Eesti Arheoloogiaseltsi Teated 1994 (1)

Reports of the Estonian Archaeological Society 1994 (1)

STILUS

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Eesti Arheoloogiaselts

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SUBFOSSIL VERTEBRATE FAUNA OF ASVA SITE, SAAREMAA. MAMMALS

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Recevied: 12. 05. 1994.

Introduction

The aim of this study is to characterize mammal remains found from the Asva site in 1965 - 1966. The results of determinations are used for establishment the peculiarities of the material.

The analysis of the osteological material of the Asva site consisted of three parts. Firstly, the bone fragments were identified: what kind of skeletal unit from what species. Secondly, the identified fragments were measured and documented. It should be possible to use them in characterization of the animals' morphology (breed, race). Thirdly, the peculiarities of the material have been given prominence: for example, material from isolated Saaremaa.

1. Characterization of the Asva settlement

The Asva fortified settlement is situated in the village of Asva, South-East Saaremaa (Ösel). This archaeological site is located in the eastern part of a ridge by a former bay. Today the plateau of the settlement is 8 metres above the sea level, whereas the neighbouring areas are somewhat lower.

Archaeological excavations in Asva have been carried out in 1938 - 1939 (directed by Richard Indreko), 1948 - 1949 (Artur Vassar and Marta Schmiedehelm) and 1965 - 1966 (Vello Lõugas). The stratigraphy of the cultural layer of the Asva site is shortly represented in table 1.

Table 1. Stratigraphy of the Asva site (by Lõugas 1970)

I - layer of the fort	building remnants and finds	2nd half of the I millennium AD
	sterile layer of gravel, heaped up to elevate the edge of the hill	
II - layer of fortified settlement	layer that contains stones and stone floors	7th-6th cent. BC
	cultural layer without stones, but with traces of burning	9th-7th cent. BC
III - layer of unfortified settlement		beginning of the I millennium BC

2. Material and methods

All analyzed bone finds were found from layers, which belonged to the period from the 9th century BC to the I millennium AD (layers I and II), and the fragments used in this research have been found during archaeological excavations in 1965 - 1966. Bones collected in 1938 - 1939 and 1948 - 1949 have been identified and published by Johannes Lepiksaar (1940) and V.I. Tsalkin (1952). These data Have not been used in this research.

According to Kalju Paaver (1965) the conservation degree of refuse finds from Asva is the average. It means that whole bones occur rarely and sometimes they even are very fragmentary, but tooth and jaws have been well preserved.

Tabel 3. Number of fragments of different skeletal elements among the seal species

Species / Units	*Phocidae indet.*	*Pagophilus groenlandicus*	*Halichoerus grypus*	*Pusa hispida*	*Phoca vitulina*
Calvarium	2	2	1	1	1
Os temporale	6	24	7	5	3
Maxillare		2	5		1
Mandibula	2	16	1	7	
Dentes	7	6	14	11	1
Vertebrae	18				
Scapula	23				
Humerus	13	5	7	4	6
Radius	29	1			
Ulna	3	4	2		1
Os coxae	18				
Femur	9	2	6		3
Os cruris	14	1		2	
Astragalus	14				
Calcaneus	9				
Metacarpalia	40				
Metatarsalia	101				
Phalanx 1	144				
Phalanx 2	112				
Phalanx 3	5				
Total number	569	63	43	30	16

Altogether 1828 bone and teeth fragments from the excavations of 1965 - 1966 have been zoologically analysed. They include remains of 19 species of mammal: about 1061 finds come from domesticated animals, 46 from wild terrestrial animals and 721 from seals (table 2; 3). The fish and the bird bones are not identified. Bone determinations have been done according to V. Gromova (1950), M. Fortelius (1981) and J. Aul *et al.* (1957). Several skeleton fragments have been studied by a comparative method, using recent bones and also partially subfossil bones determined by Lepiksaar. Bone measurements have been taken according to A. Driesch (1976).

