



CHANGES IN THE BIRD FAUNA OF TALLINN DURING 1900-2005

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Abstract. The current paper is a summary of historical data on bird recordings within the districts of Tallinn during 1900-2005. The historical data of 8 administrative districts of Tallinn was analysed in three periods of time: I period 1900-1945, II period 1946-1990 and III period 1991-2005. In these 100 years altogether 260 different bird species have been registered in Tallinn. The richest area during period I and II was Haabersti, respectively with 129 and 212 species. Therefore, more observations have been carried out in Haabersti in comparison to the rest of the city. However, by period III the increase in human activity has caused fragmentation, habitat destruction and disturbance to Haabersti. By that time the area with the most diverse bird fauna, mostly because of the Special Protection Area under the EU Bird Directive, had become North-Tallinn, with 208 species. Since the largest water body with suitable habitats – The Lake Ülemiste – belonged to the city centre, the heart of Tallinn held 146 bird species, whereas the actual number of bird species in the heart of the city was 10 times less. Due to an increased human impact on the habitats the average number of bird species in different parts of Tallinn by the end of period III remained around 100.

Introduction

There have been a lot of changes in the bird fauna of Estonia during the past hundred years. Human activity has brought about habitat degradation of species that have been numerous in the past but have become less in number or even vulnerable in Estonia as well as in the neighbouring areas. At the same time, human activity has paved way to new breeding sites and improvement of feeding conditions that in turn has led to a dramatic increase in some bird species (eg. crows and gulls).

In Estonia, only a few areas exist for carrying out traditional observations on birds living in the urban area, eg. Raadi cemetery in Tartu. Also Tallinn could have been included to these areas as observations have been carried out there since 1860 (Mank 1973). However, these observations have not been performed in a consistent manner and therefore periods of intensive research are interrupted by long-term periods of no observations. Probably here also lies the reason why there are no consistent observations of the bird fauna of Tallinn yet there are overviews of several areas, species or regions separately (eg. Kumari 1931, 1937; Kumari ja Mank 1938; Leibak 1985; Kahru 1971; Mank 1940, 1984a, 1984b, 1984c; Randla 1959, 1970; Tuule ja Tuule 2004 etc.).

The aim of the current paper was to collect data in order to provide an overview of the bird species encountered during 1900–2005 in Tallinn together with areas that have subsequently been joined to the city. Also close attention has been paid to bird fauna in connection with development of Tallinn. This study is the very first attempt to gather all publications together with reliable unwritten data of the bird fauna of Tallinn. However, authors of the current study are aware of the fact that the accessible data might not be sufficient, especially what is concerning historical source since only data available in Estonia has been used.

Material and methods.

All accessible bibliographical records of the observed period during 1900–2005 have been collected in order to obtain an overview of the bird fauna of Tallinn. Every city district has been described separately and divided to three periods: (I) 1900–1945, (II) 1946–1990 and (III) 1991–2005. This division is based on historical background: period I is covering the period of time until end of World War II, period II is covering the period of time following the war until the restoration of the independence of the Republic of Estonia in 1990 (the so called the Soviet times), and period III is covering the period of time following the restoration of independence until the year 2005. Data is divided according to city districts because of the large amount of information

and is presented on web: <http://www.loodus.ee/hirundo> (hereinafter referred as electronic appendix).

Borders of different city districts have been specified in 2005 (fig. 1). Therefore Lake Ülemiste and Mõigu settlement remain in the borders of City Centre. The only area excluded from the analyses was Aegna isle, mostly due to insufficient amount of data.

