Hirundo 21: 16-27 (2008)

BIRD SPECIES AND NESTING DENSITIES IN REED-BEDS OF WEST ESTONIAN COAST AND KÄINA BAY

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Abstract. The area of reed-beds has steadily grown in Estonia in the last decades. A large part of coastline as well as several bays and lagoons have already overgrown with reed. Larger reed-beds may be divided into reed areas covering shallow bays and reed-fringes bordering unmanaged coastal grasslands. Similar to the latter are reed-beds on the coast of isolated sea islets and islands. The current article is an overview of the bird population in two different types of reed-bed but also in reed-beds of larger islands of Matsalu National Park, Silma Nature Reserve and Käina Bay.

Dominating bird species in all the reed-beds were Sedge Warbler (*Acrocephalus schoenobaenus*) and Reed Bunting (*Emberiza schoeniclus*). The average breeding density in coastal reed-beds was 61.6 pairs per 10 ha. Therefore, on islands it was slightly lower and reached up to 51.3 pairs per 10 ha. The areas with the highest species diversity as well as population concentration were reed-beds in shallow bays that exceed twice the estimations in other reed-bed types. There were altogether 26 species breeding in the large reed areas of shallow bays with the average breeding density of 100.6 pairs per 10 ha.

Introduction

Läänemaa together with the islands is rich in reed-beds: shallow bays and lagoons that are typical for the local unique landscape are more or less overgrown with reed. Often reed-beds are isolating coastal grasslands from open sea and are surrounding islands in shallow water. Nowadays there are lot of grasslands where the vegetation is mixed with sparse and low reed and covered with a thick layer of dead grass.

These areas are inhabited by several passerines (Meadow Pipit *Anthus pratensis*, Yellow Wagtail *Motacilla flava*, Sedge Warbler *Acrocephalus schoenobaenus*, Reed Bunting *Emberiza schoeniclus* and sometimes Skylark *Alauda arvensis* but also several wader species such as Common Snipe *Gallinago gallinago*, Common Redshank *Tringa totanus* and Eurasian Curlew *Numenius arquata*. Unmanaged grasslands were not considered any further as most of them will hopefully be restored in the near future.

The current paper is mostly focusing on coastal reed-beds and large reed areas but also reed-beds of larger islands have been discussed. Moreover, since reed-beds are a rather complicated study object and therefore poorly examined in terms of bird fauna also bird composition and population concentration in different types of reed-bed has been described in the current paper. However, data of counts carried out in several types of reed-bed in the early years of the present century provide a general overview of these areas.

Study area

The current paper is compromising following resources: 1) Silma Nature Reserve: mapping of birds breeding within reed-beds in 2005 and aerial surveys above the reed-beds (Erit 2006, 2007). 2) Matsalu National Park: (a) transect counts within inner reed-beds during 2002–2003 (Mägi & Kaisel, 2005). One of the transects covering a reed-bed of poor water exchange was surrounded by rivers (Lihula Sea) and two other transects were covering reed-beds in direct connection to the sea – one in the direction from east to west, located parallel to Kasari River (Kasari) while the other was placed straight through the reed-bed (Täku). Information about the outer parts of the reed-beds were obtained by taking canoe trips in 2000–2004; (b) counts in the northern coast of Matsalu National Park covered areas between Haeska and Kiideva in 1998–2000 (Mägi *et al.* 2004), Tauksi Island (Kaisel *et al.* 1999) and Haeska islets in 2000–2001 (counts were carried out by Paakspuu, Kaisel, Mägi, Toming); 3) Käina Bay: a single mapping took place in 2002 and covered an area of 195 ha (Leito & Leito 2003).

Location and distribution of reed-beds

Reed-beds may be divided into coastal reed-beds and large areas of reed covering shallow bays. Coastal reed-beds are narrow strips of reed surrounding the shallow coast that are growing denser towards inland reaching the coastal grasslands. Usually coastal reed-beds are rather young – onset of growing remains in the time when maintenance of coastal meadows ceased in the 1980ies or later. There are many coastal reed-beds in Matsalu National Park as well as in Silma Nature Reserve. In Silma about 330 ha is reed-bed (Erit 2006) while in Matsalu approximately one third of the total coastline is covered with reed. Occasionally the breadth of reed-bed does not exceed 50 m. Reed-beds of higher importance lie in the northern part of Matsalu Bay. Also the coast of Käina Bay is overgrown with reed.

