 2017). However, what we may refer to as the wider »Globular Amphora network« also included adjacent regions in which communities were influenced significantly by GA cultural elements without adopting the full range of GA material culture and customs. Figure 1 shows the extent of the GA complex proper during the earliest 3rd millennium BC, along with an example of the latter type of region,



Fig. 1 Map of Europe showing the distribution during the earliest 3rd millennium BC of: 1 the Globular Amphora (GA) complex; 2 GA-inspired Late TRB groups, which were part of the GA network, northern and western Jutland Peninsula; and 3 Late TRB groups in contact with the GA network, southern Danish isles.

Abb. 1 Karte von Europa, die die Verbreitung im frühesten 3. Jt. v. Chr. zeigt von: 1 dem Kugelamphoren (GA)-Komplex; 2 Kugelamphoren inspirierte späte Trichterbecherkultur (TRB)-Gruppen, die Teil des Kugelamphoren-Netzwerks auf der nördlichen und westlichen Halbinsel Jütland waren; 3 späte TRB-Gruppen auf den süddänischen Inseln, in Kontakt mit dem Kugelamphoren-Netzwerk.

i.e., the Jutland Peninsula, which will be discussed further below. Moreover, even within the more narrowly defined GA complex, significant cultural variation and exceptions are found – including not only stylistic differences in material culture, but also variation on such fundamental parameters as settlement patterns, subsistence strategies and burial forms¹. This variation makes it meaningful to consider the supra-regional phenomenon we can identify archaeologically in terms of a range of different *constellations* of GA Culture. In other words, what extended across the vast area outlined in Fig. 1 were different versions of, or in some regions, more sporadic elements of GA Culture – rather than *the* GA Culture, understood as a uniform package. Nonetheless, as we shall see below, it still makes sense to discuss certain cultural trends in the realm of socioeconomic organisation that pervaded significant parts of the GA network and in many regions set it apart from previous Neolithic developments.

The following discussion presents examples of evidence informing on aspects of socioeconomic organisation in different parts of the GA network during the earliest 3rd millennium BC. In order to address ›socioeconomic organisation‹, in the sense intended here, the discussion will proceed from two starting premises. The first premise is that kinship structures – to a significant extent (though not exclusively) rooted in biological relations – are likely to have been central to the social organisation of most prehistoric communities, as indeed they are to traditional (premodern) societies more widely (cf. Bentley 2022). The second premise is that the same social organisation was, in turn, probably closely integrated with the configuration of economic activities, settlement forms, mobility and exchange patterns (Ember 2011). If these two premises are valid for understanding the socioeconomic organisation of communities in the GA network, it follows that approaches which

combine multiple lines of evidence, cross-cutting recent bioarchaeological advances and traditional archaeological data and including both regional and local scales of analysis, are more likely to succeed (cf. Johannsen et al. 2017; Racimo et al. 2020). As often in archaeology, the relevant types of data are not uniformly distributed within the GA network, thus underlining the importance of comparing across regions.

Socioeconomic organisation in the Globular Amphora complex

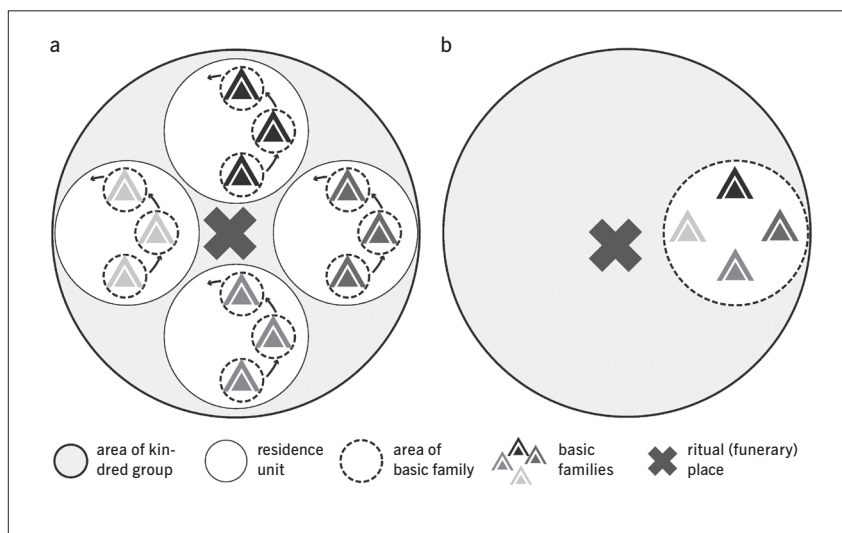
A classical model of GA socioeconomic organisation is shown in Fig. 2. This model was first developed as an attempt to capture and represent the overall impression of GA socioeconomic organisation that was forming on the basis of archaeological evidence concerning different aspects of GA Culture in Central Europe (Szmyt 1996; Czebreszuk/Szmyt 2011). To understand the basis for the model, we shall briefly summarise the information and interpretations underlying it. These data were partly available at the time when it was originally presented, but new finds and analyses have since then substantiated the model further.

