Archaeofauna 8 (1999): 123-133

1000 years (6th to 16th century) of Economic Life in the Heart of Europe. Common and distinct Trends in Cattle Economy of the Baltic Sea Region and the Swiss Region of the Alpine Forelands

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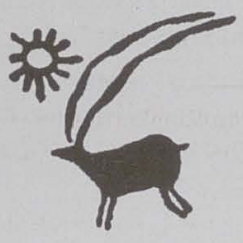

ABSTRACT: The Middle Ages in Europe are often regarded as "dark centuries" because of famines and pestilence. However, they were also undoubtedly the cradle of modern times. A number of innovations took place leading to a more intensive agriculture. As a result the population increased rapidly during this period. This development should be reflected in the archaeological material. The aim of our investigation was to examine whether sites from such strikingly different regions like the Baltic Sea and the Alpine Forelands fit into a model of supra-regional phenomena. A further question was to examine to what extent local economy and/or ecology influence the frequency of different species and the size of domesticated animals. Our data suggest that we have to reckon with supra-regional phenomena that were strongly influenced by climatic developments. However, it can also be seen that in small regions economic life is strongly correlated with cultural history (e.g. the social status of the consumer), the political environment, and geographic and ecological requirements.

KEYWORDS: MIDDLE AGES, SWITZERLAND, GERMANY, ECONOMY, ECOLOGY, OSTEOMETRY, CATTLE, PIG, SHEEP/GOAT, SOCIAL STATUS, RURAL SETTLEMENT, URBAN SETTLEMENT, CASTLE

RESUMEN: La Edad Media en Europa se considera normalmente como la "edad tenebrosa" debido a las hambrunas y a la peste. Sin embargo, fue también, sin duda, la cuna de los tiempos modernos. Una serie de innovaciones condujeron, entre otros, a una agricultura más intensiva. Como resultado de ello la población aumentó rápidamente durante este periodo. Tal desarrollo debería quedar reflejado en el registro arqueológico. El objetivo de nuestra investigación consistía en comprobar si yacimientos de zonas tan marcadamente distintas como el Mar Báltico y las regiones prealpinas pueden encuadrarse dentro de un modelo de fenómenos supraregionales. Una cuestión adicional consistió en examinar en qué medida la ecología y/o la economía local determina la frecuencia de ciertas especies así como la talla de los animales domésticos. Nuestros datos sugieren que debemos tener en cuenta fenómenos supraregionales que se vieron fuertemente influenciados por parámetros climáticos. No obstante, podemos asimismo comprobar que en zonas restringidas la vida económica se correlaciona en gran medida con la historia cultural (por ejemplo, el estatus social del consumidor), el entorno político así como con peculiaridades geográficas y ecológicas.

PALABRAS CLAVE: EDAD MEDIA, SUIZA, ALEMANIA, ECONOMÍA, ECOLOGÍA, OSTEOMETRÍA, GANADO VACUNO, GANADO PORCINO, OVICAPRINOS, ESTATUS SOCIAL, ASENTAMIENTO RURAL, ASENTAMIENTO URBANO, CASTILLO

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INTRODUCTION

The Middle Ages in Europe embrace a period of about 1000 years: from 500 to 1500 AC. This period is characterized by the adherence to old traditions as well as by important technical innovations particularly in the field of agriculture. The introduction of the three-field-system and the one-way-plough for example led to more intensive agriculture. This entailed a rapid population increase in the High Middle Ages (between 1100 and 1300 AC, Grupe, 1990).

The aim of this paper is to find out if sites from different climatic and geographic regions fit into a model of supra-regional trends in medieval cattle economy or if they depend on regional or local developments. For our analysis we chose two regions that lie 1.000 km apart: The Swiss plateau including the Jura mountains and the Rhine valley completed by some sites in Eastern France and Southern Germany and the Baltic Sea Region of Northern Germany.

MATERIAL AND METHODS

The topography, the climate and the cultural and historical development of both of the regions differ greatly. The Alpine Foreland Region in Switzerland is characterized by the hilly landscape of the Swiss plateau, the Jura mountains and a relatively plain area along the Rhine valley. This area has a long historical tradition and was part of the Roman empire for more than 400 years. In contrast, the topography of the Baltic Sea Region is almost completely plain with no elevations over 150 meters. Before becoming a political and economic center of the Danish Viking empire, this region was almost uncolonized. According to the contemporary historian Adam von Bremen, this part of Europe was covered by impenetrable forest before the first settlements were established in the 9th century (after Abel, 1978b). The following analysis is based upon the faunal assemblages of 28 sites with 53 different chronological phases and approximately 250.000 bone fragments (Table 1). From the archaeozoological point of view the most important sites of the Alpine Foreland Region are the town of Basel and the canton and the town of Schaffhausen. The best investigated medieval settlements in northeastern Germany are the port-and trade-towns of Haithabu, Schleswig and Lübeck.

To ensure the comparability of our data we selected only bone assemblages with more than 150 identified bones that were dated within a time span of 200 years or less. We excluded water-sieved material from latrines and special deposits from e.g. tanning or bone workshops.