The largest reed area is covering 2100 ha and lies in the eastern part of Matsalu Bay. Latter is classified as inland reed-bed with dense reed and shallow water with only a few puddles. Reed areas with lots of open water and occasional club-rush patches are classified as reed-fringes and lie in the western part and are reaching into open water. The land keeps emerging in the eastern part of the bay and several islets, which once lied in the open sea, now lie within reed-bed. Part of the reed-bed is isolated from open water by river channels and is therefore swampy and with rather poor water exchange (Lihula Sea). Within the reed-bed there are lots of sedge banks that have been piled up by ice and storm. Some sedge piles even form broad areas. At the same time several areas in open sea have overgrown with vegetation and covered by rhizomes of water plants that in turn have given growth to several herbal plants. Reed-beds in shallow waters and lagoons of Silma Nature Reserve are massive, extending to 655 ha (Erit 2006).

During the past decades the coastal areas of flat islands have also overgrown with reed. Furthermore, reed is spreading extremely well on islands where haying has been practiced in the past. For example, there is a 75 ha area of reed connecting the eastern flat part of Tauksi Island with several small islands nearby. Also there is a 40 ha reed-bed on Haeska islets.

Results

Species composition of breeding birds in coastal reed-bed

There are altogether 21 different bird species breeding in the coastal reed-beds – 14 in Silma Nature Reserve, 12 in Matsalu Bay and 13 in Käina Bay. Passerines dominate in the reed-beds of Matsalu and Silma making up 96–99% of the total number of birds (Table 1). The relative importance of other bird species remains low in Matsalu regardless of the consideration of the most representative and extensive reed areas. Yet, in Käina Bay the relative importance of passerines reaches only 74%.

The most numerous species of the typical reed-beds are Sedge Warbler *Acrocephalus schoenobaenus* (mean of 40.6 p/10ha) and Reed Bunting *Emberiza schoeniclus* (12.1 p/10 ha). These two species make up 76.7% of all the birds in Silma and 93.6% on the northern coast of Matsalu while only 61.6% in Käina Bay. The population concentration of the Sedge Warbler is lowest in Käina Bay and on Haeska islets. Therefore, Reed Bunting is numerous in all the reed-bed types in Matsalu with the highest population concentration on the Haeska islets. There is no major difference in the population concentration of latter species in Käina Bay and in reed areas of Silma. Rather common species on the coast of the Silma are also Reed Warbler *Acrocephalus scirpaceus*, Great Reed Warbler *Acrocephalus arundinaceus* and Savi's Warbler *Locustella luscinioides*.

Bittern *Botaurus stellaris*, Water Rail *Rallus aquaticus* and Spotted Crake *Porzana porzana* are absent from the reed-beds of Matsalu but appear in similar habitats in Silma where the Spotted Crake is even rather numerous. Water Rail is the only species mentioned above that appears in the reed-beds of Käina Bay. Also Moorhen *Gallinula chloropus* and Coot *Fulica atra* are breeding in Käina whereby are absent from other regions.

The population density of the Mute Swan *Cygnus olor* is similar in the coastal reed-beds of Silma and in the reed areas covering Haeska islets but is lower in the coastal reed-beds among other regions. The

extremely high population density of the Mute Swan in Käina Bay (6.15 p/10 ha) probably results from methodological differences – reed-beds along the coast of the islets located in the bay have also been taken into consideration whereby only the mineral part of the islet has been considered as an islet. However, Mute Swans favour these reed-fringes whereby the population density might even reach up to 37.7 pairs per ha (Erit 2007).

Table 1. Bird density in coastal reed-beds in Läänemaa and Hiiumaa and in reed-beds of large islands (pairs/10 ha).

Tabel 1. Lindude asustustihedused Läänemaa ja Hiiumaa ranniku-roostikes ja suuremate saarte roostunud aladel (paare/10 ha).