The archaeological sites in Saaremaa are important for the study of the domestication's history. Here it is possible to find samples of pure primitive breeds of domestic animals. The breed improvement of those through the breed import has reduced to the changes in or the disappearance of the prime nature of the primitive domestic animals. The preserved populations of such primitive domestic animals can be found in several areas less influenced by civilization, for instance, in the villages on isolated islands (Lepiksaar 1973). Before the World War II, there could be found the endemic pony-like Saaremaa-horse and the hornless cattle in Saaremaa. Today the small-sized horse has been only preserved at some places in Saaremaa, usually in form of mixed race, and the hornless cattle is only kept on the island of Ruhnu (Runö) and in one farm near Pärnu.

3. Domestic animals

In the Asva site the remnants of six species of domestic animals were found. They were the horse, the cattle, the sheep, the goat, the pig and the dog. Majority of the bone fragments belong to the cattle and the sheep and/or the goat. It seems, that these species were very important in the economy of the Asva people. The Asva site is the oldest of the excavated settlements in Saaremaa, where the bones of the cattle, the sheep and the goat have been found. The introduction of the domestic animals in Saaremaa must be subjected to further investigation, as it is not clear, when the rearing of domestic animals has begun here.

3. 1. Horse (*Equus ferus* f. *caballus*)

95 bone and teeth finds of the horse form 9 % of the identified fragments of the domestic animals. There also are remains coming from juvenile which form a third part of the all bone finds of the horse. According to a large amount of horse remnants, one can assume that the meat of horses was used for food. This tradition disappeared in Estonia by the distribution of Christianity in the 13th century.

Following the standards applied nowadays the Bronze Age horse must be called a pony. The measurements of the Asva finds are indicated in table 4.

3. 2. Cattle (*Bos primigenius* f. *taurus*)

330 finds of cattle bones have been found from excavations of 1965 - 1966. About a third part of the bone fragments come from juveniles.

More interesting are 4 bones, which probably belong to the castrated bullock of draught. Compared with other bones

Table 4. The domestic horse (*Equus ferus* f. *caballus*), measurements (mm)

Units	N	Variation	x
Astragalus			
lateral length	3	51,7 - 55,0	53,4
medial length	3	50,2 - 55,2	52,8
Phalanx 1			
max. length	4	71,9 - 80,5	75,1
min. width	4	31,6 - 32,6	32,1
max. prox. width	6	48,0 - 52,7	49,6
distal artic. width	4	41,2 - 43,0	41,9

Phalanx 2			
max. length	7	38,4 - 45,3	40,9
max. prox. width	8	45,5 - 52,6	47,8
distal artic. width	7	42,4 - 50,9	45,4
Phalanx 3			
max.length of the sole	5	46,4 - 53,2	50,3
articular width	5	42,7 - 50,2	45,2

of cattle, these fragments are considerably larger (table 5). It is quite doubtful that these finds come from small-sized female aurochs (*Bos primigenius*), because this species did not usually populate isolated islands.

The existence of hornless cattle in Saaremaa in Late Bronze Age and Iron Age has not been proved yet. There was no skull fragments in the osteological material of Asva site, meanwhile some horn fragments show the existence of horned cattle. The same can be attributed to the bones from Pöide hillfort (unpublished), East Saaremaa (12th century AD). There were several horn fragments, but no skull fragments belonging to the hornless cattle in the archaeozoological material of Pöide hillfort.

Table 5. The cattle (*Bos primigenius* f. *taurus*), measurements (mm)

Units	N	Variation	x
Proc. cornualis			
max. diameter (from base)	1	72,7*	
min. diameter (from base)	1	56,8*	
max. girth	1	210,0*	

Femur			
max. distal width	2	102,6* - (92,8 -juv.)*	
width of the *facies patellaris*	2	53,7* - (50,2 -juv.)*	
Tibia			
max. prox. width	1	115,0 *	
max. distal width	16	49,7 - 66,0	56,9
Astragalus			
lateral length	19	55,0 - 68,5	59,9
medial length	22	51,3 - 62,7	55,4
Calcaneus			
max. length	4	118,3 - 144,0	129,1
max. width	11	43,8 - 52,2	48,5
Os centrotarsale			
max. width	9	47,3 - 58,5	53,2
max. height	6	31,7 - 44,0	37,9
Phalax 1			
max. length	25	52,0 - 64,0	56,6
min. width	24	19,4 - 27,1	23,0
max. prox. width	25	24,4 - 33,6	28,2
distal artic. width	25	22,8 - 33,5	26,8
Phalanx 2			
max. length	15	34,9 - 45,3	38,5
max. prox. width	15	23,8 - 32,0	28,7
Phalanx 3			
max. length	12	48,7 - 69,5	59,5
articular width	13	18,1 - 24,6	21,4

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* measurements of the bullock's bones

3. 3. Sheep (*Ovis ammon* f. *aries*) and **goat** (*Capra ibex* f. *hircus*)

The sheep and the goat are represented by 468 finds. This amount forms 44 % of all the bone fragments of domestic animals. The third part of the remnants of the sheep and the goat come from juveniles.