Several lines of evidence have indicated that the subsistence economy of the GA was based mainly on animal husbandry, whereas arable agriculture played only a minor role. In addition to bone remains reflecting meat consumption in settlement contexts, the importance of animal husbandry is shown by abundant depositions of animals or animal parts in ritual contexts, e.g., joints of meat as accompanying food in human burials, and of more or less whole animals – often cattle – in ›animal burials‹, often associated with human graves. In addition to cattle, the domestic animals kept included pigs, sheep, goats and dogs (Woidich

¹ Szmyt 1999; Woidich 2014; Szmyt 2017; Piličiauskas et al. 2021; cf. Müller in press.

Fig. 2a–b Model of socioeconomic organisation of GAC communities in Kuyavia. a Maximal dispersion; b Minimal dispersion.

Abb. 2a–b Modell der sozioökonomischen Organisation der Kugelamphorenkultur-Gemeinschaften in Kujawien. a maximale Streuung; b minimale Streuung.



2014; Szmyt 2017). A limited number of stable isotope analyses (C and N) and lipid analyses on pottery, informing on the diet of GA individuals, have yielded results fully compatible with a diet predominated by meat and dairy from domestic animals (Eriksson/Howcroft 2013; Roffet-Salque et al. 2017; Schroeder et al. 2019).

The dominant form of GA settlement remains found are single homesteads and camp sites, whereas larger settlements with several, potentially contemporary houses are rare. However, there are clearly exceptions, for instance in the case of communities in Upper Silesia, which seem to have been an integrated part of the GA complex, but which nonetheless opted for living in longhouses in what appear to be classical agricultural farmsteads or larger hamlets also associated with previous Neolithic groups in the area². In general, though, both economic and settlement evidence indicate that most GA groups were relatively mobile (Müller 2001; Szmyt 2002; Woidich 2014). The basic pattern of mobility appears to have involved regular, relatively short-range movements within large territories, presumably for the purpose of seeking out optimal grazing for the animals across the annual cycle. Recent isotope analyses (⁸⁷Sr/⁸⁶Sr and $\delta^{18}\text{O}$) on humans and cattle have arrived at the same overall conclusion (Gerling 2015; Nowaczyk et al. 2017). Here, it is interesting to note an observation made in the western part of the GA complex, where GA sites tend to cluster differently in the landscape from both preceding and contemporaneous Neolithic (e.g., Bernburg) groups (Woidich 2014, 95–96). This observation potentially provides a further indication that the socioeconomic strategy of GA groups was somewhat distinct from that of these other Neolithic groups. Occasionally, mobility among GA communities may have involved farther-reaching movements but even though their mobility was likely configured mainly around needs and preferences associated with animal husbandry, it probably differed substantially from what we could refer to as full-blown pastoral nomadism (cf. Honeychurch/Makarewicz 2016).

GA communities buried their dead in a variety of different ways, with some regional variation. The most prevalent form is inhumation burial in a stone cist, but other forms, such as simple pit graves as well as larger tombs with stone kerbs or stone pavement, also occur regularly. Inhumation burial of more or less intact bodies dominates, but in some cases bodies are disarticulated, and partially or completely cremated human remains occur. Where larger funerary areas have been excavated, fewer than 20 individuals are usually found within the same cemetery (Nowaczyk et al. 2017; Szmyt 2017).