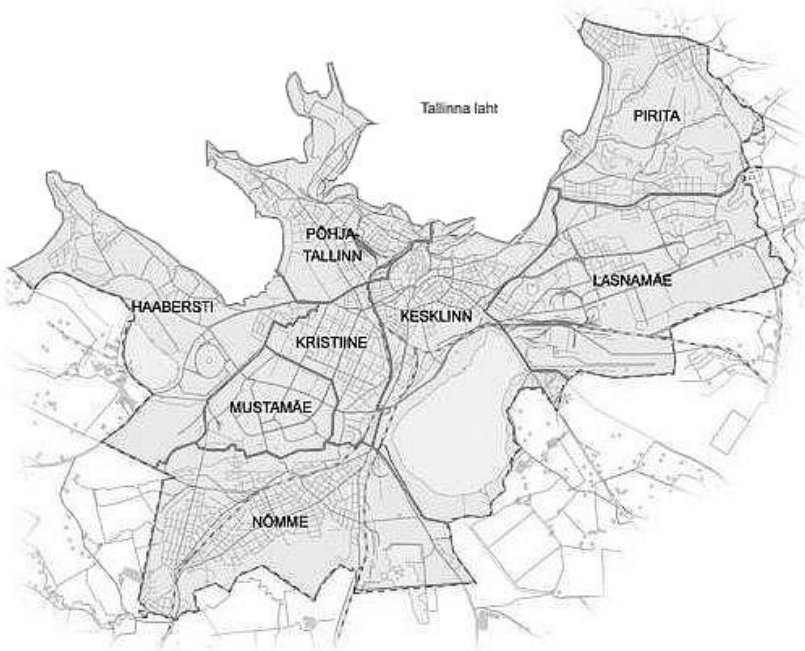


Figure 1. Districts of Tallinn (source: www.tallinn.ee)

Joonis 1. Tallinna linnaosad (allikas: www.tallinn.ee)

Only data of the species (table 1, electronic appendix, hereinafter referred as “the tables”) encountered within the urban area of Tallinn and originates from a reliable published or unwritten source has been included in the study. Hereby, the data of period I is rather poor in

comparison with the periods II and III. Sometimes the exact location of a bird has been rather difficult to associate with a certain city district since the descriptions of areas where observations had been made were rather inaccurate.

Table 1. Number of bird species in Tallinn during period II and III.

Tabel 1. Linnuliikide arv Tallinna linnaosades 1946–1990 (II perioodil) ja 1991–2005 (III perioodil).

District <i>Linnaosa</i>	All species <i>Kohatud liike</i>	Breeding <i>Pesitsejaid</i>	Migrating <i>Läbirändajad</i>	Wintering <i>Talvitujad</i>
1946–1990				
Haabersti	212	125	109	20
Northern Tallinn	167	95	100	26
Centre	174	122	81	21
Pirita	153	80	85	17
Lasnamäe	72	61	15	16
Kristiine	46	34	16	15
Mustamäe	57	43	16	21
Nõmme	102	85	25	29
1991–2005				
Haabersti	105	79	37	27
Northern Tallinn	208	102	128	49
Centre	146	115	53	29
Pirita	119	73	57	40
Lasnamäe	109	59	70	24
Kristiine	64	44	22	27
Mustamäe	68	60	16	29
Nõmme	88	73	21	30

In order to better describe the bird fauna birds have been divided into three groups (confirmed, probable and possible breeders) according to the Estonian Bird Atlas (Renno 1993). Additionally birds have been divided to migrants, non-breeding feeding visitors, wintering species and vagrants.

Data of the breeding birds from period II is mostly based on the Estonian Bird Atlas (Renno 1993). In order to obtain more accurate results only four grid squares covering a large part of Tallinn were used in the analyses (LF1 a2, LF1 a3, LF1 b2, LF1 b3). Every grid square was covering at least two different districts since one single square covered an area of 100 km². Therefore species registered in the four grid squares were grouped to districts according to habitat preference and biotopes that were present in the specific district. In case a suitable biotope was represented in every district the particular species was registered in all the districts. The same method was used for period III (data was obtained from the database of the Estonian Bird Atlas: www.eoy.ee/atlas). The current study includes the following grid squares from the Estonian Bird atlas that is being prepared: LF6595, LF7095, LF6590, LF7090, LF6090, LF6585, LF6580, LF7080, LF7085, LF7585, LF7590 and LF7595. Grid squares of the current Bird Atlas are four times smaller in size than the ones in the last Bird Atlas, which means that probably there are fewer inaccuracies in grouping the birds as well.

