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THE REPUBLIC OF LATVIA

THE STUDY ON ENVIRONMENTAL MANAGEMENT PLAN FOR LUBANA WETLAND COMPLEX

FINAL REPORT

VOLUME IV
DATA BOOK

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THE STUDY
ON
ENVIRONMENTAL MANAGEMENT PLAN FOR
LUBANA WETLAND COMPLEX IN
THE REPUBLIC OF LATVIA

FINAL REPORT

Volume IV Data Book

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PART I

Final Report of Regional Ecosystem Survey in 1999

FINAL REPORT
ON
REGIONAL ECOSYSTEM SURVEY
FOR THE STUDY ON ENVIRONMENTAL MANAGEMENT PLAN FOR
LUBANA WETLAND COMPLEX

Daugavpils Pedagogical University
November 1999

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Survey metodology

Botany

Lubana wetlands complex is situated in geobotanical region of NE Latvia (Figure 1).

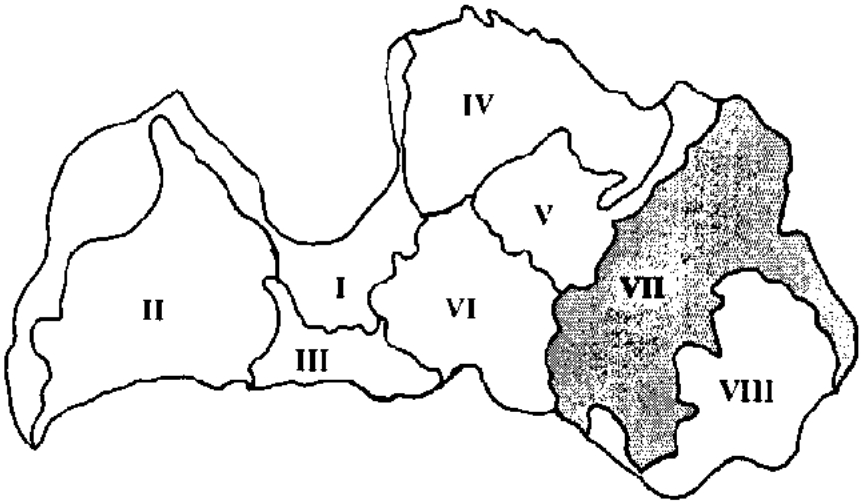

Figure 1 Geobotanical regions of Latvia

IV - N Vidzeme, V - Central Vidzeme, VI - Middle of Latvia, VII - NE Latvia, VIII - SE Latvia (Galeniece et al., 1958).

According to the gridnets created as the result of phytogeographical research carried out by Latvia University Laboratory of Botany study territory includes the following grids: 13/48, 13/49, 13/50, 14/48, 14/49, 14/50, 15/47, 15/48, 15/49, 15/50, 16/47, 16/48, 16/49, 16/50, 17/46, 17/47, 17/48, 17/49, 17/50, 18/47, 18/48 (Figure 2)

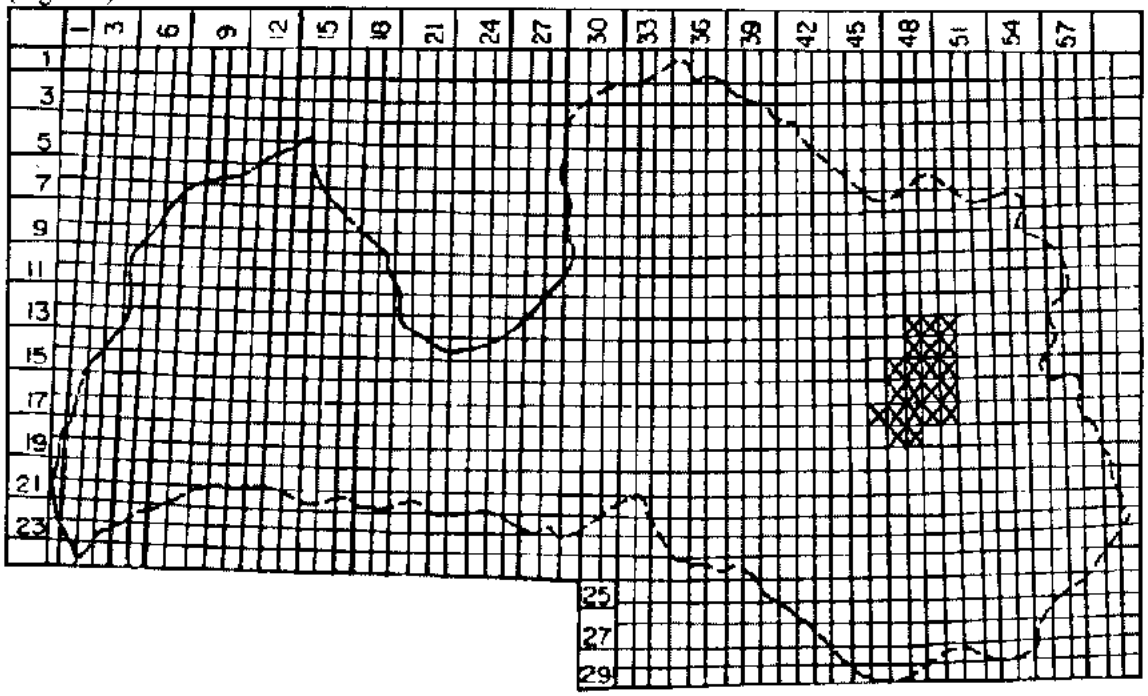

Figure 2 Location of investigated area according to floristic gridnet of institute of biology. (1988).

Study of NE bank of Lubana Lake was carried out in June 20 – august 20, 1998.

The study territory is meadows of NE bank of Lubana Lake situated in township of Gaigalava and belonging to State Land Depository. They are not valuable as agricultural lands. According to resolution of Council of Ministers of the Republic of Latvia N# 33 of February 10, 1993 average value of municipality land is 30 points (LRMP lemums...1993). Data of Latvian State Land Survey Rezekne department shows that according to preliminary evaluation value meadows of Lubana Lake is 10 points (LVZD Rezeknes... 1990). Density of population is low 5 - 10 people per 1 km^2 (World Atlas of Geography 1996)

According to administrative division study territory is situated in Gaigalava, Berzpils townships of Rezekne region and in Osupe Township of Madona region

Route choice method was used during the study. Choice of route was based on information from topographical maps with scales 1 : 50000, 1 : 25000, 1: 10000 as well as information obtained from local inhabitants. Many of the territories that were marked on maps as meadows turned out overgrown. Instead of marked mires and meadows fields of bushes exist.

Analysis of flora studied in 1998 was done by comparing with flora of geobotanical region (1988) and Latvian flora (Gavrilova, Šulcs 1999). Rare and protected plants analysed according to qualitative and quantitative distribution groups by Fatare (1992).

When examining NE bank of Lubana Lake the following biotopes were determined: 1) marshy meadows; 2) wet meadows; 3) sand zone and roadside; 4) sand-pit; 5) bank of the lake with bushes; 6) long-fallow land, waste.

A list of species was made for each of biotopes. Some of the biotopes were joined together. For example, sand zone and roadside because roadside is covered by typically ruderal species gradually turning into dry spaces. These separate spaces are not big enough to view them separately as dry meadow. Biotopes were described according to moisture, composition of species and their dissemination. All the vascular species are listed for each biotope. Moss was not included.

In July ? – August 4, 1999 vegetation of "klani" was studied. Vegetation of water plants was studied in July 16, 1999 by doing boat route in NE part of the lake. The result of study is a list of plant species, visual evaluation of their occurrence. Plant phytocoenoses of the study territory were described according to method of Braun-Blanquet. Distribution of there plants and ecological condition of the lake (its NE part) were described.

Vegetation of "klani" vas studied in grids 15/49, 16/49 situated in the middle part of NE Latvija geobotanical region on the banks of Aiviekste. According to administrative division studied "klani" meadows are situated in Gaigalava Township of Rezekne region, Berzpils Township of Balvi region, Osupe and Indrani townships of Madona region. When viewing particular meadow a list of found species was made and occurrence of each of them was specified. Herbarium of most characteristic and unknown species was collected.

To determine flowering plants two sources were used: "Latvijas PSR augu noteicejs" - "Key to Latvian plants" (Petersone, Birkmane 1980) and " Pareys Blumenbuch" (Fitter et al. 1986).

In determination of plants species we were advised by project leader of Latvian Nature Fund I. Kabucis, Dr. biol. V. G. Balodis, Diplom biol. B. Laime, bushes and *Salix* genera M. biol. assist. of National Botanical Garden Dendroflora department P. Evards - Bunders. Latin names of plants were used according to the latest published list of flora (Gavrilova, Šulcs 1999).

Description of vegetation was done and processed according to method of Braun-Blanquet (Kent, Coker 1994; Muller - Dombois C., Ellenberg 1974; Pakalne, Znotina 1992). Size of sample plots was chosen 4 - 25 m^2 according to size of meadows and homogeneity of floristic composition. 142 descriptions were collected. A list of species was made for each meadow and 2 - 15 sample plots described. Further processing will be done by computer programme DECORANA of FORTAIN, TWINSPAIN analyses.

A common list of plant species of Lubana wetlands complex (Table 9) and list of protected species (Table 11) was done using chorologies of Latvian plants (1980, 1981, 1986, 1987) as well as looking through data base "Aizsargajamo augu sugu atradnes Latvijas Republikas teritorija" (Location of protected plants species in Latvia), List of vascular plants of NE Latvia geobotanical region (1958), list of plants mentioned in Ramsar convention, personal data of D. Rakvica, L. Engele and R. Rambe. Data from chorologies of Latvian flora and data base "Aizsargajamo augu sugu atradnes Latvijas Republikas teritorija" (Location of protected plants species in Latvia) on species of study area was selected using floristic gridnet (Table ,12). List of lichens (Table 8, Table 11) and fungi (Table 12) was made using information from project of Latvia Nature Fund and Swedish society for nature conservation (Projekts, 1992).

Forestry

Scheme of forest habitat types compatibility in Latvia

A. Natural habitats

A						B
1	Cladinoso-callunosa IV-V	Vacciniosa III	Myrtillosa II	Hylocomiosa I-I^a	Oxalidosa I-I^a	Aegopodiosa I
2	Callunoso-sphagnosa V	Vaccinioso-sphagnosa IV	Myrtilloso-sphagnosa III-IV	Myrtilloso-polytrichosa III-IV	Dryopteriosa III	
3	Sphagnosa V	Caricoso-phragmitosa IV-V	Dryopterioso-caricosa III-IV	Filipendulosa I-II		
C						

1. Dry forest habitats
2. Forest habitats on wet mineral soils
3. Forest habitats on wet peat soils

A. Artificially drained habitats

A				B
1	Callunosa mel. III	Vacciniosa mel. II	Myrtillosa mel. I	Mercurialosa mel. I-II
2	Callunosa turf.-mel. III	Vacciniosa turf.-mel. II	Myrtillosa turf.-mel. I	Oxalidosa turf. – mel I-I^a

1. Forest habitats on artificially drained mineral soils
2. Forest habitats on artificially drained peat soils

Algorithm of field determination of forest habitat types

Determination of the biogeocoenotic range
1. Dry forest or wet forest?
2. If it is wet, is it peat or mineral soil in it?
3. If it is artificially drained, is it peat or mineral soil in it?

Determination of habitat within the range
According to determination tables (Buš K.K. 1976, 1981)

Abbreviations used for forest habitat types in Latvian forest inventory documentation

Table 1 Abbreviations used for forest habitat types

Latin names	Latvian names	Technical abbreviation
Cladinise callunosa	Sils	Sl
Vacciniosa	Mtrajs	Mr
Myrtillosa	Lans	Ln
Hylocomiosa	Damaksnis	Dm
Oxalidosa	Veris	Vr
Aegopodiosa	Gurša	Gr
Callunoso-sphagnosa	Grinis	Gn
Vaccinioso-sphagnosa	Slapjais metrajs	Mrs
Myrtilloso-sphagnosa	Slapjais damaksnis	Dms
Myrtilloso-polytrichosa	Slapjais veris	Vrs
Dryopteriosa	Slapja garša	Grs
Sphagnosa	Purvajs	Pv
Caricoso-phragmitosa	Niedrajs	Nd
Dryopterioso-caricosa	Dumbrajs	Db
Filipendulosa	Liekna	Lk
Callunosa-mel.	Viršu arenis	Av
Vacciniosa-mel.	Metru arenis	Am
Myrtillosa-mel.	Šaurlapju arenis	As
Mercurialosa-mel.	Platlapju arenis	Ap
Callunosa turf.-mel.	Viršu kudrenis	Kv
Vacciniosa turf.-mel.	Metru kudrenis	Km
Myrtillosa turf.-mel.	Šaurlapju kudrenis	Ks
Oxalidosa turf.-mel	Platlapju kudrenis	Kp

Vegetation map legend classes

Table 2 Vegetation map legend classes

1. Coniferous forests. 2. Mixed coniferous-deciduous forests. 3. Deciduous forests. 4. Broad-leaved forests. 5. Raised swamp.	6. Transitional swamp. 7. Low bog. 8. Water body. 9. Agricultural land. 10. Meadows.

Forest type	Legend Class	Class_id
Sils	Coniferous	1
Metrajs	Coniferous	1
Lans	Coniferous	1
Damaksnis	Coniferous, Mixed	1 or 2
Veris	Coniferous, Mixed	1 or 2
Gurša	Deciduous or Broad-leaved	3 or 4
Grinis	Raised swamp	5
Slapjais metrajs	Transitional swamp	6
Slapjais damaksnis	Coniferous, Mixed	1 or 2
Slapjais veris	Coniferous, Mixed	1 or 2
Slapja garša	Mixed or deciduous	2 or 3
Purvajs	Raised swamp	5
Niedrajs	Transitional swamp	6
Dumbrajs	Low bog	7
Liekna	Low bog	7
Viršu arenis	Raised swamp	5
Metru arenis	Transitional swamp	6
Šaurlapju arenis	Mixed or deciduous	2 or 3
Platlapju arenis	Mixed or deciduous	2 or 3
Viršu kudrenis	Raised swamp	5
Metru kudrenis	Transitional swamp	6
Šaurlapju kudrenis	Transitional swamp	6
Platlapju kudrenis	Low bog	7

Insects

Methodics used during the investigations are the following:

- **Light catching.** Material was collected with the help of UV lamp PRK-2, later drossel lamps DRL- 400, 250 and 125 were used.
- **Netting and visual registration.**
- **Sweeping** (when specimens were swept from the food plants by net).
- After **preimaginal stages.** Some species were succesfully reared from obtained larvae, pupae or eggs.
- **Feromon trapping;** this method was used for some forest pests (Rhyacionia, Blastesthia, Cydia itc.).
- Some species were registrated after **characteristic damages** (mines, rollen leaves its.).
- **Bait trapping.**

Ornitology

The previous surveys of fauna were made by repeated crossing of different biotopes: forests, meadows, swamps and making notes of the observed things. Field-glasses 7X50, 8X30 or 10X40 were always used. The quantitative registration of birds was made in most cases with the help of transect method. Seldom the method of dots was used. Definite parts of the wood (the S part of islands of the Pededze river)are completely explored during the surveys about woodpeckers. Fundamental researches of the structure of ornithofauna, its location and dependence on the level of water of Lake Lubana during the periods from 1926 to 1943 made by Vilka (1943) and Kalnina (1972) were used as a reference literature and the basis for work. The records of memories (3.5 h) made by the oldest Latvian ornithologist Dr. K.Vilks from the personal archives were also used, they contained information about Lake Lubana as well. As an additional source of information Latvian Ornithology central work survey of 1925-1936 years (Transehe 1939) and 1937-1939 years (Transehe 1940) was used. These sources contain information on ornithofauna before the economic meddling in 1920s and on the results of melioration. The work by Viksne (1974) with the information about the importance of the lake and the ornithofauna structure in the middle of 1960-1970 before the beginning of land-improvement measures (including formation of ponds) in the middle and at the and of 1970 was used as an interim literature. As additional sources of the information concerning the modern period were used the works of Viksne (1983), Aigare et al. (1985), Priednieks et al (1989), Bergmanis & Strazds (1993), Viksne (1994), Keiss (1997), Viksne (1997), Bergmanis, Petrins, Strazds, Krams (1998), Opermanis (1998).

Ihtyology

Control haul was carried out (Latvian Institute of Fish-breeding) in territories of three civil parishes of the Lake Lubana: in Osupes civil parish, Nagli civil parish, Gaigalavas civil parish from 18.06.1997 till 02.09.1997.
Control haul in Osupes civil parish in Lubana lake was carried out from 18.06 till 19.06.1997 with the net cells of size 12, 14, 15, 18, 22, 25, 27, 30, 33, 35, 40, 45, 50, 60 and 70 mm, small net (the size of cells iz 5 mm) and crayfish fish-basket.

Control haul in Naglu civil parish in Lubana lake was carried out from 30.07 till 31.07.1997 with the net cells of size 12, 14, 15, 18, 22, 25, 27, 30, 33, 35, 40, 45, 50, 60 and 70 mm, small net (the size of cells is 5 mm) and crayfish fish-basket.

Control haul in Gaigalavas civil parish in Lubana lake was carried out from 01.09 till 02.09.1997 with the size of net cells 22, 30, 50,and 60 mm.

General comment of the region

Physical geographical description

Introduction

Lubana's wetlands complex is a natural district in the middle part of the Eastern Latvian lowland. Its area is almost 420 km^2, and it is 2.2% of Latvia's territory. The configuration of the Lubana's plain is irregular; the borders of the plain with natural districts around are bent and faintly expressed. The plain is ~55 km long from the North to the South and ~45 km wide from the West to the East (Markots 1995). 50-80 km wide Eastern Latvian (Lubana's) plain crosses the Eastern territory of the republic from the Southwest to the Northwest. In the West it borders on Selija's hill, Vidzeme's and Aluksne's height, in the East and the South - the Eastern Latvian (Latgale's and Augshzeme's) height (Brivkalns 1959).

Relief

The top of primary rock of Lubana's plain in the North part under thin quarternary deposits cover is formed by abovedevon Ogre's suite clay, sandstone, dolomite marls and dolomites but in the South part - Daugava's suite dolomite marls and dolomites. Comparatively even locked fall of surface of primary rock was formed and it's average height above sea level is 80 km. Thickness of quarternary deposits is from 10 km. Glacigenos moraine loam and sandy loam deposits lying below are irregularly covered by limnoglacial deposits (sand, aleirit, clay), as much as by augshpleistocena and holocena deposits and peat, it's thickness is 1-4 m, maximum is 8 m (Markots 1995).

Relief of the plain is flat, and in some places is crossed by gently sloping hills and continental sandhills. Lubana's plain is highly bogged up, it is described by big areas of bogs in the plain, bogged up forests, and flooded meadows. Flooded meadows mostly are situated around the Lubana's lake (Laasimer et al. 1993).

Climate

Lubana's plain is partly protected from the West wind in the lee of Vidzeme's height, climate is temperate continental. The average year temperature is ~5.5 ° C, the average temperature in January is 7 ° C, in July - ~17 ° C. The sum of active temperature reaches 1900-2000 ° C. A period without frost lasts for 130-140 days. The amount of precipitation oscillates from 550 - 600 mm per year, it is one of the most arid regions in Latvia. The amount of precipitation at warm period is ~400 mm, snow fall -<200 mm. Snow cover remains ~110 days (Markots 1995).

To compare with near by Middle Vidzeme's height in climate respects the region is characterized by temperate amount of precipitation and rather long, warm summers (Laasimer et al. 1993).

Soil

Soil bedrock is deposit of basic moraine loam field: moraine loam sandstone, sandy loam and unstony clay, which are mostly covered by layer of dusty sand of different thickness (Brivkalns 1959).

Boggy soil turf in clay bedrock, poorly and middling podzolic turf soil in loam and sandy loam bedrock and typical podzolic soil in places are widely represented in Lubana's plain (Markots 1995). Tabaka (Tabaka et al. 1985) also notes that middling and strong podzolic loam and sandy loam soil are typical for regions in the aggregate, peat soil - for watershed.

In the prevalence of boggy and low boggy soil the following regularity connected with accumulation of dampness is observed: boggy soil is formed on the vastest areas of falls and on the flattest areas, where small difference of height is between positive and negative elements of relief, whereas low boggy soil is formed on the lowest places of greatly undulated relief.

Very vast reserves of soil useful for agriculture are in the Eastern Latvian plain, but much work should be done for soil fertility raising: dampness condition regulation, unnecessary dampness drainage, draining and low boggy areas cultivation (Brivkalns 1959).

Comments on Botany

According to the Northern Europe geobotanical partition Latvia belongs to the Western Baltic and Eastern Baltic underprovince of the Baltic geobotanical province. Taking into consideration territorial location of vegetative typological units, ecological peculiarity of structure of formation and phytocoenosis, geobotanical districting has been fulfilled in Latvia and 8 geobotanical region were distinguished (Vanags (red.) 1969). Soil regions were put in geobotanical region foundation, because soil influences small areas of vegetation most of all (Galeniece et al. 1958). The investigated territory is in the seventh geobotanical region. It means – in wide bogs and damp forests of the Eastern Latvian plain region (Figure 2). The Northeastern geobotanical region includes the Eastern Latvian lowland and Abrene's sloping of Mudawa's lowland and Zilupe's plain (Kabucis 1998). The region is situated in Eastern Latvian lowland and, as Laasimer notes (Laasimer et al. 1993), is the biggest geobotanical region in Latvia. This geobotanical region occupies large territory. It is 150 km long and 56-60 km wide. From geomorphological aspect it

is the glaciomorphological complex in Eastern Latvian lowlands (Laasimer et al.). Natural vegetation in this region takes up rather sizable area. In some parts of the region forests occupy 10-45% from the whole area (Galeniece et al. 1958). Bogs and wet meadows occupy much space in northeastern geobotanical region, but, for example, natural vegetation of Daugava's valley section takes up 6%, the rest of the territory is used for agriculture (Kabucis 1998). Daugava, the biggest river in Latvia, makes well formed river system. In the Northeastern geobotanical region of Latvia lakes take up 5% of total area (Laasimer et al. 1993). According to contemporary vegetation character and intensity of exploitation in agriculture the region can be divided into underregions and microregions (Tabaka et al. 1985). The Eastern Latvian geobotanical region is divided into four underregions: 1) Northern Latvian slope; 2) Lubana's plain; 3) Middle-Daugava's lowland; 4) Akniste's sloping. These regions are divided into 14 microregions. Lubana's plain is the most peculiar part of the region and it is exuded as an independent underregion by Laasimer (Laasimer et al. 1993).

In correlation Lubana's plain in homogeneous territorial nature complex in physiogeographic and geobotanical aspect. It includes the seventh and the eighth microregions (Tabaka et al. 1985).

Comments on Forest and Animal

According to the zoogeographical data animal kingdom of Latvian territory together with the region of the Baltic Sea is included into Paleoarctic section that unites the largest parts of Asia and Europe. In this region different zones of forests have general peculiarities and this determines the similarity of the animal kingdom of Latvia with fauna of neighbouring territories. Animal kingdom of Latvia from the most ancient time was rich owing to the diversity of relief. Rivers, lakes, forests and swamps among the places of agricultural soils formed a certain environment for forest animals. More than 300 species of birds and 60 mammals species were found in Latvia. Now a part of birds and forest animals decreased in number. That is why rare species of animals are registered in Latvian Red Data Book.

General spreading of animals, including Latvia, depends on the geographical position of the centre of animals' origin regarding the other regions which are suitable for life of animals in questions of climate conditions, food reserves and other factors. As far as there are no natural obstacles in the Eastern Europe, excluding the West part of the sea, settling of the territory by animals was not complicated by high mountains and deserts. Taking this into consideration it is clear that there is no natural barrier for animals and especially birds in spreading over Latvia.

Comments on Birds

Ecological description

The banks of the Lake Lubana (area of 8000 he) are changed, the lake is surrounded by dikes and water level is under regulation because of use of locks, pumping stations and canals. Initial water level of the lake is artificially raised over 2.5-3 m. The bottom is of clay, somewhere of stones. The lake-side strip is covered with rush. In the past two rivers - Rezekne and Malta flew into the lake from the E. Now these two places are joined forming a system of Nagli fishing ponds along both rivers in the SE direction (common area is about 2000 he). In many fishing ponds above-water vegetation is well developed. Every year part of the ponds is flow down, opening in these places broad puddle-pond areas. The rivers which were flowing into the lake S part earlier (Malmute, Teicija, Lisina) are joined now into Meiran canal. Nowadays only Aiviekste flows from the N part og the lake. The rest of the territory is taken by the high, transitional, low swamps, and by different types of wood mainly on the wet mineral or swamp soils. Malmutas-Zamaru (2397 he), Sulagala (1900 he), Lubanas (1966 he) and Idenu (2145 he) swamps are situated at the S part of the lake. The largest swamps to the N are Klajotnes-Balto Klans (1591 he) swamp, Berzpils swamp (5100 he) and Lagazu-Snitkas (3880 he) swamp, but to the E- Salas swamp (5000 he). High swamp prevail here; the largest low and transitional swamp areas are Lagazu-Snitkas and Berzpils swamps. Agricultural soils are also situated in this territory. Ice covers Lake Lubana, fishing ponds and rivers from the N side in winter.

Description of fauna and vegetation

Variety of natural biotopes, including territories without human impact or if it was very little, is very rich here. rivers, ponds, lake, swamps (high, transitional, low), meadows (including water meadows), remainders of Lubana "klani", bushes, all types of wood (including wet wood), agricultural soils, sand territories etc. Ornithofauna of Lubana territory riches its biological variety maximum practically at all biotopes, excluding the Lake Lubana itself. According to the peculiarities of vegetation the meadows located close to the lake are called klani. The remainders of the klani surround the Lake Lubana, the banks of the Aiviekste from the river-head till Ergla and meadows at the end of the valleys of the Pededze, Ica, Balupe, and meadows situated at the Zvidzupe river both banks. The upper lay of klani consists of peat. The thickness of this lay is not the same, varies from 1-6 m. Deeper, under the peat is clay and other lays of rocks. Lubana klani are considered as sights of Latvia. "klani" meadows are notable for their breadths and primeval natural state, especially before the beginning of hay-mowing when spring flood waters are going away, opening plants and bushes of the meadows. The variety of plants on the "klani" meadows is not large. Sedges (Carex) species prevail there. At some places in the meadows are small and large

willow bushes. There are also a lot of overgrown rivers and lakes there. Standing in such places the ground under feet is swayng. The canals and ditches, which were dug lately in connection with the melioration measures, and also sand banks of the rivers make the klani look otherwise. Not only the conditions of high waters but also subsoil-waters are lower than earlier. The change of vegetation is noticed in the meadows. Cultivated meadows and fields begin to form at the place of klani, which somewhere step back giving place for bushes, because human impact becomes less active. The other biotopes that should be mentioned are: swamps (grass swamps, moss swamps, transitional swamps), forests, ploughed lands.

Comments on Fishes

General ichtyological data on Latvian lakes

There are almost 300 lakes in the republic of Latvia. There are more than 135 lakes in Latvia with area larger than 100 ha.

There are a lot of lakes in Latgales and Vidzemes highlands, as well as around Talsi and Limbazi. Latgales highland is especially rich in lakes –57 of 135 the largest Latvian lakes are located there. Latvian lakes take up about 1.6% of the territory of the counry.

Fishes which live in Latvian lakes
Verkhovka, Ide, Gudgeon, Crucian carp, Tench, Minnow, Bream, White bream, Roach, Rudd, Asp, Chub, Silver carp, Bitterling, Carp, Dace, Bleak, Vendace, Smelt, Pike, Ruffe, Perch, Spiny loach, Pond loach, Pike-perch, Wels, Eel, Burbot, Nine-spined stickleback, Three-spined stickleback, Bullhead

Besides in the lakes can be met:
Bearded stoun loach, Blue bream, Sabrefish

Not only fish of passage (salmon, trout, vimba) can be met in lakes but also real sea fish (Baltic pilchard, long-spinned scorpion, flat-fish and smelt). In Latvia you can usually find 15-20 fish species and sometimes up to 25 species. The number of fish species in sea-side region a little bit exceeds 30. The number of fish species in swamp lakes is smaller, sometimes there are only 5-7 species. If water becomes strongly acid there are only 1-2 species in lake, but there are also such moss swamp lakes with no fish at all.

The most widely spread fish species are roach, perch and pike. Roach lives in almost all lakes because it can use both plants and benthos animals as food. Perch and pike can use not only other fish as food but also use organisms of zoobenthos if it is necessary.

Tench and crucian carp can be found in almost all lakes. Bream, rudd and ruffe live in three quarters of lakes. Burbot, white bream and bleak live in more than half of the lakes, and ide can be found in almost half of the lakes. The previous four fish species can be met in Latgale more often than in other regions of Latvia. Eel lives in a third part of the largest lakes. Eel can be found in Latgale more seldom than in the lakes of the middle regions of the republic, because it is more difficult for it to get to Latgale travelling from the sea to freshwater. Pike-perch can be found quite seldom. Its number is higher in Vidzeme than in the Eastern and Western parts of the republic. Among rare fish species vendace and lake smelt can be mentioned, because they live only in mezotrophic lakes. Such lakes are mainly located in Latgale highland, that is why both metioned species live mainly there.

Fish species mentioned above are the most important lake fishes which are used in industry.

Vegetation

Introduction

From literature on Latvian marshes and Lubana wetlands complex it is possible to get only general idea about flora of NE bank of Lubana Lake. In papers on meadows authors mostly write about certain type of a meadow and only sometimes speak on its distribution on the territory of Latvia. Authors often mention moisture and other factors that can affect forming of certain species but they do not mention species of a certain territory.

Tabaka L. (1980) has included coastal zone in her studies. In June 28, 1980 during the expedition examining square 16/49 of Lubanas Lake NE bank 30 plant species were found. Before that in 1963 meadows of Lubana were examined near mouth of river Rezeknes (Tabaka 1963). This expedition noted that *Equisetum fluviatile* reached up to 1.5 m height, 22 species were found.

Characteristic of each vegetation type in Study Area

Forests

Bogged up pine and fir-black alder forests occupy vast area of subregion in Lubana's plain. Broad-leaved, ferns and sedges - Filipendula ulmaria, Cirsium oleraceum, valeriana oficinalis, Thalictrum flavum, Dryopteris carthusiana, Carex acutiformis, Carex pseudocyperus, Carex vesicaria and others have remarkable part for the formation of fir-black alder forests society. Broad-leaved forests: lime-fir and oak-fir forests with remarkable admixture of other species are here, such as Glyceria lithuanica, Poa remota. In some places oak-groves are located (Laasimer et al.1993). Galeniece (Galeniece et al. 1958) also notes that ash vast forests are widespread from fir- broad-leaved forests to the South part of the region to the border of the region and to the North from Lubana's lake, too. Oak vast forests are rather widespread in the region, especially in the South part and on the West and the North coast of Lubana's lake. The main sedges are Carex acuta, C. acutiformis, C. nigra, C. vesicaria, C. elongata and Calamagrostis canescens. Pine forests are not so typical for subregions (Laasimer et al.1993). There are grass bog pine groves with sedges - Carex lasiocarpa, C. inflata and bog-moss below in the Northeastern part of the region. Mixed coniferous forests are not widespread in the region, the vastest areas of it are around Aiviekste and Daugava. Comparatively there are very few types of clearly expressed forests, usually there are some types of features (Galeniece et al. 1958). Kalnins (1968) divided some large tracts of forest in valleys of Lubana's lake:

Vast bogs adjacent forests. In the North they border on Liepsala's meadows in the East - Abaine's meadows, in the South - fields. Pinetum ledosum and pine swampy soil (Pinetum sphagnosum), and coniferous forests (Pinetum vaccinosum) in the Northwest part are dominant forest types. There is fir big forest, what occupies not much area on the highest hillocks of vast bogs borders in the South and West.

Large tracts of forest between Liepsala's meadow and Ergale. Mixed coniferous forests are dominant here (Pineto - piceetum hylocomiosum) as well as Pinetum ledosum. There are not vast areas of fir swamp (Piceetum dryopterioso - caricosum) to the West. Not big oak vast forest (Quercetum aegopodiosum) is on the edge of Liepsala's meadow.

Forests around Pededze's estuary. Deciduous forests are dominant here, black alder lowlands are prevailing (Alnetum filipendulosum), fewer ash vast forests (Fraxinetum aegopodiosum) and oak vast forest.

Zvidziena's bog. It is large tracts of forest between Zvidze's river, Aiviekste's and Abaine's canal. There is also Balts (White) marshy meadow ("klans") in these large tracts of forest. Pine bog-land is a dominant type. There is growth to the South from Balts marshy meadow and this growth is peculiar, because junipers and osiers grow in undergrowth of pine forest.

Forests of marshy meadows zone. Big and small clumps between marshy meadows and not big grass with vegetation of the biggest trees are also here. Birch is dominant tree species in these forests, osiers are dominant in undergrowth of the forest. Vidbirzs that is situated between Zvidzupe's and Aiviekste, and Elksnis' dry-house in the East part of Einjezers, also can be noted as separate large tracts of forest. Small birch clumps are in coast meadows of Lubana's lake (Kalnins 1968).

Mires

There are especially unfavourable outlet conditions in the subregion with intensive sloughing and big territories of marshy lands. Marshy meadows, so-called "Klani", surround Lubana Lake in a circle. There are big tracts of high mires in the Northern and eastern part of the subregion in lower reaches of Pededze River and watershed of rivers Krija and Lieda. Large territories are occupied by mires. The largest resources of peat are located here. They are situated around many rivers that fall into Lubana Lake. All of them are moss mires. In some of them process of peat forming is continuing for a longer period of time in other this process has just begun. Chamaedaphne calyculata is dominant among the bushes of mires. Conidium dubium (1985) can often be met around Lubana Lake. In the middle part these mires are mostly of Sphagnum fuscum type, there are little small lakes of mires. The rest of the moss mire is usually of Sphagnum magellanicum type, covered with rather big pines. Moss mires are usually

surrounded by transitory zones and zones of grass mires (Galiniece et al. 1958). Now as before the main role in formation of coenosis of low mires belongs to Phalaroides arundinacea, Calamagrostis canescens, Calamagrostis neglecta, as well as big sedges (1985). The main mires of Lubana Lake are:

Lielais purvs (Great mire). Situated to Northwest from Eina Lake. Moss mire. Bigger open spaces are changed by zones of pines.

Mire of White "Klani". Situated between Aiviekste and Abaini canal near mouth of river Zvidze. Moss mire. Mostly occupied by open space with rare pines.

Mire of Big Peiss. Situated on the right bank of Aiviekste between Ica and Osupite. Moss mire. There are birches and pines growing on its sides.

Pielubanas mire. Situated on the Northeast of Lubana Lake between Rezekne and Aiviekste rivers. Grass and transitional mire. Birches and osiers grow here.

Kauslienas mire. It is the smallest of mentioned mires. Situated on the banks of Lubana Lake near mouth of Asnupite. Moss mire (Kalnins 1968).

All the mires situated around Lubana Lake began to develop in places inundated for a longer time (Galiniece et al. 1958). Mostly "klani" of mires are drained and cultivated. In the territories that are still preserved the most common plant species are Filipendula ulmaria, Valeriana officinalis, Thalictrum flavum (1985).

Meadows

In geobotanical region of Northeast of Latvia meadows occupy quite big territories. In slopes of flat hills flood plains are widely spread. They are typical with coenoses dominated by small cereal meadow grass. In lower parts of landscape on limnoglacial moraine plains, in very wet conditions marshy meadows are spread. Coenoses of small sedges and small cereals play the main role in their forming. These are usually hydromezophytic meadows. Their herbage is also formed by big and small sedges as well as broad-leaved plants of mires. On limnoglacial sand (mostly on continental dunes) mezopsammophyte meadows are formed, they are poor in species diversity and not very useful as pastures of for haymaking. In fluvioglacial sediments that are widely spread in some microregions as well as on medium and slightly eroded slopes, formed with sand and gravel, in valleys of large and medium size rivers, small and rather typical spots of xeromezophytic meadows are formed and represented. In formation of coenoses of these meadows Centaurea scabiosa, Hypercium perforatum, Galium boreale, Galium verum, Medicago falcata, Viscaria vulgaris and some other species participate (1985).

The largest tracts of meadows have formed along Lubana Lake. There are mostly meadows of small sedges in marshy land and communities of wood anemones and tussock-grass and spear-grass communities in mineral soils. Here vegetation is formed by a small number of communities. The most common plants are Calamagrostis canescens, Agrostis canina, Poa palustris, Phalaroides arundinacea, Carex nigra. Along the rivers usually tallgrass meadows and sedge meadows with Phragmites australis are common (Galeniece et al. 1958). Vegetation of meadows is very diverse because it has developed in different types of landscape and in different soils.

Birkmane (1964) writes – real meadows occupy quite a large territory in Eastern Latvia and it is very important for agriculture. Many larger tracts of meadows are situated in important parts of lowland – in valleys of large and small rivers and hollows of the lakes. Four of the classes are mentioned as dominating. Two of them are observed in Lubana wetlands complex.

Analysis of phytocoenoses of the most common meadows in Eastern Latvia is given according to scheme of classification mentioned in works of Sennikov (1935, 1941), G. S. Sabardina (1958, 1959) and, with some differences - E. P. Matvejeva (1960).

1) Class of real meadows formation occupies small territories just like in the rest of Latvia.

2) Class of marshy meadows formation.

Among all the number of marshy meadows class formation only some can be mentioned. These are the most common meadows that can be found quite often but only occupying small territories. - Poeta palustris, Carieta gracilis, Carex gracilis, Carex vesicaria.

Coenoses of Poeta palustris formation usually are situated in valleys of rivers as separate small spots of zones. In general they are not widely spread in Latvia, more often they can be found near Lubana Lake (in Lubana wetlands complex). Usually there is Poa palustris in these associations as well as subdominant species (Carex gracilis, Calamagrostis canescens etc.). The most common association is Poa palustris + Herbae diversae.

Large territories in Lubana wetlands complex are occupied by coenoses of Caricета gracilis formation. They are widely spread also in other places, mostly around banks of rivers and lakes. In general distribution of these coenoses in Eastern Latvia is the same as in all the territory of Latvia. These coenoses are formed under very wet conditions in peat soils. The most common associations are Carex gracilis and Carex gracilis - Poa trivialis - Musci. Thickness and height of herbage is rather important. In the second association moss layer is well developed. In Eastern Latvia coenoses of Caricета vesicariae formations can be found in limited number of territories, mostly in river valleys and low meadows.

For example, association of Carex vesicaria was found. There is usually one stand in herbage (up to 65cm), projective coverage of species reaches 50%. Along with dominating species some other species of sedge can be found in small quantities: Carex acuta, C. vulpina, C. canescens etc. Apart from already mentioned coenoses of marshy meadows formation more seldom other associations can be found in Eastern Latvia. Rather big territories of

Lubana wetlands complex are covered by coenoses of Phalaroides arundinacea. Under favourable conditions these coenoses are quite high-yielding (60 - 70 metric centners/ha).

3) Class of peat meadows formation. Vegetation of marshes in Eastern Latvia as well as in all the country and neighbouring regions of Russia, Belarus and Lithuania is mostly formed by coenoses of the class of peat meadows formation. Here they are developed in lake hollows and in flood-lands of marshy and slow rivers. They can also be observed in Lubana wetlands complex. The most common formations are Deschampsieta caespitosa, Calamagrostideta neglectae, Poeta trivialis, Cariceta acutae, Cariceta panicea, Cariceta flavae, Cariceta caespitosa, Filipendula ulmaria. Distribution of peat meadows formation class coenoses is very important in forming vegetation. Although they agricultural value is very low after draining them good herbage can be gained.

4) Class of meadows formation appearing on poor mineral soils. Psychromezophytes and psychrophytes dominate here. Subdominant plants of other ecological types can also be found. These meadows can often be found in Eastern Latvia but on rather small territories.

Celery meadows typical for coastal zone of Kurzeme and Vidzeme cannot be met in geobotanical region. Neither elements of western flora, such as Carex buxbaumii, C. hostiana, Cirsium acaule have been found.

Inundated meadows are rather rare in Eastern Latvia and compare to meadows of Baltic sea coast coenoses with dominant of Festuca pratensis, Phleum pratense, Alopecurus pratensis, Digraphis arundinacea, Carex gracilis can be found here. Coenoses of Bromus inermis cannot be found here although they have a wide areal to Southeast from Latvia, in Belarus. (1964)

The common list of plant species of geobotanical region is based on the results of partial herbarium (LATV) processing, partial processing on other collections processing, using data of geobotanical descriptions and floristic lists, analysing literature. There are 1168 species in the list, belonging to 108 genera and 476 families. The results of structural analysis of region flora system show that according to the number of species the largest genera are the following: Asteraceae (121 species), Poaceae (108), Cyperaceae (129), Rosaceae (72), Brassicaceae (61), Fabaceae (60), Caryophyllaceae (46), Scrophulariaceae (44), Lamiaceae (40), Ranunculaceae (39), Polygonaceae (33), Apiaceae (28), Orchidaceae (27), Chenopodiaceae (24) (1985).