On the basis of the archaeological information on their economic strategy and settlement and mobility patterns, as well as the organisation of their cemeteries, the basic organisational unit of GA communities appears to have been the family or extended family group. However, these small groups probably aggregated into larger groups, plausibly tied together by kinship, on one or several occasions during the year (Szmyt 2002; Szmyt 2017). These aggregations most likely occurred at or near the cemeteries, which likely constituted a stable, cultural element across generations. Here, social interaction, including not least communal ritual activities, may have functioned to reinforce the coherence and identity of a larger group, whilst simultaneously coordinating or regulating the activities and social links between the smaller social units. Feasts or symbolic consumption of wealth, such as the slaughtering and deposition of cattle and other domestic animals (Pollex 1999; Szmyt 2006), are likely to have been particularly important in this connection. In addition to exchange of partners through cross-group marriage, one of the concrete organisational aspects probably negotiated at these localities was the division or sharing of land-use between groups, which is likely to have been crucial for a socioeconomic system emphasizing mobility. Here, the cemeteries may have played a key role as durable ideological reference points in the landscape (Szmyt 2002; Schroeder et al. 2019).

² M. Furmanek, Personal Communication. Kiel, March 17th, 2023.

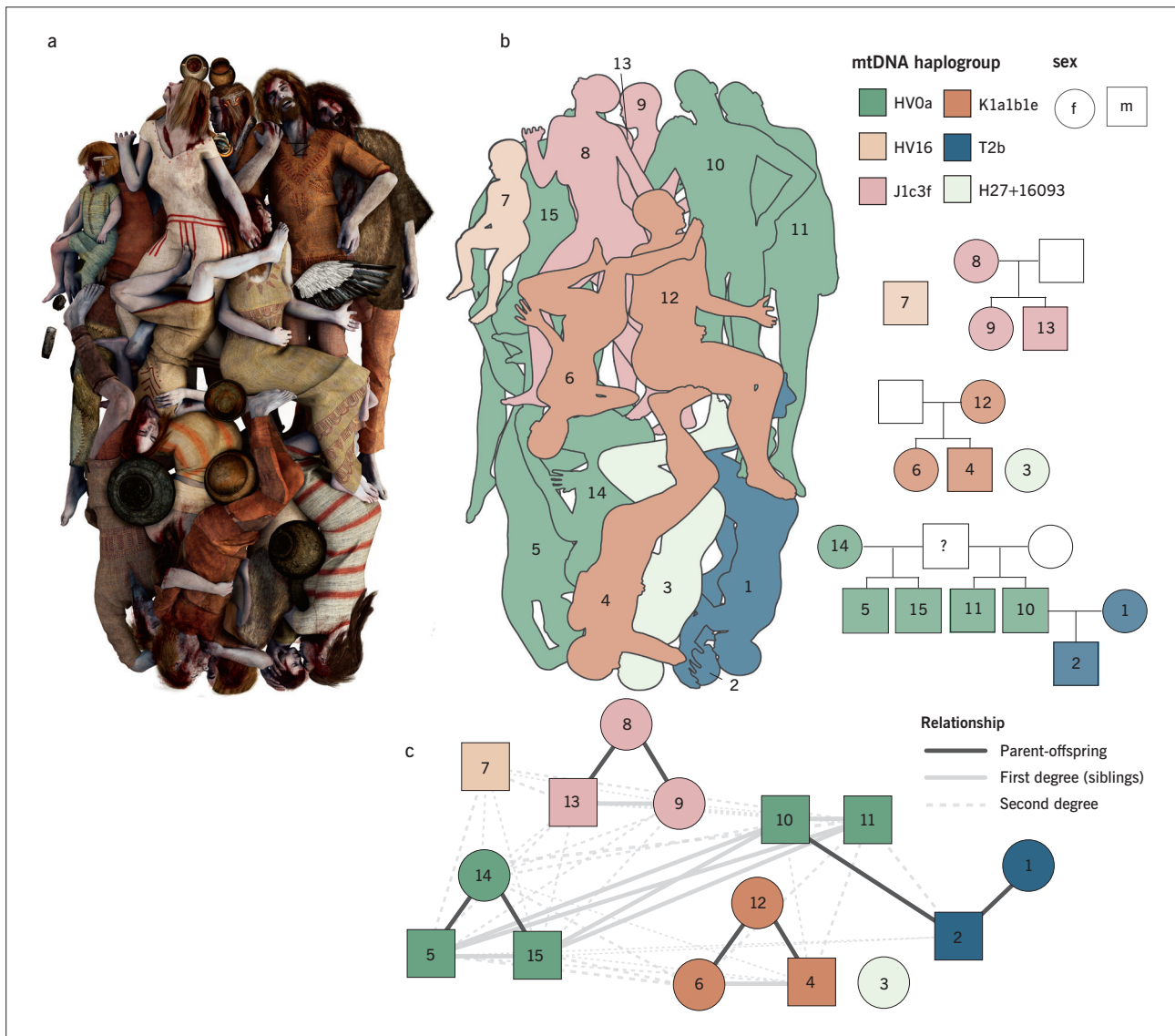


Fig. 3a–c a Artistic reconstruction of the Koszyce, Lesser Poland Voi. (Poland), mass burial based partly on phenotypic traits inferred from the ancient genomes; b schematic representation of the burial and pedigree plots showing kinship relations between the Koszyce individuals inferred from genetic data; c kinship network based on kinship coefficients inferred from IBS scores for pairs of Koszyce individuals showing first- and second-degree relationships.

Abb. 3a–c a Künstlerische Rekonstruktion der Massenbestattung von Koszyce, Voi. Kleinpolen (Polen), teilweise basierend auf phänotypischen Merkmalen, die aus den alten Genomen abgeleitet wurden; b schematische Darstellung der Bestattungs- und Ahnentafeln, welche die aus genetischen Daten abgeleiteten Verwandtschaftsbeziehungen zwischen den Individuen aus Koszyce zeigen; c Verwandtschaftsnetzwerk basierend auf Verwandtschaftskoeffizienten, die aus IBS-Bewertungen für Paare aus Koszyce abgeleitet werden, die Beziehungen ersten und zweiten Grades aufweisen.

Archaeogenetic evidence

The archaeological model of GA socioeconomic organisation summarised above was first developed well in advance of the breakthrough of genomic and genome-wide aDNA analyses. In this light, its compatibility with recent archaeogenetic results informing on the same topic is remarkable. In a recent study, H. Schroeder et al. (2019) were able to analyse in detail the biological relationships among 15 children, women and men, whose skeletal remains were found in a mass burial near the village of Koszyce, Lesser Poland Voi., in southern Poland in 2011 (Przybyła et al. 2013). As illustrated in Fig. 3, these individuals, who had all been killed by blows to the head, but who were then buried with GA material culture as grave goods, appear to have been members of