In this research the sheep and the goat are not distinguished in osteological material, but according to horn fragments one can assume that a greater part of these finds come from the sheep. We can see the same tendency in Estonia nowadays, too: the sheep is more preferenced than the goat. Some of the measurements of bones and teeth of the sheep and the goat are indicated in table 6.

Table 6. The sheep (*Ovis ammon* f. *aries*) and the goat (*Capra ibex* f. *hircus*), measurements (mm)

Units	N	Variation	x
Dentes			
M3 sup. length	10	14,7 - 18,3	16,2
M3 sup. width	11	8,0 - 11,9	10,4
M3 inf. length	8	18,1 - 24,5	21,3
M3 inf. width	6	7,8 - 9,0	8,4
Humerus			
max. distal width	7	25,6 - 30,5	28,4
Radius			
max. prox. width	5	26,0 - 30,8	27,5
Tibia			
max. distal width	13	22,3 - 26,5	24,5

Astragalus			
lateral length	18	24,7 - 30,5	26,7
medial length	18	24,2 - 28,2	25,7
Calcaneus			
max. length	4	50,8 - 58,5	53,6
max. width	6	19,4 - 23,7	21,2
Metacarpus			
max. length	2	119,2 - 126,0	
max. prox. width	9	18,0 - 24,9	21,2
Metatarsus			
max. length	1	125,4	
min. width	1	9,8	
max. prox. width	4	16,9 - 21,2	18,3
distal artic. width	2	21,8 - 27,2	
Phalanx 1			
max. length	12	33,0 - 38,2	35,2
min. width	12	8,7 - 10,8	9,4
max. prox. width	11	11,1 - 13,0	11,7
distal artic. width	12	10,2 - 13,9	11,3
Phalanx 2			
max. length	4	21,4 - 23,0	22,1
max. prox. width	4	10,4 - 12,2	11,1
Phalanx 3			
max. length	5	25,6 - 35,5	28,8
articular width	5	9,8 - 14,8	12,0

3. 4. Pig (*Sus scrofa* f. *domestica*)

158 bone and teeth fragments were identified to the pig. This species is forming about 15 % of the identified fragments of the domestic animals. There was a number of fragments coming from

juveniles in the archaeozoological material and this amount forms more than a half of the identified remnants of the pig.

The pig has been an important fat and protein resource. There are both meaty and less meaty regions represented in the refuse material. The comparatively small representation of bone elements from more meaty regions may well depend upon the different taphonomic influences.

It was not complicated to distinguish the domestic pig and the wild boar, because the domestication of the pig was quite advanced in that period of time and the bones of domesticated pigs were smaller than those of the wild boar (table 7; 10).

Table 7. The pig (*Sus scrofa* f.*domestica*), measurements (mm)

Units	N	Variation	x
Astragalus			
medial length	3	27,3 - 39,8	34,6
Calcaneus			
max. width	5	29,4 - 31,2	30,2
Phalanx 1			
max. length	4	32,5 - 38,0	35,8
min. width	4	13,7 - 19,4	16,3
max. prox. width	4	17,7 - 24,0	20,8
distal artic. width	4	15,3 - 20,5	17,9
Phalanx 2			
max. length	6	21,6 - 25,1	23,0
max. prox. width	6	14,3 - 17,5	15,8

3. 5. Dog (*Canis lupus* f. *familiaris*)

This species is one of the oldest domesticated animals represented in all the archaeologically investigated settlement sites of Estonia. The "Asva dog" is represented by 10 bone fragments, which come from adult animals.

Considering the skull of the dog (table 8), the Bronze Age dog in Saaremaa looked like the present-day husky or eskimo dog. Those dogs are plain, but variegated, universal creatures in their duties, they carry out their missions mostly by heritable instincts without much training (Lepiksaar, 1963).

