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The Scandinavian reindeer (*Rangifer tarandus* L.) after the last glacial maximum: time, seasonality and human exploitation

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Abstract

Antlers and bones of reindeer (*Rangifer tarandus* L.) are the most frequently found vertebrate remains from the Late Glacial deposits of Southern Scandinavia. The Danish collection now consists of more than 350 specimens and of these 47 have been radiocarbon dated extending the range of occurrence in the area with ca. 1300 ^{14}C yr. Thus the first occurrence is pushed back to ca. 12 500 ^{14}C yr BP (late Bølling chronozone) while the youngest date lies at ca. 9200 ^{14}C yr BP (late Preboreal chronozone) establishing that the reindeer survives well into the Holocene. The seasonal dates of the reindeer indicate for the first human occupation (the Havelte group from the Bølling period) a summer, autumn and early winter occupation, with reindeer, as well as man, apparently being absent during the coldest winter months. Finally, it is shown that Southern Scandinavia acted as a calving area throughout the Late Glacial and Early Holocene thus discrediting the North–South model of reindeer groups moving from a wintering area in Southern Scandinavia to a calving area in the foothills of the North European plain.

Keywords: Reindeer; *Rangifer tarandus*; Late Glacial; South Scandinavia; Seasonality; Human exploitation

1. Introduction

This paper is primarily based on new investigation of the now 358 reindeer specimens known from Denmark. The first question deals with the timing of the reindeer of which 47 have now been radiocarbon dated. The next question is about seasonality as many earlier interpretations are in conflict with the evidence at hand. The third, and last, problem deals with the human exploitation of reindeer in this area, and only the oldest Danish site of Slotseng, from around 12 500 cal BC, has the direct information, a faunal material. All the later sites are devoid of faunal material and must accordingly be judged indirectly as to their function along the reindeer path.

Antlers and bones of reindeer (*Rangifer tarandus* L.) are the most frequently found vertebrate remains from the Late Glacial deposits of Southern Scandinavia. Palaeozoologist have focused on the taxonomy and on the physical appearance of the species as well as on its importance as a climatic marker. Archaeologists, on the other hand, have underlined its importance as the main food resource for the initial human colonization and occupation of Northern Germany and Southern Scandinavia during the Late Glacial. This is the period of the so-called specialized reindeer hunters of the tundra. At the same time both groups of researchers have speculated on the migration pattern of the reindeer, but have always had very little evidence to go by, which, alas, still remains the case.

In 1959 came the comprehensive monograph on the Danish reindeer by Degerbøl and Krog (1959), dealing with the biology and chronology of the 200 then known specimens. Here it was stated that the Danish reindeer were only of a Late Glacial age, and so were the Scanian ones. They also remarked

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that: "Altogether, the large amount of shed antlers, and that of young animals and females, too, in Denmark indicates that at least many reindeer lived in this area even in winter". Considering the evidence at hand, this was indeed a most unfortunate statement, and as such it has also misled a number of people. We shall return to this remark later! They also stated: "It is not necessary to suppose that there were a special North-South migration … there might have been an East-West migration as well. The reindeer of the Eastern and Northern parts of Europe, where the snow cover was high, might in winter have made for the West, were the snow cover was thinner. The reindeer herds may more or less have followed the border of the Baltic Ice-lake" (pp. 99–100).

Liljegren (1975) has published a catalogue of the Swedish reindeer, and later Liljegren and Ekström (1996) have commented upon the palaeoecology as well as on the dating of the species, and so have Björck et al. (1996). One of us (Aaris-Sørensen, 1998) has recently given a short overview of the Danish reindeer in connection with a survey of the local faunal history. Most recently, Larsson et al. (2002) have discussed the faunal as well as the archaeological significance of some radiocarbon dated Late Glacial reindeer bones from the kettle hole at Hässleberga in Scania, Southern Sweden.

By including the Scanian results, our contribution outlines the Late Glacial and Early Holocene history of the South Scandinavian reindeer as well as discusses the present evidence of its former seasonal distribution. The few reindeer remains found redeposited in sediments antedating the Last Glacial Maximum are not dealt with here, but see Aaris-Sørensen (2006).