Klani

A several kilometres wide zone around the lake is flat, only a little higher than water level of the lake. Big territories are occupied by marshes or grass vegetation typical for inundated, very wet territory – klani (Lumane 1995). In Small Encyclopaedia of Latvian SSR (Galeniece 1986) klani are defined as periodically inundated meadows of Lubana region. Klani have formed on Potassium rich grassward sand-clay soils, also on peat soils or on swarded peat layers. Herbage of these meadows is 90 - 150 cm high, number of species is not big (12 - 30), plants are layered in 3-4 layers (Galeniece 1986). Vonogs K. (Vonogs K., 1997) in his turn writes that "klani" are territories of periodically inundated low (grass) mires. In Dictionary of Standard Latvian Language word 'klani' is defined as periodically inundated low territories, marshy meadows (on the banks of lakes and rivers) (Latviešu literaras valodas vardnica, 1980).

Meadows situated in Lubana Lake inundation territory are called "klani" because of their specific vegetation. "Klani" surround Lubana Lake, banks of Aiviekste from its mouth to Ergala and meadows of lower reaches of Pededze, Ica and Balupe, meadows situated on both banks of Zvidzupe , meadows of Abainu canal and Liepsalu meadows.

Upper layer of "klani" is peat. Thickness of peat level is different (1- 6 m). Under peat level there are different layers of clay and other sediments. "Klani" of Lubana are among the most peculiar places in Latvia. Meadows of "klani" are significant with their expanse and primeval nature, especially before period of haymaking when spring floodwaters have already gone to the lake, releasing grass and bushes of meadows.

Diversity of plants is not big in meadows of "klani". Here different species of Carex dominate. Sometimes there are smaller of bigger osiers. Besides, there are a lot of overgrown rivers and lakes. If you stand on such places the ground under your feet is very unstable.

Land-reclamation work that was done before, many channels and ditches as well as sandy banks of rivers have changed appearance of "klani" in some places. Surface water regime has changed in "klani" and groundwater level is lower than before. Slowly changes of vegetation take place in meadows, along the sides of "klani" cultivated meadows and fields of clover appear. Kalnins (1968) meadows of "klani" divides in several regions:

Meadows of Lubana Lake banks. They are situated on the banks of Lubana Lake. Another side of these meadows usually borders on fields. Meadows of lakebed are also included in this group. In meadows of bank of the lake big territories are covered by Phalaroides arundinacea. The most significant plants of meadows of lakebed are Menyanthes trifoliata, Equisetum fluviatile, Cicuta virosa, Sagittaria sagittifolia, Alisma plantago - aquatica, etc.

Ica meadows. Situated on the banks of Ica. These meadows are special with nearly total absence of osiers. Meadows are mostly surrounded by mires.

"Klani" meadows of Balti. They are situated on both banks of Aiviekste, in regions of Baltu lakes, mouths of Zvidzupite and Osupite. There are many small lakes and no osiers in these meadows. The borders of these meadows are marshy forests. One of the plants that grow here - Ranunculus lingua. Near marshy forests moss – Sphagnum grow.

Meadows of Pededze. They are situated on the banks of Aiviekste around the mouth of Pededze. These meadows are surrounded by large tracts of forests. Sometimes there are cultivated meadows on the banks of Aiviekste.

Abainu meadows. Up to 3-km wide zone on the banks of Abainu canal. Meadows are surrounded by tracts of forests. Sometimes bigger territories are covered by reeds.

Liepsalu meadows. They go as a narrow zone from Abainu meadows to the West. These meadows border on forest tracts. There are oak groves on the sides of these meadows.

Zvidzupe meadows. They are situated on both sides of banks of Zvidzupe along all the length of the river. On the West they border on Zvidziena mire, on the East - Vidbirzs. There are small birch clumps, a lot of osiers overgrown rivers and lakes here. The most typical plants are Menyanthes trifoliata and Equisetum fluviatile. There are reed clumps in some places here. There are large sweet flags (Acorus calamus) fields near Zvidzes Lake (Kalnins 1968).

Phalaroides arundinacea is a typical cereal for "klani" of Lubana. Is medium wet places of "klani" pure is only Phalaroides arundinacea, in more wet - Phalaroides arundinacea with Carex acuta and Agrostis canina, but in more dry places - with Alopecurus pratensis. Belts of squirrel grass succeed associations of reeds or sedges. (Galeniece 1986). Sedges - Carex nigra, Carex acutiformis, Carex cespitosa, Carex elata, Carex diandra play the main role in forming inundated mires and meadows of the plain. Natural meadows are preserved in rather small territories. The main here are marshy meadows with dominance of Carex nigra, Carex flava, Carex panicea, Agrostis canina, Deshampsia cespitosa, Festuca rubra, Festuca pratensis, Poa pratensis, Comarum palustre, Geum rivale, Caltha palustris, Ranunculus acris, Ranunculus repens, Lychnis flos - cuculi (Laasimer et al. 1993).

Regulation of Lubans changed vegetation of "klani", for example, equisetum disappeared and cereals appeared instead. It was possible to meliorate meadows, fields and state forests. That is why along the borders of "klani" a drier zone appeared for agricultural crops (Latvju enciklopedija 1952). After melioration composition of plants changed essentially. There are lot of moderate wet meadows in extensive river valleys. Dry meadows have formed on slopes of river terraces and inland dunes (Kabucis 1998).

Botanical characteristic of the representative plots in the study area

Flora and vegetation in the North-East part of Lubana lake

North-East part of Lubana lake represents 28 plant species, there are 11 real water-pants and 10 helophyte species among them, 7 other species of plants have been found on the coast line or marsh. The most common and the most characteristic to this part of the lake are the following species: *Phragmites australis*, *Butomus umbellatus*, *Sparganium microcarpum*, *Nymphaea alba* and *N. candida*. Some other species like *Eleocharis palustris*, *Sagitaria sagittifolia*, *Polygonum amphibium*, *Nuphar lutea*, *Ceratophyllum demersum* etc., can be also met quite often. (See Table 3)

According to Braun - Blanquet methodology phytocoenoses of NE part of Lubana lake are described in emergent macrophytes and submerged macrophytes zones (Table 4, 5).

There are phytocoenoses formed by reeds in the emergent macrophytes zone dominated by reeds but other species of helophyte and water plants can also be met there. Such phytocoenoses can be observed on the East and North coat as well as in the littorale of northern part of the lake as extensive stands. These phytocoenoses (Table 4, sample plot 1.) are similar to association of *Phragmitetum*.

Sandy eastern coast of the lake as well as its bank along river-bed of Aiviekste source is characteristic with phytocoenoses of *Butomus umbellatus* and *Sparganium microcarpum* (Table 4,5 sample plot and 3 - 4)

Table 3 List of the found plants species and their occurrence

Plant species	Occurrence
Coast vegetation	
Carex acuta	2
Carex elata	1
Cicuta virosa	2
Chamaenerion angustifolium	1
Phalaroides arundinacea	1
Ranunculus lingua	2
Rorippa amphibia	2
Total: 7	
Emergent macrophytes	
Butomus umbellatus Elerocharis palustris	3
Glyceria maxima	2
Phragmites australis	1
Sagittaria sagitifolia	3
Scirpus lacustris	2
Sium latifolium	2
Sparganium emersum Sparganium microcarpum	2
	2
Typha angustifolia	3
Total: 10	2
Emergent macrophytes *Hydrocharis morsus-ranae*	2
Nymphaea alba	3
Nymphaea candida	3
Nuphar lutea	2
Polygonum amphibium Potamogeton natans	2
Spirodela polyrhiza Stratiotes aloides	1
Total: 8	1
	2
Submerged macrophytes	
Ceratophyllum demersum	2
Myriophyllum verticillatum	1
Potamogeton lucens	2
Total: 3	

Occurrence: 1 - seldom, 2 - often, 3 - very often

Table 4 Composition of species of emergent macrophytes phytocoenoses and percentage in sample plot

Number of sample plot	1	2	3	4	5	6
Size of sample plot (m^2)	10	10	10	10	10	10
Depth (m)	0.4	0.4	0.4	0.5	0.4	0.5
Soil	ds	ds	ds	s	ds	s
Phragmites australis	30	.	.	+		+
Cicuta virosa	+	.	.			
Carex elata	+	.	.			
Nuphar lutea	10	.	.			
Nymphaea candida	10	.	.			
Sparganium microcarpum	.	40	50	30	5	+
Butomus umbellatus	.	+	+	+	40	40
Potamogeton lucens	.	.	.	1		5
Polygonum amphibium	.	.	.			1

Soil: s - sand, ds – muddy sand

Extensive reed stands have partially bouded off the shallow northern part of Lubana lake. Therefore it can be considered as "lake in the lake". A mosaique of *Phragmites australis*, *Sparganium*, *Polygonum amphibium* and original udensrożu-łepju phytocoenoses has formed there.

Huge water-lilies (determined as *Nymphaea alba* and *N. candida*) dominate in the described water lilies-coltsfoot phytocoenoses, *Nuphar lutea*, *Polygonum amphibium* and other plant species can be found there (Table 5, sample plot 1. - 3.). These phytocoenoses can be considered equal to *Nymphaetum albo-candidae*.

Zones and stands formed by *Polygoum amphibium* phytocoenoses are characteristic to the central region of the NE of the lake. *Polygonum amphibium* dominates in the described phytocoenoses (Table 5, sample plot 4.).

The zone of submerged macrophytes is not very characteristic in the study area. In some places *Potamogeton lucens* can be found. Overgrown inlets represent phytoceonoses dominated by *Ceratophyllum demersum* (Table 5, sample plot 5-6). These phytoceonoses can be considered equal to *Ceratophylletum demersi*.

Table 5 Composition of macrophytes species phytocoenoses and its percentage in sample plot

Number of sample plot	1	2	3	4	5	6
Size of sample plot (m^2)	10	10	10	4	4	4
Depth (m)	0.8	1	1	1.2	0.2	0.5
Soil	d	d	ds	s	ds	d
Nymphaea candida	30	30	15	+	+	3
Nymphaea alba	20	40	20	.	+	1
Nuphar lutea	10	10	10	1	+	.
Ceratophyllum demersum	10	.	.	.	80	95
Potamogeton lucens	+	.	.	.	.	.
Myriophyllum verticillatum	+	.	.	.	.	.
Hydrocharis morsus-ranae	.	+	+	.	+	.
Polygonum amphibium	.	+	1	20	1	.
Sagittaria sagittifolia	.	+	+	.	.	+
Sparganium emersum		5	1	.	+	.
Sparganium microcarpum	.	.	1	.	5	.
Butomus umbellatus	.	.	+	.	+	.
Phragmites australis	.	.	.	.	1	.
Chamaenerion angustifolium	.	.	.	.	+	.
Stratiotes aloides	.	.	.	.	+	.

Conclusions.

1. NE part of Lubana lake can be charaterised by extensive and shallow littorale with sandy soil or soil with muddy sand as well as innudated former banks with remains of dried up trees and bushes.

2. 28 plant species are found in NE part of Lubana lake (7 of coast vegetation, 18 emergent macrophytes, 3 of submerged macrophytes zone). The most comon are species characteristic to eutrophic waters: *Phragmites australis*, *Butomus umbellatus*, *Sparganium microcarpum*, water-lilies *Nymphaea alba* and *N. candida*.

3 Vegetation of NE part of Lubana is characterised by phytoceonoses of eutrophic biotopes:

- *Phragmitetum*,
- *Butomus umbellatus*,
- *Sparganium microcarpum*,
- *Nymphaetum albo-candidae*
- *Ceratophylletum demersi*

4. It is not possible to judge completely about flora and vegetation of all Lubana lake because study has been carried out only in the NE of lake. Nevertheless, it is possible to call this lake eutrophic which can be proved by discovered plant species and phytoceonoses as well as bountiful harvest green colour of water and low transparency (0.7 - 1.0 m).

The general characteristics of biotopes in the NE coast of Lubana Lake

It is difficult to speak about separate biotopes of meadows in the coastal zone of Lubana Lake as they sometimes are covered by each other; some other zones are also not easy to distinguish. Many of the biotopes are covered with bushes. Still it is possible to distinguish between 6 biotopes in the study territory. They are the following: 1) marshy meadows; 2) wet meadows; 3) sand zone together with roadside; 4) sand-pit; 5) bank of the lake covered with bushes; 6) long-fallow land, waste

1) Marshy meadows or "klani", are situated on the banks of rivers Aiviekste, Ica, Kalnupe, Balupeand other small rivers of the study territory, Southwest end of lake, Gomel as well as possibly in other places of study territory. Total size of Gomel is ~ 600 ha, but vegetation is rather homogenous. Transition from meadow to mire is difficult to determine Soil is rich in nutrition and very wet. In summer of 1998, in mid July, meadow was flooded, water level raised for 1 meter, it made study of flora quite difficult in this biotope Sedges dominate among plants. The following types can be conditionally distinguished: innudated meadows and marshy meadows although it is difficult to determine them on the spot. According to classification (Sabardina 1959) they are marshy meadows or meadows

with raised stand of grass. Herbage is quite compact; its height reaches 90 cm. The most typical plants are *Phalaroides arundinacea, Equisetum fluviatile, Carex acuta, C. cinerea, C. vesicaria, C nigra, Calamagrostis epigeios, Iris pseudacorus, Salix laponus, S. rosmarinifolia, S. aurita* etc.

2) Wet meadows are situated on the left bank of Aiviekste. There are 9 spots of such meadows in the study territory that can be considered as broad-leaved tall grass meadows Soil is transitory wet, quite rich. There are ditches between meadows. Two of the meadows are strongly dominated by *Chamaenerion angustifolium. Urtica dioica* and *Deschampsia caespitosa* also grow there. *Pharaloides arundinacea, Deschampsia caespitosa, Veronica longifolia, Calamagrostis canescens, Geum rivale, Cnidium dubium, Lychis flos – cuculi. Valeriana officinalis, Filipendula ulmaria, Galeopsis speciosa, Stellaria palustris,* etc. dominate on the rest of the meadows. *Salix cinerea, S. myrsinifolia, S. rosmarinifolia* grow in the ditches and on the sides of the meadows.

3) Sand zone together with roadside stretches along all the study territory Here xerophyte species grow adopted to poor soils. Nevertheless species which a little dominate on the roadside are different from ones growing in sand. The most common species for sand are *Rumex acetosella, Arthemisia campestris, Arenaria serpyllifolia, Dianthus deltoides, Silene nutans, Ranunculus acris, Potentilla argentea, Onobrychis arenaria, Helycrysum arenarium Picea abies, Pinus sylvestris, Salix alba, S.* x *multinervis* etc .

4) Flora of sandpits is similar to the one of roadsides and sand. *Carex nigra, Phleum pratense, Equisetum hyemale, Linaria officinalis, Ranunculus repens, Mentha arvensis, Tussilago farfara, Silene nutans* etc. dominate here.

5) There is a high level of ground water on the bank of lake, soil is sandy. Along all the coastal line *Salix caprea, S cinerea, S. viminalis, S. pentandra, Alnus incana* are evenly spread. Banks of Gaigalava township ponds are also included in the zone of bushes because a lot of osiers grow there. *Equisetum arvense, E. hyemale, Cerastium semidecandrum, Stellaria nemorum, Urtica dioica, Filipendula ulmaria, Hypericum perforatum* dominate among grass.

6) Very small territories are occupied by long-fallow lands. They are mostly situated on the sides of meadows, between road and bushes. There have also been found two meadows with a lot of weeds. Dominating species are - *Urtica dioica. Centaurea jacea. Carduus crispus, Tragopogon pratensis, Galeopsis speciosa, Rumex crispus* etc.

The total number of vascular plant species found on the NE bank of Lubana Lake is 223. Number of families, genera, species in different biotopes is shown in Table 6. and Figure 3.

Table 6 Families, genera, species in different biotopes of the NE coast the Lubana Lake

Biotopes	Families	Genera	Species
Marshy meadows	18	34	52
Wet meadows	22	52	69
Sand zone and roadsides	24	75	111
Long-fallow land	12	28	31
Bank of the lake	26	46	71

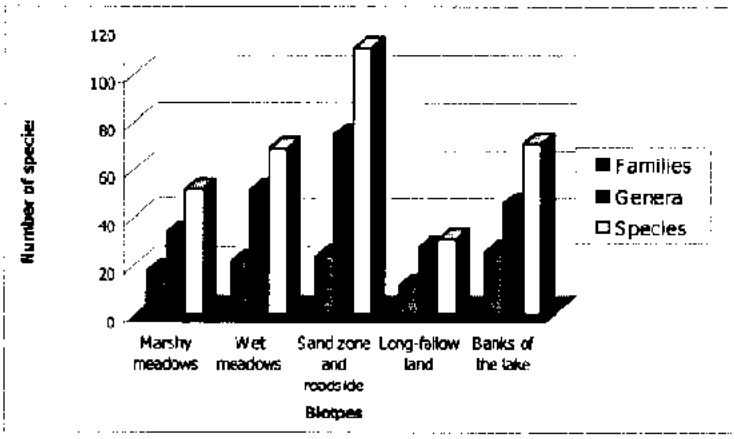

Figure 3 Families, genera, species in different biotopes of the Northeast coast the Lubana Lake

The greatest biodiversity was found in sand zones and on the roadsides. It can be explained by dominance of ruderal species and the fact that it is not covered with bushes and it is a suitable territory for luciphile plants. Species found in the biotope make up 49.8% of species found in total, genera - 53.6% of total number, and families 55.8% of total number. The biggest number of families - 60.5% of the total number was found on the bank of the lake. It is also the second biggest biotope in respect of number of species, 31,8% of the total number. This is a diverse biotope because bushes are considered as well with dominating representatives of *Salix* genera as well as other species typical for this biotope. The number of species found in marshy meadows was quite small. The number of species is only 23.3% of the total number of species found on the NE bank of Lubana Lake. These meadows are

quite large but vegetation is rather homogenous. It can be explained by peaty soil and clearly expressed dominance of several species. The number of families is also small. The smallest number of species was found in long-fallow land, there only 4.9% of the total number of species can be found. These zones cover small territories and a specific composition of species is formed in the biotope.

Main characteristic of "klani"

By looking through works of different authors and gathering all the possible definitions of "klani" it is possible to conclude that "klani" is a toponyme meaning innudated territories on the banks of Lubana Lake and flood-lands of its rivers. "Klani" include innudated meadows and grass mires that were used and in some places are still used for haymaking.

In Lubana wetlands complex "klani" occupy significant territory.

According to the classification of meadows vegetation of "klani" consists of:

1. **Group of damp meadows** :

1.1. *Deschampsia caespitosa, Juncus effuscus, Juncus conglomeratus, Ranunculus repens;*

1.2. love-lies-bleeding meadows.

2. Group of wet meadows:

2.1. water body bank grass (*Agrostis stolonifera, Phalaroides arundinacea, Carex acuta, Veronica longifolia, Lysimachia vulgaris, Sium latifolium, Lythrum salicaria);*

2.2. *Agrostis canina, Carex nigra, Carex panicea, Galium uliginosum, Geum rivale, Cardamine pratensis, Caltha palustris, Peucedanum palustre, Lychnis flos - cuculi;*

2.3. *Calamagrostis canescens, Carex disticha, Carex vesicaria, Carex rostrata, Eriophorum polystachion, Iris pseudacorus;*

2.4. *Poa trivialis, Poa palustris, Scirpus sylvaticus, Valeriana officinalis, Cirsium oleraceum, Filipendula ulmaria, Epilobium hirsutum, Geranium palustre.*

According to classification of mires (Laivins, 1998) vegetation of "klani" represents:

Group of freshwater-bodies and mires plants:

Phragmiti - Monocarteetea

1. *Phragmitetalia:*
   - *Phragmition*
   - *Magnocaricion elatae*

2. *Nasturtio - Glycerietalia:*
   - *Glycerio - Sparganion,*
   - *Phalaridion arundinacea.*

Scheuchzerio - Caricetum nigrae

1. *Scheuchzerietalia palustris;*
2. *Caricetalia nigrae.*

Dominant species in meadows of "klani" are *Phalaroides arundinacea, Calamagrostis neglecta, Lysimachia vulgaris, Filipendula ulmaria, Achillea salicifolia, Veronica longifolia, Iris sibirica, Carex acuta, Cnidium dubium, Valeriana officinalis, Viola uliginosa* etc.

There are not many rare and protected plants found in "klani" (for example, *Carex fluviatilis, Cnidium dubium*) Syntaxonomic belonging of "klani" meadows will be described after data analysis is done. Conservation of Flora at Lubana Wetlands Complex

Protected species were viewed according to "List of protected plants" (1996). These species according to their conditions in Latvia are included in one of 5 categories that are determined by commission of rare and disappearing plants at the International Union for Nature and Nature Resources Protection:

0 category – obviously withered away species that have not been observed for several years. They are probably preserved in some special places or as cultivated plants. These species require special state level protection in the form of special legislation;

Category 1 – species that are under threat of being withered away. Their existence in future is no possible without special measures. These species require special state level protection in the form of special legislation;

Category 2 – rare species that are not under threat of being withered away but they can be found in small quantities or in restricted or specific areas and can be withered away soon. These species require special state level protection in the form of special legislation;

Category 3 – species, whose number and area has decreased during several years because of natural reasons or as a result of human activities or because of both factors. It is necessary to control changes in number and restrict their use by law;

Category 4 – species that have not been studied very well. It is possible that they are under threat of being withered away but because of lack of information it is not possible to evaluate present condition of these species. Situation requires additional studies.

Lubana wetlands complex has been named as possible Ramsar convention place (Opermanis 1998). The following rare plants can be found here - *Saxifraga hirculus, Primula farinosa, Cypripedium calceolus, Dactylorhiza baltica, D. maculata, D. incarnata. Salix phylicifolia, S. myrtilloides, Cnidium dubium, Thesium ebracteatum, Liparis loeselii, Ligularia sibirica, Pulsatilla patens.*

When summarising all the available data about rare and protected species found in Lubana wetlands complex (chorology of Latvian flora (1980, 1981, 1986, 1987), looking through data base "Aizsargajamo augu sugu atradnes Latvijas Republikas teritorija" ("Location of protected plants in Latvia"), list of vascular plants of geobotanical region of NE Latvia (1958), list of plants mentioned in Ramsar convention, personal data of D. Rakvica, L. Engele and B. Bambe 34 rare and protected plant species were found.. From the first category (extinct species) - *Equisetum scirpoides, Juncus stygius, Carex aquatilis, Ligularia sibirica, Saxifraga hirculus, Thesium ebracteatum*. From the second category (sensitive species) - *Cnidium dubium, Cypripedium calceolus, Galium schultesii, Gentiana pneumonanthe, Iris sibirica, Carex scandinavica, Onobrychis arenaria, Primula farinosa, Viola persicifolia*. From the third category (rare species) - *Allium ursinum, Salix myrtilloides, Salix phylicifolia, Gladiolus imbricatus, Cinna latifolia, Glyceria lithuanica, Liparis loeselii, Malaxis monophyllos, Nuphar pumila, Scolochloa festucacea, Scirpus radicans, Hammarbia paludosa, Orchis mascula*. From the fourth category (commercially threatened species) - *Diphasium complonatum, Platanthera bifolia, Pulsatilla patens, Dactylorhiza incarnata, Dactylorhiza maculata, Dactylorhiza baltica*.

Distribution on endangered plant communities

Table 7 Occurrence of vascular plants in different biotopes of the Northeast banks of Lubana Lake

Legend:

x – biotope mentioned in literature

o - biotope where species was found and what coincide with biotope mentioned in literature

v - biotope where species was found but which is not mentioned in literature

Species	Meadows													
	dry	wet	marshy	maritime	holm	waste land	Mires	Coastal zone	Ruderal spots	Sana zone	Forests	Fringe of the forest	Bushes	Water
Equisetaceae														
Equisetum arvense L.	x	o			x	x		o	o	o	x		o	
E. fluviatile L.			o					o			x			
E. palustre L.		o	o		o			x			x		x	
E. hyemale L.			v					o			x		o	
E. scirpoides Michx.								o		o	x			
Pinaceae														
Picea abies (L.) H. Karst.										o	x	x		
Pinus sylvestris L.								x		o	x	x		
Salicaceae														
Populus longifolia Fisch.									o					
P. tremula L.						x			v		x	x	x	
Salix alba L.								o	x	o		o	x	
S. aurita L.			o											
S. x multinervis Döll			o							o			x	
S. caprea L.								o	o		x	o	o	
S. cinerea L.			o				x		o		x	o	x	
S. cinerea x viminalis								x	o		x	x	o	
S. fragilis L.								o	o		x	o		
S. lapponum L.			o				x	o						
S. myrsinifolia Salisb.			o			x	x	o			x	x		
S. pentandra L.						x	x	o			x		o	
S. rosmarinifolia L.			o				x	o						
S. triandra L.							o	x	o				o	
S. viminalis L.								x					o	
Betulaceae														
Alnus glutinosa (L.) Gaertn.							x	o			x		o	
A. incana (L.) Moench						o			o		x		o	
Betula pendula Roth						o					x			
B. pubescens Ehrh.			o				x		v		x		o	
Urticaceae														
Urtica dioica L.		v	x			v	x	o	o		x		o	
Polygonaceae														
Polygonum amphybium L.									o				o	
P. arenastrum Borcau		x						o						
P. hydropiper L.		x	o					o					o	
P. scabrum Moench														
Rumex acetosa L.		o				x		o	o		x		o	
R. acetosella L.	o					x	x		o	o	x			
R. confertus Willd	x	o			o	x		o						
R. crispus L.	o	x				o			o					
R. longifolius DC.	x			x	x	o	x	o	o		x			
Caryophyllaceae														
Arenaria serpyllifolia L.	o					o		o	o	o	x	o		
Cerastium arvense L.	o				o	x		o	o	o	x			
C. holosteoides Fr.	o				o	o			x	x	x	x	x	
C. semidecandrum L.	x					o		o	x		x	x	o	
Dianthus deltoides L.	o					o			o	o	x	o		
Lychnis flos-cuculi L.		o				o		o			x		o	
Melandrium album (Mill.) Garcke	o					o		v	o	o	x			
Sagina nodosa (L.) Fenzl	x	x			x			o	o					
Saponaria officinalis L.						x		x	o					
Silene nutans L.	x					x			o	o	x			
S. vulgaris (Moench) Garcke	o					x		x	o		x	x	x	
Stellaria graminea L.	x	o			o	x		o	x		x		x	
S. nemorum L.											x	x	o	
S. palustris Retz.	x	o	x		x		x	o						
Ranunculaceae														
Caltha palustris L.		x	o		x		x	o			x		x	
Ranunculus acris L.	o	o	x	x	x	x	x	o	o	o	x	x	o	
R. lingua L.					x		x	o						
R. repens L.		o			x			x	o		x		x	
R. sceleratus L.		o	x					x						
Thalictrum flavum L.		o	x	x	x			x	o		x		x	
Ceratophyllaceae														

Species	Meadows													
	dry	wet	marshy	maritime	helm	waste land	Mires	Coastal zone	Ruderal spots	Sans zone	Forests	Fringe of the forest	Bushes	Water
Ceratophyllum demersum L.														o
Guttiferae (Hypericaceae)														
Hypericum perforatum L.	x					x					x	x	o	
Brassicaceae														
Berteroa incana (L.) DC.	x					x			o		x	x		
Capsella bursa - pastoris (L.) Med.								x	o	x				
Descurainia sophia (L.) Webb.						x			o					
Erysimum cheiranthoides L.	x					x			o	x				
Raphanus raphanistrum L.						x			o					
Rorippa palustris (L.) Bess.		x	o		x	x		o	x		x			
Sisymbrium officinale (L.) Scop.						x			o					
Crassulaceae														
Sedum acre L.	o					x		x	v	x	x			
Parnassiaceae														
Parnassia palustris L.		o	x		x		x	x		x			x	
Rosaceae														
Alchemilla vulgaris L.		o										x		
Filipendula ulmaria (L.) Maxim.		o	o		x		x	o			x		o	
Fragaria vesca L.	x					x			v		x	x	v	
Geum rivale L.	x	o	x		x	x	x	o	x	x	x		o	
Potentilla anserina L.	x	o	x	x	x	x	x	o	o					
P. argentea L.	o					x				o	x	x		
Rubus idaeus L.								o	o		x	x	x	
R. nessensis Hall								x	o			x	x	
Sorbus aucuparia L.										o	x	x	o	
Leguminosae (Fabaceae)														
Anthyllis vulneraria L.	o										x	x		
Lathyrus palustris L.			o	x	x		x	o						
L. pratensis L.	o				x	x	x	o	x			x	x	
L. sylvestris L.									o			x	x	
Lotus corniculatus L.	x				x	x			o	x	x	x		
Medicago lupulina L.	x					x			o		x	x		
Melilotus albus Medik.	x	o				o		x	x	o			x	
Onobrychis arenaria (Kit.) DC.									v	o			x	
Trifolium arvense L.	o			x		x			o		x	x		
T. hybridum L.	x	o			x	x			o				x	
T. medium L.	x					x			x		x	x	o	
T. montanum L.	x					x			o		x	x		
T. pratense L.	x	o			x	x			o			x	x	
T. repens L.	x	x			x	x			o		x		o	
Vicia cracca L.	x	o			o	o			x		x	x	o	
Geraniaceae														
Geranium palustre L.	x	o	o	x	x	x			x		x		x	
Rhamnaceae														
Rhamnus cathartica L.						x		o			x	x	x	
Violaceae														
Viola arvensis Murray									o	o	x			
Lythraceae														
Lythrum salicaria L.		o					x	o					x	
Onagraceae														
Chamaenerion angustifolium (L.) Scop.		v							o		x	x		
Oenothera biennis L.	x					x			o	x				
O. rubricaulis Kleb.	x					x			o					
Haloragaceae														
Myriophyllum sp.														o
Umbelliferae (Apiaceae)														
Aegopodium podagraria L.									o				o	
Angelica sylvestris L.		o	o		x		x	o			x		x	
Anthriscus sylvestris (L.) Hoffm.	x	o			o	o		x	x		x	x	o	
Cicuta virosa L.			o		x			o						
Cnidium dubium (Schkuhr) Thell.		o	o					o	v		x			
Daucus carota L.	x					x			o	x			x	
Peucedanum oreoselinum (L.) Moench	x					x		o		x	x	x		
P. palustre (L.) Moench			o								x		o	
Sium latifolium L.				x	x			o						
Pyrolaceae														
Pyrola rotundifolia L.											x	x	o	
Primulaceae														
Androsace septentrionalis L.	x					x			o	o		x		
Lysimachia nummularia L.	x	o			x			x			x		o	
L. vulgaris L.	x	o			x		x	x			x		o	
Primula veris L.			o	x			x							
Rubiaceae														
Galium album Mill.	x	o			x	x					x	x	x	
G. elongatum C. Presl		x	x				x	o			x		o	
G. mollugo L.						x					x	x	o	
G.uliginosum L.		o	x				x	x			x		x	

Species	Meadows													
	dry	wet	marshy	maritime	holm	waste land	Mires	Coastal zone	Ruderal spots	Sans zone	Forests	Fringe of the forest	Bushes	Water
Convolvulaceae														
Calystegia sepium (L.) R. Br.								x	x			x	o	
Convolvulus arvensis L.						x			o					
Boraginaceae														
Anchusa officinalis L.	x					o			o	x			x	
Echium vulgare L.									o	x				
Myosotis palustris (L.) L.		o				x	x	o					o	
Labiatae (Lamiaceae)														
Acinos arvensis (Lam.) Dandy	x								o	x	x	x	x	
Galeopsis speciosa Mill.		o				o				x				
G. tetrahit L.	x	v				o				x				
Mentha arvensis L.		o				x		x	o		x		o	
M. x verticillata L.			x					x					o	
Origanum vulgare L.					x	x					x	x	o	
Scutellaria galericulata L.		x						x					o	
Stachys palustris L.		o	x											
Prunella vulgaris L.	x	x			x	x			o		x	x	o	
Thymus ovatus Mill.	x					x			o		x	x		
Solanaceae														
Solanum dulcamara L.							x	o			x	x	x	
Schrophulariaceae														
Euphrasia officinalis L.	x								o	x				
Linaria vulgaris Mill.	x					x			o	o	x	x		
Odontites vulgaris Moench	x					x			x			x	o	
Rhinanthus minor L.	x	x			x	x		x			x		x	
Rh. serotinus (Schönh.) Oborny	x	x			x	x			x			x	x	
Veronica chamaedrys L.	x	x			x	x			o		x	x	o	
V. longifolia L.	x	o			x	x		x						
V. spicata L.								o				x	x	
Plantaginaceae														
Plantago lanceolata L.	x	x	x	x	x	o			o		x	x	x	
P. major L.	o				x	x			o	x		x	o	
Viburnaceae														
Viburnum opulus L.						x					x	x	o	
Valerianaceae														
Valeriana officinalis L.		o	o				x	o			x		x	
Campanulaceae														
Campanula patula L.	x	x			x	x					x	x	o	
C. persicifolia L.	x					o					x	x		
Compositae (Asteraceae)														
Achillea millefolium L.	o	o		x	x	o			o		x	x	o	
Anthemis tinctoria L.	x					x			o	x				
Artemisia campestris L.	x	o			x	x			x	o	x	x		
A. vulgaris L.	x	x			x	x		o	x		x	x	o	
Bidens tripartita L.		o				x		x	o				x	
Carduus crispus L.	x	o				o			o		x	x	o	
Centaurea jacea L.	x	o				o			o		x	x	x	
C. scabiosa L.	x	x			x	x			o			x	x	
Cirsium arvense (L.) Scop.	o					o			x					
C. vulgare (Savi.) Ten.						o			o			x		
Crepis tectorum L.	x					x			o					
Conyza canadensis (L.) Cronquist	x					x			o		x	x		
Erigeron acris L.	o					x			o	x		x		
Filaginella uliginosa L. Opiz.		x							x				o	
Helichrysum arenarium (L.) Moench	x					x				o				
Leontodon autumnalis L.	x	o	o	x	x	x			o		x	x	o	
Lepidotheca suaveolens (Pursh) Nutt	x								o	o				
Petasites hybridus (L.) P. Guertn., B.Mey. et Scherb.								x	o				o	
Pilosella officinarum F.W. Schultz et Sch. Bip.	x					x			o	x	x	x		
P. praealta (Vill. ex Gochnat) F.W. Schultz et Sch. Bip.	o									o				
Ptarmica cartilaginea (Ledeb ex Rchb.) Ledeb.						x			o				o	
P. vulgaris Blackw. ex DC.		x			x	o		x	o					
Senecio fluviatilis Wallr.								o				x		
S.paludosus L.					x								o	
Solidago virgaurea L.	x					x			o		x	x	x	
Sonchus arvensis L.					o				o				x	
S. oleraceus L.									o					
Tanacetum vulgare L.	x					o		x	x				o	
Taraxacum erythrospermum Andrz. s.l.	o									x	x			
T. officinale F.H. Wigg. s.l.	x	o				x			o			x	o	
Tragopogon pratensis L.	x				x	o						x	o	
Tussilago farfara L.	x					x		x	o					
Alismataceae														
Alisma plantago - aquatica L.		x			x			o					x	o
Butomaceae														
Butomus umbellatus L.			x					o						
Iridaceae														

Species	Meadows													
	dry	wet	marshy	maritime	holm	waste land	Mires	Coastal zone	Ruderal spots	Sans zone	Forests	Fringe of the forest	Bushes	Water
Iris pseudacorus L.			v					o						o
Juncaceae														
Juncus articulatus L.		o	o		o	x	x	o					x	
J. bufonius L.					o	x		o	x	x				
J. effusus L.		o			o	x		o			x	x		
Gramineae (Poaceae)														
Agrostis tenuis Sibth.	x	o			o	o			o		x	x	o	
Alopecurus aequalis Sobol.		x	o			o	x	x					o	
A. pratensis L.		o		x	x	x		o						
Briza media L.	x	o	o		x	x			o			x	o	
Bromus mollis L.	o					x			o					
Calamagrostis arundinacea (L.) Roth											x	x	o	
C. canescens (Weber) Roth		o				x	x	o			x			
C. epigeios (L.) P. Roth	x					o		x	o		x	o		
Deschampsia caespitosa (L.) Beauv	o	o			x	x	x		o		x		o	
Elytrigia repens (L.) Nevski	x	o				x			o				o	
Festuca pratensis Huds.	o	o			o	o			o			x	o	
F. rubra L.	x	o		x	o	x	x		o		x	x	o	
Glyceria fluitans (L.) R. Br		o			o		x	x						
Holcus lanatus L.	x	o				o			x	x			o	
Leersia oryzoides (L.) Sw.		o	o					x					x	
Lerchenfeldia flexuosa (L.) Schur	o									o	x			
Lolium perenne L.	x	o				x				x				
Phalaroides arundinacea (L.) Rauschert					o			o						
Phleum pratense L.	x	x			x	x			o		x	x	x	
Phragmites australis (Cav.) Trin. ex Steud.		v			o		x	o	x					
Poa compressa L.	o								o	x				
P. nemoralis L.		o							x		x	x	o	
P. palustris L.		o	o		x		x	o						
P. pratensis L.	o	o			o	x			o		x	x	o	
P. trivialis L.	x	x	o		x	x		o	x		v	x	x	
Cyperaceae														
Carex acuta L.	x	o	o		x		x	o			x			
C. arenaria L.	x	x						o		x				
C. cinerea Pollich			o					x			x		o	
C. flava L.		o	o		x		x							
C. nigra (L.) Reichard		o	o		v		x	x			x			
C. panicea L.		o	x		o		x	o			x			
C. pseudocyperus L.			o				x	o			x			
C. scandinavica E.W. Davies			o					o					x	
C. vesicaria L.		o	o				x	o						
Scirpus lacustris L.			x					o						o
Orchidaceae														
Dactylorhiza incarnata (L.) Soo		o	x		x		x	x				x	o	
D. maculata (L.) Soo		x										x	o	
Epipactis palustris (L.) Crantz		o	o				x				x			
E. atrorubens (Hoffm. ex Bernh.) Besser								o		x				

Table 8 List of lichens found in Lubana wetlands complex

Species
Acrocordia gemmata
Anaptychia ciliaris
Arthonia radiata
Arthonia ruanum
Bryoria fuscescens
Calicium viride
Caloplaca flavorubescens
Candelaria pinasin
Cetrelia olivetorum
Cladonia cenotea
Cladonia chlorophaea
Cladonia fimbriata
Cladonia cenotraea
Chrysothrix candelaris
Evernia prunastri
Graphis scripta
Hyphogymnia physodes
Lecanora allophana
Lecanora carpinea

Species
Lecanora rugosella
Leciella euphorea
Lepraria incana
Lobaria pulmonaria
Opegrapha lichenoides
Parmelia ekasperatule
Parmelia v. glabratula
Parmelia olivacea
Parmelia subaurifera
Parmelia sulcata
Peltigera canina
Peltigera polydactula
Pertusaria amara
Pertusaria discoidea
Pertusaria leucostoma
Phlycts argena
Physcia ascendens
Physcia apolia
Physcia stellaris

Species
Physcia tenella
Physconia grisea
Physconia pulverulacea
Platismatia glauca
Pseudevernia furfuracea
Ramalina farinacea
Ramalina fastigiata
Ramalina fraxinea
Ramalina pollinaria
Ramalina roesleri
Usnea filipendula
Usnea hirta
Usnea subfloridiana
Xanthoria parietina