Table 8. The dog (*Canis lupus* f. *familiaris*), measurements

Units	Measurements (mm)			
Maxillare				
alveolar length of *P1-M2*:	67,0			
Mandibula				
max. length:	117,0	131,5		
alveolar length of *P1-M3*:	67,0	68,0	70,0	70,8
Astragalus				
lateral length:	25,4			
medial length:	24,2			

4. Wild animals

4. 1. Terrestrial

It is known that the isolation between Saaremaa and mainland was bigger in the past than nowadays. This could be a barrier for the distribution of the terrestrial animals on the island. This is concerning mainly the species that cannot cross the ice bridge in winter. Nowadays the species like the Mole (*Talpa*

europea), the Birch Mouse (*Sicista betulina*), the Field Mouse (*Apodemus mikrops*), the Black Rat (*Rattus rattus*) and the European Mink (*Lutreola lutreola*) are not living in Saaremaa, but they are common in mainland (Timm 1991).

Such an island isolation has been found by zoogeographers during the exploration of the fauna of Gotland as well. Some of the species, common on the Swedish mainland, are absent on Gotland: the Shrew (*Sorex araneus*), the Mole (*Talpa europea*), the Red Vole (*Clethrionomys glareolus*), the Pine Marten (*Martes martes*), the Pole Cat (*Mustela putorius*) and the Weasel (*Mustela nivalis*). This is a firm evidence for a primary isolation of this island (Lepiksaar 1986).

It is very important to seek out these species from subfossil material on Saaremaa and give prominence to the species common on mainland but not usually to be met on islands.

The remnants of the following terrestrial species have been found from the Asva site: the Elk (*Alces alces*), the Wild Boar (*Sus scrofa*), the Brown Bear (*Ursus arctos*), the Red Fox (*Vulpes vulpes*), the Pine Marten (*Martes martes*), the Mountain Hare (*Lepus timidus*), the Beaver (*Castor fiber*), the Water Vole (*Arvicola terrestris*) and the Hedgehog (*Erinaceus europaeus*).

The bone finds of the hedgehog found on Saaremaa are of special interest. As this species does not populate isolated islands, its distribution on Saaremaa may be explained as secondary occurrence, caused by man, because it is impossible for the hedgehog to cross the sea barrier or the ice bridge in winter. All the more the hedgehog being in hibernation. The measurements of the wild terrestrial animals are indicated in tables 9, 10 and 11.

Table 9. The elk (*Alces alces*), measurements

Units	Measurements (mm)
Radius	
max. distal width	66,0
Metacarpus	
distal artic. width	68,6
Astragalus	
lateral length	75,7
medial length	72,5
Calcaneus	
max. width	50,8
Phalanx 1	
max. length	75,3 82,2 87,8
min. width	25,0 27,1
max. prox. width	30,7 31,5 31,6 33,3 33,4 34,1
distal artic. width	30,0 30,9
Phalanx 2	
max. length	64,0 66,0
min. width	22,2
max. prox. width	32,9
distal artic. width	26,7

Table 10. The wild boar (*Sus scrofa*), measurements

Units	Measurements (mm)
Mandibula	
alveolar length of *P2-M3*:	114,0
alveolar length of *P4-M2*:	51,8
Tibia	
max. distal width:	53,5
Astragalus	
lateral length:	43,8
medial length:	41,5

Table 11. Measurements of some bones of wild animals

Units	Measurements (mm)
Ursus arctos	
length of *M1 inf.*:	24,0
width of *M1 inf.*:	14,4
max. width of the *calcaneus*:	46,5
Vulpes vulpes	
alveolar length of *P2-M1 inf.*:	44,9
Martes martes	
alveolar length of *P1-M3 inf.*:	30,4; 31,2
Lepus timidus	
length of the *calcaneus*:	32,4
width of the *calcaneus*:	11,1

Castor fiber
alveolar length of *P1-M3 inf.*: 34,2

Arvicola terrestris
alveolar length of *M1-M3 inf.*: 9,8

Erinaceus europaeus
alveolar length of *P1-M3 inf.*: 21,4

4. 2. Marine mammals: seals (*Phocidae*)

721 bone and teeth fragments of the seal have been found from the excavation area of 206 mý. It was possible to identify the species of 152 fragments (21 %): 63 come from the Harp Seal (*Pagophilus groenlandicus*), 43 come from the Gray Seal (*Haliachoerus grypus*), 30 from the Ringed Seal (*Pusa hispida*) and 16 from the Harbour Seal (*Phoca vitulina*). The morphomethric analysis of seal bones has been also done and the results are shown in tables 12, 13 and 14.

