

Review of the genus *Dacne* Latr. (Coleoptera, Erotylidae) from Kazakhstan

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Pleasing fungus beetles *Dacne bipustulata* (Thunberg, 1781), *D. pontica* (Bedel, 1868), and *D. semirufula* (Reitter, 1897) from the family Erotylidae are firstly recorded in Kazakhstan. The data on the Erotylidae fauna of this genus from three protected areas of Almaty oblast are given. *D. semirufula* is recorded only in Almaty city and its neighborhoods. It is possible that it is adventive, the introduction took place relatively recently, and the beetle did not have time to settle outside the site of invasion. A key to known species of the genus *Dacne* from Kazakhstan is given. Information about some species of mushrooms, on which Erotylidae were collected, presented for the first time. *Pholiota vernalis* (Saccardo) A.H. Smit & Hesler, 1968, *Psathyrella candolleana* (Fries) Maire, 1913 and *Gloeophyllum sepiarium* (Wulfen) P. Karsten, 1882 were recorded from Kazakhstan for *D. bipustulata*, *Pholiota vernalis* (Saccardo) A.H. Smit & Hesler, 1968 and *P. candolleana* for *D. pontica* and *Fomitopsis betulina* (Bulliard) B.K. Cui, M.L. Han & Y.C. Dai, 2016 and *Ganoderma applanatum* (Persoon) Patouillard, 1889 for *D. semirufula*.

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Academic editor: R. Yakovlev | Received 20 July 2022 | Accepted 6 August 2022 | Published 12 September 2022

<http://zoobank.org/57BBD73F-41B0-4713-87F4-17F2DCE771D2>

Citation: Temreshev II (2022) Review of the genus *Dacne* Latr. (Coleoptera, Erotylidae) from Kazakhstan. Acta Biologica Sibirica 8: 367–380. <https://doi.org/10.14258/abs.v8.e21>

Keywords

Dacne bipustulata, *Dacne pontica*, *Dacne semirufula*, pleasing fungus beetles, Central Asia, first records.

Introduction

Pleasing fungus beetles (Erotylidae) belong to the superfamily Cucujoidea of the suborder Polyphaga. It includes about 280 genera and above 3500 species in the world fauna (Wegrzynowicz 2007; Ślipiński et al. 2011; Drilling et al. 2013). Some new genera and species of this family were described (Tang, Skelley and Pérez-Farrera 2018; Skelley and Gasca-Álvarez 2020; Skelley, Leschen and Liu 2021) from Australia, French Guian, Mexico and USA. About 16 genera and more than 50 species is presented by the former USSR fauna (Krivolutskaya 1992). Six genera and thirteen species were known from Kazakhstan (Wegrzynowicz 2007; Temreshev 2017a). Their imagoes and larvae feed on plant and fungal matter, are found on fungi, especially tinder fungi, pupate in the soil; some are important pollinators (e.g. of the ancient cycads) (Krivolutskaya 1992; Krasutsky 1996; Krasutsky 2005, 2007; Robinson 2005; Drake 2009; Tang, Skelley and Pérez-Farrera 2018; Skelley and Gasca-Álvarez 2020). Representatives of the subfamily Languriinae are associated primarily with herbaceous plants. Some species are xylobionts (Robinson 2005; Drake

2009; Tang, Skelley and Pérez-Farrera 2018; Skelley and Gasca-Álvarez 2020). Several species were listed as pests of food supplies and / or invasive species (Khalidov 1984; Krivolutskaya 1992; Krasutsky 1996; Mordkovich and Sokolov 1999; Krasutsky 2005, 2007; Robinson 2005; Drake 2009; Hagstrum and Subramanyam 2009; Denux and Zagatti 2010; Drilling, Dettner and Klass 2013; Temreshev 2017a).

