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LONGHORN BEETLES (COLEOPTERA: CERAMBYCIDAE) OF ROMINCKA FOREST

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ABSTRACT: The paper presents the results of study of longhorn beetles in Romincka Forest (NE Poland); the observations were done irregularly by the authors during the last 30 years. The cerambycid fauna of the area, according to our data and literature informations, contains 71 species including such – important from both faunistic and nature conservation perspective – as e.g. *Saperda similis*, *S. punctata*, *Phytoecia nigricornis* or *Stenostola dubia*. We provide also remarks on the trophic relations of most taxa, discuss problems of their protection, and analyse the usability of particular species in natural history education.

KEY WORDS: *Cerambycidae*, faunistics, environmental and species protection, entomology education, Romincka Forest.

Introduction

The family of longhorn beetles (Coleoptera: Cerambycidae) is represented in Poland by 192 species. These insects, popular among entomologists, are nevertheless insufficiently known because, among others, of secretive (especially in the larval stage) way of life, short period of flight of imagines, and/or rarity of many taxa.

The knowledge of the distribution of Cerambycidae in various parts of Poland is unequal: the least explored are the maritime and lake regions of northern part of the country, including the area of this study: longhorns of the Romincka Forest (RF) have never been the object of detailed research. Most informations are contained in the paper

by Bercio and Folwaczny (1979), containing data collected between the beginning of XX century and the World War II. Some – altogether 13 – species have been mentioned in papers of Vorbringer (1904), Dominik (1958) and Capecki (1980). More exact survey of the Cerambycidae of Polish part of RF was attempted in the eighties of XX century (Gutowski 1995), and then in connexion with works on the protection programme for the Romincka Forest Landscape Park (Zieliński 2004a). In 2009 and 2011 observations were made by the third author (T. Biwo unpubl. data), and in 2008, 2010 and 2011 again J.M. Gutowski. In this paper the results have been pooled, with special reference – in view of the conservationist importance of the area – to the problems of protection and educational role of cerambycids.

Study area

Romincka Forest is an extensive forest area at the northern edge of Mazury Garbate. Its entire surface amounts to 355 km^2, of which 150 km^2 within the present borders of our country. The Polish part adjoins on the west with Lake Gołdap, on the east with Żytkiejmy village, on the north with Kaliningrad District, and on the south with the road Gołdap – Szypliszki. RF – as the mezoregion of Romincka Forest – belongs to the subprovince of East-Baltic Lake District, macroregion of Lithuanian Lake District (Kondracki 2001). Administratively it lies in the Warmia-Masuria voivodship, within the borders of Gołdap and Dubeninki communes. The Forest is managed by Gołdap Forest Inspectorate placed in the II Masurian-Podlasian Region of the Masurian Lakes District. Accordng to the divisions accepted in the „Catalogue of Polish Fauna" (Burakowski et al. 1990), and commonly used by Polish entomologists, RF lies in the Masurian Lake District.

Mesoclimate of that region belongs among the most severe in Poland: the period of vegetation extends to only ca. 160 days, main temperature of January -4.2^0C, that of July 16.9^0C, main annual precipitation somewhat above 600 mm. Winter is harsh and almost twice longer than in western Poland (Zalewska et al. 2004).

More than 80% of the RF surface is covered by fertile to very fertile fresh or humid forest habitats on brown, fawn-coloured and rusty soils; the remaining 20% occupy coniferous, usually moist biotopes. Here occur many rare and interesting plant communities, among others boreal spruce forest on peat *Sphagno girgensohnii-Piceetum* (Matuszkiewicz 2005). Dominate stands with Norway spruce (41.3%), common oak (21.9%), Scotch pine (19.9%), common and downy birches (8.1%) and black alder (6.7%), with admixture of European ash, aspen, European larch, small-leaved linden, hornbeam, Norway maple and mountain elm (Sokołowski 2006). Undergrowth is composed mainly of hazel (which growing to large sizes), spindle-tree, serviceberry, honeysuckle and feral fruit-trees and shrubs. Average age of tree-stands is ca. 60 years, old deciduous trees are few.

Almost 1000 species of vascular plants have been found in RF (Zalewska et al. 2004), a part of them showing boreal or montane affinities what – together with harsh climate – justified nicknaming the Forest as „Polish taiga".

In the years 1994-1998 the Russian part of RF was protected as a complex reserve (zakaznik); in 1998 its status was reduced to „Wisztyniec Zoological Reserve", and in 2004 formally suppressed. In 2010 a new project for protection was presented for Nature Complex „Romintenskaja pushcha" (Napreenko et al. 2010).

In 1998 the entire area of Polish part of the Forest was included into the newly created Landscape Park of Romincka Forest with the headquarters in Żytkiejmy. The surface of the Park amounts to 146.2 km^2, of its buffer zone 85 km^2. The Park includes 6 nature reserves of total surface of ca. 8.4 km^2 (Sokołowski, Kot 1996; Żukowski 1997):

- Czerwona Struga – created in 1973, 3.59 ha, with mass occurrence of ostrich fern *Matteucia struthiopteris* (L.) Tod.
- Dziki Kąt – 1973, 34.1 ha, spruce-pine forest of boreal character.
- Mechacz Wielki – 1974, 146.72 ha, marshy coniferous forest with numerous protected boreal species.
- Boczki – 1974, 108.83 ha, oak-lime-hornbeam and spruce forests as well as peat-bogs.
- Struga Żytkiejmska – 1982, 467.07 ha, of variable habitats, with numerous protected species of animals and plants, including rare orchids.
- Uroczysko Kramnik – 2001, 75.96 ha, rare species of peat-bog plants (orchids, cloudberry).

The last reserve lies outside of the compact complex of the Forest (ca. 2 km East), in the buffer zone of the Park. Planed reserve „Jary Błędzianki" in south-eastern part of RF should protect the Błędzianka river valley. Under consideration is also a reserve in the forest compartment 153 (E of the res. „Mechacz Wielki"), to protect rare peat-bog plants.

From the viewpoint of the ecology of Cerambycidae the most important physiographical-biotic characteristics of the study area are:

- placement in the climatic-botanic zone of boreal influences,
- influence of continental climate causing harshness of the mesoclimatic conditions,
- short period of vegetation and little number (~150) of frost-free days,
- diversity of forest plant communities,
- diverse food base (trees, shrubs) for larvae of xylobiont longhorn beetles,
- diversified pressure of forest management in various areas of the Forest
- scarcity of old tree-stands, especially out of the reserves,
- great variety of seminatural non-forest communities,
- great proportion of marshy communities (riparian forests, alder forests, wet meadows and pastures),
- significant (both qualitatively and quantitatively) amount of „dead" wood in nature reserves and river valleys.

