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Species Composition and Ecological Characteristics of Rove Beetles (Coleoptera, Staphylinidae) in the Southern Taiga of the Middle Urals

E. A. Belskaya and A. A. Kolesnikova

Institute for Plant and Animal Ecology, Ural Branch, Russian Academy of Sciences, Yekaterinburg, Russia;
Institute of Biology, Komi Scientific Centre, Ural Branch, Russian Academy of Sciences, Syktyvkar, Russia

Received August 31, 2009

Abstract—76 species of 44 genera from 9 subfamilies of Staphylinidae (Omaliinae, Proteninae, Pselaphinae, Tachyporinae, Oxytelinae, Steninae, Staphylininae, Paederinae, and Aleocharinae) were found in dark coniferous and broad-leaved forests in the south of Sverdlovsk Province. The ecological characteristics are presented for most species based on the original and published data. An ecological analysis of the rove beetle fauna in the southern taiga of the Middle Ural region is done.

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Staphylinidae is one of the largest families of beetles. Its representatives occupy a broad range of habitats and show diverse trophic specialization. Since the species composition and abundance of rove beetles are determined by the conditions of their environment, species of this family are often used as indicators of various natural and anthropogenic factors (Shuetski, 1972; Matveev and Tikhomirova, 1975; Boháč and Guseva, 1988; Boháč, 1999; Derunkov, 2005). Many species of rove beetles feed on insects damaging forest and agricultural plants (Frank, 1967; Sunderland, 1975; Soboleva-Dokuchaeva and Soldatova, 1977; Raymond et al., 2002), and also on acarines transmitting infections (Babenko, 1991; Shulaev, 2004), so that rove beetles may be considered as possible agents of control of these arthropods. However, rove beetles can be used for these purposes only if the species composition and ecology of individual species are known.

The species composition of rove beetles is very unevenly studied throughout the territory of Russia. The fauna and ecology of these beetles were studied in the Russian Far East and Siberia (Ryabukhin, 1991, 1998; Shavrin et al., 1999; Babenko, 2000; Rybalov and Vorob'eva, 2002), the Komi Republic (Kolesnikova, 2007), the Middle Urals (Ermakov, 1999, 2003; Belskaya and Solodovnikov, 2003), Moscow Province (Tikhomirova, 1973; Semenov, 2004, 2007, 2008), the Volga Region (Utrobina, 1968; Grebennikov, 2001; Shulaev, 2004), the Caucasus (Solodovnikov, 1996, 1998; Khachikov, 1997, 1998), and the Crimea (Gusarov, 1989). Only several species from the subfamilies Staphylininae and Tachyporinae are well studied from the ecological viewpoint, whereas data on most species from other subfamilies are evidently insufficient. In some cases, different authors provide contradictory data concerning the ecology of the same species of rove beetles, and the sources of information are not always specified.

The aim of this study was to investigate the species composition of rove beetles in the southern taiga ecosystems of the Middle Urals and to compile the ecological characteristics of the species found. The work was carried out in 2003–2005 in Sverdlovsk Province (Revda, Pervouralsk, and Nizhne-Serginsk Districts). The study region is characterized by the presence of large forest massifs (dark coniferous forests and derived birch and aspen forests) and industrial centers (the cities of Revda and Pervouralsk). Emissions from industrial objects affect the atmosphere, water bodies, and soil, resulting in anthropogenic transformation of forest ecosystems near the sources of pollution. The rove beetles were surveyed along a 30-km transect positioned to the west of Revda in wood-sorrel and forb-grass spruce and fir forests, and also in reedgrass-forb and forb birch forests with a varying degree of stand degradation. In 2003 and 2004 the beetles were captured in Barber traps (plastic cups with an upper diameter 85 mm, filled to 1/3 of their volume with 3% acetic acid). In 2003, the traps were arranged in 6 lines (15 traps in each), and in 2004, in 24 lines (5 traps in

each). The characteristic of the environmental factors in the biotopes studied and a detailed description of the trap survey technique were published earlier (Belskaya and Zinov'ev, 2007). In 2005, net-sweeping of tree branches was carried out in the same places where the soil traps had been installed in the preceding years. The total material comprised 8345 trap-days and 750 net-sweeps.

The subfamilies and genera are arranged in the list according to *Catalog of the Staphylinidae* (Herman, 2001). The species within each genus are listed alphabetically. The list of species of the subfamilies Paederinae and Aleocharinae corresponds to the most complete faunistic synopsis of the Palaearctic Staphylinidae (Tikhomirova, 1973).

The relative abundance of species (rare, common, or abundant) was characterized using a 5-point logarithmic scale (Pesenko, 1982), based on the trap capture data for two years, since most of the species were collected by this technique. The species with 1 or 2 points on the scale (from 1 to 62 ind. collected) were regarded as rare, those with 3 points (from 63 to 484 ind.), as common, and those with 4 or 5 points (from 485 to 29 882 ind.), as abundant. The abundance of *Eusphalerum longipenne* Er. is not reflected in the table since this species was collected only by net-sweeping. The ecological characteristics of species were compiled based on the available published data and the original observations. We considered such ecological characteristics as the type of feeding, the biotopic preferences, and preferences with respect to humidity, because these parameters are used most frequently in bioindication studies. The ecological characteristics of the taxa identified only to genus (*Pselaphus* sp.) were specified only in those cases when they were approximately the same in all the congeners.

In determining the trophic types, we subdivided the consumers into biophages, feeding on living tissues, and saprophages, feeding on dead organic matter (Riklefs, 1979; Begon et al., 1989). Three trophic groups were distinguished among the biophages: zoophages, phytophages, and mycetophages, consuming the tissues of animals, plants, and fungi, respectively. The group of saprophages includes all the species that feed on decomposing organic matter, including dead animals, excrements, and rotting plant remains. In cases when different feeding types were reported in the literature for the same species, the reports confirmed by direct observations or serological reactions were given preference; otherwise, the species was considered to be mixophagous. The feeding type was regarded as uncertain if no relevant data could be found.

Since the biotopic and humidity preferences of a given species may depend on the latitude, they were determined using the following approach. If all the literary sources agreed as to the preferred biotopes and degree of humidity, these characteristics were listed in the table. If the reported preferences varied, we chose the results of studies carried out in the taiga and mixed forest zones. When no such results were available, the data for other natural and climatic zones were taken into account. If the preferences of a particular species were not explicitly described but its abundance was characterized, we considered the habitats with the highest abundance to be the preferred ones. If none of the above approaches could be used, the biotopic preferences were not determined. The species with intermediate humidity preferences (mesohygrophilic, mesoxerophilic) were regarded as mesophiles.