what we might call an ›extended family‹. Almost all of them were connected via several first- and second-degree relationships, and four nuclear families were identified in the grave, three of them represented by mothers and their children. As already indicated, the Koszyce mass burial reflects a violent event that was catastrophic to the group in question, and the under-representation of the older males/fathers in the grave further suggests that they were absent when disaster struck; indeed, although entirely hypothetical, it is possible that they were the ones who buried their kin. Whatever the case, the genetic information clearly confirms the impression that the seemingly careful placing of specific individuals next to one another had not been coincidental. Closely related kin were buried next to each other: a mother was buried holding her child, and in several cases siblings were placed side by

side. The only father present in the grave was individual 10, whose partner and son were placed together opposite him in the grave. And individual 14, the oldest individual in the grave, was buried close to her two sons (individuals 5 and 15), while individual 8, a 30–35 year-old woman, was buried with her teenage daughter (individual 9) and 5 year-old son (individual 13). The parents of a young boy (individual 7), aged 2–2.5 years, were not in the grave, but he had been placed next to other individuals to whom he was closely related through various second-degree relationships. Evidently, these individuals were buried by people who knew them well and placed them in the grave according to their family relationships (Schroeder et al. 2019).

Despite the atypical and dramatic background of the Koszyce burial, the buried individuals provide valuable information on the social structure and kinship system of the community that they represent. Looking at the burial arrangement in combination with the biological data, it seems clear that in this group, genetic and reproductive relationships were also considered key social relationships. Further, as exemplified by individual 3, an adult female who is not genetically related to anyone in the grave (but placed close to individual 4, a young man), the pedigrees of females and males in the grave show a clear pattern. According to mitochondrial DNA data combined with Y chromosome (NRY) data on the seven females and eight male individuals buried, there were six female lineages represented in the grave, while all of the males appear to belong to the same lineage (Schroeder et al. 2019). This suggests that the community at Koszyce was organised along patrilineal lines of descent, aligning with previous evidence suggesting that this was a common form of social organisation among Late Neolithic communities in Central Europe, often combined with female exogamy – i.e., women joining/marrying outside their own social group and into the group of their partner (Haak et al. 2008; Knipper et al. 2017).

