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EDITED BY
Joakim Wehlin,
Uppsala University, Sweden

*CORRESPONDENCE
Eva Svensson,
✉ eva.svensson@kau.se

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Kårebolssättern and other shielings - the emergence and development of Swedish transhumant pastoralism

Eva Svensson^{1*}, Susanne Pettersson² and Annie Johansson³

¹Risk and Environmental Studies, Department of Political, Historical, Religious and Cultural Studies, Karlstad University, Karlstad, Sweden, ²Norsk Folkemuseum, Oslo, Norway, ³County Administrative Board, Karlstad, Sweden

Transhumant pastoralism, characterized by the seasonal movement of livestock, has been a traditional practice in various forms globally for millennia. The Scandinavian shieling system—specifically, the Kårebolssättern site—exemplifies this practice, where designated areas provide grazing and dairy processing facilities. However, many of these systems, including Kårebolssättern, have faced abandonment or decline, primarily due to modernization and industrial forces. An interdisciplinary research project compared Kårebolssättern's history to other shielings in Sweden. The study utilized various methodologies, including pollen analysis, archaeological mapping, and historical documentation, to trace human impact and land use, indicating shifts between grazing and cereal cultivation. Findings demonstrated that Kårebolssättern had significant early cultivation of barley and hemp, and by the 13th century, its use intensified amidst changes in local agricultural conditions. Four chronological phases regarding the emergence and development of Swedish shielings over two millennia were detected. The results offer insights into the adaptability of shielings amidst socio-economic transformations. As modern pressures threaten the remaining shielings, preserving their historical significance and adaptive strategies may provide pathways for their future survival. The study ultimately highlights the resilience of pastoral practices within evolving landscapes.

KEYWORDS

transhumant pastoralism, shieling, archaeology, pollen analysis, landuse history

Introduction

Transhumant pastoralism, in locally adaptive forms, has been practised globally for millennia. Currently, many pastoral transhumance systems have been abandoned or significantly reduced, and are struggling to survive. The Scandinavian transhumance system, based on shielings, is among these. The classic Scandinavian shieling consisted of a fenced site in outlying areas at a distance from the farmstead, including structures for dwelling, stabling livestock, processing milk, meadows for haymaking, and often small fields for cereal cultivation. This practice formed a long-standing tradition in boreal

Scandinavia, but most shielings were closed during the 20th century. The few remaining shielings have adapted to new societal demands, such as nature conservation, heritage management, and tourism, with livestock often playing a reduced role (Svensson et al., 2023).

We recently concluded an interdisciplinary research project, encompassing archaeology, palaeobotany, and historical geography, on the history of the Kårebolssättern shieling. In this paper, we present the results of the project, comparing them with findings from other investigated shielings in Sweden. We then discuss the outcomes of the compiled results regarding the emergence and development of shielings.

Shielings – a background

Shielings are mostly found in the forested and mountainous areas of boreal Scandinavia, where fertile agrarian land was scarce and spread across large distances. Shielings enabled the use of grazing areas in the forest, distant from the farmstead, and included meadows for haymaking. Hay was of utmost importance for the winter stabling of livestock. It is noteworthy that at shielings dwelling houses and cow houses are located along the fenced border of the shieling, while barns are situated in the meadows at the centre. The livestock grazed in the forest outside the shieling and were only allowed into the meadows after the hay had been harvested. Therefore, cow houses had entries for the livestock facing the forest and for people handling milking and dung collection facing the shieling. The hay from the shieling, which was important winter fodder for the livestock, had to be protected until it could be moved.

Due to the distance from the farmsteads being too great for daily travel, herders and livestock stayed at the shieling during the summer grazing season. Unlike most other transhumance systems, the herders were mostly women, who were also responsible for milking and dairy production, such as butter and cheese (Costello and Svensson, 2018; Szabó, 1970).

The use of shielings was organised cooperatively by the different part-owners. They were adhering to strict regulations, including monitoring the use of their shielings. Herders and livestock would depart for the shieling on a specific day in the spring or early summer and return on a set date in early autumn. Each shareholder of the shieling was allowed to bring a certain number of livestock to ensure all partners in the cooperative received their rightful share of grazing and hay (Larsson, 2009; Svensson, 1998).

