New records of beetle species (Coleoptera) from the Polish part of Białowieża Forest with special emphasis on the genus *Episernus* C.G. Thomson, 1863 (Ptinidae) in Central Europe

Radosław Plewa¹*, Tomasz Jaworski¹, Grzegorz Tarwacki¹, Krzysztof Sućko², Szymon Konwerski³, Roman Królik⁴, Andrzej Lasoń⁵, Andrzej Melke⁶, Marek Przewoźny⁷, Rafał Ruta⁸, Henryk Szoltyś⁹, Benoit Dodelin¹⁰, Jacek Hilszczański¹

¹ Department of Forest Protection, Forest Research Institute, Sękocin Stary, Braci Leśnej 3, 05-090 Raszyn, Poland.
² Department of Natural Forests, Forest Research Institute, Białowieża, Park Dyrekcyjny 6, Białowieża 17-230, Poland.
³ Natural History Collections, Faculty of Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland.
⁴ Ligota Zamecka 56A, 46-200 Kluczbork, Poland.
⁵ Wiejska 48/85, 15-352 Białystok, Poland.
⁶ Św. Stanisława 11/5, 62-800 Kalisz, Poland.
⁷ Department of Systematic Zoology, Faculty of Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland.
⁸ Department of Biodiversity and Evolutionary Taxonomy, University of Wrocław, Przybyszewskiego 65, 51-148 Wrocław, Poland.
⁹ Park 9, 42-690 Brynek, Poland.
¹⁰ 11 Rue Montesquieu, F-69007 Lyon, France.

*Corresponding author: r.plewa@ibles.waw.pl*

**Abstract:** This paper presents data on 23 beetle species recorded for the first time from the Białowieża Forest (Polish part), and among them two species new for the fauna of Poland. All the beetles were collected using multifunnel (Lindgren) traps, placed in the selected sites of the study area in 2018. Collected species belong to 13 families: Carabidae (1 species), Corylophidae (1), Curculionidae (1), Dermestidae (1), Elateridae (2), Eucnemidae (1), Laemophloeidae (1), Latridiidae (2), Nitidulidae (1), Ptinidae (3), Staphylinidae (7), Throscidae (1) and Trogossitidae (1). *Episernus angulicollis* C.G. Thomson, 1863 and *E. tatarinovae* Toskina et Nikitsky, 2003 (Ptinidae) are recorded for the first time from Poland, and *Microrhagus pyrenaeus* Bonvouloir, 1872 (Elateridae) and *Leptusa norvegica* Strand, 1941 (Staphylinidae), for the second time. Distribution of all the above species in Poland is briefly discussed and details on the biology of some of them are given. An identification key for the species of the genus *Episernus* C.G. Thomson, 1863 from Central Europe is presented. Species diversity of beetles in the Polish part of Białowieża Forest is estimated based on published data.

**Key words:** beetles, Lindgren funnel trap, faunistics, new records, distribution, Poland

**Introduction**

This article is a continuation of the series of new faunistic records of beetles in the Białowieża Primeval Forest. In the recent work we presented data on 69 species of Coleoptera recorded for the first time in this area, and among them one species new for the Polish fauna (Plewa et al. 2019). In that article we presented the most important results of a study carried out in 2017, and a brief overview of coleopterological studies in the Białowieża Forest (Plewa et al. 2019). Therefore, in the introduction of the present
article, we refrain from repeating similar content and focus exclusively on the information on the biodiversity of this region based on the material collected in 2018. In addition to new data records for Poland and the Polish part of Białowieża Forest, we also present a key to the identification of some Central European species of the genus Episernus C. G. Thomson, 1863.

**Material and Methods**

All the specimens were collected using Lindgren funnel traps, i.e. 12-funnel purple traps covered with PTFE to enhance trap slipperiness (see, Plewa et al. 2019 for trap photo). Traps were equipped with a collection chamber half-filled with ethylene glycol to preserve captured insects. A total of 328 traps were displayed from late-April to late-September of 2018 in selected sites of Białowieża Forest (Fig. 1). Traps were hung at the lower branches of trees (i.e., one trap per tree) at a height of 2–7 m (mean = 5.1 m) above ground level, and were next emptied every 1–1.5 month.

Beetle species were identified by all the authors, and determinations of some taxa were further confirmed by Radosław Plewa (RP) – Latridiidae, Szymon Konwerski (SK) – Leiodidae, Roman Królik (RK) – Ciidae, Andrzej Melke (AM) – Staphylinidae, Marek Przewoźny (MP) – Eucnemidae, Rafał Ruta (RR) – Corylophidae, Andrzej Lasoń (AL) – Nitidulidae, Henryk Szołtys (HS) – Elateridae, and Benoit Dodelin (BD) – Ptinidae.

Taxonomic nomenclature follows the Catalogue of Palaeartic Coleoptera (Löbl I. & Smetana 2003, 2004, 2007, 2011) with further amendments (Löbl I. & Löbl D. 2015; Rücker & Johnson 2007). The list of families and species is presented in alphabetical order. The locality names: Białowieża, Browsk, Hajnówka, refer to the areas administered by Białowieża Forest District, Browsk Forest District, and Hajnówka Forest District, respectively, while BNP refers to the area of Białowieża National Park. Symbols in square brackets are: (1) designations of the forest management units according to the territorial division of the Polish part of Białowieża Forest (hereafter subcompartments); (2) codes of forest habitat type (i.e. basic unit of the typological classification of forests applied in Poland) in which particular traps were installed: Bśw – fresh coniferous, BMśw – mixed fresh coniferous, BMw – mixed humid coniferous, Bw – humid coniferous, Lśw – fresh deciduous, LMśw – mixed fresh deciduous, LMw – mixed humid deciduous, Lw – humid deciduous, O – alder forest, OJ – ash-alder forest; (3) name and (4) age of dominant tree species within given forest subcompartment; (5) tree species on which the trap was installed.

The location of each subcompartment within the particular UTM (Universal Transverse Mercator) square is visualized in Figure 1. Numbers of collected individuals of beetles are followed by the information about the trapping period during which they were captured.

**Taxa overview**

**Family: Carabidae**

- *Dromius laeviceps* Motschulsky, 1850

  Material examined. Hajnówka: [515Cc; Lw; *Picea abies* (L.) H. Karst; 60; *Carpinus betulus* L.], 1 indiv., 8.08–19.09.2018, det. HS.

  Remarks. Thus far, the species has been recorded from central and eastern parts of the country (Burakowski et al. 1974), and was recently discovered in the Eastern Beskid Mountains (Taszakowski et al. 2019) and from the border between the southern part of Podlasie and the Lublin Upland (Tylkowski 2014).

**Family: Corylophidae**

- *Arthrolips obscura* (Sahlberg C.R., 1833)

  Material examined. BNP: [136Ca; LMśw; *Pinus sylvestris* L.; 78; *C. betulus*], 1 indiv.,
Fig. 1. Localization of study sites within Polish part of the Białowieża Forest (perpendicular lines delineate UTM squares).

17.04–28.05.2018, det. RR; Browsk: [778Cb; Lśw; C. betulus; 83; C. betulus], 1 indiv., 17.04–22.05.2018, det. RR; Hajnówka: [636Ba; Lw; Alnus glutinosa Gaertn.; 113; C. betulus], 1 indiv., 17.04–30.05.2018, det. RR.

Remarks. At the turn of 19th and 20th centuries, the species has been reported from two localities in southeastern Poland (i.e. Lower Silesia and Western Beskid Mts.) (Burakowski et al. 1986c). Later, the species was recorded from Roztocze (Borowiec & Iwan 1989), the Wielkopolska-Kujawy Lowland (Majewski 1994), and Lower Silesia (Trzebnickie Hills) (Ruta et al. 2010).