Changes in the bird fauna of Tallinn during 1900–2005

Bird fauna of Haabersti

Haabersti was probably the area in Tallinn that was richest in birds during 1900–1945. Human impact remained rather insignificant in Haabersti since densely populated as well as industrial areas were located far from that district. Also biotopes that birds used for migration, breeding or wintering were abundant (Kumari 1931; Masso 1993; Bruns 1993). There were different habitat types represented in Haabersti – reedbed, sea coast, alvar, fen, deciduous woodland, grassland, field, spruce forest, pine forest, water meadow, park, river (Mustjõgi, Tiskre creek) and a lake (Harku). Due to the local diverse landscape and biota several nature hobbyists preferred to carry out ornithological observations in that particular region on account of

which during period I the majority of the data originated from the surroundings of Kopli bay (Haabersti and Northern Tallinn).

Altogether 129 different bird species have been registered in Haabersti during 1900–1945 (tables). However, data from the 1930ies is rather poor - only 35 breeders have been registered even though the total numbers are probably higher (Kumari 1931, 1937, 1978). Haabersti has also been a good region for staging. At least 53 species were passage migrants, 43 wintering species and 10 vagrants.

After World War II former settlements were starting to expand and new ones were being built which brought about increase in human population and traffic volume (Bruns 1993). In 1973 Väike-Õismäe district was being established on the grasslands near Lake Harku and in 1983 Tallinn Zoological Gardens became operative in Veskimetsa. This development resulted in loss of local bird fauna breeding in natural habitats whereas the urban bird population started to increase. Tallinn Zoo provided new breeding sites (ponds) and enhanced feeding conditions of urban birds (mostly crows and gulls). Even though the majority of birds that fear humans disappeared from Veskimetsa the total number of local breeders remained high (Chaffinches *Fringilla coelebs* and thrushes; see electronic appendix). Also the bird fauna of Lake Harku declined during period II as a result of intense local development (Mäemets 1977).

In the 1950ies and 1970ies in-depth studies have been performed on the bird fauna of Veskimetsa. During that period the region reaching from Kopli bay to the industrial areas in Mustamäe was covered by deciduous forest, dense spruce forest, human settlements and open field (Jüssi 1954; Leibak 1985). In the 1950ies 47 out of the 102 registered bird species were local breeders while the rest were passage migrants, wintering species or vagrants. Studies carried out in 1972–1974 showed a decline in the species diversity down to 44 species (Leibak 1985). There were 163–170 species breeding within an area of 32 ha that is a population concentration of 5.2 pairs per ha. During two decades the bird fauna of Veskimetsa had declined by 10 species while some new species were included in the register (Tawny Owl *Strix aluco*, Lesser Spotted Woodpecker *Dendrocopus minor*, Goldfinch *Carduelis carduelis*).

During 1946-1990 altogether 212 species of birds had been registered in Haabersti (tables).

In period III (1991–2005) the real estate industry of Haabersti became even more intense and brought about pressure on all natural landscape types. New districts and blocks of houses were established in the forested area, on the coast and in open field. Species diversity declined within the entire area when compared to period II. However, some of the latter tendency may also be explained by the fact that observations became less frequent in time. By that time 30-40 species of birds were estimated on the territory of Tallinn Zoological Gardens, in Veskimetsa. There is very few data of the bird fauna in Kakumäe peninsula, however, the biggest Grey Heron *Ardea cinerea* colony with more than 30 nests is located in that region (Roováli, Ernits 2003). During 1991–2005 there were altogether 105 species of birds registered in Haabersti (tables).