Species / *Liik*		Coastal reed-beds *Rannikuroostik*		Reed-beds of islands *Roostik saartel*		Käina Bay *Käina laht*
		Silma	Matsalu	Tauksi	Haeska	
Great Crested Grebe	PODCRI					0.10
Great Bittern	BOTSTE	0.06				
Mute Swan	CYGOLO	0.79	0.14	0.16	0.79	6.15
Greylag Goose	ANSANS	0.03	0.05	0.48	0.49	0.51
Mallard	ANAPLA		0.14	0.79	0.37	
Garganey	ANAQUE		0.10	0.16	0.14	
Gadwall	ANASTR				0.12	
Marsh Harrier	CIRAER	0.02	0.08	0.13	0.41	0.10
Water Rail	RALAQU	0.22				0.05
Spotted Crake	PORANA	1.09				
Moorhen	GALCHL					0.05
Coot	FULATR					0.77
Crane	GRUGRU	0.03				
Yellow Wagtail	MOTFLA	0.87	1.11	0.63	1.50	
Grasshopper Warbler	LOCNAE			0.71	0.08	
Savi's Warbler	LOCLUS	2.55	0.87		0.26	0.05
Sedge Warbler	ACRSCH	36.09	45.12	32.38	9.81	11.8
Reed Warbler	ACRSCI	4.57	0.97	2.38	4.46	1.69
Great Reed Warbler	ACRARU	1.2	0.19		0.24	0.72
Bearded Tit	PANBIA	2.23	0.48	2.7	1.00	1.13
Reed Bunting	EMBSCH	8.91	15.36	16.43	25.93	6.36
TOTAL / *Kokku*		58.66	64.61	56.95	45.60	29.48
Passerines / *Värvulisi*		96%	99%	97%	95%	74%

The population density of Greylag Goose *Anser anser* within the coastal reed-beds of northern Matsalu and Silma are similar. However, the numbers are considerably higher in Tauksi, the Haeska islets and in Käina Bay whereas similar among these three regions.

Species diversity of the large reed areas

Within the large reed areas passerines are dominating over the other species. The relative importance of these birds reaches up to 90% in the reed-beds of Matsalu, which is somewhat lower, compared to the numbers inhabiting coastal reed-beds. In Silma, therefore, the number is 1% higher compared to the coastal areas and reaches up to 97%. The dominant species are once again Sedge Warbler and Reed Bunting who make up 58–67% of all the birds in Matsalu and 80% in Silma. Moreover, the number of these two species is similar in Matsalu or might be in favour of the Reed Bunting (in Lihula Sea and reed-fringes). In Silma, Sedge Warbler outnumbers all other species and makes up 63.6% of all the birds inhabiting reed-bed (population density of 70.5 p/10 ha). The number of Sedge Warblers is 3.8 times higher than the number of the Reed Buntings, the second numerous species in Silma. The difference in bird fauna of Lihula Sea compared to the rest of reed-beds may come from intensive reed storage in winter whereas may also result from a poor water exchange that leads to paludification. However, species composition of this region still resembles that of the other large reed areas with the only exception of the Great Reed Warbler being absent from the area. The population density of the Savi's Warbler is considerably higher in the reed-beds of Matsalu when compared to the rest of the regions under consideration. Matsalu Bay is also the region where latter species was first registered in Estonia before it started to spread out. Probably an increase in the number of the Savi's Warbler is expected among other regions.

The number of Water Rails as well as Spotted Crakes is high in the reed-beds of Matsalu that have been growing there throughout centuries.

Table 2. Population density of birds (pairs/10 ha) in large reed-beds in Silma Nature Reserve and in different regions in the eastern part of Matsalu Bay

Tabel 2. Lindude asustustihedused (paare/10 ha) suurtes roolaamades Silma looduskaitsealal ja Matsalu lahe idaosa roostiku erinevates piirkondades.

			Matsalu NP *Matsalu RP*			
Species / *Liik*		SilmaNR *Silma LKA*	Täku *Täku*	Kasari *Kasari*	Lihula See *Lihula meri*	reed-fringes *Välisroostik*
Great Crested Grebe	PODCRI					1.39
Slavonian Grebe	PODAUR	0.05				
Great Bittern	BOTSTE	0.08	0.34	0.23	0.14	0.38
Mute Swan	CYGOLO	1.24			0.09	1.72
Greylag Goose	ANSANS	1.25	0.3	0.14	1.16	0.29
Mallard	ANAPLA		0.84	1.83	1.43	0.30
Garganey	ANAQUE		0.5	0.49	0.09	0.29
Gadwall	ANASTR			0.14		0.21
Pochard	AYTFER					0.38
Marsh Harrier	CIRAER	0.08	0.08	0.11	0.15	0.08
Water Rail	RALAQU	0.5	1.51	2.38	0.36	0.70
Spotted Crake	PORANA	?	5.47	3.96	1.71	1.27
Little Crake	PORPAR	0.03	0.05			
Corn Crake	CRECRE		0.53	0.58	0.97	
Moorhen	GALCHL			0.07		
Coot	FULATR				0.19	0.89
Crane	GRUGRU	0.08			0.09	
Black Tern	CHLNIG					0.44
Yellow Wagtail	MOTFLA		6.04	3.24	4.07	1.7
Grasshopper Warbler	LOCNAE		2.35	1.39	0.37	
Savi's Warbler	LOCLUS	6.5	18.28	14.1	14.87	22.40
Sedge Warbler	ACRSCH	70.5	33.68	33.75	22.66	11.38
Reed Warbler	ACRSCI	5.5	5.26	2.41	8.19	8.81
Great Reed Warbler	ACRARU	5	4.6	1.56		11.11
Bearded Tit	PANBIA	1.5				
Reed Bunting	EMBSCH	18.5	32.99	32.84	30.56	29.23
TOTAL / *Kokku*		110.81	112.82	99.22	87.10	92.96