Unfortunately the different types of settlements like villages, towns and castles are not represented equally through the different phases of the Middle Ages. In the early period from the 6th to the 9th century the farmstead with wooden houses was the normal case of settlement in the Alpine Foreland. From the 11th century on, we are quite well informed about the life in towns but we lack almost every archaeological record of rural settlements. Furthermore, castles are very well represented from the 12th to 15th century in the southern region of the investigated areas. In earlier periods our knowledge of this type of settlement is very poor.

Concerning the archaeozoological research in the Baltic Sea Region mostly urban settlements dating from the 9th to 11th century are well examined.

RESULTS AND DISCUSSION

To show the variation of the bone-frequencies of the domestic animal species cattle, sheep, goat and pig through the centuries we use box-plots in addition to conventional column graphs.

The faunal remains from sites of the Alpine Forelands and the Baltic Sea show a more or less similar composition of animal species (Table 1). Cattle are the most important domestic animal followed by pig and sheep/goat. Game animals like red deer or wild boar played a relatively unimportant role in the economic life of these sites.

In both the northern and the southern sites increasing frequencies of cattle bone can be detected in the course of the Middle Ages (Figure 1 and Figure 2). This trend is more distinct in the Baltic Sea sites. Furthermore, higher variation of cattle frequencies was observed in the Alpine Foreland sites from the 14th to the 16th century. On the other hand, sheep/goat and pig bone frequencies decreased from the 6th to the 16th century in both regions. A possible explanation for these trends is the increase of cleared woodland and the intensification of grain cultivation particularly in the High Middle Ages. This development, for example, is documented very well for the Zurich

