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Deliverable T2.1.3 - Recommendations for improving the conditions for biodiversity in Bebrene manor park

Vilnius, 2022

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Introduction

The park is an excellent heritage of garden and park art and one of the visually most impressive landscape parks in Latvia, with the area of 7.9 ha. The park has been arranged in late 19th century, and 200 year old oak-trees are still growing there. The central part of the park is surrounded by an arch-type road, which reveals various landscapes and a view to 3 ponds — the biggest one is millpond, while two others are smaller, and one of them has a picturesque island in the middle of it that can be reached from a romantic small bridge (Figure. 1). There are 81 tree and shrub taxa (species, subspecies, varieties) in the park: 30 native species and 51 alien species. Special values of the park include natural monuments of national and local significance. The park has great dendrological value and very significant value as a monument of garden and park art, as well as a place for the preservation of biological diversity in nature. The landscape park is located on the top of a flat hill with slightly sloping edges, on the NW side there is a natural ravine with a small river. Bebrene manor park is state owned and belongs to Augsdaugavas municipality.

The recommendations were pre prepared while implementing project “LLI-476 IMPROVEMENT OF THE ENVIRONMENTAL CONDITIONS OF THE PUBLIC WATER BODIES IN LATVIA AND LITHUANIA (SAVE PAST FOR FUTURE)”, financed by Interreg V-A Latvia-Lithuania Programme 2014-2020. The project aims to increase capacity of organisations involved into restoration and maintenance of historical parks in complex with water bodies in North-East Lithuania and Latgale as important biodiversity objects by providing comprehensive management attitude on history, nature values and rural landscape. To improve water quality ponds in 3 parks – Anatalieptēs Monastery park, Kamariškiai Manor park (LT) and Preili Manor park (LV) – will be reconstructed and cleaned. During these works the emphasis will also be done on arrangement of the landscape and its adaptation for biodiversity protection. Knowledge and experience capacity for organizations involved in the project will be strengthened by organizing events for experience exchange with professionals and experienced field experts and active involvement of stakeholders into the elaboration of recommendations for the improvement of biodiversity status in 8 parks.

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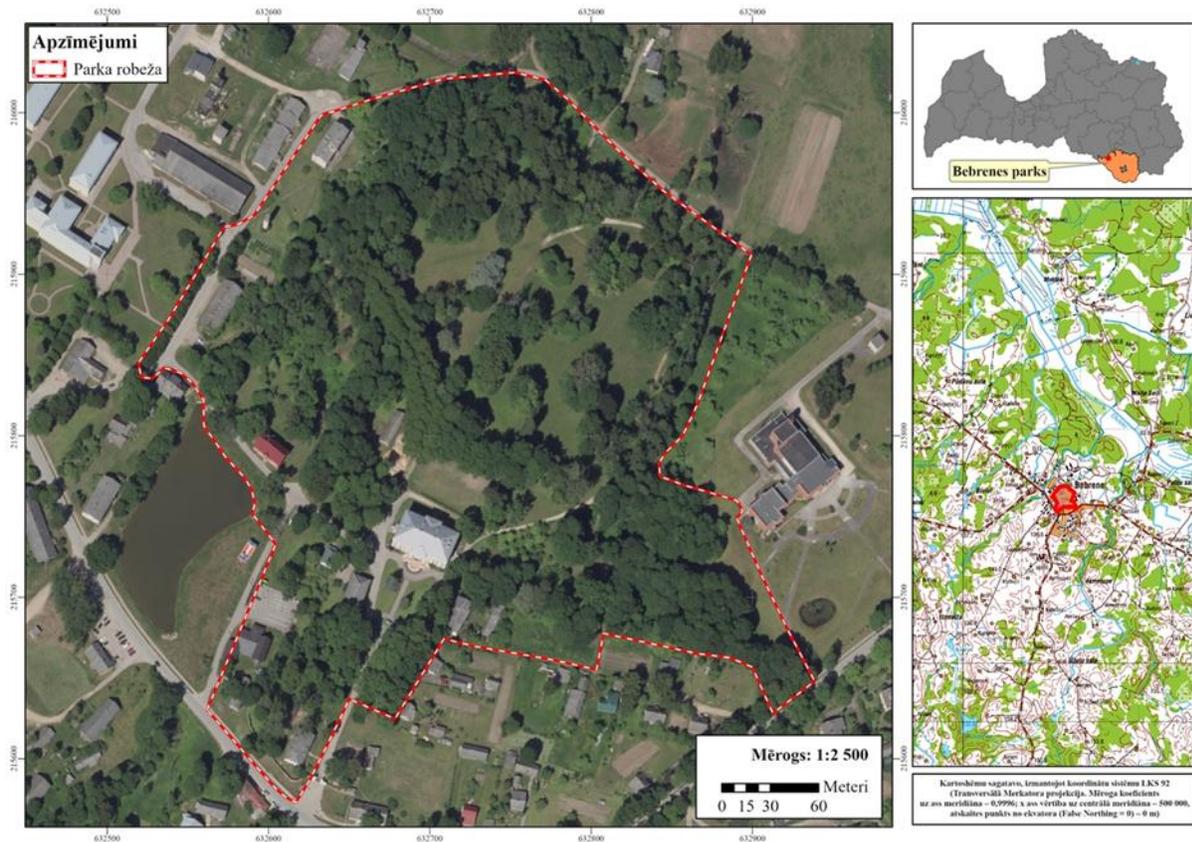