Genus *Dacne* Latreille, 1797 includes 31 species around the world (Skelley 2003; Dai and Zhao 2013). They live on the fruiting bodies of various mushrooms, sometimes under the bark of trees on mycelial slicks fungi and moldy plant and food debris (Kryzhanovsky 1965; Khalidov 1984; Krivolutskaya 1992; Krasutsky 1996; Drogvalenko 1997; 2002; Schigel 2002; Krasutsky 2005; 2007; Nikitsky, Bibin and Dolgin 2008). Some species pest of herbal medicine, fresh and dried mushroom, and wood ear (Hagstrum and Subramanyam 2009; Denux and Zagatti 2010). Representatives of this genus were not been previously recorded from Kazakhstan.

Material and methods

The material was collected by manual method from 2007 to 2022 in different parts of West Kazakhstan, Akmola, and Almaty oblast, and in the cities of Almaty, Karaganda and Nur-Sultan, incl. the State national natural parks Ile-Alatau, Altyn-Emel and Zhongar-Alatau. Some of the beetles were bred from the mushrooms in the laboratory. The materials of V.L. Kazenas (Almaty, Kazakhstan) from Almaty regions (Ile-Alatau State Natural National Park) and V.A. Glushen (vill. Zerenda, Kazakhstan) from North Kazakhstan and Akmola regions were studied also. Standard techniques (Fasulati 1971) used in entomology were used during the collection of the material. The following sources (Jacobson 1905-1915; Kryzhanovsky 1965; Khalidov 1984; Krivolutskaya 1992; Krasutsky 1996; Drogvalenko 1997; 2002; Schigel 2002; Krasutsky 2005, 2007; Wegrzynowicz 2007; Nikitsky, Bibin and Dolgin 2008; Drilling, Dettner and Klass 2013; Muller, Jarzabek-Muller and Bussler 2013; Lyubarsky and Ghahari 2020) were used for species determination of the beetles, clarification of their taxonomic position, biology and the distribution. Studied specimens are kept in the private collection I.I. Temreshev (Almaty, Kazakhstan), with the exception of specimens transferred to the ISEA - Institute of Systematics and Ecology of Animals (Russia: Novosibirsk) in 2018.

Photographs of *Dacne* were taken with a camera Canon EOS 50 D by author (Figs. 1, 4).

Photographs of the mushrooms were taken with a camera Redmi 7 by I.I. Temreshev (Figs. 3, A, B, C, D, F) and V.L. Kazenas (Figs. 3, E) also. Descriptions and body measuring were performed using a Micromed MC var 1-C dissecting stereomicroscope.

The mushrooms that the material was collected were determined using special literature (Samgina 1981, 1985) and the materials from the site "Mushrooms of Kazakhstan" ("Mushroom classification", n.d.).

For convenience, the initials of the collectors are shortened: IT - I.I. Temreshev, VG - V.A. Glushen, VK - Vladimir Longinovich Kazenas, as well as some geographical and administrative terms: AkO - Akmola oblast, AO - Almaty oblast, Kg - Karaganda oblast, NKO - North Kazakhstan oblast, WKO - West Kazakhstan oblast, SNNP - state national natural park, av. - avenue, g. - gorge, m. - mountain, c. - cordon, d. - district, ex. - exemplar, md. - microdistrict, nei. - neighborhoods, r. - river, st. - street, v. - village.