Site	Short-cut	Type of settlement	Dating AC	NISP domestic animals	NISP% domestic animals	NISP wild animals	NISP% wild animals	No. wild animal species	NISP% cattle	NISP% sheep/goat	NISP% pig	References
Alpine Forelands:												
Schleitheim-Brüel	Schleit 6./7.	rural	6th/7th cent.	3914	99.1	35	0.9	3	50.5	17.7	29.7	Rehazek in prep. a
Lausen-Bettenach	Lausen 6./7.	r	6th/7th cent.	1183	96.7	40	3.3	15	30.3	18.3	39.7	Hüster-Plogmann & Veszeli unp.
Basel-Reischacherhof, D+E	ReischD/E 7./8.	urban	7th/8th cent.	1041	99.0	10	1.0	5	33.2	19.7	38.2	Morel unp.
Berslingen, Ph2b	Bers2b 8./9.	r	8th/9th cent.	629	93.7	42	6.3	2	39.2	18.8	31.4	Rehazek in press
Basel-Reischacherhof, C	ReischC 9./10.	u	9th/10th cent.	190	98.9	2	1.1	2	32.3	30.7	28.6	Morel unp.
Basel Schneidergasse 1	Schneider1 10.	u	10th cent.	804	99.6	3	0.4	2	18.0	56.0	23.9	Reich 1995
Basel Schneidergasse 4	Schneider4 10./11.	u	10th/11th cent.	646	99.7	2	0.3	1	39.8	34.7	23.0	Reich 1995
Berslingen, Ph3b	Bers3b 10./11.	r	10th/11th cent.	356	99.7	1	0.3	1	48.7	15.4	23.5	Rehazek in press
Basel-Barfüsserkirche, total	BarfüssTot 11.	u	11th cent.	3767	99.7	11	0.3	7	50.3	37.4	9.8	Schibler/Stopp 1987
Basel Schneidergasse 2	Schneider2 11.	u	11th cent.	1483	99.8	3	0.2	2	26.7	47.1	23.1	Reich 1995
Habsburg Splittplanie	Habssplitt 11.	castle	11th cent.	211	88.3	28	11.7	5	13.0	19.2	53.6	Veszeli & Schibler 1998
Habsburg untere Kulturschicht	HabsUK 11.	c	11th cent.	756	95.0	40	5.0	8	20.9	19.8	51.0	Veszeli & Schibler 1998
Berslingen, Ph4	Bers4 11./12.	r	11th/12th cent.	418	98.4	7	1.6	3	28.5	22.6	43.1	Rehazek in press
Basel-Reischacherhof, A+B	ReischA/B 11./12.	u	11th/12th cent.	1916	99.2	15	0.8	6	25.2	32.4	36.9	Morel unp.
Basel Schneidergasse 5	Schneider5 11./12.	u	11th/12th cent.	648	99.8	1	0.2	1	33.2	38.5	28.5	Reich 1995
Eptingen, Riedfluh	Riedfl 11./12.	c	11th/12th cent.	2036	95.3	100	4.7	6	42.6	18.5	28.4	Kaufmann 1988
Salbüel	Salbüel 11./12.	c	11th/12th cent.	716	98.8	9	1.2	5	9.0	29.8	58.6	Morel 1991
Winterthur, Phase II	WinterII 11./12.	u	11th/12th cent.	661	99.6	3	0.5	2	33.9	16.4	44.6	Hartmann-Frick 1994
Basel-Barfüsserkirche, total	BarfüssTot 12.	u	12th cent.	782	99.1	7	0.9	6	20.4	54.5	19.8	Schibler/Stopp 1987
Zürich Münsterhof A	MünsterhA 12.	u	12th cent.	932	95.8	41	4.2	12	12.5	46.1	14.6	Csont 1982
Berslingen, Ph5	Bers5 12.	r	12th cent.	449	97.2	13	2.8	2	54.5	16.5	23.8	Rehazek in press
Winterthur, Phase III	WinterIII 12./13.	u	12th/13th cent.	926	99.1	9	0.9	3	43.7	19.9	33.2	Hartmann-Frick 1994
Zug Kaufhaus, I-III	KaufhI-III 12./13.	u	12th/13th cent.	470	99.4	3	0.6	3	23.7	31.9	41.0	Rehazek in prep. b
Basel Schneidergasse 6	Schneider6 12./13.	u	12th/13th cent.	635	100.0	0		0	31.8	42.2	23.8	Reich 1995
Burg Grenchen	Grench 12./13.	c	12th/13th cent.	1453	96.3	56	3.7	6	44.2	11.5	38.1	Stampfli 1962
Salbüel	Salbüel 12./13.	c	12th/13th cent.	415	99.0	4	1.0	2	31.0	15.0	53.0	Morel 1991
Habsburg obere Kulturschicht	HabsOK 12./13.	c	12th/13th cent.	1350	89.9	151	10.1	21	11.9	8.8	62.0	Veszeli & Schibler 1998
Basel-Augustinergasse, Latr. 1-4	August1-4 13.	u	13th cent.	1260	99.5	6	0.5	3	15.6	26.4	25.3	Schibler 1995
Basel Schneidergasse 3	Schneider3 13.	u	13th cent.	454	99.1	4	0.9	3	18.1	53.7	23.8	Reich 1995
Basel-Barfüsserkirche, total	BarfüssTot 13.	u	13th cent.	3631	99.5	20	0.5	15	27.1	45.9	21.1	Schibler/Stopp 1987
Zürich Münsterhof C	MünsterC 13.	u	13th cent.	887	96.8	29	3.2	7	17.7	52.2	19.9	Csont 1982
Stadtkirche St. Johann G4	JohannG4 13.	u	13th cent.	548	68.1	257	31.9	8	15.9	12.3	15.3	Markert 1990; Markert unp.
Winterthur, Phase V	WinterV 13.	u	13th cent.	425	99.8	1	0.2	1	35.9	28.7	31.0	Hartmann-Frick 1994
Gelterkinden, Scheidegg	Scheidegg 13.	c	13th cent.	269	85.4	46	14.6	6	27.0	3.2	40.0	Kaufmann 1975
Nidau-Schloss U	NidauU 13.	c	13th cent.	4190	95.7	190	4.3	26	9.6	6.3	64.8	Büttiker/Nussbaumer 1990
Nidau-Schloss M	Nidau M 13./14.	c	13th/14th cent.	1123	89.5	134	10.5	17	15.4	11.8	42.0	Büttiker/Nussbaumer 1990
Heitnau	Heitnau 13./14.	c	13th/14th cent.	390	99.0	4	1.0	1	32.2	9.6	50.3	Hartmann-Frick 1957
Gräpplang O	GräppO 14.	c	14th cent.	306	95.9	13	4.1	5	20.7	13.2	27.3	Würgler 1961
Zug Kaufhaus, IVb	KaufIVb 14./15.	u	14th cent.-1430	470	99.6	2	0.4	2	32.0	41.0	14.2	Rehazek in prep. b
Nidau-Schloss O	NidauO 15./16.	c	15th/16th cent.	375	72.8	140	27.2	9	12.0	11.7	35.3	Büttiker/Nussbaumer 1990
Habsburg Graben	HabsGr 16.	c	16th cent.	545	97.1	16	2.9	6	48.8	6.2	39.6	Veszeli & Schibler 1998
Haut Koenigsbourg	Koenig 15./17.	c	1450-1630	3359	97.7	79	2.3	5	73.6	6.9	14.4	Arbogast 1993
Zug Casino	Casino 16./17.	u	16th/17th cent.	181	98.4	3	1.6	2	78.3	4.9	14.1	Rehazek 1998
Baltic Sea:												
Haithabu	Hb1	u	9th cent.						30*	18*	52*	Haithabu div. authors
Haithabu	Hb2	u	10th cent.	224671	98.8	2821	1.2	99	37*	16*	47*	Haithabu div. authors
Haithabu	Hb3	u	10th/11th cent.						40*	15*	45*	Haithabu div. authors
Schleswig-Schild	Sl11.	u	11th cent.						40	35	25	Schleswig div. authors
Schleswig-Schild	Sl12.	u	12th cent.	110799	97.6	2672	2.4	67	46	32	22	Schleswig div. authors
Schleswig-Schild	Sl13.	u	13th cent.						50	25	25	Schleswig div. authors
Schleswig-Schild	Sl14.	u	14th cent.						46	26	29	Schleswig div. authors
Lübeck-Heiliggeist Hospital	HL13-15	u	13th/15 cent.	5793	99.5	26	0.5	5	49*	19*	31*	Pudeck 1980
Lübeck-Königsstrasse	HL15	u	15th cent.	4027	99	40	1	8	65*	15*	20*	Paul 1980
									* estimated values			

TABLE 1
Analyzed faunal assemblages from the different archaeological sites/phases and their datings.