Methods

The study started in 1985 and continued as several-days-long field trips until 2011. In 2009 one of the Authors (T. Biwo) made observations and collections throughout the season of vegetation. Surveyed were forest, scrub, and non-forest (meadows, pastures) communities, ecotone zones between them, isolated tree-stands, as well as anthropogenic biotopes like the embankment of inactive railway Gołdap-Żytkiejmy, roads, populated and abandoned human settlements. We penetrated the possible places of occurrence of cerambycids: standing (living, weakened, dying, died) or lying (in various degree of decay) trees and shrubs and their fragments (tips, so-called snags, stumps, boughs, branches, roots), flowering herbaceous plants, hunter's coigns of vantage, fences and wooden buildings. Applied methods included sighting of imagines, shaking down to

japanese umbrella, sweep-netting, rearing in laboratory from collected pieces of infected food-plants, various traps laid by foresters, looking for trampled beetles on roads, collecting of abandoned feeding sites. In elaboration of the results the specimens collected between 31 V and 2 VII 2004 by Magdalena Marzec and Zbigniew Mazur, in 2010 and 2011 by Michał Rawinis, as well as some received from other persons have also been included. The majority of imagines have been identified in the field without collecting (only appropriate notes – e.g. on numbers – were made). Voucher specimens are preserved in the collections of J.M. Gutowski (JG), S. Zieliński (SZ) oraz T. Biwo (TB).

The materials have been collected in 8 (10 x 10 km) squares of UTM grid: EF81, 82, 91, 92; FF01, 02, 11, 12.

The applied criteria of didactic usability of Cerambycidae (tab. 5) are the following (the scores favour the value most serviceable in didactics):

● Numbers/frequency: the more numerous (individuals traces of feeding) and frequent (sites) the better: - numerous and frequent (3 points); - numerous but infrequent and not numerous but frequent (2); - rare (1).

● Accessibility: the easier to access the better:
a) stage of development (SR)
accessible: - imagines and feeding sites (3); - imagines (2); - feeding sites (1).
The scores at this criterion has a practical dimension: takes into account the remaining „subcriteria" of accessibility as well as the criterion of numbers/frequency.
b) daytime accessibility (imagines) (DD)
appearance: - day (3); - day or night, or uncertain data (2); - night (1).
c) seasonal accessibility (imagines) (DR)
- long, above 6 dekades (3); - medium, 3-6 dekades (2); - short, up to 3 dekades (1).
d) relation of the appearance of imagines to school year (RS)
species appearing in: spring, early summer, throughout the season (3); - summer and late summer (1).
Data on the phenological aspects „c" or „d" are approximate, based mainly on extrapolated information from other publications, in particular those of Starzyk (1979), Gutowski (1984), Burakowski et al. (1990) and Zieliński (2004b).

● Morphological characters: the bigger, more colourful (except cryptic) and more distinctive the better:
a) size (imagines) (PW)
- large (3); - medium-sized and small (1)
b) colour (imagines) (B)
- intensive, bright, masking (3); - dimorphic (2); - intermediate (1).
c) other morphological features serviceable on lessons (imagines, larvae), e.g. long antennae, colour varieties, clearly audible stridulation, larval appendages, etc. (IC)
- strong expression or applicability of characters (3); - medium (2); - slight (1).

● Ecological or ethological characters: preference for e.g.: mono- and polphages, anthophyly, foliophages, mycophages, cryptic and mimetic insects, steno- and eurybionts etc.

a) feeding biology (against the background of the accessibility of trophic base) (O)
- greatly usable (3); - moderately usable (2); - less usable (1)
b) defensive behaviours (ZO)
- greatly usable (3); - moderately usable (2); - less usable (1)
c) mobility (imagines) (R)
- imagines torpid (3); - imagines shy (1).

● Geographical distribution:
- zoogeographically interesting (3); - less interesting (1).
Zoogeographically interesting: „warm" (Pm, Me, Po), „cold" (Bg, Gp) elements and single – according to the present knowledge – representatives of other zoogeographical elements (here: Me, Ko, Po, Gp) in the area of the Forest.

● Species in relation to nature protection: preference for species of great biocenotic or indicator value, characteristic of natural forests, synanthropic, rare, etc.
- greatly usable (3); - moderately usable (2)

Results and discussion

Faunistical characteristics

The list of recorded species (with the basis of identification, zoogeographical and chorological assignment, host plants of larvae, food plants of anthophilous imagines, as well as results of evaluation and existing literature sources) is presented in tab. 1. Altogether 71 species (37% of Polish fauna) of Cerambycidae have been found. The presence of two of them – *Stictoleptura variicornis* and *Cerambyx scopolii* – have not been confirmed in this survey, but cannot be excluded in view of the expanse of the study area, lack of data from the Russian part of the Forest, and little intensity of exploration aimed specifically at these taxa. Otherwise to the most interesting, rare in this part of Poland, belong: *Stenocorus meridianus*, *Callidium coriaceum*, *Lamia textor*, *Oplosia cinerea*, *Leiopus punctulatus*, *Saperda perforata*, *S. punctata*, *S. similis*, *Stenostola dubia*, *S. ferrea*, *Oberea pupillata*, *Phytoecia nigricornis* (tab. 1). Dominants are: *Rhagium inquisitor*, *R. mordax*, *Dinoptera collaris*, *Alosterna tabacicolor*, *Pachytodes cerambyciformis*, *Stictoleptura maculicornis*, *S. rubra*, *Stenurella melanura*.

The number of recorded species may be considered rather large taking into account the relatively small area of RF, and especially its geographical-climatical conditions of this northeasternmost Polish forest complex. In the 100 times larger (15 096 km^2) Kaliningrad Distr. (now Russia) also 71 species have been found (Alekseev 2007; Alekseev, Nikitsky 2008). From Lithuania 120 are known, from Latvia 109 (Telnov et al. 1997), and from all Masurian Lake District 106 (Gutowski 1995). The hitherto from RF not recorded but possible species are the following: *Pachyta lamed* (L.) and *Evodinus borealis* (Gyll.) (both known from the Augustów Forest), *Cortodera femorata* (Fabr.) (occurs throughout the Kaliningrad Distr.), *Rutpela maculata* (Poda) (also known from the Królewiec Distr.), *Stenurella nigra* (L.) (in the Królewiec Distr. common), *Semanotus undatus* (L.), *Monochamus urussovii* (Fisch.), *Pogonocherus hispidulus* (Pill. et Mitt.), *Aegomorphus clavipes* (Schrank).

Cerambyx cerdo L. had been mistakenly recorded from Polish part of RF by Alekseev (2007), allegedly after Gutowski (1995), but in fact there is no such information in that paper.

Zoogeographical analysis of the cerambycid fauna has been performed according to the traditional method, most frequently applied to this group of insects (e.g. Gutowski 1995) and using the chorological elements proposed by Mazur (2001). Not included in the analysis remained only recently separated *Leiopus nebulosus* and *L. linnei*, whose distribution, despite intensive studies (Gutowski et al. 2010) have not yet been sufficiently well known. The study area is inhabited by representatives of 12 zoogeographical elements (tab. 1, 2). Prevail – as in most other studied areas in Poland – palaearctic species (37,7%). Noteworthy is the contribution of the eurocaucasian element (14,6%) and – as expected – boreomontane (11,6%). The remaining elements – holarctic and eurosiberian (8,7% each), european (7,3%), subponto-mediterranean (4,4%) and submediterranean, subcosmopolitan, subpontian, boreomontane-submontane (each 1,4%) – are less abundantly represented.

16 chorological elements have been distinguished in RF (tab. 1, 3), best represented among them are siberian-atlantic (8), pacific-baltic (7) and kaspian-atlantic (6); holarctic, ponto-baltic and ponto-atlantic count 5 species each, while each of the remaining elements contains 1 to 3 species. Most taxa are very widely distributed: 41 of them occurs throughout the Palaearctic or even beyond.