Family: Curculionidae

• Scolytus ensifer Eichhoff, 1881

Material examined. Browsk: [777Bb; Lw; A. glutinosa; 55; C. betulus], 1 indiv., 25.06–7.08.2018, det. RK.

Remarks. Thus far, the species has been recorded from several localities throughout the country (Mokrzycki et al. 2011). Larvae develop exclusively on elms Ulmus spp., where they inhabit thin branches (Nunberg 1954).
Family: Dermestidae

- *Attagenus pantherinus* (Ahrens, 1814)

Material examined. BNP: [283Db; Ol; A. glutinosa; 110; Fraxinus excelsior L.], 1 indiv., 17.04–29.05.2018, det. RK; Browsk: [774Cn; Lśw; Quercus robur L.; 83; C. betulus], 1 indiv., 17.04–22.05.2018, det. SK.

Remarks. In Poland, the species is relatively rarely recorded, although based on the number of records to-date it can be assumed that it occurs in most parts of the country. The distribution of *A. pantherinus* in Poland was summarized by Ruta et al. (2005). Larvae develop inside nests of various aculeate Hymenoptera, hence the adults are often found near them, i.e. on wooden buildings and on loess or clay walls (Burakowski et al. 1986a).

Family: Elateridae

- *Lacon querceus* (Herbst, 1784)

Material examined. BNP: [283Db; Ol; A. glutinosa; 110; F. excelsior], 1 indiv., 17.04–29.05.2018, det. RK.

Remarks. A rare species, reported from seven zoogeographical regions in Poland (Tarnawski 2000). Most of the localities of *L. querceus* are situated in western Poland, except for single records from the Masurian Lake District (Augustów) (Buchholz & Ossowska 1992), the Mazovian Lowland (Warsaw) (Burakowski et al. 1985), and the Małopolska Upland (Spała Reserve) (Byk et al. 2013). The species is typically associated with old, hollowed oaks. Larvae are predatory and live in decaying wood infested by brown-rot fungi, in particular by *Laetiporus sulphureus* (Bull. Et Fr.) Murr. (Burakowski et al. 1985).

- *Stenagostus rhombeus* (Olivier, 1790)

Material examined. Hajnówka: [702Ab; LMśw; Betula pendula Roth; 77; C. betulus], 1 indiv., 2.07–7.08.2018, det. SK.

Remarks. A rare species, known from several localities across the country, i.e. from the Baltic Coast (Wolin island), the Pomeranian Lake District, Lower and Upper Silesia, and the Wielkopolska-Kujawy Lowland (Tarnawski 2000, Smolis 2008). The species is trophically associated with deciduous trees, especially oaks, beeches, limes and elms. Larvae feed under the bark or in decaying wood, often in corridors created by larvae of the longhorn beetles – Cerambycidae (Burakowski et al. 1985).

Family: Eucnemidae

- *Microrhagus pyrenaeus* Bonvouloir, 1872

Material examined. Białowieża: [672Fb; Ol; A. glutinosa; 108; B. pendula], 1 indiv., 21.05–25.06.2018, det. RR & RP; [672Fb] 1 indiv., 25.06–6.08.2018, det. RP.

Remarks. The species was recently reported as new species for the Polish fauna from several localities in the Lublin Upland (Hilszczański et al. 2015). Thus, the present locality of *M. pyrenaeus* in the Białowieża Forest is the first record from this Region. Larvae develop in wood of deciduous trees, mainly of hornbeams, oaks, and alders, infested with white-rot fungi (Muona 1993, Brustel & Van Meer 2008).

Family: Laemophloeidae

- *Notolaemus unifasciatus* (Latreille, 1804)

Material examined. Browsk: [774Cn; Lśw; Q. robur; 83; C. betulus], 1 indiv., 25.06–6.08.2018, det. MP.

Remarks. Recent records on this species come from the 1960s from Lower Silesia (Burakowski et al. 1986b). Larvae develop under the bark of dead oaks and beeches, and were also found in the corridors of the scolytid beetle, *Dryocoetes villosus* (Fabricius, 1792) (Ślipiński 1982).

Family: Latridiidae

- *Corticaria umbilicata* (Beck, 1817)

Material examined. Browsk: [774Cn; Lśw; Q. robur; 83; C. betulus], 1 indiv., 25.06–6.08.2018, det. RP.
**Family: Nitidulidae**

- *Epuraea distincta* (Grimmer, 1841)

  Material examined. Hajnówka: [306Ad; LMw; *P. abies*; 123; *A. glutinosa*], 1 indiv., 17.04–22.05.2018, det. AL.

  Remarks. The species is known only from the Eastern Beskid Mts., the Masurian Lake District (Nunberg 1976), the Świętokrzyskie Mts. (Borowski 2007) and one unspecified locality (Borowski 2006). It was also recorded from the Belarusian part of the Białowieża Forest (Tsinkevich 1998).

- *Melanophthalma rispini* Rücker & Johnson, 2007

  Material examined. Białowieża: [338Cg; Lśw; *P. abies*; 92; *Corylus avellana* L.], 1 indiv., 17.04–22.05.2018, det. RP; Browsk: [760Bf; Lw; *Q. robur*; 103; *C. betulus*], 1 indiv., 22.05–25.06.2018, det. RP.

  Remarks. Thus far, the species has been known from three regions of Poland: the Wielkopolska-Kujawy Lowland (Jałoszyński & Przewoźny 2013), the Mazovian Lowland (Plewa & Miłkowski 2018) and the Małopolska Upland (Plewa & Miłkowski 2018). Based on present record, Białowieża Forest is the easternmost locality of *M. rispini* in Europe.

**Family: Ptinidae**

- *Episernus tatarinovae* Toskina et Nikitsky, 2003 (Fig. 2)

  Material examined. BNP: [229Af; Bśw; *P. sylvestris*; 26; *P. sylvestris*], 1 indiv. (male), 17.04–28.05.2018, det. BD & RP; Białowieża: [495Ca; LMśw; *Pinus sylvestris*; 92; *C. betulus*], 1 indiv. (female), 17.04–22.05.2018, det. BD & RP.

  Remarks. New species for the fauna of Poland. Thus far, it was known only from the northern European part of Russia (Zahradník 2007), namely from the Pechora-Ilych Nature Reserve (Shaytanovka) in the Republic of Komi (Toskina & Nikitsky 2003). Thus, the Białowieża Forest is second known locality of *E. tatarinovae*; distant of about 2300 km from species’ locus typicus.

  Biology of the species is practically unknown. The adult beetles were captured using barrier traps installed on spruce and larch (Tatarinova 2002).

- *Episernus tatarinovae* Toskina et Nikitsky, 2003 (Fig. 2)

  Material examined. Białowieża: [338Cg; Lśw; *P. abies*; 92; *Corylus avellana* L.], 1 indiv., 27.06–7.08.2018, det. RP; Browsk: [760Bf; Lw; *Q. robur*; 103; *C. betulus*], 1 indiv., 22.05–25.06.2018, det. RP.

  Remarks. Thus far, the species has been known from three regions of Poland: the Wielkopolska-Kujawy Lowland (Jałoszyński & Przewoźny 2013), the Mazovian Lowland (Plewa 2018) and the Małopolska Upland (Plewa & Miłkowski 2018). Based on present record, Białowieża Forest is the easternmost locality of *M. rispini* in Europe.
Fig. 3. Apex of male aedeagus of: A) *Episernus gentilis*, B) *E. striatellus*, C) *E. taygetanus alpestris*, D) *E. granulatus*. In each panel, figures represent: left – right paramere; center – aedeagus apex; right – habitus of paramere (drawings by B. Dodelin).