Identification of 29 882 specimens from the study region revealed 76 species of rove beetles, belonging to 44 genera and 9 subfamilies (see table). The most diverse were the subfamilies Aleocharinae (24 species), Tachyporinae (19), and Staphylininae (11). Most of the species were found in soil trap samples; among the 4 species occurring in the tree crowns, only 1 was found exclusively in net-sweeping samples.

The spruce plus fir and birch forests showed comparable diversity of rove beetles: 61 and 69 species, respectively. Such species as *Eusphalerum minutum* F., *Ischnosoma splendidum* Grav., *Sepedophilus testaceus* F., *Tachinus elongatus* Gyll., *Carpelimus corticinus*, *Platystethus nodifrons* Marsh., and *Zyras cognatus* Maerk. were found only in spruce and fir forests; *Eusphalerum luteum* Marsh., *Eu. primulae* Steph., *Acidota crenata* F., *Bryoporus cernuus* Grav., *Megarthrus nitidulus* Kr., *Mycetoporus longulus* Mnnh., *Tachinus proximus* Kr., *Oxytelus laqueatus* Marsh., *Ontholestes tesselatus* Ganglbauer, *Quedius longicornis* Kr., *Q. molochinus* Grav., *Atheta castanoptera* Mnnh., *Acrotona sylvicola* Kr., *Zyras limbatus* Payk., *Oxypoda praecox* Er., and *Aleochara fumata* Grav. were found only in birch forests.

The core of the rove beetle community in the forest was formed by the most abundant *Tachinus laticollis* Grav., *T. rufipes* L., *Tachyporus abdominalis* F., *Philonthus decorus* Grav., *Staphylinus erythropterus* L.,

Species list and ecological characteristics of rove beetles in forest ecosystems of the Middle Urals

Species	Biotope (forest)		TF	BP	HP	References
	spruce and fir	aspen and birch				
Subfamily OMALIINAE						
Eusphalerum longipenne Er.**	+	+	ph	–	–	Kolesnikova, 2002
Eu. luteum Marsh.	–	+	ph	f	h	Babenko, 1991
Eu. minutum F.	+	–	ph	eu	–	Tikhomirova, 1973; Babenko, 1982; Mazur et al., 2003
Eu. primulae Steph.	–	+	ph	–	–	Mazur et al., 2003; Anderson, 1997
Omalium rivulare Payk.	+	+	mx	eu	m	Hanski and Koskela, 1977; Boháč and Fuchs, 1995; Ottesen, 1996; Deichsel, 2006; Topp et al., 2007
Deliphrum tectum Payk.	+	+	mx	f	–	Hanski and Koskela, 1977; Babenko, 1991; Siitonen, 1993; Kolesnikova, 2002; Shavrin, 2009
Olophrum fuscum Grav.	+	+	mx	b	h	Siitonen, 1993; Anderson, 1997; Kolesnikova, 2002; Rybalov, 2002; Behre et al., 2005
Arpedium quadrum Grav.	+	++	z	eu	m	Hanski and Koskela, 1977; Ottesen, 1996; Kolesnikova, 2002; Pavlov, 2005; Atlegrim, 1988
Acidota crenata F.	–	+	mx	f	m	Shuetski, 1972; Babenko, 1991; Ottesen, 1996; Kolesnikova, 2002; Rakhleeva and Sedova, 2002
Anthophagus caraboides L.*	+	+	z	f	m	Tikhomirova, 1973; Pavlov, 2005; Shavrin et al., 2008
A. omalinus Zett.*	+	+	z	f	–	Sippola, 2001; Sippola et al., 2002; Kudryasheva, 1987
Subfamily PROTEININAE						
Megarthrus nitidulus Kr.	–	+	s	–	–	Babenko, 1991
Proteinus brachypterus F.	+	+	mx	f	h	Babenko, 1991; Hanski and Koskela, 1977; Dolný, 2000
Subfamily PSELAPHINAE						
Pselaphus sp.	+	+	z	–	–	*Keys to Insects…*, 1965
Subfamily TACHYPORINAE						
Bolitobius cingulatus Mnnh.	+	+	z	f	m	Bauer, 1989; Anderson, 1997; Kolesnikova, 2002; Eyre et al., 2003
Ischnosoma longicorne Maekl.	+	+	z	f		Kolesnikova, 2002
I. splendidum Grav.	+	–	z	f	–	Derunkov, 2005; Shulaev, 2008
Bryoporus cernuus Grav.	–	+	–	f	–	Evsyunin, 2002; Derunkov, 2005
Lordithon lunulatus L.	+	+	z	f	m	Boháč and Guseva, 1988; Pavlov, 2005; Tikhomirova, 1973; Shavrin et al., 2008
L. thoracicus F.	+	+	z	f	–	Babenko, 1991; Derunkov, 2005; Shulaev, 2008
Mycetoporus lepidus Grav.	+	+	mx	eu	m	Anderson, 1997; Eyre et al., 2001; Krasutskii, 2005; Deichsel, 2006; Shavrin et al., 2008

Table (Contd.)

Species	Biotope (forest)		TF	BP	HP	References
	spruce and fir	aspen and birch				
M. longulus Mnnh.	–	+	z	eu	m	Anderson, 1997; Eyre et al., 2001; Kolesnikova, 2002
M. niger Fairmaire et Laboulbene	+	+	–	f	–	Evsyunin, 2002; Shulaev, 2008
Sepedophilus testaceus F.	+	–	mc	f	h	Landor, 1991; Nikitskii et al., 1996; Tikhomirova and Pronova, 1997
Tachinus elongatus Gyll.	+	–	z	eu	m	Babenko, 1982, 1991; Ottesen, 1996; Evsyunin, 2002; Shavrin et al., 2008
T. laticollis Grav.	+++	+	z	eu	m	Shilov, 1975; Hanski and Koskela, 1977; Babenko, 1982, 1988, 1991; Pavlov, 2005; Deichsel, 2006
T. marginellus F.	+	+	mx	f	m	Tikhomirova, 1973; Hanski and Koskela, 1977; Babenko, 1982, 1991; Pavlov, 2005; Deichsel, 2006
T. pallipes Grav.	++	+	mx	f	m	Park, 1931; Hanski and Koskela, 1977; Babenko, 1988, 1991
T. proximus Kr.	–	+	z	f	m	Hanski and Koskela, 1977; Ottesen, 1996; Anderson, 1997; Kolesnikova, 2002
T. rufipes L.	+++	+++	mx	eu	m	Lipkow, 1966; Shuetski, 1972; Tikhomirova, 1973; Jones, 1976; Sunderland and Sutton, 1980; Kozodoi, 1982; Babenko, 1991; Soboleva-Dokuchaeva et al., 2002; Shulaev, 2008; Deichsel, 2006
Tachyporus abdominalis F.	+++	++	z	eu	h	Tikhomirova, 1973; Matveev and Tikhomirova, 1975; Babenko, 1982; 1991; Boháč and Růžička, 1990; Dolný, 2000; Deichsel, 2006; Shavrin et al., 2008; Shavrin, 2009
T. chrysomelinus L.	+	+	mx	f	m	Lipkow, 1966; Matveev and Tikhomirova, 1975; Kozodoi, 1982; Pavlov, 2005; Sunderland, 1975; Sunderland and Sutton, 1980
T. nitidulus F.	+	+	z	eu	m	Minoranskii and Lomakin, 1978; Boháč and Guseva, 1988; Puchkov, 1990; Babenko, 1991; Boháč and Fuchs, 1995
Subfamily OXYTELINAE						
Oxytelus laqueatus Marsh.	+	+	s	f	–	Hanski and Koskela, 1977; Boháč and Guseva, 1988
Carpelimus corticinus Grav.	+	–	–	eu	h	Derunkov, 2005; Stan, 2009
Platystethus nodifrons Marsh.	+	–	s	–	–	Babenko, 1991
Subfamily STENINAE						
Stenus humilis Er.	+	+	z	f	h	Shuetski, 1972; Hanski and Koskela, 1977; Kozodoi, 1982; Boháč and Guseva, 1988
Subfamily STAPHYLININAE						
Ontholestes tesselatus Ganglbauer	–	+	z	eu	–	Babenko, 1982; Derunkov, 2005; Shulaev, 2008; Stan, 2009