Bird fauna of Northern Tallinn

During period I Northern Tallinn had a rather poor natural biotic community and therefore did not have a species diversity as rich as Haabersti. There were pine forests in Merimetsa and Pelgulinna also one small landfill and allotments in Pelguranna. In Kopli region there was a settlement and a cemetery but also areas of broad-leaved woodland (Kumari 1931; 1937; Mank 1940). During 1900-1945 Kalamaja and the industrial area beyond Balti Jaam expanded. A new harbour was built to serve the war and earth material that was excavated during dredging operations was used to join Great- and Little-Paljassaare isles to mainland and an embankment was established in order to supply a citadel (Nerman 2002). Similar to Haabersti, the bird fauna of Northern Tallinn is mostly described by data originating from the coastal areas. These two regions also share the same list of passage migrants, however, there is no reliable data of the local breeders in Northern Tallinn. There were altogether 7 species of breeders, 47 passage

migrants and 21 wintering species registered in Northern Tallinn during period I (tables).

During period II new living districts and industrial areas were being built in Northern Tallinn (Bruns 1993; Masso 1993). The number of species that fear humans or whose habitats have been destroyed started to decline. Moreover, straying cats and dogs probably reduced the breeding success of open nesting birds. Establishing harbours brought about changes where several coastal areas were transformed to artificial landscape and thus became unsuitable for staging *charadriiformes* and passerines. Stroomi beach and Paljassaare peninsula became the new staging points for these species. The biotope and species diversity was growing in the northern part of Paljassaare. Reedbeds with small water bodies started to appear between Great- and Little Paljassaare and provided several species with suitable staging points or breeding sites (Mens & Miidel 1998). This area was closed to the public as it belonged to the Border Guard of Estonia and therefore remained rather wild. During winter, shipping lanes of Tallinn were kept free of ice which had a positive effect on the feeding and wintering conditions of geese in water bodies surrounding Paljassaare. Altogether 167 species of birds were registered in Northern Tallinn during period II (Merihein 1970; Mank 1974, 1984c).

In 1991–2005 a total of 208 bird species was registered in Northern Tallinn. Such dramatic increase in species diversity probably comes from an increase in observation intensity within that area. By the end of 2005 there were 85 breeders and 121 either non-breeding feeding visitors, passage migrants or vagrants registered in the northern part of Paljassaare peninsula (data from author and the Bird Club of Tallinn). Disturbance in this region has been very low due to the lack of interest of real estate developers. However, human impact increased in the rest of Tallinn and shrub layer was cleared in parks and forests.

Bird fauna of City Centre

During period I City Centre was a rather green region with many gardens, parks and avenues (Bruns 1993). In the eastern part there was

park Kadriorg that classified as wooded meadow and had a rich bird diversity. In the southern part there was Lake Ülemiste with large sandy areas and young pine growths (Kumari 1931). Also deciduous forest, seacoast, reedbed, water meadow, grassland and artificial landscape were represented in City Centre. However, data of the bird fauna of City Centre during period I is rather poor. Park Kodriorg was covering a rather large area during period I and was one of the richest regions in migrating as well as breeding species. In the 1930ies altogether 49 different breeding species were registered in park Kadriorg. However, there is no data of the species composition from that period (Leibak 1985). The same number of species was also registered during spring migration by Eerik Kumari.

By the end of period I City Centre had expanded south, east and south-west which, however, did not bring about any major negative changes in the existing bird fauna that mostly was consisting of garden birds (Masso 1993). Based on the existing data there were 58 different bird species registered in City Centre during 1900-1945.

During World War II City Centre suffered from serious destruction and was restored in the beginning of period II (Masso 1993). Former wooden houses were replaced by massive multi-storey buildings made of stone or concrete. Traffic was getting denser and was demanding wider streets mainly on the account of green areas. Regions that were richest in birds were Lake Ülemiste, park Kadriorg and Siselinna cemetery. Due to the lack of suitable breeding sites the rest of City Centre was mostly inhabited by House Sparrow *Passer domesticus*, Rock Pigeon *Columba livia* and Jackdaw *Corvus monedula* that were able to breed in building openings or garrets.