The shieling system reached its peak in the second half of the 19th century before declining due to modernisation and industrialisation. Forest grazing increasingly conflicted with forestry objectives, as livestock, particularly goats, were seen to damage young trees through trampling and grazing (Björkbom, 1907).

Emergence and context

Shielings share the boreal landscape with other archaeological sites, such as bloomery iron production sites, pitfalls for elk (and sometimes reindeer) hunting, and tar and charcoal production sites. These activities, the extraction and utilisation of forest resources in outlying areas, are called outland use (Sw. *utmarksbruk*). Shielings are also a kind of outland use and were interconnected with various outland use activities through common cooperative work organisations, labour division and seasonal planning of the various tasks. Much of the outland use production was aimed at trade. Periodically, when the market was favourable, trade in outland use goods could be intense, overshadowing agrarian production, including the use of shielings (Emanuelsson et al., 2003; Magnusson, 1986: 282-3; Svensson, 1998). This is a topic we will return to in the Discussion. There are also, though less common, burial sites, some of which are even located on shielings (Liasen, 2003: 101).

The emergence and development of shielings have been subjects of scholarly debate for over a century, involving various academic disciplines. Early studies relied on proxy data such as place names, stray archaeological finds, and information in written documents and historical maps from early modern to modern times. As a result, suggestions for the emergence of shielings have varied, ranging from the Late Stone Age to early modern times (e.g., Cabouret, 1989; Erixon, 1918; Erixon, 1956; Frödin, 1925; Hougen, 1947; Larsson, 2009; Sandnes, 1989). Major methodological breakthroughs for studying the history of shielings were provided by palaeobotany, pollen analyses, in the last decades of the 20th century. Pollen analyses show the development of vegetation and land use at a site thus giving the information on *when* different kinds of land use, such as grazing and cereal cultivation, started, increased, declined and ceased. Thanks to solid data on land use history from pollen analysis, often combined with archaeology, the initial agrarian land use activities at several shieling sites could be dated to the centuries around the middle of the first millennium AD (e.g., Emanuelsson, 2001; Emanuelsson et al., 2003; Karlsson, 2001; Kvamme, 1988). This corresponds to a period when other outland use activities and trade in outland use commodities became more prominent in boreal Scandinavia (Hennius, 2021).

Methods

Kårebolssättern is situated on a forested mountain plateau at 348 m.a.s.l., by a lake, Kårebolssjön, which is connected to major watercourses. The shieling was abandoned in 1973, but reclaimed in 1988 and uniquely well restored for the region. Kårebolssättern was not selected for study because we, the researchers, considered it particularly interesting from a historical perspective. On the contrary, we presumed that Kårebolssättern would have a

relatively recent history. Instead, our motivation was to support the active action group dedicated to preserving Kårebolssäteren and the extensive work they had done and continued to do to keep it alive. The action group valued knowledge about the history of their shieling as inspiration for their ongoing efforts to preserve Kårebolssäteren (Eddudóttir et al., 2021; Svensson et al., 2023).

Various methods and sources were used to investigate Kårebolssäteren. Initially, historical maps, available from the early 19th century onwards, and sporadic information from written records were compiled. A field survey followed, with detailed mapping of visible surface remains of houses, clearance cairns, fields, and other historical activities. In addition, a soil probe was used to check for potential cultural layers underneath the surface. Recorded remains were described and positioned with GPS. Additionally, LIDAR data was checked but did not provide further information. The next step was sampling a core from Lake Kårebolssjön, adjacent to Kårebolssäteren, for pollen analysis (Eddudóttir et al., 2021). Finally, three house foundations were selected for partial archaeological excavations, including sampling for carbon-14 dating and macrofossil analyses. The excavations mainly targeted house foundations presumed to belong to the older phases of Kårebolssäteren in order to obtain information on house construction and dating. These excavations were challenging, as is often the case at shielings when excavating older house foundations, where cultural layers were very thin and merged with the natural ground, making stratigraphy complex to interpret. Oral information was regularly obtained through interactions with members of the Kårebolssäteren action group.