Table 9 List of plants of Lubana wetlands complex

Latine name of spieces	Reference where species were mentioned
Lycopodiaceae	
Diphastrum complonatum (L.) Houlb	*Data base
Thelypteridaceae	
Thelypteris palustris Schott	Pers. dat. B. Bambe
Equisetaceae	
Equisetum arvense L.	Pers. dat. D. Rakvica
E. fluviatile L.	Pers. dat. D. Rakvica
E. palustre L.	Pers. dat. D. Rakvica
E. hyemale L.	Pers. dat. D. Rakvica
E. scirpoides Michx.	Pers. dat. D. Rakvica
Pinaceae	
Picea abies (L.) H. Karst.	Pers. dat. D. Rakvica
Pinus sylvestris L.	Pers. dat. D. Rakvica
Salicaceae	
Populus longifolia Fisch	Pers. dat. D. Rakvica
P. tremula L.	Pers. dat. D. Rakvica
Salix alba L.	Pers. dat. D. Rakvica
S. aurita L.	Pers. dat. D. Rakvica
S. x multinervis Döll	Pers. dat. D. Rakvica
S. caprea L.	Pers. dat. D. Rakvica
S. cinerea L.	Pers. dat. D. Rakvica
S. cinerea x viminalis	Pers. dat. D. Rakvica
S. fragilis L.	Pers. dat. D. Rakvica
S. lapponum L.	Pers. dat. D. Rakvica
S. myrsinifolia Salisb.	Pers. dat. D. Rakvica
S. myrtilloides L.	Pers. dat. D. Rakvica, *Data base, Chorologies
S. pentandra L.	Pers. dat. D. Rakvica
S. phylicifolia L.	Pers. dat. D. Rakvica
S. rosmarinifolia L.	Pers. dat. D. Rakvica
S. triandra L.	Pers. dat. D. Rakvica
S. viminalis L.	Pers. dat. D. Rakvica
Betulaceae	
Alnus glutinosa (L.) Gaertn.	Pers. dat. D. Rakvica
A. incana (L.) Moench	Pers. dat. D. Rakvica
Betula pendula Roth.	Pers. dat. D. Rakvica
B. pubescens Ehrh.	Pers. dat. D. Rakvica
Fagaceae	
Quercus robur L.	Pers. dat. D. Rakvica
Urticaceae	
Urtica dioica L.	Pers. dat. D. Rakvica
Santalaceae	
Thesium alpinum L.	Ramsar convention
Loranthaceae	
Viscum album L.	Pers. dat. D. Rakvica
Polygonaceae	
Polygonum amphybium L.	Pers. dat. D. Rakvica
P. arenastrum Boreau	Pers. dat. D. Rakvica
P. hydropiper L.	Pers. dat. D. Rakvica
P. minus Huds	Pers. dat. D. Rakvica
P. nodosum Pers.	Pers. dat. D. Rakvica
P. persicaria L.	Pers. dat. D. Rakvica
P. scabrum Moench	Pers. dat. D. Rakvica
Rumex acetosa L.	Pers. dat. D. Rakvica
R. acetosella L.	Pers. dat. D. Rakvica
R. confertus Willd.	Pers. dat. D. Rakvica
R. crispus L.	Pers. dat. D. Rakvica
R. longifolius DC.	Pers. dat. D. Rakvica
R. maritimus L.	Pers. dat. D. Rakvica
Caryophyllaceae	
Arenaria procera Spreng	Chorologies
A. serpyllifolia L.	Pers. dat. D. Rakvica
Cerastium arverse L.	Pers. dat. D. Rakvica
C. holosteoides Fr.	Pers. dat. D. Rakvica
C. semidecandrum L.	Pers. dat. D. Rakvica
Dianthus deltoides L.	Pers. dat. D. Rakvica
Lychnis flos-cuculi L.	Pers. dat. D. Rakvica
Melandrium album (Mill.) Garcke	Pers. dat. D. Rakvica
Sagina nodosa (L.) Fenzl	Pers. dat. D. Rakvica
Saponaria officinalis L.	Pers. dat. D. Rakvica
Silene nutans L.	Pers. dat. D. Rakvica
S. vulgaris (Moench) Garcke	Pers. dat. D. Rakvica
Stellaria graminea L.	Pers. dat. D. Rakvica
S. nemorum L.	Pers. dat. D. Rakvica
S. palustris Retz.	Pers. dat. D. Rakvica
Chenopodiaceae	
Chenopodium polyspermum L.	Pers. dat. D. Rakvica
Ranunculaceae	
Aquilegia vulgaris L.	Chorologies
Caltha palustris L.	Pers. dat. D. Rakvica
Pulsatilla patens (L.) Mill.	*Data base, Chorologies
Ranunculus acris L.	Pers. dat. D. Rakvica
R. lingua L.	Pers. dat. D. Rakvica
R. repens L.	Pers. dat. D. Rakvica
R. sceleratus L.	Pers. dat. D. Rakvica
Thalictrum flavum L.	Pers. dat. D. Rakvica
Nymphaeaceae	
Nuphar lutea (L.) Sm.	Pers. dat. L. Engele
Nymphaea alba L.	Chorologies
N. candida C. Presl	Chorologies
N. pumila (timm) DC.	Pers. dat. B. Bambe
Ceratophyllaceae	
Ceratophyllum demersum L.	Pers. dat. D. Rakvica
Guttiferae (Hypericaceae)	
Hypericum perforatum L.	Pers. dat. D. Rakvica
Droseraceae	
Drosera anglica Huds	Pers. dat. B. Bambe
D. rotundifolia L.	Pers. dat. B. Bambe
Brassicaceae	
Berteroa incana (L.) DC.	Pers. dat. D. Rakvica
Capsella bursa - pastoris (L.) Med.	Pers. dat. D. Rakvica
Descurainia sophia (L.) Webb	Pers. dat. D. Rakvica
Erysimum cheiranthoides L.	Pers. dat. D. Rakvica
Raphanus raphanistrum L.	Pers. dat. D. Rakvica
Rorippa amphibia (L.) Besser	Pers. dat. L. Engele
R. palustris (L.) Bess.	Pers. dat. D. Rakvica
Sisymbrium officinale (L.) Scop.	Pers. dat. D. Rakvica
Crassulaceae	
Jovibarba globifera (L.) J. Parn.	*Data base , Chorologies
Sedum acre L.	Pers. dat. D. Rakvica
Saxifragaceae	
Saxifraga granulata L.	Ramsar convention
Parnassiaceae	
Parnassia palustris L.	Pers. dat. D. Rakvica
Rosaceae	
Alchemilla vulgaris L.	Pers. dat. D. Rakvica
Filipendula ulmaria (L.) Maxim.	Pers. dat. D. Rakvica
Fragaria vesca L.	Pers. dat. D. Rakvica
Geum rivale L.	Pers. dat. D. Rakvica
Malus sylvestris (L.) Mill.	Chorologies
Potentilla anserina L.	Pers. dat. D. Rakvica
P. argentea L.	Pers. dat. D. Rakvica
P. norvegica L.	Pers. dat. D. Rakvica
Rubus idaeus L.	Pers. dat. D. Rakvica
R. chamaemorus L.	Pers. dat. B. Bambe
R. nessensis Hall.	Pers. dat. D. Rakvica
Sorbus aucuparia L.	Pers. dat. D. Rakvica
Leguminosae (Fabaceae)	
Anthyllis vulneraria L.	Pers. dat. D. Rakvica
Lathyrus palustris L.	Pers. dat. D. Rakvica
L. pratensis L.	Pers. dat. D. Rakvica
L. sylvestris L.	Pers. dat. D. Rakvica
Lotus corniculatus L.	Pers. dat. D. Rakvica
Medicago lupulina L.	Pers. dat. D. Rakvica
Melilotus albus Medik.	Pers. dat. D. Rakvica
Onobrychis arenaria (Kit.) D.C.	Pers. dat. D. Rakvica
Trifolium arvense L.	Pers. dat. D. Rakvica
T. hybridum L.	Pers. dat. D. Rakvica
T. medium L.	Pers. dat. D. Rakvica
T. montanum L.	Pers. dat. D. Rakvica
T. pratense L.	Pers. dat. D. Rakvica
T. repens L.	Pers. dat. D. Rakvica
Vicia cracca L.	Pers. dat. D. Rakvica
Geraniaceae	
Geranium palustre L.	Pers. dat. D. Rakvica
Rhamnaceae	
Rhamnus cathartica L.	Pers. dat. D. Rakvica
Violaceae	
Viola arvensis Murray	Pers. dat. D. Rakvica

Latine name of spieces	Reference where species were mentioned
V. canina L.	Pers. dat. D. Rakvica
V. persicifolia Schreb.	*Data base
Lythraceae	
Lythrum salicaria L.	Pers. dat. D. Rakvica
Onagraceae	
Chamaenenon angustifolium (L.) Scop.	Pers. dat. D. Rakvica
Epilobium palustre L.	Pers. dat. D. Rakvica
Oenothera biennis L.	Pers. dat. D. Rakvica
O. rubricaulis Kleb	Pers. dat. D. Rakvica
Haloragaceae	
Myriophyllum verticillatum L.	Pers. dat. D. Rakvica, L. Engele
Umbelliferae (Apiaceae)	
Aegopodium podagraria L.	Pers. dat. D. Rakvica
Angelica sylvestris L.	Pers. dat. D. Rakvica
Anthriscus sylvestris (L.) Hoffm.	Pers. dat. D. Rakvica
Cicuta virosa L.	Pers. dat. D. Rakvica
Cnidium dubium (Schkuhr) Thell.	Pers. dat. D. Rakvica, *Data base
Daucus carota L.	Pers. dat. D. Rakvica
Peucedanum oreoselinum (L.) Moench	Pers. dat. D. Rakvica
P. palustre (L.) Moench	Pers. dat. D. Rakvica
Sium latifolium L.	Pers. dat. D. Rakvica
Pyrolaceae	
Pyrola rotundifolia L.	Pers. dat. D. Rakvica
Ericaceae	
Andromeda polifolia L.	Pers. dat. B. Bambe
Calluna vulgaris (L.) Hull	Pers. dat. B. Bambe
Chamaedaphne calyculata (L.) Moench	Pers. dat. B. Bambe
Oxycoccus microcarpus Turz. ex Rupr.	Pers. dat. B. Bambe
Oxycoccus palustris Pers.	Pers. dat. B. Bambe
Primulaceae	
Androsace septentrionalis L.	Pers. dat. D. Rakvica
Lysimachia nummularia L.	Pers. dat. D. Rakvica
L. vulgaris L.	Pers. dat. D. Rakvica
Primula farinosa L.	Ramsar convention
P. veris L.	Pers. dat. D. Rakvica
Gentianaceae	
Gentiana pneumonanthe	Chorologies
Rubiaceae	
Galium album Mill.	Pers. dat. D. Rakvica
G. elongatum C. Presl	Pers. dat. D. Rakvica
G. schultesii Vest	*Data base
G. mollugo L.	Pers. dat. D. Rakvica
G.uliginosum L.	Pers. dat. D. Rakvica
Convolvuaceae	
Calystegia sepium (L.) R. Br.	Pers. dat. D. Rakvica
Convolvus arvensis L.	Pers. dat. D. Rakvica
Boraginaceae	
Anchusa officinalis L.	Pers. dat. D. Rakvica
Echium vulgare L.	Pers. dat. D. Rakvica
Myosotis palustris (L.) L.	Pers. dat. D. Rakvica
Labiatae (Lamiaceae)	
Acinos arvensis (Lam.) Dandy	Pers. dat. D. Rakvica
Galeopsis speciosa Mill	Pers. dat. D. Rakvica
G. tetrahit L.	Pers. dat. D. Rakvica
Lycopus europaeus L.	Pers. dat. D. Rakvica
Mentha arvensis L.	Pers. dat. D. Rakvica
M. x verticillata L.	Pers. dat. D. Rakvica
Origanum vulgare L.	Pers. dat. D. Rakvica
Scutellaria galericulata L.	Pers. dat. D. Rakvica
Stachys palustris L.	Pers. dat. D. Rakvica
Prunella vulgaris L.	Pers. dat. D. Rakvica
Thymus ovatus Mill.	Pers. dat. D. Rakvica
Solanaceae	
Solanum dulcamara L.	Pers. dat. D. Rakvica
Schrophulariaceae	
Euphrasia officinalis L.	Pers. dat. D. Rakvica
Linaria vulgaris Mill.	Pers. dat. D. Rakvica
Odontites vulgaris Moench	Pers. dat. D. Rakvica
Rhinantus minor L.	Pers. dat. D. Rakvica
Rh. serotinus (Schonb.) Oborny	Pers. dat. D. Rakvica
Veronica chamaedrys L.	Pers. dat. D. Rakvica
V. longifolia L.	Pers. dat. D. Rakvica
V. spicata L.	Pers. dat. D. Rakvica
Lentibulariaceae	
Utricularia intermedia Hayne	Pers. dat. B. Bambe
Plantaginaceae	
Plantago lanceolata L.	Pers. dat. D. Rakvica
P. major L.	Pers. dat. D. Rakvica

Latine name of spieces	Reference where species were mentioned
Viburnaceae	
Viburnum opulus L.	Pers. dat. D. Rakvica
Valerianaceae	
Valeriana officinalis L.	Pers. dat. D. Rakvica
Campanulaceae	
Campanula patula L.	Pers. dat. D. Rakvica
C. persicifolia L.	Pers. dat. D. Rakvica
Compositae (Asteraceae)	
Achillea millefolium L.	Pers. dat. D. Rakvica
Anthemis tinctoria L.	Pers. dat. D. Rakvica
Artemisia campestris L.	Pers. dat. D. Rakvica
A. vulgaris L.	Pers. dat. D. Rakvica
Bidens tripartita L.	Pers. dat. D. Rakvica
Carduus crispus L.	Pers. dat. D. Rakvica
Centaurea jacea L.	Pers. dat. D. Rakvica
C. scabiosa L.	Pers. dat. D. Rakvica
Cirsium arvense (L.) Scop.	Pers. dat. D. Rakvica
C. vulgare (Savi.) Ten.	Pers. dat. D. Rakvica
Crepis tectorum L.	Pers. dat. D. Rakvica
Conyza canadensis (L.) Cronquist	Pers. dat. D. Rakvica
Erigeron acris L.	Pers. dat. D. Rakvica
Filaginella uliginosa L. Opiz.	Pers. dat. D. Rakvica
Helichrysum arenarium (L.) Moench	Pers. dat. D. Rakvica
Leontodon autumnalis L.	Pers. dat. D. Rakvica
Lepidotheca suaveolens (Pursh) Nutt	Pers. dat. D. Rakvica
Ligularia sibirica (L.) Cass	Ramsar convention
Pelasites hybridus (L.) P. Gaertn., B.Mey. et Scherb.	Pers. dat. D. Rakvica
Pilosella officinarum F.W. Schultz et Sch. Bip.	Pers. dat. D. Rakvica
P. praealta (Vill. ex Gochnat) F.W. Schultz et Sch. Bip.	Pers. dat. D. Rakvica
Ptarmica cartilaginea (Ledeb ex Rchb.) Ledeb	Pers. dat. D. Rakvica
P. vulgaris Blackw. ex DC.	Pers. dat. D. Rakvica
Senecio fluviatilis Wallr.	Pers. dat. D. Rakvica
S.paludosus L.	Pers. dat. D. Rakvica
Solidago virgaurea L.	Pers. dat. D. Rakvica
Sonchus asper (L.) Hill	Pers. dat. D. Rakvica
S. arvensis L.	Pers. dat. D. Rakvica
S. oleraceus. L.	Pers. dat. D. Rakvica
Tanacetum vulgare L.	Pers. dat. D. Rakvica
Taraxacum erythrospermum Andrz. s.l.	Pers. dat. D. Rakvica
T. officinale F.H. Wigg. s.l.	Pers. dat. D. Rakvica
Tragopogon pratensis L.	Pers. dat. D. Rakvica
Tusillago farfara L.	Pers. dat. D. Rakvica
Alismataceae	
Alisma plantago - aquatica L.	Pers. dat. D. Rakvica
Sagittaria sagittifolia L.	Pers. dat. L. Engele
Butomaceae	
Butomus umbellatus L.	Pers. dat. D. Rakvica
Potamogetonaceae	
Potamogeton lucens L.	Pers. dat. L. Engele
Alliaceae	
Allium ursinum L.	*Data base, Chorologies
Hydrocaritaceae	
Hydrocaris morsus - ranae L.	Pers. dat. L. Engele
Straloides aloides L.	
Potamogetonaceae	
Potamogeton natans L.	Pers. dat. L. Engele
Iridaceae	
Gladiolus imbricatus L.	Chorologies
Iris pseudacorus L.	Pers. dat. D. Rakvica
I. sibirica L.	*Data base
Juncaceae	
Juncus articulatus L.	Pers. dat. D. Rakvica
J. bufonius L.	Pers. dat. D. Rakvica
J. compressus Jacq.	Pers. dat. D. Rakvica
J. effusus L.	Pers. dat. D. Rakvica
J. filiformis L.	Pers. dat. D. Rakvica
J. stygius L.	Chorologies
Graminеae (Poaceae)	
Agrostis tenuis Sibth.	Pers. dat. D. Rakvica
Agrostis canina L.	Pers. dat. D. Rakvica
Alopecurus aequalis Sobol.	Pers. dat. D. Rakvica
A. pratensis L.	Pers. dat. D. Rakvica
Briza media L.	Pers. dat. D. Rakvica
Bromus mollis L.	Pers. dat. D. Rakvica
B. inermis (Leyss.) Holub	Pers. dat. D. Rakvica
Calamagrostis arundinacea (L.) Roth.	Pers. dat. D. Rakvica
C. canescens (Weber) Roth	Pers. dat. D. Rakvica

Latine name of spieces	Reference where species were mentioned
C. epigeios (L.) P. Roth	Pers. dat. D. Rakvica
Cinna latifolia (trevir.) Griseb.	*Data base
Deschampsia caespitosa (L.) Beauv.	Pers. dat. D. Rakvica
Elytrigia repens (L.) Nevski	Pers. dat. D. Rakvica
Festuca pratensis Huds.	Pers. dat. D. Rakvica
F. rubra L.	Pers. dat. D. Rakvica
Glyceria fluitans (L.) R. Br.	Pers. dat. D. Rakvica
G. lithuanica (Gorski) Gorski	*Data base
G. maxima (Hartm.) Holmb.	Pers. dat. D. Rakvica
Hierochloe odorata (L.) P. Beauv.	Pers. dat. D. Rakvica
Holcus lanatus L.	Pers. dat. D. Rakvica
Leersia oryzoides (L.) Sw.	Pers. dat. D. Rakvica
Lerchenfeldia flexuosa (L.) Schur	Pers. dat. D. Rakvica
Lolium perenne L.	Pers. dat. D. Rakvica
Phalaroides arundinaceae (L.) Rauscheri	Pers. dat. D. Rakvica
Phleum pratense L.	Pers. dat. D. Rakvica
Phragmites australis (Cav.) Trin. ex Steud.	Pers. dat. D. Rakvica
Poa compressa L.	Pers. dat. D. Rakvica
P. nemoralis L.	Pers. dat. D. Rakvica
P. palustris L.	Pers. dat. D. Rakvica
P. pratensis L.	Pers. dat. D. Rakvica
P. trivialis L.	Pers. dat. D. Rakvica
Scolochloa festucacea (Willd.) Link	Pers. dat. D. Rakvica
Lemnaceae	
Spirodella polyrhiza (L.) Schleid.	Pers. dat. L. Engele
Sparganiaceae	
Sparganium angustifolium Miex.	Pers. dat. L. Engele
S. microcarpum (Neuman) Raunk.	Pers. dat. L. Engele
Typhaceae	
Typha angustifolia L.	Pers. dat. L. Engele
Cyperaceae	
Carex acuta L.	Pers. dat. D. Rakvica
C. arenaria L.	Pers. dat. D. Rakvica
C. aquatilis Wahlenb.	Pers. dat. D. Rakvica
C. chordorriza Ehrh.	Pers. dat. B. Bambe
C. cinerea Pollich	Pers. dat. D. Rakvica
C. diandra Schrank	Pers. dat. D. Rakvica

Latine name of spieces	Reference where species were mentioned
C. disticha Huds.	Pers. dat. D. Rakvica
C. elata All.	Pers. dat. L. Engele
C. flava L.	Pers. dat. D. Rakvica
C. limosa L.	Pers. dat. B. Bambe
C. nigra (L.) Reichard	Pers. dat. D. Rakvica
C. panicea L.	Pers. dat. D. Rakvica
C. pauciflora Lightf.	Pers. dat. B. Bambe
C. pseudocyperus L.	Pers. dat. D. Rakvica
C. scandinavica E.W. Davies	Pers. dat. D. Rakvica
C. vesicaria L.	Pers. dat. D. Rakvica
Eleocharis palustris (L.) Roem. et Schult.	Pers. dat. L. Engele
Eriophorum gracile W. D. J. Koch	Pers. dat. B.Bambe, *Data base
E. polystachion L.	Pers. dat. B. Bambe
E. vaginatum L.	Pers. dat. B. Bambe
Rhynospora alba (L.) Vahl	Pers. dat. B. Bambe
Scirpus lacustris L.	Pers. dat. D. Rakvica
S. radicans Schkuhr	*Data base
S. sylvaticus L.	Pers. dat. D. Rakvica
Trichophorum cespitosum (L.) Hartm.	Pers. dat. B. Bambe
Orchidaceae	
Cypripedium calceolus L.	Ramsar convention
Dactylorhiza baltica (Klinge) N.I. Orlova	Ramsar convention
D. incarnata (L.) Soo	Pers. dat. D. Rakvica
D. maculata (L.) Soo	Pers. dat. D. Rakvica
Epipactis palustris (L.) Crantz	Pers. dat. D. Rakvica
E. atrorubens (Hoffm. ex Bernh.) Besser	Pers. dat. D. Rakvica
Hammarbya paludosa (L.) Kuntze	Pers.dat. B. Bambe, Chorologies
Liparis loeselii (L.) Rich.	Ramsar convention
Malaxis monophylos (L.) Sw.	Pers. dat. B. Bambe,*Data base, Chorologies
Orchis mascula (L.) L.	*Data base, Chorologies
Platanthera bifolia (L.) Rich.	Pers. dat. B.Bambe

*Data base - "Aizsargajamo augu sugu atradnes Latvijas teritorija (Location of protected plants species in Latvia")
Chorologies - see list of literature - 1980,1981,1986
Ramsar convention - Species of Lubana wetlands complex mentioned in Ramsar convention
Pers. dat. - personal data (notes)

Table 10 List of protected plants of Lubana wetlands

Species	Category	Reference
Carex aquatilis	1	Pers. dat. D. Rakvica, B. Bambe,
Equisetum scirpoides	1	Pers. dat. D. Rakvica
Juncus stygius	1	Chorologics
Lugularia sibirica	1	Ramsar convention
Saxifraga hirculus	1	Ramsar convention
Thesium ebracteatum	1	Ramsar convention
Carex scandinavica	2	Pers. dat. D. Rakvica
Cnidium dubium	2	*Data base, pers. dat. D. Rakvica
Cypripedium calceolus	2	Ramsar convention
Galium schultesii	2	*Data base
Gentiana pneumonanthe	2	Horologijas
Iris sibirica	2	*Datu baze
Onobrychis arenaria	2	Pers. dat. D. Rakvica
Primula farinosa	2	Ramsar convention
Viola persicifolia	2	*Data base
Allium ursinum	3	*Data base, chorologies
Cirsa latifolia	3	*Datu baze
Gladiolus imbricatus	3	Horologijas
Glyceria lithuanica	3	*Datu baze
Hammarbia paludosa	3	Horologijas, pers. dat. B. Bambe
Liparis loeselii	3	Ramsares konvencija
Malaxis monophyllos	3	*Datu baze, horologijas, pers. dat. B. Bambe
Nuphar pumila	3	Pers. dat. B. Bambe
Orchis mascula	3	*Datu baze
Salix myrtilloides	3	*Datu baze, horologijas, Ramsares konvencija, pers. dat B. Bambe, D. Rakvica
Salix phylicifolia	3	Ramsares konvencija, pers. dat. D. Rakvica
Scirpus radicans	3	*Datu baze
Scolochloa festucacea	3	Pers. dat. D. Rakvica
Dactylorhiza baltica	4	Ramsares konvencija
Dactylorhiza incarnata	4	Ramsares konvencija, pers. dat. D. Rakvica
Dactylorhiza maculata	4	Ramsares konvencija, pers. dat. B. Bambe, D. Rakvica
Diphasiastrum complanatum	4	*Datu baze
Platanthere bifolia	4	Pers. dat. B. Bambe
Pulsatilla patens	4	*Datu baze, Horologijas, Ramsares konvercija

Table 11 Location to protected species in Lubana wetlands complex

(Data base "Aizsargajamo augu sugu atradnes Latvijas Republikas teritorija")

Latin name of species	Latvian name of species	Geographical point	Biotope	Grid	Year of finding
Allium ursinum	laksis, mežloks	Forestry of Pededze forest inventory Class I grid 177. , 1., 5. woodlots., left bank of river Liede below "Kaizgrivas".	Big forest	14/48	1991
Cirsa latifolia	platlapu cirsa	4 km to Northwest from Murmastiene, 1 km to East from Verteza lake	Daurlapu kudrenis	17/46	1992
Cnidium dubium	maniga knidija	"Klani" of Lubana to Notheast from the lake	No biotope	17/49	1964
		About 6 km to East form Barkava, left bank of Lisina river labais krasts towards "Jaunzemnieki", "Buzani"	Meadow	17/47	1978
		Southwest bank of Lubana lake, "klani", near river Malmuta	Water-meadow	17/48	1980
		Zvidziens, region of Lina lake	Water-meadow	15/49	1978
		4 - 5 km to West from Lubana lake, meadow situated on the side of canal	Meadow	15/48	1980
		On the bank of Iea, near Berzpils	Water-meadow	15/50	1970
		About 4 km to South form Rubani	Waste land	15/50	1980
		Not far from bridge of river Variene, right bank	River bank	14/50	1980
Diphasiastrum complanatum	parastais plakanstaipeknis	About 20 km to Southeast from Gulbenes, left bank of Balupe	Coniferous forest	13/50	1978
Eriophorum gracile	slaida spilve	13 - 15 km to the South from Lubana, near Klajotne mire	Ditch	15/49	1980
		Klanu forestry, forest inventory Class I grids 47 /48 and 70./71. , 1km to Northeast from Abaine bridge	Ditch, water	15/49	1991
Galium schultesii	Gultesa macara	Oak-growth of Barkava. About 40 m from Lisina	Oak vast forest	17/46	1985
Glyceria lithuonica	Lietuvas udenszale	About 14 km to Northeast from Lubana, on the side of road to Balvi	Vast forest	14/48	1980
		12 km to North from Lubana, near turn to Daukstes	Spruce vast forest	14/48	1980
		12 km to the North from Lubana, Tevabhirzi	Big forest	13/48	1980
Iris sibirica	Sibirijas skalbe	Road Atasiene-Madona, left bank of Aiviekstenear bridge	Meadow	17/47	1980
Jovibarba globifera	ezvagu saulrietenis	Southeast bank of Lubana Lake, Idena hill, slope on the side of the lake	Gravel pit	16/48	1980
Maxalis monophylos	purvaja vienlape	Near Lazdogu Lake	No biotope	13/49	1958
Orchis mascula	Viru dzegužpuke	0.5 - 0.7 km from Mandangu ditch estuary to Liede, 1km form farm ditch of Cepurnieki farm ditch on the left	Meadow	14/48	1991
Pulsatilla patens	meza silpurene	Southeast bank of Lubana lake, hill Idenas	Coniferous forest	17/49	1980
Salix myrtilloides	mellenaju karkls	Surroundings of Berzpils, left bank of river Iea, Northeast part of Salas mire	Transitory mire	16/50	1980
Scirpus radicans	saknejogais meldrs	around Western coast of lakes Zvidziens, Lina	Roadside	15/49	1978
Viola persicifolia		on the left bank of Malta, apm. 1 km to ietekas Lubanas ezera	Transitory mire	17/49	1980
		4 -5 km to West from Lubana lake	Side of dich	16/48	1980
		on the left bank of river Liede, 7 km to North from Lubana	Palienes pkava	14/48	1980
		About 10 km to East from Lubana on the North of Vilku mire	Water-meadow	14/49	1980
		10 - 12 km to East form Lubana, on the roadside	Roadside	15/49	1980
		Near Berzpils. Left bank of river Iea, Northeast part of Salas mire.	Transitory mire	16/50	1980
		About 4 km to SW from Rubani	Bush	15/50	1980
		Left bank of river Variene about 2 km from bridge	Water body	14/50	1980

Table 12 Location of protected and rare plant species in Lubana wetlands complex.

(Chorologies 1980, 1981, 1981, 1986)

Latin name of species	Latvian name of species	Geographical point	Description of areal	Grid	Year of finding
Allium ursinum	Lakšis. mežloks	Bank of river Liede (Mežkli)	Submeridional, temperate, oceanic zone of Europe. Latvia is situated on the Eastern border of areal. It is found seldom in spruce and foliage forests.	14/48	1979,1978
Gentiana pneumonanthe	Tumšzila drudzene	Rugaji	Meridional, submeridional and temperate oceanic zone of Europe, Western Asia. Seldom found in Latvia. mostly in Central and Eastern parts. Grows in wet and marshy meadows, around mires.	13/50	1952
		Gaigalava		16/48	1959
Gladiolus imbricatus	Jumstiņu gladiola	Lubana	Submeridional, temperate, subcontinental zone of Europe. Latvia is situated on the border of Western areal. Seldom found, in wet and marshy meadows, forest meadows, bushes	15/47	1929,1995
		Bank of river Lisina		17/46	1965
Hammarbya paludosa	Purvu surene	Bank of Ica	Temperate and boreal, oceanic zone of Europe, Asia and America. Seldom found in Latvia, in all the territory - in high bogs and marshy meadows.	16/50	1936
Malaxis monophyllos	Purvaju vienlape	Lazdoga lake	Circumpolar species.Can be found in meridional, submeridionas, temperate and boreal suboceanic zone. Seldom found in Latvia in marshy meadows and forests	13/49	1959
Salix myrtilloides	Mellenoju karkls	Lake Prodi,	Submeridional, temperate and boreal zone of continental Eurpe and Siberia.Latvija is situated on the Western border of areal. Can be found seldom, mostly in transitory mires. Often places of location are destroyed by melioration	15/48	1911, 1959
		Zvidziene,		15/49,	1911, 1959
		"Klani" of Berzpils- Ica		15/50	1936, 1955, 1959, 1960
Aquilegia vulgaris	Meža ozolīte	Lubana,	Meridional, submeridional and temperate suboceanic zone of Europe. Seldom found in Latvia, distributed in all the territory of Latvia. Grows in foliage forests and mixed forests, bushes and river hollows. Can be found as ornamental plant isn old parks	15/47	1895
Joviburba sobolifera	Atvaļu saulrietenis	Viesiena	Grows in temperate suboceanic zone of Europe. Latvija is situated on the Northern border of areal. Can be found seldom in dry coniferous forests, hill slopes, cemeteries.	15/49	1952
Malus sylvestris	Meža ābele	Eleonora	Grows in meridional, submeridional un temperate ooceanic zone of Europe. Can be found quite often in all the territory of Latvia, mostly on the banks of lakes and rivers as well as in forests in carbonate and wet mineral soils with anoxic conditions	18/48	1974
Nymphae alba	Balta ūdensroze	Zvidze	Can be found in meridional, submeridional, temperate and boreal (oceanic) zone of Europe. Quite seldom found in Latvoa in rivers and lakes and stagnant water.	15/48	1911
		Malta		17/49	1978,1979
Nymphae candida	Sniegbalta ūdensroze	Old river-bed of Rezekne	Can be found in submeridional. temperate and boreal subcontinental zone of Europe and Northeem Siberia. Often found in Latvia in rivers, lakes and stangnant water.	16/49,	1978,1979,
		Canal Nagli-Makuzi		17/49	1978
Orchis mascula	Vīru dzegužpuķe	Bank of Pededze	Grows in meridional, submeridional and temperate and boreal oceanic zone of Europe. Seldom found in Latvia, mostly in Northern part of the country in wet meadows and forest clearings.	14/48	1977
Pulasatilla patens	Meža silpurene	Valley of Pededze	Found in submeridional, boreal zone of subcontinental Europe and Northern Siberia. In Latvia grows on the border of Northern areal. Seldom met in Latvia, mostly in the Eastern pat of the country.	13/49	1978,1980
Arenaria stenophylla	Marsilu smiltenkte	Bank of river Aviekste	Eurasian species, in Latvia reaches Northwestern border of the areal. Found seldom. Grows in coniferous forests, in sandhill slopes.	15/47	1911
Juncus stygius	Tumšais donis	Salas mire	Circumpolar species, found in temperate and boreal suboceanic zone. Seldom found in Latvia. Grows in grass, transitory and high mires and on the banks of overgrown lakes	14/49 - 50	1938

Table 13 Lichens found in the plots at Pededze river territory

Marks:

x seldom encountered species in the plot
xx common species in the plot
xxx dense population species in the plot

No	Species	Distribution
1	*Acrocordia gemmata*	x
2	*Anaptychia ciliaris*	xx
3	*Arthonia radiata*	x
4	*Arthonia ruanum*	x
5	*Bryoria fuscescens*	x
6	*Calicium viride*	x
7	*Caloplaca flavorubescens*	x
8	*Cetraria pinastri*	x
9	*Cetrelia olivetorum*	x
10	*Cladonia cenotea*	x
11	*Cladonia chlorophaea*	x
12	*Cladonia fimbriata*	x
13	*Cladonia caniocraea*	x
14	*Chrysothrix candelaris*	x
15	*Evernia prunastri*	xx
16	*Graphis scripta*	xx
17	*Hyphogymnia physodes*	xxx
18	*Lecanora allophana*	xx
19	*Lecanora carpinea*	x
20	*Lecanora rugosella*	x
21	*Lecidella euphorea*	xx
22	*Lepraria incana*	xx
23	*Lobaria pulmonaria*	x
24	*Opegrapha lichenoides*	x
25	*Parmelia ekasperatula*	x
26	*Parmelia v. glabratula*	x
27	*Parmelia olivacea*	x
28	*Parmelia subaurifera*	x
29	*Parmelia sulcata*	xxx
30	*Peltigera canina*	x
31	*Peltigera polydactula*	x
32	*Pertusaria amara*	xxx
33	*Pertusaria discoidea*	x
34	*Pertsaria leucostoma*	x
35	*Phlyctis argena*	xx
36	*Physcia ascendens*	x
37	*Physcia aipolia*	x
38	*Physcia stellaris*	x
39	*Physcia tenella*	x
40	*Physconia grisea*	x
41	*Physconia pulverulacea*	x
42	*Platismatia glauca*	xx
43	*Pseudevernia furfuracea*	xx
44	*Ramalina farinacea*	xx
45	*Ramalina fastigiata*	x
46	*Ramalina fraxinea*	x
47	*Ramalina poitinaria*	x
48	*Ramalina roesleri*	x
49	*Usnea filipendula*	x
50	*Usnea hirta*	x
51	*Usnea subfloridiana*	x
52	*Xanthoria parietina*	xx

Table 14 Fungi found in the plots at Pededze river territory

Marks:

x seldom encountered species in the plot
xx common species in the plot
xxx dense population species in the plot

No	Species and substratum	Distribution
	Myxomycota	
1	*Lycogala epidendrum*	
	Fallen Betula sp	xx
2	*Mucilago spongiosa*	
	Fallen Ulmus laevis	xx
	Ascomycota	
3	*Bulgaria inquians*	
	Quercus robur	x
4	*Calycella citrina*	
	Betula sp.	xx
	Fallen P. tremula	xx
	Dying wood	xx
5	*Daldinia concentrica*	
	Alnus incana	x
6	*Diatrypella verrucaeformis*	
	Corylus avellana	xxx
7	*Nectria dalitgena*	
	Fraxinus excelsior	xx
8	*Nectria punicea*	
	Frangula alnus	x
9	*Bjerkandera odusta*	
	Alnus glutinosa	xx
	Betula sp.	xx
	P. tremula	xx
10	*Calocera viscosa*	
	P. tremula	xx
11	*Coprinus micaceus*	
	Betula sp.	xx
	F. excelsior	xx
	P. tremula	xxx
12	*Crepidotus mollis*	
	P. tremula	xx
13	*Daedalea quercina*	
	Quercus robur	x
14	*Datronia mollis*	
	Betula sp.	x
15	*Exidia glandulosa*	
	F. excelsior	xx
16	*Fomes fomentarius*	
	A. glutinosa	xx
	Betula sp.	xx
	P. tremula	xx
	Quercus robur	xx
	U. laevis	xx
17	*Fomitopsis pinicola*	
	A. glutinosa	xx
	A. incana	xx
	Betula sp.	xx
	P. tremula	xx
18	*Ganoderma applanatum*	
	A. glutinosa	xx
	Betula sp.	xx
	P. tremula	xx
19	*Ganoderma lucidum*	
	Quercus robur	x
20	*Hymenochaete rubigmosa*	
	Quercus robur	xxx
21	*Hypholoma fasciculare*	
	Betula sp.	xx
22	*Inonotus obliquus*	
	A. incana	x
	Betula sp.	xx
23	*Inonotus radiatus*	
	A. glutinosa	xxx
	A. incana	xx
	C. avellana	x
24	*Kuhneromyces mutabilis*	
	Betula sp.	xx
25	*Laetiporus sulphureus*	
	P. tremula	x
	Quercus robur	xxx
26	*Lentinus tigrinus*	
	Fallen P. tremula	x
27	*Lycoperdon pyriforme*	
	Quercus robur	xx
28	*Phlebia aurivella*	
	A. glutinosa	x
29	*Phlebia squarrosa*	
	F. excelsior	x
30	*Piptoporus betulinus*	
	Betula sp.	xx
31	*Pluteus atricapillus*	
	Stump of A. glutinosa	xx
	B. pubescens	xx
	P. tremula	xx
32	*Polyporus badius*	
	Dying wood	x
33	*Polyporus squamosus*	
	F. excelsior	x
34	*Steccherinum ochraceum*	
	P. tremula	x
35	Stereum subtomentosum	
	A. glutinosa	xx
	A. incana	xx
36	Trametes hirsuta	
	A. glutinosa	xx
37	Merulius tremellosus	
	Fallen Betula sp	xx
38	Mycena haematopoda	
	A. incana	xx
39	Oligoporus stypticus	
	P. abies	x
40	Phellinus igniarius	
	A. glutinosa	xx
	A. incana	xx
	Betula sp.	xx
41	Phellinus punctatus	
	A. glutinosa	x
	B. pendula	x
	F. excelsior	x
	P. tremula	xx
42	Phellinus robustus	
	Quercus robur	xx
43	Phellinus tremulae	
	P. tremula	xx
44	Trametes versicolor	
	Quercus robur	xx
	U. laevis	xx
45	Tricholomopsis rutilans	
	Dying wood	x
46	Vuilleminia comedens	
	Quercus robur	xx
47	Xylobolus frustulatus	
	Quercus robur	x

Forest ecosystem classification in Latvia

Introduction

Latvia has strong traditions in forest management, and a forest typology system began to be formed at the beginning of the century. In the 1970's, Kaspars Bušs summarised the existing notions on forest growth condition types, in Latvia, and with further extensive research, developed the currently used forest classification system. The presented work is a translation of the forest growth condition type descriptions in Meža ekologija un tipologija [Forest ecology and typology] by Kaspars Bušs (1919-1989), with permission of the publishers.

Forest stand classification in Latvia has a long history from the beginning of this century. The extensive research in this field has led to an ecosystem classification system which forms the basis of forest management. During the years, many modifications to the system have been made, based on the experience of foresters and new research. The currently used typology is that described by Kaspars Bušs, translated in this paper. To develop the classification, K. Buss used data collected from sample plots in 434 dry and 328 wet or drained forest stands, earlier work, surveys by questionnaires to forestry specialists, and the experience of the employs of the Latvian State Melioration Planning Institute. The classification developed by K. Bušs is an every-day tool of foresters in Latvia, and is useful for ecological study.

Due to the long history of forest management and typology in Latvia, common names have been given to the types, c many of which stem from much older folk tradition. Also, latinised names were given for each type, based on the main indicator species.

The described growth condition forest types, divided into five major groups are determined by stand productivity and ecological and biological attributes. Three major groups of natural forest ecosystems are recognized which are defined by water regime, but which obviously also differ in trophic level upland dry forests wet mineral soil forests, and forests on wet peat soil. Due to the large areas of drained forests in Latvia, these forests are treated separately in the typology as two groups: forests on drained mineral soil (arenis) and drained forests on peat soil **(kudrenis).** Each of these five major groups is further subdivided into forest types on the basis of their position along nutrient and species composition gradients. In increasing trophy, the types are arranged within the groups as follows
names are given followed by the Latvian):

NATURAL FORESTS
Upland dry forests.
1. Cladinoso-callunosa. Sils
2. Vacciniosa, Metrajs
3. Myrtillosa, Lans
4. Hylocomiosa, Damaksnis
5. Oxalidosa, Veris
6. Aegopodiosa, Garsa
Wet mineral soil forests.
7. Callunoso-sphagnosa, Grinis
8. Vaccifiioso-sphagnosa, Slapjais metrajs
9. Myrtilloso-sphagnosa, Slapjais damaksnis.
10.Myrtilloso-polytrichosa Slapjais veris
11. Dryopteriosa, Slapja garša
Forests on wet peat soil.
12. Sphagnosa, Purvajs
13. Caricoso-phragmitosa, Niedrajs
14. Dryopterioso-caricosa, Dumbrajs
15. Filipeiidulosa, Liekna

DRAINED FORESTS
Drained forests on mineral soil
16. Callunosa mel,, Viršu arenis
17. Vacciniosa-mel, Metru arenis
18. Myrtillosa-mel., Šaurlapju arenis
19. Mercurialiosa-mel., Platlapju arenis

Forests on drained peat soil
20. Callunosa turf. mel. **Viršu kudrenis**
21. Vacciniosa turf. mel. **Metru kudrenis**
22. Myrtillosa turf. niel., **Šaurlapju kudrenis** ,
23.Oxalidosa turf.mel., **Platlapju kudrenis**

The forest types can be further subdivided into ecosystem types by the dominant tree species, placing the tree name in front of the forest type. An overview of the Latvian typology, in comparison with classifications used elsewhere, is presented by Avis (1997, this issue).
Harijs Bušs (the son of Kaspars Bušs) used principal components analysis of upland and drained forests in order to demonstrate (1977) how these forest types segregate along gradients of vegetation variables (primary axis) and ecosystem variables (secondary axis). A clear separation of these forest types along these gradients was evident.
Explanation of terms:

Bonitate is a forest site index dependent on the size and quality of trees with a range from I (the best and largest) to V (the poorest and smallest).
The "(number of) species recorded" indicates the total number of plant species that have ever been recorded from a particular forest type and that any given type will likely contain a subset of this total number of species.
Plant species terminology follows that used by the author. Soil classification terminology was translated following the / FAO system, and the currently accepted land-form unit / names were used.