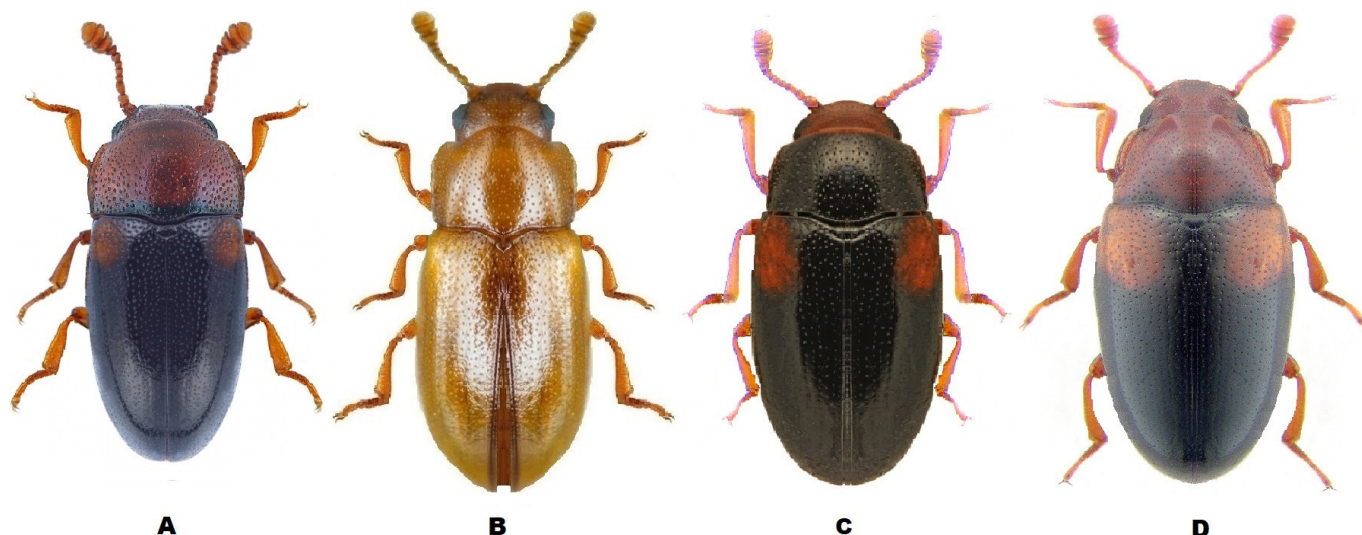


Figure 1. Species of genus *Dacne*: A - *Dacne bipustulata*, typical colored exemplar, North Kazakhstan; B - *Dacne bipustulata*, undercolored yellowish exemplar, South-East Kazakhstan; C - *Dacne pontica*, South-East Kazakhstan; D - *Dacne semirufula*, South-East Kazakhstan.

Coordinates of collection points: AkO, Zerendinsky d., Zerenda village 1 - N 52°54'15.87" E 69°7'12.22"; AkO, Zerendinsky d., Zerenda village 2 - N 52°53'24.55" E 69°9'46.72"; AkO, Akkol d., Azat village - N 52°5'7.16" E 71°31'27.64"; AkO, Stepnogorsk city - N 52°29'31.49" E 72°1'18.97"; Almaty, Auezovsky d., Dzhandosova st. - N 43°12'29.28" E 76°51'51.03"; Almaty, Bostandyk d., Dostyk park - N 43°13'30.50" E 76°55'42.88"; Almaty, Bostandyk d., floodplain of the r. Esentai - N 43°13'4.09" E 76°56'15.00"; Almaty, Bostandyk d., md. Koktem-1 - N 43°13'43.81" E 76°55'34.35"; Almaty, Nauryzbayskiy d., md. Rahat - N 43°11'04" E 77°02'58"; Almaty, Bostandyk d., Al-Farabi av. - N 43°13'19.49" E 76°56'1.17"; AO, v. Gorny Gigant - N 43°12'26.04" E 76°57'25.24"; AO, SNNP Ile-Alatau, Maloye Almaty g. - N 43°10'33" E 77°00'43"; AO, SNNP Ile-Alatau, Medeo g. - N 43°08'27" E 77°04'01"; AO, SNNP Ile-Alatau, Aksai g. - N 43°05'44" E 76°47'03"; AO, SNNP Ile-Alatau, Mokhnatka m. - N 43°09'42" E 77°02'58"; AO, SNNP Ile-Alatau, Kimasar g. - N 43°09'46" E 77°03'58"; AO, SNNP Ile-Alatau, Turgen g. - N 43°20'9.32" E 77°37'0.77"; AO, Karasai d., Kaskelenskoe v. - N 43°17'28.58" E 76°41'38.83"; AO, Karasai d., nei. Bekbolat v. - N 43°9'25.62" E 76°30'21.73"; AO, Karasai d., nei. Kairat v. - N 43°9'28.82" E 76°33'41.48"; AO, Talgar d., Arkabay v. - N 43°24'51.58" E 77°6'8.82"; AO, Talgar d., Beskaynar v. - N 43°11'50.7" E 77°07'07.8"; AO, SNNP Altyn-Emel, Taigak g. - N 44°14'17.30" E 79°21'2.27"; AO, SNNP Altyn-Emel, Kerbulak d., nei. Koksuv., - N 44°40'57.70" E 78°56'18.01"; AO, SNNP Zhongar-Alatau, Sarkand d., nev. Topolevka v. - N 45°25'58.97" E 80°20'47.68"; AO, SNNP Zhongar-Alatau, Sarkand d., c. Osinovskiy - N 45°24'22.34" E 80°23'41.96"; AO, SNNP Zhongar-Alatau, Lepsinsky d., c. Chernorechensky - N 45°31'14.79" E 80°42'57.17"; AO, SNNP Zhongar-Alatau, Lepsinsky d., c. Zhalanash - N 45°34'31.91" E 80°38'51.38"; Karaganda city - N 49°45'29.98" E 73°2'25.69"; NKO, Ayyrtau d., Imantau v. - N 52°57'51.45" E 68°20'2.35"; WKO, Amangeldy d., nei. Chizha v. - N 50°56'32.03" E 49°55'11.90".