Figure 1. Location of Bebrene Park

1. Natural values

Bebrene Park is not included in the list of specially protected nature areas. Nevertheless, the park despite comparably small area hosts unique variety of biodiversity. The most valuable elements of the park are old trees, which creates shelter for numerous amounts of species. During the investigations, 12 veteran trees valuable for biodiversity were inventoried. The scheme indicating their localization is provided in annex 1. Hollows, dead timber and other features characteristic to old trees is a habitat for various invertebrates, lichens, birds, bats, etc. One of which is *Osmoderma barnabita* – the insect commonly found in the old trees and protected both on national and European level. Bebrene park is one of the few positive examples of how biologically valuable meadows can be preserved in an urban environment while making them attractive to visitors. Meadows located in the northern part of the park are being maintained (mowed) extensively, therefore provides habitats for rich fauna and flora variety (Figure 2).



Figure 2. Natural values in Bebrene park are maintained in a good way

Based on the investigations performed by experts from Daugavpils university, SIA “Dabas eksperti” and Foundation for Peatland Restoration and Conservation 22 protected species were inventoried in Bebrene manor park (Figure 3). The list of protected invertebrates, birds, bats, lichens and mosses species and the map of their localities is provided in annexes 2, 3.



Figure 3. Protected insect species *Osmoderma barnabita*, *Papilio machaon* and *Aromia moschata* can be found in Bebrene manor park (Photo: U. Valainis, V. Vahruševs).

2. Recommendations for improving the conditions for biodiversity.

Successful management of manor parks is usually focused on maintenance of greeneries and preservation of historical values. However, these parks host a unique biodiversity, which must be maintained and secured as well. In order to make a planning process of park maintenance more efficient, we recommend to distinguish the priority zones for their maintenance. Three management priority zones were distinguished in Beberene manor park: priority for natural habitat maintenance, priority for recreational zone maintenance, priority for natural meadow maintenance (Figure. 4).