NATURAL FORESTS CHARACTERISTICS OF NATURAL UPLAND (DRY) FORESTS
Upland forests occur on mineral soil without excess moisture, including in wet summers. Water percolates well into deeper parent horizons, or flows through upper horizons into depressions.
Groundwater does not enter tree root horizons; soils are well drained, therefore podzolic soils are common. The forest productivity is determined by soil physical and chemical factors, especially the rates of mineral turnover in the organic horizon.
The rates of forest litter accumulation are balanced with the rates of decomposition; a thick layer of humus does not develop. Forest productivity is determined by the soil chemical and physical features. However, tree growth cannot be simply related to soil texture, since very productive stands can occur on sandy soils, and compact clay soils may support only less nutrient-demanding species, such as pine and birch.
The nutrient flows are most important, being formed from inputs from mineral soil and humus decomposition. The organic horizon is of major importance in the typology. Oligotrophic conditions are characterised by low decomposition rates, eutrophic soils by high nutrient turnover rates. Along a trophic gradient from poor to rich, the dry mineral soil growth condition types can be ordered as follows:
Cladinoso-callunosa, Vacciniosa, Myrtillosa, Hylocomiosa, Oxalidosa, and Aegopodiosa.
Principal components analysis well showed the main gradients along which the forest types are segregated (1977). In the two-dimensional ordination, the differences in vegetational composition of the canopy and understorey well differentiate the forest types. The Cladinoso-callunosa, Vacciniosa and Myrtillosa types form a group in which the understorey is dominated by low shrubs (Calluna and Vaccinium), and the soil upper organic layer is acidic fibric humus. Individual stands of one type are quite similar, explaining the tight clusters of points on the ordination. With increased nutrient content of soil and decomposition rate (decreased C/N ratio), the variability between sample plots of a particular type increases. If a specific similarity distance measure was used to differentiate between types, the richer types would be further subdivided, but these subtypes are mostly rare and without practical importance. Examples of such types that are included in the typology are **džsils** and **metrajs.** The **dižsils** type is dinstinct from others (Sarma, 1960), and occurs on the top of the principal components ordination within the **Hylocomiosa** type. Similarly, the **Hylocomiosa** and **Oxalidosa** types, and especially the Aegopodiosa type (Abele, 1963) could be divided into smaller types, but these types would have little practical importance. The recognition of the Myrtillosa type is warranted due to its wide distribution, distinct ecological boundaries, and specific management goals.
The principal components analysis indicates that a transition occurs between types, and hence that unique features do not define the boundaries between types. Rare plants are also not useful for typology, since they usually reflect too specific soil characteristics. Instead, site types are defined by a set of five-eight diagnostic features which include the main characteristics of soil, canopy and understorey. Descriptions of the dry mineral soil types are given below.

Forest ecosystem description

1. Cladinoso-callunosa, Sils

Forests sensitive to disturbance, with dry and poor soil. After fires, they are slow to regenerate and often change co heaths.
Soil: Thin (-3 cm) litter and acidic raw-humus layer with slow mineralisation rates; the organic Ah horizon is shallow and often hard to distinguish from the eluvial E horizon. The illuvial B horizont is reddish with Fe [Al] accumulation. Soil texture is quartz sand with very low amounts of silt. The active tree root system is located mainly in upper soil horizons. In dry summers, a hardpan (ortstein) can form. Deeper soil layers contain pine tap roots.
Canopy: Unproductive bonitate IV-V Pinus sylvestris monocultures. At 100 years, average height is 17 m. Hardwood cultivation for soil improvement is not effective. Tall shrub-sapling layer: Normally this layer is not present. Sometimes Juniperus communis.; or small Picea abies. Herb and moss layer: 50 species recorded. Calluna

vulgaris, Vaccinium vitis-idaea, Fesluca ovina, Arctostaphylos uva-ursi, Vaccinium myrtillosa, Deschampsia flexuosa, Nardus siricta, Carex ericelorum, Koeleria glauca, Hieracium pilosella, and Thymus serpyllum. Good feeding habitats for red deer and roe. Lichens and mosses: Cladonia alperstris, C. sylvatica. C. rangiferina. Cetraria is-landica, Pleurouum schreberi, Hylocomium splendens, Dicranum polysetum, D. scoparium, Polytrichum juniperi num. P. piliferum, and Racomilrium canescens.
Variants: Division into the sub-types Calluna (viršu sils) and lichen (kerpju sils) is not warranted, since these variants are largely duc to management.
Forest renewal: After clearing, berries and bryophytes first disappear. Annual and biennial grasses are not abundant. Gradually heaths invade, especially in burned areas. Tall shrub species do affect successional patterns. Pines regenerate slowly. In ten years only 40 % of the cut area naturally regenerates. Management should avoid birch seeding, which will lead to unproductive stands, an unneeded successional forest, and will enhance a population increase of maybeetles.
Geomorphology: On undulating dune areas (coastal or inland), less common on lowlands with wind-derived sandy soils. Common on the Piejuras (Coastal) Lowland and on the Middle Latvian Dip Plain.

2. Vacciniosa, Metrajs

Forests on fairly poor mineral soil. Fungi, are the main litter and organic matter decomposers; in dry summers, humus decomposition and mineral cycles are slow. In these conditions, the frugal pines are the best adapted and they form a valuable wood crop. A favorite type for mushroom and berry gatherers. The abundant fungal mycelium should be protected. Vaccinium shrubs form productive crops for a few tens of years.
Soil: Litter and raw-humus layers are about 4 cm; mineralisation rates are satisfactory. On higher land relief, the soil horizons are thinner: in hollows and slopes with more water runoff, the soil horizons are thicker and more distinct. Thin Ah, but well defined podzolic E. Reddish B in sand. The soil texture is medium-sized rough quartz sand mixed with a slight silt portion.
Canopy: Pinus sylvestris is dominant and desired. At 100 years, trees are ~20-23 m, bonitate III. Birch and spruce in the overstorey are considered management errors which should be converted to Pinus. Spruce in the subcanopy has little biological or management importance, and hence the enhancement of its growth is not recommended.
Tall shrub-sapling layer: Typically not present but on occasion Juniperus communis and other undemanding species can be found.
Herb and moss layer: 80 species recorded. Mainly Vaccinium vitis-idaea and V. myrtillus, Commonly Calluna vulgaris Festuca ovina, Deschampsia flexuosa, Calamagrostis epigeios. and Maianthemum bifolium. Berries and Calluna form good feeding grounds for red deer and roe. Mosses and lichens include Pleurouum schreberi. Hylocomium splendens, Dicranum polysetum, D. scoparium, Cladonia sylvatica, C. rangiferina, and Polytrichum junipefinum. In urban areas the berries decrease in importance and grami-noids invade.
Forest renewal: After clearcutting, bryophyte and berry cover decreases, while annuals and biennials appear (Chamaenerion angustifolium, Rumex acetosella, and Senecio vulgaris) but do not affect renewal. Calluna increases in abundance. Tall shrubs do not out-compete successional species. A common pioneer tree is birch which, without management, can become dominant occupying ~40 % of the area. Pine planting is required, with thinning.
Geomorphology: Usually on dunes or other sand formations. The relief is typically moderately wavy, less are found on lowlands. Common on the Piejuras (Coastal) Lowland, the Kursa Lowland and the Middle Latvian Dip Plain.

3. Myrtillosa, Lans

Forests of moderately productive pine. Spruce is found in Inc sub-canopy, and in unmanaged stands along with birch. Earlier, forests of the **lans** type were classified as either Vacciniosa or Hylocomiosa types. Forest management defined a requirement for an additional type for these forests, which was confirmed by objective mathematical methods.
Soil: Raw-humus is 4-5 cm thick and loose. Organic litter decomposition is quick and litter is composed of only the last two- to three-year-old remains. Podzolic and sandy soils. Active tree root depth is up to 50 cm deep. A reddish B horizon is often present, sometimes with a clay layer.
Canopy: Vigorous and valuable Pinus sylvestris of bonitate II. At 100 years, trees are 24-27 m. Pine is the management priority. Some mixture with Picea abies is allowed, but not with Betula spp. which decreases stand vigour and quality. Spruce or birch monocultures are management errors. Spruce in the subcanopy will provide additional wood yield. but this causes problems in tending the dominant tree and decreases the overstorey tree growth. Tall shrub-sapling layer: Usually not very dense, often present convnunis, scattered Sorbus aucuparia and Corylus avellana. Herb and moss layer: 100 species recorded. Donunani Vaccinium myrtillus, often Calamagrostis arundinacea, Maianthemum biflorum, Luzula pilosa, Solidago virgauera, V. vitis-idaea, Pteridium aquilinum and Ramischia secunda Bryophytes include Pleurozium schreberi, Hylocomium splendens, Dicranum polysetum, D. scoparium, and Ptilium crista-castrensis.
Forest renewal: After clearing, V. myrtillus and bryophytiy cover decreases. Invading species are Chaemaenerion angustifolium, Senecio vulgaris, Erigeron acris and others. Decomposition of the organic layer is enhanced. Later come grasses such as Deschampsia flexuosa and Calamagrostis arundinacea. Birch is the pioneer tree and without management will cover 50 % of the area. Pine planting is necessary.

Geomorphology: Found mainly in sand deposits of various origin on the Middle Latvian Dip Plain, the Piejuras (Coastal) Lowland and the Kursa Lowland.

4. Hylocomiosa, Damaksnis

Mesotrophic forests where Pinus sylvestris and Picea abies can grow well and be very valuable. The proportions of pine and spruce in the overstorey are determined by long-term climatic changes and by past disturbance. However, pine forms more stable ecosystems. Birch can also be included in management, but aspen (Populus tremula) and white alder (Alnus incana) quality is low. This type has a subgrouping called dižsils, described at the end of this section.

Soil: Thin (-5 cm) forest litter and fibric humus. Deep (to 60 cm) podzolic soils. Soil texture is variable-sand with abundant silt, clay sands and compact clay. High yield pine stands have been described on compact clay soils. Under these same conditions spruce has not perfomed well due to poor aeration (1956).

Canopy: Highly productive, stable, and valuable bonitate I pine. Pine is the management goal. The earlier management recommendation pine mixed with some spruce (Kelers, 1940) is not applicable with this land-type, and lacks a scientific basis. Spruce monocultures can initially produce higher yields, but in older age classes, much natural thinning occurs making the stands risky in management. Mixing with deciduous trees lowers spruce productivity and durability. At 100 years, pine and spruce tree height is 28-33 m. On rotation after a few generations of conifers, a management goal can be birch monocultures to improve the soil nutrient status and for veneer production. Cutting height is 30 m. Birch shoot growth not suggested. Aspen and white alder growth has no ecological or management importance.

Tall shrub-sapling layer: Moderately thick tall shrub layer with Juniperus communis, Corylus avellana, Sorbus aucuparia as well as some Betula spp. and Alnus incana.

Herb and moss layer: 120 species recorded. Dominants include Vaccinium myrtillosa arid often Oxalis acelosella, Ramischia secunda, Pteridium aquilinum, Solidago virgaurea. Maianthemum bifolium. Lazula pilosa. Calamagrostis arundinacea. Rubus saxitilis. Hepatica nobilis. Fragaria vesca, Convallaria majalis. Anemone nemorosa and other mesotrophic species. Moss layer dominated by Hylocomium splendens, Forest renewal: After harvest, Vaccinium myrtillus and other shade tolerant species cover decreases. Annual and biennial herbs appear {Chamaenerion angustifolium, Senecio vulgaris, Erigeron canadensis, Galeopsis tetrahit and G. bifida) for about one to three years. During this time, forest planting should ensue, which must also include management for the eradication of the large pine weevil. Later, grasses invade (Calamagrostis arundinacea), which can slow forest renewal. Corylus avellana can also spread. The majority (-66 %) of the cut area is covered by naturally regenerating birch, followed by aspen (11 %), pine (7 %) and spruce (12 %). The greatest management attention should be paid to pine regeneration, its protection from elk and pest damage, and forest tending.

Geomorphology: Usually found on highlands or mildly undulating topographies, less on moraines and "sandru" (sandy) landscapes. Found on the Eastern Kursa and Northern Kursa Uplands, the Middle Latvian Dip Plain and the Metsepole Plain and Jolumeja Upland.

4.1. Dižsils

Rare and rich forest type with a pine overstorey slightly mixed with deciduous trees. The underslorey is dominated by deciduous trees. This forest type is more common in warmer climates.

Soil: The organic layer is well decomposed humus. The soil is deep and weakly to, less commonly, moderately podzolised. Texture is clay-sand or sandy-clay on a carbonate-rich sandy-clay, clay and, less commonly clay-sand parent horizon.

Canopy: Bonitate I-Ia pine with some oak and-birch. The sub-canopy, contains oaks, maples, elm and ash.

Tall shrub-sapling layer: Shrub layer is thick to moderately thick with Corylus avellana, Frangula alnus, Lomcera xylosteum, Vibernum opulus, Juniperus communis, Sorbus aucuparia and Rhamnus cathartica.

Herb and moss layer: Many herb and grass species and sometimes with berries. Includes Aegopodium podagraria, Veronica officinalis, Mercurialis perennius, Brachypodium sylvaticum, Fragaria vesca, Vaccinium myrtillus, Stellaria media, Carex silvatica. Mosses include Rhytidiadelphus triquetris, Hylocomium splendens, Mnium undulatum, and Rhodobryum roseum.

Forest renewal: Harvested areas are rapidly invaded and pine does not naturally regenerate.

Likely, succession to pine is a very long process. Management should involve planting of pine.

Geomorphology: Found on rich carbonate deposits. Topography is mildly hilly. Found only on the Zemgale Plain.

5. Oxalidosa, Veris

Mesotrophic forests dominated by Picea abies. During succession, P. abies will out-compete other species, forming monocultures. Various aged stands of P. abies on flats are characterised by a single-story structure, since younger trees have good height growth and thus quickly fill in crown gaps.

The competitiveness of spruce in this type has been previously over-rated, since it is very sensitive to environmental factors, including pest invasions, which can quickly reduce its vigour. Due to the perceived importance of spruce monocultures in the typology, the **veris** in practice has been often viewed as a broad type, including some stands with metrajs or garša type growth conditions. Spruce monocultures will form only in stable environmental conditions, with suitable ecological conditions. Highly productive Picea stands with intensive mineral cycles and flows require well aerated soil and active fungal decomposition which occurs in more acidic environments.
Soil: Forest litter and acidic fibric horizon is thin (~5 cm). The humified Ah horizon is well developed, and soil is moderatley podzolised. Texture is clay-sand and sandy-clay, and some clay and water deposited fine sand. No carbonates in parent material.
Canopy: Highly productive bonitae I-Ia Picea abies with average height at 100 years of 30-33 m. Most productive are spruce monocultures. Often is found **veris** with rich mixtures of deciduous trees. Forest managers have found it hard to work with these mixed stands. If the mature aspen and white alder is removed, the left over Picea stand density slides below the critical level, productivity decreases and stands are threatened with windthrows and disease. On the other hand, keeping the deciduous trees until harvest of spruce the quality of the desired wood decreases. Stands mixed with birch, lower the Picea volume and stand durability against wind. Therefore, the management should involve planning from onset, keeping birch and aspen in strips alongside spruce main stands. For the optimum utilisation, these strips need to be rotated to avoid vegetative monoculture effects on the soil.
Birch and aspen dominated **veris** stands are economically worthy and productive. White alder Veris stands are not recommended and should be changed to spruce.
Tall shrub-sapling layer: Due to canopy closure in the spruce stands, understorey growth is suppressed and rare, but if deciduous trees are found in the canopy then the understorey is moderately dense with Sorbus aucuparia, Corylus avellana, Salix caprea and other mesotrophic species. In addition, some birch and white alder may occur as low shrubs.
Herb and moss layer: 180 species recorded. Mainly **Oxalis** acetosella, Reunischia secunda, Melianthemum **bifolium, Ca**-lamagrostis cirundinacea, Vaccinium **myrtillus, Pyrola** rotundifolia, Equisetum sylvaticum, **Convallaria majalis**, Polygonatum multiflorum, **Poa nemoralis. Dfyopteris** spinulosa, Athyrium filix-femina, **Anemone nemorosa** and Rubils scixitilis. The moss layer includes **mainly Hylocomiiun** splendens, Pleurozium **schreberi, Dicranum polystetum** Rhytidicidelphus triquetrus, Polytrichum commune, P. formosum, Plagiochila asplenoides, Brachythacium curtum Mnium affine, M. cuspidatum. Cirriphyllum piliferum, and Eurhynchium striatum Forest renewal: After harvest, the shade tolerant species die out and annuals and biennials invade: Semcio vulgaris, Erigeron canadensis, Guleopsis tetrahit, G. bifida. The raw humus undergoes rapid decomposition. Other species that rapidly spread are Rubus idaeus and, Chamaenerion angustifolia, and graminoid species become dense which slows spruce renewal. Cofylus avellana, Salix spp. and other shrub species may appear.

During natural regeneration, on average, the spruce advance growth will grow to dominate only ~8 % of the cut over areas. Mainly, regeneration consists of birch (71 %), aspen! (19%) and some white alder (2%). Nevertheless, in young deciduous tree stands 2000-6000 small spruce per hectare, are found that are older than the leaf trees. The earlier idea that birch was helpful in spruce renewal by natural seeding was proved to be erroneous. If young spruce are confined, then only at 50 to 70 years do individual spruce break into the overstorey, while most remain in the sub-canopy. In areas where spruce seedling growth is not abundant, the area must be planted.

Geomorphology: Normally found on highlands and undulating moraine landscapes. Some found on alluvial plains. Largest areas are found on the Kursa Uplands, the Vidzeme Upland, and the Middle Latvian Dip Plain.

6. Aegopodiosa, Garša

Forests on moist eutrophic soil with well developed decomposer flora and fauna. Intensive organic litter miner alisation occurs in weakly acidic or neutral environments occurring mainly by bacteria. Very rich in plant species,with variable combinations of tree, shrub, herb and moss species.
A contradiction occurs in that the **Aegopodiosa** type is considered not to be able to produce highly productive and economically valuable tree growth. This can be explained by considering the incompatibility between the tree species and the remaining ecosystem components. The Aegopodiosa evolutionary process has developed hardwood (oak and ash) overstoreys, to which the other ecosystem components have conformed. The past slash-and-bum encroachments, erosion, climatic changes in 15th to 18th centuries, game animal increases and other conditions have caused many permanent changes in the Aegopodiosa structure and function. Ultimately this complicated process has made Aegopodiosa unfit for oak and ash growth while at the same time it has not become a place to cultivate conifers. Additionally, birch species do not invade this type as a pioneer species. Also, the production in this is considered to be poor since the low-productive wet areas are also included in this type.
From the Aegopodiosa type, other types can be further delineated. **Mistrajs** (Ms) contains hardwoods and spruce cannot dominate (Abele, 1963). The mistrajs type is rare and local, and does not require to be included as a separate type. A description follows at the end of this section.

Soil: The top layer is well decomposed humus. The Ah is well defined and some weak podzolisation is observable. The soil is deep (-60 cm) and contains carbonates. The texture is sandy-clay and some clay and some sands rich with alluvial silts. The parent material is typically marl clay.
Canopy: Useful forest types and grown species content depends on the specific conditions. Where hardwoods grow well, it is better to manage for ash and oak, using early thinning cuts and protective measures against animal damage. Oak (Quercus robur) is better used in wind protection bands and forest edges. The very rare linden tree (Tilia cordata) dominated stands should be protected.
Areas with more podzoliscd soil should be managed for spruce. These stands are productive with bonitate I trees. Upper spruce height at 100 years is 28-30 m. Broadleaf tree mixtures with spruce arc not suggested since they aggravate management goal efforts.
Aspen and white alder growth can be used as a management tool in site improvement and are highly productive. Usually these species regenerate naturally. Conversion to other species later is difficult.
The goal species depends on the territorial planning. Picea is not optimal in the majority of the areas, and if used then wind resistant species must be included in strips.
Tall shrubs-saplings: The tall shrub layer is moderately thick or thick, except in the spruce stands. Normally found arc Corylus avellana, Tilia cordata, Sorbus aucuparia, Lonicera xylosteum, Vibemum opulus, Ribes alpinum, Salix caprea, Frangula ainus, and Euonymous europea (E. verru-cosa in the east).
Herb and moss layer: 200 species recorded. Species include Aegopodium podograria, Anemone nemorosa, Stellaria ne-moreum, S. holostea, Asperula odorata, Oxalis actosella, Vicia silvaticei, Lathyrus vernus, Mercurialis perennis, Milium effusum, Convcillaria majcilis, Polygonatum multiflorum, Poa nemoralis, Dryopteris spinulosa, D. phegopteris, Athyrium filix-femina, Paris quadrifolia, Galeobdolon luteum, Mycelis muralis and Jmpatiens noli-tangere. Mosses are not abundant, except in spruce stands. Common species are Rhytidiadelphus triquetrus, Mnium (iffine, M. cuspidatum, M. undulatum, Brachythecium curium, Eurynchium striatum, E. hians, Fissidens taxifolius, Atrlchum undulatum Cirriphylum piliferum and Rhodobryum roseum can be bund.
Forest renewal: Harvested areas quickly cover with herbs, and only later come the grasses. Often spreading are the tall shrubs Corylus aveliana and Salix spp. Of the tree species, white alder regenerates quickly (34 % of the area), with pirch (32 %), aspen (24 %) and less black alder (3 %). Slowly regenerating are ash (5 %) and spruce (2 %), but in he birch and alder stands ash is often mixed in the canopy.
Using thinning cuts, goal canopies can be obtained. Ash management is described in Saksa (1958).
Geomorphology: Found mainly on carbonate containing moraines, rich water lain deposits and river valley slopes.

6.1 Mistrajs

Soil: Organic layer is rich humus and mineral soil contains carbonates. Only slightly eluviated. Texture is sandy-clay and clay.
Canopy: Deciduous trees. Recommended canopies are ash and oak. Also very productive are white alder stands. Common overstorey dominant species are birch and aspen. Type should not be managed for spruce. Tall shrub-sapling layer is dense and similar to Aegopodiosa.
Herb and moss layer: 260 species recorded. Dominated by herbs, often with Brachypodium silveiticum and Rubus cae-sius. Moss layer is rare or absent.
Geomorphology: On rich carbonate water-basin deposits, mainly on the Zemgale Plain.

CHARACTERISTICS OF WET MINERAL SOIL FORESTS

This site type is characterised by wet or moist mineral soil with an unstable water and aeration regime. Without oxygen, mineralisation is hindered and fibric humus accumulates. Soil podzolisation and gleying is well developed
During wet periods, peat accumulates and tree growth slows, while in dry periods, growth increases and peat decomposes. The organic layer is not deeper than 30 cm and tree roots contact mineral soil. Understorey species are characteristic of the beginning stages of paludification. Cutovers and burned areas tend to flood
Natural wet forests are not common since most have been drained at some Lime. Insufficiently drained areas are regarded as wet, and should have adequate drainage systems installed.
The Latvian common names for the types are derived by adding the word "slapjais" [wet] in front of the respective dry site type, excepting the **grinis** wet type. In increasing site productivity, the wet types follow the order: **Callunoso-sphagnosa, Vaccinioso-sphagnosa**, Myrtilloso-**sphagnosa**, **Myrtilloso-polytrichosa** and Dryopteriosa. The ecological and management differences between **Vaccinioso-sphagnosa** and Myrtilloso-sphagnosa are not as large to warrant separation of a **slapjais lans** type (as for the dry sites).

7. Callunoso-sphagnosa, Grinis

Earlier, the **grinis** type described unique forest in the Pavilosta-Sakas area. Sometimes non-forests, such as wet heaths, calcareous meadows, and minerotrophic swamps were also included. In this case, the term **grinis** can only be used for geobotanical study, and not for forest typology.
In forest typology, the Callunoso-sphagnosa type is an ecosystem type, described by Gailis (1956) and a heath grini, and by Zviedris and Matuzanis (1960) as a paludified Cladinoso-caUuiiosa, which can be found throughout Latvia. The Callunoso-sphagnosa type here includes ecosystems with very poor and periodically wet soils.

Soil: Strongly acidic fibric-peat layer formed by Sphagnum spp.. Calluna vulgaris and pine litter. Soil is not well aerated but is strongly podzolic, often with a dense iron layer. The soil is degraded in fires which also hasten paludification. The composition is poor quartz sand.
Canopy: Unproductive and usually sparse bonitate V pine. Birch stands are not valuable.
Tall shrub-sapling layer: Usually not present but Juniperus
communis may occur.
Herb and moss layer: 40 species recorded. Dominated by Calluna vulgaris. Often found are Andromeda polifolia, Drosera rotundifolia, Ledum palustre, Vaccinium uligino-sum, Molinia coerulea, Vaccinium vitis-idaea, Erica tetralix (protected) found in coastal strip in Vergali, but is not a common species of the type. Moss layer contains mainly Sphagnum nemoreum. S. angustifolium, S. compactum, Pleurozium schreberi, Dicranum polysetum. and the lichens Cladonia sylvatica, C. rangiferina, C. deformis and C. alpestris,
Forest renewal: Cutovers and burns are grown over by Calluna which hinders forest regeneration. Birch is the pioneer tree species and regeneration of pine is slow. Planting of pine is suggested only after drainage. Areas should be ploughed and trenched. Initial fertilization is recommended.
Geomorphology: Found mainly on lowlands or periodically wet alluvial quartz sand deposits. Most common on the Piejuras (Coastal) Lowland and in the Kursa Lowland.

8. Vaccinioso-sphagnosa, Slapjais metrajs

Periodically wet and poor sandy soils. Mineralisation is higher in dry periods, but paludification occurs in wet periods.
Before the current division of mineral soil types into dry and wet types, this type was classified as nests, which according to the definition of Zviedrs and Matuzanis (1960) and Sarma (1954), has lost its previous meaning.
Soil: Thin litter layer. 10-30 cm thick fibric layer formed by tree. shrub and Sphagnum litter. Mineral soil is poor. acidic, poorly aerated, and podzolised with a dense iron layer. Parent material is usually sand, uncommonly with a clay layer that inhibits water percolation.
Canopy: Tree growth fluctuates with cyclic meteorological changes. Bonitate IV pine stands are often mixed with Betula pubescens and a spruce subcanopy. Birch stands have little value. Tall shrub-sapling layer.Usually sparse with Juniperus communis, Frangula ainus. Scilix repens and other species tolerant of infertile soils.
Herb and moss layer: 60 species recorded. Commonly
Vacinium vitis-idaea, V. uliginosum, V. myrtillus. Ledum palustre, Calluna vulgaris, Andromeda polifolia, Empetrum nigrum, Carex acuta, Molinia coerulea and C. pauciflora. Mosses include Sphagnum nemoreum, S. russowii, (with much paludification S. angustifolium and. S. magellanicum), Aulacomnium pcilustre, Polytrichum strictum, Pleurozium schreberi, and Cladonia lichens.
Forest renewal: In harvested areas the Calluna and Molina cover increases. Tall shrub species have little importance Birch is the pioneer tree. Natural pine invasion is erratic and slow. Planting of pine is useful only in less paludified areas.
Geomorphology: Found on flat periodically wet sand deposits, and between dunes. Common on the Piejurai (Coastal) Lowland, the Ventas-Usmas Depression, the East Latvian Lowland and the Central Latvia Highland.

9. Myrtilhso-sphagnosa Slapjais damaksnis

Forests on periodically wet mesotrophic soil.
Soil: The organic horizon is 10-30 cm thick fibric humus (formed of tree, berry and Sphagnum litter. The mineral soil is moderately rich, riot well aerated, deeply podzolised and gleyed. The parent material is sand, often with a clay layer, clay-sands or clay.
Canopy: Productivity is much determined by meteorological conditions. Bonitate III pine stands are often fount mixed with birch and in the subcanopy with spruce. Often birch monocultures are found. Wet Picea abies types have regenerated from advance, but they are not recommends they arc neither productive nor stable.
Tall shrub-sapling layer: Shrub layer is sparse to moderate thick. Species include Frangula ainus, Juniperus communis, Salix cinerea and other mesotrophic species.
Herb and moss layer: 100 species recorded. The small shrub and grass layer is dominated by Vaccinium myrtilius Often Molinia coerulea and Vaccinium vitis-idaea, Potentilla erecta Melanopyrum pratense, Deschampsia flexuosi D. caespitosa, Calamagrostis lanceolate Viola palustris Dryopteris cristata and Lysimachia vulgaris. Moss species include Sphagnum girgensohnii, S. nemoreum, Polytrichum commune, Dicranum bonjeanii with much paludification Sphagnum magellanicum), Pleurouum schreberi on hummocks, and Dicranum polysetum.
Forest renewal: In cutovers, the first to decrease in abundance are berries. Invasion by annuals and biennials occurs y including Molinia coerulea and Calamagrostis lanceolata Betula pubescens quickly regenerates as a pioneer. Pint; y regenerate unevenly and slowly. Advance spruce will no form the overstorey. Pine planting is recommended only for less paludified areas.
Geomorphology: Found mainly on periodically wet lowlands, moderately rich, wet sand deposits, in depressions of undulating relief, and some on washed out base moraines. Mainly found in the Vidzeme Upland, the East-Latvian Lowland and the Piejuras (Coastal) Lowland.

10. Myrtilloso-polytrichosa, Slapjais veris

Forests on potentially productive but periodically wet and acidic mineral soil. Paludification vastly decreases soil aeration, and as a result, spruce looses its competitive advantages and the type becomes similar to Myrtilloso-sphasnosa. If changes occur, they are likely to be permanent. In Lithuania, the Myrtilloso-polytrichosa and Myrtilloso-sphagnosa are considered to be one type (dzegužlinu). In Latvia, a separation of the types is apparent due to a large number of forests on the transition from the wet to dry Oxalidosa types. In these less wet areas, spruce maintains its dominance over other trees.

Soil: The organic layer is 10-30 cm of fibric formed from tree and berry litter. The mineral soil is moderately rich, not well aerated, usually strongly gleyed, uncommonly deeply podzolised with a dense iron layer. The parent material is clay-sand, sandy-clay or sand with a clay layer. Carbonates are not present.

Canopy: Spruce stands are of bonitate V, often mixed with birch, less commonly with pine. Black alder is not found in the canopy stands. Birch stands are less productive and of the bonitate III. Aspen and white alder stands have low quality. With increased paludification, swamp birch becomes dominant while spruce forms the subcanopy.

Tall shrub-sapling layer: The shrub layer is sparse to moderately dense. Usually present are Frcingula ainus, Corylus avellana. Sorhus aucuparia, Salix cinerea, Ainus incana and other nutrient demanding species.

Herb and moss layer: 120 species recorded. Vaccinium myriillosa is the dominant low shrub. Often also Equisetum sylvaticum, Deschumpsia fletuosa. D. caespitosa, Culamagrostis lanceolata, Lysimachia vulguris, Pyrola rotundifolia and Crepis paludosa. On hummocks, Rubus saxatilis, Maianthemum bifolium and Lycopodium annotinum are found. Mosses include Sphagnum girgvnsohnii, S. wulfianum, S. quinqefarlum. and Polytrichum commune. With increasing paludification. Sphagnum angustifolium and S. magellanicum are found. Common hummock species are Pleurozium schreberi, Hylocomium splendens, Dicranum polysvtum. D. majus, and Rhytidiadeliphus triquetrus.

Forest renewal: In cutovers, berries decrease in cover, and annuals and biennials invade on soil disturbed by wood harvest. Dominant invading species include Juncus leersii, J. effusus. Carex acuta, Calamagrostis lanceolata and other herbs. Birch regenerates quickly as a pioneer, uncommonly with aspen and white alder. Spruce renews slowly. Spruce planting should be conducted in less paludified areas.

Geomorphology: Found mainly in flats and washed out moraines, less in undulating depressions. Mostly on the Middle Latvian Dip Plain. Melsepole Plain and Joiumeja Upland.

11. Dryopteriosa, Slapja garša

Forests on periodically wet but potentially productive mineral soil. Also includes some wet **mistraji.**

Soil: Organic layer is 10-30 cm thick, and composed of weakly acidic fibric humus formed from mainly leaf tree litter. Mineral soil is rich in nutrients but not well aerated, weakly acidic with deeper layers neutral, gleyed or with thick gley horizon. The parent material is carbonate sandy-clay, clay or rich sand above a clay layer.

Canopy; Usually bonitate II-III birch mixed with spruce, ash and black alder. In areas with calcareous ground water, the canopy contains productive bonitate II ash mixed with black alder.

Tall shrub-sapling layer: Shrub layer is moderately dense or dense with Frangula ainus, Prunus padus, Daphne mezerenum, Ribes nigrum, Rhamnus cathartica and other nutrient demanding species.

Herb and moss layer: 180 species recorded. Community Cirsium oleraceum, Mercurialis peiwnius, Angelica silvestris, Geum rivale, Chrysosplenium alternifolium. Scutellaria galericulata. Caltha palustris, Athyrium filix-femina, Dryopteris spinulosa. D. linnaeana. and under spruce, Vaccinium myrtillus and Oxalis acetosella. Moss layer is scanty (greater coverage under spruce): Calliegonella cuspidata, Climacium dendroides, Mnium cinelidioides. M. seligeri, M. rugicum, Plagiochila asplenioides. Rhytidiadeliphus trignetrus. Sphagnum squarrosum, Calliergon cordifolium and Thuidium tamarscifolium.

Forest renewal: Cuts are densely covered by Juncus leersii. J. effusus, Carex acutiformis. C. caespitosa and herbs. Birch and black alder return quickly but spruce and ash require early tending.

Geomorphology: Found mainly on flats, carbonate moraines and some on alluvial deposits and flood-plains. Found on the Metsepole Plain and the East-Latvian Lowland.

CHARACTERISTICS OF NATURAL FORESTS ON WET PEAT SOIL.

With an increase in paludification, the organic horizon becomes deeper and tree roots do not reach mineral soil. The depth criteria of peat (30 cm) distinguishes peat soils from mineral soils/The major proportion of ecosystem productivity is formed by trees in wet forests. With increased paludification, tree growth slows and forests revert 10 bogs, where an increased role in biomass accumulation is played by moss (for example, in a raised bog, Sphagnum can produce 2-4 t/ha annually). The lowest tree bonitate is V, but in bogs tree productivity is lower and forestry does not occur.

In drier climatic periods, the rate of paludificalion decreases, but, nevertheless, usually continues. Not many natural forests have been left, since most have been drained. In almost all areas the long-term effects of agricultural drainage are observed, and old drainage ditches are common. Insufficiently drained areas are considered natural forests on wet peat soil, although some changes have occurred.

Forest management practices are difficult to conduct in the peat types, since the costs of planting, fertilisation and other activities does not result in a sufficient return in wood yield. Based on the needs of forest management, the

forest typology system has been simplified. The **riests** type (a type similar to Sphagnosa) is no longer a part of the typology, since it lacked importance with the development of the wet mineral soil types. Although KirSteins (1926) emphasised that no major differences between the **Sphagnosa** and the riests type are evident, the **riests** type has still been present in the Latvian typology. The analysis of data collected in forest plots showed the similarity of the two types, and that the distinguishing features lacked relevance (peat depth of 30-50 cm), or that the criteria did not well differentiate the types (peat composition, tree bonitate, species cover). The forest management in both types is also similar.
The forests on wet peat soil include the following types:
Sphagnosa, Caricoso-phragmitosa, Dryopterioso-caricosa and Filipendulosa.

12. Sphagnosa, Purvajs

Oligotrophic forests where the dominating nutrient source is precipitation. With increasing paludification, these forests will become raised bogs.
Soil: Tree root layer contains strongly acidic Sphagnum peat mixed with pine, cotton-grass, and small shrub matter. Charcoal from past burns is often found. Upper organic layer is up to 20 cm thick and composed of Sphagnum,
Canopy: Poor bonitate V pine, sometimes with some swamp birch. Stunted spruce may be found in the sub-canopy.
Tall shrub-sapling layer: Usually absent to sparse with Juniperus communis and Frangula alnus.
Herb and moss layer: 50 species recorded. Dominated by Eriophorum vaginatum, Calluna vulgaris, Ledum palustre, in eastern Latvia Chaemeadaphne calyculata, often Vaccinium uliginosium, Oxycoccus queidripetalus, Ruhus chamaemorus, Andromeda polifolia, Empetrum nigrum, Carex pauciflora, Drosera rotundifolia, and on hummocks, Vaccinium myrtillus. Mosses include the dominant Sphagnum magellanicum and S.angustifolium. Often S. nemoreum, and the occurrence of S. fuscum and S. rubellum indicate a transition to a raised bog. Often also Polytrichum strictum, and on hummocks, Pleurozium schreberi, Dicranum polysetum, and the lichens Cladonia sylvatica, C. rangiferina and C. deformis.
Forest renewal: Cutovers and burned areas cover with Calluna, Pine regenerates in about 76 % of the harvested areas, although slowly and unevenly. More paludified areas turn into raised bogs. Some areas renew with unworthy and unstable swamp birch stands.
Geomorphology: Found at the edges of raised bogs and in poor sandy depressions. Often found on the Piejuras (Coastal) Lowland, the Kursa Lowland, the East-Latvian Lowland and the Middle Latvian Dip Plain.

13. Caricoso-phragmitosa, Niedrajs

Forests on mesotrophic peat soils with some minerotrophic input of nutrients. Increased paludification causes this type to change to a pine swamp. A wide type which can be divided into sub-types for the needs of drainage management, but these are not required to foresters.
Soil: Tree root layer contains moderately decomposed, acidic Carex and tree peat, sometimes mixed with Sphagnum peat. The upper, undecomposed Sphagnum layer is thin. Phragmites peat is found only in deeper layers and easily noted by a sulfurous smell,

Canopy: Most often bonitate IV-V pine or Betula stands, often with spruce in the sub-canopy. White alder does not occur or the stems are weak and stunted. Spruce stands are rare and are the result of advance growth in harvested areas, and they have low productivity.
Tall shrub-sapling layer: Sparse to moderately dense. Often including Frangula alnus, Juniperus communis, Betula humilis, and Salix cinerea.
Herb and moss layer: 150 species recorded. Many sedges (Carex caespitosa, C. globularis, C. acuta, C. chordorrhiza, C. vaginata), Calamagrostis lanceolata, Deschampsia caespitosa, Phragmites australis, Menyanthes trifoliate Comarum palustre, Cirsium palustre, Peucedanum palustre, Pyrola rotundifolia, Dryopteris thelypteris, Angelica silvestris, Lysimachia vulgaris, and on hummocks, Vaccinium myrtiilus, Vaccinium vitis-idaea, Rubus saxatilis, Maianthemum bifolium, Ramischia secunda. Mosses include Sphagnum wamstorfianum, S. magellanicum, S. angustifolium, Calliegonella cuspidata, Mnium pseudopunctatum, M, ruicum, Aulacomnium palustre, and on hummocks. Pleurozium schreberi, Dicranum polysetum, and Hylocomium splendens.
Forest renewal: Harvested areas cover with Carex, Calamagrostis. and herbs. Betula quickly invades (71 %) as does} Pinus (27 %). Much less Picea is found (2 %).

Geomorphology: Found in lowlands, in depressions between rises, at the edges of swamps and on floodplains Most often on the East-Latvian Lowland and Middle Latvian Dip Plain.

14. Dryopterioso-caricosa, Dumbrajs

Forests on potentially productive eutrophic peat soils with minerotrophic nutrient supply. Low productivity is due to high groundwater. With increased paludification, this type will become a grass swamp.

Soil: Tree root horizon consists of well decomposed, acidic tree and sedge peat. The proportion of Sphagnum in the peat is small.
Canopy: Usually bonitate III-IV birch or white alder stands. Sometimes Picea stands or less often spruce mixed into the leaf tree stands in the second story. Ash stands are unproductive. Naturally occurring bonitate I-II forest stands are not found in undrained conditions.
Tall shrub-sapling layer: Shrub layer is moderately dense. Often found are Frangula ainus, Salix cinerea, S. aurita, Prunus padus, and Daphne mezerenum.
Herb and moss layer: 200 species recorded. Many herbs and ferns: Dryopteris spinulosa, D. thelypteris, Athyrium filix-femina. Caltha palustris, Cirsium oleraceum, Lysimachia vulgaris Angelica silvestris, Filipendula ulmairia, Scutellaria galericulata, Carex caespitosa, C. pseudocyperus, Scirpus silvaticus, Circaea alpina, Oxalis acetosella, Vaccinium myrtillus and Maianthemum bifolium. The moss layer is well developed and includes Calliegonella cuspidate Climacium dendroides, Mnium seligeri, M. rugicum, M. cuspidatum, Rhodobryum roseum, Rhytidiadeliphus triquetrus, Hylocomium splendens and Eurhynchium striatum.
Forest renewal: Harvested areas quickly cover with herbs, sedges and Calamagrostis lanceolata. The tree species that renew are birch (70 %), white alder (22 %), spruce (6 %) and others (2 %). In wetter areas, planting is not recommended, management should involve early tending as required.
Geomorphology: Found on lowlands, in depressions of hilly relief and on floodplains. Found on the East-Latvian Lowland and Middle Latvian Dip Plain.

15. Filipendulosa, Liekna

Forests on eutrophic peat soil where calcified groundwater flow is intense and abundant. It has been determined that underground water flow is important in the water budgets of ecosystems where water inputs are not matched by the outputs (for example, to streams). This type is now considered to be broad and includes the highly productive forests on wet peat soil. With paludification this site type changes to a **dumbraji.** Drainage of the **Filipendulosa** type is not recommended, and streams should be protected.
Soil: Well decomposed, weakly acidic tree (black alder, often mixed with birch) peat with some sedge remains. Peat decomposition is enhanced by calcareous groundwater.
Canopy: Highly productive bonitate I-II white alder, often mixed with birch and ash. Birch and ash stand are also productive. Something with a weak spruce understorey.