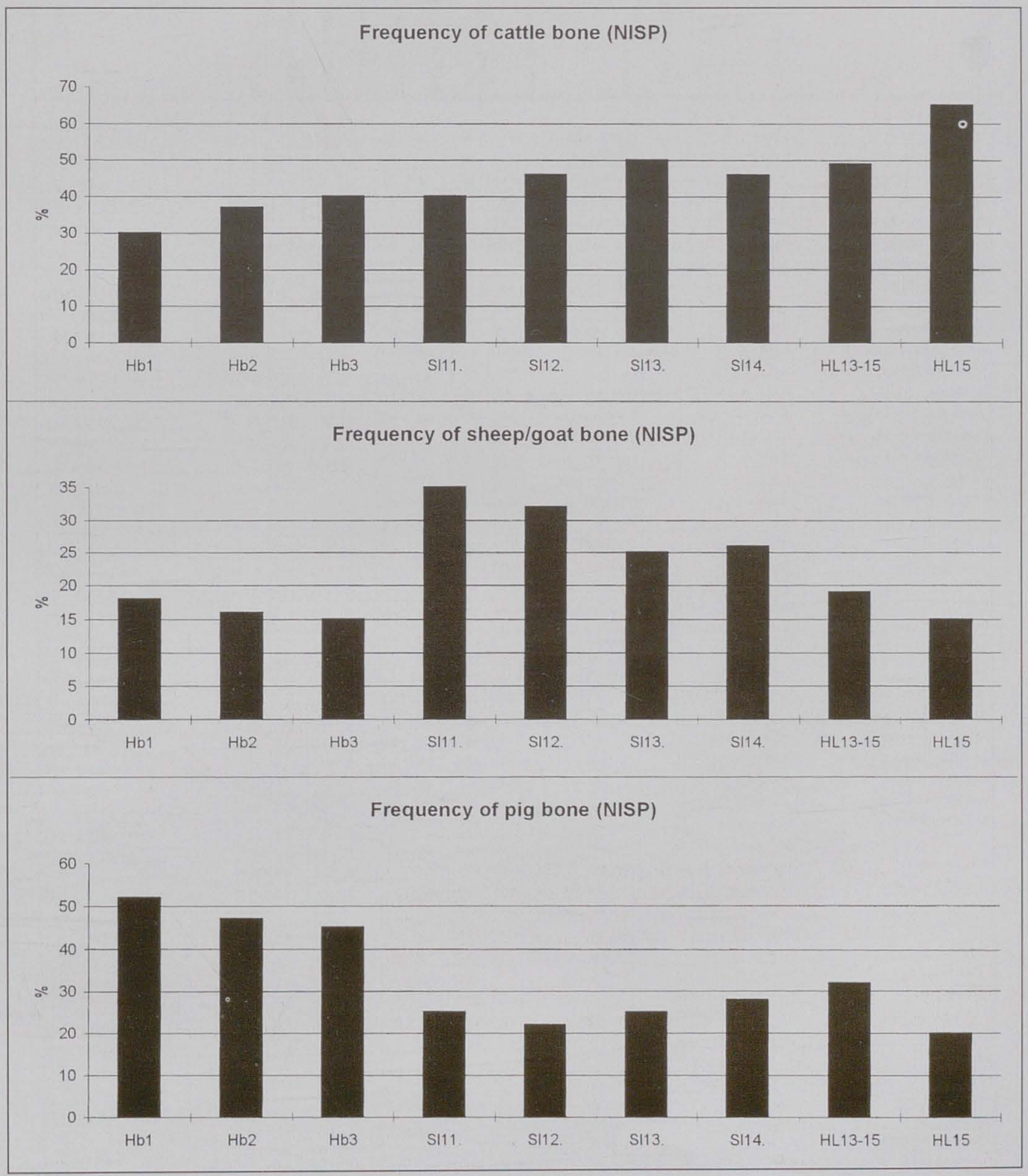
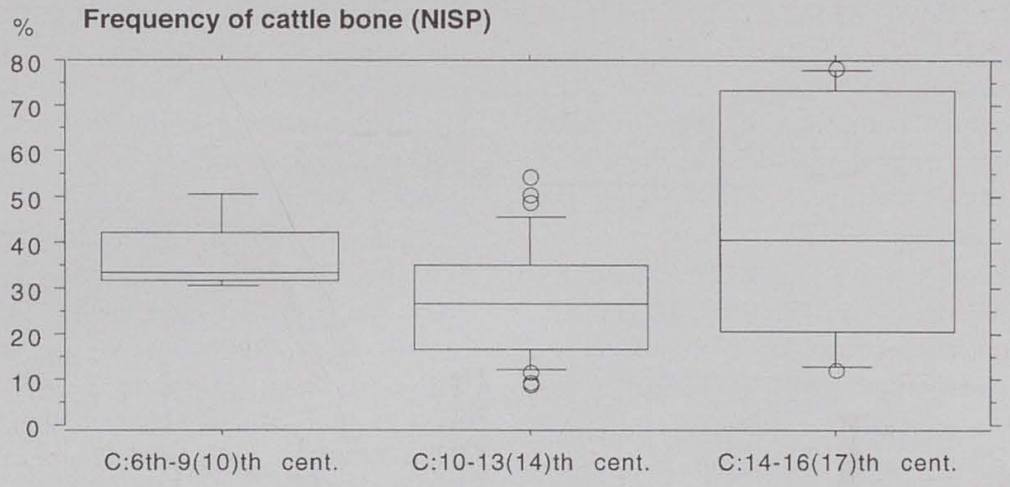
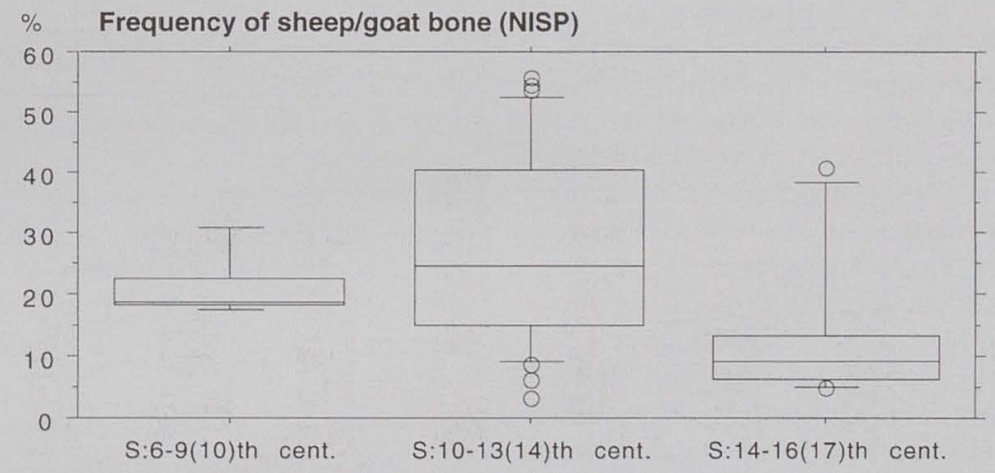