The comparative material consists of published and reported investigations of shielings in boreal Sweden, where the investigation included at least one of the following methods: archaeological survey (most often including the use of historical maps), archaeological excavation, or pollen analysis. Thanks to the authors' long-standing (30 years) research activity in the field, several reports and publications were known. The compilation of information was further conducted with searches in The National Heritage Board's database for archaeological sites and monuments¹ for reported excavations regarding the site category "fäbod" and free-text search on the words "säter" (Sw.) and "fäbod" (Sw.) with variations, and The Digital Scientific Archive for Swedish scientific publications,² including student essays and grey literature, using search terms (and variations thereof) such as "shieling," "summer farm," "säter" (Sw.) and "fäbod" (Sw.).

Altogether we found information on 32 shielings, including Kårebolssäteren, which have been investigated using detailed

archaeological mapping, excavation, and/or pollen analysis to some degree. The quality of the material varied, and not all investigations have provided useful results and datings. For instance, most contract archaeological excavations of shielings were very limited. Undated shielings have been excluded from the analysis but are included in Table 1 and Figure 3.

The compiled material was analysed regarding the chronology of the sites; the emergence of agrarian land use (grazing and cereal cultivation), the construction of buildings, and periods of increase and decrease of the use of the sites. As described in the introduction, pollen analysis provided the major breakthrough for establishing the chronology of shielings (e.g., Emanuelsson, 2001; Emanuelsson et al., 2003; Karlsson, 2001; Kvamme, 1988). In this sense, excavations and surveys have been less successful, as archaeology has not been able to detect the oldest settlement structures, and there is a lack of knowledge on how to locate them. Thus, investigations using pollen analyses are to be considered the most useful ones. It should also be noted that not all excavation projects were focused on uncovering the origins of shielings, but rather aimed to answer other research objectives (e.g. Andersson et al., 2011).

Most datings of shielings, whether based on pollen diagrams or charcoal sampled in excavations of land use or settlement structures, rely on the carbon-14 method. Over the years, archaeologists' sampling skills, laboratory processes, and calibration methods have evolved, resulting in increased reliability and precision in the carbon-14 dating, which can be noted in the more recent investigations of shielings. On the other hand, the use of pollen analysis at shielings is more infrequent in the younger investigations which are dominated by contract archaeology projects not being able to fund pollen analyses.

Results

The results section is divided into two parts: first, the findings from Kårebolssäteren are presented, followed by a summary of the other investigated shielings in Sweden.

Kårebolssäteren

Kårebolssäteren first appears on historical maps in 1815. Subsequently, the shieling is depicted on several younger historical maps, which were used to plan the field survey.

During the 2018 field survey, a total of 45 remains were mapped and described: 12 house foundations, two wells, three areas with cultural layers, two fields and features indicating additional fields, seven border stones or cairns, and approximately 10 larger clearance cairns. Several smaller clearance cairns were also mapped but not described. A few of the house foundations and a feature recorded as a pit were assessed as pre-modern, based on similar dates for house

1 Fornsök, <https://app.raa.se/open/fornsok/> (2024-07-04).

2 DIVA, <https://www.diva-portal.org/> (2024-07-04).

TABLE 1 Investigated shielings in Sweden.