Table (Contd.)

Species	Biotope (forest)		TF	BP	HP	References
	spruce and fir	aspen and birch				
Othius lapidicola Kiesw.	+	+	z	f	h	Tikhomirova, 1967; Anderson, 1985; Siitonen, 1993; Kolesnikova, 2002
O. punctulatus Gz.	+	+	mx	f	m	Ghilyarov, 1953; Matveev and Tikhomirova, 1975; Tikhomirova, 1966, 1968; Shuetski, 1972; Sunderland and Sutton, 1980; Dennison and Hodkinson, 1983; Deichsel, 2006
Philonthus decorus Grav.	+++	+++	z	f	m	Babenko, 1988, 1989; Boháč and Růžička, 1990; Evsyunin, 2002; Soboleva-Dokuchaeva et al., 2002; Shulaev, 2008; Pavlov, 2005; Deichsel, 2006
Quedius fuliginosus Grav.	++	++	z	f	h	Kozodoi, 1982; Boháč and Guseva, 1988; Babenko, 1991; Shulaev, 2008; Deichsel, 2006
Q. longicornis Kr.	–	+	z	f	–	Shulaev, 2008; Frank, 1967
Q. molochinus Grav.	–	+	z	eu	–	Tikhomirova, 1968; Anderson, 1997; Raymond et al., 2002
Q. umbrinus Er.	++	++	z	eu	h	Tikhomirova, 1979; Evsyunin, 2002; Knysh and Solodovnikov, 2004; Stan, 2009
Staphylinus erythropterus L.	+	+++	z	f	m	Kozodoi, 1982; Boháč and Guseva, 1988; Knysh and Solodovnikov, 2004; Shulaev, 2008; Pavlov, 2005, 2006
Xantholinus linearis Ol.	+	++	s	eu	m	Buse, 1988; Boháč and Růžička, 1990; Sunderland and Sutton, 1980; Babenko, 1991; *Catalogue of Beetles…*, 2002; Pavlov, 2005; Deichsel, 2006
X. tricolor F.	++	++	mx	f	m	Shuetski, 1972; Matveev and Tikhomirova, 1975; Sunderland and Sutton, 1980; Babenko, 1991, 2000; Soboleva-Dokuchaeva et al., 2002; *Catalogue of Beetles…*, 2002; Lapteva et al, 2005; Pavlov, 2005; Deichsel, 2006
Subfamily PAEDERINAE						
Rugilus rufipes Germ.	+	+	z	f	m	Shuetski, 1972; Dolny, 2000; Knysh and Solodovnikov, 2004; Pavlov, 2005; Deichsel, 2006
Lathrobium boreale Hochh.	+	+	z	f	m	Tikhomirova, 1967; Matveev and Tikhomirova, 1975; Siitonen, 1993; *Catalogue of Beetles…*, 2002
L. brunnipes F.	+	+	z	f	h	Matveev and Tikhomirova, 1975; Kozodoi, 1982; Boháč and Guseva, 1988; Dennison, Hodkinson, 1983; Siitonen, 1993; *Catalogue of Beetles…*, 2002; Rakhleeva and Sedova, 2002; Pavlov, 2005; Deichsel, 2006
L. longulum Grav.	+	+	z	eu	h	Matveev and Tikhomirova, 1975; Shuetski, 1972; Kolesnikova, 2002; Boháč et al., 2005

Table (Contd.)

Species	Biotope (forest)		TF	BP	HP	References
	spruce and fir	aspen and birch				
Subfamily ALEOCHARINAE						
Leptusa pulchella Mnnh.*	+	+	z	f	–	Nikitskii et al., 1996; Kolesnikova, 2002; Babenko, 1991
Bolitochara pulchra Grav.	+	+	mc	f	–	Siitonen, 1993; Nikitskii et al., 1996; *Catalogue of Beetles…*, 2002
Autalia longicornis Scheerp.	+	+	z	f	–	Hanski and Koskela, 1977; Nikitskii et al., 1996
Geostiba circellaris Grav.	++	+	mx	f	m	Matveev and Tikhomirova, 1975; Hanski and Koskela, 1977; Kozodoi, 1984; Boháč and Guseva, 1988; Buse, 1988; Anderson, 1997; Babenko, 2000; Rybalov, 2002; Lapteva et al, 2005; Deichsel, 2006
Liogluta granigera Kiesw.	+++	++	–	f	–	*Catalogue of Beetles…*, 2002; Deichsel, 2006
L. micans Muls. et Rey	++	++	–	f	–	*Catalogue of Beetles…*, 2002
Atheta castanoptera Mnnh.	–	+	–	eu	–	Nikitskii et al., 1996; Stan, 2009
A. fungi Grav.	+++	++	z	eu	m	Hanski and Koskela, 1977; Ottesen, 1996; Eyre et al., 2001; Gudleifsson, 2005; Deichsel, 2006; Topp et al., 2007
A. hypnorum Kiesw.	++	++	z	f	m	Siitonen, 1993; Dennison and Hodkinson, 1983; *Catalogue of Beetles…*, 2002
A. paracrassicornis Brund.	++	+	z	f	–	Hanski and Koskela, 1977; Nikitskii et al., 1996; *Catalogue of Beetles…*, 2002
Acrotona sylvicola Kr.	–	+	–	f	–	Deichsel, 2006
Dinaraea aequata Er.	+	+	–	f	–	Nikitskii et al., 1996; Voitenkova, 2009
Drusilla canaliculata F.	+	+	mx	eu	m	Sunderland and Sutton, 1980; Boháč and Guseva, 1988; Good, 1999; Babenko, 1991, 2000; *Catalogue of Beetles…*, 2002; Deichsel, 2006; Topp et al., 2007; Shavrin, 2008
Zyras cognatus Maerk.	+	–	–	f	–	Derunkov, 2005
Z. humeralis Grav.	++	++	mx	f	m	Boháč and Guseva, 1988; Derunkov, 2005; Babenko, 1991; Rabitsch, 1995
Z. limbatus Payk.		+	z	eu	m	Boháč and Guseva, 1988; Boháč, 1993; Schatz et al., 2003; Knysh and Solodovnikov, 2004; Derunkov, 2005; Deichsel, 2006
Ocalea badia Er.	+	+	z	eu	–	Dolný, 2000; Deichsel, 2006
Mniusa incrassata Muls. et Rey	+	+	–	f	–	Siitonen, 1993
Oxypoda alternans Grav.	+	++	z	f	m	Hanski and Koskela, 1977; Anderson, 1997; Boháč et al., 2006
O. annularis Mnnh.	++	+	z	f	m	Tikhomirova, 1979; Boháč and Růžička, 1990; Boháč, 1993; Ottesen, 1996; Anderson, 1997; *Catalogue of Beetles…*, 2002; Rybalov, 2002