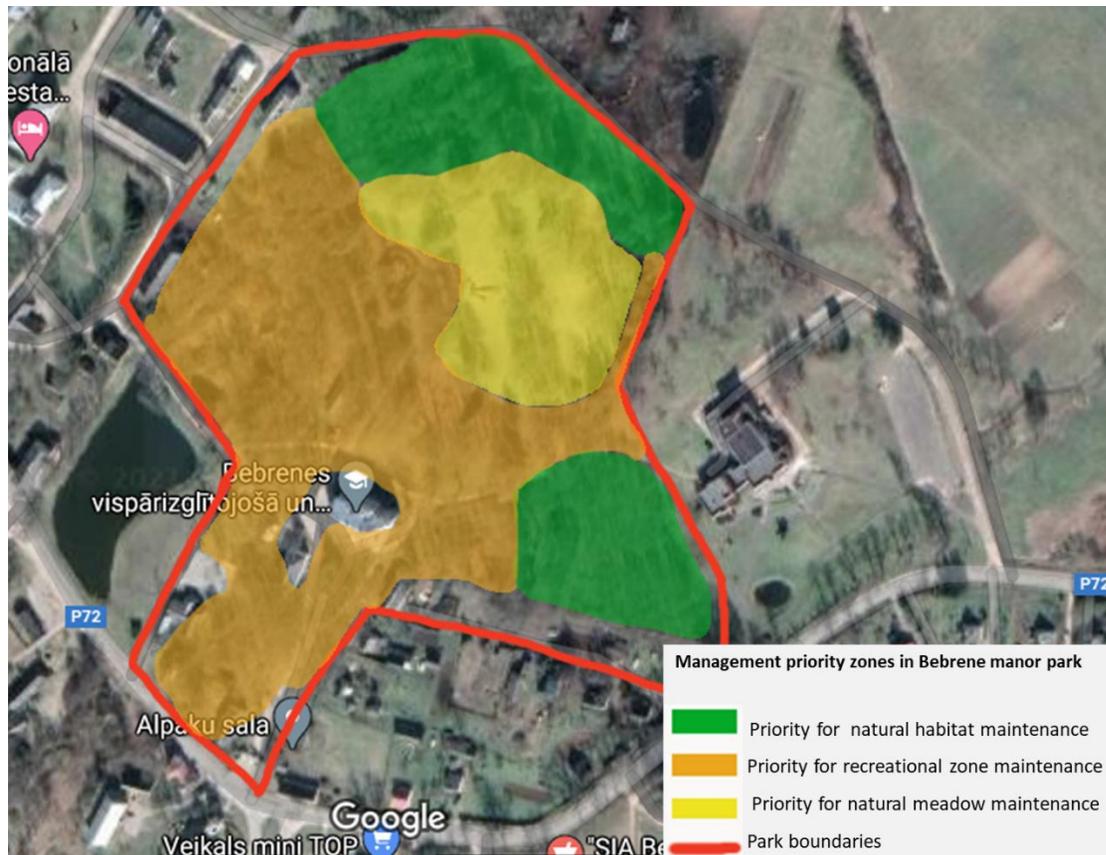


Figure 4. Management priority zones in Beberene manor park

The zone of recreational priority occupies territory near the most visited objects such as manor, parking place, pathways, etc. Since this zone is commonly visited by people and has representative or recreational priority, management actions should be focused on well-being of visitors. Whereas, more remote parts of the park represented by biodiversity values should be managed extensively. However, it should be taken into consideration, that nature conservation actions should not pose any danger for the park visitors.

2.1. Recommendations for meadow habitat maintenance

In the territory of Beberene Park there are several high-value meadow habitats in terms of biological diversity, for which appropriate management must be ensured. This park is one of the few positive

examples of how biodiversity rich meadows can be preserved in an urban environment while making them attractive to visitors.

In order to ensure the favorable conservation status of meadow habitats in Bebrene park territory the following actions might be recommended:

- to mow the tall grass and ruderal vegetation several times during the vegetation period and to cut the shrubs, leaving only valuable elements of the woody vegetation. The mowed biomass must be removed from the area;
- the frequency of mowing depend of the nature management priority areas: 1. in representative /recreational areas standard lawn care guidelines should be followed; 2. in areas valuable for natural values (zones of biodiversity priority) late mowing should be performed, which is usually done twice a year in late July and in September;
- localization and cutting of invasive species;
- formation of “educational stripes“ (1,0-1,5 m width), which would serve as a path for the visitors to enter the meadow (Figure 5).