Fig. 4. *Episernus angulicollis* A) habitus of male, B) apex of the male aedeagus (left – right paramere; center – aedeagus apex, right – habitus of paramere), drawings by B. Dodelin.

Thus, the species was listed in the Polish red list of endangered animals, with the category EX? (presumably extinct) (Pawłowski *et al.* 2002). In Poland, *E. striatellus* was last recorded in late 20th century from the Małopolska Upland (Borowski 1993, 2016).

Morphological description. Antennae with the 3rd and 4th segment elongated, each 2 to 2.2 times longer than wide. Segments 5 and 6, 1.2 times and 1.6 times longer than wide, respectively. Frons smooth and shiny, frons sides and vertex strongly granulated, forehead with a narrow longitudinal groove. Pronotum with rounded granules, spaced 0.5 to 1 times their diameter on the disc, surface between punctures covered with dense micro-reticulation. Elytrae covered with flat-top granules, 2 to 3 times wider than the pronotum’s granules. Spaced 0.5 to 1 times their diameter, surface between punctures covered with dense micro-reticulation.

- *Episernus angulicollis* C.G. Thomson, 1863 (Fig. 4)

Material examined. Browsk: [749Cb; LMśw; *P. sylvestris*; 50; *C. betulus*], 1 indiv. (male), 17.04–22.05.2018, det. BD & RP.

Remarks. New species for the fauna of Poland. It is characterized by boreal-montane distribution and is known from most of Europe. In the northern parts of its range it was recorded from Norway, Finland, Sweden, the Northern European Russia and parts of Asia (Eastern Siberia). In southern Europe, the species is known from France, Austria, Italy and Switzerland (Zahradník 2007, Dodelin 2016).

Biology of *E. angulicollis* is partly known. Adults were collected in June and July, nevertheless present data suggest earlier phenology. Larvae develop in thin (ca. 1–2 cm) branches of Norway spruce *Picea abies* (Dodelin 2016). Furthermore, larval hosts include several other tree species, i.e. Scots pine *Pinus sylvestris*, Swiss pine *P. cembra* or mountain pine *P. mugo* (Saalas 1917, Holzer 2010).
Identification key to Central European *Episernus* species

In the subfamily Ernobiinae subfamily, *Episernus* has the following characters: antennae consisting of ten segments (rarely nine), terminated by a three-segment club. Males can be recognized by their large, prominent eyes, as well as their antennae with the 3 last segments very long, at least twice as long as all the previous articles. Females’ eyes are less protruding and the antennae have shorter clubs. European species of *Episernus* (males and females) may be distinguished by the following features:

1. Pronotum with the rear angles rounded. Lateral edge with a continuous keel widely flattened posteriorly. Pronotum marked with a smooth, longitudinal, unpressed line. Two weak depressions from either side of the disc, close to the basis

\[
\text{Episernus tatarinovae (Fig. 2)}
\]

   Distribution: Northern European part of Russia, Poland: Białowieża Forest.

1A. Pronotum with the rear angles rounded. Lateral edge without keel

1B. Pronotum with distinct rear angles, placed in front of the base, in general angular and flattened but sometimes reduced to an acute point. Lateral edge with a keel reaching the middle of pronotum

2. Base of elytra with no or few points aligned. Sculpture of dense and homogeneous, rounded granules, spaced apart less than their diameter, the surface between the granules smooth and shiny. Pronotum regularly convex, without noticeable relief or depression. Angularly widens at the anterior quarter. Sometimes with a median smooth line poorly indicated, pronotum brown, lighter than elytra. Head fully covered with fine granulation. Aedeagus (Fig. 3A)

\[
\text{Episernus gentilis}
\]

   Distribution: Western Europe, at low altitudes.

2A. Base of elytra with well-marked punctate striations. Sculpture of fine and superficial granules, spaced by 2 to 3 times their diameter on the elytra, 1 time their diameter on the pronotum. Pronotum: ♂ with 2 strong transverse depressions marking 3 reliefs; ♀ clearly oval with a more or less marked transversal basal groove. Pronotum and elytra concolor, light brown. Head with weak granulation, smooth and shiny in front of the forehead (♂), or entirely (♀). Aedeagus (Fig. 3B)

\[
\text{Episernus striatellus}
\]

   Distribution: Europe, at low altitudes.

3. Antennae with the 3rd segment 1.3 times longer than wide, 4th segment slightly shorter than wide. Forehead regularly granulated, without (♂) or with (♀) circular depression. Aedeagus (Fig. 3C)

\[
\text{Episernus taygetanus alpestris}
\]

   Distribution: France: Alps: Izoard, Briançonnais.

3A. Antennae with elongated 3rd and 4th segment, each 1.5 to 2 times longer than wide

4. Antennae with the 5th and 6th segment 2 times longer than wide. Sculpture of elytra formed by small, well-defined cylindrical granules, spaced by distance equal to their diameter, on a smooth and shiny background. Sculpturation of the pronotum of the same structure except in the postero-lateral quarter where it is more complindiv. Aedeagus (Fig. 3D)

\[
\text{Episernus granulatus}
\]

   Distribution: Central European mountains, Eastern Alps.

4A. Antennae with the 5th and 6th segments as long as wide. Disc of elytra with few aligned points, more or less marked. Sculpture of elytra formed by pyramidal granules with contact at the base. Sculpture of the pronotum with round granules spaced by distance of 1 to 2 times of their diameter, with micro-reticulation in-between. Laterally, the granules disappear almost completely and are replaced by the micro-reticulation

\[
\text{Episernus angulicollis (Fig. 4)}
\]

   Distribution: Boreal Europe, high altitudes of the Alps and Pyrenees.
• *Ernobius pini* (Sturm, 1837)

Material examined. Browsk: [769Cg; Lw; *P. abies*; 63; *P. abies*; 1 indiv., 22.05–25.06.2018, det. HS; Hajnówka: [631Ac; Lw; *P. abies*; 47; *P. abies*], 1 indiv., 17.04–30.05.2018, det. HS.

Remarks. Until the mid-20th century, the species has been recorded mainly from western Poland (*Burakowski et al.* 1986a). More recently, the species was recorded from single localities in the eastern part of the country (Knyzysřinska Forest – Kopna Góra) by Kubisz and Szwàłko (1991) and from central Poland (Rogów) by Borowski (2016). Larvae feed on pith of thin branches of Scots pine, which were previously weakened by larvae of bark beetles. Adults were observed from May to July, often near the breeding sites of larvae (*Burakowski et al.* 1986a).

**Family: Staphyliniade**

• *Bibloplectus tenebrosus* (Reitter, 1880)

Material examined. Białowieża: [338Cg; Lsw; *P. abies*; 92; *C. avellana*], 1 indiv., 17.04–23.05.2018; [639Bi; Lsw; *P. abies*; 36; *C. betulus*], 1 indiv., 17.04–22.05.2018; [429Bk; LMśw; *C. betulus*; 53; *C. betulus*], 1 indiv., 21.05–25.06.2018; [395Bd; Lw; *A. glutinosa*; 93; *A. glutinosa*], 1 indiv., 23.05–27.06.2018, det. AM; BNP: [341Ab; Lw; *C. betulus*; 120; *C. betulus*], 1 indiv., 17.04–25.05.2018; [259Di; Ol; *A. glutinosa*; 133; *C. betulus*], 1 indiv., 28.05–29.06.2018, det. AM; Browsk: [769Cg; Lw; *P. abies*; 63; *P. abies*], 1 indiv., 22.05–25.06.2018; [774Cn; Lsw; *Q. robur*; 83; *C. betulus*], 2 exx., 25.06–08.2018, det. AM; Hajnówka: [214Cj; Ol; *Q. robur*; 30; *A. glutinosa*], 1 indiv., 3.07–9.08.2018, det. AM.