Results

As a result of the research, three species of this genus, are determinates as new for Kazakhstan, and the list of mushrooms on which they are found is clarified.

Dacne bipustulata (Thunberg, 1781)

Figs 1, 4, A, B.

Material examined. 3 ex. - 17.06.2005, AkO, Akkol district, Azat village, *Ceriporus squamosus*

(Hudson) Quélet, 1886, IT; 1 ex. - 27.07.2007, AkO, Zerendinsky district, Zerenda village 1, *Trametes versicolor* (Linnaeus) Lloyd, 1920, IT; 5 ex. - 28.08.2007, AkO, Zerendinsky district, Zerenda village 2, *C. squamosus*, VG; 3 ex. - 6.06.2009, Almaty, Bostandyk d., floodplain of the r. Esentai, *Psathyrella candolleana* (Fries) Maire, 1913, IT; 1 ex. - 28.06.2009, Almaty, Bostandyk d., Dostyk park, under the bark of the dead *Pinus sylvestris* Linnaeus, 1753, IT; 3 ex. - 6.06.2010, AO, SNNP Altyn-Emel, Taigak g., *Pholiota vernalis* (Saccardo) A.H. Smit & Hesler, 1968, IT; 4 ex. - 10.02.2013, AO, Talgar d., Beskaynar v., *Pleurotus ostreatus* (Jacquin) P. Kummer, 1871, IT; 2 ex. - 27.05.2012, Almaty, Bostandyk d., floodplain of the r. Esentai, *Gloeophyllum sepiarium* (Wulfen) P. Karsten, 1882, IT; 4 ex. - 20.05.2015, AO, SNNP Ile-Alatau, Mokhnatka m., *C. squamosus*, IT; 1 ex. - 28.05.2014, Almaty, Bostandyk d., Dostyk park, under the bark of the dead *Ulmus parvifolia* Jacquin, 1798, IT; 2 ex. - 8.08.2014, AO, SNNP Zhongar-Alatau, Sarkand d., nev. Topolevka v., *C. squamosus*, IT; 3 ex. - 8.11.2014, AO, SNNP Ile-Alatau, Mokhnatka m., *C. squamosus*, IT; 3 ex. - 8.05.2015, SNNP Ile-Alatau, Aksai g., *Pleurotus dryinus* (Persoon) P. Kummer, 1871, IT; 2 ex. - 8.05.2015, AO, SNNP Ile-Alatau, Aksai g., *C. squamosus*, IT; 4 ex. - 15.05.2015, AO, SNNP Ile-Alatau, Medeo g., *C. squamosus*, IT; 3 ex. - 27.05.2015, AO, SNNP Zhongar-Alatau, Lepsinsky d., c. Chernorechensky, *P. dryinus*, IT; 1 ex. - AO, SNNP Ile-Alatau, Medeo g., *P. dryinus*, IT; 1 ex. - 8.06.2015, AO, SNNP Ile-Alatau, Maloye Almaty g., *Ph. vernalis*, IT; 3 ex. - 22.07.2015, AO, SNNP Zhongar-Alatau, Lepsinsky d., c. Zhalanash, *T. versicolor*, IT; 2 ex. - 25.07.2015, AO, v. Gorny Gigant, *C. squamosus*, IT; 8 ex. - 12.06.2015, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *P. dryinus* and *C. squamosus*, taken SNNP Ile-Alatau, Aksai g., 8.05.2015, IT; 6 ex. - 16.08.2015, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *P. dryinus* and *C. squamosus*, taken SNNP Ile-Alatau, Aksai g., 8.05.2015, IT; 1 ex. - 4.09.2015, AO, SNNP Zhongar-Alatau, Sarkand d., c. Osinovsky, *Neolentinus lepideus* (Fries) Redhead & Ginns, 1985, IT; 7 ex. - 9.09.2015, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *C. squamosus*, taken AO, SNNP Ile-Alatau, Mokhnatka m., 8.11.2014, IT; 6 ex. - 10.09.2015, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *Ph. vernalis*, taken AO, SNNP Ile-Alatau, Maloye Almaty