There were 60 species of birds registered in park Kadriorg during 1950-1955 while 42 were local breeders (Sakkus 1984). In the 1970ies altogether 415 breeding pairs of 44 different species were registered on 71 ha of park area (Leibak 1985). The mean population density was 5.85 pairs/ha. The number of warblers was rather high despite of the sparse shrub layer. In terms of species diversity park Kadriorg was comparable to an area of 25 ha of Siselinna cemetery where during 1975-1976

altogether 157-175 breeding pairs out of 29 different species were registered (Leibak 1985). Already in the 1950ies only a few species were breeding in the other parks of the City Centre due to the lack of suitable breeding sites. Altogether 13 species were registered in the former Mitšurin Park and 7 species in the park close to Toompuiestee whereas most of these birds were breeding in the border area of the park - Toompea wall, Town wall and towers surrounding the town (Sakkus 1984; Randla 1970). Bird fauna of Lake Ülemiste was becoming more diverse after restrictions were set on public access (Kahru 1971). As a result of access control the number of several species was getting higher and 9 new species were included in the register. Altogether 174 species of birds were registered during period II (tables).

Period III brought about major changes in the City Centre. In 1997 large-scale cuttings were carried out where hundreds of trees in a good or fair condition were felled in Old Town, near Toompea and Vabaduse Square (Milve 1997). Similar cuttings were carried out in park Kadriorg that brought along degradation of several breeding as well as feeding sites. The total number of bird species breeding in park Kadriorg was estimated to 20.

In period III altogether 146 species of birds were registered in City Centre (tables). Reason for this high species diversity being Lake Ülemiste together with its surroundings. However, the heart of the city had become extremely poor in species diversity. In the beginning of the period, many suitable breeding sites were available to Rock Pigeons and Domestic Sparrows which, however, disappeared after renovation of old buildings and erecting of new ones. Yet, an epidemic of urban birds cannot be excluded. By the end of period III the dominating pigeons and sparrows had been replaced by Herring Gull *Larus argentatus* and Hooded Crow *Corvus corone* breeding on roof tops and trees. These species benefitted from food waste that was easily accessible and available near trash cans as well as on sea shore.

Bird fauna of Pirita

In period I Pirita was mostly covered by planted pine forest on sandy grounds. Also settlements, open seacoast and deciduous forest were represented (Kumari 1931; Ratas 1986). The bird fauna of Pirita has been rather poorly described in period I and thus there is data of only 2 breeders and 25 migrants and vagrants available. However, the same species that occurred in City Centre and Northern Tallinn during spring and autumn migration probably also occurred in the coastal waters of Pirita.

In period II several residential districts like Merivälja, Pirita, Pirita-Kose, Viimsi and Mähe were expanding and brought about rise in the number of cavity nesting species as well as open nesters (Masso 1993). There were 153 different species registered in Pirita during period II (tables). Dominant breeders were passerines while passage migrants and wintering species staging at sea were mostly geese and *charadriiformes*.

During period III Pirita was probably the richest area in bird numbers as it provided suitable breeding conditions for several passerines. However, establishing new residential districts and intensification of former regions resulted in the disappearance of bushes and other green areas. Thus, the total number of species registered in Pirita during period III was 119 (tables). The area with the most diverse bird fauna in Pirita district was park Lillepi with 39 breeders out of 71 encountered species of birds registered in 2004 (Ottesson & Puumets 2004). There is no data of the bird fauna on the woodland of Kloostrimetsa.

Bird fauna of Lasnamäe

Most of Lasnamäe was rather unpopulated with only a few farms here and there. The only densely populated region was Sikupilli residential district (Masso 1993; Pesur 2003). In the middle of Lasnamäe there was Tondi fen and large areas covered by fields, grasslands and

also an airport. The eastern part of the area, Nehatu, was occasionally covered by mixed forest stands and was inhabited by Common Kestrel *Falco tinnunculus* and Fieldfare *Turdus pilaris* (Juhtund 1937). Further data of the local bird fauna is not present.