Figure 5. Formation of “educational stripes“ in meadows of Bebrene manor park

Other measures, such as grazing with cattle for nature management, educational or economic purposes or sowing of special meadow seed mixtures are also a favorable management method. However, in case of grazing it is necessary to ensure the protection of trees growing in the grassland area against possible damage to livestock. For raising the public awareness about importance of natural meadows special informational boards might be installed, which would provide information about meadow biodiversity and give answers why these habitats are mowed only in the second part of summer (Figure 6).



Figure 6. Example of correct way to maintain meadow and informational board about the nature values in Preiļi park.

2.2. Recommendations for maintenance of veteran trees and trees valuable for biodiversity

By creating the habitats for huge variety of species, old trees are the most valuable element of Bebrene park. In order to ensure longevity and favorable conservation status of these trees several measures might be taken. These management measures and their description are provided in table 1. Maintenance of old veteran trees requires special skills and knowledge. Thus, it should be taken into

consideration, that maintenance of veteran trees should be implemented after the consultation with professional arborist or dendrologist.

Table 1. Recommendations for maintenance of veteran trees and trees valuable for biodiversity

Management measures	Purpose and description of the measure	Remarks
Tree cutting	When the danger posed by a tree is high or extreme. Near recreational infrastructure, buildings, etc. cases. Healthy invasive trees and shrubs are also removed.	Not recommended in Bebrene
Preservation of dead trees	To preserve the dead trees valuable for biodiversity or their stems without cutting them. The measure is applied in places which are not overcrowded by visitors. In this case visitors must be informed about the importance of dead trees. Leaving the timber of dead trees (branches, stems) on a ground as much as possible is also very important (Figure 7)	Recommended in bebrene
Marking with special sign	Trees important for biodiversity are inventoried and marked with a special sign. These signs can be put not only on the trees but on the dead timber, which is left on the ground as well (Figure 7).	Successfully applied in Bebrene, but only on the living trees. Might be applied for the dead timber as well.
Surrounding the trees stems with the special fence	The stems of the trees are surrounded by a mesh fence (height of 2 meters) to protect the trees from the negative activities of visitors and beavers.	Not important in Bebrene
Tiding the tre crown	Tiding up the tree crown might help to avoid tree splitting and thus prolong the tree life	Might be recommended in Bebrene after consultation with professional arborists
Cutting of branches	Reductions of tree crown - dry, even small branches breaking and falling down break other branches and pose a threat to humans. Therefore, the crown should be thinned periodically by cutting up to 20% of all branches. These actions might also help to prolong the tree life.	Recommended in Bebrene



Figure 7. Leaving the dead timber in Bebrene manor park (left) and special sign which explains the value of dead timber for the visitors in Verkiai manor park (Lithuania) (right).

13 veteran trees valuable for biodiversity were inventoried during the investigations. However, some of them were managed by professional arborists previously or grows in the remote sites of the park and thus do not pose significant danger for the visitors. Therefore, we recommend to make management actions for 6 of all inventoried old veteran trees (Table 2).

Table 2. The list of veteran trees, which requires management in Bebrene manor park

Species name	Coordinates, WGS	Height (m), age (years), diameter (cm)	Conservation status	Natural value	Measures
<i>Tilia cordata</i>	56.067637, 26.130129	18, 100, 90	satisfactory	Tree important for biodiversity	Cutting the dead dry branches
<i>Quercus robur</i>	56.067536, 26.130471	18, 120, 73	bad	Tree important for biodiversity	Cutting the dead dry branches
<i>Fraxinus excelsior</i>	56.067604, 26.131120	22, 120, 114	satisfactory	Tree important for biodiversity and dendrology	Cutting the dead dry branches
<i>Fraxinus excelsior</i>	56.068504, 26.132223	21, 120, 100	satisfactory	Tree important for biodiversity and dendrology	Cutting the dead dry branches, reduction of tree crown reduction
<i>Quercus robur</i>	56.068213, 26.133467	21, 130, 120	Bad	Tree important for biodiversity and dendrology	Cutting the dead dry branches, tiding the tree crown