Remarks. The species is known from scattered localities across the country. Recent data on *G. lucidula* come from the Lublin Upland (Staniec 1994, 1998), the Pomeranian Lake District (Ruta & Melke 2002, Ruta 2009), the Małopolska Upland (*Burakowski* 2006) the Wielkopolska-Kujawy Lowland (Renner & Messutat 2007), and Pieniny Mts. (*Chachuła et al.* 2019). The species is found inside bodies of wood-decaying fungi, especially those of *Polyporus squamosus* (Huds.) Fr. and *Pluteus cervinus* (Schaeff.) Fr., among decaying leaf-litter, and sometimes close to small water reservoirs and on the banks of rivers (*Burakowski et al.* 1981).

• *Eusphalerum tenenbaumi* (Bernhauer, 1932)

Material examined. Hajnówka: [572Af; Bw; *P. sylvestris*; 76; *C. betulus*], 1 indiv., 17.04–29.05.2018, det. AM.

Remarks. The species is known from five regions located in the southern part of Poland: Western Sudeten Mts. (*Mazur* 1995), Western Beskid Mts. (*Kubisz & Szafraniec* 2003), Bieszczady Mts. (*Szujecki* 1996, *Pawłowski et al.* 2000) and the Świętokrzyskie Mts. (*Byk 2007, Mokrzycki 2007*). Older reports (from the turn of the 19th and 20th centuries) come from the Eastern Beskid Mts., Kraków-Wieluń Upland, the Mazovian Lowland, Pieniny Mts. and Upper Silesia (*Burakowski et al.* 1979).

• *Gyrophaena lucidula* Erichson, 1837

Material examined. Białowieża: [605Cr; Ol; *A. glutinosa*; 40; *A. glutinosa*], 1 indiv., 25.06–7.08.2018, det. AM.

Remarks. The species is known from three regions in Poland: the Wielkopolska-Kujawy Lowland (*Burakowski et al.* 1978, Renner & Messutat 2007), the Kraków-Wieluń Upland (*Burakowski et al.* 1978, *Pawłowski et al.* 1994) and the Mazovian Lowland (*Mazur et al.* 2010).

• *Ischnoglossa elegantula* (Mannerheim, 1830)

Material examined. Białowieża: [429Bk; LMśw; *C. betulus*; 53; *C. betulus*], 1 indiv., 21.05–25.06.2018; [496Ac; BMśw; *P. abies*; 46; *P. abies*], 1 indiv., 21.05–26.06.2018; [475Bb; LMśw; *P. abies*; 163; *C. betulus*], 1 indiv., 22.05–26.06.2018; [426Cj; Lw; *P. abies*; 173; *C. betulus*], 1 indiv., 23.05–28.06.2018,
Remarks. The species inhabits boreal and montane regions and is known from Scandinavia, Lithuania, the European part of Russia, and the Italian Alps (Smetana 2004). It has recently been recorded from the Czech Republic (Vávra 2011) and Slovakia (Benedikt et al. 2015). In Poland, it is known from two localities: the Eastern Beskid Mts. (Turnica) (Buchholz & Melke 2018) and the Babia Góra National Park (Szafraniec et al. 2019). Knowledge about the biology and ecology of *I. elegantula* is limited, but it is perhaps similar to other species in the genus. It is presumed that the species may inhabit forests with significant amounts of dead wood of fir and spruce (Buchholz & Melke 2018). The present data from the Białowieża Forest are the third country records of this species in Poland.

- *Leptusa norvegica* Strand, 1941

Material examined. Białowieża: [277Bd; Lw; *F. excelsior*; 173; *C. betulus*], 1 indiv., 28.06–9.08.2018, det. AM; BNP: [288Aa; Lw; *P. abies*; 100; *C. betulus*], 1 indiv., 25.05–29.06.2018; [370Bb; Lw; *C. betulus*; 120; *C. avellana*], 1 indiv., 29.05–28.06.2018, det. AM; Browsk: [101Cb; LMśw; *P. sylvestris*; 42; *C. betulus*], 1 indiv., 25.05–28.06.2018; [749Cb; LMśw; *P. sylvestris*; 50; *C. betulus*], 1 indiv., 25.06–6.08.2018; [95Aa; Lśw; *P. abies*; 93; *C. betulus*], 1 indiv., 26.06–7.08.2018; [65Bf; Lśw; *C. betulus*; 163; *C. betulus*], 1 indiv., 27.06–8.08.2018; [187Cd; BMśw; *P. abies*; 78; *C. betulus*], 1 indiv., 28.06–9.08.2018; [101Cb; LMśw; *P. sylvestris*; 42; *C. betulus*], 1 indiv., 6.08–17.09.2018, det. AM; Hajnówka: [303Ba; Lśw; *P. abies*; 93; *P. abies*], 1 indiv., 3.07–10.08.2018, det. AM.

Remarks. The species is known from several localities in central-west Europe (Great Britain, Germany, Denmark, the Netherlands, Slovakia), Scandinavia (Sweden, Norway and Finland), and eastern Siberia ( Pace 1989, Smetana 2004, Mazur 2005). In Poland, *L. norvegica* was recorded only from one site in the Wielkopolska-Kujawy Lowland, i.e. Mosina near Poznań. The species was found under the bark of standing Scots pine with galleries of *Arhopalus rusticus* (Linnaeus, 1758) (Coleoptera: Cerambycidae) larvae (Mazur 2005). The present data from the Białowieża Forest are the second country records of this species.

- *Quedius ochripennis* (Ménétriés, 1832)

Material examined. Browsk: [751Df; OJ; *A. glutinosa*; 103; *C. betulus*], 1 indiv., 22.05–25.06.2018, det. AM.

Remarks. In Poland, the species was reported from the Wielkopolska-Kujawy Lowland, the Lower and Upper Silesia, the Eastern and Western Sudeten Mts. and the Eastern Beskid Mts. (Burakowski et al. 1980, Nowosad 1990). Recent records come from the Bieszczady Mountains (Wojas 1992, Pawłowski et al. 2000), the Świętokrzyskie Mts. (Mokrzycki 2007) and the Małopolska Upland (Jaskuła et al. 2010, Byk et al. 2013, Mokrzycki et al. 2013). Previously, the species was found in decaying wood, as well as in caves, basements, barns, nests of small mammals or hornets *Vespa crabro* (Linnaeus, 1758) (Wojas 1992).
Thoracophorus corticinus  Motschulsky, 1837

Material examined. BNP: [369Gc; Lśw; Tilia cordata Mill.; 65; C. betulus], 1 indiv., 29.05–2.07.2018, det. AM.

Remarks. Thus far, the species has been recorded only from the Mazovian Lowland, Upper Silesia and the Western Sudeten Mts. (Burakowski et al. 1979). Recent records of this species come from the Wielkopolska-Kujawy Lowland (Konwerski & Staniec 2000, Jałoszyński & Konwerski 2001, Konwerski & Matusiak 2001), Mazovian Lowland (Burakowski 1997), Podlasie (Staniec 2003, 2006) and Lublin Upland (Konwerski & Staniec 2000, Staniec 2001, 2006). Thoracophorus corticinus is a myrmecophile species, developing inside nests of Lasius brunneus (Latreille, 1798) (Hymenoptera), most often inside corridors built in decaying trunks of deciduous trees (Burakowski et al. 1979, Jałoszyński & Konwerski 2001).

Family: Throscidae

Trixagus elateroides (Heer, 1841)

Material examined. Hajnówka: [519Ag; OU; A. glutinosa; 40; A. glutinosa], 1 indiv., 4.07–13.08.2018, det. HS.