While the genetic analyses of the individuals from the Koszyce mass burial do not in themselves prove any specific mode of socioeconomic organisation, the results are fully compatible with the archaeologically based model of GA socioeconomic organisation presented above. In particular, it seems on the one hand that nuclear families formed a basic social unit in the community in question but, simultaneously, also that these 'basic units' joined each other in larger, extended family groups, plausibly for parts of the year only – as indeed suggested by the archaeological model. Interestingly, evidence from another part of the GA network points to a similar mode of organisation.

The wider Globular Amphora network: the example of the Jutland Peninsula

On the Jutland Peninsula, Denmark, a body of evidence centring around the so-called stone heap grave custom is pertinent to the present discussion of socioeconomic organisation during the earliest 3rd millennium BC. The stone heap graves, which have been found at more than 50 sites located in a zone covering the northern and western parts of the

peninsula (see Fig. 1), are clear manifestations of the participation of their makers in the supra-regional GA network (Johannsen/Laursen 2010). Constructed during the period 3100–2800 BC, these graves appear to have been vehicle graves in which single individuals were interred either in a fully functional or more symbolic vehicle placed in a more or less rectangular structure and equipped with a draught team of two oxen (Fig. 4). The animals were placed with their bodies in the two associated oblong pits with their heads resting high on the adjacent surface, facing away from the quadrangular structure, as if ready to pull the vehicle behind them, before the whole structure was covered by a large heap of stones. As discussed at length elsewhere, the stone heap graves are clearly a particular regional manifestation of the custom of burying cattle, often in pairs, which was also practiced by many communities in the GA complex to the south and south-east of the peninsula (Johannsen/Laursen 2010; Johannsen/Kieldsen 2014; Johannsen et al. 2016).

Unfortunately, soil conditions in north-western Jutland have not permitted the preservation of organic remains that could provide a basis for archaeogenetic analyses of the buried individuals, as we have seen exemplified with the Koszyce grave elsewhere in the GA network. Despite this rather significant limitation, the stone heap graves do yield information that is directly relevant to our discussion here. The clear thematic focus of the stone heap graves is stressed by their alignment in small linear groups that in some places accumulated into large, linear cemeteries (Jørgensen 1977; Fabricius 1996). These followed the corridors of transport used in the area in question (Johannsen/Laursen 2010). However, what is particularly noteworthy in the present context is a clear pattern indicated by thorough typo-chronological analyses of the artefacts deposited as grave goods in these graves (Fabricius 1996, 210 ff.). Individual groups (rows) of stone heap graves seem to have accumulated, each on their own, across a longer time span, probably over generations. An illustration of this pattern is shown in Fig. 5, which shows a small group of graves at the site Øster Ristoft, western Jutland, but the same overall principle has also been identified at other sites in the north-western part of the peninsula, such as Bondesgård, Herrup and Øster Brændgård (Fabricius 1996, 214 ff.). Whether or not the cemetery at a given site encompassed a single or multiple groups of graves, each group appears to have its own history of accumulation. As noted by K. Fabricius (1996, 247), this pattern suggests that most of these groups reflect funerary activities of individual social units, possibly household or family units.

Looking into the wider landscape context of the stone heap grave custom may provide the necessary background for understanding this pattern, which seemingly emphasises small social units that in some contexts aggregated into larger units. Contemporaneous settlement evidence in the area consists of scattered occurrences of small-scale evidence for domestic activity and dwelling that appear to reflect a rather flexible way of inhabiting and moving around in the landscape (Davidsen 1978; Johannsen et al. 2016). The pollen record of this part of the Jutland Peninsula shows significant variation between sequences for different localities,