Bird density in reed-beds

Bird density in the coastal reed-beds of Silma and Matsalu reaches approximately 61.6 pairs/10 ha (Table 1). Within the shallow reed-beds in the eastern part of Tauksi (57.0 pairs/10 ha) but as well on the Haeska islets (45.6 pairs/10 ha) similar numbers have been estimated.

Therefore, bird fauna in large reed-beds covering shallow bays is far more diverse. In these areas the mean population density is reaching up to 100.6 pairs/10 ha: 110.8 in Silma and 87.1–112.8 pairs/10 ha within different parts of Matsalu Bay (Table 2). In Matsalu Bay, in addition to large areas densely overgrown with reed and bulrush also reed-beds in open water were taken into consideration. Moreover, for the Crested Grebe *Podiceps cristatus*, the Pochard *Aythya ferina* and the Black Tern *Chlidonias niger* latter areas are the only suitable habitat. Also the majority of Coots and Mute Swans is aggregated in these particular reed-beds in the open water (Table 2). Bird density of the reed-beds located in the east is higher compared to the one in reed-fringes where the numbers reach up to 93 pairs/10 ha and decline as the open water area increases.

Bird fauna of the reed-beds in Käina Bay is particularly moderate when compared to the numbers of Silma and Matsalu, reaching merely 29.5 pairs/10 ha. In Käina Bay, coastal reed-beds are prevailing whereas large areas of reed are entirely absent. The total area of reed-beds is covering 195 ha and comprises reed-fringes together with narrow strips of reed surrounding the islands. Apparently, for several birds, dispersal across the sea has been a hindrance.

Bird species that are not numerous generally inhabit shallow reed-beds, which provide protection from storm (Table 3). Several cranes, bitterns, grebes, and geese belong to these species. The only species inhabiting various kind of reed-bed is Marsh Harrier *Circus aeruginosus.* The only factor limiting its dispersal is the size of the area.

Table 3. Number of species, population concentration (pairs 10/ha) and proportion of some taxons in all reed-beds types.

Tabel 3. Liikide arv, asustustihedus (paare 10/ha) ja linnurühmade jaotus kõigis käsitletud erinevates roostikes.

	Number of species *Liikide arv*			Density *Asustustihedus*			Proportion *Osakaal linnustikust*		
	coast *rannik*	shoal bay *madal laht*	islands *saared*	coast *rannik*	shoal bay *madal laht*	islands *saared*	coast *rannik*	shoal bay *madal laht*	islands *saared*
Grebes Great Bittern Marsh Harrier *Pütid, hüüp, roo-loorkull*	2	4	1	0.08	0.62	0.27	0.1%	0.6%	0.5%
Anseriformes *Hanelised*	4	6	5	0.63	2.54	1.81	1.0%	2.5%	3.5%
Gruiformes *Kurelised*	3	7	0	0.68	4.89	0	1.1%	4.8%	0.0%
Passerines *Värvulised*	7	8	8	60.23	93.07	49.26	97.8%	92.0%	95.9%
Total/Kokku	16	25	14	61.6	101.12	51.34			

Discussion

Current nature conservation objectives determine opening up and restoring of coastal meadows. Conservation plans demand for determining species which gain from management and species that might be deprived of their nesting habitat. In order to avoid harming the nature the pros and cons of management need to be discussed prior to taking any action. As reed has become a requested material in building roofs winter mowing of reed-beds has become an emergent business. However, winter mowing is known to affect the living conditions of birds during breeding season. Relevant counts have been carried out in Silma Nature Reserve for several years now and hopefully one day the results will be published. Furthermore, during counts in Matsalu National Park, only half as many birds were registered within mowed reed-beds when compared to the mean of the entire route.