FIGURE 1
Frequency of cattle, sheep/goat, and pig bone (NISP) from the Baltic Sea Region, 9.-15th century.





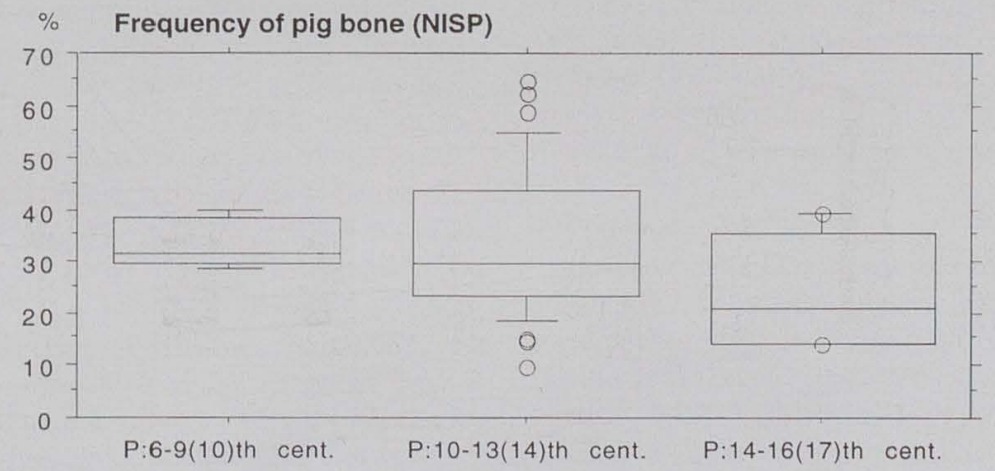


FIGURE 2

Frequency of cattle, sheep/goat, and pig bone (NISP) from sites of the Early, High and Late Middle Ages of the Alpine Forelands. Each box plot is composed of five horizontal lines representing the 10th, 25th, 50th and 75th percentile of a variable, in this case the frequencies of the four different animal species. The values below the 10th and above the 90th percentiles are outliers. Number of analyzed sites: 6th-9th/10th century (n=5), 10th-13th/14th century (n=32), 14th-16th/17th century (n=6).

region (Stromer, 1995) and the area of Schaffhausen, which shows a very one-sided intensification of meadowland (Rehazek, in press). An open landscape (with a high percentage of meadowland) favors the keeping of cattle. In addition, a decrease in woodland entails a diminished food supply for small livestock, particularly for the pigs.

Further questions concerning the consumption and perhaps the breeding of domesticated animals are the differences between the types of settlements like towns, villages, and castles in the different regions.

Cattle seem to be more frequent in rural settlements than in towns or castles in the Alpine Forelands (Figure 3). A comparison between the North and the South shows that the people in the urban sites of both had a very similar amount of cattle.

The situation is different for sheep and goat (Figure 3). Most of the sheep and goat bones were found in the southern towns with large differences from town to town. Again, the amount of sheep or goat bone in rural settlements of the Alpine Forelands and towns of the Baltic Sea is quite similar. However, the percentage of sheep bone in castles is relatively low. Pig bones, together with poultry and wild animals, are found in castles more often than in every other kind of settlement (Figure 3). This is not very surprising, because according to historical records from the Southern feudal lords collected animals like pigs and poultry as taxes from unfree farmers (reference follows). As a consequence, we would expect the consumption of those animals to be relatively low in rural settlements which it turned out to be.

It is not very astonishing that beef was in contrast very common among farmers in the villages. Cattle were needed to do the fieldwork and they produced goods like milk, leather, dung, etc. After they grew old and unproductive they were slaughtered.

In the Middle Ages the citizens of towns had also the right to keep some animals for their own use (Borst, 1983). Many of them were obviously sheep or goat. These so called "cows of the poor men" may have been chosen because of their modest requirements and their ability to produce milk and wool.