Shieling, Parish	Fornsök Identifier	Survey	Excavation	Pollen analysis	Dating AD	Phase	References
Kårebolssäteren, Norra Ny	L2004:818	X	X	X	100 BC	1	Eddudóttir et al. (2021)
Backadammen, Dalby	—	X		X	400-750	1	Emanuelsson et al. (2003)
Backasäteren, Dalby	L2007:2788	X	X	X	500-800	2	Emanuelsson et al. (2003)
Bäntebysäteren, Dalby	L2008:8488	X		X	14th century	3	Olsson (1998), Svensson (1998)
Gammelsäteren Likenä, Dalby	L2007:3755	X		X	c. 700-800	2	Olsson (1998), Svensson (1998)
Ransbysäteren, Dalby	L2007:3110	X	X	X	c. 1000-1200	2	Olsson (1998), Svensson (1998)
Gammelsäteren Treskog, Gunnarskog	L2007:9592	X		X	c. 1000-1200	2	Olsson (1998), Svensson (1998)
Ingersbysäteren, Gunnarskog	L2007:9166	X	X	X	13th century	3	Johansson and Svensson (2002), Olsson (1998), Svensson (1998)
Fryksås Fäbod, Orsa	L2000:3003		X		—	—	Grahn Danielsson (2019)
Trygåsvalen, Särna	L1998:26		X	X	c. 1000	2	Pettersson (2008), Segerström et al. (1996)
Torkelsbovallen, Ljusdal	L1950:546		X		8th century	2	Liasen and Olsson (2000)
Lembyvallen, Ovan sjö	L1950:1037		X		—	—	Hovanta and Groop (2020a)
Myrbyvallen, Ovan sjö	L1950:2077		X		Viking Age	2	Hovanta and Groop (2020a)
Munkebovallen, Oviken	L1945:1750		X	X	1300-1500	3	Bengtsson (2007)
Gammelvallen Ängersjö, Ängersjö	L1945:668	X	X	X	c. 700-900	2	Emanuelsson et al. (2000)
Öjingsvallen, Ängersjö	L1945:607		X	X	c. 350-650	1	Karlsson (2001)
Gammalbodarna, Laxsjö	L1947:8053	X (phosphate)	X		—	—	Hansson and Oskarsson (1998)
Skärs gamla fäbodvall, Nederluleå	L1992:9657		X		18th-19 centuries	4	Bennerhag and Palmbo (2015)
Marma fäbod, Älvkarleby	L1941:7879		X		—	—	Karlenby (1993)
Gärde fäbod, Lövånger	L1937:8267	X	X	X	Iron Age-Middle Ages	2	Östlund (2020)
Stock bys fäbodställe, Umeå	L1937:7194		X		19th century	4	Andersson (2013)
Lilla Hökberg, Mora	L2000:4593			X	c. 900-1200	2	Emanuelsson (1997)
Svartviksbodarna, Stora Skedvi	L2000:9646				18th century	4	Andersson et al. (2011)
Gammalbodarna, Ås	L2019:3138	X	X		18th century	4	Jonsson (2020)
Almberg, Leksand	L2000:1341(1342)	X	X		—	—	Bennström (2019)
Dammskog, Leksand	L2000:1886 (etc.)	X	X		Late Middle Ages - Early Modern Times	3	Skjyllberg and Emanuelsson (1996)
Skallskog, Leksand	L2000:1250	X	X	X	Viking Age	2	Skjyllberg and Emanuelsson (1996)
Gränsberg, Leksand	L2000:1648	X			—	—	Skjyllberg (1993)

(Continued on following page)

TABLE 1 (Continued) Investigated shielings in Sweden.

Shieling, Parish	Fornsök Identifier	Survey	Excavation	Pollen analysis	Dating AD	Phase	References
Brattbergsbodarna, Hanbo	L1951:5594	(X)			—	—	Hovanta and Groop (2020b)
Gräftåvallen, Oviken	L1945:2255	(X)			—	—	Wennstedt Edvinger (2021)
Våsbo fåbodar, Ovanåker	L1948:6969		X		18th century	4	Eriksson (2014)
“Valberget”, Fryksände	L2005:6597	X	X		15th century	3	Olsson (2005)

Table: Eva Svensson and Susanne Pettersson.

foundations at other shielings (Figure 1). The northern part of Kårebolssättern appeared “younger”, as soil layers were thinner and vegetation bushier, and was interpreted as a more recent extension of the shieling (Eddudóttir et al., 2021). It appears likely that the western part, being closest to Lake Kårebolssjön, was the oldest part.

A pollen core was sampled from the adjacent lake during the winter of 2019. According to the pollen analysis,³ the first evidence of human impact dates to around 100 BC, when small-scale cultivation of barley and hemp was detected. From approximately 250 AD, Kårebolssättern appears to have expanded, particularly from around 570 AD when the forest was modified for grazing. This expansion was followed by a decline in the use of Kårebolssättern during the period c. 1000–1250 AD. After this, the shieling began to grow more substantially, with the most significant changes in the pollen assemblage indicating substantial grazing of livestock and the cultivation of barley and hemp, although pollen from oats and rye occasionally appear in the pollen diagram (Eddudóttir et al., 2021).