Table (Contd.)

Species	Biotope (forest)		TF	BP	HP	References
	spruce and fir	aspen and birch				
O. brevicornis Steph.	+	+	z	eu	–	Dolný, 2000
O. praecox Er.	–	+	–	f	–	Deichsel, 2006; Semenov, 2008
O. spectabilis Maerk.	+	++	mx	f	–	Boháč and Guseva, 1988; Siitonen, 1993; Ottesen, 1996; Dolný, 2000; Deichsel, 2006
Aleochara fumata Grav.	–	+	z	f	–	Evsyunin, 2002; Nikitskii et al., 1996

Notes: Types of feeding (TF): mixophagous (mx), mycetophagous (mc), phytophagous (ph), saprophagous (s), or zoophagous (z). Biotopic preferences (BP): bog-dwelling (b), eurytopic (eu), or forest-dwelling (f). Humidity preferences (HP): hygrophilous (h) or mesophilous (m). Abundance: occasional and rare (+), common (++), or numerous (+++). Dashes (–) indicate that the species was absent in the authors' collections or its ecological characteristics were not determined. Species collected by soil traps and net-sweeping are marked with an asterisk (*); those collected only by net-sweeping, with two asterisks (**).

Liogluta granigera Kiesw., *Atheta fungi* Grav. and the common *Arpedium quadrum* Grav., *Tachinus pallipes* Grav., *Quedius fuliginosus* Grav., *Q. umbrinus* Er., *Xantholinus tricolor* F., *X. linearis* Ol., *Geostiba circellaris* Grav., *Liogluta micans* Muls. et Rey, *Atheta hypnorum* Kiesw., *A. paracrassicornis* Brund., *Zyras humeralis* Grav., *Oxypoda alternans* Grav., *O. annularis* Mnnh., and *O. spectabilis* Maerk.

Most of the species recorded were zoophagous (39 species); 16 species had a mixed trophic type, while the mycetophages (2 species), saprophages (4), and phytophages (4) were less diverse. The trophic type of 11 species could not be determined. The fraction of forest-dwelling species was the largest (48), and that of eurytopic species was smaller (22). *Olophrum fuscum* Grav. was regarded a bog-dwelling species because it is abundant in the tundra (Rybalov, 2002), occurs in swamped territories (Anderson, 1997) and in humid moss pads, soil, and litter along the banks of rivers and lakes (Behre et al., 2005). The biotopic preferences of 5 species were not determined. The humidity preferences were determined in 43 species, of which 31 were mesophilic and 12 hygrophilic. Thus, ecological data were obtained for most of the species recorded. The complete ecological characteristics were compiled for 42 species.

The soil and litter are one of the principal habitats of rove beetles in the forest ecosystems, where their abundance and species diversity reach the maximum values. Most rove beetles, with the exception of some specialized species, are to some extent associated with these substrates, occurring in them permanently or temporarily. Therefore, most of the species inhabiting the forest biotopes can be revealed by samples taken from the soil and epigeic layers.

The rove beetle fauna of the southern taiga of the Middle Ural region includes several ecological groups. Although most of these beetles are forest dwellers, the fraction of eurytopic species is large enough, partly due to transformation of the vegetation near industrial objects.

In their trophic type, most rove beetles are zoophages. Zoophagy is the most typical of the evolutionarily advanced subfamilies Staphylininae and Paederinae and is quite common in other subfamilies. In our collections the zoophages prevailed both in the number of species and the number of individuals. Mycetophagy has been recorded in representatives of different subfamilies but is less common than zoophagy. This trophic group included *Sepedophilus testaceus* (Landor, 1991) and *Bolitochara pulchra* Grav. (Nikitskii et al., 1998).

Saprophagy is sometimes difficult to distinguish from mycetophagy, since the decomposing organic matter is usually infected with fungi and it may be difficult to say which component is more important for the rove beetles. In our material, this trophic group included *Megarthrus nitidulus*, *Platystethus nodifrons* Marsh. (Babenko, 1991), and *Oxytelus laqueatus* (Hanski and Koskela, 1997), and also the obligatory saprophage *Xantholinus linearis* (Sunderland and Sutton, 1980; Buse, 1988). In other cases saprophagy was combined with zoo- or mycetophagy. For example, *Zyras humeralis* is traditionally regarded a predator; however, according to the observations of Babenko (1991), this species feeds on dead and weakened ants,