Tall shrub-sapling layer: Sparse to moderately thick. Rich in species including Frangula ainus, Prunus padus, Ribes nigrum, Daphne meierenum, Salix cinerea, S. pentandra, S. aurita and Vibemum opulus.
Herb and moss layer: 180 species recorded, but microrelief depressions are bare. Dominated by herbs including Filipendula ulmaria, Urtica dioica, Circaea alpina, Lycopus europa, Geum rivale, Paris quadrifolia, Lysimachia vulgaris, Caltha palustris, Stellaria nemorcum. Impatiens nolitangere, Solanum dulcamara, Athyrium filix-femina, Dryopteris spinulosa, D. thelypteris, Cirsium oleraceum, Iris pseudacorus, Chrysosplenium alternifolium and on hummocks. Oxalis acetosella and Rubus idaeus. The moss layer has little cover, but is rich in species: Climacium dendroides Calliergonella cuspidata, Calliergon cordifolium, Mnium rugicum, M, punctatum, Plagiochila asplenioides, and on hummocks, Rhytidiadelphus triquetrus, Hylocomium splendens and Brachythecium curium.
Forest renewal: Cutovers quickly invaded by herbs and raspberries. Birch covers about 69 % of the cut expanse and black alder about 31 %. Management for ash requires early tending, and spruce management is not successful.
Geomorphology: Found where calcium rich groundwater flow exists: in hollows and riparian habitats. Often found in the East-Latvian Lowland, some on the Piejuras (Coastal) Lowland where soil is close to upper Devonian dolomite, and also on the Jolumeja Upland.

DRAINED FORESTS

The goal of drainage is to enhance the nutrient and energy turnover rates in wet forests and bogs. This is achieved by changing the water regime. Systems of installed ditches serve to protect tree roots by preventing the water-logging of soil. When the groundwater level is deeper than that of the ditches, the ditches cease to function. Usually, the groundwater level can be lowered by only 10-20 cm, but this removes the danger to trees of critically high water levels and sharp seasonal groundwater level changes. When the groundwater level approaches the soil surface, the biological effects are more important than for changes in deep groundwater levels. At levels deeper than 0.8 m the effects of groundwater fluctuations are insignificant.
Drainage improves decomposition and mineralisation rates. Tree growth quickly increases, as well as competition between species. Great changes are observed in the composition of the understorey species, which can be explained by competition between species. After drainage, the soil water regime is still suitable for the hydrophillic species. For example, after drainage, the cover of Ledum increases, reducing cover of cranberries and cotton grass. Later, canopy closure will reduce the Ledum cover. The understorey forests composition in productive drained forest is simplified and species richness is lower The increased productivity of drained forests increases the food sourse available to consumer and the fauna becomes richer. Of course, to protect rare and valuable species, reserves require to be planned or drainage planning should leave some areas with higher groundwater levels.

Typically, drainage ditch depth is 1 m. The planning of ditching often involves road building, so intensive forest management can be planned. It is expected that the drained forest area will be similar to that of the wet forest area. Due to the abundance of drained areas in Latvia, the drained forests should be included in the typology. The differences between undrained wet types decrease after drainage causing a need to group some types together. The types were determined using principal component analysis.

CHARACTERISTICS OF FORESTS ON DRAINED MINERAL SOIL (ARENI)

After drainage, the fibric layer begins to decompose. The organic layer is <20 cm thick. Active tree roots are in contact with mineral soil. Podzolisation continues and deeper layers are gleyed. Ditches are usually spaced 200 to 300 m, and non-forested areas should have finer drainage networks planned. Areas with damaged ditches are not considered to be drained.

Earlier typologies attempted to fit these drained types into dry forest categories. This was not suitable since the drained types have large organic reserves that can be utilized in intensive forestry, if needed in plantation type forestry. The shallow groundwater level continues to be important for the ecosystems, and hydrophyllic species are often still dominant. The forcing of the areni types into the dry types has led to forest management maps on which ditch networks seem to be surrounded by dry types. The Areni types require adequate inventory, they must be regularly tended, and the drainage networks require repair and improvement.

16. Callunosa mel., Viršu arenis

Drained forests on poor and fire degraded sand soils. To improve forest productivity, in addition to ditching, often additional techniques such as ploughing and fertilisation are required.

Soil: The organic horizon is 5-20 cm thick with adequately decomposed mesic humus. The soil is highly acidic (pH ~2.9), podzolic and often with a dense iron layer. The parent material is poor quartz sand.

Canopy: Bonitate III pine stands often mixed with birch (50 % of stands). Spruce is absent or stunted. The management goal is pine monoculture.

Tall shrub-sapling layer: Absent or occasional Juniperus communis.

Herb and moss layer: 18 herbaceous species recorded with a total average cover of 33 %. Commonly Calluna vulgaris, Vaccinium vitis-idaea, V. myrtillus, Molinia caerulea. In more sparse forest, Ledum palustre and Andromeda polifolia are present. The moss layer contains ~19 species, mainly composed of Pleurozium schreberi, Dicranum polysetum, and Hylocomium splendens. Some lichens are found, and Sphagnum nemoreum remains for a long time after drainage.

Forest renewal: Annual and biennial grasses expand on worked over soil. Calluna spreads on cutovers. Pines renew slow and unevenly. Pine planting is recommended, and hardwoods are to be used only as fire protection belts.

Pre-drained forest ecosystem type: Originally grinis, poor **slapjais metrajs**, or non-forested Sphagnum-Calluna types.

17. Vacciniosa mel., Metru arenis

Drained forests on oligomesotrophic mineral soils.

Soil: Organic layer is 5-20 cm thick, fibric and satisfactorily decomposed mesic humus. Soil is acidic (pH ~3.2), podzolised, less commonly gleyed, often with an iron layer. The parent material is sand, often with a clay layer.

Canopy: bonitate II pine often mixed with birch (60 % of cases). Spruce in the upper story is rare (8 %), but it is common (83 %) in the sub-canopy. Birch stands are of less quality. The management goal is pine monoculture, but mixture with only a few spruce in the overstorey, or spruce in the sub-canopy, is acceptable.

Tall shrub-sapling layer: Sparse, often (42 %) with Juniperus communis, sometimes (25 %) with Frangula alnus and rarely (12 %) with Salix repens.

Herb and moss layer: 36 herbaceous species recorded with a total average cover of 30 %. Mainly Vaccinium myrtillus, Molinia caerulea, Vaccinium vitis-idaea, Maianthemum bifolium and Ramischia secunda. 20 moss species recorded with a total mean cover of 27 %, mainly containing Pleurozium schreberi, Hylocomium splendens, Dicranum polysetum, D. scoparium, Ptilium crista-castrensis, Polytrichum commune and Sphagnum nemoreum remains for a long time after drainage.

Forest renewal: After harvest, berries are lost, and Chaemaenerion angustifolium and Rumex acetosella invade Faster decomposition rates occur. Grasses become dense (Molinia and others). Pine renews slowly and unevenly Birch renews about 53 % of the harvested area. Pine should be planted, and early tending is required.

Pre-meliorated forest type: Originally Vaccnioso-sphagnosa, or oligotrophic Molinia meadows, or drained riesta types with a thin organic layer.

18. Myrtillosa mel., Šaurlapju arenis

Forests on mesoeutrophic drained mineral soils.

Soil: The organic layer is 5-20 cm thick, composed of a well decomposed mesic humus. The soil is acidic (pH 3.8), gleyed, uncommonly deeply podzolised, with an iron layer! The texture is clay-sand or sandy-clay. The sandier soils of contain a clay layer. The parent material does not contain carbonates.
Canopy: Bonitate I pine stands with variable amounts of spruce. The conifer stands are normally mixed with birch (90 %), less commonly with black alder (12 %). Pine stands have spruce in the subcanopy in 95 % of cases. Satisfactorily productive stands also are formed by birch and aspen. The management goal is pine monoculture, some spruce are allowed. The drainage does not deepen the active root depth (-26 cm), and thus the spruce stands are strongly threatened by wind. The birch mixes with spruce have increased susceptibility to wind damage. Therefore, spruce growth should be grown as large stands, but the spruce should be interspersed with leaf tree strips for wind protection. Spruce can be grown in plantations in this manner.
Tall shrub-sapling layer: Under dense canopies the tall shrub layer is sparse, commonly with Sorbus aucuparia (88 %), Frangula ainus (87 %), some Salix cinerea, Vibernum opulus and Lonicera xylosteum.
Herb and moss layer: 70 herb and low shrub species recorded, with a total mean cover of 30 % composed mainly of Vaccinium myrtillus, Oxalis acetosella, Vaccinium vitis-idaea, Maianthenium bifolium, Rubus saxatilis, Dryopteris spinulosa, Calamagrostis arundinacea C. lanceolata, Anemone nemorosa, and Lycopodium amotinum, For the moss layer, 42 species recorded with a mean cover of 45 %, mostly containing Hylocomium splendens, Pleurozium schreberi, Rhytidiadelphus triquetrus, Brachythecium curium, Dicranum polysetum, D. majus, Cirriphyllum piliferum, Polytrichum communis and Sphagnum girgensohnii.
Forest renewal: Berries reduce in cover in harvested areas, short-term invasion (1-3 years) of Chaemaenerion angustifolia, Senecio vulgaris, Erigeron canadensis, Galeopsis tetrahit. G. bifida, and Rumex acetosa occurs. This period is a good time for planting work. Grasses become dense (Calamagrostis arundinacea, Molinia coerulea typical hummock grasses, and Poa spp.), as well as raspberries. Birch renews quickly (70 % of the cut area), while pine renews slowly and unevenly. Under the tree canopy, good spruce regeneration usually occurs, and it may sometimes be wise to protect this growth, though, management for spruce in large areas is not recommended.
Pro-drained forest type: Originally, **Myrtilloso-sphagnosa**, or Myrtillso-polytrichosa, or some previously unforested wetlands. In the latter case of non-forest wetland conversion, a successional forest is required before the conifers since the ecosystems originally lack the necessary saprotrophs and thus immediate tree growth will not be valuable.

19. Mercurmliosa met, Platlapju arenis

Forests on rich eutrophic drained mineral soil.
Soil: The organic layer is 5-20 cm thick with well decomposed mesic peat. Soil is weakly acidic with a pH of -5.2, with the deeper layers more neutral and usually with a gley horizon. The parent material is of various texture and contains carbonates.
Canopy: The spruce stands are normally of bonitate I-II often (60 % cases) with birch and sometimes (25 %) with white alder. The soil conditions are not ideal for spruce growth. At 50 years, stands begin to thin and become susceptible to wind damage. Spruces can be grown as plantations. High value stands are of ash. In areas where ash regenerates naturally, ash should be the management goal. Black alder mixed with ash is helpful. Birch and aspen stands are sufficiently valuable but not white alder stands.
Tall shrub-sapling layer: Sparse in spruce stands, but moderately dense in deciduous stands. Often found (90 % cases) are Frangula alnus and Sorbus aucuparia, with some Viburnum opulus, Ribes alpinum, Prunus padus and Daphne mezerenum.
Herb and moss layer: The herb layer has mean cover of 36 % (88 species recorded), including Mercurialis perennius, Oxalis acetosella, Carex digitalis, Rubus saxatilis, Convallaria majalis, Galeobdolon luteum, Crepis paludosa, Paris quadrifolia, Athyrium filix-femina, Impatiens nolitangere, Melica nutans, Anemone nemorosa. Lathyrus vernus and in spruce stands also Vaccinium myrtillus. The moss layer cover averages 34 % (50 species recorded) including Rhytidiadelphus triquetrus, Eurhynchium striatum, Plagiochila asplenioides. Brachythecium curium, Mnium seligeri, M. cuspidatum, M, undulatum, and in spruce stands also Hylocomium splendens. and Pleurozium schreberi.
Forest renewal: The pioneer stage of succession after harvest is short-term (1-2 years) and includes dense growth of Cirsium oleraceum, Urtica dioica, Geum rivale, Angelica silvestris, Impatiens nolitangere, Anthriscus silvestris, Juncus spp. and Rubus idaeus. Cuts also cover with shrubs. Regenerating quickly are birch, aspen, black alder and large amounts of advance growth of ash and spruce are found. Early tending is required.
Pre-drained types: Originally **slapja garša** or **slapjais mistrajs,** or rarely from conversion of less productive meadows and carbonate soil types.
CHARACTERISTICS OF FORESTS ON DRAINED PEAT SOIL (K¯ DRENI)
Drained peat layer thickness is 20 cm and active tree roots do not contact mineral soil. The peat layer thickness does not influence plant productivity. Rather, the peat characteristics in tree root horizon and the chemistry of the ground water affect forest growth. Ditches are spaced approximately 100-200 m. Poor types require finer drainage networks. Areas with decrepit drainage systems are considered not drained, and hence not considered here.
Forest ecosystems of these peat soils are classified into four types: **Callunosa** turf. met, Vacciniosa turf. met. Myrtillosa turf. met., and Oxalidosa turf. mel.,

20. Callunosa turf. met., Viršu kudrenis

Forests on poor oligotrophic drained peat soil. Forest productivity improvement requires intensive drainage. Fertilisation is recommended.
Soil: The organic horizon depth is about 24 cm. Peat composition is Sphagnum (60 %), pine (30 %) and cotton-grass (10 %). The degree of decomposition is 20 % (on a 100 % scale) and the pH is -3.0. A charcoal layer is occasionally found.
Canopy: Bontate III pine stands, occasionally (28 %) mixed with birch. Spruce in the sub-canopy is rare and weak. Management goals are pine monocultures.
Tall shrub-sapling layer: Absent or weak Juniperus communis and Frangula alnus present.
Herb and moss layer: Herb layer coverage is 33 % (20 species recorded), mainly Vaccinium vitis-idaea, Calluna vulgaris, Vaccinium myrtillus, Ledum palustre (persists for a long time), Vaccinium uliginosum, Andromeda polifolia, and Eriophorum vaginatum. The moss layer coverage is 31 % (22 species recorded), consisting of Pleurozium sere-hen, Dicranum polysetum, Cladonia silvatica. Sphagnum angustifolium and S. magellanicum,
Forest renewal Berries and Ledum palustre reduce in cover. Annual and biennial graminoids grow only on exposed soil. Pine usually regenerates slowly. Approximately 24 % of the area regenerates as swamp birch.
Pro-drained forest type: Originally **Sphagnosa** and transitional raised bogs with pine. The raised bog types with Sphagnum fuscum types are not useful.

21. Vacciniosa turf., mel. Metru kudrenis

Forests on drained oligomesotrophic peat soils.
Soil: Root depth horizon is about 30 cm. Peat is composed of birch-pine (50 %), Carex (30 %), Eriophorum Sphagnum (20 %), and has an average decomposition degree of 25 % and a pH of -3.4. Peat is covered for a long time with litter composed of mixed Sphagnum leaves needles,
Canopy: Bonitate II pine stands, usually (76 % cases) with birch. Spruce rarely occurs in the overstorey, but is abundant (92 %) in the sub-canopy. The birch stand quality is low. The management goal is pine monocultures. Some mixture with spruce is allowed.
Tall shrub-sapling layer: Saplings are rare. Often (84 % cases) found is Frangula alnus (84 %) less often (28 %) Juniperus communis, Salix repens, S. cinerea and Betula
humilis.
Herb and moss layer: The herb layer cover is about 34 % (45 species recorded) including mainly Vaccinium myrtilius, V. vitis-idaea, Lycopodium annotinum, Melampyrum pratense, Maianthemum bifolium, Luzula pilosa and Ramischia secunda. The moss layer coverage is 37 % (27 species recorded), mainly with Pleurozium schreberi, Hylocomium splendens, Dicranum polysetum, D. scoparium, Ptilium
crista-castrensis. In some areas. Sphagnum magellanicum and S. angustifolium persist for a long time.
Forest renewal: Berries and Lycopodium spp. reduce in cover on harvested areas. Short-term invasions of Chaemaenerion angustifolia, Senecio vulgaris, Galeopsis tetrahit and G. bifida occurs. Grasses become dense (Molinia coerulea, Calamagrostis arundinacea and C. lanceolata). Pine regenerates slowly and unevenly. Birch regeneration is about 46 % of cases. Pine planting is required with early tending.
Pre-drained forest type: Originally from transitional swamp forests and from **niedrajs** type forests with pine growth or rarely from those without pine.

22. Myrtillosa turf, met, Šaurlapju kudrenis

Forests on mesocutrophic drained peat soil. This is a broad type and includes a rare subtype **zalu kudrenis** (drained fen peat forests), described at the end of the section.
Soil: Root horizon average depth is 35 cm. The peat contains tree (70 %), sedge (30 %) and small amounts of Sphagnum. The mean degree of decomposition is 35 % and pH is - 4.6. The Sphagnum cover layer quickly decomposes after drainage.
Canopy: Very productive bonitate I pine and spruce stands. The conifer stands are almost always (91 % cases) mixed with birch. Before drainage, the birch stands are not valuable. but after drainage the value is acceptable. Black alder mixes are rare. The management goal is pine stands, with some spruce mixture allowed. Spruce growth in large expanses is not suggested, except for plantation-type cultivation.
Tall shrub-sapling layer: Moderately thick in pine and birch stands, sparse and weak in spruce stands. Nearly always (98 %) found is Frangula ainus, often with Sorhus aucuparia and Juniperus communis.

Herb and moss layer: The herb layer cover is 24 % (87 spe-f cies recorded) mainly with Vaccinium myrtillus, Oxalis acetosella, Dryopteris spinulosa, Rubus saxatilis, Maianthemum bifolium, Calamagrostis arundinacea, C. lanceolata, Lycopodium annotinum, and Vaccinium vitis-idaea. The moss layer cover is 48 % (60 species recorded), including Hylocomium splendens, Pleurozium schreberi, Dicranum polysetum, D. majus, Rhytidiadelphus triquetrus. Brachythecium curium and Cirriphyllum piliferum,

Forest renewal: Berries reduce in cover on cutovers. Shortterm invaders are Chaemaenerion angustifolium, Senecio vulgaris, Erigeron canadensis, Galeopsis tetrahit, G. bifida, Sonchus oleraceus, Cirsium arvense. This period is good for pine culturing. Grasses become dense including Calamagrostis arundinacea, C. lanceolata, Agropyrum caninum, Poa trivalis, and Festuca rubra and Rubus spp. Birch naturally regenerates (70 % cases), but pine renewal is slow. Spruce advance growth is common, and if not quickly shaded by other growth, it will reach the sub-canopy in deciduous stands.
Pre-drained forest types: Originally **niedrajs,** or potentially productive transitional bogs or fens with a thin sphagnum cover.

22.1. Zalu kudrenis
A relatively rare drained forest subtype dominated by graminoids. Tree root horizon formed from tree and sedge matter with a pH of 5.0. The Sphagnum cover quickly decomposes after drainage. The canopy is bonitate I-II pine stands, usually mixed with spruce» birch and rarely some black alder. First generation birch stands are not valuable. herb layer lacks berries but does have a well developed distributed grass component. Also contains Pyrola roundifolia, Naumburgia thyrsiflora, Cirsium oleraceum, and Angelica silvestris, Cutovers rapidly cover with graminoids. The **zalu kudrenis** type originates mainly from drained floodplain swamps. Conversion to forest can use a successional forest to improve soil fertility; the soil originally lacks the necessary decomposers, especially fungi.

23. Oxalidosa turf., mel. Platlapju kudrenis

Forests on eutrophic rich drained peat soils.
Soil: Root horizon average depth is 36 cm. Peat contains tree (80 %) and sedge (20 %) litter. Average degree of decomposition is 40 % and the pH is -5.1.
Canopy: Bonitate Ia-I spruce stands often mixed with birch ind black alder (64 %) and pine (57 %). The spruce squeezes out other species and achieves very high yields. However, at an age of 50-60 years, the stands thin and weaken. Spruce is desired to be planted in plantation type stands. Highly productive stands are ash, black alder and birch. Aspen stands also have high yields. The management goal is spruce stands, possibly mixed with some pine, with secondary goals as ash, black alder and birch stands.
Subcanopy: Sparse under spruce, but moderately dense under a deciduous canopy. Many species are present including Frangula alnus, Sorbus aucuparia, Salix cinerea, Daphne mezerenum, Ribes nigrum, and Vibernum opulus.
Groundcover: The herb layer cover is 25 % (80 species recorded), mainly Oxalis acetosella, Dryopteris spinulosa, D. linnaeana, D. austriaca, Athyrium filix-femina, Cirsium oleraceum, Convallaria majalis, Circaea alpina, Mycelis muralis, Stellaria nemorum, Crepis paludosa, Urtica dioica, Paris quadrifolia Galeobdolon luteum, Impatiens nolitangere, and under spruce, also Vaccinium myrtillus. The moss layer cover is about 17 % (58 species recorded), including Hylocomium splendens, Rhytidiadelphus triquetrus. Brachythecium curium, Plagiochila asplenioides, Eurhynchium striatum, Cirriphyllum piliferum, and Mnium seligeri and M. cuspidatum.
Forest renewal: Cutovers cover with Urtica dioica, Anthriscus sylvalica, Carduus crispus, Filipendula ulmaria, and grasses, in places with some Rubus idaea, A large role in forest natural regeneration is played by shrubs. Birch quickly renews (71 % of the area) and also black alder (22 %). Much advance growth of spruce and ash is found. Early tending is required.
Pre-drained forest type: Originally Dryopterioso-caricosa or Filipendulosas types, or some other minerotrophic swamps.

Insects

Distriburion of Lepidoptera in the vicinity of Lubana Lake

Introduction

Wet meadows, marshes, swamps and other kinds of wet biotops are strongly declined in Western Europe. Mostly they are destroyed or at least strongly changed. In Latvia such kind of biotop is still quite spread. In the period of very intensific agriculture, when a wide melioration took place, there was also some declining. But the depression in agricalture in early 90-th influenced positively on insect complex of wetlands. Obviously one of the biggest wetland massives in Latvia are situated in the vicinity of Lubana lake.

In despite of that the investigation of the fauna of Lepidoptera in Latvia has very deep traditions the literature data concerning Lepidoptera of vicinity of Lubana lake are very poor. Materials before 1960 are also very poor and consists only of several dosens specimens of mostly Macros in the collections of H.Saar and H.Carlile (coll. Zoological museum of Latvian University). Some finds from the vicinity of Gaigalava were informed by J.Viidalepp in 60-th. Some materials were collected in 1970-80 by Aleksandrs & Ivars Šulcs. They collected some materials in the vicinity of Barkava. From 1980 till 1999 some expeditions were made by the author. His material was collected in the vicinity of Lubana, Nagli, Barkava and valley of Pededze river.

General comment on Lepidoptera in the vicinity of Lubana Lake

The vicinity of Lubana lake has very wide territory of wetlands. Unfortunately it is hard to affirm, that its entomological fauna is investigated satisfactorily. The main investigations took part in: low part of Pededze river, Barkavas oak grove, vicinity of Lubana and fish ponds in the vicinity of Nagli. The first two places seems to be the most important and are worthy of protected territory status.

In whole 1.251 species of *Lepidoptera* were registrated in the region under investigation, that is about 51,8 % from all Lepidoptera fauna of Latvia (2.412 species). The longterm investigations of some protected territories (Slitere and Teici reserves, Kemeri national park, as far as vicinities of Ilgas and Carnikava) indicates, that richness percent of local fauna is about 70 – 75 % of total number. So, investigation of discussed territoty must be continued.

Eight species – *Anchinia daphnella, Agtia tau, Saturnia pavonia, Papilio machaon, Apatura iris, Limenitis populi, Catocala fraxini* and *Callimorpha dominula* – are included in Latvian Red Book (in the list are noted 'LRB'). The indicator species for both - wet meadows and wet forests – are specially noted (see NOTES in the table near each species). A number of species of specific rearity is also specially noted; for such species more detailed information is addused.

Evaluating the investigated places it must be said that the most useful to organize the protection of:

Barkavas oak grove. Besides old oak grove, which is a biotop for some rare *Quercus*-feeding species, many interesting species were found on wet meadows and in the valley of Lisina river. Among them - *Euphydryas maturna* and *E. aurinia* – indiacator species of accordingly wet forests and wet meadows, especially protected species in Western Europe due to strong declining during last 30 years. In Latvia the populations are quite strong, especially in the investigated region. Old spurce and pine forest eastwords towards Lubana lake is the biotop of some species of northern and eastern distribution.

The valley of low part of Pededze river with the bog massives like Vilku and Klajatnes bogs. Old Quercus and Tilia groves are characteristic to the valley of Pededze river; some species like *Arctornis l-nigrum* reach here the northernmost part of their distribution. The find of *Alcis bastelbergeri* here in 1987 was the first in Balticum here. Some glacial relicts (like *Clossiana freija, C. frigga* itc.) are waited in bog massives.

The valley of Icha river. This place was only visited by us; unfortunately investigations were not conducted. Perspective biotops for many rare species.

In the finds of some others rare species it is useful to orginize 'micro protected territories', like *Gypsophyla fastigiata*-population on Nagli-Varaklani road with very interesting xerothermic species complex,

The occurence of Lepidoptera in the vicinity of Lubana Lake

The occurence of Lepidoptera in the table was evaluated according to 3 number scale:

Single specimens (rare) – marked with one asterisk *

Specimens were obtained regulary in some number (quite common) – marked with two asterisks **

Specimens were registrated every year in large number, at least several dosens till hundreds or more specimens (numerous) – marked with three asterisks ***.

Table 15 Destribution of Lepidoptera species

Species	Occur.	Food plant	Biotop	Notes
MICROPTERIGIDAE Micropterix aruncella (Sc., 1763)	***	Probably, mosses	Meadows, forest edges	
aureatella (Sc., 1763)	**	Probably, mossses	Mixed and coniferous forests, bogs	
calthella (L., 1761)	***	Probably, mosses	Meadows, forest edges, scrubs	
mansuetella Z., 1844	*	Probably, mosses	Forests	Indicator species of wet forests
ERIOCRANIIDAE Eriocrania subpurpurella (Hw., 1828)	***	Quercus, mine leafs	Mixed and deciduous forests, parks	
cicatricella (Zett., 1839)	***	Betula, mine leafs	Mixed forests	
semipurpurella (Stph., 1835)	***	Betula, mine leafs	Mixed forests	
HEPIALIDAE Triodia sylvina (L., 1761)	**	Polyphagous on low plants	Meadows, forest edges	
Phymatopus hecta (L., 1758)	**	Low plants	Forest edges	
Hepialus humuli (L., 1758)	**	Polyphagous on low plants	Meadows, gardens	
NEPTICULIDAE Stigmella lapponica (Wck., 1862)	**	Betula	Mixed forests	
tiliae (Frey, 1856)	**	Tilia	Deciduous forests, parks	
betulicola (Stt., 1856)	*	Betula pubescens, B. nana	Bogs, boggy forests	
lutella (Stt., 1857)	*	Betula verrucosa	Forests	
glutinosae (Stt., 1858)	*	Alnus glutinosa	Scrubs, forest edges	
Microtheriella (Stt., 1854)	***	Corylus	Forests	
malella (Stt., 1854)	*	Malus	Gardens	
anomalella (Gz., 1783)	**	Rosa spp.	Forests edges, gardens, parks	
magdalenae (Klim., 1950)	***	Sorbus	Forests	
nylandriella (Tgstr., 1848)	**	Sorbus	Forests	
Oxyacanthella (Stt., 1854)	**	Sorbus, Malus, Crataegus	Gardens, parks, forests	
floslactella (Hw., 1828)	**	Corylus	Forests	
salicis (Stt., 1854)	**	Salix spp.	Forests, scrubs	
myrtillella (Stt., 1857)	**	Vaccinium myrtillus, V. uliginosum	Forests, bogs	
assimilella (Z., 1848)	*	Populus tremula	Forests	
sorbi (Stt., 1861)	***	Sorbus	Forests	
plagicolella (Stt., 1854)	*	Prunus	Gardens	
lemniscella (Z., 1839)	**	Ulmus	Forests, parks	
Splendidissimella (H.-S., 1855)	**	Rubus spp.	Forest edges, scrubs	
pretiosa (Hein., 1862)	*	Geum	Wet meadows	Indicator species of wet meadows
Aeneofasciella (H.-S., 1855)	**	Agrimonia	Meadows	
poterii (Stt., 1857)	**	Rubus chamaemorus, Comarum, Potentilla	Bogs, meadows	
lediella (Schleich, 1867)	**	Ledum	Bogs	
incognitella (H.-S., 1855)	**	Malus	Gardens	
ruficapitella (Hw., 1828)	**	Quercus	Forests	
roborella (Joh., 1971)	*	Quercus	Forests	
Bohemannia pulverosella (Stt., 1849)	*	Malus	Gardens	
Ectoedemia sericopeza (Z., 1839)	**	Acer	Deciduous forests, parks	
weaveri (Stainton, 1855)	*	Vaccinium vitis-idaea	Bogs, heaths, forest edges	
septembrella (Stt., 1849)	**	Hypericum	Meadows	
argyropeza (Z., 1839)	***	Populus tremula	Forests	
albifasciella (Hein., 1871)	*	Quercus	Deciduous forests, parks	
Subbimaculella (Hw., 1828)	*	Quercus	Deciduous forests, parks	
rubivora (Wck., 1860)	**	Rubus saxatilis	Forest edges	
occulella (L., 1767)	**	Betula	Forests	
OPOSTEGIDAE Opostega Salaciella (Tr., 1883)	**	Probably, Rumex spp	Meadows	
Pseudopostega auritella (Hb., 1813)	*	Probably, Lycopus	Wet meadows	Indicator species of wet meadows
crepusculella (Z., 1839)	**	Probably, Mentha sp	Wet meadows	
ADELIDAE Nemophora degeerella (L., 1758)	**	Some low plants	Forest edges, scrubs	
metallica (Poda, 1761)	**	Knautia	Meadows	
Cauchas fibulella (D.& S., 1775)	***	Veronica chamaedris	Meadows	
Nematopogon pilella (D. & S., 1775)	**	?	Bogs, heaths, coniferous forests	
metaxella (Hb., 1813)	**	?	Forests	
swammerdamella (L., 1758)	**	Quercus	Forests	
robertella (Clerck, 1759)	**	?	Coniferous forests	
PRODOXIDAE Lampronia luzella (Hb., 1817)	*	Rubus saxatilis	Forest edges	
corticella (L., 1758)	**	Rubus	Forest edges, gardens	
flavimitrella (Hb., 1817)	**	Rubus spp	Forests, scrubs	
INCURVARIIDAE Alloclemensia mesospilella (H.-S., 1854)	**	Ribes	Forests	Rare species in Latvia, in Barkava oak grove is the richest population in Latvia. 17.06.1980 – numerous spec.

Species	Occur.	Food plant	Biotop	Notes
Incurvaria pectinea Hw., 1828	**	Betula	Forests	
ochlmanniella (Hb., 1796)	**	Vaccinium	Forests	
praelatella (D. & S., 1775)	**	Low plants	Forests	
Phylloporia bistrigella (Hw., 1828)	*	Betula	Forests	
TISCHERIIDAE Tischeria ekebladella (Bjerk., 1795)	***	Quercus	Deciduous forests, parks	
TINEIDAE Haplotinea insectella (F., 1794)	**	Different organic substratum	Different stations	
Montescardia tessulatellus (Lg.& Z., 1846)	**	Fungi and rotten wood	Forests	
Scardia boletella (F., 1794)	**	Fungi	Forests	Indicator species for old forests
Morophaga choragella (D. & S., 1775)	**	Fungi	Forests	
Archinemapogon yildizae Koçak, 1981	**	Fungi	Forests	
Nemaxera betulinella (Payk., 1785)	**	Fungi	Forests	
Nemapogon cloacella (Hw., 1828)	***	Fungi	Forests, gardens, parks also indoors	
variatella (Clem., 1859)	**	Fungi	Forests, gardens, also indoors	
clematella (F., 1781)	*	Fungi	Forests	
picarella (Cl., 1759)	**	Fungi	Forests	
Tinea pellionella L., 1758	*	Organic substratum	Different biotops, but mostly indoors	
steueri G.Pet., 1966	*	Bird nests	Forests	Very rare species!
columbariella Wck., 1877	**	Bird nests	Different biotops	
svenssoni Opheim, 1965	*	Bird nests	Forests, parks, gardens	Very rare species!
semifulvella Hw., 1828	**	Bird nests	Forests, parks, gardens	
trinotella Thnbg., 1794	**	Bird nests	Different stations	
Niditinea fuscella (L., 1758)	**	Different organic substratum	Different stations	
striolella (Mats., 1931)	*	Nests	Forests, parks	
Monopis laevigella (D. & S., 1775)	**	Different organic substratum	Different stations, but mostly synanthropic	
weaverella (Scott, 1858)	**	Nests, animal burrows	Different stations	
spilotella (Tgstr., 1848)	**	Nests, animal burrows	Different stations	
obviella (D.& S., 1775)	*	Different organics	Different stations	
imella (Hb., 1813)	*	Different organics	Different stations	
monachella (Hb., 1796)	**	Different organics	Different stations	
PSYCHIDAE Diplodoma laichartingella (Gz., 1783)	*	Algae, lichenes	Forest edges, walls, stones	
Dahlica triquetrella (Hb., 1813)	**	Algae	Tree trunks, walls	
fumosella (Hein., 1870)	**	Algae	Tree trunks, walls	
charlottae (Meier, 1957)	**	Algae	Tree trunks, walls	
Siederia rupicolella (Sauter, 1954)	*	Algae	Tree trunks, walls	
Taleporia tubulosa (Retz., 1783)	***	Algae	Forests	
Psyche casta (Pall., 1767)	***	Low plants	Meadows, forest edges	
Canephora hirsuta (Poda, 1761)	**	Low plants	Meadows, forest edges	
Sterrhopterix fusca (Hw., 1809)	**	Low plants	Forest edges, bogs	
ROESLERSTAMMIIDAE Roeslerstammia erxlebella (F., 1787)	**	Tilia	Deciduous forests, parks	
BUCCULATRICIDAE Bucculatrix artemisiella H.-S., 1855	***	Artemisia campestris	Meadows, dunes	
bechsteinella (Bechs.& Scharf., 1805)	**	Rosaceae trees and shrubs	Forests, gardens, scrubs	
cidarella (Z., 1839)	*	Alnus glutinosa	Forests	
Cristatella (Z., 1839)	*	Achillea	Meadows	
Demaryella (Dup., 1840)	*	Betula	Forests	
Frangutella (Gz., 1783)	***	Frangula, Rhamnus	Forests, scrubs	
Nigricomella (Z., 1839)	**	Chrysanthemum	Meadows	
Nolteri Petry, 1912	*	Artemisia vulgaris	Meadows	Expansive species last 5 years
Thoracella (Thnbg., 1794)	**	Acer, Tilia, Quercus	Deciduous forests, parks	
GRACILLARIIDAE Parectopa ononidis (Z., 1839)	*	Trifolium, Lotus, Melilotus	Meadows	
Caloptilia alchimiella (Sc., 1763)	*	Quercus	Forests	
Betulicola (M.Her., 1928)	**	Betula	Forests, scrubs	
Elongella (L., 1761)	***	Alnus spp.	Forests, scrubs	
Hemidactylella (D.& S., 1775)	**	Acer	Deciduous forests, parks	
Populetorum (Z., 1839)	*	Betula	Forests, scrubs	
Stigmatella (F., 1781)	***	Salix	Forests, scrubs	
Gracillaria syringella (F., 1794)	***	Fraxinus, Syringa	Forests, gardens, parks	
Aspilapteryx tringipennella (Z., 1839)	**	Plantago	Meadows	
Eucalybites auroguttella (Stph., 1835)	**	Hypericum	Meadows	
Calybites phasianipennella (Hb., 1813)	***	Different low plants	Meadows, scrubs, bogs	
Parornix anglicella (Stt., 1850)	**	Sorbus, Crataegus	Forests, gardens	
Betulae (Stt., 1854)	***	Betula	Forests	
Devoniella (Stt., 1850)	**	Corylus	Forests, gardens	
Scoticella (Stt., 1850)	**	Sorbus	Forests	
Callisto denticulella (Thnbg., 1794)	**	Malus	Gardens	
Phyllonorycter apparella (H.-S., 1855)	*	Populus tremula	Forests	
Blancardella (F., 1781)	***	Malus	Gardens, forests	
Cavella (Z., 1846)	*	Betula	Forests	

Species	Occur.	Food plant	Biotop	Notes
Coryli (Nic., 1851)	**	Corylus	Forests	
Dubitella (H.-S., 1855)	***	Salix spp.	Forests, scrubs	
Emberizaepennella (Bch., 1834)	**	Lonicera, Symphoricarpus	Forests, parks, gardens	
Harrisella (L., 1761)	**	Quercus	Forests, parks	
Heegeriella (Z., 1846)	**	Quercus	Forests, parks	
Hilarella (Zett., 1839)	**	Salix spp.	Forests, scrubs	
Junoniella (Z., 1846)	**	Vaccinium vitis-idaea	Bogs, heaths, forests	
Kleemannella (F., 1781)	*	Alnus glutinosa	Forests	
Platanoidella (Joan., 1920)	***	Acer	Forests, parks	
Quercifoliella (Z., 1839)	**	Quercus	Forests, parks	
Rajella (L., 1758)	**	Alnus glutinosa	Forests, scrubs	
Salictella (Z., 1846)	**	Salix spp.	Forests, scrubs	
Sorbi (Frey, 1855)	**	Sorbus, Padus, Crataegus	Forests, gardens, parks	
Spinicolella (Z., 1846)	**	Prunus, Cerasus	Gardens	
Stettinensis (Nic., 1852)	**	Alnus glutinosa	Forests, scrubs	
Strigulatella (Lg.& Z., 1846)	***	Alnus incana	Forests, scrubs	
Ulmifoliella (Hb., 1817)	***	Betula	Forests	
Vimetorum (Stt., 1854)	*	Salix	Forests, scrubs	
Phyllonistis labyrinthella (Bjerk., 1790)	*	Populus tremula	Forests	
YPONOMEUTIDAE Yponomeuta evonymella (L., 1758)	***	Padus	Forests	
Padella (L., 1758)	**	Rosacea trees and scrubs	Gardens, forests	
Plumbella (D.& S., 1775)	**	Evonymus	Forests	
Swammerdamia caesiella (Hb., 1796)	**	Betula	Forests, bogs	
Compunctella (H.-S., 1855) **Paraswammerdamia** conspersella (Tgstr., 1848)	** **	Sorbus Empetrum nigrum	Forests Bogs, heaths	
Cedestis gysseleniella Z., 1839	**	Pinus	Coniferous forests	
Subfasciella (Stph., 1834)	*	Pinus	Coniferous forests	
Ocnerostoma piniariella Z., 1847	*	Pinus	Coniferous forests	
Friesei Svens., 1966	**	Pinus	Coniferous forests	
Prays fraxinella (Bjerk., 1784)	**	Fraxinus	Forests, parks	
Ruficeps (Hein., 1854)	**	Fraxinus and others trees	Forests, parks	The species' status is unclear
Argyresthia glabratella (Z., 1847)	**	Picea abies	Coniferous forests	
Bergiella (Ratz., 1840)	**	Picea abies	Coniferous forests	
Arcuatella Stt., 1849	**	Juniperus	Coniferous forests	
Brockella (Hb., 1813)	**	Betula	Forests	
Goedartella (L., 1758)	***	Betula, Alnus	Forests, scrubs	
Pygmaeella (D.& S., 1775)	**	Salix	Forests	
Retinella Z., 1839	**	Betula	Forests	
Conjugella Z., 1839	**	Sorbus, Malus	Forests, gardens	
Semifusca (Hw., 1828)	**	Padus	Forests	
Pruniella (Cl., 1759)	**	Prunus, Cerasus	Gardens	
Albistria (Hw., 1828)	**	Prunus	Gardens	
YPSOLOPHIDAE Ypsolopha dentella (F., 1775)	**	Lonicera	Forests, gardens, parks	
Fascella (D.& S., 1775)	**	Lonicera	Forests	
Scabrella (L., 1761)	**	Rosaceae trees and shrubs	Gardens, forests	
Sylvella (L., 1767)	*	Quercus	Forests	
Parenthesella (L., 1761)	**	Trees	Forests	
Ustella (Cl., 1759)	**	Quercus	Forests	
Sequella (Cl., 1759)	**	Trees	Forests, parks	
Ochsenheimeria urella F.v. R., 1842	*	Poaceae	Meadows	
PLUTELLIDAE Plutella xylostella (L., 1758)	***	Brassicaceae	Almost all kinds of biotops	
Porrectella (L., 1758)	*	Brassicaceae	Meadows, gardens	
Eidophasia messingiella (F.v. R., 1840)	**	Cardamine	Meadows	
ACROLEPIIDAE Acrolepiopsis assectella (Z., 1839)	*	Allium	Gardens	
Acrolepia autumnitella Curt., 1838	**	Solanum dulcamara	Meadows, forest edges, fens	Indicator species of wet meadows
GLYPHIPTERIGIDAE Glyphipterix thrasonella (Sc., 1763)	***	Juncus	Wet meadows	
Bergstraesserella (F., 1781)	**	Luzula	Forests	
Equitella (Sc., 1763)	***	Sedum acre	Dry meadows, dunes	
Haworthiana (Stph., 1834)	**	Eriophorum	Bogs	
Forsterella (F., 1781)	***	Carex	Meadows	
Simpliciella (Stph., 1834)	***	Deschampsia caespitosa	Meadows	
LYONETIIDAE Leucoptera lustratella (H.-S., 1855)	*	Hypericum	Meadows	
Sinuella (Rtz., 1853)	*	Populus tremula	Forests	
Lyonetia clerkella (L., 1758)	***	Malus, Padus, Sorbus, Crataegus, Ulmus, Betula	Forests, gardens, parks	
Ledi Wck., 1859	**	Ledum	Bogs	
ETHMIIDAE Ethmia quadrillella (Gz., 1783)	*	Pulmonaria	Forests	
DEPRESSARIIDAE Semioscopis avellanella (Hb., 1793)	***	Betula	Forests, scrubs, parks	
Oculella (Thnbg., 1794)	**	Betula	Forests	
Steinkellneriana (D.& S., 1775)	**	Sorbus	Forests	