The excavations at Kårebolssättern aimed at finding house structures corresponding to the early dates from the pollen analysis, and date the extensions of the shieling over time. House foundations from buildings interpreted as dwelling houses or cow houses located in the meadows of Kårebolssättern could reflect an older outer border of the shieling. As these house foundations were among those characterised as pre-modern, one was selected for excavation (B1). Additionally, a house foundation of pre-modern character located in the presumed oldest area was selected (B2). The third selected house foundation (B3) was located in the northern, presumably youngest, extension of the shieling.

B1 consisted of a low, flat area surrounded by low ramparts and a stone structure (possibly a hearth) in the northwest corner. It was dated to the 16th century. B2 appeared as an elevated

surface marked by low ramparts. A post-hole in the centre of the building was dated to AD 1224–1287, but additional datings to the 16th century indicate a later reuse of the site (Figure 2). B3 consisted of a sunken cellar surrounded by six sill stones. A layer with remains of charcoal under the building was dated to AD 435–604, probably representing the clearing of trees with fire for promoting grazing of the northern extension of the shieling. The house was dated to be younger than AD 1662.

The results show that Kårebolssättern developed over time as follows: From around 100 BC, a small area, most likely in the western part, was used for the cultivation of barley and hemp, and probably some livestock grazing. In the 7th century, a significant clearing of the shieling occurred, including the northern part, for grazing and hay production, evident both in the pollen diagram and in the dating of the clearance for grazing in the northern part. No buildings from these periods have been detected in spite of great efforts to locate them. The expansion was followed by a decline during the period c. 1000–1250 AD, indicated by forest regrowth at Kårebolssättern.

After 1250 AD, the shieling expanded again, with the oldest dated house foundation corresponding to the beginning of this expansion. The next expansion phase, more visible in mapped and excavated houses than in the pollen diagram, appears to have occurred in the 16th century when Kårebolssättern expanded eastward. It was likely fenced to the north along the excavated building remains in the middle of the meadow. The final expansion phase likely took place before 1815, when the earliest map shows the current extent of the shieling.

Swedish shielings

The results from Kårebolssättern should be viewed in relation to other shielings. A total of 32 Swedish shielings have been investigated to varying extents (Figure 3; Table 1). Of these, 24 have been dated, but four only have dates from relatively recent house remains. The investigated shielings have been analysed regarding information on the dating of the emergence of agrarian land use (grazing and cereal cultivation), the establishment of buildings and periods of

³ The pollen analysis, with pollen diagram and detailed descriptions, is published in Eddudóttir et al. (2021), available at <https://link.springer.com/article/10.1007/s00334-021-00829-y> (2024-12-16).