g., 8.06.2015, IT; 2 ex. - 11.09.2015, AO, SNNP Ile-Alatau, Medeo g., *P. dryinus*, IT; 1 ex. - 3.10.2015, AO, SNNP Ile-Alatau, Medeo g., *Fomitopsis betulina* (Bull.) B.K. Cui, M.L. Han & Y.C. Dai, 2016, VK; 2 ex. - 27.10.2015, AO, SNNP Ile-Alatau, Mokhnatka m., *C. squamosus*, IT; 8 ex. - 20.03.2016, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *C. squamosus*, taken AO, SNNP Ile-Alatau, Mokhnatka m., 8.11.2014, IT; 10 ex. - 2.05.2016, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *C. squamosus*, taken AO, SNNP Ile-Alatau, Mokhnatka m., 8.11.2014, IT; 1 ex. - 8.08.2016, Almaty, Bostandyk d., Dostyk park, *P. dryinus*, IT; 5 ex. - 10.02.2017, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *P. dryinus*, taken Almaty, Bostandyk d., Dostyk park, 8.08.2016, IT; 2 ex. - 24.05.2017, Almaty, Bostandyk d., Dostyk park, *T. versicolor*, IT; 1 ex. - 23.04.2018, AO, Karasai d., Kaskelenskoe v., *Pleurotus eryngii* (De Candolle) Quélet, 1872, IT; 2 ex. - 4.05.2018, AO, Karasai d., nei. Bekbolat v., *P. eryngii*, IT; 2 ex. - 14.06.2018, Almaty, Nauryzbayskiy d., md. Rahat, *P. ostreatus*, IT; 2 ex. - North Kazakhstan region, Ayyrtau district, Imantau v., *C. squamosus*, 21.05.2019, VG; 1 ex. - 25.05.2019, AO, Talgar d., Arkabay v., *G. sepiarium*, IT; 1 ex. - 4.05.2020, AO, Talgar d., Arkabay v., *Laetiporus sulphureus* (Bulliard) Murrill, 1920, IT; 4 ex. - 11.05.2021, Almaty, Bostandyk d., Al-Farabi av., *C. squamosus*, IT; 3 ex. - 24.05.2020, AO, Talgar d., Arkabay v., *P. eryngii*, IT; 3 ex. - 8.11.2020, Almaty, Bostandyk d., floodplain of the r. Esentai, *C. squamosus*, IT; 4 ex. - 10.11.2020, AO, Talgar d., Arkabay v., *Ganoderma applanatum* (Persoon) Patouillard, 1889, IT; 4 ex. - 2.03.2021, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *G. applanatum*, taken AO, Talgar d., Arkabay v., 10.11.2020, IT; 6 ex. - 2.03.2021, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *L. sulphureus*, taken AO, Talgar d., Arkabay v., 4.05.2020, IT; 2 ex. - 25.03.2021, Almaty, Auezovsky d., Dzhandosova st., *C. squamosus*, IT; 3 ex. - 5.05.2021, AO, Karasai d., nei. Kairat v., *Ph. vernalis*, IT; 4 ex. - 11.05.2021, AO, Karasai d., nei. Kairat v., *C. squamosus*, IT; 3 ex. - 18.05.2021, AO, Karasai d., nei. Kairat v., *P. dryinus*, IT; 3 ex. - 1.06.2021, AO, Karasai d., nei. Kairat v., *P. ostreatus*, IT; 3 ex. - 23.06.2021, SNNP Ile-Alatau, Aksai g., *P. dryinus*, IT; 7 ex. - 25.08.2021, AO, SNNP Ile-Alatau, Maloye Almaty g., *P. dryinus*, IT; 6 ex. - 26.08.2021, AO, SNNP Ile-Alatau, Turgen g., *C. squamosus*, IT; 2 ex. - 7.09.2021, SNNP Ile-Alatau, Aksai g., *P. dryinus*, IT; 4 ex. - 28.09.2021, SNNP Ile-Alatau, Aksai g., *C. squamosus*, IT; 5 ex. - 16.10.2020, AO, SNNP Ile-Alatau, Maloye Almaty g., *F. betulina*, IT; 2 ex. - 27.10.2021, AO, Karasai d., nei. Kairat v., *C.*