2.3. Controlling the invasive species

Within the framework of the inventory of natural values carried out in Bebrene park, the inventory of invasive plant species has been performed (Figure 8). The further uncontrolled spread of these species may pose danger to the natural values found in the park. In order to reduce the risks of uncontrolled spread of invasive plant species several measures might be taken:

- Identification and localization of invasive species distribution;
- Constant mowing;
- Do not allow the formation of seeds;
- Biomass removal;
- Using chemical or phytopathogenic measures.



Figure 8. Invasive plant species *Sorbaria sorbifolia* in the territory of Bebrene Park (Photo: U. Valainis)

Currently invasive species do not pose to much danger for the natural values of Bebrene manor park. Only one invasive species *Sorbaria sorbifolia* was inventoried in this park (Figure 8). The most effective way of controlling the distribution of such species is constant cutting and even injecting glyphosate into boreholes. More information about invasive species and effective ways of their control can be found in the following link <https://www.daba.gov.lv/lv/invazivas-sugas>.

2.4. Creating habitats for birds, bats, insects and other species

Creating the artificial habitats for birds, bats, insects and other species might significantly improve biodiversity status in the parks as well as making the parks more attractive for the visitors. These measures include installment of nesting boxes for the birds and creating artificial habitats for bats, insects and other species.

Bebrene manor park hosts a big variety of bird species. This is partly determined by the big amount of nesting boxes. However, currently most of them are constructed for the small insect eating birds. It should

be noted that species such as owls, woodpeckers, common merganser (*Mergus merganser*), common goldeneye (*Bucephala clangula*) commonly breeds in the parks as well. Therefore, in order to improve their conservation status, it is recommended to create artificial habitats or construct nesting boxes. In Annex 4 we provide the main parameters of nesting boxes for some bird species, which includes: nesting box height, board width, hole diameter, etc (Source: Lithuanian Ornithological Society). For more guidelines how to construct these nesting boxes see the following link: <http://www.birdlife.lt/kokie-turetu-buti-inkilu-matmenys>

In Bebrene Park, as in many other dendrological plantations, there is a lack of hollow trees, which reduces the suitability of the park for the species of insects and other organisms inhabiting the cavities. In order to improve the conditions for the species living in the cavities, it is recommended to create and place artificial habitats imitating the cavities in the park. An experimental artificial habitat has been developed in Sweden and has also been tested in Lithuanian conditions. The man-made habitat is a wooden box about 3.5 m high, the upper part of which is adapted for nesting birds and bats, while in the middle and lower part is filled with decaying wood material characteristic of the interior of a wooden cavity and serves as a good habitat for insects (Figure X)



Figure 9. Artificial habitat for bats, insects and birds in the Verkiai Regional Park in Lithuania, created within the framework of the LIFE project LIFE OSMODERMA (Photo: A. Banelienė (right), Scheme by M. Jasnauskaitė (left)).

2.5. Other recommendations

Parks are often represented by small ponds, which provides habitats for amphibians and other species. During the spring migratory season amphibians become very active and vulnerable. Protective fence for amphibians and reptiles can be used to protect these animals during the migration season by isolating their migratory paths. In addition, restrictions for vehicles traffic might be initiated or special signs

informing about speed limiting might be installed (Figure 10). Except the car parking place vehicle traffic is not very intensive in Bebrene manor park, therefore these measures are not the first priority.