Species	Occur.	Food plant	Biotop	Notes
Strigulana (F., 1787)	**	Populus tremula	Forests	
Exaeretia allisella Stt., 1849	**	Artemisia vulgaris	Dry meadows	
Agonopterix ocellana (F., 1775)	**	Salix spp.	Forests, scrubs	
Ciliella (Stt., 1849)	**	Apiaceae	Meadows, forest edges	
Arenella (D.& S., 1775)	**	Cirsium, Cardus	Meadows, gardens	
Propinquella (Tr., 1835)	**		Meadows	
Heracliana (L., 1758)	***	Apiaceae	Meadows, gardens, forests, parks	
Angelicella (Hb., 1813)	**	Angelica	Meadows	
Selini (Hein., 1870)	**	Peucedanum palustre	Wet meadows	Indicator species of wet meadows
Kaekeritziana (L., 1767)	**	Centaurea jacea	Meadows	
Liturosa (Hw., 1811)	**	Hypericum	Meadows	
Nervosa (Hw., 1811)	*	Lupinus	Meadows	
Depressaria pastinacella (Dup., 1838)	**	Apiaceae	Meadows	
Depressana (F., 1775)	**	Apiaceae	Meadows	
Pimpinellae Z., 1839	**	Pimpinella	Meadows	
Daucella (D.& S., 1775)		Hydrophylous Apiaceae		
Sordidatella Tgstr., 1848	**	Apiaceae	Meadows	
Pulcherrimella Stt., 1849	**	Apiaceae	Meadows	
Emeritella Stt., 1849	*	Tanacetum	Meadows	
Ocellella Z., 1854	**	Achillea	Meadows	
Leucocephala Snell., 1884	*	Artemisia vulgaris	Meadows	
ELACHISTIDAE Cosmiotes freyerella (Hb., 1825)	**	Poaceae	Meadows	
Perittia herrichiella (H.-S., 1855)	**	Lonicera xylosteum	Forests	
Elachista adscitella Stt., 1851	**	Poaceae	Forests	
Albidella Nyl., 1848	***	Eriophorum	Bogs, wet meadows	
Albifrontella (Hb., 1817)	***	Poaceae	Forests	
Alpinella Stt., 1854	**	Poaceae	Forests, meadows	
Apicipunctella Stt., 1849	*	Poaceae	meadows, forest edges	
Argentella (Cl., 1759)	***	Poaceae	Meadows	
Bisulcella (Dup., 1843)	**	Poaceae	Meadows	
Canapennella (Hb., 1813)	***	Poaceae	Meadows, forests	
Dispilella Z., 1839	*	Festuca ovina	Dry meadows, coniferous forests	
Gleichenella (F., 1781)	*	Luzula, Poaceae	Forests	
Humilis Z., 1850	**	Poaceaea	Meadows, forests	
Luticomella Z., 1839	**	Poaceae	Meadows	
Monosemiella Rssl., 1881	***	Poaceae	Meadows	
Pollinariella Z., 1839	***	Festuca ovina	Meadows	
Pomerana Frey, 1870	**	Poaceae	Meadows	
Pullicomella Z., 1839	**	Poaceae	Meadows	
Serricornis Stt., 1854	*	Carex	Wet meadows, bogs	Indicator species of wet meadows
Subalbidella Schl., 1847	**	Poaceae	Meadows forests	
Subnigrella Dgl., 1843	**	Poaceae	Meadows	
Utonella Frey, 1856	**	Carex spp	Wet meadows	Indicator species of wet meadows
AGONOXENIDAE Blastodacna atra (Hw., 1828)	**	Malus	Gardens	
SCYTHRIDIDAE Scythris inspersella (Hb., 1817)	**	Chamaenerium angustifolium	Dry meadows, heaths, forest edges	
CHIMABACHIDAE Diurnea fagella (D.& S., 1775)	**	Trees	Forests	
Lipsiella (D.& S., 1775)	**	Quercus	Forests	
OECOPHORIDAE Denisia similella (Hb., 1796)	**	Rotten wood	Forests	
stipella (L., 1758)	**	Rotten wood	Forests	
Borkhausenia minutella (L., 1758)	**	Detrit	Forests, gardens	
fuscescens (Hw., 1828)	**	Detrit	Different biotops	
Pleurota bicostella (Cl., 1759)	***	Calluna vulgaris	Bogs, heaths	
Cephalispheira ferrugella (D.& S., 1775)	**	Campanula	Forest edges	
Stathmopoda pedella (L., 1761)	**	Alnus	Forests	
BATRACHEDRIDAE Batrachedra praeangusta (Hw., 1828)	***	Salix spp., Populus tremula	Forests	
pinicolella (Z., 1839)	**	Picea, Pinus, Juniperus	Coniferous forests	
COLEOPHORIDAE Coleophora				
flavipennella (Dup., 1843)	*	Quercus	Forests, parks	
milvipennis Z., 1839	**	Betula, Corylus	Forests, bogs, scrubs	
alnifoliae Bar., 1934	**	Alnus spp	Forests, scrubs	
serratella (L., 1761)	***	Betula, Alnus, Corylus	Forests, scrubs	
spinella (Schrek., 1802)	**	Sorbus, Malus, Prunus	Forests, gardens	
lusciniaepennella (Tr., 1833)	***	Salix, Myrica	Forest edges, scrubs	
vaccinella H.-S., 1861	*	Vaccinium	Bogs	
ledi Stt., 1860	**	Ledum	Bogs	
violacea (Ström, 1783)	**	Some trees	Forests	
potentillae Elisch., 1885	*	Rubus	Forest edges, scrubs, meadows	
juncicolella Stt., 1851	**	Calluna vulgaris	Bogs, heaths	
orbitella Z., 1849	**	Betula	Forests	

Species	Occur.	Food plant	Biotop	Notes
binderella (Koll., 1832)	**	Alnus	Forests	
albitarsella Z., 1849	*	Mentha, Origanum, Glechoma	Meadows	
trifolii (Curt., 1832)	**	Melilotus	Meadows	
alcyonipennella (Koll., 1832)	**	Probably, Trifolium	Meadows	
deauratella (Lg & Z., 1846)	**	Probably, Trifolium	Meadows	
mayrella (Hb., 1813)	**	Trifolium	Meadows	
albidella (D.& S., 1775)	**	Salix spp.	Forests, scrubs	
betulella Hein., 1876	**	Betula	Forests	
brevipalpella Wck., 1874	*	Centaurea	Meadows	
laricella (Hb., 1817)	***	Larix	Parks	
antennariella H.-S., 1861	**	Luzula	Forests	
caespiticiella Z., 1839	***	Juncus	Meadows, forests	
glaucicolella Wood, 1892	***	Juncus	Meadows	
oxidipennella (Hb., 1817)	***	Luzula	Meadows	
alticolella Z., 1849	***	Juncus	Meadows, forests	
taeniipennella H.-S., 1855	**	Juncus	Meadows	
lassella Stgr., 1859	*	Juncus	Meadows	Indicator species of wet meadows; very rare species, only 2 spec. are known in Latvia
obscurella H.-S., 1855	***	Solidago	Meadows	
therinella Tgstr., 1848	**	Polygonum	Meadows	
sternipennella (Zett., 1839)	**	Atriplex, Chenopodium	Meadows	
versurella Z., 1849	***	Atriplex, Chenopodium	Meadows	
vestianella (L., 1758)	**	Atriplex, Chenopodium	Meadows	
artemisicolella Brd., 1855	**	Artemisia vulgaris	Meadows	
gnaphalii Z., 1839	*	Helichrysum	Meadows	
peribenanderi Toll, 1948	**	Cirsium, Cardus	Meadows	
trochilella (Dup., 1843)	***	Achillea, Artemisia spp.	Meadows	
striatipennella Nyl., 1848	***	Cerastium, Stellaria	Meadows	
tanaceti Mühl., 1865	**	Tanacetum	Meadows	
artemisiella Scott, 1861	*	Artemisia campestris	Meadows	
argentula (Stph., 1834)	***	Achillea	Meadows	
granulatella Z., 1849	*	Artemisia campestris	Meadows	
nutantella Müll.& Frey, 1857	**	Silene nutans	Dry meadows	
paripennella Z., 1839	**	Centaurea, Cirsium, Arctium	Meadows	
niveistrigella Wck., 1876	*	Gypsophyla fastigiata	Meadows	Very rare species in Latvia
MOMPHIIDAE Mompha locupletella (D.& S., 1775)	**	Epilobium spp.	Meadows	
raschkiella (Z., 1838)	**	Chaemenerion angustifolium	Forest edges, heaths	
sturnipennella (Tr., 1833)	*	Chaemenerion angustifolium	Forest edges, heaths	
epilobiella (D.& S., 1775)	**	Epilobium spp.	Meadows	
BLASTOBASIDAE Hypatopa binotella (Thnbg., 1794)	**	Fallen rotten needles	Coniferous forests	
AMPHISBATIDAE Pseudatemelia josephinae (Toll, 1956)	**	Detrit	Forests	
Hypercallia citrinalis (Sc., 1763)	**	Polygala	Meadows	
Anchinia daphnella (D.& S., 1775)	**	Daphne mesereum	Forests	LRB! Indicator species of old forests
COSMOPTERIGIDAE Limnaecia phragmitella Stt., 1851	**	Typha	Banks, wet meadows, fens	
GELECHIIDAE Aristotelia ericinella (Z., 1839)	**	Calluna vulgaris	Heaths, bogs	
Isophrictis striatella (D.& S., 1775)	**	Tanacetum	Meadows	
Metzneria lappella (L., 1758)	**	Arctium	Meadows	
metzneriella (Stt., 1851)	**	Centaurea jacea	Meadows	
aprilella (H.-S., 1854)	**	Centaurea scabiosa	Meadows	
Monochroa cytisella (Curt., 1837)	**	Ferns	Forests	
terebrella (Hb., 1817)	**	Rumex	Meadows	
servella (Zeller, 1839)	**	Primula	Meadows	
conspersella (H.-S., 1854)	**	Lysimachia	Meadows	Indicator species of wet meadows
elongella (Hein., 1870)	**	Probably, Filipendula	Meadows	
lutulentella (Z., 1839)	**	Filipendula ulmaria	Meadows	
simplicella (Lg. & Z., 1846)	*	Not known	Meadows	Indicator species of wet meadows
Eulamprotes wilkella (L., 1758)	**	Probably, mosses	Meadows	
unicolorella (Dup., 1843)	**	Probably, mosses	Meadows	
atrella (D.& S., 1775)	**	Hypericum	Meadows	
Bryotropha terrella (D.& S., 1775)	***	Mosses	Meadows	
plantariella (Tgstr., 1848)	*	Mosses	Wet meadows, bogs	Indicator species of wet meadows
senectella (Z., 1839)	***	Mosses	Meadows	
similis (Stt., 1854)	***	Mosses	Meadows	
Recurvaria leucatella (Cl., 1759)	**	Sorbus	Forests	
Exoteleia codecella (L., 1758)	***	Pinus	Coniferous forests	
Stenolechia gemmella (L., 1758)	*	Quercus	Deciduous forests, parks	
Teleiodes luculella (Hb., 1813)	*	Quercus	Deciduous forests, parks	

Species	Occur.	Food plant	Biotop	Notes
fugitivella (Z., 1839)	**	Acer, Tilia, Ulmus	Forests, parks	
alburnella (Z., 1839)	**	Betula	Forests	
notatella (Hb., 1813)	**	Salix spp.	Forests, scrubs	
proximella (Hb., 1796)	***	Betula	Forests	
paripunctella (Thnbg., 1794)	**	Betula	Forests	
Teleiopsis diffinis (Hw., 1828)	**	Rumex	Meadows	
Gelechia rhombella (D.& S., 1775)	**	Malus, Sorbus	Gardens, forests	
sororculella (Hb., 1817)	**	Salix caprea	Forests	
muscosella Z., 1839	**	Salix spp	Forests, scrubs	
Psoricoptera gibbosella (Z., 1839)	**	Quercus	Forests	
Chionodes luctuella (Hb., 1793)	**	Lichenes	Spurce forests	
distinctella (Z., 1839)	**	Low plants	Heaths, dry meadows	
electella (Z., 1839)	**	Juniperus, Picea	Coniferous forests	
fumatella (Dgl., 1850)	**	Mosses, lichenes	Dunes, dry forests	
Aroga velocella (Z., 1839)	**	Rumex	Meadows	
Neofriseria peliella (Tr., 1835)	**	Rumex	Meadows	
Prolita sexpunctella (F., 1794)	***	Mosses ?	Bogs	
Athrips prunosella (Lg.& Z., 1846)	**	Vaccinium uliginosum	Bogs	
mouffetella (L., 1758)	**	Lonicera	Forests, gardens	
Scrobipalpa acuminatella (Sirc., 1850)	**	Cirsium	Meadows	
atriplicella (F.v.R., 1841)	**	Atriplex, Chenopodium	Meadows	
Scrobipalpula psilella (H.-S., 1854)	**	Artemisia campestris	Dry meadows, dunes	
Caryocolum fischerella (Tr., 1833)	**	Saponaria	Meadows	
cassella (Walk., 1864)	**	Stellaria nemorum	Forests	
Sophronia semicostella (Hb., 1813)	**	Anthoxanthum odoratum	Meadows	
scutellus (Z., 1839)	**	Achillea millefolium	Meadows	
Syncopacma cinctella (Cl., 1759)	**	Lotus,	Meadows	
Aprocrema anthylidella (Hb., 1813)	**	Fabaceae	Meadows	
Anacampsis populella (Cl., 1759)	***	Salix spp., Populus tremula	Forests, scrubs	
blattariella (Hb., 1796)	**	Betula	Forests	
Hypatima rhomboidella (L., 1758)	**	Tilia, Betula	Forests	
Neofaculta ericetella (Geyer, 1832)	***	Calluna vulgaris	Heaths, bogs	
infernella (H.-S., 1854)	**	Vaccinum, Betula	Bogs	
Dichomeris juniperella (L., 1761)	*	Juniperus communis	Coniferous forests	
alacella (Z., 1839)	**	Lichenes	Forests	
Brachmia blandella (F., 1798)	**		Meadows	
Helcystogramma rufescens (Haw., 1828)	***	Poaceae	Meadows	
Acompsia cinerella (Cl., 1759)	***	Mosses	Forests, meadows	
subpunctella Svens., 1966	*	Veronica longifolia	Meadows, valleys	Very rare species in Latvia
LIMACODIDAE **Apoda** limacodes (Hufn., 1766)	*	Quercus	Forests, parks	
ZYGAENIDAE **Rhagades** pruni (D.& S., 1775)	*	Calluna vulgaris	Bogs	
Adscita statices (L., 1758)	**	Rumex	Meadows	
Zygaena viciae (D.& S., 1775)	**	Trifolium, Lathyrus, Vicia	Meadows	
filipendulae (L., 1758)	*	Trifolium	Meadows	
loniceraе (Schev., 1777)	**	Trifolium	Meadows	
SESIDAE **Synanthedon** scoliaeformis (Bkh., 1789)	*	Betula, under the old bark	Forest edges, parks	
sphecіformis (D.& S., 1775)	*	Alnus, Betula	Scrubs, forest edges	
COSSIDAE **Cossus** cossus (L., 1758)	**	Different trees: Alnus, Betula, Salix, Quercus	Forests, parks, gardens	
Lamellocossus terebra (D.& S., 1775)	*	Populus tremula	Forests	Very rare species in Latvia; indicator speciers of old forests
TORTRICIDAE **Phtheochroa** inopiana (Hw., 1811)	*	Low plants	Meadows	
Cochylimorpha alternana (Stph., 1834)	**	Centaurea scabiosa	Meadows	
Phalonidia curvistrigana (Stt., 1859)	*	Solidago	Meadows	
manniana (F.v.R., 1839)	**	Hydrophylous low plants	Wet meadows	
Gynnidomorpha permixtana (D.& S., 1775)	**	Low plants	Meadows	
alismana (Rag., 1883)	*	Hydrophylous low plants	Wet meadows	
Agapeta hamana (L., 1758)	**	Cirsium	Meadows	
zoegana (L., 1767)	*	Centaurea	Meadows	
Eupoecilia angustana (Hb., 1799)	**	Low plants	Meadows, bogs	
ambiguella (Hb., 1796)	*	Some shrubs	Forests, scrubs	
Aethes hartmanniana (Cl., 1759)	**	Knautia	Meadows	
margaritana (Hw., 1811)	**	Achillea	Dry meadows	
triangulana (Tr., 1835)	*	Veronica longifolia	Meadows	
smeathmanniana (F., 1781)	**	Asteraceae	Meadows	
cnicana (Ww., 1854)	*	Asteraceae	Meadows	
rubigana (Tr., 1830)	**	Asteraceae	Meadows	
fennicana (M.Her., 1924)	*	Apiaceae	Meadows	
Cochylidia implicitana (Wck., 1856)	**	Asteraceae	Meadows	
Cochylis nana (Haw., 1811)	**	Betula	Forests	
flaviciliana (Ww., 1854)	**	Knautia	Meadows	
dubitana (Hb., 1799)	**	Low plants	Meadows	
Falseuncaria ruficiliana (Haw., 1811)	**	Different low plants	Meadows	

Species	Occur.	Food plant	Biotop	Notes
Tortrix viridana L., 1758	**	Quercus	Forests, parks	
Ahrimma loeflingiana (L., 1758)	**	Quercus	Forests, parks	
Acleris holmiana (L., 1758)	**	Malus	Gardens	
forsskaleana (L., 1758)	**	Acer	Forests, parks	
bergmanniana (L., 1758)	**	Rosa spp.	Gardens, parks, forest edges	
comariana (Lw & Z., 1846)	**	Comarum, Fragaria	Meadows, gardens	
laterana (F., 1794)	***	Different trees and shrubs	Forests	
nigrilineana (Kawabe, 1963)	**	Abies, Pinus	Coniferous forests	
rhombana (D & S., 1775)	**	Sorbus	Forests	
emargana (F., 1775)	**	Salix spp.	Forests	
schalleriana (L., 1761)	*	Viburnum	Forests	
variegana (D.& S., 1775)	**	Sorbus, Malus	Forests	
aspersana (D.& S., 1775)	**	Filipendula ulmaria	Meadows	
hastiana (L., 1758)	**	Salix spp.	Forests, scrubs	
obtusana (Ev., 1844)	*	Populus tremula	Forests	Very rare species in Latvia
ferrugana (D.& S., 1775)	*	Quercus	Forests	
notana (Don., 1806)	**	Betula	Forests	
logiana (Cl., 1759)	**	Betula	Forests	
roscidana (Hb., 1799)	*	Populus tremula	Forests	Very rare species in Latvia
lipsiana (D & S., 1775)	*	Low plants	Meadows, bogs, forests	
Exapate congelatella (Cl., 1759)	**	Polyphagous on trees and shrubs	Forests, gardens, parks	
Tortricodes alternella (D.& S., 1775)	**	Quercus	Forests	
Eana osseana (Sc., 1763)	**	Low plants	Meadows	
incanana (Stph., 1852)	**	Polyphagous on low plants	Meadows	
Cnephasia stephensiana (Dbld., 1849)	***	Polyphagous on low plants and trees	Meadows, forests	
asseclana (D & S., 1775)	***	Polyphagous on low plants	Meadows	
Eulia ministrana (L., 1758)	**	Trees and shrubs	Forests	
Pseudargyrotoza conwagana (F., 1775)	**	Polyphagous on trees	Forests, parks	
Epagoge grotiana (F., 1781)	**	Polyphagous on	Forests, scrubs	
NOTODONTIDAE Pygaera timon (Hb., 1803)	*	Populis tremula	Forests	
Clostera curtula (L., 1758)	***	Populus tremula	Forests	
pigra (Hufn., 1766)	**		Forests	
anachoreta (D.& S., 1775)	*		Forests	
anastomosis (L., 1758)	*	Salix spp.	Forests	
Cerura vinula (L., 1758)	**	Salix, Populus	Forest edges, scrubs	
Furcula furcula (C., 1759)	**	Salix	Forests, scrubs	
bicuspis (Bkh., 1790)	*	Alnus, Betula	Forests	
bifida (Brahm, 1787)	**	Populus tremula	Forests	
Notodonta dromedarius (L., 1758)	**	Alnus	Forests	
torva (Hb., 1803)	**	Populus	Forests	
tritophus (D & S., 1775)	*	Salix, Populus	Forests	
ziczac (L., 1758)	***	Salix, Populus	Forests, scrubs	
Drymonia ruficornis (Hufn., 1766)	*	Quercus	Deciduous forests	
Pheosia tremula (Cl., 1759)	***	Populus	Forests	
gnoma (F., 1776)	***	Betula	Forests	
Pterostoma palpina (Cl., 1759)	**	Populus, Salix	Forests	
Leucodonta bicoloria (D.& S., 1775)	**	Betula	Forests	
Ptilodon capucina (L., 1758)	***	Tilia, Alnus	Forests	
Odontosia carmelita (Esp., 1799)	**	Betula	Forests	
sieversii (Mén., 1856)	**	Betula	Forests	
Gluphisia crenata (Esp., 1785)	**	Populus	Forests	
Phalera bucephala (L., 1758)	***	Tilia, Betula, Quercus, Acer	Forests, parks	
Peridea anceps (Gz., 1781)	*	Quercus	Forests	
Stauropus fagi (L., 1758)	**	Betula, Quercus	Forests	
NOCTUIDAE Moma alpium (Osb., 1778)	**	Quercus, Betula, Acer	Forests	
Acronicta alni (L., 1767)	*	Alnus, Rosa	Forests	
cuspis (Hb., 1813)	**	Alnus	Forests	
psi (L., 1758)	**	Different trees	Forests, scrubs, gardens	
aceris (L., 1758)	*	Acer	Forests, parks	
leporina (L., 1758)	**	Salix, Populus	Forests	
megacephala (D.& S., 1775)	**	Populus	Forests	
strigosa (D.& S., 1775)	*	Padus, Malus, Prunus	Forests	
menyanthidis (Esp., 1789)	*	Menyanthis, Calluna	Bogs	
auricoma (D.& S., 1775)	***	Different trees and shrubs	Forests, scrubs	
rumicis (L., 1758)	**	Low plants, shrubs	Forest edges, meadows	
Simyra albovenosa (Gz., 1781)	*	Hydrophy'ous low plants	Wet meadows, bogs	Indicator species of wet meadows
Macrochilo cribrumalis (Hb., 1793)	**	Poaceae	Wet meadows	Indicator species of wet meadows
Herminia tarsicrinalis (Knoch, 1782)	**	Fallen leafs and low plants	Forests	
grisealis (D & S., 1775)	**	Some trees and scrubs	Forests	
Polypogon tentacularia (L., 1758)	***	Low plants	Meadows	
Pechipogo strigilata (L., 1758)	**	Different trees	Forests	

Species	Occur.	Food plant	Biotop	Notes
Zanclognatha tarsipennalis Tr , 1835	**	Fallen leafs and low plants	Forests	
Hypenodes humidalis Dbld , 1850	***	Not known	Bogs, wet meadows	
Schrankia costaestrigalis (Stph., 1834)	**	Calluna, low plants	Forests	
Catocala fraxini (L., 1758)	**	Populus, Salix, Fraxinus	Forests, parks	LRB!
nupta (L., 1758)	**	Salix, Populus	Forests	
pacta (L., 1758)	*	Salix	Forests, scrubs	
Lygephila pastinum (Tr., 1826)	**	Fabaceae	Meadows	
viciae (Hb., 1822)	*	Fabaceae	Meadows	
Callistege mi (Cl., 1759)	***	Fabaceae	Meadows	
Euclidia glyphica (L., 1758)	***	Fabaceae	Meadows	
Laspeyria flexula (D.& S., 1775)	**	Lichenes and algae	Forests	
Scoliopteryx libatrix (L., 1758)	**	Salix spp.	Forests, scrubs	
Hypena proboscidalis (L., 1758)	***	Urtica	Meadows	
rostralis (L., 1758)	*	Humulus, Ribes	Forests, gardens	
crassalis (F., 1787)	**	Vaccinium	Forests	
Phytometra viridaria (Cl., 1759)	**	Polygala	Meadows	
Rivula sericealis (Sc., 1763)	***	Poaceae	Forests	
Parascotia fuliginaria (L., 1761)	**	Fungi	Forests	
Calobochyla salicalis (D.& S., 1775)	**	Salix spp.	Forests, scrubs	
Polychrysia moneta (F., 1787)	*	Delphinium	Meadows	
Lamprotes c-aureum (Knoch, 1781)	*	Thalictrum	Forest edges, meadows	Indicator species of wet meadows
Diachrysia chrysitis (L., 1758)	***	Urtica and others low plants	Meadows	
tutti (Kostr., 1961)	***	Low plants	Meadows	
Macdunnoughia confusa (Stph., 1850)	**	Low plants	Meadows	
Plusia festucae (L., 1758)	**	Poaceae, Carex	Meadows	
putnami (Grote, 1873)	**	Poaceae, Carex	Meadows	
Autographa gamma (L., 1758)	***	Low plants	Meadows	
mandarina (Frr., 1845)	*	Low plants	Meadows	
pulchrina (Hw., 1809)	**	Low plants	Meadows	
jota (L., 1758)	**	Low plants	Meadows	
bractea (D.& S., 1775)	**	Low plants	Meadows	
Syngrapha interrogationis (L., 1758)	**	Vaccinium	Bogs, forests	
Abrostola triparuna (Hufn., 1766)	**	Urtica	Meadows	
triplasia (L., 1758)	**	Urtica	Meadows	
Protodeltote pygarga (Hufn., 1766)	***	Poaceae	Forests, scrubs	
Deltote uncula (Cl., 1759)	**	Carex	Wet meadows, bogs	Indicator species of wet meadows
bankiana (F., 1775)	**	Poaceae	Meadows	
Pseudeustrotia candidula (D.& S., 1775)	**	Poaceae	Meadows	
Trisateles emortualis (D.& S., 1775)	**	Quercus	Forests	
Cucullia umbratica (L., 1758)	**	Taraxacum, Picris, Hieracium	Meadows	
Calophasia lunula (Hufn., 1766)	**	Linaria	Meadows, dunes	
Amphipyra pyramidea (L., 1758)	**	Tilia, Acer	Forests, parks	
perflua (F., 1787)	**	Different trees	Forests	
tragopogonis (Cl., 1759)	**	Low plants	Forest edges, meadows	
Brachionycha nubeculosa (Esp., 1785)	**	Betula	Forests	
Dilobia caeruleocephala (L., 1758)	***	Sorbus, Malus, Prunus	Forests, gardens	
Pyrrhia umbra (Hufn., 1766)	**	Low plants	Meadows	
Caradrina morpheus (Hufn., 1766)	***	Low plants	Meadows, gardens	
Paradrina selini (Bsd., 1840)	*	Low plants	Dunes, dry meadows	
clavipalpis (Sc., 1763)	*	Low plants	Meadows	
Hoplodrina octogenaria (Gz., 1781)	***	Low plants	Meadows	
blanda (D.& S., 1775)	**	Low plants	Meadows	
Charanyca trigrammica (Hufn., 1766)	**	Low plants	Meadows	
Chilodes maritima (Tausch., 1806)	*	Phragmites communis	Reed-beds, bogs, wet meadows	
Athetis pallustris (Hb., 1808)	*	Low plants	Wet meadows	Indicator species of wet meadows
Dypterygia scabriuscula (L., 1758)	**	Low plants	Meadows	
Rusina ferruginea (Esp., 1785)	**	Low plants	Forest edges, meadows	
Thalpophila matura (Hufn., 1766)	*	Low plants	Meadows	
Trachea atriplicis (L., 1758)	*	Atriplex, Chenopodium	Meadows	
Euplexia lucipara (L., 1758)	**	Rubus	Forest edges, gardens	
Hyppa rectilinea (Esp., 1788)	**	Rubus	Forest edges, scrubs	
Actinotia polyodon (Cl., 1759)	*	Hypericum	Meadows	
Ipimorpha retusa (L., 1761)	**	Salix spp.	Forests	
subtusa (D.& S., 1775)	**	Populus	Forests	
Enargia paleacea (Esp., 1788)	**	Salix spp.	Forests	
Parastichtis suspecta (Hb., 1817)	**	Salix spp.	Forests	
Mesogona oxalina (Hb., 1803)	*	Alnus	Forests	
Cosmia pyralina (D.& S., 1775)	**	Ulmus	Forests	
trapezina (L., 1758)	***	Different trees	Forests	
Xanthia togata (Esp., 1788)	***	Salix spp.	Forests, scrubs	
icteritia (Hufn., 1766)	***	Salix spp.	Forests, scrubs	
citrago (L., 1758)	**	Tilia	Deciduous forests, parks	
ocra (Cl., 1759)	**	Salix spp.	Forests, scrubs	

Species	Occur.	Food plant	Biotop	Notes
helvola (L., 1758)	**	Different trees	Forests	
Eupsilia transversa (Hufn., 1766)	***	Polyphagous	Forests	
Conistra vaccinii (L., 1758)	***	Polyphagous	Forests	
rubiginea (D.& S., 1775)	**	Salix, low plants	Forests	
Brachylomia viminalis (F., 1776)	**	Salix spp.	Forests	
Lithomoia solidaginis (Hb., 1803)	**	Low plants	Forest edges, meadows	
Lithophane socia (Hufn., 1766)	**	Low plants	Forests, meadows	
furcifera (Hufn., 1766)	**	Polyphagous	Forests	
consocia (Bkh., 1792)	**	Alnus	Forests	
Xylena vetusta (Hb., 1813)	*	Poaceae	Meadows	
Allophyes oxyacanthae (L., 1758)	**	Crataegus, Malus, Sorbus	Forests, gardens	
Dichonia aprilina (L., 1758)	**	Quercus, Betula	Forests	
Antitype chi (L., 1758)	**	Low plants	Forests, scrubs	
Ammoconia caecimacula (D.& S., 1775)	**	Low plants	Forests, meadows	
Polymixis gemmea (Tr., 1825)	*	Poaceae	Forest edges, meadows	
Blepharita satura (D.& S., 1775)	**	Different trees	Forests, scrubs	
Mniotype adusta (Esp., 1790)	*	Low plants	Meadows	
Apamea monoglypha (Hufn., 1766)	**	Poaceae	Meadows	
sublustris (Esp., 1788)	**	Poaceae	Meadows	
crenata (Hufn., 1766)	**	Poaceae	Meadows	
lateritia (Hufn., 1766)	**	Poaceae	Meadows	
furva (D.& S., 1775)	*	Poaceae	Dry meadows	
remissa (Hb., 1809)	**	Poaceae	Meadows	
unanimis (Hb., 1813)	*	Poaceae	Wet meadows	Indicator species of wet meadows
sordens (Hufn., 1766)	**	Poaceae	Meadows, gardens	
scolopacina (Esp., 1788)	**	Poaceae	Meadows	
ophiogramma (Esp., 1794)	*	Hydrophylous Poaceae	Wet meadows	
Oligia strigilis (L., 1758)	***	Poaceae	Meadows	
latruncula (D.& S., 1775)	**	Poaceae	Meadows	
Mesoligia furuncula (D.& S., 1775)	**	Poaceae	Meadows	
Mesapamea secalis (L., 1758)	***	Poaceae	Meadows	
didyma (Esp., 1788)	**	Poaceae	Meadows	
Photedes minima (Hw., 1809)	**	Hydrophylous Poaceae	Wet meadows	
Luperina testacea (D.& S., 1775)	**	Poaceae	Meadows	
Rhizedra lutosa (Hb., 1803)	*	Phragmites communis	Reed-beds, wet meadows	
Amphipoea oculea (L., 1761)	**	Poaceae	Meadows	
fucosa (Frr., 1830)	***	Poaceae	Meadows	
lucens (Frr., 1845)	*	Hydrophylous Poaceae	Wet meadows	
Hydraecia micacea (Esp., 1789)	***	Low plants	Meadows	
Gortyna flavago (D.& S., 1775)	**	Low plants	Meadows	
Staurophora celsia (L., 1758)	**	Poaceae	Forest edges	
Celaena haworthii (Curt., 1829)	**	Eriophorum	Bogs	
leucostigma (Hb., 1808)	**	Low plants	Wet meadows	
Nonagria typhae (thnbg., 1784)	**	Typha	Wet meadows	
Phragmatiphila nexa (Hb., 1808)	*	Phragmites communis	Wet meadows	
Sedina buettneri (E.Her., 1858)	*	Carex	Wet meadows	
Arenostola phragmitidis (Hb., 1803)	**	Phragmites communis	Wet meadows, boggy forests	
Chortodes fluxa (Hb., 1809)	**	Poaceae	Meadows	
pygmina (Hw., 1809)	**	Juncus	Wet meadows	
Discestra trifolii (Hufn., 1766)	**	Low plants	Meadows	
Anarta myrtilli (L., 1761)	**	Calluna vulgaris	Heaths, bogs	
cordigera (Thnbg., 1788)	**	Oxycoccus	Bogs	
Lacanobia splendens (Hb., 1808)	*	Low plants	Meadows	
oleracea (L., 1758)	***	Low plants	Meadows, gardens	
thalassina (Hufn., 1766)	***	Low plants	Meadows	
contigua (D.& S., 1775)	**	Low plants	Forest edges, meadows	
suasa (D.& S., 1775)	**	Low plants	Meadows	
Hada plebeja (L., 1761)	***	Low plants	Meadows	
Hadena bicruris (Hufn., 1766)	*	Melandrium, Saponaria, Silene	Meadows	
confusa (Hufn., 1766)	*	Melandrium, Silene	Meadows	
rivularis (F., 1775)	**	Melandrium, Silene	Meadows	
Heliophobus reticulata (Gz., 1781)	**	Silene, Saponaria, Dianthus	Meadows	
Melanchra persicariae (L., 1761)	***	Low plants	Meadows, gardens	
pisi (L., 1758)	***	Low plants	Meadows, gardens	
Mamestra brassicae (L., 1758)	*	Low plants	Meadows, gardens	
Polia bombycina (Hufn., 1766)	**	Low plants	Meadows	
hepatica (Cl., 1759)	**	Low plants	Forest edges, bogs	
nebulosa (Hufn., 1766)	**	Low plants	Meadows, forest edges	
Mythimna turca (L., 1761)	*	Poaceae	Meadows	
conigera (D.& S., 1775)	**	Poaceae	Meadows	
ferrago (F., 1787)	**	Poaceae	Meadows	
pudorina (D.& S., 1775)	*	Poaceae	Meadows	
straminea (Tr., 1825)	*	Phragmites communis	Wet meadows	
impura (Hb., 1808)	***	Poaceae	Meadows	
pallens (L., 1758)	**	Poaceae	Meadows	
comma (L., 1761)	**	Poaceae	Meadows	

Species	Occur.	Food plant	Biotop	Notes
Orthosia incerta (Hufn., 1766)	***	Different trees	Forests, scrubs	
gothica (L., 1758)	***	Different trees	Forests, scrubs	
cruda (D.& S., 1775)	***	Different trees	Forests	
opima (Hb., 1809)	**	Vaccinium, Salix	Bogs, forests	
populeti (F., 1775)	***	Populus	Forests	
cerasi (F., 1775)	***	Different trees	Forests	
gracilis (D.& S., 1775)	**	Different trees and shrubs	Forests, scrubs	
munda (D.& S., 1775)	**	Different trees	Forests	
Panolis flammea (D.& S., 1775)	**	Pinus	Coniferous forests	
Cerapteryx graminis (L., 1758)	***	Low plants	Meadows	
Tholera cespitis (D.& S., 1775)	**	Poaceae	Meadows	
decimalis (Poda, 1761)	***	Poaceae	Meadows	
Lasionycta proxima (Hb., 1809)	*	Low plants	Meadows, forest edges	
Axylia putris (L., 1761)	***	Low plants	Meadows, gardens	
Ochropleura plecta (L., 1758)	***	Low plants	Meadows	
Diarsia mendica (F., 1775)	***	Low plants	Forests	
dahlii (Hb., 1813)	**	Low plants	Forests, bogs	
brunnea (D.& S., 1775)	***	Low plants	Forests	
rubi (View., 1790)	**	Low plants	Meadows, forests	
florida (F.Schmidt, 1859)	**	Low plants	Meadows, forests	
Noctua pronuba (L., 1758)	***	Low plants	Meadows	
orbona (Hufn., 1766)	*	Low plants	Meadows	
Lycophotia porphyrea (D.& S., 1775)	**	Calluna	Heaths, bogs	
Rhyacia simulans (Hufn., 1766)	*	Low plants	Meadows	
Eurois occulta (L., 1758)	**	Low plants	Forests, meadows	
Opigena polygona (D.& S., 1775)	*	Low plants	Meadows	
Graphiphora augur (F., 1775)	**	Low plants	Meadows	
Xestia c-nigrum (L., 1758)	**	Low plants	Forests, meadows	
triangulum (Hufn., 1766)	***	Low plants	Forests, meadows	
baja (D.& S., 1775)	***	Low plants	Meadows	
sexstrigata (Haw., 1809)	***	Low plants	Meadows	
xanthographa (D.& S., 1775)	***	Low plants	Dunes, dry meadows	
Eugraphe sigma (D.& S., 1775)	*	Low plants	Dry meadows	
Coenophila subrosea (Stph., 1829)	**	Low plants	Bogs, forests	
Cerastis rubricosa (D.& S., 1775)	***	Low plants	Forests, meadows	
leucographa (D.& S., 1775)	**	Low plants	Forests, meadows	
Anaplectoides prasina (D.& S., 1775)	**	Low plants	Meadows, forests	
Cryptocala chardinyi (Bsd., 1829)	*	Low plants	Meadows	
Protolampra sobrina (Dup., 1843)	*	Low plants	Bogs, forests	
Euxoa nigricans (L., 1761)	**	Poaceae	Meadows	
tritici (L., 1758)	**	Poaceae	Meadows, gardens, dunes	
Agrotis exclamationis (L., 1758)	***	Low plants	Meadows, gardens	
clavis (Hufn., 1766)	**	Low plants	Meadows	
segetum (D.& S., 1775)	**	Low plants	Meadows	
vestigialis (Hufn., 1766)	**	Low plants	Meadows, dunes	
PANTHEIDAE **Panthea** coenobita (Esp., 1785)	**	Pinus, Picea	Coniferous forests	
Colocasia coryli (L., 1758)	***	Different trees and shrubs	Forests	
LYMANTRIIDAE **Lymantria** monacha (L., 1758)	***	Pinus, Picea, Quercus	Forests	
Calliteara pudibunda (L., 1758)	***	Different trees and shrubs	Forests, gardens	
abietis (D.& S., 1775)	*	Picea	Coniferous forests	
Dicallomera fascelina (L., 1758)	*	Low plants	Meadows	
Orgyia antiqua (L., 1758)	**	Polyphagous	Forests, scrubs, gardens	
Leucoma salicis (L., 1758)	**	Populus, Salix	Forests	
Arctornis l-nigrum (Müll., 1764)	*	Tilia	Forests, parks	
NOLIDAE **Meganola** strigula (D.& S., 1775)	*	Quercus, Tilia	Forests	
Nola cucullatella (L., 1758)	**	Rosa, Sorbus, Prunus	Forests, gardens	
confusalis (H.-S., 1847)	**	Different trees	Forests	
aerugula (Hb., 1793)	***	Low plants	Bogs, wet meadows	
Nycteola revayana (Sc., 1772)	*	Quercus	Forests	
degenerana (Hb., 1799)	**	Salix	Forests	
Pseudoips prasinana (L., 1758)	**	Different trees and shrubs	Forests	
Earias clorana (L., 1761)	**	Salix spp.	Scrubs, forest edges	
ARCTIIDAE **Thumatha** senex (Hb., 1808)	**	Mosses	Bogs, wet meadows	
Miltochrista miniata (Forst., 1771)	**	Lichenes	Forests	
Cybosia mesomella (L., 1758)	**	Lichenes	Meadows	
Pelosia muscerda (Hufn., 1766)	**	Lichenes	Wet meadows	
Atolmis rubricollis (L., 1758)	**	Lichenes	Forests	
Eilema depressa (Esp., 1787)	***	Lichenes	Forests	
griseola (Hb., 1803)	**	Lichenes	Forests	
lurideola (Zck., 1817)	**	Lichenes	Forests	
complana (L., 1758)	**	Lichenes	Dunes, coniferous forests	
lutarella (L., 1758)	**	Lichenes	Meadows	
Setina irrorella (L., 1758)	*	Lichenes	Dry meadows	
Coscinia cribraria (L., 1758)	*	Low plants	Dry meadows, dunes	
Phragmatobia fuliginosa (L., 1758)	**	Low plants	Meadows	

Species	Occur.	Food plant	Biotop	Notes
Parasemia plantaginis (L., 1758)	*	Low plants	Meadows	
Spilosoma lutea (Hufn., 1766)	***	Low plants	Meadows, gardens	
lubricipeda (L., 1758)	***	Low plants	Meadows, gardens	
urticae (Esp., 1789)	*	Low plants	Meadows	
Rhyparia purpurata (L., 1758)	**	Low plants	Meadows	
Diacrisia sannio (L., 1758)	***	Low plants	Meadows, bogs	
Arctia caja (L., 1758)	**	Low plants	Meadows	
Callimorpha dominula (L., 1758)	*	Low plants	Forest edges	LRB!