squamosus, IT; 5 ex. - 6.05.2022, AkO, Stepnogorsk city, *C. squamosus*, IT; 3 ex. - 20.05.2022, WKO, Amangeldy d., nei. Chizha v., *P. dryinus*, IT; 2 ex. - 13.07.2022, KgO, Karaganda city, *C. squamosus*, IT.

D. bipustulata is distributed in Europe (Albania, Armenia, Austria, Belorussia, Belgium, Bosnia Herzegovina, Belarus, Caucasus, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Moldova, Montenegro, Netherlands, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine), Asia (Far East, Iran, Mongolia, Siberia) (Jacobson 1905-1915; Kryzhanovsky 1965; Krivolutskaya 1992; Krasutsky 1996; Drogvalenko 1997; 2002; Krasutsky 2005, 2007; Wegrzynowicz 2007; Nikitsky, Bibin and Dolgin 2008; Drilling, Dettner and Klass 2013; Muller, Jarzabek-Muller and Bussler 2013; Lyubarsky and Ghahari 2020) (Fig. 2).

Note. The records of *D. bipustulata* were absent for Kazakhstan (Wegrzynowicz 2007). There are the first records on *Pholiota vernalis*, *Psathyrella candolleana* and *Gloeophyllum sepiarium* (Fig. 3).

***Dacne pontica* (Bedel, 1868)**

Figs. 1, 4, C.