Remarks. The species has been very rarely recorded in Poland. Currently, the two known localities of T. elateroides are situated in the northwestern parts of the country, i.e., the Baltic Coast (Gruszka & Tarnawski 1995) and the Pomeranian Lake District (Bielinek forest-steppe reserve) (Buchholz 2008). Older records origin from the late 19th and early 20th century and require confirmation (Burakowski et al. 1985). According to Buchholz (2008), T. elateroides should be considered Medi-terraneanean species, and is probably associated with moist and warm habitats, e.g. riverside areas covered with rush plant communities.

Nemozoma caucasicum Ménétrries, 1832

Material examined. Browsk: [760Bf; Lw; Q. robur; 103; C. betulus], 1 indiv., 17.04–22.05.2018, det. MP; [773Ad; OU; A. glutinosa; 113; F. excelsior], 2 indiv., 17.04–2.05.2018, det. RP.

Remarks. Relatively recently, the species was reported as new for Poland (Hilszczański 2006). Since then, it has been recorded in several regions of Poland. A summary of faunistic data and a description of biology was recently presented by Miłkowski et al. (2019).

Discussion

Compared to other parts of Poland, coleopterological studies in the Białowieża Forest have a long and well-documented history (e.g., Gutowski & Jaroszewicz 2001). This allows a relatively precise estimation of the current beetle species-richness in this area. In the Catalogue of the fauna of Białowieża Primeval Forest, Gutowski and Jaroszewicz (2001) listed 2691 beetle species recorded from its Polish part. Further 50 species new for this area were recorded shortly after, during the surveys carried out by Borowski (2001), Byk (2001), Mokrzycki (2001) and Skłodowski (2001). Since then, new records of 126 species were published by various authors (Wąsowska 2001, 2005, Majewski 2003, Wanat 2003, Gutowski et al. 2006, Szujecki 2006, Gutowski 2010, Gutowski et al. 2010, Jałoszyński 2010, Mokrzycki et al. 2011, Plewa & Melke 2013, Hilszczański et al. 2014, 2015, Plewa et al. 2014, 2017, Greń et al. 2017). Based on the results of our previous research, which mentioned 69 species (Plewa et al. 2019), and the present study (23 species), we report a total number of 92 species. The recent paper of Gutowski et al. (2020) includes records on further 14 species.
of beetles new for this area. Thus, the current species-richness of Coleoptera of the Polish part of Białowieża Forest is estimated at 2973 species.

Considering exclusively the families of Coleoptera studied by us, the current species richness within the Polish part of Białowieża Forest is estimated at: Carabidae (220 species, i.e. ~41.4% of the Polish fauna), Corylophidae (11, ~68.7%), Curculionidae (452, ~42.4%), Dermentidae (18, ~50%), Elateridae (73, ~54.9%), Eucnemidae (18, ~82%), Laemophloeidae (4, ~22.2%), Latridiidae (50, ~68.5%), Nitidulidae (18, ~50%), Ptinidae (49, ~53.5%), Staphylinidae (595, ~44.3%), Throscidae (6, ~60%), Trogossitidae (3, ~60%).

The high number of previously unrecorded beetle species in the Białowieża Forest can be explained in several ways, as highlighted in our previous work (Plewa et al. 2019). Firstly, this area is considered one of the best preserved forests in the European lowlands (e.g. Jaroszewicz et al. 2019), as reflected for example by large diversity of forest habitats, accumulation of diversified dead wood substrates, and continuity of old trees – a features which favour many species, including those highly specialized with respect to inhabited ecological niches. Secondly, it should be noted that some species which are actually present in a given area may remain undetected due to the methods used or the intensity of their application (e.g., Gu & Swihart 2004). The multi-funnel traps used in the present research are characterized by relatively high trapping efficiency (up to 100 beetle species per trap – unpublished data), which, given the number of traps used, presumably allowed for collection of species characterized by hidden lifestyle, short period of activity or occurring at very low abundances. Therefore, Lindgren funnel traps can be a valuable tool in the future studies of forest beetles.

In conclusion, our results emphasize the need to continue the investigations on the beetle fauna of the Białowieża Forest. Complex studies using various methods should be performed to fully assess the biodiversity this valuable area.

Acknowledgements

This study was financed by the Polish State Forests, National Forest Holding, under the project Biodiversity assessment of the Białowieża Forest based on selected natural and cultural components.

References

Benedikt S, Mantič M, Vávra JC. 2015. Nové a potvrzené druhy drabčíků (Coleoptera: Staphylinidae) pro Slovensko. Západočeské entomologické listy, 6: 12–21.
Borowiec L, Iwan D. 1989. Nowe stanowiska reliktowych gatunków chrząszczy (Coleoptera) z Roztocza. Przegląd Zoologiczny, 33(3): 439–440.
Borowski J. 1993. Nowe stanowiska i uwagi o niektórych polskich kołatkowatych (Coleoptera, Anobiidae). Wiadomości Entomologiczne, 12(1): 55.
Borowski J. 2001. Próba waloryzacji lasów Puszczy Białowieskiej na podstawie chrząszczy (Coleoptera) związanych z nadrzewnymi grzybami. In: Szujecki A. (Ed.). Próba szacunkowej waloryzacji lasów Puszczy Białowieskiej metodą zooindykacyjną. Wydawnictwo SGGW, Warszawa, pp. 287–317.
Borowski J. 2006. Chrzaszcze (Coleoptera) grzybow nadrzewnych – studium waloryzacyjne. Wydawnictwo SGGW, Warszawa, pp. 91.
Borowski J. 2007. Waloryzacja drzewostanów Gór Świętokrzyskich przy wykorzystaniu mycetobiontycznych chrząszczy grzybów nadrzewnych. In: Borowski J, Mazur S. (Eds.). Waloryzacja ekosystemów leśnych Gór Świętokrzyskich metodą zooindykacyjną. Wydawnictwo SGGW, Warszawa, pp. 119–147.
Borowski J. 2016. Beetles (Coleoptera) of the Rogów region. Part. 07. – powderpost
beetles (Bostrichidae), spider and death-watch beetles (Ptinidae). World Scientific News, 37: 101–113.

Brustel H, Van Meer C. 2008. Nouvelles observations de Microrhagus pyrenaicus (Bonvouloir, 1872) (Coleoptera Eucnemidae). L’Entomologiste, 64(2): 75–78.

Buchholz L. 2008. Sprężyki (Coleoptera: Elateridae, Eucnemidae, Thysanidae) rezerwatu leśno-stepowego "Bielinek" nad Odrą – charakterystyka i geneza fauny. Wiadomości Entomologiczne, 27(4): 195–258.

Buchholz L, Ossowska M. 1992. Nowe dane i uwagi o rozmieszczeniu niektórych sprężykowatych (Coleoptera, Elateridae) w Polsce. Wiadomości Entomologiczne, 11(4): 254.

Buchholz L, Melke A. 2018. 4.6 Owady – chrząszcze – Coleoptera. In: Boćkowski MD (Ed.). Projektowany Turnicki Park Narodowy. Stan walorów przyrodniczych – 35 lat od pierwszego projektu parku narodowego na Pogórzu Karpackim. Fundacja Dziedzictwo Przyrodnicze, Nowosiółki Dydyńskie, 314–377.

Burakowski B. 1997 (1996). Uwagi i spostrzeżenia dotyczące chrząszczy (Coleoptera) żyjących w próchnowiskach. Wiadomości Entomologiczne, 15(4): 197–206.

Burakowski B, Mroczkowski M, Stefańska J. 1974. Chrząszcze – Coleoptera. Biegaczowate – Carabidae, część 2. Katalog Fauny Polski, 23(3): 1–430.

