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THE HISTORY OF INVESTIGATIONS OF WEEVILS, BARK BEETLES AND PINHOLE BORERS (COLEOPTERA: CURCULIONIDAE, INCL. SCOLYTINAE AND PLATYPODINAE) IN LATVIA

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The history of investigations of weevils, bark beetles and pinhole borers in Latvia is presented in this article. It is more than 220 years old. The first information about the weevils and bark beetles in Latvia can be found in the monographs (Fischer 1778, 1784, 1791). The bibliographical list of 182 sources is composed.

Key words: Coleoptera, Curculionidae, Scolytinae, Platypodinae, Latvia, investigations, history, bibliography.

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The number of species of weevils, bark beetles and pinhole borers (Curculionidea) of the world fauna is estimated on a miscellaneous, because the weevils are explored not with identical completeness in different parts of the world. Entomologists regularly discover and describe new species of weevils. Estimation of number of species of Curculionidae has grown from 30 000 (Endrödi 1961) to 50 000 (Kippenberg 1981). Hoffman (1950) even considered Curculionidae as the greatest family of animals. This opinion is supported also by newer data (Alonso-Zarazaga, Lyal 1999). According to this data in the world live about 500 000 species of weevils only about every tenth of which is described (Lyal, King 1996).

In this article we consider Curculionidae according to the taxonomy of J.F. Lawrence and A.F. Newton (1995). In current research we relate concept weevils to subfamilies: Brachycerinae, Curculioninae, Dryophthorinae, Cossoninae; concept bark beetles we relate to Scolytinae and concept pinhole borers we relate to Platypodinae.

The special research of the history of Curculionidae sensu lato in Latvia was not made till now. Historical review of research of bark beetles in Latvia is presented in monograph (Šmits 1960). The analogous works were made also on Elateridae (Spuris 1981), Cantharidae (Melecis 1975), Carabidae (Spuris 1983; Barševskis 2003),

Cerambycidae (Spuris1984), Coccinellidae (Spuris 1990), Scarabaeidae (Spuris 1991a) Dytisciformia (Spuris 1991b; Barševskis et al. 2005) and Chrysomelidae (Bukejs 2008).

The aim of this work is to summarize and to analyse the bibliographical data about the weevils, bark beetles and pinhole borers of Latvian fauna, to give the short essay about the history of investigations and to make bibliographical list.

The first data about the weevils of Latvian fauna was published in the second half of the 18th century in J.B. Fischer's (1778, 1784, 1791) works about the nature of Livland. In the first edition of the monograph (Fischer 1778) seven species of the weevils are mentioned (*Curculio cerafi* L., *C. frumentarius* L., *C. pini* L., *C. quercus* L., *C. pomorum* L., *C. nucum* L. and *C. incanus* L), one of them *Curculio frumentarius* L. in the modern taxonomy is the *Apion frumentarium* L. (Apionidae). After some additions (Fischer 1784), in the second edition of the monograph (Fischer 1791) 13 species are already mentioned, including *Curculio frumentarius* L. (Apionidae) and Curculio Germanus L., which in the modern taxonomy is the *Liparus germanus* L. This species is not mentioned in the catalogue of Latvian beetles (Telnov 2004). J.B. Fischer has mentioned one bark beetle species - *Ips typographus* (L.). The author has related this species to skin beetles (as *Dermestes typographus* L.). Z. Spuris (1981, 1983) regarded, that J.B. Fischer has made his investigations in the Rīga district.

Johan Groschke, the professor of the Gymnasium of Jelgava, has published some coleopterological articles in 19th century. There were mentioned 13 species of weevils for Kurzeme (*Curland*). In this investigation were mentioned species which are considered as pests (Groschke 1805).

In 1818 the first catalogue of beetles of Latvian fauna has been published. There are 725 species mentioned, those were found in the environs of Rīga and Rīga district (in that time it was a large territory including the Rūjiene environs). The author of this catalogue was not mentioned when the catalogue was published, but from other sources (Kawall 1868) is clear that it was the citizen of Rīga K.H. Precht (1818). This catalogue feature is that concrete places of finds are given for rare species in it. According to the J. Fabricius system there are 5 genera and 41 species of the weevils. Three species (*Calandra picea, Rhynchaenus festucae* and *Lixus incurvus*) in the catalogue are not determined for certain. *Lixus incurvus* was indicated as n. sp., new species for science, though the description of this species has not been published. Material that was in the K. Precht's collection is not remained.