and also on their prey (insects). Facultative saprophagy was recorded in *Xantholinus tricolor* and *Othius punctulatus* Gz. (Sunderland and Sutton, 1980). According to different authors, *Omalium rivulare* Payk. is either a predator (Ottesen, 1996; Hanski and Koskela, 1977), or a saprophage (Topp et al., 2007). The same is true of *Deliphrum tectum* Payk. (Hanski and Koskela, 1977; Kolesnikova, 2002; Shavrin, 2009), *O. fuscum* (Kolesnikova, 2002; Behre et al., 2005), *A. crenata* (Ottesen, 1996; Kolesnikova, 2002), *O. spectabilis* (Ottesen, 1996; Dolný, 2000), *G. circellaris* (Buse, 1988; Hanski and Koskela, 1977), and *Drusilla canaliculata* F. (Sunderland and Sutton, 1980; Topp et al., 2007). Although *Tachinus marginellus* F. was regarded a predator (Hanski and Koskela, 1977), according to the observations of Tikhomirova (1973) adults of this species did not consume living prey under laboratory conditions. Some authors (Babenko, 1988; Hanski and Koskela, 1977) considered *T. pallipes* a predator, but according to Park (1931) this species could also feed on fungal tissues. *Proteinus brachypterus* F. was characterized in the literature as either a saprophage or a mycetophage (Babenko, 1991; Hanski and Koskela, 1977; Dolny, 2000). Both zoo- and mycetophagy were observed in *Mycetoporus lepidus* Grav. (Krasutskii, 2005). Three types of feeding were reported for *Tachyporus chrysomelinus* L.: zoophagy (Lipkow, 1966), obligatory saprophagy (Sunderland and Sutton, 1980), and zoo-mycetophagy (Sunderland, 1975). The same types of feeding were reported for *T. rufipes* (Lipkow, 1966; Jones, 1976; Hanski and Koskela, 1977; Sunderland and Sutton, 1980). All the above species were classified by us.

Phytophagy is very infrequent among rove beetles. Only single cases of beetles (mostly of the subfamily Oxytelinae) feeding on leaves and petals of flowering plants were observed, which represented cases of phytophagy in the most commonly used meaning. The species feeding on pollen or nectar are more abundant; they belong to the subfamilies Omaliinae and Aleocharinae. Our material included four phytophagous species of the genus *Eusphalerum*.

The absence of ecological data for some species of rove beetles reflects the insufficient knowledge of this group and low availability of the results of some studies. However, the material provided can be used to characterize the fauna and community of rove beetles of the Urals, and also as a basis for ecological studies, in particular the monitoring of regional and local anthropogenic impacts on natural ecosystems.

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REFERENCES

1. Anderson, R., Northern Ireland Species Inventories: Rove Beetles (Coleoptera: Staphylinidae) (Roy Anderson, Belfast, 1997) [Electronic resource]. http://www.ri-environment.gov.uk/print/staph.pdf.
2. Atlegrim, O., "Is Coexistence between *Eucnecosum brachypterum* and *Arpedium quadrum* (Coleoptera, Staphylinidae) Connected to Different Life Cycles?" Entomologisk **109** (3/4), 111–117 (1988).
3. Babenko, A.S., "Biotopic Distribution of Rove Beetles (Coleoptera, Staphylinidae) in the Altitudinal Gradient of Ecosystems in Southern Siberia," in *Landscape Ecology of Insects* (Novosibirsk, 1988), pp. 69–75 [in Russian].
4. Babenko, A.S., "Changes in the Species Diversity of Rove Beetles (Coleoptera, Staphylinidae) in the Altitudinal Gradient of Ecosystems in Southern Siberia," Sib. Ekol. Zh., No. 3, 279–282 (2000).
5. Babenko, A.S., "Fauna and Biotopic Distribution of Rove Beetles (Coleoptera, Staphylinidae) in the Southern Part of the Forest Zone of West Siberia," in *Harmful and Beneficial Insects in Siberia* (Nauka, Novosibirsk, 1982), pp. 52–59 [in Russian].
6. Babenko, A.S., *Ecology of Rove Beetles (Coleoptera, Staphylinidae) in Kuznetsk Alatau* (Tomsk, 1991) [in Russian].
7. Bauer, L.J., "Moorland Beetle Communities on Limestone 'Habitat Islands.' I. Isolation, Invasion and Local Species Diversity in Carabids and Staphylinids," J. Anim. Ecol. **58** (3), 1077–1098 (1989).
8. Begon, M., Harper, J.L., and Townsend, C.R., *Ecology. Individuals, Populations and Communities* (Blackwell Sci. Publ., Oxford, 1986; Mir, Moscow, 1989) [in Russian].
9. Behre, K.E., Hölzer, A., and Lemdahl, G. "Botanical Macroremains and Insects from the Eemian and Weichselian Site of Oerel (Northwest Germany) and Their