Beetles distribution in the areas around the Lake Lubana

(Insecta: Coleoptera)

Introduction

Researches in fauna of the beetles around the Lake Lubana were made in the period of 1995- 1999 years in the closest areas to the lake and in a zone of 1-15 km along the lake (depending on the location of the biotops). Basically the regions of swamps and swamped woods were investigated as well as definite littoral biotops. The following methods in research of the beetles were used: catching with the entomological net, visual examination of the separate objects, snares in soil (plastic cups which are filled with the 5-7% vinegar), the use of snares made of twigs, the use of different baits, the use of light as a bait etc. Especially good results were got by using the light as a bait at night, in a such way the rows of interesting species (Carabidae) and (Dytiscidae) were fixed. Often the species difficult to define were only gathered but in most cases the species were defined at once and fixed in the records of the field-work. The gathered material is kept as mounted or unmounted in the collections of A.Barsevskis and Latvian Museum of Nature. In the process of making the list of species the literature with the information about earlier researches in this territory was also used. The first information about the beetles of the territory was found in the work of A.Ulanovskis (1883), but the historical survey of researches was made by A.Barsevskis about the fauna of Latgalian beetles and the beetles of the Eastern Latvia (Barsevskis, 1993, 1999). The gained experience in carrying out the same researches in other Latvian territories which are alike but which are investigated better helps us to conclude that the fauna of the Lake Lubana territories is researched only in 65-75%. Though the results of the researches show that it is unique, relic (several relic species which are not met in the other parts of Latvia and which natural habitats are far to the North from this territory or they are very rare or endemic for the Eastern Europe (Trachypachis zetterstedti, Pelophila borealis, Carabus menetriesi, Asaphidion curtum, Patrobus australis etc.). The row of rare and very rare and not typical for Latvia species are ascertained here (Ampedus tristis, Anoploder virens etc.) which are mostly distributed in taiga. Rich biodiversity of the rare species of the region can be explained by the large variety of biotops and primeval state of nature (areas of wet woods, flooded meadows, swamps etc.).

General comments on beetles distribution

From the point of view of the protection of the beetles it is necessary to make the following:

not to allow the change of hydrological conditions with the trend of melioration. The flooding of the territory does not influence the unique complexes of species of wet woods, meadows and swamps, but the draining can destroy it.

to carry out the planning of management in a way not to allow the flooded meadows to grow over with bushes.

to limit the cleaning measures of the wood areas which are close to the lake, explaining to the owners of the wood the importance of old and fallen trees for the establishing of biodiversity (in all areas of wet woods).

From the point of view of the researches in fauna of beetles it is necessary to ensure especial protecting conditions (with the stopping of the artificial processes which change the hydrological conditions - draining) in the areas of river-heads and outfalls, areas of swamps and wet woods, the northern part of the clans of the lake and in the direction of Nagli fishing ponds.

The list of beetles in the areas around the Lake Lubana

(Insecta: Coleoptera)

Legend:

Density of spreading:
A-very often;
B-often;
C-rare,
D-very rare;
E- in Latvia - only around the Lake Lubana;

Commentary:
1-relic species;
2- swamp species;
3- species which are in danger in case of draining;
4- species-indicators of natural biotops;
5- protected species of The Latvian Red Book;
6- species of stenobionts;
7- water-living species;
8- endem of the Eastern Europe.

Table 16 The occurence of Coleoptera in the vicinity of Lubana Lake

Species	Occure Latvia – Lubans	Note
ADEPHAGA Schellenberg, 1806		
GYRINIDAE Latreille, 1810		
Gyrinus Geoffroy, 1762		
minutus Fabricius, 1798	A - B	7
opacus Sahlberg, 1819	C - B	7
aeratus Stephens, 1835	A - B	7
pullatus Zaitzev, 1908	A - A	7
marinus Gyllenhal, 1808	A - A	7
natator (Linnaeus, 1758)	A - A	7
substriatus Stephens, 1828	A - A	7
paykulli Ochs, 1927	B - B	7
HALIPLIDAE Aube, 1836		
Haliplus Latreille, 1802		
flavicollis Sturm, 1834	B - B	7
fulvus (Fabricius, 1801)	B - B	7
variegatus Sturm, 1834	B - C	7
fulvicollis Erichson, 1837	B - B	7
fluviatilis Aube, 1836	B - B	7
lineolatus Mannerheim, 1844	B - B	7
interjectus Lindberg, 1937	C - C	7
immaculatus Gerhardt, 1877	C - C	7
TRACHYPACHIDAE Thomson, 1857		
Trachypachus Motschulsky, 1845		
zetterstedti (Gyllenhal, 1827)	E - E	1, 4
NOTERIDAE Aube, 1836		
Noterus Clairville, 1806		
clavicornis (Degeer, 1774)	A - A	7
crassicornis (Muller, 1776)	A - A	7
DYTISCIDAE Leach, 1815		
Copelatus Erichson, 1832		
haemorrhoidalis (Fabricius, 1787)	B - B	7
Laccophilus Leach, 1815		
hyalinus (Degeer, 1774)	B - B	7
minutus (Linnaeus, 1758)	B - B	7
Hydroglyphus Motschulsky, 1853		
pusillus (Fabricius, 1781)	C - D	7
Hygrotus Stephens, 1828		
decoratus (Gyllenhal, 1810)	B - B	7
marginalis (Fabricius, 1777)	D - D	7
versicolor (Schaller, 1783)	B - B	7
Coelambus Thomson, 1860		
polonicus (Aube, 1842)	C - C	7
impressopunctatus (Schaller, 1783)	A - B	7
Hyphydrus Illiger, 1802		
ovatus (Linnaeus, 1761)	A - B	7
Hydroporus Clairville, 1806		
angustatus Sturm, 1835	B - C	7
nigrita (Fabricius, 1792)	B - C	7
fuscipennis Schaum, 1868	C - C	7
planus (Fabricius, 1781)	A - A	7
obscurus Sturm, 1835	B - B	7
elongatulus Sturm, 1835	B - C	7
rufifrons (Muller, 1776)	B - B	7
erythrocephalus (Linnaeus, 1758)	B - B	7

Species	Occure Latvia – Lubans	Note
melanarius Sturm, 1835	C - C	7
longicornis Sharp, 1871	C - C	7
tristis (Paykull, 1798)	A - A	7
palustris (Linnaeus, 1761)	A - A	7
tesselatus Drapiez, 1819	C - c	7
Porhydrus Guignot, 1945		
lineatus (Fabricius, 1775)	A - A	7
Graptodytes Seidlitz, 1887		
granularis (Linnaeus, 1767)	B - B	7
Suphrodytes Des Gozis, 1914		
dorsalis (Fabricius, 1787)	B - B	7
Scarodytes Des Gozis, 1914		
halensis (Fabricius, 1787)	B - B	7
Platambus Thomson, 1859		
maculatus (Linnaeus, 1758)	A - A	7
Agabus Leach, 1817		
guttatus (Paykull, 1798)	C - C	7
paludosus (Fabricius, 1801)	B - B	7
uliginosus (Linnaeus, 1761)	B - C	7
melanarius Aube, 1837	B - B	7
bipustulatus (Linnaeus, 1767)	B - B	7
affinis (Paykull, 1798)	B - C	7
nebulosus (Forster, 1771)	B - C	7
congener (Thunberg, 1794)	B - B	7
confinis (Gyllenhal, 1808)	B - B	7
fuscipennis (Paykull, 1798)	C - C	7
melanocornis Zimmermann, 1915	C - C	7
neglectus Erichson, 1837	C - C	7
subtilis Erichson, 1837	C - C	7
undulatus (Schrank, 1776)	A - A	7
Ilybius Erichson, 1832		
angustior (Gyllenhal, 1808)	B - C	7
subaeneus Erichson, 1837	A - A	7
ater (Degeer, 1774)	A - A	7
guttiger (Gyllenhal, 1808)	B - C	7
quadriguttatus (Lacordaire, 1835)	C - B	7
similis Thomson, 1856	C - B	7
aenescens Thomson, 1870	B - B	7
fuliginosus (Fabricius, 1792)	A - A	7
fenestratus (Fabricius, 1781)	B - A	7
Rhantus Dejean, 1833		
grapii (Gyllenhal, 1808)	B - A	7
frontalis (Marsham, 1802)	B - B	7
notaticollis (Aube, 1837)	B - B	7
exsoletus (Forster, 1771)	B - B	7
latitans Sharp, 1882	C - B	7
Colymbetes Clairville, 1806		
fuscus (Linnaeus, 1758)	B - B	7
paykulli Erichson, 1837	B - A	7
striatus (Linnaeus, 1758)	B - B	7
Hydaticus Leach, 1817		
seminiger (Degeer, 1774)	A - B	7
transversalis (Pontoppidan, 1763)	B - B	7
continentalis Balfour-Browne, 1944	B - B	7

Species	Occure Latvia – Lubana	Note
Graphoderus Dejean, 1833		
cinereus (Linnaeus, 1758)	B - B	7
zonatus (Hoppe, 1795)	B - B	7
Acilius Leach, 1817		
sulcatus (Linnaeus, 1758)	A - A	7
canaliculatus (Nicolai, 1822)	A - A	7
Dytiscus Linnaeus, 1758		
latissimus Linnaeus, 1758	C - C	7
dimidiatus Bergstrasser, 1778	B - B	7
marginalis Linnaeus, 1758	A - A	7
circumcinctus Ahrens, 1811	A - A	7
lapponicus Gyllenhal, 1808	C - D	7
Cybister Curtis, 1827		
lateralimarginalis (Degeer, 1774)	D - D	7
CARABOIDEA Latreille,1825		
Omophron Latreille, 1802		
limbatum (Fabricius, 1777)	C - D	6
Cicindela Linnaeus, 1758		
sylvatica Linnaeus, 1758	B - B	
hybrida Linnaeus, 1758	B - B	
campestris Linnaeus, 1758	B - B	
Leistus Frolich, 1799		
terminatus (Hellwig, 1793)	B - B	
ferrugineus (Linnaeus, 1758)	C - C	
piceus Froelich, 1799	C - D	4
Nebria Latreille, 1802		
rufescens (Strom, 1768)	C - D	1, 6
Pelophila Dejean, 1821		
borealis (Paykull,1790)	E - E	1, 2, 3, 4
Notiophilus Dumeril, 1806		
aquaticus (Linnaeus, 1758)	B - B	
palustris (Duftschmid, 1812)	B - B	
germanyi Fauvel, 1863	B - C	
biguttatus (Fabricius, 1779)	B - B	
Carabus Linnaeus, 1758		
arvensis Herbst, 1784	A - B	
granulatus Linnaeus, 1758	A - A	
menetriesi Faldermann,1827	C - B	1, 2, 3, 4, 5, 8
cancellatus Illiger, 1798	A - A	
nemoralis Muller, 1764	B - B	
hortensis Linnaeus, 1758	B - B	
glabratus Paykull, 1790	B - B	5
nitens Linnaeus, 1758	C - C	5, 8
convexus Fabricius, 1775	C - C	5
Cychrus Fabricius, 1794		
caraboides (Linnaeus, 1758)	B - B	
Leistus Latreille, 1802		
piliceornis (Fabricius, 1775)	A - A	
Elaphrus Fabricius, 1775		
cupreus Duftschmid, 1812	A - A	
riparius (Linnaeus, 1758)	A - A	
Clivina Latreille, 1802		
fossor (Linnaeus, 1758)	A - A	
Dyschirius Bonelli, 1810		
obscurus (Gyllenhal, 1827)	B - B	6
arenosus Stephens, 1828	B - B	6
Dyschiriodes Jeannel, 1941		
nitidus (Dejean, 1825)	B - B	6
politus (Dejean, 1825)	B - B	6
aeneus (Dejean, 1825)	B - B	6
tristis (Stephens, 1827)	B - B	6
globosus (Herbst, 1784)	A - A	
Broscus Panzer, 1813		
cephalotes (Linnaeus, 1758)	A - A	
Miscodera Eschscholtz, 1830		
arctica (Paykull, 1798)	C - B	
Patrobus Dejean, 1821		
australis Sahlberg, 1875	D - B	1, 2, 3, 4,
assimilis Chaudoir, 1844	C - C	
atrorufus (Stroem, 1768)	A - A	
Trechoblemus Ganglbauer, 1896		
micros (Herbst, 1784)	C - C	
Blemus Dejean, 1821		
discus (Fabricius, 1792)	B - B	
Epaphius Stephens, 1827		
secalis (Paykull, 1790)	A - A	
rivularis (Gyllenhal, 1810)	C - C	2, 3,
Trechus Clairville, 1806		
rubens (Fabricius, 1792)	C - C	2
quadristriatus (Schrank, 1781)	A - A	
Asaphidion Des Gozis, 1886		
pallipes (Duftschmid, 1812)	B - B	
flavipes (Linnaeus, 1761)	B - B	

Species	Occure Latvia – Lubana	Note
curtum (Heyden, 1870)	D - D	New species for fauna of Latvia [1]
Bembidion Latreille, 1802		
striatum (Fabricius, 1792)	B - D	
litorale (Olivier, 1791)	B - C	6
lampros (Herbst, 1784)	A - A	
properans (Stephens, 1828)	A - A	
ruficolle (Panzer, 1797)	B - B	6
genei (Kuster, 1847)	B - B	
tetracolum (Say, 1823)	B - B	
bruxellense (Westmael, 1835)	B - B	
femoratum (Sturm, 1825)	B - B	
dentellum (Thunberg, 1787)	B - B	
varium (Olivier, 1795)	B - B	
semipunctatum (Donovan, 1806)	B - B	
obliquum (Sturm, 1825)	B - B	
azurescens Dalla Torre, 1877	C - C	
articulatum (Panzer, 1796)	A - A	
doris (Panzer, 1797)	A - A	2
schuppelii (Dejean, 1831)	C - C	6
famigatum (Duftschmid, 1812)	E - E	6, New species for fauna of Latvia
assimile (Gyllenhal, 1810)	C - B	6
quadrimaculatum (Linnaeus, 1761)	A - A	
humerale Sturm, 1825	C - B	2,3,4,
biguttatum (Fabricius, 1779)	B - B	
guttula (Fabricius, 1792)	B - B	
mannerheimii (Sahlberg, 1827)	B - B	
Tachyta Kirby, 1837		
nana (Gyllenhal, 1810)	C - D	4,6
Stomis Clairville, 1806		
pumicatus (Panzer, 1796)	B - B	
Poecilus Bonelli, 1810		
lepidus (Leske, 1785)	B - B	
cupreus (Linnaeus, 1758)	A - A	
versicolor (Sturm, 1824)	A - A	
Pterostichus Bonelli, 1810		
crenatus (Duftschmid, 1812)	B - B	
aethiops (Panzer, 1797)	B - B	
oblongopunctatus (Fabricius, 1787)	A - A	
quadrifoveolatus Letzner, 1852	C - D	6
niger (Schaller, 1783)	A - A	
melanarius (Illiger, 1798)	A - A	
vigrita (Paykull, 1790)	A - A	
rhaeticus Heer, 1837	A - A	
anthracinus (Illiger, 1798)	A - A	
gracilis (Dejean, 1828)	C - A	2,6
minor (Gyllenhal, 1827)	A - A	
strenuus (Panzer, 1797)	A - A	
diligens (Sturm, 1824)	B - A	2
Calathus Borelli, 1810		
fuscipes (Goeze, 1777)	A - B	
erratus (Sahlberg, 1827)	A - A	
ambiguus (Paykull, 1790)	B - D	
melanocephalus (Linnaeus, 1758)	A - A	
micropterus (Duftschmid, 1812)	A - A	
Synuchus Gyllenhal, 1810		
vivalis (Illiger, 1798)	B - C	
Anchomenus Bonelli, 1810		
dorsalis (Pontoppidan, 1763)	A - A	
Oxypselaphus Chaudoir, 1843		
obscurus (Herbst, 1784)	A - A	
Agonum Bonelli, 1810		
livens (Gyllenhal, 1810)	B - B	
mannerheimi (Dejean, 1828)	D - D	1,2,3,4,6,
assimilis (Paykull, 1790)	A - A	
krynicki (Sperk, 1835)	C - B	
longiventre Mannerheim, 1825	D - D	1,2,3,4,6
micans (Nicolai, 1822)	B - B	
piceus (Linnaeus, 1758)	B - B	
gracilis (Sturm, 1824)	B - B	
fuliginosus (Panzer, 1809)	A - A	
thoreyi (Dejean, 1828)	B - A	
munsteri Hellen, 1935	D - D	2,3,4,6
sexpunctatum (Linnaeus, 1758)	B - B	
ericeti (Panzer, 1809)	C - B	2,3,4,6
muelleri (Herbst, 1784)	B - B	
versutum Sturm, 1824	D - A	
viduum (Panzer, 1797)	A - B	
afrum (Duftschmid, 1812)	A - A	

Species	Occure Latvia – Lubans	Note
Amara Bonelli, 1810		
plebeja (Gyllenhal, 1810)	B - B	
similata (Gyllenhal, 1810)	B - B	
ovata (Fabricius, 1792)	B - C	
nitida Sturm, 1825	B - B	
communis (Paazer, 1797)	B - B	
convexior Stephens, 1828	C - B	
aenea (Degeer, 1774)	A - B	
spreta Dejean, 1831	B - B	
fumelica Zimmermann, 1832	B - D	
curynata (Panzer, 1797)	B - B	
familiaris (Duftschmid, 1812)	B - B	
tibialis (Paykull, 1798)	C - C	
municipalis (Duftschmid, 1812)	B - B	
bifrons (Gyllenhal, 1810)	D - D	
brunnea (Gyllenhal, 1810)	B - B	
apricaria (Paykull, 1790)	B - B	
fulva (Muller, 1776)	B - B	
majuscula (Chaudoir, 1850)	B - C	
consularis (Duftschmid, 1812)	B - B	
Curtonotus Stephens, 1828		
aulicus (Panzer, 1797)	A - B	
gebleri Dejean, 1831	B - B	
Percosia Zimmermann, 1832		
equestris (Duftschmid, 1812)	C - C	
Ophonus Stephens, 1828		
nitidulus (Stephens, 1828)	B - B	
puncticulis (Paykull, 1798)	B - C	
rufibarbis (Fabricius, 1792)	B - B	
Pseudoophonus Motschulsky, 1844		
griseus (Panzer, 1797)	B - C	
rufipes (Degeer, 1774)	A - A	
Harpalus Latreille, 1802		
affinis (Schrank, 1781)	A - A	
smaragdinus (Duftschmid, 1812)	B - B	
latus (Linnaeus, 1758)	B - B	
luteicornis (Duftschmid, 1812)	C - D	
laevipes Zetterstedt, 1828	A - B	
rubripes (Duftschmid, 1812)	B - C	
tardus (Panzer, 1797)	B - B	
picipennis (Duftschmid, 1812)	C - D	6
Anisodactylus Dejean, 1829		
binotatus (Fabricius, 1787)	A - A	
Stenolophus Dejean, 1821		
mixtus (Herbst, 1784)	A - B	2,3
Bradycellus Erichson, 1837		
ruficollis (Stephens, 1828)	B - C	
caucasicus (Chaudoir, 1846)	B - B	
Dicheirotrichus Jacquelin du Val, 1857		
rufithorax (Sahlberg, 1827)	A - B	
cognatus (Gyllenhal, 1827)	D - D	2,3,4,6,
placidus (Gyllenhal, 1827)	B - B	
Acupalpus Dejean, 1829		
flavicollis (Sturm, 1825)	B - B	3
meridianus (Linnaeus, 1761)	B - B	
parvulus (Sturm, 1825)	B - B	
exiguus Dejean, 1829	C - B	3,6
consputus (Duftschmid, 1812)	C - B	3
Panagaeus Latreille, 1802		
cruxmajor (Linnaeus, 1758)	B - B	3,6
Chlaenius Bonelli, 1810		
tristis (Schaller, 1783)	C - C	3,6
nigricornis (Fabricius, 1787)	B - B	3,6
nitidulus (Schrank, 1781)	B - B	3
sulcicollis (Paykull, 1798)	C - D	3,4,6
quadrisulcatus (Paykull, 1790)	D - D	1,2,3,4,6
costulatus (Motschulsky, 1859)	D - D	2,3,4,6
Oodes Bonelli, 1810		
helopioides (Fabricius, 1792)	B - B	3
Badister Clairville, 1806		
unipustulatus Bonelli, 1813	B - B	
bullatus (Schrank, 1798)	B - B	
meridionalis Puel, 1925	C - D	4
lacertosus Sturm, 1815	C - D	4
sodalis (Duftschmid, 1812)	C - B	3,6
peltatus (Panzer, 1797)	B - B	
dilatatus Chaudoir, 1837	B - B	
collaris Motschulsky, 1845	B - B	
Odacantha Paykull, 1798		
melanura (Linnaeus, 1767)	C - B	3,6
Lebia Latreille, 1802		

Species	Occure Latvia – Lubans	Note
chlorocephala (Hoffmannsegg,1803)	A - D	
cruxminor (Linnaeus, 1758)	B - C	
Dromius Bonelli, 1810		
agilis (Fabricius, 1787)	B - B	
quadraticollis Morawitz, 1862	B - B	
schneideri Crotch, 1871	B - B	
fenestratus (Fabricius, 1794)	B - B	
quadrimaculatus (Linnaeus, 1758)	B - B	
Philorhizus Hope, 1838		
sigma (Rossi, 1790)	B - B	
Syntomus Hope, 1838		
truncatellus (Linnaeus, 1761)	B - B	
fovectus (Geoffroy, 1785)	B - B	
LEIODIDAE Fleming, 1821		
Leiodes Latreille, 1796		
polita (Marsham, 1802)	C - C	4
oblonga (Erichson, 1845)	C - C	4
furva (Erichson, 1845)	C - C	4
picea (Panzer, 1797)	C - B	4
flavescens (Schmidt, 1841)	C - C	4
dubia (Kugelann, 1794)	B - C	4
badia (Sturm, 1807)	C - C	4
Agaricophagus Schmidt, 1841		
cephalotes Schmidt, 1841	C - C	4
Anisotoma Panzer, 1797		
humeralis (Fabricius, 1792)	B - A	4
axillaris Gyllenhal, 1810	B - C	4
castanea (Herbst, 1792)	C - C	4
glabra (Kugelann, 1794)	C - C	4
orbicularis (Herbst, 1792)	C - C	4
Amphicyllis Erichson, 1845		
globus (Fabricius, 1792)	D - D	4
Agathidium Panzer, 1797		
convexum Sharp, 1866	C - C	4
rotundatum (Gyllenhal, 1827)	C - C	4
nigrinum Sturm, 1807	C - C	4
nigripenne (Fabricius, 1792)	B - A	4
atrum (Paykull, 1798)	C - C	4
seminulum (Linnaeus, 1758)	C - C	4
laevigatum Erichson, 1845	c - B	4
CHOLEVIDAE Kirby, 1837		
Choleva Latreille, 1796		
oblonga Latreille, 1807	C - C	
Sciodrepoides Hatch, 1933		
watsoni (Spence, 1815)	B - B	
fumatus (Spence, 1815)	B - B	
Catops Paykull, 1798		
subfuscus Kellner, 1846	C - C	
tristis (Panzer, 1793)	C - C	
nigrita Erichson, 1837	B - B	
nigriclavis Gerhardt, 1900	C - C	
fuscus (Panzer, 1794)	B - C	
fuliginosus Erichson, 1837	B - C	
picipes (Fabricius, 1787)	B - B	
HYDRAENIDAE Mulsant, 1844		
Hydraena Kugelann, 1794		
palustris Erichson, 1837	B - B	7
riparia Kugelann, 1794	C - B	7
Limnebius Leach, 1815		
truncatellus (Thunberg, 1794)	B - B	7
Ochthebius Leach, 1815		
minutus (Fabricius, 1792)	C - C	7
SCYDMAENIDAE Leach, 1815		
Cephennium Muller & Kunze, 1822		
thoracicum Muller & Kunze, 1822	C - C	
majus Reitter, 1822	C - C	
Nevraphes Thomson, 1859		
talparum Lokay, 1920	C - C	
Scydmoraphes Reitter, 1891		
minutus (Chaudoir, 1845)	C - C	
Stenichnus Thomson, 1859		
scutellaris (Muller & Kunze, 1822)	B - c	
Euconnus Thomson, 1859		
pubicollis (Muller & Kunze, 1822)	C - C	
limulatus (Chaudoir, 1845)	C - C	
SCAPHIDIIDAE Latreille, 1807		
Scaphidium Olivier, 1790		
quadrimaculatum Olivier, 1790	B - B	
Scaphisoma Leach, 1815		
agaricinum (Linnaeus, 1758)	B - B	
inopinatum Lobl, 1967	C - C	4

Species	Occure Latvia – Lubans	Note
boleti (Panzer, 1793)	A - B	
subalpinum Reitter, 1881	C - B	
balcanicum Tamanini, 1954	C - C	
borcale Lundblad, 1952	B - B	
assimile Erichson, 1845	B - B	
SILPHIDAE Latreille, 1807		
Nicrophorus Fabricius, 1775		
humator (Gleditsch, 1767)	B - B	
investigator Zetterstedt, 1824	B - B	
fossor Erichson, 1837	B - B	
vesprilloides Herbst, 1784	A - A	
vespillo (Linnaeus, 1758)	A - A	
Necrodes Leach, 1815		
littoralis (Linnaeus, 1758)	A - A	
Thanatophilus Leach, 1815		
rugosus (Linnaeus, 1758)	A - A	
sinuatus (Fabricius, 1775)	A - A	
Oiceoptoma Leach, 1815		
thoracica (Linnaeus, 1758)	A - A	
Aclypaea Reitter, 1884		
opaca (Linnaeus, 1758)	B - C	
undata (Muller, 1776)	B - C	
Silpha Linnaeus, 1758		
obscura Linnaeus, 1758	B - D	
tristis Illiger, 1798	B - B	
Phosphuga Leach, 1817		
atrata (Linnaeus, 1758)	A - A	
STAPHYLINIDAE Latreille, 1802		
Omalium Gravenhorst, 1802		
oxyacanthae Gravenhorst, 1806	B - C	
litorale Kraatz, 1858	B - B	
Phloeonomus Heer, 1839		
pusillus (Gravenhorst, 1806)	B - B	
Eusphalerum Kraatz, 1858		
primulae (Stephens, 1834)	C - B	
minutum (Fabricius, 1792)	C - D	
Deliphrum Erichson, 1839		
tectum (Paykull, 1789)	B - C	
Anthobium Samouelle, 1819		
atrocephalum (Gyllenhal, 1827)	B - B	
Olophrum Erichson, 1839		
fuscum (Gravenhorst, 1806)	B - C	
assimile (Paykull, 1800)	B - B	
rotundicolle (Sahlberg, 1830)	B - B	
Lesteva Latreille, 1796		
longoelytrata (Goeze, 1777)	C - C	
Anthophagus Gravenhorst, 1802		
angusticollis (Mannerheim, 1830)	B - B	
omalinus Zetterstedt, 1828	B - B	
caraboides (Linnaeus, 1758)	A - B	
Deleaster Erichson, 1839		
dichrous (Gravenhorst, 1802)	B - C	
Manda Blackwelder, 1952		
mandibularis (Gyllenhal, 1827)	D - C	
Carpelimus Samouelle, 1819		
bilineatus Stephens, 1834	B - B	
rivularis (Motschulsky, 1860)	B - B	
fuliginosus (Gravenhorst, 1802)	B - B	
Aploderus Stephens, 1833		
caelatus (Gravenhorst, 1802)	C - C	
caesus (Erichson, 1839)	C - C	
Oxytelus Gravenhorst, 1802		
sculptus Gravenhorst, 1806	C - C	
fulvipes Erichson, 1839	B - B	
piceus (Linnaeus, 1767)	B - B	
laqueatus (Marsham, 1802)	C - B	
Anotylus Thomson, 1859		
rugosus (Fabricius, 1775)	A - A	
sculpturatus (Gravenhorst, 1806)	B - B	
Platystethus Mannerheim, 1830		
arenarius (Geoffroy, 1785)	A - B	
Bledius Samouelle, 1819		
talpa (Gyllenhal, 1810)	B - B	6
subterraneus Erichson, 1839	B - B	6
littoralis Heer, 1839	B - B	6
Oxyporus Fabricius, 1775		
rufus (Linnaeus, 1758)	B - B	
mannerheimi Gyllenhal, 1827	C - D	4
maxillosus Fabricius, 1792	B - C	
Stenus Latreille, 1796		
bipustulatus (Linnaeus, 1758)	A - A	
guttula Muller, 1821	B - B	
aterrimus Erichson, 1839	C - C	

Species	Occure Latvia – Lubans	Note
juno (Paykull, 1789)	B - B	
calcaratus Scriba, 1864	B - B	
ater Mannerheim, 1830	C - C	
proditor Erichson, 1839	B - B	
clavicornis (Scopoli, 1763)	B - B	
bimaculatus Gyllenhal, 1810	B - B	
boops Ljungh, 1804	B - B	
melanarius Stephens, 1833	B - B	
fuscipes Gravenhorst, 1802	B - C	
pusillus Stephens, 1833	B - B	
ramus Stephens, 1833	B - C	
intermedius Rey, 1884	C - C	
luteotatus Ljungh, 1804	B - C	
puberescens Stephens, 1833	B - B	
palustris Erichson, 1839	B - D	
flavipalpis Thomson, 1860	B - C	
Paederus Fabricius, 1775		
riparius (Linnaeus, 1758)	A - A	6
fuscipes Curtis, 1826	C - B	6
Rugilus Samouelle, 1819		
rufipes Germar, 1836	B - B	
orbiculatus (Paykull, 1789)	C - B	
erichsoni (Fauvel, 1867)	B - C	
Bisnius Stephens, 1829		
fimetarius (Gravenhorst, 1802)	B - B	
puella Nordmann, 1837	C - C	
Philonthus Curtis, 1829		
quisquiliarius (Gyllenhal, 1810)	A - B	
lamonatus (Creutzer, 1799)	B - B	
politus (Linnaeus, 1758)	B - B	
nitidus (Fabricius, 1792)	B - B	
rotundicollis (Menetries, 1832)	A - A	
decorus (Gravenhorst, 1802)	A - B	
varians (Paykull, 1789)	B - B	
carbonarius (Gravenhorst, 1802)	B - B	
umbratilis (Gravenhorst, 1802)	B - C	
Dinothenarus Thomson, 1858		
puberescens (Degeer, 1774)	B - C	
Onthotrupes Ganglbauer, 1895		
tessellatus (Geoffroy, 1785)	B - B	
murmus (Linnaeus, 1758)	B - B	
Emus Samouelle, 1819		
hirtus (Linnaeus, 1758)	C - D	5
Staphylinus Linnaeus, 1758		
erythropterus Linnaeus, 1758	A - A	
dimidiaticornis Gemminger, 1851	B - B	
Ocypus Samouelle, 1819		
aeneocephalus (Degeer, 1774)	C - C	
ater (Gravenhorst, 1802)	B - B	
melanarius (Heer, 1839)	B - B	
Creophilus Samouelle, 1819		
maxillosus (Linnaeus, 1785)	B - B	
Quedius Stephens, 1829		
mesomelinus (Marsham, 1802)	C - B	
maurus (Sahlberg, 1830)	B - C	
vexans Eppelsheim, 1881	B - B	
brevis Thomson, 1867	C - B	
microps (Gravenhorst, 1847)	B - C	
fuliginosus (Gravenhorst, 1802)	A - A	
curtipennis Bernhauer, 1908	B - B	
tristis (Gravenhorst, 1802	B - B	
molochinus (Gravenhorst, 1806)	C - C	
boops (Gravenhorst, 1802)	B - B	
Gyrohypnus Mannerheim, 1830		
fracticornis (Muller, 1776)	A - B	
Nudobius Thomson, 1860		
lentus (Gravenhorst, 1806)	D - B	
Xantholinus Dejean, 1821		
linearis (Olivier, 1794)	A - B	
longiventris Heer, 1839	B - B	
Lordithon Thomson, 1859		
trinotatus (Erichson, 1839)	B - B	
trimaculatus (Paykull, 1800)	A - A	
lunulatus (Linnaeus, 1761)	A - B	
pulchellus (Mannerheim, 1830)	A - A	
Bolitobius Samouelle, 1819		
cingulatus Mannerheim, 1830	B - B	
castaneus (Stephens, 1832)	B - B	
Tachyporus Gravenhorst, 1802		
nitidulus (Fabricius, 1781)	C - D	
obtusus (Linnaeus, 1767)	B - B	
abdominalis (Fabricius, 1781)	B - B	
solutus Erichson, 1840	C - B	

Species	Occure Latvia – Lubans	Note
hypnorum (Fabricius, 1775)	B - C	
chrysomelinus (Linnaeus, 1758)	B - B	
transversalis Gravenhorst, 1806	B - B	
Cilea Jacquelin du Val, 1856		
siphoides (Linnaeus, 1767)	B B	
Tachinus Gravenhorst, 1802		
rufipes (Linnaeus, 1758)	A - B	
pallipes (Gravenhorst, 1806)	B - B	
marginatus (Fabricius, 1792)	C - C	
proximus Kraatz, 1855	B - C	
subterraneus (Linnaeus, 1758)	B - C	
fimetarius Gravenhorst, 1802	A - A	
lignorum (Linnaeus, 1758)	B - B	
Aleochara Gravenhorst, 1802		
curtula (Goeze, 1777)	B - B	
intricata Mannerheim,1830	C - D	
tristis Gravenhorst, 1806	C - C	
moesta Gravenhorst, 1802	C - C	
Drusilla Samouelle, 1819		
canaliculata (Fabricius, 1787)	A - B	
Zyras Stephens, 1835		
collaris (Paykull, 1800)	B - B	
Lamechusa Gravenhorst, 1806		
emarginata (Paykull, 1789)	C - B	
Cypha Samouelle, 1819		
puberula (Erichson, 1839)	B - B	
PSELAPHIDAE Latreille, 1802		
Bryaxis Kugelann, 1794		
puncticollis (Denny, 1825)	C - B	
bulbifer (Reichenbach, 1816)	C - C	
Rybaxis Saulcy, 1876		
longicornis (Leach, 1817)	C - C	
Brachygluta Thomson, 1859		
fossulata (Reichenbach, 1816)	C - B	
LUCANIDAE Latreille, 1804		
Sinodendron Schneider, 1791		
cylindricum (Linnaeus, 1758)	B - B	
Platycerus Geoffroy, 1762		
caraboides (Linnaeus, 1758)	B - B	
caprea (Degeer, 1774)	B - B	
Dorcus MacLeay, 1819		
parallelepipedus (Linnaeus, 1758)	C - D	5
TROGIDAE MacLeay, 1819		
Trox Fabricius, 1775		
sabulosus (Linnaeus, 1758)	B - B	4
scaber (Linnaeus, 1767)	B - B	4
GEOTRUPIDAE Latreille, 1802		
Geotrupes Latreille, 1796		
spiniger (Marsham, 1802)	C - D	6
stercorarius (Linnaeus, 1758)	A - B	
stercorosus (Scriba, 1791)	B - C	
SCARABAEIDAE Latreille, 1802		
Aphodius Illiger, 1798		
erraticus (Linnaeus, 1758)	B - B	
subterraneus (Linnaeus, 1758)	B - C	
fossor (Linnaeus, 1758)	A - A	
haemorrhoidalis (Linnaeus, 1758)	C - D	6
rufipes (Linnaeus, 1758)	A - A	
depressus (Kugelann, 1792)	B - B	
distinctus (Muller, 1776)	A - B	
prodromus (Brahm, 1790)	A - A	
fimetarius (Linnaeus, 1758)	A - A	
fuetens (Fabricius, 1787)	B - B	
ater (Degeer, 1774)	B - B	
nemoralis Erichson, 1848	D - D	
sordidus (Fabricius, 1775)	C - B	
scybalarius (Fabricius, 1781)	B - B	
plagiatus (Linnaeus, 1767)	C - B	3, 6
Oxyomus Dejean, 1833		
sylvestris (Scopoli, 1763)	B - B	
Copris Geoffroy, 1762		
lunaris (Linnaeus, 1758)	C - D	5,6
Onthophagus Latreille, 1802		
nuchicornis (Linnaeus, 1758)	B - B	
fracticornis (Preyssler, 1790)	B - B	
Serica MacLeay, 1819		
brunnea (Linnaeus, 1758)	B - B	
Amphimallon Berthold, 1827		
solstitiale (Linnaeus, 1758)	B - B	
Melolontha Mueller, 1764		
hippocastani Fabricius, 1801	B - B	
melolontha (Linnaeus, 1758)	A - A	
Anomala Leach, 1819		

Species	Occure Latvia – Lubans	Note
dubia (Scopoli, 1763)	B - B	
Phyllopertha Stephens, 1830		
horticola (Linnaeus, 1758)	A - A	
Oryctes Illiger, 1798		
nasicornis (Linnaeus, 1758)	B - B	4
Cetonia (Fabricius, 1775)		
aurata (Linnaeus, 1758)	A - B	
Potosia Mulsant & Rey, 1871		
metallica (Herbst, 1786)	A - A	
HELOPHORIDAE Leach, 1815		
Helophorus Fabricius, 1775		
aquaticus (Linnaeus, 1758)	A - A	7
grandis Illiger, 1798	B - B	7
granularis (Linnaeus, 1761)	A - A	7
HYDROCHIDAE Thomsen, 1859		
Hydrochus Leach, 1817		
carinatus Germar, 1824	B - B	7
brevis (Herbst, 1793)	C - B	7
HYDROPHILIDAE Latreille, 1802		
Berosus Leach, 1817		
luridus (Linnaeus, 1761)	C - B	7
Chaetarthria Stephens , 1832		
seminulum (Herbst, 1797)	B - B	
Anacaena Thomson, 1859		
globulus (Paykull, 1798)	B - B	7
Laccobius Erichson, 1837		
minutus (Linnaeus, 1758)	A - B	7
bipunctatus Gerhardt, 1877	A - B	7
Helochares Mulsant, 1844		
obscurus (Mueller, 1776)	B - B	7
Enochrus Thomson, 1859		
melanocephalus (Olivier, 1792)	B - B	7
ochropterus (Marsham, 1802)	A - B	7
quadripunctatus (Herbst, 1794)	A - B	7
bicolor (Fabricius, 1792)	B - B	7
testaceus (Fabricius, 1801)	B - B	7
affinis (Thunberg, 1794)	A - B	7
coarctatus (Gredler, 1863)	B - B	7
Cymbiodyta Bedel, 1881		
marginella (Fabricius, 1792)	C - B	7
Hydrobius Leach, 1815		
fuscipes (Linnaeus, 1758)	A - A	7
Hydrochara Berthold, 1827		
caraboides (Linnaeus, 1758)	A - B	7
Hydrophilus Geoffroy, 1762		
aterrimus Eschscholtz, 1822	B - B	7
Coelostoma Brulle, 1835		
orbiculare (Fabricius, 1775)	B - B	7
Cercyon Leach, 1817		
ustulatus (Preyssler, 1790)	B - B	
littoralis (Gyllenhal, 1808)	B - B	
haemorrhoidalis (Fabricius, 1775)	B B	
melanocephalus (Linnaeus, 1758)	A - B	
lateralis (Marsham, 1802)	B - B	
quisquilius (Linnaeus, 1761)	A - A	
terminatus (Marsham, 1802)	B - B	
pygmaeus (Illiger, 1801)	B - B	
Cryptopleurum Mulsant, 1844		
minutum (Fabricius, 1775)	A - B	
Sphaeridium Fabricius, 1775		
nipustulatum Fabricius, 1781	A - A	
scarabaeoides (Linnaeus, 1758)	A - A	
SPHAERITIDAE Shuckard, 1839		
Sphaerites Duftschmid, 1805		
glabratus (Fabricius, 1792)	C - C	4
HISTERIDAE Gyllenhal, 1808		
Plegaderus Erichson, 1834		
vulneratus (Panzer, 1797)	B - B	4
Saprinus Erichson, 1834		
semistriatus (Scriba, 1790)	A - B	
submitescens Bickhardt, 1909	B - B	
aeneus (Fabricius, 1775)	C - C	
Gnathoncus Jacquelin du Val, 1858		
rotundatus (Kugelann, 1792)	C - B	
nannetensis (Marseul, 1862)	C -	
Myrmetes Marseul, 1862		
paykulli Kanaar, 1979	D - D	4
Paromalus Erichson, 1834		
parallelepipedus (Herbst, 1792)	A - B	4
Margarinotus Marseul, 1853		
striola (Sahlberg, 1819)	A - B	