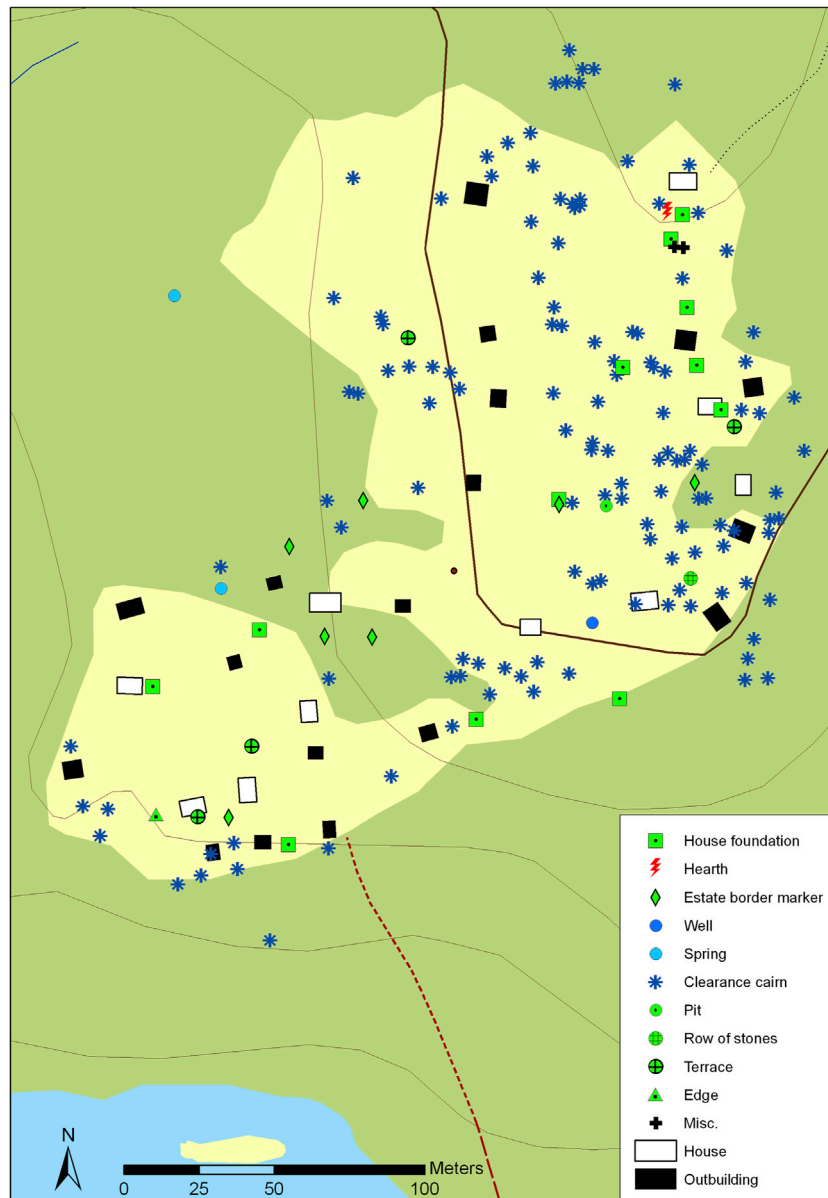


FIGURE 1
Detailed mapping of Kårebolssättern. After Eddudóttir et al. (2021): Figure 6.

increase and decrease in the use of the sites. Although the compiled material is very heterogeneous, some trends are discernible regarding the establishment and development of shielings, and four major expansion phases can be detected.

- Phase 1 (c. 4th-7th centuries AD): early emergence of shielings;
- Phase 2 (7th to 11th centuries): second wave of the establishment of shielings;
- Phase 3 (c. 13th–15th centuries): expansion phase and increased focus on livestock grazing;
- Phase 4 (early modern period): intensified use of shielings.

It should be observed that almost all shielings in Phases 1 and 2 have been investigated with pollen analysis, whereas this is the case with very few in Phases 3 and 4. It is thus highly possible that several shielings in Phases 3 and 4 could be of an older date. It is however unlikely that this would change the interpretation of



FIGURE 2

Detail of the medieval house foundation (B2) at Kårebolssäteren during excavation. The dark layer in the centre of the photo is a posthole (visible both in the plan and in the section). The two phases of the house are visible in the section. To the left of the posthole, there are two chronologically different phases of the earthen wall, separated by a layer of bleached, pale soil. To the right of the posthole, there are two chronologically different brown cultural layers, separated by a lighter, sandy layer. Photo: Eva Svensson.

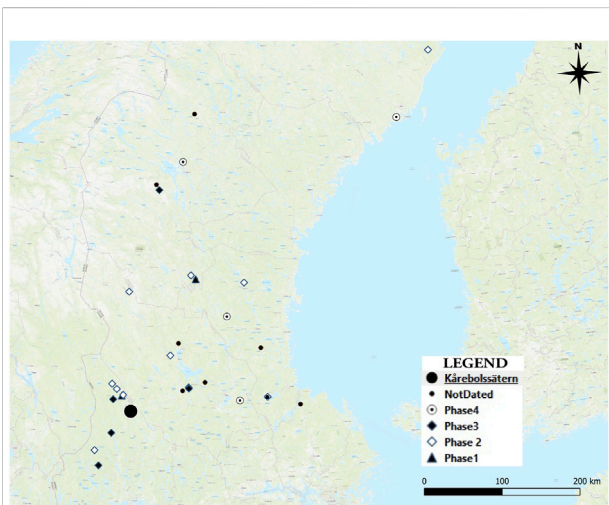


FIGURE 3

Geographical distribution of investigated shielings, the four chronological phases, and undated shielings. Map: Eva Svensson and Susanne Pettersson.

expansion and intensification in Phases 3 and 4 as these developments are clearly observable also in the pollen diagrams.

The four phases are described below and will be put into context in the Concluding Discussion.