Remarks on selected species

***Stenocorus meridianus* (L.)**

In Poland sporadically encountered species, characteristic of natural forests (though opinions as to its status vary: Gutowski 1995; Zieliński, Kowalczyk 2000). In the „red list" of longhorn beetles of eastern Poland (Gutowski 1995) placed in the category "rare" (R). Within the Masurian Lake District Burakowski et al. (1990) records it from the locality Gruszki. Found also in the vicinity of Romincka Forest: in Suwałki Landscape Park (Gutowski, Sućko 2011).

In the study area some specimens have been observed in the reserve "Mechacz Wielki" (2003, leg. M. Marzec) on leaf of *Tilia cordata*, at the road near the village Czarnowo Średnie on leaf of *Aegopodium podagraria* (5.07.2004, leg. SZ), and in the comp. 92/153 on umbel of *A. podagraria* (29.06.1987, leg. JG).

***Gaurotes virginea* (L.)**

Boreomontane species, in NE-Poland rare and local, in mountains and submontane areas more frequent and numerous. Contrary to some opinions (e.g. Burakowski et al. 1990) it does not occur on significant part of Poland. Found in the vicinity of the village Wyskok (commune of Srokowo, district Kętrzyn – Giłka 1999).

In RF this longhorn-beetle is rather frequent and relatively numerous. Imagines prefer herbaceous, sunny roadsides and edges of the forests, as well as flowery meadows and clearings of various humidity. It had been observed e.g. in the area of forest districts Ostrówek, Żyliny and Jędrzejów and in res. „Boczki", „Czerwona Struga" and „Dziki Kąt" (leg.: JG, SZ, TB, M. Wanat). Reported also by Bercio and Folwaczny (1979).

Stictoleptura variicornis (Dalm.)

In the last years observed in Poland only in Białowieża Primaeval Forest, but earlier, before the World War II, it was reported from the vicinities of Braniewo, Elbląg and Susz (Burakowski et al. 1990).

From RF it has been recorded by Bercio and Folwaczny (1979), but the present study failed to confirm its presence.

Necydalis major L.

Occurs all-over Poland, but found usually in single individuals or isolated microbiotopes (large deciduous trees at roads or on fields).

In RF 1 female has been found in comp. 98 (EF92), ad Czarnowo Średnie, mixed fresh forest, on stalk of *Artemisia* sp., 26.07.1988, leg. JG. Reported also by Bercio and Folwaczny (1979).

Tetropium gabrieli J. Weise

Monophagous, expanding northwards together with the expansion of its host-plant, larch, resulting from the preference for this tree in forestry (Gutowski 1995).

The locality found (5.07.2004, leg. SZ) in RF on the edge of river Jarka valley near Jurkiszki is the northernmost in eastern Poland.

Cerambyx scopolii Fuessl.

In Poland very rare, known from few localities in southern and western parts of the country. Most literature data refer to several tens or more years ago (Burakowski et al. 1990).

From RF it had been reported by Bercio and Folwaczny (1979), but we have not managed to find it.

Glaphyra umbellatarum (Schreb.)

Shows strong cenotic affinity to fruit trees on sunny sites. Occurs also in towns. In the „red list" of eastern Polish cerambycids (Gutowski 1995) ascribed to the category R.

In the Romincka Forest observed on roses on the embankment of inactive railway near the village Skajzgiry (FF12) (28.05.2004, leg. SZ) and on apple trees in western part of the Forest (vicinities of the settlement Czarnówka – EF92), 29.05.2004, leg. SZ.

Callidium coriaceum Payk.

In the „red list" of eastern Polish cerambycids (Gutowski 1995) ascribed to the category R. Boreomontane species, developing in spruce.

In RF, on shadowy site in the res. „Boczki", comp. 86 (EF92), 16.05.1985, standing dead spruce of 18 cm in diameter, with firmly attached dried bark had been found, with ca. 40 galleries of larvae (under bark) and pupae (in wood) of this species. From some pupae 2 imagines emerged 3.06.1985. Besides in galleries there were also 5 cocoons belonging to two different species of parasitoids of *C. coriaceum*; from one of

them an imago of *Ichneumonidae* have been reared (leg. et cult. JG). Based on this observation *C. coriaceum* had been reported from RF by Gutowski (1995); then it was found again 27.06.2008 NE of Jurkiszki, comp. 166l (EF92), on the pile of spruce wood, 1 ex., leg. JG.

Lamia textor L.

Species considered as vanishing in Poland. Nowadays only sporadically observed in the country, except for the eastern part where one of the authors (JG) encountered it more frequently. In Masurian Lake District, close to the study area, M. Rawinis found it in 2010 in Niedrzwica W of Gołdap, while Gutowski and Sućko (2011) reported it from the Suwałki Landscape Park. In the „red list" of eastern Polish cerambycids (Gutowski 1995) ascribed to the category R.

In the study area three specimens (1 living, 2 trampled) were found on gravel road near the village Pobłędzie (FF11, 29.05.2004, leg. SZ) and 1 imago in Dubeninki (FF01, 20.06.2009, obs. TB).

Oplosia cinerea (Muls.)

Develops mainly in old lindens (only sporadically in other tree species), which in Poland occur not frequently and in most cases locally, therefore, and because of its secretive way of life, *O. cinerea* is a rarely met species.

In the res. „Czerwona Struga", marshy meadow, comp. 196 (FF02), shadowy site, 15.05.1985 5 larvae feeding in bark of linden bough (5-8 cm in diameter) lying on ground have been found (leg. JG), accompanied by numerous larvae of *Stenostola ferrea*.

Ca. 30 larvae were found also (leg. JG) 15.07.1989 in oak-lime-hornbeam forest near Żytkiejmy, comp. 306/339 (FF01), on lying branches of 5-7 cm in diameter; on somewhat thinner branches of the same site larvae of *Leiopus nebulosus* occurred.

Acanthocinus griseus F.

Reported from few localities in various parts of Poland.

In the area of study one specimen has been found on the stem of freshly cut spruce in the vicinity of Hajnówek (EF92, 5.07.2004. leg. SZ); 1 imago on pile of spruce timber in the forestry Ostrówek comp. 44 (EF 82, 26.06.2009, obs. TB) and 2 beetles in the same biotope in Czarnowo Średnie (EF 92, 15.07.2009, obs. TB); 1 ex. N of the village Błąkały (FF02) on pile of pine timber 10.07.2011 (leg. JG); 2 larvae and some galleries in underside of trunk of dying pine in res. „Mechacz Wielki" (EF92), raised bog, 27.06.2008, leg. JG.

Leiopus linnei Wallin, Nylander et Kvamme and *Leiopus nebulosus* (L.)

In 2009 Scandinavian researchers separated a new species – *Leiopus linnei* (Wallin et al. 2009) – from the widely distributed and well known *Leiopus nebulosus*. To clarify the distribution of both species, one of the authors initiated the elaboration of *Leiopus nebulosus sensu lato* from more than ten Polish collections, what resulted (Gutowski et al. 2010) in ascertainment of many localities of both species in Poland and neighbouring countries.

In RF: *L. linnei* has been found in Ostrówko (EF91), ad Pluszkiejmy (EF91); while ad Żytkiejmy (FF01) from larvae feeding in thin branches of small-leaved linden 7 ex. imagines of *L. nebulosus* have been reared (Gutowski et al. 2010).