In the 1950ies and 1960ies new apartment blocks were being built in Majaka region and continued later within the entire Lasnamäe (Masso 1993). These areas were mostly inhabited by House Sparrow, Rock Pigeon and Common Swift *Apus apus*. The southern part of Lasnamäe was occupied by industrial area and Tallinn Airport. The only areas that remained unoccupied had a high radon content (Paekalda) or were overmoist (Tondi fen). Changes in water regime induced Tondi fen to overgrow with birch, osier and alder. Increase in human population on one hand and the outset of food industry on the other brought about increase in waste production that in turn favoured the living conditions of crows and gulls. In Lasnamäe, the total number of registered bird species in period II was 72 (tables).

A major change in the bird fauna of Lasnamäe in period III was the inhabiting of rooftops of apartment houses and buildings of the former Dvigatel plant by colonies of Herring Gull. During this period 109 different bird species were registered in the Lasnamäe district (tables). The major part of these birds was registered on Tallinn Airport territory that at the same time had become the richest bird area in Lasnamäe (Tuule & Tuule 2004). Reason why this area has extremely high bird numbers lies in its favourable location with regard to different habitat types since Tallinn Airport is surrounded by the City of Tallinn, lake Ülemiste with shallow waters and rich in fish, Rae-Assaku agricultural landscape and Rae fen.

Bird fauna of Kristiine

In Kristiine district constructions begun in 1904. Private houses, market gardens were being built while at the same time large areas were still covered by fields and grasslands (Nerman 2004). Reliable data of the local bird fauna is not existent, however, the area was probably

inhabited by common urban birds and by species inhabiting open landscape.

Period II brought about extension of Lilleküla settlement and tens of new apartment houses were being built. As construction became more intensive the dominant species of the area became warblers. However, in the middle of period II the wild Löwenruhe Park was still inhabited by Tawny Owl *Strix aluco* and Green sandpiper *Tringa ochropus* (Randla 1970). Altogether 46 species of birds were registered in Kristiine (tables).

Period III brought about decline in the number of local breeders, except Hooded Crow. The result probably lies in a tendency where traditional gardening was not pursued anymore. A colony of Black-headed Gulls *Larus ridibundus* was formed in Liimi street that was located in the industrial area of Kristiine. In spring 2005 this colony consisted of 1200 breeding and staging birds and also a pair of Moorhens *Gallinula chloropus* were encountered among the gulls (A. Tuule, unwritten data). In period III altogether 64 species of birds were registered in Kristiine (tables).

Bird fauna of Mustamäe

In period I there was a blowing sand area near Mustamäe slope that was located in the southern part of Mustamäe. From the 1930ies this sandy area was being planted with pines in order to prevent erosion (Ratas 1986). The Western and Northern part of Mustamäe were typical village landscape and covered by fields and pastures. Therefore Northeastern and Eastern parts were forests of European Alder *Alnus glutinosa* and due to many springs this area was rather boggy. However, data of Mustamäe during period I is rather poor.

In 1962 intensive construction begun in the grasslands in Mustamäe district. The Western and Northern parts were transformed into industrial areas and other regions into residential districts with no green areas. Thus the main birds inhabiting Mustamäe were the urban species. Altogether 57 different species were registered in period II (tables).

In period III the bird fauna of Mustamäe remained rather poor with an only rise in the number of Herring Gulls, Jackdaws and Hooded Crows that were breeding, feeding or wintering in that region. The total number of species registered in Mustamäe in period III was 68 (tables). In time Mustamäe district has become an important wintering area for Mallards *Anas platyrhynchos*. In 2005/2006 altogether 1253 individuals were registered in the surroundings of Lepistiku Park, Parditiik and in nearby trade centres (A. Tuule, unpublished).

Bird fauna of Nõmme

Period I brought about intensive construction in Nõmme since it was a popular resting place and summer resort (Masso 1993). However, construction did not result in cutting of trees and thus Nõmme garden city maintained its semi-natural appearance. Some areas between the houses were reconditioned but maintained rather natural. During the entire period the sandy area of Mustamäe slope was being planted with pine trees in order to prevent erosion (Ratas 1986). Only 1 breeder, 8 passage migrants and 10 wintering species have been registered in Nõmme during period I.