Evidence for the History of Climate," Veget. Hist. Archaeobot. **14**, 31–35 (2005).
10. Belskaya, E.A. and Zinov'ev, E.V., "The Structure of Ground Beetle Complexes (Coleoptera, Carabidae) in Natural and Disturbed Forest Ecosystems in Southwestern Sverdlovsk Province," Sib. Ekol. Zh., No. 4, 533–543 (2007).
11. Belskaya, E.A. and Solodovnikov, A.Yu., "The Effect of the Pyrethroid Insecticide DECIS on Rove Beetle Populations (Coleoptera: Staphylinidae) in a Spring Wheat Agrocenosis," Agrokhimiya, No. 6, 53–58 (2003).
12. Boháč, J., "Rove Beetles (Coleoptera: Staphylinidae) as Bioindicators of Ecological Equilibrium and Anthropogenic Influence by the Example of the City of Prague," in *Bioindication in Urban and Suburban Zones* (Nauka, Moscow, 1993), pp. 36–42 [in Russian].
13. Boháč, J., "Staphylinid Beetles as Bioindicators," Agr. Ecosyst. Env. **74**, 357–372 (1999).
14. Boháč, J., Frouz, J., and Syrovátka, O., "Communities of Carabids and Staphylinids in Seminatural and Drained Peat Meadows in Southern Bohemia," Ekológia (Bratislava) **24** (3), 292–304 (2005).
15. Boháč, J. and Fuchs, R., "The Effect of Air Pollution and Forest Decline on Epigeic Staphylinid Communities in the Giant Mountains," Acta Zool. Fennica **196**, 311–313 (1995).
16. Boháč, J. and Guseva, N.A., "Analysis of Ecological Groups of Ground and Rove Beetles (Coleoptera: Carabidae, Staphylinidae) in the Central Chernozem Reserve as a Way of Assessment of Anthropogenic Influence," in *Structure and Function of Protected Forest Ecosystems* (Moscow, 1988), pp. 64–68 [in Russian].
17. Boháč, J. and Růžička, V., "Size Groups of Staphylinid Beetles (Coleoptera, Staphylinidae)," Acta Entomol. Bohemoslov. **87**, 342–348 (1990).
18. Boháč, J., Šrubař, V., Matějka, K., and Št'astný, J., "The Impact of Tourism and Landscape Management in the Šumava Landscape Protected Area on the Epigeic Beetle Communities," Ekológia (Bratislava) **25**, 41–52 (2006).
19. Buse, A., "Habitat Selection and Grouping of Beetles (Coleoptera)," Holarctic Ecol. **11** (4), 241–247 (1988).
20. *Catalogue of Beetles of the Beloyarskii Complex Nature Reserve* (Syktyvkar, 2002) [in Russian].
21. Deichsel, R., "Species Change in an Urban Setting – Ground and Rove Beetles (Coleoptera: Carabidae and Staphylinidae) in Berlin," Urban Ecosyst. **9**, 161–178 (2006).
22. Dennison, D.F. and Hodkinson, I.D., "Structure of the Predatory Beetle Community in a Woodland Soil Ecosystem. 1. Prey Selection," Pedobiologia **25** (2), 109–115 (1983).
23. Derunkov, A.V., "Changes in the Species Diversity of Rove Beetles (Coleoptera, Staphylinidae) in Relation to the Age of Pine Stands in Central Belarus," Ekologiya, No. 4, 306–313 (2005).
24. Dolný, A., "Ecological-Faunistic Characteristics of the Communities of Beetles (Coleoptera) at the Coal-Mine Spoils," Acta Univ. Palacki. Olomuc. Fac. Rer. Nat. **38**, 47–77 (2000).
25. Ermakov, A.I., "On the Fauna of Rove Beetles (Coleoptera, Staphylinidae) in Alpine Areas of the North Urals," in *Topical Problems of Biology and Ecology. Abstracts of Papers, VI Conf. of Young Scientists* (Syktyvkar, 1999), pp. 70–71 [in Russian].
26. Ermakov, A.I., "The Beetle Fauna (Insecta, Coleoptera) of Denezhkin Kamen Reserve," in *Proceedings of Denezhkin Kamen State Reserve, Issue* 2 (Ekaterinburg, 2003), pp. 79–93 [in Russian].
27. Evsyunin, A.A., "The Parcellar Structure of the Forest and Spatial Distribution of Rove Beetles (Coleoptera, Staphylinidae)," Rus. Entomol. Zh. **11** (1), 117–121 (2002).
28. Eyre, M.D., Lott, D.A., and Luff, M.L., "The Rove Beetles (Coleoptera: Staphylinidae) of Exposed Riverine Sediments in Scotland and Northern England: Habitat Classification and Conservation Aspects," J. Insect Cons. **5**, 173–186 (2001).
29. Eyre, M.D., Luff, M.L., and Woodward, J.C., "Beetles (Coleoptera) on Brownfield Sites in England: An Important Conservation Resource?" J. Insect Cons. **7**, 223–231 (2003).
30. Frank, J.H., "The Insect Predators of the Pupal Stage of the Winter Moth, *Operophtera brumata* (L.) (Lepidoptera: Hydriomenidae)," J. Animal Ecol. **36** (2), 375–389 (1967).
31. Ghilyarov, M.S., "Soil Fauna of Valley Forests and Its Significance for Soil Diagnosis," Zool. Zh. **32** (3), 328–347 (1953).
32. Good, J.A., "Recolonisation by Staphylinidae (Coleoptera) of Old Metalliferous Tailincs and Mine Soils in Ireland," Biol. Env. Proc. Royal Irish Acad. **99B** (1), 27–35 (1999).
33. Grebennikov, K.A., "Fauna and Ecological Features of Rove Beetles (Coleoptera, Staphylinidae) from the Lower Volga Area. Subfamily Staphylininae," Entomol. Obozr. **80** (3), 603–610 (2001) [Entomol. Review **81** (6), 632–638 (2001)].
34. Gudleifsson, B.E., "Beetle Species (Coleoptera) in Hayfields and Pastures in Northern Iceland," Agric. Ecos. Env. **109**, 181–186 (2005).
35. Gusarov, V.I., "Fauna and Ecology of Rove Beetles (Coleoptera, Staphylinidae) in the Crimea. Subfamilies Metopsiinae, Proteininae, Omaliinae, Piestinae, Tachyporinae, Oxyporinae, Steninae, Paederinae, Xantholininae, and Staphylininae," Vestnik Len. Gos. Univ. Ser 3 **3** (7), 3–17 (1989).
36. Hanski, I. and Koskela, H., "Niche Relations among Dung-Inhabiting Beetles," Oecologia (Berlin) **28**, 203–231 (1977).
37. Herman, L.H., *Catalog of the Staphylinidae (Insecta: Coleoptera). Parts I–VII* (2001).