The different percentages of domestic animals in towns of the Alpine Forelands and the Baltic Sea region need an explanation. The results show that the kitchen refuse found in northern towns is very similar to that found in rural settlements of the South. We suggest that this is caused by different cultural conditions. As we briefly mentioned above, Scandinavia was disconnected from cultural life in Europe up to the 9th century. The lack of 300 years of agriculture may have resulted in a "rural town life".

Cattle size, which is related to genetic predisposition, fodder quality, and breeding-know-how, provides further information on the economic circumstances in the Middle Ages. We used the LSI-method (Meadow, 1984; Uerpmann, 1990) with a standard individual of 117 cm withers height. The individual is a cow of the traditional "Hinterwälder" breed of Southern Germany and Northern Switzerland.

As shown on Figure 4, the size of southern cattle decreased up to the 12th century whereas the size of northern cattle increased (Figure 5).

In our opinion this is a result of agricultural tradition. After the Romans left the Alpine Forelands in the 4th century there was a slow and continuous decrease in cattle size. Perhaps, cattle breeding did not collapse right away because some knowledge and/or Roman tradition was still present and the region was always more or less cultivated (Breuer *et al.*, in press). On the other hand, the settlers in the north first had to convert the primary forest into arable land before they had long-term success in cattle breeding.

However, the look at the box plots shows a further striking feature: In the South, the size of cattle decreased remarkably in the 11th century and in the North in the 13th century. The question is why. This period is known as a climatic optimum with warm summers (Glaser & Schenk, 1995) and was characterized by an increasing human population. To feed the whole population as much grain as possible was cultivated. This meant that cattle was fed on more or less poor land. This is documented by historical records in the 11th century in Switzerland (Stromer, 1995) and, with a delay of almost 200 years, in the 13th century in northern Germany (Abel, 1978b; Kuhlmann, 1958). As a result the animals were smaller than in the preceding periods.

Admittedly, cattle were small in the Middle Ages. However, while there were differences in size up to the 13th century the animals remained remarkably small in both regions from the 13th to the 15th century. Diminished cattle size concurred with the agricultural crisis in the very early 14th century that was accompanied by bad weather conditions, poor harvests, famines and pestilence. But although historical records tell us about the