Material examined. 1 ex. - 17.06.2005, AkO, Akkol district, Azat village, *C. squamosus*, IT; 2 ex. - 28.08.2007, AkO, Zerendinsky district, Zerenda village 2, *C. squamosus*, VG; 3 ex. - 24.05.2009, Almaty, Bostandyk d., floodplain of the r. Esentai, *Ph. vernalis*, IT; 2 ex. - 6.06.2009, Almaty, Bostandyk d., floodplain of the r. Esentai, *P. candolleana*, IT; 2 ex. - 10.02.2013, AO, Talgar d., Beskaynar v., *P. ostreatus*, IT; 4 ex. - 28.05.2014, Almaty, Bostandyk d., floodplain of the r. Esentai, *C. squamosus*, IT; 2 ex. - 2.10.2014, AO, SNNP Ile-Alatau, Kimasar g., *C. squamosus*, IT; 5 ex. - 20.05.2015, AO, SNNP Ile-Alatau, Mokhnatka m., *C. squamosus*, IT; 2 ex. - 8.05.2015, AO, SNNP Ile-Alatau, Aksai g., *P. dryinus*, IT; 5 ex. - 8.05.2015, AO, SNNP Ile-Alatau, Aksai g., *C. squamosus*, IT; 4 ex. - 20.05.2015, AO, SNNP Ile-Alatau, Mokhnatka m., *C. squamosus*, IT; 3 ex. - 27.05.2015, AO, SNNP Zhongar-Alatau, Lepsinsky d., c. Chernorechensky, *P. eryngii*, IT; 11 ex. - 16.08.2015, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *C. squamosus*, taken SNNP Ile-Alatau, Aksai g., 8.05.2015, IT; 8 ex. - 16.08.2015, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *P. dryinus*, taken SNNP Ile-Alatau, Aksai g., 8.05.2015, IT; 4 ex. - 11.09.2015, AO, SNNP Ile-Alatau, Medeo g., *P. dryinus*, IT; 5 ex. - 27.10.2015, AO, SNNP Ile-Alatau, Mokhnatka m., *C. squamosus*, IT; 11 ex. - 30.10.2015, Almaty, Bostandyk d., md. Koktem-1, b derived in laboratory from *C. squamosus*, taken SNNP Ile-Alatau, Aksai g., 8.05.2015, IT; 9 ex. - 30.10.2015, Almaty, Bostandyk d., md. Koktem-1, b derived in laboratory from *P. dryinus*, taken SNNP Ile-Alatau, Aksai g., 8.05.2015, IT; 10 ex. - 20.03.2016, A Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *C. squamosus*, taken AO, SNNP Ile-Alatau, Mokhnatka m., 27.10.2015, IT; 12 ex. - 2.05.2016, A Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *C. squamosus*, taken AO, SNNP Ile-Alatau, Mokhnatka m., 27.10.2015, IT; 3 ex. - 05.05.2016, AO, SNNP Ile-Alatau, Maloye Almaty g., *C. squamosus*, IT; 1 ex. - 3.08.2016, AO, SNNP Altyn-Emel, Kerbulak d., nei. Koku v., *T. versicolor*, IT; 1 ex. - 8.08.2016, Almaty, Bostandyk d., Dostyk park, *P. dryinus*, IT; 8 ex. - 10.02.2017, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *P. dryinus*, taken Almaty, Bostandyk d., Dostyk park, 8.08.2016, IT; 1 ex. - 14.06.2018, Almaty, Nauryzbayskiy d., md. Rahat, *P. ostreatus*, IT; 1 ex. - 4.05.2020, AO, Talgar d., Arkabay v., *L. sulphureus*, IT; 3 ex. - 2.03.2021, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *L. sulphureus*, taken AO, Talgar d., Arkabay v., 4.05.2020, IT; 1 ex. - 8.11.2020, Almaty, Bostandyk d., floodplain of the r. Esentai, *C. squamosus*, IT; 2 ex. - 2.03.2021, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *C. squamosus*, taken Almaty, Bostandyk d., floodplain of the r. Esentai, 8.11.2020, IT; 1 ex. - 19.03.2021, Almaty, Auezovsky d., Dzhandosova st., *C. squamosus*, IT; 2 ex. - 11.05.2021, Almaty, Bostandyk d., Al-Farabi av., *C. squamosus*, IT; 1 ex. - 18.05.2021, AO, Karasai d., nei. Kairat v., *P. dryinus*, IT; 2 ex. - 1.06.2021, AO, Karasai d., nei. Kairat v., *Ph. vernalis*, IT; 5 ex. - 25.08.2021, AO, SNNP Ile-Alatau, Maloye Almaty g., *P. dryinus*, IT; 2 ex. - 26.08.2021, AO, SNNP Ile-Alatau, Turgen g. *C. squamosus*, IT; 2 ex. - 28.09.2021, SNNP Ile-Alatau, Aksai g., *C. squamosus*,