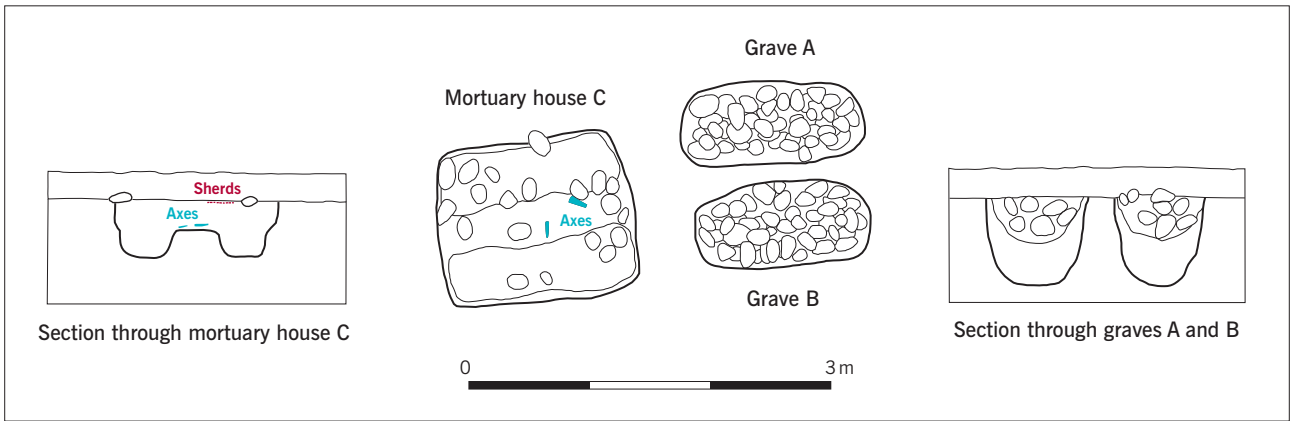


Fig. 4 Stone heap grave at Vroue Hede, northern Jutland Peninsula (Denmark), in plan and section. The finds have been plotted onto the section through the quadrangular feature C (Vroue Hede II, Structure IX).

Abb. 4 Steinhaufragrab bei Vroue Hede, nördliche Halbinsel Jütland (Dänemark), im Grundriss und im Schnitt. Die Funde wurden auf dem Schnitt durch den viereckigen Bef. C (Vroue Hede II, Struktur IX) aufgetragen.

but the dominant picture is a trend towards a gradual opening of the landscape with larger areas of pasture forming during this period (and continuing in the subsequent Corded Ware period) (Odgaard 1994; Andersen 1998; Hübner 2005, 702–707). Together with the settlement data, the pollen record thus points towards the predominance of a particular socioeconomic strategy, with an emphasis on animal husbandry, in northern and western Jutland during the earliest 3rd millennium BC. Furthermore, when plotted on a soil classification map, sites with stone heap graves can be shown to be located predominantly in areas with different types of sandy soil, combined with a relative vicinity to

the coast/fjords and/or major river valleys (Fig. 6). While the light, nutrient-poor soils in these areas are of very low quality for traditional arable agriculture, the vegetation here is correspondingly sensitive to a sustained grazing pressure, which would quickly have promoted growing patches of open land, dominated by grasses and herbs – i.e., further grazing potential. And with good access to shore meadows, river valleys and drier parts of the inland, a pattern of settlement and mobility centred around these sites would have been particularly well-suited to provide suitable foraging environments for the animals at different times of the year (Johannsen et al. 2016).