The remnants of the seal found from Asva have been analysed earlier too and the results have been published in different issues (Lepiksaar 1940; Tsalkin 1952; Lõugas 1992).

Table 12. The harp seal (*Pagophilus groenlandicus*), measurements (mm)

Units	N	Variation	x
Os temporale			
width of the *meatus auditorius externus*	29	9,5-12,5	11,1
Mandibula			
max. length	4	120,5-132,9	125,8
alveolar length of P1-M1	14	39,0-45,6	43,2
Humerus			
max. length	11	108,8-126,3	117,2
min. width	12	18,1-21,9	19,8
diameter of the *caput humeri*	12	24,3-28,8	26,3
max. distal width	12	34,6-42,3	37,4
Ulna			
max. length	6	141,0-159,5	151,4
prox. artic. width	9	19,8-24,0	22,2

Table 13. The ringed seal (*Pusa hispida*), measurements (mm)

Units	N	Variation	x
Os temporale			
width of the *meatus auditorius externus*	5	8,2-10,6	9,6
Mandibula			
max. length	4	111,8-124,6	119,9
alveolar length of *P1-M1*	9	35,1-40,8	39,1
Humerus			
max. length	3	110,8-115,6	113,1
min. width	5	18,0-20,3	18,9
diameter of the *caput humeri*	3	24,8-26,0	25,5
max. distal width	4	35,8-40,0	37,0
Femur			
max. length	6	91,0-100,3	95,4
min. width	7	20,5-26,9	23,8
diameter of the *caput femoris*	6	17,6-19,0	18,3
distal artic. width	6	43,0-44,8	43,9

Table 14. The gray seal (*Halichoerus grypus*), measurements (mm)

Units	N	Variation	x
Os temporale			
width of the *meatus auditorius externus*	7	10,5-14,4	13,5
Humerus			
max. length	1	148,0	
diameter of the *caput humeri*	2	32,8-33,2	
max. distal width	2	49,0-50,4	
Femur			
max. length	1	96,8	
diameter of the *caput femoris*	2	19,4-23,0	
distal artic. width	3	44,2-45,0	44,7

The Asva site is important for the study of the history of seals in the Baltic. Until now it is the only archaeolcgically investigated Late Bronze Age monument in the eastern part of the Baltic where the remnants of four species of seal have been found.

The Harp Seal came into the Baltic probably during the Litorina phase. In the Subboreal climatic period the finds of this species were quite numerous in the refuse material of fishers and hunters, but they are rare since the Subatlantic climatic change. It is interesting that even in the "Asva time", this species still occurred there as a prey for the hunters. No newborn pups of this seal are known from the Baltic area until now. Wether these have formed an isolated population in the Subboreal time in the Baltic or the recorded finds do belong to individuals invading the area from the North-Atlantic, is still a problem f or scientific discussion

Lepiksaar 1964, 1986; Ericson 1989; Sergeant 1991).

Unfortunately, the Asva finds belonging to the Harbour Seal are very few in number, and it is impossible to draw any conclusion concerning the occurrence and distribution of this species in the eastern part of the Baltic at that time. In contrast to the other seal species, the Harbour Seal gives birth to pups in summer, either on the coast or islet, but not on the ice. Nowadays this species is a very rare error-visitor in the Estonian shelf-sea (Aul *et al.* 1957). It seems as if this species occurred in the eastern part of the Baltic quite numerously in the "Asva time" as hunters could hunt them. It should not be an accidental invasion by a few individuals only.

The other two species of seal - the Ringed Seal and the Gray Seal - have a long history in the Baltic. Their bones have been found even from clay deposits in the Ancylus Lake, showing that the species must have arrived into the Baltic during the Yoldia Sea stage through the Närkessund (Winge 1904; Lepiksaar 1964; 1986; Forst,n & Alhonen 1975). There is some doubt whether the more pelagic Gray Seal could do this, but the earliest Baltic find from Skattmansö, Uppland, Sweden (Munthe 1895) has been dated from the stage of the Ancylus Lake.