In 1829 Benjamin Gimmerthal published the catalogue of the Livland beetles, in which about 800 species were listed. (Gimmerthal 1829). As B. Gimmerthal lived in Rīga it was possible to suppose that those species were observed in vicinities of Rīga. Some names of the species are repeated or are difficult to determine. Correctness of the data published in this paper can be checked up, because Gimmerthal's collection is remained at the Zoological museum of Latvian University in Rīga.

In the same year the citizen of Jelgava J.G. Fleischer had published a list of beetles of local fauna (Fleischer 1829). In this list are mentioned only new beetles species for the fauna of the East Baltic. There are 640 species in this list. Five species of them are referable to the bark beetles and 83 species are referable to weevils; one of them *Orobitis Lythri* F., in the modern taxonomy is the *Nanophyes marmoratus* Gz. (Apionidae) and one species (*Falciger guttula F.*) is not determined.

In the review of phenological observations in Kurzeme J.H. Kawall has mentioned some species of Curculionidae (Kawall 1865, 1866a, 1866b).

At the end of the 19th century the George Seidlitz's monograph about the fauna of Baltic beetles was published. This monograph was published in two editions (Seidlitz 1872-1875, 1887-1891). It is

important to know that the Baltic States in that time were Estonia and Latvia, without Latgale. G. Seidlitz writing his monograph used data from local collections of beetles. A lot of the beetles collected in Kurzeme have been passed to the author by researchers of the nature – J.H. Kawall, A. Rozenberg and K. Bitner (Spuris 1984). Unfortunately the localities for species are rarely mentioned in this monograph, usually there is evaluation of distribution. Sometimes there are directions to Kurzeme (Curland), especially in the first edition, Livland and Rīga or it is mentioned, that in Europe the species are distributed till Kurzeme or Estonia. That's why it is not possible to define the number of species exactly for Latvia and Estonia. In the monograph we can find keys for determination of families, genera and all species (including also potential species). In the first edition of monograph (Seidlitz 1872-1875) 235 species of the weevils are described, but there are concrete localities (Curland, Rīga and other) for 50 species in Latvia, in the second edition (Seidlitz 1887-1891) respectively 242 species of the weevils totally and only 33 species feasibly to Latvia. In this monographs author has mentioned 31 species of bark beetles. Spuris (1973) argues away the importance of the Seidlitz's monograph as the basic work for the fauna of Latvian beetles.

In 1883 the article about the beetles of Poland Lifland was published (Ulanowski 1883). At that time Latgale (the eastern part of Latvia) belonged to Poland Lifland. It should be mention, that these faunal data are very inexact and doubtful (Barševskis 1993). In the lists of beetle families in Latvia published earlier a lot of authors did not take account of this publication (Šmits 1960; Spuris 1981, 1983, 1984, 1990, 1991a, 1991b; Barševskis 2003; Barševskis et al., 2005; Bukejs 2008).
In this time two small articles (Müthel 1886, 1889) were published, where we can find faunal data on ten species of the weevils. Information about weevils and bark beetles in Latvia can be found also in Sintenis (1900).

The first information about the bark beetles and weevils as pests of wood can be found in articles published by Willkom (1871), Fritsche (1879), Fromm (1880), Ostvald (1880), Buhse (1880) and Baltiņš (1899). In the first half of the 20th century a few publications where it is possible to find the information about bark beetles and weevils as the pests of wood were published (Rodzjanko 1915; Brammanis 1928, 1929, 1930b, 1937, 1938, 1940; Lorencs 1926; Ions 1927; Saars 1930; Stauvers 1935).

In 1905 the catalogue of the beetles of the Baltic fauna was published. The author of this catalogue is H. von Rathlef. This catalogue was written according to the Seidlitz's (1887-1891) monograph and other faunal publications of that time. In this catalogue with the supplement (Rathlef 1905, 1921), 267 species of weevils and 32 species of bark beetles are mentioned.

In this period noteworthy papers were published by L. Heyden, J. Mikutowicz, T. Lackschewitz, L. Brammanis, H. Lindberg and L. Gailītis. Heyden (1903) in his article mentioned 18 weevil species for Lielvārde; Lindberg (1932) mentions 36 species for Latvian fauna.

Brammanis (1930a) mentions 24 species of weevils and 4 species of bark beetles from Inčukalns forestry. Information about the bark beetles in Cīrava was published (Brammanis 1926 cf. Šmits 1960). The author has mentioned 24 species of bark beetles in this article, three of them are new for Latvian fauna.