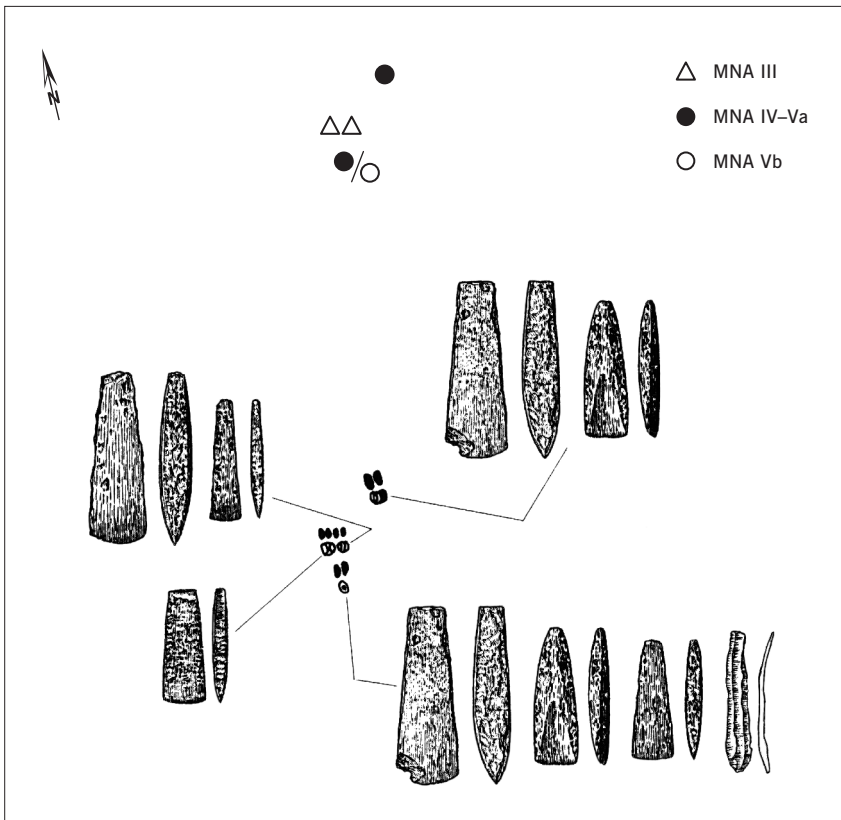


Fig. 5 Relative dating of four stone heap graves excavated at Øster Ristoft, western Jutland Peninsula (Denmark). The graves are dated typo-chronologically to three subsequent sub-periods of the regional chronology (MN = Middle Neolithic), representing an approximate time span of 200 years, c. 3000–2800 BC.

Abb. 5 Relative Datierung von vier Steinhaufragravern, die in Øster Ristoft, westliche Halbinsel Jütland (Dänemark), ausgegraben wurden. Die Gräber sind typo-chronologisch auf drei aufeinanderfolgende Unterperioden der regionalen Chronologie (MN = Mittelneolithikum) datiert, was einer ungefähren Zeitspanne von 200 Jahren entspricht, also ca. 3000–2800 v. Chr.