According to Degerbøl and Krog (1959) the morphology of the Danish reindeer indicates affinity with the Eurasian tundra reindeer (*Rangifer tarandus tarandus*), and so does the Swedish (Björck et al., 1996) as well as the reindeer population of Schleswig-Holstein (Gripp, 1937, 1943; Kollau, 1943; Krause, 1937).

The osteological collection at the Zoological Museum, University of Copenhagen, has been used as reference.

2. Materials

In all, 358 Danish reindeer specimens from about 300 localities have been recorded, most of them found in the freshwater deposits of kettle holes during peat cutting (Fig. 1). The vast majority of the material consists of shed antlers. Most of these belong to males, while only 26 antlers have been identified as coming from females, and these usually consist of larger parts of the beam, but with the tines broken off. Female antlers, being smaller than most male antlers, have clearly escaped the attention of the peat cutters. Other remains are skulls or part of skulls with attached antlers, different postcranial elements and the single, but complete skeleton from Villestofte (Fig. 2). The bones and antlers from the archaeological site of Slotseng are also included in this material (Holm et al., 2002).

3. Dating

This paper presents 47 direct radiocarbon dates (Table 1 and Fig. 3) performed at the laboratories in Copenhagen (conventional) and in Aarhus (AMS). The selection of samples was based primarily on geological indications trying to secure the oldest and the youngest evidence. Two of the radiocarbon dated specimens were previously dated by pollen analysis (Degerbøl and Krog, 1959) and the two sets of results are in good agreement with each other. Thus the Villestofte reindeer from the Older Dryas has been dated to 12 080 ± 90 BP while Søhjem, Bornholm, from the Younger Dryas, now dates to 10 120 ± 140 BP.

Due to this dating program the general time span for reindeer in the Danish region has now been expanded, with the first occurrence of the species being pushed back to ca. 12 500 BP, while the youngest date lies at ca. 9200 BP. This range corresponds to the late Bølling, Older Dryas, Allerød, Younger Dryas and most of the Preboreal chronozones (Mangerud et al., 1974). If calibrated into calendar years using the OxCal3 program the reindeer seems to have occupied the Danish area from around 12 700 cal BC to 8400 cal BC. This time span for the reindeer in Denmark corresponds well with the present evidence from Schleswig-Holstein with youngest appearance dated to the very end of the Younger Dryas and to the Preboreal (Benecke, 2004; Fischer and Tauber, 1987). In England the reindeer also disappeared during the Preboreal, the youngest dates lying around 9600–9700 BP in Kitley Shelter Cave and Aveline's Hole in Southwest England (Coard and Chamberlain, 1999).

However, going North as well as Northeast, from the North German/Danish area, there seems to be a delay in the immigration of reindeer into these neighbouring provinces. First of all, the oldest dates from Scania are practically a thousand years later around 11 700 BP (Björck et al., 1996), with a population being established around 11 500 BP. Also here the youngest date for reindeer is Preboreal (Larsson et al., 2002). As far as we know, there are not yet any radiocarbon dated reindeer remains from Mecklenburg and Vorpommern (Terberger, 2006; Terberger and Lübke, 2004) although several finds have been made in the past.

4. Timing of the Scandinavian reindeer

After the Last Glacial Maximum (ca. 30 000–20 000 cal BP) the deglaciation led to an ice-free Danish–Swedish area as early as 13 000 cal BC according to Houmark-Nielsen and Kjær (2003). A first expansion of the North European mammalian fauna into Southern Scandinavia is seen even during the deglaciation as documented by remains of *Saiga tatarica* (Aaris-Sørensen et al., 1999) and of *Mammuthus primigenius* (Berglund et al., 1976).

The second, but major immigration wave, begins right after 13 000 cal BC and includes, beside the reindeer, other larger mammals such as *Alces alces*, *Megaloceros giganteus*, *Equus ferus*, *Lepus timidus*, *Ochotona* cf. *pusilla*, *Castor fiber*, *Ursus arctos*, *Canis lupus*, *Alopex lagopus* and *Gulo gulo*, not forgetting *Homo sapiens* (Aaris-Sørensen, 1998, in press). Among these the reindeer yields the oldest date of 12 520 ± 190 BP (AAR-906) corresponding to the time shortly after the beginning of the Bølling period. This specimen (a piece of worked