Leiopus punctulatus (Payk.)

Very rarely observed in Poland, monophagous (developing on aspen) species; in the „red list" of eastern Polish cerambycids (Gutowski 1995) ascribed to the category R.

In RF found (leg. JG) at three occasions: comp. 32/87 (EF92), N of village Boczki, oak-lime-hornbeam forest, 1 ex. on aspen-willow cord, 30.06.1987 (Gutowski 1995); N of Jurkiszki (EF82), 1 ex. on aspen branches lying on edge of forest crops, 26.06.2008; N of village Błędziszki (FF02), 1 ex. on bough of freshly fallen aspen, 10.07.2011.

Saperda punctata (L.)

Very rare species in Poland, known from few localities of six faunistic regions (Burakowski et al. 1990, Gutowski 2004, Zieliński 2003). Monophage of elms. Most data on the localities of this beetle are ca. 100 years old. In the „red list" of eastern Polish cerambycids (Gutowski 1995) ascribed to the category "endangered" (E).

From the Masurian Lake District had not been hitherto recorded – the locality in RF is the first for this faunistic region. Feeding of larvae has been observed (5.07.2004, leg. SZ) on broken and cut fragments of trunk of ca. 30 years old mountain elm on the border of modernized forest road (green track) West of Hajnówek (EF92). Recorded also on grounds of larvae and galleries found in stems of felled stately elms in the forestry Jędrzejów (EF 91, 26.03.2009, obs. TB).

Saperda similis Laich.

Until recently poorly known in Poland and considered rare (Burakowski et al. 1990), but in the last years found more frequently (Gutowski 1995, Gutowski et al. 1999, Bidas 2005, Miłkowski et al. 2008) as the result of directed search based on the knowledge of its biology. Probably much more widely distributed wherever its host-plant, sallow, occurs. From the Suwałki Landscape Park recorded recently by Gutowski and Sućko (2011).

From RF reported by Vorbringer (1904) from Szyliny near Gołdap, and 26.06.2006 in the environs of that locality (EF82) we managed to find recently abandoned galleries of this species in living 4 cm thick branch of *Salix caprea* (leg. JG).

Stenostola dubia (Laich.)

The occurrence of this montane-submontane species in central and northern Poland had until recently been questioned, so e.g. (Burakowski and Nowakowski 1981) negated the locality in Mazowsze. However, in the last years two new records from northern part of the country – in the vicinities of Gdynia and in the Romincka Forest near Czarnówka (EF92, where one ex. imago was observed) – have been published (Zieliński, Graczyk 2005).

Stenostola ferrea (Schrank)

Rather rare (only locally somewhat more numerous) species, in the „red list" of eastern Polish cerambycids (Gutowski 1995) ascribed to the category R.

In RF recorded in res. „Czerwona Struga", riparian forest, comp. 196 (FF02), where 15.05.1985 on linden bough lying on ground in shadowy site several tens of abandoned and occupied galleries of this species have been found (Gutowski 1995). In the same bough fed also larvae of *Oplosia cinerea*. In laboratory some imagines of *S. ferrea* and some parasitoids (2 species) have been reared (leg. et cult. JG). One of the parasitoids, *Odontocolon dentipes* (Gmel.), Ichneumonidae (det. J. Sawoniewicz), known to infest some saproxylic beetles (including Cerambycidae) has not been hitherto noted from the species in question.

In the study area, near Czarnówka (EF92), a larval exuvium in pupal chamber in *Sambucus nigra* has also been found (30.05.2004, leg. SZ) – as far as the authors are aware, *Oplosia cinerea* had not been reported from this host-plant.

Phytoecia nigricornis (Fabr.)

Known from few, widely sparsed localities, mostly in southern part of Poland; from the North (Baltic Coast) recorded only once, more than 100 years ago (Lentz 1879); recorded also (Alekseev 2007) from the Kaliningrad District. Biologically bound up with herbaceous plants, prefers warm, often xerotherm places.

Found in the foreland of Romincka Forest by sweepnetting of a meadow on slopes of Piękna Góra (photo 1) ad Gołdap (EF81) 31.05.2009 – 1 ex., and in similar biotope in the vicinity of Stańczyki (FF01) 11.06.2009 – 1 ex (TB). New for Masurian Lake District.

Food plants for larvae and imagines

Searching, for larvae, pupae and imagines in pupal chambers has resulted in identification of host-plants for 42 species (tab. 1), including as well coniferous (3 species), as deciduous trees and shrubs (21 species). The widest spectrum has been established for *Saperda scalaris* (8) and *Rhagium mordax* (6 species); the remaining cerambycids have been recorded from one host-plants. Worth mentioning is the discovery of a new host-plant – *Sambucus nigra* – for *Stenostola ferrea*. Interesting was also the observation of very rare development of larvae *Leptura annularis* in wood of *Tilia cordata*. The most frequently infested are Scotch pine and Norway spruce, on which 11 species of Cerambycidae develops, then poplars (mainly aspen), oaks (common, chestnut, red) (4), birches (common and downy) and small-leaved linden (by 3).

Among the longhorn beetles recorded from RF there are 68 saproxylic, the remaining ones develop in herbaceous plants (*Agapanthia villosoviridescens*, *Phytoecia nigricornis*) or (*Pseudovadonia livida*) feeding on spawn of *Marasmius oreades* (Bolt.: Fr.) Fr. (Burakowski et al. 1990).

Food plants for imagines of 23 anthophilous species, feeding on pollen, were determined. Cerambycids visited 26 plant species, mainly Apiaceae, Asteraceae and Rosaceae (tab. 1).

Problems of protection

All the species recorded from RF are to a certain degree protected by the very fact of the existence of the Romincka Forest Landscape Park. However, the aims of landscape preservation are not always congruent with the needs of particular species, including Cerambycidae. Much more reliable protection ensure them existing nature reserves – in five of them altogether 34 species have been found, what makes less than half of those recorded from RF – certainly there are more of them, but the exploration of reserves and assembling full lists of Cerambycidae occurring there was beyond the scope of our study. The highest number of species (21) has been detected in res. „Boczki", somewhat less (19 each) in res. „Dziki Kąt" and „Struga Żytkiejmska"; in res. „Mechacz Wielki" 17, fewest (11) in res. „Czerwona Struga" (tab. 4). The majority of species recorded from nature reserves are common beetles, noteworthy is finding of *Stenocorus meridianus* in res. „Mechacz Wielki", *Callidium coriaceum* in res. „Boczki" and *Oplosia cinerea* in res. „Czerwona Struga". Potentially the reserves within the area of RF would be inhabited by the richest, most interesting fauna, but their combined surface amounts to just ca. 5% of the total area, what in not sufficient from the viewpoint of nature protection: this being a landscape park, it would be highly desirable to extend the surface of nature reserves to ca. 10% of the area.

Generally, on the most part of the area, the forests in RF are strongly rejuvenated, artificial. They suffer from shortage of dead wood, especially thick, whose presence often conditions the possibility of subsistence for rare stenotopic saproxylic insects; somewhat better in this respect is the situation in wet, swampy, hardly accessible place in some reserves. In the past forest management was much more intensive, what for some stenotopic species might have meant discontinuation of sufficient supply of dead wood, resulting in their local regress. Perhaps therefore we have not managed to find *Stictoleptura variicornis* and *Cerambyx scopolii* despite their occurrence here in the past. Also lacking are *Leptura thoracica*, *Pedostrangalia pubescens* and other species demanding continuous presence of thick dead wood in the ecosystem, and still inhabiting better conserved forests of north-western Poland (Gutowski 1995).