The populations of the Ringed Seal and the Gray Seal have preserved until today in the eastern part of the Baltic and we have to do everything we can to save and preserve the seals in the Baltic.

5. Conclusions

The subfossil bone material being the basis of this study comes from a Late Bronze Age settlement site of Asva. The present study deals mainly with a limited bone sample from the excavations which covered an area of 206 m^2. An earlier investigation of animal remains from Asva has been published by Lepiksaar (1935; 1940), Tsalkin (1952), Paaver (1965) and Lõugas (1992).

Altogether 1828 fragments of bones, teeth and horns from the excavations of 1965-1966 at the Asva site have been identified. The domestic animals mostly dominate the material (table 2). Among these, the sheep and the

goat (mainly sheep) are individually most common, followed by the cattle, while the pig and the horse are represented by 158 and 95 bone and tooth fragments respectively. Wild animals constitute only a small part of the bone material.

As hunting of terrestrial animals played a very small role on Saaremaa during the Late Bronze Age, hunting of seals became more important. There were four species of seal in the subfossil material of the Asva site: the Harp Seal, the Gray Seal, the Ringed Seal and the Harbour Seal.

The economy of the Asva people was based on both farming and hunting. The study showed that animal husbandry probably played a vital role in the subsistence of the Asva people in the Late Bronze Age. The seal hunting too was important for getting rich in fat meat and train-oil.

Acknowledgements

The author is indebted to Dr. Johannes Lepiksaar for discussion and reading the manuscript, Dr. Vello Lõugas for discussion about archaeology, and Liina Maldre for help in bone determinations.

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SUBFOSSIILNE SELGROOGSETE FAUNA ASVA MUISTSEST ASULAKOHAST SAAREMAAL. IMETAJAD

Artiklis analüüsitakse Asvas 1965. ja 1966. aastal välja kaevatud subfossiilseid loomseid luujäänuseid. Nende põhjal selgitati Asva asulakoha tanatotsönoosi liigiline koosseis (ainult imetajad). Kõik tervemad skeletiosad mõõdeti ja tulemused kanti tabelitesse (4-14).

Asva kindlustatud asula (9. sajand e.Kr. - I aastatuhande teine pool p.Kr.) luuainesest oli võimalik kuni liigini määrata 1828 fragmenti. Esindatud oli kuus koduloomaliiki (hobune, veis, kits, lammas, siga ja koer), üheksa metsloomaliiki (põder, metssiga, karu, rebane, nugis, valgejänes, kobras, mügri ja siil) ning neli hülgeliiki (hall-, grööni-, viiger- ja randalhüljes). Kõige paremini olid määratavad koljufragmendid ja toruluud.

Materjali läbitöötamisel saadud tulemustest väärib eraldi märkimist grööni hülge ja randali, samuti siili esinemine Saaremaa leiuaineses. Viimase levikut saarele takistas meri, mida pika maa ja talveune tõttu ei saanud

ületada ka talvel, kui meri oli jäätunud. Siili levikut Saaremaal võib seletada sekundaarse esinemisena, mille põhjustas inimene.

Grööni hülge levikut Läänemeres tuleb veel täpsustada. Kuni pole leitud viimase 5000 aastaga dateeritud vastsündinud loomade luid, ei saa väita, et see liik sel ajal siin püsipopulatsiooni oleks moodustanud. Seega võib arvata, et grööni hülge luuleiud nooremast kiviajast ja varasest metalliajast pärinevad isenditelt, kes tulid Läänemerre Põhja-Atlandist, alguses perioodiliste, hiljem sporaadiliste massrännakute ajal.

Randal seevastu on tänapäevani Läänemeres püsinud, seda küll vaid mere lõunaosas. Vastandiks teistele Läänemere hülgeliikidele poegib randal suvel, kas rannal või laidudel, mitte aga jääl. Tänapäeval on ta meie rannikul haruldane eksikülaline. Asva asula ajal näib ta olevat olnud tänapäevast sagedasem, esinedes küll "kütitaval hulgal", kuid vähemal arvul kui teised liigid.