Living conditions within reed-beds vary among the years. There are years when reed from past year is still upright and years when storm and ice have almost entirely flattened the whole reed areas. However, in most years the situation is in-between these two extremes. Fallen reed is a suitable habitat for several bird species but primarily crakes, rails and ducks. Also piled up sedge banks within reed-beds make suitable grounds for building nests. However, mowed reed-beds lack of hiding places that are otherwise characteristic to reed areas and are therefore suitable for only a few breeding species. Black-tailed Godwit *Limosa limosa* and Common Redshank but also Curlew and Lapwing *Vanellus vanellus* inhabit these flat areas.

The bird fauna of reed-beds is very specific and rather poor. There are only 12–13 species of birds in Estonia who are breeding only in reed-beds and about the same number of species who inhabit reed-beds but also several other biotopes. The reed-beds of Matsalu lack of reed-fringes what makes them rather unique. Crested Grebe, Pochard, Coot, Black Tern and Great Reed Warbler but also the majority of Mute Swans breed in these reed-beds. The few puddles scattered within the reed area are also suitable breeding sites for Spotted Crakes and Water Rails.

There are many ducks breeding within the reed-beds of Matsalu and recently several species typical for the water meadow have also been registered in this area. Corn Crake *Crex crex* was first registered here in 1999. This species cannot be heard during late spring and early summer when the water level is high. However, there were several birds registered in the arid summer of 2002. Corn Crakes do not only inhabit the riversides near reed-bed but can also be found within the reed areas – probably on islets forming from mineral ground or rhizomes of bulrush and reed but also in patches of sedge. During arid summers these areas are suitable not only for the Corn Crake but also the Common Snipe. Wader species were particularly numerous in the year 2002 which was especially arid and the reed was flattened. There are also many wagtails inhabiting the reed-beds.

The high percentage of passerines within reed-beds and its growing tendency is similar to what is happening in all the open areas covered with herbal plants but especially in coastal meadows and water

meadows. Typical inhabitants of the meadows are Meadow Pipit, Skylark and Yellow Wagtail (Mägi *et al*. 2004). Sedge Warbler and Reed Bunting usually prefer areas in the coast that are overgrown with reed, however, the numbers are also growing on meadows with high vegetation. Probably the reason for this pattern may lie in the same phenomenon, however, remains unknown.

Reed-fringes growing on coastal meadows are not significantly valuable in terms of bird fauna. Cutting down the coastal reed-fringes might mainly decrease the number of Sedge Warbles and Reed Buntings that are the most abundant species in almost any wet area. Also Marsh Harrier might suffer from the cutting of coastal reed by loosing a considerable part of its nesting habitat. Habitat deprivation also affects the Bittern and the Great Crested Grebe. Cutting of reed-beds is reasonable in case restoration and regular management of coastal meadows is possible. Latter concerns coastal areas as well as the islands. Data of the current paper suggests that of all the vulnerable species Marsh Harrier is the only one that might suffer from the restoration of coastal meadows on larger islands.

Literature cited: **Erit, M. 2006.** Silma looduskaitseala tähtsus niidu- ja roostikulindude pesitsusalane Eestis. Hirundo 19: 58–67. – **Erit, M. 2007.** Rannaniidu- ja roostikulindude asustustihedus Silma looduskaitsealal ja Eestis. Loodusevaatlusi 2006: 32–49. – **Kaisel, K., Paakspuu, T. & Mägi, E. 1999.** Muutustest Tauksi, Liia ja Sõmeri saarte linnustikus ja nüüdisaegse linnustiku üldiseloomustus. Loodusevaatlusi 1997–1999: 76–87. – **Leito, A. & Leito, T. 2003.** Käina lahe haudelinnustik 2002. aastal ning viimaseaegsed muutused selles. Loodusevaatlusi 2000–2002: 64–79. – **Mägi, E. & Kaisel, K. 2005.** Matsalu siselahe roostikus pesitsevate lindude paiknemine ja arvukus. Linnustikus toimunud muutused viimasel poolsajandil. Loodusevaatlusi 2004–2005: 33–56. – **Mägi, E., Paakspuu, T. & Kaisel, K. 2004.** Linnustiku arengust Matsalu rannaniitudel viimase poolesaja aasta jooksul. Loodusevaatlusi 2003: 3–40.