Among the cerambycids recorded from RF there are 4 species placed on the *Red list of threatened animals in Poland* (Pawłowski et al. 2002): *Saperda punctata* as species strongly threatened EN and *Stictoleptura variicornis*, *Cerambyx scopolii* and *Saperda similis* of unspecified threat DD. On the *Red list* of species threatened in eastern Poland (Gutowski 1995) are 13 species from among those occurring in the study area: *Stictoleptura variicornis* and *Saperda punctata* – E (endangered), *Cerambyx scopolii* – V (vulnerable), *Stenocorus meridianus*, *Necydalis major*, *Glaphyra umbellatarum*, *Callidium coriaceum*, *Lamia textor*, *Leiopus punctulatus*, *Saperda similis*, *Stenostola dubia*, *S. ferrea*, *Phytoecia nigricornis* – R (rare).

To assure the relative stability of natural functioning of cerambycid populations in the area of PR, especially of the taxa of particular fanistic or nature protection interest, we have assembled below a list of recommendations for practical realization by foresters, state and local administration and other decision-makers. It would be desirable to:

- increase the proportion of old (above 100 years) tree-stands to at least 30% of forested surface;

- increase the amount of dead wood, especially in stands older than 60 years, to at least 10 m^3/ha;
- improve the quality of dead wood, i.e. in particular to assure the participation of all species occurring in the tree-stand and presence of thick (not mechanically fragmented) lying logs and standing dead trees;
- reestablish the ecological corridors between sites of actual and potential occurrence of important saproxylic species inside of the Park, and attempt to gain the ecological connection with areas outside of its area;
- assure preservation of tree- (oak-, linden-, etc.) avenues in and near forests;
- assure stability of population of beaver, which in fully natural way ensures the continuity of supply of food base for monophagous (e.g. *Saperda perforata*) and polyphagous (e.g. *Clytus arietis*) longhorn beetles (cf. e.g. Zieliński 2001);
- unconditionally promote elms in the Park, abandon economical pressure, leave broken, fallen, or otherwise damaged or dead trees, especially at roadsides, forest edges, in tree-stands; this suggestion refers also to young trees (do not cut off the examples dead e.g. in consequence of competition for light);
- restrict pressure against aspen in view of its role in the ecosystem, including its importance for rare monophagous species (*Leiopus punctulatus, Saperda perforata*);
- recommend storage of fire-wood in airy farm-buildings (Zieliński 2002) to enable the escape of imagines of rare cerambycid species having earlier infested that material;
- prefer in plantings around forester's lodges and other settlements within, or at the edge of, a forest complex „usable" plant species, e.g. rowan, water elder, black elder, hawthorns, roses, spindle-tree (for anthophilous cerambycids).

The didactic value of Cerambycidae

Among Polish cerambycids there are species whose protection is regulated by the rulings of the European Union, those protected according to the statutes of our country, as well as included in various elaborations of national, regional or local rank. Many species customarily considered common and numerous are nowadays evidently in regress. Cerambycidae, one of the most popular beetle families, easily recognizable even by persons not particularly interested in entomology, can play a significant part in the ecological education, also in increasing positive reactions towards insects.

Albeit the didactic value of several cerambycid species are widely known (see e.g. Strojny 1957), attempts at comprehensive evaluation of their usability have been rarely undertaken: the only such trial of which the authors are aware, together with a simplfied scenario for lessons, has been performed in relation to the species found in the Drawno National Park (Zieliński 2001). Applying the (here somewhat modified) criteria accepted in that publication we have evaluated the longhorn beetles of RF (tab. 1, 5).

According to the proposed scale (of theoretical range 12-39 pts.) four groups of didactic usability have been distinguished:

• Outstanding didactic value (W) 36-39 points – 2 species: *R. mordax, A. aedilis.*

• Great didactic value (D) 32-35 pts. – 26 species: *R. inquisitor, P. quadrimaculata, D. collaris, L. annularis, L. quadrifasciata, S. melanura, S. buprestoides, T. castaneum, C. scopolii, A. moschata, H. bajulus, C. arietis, P. arcuatus, L. textor, M. galloprovincialis pistor, M. sutor, P. fasciculatus, L. linnei, L. nebulosus, S. perforata, S. punctata, S. scalaris, O. pupillata, A. villosoviridescens, P. nigricornis, T. praeustus.*

• Medium didactic value (S) 28-31 pts. – 34 species: *O. cursor*, *R. bicolor*, *S. meridianus*, *G. virginea*, *A. tabacicolor*, *P. livida*, *J. sexmaculata*, *P. cerambyciformis*, *A. sanguinolenta*, *S. maculicornis*, *S. rubra*, *S. variicornis*, *L. aethiops*, *S. bifasciata*, *S. attenuata*, *N. major*, *A. striatum*, *T. fuscum*, *T. gabrieli*, *M. minor*, *G. umbellatarum*, *C. aeneum*, *C. violaceum*, *X. rusticus*, *P. detritus*, *P. decoratus*, *O. cinerea*, *A. griseus*, *L. punctulatus*, *E. lusitanus*, *S. carcharias*, *S. populnea*, *S. similis*, *S. dubia*.

• Little didactic value (M) below 27 pts. – 9 species: *P. coriarius*, *G. ruficornis*, *A. reyi*, *A. rusticus*, *O, brunneum*, *C. coriaceum*, *P. testaceus*, *S. ferrea*, *O. oculata*.

This analysis may be helpful in the educational activity of the Management of the Romincka Forest Landscape Park, but is also addressed to active and creative teachers of natural scientific subjects, especially natural history and biology. During field excursions it would be desirable to emphasize e.g. various methods of detecting the presence of particular species in the area (based on found imagines, larvae, galleries), pollination not exclusively by bees but also e.g. by cerambycids, diversity of colours and forms of insects exemplified by longhorn beetles, etc.

Popularization

Postulates concerning popularization are mainly addressed to nature protection and forestry services. Exemplary lines of popularization of cerambycids in Romincka Forest are:

- ✓ propagation of the fact that scientific research has shown significant diversity of this group in the Park;
- ✓ using this publication in promotion;
- ✓ emphasizing (e.g. in folders) the specificity of the cerambycid fauna of the area, expressed as well in the great number of zoogeographic elements as in the significant proportion of boreomontane elements – a good additional argument for qualifying RF as „Polish taiga";
- ✓ publication of flyers (addressed to local drivers, cyclists and walking tourists) calling their attention to *Lamia textor* and other large insects (e.g. *Carabus* migrating (esp. from May to August);
- ✓ production of warning boards to be posted at roads – at the beginning near the village Pobłędzie, where *Lamia textor* was observed.

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Photo 1. The south slope of the Góra Gołdapska – habitat of *Phytoecia nigricornis* (photo by T. Biwo)

Table 1. Cerambycidae of the Romincka Forest.

The taxonomy and nomenclature of Cerambycidae according BENSE (1995) and GUTOWSKI (2005), with regard to some changes related to the most recent research; the species within a genus are given in alphabetical order. Plant names are given in an alphabetical order according to their abbreviations (Polish or Latin); the nomenclature according MIREK et al. (2002).