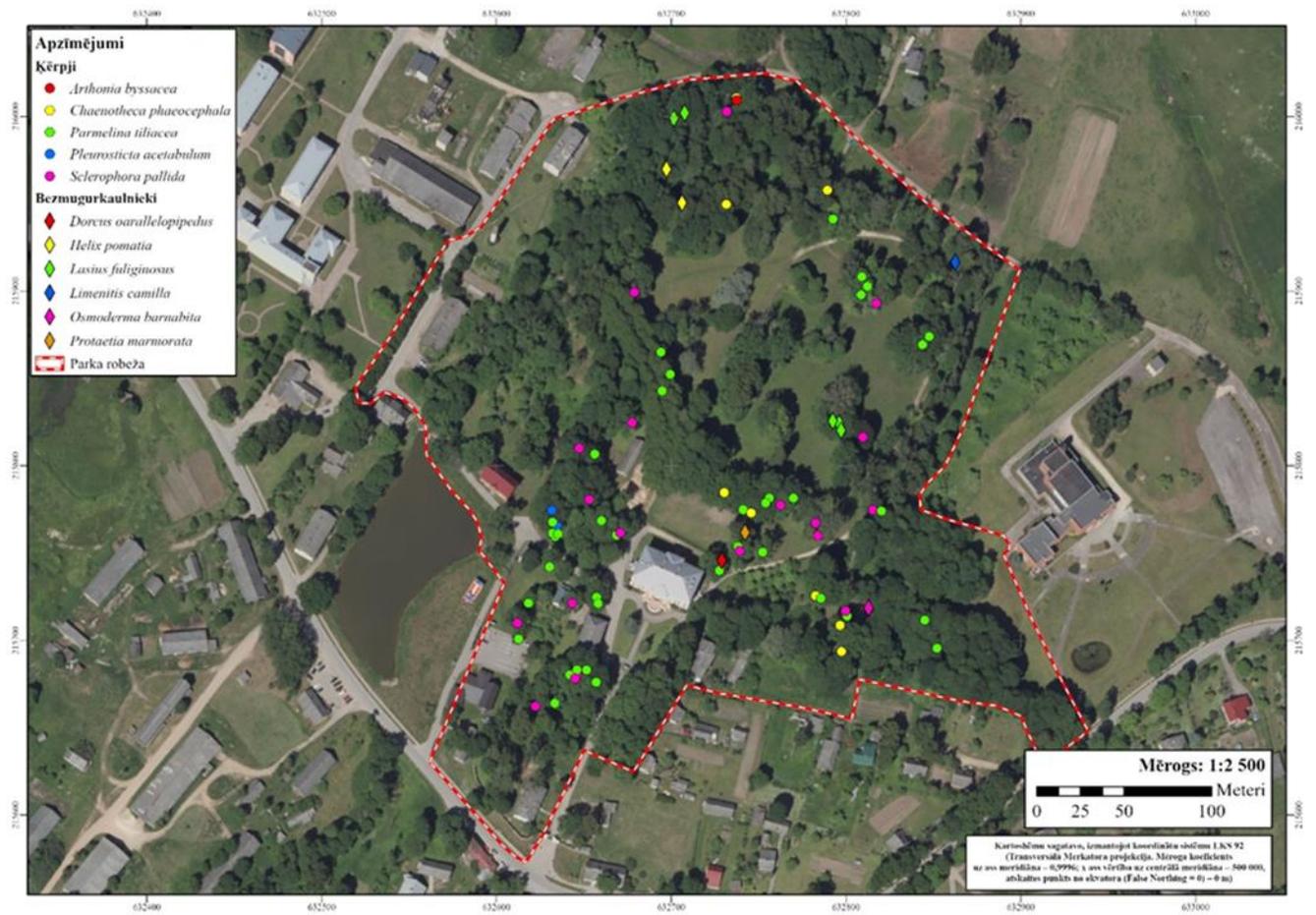
Figure 10. Special signs informing about speed limiting might save amphibians, which are very vulnerable during the migratory season.