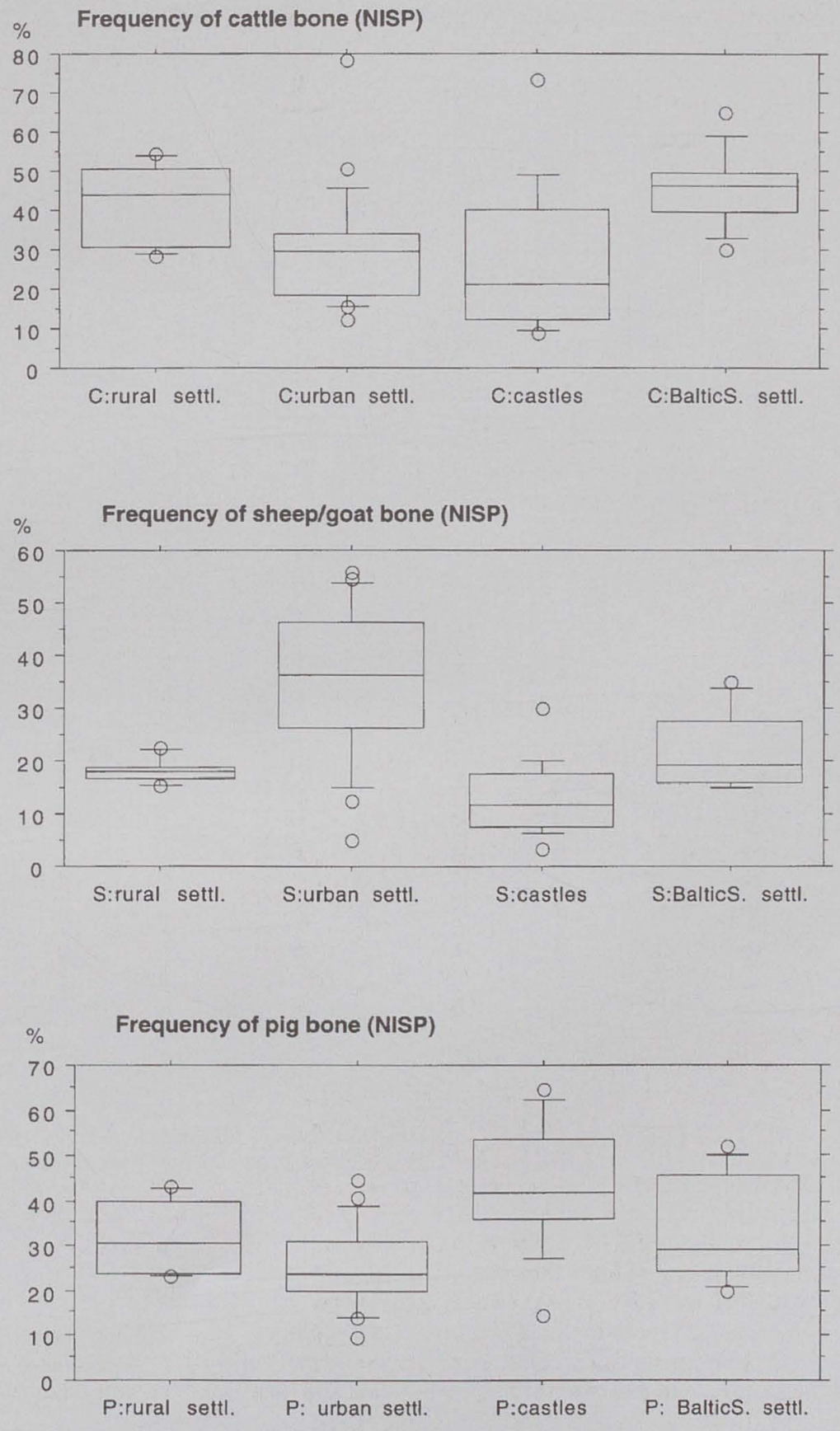


FIGURE 3

Frequency of cattle, sheep/goat and pig bone (NISP) from the different types of settlements (rural, urban, castle). Baltic Sea Region and Alpine Forelands, 6th-16th/17th century. Each box plot is composed of five horizontal lines representing the 10th, 25th, 50th and 75th percentile of a variable, in this case the frequencies of the four different animal species. The values below the 10th and above the 90th percentiles are outliers. Number of analyzed sites: rural settlements (n=22), urban settlements (n=16), castles (n=15), Baltic Sea settlements (n=9).

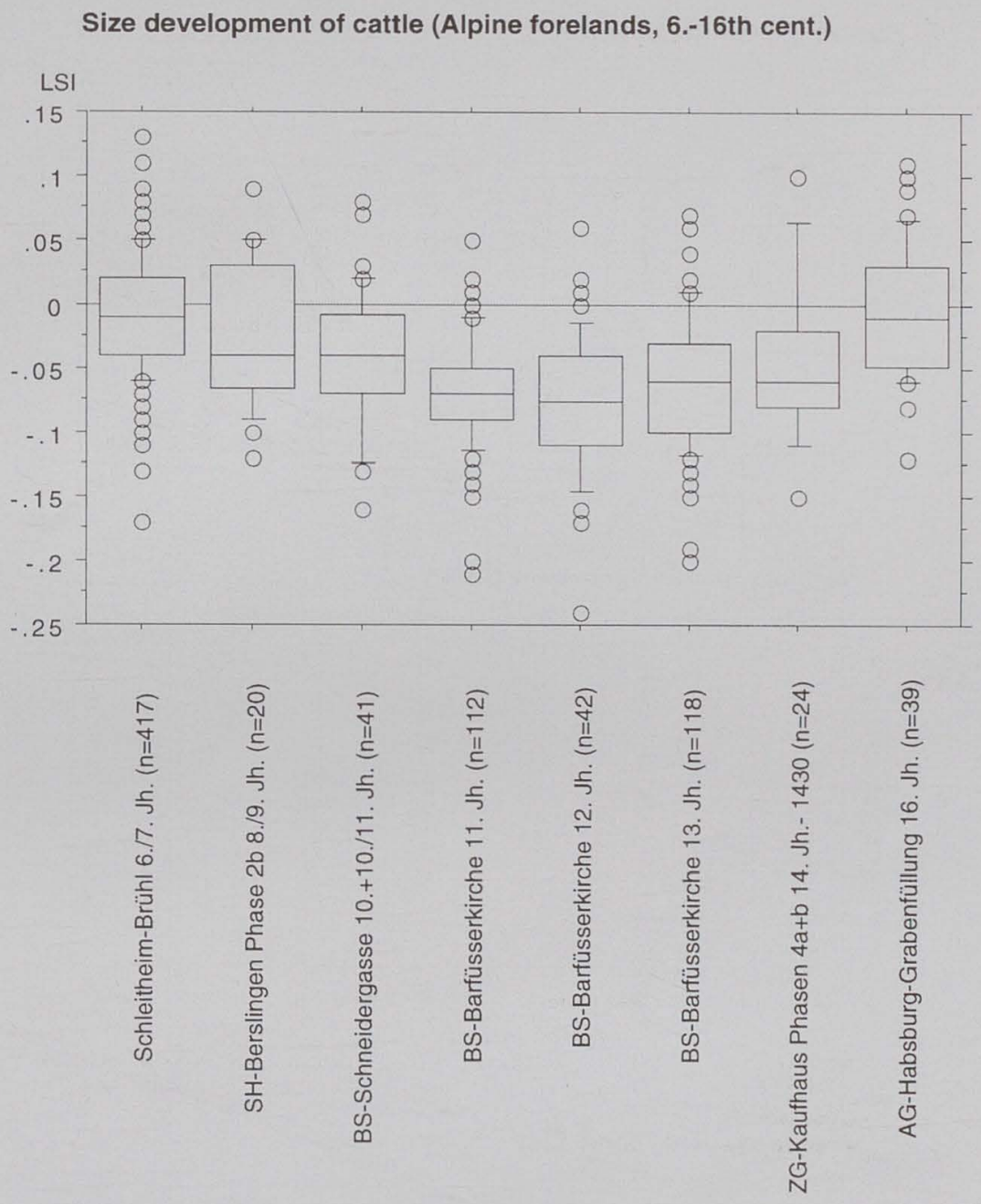


FIGURE 4
Size development of cattle. Alpine Forelands, 6th-16th century. Each box plot is composed of five horizontal lines representing the 10th, 25th, 50th and 75th percentile of a variable, in this case the logarithmic size index LSI.The values below the 10th and above the 90th percentiles are outliers. Zero-line: Standard individual (withers height 117 cm).

intensification of cattle breeding after the "black death" in the middle of the 14th century (Abel, 1978a), cattle size remained low up to the 16th century. From the 16th century onwards cattle size increased and led to our modern cattle breeds.