Abbreviations:

Ż – traces of larva's foraging, L – larva or pupa, I – imago, WP – valuable species in Masurian Lake Region, WD – educational value: W – outstanding, D – large, S – average, M – small.

Host plants of larvae:

Brzo – *Betula pubescens* EHRH., Brzb – *Betula pendula* ROTH, Db – *Quercus* L. sp., Dbb – *Quercus petraea* (MATT.)LIEBL., Dbc – *Quercus rubra* L., Dbs – *Quercus robur* L., dzbcz – *Sambucus nigra* L., Gb – *Carpinus betulus* L., Gł – *Crataegus* L., Gr – *Pyrus communis* L., Iwa – *Salix caprea* L., Jbd – *Malus domestica* BORKH., Jrz – *Sorbus aucuparia* L., Js – *Fraxinus excelsior* L., Klz – *Acer platanoides* L., Lpd – *Tilia cordata* MILL., Mde – *Larix decidua* MILL., Olcz – *Alnus glutinosa* (L.)GAERTN., Os – *Populus tremula* L., róża – *Rosa* L. sp., So – *Pinus sylvestris* L., such. – *Lonicera xylosteum* L., Św – *Picea abies* (L.)H.KARST., Tpc – *Populus nigra* L., Wzg – *Ulmus glabra* HUDS.

Food plants of imagines:

Acm – *Achillea millefolium* L., Acp – *Achillea ptarmica* L., Aep – *Aegopodium podagraria* L., Ans – *Angelica sylvestris* L., Ant – *Anthriscus sylvestris* L., Cha – *Chaerophyllum aromaticum* L., Cia – *Cirsium arvense* (L.)SCOP., Dac – *Daucus carota* L., Era – *Erigeron annuus* (L.)PERS., Fiu – *Filipendula ulmaria* (L.)MAXIM., Jam – *Jasione montana* L., Kna – *Knautia arvensis* (L.)J.M.COULT., Lev – *Leucanthemum vulgare* LAM., Map – *Matricaria maritima inodora* (L.)DOSTÁL, Mea – *Melilotus alba* MED., Peo – *Peucedanum oreoselinum* (L.)MOENCH, Pep – *Peucedanum palustre* (L.)MOENCH, Pis – *Pimpinella saxifraga* L., Plm – *Plantago media* L., Prp – *Prunus padus* L., Ro – *Rosa* L. sp., Rui – *Rubus idaeus* L., Soa – *Sorbus aucuparia* L., Tha – *Thalictrum aquilegiifolium* L., Thl – *Thalictrum lucidum* L., Toj – *Torilis japonica* (HOUTT.)DC.

Species	Basis of identification			Zoogeographical elements (see table 2)	Range elements (see table 3)	Evaluation of species		Food plants of larvae	Host plants of imagines	Literature data
	Ż	L	I			WP	WD			
Prionus coriarius (L.)	+			Pa	SY-AT		M	So Św		
Oxymirus cursor (L.)	+		+	Ek	KI-AT		S	Św		
Rhamnusium bicolor (SCHRANK)	+	+		Eu	KA-AT		S	Brzb Tpc		
Rhagium inquisitor (L.)	+	+	+	Ho	Ho		D	So Św		

Rhagium mordax (DE GEER)	+	+	+	Es	SY-AT		W	Brzb Dbb Dbc Dbs Gb Olcz	Aep Prp Tha	
Stenocorus meridianus (L.)			+	Es	SY-AT	+	S		Aep	
Pachyta quadrimaculata (L.)			+	Bg	PA-BT		D		Aep	BERCIO, FOLWACZNY (1979)
Dinoptera collaris (L.)			+	Pa	KA-AT		D		Aep Cha Plm	BERCIO, FOLWACZNY (1979)
Gaurotes virginea (L.)			+	Bg	PC-BT		S		Aep Fiu Jam Kna Mea Tha Thl	BERCIO, FOLWACZNY (1979)
Grammoptera ruficornis (FABR.)			+	Ek	PO-AT		M		Aep Soa	
Alosterna tabacicolor (DE GEER)	+		+	Pa	PC-AT		S	Klz	Aep Ans Cha Lev Tha	
Pseudovadonia livida (FABR.)			+	Pa	MO-AT		S		Acm Aep	
Judolia sexmaculata (L.)			+	Bg	PC-BT		S		Aep	
Pachytodes cerambyciformis (SCHRANK)			+	Ek	PO-AT		S		Aep Ans Cha Era Fiu Pep Rui Tha	
Anastrangalia reyi (HEYD.)			+	Eu	BT-ME		M		Aep	
Anastrangalia sanguinolenta (L.)			+	Bg	PO-AT		S		Acm Aep Ans Cha	BERCIO, FOLWACZNY (1979)
Stictoleptura maculicornis (DE GEER)			+	Ek	PO-BT		S		Acm Aep Ans Cha Cia Dac Kna Peo Pis	BERCIO, FOLWACZNY (1979)
Stictoleptura rubra (L.)	+	+	+	Pa	SY-AT		S	So Św	Acm Ans Cha Lev Peo Pis	
Stictoleptura variicornis (DALM.)				Bo	PC-BT	+	S			BERCIO, FOLWACZNY (1979)

Leptura aethiops PODA			+	Pa	PC-AT		S		Aep	
Leptura annularis FABR.	+	+	+	Bg	PC-BT		D	Lpd	Aep Cha Ro Rui	
Leptura quadrifasciata L.	+	+	+	Pa	PC-AT		D	Brzo Lpd	Ans Peo Pis	
Stenurella bifasciata (O. F. MÜLL.)			+	Pa	MO-AT		S		Jam Lev	
Stenurella melanura (L.)			+	Pa	SY-AT		D		Acm Acp Aep Ans Cha Cia Dac Era Kna Lev Map Peo Pis Plm Toj	
Strangalia attenuata (L.)			+	Pa	PC-AT		S			
Necydalis major L.			+	Pa	PC-AT		S			BERCIO, FOLWACZNY (1979)
Spondylis buprestoides (L.)	+		+	Pa	PC-AT		D	So		
Asemum striatum (L.)	+		+	Ho	Ho		S	So		
Arhopalus rusticus (L.)	+	+	+	Ho	Ho		M	So		DOMINIK (1958)
Tetropium castaneum (L.)	+	+	+	Pa	PC-AT		D	Św		BERCIO, FOLWACZNY (1979); CAPECKI (1980)
Tetropium fuscum (FABR.)	+	+	+	Es	SY-BT		S	Św		
Tetropium gabrieli J. WEISE	+			Eu	PA-AT		S	Mde		
Molorchus minor (L.)	+	+	+	Pa	PC-AT		S	Św	Aep Prp	
Glaphyra umbellatarum (SCHREB.)	+			Ek	KA-AT		S	Jbd róża		
Obrium brunneum (FABR.)			+	Ek	KA-AT		M		Aep Cha	
Cerambyx scopolii FUESSL.				Pm	KA-ME	+	D			BERCIO, FOLWACZNY (1979)
Aromia moschata (L.)	+	+	+	Pa	PC-AT		D	Iwa		
Hylotrupes bajulus (L.)	+			Ko	Ko		D	So		