Gailītis (1932) in his promotion work has mentioned 36 species of bark beetles, five species of them are new for Latvian fauna. The author has published also other papers where wood pests are mentioned (Gailītis 1926, 1928, 1929a, 1929b, 1930a, 1930b, 1931, 1933, 1934, 1935, 1936, 1940).

J. Mikutowicz and T. Lackschewitz are the authors of several faunal publications about beetles in Latvia. In their publications (Mikutowicz 1905, 1911; Lackschewitz, Mikutowicz 1939; Lackschewitz 1927) authors has mentioned 61 species of weevils and 17 species of bark beetles.

The Professor E. Ozols (1955) has collected in Rīga 2 new species of bark beetles for Latvian fauna. Šmits (1960) has collected in Ogre one new species for Latvian fauna.

In the 20th century a lot of authors have published articles where weevils are mentioned as pests of cultivated plants and wood. Thomson (1939-1940, 1940) has studied the pests of sugar beets and has mentioned beet weevil *Chromoderus fasciatus* Müll. as the pest of sugar beets. Eglītis (1956a, 1956b) have published the article about corn pests and has mentioned 3 weewils (*Sitophilus granarius* L., *S. oryzae* L., *S. zeamais* Motsch.); Žuravska (1986) has written about weevils on rape, but Petrova et. al. (2000, 2006) – on strawberries. Priedītis (1971) has mentioned 14 weevil species and 5 bark beetles as apple tree pests. About the weevils and bark beetles meaning in agrocenosis and forest was published by Danka (1950), Eglītis (1954), E. Ozols (1948, 1955, 1963, 1973), Peņģerots-Svešais (1927), Rupais (1959, 1962, 1981, 1999), Smarods, Liepa (1956), Priedītis (1979).

It is necessary to give particular attention to Gints Ozols and co-authors works on study of weevils and bark beetles as forest pests. G. Ozols studied separate species of the weevils as wood pests: *Philopedon plagiatus* (Schall.) (Ozols 1959) and *Brachyderes incanus* (L.) (Ozols 1962ą).

In paper about spruce pests and that ecological groups G. Ozols (1968c) mentioned 5 weevil species *Pissodes harcyniae* (Hrbst.), *Hylobius abietis* (L.), *Hylobius pinastri* (Gyll)., *Hylobius piceus* (Deg.), *Magdalis* sp. and 25 bark beetle species.

Ozols (1982) has published the material about insects of pine and spruce, where 23 weevils species and 33 bark beetles species, their ecological individuality, phenological and faunal data.

In monograph "Dendrophagous insects of pine and spruce in the Latvian forests" ["Priedes un egles dendrofāgie kukaiņi Latvijas mežos"] (Ozols 1985) are mentioned 23 weevil species and 36 species of bark beetles. The author has published also other papers where are mentioned weevils and bark beetles as forest pests (Ozols 1957, 1958a, 1958b, 1958c, 1960a, 1960b, 1960c, 1962b, 1962c, 1962d, 1963, 1964a, 1964b, 1965, 1966, 1967, 1968a, 1968b, 1970, 1971a, 1971b, 1971c, 1971d, 1971e, 1973, 1974a, 1974b, 1975a, 1975b, 1981).

There were investigations dedicated to the study how to fight against dangerous wood pests. M. Bičevskis and G. Ozols have published some articles about pests of forest where there is information on biology of bark beetles and weevils, about economic meaning and methods of struggle against them (Ozols, Bičevskis 1971, 1973 1976a, 1976b, 1976c, 1978a, 1978b, 1978c, 1979, 1980a, 1980b, 1981, 1982a, 1982b; Ozols et al. 1973, 1983; Bičevskis, Ozols 1983, 1984; Bičevskis 1983). Similar information can be found in other authors publications (Šmits 1964; Baumanis, Ozols 1976; Kaucis 1967; Saksons 1966, 1967, 1973, 1976; Vītola et al. 1977; Vilks 1983).

In 1960 was published monograph "The bark beetles" ["Mizgrauži"] (Šmits 1960). There are data about the history of research of bark beetles in Latvia, their ecological peculiarity, phenological data and information on bark beetles morphology. In this monograph we can find keys for determination of Latvian species. V. Šmits has mentioned 53 bark beetles species for Latvian fauna.

Information about the largest families of the beetles can be found in the books "Latvian animals" ["Latvijas dzīvnieki"] (Šmits, Spuris 1966) and "The world of Latvian animals" ["Latvijas dzīvnieku pasaule"] (Spuris1974). There can be found general information about the weevils and bark beetles. There are mentioned 400 species of Curculionidae id est. 346 weevil species and 54 species of bark beetles (Šmits, Spuris 1966) and about 408 species of Curculionidae id est. 350 weevil species and 58 species of bark beetles (Spuris1974) for the Latvian fauna.