CONCLUSION

It can be concluded that supra-regional phenomena may have been influenced primarily by climatic developments. However, within small regions, economic life was strongly correlated with cultural history, the political environment and geographic and ecological requirements. Thus our aim must be to compare regional, archeologically classified data first and then look for supra-regional phenomena.

ACKNOWLEDGEMENTS

We would like to thank Barbara Stopp, University of Basel, for allowing us to examine the unpub-

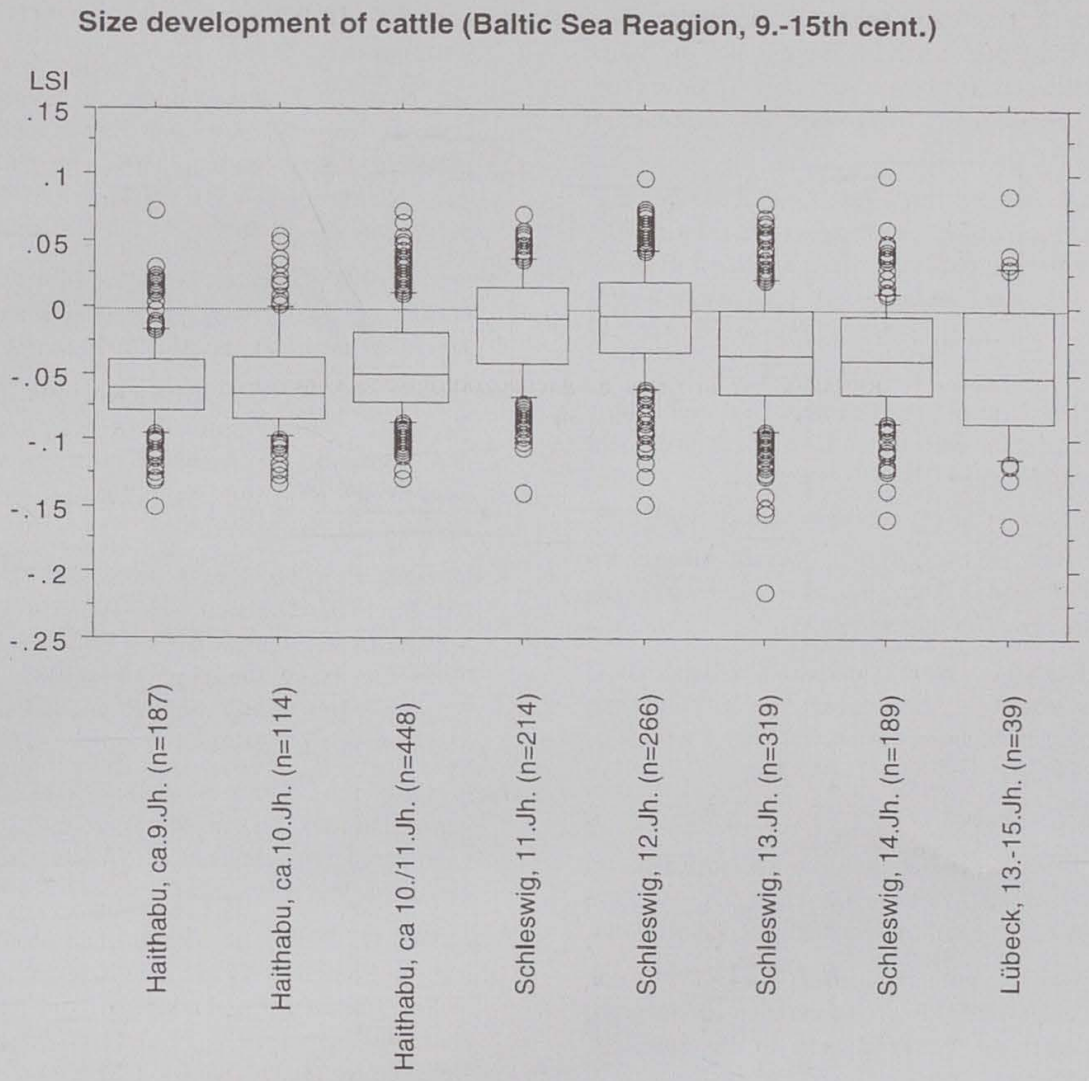


FIGURE 5
Size development of cattle. Baltic Sea Region, 9th-15th century. Each box plot is composed of five horizontal lines representing the 10th, 25th, 50th and 75th percentile of a variable, in this case the logarithmic size index LSI.The values below the 10th and above the 90th percentiles are outliers. Zero-line: Standard individual (withers height 117 cm).

lished osteometrical data from Basel-Gasfabrik and Claudia Steiner for translating the manuscript. Additional thanks to Dirk Heinrich for his hospitality during the time we were allowed to study unpublished data from Haithabu in the Institut für Haustierkunde, University of Kiel, Germany.

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