In period II the expansion of Nõmme garden city continued until Pääsküla fen and Harku forest. In the Southeastern part industrial and mining areas were established. The dominant breeders were warblers whereas in several gardens in Pääsküla and Rahumäe Hoopoe *Upupa epops* was a persistent breeder (Randla 1970; Mank 1984c). In the 1950ies an illegal discharges of waste into peat holes took place in the border of Pääsküla fen. In 1974 the tipping continued officially (www.landfill.ee) and led to the establishmet of Pääsküla landfill that became a good feeding area for several bird species all year round. Altogether 102 species of birds have been registered in Nõmme during period II (tables).

In period III species diversity in Nõmme was rather high. However, intensive cutting of shrubbery within gardens and park forests led to a decline in the numbers of passerine birds breeding on the ground or in bushes. The number of Hooded Crows was increasing probably due to

Pääsküla landfill. In period III approximately 2000-20 000 Herring Gulls together with several other gulls, crows and passerines were daily visitors of the Pääsküla landfill (R. Ottesson, unwritten data). After the closure of this landfill in 2003 birds abandoned the area and inhabited another landfill that was recently opened near Ülgase settlement, in Jõelähtme rural municipality (E. Tuule, unwritten data). There is no data of the changes in the bird fauna that took place in Pääsküla fen. During period III altogether 88 species of birds have been registered in Nõmme (tables).

Summary of changes in the bird fauna of Tallinn during 1900–2005

The bird fauna of Tallinn has shown high diversity throughout the years (within different regions). Since Tallinn is located on the coast and all the districts differ from each other in landscape type (coastal landscapes in Pirita and Northern Tallinn, slopes in Mustamäe, parks in City Centre etc.). Observations were carried out during 105 years and throughout the time the local bird fauna has changed along with the habitats and their condition in the city as well as in the surroundings.

During 1900-2005 the Estonian bird fauna has been changing and become more diverse (Lilleleht 1998). In the beginning of the 20th century there were less than 300 species of birds registered in Estonia (Repnan 1974) whereas on the 25th of September in 2005 the number of natural species was 353 (www.eoy.ee). During the past 105 years many new species have inhabited the administrative territory of Tallinn while some species have disappeared. New species breeding in Tallinn are Grey Heron, Mute Swan, Collared Dove *Streptopelia decaocto*, Bearded Tit *Panurus biarmicus*, Black Redstart *Phoenicurus ochruros*, Blyth's Reed Warbler *Acrocephalus dumetorum*, Penduline Tit *Remiz pendulinus*, Serin *Serinus serinus*, Savi's Warbler *Locustella luscinioides*, Greenish Warbler *Phylloscopus trochiloides* and probably also Little Grebe *Tachybaptus ruficollis*. Therefore several vulnerable species have disappeared from

Tallinn for example Roller *Coracias garrulus*, Hoopoe and Corn Bunting *Emberiza calandra* (Elts *et al.* 2003).

Tallinn was rich in natural habitats during period I. However, there were also areas with poor bird fauna. Probably former young growths of pine in Mustamäe and Pirita and grasslands in Kristiine district had a poorer bird fauna than the living districts which were built later and were inhabited by common garden birds. In small living districts the number of cavity nesting species started to grow since garden cities provided them with suitable breeding and feeding conditions. In these regions also putting up netsboxes became very popular.

In the 1950ies the construction of new houses and establishing new living districts began in Nõmme, Merivälja, Pirita, Kristiine and Northern Tallinn. From 1962 until the end of period II districts of panel houses were being established from Mustamäe until Haabersti and Lasnamäe. These regions were inhabited by common urban birds like Rock Doves, Domestic Sparrows, Common Swifts and others. During period II pine stands in Mustamäe, Nõmme and Pirita reached maturity (Ratas 1986). By the end of period II a dense shrub layer was covering the pine plantations in Mustamäe and Pirita and was the reason for a more diverse local bird fauna.