Burakowski B, Mroczkowski M, Stefańska J. 1978. Chrząszcze – Coleoptera. Histeroidea i Staphylinoidea prócz Staphylinidae. Katalog Fauny Polski, 23(5): 1–356.

Burakowski B, Mroczkowski M, Stefańska J. 1979. Chrząszcze – Coleoptera. Kusakowate – Staphylinidae, część 1. Katalog Fauny Polski, 23(6): 1–309.

Burakowski B, Mroczkowski M, Stefańska J. 1980. Chrząszcze – Coleoptera. Kusakowate – Staphylinidae, część 2. Katalog Fauny Polski, 23(7): 1–271.

Burakowski B, Mroczkowski M, Stefańska J. 1981. Chrząszcze – Coleoptera. Kusakowate – Staphylinidae, część 3: Aleochari-
**Dodelin B. 2016.** On the Palaearctic *Episernus* (Col., Ptinidae, Ernobiinae). *Bulletin mensuel de la Société linnéenne de Lyon*, 85(9–10): 278–302.

**Greń C, Lubecki K, Przewoźny M. 2017.** *Materiały do poznania chrząszczy wodnych (Coleoptera: Adephaga, Hydrophiloidea, Byrrhoidea, Myxophaga)* Puszczy Białowieskiej. *Acta entomologica silesiana*, 25(online10): 1–13.

**Gruszka A, Tarnawski D. 1995(1994).** *Trixagus elateroides* (Herr) (Coleoptera, Throscidae) oraz *Isorhipis melasoides* (Cast.) i *Dirhagus pygmaeus* (F.) (Coleoptera, Eucnemidae) – nowe stanowiska w Polsce. *Wiadomości Entomologiczne*, 13(4): 256.

**Gu W, Swihart RK. 2004.** Absent or undetected? Effects of non-detection of species occurrence on wildlife–habitat models. *Biological Conservation*, 116(2): 195–203.

**Gutowski JM, Jaroszewicz B. 2001.** *Catalogue of the fauna of Białowieża Primeval Forest*. Wydawnictwo IBL, Warszawa, 1–403.

**Gutowski JM, Buchholz L, Kubisz D, Ossowska M, Sućko K. 2006.** Chrząszcze saproksyliczne jako wskaźnik odkształceń ekosystemów leśnych borów sosnowych. *Leśne Prace Badawcze*, 4: 101–144.

**Gutowski JM. 2010.** Nowe i interesujące gatunki bogatkowatych (Coleoptera: Buprestidae) w faunie Puszczy Białowieskiej. *Wiadomości Entomologiczne*, 29(3): 212–213.

**Gutowski JM, Hilszczanśki J, Kubisz D, Kurzawa J, Miłkowski M, Mokrzycki T, Plewa R, Przewoźny M, Welnicki M. 2010.** Distribution and host plants of *Leiopus nebulosus* (L.) and *L. linnei* Wallin, Nylander et Kvamme (Coleoptera: Cerambycidae) in Poland and neighbouring countries. *Polish Journal of Entomology*, 79: 271–282.

**Gutowski JM, Sućko K, Borowski J, Kubisz D, Mazur MA, Melke A, Mokrzycki T, Plewa R, Żmihorski M. 2020.** Post-fire beetle succession in biodiversity hotspot: Białowieża Primeval Forest. *Forest Ecology and Management*, 461: 117893.

**Hilszczanśki J. 2006.** *Nemosoma caucasicum* Menetries, 1832 (Coleoptera: Trogossitidae) – nowy dla fauny Polski gatunek chrząszcz. *Wiadomości Entomologiczne*, 25(1): 29–32.

**Hilszczanśki J, Jaworski T, Plewa R, ługowoj J. 2014.** *Zavulys brunneus* (Gyllenhal, 1808) – a beetle species new to the Polish fauna (Coleoptera: Erotylidae). *Genus*, 25(3): 421–424.

**Hilszczanśki J, Plewa R, Jaworski T, Sierpiński A. 2015.** *Microrhagus pyrenaicus* Bonvouloir, 1872 – a false click beetle new for the fauna of Poland with faunistic and ecological data on Eucnemidae (Coleoptera, Elateroidea). *Spixiana*, 38(1): 77–84.

**Holzer E. 2010.** Erstnachweise und Wiederfunde für die Käferfauna der Steiermark (XII ) (Coleoptera). *Joannea Zoologie*, 11: 31–45.

**Jałoszyński P, Konwerski S. 2001.** Znaczenie parków śródmiejskich w zachowaniu różnorodności gatunkowej chrząszczy (Coleoptera) na przykładzie parku „Cytadela” w Poznaniu. In: Indykiewicz P, Barczak T, Kaczorowski G. (Eds). *Bioróżnorodność i ekologia populacji zwierzących w środowiskach zurbanizowanych*. Wydawnictwo NICE, Bydgoszcz, 46–51.

**Jałoszyński P. 2010.** Nowe dane o rozmieszczeniu w Polsce chrząszczy z rodzaju Batrisodes Reitter (Coleoptera: Staphylinidae: Pselaphinae). *Wiadomości Entomologiczne*, 29(3): 157–166.

**Jałoszyński P, Przewoźny M. 2013.** *Melanophthalma rispini* Rücker et Johnson, 2007, gatunek nowy dla fauny Polski (Coleoptera, Latridiidae). *Wiadomości Entomologiczne*, 32(4): 255–258.

**Jaroszewicz B, Cholewińska O, Gutowski JM, Samojlik T, Zimny M, Latałowa M. 2019.** Białowieża forest – a relic of the high naturalness of European forests. *Forests*, 10(10): 849.

**Jaskuła R, Przewoźny M, Melke A, Soszyńska-Maj A. 2010.** Chrząszcze (Coleoptera). In:
Jaskuła R, Tończyk G. (Eds.) Owady (Insecta) Parku Krajobrazowego Wzniesień Łódzkich. Park Krajobrazowy Wzniesień Łódzkich. Mazowiecko-Świetokrzyskie Towarzystwo Ornitoligiczne, Łódź, 45–72.

Konwerski S, Matusiak R. 2001. Drugie stanowisko Thoraxophorus corticinus Motsch. (Coleoptera: Staphylinidae) na Nizinie Wielkopolsko–Kujawskiej. In: Drugie Sympozjum Staphylinidae, Poznań–Jeziory 1: 19–20.

Konwerski S, Staniec B. 2000. Nowe stanowiska Encephalus complicans Steph. i Thoraxophorus corticinus Motsch. (Coleoptera: Staphylinidae). In: Materiały konferencyjne, Pierwsze Sympozjum Staphylinidae, Rogów 10–12.11.1999, 47–48.

Kubisz D, Szańko P. 1991. Nowe dla Podlasia i Puszczy Białowieskiej gatunki chrząszczy (Coleoptera). Wiadomości Entomologiczne, 10(1): 5–14.

Kubisz D, Szarfaniec S. 2003. Chrząszcze (Coleoptera) masywu Babiej Góry. In: Wołoszyn BW, Wołoszyn D, Celary W. (Eds.). Monografia Fauny Babiej Góry. Publikacje Komitetu Ochrony Przyrody PAN, Kraków, 163–221.

Löbl I, Löbl D. 2015. Catalogue of Palaearctic Coleoptera. Revised and updated edition. Vol. 2. Hydrophiloidea-Staphylinoidea. Brill, Leiden, Boston, pp. xxvi + 1702.

Löbl I, Smetana A. 2003. Catalogue of Palaearctic Coleoptera. Archostemata – Myxophaga – Adepoha. Vol. 1. Stenstrup, Apollo Books, pp. 819.