Besides Kårebolssäteren, the two sites with the oldest dates are included in Phase 1: Backadammen (c. 3rd–6th centuries AD)

and Öjingsvallen (c. 4th–7th centuries AD) (Emanuelsson et al., 2003; Karlsson, 2001). Interestingly, these sites, like Kårebolssäteren, are located near watercourses. Backadammen shares another similarity with Kårebolssäteren in that cereal cultivation appears to have been of major importance during the foundation period, followed by grazing probably in the 7th to 9th centuries AD. At Öjingsvallen, grazing is the primary land use, with cereal cultivation appearing sometime around 900–1200 AD.

The 7th to 11th centuries stand out as a period when several shielings were initiated (Phase 2): Backasäteren, Gammelsäteren Likenäs, Ransbysäteren, Gammelsäteren Treskog, Trygåsvalen, Torkelsbovallen, Gammelvallen Ängersjö, Gärde fåbodan, Lilla Höksberg, Skallskog and Myrbyvallen (Emanuelsson, 1997; Emanuelsson et al., 2000; Emanuelsson et al., 2003; Hovanta and Groop, 2020a; Liasen and Olsson, 2000; Olsson, 1998; Segerström et al., 1996; Skyllberg and Emanuelsson, 1996; Svensson, 1998; Östlund, 2020). In most cases, grazing, or grazing combined with cereal cultivation, appears to be the earliest land use. However, there are examples, mainly Gärde fåbodan, where cereal cultivation predates grazing. In this case, it is possible that the site was initially a farmstead, which was later converted into a shieling. From this period, we also have the earliest dates of house foundations from the excavations at Backasäteren and Gammelsäteren Ängersjö. At Myrbyvallen (Hovanta and Groop, 2020a), stray finds of a Viking Age sword, a Viking Age arrowhead, and a knife, probably from the same period, indicate that there had been a burial site at the shieling. At Backasäteren, like at Kårebolssäteren, there was a decline, probably even abandonment, around 1050 AD, lasting a few centuries.

The next phase (Phase 3), c. 13th–15th centuries, was a period of expanding land use, grazing and/or cereal cultivation, at most shielings including Kårebolssäteren, and some more were established: Båntebysäteren, Ingersbysäteren, Munkebovallen, and Dammskog (Bengtsson, 2007; Olsson, 1998; Skyllberg and Emanuelsson, 1996; Svensson, 1998). From this period, there are also dates from excavations of house foundations at Kårebolssäteren, Öjingsvallen, Gammelvallen Ängersjö, Ingersbysäteren, Torkelsbovallen, “Valberget” (Emanuelsson et al., 2000; Johansson and Svensson, 2002; Karlsson, 2001; Liasen and Olsson, 2000; Olsson, 2005), and potentially at Trygåsvalen where a cultural layer beneath a more recent house foundation has been dated to the 13th century (Pettersson, 2008).

The intensity of land use increased at most shielings during the early modern period (Phase 4). There are also a few excavated house foundations, dating from the 17th to 19th centuries, at Kårebolssäteren, Ransbysäteren (excavation by the author, the report is lacking), Trygåsvalen, Munkebovallen, Skärs gamla fåbodavall, Gärde fåbodan, Stockbys fåbodan, Svartviksbodarna, Våsbo fåbodan, and Gammalbodarna in Ås (Andersson, 2013;

Andersson et al., 2011; Bengtsson, 2007; Bennerhag and Palmbo, 2015; Eriksson, 2014; Jonsson, 2020; Pettersson, 2008; Östlund, 2020). However, due to the absence of pollen analyses from Skärs gamla fåbodvall, Stockbys fåbodar, Svartviksbodarna, and Gammalbodarna in Ås, the precise ages of these shielings remain uncertain.

Most of the investigated shielings were abandoned in the 19th and 20th centuries, although some are still in use as summerhouses.

Concluding discussion

The historical trends regarding transhumant pastoralism in boreal Sweden observed at Kårebolssättern, as well as in other investigated shielings, will now be discussed in relation to other landscape features, as highlighted in the introduction, such as elk hunting pitfalls, bloomery iron production sites, burial sites, and settlements. They were intricately connected to historical developments and influenced by events beyond boreal Scandinavia.