Species	Occure Latvia – Lubans	Note
ventralis (Marseul, 1854)	A - A	
purpurascens (Herbst, 1792)	B - B	
Hister Linnaeus, 1758		
unicolor Linnaeus, 1758	A - A	
Atholus Thomson, 1859		
bimaculatus (Linnaeus, 1758)	C - C	
duodecimstriatus (Schrank, 1781)	C - C	
SCIRTIDAE Fleming, 1821		
Elodes Latreille, 1796		
minuta (Linnaeus, 1767)	C - c	
Microcara Thomson, 1859		
testacea (Linnaeus, 1767)	A - B	
Cyphon Pykull, 1799		
coarctatus Paykull, 1799	B - B	2
palustris Thomson, 1855	C - C	2
kongsbergensis Munster, 1924	D - C	2
ochraceus Stephens, 1830	C - B	2
hilaris Nyholm, 1944	C - B	2
variabilis (Thunberg, 1787)	A - A	
phragmiteticola Nyholm, 1955	C - A	6
pubescens (Fabricius, 1792)	B - B	
padi (Linnaeus, 1758)	A - a	
Scirtes Illiger, 1807		
hemisphaericus (Linnaeus, 1758)	B - B	
DASCILLIDAE Guerin-Meney., 1843 (1834)		
Dascillus Latreille, 1796		
cervinus (Linnaeus, 1758)	D - D	3,4,6
BUPRESTIDAE Leach, 1815		
Chalcophora Solier, 1833		
mariana (Linnaeus, 1758)	B - B	5
Buprestis Linnaeus, 1758		
rustica Linnaeus, 1758	C - C	
haemorrhoidalis Herbst, 1780	B - C	
Phaenops Dejean, 1833		
cyanea (Fabricius, 1775)	B - B	
Anthaxia Eschscholtz, 1829		
quadripunctata (Linnaeus, 1758)	A - A	
godeti Guty, 1841	C - C	
Agrilus Curtis, 1825		
roberti Chevrolat, 1837	C - C	4
hyperici Ratzeburg, 1837	D - D	4
viridis (Linnaeus, 1758)	B - B	
Trachys Fabricius, 1801		
minutus (Linnaeus, 1758)	A - A	
BYRRHIDAE Latreille, 1804		
Cytilus Erichson, 1846		
sericeus (Forster, 1771)	B - B	
Byrrhus Muller, 1764		
fasciatus (Forster, 1771)	B - B	
pilula (Linnaeus, 1758)	B - B	
DRYOPIDAE Fleming, 1821		
Dryops Olivier, 1791		
auriculatus (Geoffroy, 1785)	C - B	7
ernesti Des Gozis, 1886	B - B	7
HETEROCERIDAE MacLeay, 1825		
Heterocerus Fabricius, 1792		
marginatus (Fabricius, 1787)	C - B	6
fenestratus (Thunberg, 1784)	B - B	6
fusculus Kiesenwetter, 1843	B - B	6
hispidulus Kiesenwetter, 1843	B - B	6
intermedius Kiesenwetter, 1843	C - B	6
EUCNEMIDAE Eschscholtz, 1829		
Microrhagus Dejean, 1833		
lepidus Rosenhauer, 1847	C - D	4
THROSCIDAE Laporte de Castelnau, 1840		
Trixagus Kugelann, 1794		
dermestoides (Linnaeus, 1767)	A - B	
ELATERIDAE Leach, 1815		
Agrypnus Eschscholtz, 1829		
murinus (Linnaeus, 1758)	A - A	
Hypnoidus Dillwyn, 1829		
riparius (Fabricius, 1792)	C - C	6
Cidnopus Thomson, 1859		
aeruginosus (Olivier, 1790)	B - B	
Denticollis Piller & Mitterpacher, 1783		
linearis (Linnaeus, 1758)	B - B	
Athous Eschscholtz, 1829		
vittatus (Fabricius, 1792)	B - C	
haemorrhoidalis (Fabricius, 1801)	B - C	

Species	Occure Latvia – Lubans	Note
subfuscus (Muller, 1764)	A - A	
Hemicrepidius Germar, 1839		
niger (Linnaeus, 1758)	A - B	
Actenicerus Kiesenwetter, 1855		
sjaelandicus (Muller, 1764)	B - B	
Anostirus Thomson, 1859		
castaneus (Linnaeus, 1758)	C - C	
Ctenicera Latreille, 1829		
pectinicornis (Linnaeus, 1758)	B - B	
Selatosomus Stephens, 1830		
impressus (Fabricius, 1792)	B - C	4
cruciatus (Linnaeus, 1758)	C - C	4
aeneus (Linnaeus, 1758)	A - B	
Prosternon Latreille, 1834		
tessellatum (Linnaeus, 1758)	A - A	
Oedostethus LeConte, 1853		
quadripustulatus (Fabricius, 1792)	B - B	
Ampedus Dejean, 1833		
sanguineus (Linnaeus, 1758)	B - B	4
pomonae (Stephens, 1830)	B - B	4
sanguinolentus (Schrank, 1776)	B - B	4
pomorum (Herbst, 1784)	B - A	4
balteatus (Linnaeus, 1758)	A - A	
Sericus Eschscholtz, 1829		
brunneus (Linnaeus, 1758)	B - B	2,3
Melanotus Eschscholtz, 1829		
villosus (Geoffroy, 1785)	B - B	
castanipes (Paykull, 1800)	B - B	4
Agriones Eschscholtz, 1829		
striatus (Linnaeus, 1758)	B - B	
lineolus (Linnaeus, 1767)	A - A	
obscurus (Linnaeus, 1758)	A - A	
Ectinus Eschscholtz, 1829		
aterrimus (Linnaeus, 1761)	B - B	4
Dalopius Eschscholtz, 1829		
marginatus (Linnaeus, 1758)	A - A	
Adrastus Eschscholtz, 1829		
pallens (Fabricius, 1792)	A - B	
LYCIDAE Laporte de Castelnau, 1836		
Lygistopterus Dejean, 1833		
sanguineus (Linnaeus, 1758)	B - B	4
LAMPYRIDAE Fleming, 1821		
Lampyris Muller, 1764		
noctiluca (Linnaeus, 1758)	B - B	
CANTHARIDAE Imhoff, 1856 (1815)		
Cantharis Linnaeus, 1758		
fusca Linnaeus, 1758	A - A	
rustica Fallen, 1807	B - A	
obscura Linnaeus, 1758	B - C	
pulicaria Fabricius, 1781	B - B	
nigricans (Muller, 1776)	A - A	
pellucida Fabricius, 1792	B - B	
figurata Mannerheim, 1843	B - B	
rufa Linnaeus, 1758	B - B	
pallida Goeze, 1777	B - C	
fulvicollis Fabricius, 1792	B - B	
nigra (Degeer, 1774)	C - B	
pallidula Fallen, 1807	C - B	
lateralis Linnaeus, 1758	B - B	
Rhagonycha Eschscholtz, 1830		
fulva (Scopoli, 1763)	A - A	
testacea (Linnaeus, 1758)	B - B	
limbata Thomson, 1864	A - A	
lignosa (Muller, 1764)	B - B	
elongata (Fallen, 1807)	B - C	
atra (Linnaeus, 1767)	C - C	
Silis Charpentier, 1825		
nitidula (Fabricius, 1792)	C - D	4
Malthinus Latreille, 1806		
biguttatus (Linnaeus, 1758)	A - A	
frontalis (Marsham, 1802)	B - B	
Malthodes Kiesenwetter, 1852		
minimus (Linnaeus, 1758)	B - D	
DERMESTIDAE Latreille, 1804		
Dermestes Linnaeus, 1758		
frischii Kugelann, 1792	C - D	
murinus Linnaeus, 1758	B - D	
lardarius Linnaeus, 1758	B - B	
Attagenus Latreille, 1802		
schaefferi (Herbst, 1792)	B - C	

Species	Occure Latvia – Lubans	Note
smirnovi Zhantiev, 1973	B - D	
pellio (Linnaeus, 1758)	B - B	
Megaloma Herbst, 1792		
undata (Linnaeus, 1758)	C - C	
Anthrenus Geoffroy, 1762		
scropulariae (Linnaeus, 1758)	A - B	
museorum (Linnaeus, 1758)	A - B	
ANOBIIDAE Fleming, 1821		
Ptinus Linnaeus, 1767		
fur (Linnaeus, 1758)	A - C	
raptor Sturm, 1837	A - C	
Ernobius Thomson, 1859		
nigrinus (Sturm, 1837)	B - C	
mollis (Linnaeus, 1758)	B - C	
abietinus (Gyllenhal, 1808)	B - C	
Stegobium Motschulsky, 1860		
paniceum (Linnaeus, 1758)	A - C	
Anobium Fabricius, 1775		
punctatum (Degeer, 1774)	B - B	
rufipes Fabricius, 1792	C - C	4
Hadrobregmus Thomson, 1859		
pertinax (Linnaeus, 1758)	D - D	
Priobium Motschulsky, 1845		
carpini (Herbst, 1793)	B - B	
Xyletinus Latreille, 1809		
ater (Creutzer, 1796)	B - B	4
Dorcatoma Herbst, 1792		
robusta Sstrand, 1938	D - D	4
LYMEXYLIDAE Fleming, 1821		
Hylecoetus Latreille, 1806		
dermestoides (Linnaeus, 1761)	B - B	
flabellicornis (Schneider, 1791)	B - B	
TROGOSSITIDAE Latreille, 1892		
Peltis Muller, 1764		
grossa (Linnaeus, 1758)	C - B	4,5
Ostoma Laicharting, 1781		
ferruginea (Linnaeus, 1758)	B - B	4
CLERIDAE Latreille, 1802		
Thanasimus Latreille, 1806		
formicarius (Linnaeus, 1758)	B - B	
femoralis (Zetterstedt, 1828)	C - C	4
Trichodes Herbst, 1792		
apiarius (Linnaeus, 1758)	B - B	
Necrobia Olivier, 1795		
violacea (Linnaeus, 1758)	B - B	
MELYRIDAE Leach, 1815	B - B	
Dasytes Paykull, 1799	B - B	
niger (Linnaeus, 1761)	A - B	
flavipes (Olivier, 1790)	A - A	
fusculus (Illiger, 1801)	A - B	
Dolichosoma Stephens, 1830		
lineare (Rossi, 1792)	A - A	
MALACHIIDAE Fleming, 1821		
Malachius Fabricius, 1775		
aeneus (Linnaeus, 1758)	B - B	
bipustulatus (Linnaeus, 1758)	B - B	
Anthocomus Erichson, 1840		
rufus (Herbst, 1784)	C - B	
fasciatus (Linnaeus, 1758)	B - B	
BRACHYPTERIDAE Erichson,1845		
Kateretes Herbst, 1793		
pedicularius (Linnaeus, 1758)	B - B	
Brachypterus Kugelann, 1794		
urticae (Fabricius, 1792)	A - A	
Brachypterolus Grouvelle, 1913		
linariae (Stephens, 1830)	B - B	6
NITIDULIDAE Latreille, 1802		
Epuraea Erichson, 1843		
abietina Sahlberg, 1880	C - C	
pallescens Stephens, 1832	B - B	
borreila (Zetterstedt, 1828)	D - D	4
longula Erichson, 1845	D - D	4
biguttata (Thunberg, 1784)	B - B	4
unicolor (Olivier, 1790)	B - B	4
variegata (Herbst, 1793)	B - B	4
rufomarginata (Stephens, 1830)	C - B	4
limbata (Fabricius, 1787)	B - C	4
Meligethes Stephens, 1830	B - B	
flavimanus Stephens, 1830	B - B	
subaeneus Sturm, 1845	B - B	
cyaneiventris Foerster, 1849	B - B	
aeneus (Fabricius, 1775)	A - A	

Species	Occure Latvia – Lubans	Note
viridescens (Fabricius, 1787)	A - A	
bidens Brisout de Barneville, 1863	B - B	
ochropus Sturm, 1845	B - B	
viduatus (Heer, 1841)	A - B	
ovatus Sturm, 1845	A - B	
maurus Sturm, 1845	B - B	
umbrosus Sturm, 1845	B - B	
nigrescens Stephens, 1830	B - C	
Omosita Erichson, 1843		
depressa (Linnaeus, 1758)	B - B	
discoidea (Fabricius, 1775)	B - B	
colon (Linnaeus, 1758)	B - B	
Nitidula Fabricius, 1775		
bipunctata (Linnaeus, 1758)	A - B	
Soronia Erichson, 1843		
grisea (Linnaeus, 1758)	A - B	
Pocadius Erichson, 1843		
ferrugineus (Fabricius, 1775)	B - A	4
Cyllodes Erichson, 1843		
ater (Herbst, 1792)	B - B	4
Cychramus Kugelann, 1794		
variegatus (Herbst, 1792)	B - A	4
luteus (Fabricius, 1787)	A - A	
Glischrochilus Reitter, 1873		
quadriguttatus (Fabricius, 1777)	A - B	
hortensis (Geoffroy, 1785)	A - A	
quadripunctatus (Linnaeus, 1758)	B - B	
RHIZOPHAGIDAE Redtenbacher, 1845		
Rhizophagus Herbst, 1793		
ferrugineus (Paykull, 1800)	B - B	4
picipes (Olivier, 1790)	B - B	4
dispar (Paykull, 1800)	A - A	
bipustulatus (Fabricius, 1792)	A - A	
parvulus (Paykull, 1800)	B - A	
MONOTOMIDAE Lap. de Castelnau, 1840		
Monotoma Herbst, 1793		
picipes Herbst, 1793	B - D	
SILVANIDAE Kirby, 1837		
Silvanus Latreille, 1807		
bidentatus (Fabricius, 1792)	B - B	4
Psammoecus Latreille, 1829		
bipunctatus (Fabricius, 1792)	C - B	3,6
Dendrophagus Schoenherr, 1809		
crenatus (Paykull, 1799)	B - B	4
PHALACRIDAE Leach,1815		
Phalacrus Paykul, 1800		
fimetarius (Fabricius, 1775)	D - D	3
corruscus (Panzer, 1797)	B - B	3
Olibrus Erichson, 1845		
aeneus (Fabricius, 1792)	B - C	
millefolii (Paykull, 1800)	A - B	
nimaculatus Kuster, 1848	A - B	
Stilbus Seidlitz, 1872		
testaceus (Panzer, 1797)	B - B	3
CRYPTOPHAGIDAE Kirby, 1837		
Telmatophilus Heer, 1841		
caricis (Olivier, 1790)	C - B	3
typhae (Fallen, 1802)	A - A	3
schoenherri (Gyllenhal, 1808)	B - A	3
Cryptophagus Herbst, 1792		
acutangulus Gyllenhal, 1827	C - C	
pseudodentatus Bruce, 1934	B - C	
cellaris (Scopoli, 1763)	B - C	
Antherophagus Dejean, 1821		
nigricornis (Fabricius, 1787)	B - B	4
Atomaria Stephens, 1830		
pusilla (Paykull, 1798)	B - A	
fuscata (Schoenherr, 1808)	A - B	
lewisi Reitter, 1877	B - B	
atra (Herbst, 1793)	C - D	
EROTYLIDAE Latreille,1802		
Dacne Latreille, 1796		
bipustulata (Thunberg, 1781)	A - A	4
Triplax Herbst, 1793		
aenea (Schaller, 1783)	B - B	4
russica (Linnaeus, 1758)	B - B	4
BYTURIDAE Jacquelin du Val, 1858		
Byturus Latreille, 1796		

Species	Occure Latvia – Lubans	Note
ochraceus (Scriba, 1790)	A - A	
tomentosus (Degeer, 1774)	A - A	
CERYLONIDAE Billberg, 1820		
Cerylon Latreille, 1802		
histeroides (Fabricius, 1792)	B - B	
ferrugineum Stephens, 1830	B - B	
ENDOMYCHIDAE Leach, 1815		
Endomychus Panzer, 1795		
coccineus (Linnaeus, 1758)	B - B	
COCCINELLIDAE Latreille, 1807		
Coccidula Kugelann, 1798		
scutellata (Herbst, 1783)	B - B	3
rufa (Herbst, 1783)	B - B	3
Scymnus Kugelann, 1794		
nigrinus Kugelann, 1794	B - B	
frontalis (Fabricius, 1787)	B - B	
Hyperaspis Chevrolat, 1837		
campestris (Herbst, 1783)	C - D	
Chilocorus Leach, 1815		
renipustulatus (Scriba, 1790)	B - B	
Exochomus Redtenbacher, 1843		
quadripustulatus (Linnaeus, 1758)	B - B	
Psyllobora Chevrolat, 1837		
vigintiduopunctata (Linnaeus, 1758)	A - A	
Aphidecta Weise, 1893		
obliterata (Linnaeus, 1758)	C - B	4
Hyppodamia Chevrolat, 1837		
tredecimpunctata (Linnaeus, 1758)	B - B	
septemmaculata (Degeer, 1775)	C - B	
Semiadalia Crotch, 1874		
notata (Laicharting, 1781)	B - B	
Anisosticta Chevrolat, 1837		
novemdecimpunctata (Linnaeus, 1758)	B - B	3
Tytthaspis Crotch, 1874		
sedecimpunctata (Linnaeus, 1761)	A - B	
Adalia Mulsant, 1850		
conglomerata (Linnaeus, 1758)	C - B	
bipunctata (Linnaeus, 1758)	A - C	
Coccinella Linnaeus, 1758		
septempunctata Linnaeus, 1758	A - A	
quinquepunctata Linnaeus, 1758	A - A	
hieroglyphica Linnaeus, 1758	A - A	
Cocciaula Dobzhansky, 1925		
quatuordecimpustulata (Linnaeus, 1758)	A - A	
Myrrha Mulsant, 1846		
octodecimguttata (Linnaeus, 1758)	B - B	
Calvia Mulsant, 1846		
decemguttata (Linnaeus, 1767)	B - A	
Propylea Mulsant, 1846		
quatuordecimpunctata (Linnaeus, 1758)	A - A	
Myzia Mulsant, 1846		
oblongoguttata (Linnaeus, 1758)	B - B	
Anatis Mulsant, 1846		
ocellata (Linnaeus, 1758)	B - B	
Subcoccinella Agassiz, 1846		
vigintiquatuorpunctata (Linnaeus, 1758)	A - a	
CORYLOPHIDAE LeConte, 1852		
Orthoperus Stephens, 1829		
punctatus Wankowicz, 1865	B - B	
CORTICARIIDAE Curtis, 1829		
Latridius Herbst, 1793		
anthracinus Mannerheim, 1844	B - B	
minutus (Linnaeus, 1767)	B - B	
Enicmus Thomson, 1859		
rugosus (Herbst, 1793)	B - B	
transversus (Olivier, 1790)	B - C	
Stephostethus LeConte, 1878		
lardarius (Degeer, 1775)	B - C	
Cortodere Thomson, 1859		
nodifer (Westwood, 1839)	B - B	
Corticaria Marsham, 1802		
pubescens (Gyllenhal, 1827)	B - B	
umbilicata (Beck, 1817)	B - A	
obtetorum Motschulsky, 1867	B - B	
Cortinicara Johnson, 1975		
gibbosa (Herbst, 1793)	B - B	
Corticarina Reitter, 1880		
fuscula (Gyllenhal, 1827)	A - A	

Species	Occure Latvia – Lubans	Note
MYCETOPHAGIDAE Leach, 1815		
Litargus Erichson, 1846		
connexus (Geoffroy, 1785)	A - A	4
Mycetophagus Hellwig, 1792		
quadripustulatus (Linnaeus, 1761)	B - B	4
piceus (Fabricius, 1777)	B - B	4
multipunctatus Fabricius, 1792	B - B	4
Typhaea Stephens, 1829		
stercorea (Linnaeus, 1758)	B - B	
CIIDAE Leach, 1819		
Cis Latreille, 1796		
hispidus (Paykull, 1798)	B - B	4
boleti (Scopoli, 1763)	B - B	4
rugulosus Mellie, 1848	B - B	4
MELANDRIIDAE Leach, 1815		
Orchesia Latreille, 1807		
minor Walker, 1837	D - D	4
Xylita Paykull, 1798		
laevigata (Hellenius, 1786)	C - C	4
Serropalpus Hellenius, 1786		
barbatus (Schaller, 1783)	B - B	
MORDELLIDAE Latreille, 1802		
Mordella Linnaeus, 1758		
aculeata Linnaeus, 1758	B - B	
holomelaena Apfelbeck, 1914	B - B	
Hoshihananomia Kono, 1935		
perlata (Sulzer, 1776)	C - D	4
Mordellistena Costa, 1854		
parvula (Gyllenhal, 1827)	B - B	
variegata (Fabricius, 1798)	B - B	
COLYDIIDAE Erichson, 1845		
Synchita Hellwig, 1792		
humeralis (Fabricius, 1792)	C - C	4
Bitoma Herbst, 1793		
crenata (Fabricius, 1775)	B - B	4
LAGRIIDAE Latreille, 1825 (1820)		
Lagria Fabricius, 1775		
hirta (Linnaeus, 1758)	A - A	
TENEBRIONIDAE Latreille, 1802		
Bolitophagus Illiger, 1798		
reticulatus (Linnaeus, 1767)	B - B	4
Eledona Latreille, 1796		
agricola (Herbst, 1783)	B - B	4
Tenebrio Linnaeus, 1758		
molitor Linnaeus, 1758	A - B	
Uloma Dejean, 1821		
culinaris (Linnaeus, 1758)	C - C	4
rufa (Piller & Mitterpacher, 1783)	C - C	4
Melanimon Steven, 1829		
tibiale (Fabricius, 1781)	B - B	
Opatrum Fabricius, 1775		
sabulosum (Linnaeus, 1761)	B - B	
Mycetochara Berthold, 1827		
flavipes (Fabricius, 1792)	B - B	4
Crypticus Latreille, 1817		
quisquilius (Linnaeus, 1761)	A - B	
Corticeus Piller & Mitterpacher, 1783		
fraxini (Kugelann, 1794)	C - C	
pini (Panzer, 1799)	C - C	
Diaperis Geoffroy, 1762		
boleti (Linnaeus, 1758)	B - B	4
OEDEMERIDAE Latreille, 1810		
Chrysanthia Schmidt, 1844		
viridissima (Linnaeus, 1758)	A - B	
nigricornis (Westhoff, 1881)	A - B	
Oedemera Olivier, 1789		
virescens (Linnaeus, 1767)	A - A	
lurida (Marsham, 1802)	A - A	
PYTHIDAE Solier, 1834		
Pytho Latreille, 1796		
depressus (Linnaeus, 1767)	B - B	4
PYROCHROIDAE Latreille, 1807		
Schizotus Newmann, 1838		
pectinicornis (Linnaeus, 1758)	B - B	
SALPINGIDAE Leach, 1815		
Rhocerus Mulsant, 1859		
foveolatus (Ljungh, 1823)	B - B	4
ANTHICIDAE Latreille, 1819		
Notoxus Geoffroy, 1762		
monoceros (Linnaeus, 1761)	A - A	

Species	Occure Latvia – Lubans	Note
Stictleumus Pic, 1894		
tibias (Marseul, 1879)	B - B	
Omonadus Mulsant & Rey, 1866		
floralis (Linnaeus, 1758)	B - B	
Anthicus Paykull, 1798		
ater (Panzer, 1796)	B - B	
antherinus (Linnaeus, 1761)	B - B	
SCRAPTIIDAE Mulsant, 1856 / Gistel, 1856		
Anaspis Geoffroy, 1762		
frontalis (Linnaeus, 1758)	A - A	
rufilabris (Gyllenhal, 1827)	B - A	
CERAMBYCIDAE Layreille, 1802		
Spondylis Fabricius, 1775		
buprestoides (Linnaeus, 1758)	A - B	
Asemum Eschscholtz, 1830		
striatum (Linnaeus, 1758)	B - B	
Tetropium Kirby, 1837		
castaneum (Linnaeus, 1758)	B - B	
Rhagium Fabricius, 1775		
mordax (Degeer, 1775)	B - B	
inquisitor (Linnaeus, 1758)	B - B	
Pachyta Dejean, 1821		
quadrimaculata (Linnaeus, 1758)	C - B	
Gaurotes *LeConte, 1850*		
virginea (Linnaeus, 1758)	B - B	
Armaropsis LeConte, 1850		
collaris (Linnaeus, 1758)	A - B	
Alosterna Mulsant, 1863		
tabacicolor (Degeer, 1775)	A - A	
Anoplodera Mulsant, 1839		
livida (Fabricius, 1777)	A - B	
maculicornis (Degeer, 1775)	A - B	
rubra (Linnaeus, 1758)	A - B	
reyi (Heyden, 1886)	A - B	
virens (Linnaeus, 1758)	D - D	4
Leptura Linnaeus, 1758		
quadrifasciata Linnaeus, 1758	A - A	
melanura Linnaeus, 1758	A - A	
Strangalia Audinet - Serville, 1835		
attenuata (Linnaeus, 1758)	B - B	
Malachus Fabricius, 1792		
minor (Linnaeus, 1758)	B - B	
Aromia Audinet - Serville, 1833		
moschata (Linnaeus, 1758)	C - C	5
Lamia Fabricius, 1775		
textor (Linnaeus, 1758)	C - C	5,6
Monochamus Dejean, 1821		
sutor (Linnaeus, 1758)	B - B	
galloprovincialis (Olivier, 1795)	B - B	
Acanthocinus Dejean, 1821		
aedilis (Linnaeus, 1758)	B - B	
griseus (Fabricius, 1792)	B - D	
Agapanthia Audinet - Serville, 1835		
villosoviridescens (Degeer, 1775)	A - A	
Saperda Fabricius, 1775		
carcharias (Linnaeus, 1758)	B - B	
populnea (Linnaeus, 1758)	B - B	
Tetrops Kirby, 1826		
praeusta (Linnaeus, 1758)	B - B	
MEGALOPODIDAE Latreille, 1802		
Zeugophora Kunze, 1818		
scutellaris Suffrian, 1840	B - B	
subspinosa (Fabricius, 1781)	A - B	
ORSODACNIDAE Thomson, 1859		
Orsodacne Latreille, 1802		
cerasi (Linnaeus, 1758)	B - C	
BRUCHIDAE Latreille, 1802		
Bruchus Muller, 1764		
rufimanus Boheman, 1833	B - B	
CHRYSOMELIDAE Latreille, 1802		
Plateumaris Thomson, 1859		
braccata (Scopoli, 1772)	C - C	2,3
rustica (Kunze, 1818)	B - B	3,
Donacia Fabricius, 1775		
semicuprea Panzer, 1796	B - C	3,
sparganii Ahrens, 1810	B - B	3,
aquatica (Linnaeus, 1758)	A - B	3

Species	Occure Latvia – Lubans	Note
bicolor Zschach, 1788	C - B	3
obscura Gyllenhal, 1813	B - B	3
antiqua Kunze, 1818	B - C	3
clavipes Fabricius, 1792	B - B	3
Cassida Linnaeus, 1758		
viridis Linnaeus, 1758	A - B	
vibex Linnaeus, 1767	A - A	
denticollis Suffrian, 1844	B - B	
Leptinotarsa Chevrolat, 1837		
decemlineata (Say, 1824)	A - B	
Chrysolina Motschulsky, 1860		
graminis (Linnaeus, 1758)	B - B	
polita (Linnaeus, 1758)	A - B	
staphylaea (Linnaeus, 1758)	A - B	
varians (Schaller, 1783)	A - B	
fastuosa (Scopoli, 1763)	A - A	
Gastrophysa Chevrolat, 1837		
polygoni (Linnaeus, 1758)	A - C	
viridula (Degeer, 1775)	A - B	
Phaedon Latreille, 1829		
cochleariae (Fabricius, 1792)	A - B	
armoraciae (Linnaeus, 1758)	A - A	
Hydrothassa Thomson, 1859		
glabra (Herbst, 1783)	B - B	
marginella (Linnaeus, 1758)	B - B	
Prasocuris Latreille, 1802		
phellandrii (Linnaeus, 1758)	B - B	3
Chrysomela Linnaeus, 1758		
vigintipunctata (Scopoli, 1763)	B - C	
populi Linnaeus, 1758	A - A	
tremula Fabricius, 1787	B - C	
Linaeidea Motschulsky, 1860		
aenea (Linnaeus, 1758)	B - B	
Gonioctena Chevrolat, 1837		
viminalis (Linnaeus, 1758)	B - B	
quinquepunctata (Fabricius, 1787)	B - B	
Phratora Chevrolat, 1837		
vulgatissima (Linnaeus, 1758)	A - A	
vitellinae (Linnaeus, 1758)	A - A	
atrovirens (Cornelius, 1857)	B - B	
Galerucella Crotch, 1873		
nymphaeae (Linnaeus, 1758)	B - A	7
lineola (Fabricius, 1781)	A - A	
calmariensis (Linnaeus, 1767)	C - B	3
pusilla (Duftschmid, 1825)	C - B	3
tenella (Linnaeus, 1761)	B - B	
Pyrrhalta Joannis, 1866		
viburni (Paykull, 1799)	B - B	
Lochmaea Weise, 1883		
caprea (Linnaeus, 1758)	A - A	
Galeruca Geoffroy, 1762		
tanaceti (Linnaeus, 1758)	B - B	
Agelastica Chevrolat, 1837		
alni (Linnaeus, 1758)	A - A	
Phyllobrotica Chevrolat, 1837		
quadrimaculata (Linnaeus, 1758)	B - C	
Alticinae Newman, 1834	non det.	
Bromius Chevrolat, 1837		
obscurus (Linnaeus, 1758)	A - B	
Coptocephala Chevrolat, 1837		
unifasciata (Scopoli, 1763)	B - C	
Cryptocephalus Geoffroy, 1762		
octopunctatus (Scopoli, 1763)	B - B	
sexpunctatus (Linnaeus, 1758)	C - C	4
distinguendus Schneider, 1792	C - C	4
sericeus (Linnaeus, 1758)	B - B	
coerulescens Sahlberg, 1830	B - B	
decemmaculatus (Linnaeus, 1758)	C - C	
moraei (Linnaeus, 1758)	B - B	
pini (Linnaeus, 1758)	B - B	
labiatus (Linnaeus, 1761)	B - B	
pusillus Fabricius, 1777	B - B	
ANTHRIBIDAE Billberg, 1820		
Anthribus Geoffroy, 1762		
nebulosus Forster, 1771	B - B	4
ATTELABIDAE Billberg, 1820		
Pselaphorhynchites Schilsky, 1903		
nanus (Paykull, 1792)	B - C	
tomentosus (Gyllenhal, 1839)	B - B	
Rhynchites Schneider, 1791		
cupreus (Linnaeus, 1758)	B - B	
Kyctiseus Thomson, 1859		

Species	Occure Latvia – Lubans	Note
betulae (Linnaeus, 1758)	B - C	
populi (Linnaeus, 1758)	B - B	
Deporaus Leach, 1819		
mannerheimii (Hummel, 1823)	B - B	
betulae (Linnaeus, 1758)	B - B	
Apoderus Olivier, 1807		
coryli (Linnaeus, 1758)	B - B	
BRENTIDAE Billberg, 1820		
Apion Herbst, 1797		
hookeri Kirby, 1808	B - C	
onopordi Kirby, 1808	B - B	
sulcifrons Herbst, 1797	B - B	
flavimanum Gyllenhal, 1833	B - B	
vicinum Kirby, 1808	B - B	
alomarium Kirby, 1808	D - D	
pallipes Kirby, 1808	B - B	
urticarium (Herbst, 1784)	B - C	
fulvipes (Geoffroy,1785)	A - B	
nigritarse Kirby, 1808	D - B	
filirostre Kirby, 1808	A - B	
trifolii (Linnaeus, 1768)	B - B	
ruficrus Germar, 1817	D - D	
apricans Herbst, 1797	A - A	
varipes Germar, 1817	B - B	
assimile Kirby, 1808	B - B	
onobrychis Boh., 1854	B - B	
dissimile Germar, 1817	C - B	
violaceum Kirby, 1808	B - A	
marchicum Herbst, 1797	B - B	
affine Kirby, 1808	B - B	
curtirostre Germar, 1817	D - B	
frumentarium (Linnaeus, 1758)	B - C	
cruentatum Walton, 1844	C - B	
rubiginosum Grill, 1893	C - B	
rubens Stephens, 1839	C - C	
tenue Kirby, 1808	B - B	
trifolii Kirby, 1808	B - B	
loti Kirby, 1808	B - B	
virens Herbst, 1794	A - A	
gyllenhali Kirby, 1808	D - B	
cerdo Gerstaecker, 1854	B - B	
pomonae (Fabricius, 1798)	B - B	
veniae (Paykull, 1800)	B - B	
ervi Kirby, 1808	A - B	
Nanophyes Schoenherr, 1838		
marmoratus (Goeze, 1777)	A - A	3
CURCULIONIDAE Latreille, 1802		
Otiorhynchus Germar, 1824		
raucus (Fabricius, 1777)	B - B	
scaber (Linnaeus, 1758)	B - C	
ovatus (Linnaeus, 1758)	A - A	
tristis (Scopoli, 1763)	A - B	
Phyllobius Germar, 1824		
viridaeris (Laicharting, 1781)	B - B	
oblongus (Linnaeus, 1758)	D - B	
pyri (Linnaeus, 1758)	A - A	
maculicornis Germar, 1824	A - B	
argentatus (Linnaeus, 1758)	B - B	
arborator (Herbst, 1797)	B - B	
calcaratus (Fabricius, 1792)	B - B	
pomaceus Gyllenhal, 1834	A - A	
Polydrusus Germar, 1817		
pallidus (Gyllenhal, 1831)	C - B	
undatus (Fabricius, 1781)	D - B	
ruficornis (Bonsdorff, 1785)	A - A	
mollis (Strom, 1768)	B - B	
Sciaphilus Schoenherr, 1823		
asperatus (Bonsdorff, 1785)	A - A	
Strophosoma Billberg, 1820		
capitatum (Degeer, 1775)	A - A	
Philopedon Stephens, 1831		
plagiatus (Schaller, 1783)	B - B	
Chlorophanus Sahlberg, 1823		
viridis (Linnaeus, 1758)	A - B	
Sitona Germar, 1817		
inops (Schoenherr, 1832)	A - B	
suturalis Stephens, 1831	B - B	
lepidus Gyllenhal, 1834	C - B	
ambiguus Gyllenhal, 1834	A - A	
hispidulus (Fabricius, 1777)	B - A	
Hypera Germar, 1817		
adspersa (Fabricius, 1792)	B - C	

Species	Occure Latvia – Lubans	Note
rumicis (Linnaeus, 1758)	D - D	
arator (Linnaeus, 1758)	C - B	
diversipunctata (Schrank,1798)	A - B	
nigrirostris (Fabricius, 1775)	A - A	
Coniocleonus Motschulsky, 1860		
hollbergi (Fahraeus, 1842)	B - B	
nebulosus (Linnaeus, 1758)	B - B	
Cleonis Dejean, 1821		
piger (Scopoli, 1763)	B - B	
Lixus Fabricius, 1801		
iridis Olivier, 1807	B - B	
Hylobius Germar, 1817		
abietis (Linnaeus, 1758)	A - A	
pinastri (Gyllenhal, 1813)	A - A	
Pissodes Germar, 1817		
pini (Linnaeus, 1758)	B - B	
validirostris (Sahlberg, 1834)	A - B	
harcyniae (Herbst, 1795)	B - A	
piniphilus (Herbst, 1797)	A - A	
Magdalis Germar, 1817		
violacea (Linnaeus, 1758)	A - B	
Cryptorhynchus Illiger, 1807		
lapthi (Linnaeus, 1758)	B - B	
Hydronomus Schoenherr, 1825		
alismatis (Marsham, 1802)	C - B	3
Bagous Germar, 1817		
nodulosus Gyllenhal, 1836	B - B	3
lutulosus (Gyllenhal, 1827)	B - B	3
Notaris Germar, 1817		
bimaculatus (Fabricius, 1787)	A - A	3
scirpi (Fabricius, 1792)	B - A	3
acridulus (Linnaeus, 1758)	a - A	3
Grypus Germar, 1817		
equiseti (Fabricius, 1775)	B - B	
brunnirostris (Fabricius, 1792)	C - C	3
Tanysphyrus Germar, 1817		
lemnae (Paykull, 1792)	B - B	3
Dorytomus Germar, 1817		
filirostris (Gyllenhal, 1836)	B - B	
dejeani Faust, 1882	C - C	4
occallescens (Gyllenhal, 1836)	C - C	
Pelenomus Thomson, 1859		
velaris (Gyllenhal, 1827)	C - B	3
Rhinoncus Schoenherr, 1825		
bruchoides (Herbst, 1784)	B - B	
castor (Fabricius, 1792)	B - B	
Scleropterus Schoenherr, 1825		
serratus (Germar, 1824)	B - B	
Tapinotus Schoenherr, 1826		
sellatus (Fabricius, 1794)	C - C	3,4
Zacladus Reitter, 1913		
geranii (Paykull, 1800)	A - A	
Ceutorhynchus Germar, 1824		
ignitus Germar, 1824	B - B	
pervicax Weise, 1883	B - B	
barbareae Sufrian, 1847	B - B	
assimilis (Paykull, 1792)	B - B	
campestris Gyllenhal, 1837	B - B	
Limnobaris Bedel, 1885		
t-album (Linnaeus, 1758)	A - A	3
dolorosa (Goeze, 1777)	B - A	3
Anthonomus Germar, 1817		
pomorum (Linnaeus, 1758)	A - B	
humeralis (Panzer, 1795)	C - B	
rubi (Herbst, 1795)	B - B	
brunnipennis Curtis, 1840	A - a	
phyllocola (Herbst, 1795)	B - B	
pinivorax Silfverberg, 1977	B - B	
Furcipus Desbrochers des Loges, 1868		
rectirostris (Linnaeus, 1758)	B - B	
Brachonyx Schoenherr, 1825		
pineti (Paykull, 1792)	B - B	
Curculio Linnaeus, 1758		
nucum Linnaeus, 1758	B - B	
crux Fabricius, 1777	B - C	
salicivorus Paykull, 1792	B - B	
pyrrhoceras Marsham, 1802	C - c	
Tychius Germar, 1817		
medivaginis Brisout de Barneville, 1862	B - B	
meliloti Stephens, 1831	B - B	
stephensi Gyllenhal, 1836	B - B	

Species	Occure Latvia – Lubans	Note
Ellescus Dejean, 1821		
scanicus (Paykull, 1792)	B - C	
bipunctatus (Linnaeus, 1758)	B - B	
Acalyptus Schoenherr, 1833		
carpini (Fabricius, 1792)	B - B	
Gymnetron Schoenherr, 1825		
labile (Herbst, 1795)	B - B	
pascuorum (Gyllenhal, 1813)	A - B	
melanarium (Germar, 1821)	A - B	
linariae (Panzer, 1793)	B - C	4
Miarus Schoenherr, 1826		
campanulae (Linnaeus, 1767)	B - B	
graminis (Gyllenhal, 1813)	B - B	
Rhynchaenus Clairville & Schellenberg, 1798		
lonicerae (Herbst, 1795)	A - B	
stigma (Germar, 1821)	B - B	
pseudostigma Tempere, 1982	C - B	
populicola Silfverberg, 1977	B - C	
Rhamphus Clairville & Schellenberg, 1798		
pulicarius (Herbst, 1795)	B - B	
Rhyncolus Germar, 1817		
ater (Linnaeus, 1758)	B - C	
Hylurgops LeConte, 1876		
glabratus (Zetterstedt, 1828)	B - B	
Hylastes Eichson, 1836		
ater (Fabricius, 1792)	A - B	
Hylesinus Fabricius, 1801		

Species	Occure Latvia – Lubans	Note
fraxini (Panzer, 1799)	A - a	
Tomicus Latreille, 1802		
piniperda (Linnaeus, 1758)	A - A	
Polygraphus Erichson, 1836		
poligraphus (Linnaeus, 1758)	a - B	
Pityogenes Bedel, 1888		
calcogarphus (Linnaeus, 1761)	B - B	
quadridens (Hartig, 1834)	B - B	
bidentatus (Herbst, 1783)	B - c	
Ips Degeer, 1775		
acuminatus (Gyllenhal, 1827)	B - B	
sexdentatus (Boerner, 1776)	B - C	
Trypophloeus Fairmaire, 1868		
alni (Lindemann, 1875)	B - C	
Cryphalus Erichson, 1836		
piceae (Ratzeburg, 1837)	B - B	
Pityophthorus Eichhoff, 1864		
micrographus (Linnaeus, 1758)	B - C	
pityographus (Ratzeburg, 1837)	B - B	
Trypodendron Stephens, 1830		
domesticum (Linnaeus, 1758)	B - A	
lineatum (Olivier, 1795)	B - A	
signatum (Fabricius, 1792)	B - B	
Xyleborus Eichhoff, 1864		
dispar (Fabricius, 1792)	B - C	
Scolytus Geoffroy, 1762		
ratzeburgi Janson, 1856	A - B	
intricatus (Ratzeburg, 1837)	C - C	4