38. Jones, M.G., "The Arthropod Fauna of a Winter Field," J. Appl. Ecol. **13** (1), 61–85 (1976).
39. *Keys to Insects of the European Part of the USSR, in Five Volumes. Vol. 2. Coleoptera, Strepsiptera*, Ed. by E.L. Guryeva and O.L. Kryzhanovskii (Nauka, Moscow, 1965) [in Russian].
40. Khachikov, E.A., *Contribution to the Fauna of Beetles (Coleoptera) of the Lower Don Basin and the North Caucasus. The Rove Beetles. Part 1. Tribe Staphylinini* (Rostov-on-Don, 1997) [in Russian].
41. Khachikov, E.A., *Contribution to the Fauna of Beetles (Coleoptera) of the Lower Don Basin and the North Caucasus. The Rove Beetles. Part 2* (Rostov-on-Don, 1998) [in Russian].
42. Knysh, V.G. and Solodovnikov, A.Yu., "On the Complexes of Rove Beetles (Coleoptera: Staphylinidae: Staphylininae and Paederinae) of Fruit Orchards and Adjacent Natural Landscapes in the Northwest Ciscaucasia ," Evraziat. Entomol. Zh. **3** (2), 129–138 (2004).
43. Kolesnikova, A.A., *Rove Beetles (Coleoptera, Staphylinidae) of Northeast European Russia*. Candidate's Dissertation in Biology (Voronezh, 2002).
44. Kolesnikova, A.A., "A Taxonomic Review and Zoogeographical Characteristic of Rove Beetles (Coleoptera, Staphylinidae) of Northeast European Russia," in *Invertebrates of Northeast European Russia* (Syktyvkar, 2007), pp. 41–57 [in Russian].
45. Kozodoi, E.M., "Structure of the Mesofauna of the North Bank of the Rybinsk Reservoir," in *Fauna and Ecology of Invertebrates: Collected Papers* (Moscow, 1984), pp. 53–62 [in Russian].
46. Kozodoi, E.M., "Ecological Specificity of the Rove Beetle Assemblage at Initial Stages of Plant Community Development in Moscow Region," in *Anthropogenic Influence on the Soil Fauna* (Moscow, 1982), pp. 68–76 [in Russian].
47. Krasutskii, B.V., *Mycetophilous Beetles of the Urals and Transural Area. Vol. 2. The System Fungi–Insects* (Chelyabinsk, 2005) [in Russian].
48. Kudryasheva, I.V., "Soil Invertebrates (Mesofauna) in the Forests of the Lower Onega Basin," in *Soil Fauna of North Europe* (Nauka, Moscow, 1987), pp. 39–50 [in Russian].
49. Landor, D., "Arthropods and Nematodes Co-Occurring with the Eastern Larch Beetle, *Dendroctonus simplex* (Col., Scolytidae) in Newfoundland," Entomophaga **36** (2), 303–313 (1991).
50. Lapteva, E.M., Kolesnikova, A.A., Taskaeva, A.A., et al., *Diversity of Micro- and Mesofauna in Alluvial Forest Soils of Middle Taiga (by the Example of the Sysola Valley)* (Syktyvkar, 2005) [in Russian].
51. Lipkow, E., "Biologischökologische Untersuchungen über *Tachyporus*-Arten und *Tachinus rufipes* (Col., Staphyl.)," Pedobiologia **6**, 140–177 (1966).
52. Matveev, V.A. and Tikhomirova, A.L., "Changes in the Rove Beetle Community (Staphylinidae) of Spruce Cutover Patches in Mari ASSR," Ekologiya, No. 5, 73–78 (1975).
53. Mazur, A., Boháč, J., and Matěĺćek, J., "Occurrence of Species of the Genus *Eusphalerum* Kr. (Col., Staphylinidae, Omaliinae) in the Giant Mountains Area," Opera Corcontica **41**, 287–300 (2003).
54. Minoranskii, V.A. and Lomakin, V.I., "An Ecological Characteristic and Distribution of Rove Beetles (Coleoptera, Staphylinidae) in Agrobiocenoses of Rostov Province," Nauchnye Doklady Vysshei Shkoly, Biol. Nauki, No. 4, 53–57 (1978).
55. Nikitskii, N.B., Osipov, I.N., Chemeris, M.V., et al., *Xylobiont, Mycetobiont, and Lamellicorn Beetles of the Prioksko-Terrasny Nature Biosphere Reserve, with a Faunistic Review of These Groups in Moscow Province* (Mosk. Gos. Univ., Moscow, 1996) [in Russian].
56. Ottesen, P.S., "Niche Segregation of Terrestrial Alpine Beetles (Coleoptera) in Relation to Environmental Gradients and Phenology," J. Biogeogr. **23** (3), 353–369 (1996).
57. Park, O., "Studies in the Ecology of Forest Coleoptera," Ecology **12** (1), 188–207 (1931).
58. Pavlov, E.E., "Biotopic Distribution of Rove Beetles (Coleoptera, Staphylinidae) in South Baraba," Sib. Ekol. Zh. **13** (6), 229–232 (2006).
59. Pavlov, E.E., "Fauna of Rove Beetles (Coleoptera, Staphylinidae) of the West Siberian Forest-Steppe Zone," Evraziat. Entomol. Zh. **4** (3), 223–230 (2005).
60. Pesenko, Yu.A., *Principles and Methods of Quantitative Analysis in Faunistic Research* (Nauka, Moscow, 1982) [in Russian].
61. Puchkov, A.V., "Beetles (Coleoptera) of Wheat Fields in the Southwestern Steppe Zone of the European Part of the USSR," Entomol. Obozr. **69** (3), 536–549 (1990).
62. Rabitsch, W.B., "Metal Accumulation in Arthropods near a Lead/Zinc Smelter in Arnoldstein, Austria. I," Env. Poll. **90** (2), 221–237 (1995).
63. Rakhleeva, A.A. and Sedova, T.S., "Soil Invertebrates (Mesofauna) of Bogged Spruce Forests in the Southern Taiga Zone of the Central Forest Reserve, Tver Province," Rus. Entomol. Zh. **11** (1), 93–100 (2002).
64. Raymond, B., Vanbergen, A., Watt, A., et al., "Escape from Pupal Predation as a Potential Cause of Outbreaks of the Winter Moth, *Operophtera brumata*," Oikos **98**, 219–228 (2002).
65. Riklefs, R.E., *The Economy of Nature: A Textbook in Basic Ecology* (Chiron Press, New York, 1976; Mir, Moscow, 1979) [in Russian].
66. Ryabukhin, A.S., "On the Rove Beetles (Coleoptera: Staphylinidae) of the Northeast of the USSR. 1. Genus *Olophrum* Erichson," in *Entomological Studies in the Northeast of the USSR* (Vladivostok, 1991), pp. 11–25 [in Russian].
67. Ryabukhin, A.S., *Rove Beetles (Coleoptera, Staphylinidae) of Northeast Asia*. Candidate's Dissertation in Biology (St. Petersburg, 1998).