Annexes

Annex 1. The localities of trees valuable for biodiversity in Bebrene manor park.



Annex 2. The localities of the recorded rare and/or protected invertebrate and lichen species in Bebrene manor park.



Annex 3. The list of protected species inventoried in Bebrene manor park

Latin name	Latvian name	European scale	Red Data Book of Latvia
Invertebrates			
<i>Aromia moschata</i>	Zaļais vītola grauzis		4
<i>Dorcus paralellopedus</i>	Blāvā briežvabole		2
<i>Helix pomatia</i>	Parka vīngliemezis	+	
<i>Lasius fuliginosus</i>	Spožā skudra	+	
<i>Limenitis camilla</i>	Sausseržu raibenis		4
<i>Osmoderma barnabita</i>	Lapkoku praulgrauzis	+	1
<i>Papilio machaon</i>	Čemurziežu dižtauriņš		2
<i>Prionychus ater</i>	Melnā praulvabole	+	
<i>Protaetia lugubris</i>	Marmora rožvabole		2
Birds			
<i>Dendrocopos medius</i>	Vidējais dzenis	+	
<i>Dryocopus martius</i>	Melnā dzilna	+	
<i>Picus canus</i>	Pelēkā dzilna	+	
Bats			
<i>Nyctalus noctula</i>	Rūsganais vakarsikspārnis	+	
<i>Eptesicus serotinus</i>	Platspārnu sikspārnis	+	
<i>Pipistrellus nathusii</i>	Natūza sikspārnis	+	
<i>Pipistrellus pygmaeus</i>	Pigmejsikspārnis	+	
<i>Plecotus auritus</i>	Brūnais garausainis		
Lichens			
<i>Arthonia byssacea</i> (syn. <i>Innoderma byssaceum</i>)	Sīkpunktainā artojjja	+	
<i>Chaenotheca phaeocephala</i>	Brūngalvainā henotēka	+	
<i>Parmelina tiliacea</i>	Liepu parmelina		3
<i>Pleurosticta acetabulum</i>	Kausveida pleiostikta		2
<i>Sclerophora pallida</i>	Sklerofora	+	

Annex 4. Main parameters for some bird species nesting boxes

Bird species	Nesting box height, cm	Nesting box height (till the hole), cm	Board width, cm	Hole diameter, cm	The height in the tree (from the ground), m
<i>Parus major</i>	30	23	16	3-3,2	3-5
<i>Parus caeruleus</i>	27	20	15-16	2,8	3-5
<i>Parus cristatus</i>	25	18	14-15	2,8	3-7
<i>Ficedula hypoleuca</i>	28	21	15-16	2,8	3-5
<i>Phoenicurus phoenicurus</i>	23	14	18	5	4-6
<i>Picus viridis</i>	45	31	25	9	5-10
<i>Picus canus</i>	45	31	25	9	5-10
<i>Coracias garrulus</i>	45	34	24	6	5-10
<i>Upupa epops</i>	40	29	24	6-7	3-7
<i>Sitta europaea</i>	30	22,5	16	3,4-3,5	4-7
<i>Sturnus vulgaris</i>	35	26	19	5	4-7
<i>Apus apus</i>	35	26	19	5	6-15
<i>Strix aluco</i>	55	37	28	13	5-10
<i>Aegolius funereus</i>	45	31	28	9	5-10
<i>Athene noctua</i>	30	18	24	8	3-7
<i>Glaucidium passerinum</i>	40	29	24	6-6,5	5-7
<i>Tyto alba</i>	55	38	37-38	17*17	4-8
<i>Bucephala clangula</i>	55	38	28	12	2-10
<i>Mergus merganser</i>	65	42	37-38	18	2-10
<i>Strix uralensis</i>	65	45	37-38	20	5-10
<i>Coloeus monedula</i>	40	26	25	9	5-10