During the centuries around and following the start of the Common Era, there was a demand for luxury products from boreal regions, such as furs. To supply the European elite with these desired commodities, settlements and human activities expanded into boreal Scandinavia, a process known as resource colonisation, sometimes manifested in burial grounds (Hennius, 2021). Resource colonisation likely included settlements along river valleys and other fertile lands, as well as secondary settlements in outlying forested hunting grounds. Investigations into the hamlet of Ängersjö (a primary settlement) and a connected shieling-site (a secondary settlement) indicate that they are roughly contemporary (Karlsson et al., 2010; Mogren, 1996). Kårebolssättern and the other Phase 1 shielings are interpreted as exponents of resource colonisation. Their proximity to watercourses would have facilitated the transportation of commodities from forests to markets. The cultivation of hemp at Kårebolssättern was probably intended for ropes to pack such commodities. Thus, transhumance during this phase was more about moving people and goods than grazing practices, with the shielings serving as seasonally used secondary farmsteads that facilitated resource extraction in the forests.

The resource colonisation was soon restructured to enable the long-term settlement expansion into the limited fertile lands, mostly along river valleys, of boreal Scandinavia. To establish a permanent agrarian colonisation of the rough landscape, something more than a farmstead was needed. Rooted in resource colonisation, the innovation system of farm-shieling-outland use emerged. In contrast to resource colonisation, there was an increased emphasis on bulk, mundane products for a broader market, replacing luxury commodities for the elite (Emanuelsson, 2001; Svensson,

1998). Our interpretation is that Phase 2 corresponds to the establishment of this innovation system and further agrarian settlement expansion in boreal Scandinavia. It should be noted that this expansion was facilitated by the Medieval Climate Anomaly (MCA), a period of warm and predictable climatic conditions that coincided with population growth (Charpentier Ljungqvist, 2017).

In the 13th century and during the Late Middle Ages, a recession began in several outland use activities, including bloomery iron production in some areas, especially in northern Värmland, due to increased competition with pig iron and the newly invented blast furnace, alongside failing markets (Emanuelsson et al., 2003; Svensson, 1998). This recession, which reduced the benefits forest peasants gained from outland use commodities, led to an increase in the use of shielings and self-subsistence, marking Phase 3. Kårebolssättern, along with nearby Backasättern, saw more intense use after being closed down or only lightly used in the previous two to three centuries due to the prioritisation of lucrative bloomery iron production and elk hunting in pitfalls. However, the increased use of shielings coincided with the late medieval agrarian crisis, including the Black Death and the onset of the Little Ice Age (LIA), which caused a significant agrarian downturn in other parts of the world (e.g., Campbell, 2016).

In Early Modern Times (Phase 4), Kårebolssättern and other shielings grew in size and use, and new shielings were established. This expansion partly coincided with the height of the Little Ice Age (LIA), which made cereal cultivation problematic in some parts of boreal Scandinavia (Ljungqvist et al., 2021). Hence, increased livestock breeding became a strategy to compensate for poor and insecure harvests. There was also a commercial incentive to increase cattle breeding due to the strong demand for cattle from the growing mining districts. Oxen were traded en masse, especially from Western Sweden (Jansson, 1998; Myrdal and Söderberg, 1991). At the same time, as the expanding mining industry encroached on new parts of boreal Sweden, population growth and housing needs followed - often at the expense of shielings. Some shielings, such as Ingersbysättern and Gammelsättern Treskog, were transformed into permanent settlements or crofts in the 17th and 18th centuries (Svensson, 1998).

In conclusion, Scandinavian transhumant pastoralism and shielings have demonstrated remarkable adaptability to changing conditions and challenges, playing a crucial role in community resilience over time. Kårebolssättern is a prime example of this historical development. However, shielings today face significant challenges due to industrialisation and modernisation, and many are nearing their end. A few surviving shielings, like Kårebolssättern, continue to struggle for survival and a new future. We hope that our findings on two millennia of adaptive capacity will contribute to the ongoing effort to secure a new future for shielings.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

All authors have planned and executed the fieldwork at Kårebolssätern. SP has been responsible for processing and reporting the data. ES has searched the archives, collected and processed the data regarding investigated shielings in Sweden, ES has produced the draft of the text to this paper, supplemented by SP and AJ. ES and SP has produced figures and table.

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Conflict of interest

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