68. Rybalov, L.B., "Zonal-Landscape Changes in the Soil Invertebrate Community in the Yenisei Region of Middle Siberia and the Role of Temperature Adaptations in the Zonal Distribution of Invertebrates," Rus. Entomol. Zh. **11** (1), 77–86 (2002).
69. Rybalov, L.B. and Vorob'eva, I.G., " Soil Invertebrate Community in Taiga Ecosystems of the Middle Yenisei Basin," in *Biodiversity Studies along the Yenisei Ecological Transect. Animals* (Moscow, 2002), pp. 8–43 [in Russian].
70. Schatz, I., Kopf, T., Steinberger, K.-H., and Glaser, F., "Die Kurzflügelkäfer (Coleoptera, Staphylinidae) des Frastanzer Riedes und der angrenzenden Illaue (Vorarlberg, Österreich)," Vorarlberger Naturschau **13**, 239–258 (2003).
71. Semenov, V.B., "Contribution to the Fauna of Rove Beetles of the Subfamily Steninae (Coleoptera, Staphylinidae) of Moscow Province," Byul. MOIP Otdel. Biol. **109** (4), 8–16 (2004).
72. Semenov, V.B., "Rove Beetles of the Subfamily Aleocharinae (Coleoptera: Staphylinidae) of Moscow Province. Part 1. Tribes Deinopsini–Athetini," in *Eversmannia. Entomological Studies in Russia and Neighboring Regions, Issues 11–12* (2007), pp. 24–52 [in Russian].
73. Semenov, V.B., "Rove Beetles of the Subfamily Aleocharinae (Coleoptera: Staphylinidae) of Moscow Province. Part 2. Tribes Falagriini–Aleocharini," in *Eversmannia. Entomological Studies in Russia and Neighboring Regions, Issues 13–14* (2008), pp. 18–34 [in Russian].
74. Shavrin, A.V., "The Effect of Industrial Pollution on Forest Rove Beetle Communities (Coleoptera, Staphylinidae) in Shelekhov District, Irkutsk Province," Sib. Ekol. Zh., No. 1, 55–61 (2009).
75. Shavrin, A.V., Nogovitsyna, S.N., and Averenskii, A.I., "On the Fauna of Rove Beetles (Coleoptera, Staphylinidae) of Yakutia," in *Studies of Arthropods in Yakutia* (Yakutsk, 2008), pp. 79–94 [in Russian].
76. Shavrin, A.V., Shilenkov, V.G., and Veinberg, I.V., "Fauna and Biotopic Distribution of Rove Beetles (Coleoptera, Staphylinidae) on the North Macroslope of the Khamar-Daban Range, South Cisbaikalia," in *Biodiversity of the Baikal Region* (Irkutsk, 1999), pp. 26–42 [in Russian].
77. Shilov, V.F., "On the Knowledge of Bionomic Groups of Rove Beetles in the Taiga Zone of Komi ASSR," in *Problems of Soil Zoology* (Nauka, Vilnius, 1975), p. 336 [in Russian].
78. Shuetski, A., "Staphylinidae (Col.) as Indicators of Some Soil Properties and the Condition of Pine Stands," in *Proc. of the XIII Int. Entomological Congr. (29 August, 1963)* (Nauka, Moscow, 1972), pp. 405–406 [in Russian].
79. Shulaev, N.V., *Fauna of Rove Beetles (Coleoptera, Staphylinidae) of the Republic of Tatarstan (the Kama Region): An Annotated Species List of the Subfamilies Oxyporinae, Steninae, Paederinae, Xantholininae, Staphylininae, and Tachyporinae* (Novoe Znanie, Kazan, 2004) [in Russian].
80. Shulaev, N.V., "Contributions to the Rove-Beetle Fauna (Coleoptera, Staphylinidae) of the Republic of Tatarstan," Entomol. Obozr. **87** (1), 38–44 (2008) [Entomol. Review **88** (1), 34–41 (2008)].
81. Siitonen, J., "Faunistic Records of Carabidae and Staphylinidae (Coleoptera) Caught by Pitfall Trapping in Western Finnish Lapland," Entomol. Fenn. **4**, 225–231 (1993).
82. Sippola, A.-L., "Forest Structure and Biodiversity in Northern Boreal Forests: Effects of Regeneration Cutting on Flying Beetles and Wood-Decomposing Fungi," in *Arctic Centre Reports, No. 35* (Helsinki, 2001), pp. 1–62.
83. Sippola, A.-L., Siitonen, J., and Punttila, P., "Beetle Diversity in Timberline Forests: a Comparison between Old-Growth and Regeneration Areas in Finnish Lapland," Ann. Zool. Fenn. **39**, 69–86 (2002).
84. Soboleva-Dokuchaeva, I.I., Chernyshev, V.B., Afonina, V.M., and Timokhov, A.V., "Seasonal Dynamics of Spatial Distribution of Mass Staphylinid Beetles (Coleoptera, Staphylinidae) in Agroecosystems," Zool. Zh. **81** (4), 451–456 (2002) [Entomol. Review **82** (7), 876–882 (2002)].
85. Soboleva-Dokuchaeva, I.I. and Soldatova, T.A., "Feeding of Field Rove Beetles (Coleoptera, Staphylinidae) in Captivity," Biol. Nauki, No. 11, 53–57 (1977).
86. Solodovnikov, A.Yu., "New and Little Known Rove Beetles of the Genus *Othius* Stephens (Coleoptera, Staphylinidae) in the Caucasian Fauna," Entomol. Obozr. **75** (2), 294–302 (1996).
87. Solodovnikov, A.Yu., "The Rove Beetle Fauna (Coleoptera, Staphylinidae) of the Northwest Caucasus. Subfamilies Staphylininae, Xantholininae, Paederinae, Steninae, Oxyporinae," Entomol. Obozr. **77** (2), 331–354 (1998).
88. Stan, M., "Rove Beetles (Coleoptera: Staphylinidae) from Mehedinti Plateau Geological Park (Mehedinti County, Romania)," Trav. Mus. Natn. Hist. Nat. Grigore Antipa **52**, 233–247 (2009).
89. Sunderland, K.D., "The Diet of Some Predatory Arthropods in Cereal Crops," J. Appl. Ecol. **12** (2), 507–515 (1975).
90. Sunderland, K.D. and Stephen, L.S., "A Serological Study of Arthropod Predation on Woodlice in a Dune Grassland Ecosystem," J. Anim. Ecol. **49**, 987–1004 (1980).
91. Tikhomirova, A.L., "The Fauna of Rove Beetles and Their Distribution over Different Kinds of Agricultural Lands in the Moscow University Field Station, Chashnikovo, Moscow Province," in *Problems of Soil Zoology: Proc. of the 2nd All-Union Workshop* (Nauka, Moscow, 1966), pp. 135–136 [in Russian].

92. Tikhomirova, A.L., "Some Comparative Data on Ecology and Behavior of Rove Beetles (Coleoptera, Staphylinidae)," Zool. Zh. **46** (12), 1785–1797 (1967).
93. Tikhomirova, A.L., "Comparative Data on the Humidity Preferences of Rove Beetles (Coleoptera, Staphylinidae)," Zool. Zh. **47** (10), 1498–1505 (1968).
94. Tikhomirova, A.L., *Morphoecological Specificity and Phylogeny of Rove Beetles, with a Catalogue of the USSR Fauna* (Nauka, Moscow, 1973) [in Russian].
95. Tikhomirova, A.L., "Successions of Rove Beetle Community during a Eutrophic Hydroseries in Moscow Region," Ekologiya, No. 6, 53–58 (1979).
96. Tikhomirova, A.L. and Pronova, T.Ya., "A Comparative Characteristic of the Fauna and Seasonal Population Dynamics of Epigeic Beetles in Two Types of Forest in the South Transural Area," in *Ecology of Soil Invertebrates* (Nauka, Moscow, 1972), pp. 193–194 [in Russian].
97. Topp, W., Kappes, H., and Rogers, F., "Response of Ground-Dwelling Beetle (Coleoptera) Assemblages to Giant Knotweed (*Reynoutria* spp.) Invasion," Biological Invasions 26 July, 2007 [Electronic resource]. http://www.springerlink.com/content/vt32mq3202815342.
98. Utrobina, N.M., "Species Composition and Distribution of Rove Beetles (Staphylinidae) in Various Types of Forest within the Taiga Zone of the Middle Volga Basin," in *Contribution to the Fauna and Ecology of Soil Invertebrates* (Kazan, 1968), pp. 86–93 [in Russian].
99. Voitenkova, N.N., "Some Ecological Traits of Mycetobiont Rove Beetles (Coleoptera; Staphylinidae) in Different Forest Types of Southeast Non-Chernozem Zone of Russia," Byul. Mosk. Obshch. Ispyt. Prirody, Otdel. Biol. **114** (2), 20–26 (2009).
100. Species List and Ecological Characteristics of Rove Beetles in Forest Ecosystems of the Middle Urals.