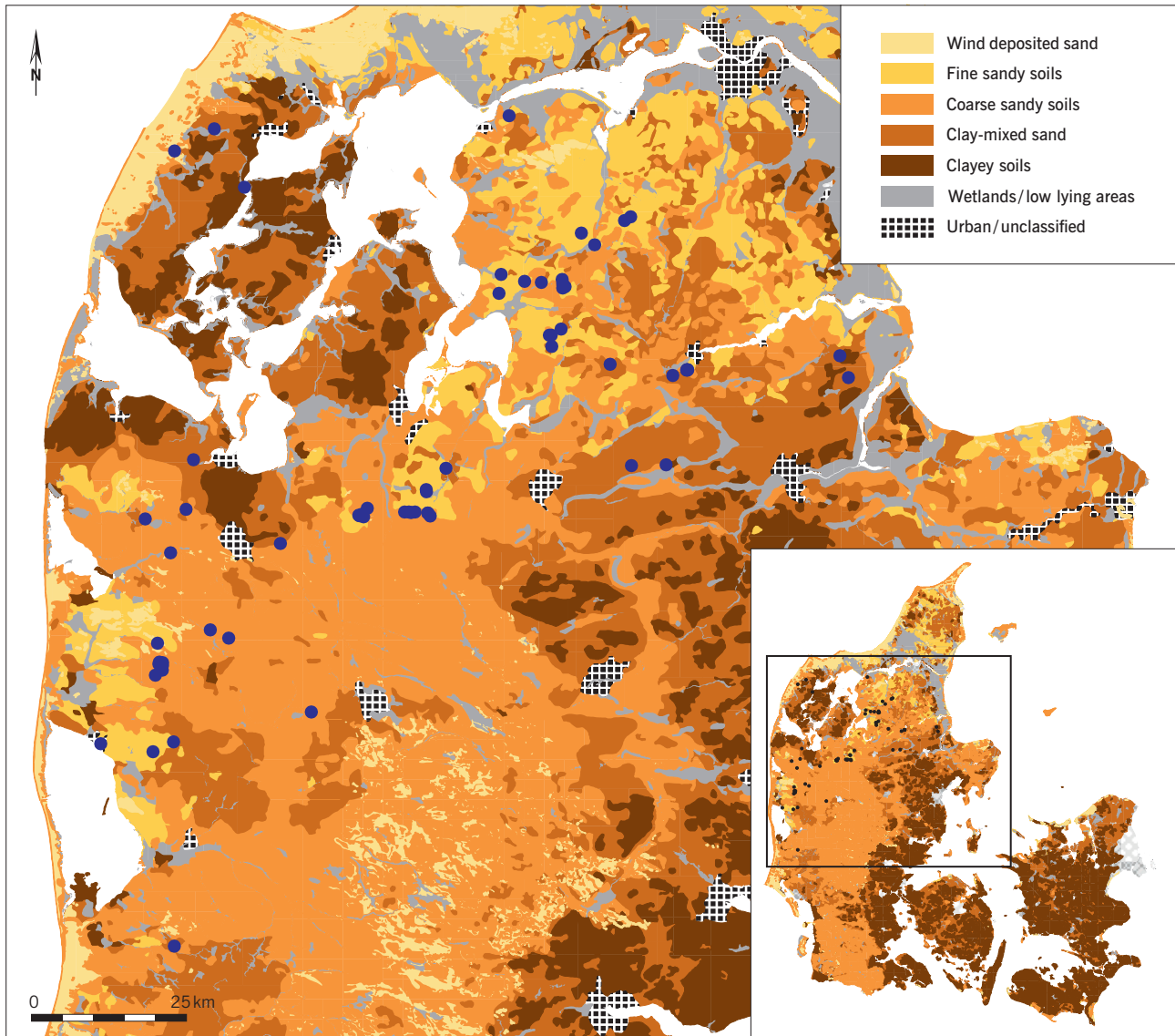


Fig. 6 Distribution of stone heap graves (blue dots) sites in relation to different soil types on the Jutland Peninsula.

Abb. 6 Verteilung der Steinhaufragraber (blaue Punkte) in Bezug auf verschiedene Bodentypen auf der Halbinsel Jütland.

Conclusion

As illustrated by the brief discussion above, very different lines of evidence point to rather similar conclusions regarding the socioeconomic organisation of communities in several different regions within the GA network. Even if the evidence is somewhat uneven and variable in character, it does indicate the emergence of a type of socioeconomic organisation that differed from those of previous Neolithic groups. A further observation is that combining different lines of evidence – from traditional archaeological data to recent archaeogenetic results – seems to lend support to the initial assertion of this discussion, namely that biological kinship patterns, social organisation and the economic strategies chosen by these communities were closely and functionally integrated with one another. Future work will hopefully strengthen our basis for inferring socioeconomic organisation in the GA network (and in other past societies), particularly by building up broad-spectrum regional data-

sets that look beyond individual sites and types of data (Johannsen et al. 2017). However, even on the basis of the present state of research, and despite the limitations of this brief treatment, looking across different lines of evidence does allow us to sketch a picture that is likely to have been more or less valid for many (but not all) of the communities that participated in the GA network.

In summary, a probable mode of life for many groups in the GA network can be described in the following way: Families, or extended families, sustained themselves mainly through animal husbandry supplemented by some other resources, wild as well as domestic, and moved within a defined (if perhaps loosely defined) territory up to several times in a year. Potentially, these groups may have split up into even smaller subunits when favourable, e.g., with some individuals staying at the base settlement and some herding animals to exploit particularly good feeding opportunities for a limited period of time. At certain times, basic social units aggregated into larger groups at ideologically

key points in the landscape, perhaps concentrating mainly near the cemeteries, where social, economic and biological exchange took place; allowing socioeconomic rules and territorial agreements to be reconfirmed or negotiated anew. The socioeconomic organisation of these communities thus appears to have combined substantial, probably cyclical, mobility with normative and physical elements of stabilisation that allowed for a predominantly pastoral land-use, while maintaining pro-social interaction between related

groups inhabiting the same regional landscape. Needless to say, the picture just sketched is in part hypothetical, but hopefully the discussion above has illustrated ways towards establishing a more accurate and nuanced understanding of how life was organised among communities in the Globular Amphora network – and towards understanding prehistoric socioeconomic organisation more broadly through combinations of molecular and more traditional archaeological lines of evidence.

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Sources of figures

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|---|--|---|
| <p>1 1 following Szmyt 2003, 403 Fig. 1; Woidich 2014, 90 Fig. 18 with additions;
2 following Johannsen et al. 2016, 37 Fig. 1 with additions;
3 following Woidich 2014, 90 Fig. 18</p> | <p>2 after Czebreszuk/Szmyt 2011, 279, Fig. 8; cf. Szmyt 1996
3 after Schroeder et al. 2019, 10708, Fig 3; reconstruction by M. Podsiadło
4 redrawn after Jørgensen 1993, 113
5 after Fabricius 1996, 221 Fig. 321</p> | <p>6 after Johannsen et al. 2016, 47 Fig. 9</p> |
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