Löbl I, Smetana A. 2004. Catalogue of Palaearctic Coleoptera. Hydrophiloidea – Staphylinoidea. Vol. 2. Stenstrup, Apollo Books, pp. 942.

Löbl I, Smetana A. 2007. Catalogue of Palaearctic Coleoptera. Elateroidea, Derodontoidae, Bostrichoidae, Lymexyloidea, Cleroidea and Cucujoidea. Vol. 4. Stenstrup, Apollo Books, pp. 935.

Löbl I, Smetana A. 2011. Catalogue of Palaearctic Coleoptera. Curculionoidea I. Vol. 7. Stenstrup, Apollo Books, pp. 373.

Majewski T. 1994 (1993). Nowe stanowiska Corylophidae (Coleoptera) w Polsce. Wiadomości Entomologiczne, 12(4): 303–304.

Majewski T. 1997(1996). Nowe dane o rozmieszczeniu Latridiidae (Coleoptera) w Polsce. Wiadomości Entomologiczne, 15(4): 227–236.

Majewski T. 2003. Distribution and ecology of Laboulbeniales in the Białowieża Forest. Phytoocoenosis, 15: 1–144.

Mazur A. 1995. Zgrupowania kusakowatych Col., Staphylinidae płatów śnieżnych w Karkonoskim Parku Narodowym. Parki Narodowe i Rezerwaty Przyrody, 13(1 supl.): 43–46.

Mazur A. 2005. Leptusa (Boreoleptusa) norvegica Strand, 1941 (Coleoptera, Staphylinidae) – a new species to the fauna of Poland. In: Skłodowski J, Huruk S, Barševskis A, Tarasiuk S. (Eds.) Protection of Coleoptera in the Baltic Sea Region. Warsaw Agricultural University Press, Warszawa, 103–107.

Mazur S, Borowski J, Łęgowski D, Perliński S, Skłodowski J. 2010. Monitoring wybranych grup stawonogów w Kampinoskim Parku Narodowym. Maszynopis, Biblioteka KPN w Izabelinie.

Miłkowski M, Tatar-Dytkowski J, Gutowski JM, Ruta R, Grzywoc J, Konwerski S, Król R, Kubisz D, Lassó A, Melke A, Olbrzych T, Szołty S, Wanas M. 2019. Trogossitidae, Lophocateridae, Peltidae and Thymalidae (Coleoptera: Cleroidea) of Poland: distribution, biology and conservation. Polish Journal of Entomology, 88(3): 215–274.

Mokrzycki T. 2001. Próba waloryzacji starszych drzewostanów Puszczy Białowieskiej metodą zooindykacyjną na przykładzie chrząszczy (Coleoptera) powierzchni pni In: Szujecki A (Ed.). Próba szacunkowej waloryzacji lasów Puszczy Białowieskiej metodą zooindykacyjną. Wydawnictwo SGGW, Warszawa, 267–285.

Mokrzycki T. 2007. Waloryzacja ekosystemów...
leśnych Gór Świętokrzyskich na podstawie struktury zgrupowań chrząszczy związanych z pniakami. In: Borowski J, Mazur S (Eds.). Waloryzacja ekosystemów leśnych Gór Świętokrzyskich metodą zoonindykacyjną. Wydawnictwo SGGW, Warszawa, 148–193.

Mokrzycki T, Hilszczanka J, Borowski J, Cieślak R, Mazur A, Miłkowski M, Szołtys H. 2011. Faunistic review of Polish Platypodinae and Scolytinae (Coleoptera: Curculionidae). *Polish Journal of Entomology, 80*(2): 343–364.

Muona J. 1993. Review of the phylogeny, classification and biology of the family Eucnemidae (Coleoptera). *Entomologica Scandinavica, Supplement*, 44: 1–133.

Nunberg M. 1976. Część XIX. Chrząszcze – Coleoptera. Łyszychkowate – Nitidulidae. *Klucze do oznaczania Owadów Polski*, Zeszyt 99–100, PWN, Warszawa, 1–106.

Nunberg M. 1954. Część XIX. Chrząszcze – Coleoptera. Korniki – Scolytidae, Wyrynniki – Platypodidae. *Klucze do oznaczania Owadów Polski*, Zeszyt 99–100, PWN, Warszawa, 1–106.

Pace R. 1989. *Monografia del genere Leptusa Kraatz* (Coleoptera: Staphylinidae). *Memorie del Museo Civico di Storia Naturale di Verona (II Serie) Sezione Scienze Della Vita (A Biologica)*, 8: 1–307.

Pawłowski J, Mazur M, Młynarski JK, Szczygielska A, Szmyczakowski W. 1994. Chrząszcze (Coleoptera) Ojcowskiego Parku Narodowego i terenów ościennych. Wydawnictwo Ojcowski Park Narodowy, Ojców, pp. 247.

Pawłowski J, Petryszak B, Kubisz D, Szwafko P. 2000. Chrząszcze (Coleoptera) Bieszczadów Zachodnich. *Monografie Bieszczadzkie*, 8: 9–143.

Pawłowski J. Kubisz D, Mazur M. 2002. Coleoptera Chrząszcze. In: Z. Gowaciński (Ed.). *Czerwona lista zwierząt gatunkowych i zagrożonych w Polsce*. Wydawnictwo Instytutu Ochrony Przyrody PAN, Kraków, 88–110.

Plewa R, Melke A. 2013. Nowe stanowiska rzadko spotykanych w Polsce gatunków kusakowatych (Coleoptera: Staphylinidae). *Wiadomości Entomologiczne, 32*(3): 228–230.

Plewa R, Hilszczanka J, Jaworski T, Sierpinski A. 2014. Nowe i rzadko spotykane chrząszcze (Coleoptera) saproksyliczne wschodniej Polski. *Wiadomości Entomologiczne, 33*(2): 85–96.

Plewa R, Jaworski T, Hilszczanka J, Rücker WH, Borowski J. 2017. The saproxylic beetle *Corticaria bella* Redtenbacher, 1847 (Coleoptera: Cucujoidea: Latridiidae) in Europe: distribution and habitat. *The Coleopterists Bulletin*, 71(4): 798–804.

Plewa R. 2018. Drugie stanowisko *Melanophthalma rispini* Rücker et Johnson, 2007 (Coleoptera: Latridiidae) w Polsce. *Acta Entomologica Silesiana*, 26 (online 011): 1–2.

Plewa R, Miłkowski M. 2018. Wymiecinowate (Coleoptera: Latridiidae) Puszczy Kozienickiej i okolic Radomia. *Wiadomości Entomologiczne*, 37(3): 139–158.

Plewa R, Jaworski T, Tarwacki G, Sucho K, Konwerski S, Król R, Lason A, Melke A, Przewoźny M, Ruta R, Szołtys H, Hilszczanka J. 2019. Beetles (Coleoptera) new for the fauna of the Białowieża Forest including a species new for Poland. *Entomologica Fennica*, 30(3): 114–125.

Renner K, Messutat J. 2007. Untersuchungen zur Käferfauna der Umgebung von Skwierzyna im westlichen Polen (Wielkopolska). *Coleo*, 8: 16–20.

Ruta R. 2009. Chrząszcze (Insecta: Coleoptera) Rynny Jezior Kuźnickich ze szczególnym...
uwzględnieniem rezerwatu „Kuźnik”. In: Owsianny PM (Ed.). Rynna Jezior Kuźnickich i rezerwat przyrody „Kuźnik” – Bioróżnorodność, Funkcjonalizm, Ochrona i Edukacja. Muzeum Stanisława Staszica, Piła, 150–177.

Ruta R, Melke A. 2002. Chrząszcze (Insecta: Coleoptera) rezerwatu „Kuźnik” koło Piły. Rocznik Naukowy PTOP „Salamandra”, 6: 57–101.