Spuris (1953) also was published article about animal species of lake habitat, where are also

mentioned Curculionidae species. In 1957 was published guides to Latvian Coleoptera (Trauberga 1957), where keys for determination of some species of weevils and bark beetles can be found.

There is information about weevils of Latvian fauna in Dieckman (1968, 1973, 1980), where faunal data for some species were mentioned. R. Varzinska and G. Mileders in their publication about the Moricsala Nature Reserve have meant 19 weevil species (Varzinska, Milenders 1981). There are data about three species of the weevils and one species of the bark beetles in review of beetles of pig-breeding complex in Jumprava (Stiprais, Varzinska 1985).

In 1993 the monograph "The beetles of Eastern Latvia" (Barševskis 1993) was published where the author has mentioned 167 weevil species, but later the author mentions six species (*Otiorhynchus* sp., *Omiamima concinna* Boh., *Phyllobius roberetanus* Gredl., *Polydrusus impar* Gz., *Coniocleonus nigrosuturatus* Gz., *Acalles lemur* Germ.), misidentified and deleted from the list of beetles of Eastern Latvia. Author has mentioned also 25 species of the bark beetles. Coleopterological material for this publication was collected in Latgale, Augšzeme and eastern part of Vidzeme. In this monograph besides the large amount of faunal data, there are also a review of history of research of beetles in eastern Latvia, detailed description of collecting methods, the ecological review of habitats, and morphological and systematic notes for some groups of beetles.

In 1996 Danish coleopterologist Eivind Palm has published monograph "The weevils of northern Europe" (Palm 1996). In this monograph new data on weevils of Latvian fauna are found. The author personally has determined material from eastern Latvia. In this monograph totally 54 weevil species with the concrete localities are mentioned.

Silferberg (1992, 1996 and 2004) and Lundberg (1995) in their catalogues of Coleoptera are mentioned information about Latvian weevils and bark beetles.

Barševskis (1997a) has mentioned 344 species of the weevils in article "The materials about the weevils (Coleoptera: Curculionidae) fauna of Latvia and check-list of species". The history of research of weevils is analysed and a check-list of weevils of Latvian fauna is presented in this article. There are faunal data on 226 species, including 2 new species for North Europe, 5 – for the Baltic States and 25 new species for Latvia. In total about 3200 specimens processed in this research, major part of coleopterological material was collected by author in eastern Latvia. This paper is the most valuable work dedicated to investigation of weevils in Latvia.

Barševskis (1997c) has published article where pinhole borer species *Platypus cylindrus* (F.) for Latvian fauna was mentioned for the first time. This species was collected by the author in Silene Nature Park. It is single record of this species in the Baltic States.

In 1997 the catalogue of Latvian Coleoptera was published (Telnov et al. 1997), where 384 species of Curculionidae are mentioned, id est. 316 weevil species, 67 bark beetle species and one pinhole borer. In the second edition of the catalogue (Telnov 2004) the number of species of Curculionidae is larger – 442 species, id est. 373 weevil species, 68 species of bark beetles and one pinhole borer.

In the list of Coleoptera of Silene Nature Park, 198 species of Curculionidae (171 weevils, 26 bark beetles and one pinhole borers species) are mentioned (Barševskis 2002). In similar publication on Invertebrates of Gauja National Park (Kalniņš et al. 2007), 170 species of Curculionidae (139 weevils and 31 bark beetles species) are reported.

In theses of different conferences, some information about Latvian weevils and bark beetles can be found (Leiskina 1999, 2000; Bojāre 2000; Princovs 2000; Balalaikins 2009; Bukejs, Balalaikins 2009).

D. Telnov and co-authors has published some articles where new faunal data about weevils and

bark beetles in Latvia can be found (Telnov, Kalniņš 2003; Telnov et al. 2005, 2006, 2007, 2008). In these papers authors mentions 21 new weevils species and some rare species of weevils and bark beetles for Latvian fauna.

A lot of authors mention some rare and new species of weevils and bark beetles for Latvian fauna in their publications (Barševskis 1996, 1997b, 2001; Barševskis at al. 2004, 2008; Rūtenberga 1992; Cibuļskis 1996; Cinītis 1997).

In Latvian fauna, 462 species of Curculionidae (392 of them are weevils, 69 are bark beetles and one is pinhole borer) are known now. We are going to continue our study of the Curculionidae.

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