Post war establishment of living districts in the former breeding habitats brought along a steep decline in the number of several species inhabiting open landscape (Lapwing *Vanellus vanellus*, Skylark *Alauda arvensis*, Corncrake *Crex crex*). In period III these species inhabited only the vicinity of Lake Ülemiste and the territory of Tallinn airport. Moreover, cutting trees and bushes became more intensive in period III that resulted in a significant decline in the bird fauna of the green areas in City Centre. A decline in bird numbers has probably also occurred within other city districts.

The number of species in Haabersti has been significantly lower during the past decades compared to the Soviet period. On one hand, the reason for the decline may lie in the fact that observations have not been performed in a consistent manner whereas long-term periods with no observations concern mostly migrating waterfowls. On the other hand, the establishment of Väike-Õismäe next to lake Harku and Tallinn

zoo in Veskimetsa has been a major factor affecting open landscape nesters. Forest birds of Tallinn have mostly been affected by habitat fragmentation and increased disturbance resulting from the establishment of living districts in Kakumäe.

In period III Northern Tallinn, instead of Haabersti, had become the region with the most diverse bird fauna. The main reason for this change lies in the reedbeds, shrubberies and coastal area in the Paljassaare peninsula that is providing many different bird species with suitable breeding as well as feeding sites. Paljassaare is a good example for demonstrating how landscapes that have been modified by humans may become a valuable bird area in less than a century's time.

Decline in the bird fauna of City Centre has been even more drastic than it appears from the data (table 1) since lake Ülemiste is keeping the species diversity rather high. Therefore, species diversity in the heart of the city is low as a consequence of high human impact and habitat degradation. City Centre is providing suitable breeding and feeding sites only to a few species, foremostly to Herring Gulls and Hooded Crows.

The bird fauna of Kristiine district seems to have become more diverse during the past decades. However, this statement cannot be confirmed since there is no data of period II. Quite an opposite trend has been observed in Pirita whereas data of period III concerning this district is rather poor.

The bird fauna of other large living districts – Lasnamäe and Mustamäe – has become more diverse during these past hundred years. The reason lies in green areas that have been established among the houses and provide birds with suitable habitats. A scrub layer that was planted in the pine forests of Mustamäe has become sparser due to human impact. The species diversity of Lasnamäe during period III was high mostly due to Tallinn Airport that is located near lake Ülemiste.

It is necessary to continue studies on the bird fauna of Tallinn and the members of the Bird Club of Tallinn, established in 2002, will give their contribution. Also the new Estonian Bird Atlas that is being prepared will provide information about the bird fauna of Tallinn.

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MUUTUSI TALLINNA LINNUSTIKUS AASTATEL 1900–2005

Kokkuvõte. Tallinna linnaosade linnustiku ajaloolise ülevaate koostamiseks koondati kättesaadavad teated lindude esinemise kohta aastatest 1900–2005. Tallinna kaheksa linnaosa linnustikku on kirjeldatud kolme ajaperioodi lõikes: I periood 1900–1945, II periood 1946–1990 ja III periood 1991–2005. Ühtekokku on Tallinnas selle saja aasta vältel registreeritud 260 linnuliiki. I ja II perioodil oli Tallinna linnurikkaimaks linnaosaks Haabersti (vastavalt 129 ja 212 liiki), kuivõrd oli seal kuni 1970-ndate aastateni elupaikade mitmekesisus suurem kui mujal pealinnas. Haabersti linnurikkus pälvis omakorda paljude vaatlejate tähelepanu ja nii tehti seal ka enim vaatlusi. III perioodiks olid paljud Haabersti elupaigad aga fragmenteerunud, hävinud või sattunud suure inimõju alla. Linnurikkaimaks linnaosaks tõusis viimasel kümnendil 208 liigiga Põhja-Tallinn, eelkõige tänu Paljassaare linnuhoiualale. Kuna Ülemiste järv on sobiv elupaik paljudele veelindudele on Kesklinnas kohatud 146 linnuliiki. Samas on Tallinna südalinnas kohatud üle kümne korra vähem linnuliike. Sajandi jooksul suurenes teisteski linnaosades inimõju ning III perioodiks jäi liikide arv enamasti 100 piiresse.

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