Callidium aeneum (DE GEER)			+	Pa	PC-BT		S			
Callidium coriaceum PAYK.	+	+	+	Bg	MO-BT	+	M	Św		GUTOWSKI (1995)
Callidium violaceum (L.)	+		+	Ho	Ho		S	Św		
Phymatodes testaceus (L.)			+	Ho	PC-AT		M			
Xylotrechus rusticus (L.)			+	Pa	PC-AT		S			
Clytus arietis (L.)	+	+	+	Ek	KA-AT		D	Dbb Gł	Aep	
Plagionotus arcuatus (L.)	+		+	Pm	KA-ME		D	Db Dbc		
Plagionotus detritus (L.)			+	Ek	KA-AT		S			
Lamia textor (L.)			+	Pa	PC-AT	+	D			
Monochamus galloprovincialis pistor (GERM.)	+	+	+	Pa	MO-AT		D	So		BERCIO, FOLWACZNY (1979)
Monochamus sutor (L.)	+	+	+	Bg	PC-AT		D	Św		
Pogonocherus decoratus (FAIRM.)	+			Eu	PO-AT		S	So Św		
Pogonocherus fasciculatus (DE GEER)	+		+	Pa	PC-AT		D	Św		
Oplosia cinerea (MULS.)	+	+		Pa	PO-BT	+	S	Lpd		
Acanthocinus aedilis (L.)	+	+	+	Pa	PC-AT		W	So		
Acanthocinus griseus (FABR.)	+	+	+	Es	SY-AT		S	So		
Leiopus linnei WALLIN, NYLANDER et KVAMME			+	?	?		D			GUTOWSKI et al. (2010)
Leiopus nebulosus (L.)	+	+	+	?	?		D	Lpd		GUTOWSKI et al. (2010)
Leiopus punctulatus (PAYK.)	+		+	Eu	PA-BT	+	S	Os		GUTOWSKI (1995)
Exocentrus lusitanus (L.)	+			Ek	PO-AT		S	Lpd		
Saperda carcharias (L.)	+			Pa	PC-AT		S	Os		
Saperda perforata (SCOP.)	+	+	+	Pa	PC-BT	+	D	Os		BERCIO, FOLWACZNY (1979)
Saperda populnea (L.)	+	+		Ho	Ho		S	Os		
Saperda punctata (L.)	+	+		Me	BT-ME	+	D	Wzg		

Saperda scalaris (L.)	+	+	+	Pa	PC-BT		D	Dbb Dbc Gr Jbd Js Klz Olcz Iwa		
Saperda similis LAICH.	+			Es	SY-BT	+	S	Iwa		VORBRINGER (1904)
Stenostola dubia (LAICH.)			+	Gp	PO-BT	+	S			ZIELIŃSKI, GRACZYK (2005)
Stenostola ferrea (SCHRANK)	+	+	+	Ek	PO-BT	+	M	dzbcz Lpd		GUTOWSKI (1995)
Oberea oculata (L.)			+	Pa	PC-AT		M			
Oberea pupillata (GYLL.)	+			Bg	PO-BT	+	D	such.		
Agapanthia villosoviridescens (DE GEER)			+	Es	PC-AT		D			
Phytoecia nigricornis (FABR.)			+	Po	SY-AT	+	D			
Tetrops praeustus (L.)	+		+	Pm	SY-AT		D	Jbd		

Table 2. Numerical (N – number of species) and percentage share of zoogeographical elements within Cerambycidae of Romincka Forest

Zoogeographical element	N	%
Subcosmopolitan (Ko)	1	1.4
Holarctic (Ho)	6	8.7
Palaearctic (Pa)	26	37.7
Eurosiberian (Es)	6	8.7
Eurocaucasian (Ek)	10	14.6
European (Eu)	5	7.3
Subpontomediterranean (Pm)	3	4.4
Subpontic (Po)	1	1.4
Submediterranean (Me)	1	1.4
Boreomontane (Bg)	8	11.6
Boreal (Bo)	1	1.4
Montane/Submontane (Gp)	1	1.4
Total	69	100.0

Table 3. Numerical (N – number of species) and percentage share of range (chorological) elements within Cerambycidae of Romincka Forest

Range elements	N	%
Subcosmopolitan (Ko)	1	1.4
Holarctic (Ho)	5	7.3
Pacific-Atlantic (PC-AT)	18	26.1
Pacific-Baltic (PC-BT)	7	10.1
Syberian-Atlantic (SY-AT)	8	11.6
Siberian-Baltic (SY-BT)	2	2.9
Mongolian-Atlantic (MO-AT)	3	4.4
Mongolian-Baltic (MO-BT)	1	1.4
Kirghisian-Atlantic (KI-AT)	1	1.4
Caspian-Atlantic (KA-AT)	6	8.7
Ponto-Atlantic (PO-AT)	5	7.3
Ponto-Baltic (PO-BT)	5	7.3
Pannonian-Atlantic (PA-AT)	1	1.4
Pannonian-Baltic (PA-BT)	2	2.9
Baltic-Mediterranean (BT-ME)	2	2.9
Caspian-Mediterranean (KA-ME)	2	2.9
Total	69	100.0

Table 4. *Cerambycidae* in the Romincka Forest reserves

Species	Reserves					Total
	Boczki	Czerwona Struga	Dziki Kąt	Mechacz Wielki	Struga Żytkiejmska	
Rhagium inquisitor	+	+	+	+	+	5
Rhagium mordax	+	+	+		+	4
Stenocorus meridianus				+		1
Pachyta quadrimaculata				+		1
Dinoptera collaris	+	+	+	+	+	5
Gaurotes virginea	+	+	+			3
Alosterna tabacicolor	+	+	+		+	4
Pachytodes cerambyciformis	+	+	+		+	4
Stictoleptura maculicornis	+		+	+	+	4
Stictoleptura rubra	+	+	+	+	+	5
Leptura annularis	+				+	2
Leptura quadrifasciata	+		+	+	+	4
Stenurella melanura	+		+	+	+	4
Spondylis buprestoides	+		+	+	+	4
Asemum striatum			+	+		2
Arhopalus rusticus			+	+	+	3
Tetropium castaneum	+		+	+		3
Tetropium fuscum	+		+			2
Molorchus minor	+		+	+	+	4
Callidium coriaceum	+					1
Callidium violaceum			+			1
Monochamus galloprovincialis pistor			+	+	+	3
Monochamus sutor	+					1
Pogonocherus fasciculatus	+					1
Oplosia cinerea		+				1
Acanthocinus aedilis			+	+		2
Acanthocinus griseus				+		1
Leiopus linnei		+				1
Saperda carcharias					+	1
Saperda perforata	+				+	2
Saperda scalaris	+	+		+	+	4
Stenostola ferrea		+				1
Oberea oculata					+	1
Agapanthia villosoviridescens	+				+	2
Total	**21**	**11**	**19**	**17**	**19**	

Table 5. Educational valorization of longhorn beetles (Coleoptera: Cerambycidae) of the Romincka Forest.
Abbreviations: SR – life stage, DD – daily accessibility of imagines, DR – emerging time during the year, RS – emerging time vs. school year; PW – average size of imagines, B – imagines colour, IC – other morphological features that are "accessible" during lessons and are didactically valuable (for example: long antennae, colour variability, loud stridulation, non-specyfic larvae structures); O – trophic biology, ZO – defence behaviour, R – mobility of imagines; W – outstanding, D – big, S – medium, M – small.