Ruta R, Konwerski S, Król R, Lassoń A, Miłkowski M. 2005. Nowe stanowiska skórnikowatych (Coleoptera: Dermestidae) w Polsce. Część 1. Dermestinae, Trinodinae i Attageninae. Wiadomości Entomologiczne, 24(4): 213–218.

Ruta R, Gawroński R, Jałoszyński P, Miłkowski M. 2010. Contribution to the knowledge of Corylophidae (Coleoptera: Cucujoidea) of Poland. Polish Journal of Entomology, 79(3): 223–234.

Rücker WH, Borowiec L. 1991(1990). Nowe i rzadkie dla Polski Lathridiidae (Coleoptera). Wiadomości Entomologiczne, 9(3–4): 67–69.

Rücker WH, Johnson C. 2007. Revision of Melanophthalma taurica (Mannerheim, 1844) species-group and description of three new species. (Coleoptera: Latridiidae). Latridiidae, 5: 11–24.

Rücker WH. 2018. Latridiidae und Merophysiidae der West-Palaarktis. Selbstverlag Wolfgang H. Rücker, Germany, Neuwied, pp. 176.

Saalas U. 1917. Die fichtenkäfer Finnlands. Studien über die Entwicklungsstadien, Lebensweise und geographische Verbreitung der an Picea excelsa Link. lebenden Coleopteren nebst einer Larvenbestimmungstabelle. Teil I. Annales Academiae Scientiarum Fennicae, Ser. A(8): 1–547.

Skłodowski J. 2001. Waloryzacja lasów Puszczy Białowieskiej na podstawie zgrupowań Carabidae. In: Szujecki A. (Ed.). Próba szacunkowej waloryzacji lasów Puszczy Białowieskiej metodą zoondykacyjną. Wydawnictwo SGGW, Warszawa, 73–104.

Ślipiński SA. 1982. Część XIX. Chrząszcze – Coleoptera. Zgniotkowane – Cucujidae. Klucze do Oznaczania Owadów Polski, PWN, Warszawa, 123(56): 1–35.

Smetana A. 2004. Subfamily Aleocharinae Fleming, 1821. In: Löbl I, Smetana A. (Eds.) Catalogue of Palearctic Coleoptera. Vol. 2. Hydrophiloidea, Histeroidea, Staphylinoida. Apollo Books, Stenstrup, 353–505.

Smolis A. 2008. Sprężynk Stenagostus rhombeus (Olivier, 1790) (Coleoptera: Elateridae) w południowo-zachodniej Polsce. Przyroda Sudetów, 11: 69–72.

Staniec B. 1994. Contribution to the knowledge of the Staphylinidae (Coleoptera) of the Wyżyna Lubelska. Part I. Wiadomości Entomologiczne, 13(2): 95–99.

Staniec B. 1998(1997). Kusakowate (Coleoptera: Staphylinidae) nowe dla Wyżyny Lubelskiej. Wiadomości Entomologiczne, 16(3–4): 227–228.

Staniec B. 2001. Nowe stanowisko Thoracophorus corticinus Motschulsky, 1837 (Coleoptera: Staphylinidae) na Wyżynie Lubelskiej. Wiadomości Entomologiczne, 20(1–2): 89.

Staniec B. 2003. Nowe dane o występowaniu niektórych Staphylinidae (Coleoptera) we wschodniej Polsce. Wiadomości Entomologiczne, 22(1): 25–32.

Staniec B. 2006. Kusakowate (Coleoptera: Staphylinidae) zasiedlające próbnowiska w południowo-wschodniej Polsce. Wiadomości Entomologiczne, 25(3): 165–174.

Szafraniec S, Chachuła P, Melke A, Ruta R, Szoltys H. 2019. New findings of rare and interesting beetles (Coleoptera) in the Babia Góra National Park. Wiadomości Entomologiczne, 38(4): 212–231.

Szujecki A. 1996. Kusakowate (Coleoptera: Staphylinidae) Bieszczadów Zachodnich. Warszawa, pp. 224.

Szujecki A. (Ed.) 2006. Zooindication-based monitoring of anthropogenic transformations in Białowieża Primeval Forest. Warsaw Agricultural University Press, Warsaw, pp. 444.

Tarnawski D. 2000. Elateridae - sprężykowate
(Insecta: Coleoptera). Część I (część ogólna oraz podrodziny: Agrypninae, Negastriinae, Diminae and Athoinae). Fauna Polski. Tom 21. Muzeum i Instytut Zoologii PAN, Warszawa, pp. 412.

Taszakowski A, Małowski A, Karpiński L, Szczeperański WT, Szoltys H. 2019. Materiały do znajomości biegaczowatych (Coleoptera: Carabidae) Beskidu Wschodniego. Rocznik Muzeum Górnośląskiego w Bytomiu Przyroda, 25(online 002): 1–18.

Tatarinova AF. 2002. Fauna i ekologia ksilobiontynych żestkokrytych (Insecta: Coleoptera) europejskiego Severo-Vostocka Rossii. Dissertacja. Moskwa, 139 pp. [Фауна и экология ксилобионтных жесткокрылых (Insecta, Coleoptera) европейского Северо-Востока России. Диссертация. Москва, 139 pp.]

Toskina IN, Nikitsky NB. 2003. A new species of Anobiidae (Coleoptera) of the genus Episernus from northeastern European Russia. Zoologicheskii Zhurnal, 82(9): 1126–1128.

Tsinkevich VA. 1998. A survey of Cucujoidae in the belorussian part of „Belovezskaya Pushh”a National Park. Parki Narodowe i Rezerwaty Przyrody, 17 (3 (supl.)): 123–135.

Tsinkevich VA. (Ed.) 2017. Catalogue of insects of the National Park "Belovezskaya Pushh”a”. Belorussskij Dom Piechat, Minsk, pp. 343.

Tyłkowski S. 2014. Sosnowe bory bagienne jako refugium występowania chrząszczy (Coleoptera) saproksylicznych. Studia i Materiały CEPL w Rogowie, 41(4): 308–321.

Vávra JC. 2011. Faunistic records from the Czech Republic – 324. Coleoptera: Staphylinidae. Klapalekiana, 47: 275–278.

Wąsowska M. 2001. Stonkowate (Coleoptera: Chrysomelidae) Puszczy Białowieskiej – stan poznania. Parki Narodowe i Rezerwaty Przyrody, 20(3): 99–105.

Wąsowska M. 2005. Stonkowate (Coleoptera: Chrysomelidae) jako element monitoringu ekologicznego w Puszczy Białowieskiej. Leśne Prace Badawcze, 1: 81–88.

Wanat M. 2003. Uzupełnienia i poprawki do wykazu ryjkowców (Coleoptera: Curculionoidea) Puszczy Białowieskiej. Parki Narodowe i Rezerwaty Przyrody, 22(2): 267–279.

Weise J. 1887. Mitteilungen über das Sammeln von Käfer und über die Fangstellen im Glatzer Gebirge. Zeitschrift für Entomologie (N.F.) (Breslau), 12: 47–60.

Wojas T. 1992. Quedius (Microsaurus) ochriennis (Ménétr.) (Coleoptera, Staphylinidae) w Bieszczadach. Wiadomości Entomologiczne, 11(3): 186.

Zahradník P. 2007. Subfamily Ernobiinae Pic, 1912. In: Löbl I, Smetana A. (Eds.) Catalogue of Palaearctic Coleoptera. Vol. 4. Elateroidea, Derodontoidea, Bostrichoidea, Lymexyloidea, Cleroidea, Cucujoidae. Apollo Books, Stenstrup, 349–353.