Species	Number/ frequency	Accessibility				Morphological features			Ecological and etological features			Range	Species vs. nature conservation	Total number of points	Didactical value **WD**
		SR	DD	DR	RS	PW	B	IC	O	ZO	R				
P. coriarius	1	1	1	2	1	3	1	3	2	3	3	1	2	24	**M**
O. cursor	1	2	3	2	3	3	2	3	3	2	3	1	3	31	**S**
R. bicolor	1	1	1	3	3	3	3	3	3	2	3	1	3	30	**S**
R. inquisitor	2	3	3	3	3	1	3	2	3	3	3	1	2	32	**D**
R. mordax	3	3	3	3	3	3	3	3	3	2	3	3	2	37	**W**
S. meridianus	1	2	3	3	3	3	1	3	2	2	3	1	3	30	**S**
P. quadrimaculata	1	2	3	3	1	3	3	3	2	2	3	3	3	32	**D**
D. collaris	3	3	3	3	3	1	3	2	3	2	3	1	2	32	**D**
G. virginea	1	2	3	3	3	1	3	2	2	2	3	3	3	31	**S**
G. ruficornis	1	3	3	2	3	1	1	2	2	2	3	1	2	26	**M**
A. tabacicolor	2	2	3	3	3	1	1	2	2	2	3	1	3	28	**S**
P. livida	2	2	3	3	3	1	1	3	2	2	3	1	3	29	**S**
J. sexmaculata	1	2	3	3	3	1	3	2	2	2	3	3	3	31	**S**
P. cerambyciformis	3	2	3	3	3	1	3	2	3	2	3	1	2	31	**S**
A. reyi	1	2	2	3	1	1	2	3	2	2	3	1	2	25	**M**
A. sanguinolenta	2	2	3	3	3	1	2	3	2	2	3	3	2	31	**S**
S. maculicornis	2	2	3	3	3	1	1	3	2	2	3	1	2	28	**S**
S. rubra	3	3	3	3	1	3	2	3	2	2	3	1	2	31	**S**
S. variicornis	1	2	3	3	1	3	2	3	2	2	3	3	3	31	**S**

L. aethiops	1	2	3	2	1	3	3	2	2	2	3	1	3	28	**S**
L. annularis	2	2	3	2	1	3	3	2	2	3	3	3	3	32	**D**
L. quadrifasciata	2	3	3	3	3	3	3	2	3	3	3	1	2	34	**D**
S. bifasciata	1	2	3	2	3	1	2	3	2	3	3	1	3	29	**S**
S. melanura	3	2	3	3	3	1	2	3	3	3	3	1	2	32	**D**
S. attenuata	1	2	3	3	1	3	3	2	3	3	3	1	2	30	**S**
N. major	1	3	3	1	2	3	1	3	3	3	3	1	3	30	**S**
S. buprestoides	3	3	2	3	3	3	3	3	3	3	3	1	2	35	**D**
A. striatum	3	3	3	2	3	3	3	2	2	1	3	1	2	31	**S**
A. rusticus	3	3	1	2	1	3	1	3	2	2	3	1	2	27	**M**
T. castaneum	3	3	2	3	3	3	3	3	2	1	3	1	2	32	**D**
T. fuscum	1	3	2	3	3	3	1	3	2	1	3	1	2	28	**S**
T. gabrieli	1	3	2	3	3	3	1	2	3	1	3	1	2	28	**S**
M. minor	2	3	3	2	3	1	3	3	2	1	3	1	2	29	**S**
G. umbellatarum	2	3	3	2	3	1	1	3	2	1	3	1	3	28	**S**
O. brunneum	2	1	3	3	3	1	1	2	2	1	3	1	2	25	**M**
C. scopolii	1	2	3	3	3	3	1	3	3	3	3	3	3	34	**D**
A. moschata	2	3	3	3	1	3	3	3	3	3	3	1	3	34	**D**
H. bajulus	2	3	3	3	1	3	3	2	3	3	3	3	3	35	**D**
C. aeneum	2	1	2	2	3	3	3	2	3	2	3	1	2	29	**S**
C. coriaceum	1	2	2	2	1	1	1	2	3	1	3	3	2	24	**M**
C. violaceum	2	3	2	2	3	3	3	3	3	1	3	1	2	31	**S**
P. testaceus	1	1	1	3	1	3	3	3	2	2	1	1	2	24	**M**
X. rusticus	1	3	2	3	1	3	3	2	3	3	1	1	3	29	**S**
C. arietis	2	3	3	3	3	3	3	3	3	3	1	1	2	33	**D**
P. arcuatus	2	3	3	3	3	3	3	2	2	3	1	3	2	33	**D**
P. detritus	1	2	2	3	1	3	3	3	2	3	1	1	3	28	**S**
L. textor	1	3	2	3	3	3	3	3	3	3	3	1	3	34	**D**
M. galloprovincialis pistor	2	3	3	3	1	3	3	3	3	3	3	1	2	33	**D**
M. sutor	2	3	2	3	1	3	3	3	3	3	3	3	3	35	**D**

P. decoratus	2	1	1	3	3	1	3	2	3	3	3	1	2	28	**S**
P. fasciculatus	3	3	3	3	3	1	3	3	2	3	3	1	2	33	**D**
O. cinerea	1	1	1	3	3	1	3	3	2	3	3	1	3	28	**S**
A. aedilis	3	3	3	3	3	3	3	3	3	3	3	1	2	36	**W**
A. griseus	1	2	2	3	1	1	3	3	3	3	3	1	3	29	**S**
L. linnei	1	3	3	3	3	1	3	2	3	3	3	3	2	33	**D**
L. nebulosus	3	3	3	3	3	1	3	2	3	3	3	3	2	35	**D**
L. punctulatus	1	2	2	3	3	1	3	2	3	3	3	1	3	30	**S**
E. lusitanus	2	1	2	3	1	1	3	3	3	3	3	1	3	29	**S**
S. carcharias	1	3	3	3	1	3	3	3	2	2	3	1	2	30	**S**
S. perforata	2	1	2	3	3	3	3	3	3	2	3	1	3	32	**D**
S. populnea	1	3	3	1	3	3	1	2	3	2	3	1	2	28	**S**
S. punctata	1	1	2	3	3	3	3	3	3	2	3	3	3	33	**D**
S. scalaris	2	3	2	2	3	3	3	3	3	2	3	1	2	32	**D**
S. similis	1	1	2	3	1	3	3	3	3	2	3	1	3	29	**S**
S. dubia	1	2	2	2	3	1	3	3	2	2	3	3	3	30	**S**
S. ferrea	1	1	2	2	3	1	3	3	2	2	3	1	3	27	**M**
O. oculata	1	1	3	3	1	1	3	3	3	2	3	1	2	27	**M**
O. pupillata	1	1	3	3	3	1	3	3	3	2	3	3	3	32	**D**
A. villosoviridescens	1	3	3	3	3	3	1	3	2	2	3	3	2	32	**D**
P. nigricornis	1	2	3	2	3	1	3	3	3	3	3	3	3	33	**D**
T. praeustus	2	3	3	3	3	1	3	3	2	2	3	3	3	34	**D**