IT; 3 ex. - 16.10.2020, AO, SNNP Ile-Alatau, Maloye Almaty g., *F. betulina*, IT; 2 ex. - 6.05.2022, AkO, Stepnogorsk city, *C. squamosus*, IT; 1 ex. - 20.05.2022, WKO, Amangeldy d., nei. Chizha v., *P. dryinus*, IT; 2 ex. - 13.07.2022, KgO, Karaganda city, *L. sulphureus*, IT.

D. pontica is distributed in Europe (Albania, Austria, Azerbaijan, Bosnia Herzegovina, Caucasus, Georgia, Hungary, Italy, Romania, Russia, Slovakia, Slovenia, Ukraine. Asia: Iran, India, Turkey (Jacobson 1905-1915; Droghvalenko 1997; 2002; Wegrzynowicz 2007; Nikitsky, Bibin and Dolgin 2008; Lyubarsky and Ghahari 2020) (Fig. 2).

Note. The records of *D. pontica* were absent for Kazakhstan (Wegrzynowicz 2007). There are the first records on *Pholiota vernalis* and *Psathyrella candolleana*.

***Dacne semirufula* (Reitter, 1897)**

Figs. 1, 4, D.

Material examined. 1 ex. - 28.05.2014, Almaty, Bostandyk d., floodplain of the r. Esentai, *P. dryinus*, IT; 1 ex. - 8.05.2015, AO, SNNP Ile-Alatau, Maloye Almaty g., *F. betulina*, IT; 2 ex. - 8.05.2015, AO, SNNP Ile-Alatau, Maloye Almaty g., *P. dryinus*, IT; 2 ex. - 20.05.2015, AO, SNNP Ile-Alatau, Mokhnatka m., *C. squamosus*, IT; 2 ex. - 21.05.2015, AO, SNNP Ile-Alatau, Mokhnatka m., *P. dryinus*, VK; 8 ex. - 16.08.2015, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *F. betulina*, taken AO, SNNP Ile-Alatau, Maloye Almaty g., 8.05.2015, IT; 2 ex. - 11.09.2015, AO, SNNP "Ile-Alatau", Medeo g., *T. versicolor*, IT; 1 ex. - 11.09.2015, AO, SNNP Ile-Alatau, Mokhnatka m., *C. squamosus*, IT; 8 ex. - 30.10.2015, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *P. dryinus*, taken SNNP Ile-Alatau, Aksai g., 8.05.2015, IT; 2 ex. - 8.08.2016, Almaty, Bostandyk d., Dostyk park, *P. dryinus*, IT; 10 ex. - 10.02.2017, Almaty, Bostandyk d., md. Koktem-1, derived in laboratory from *P. dryinus*, taken Almaty, Bostandyk d., Dostyk park, 8.08.2016, IT; 1 ex. - 24.05.2017, Almaty, Bostandyk d., Dostyk park, *G. applanatum*, IT; 2 ex. - 16.10.2020, AO, SNNP Ile-Alatau, Maloye Almaty g., *F. betulina*, IT; 1 ex. - 25.08.2021, AO, SNNP Ile-Alatau, Mokhnatka m., *C. squamosus*, IT; 2 ex. - 28.09.2021, SNNP Ile-Alatau, Aksai g., *C. squamosus*, IT.

D. semirufula is distributed in Europe (Albania, Armenia, Azerbaijan, Denmark, Georgia, Russia, Ukraine) (Jacobson 1905-1915; Droghvalenko 1997; 2002; Wegrzynowicz 2007; Nikitsky, Bibin and Dolgin 2008) (Fig. 2).

Note. The records of *D. semirufula* were absent for Kazakhstan (Wegrzynowicz 2007). Possibly imported with planting material. There are the first records on *Fomitopsis betulina* and *Ganoderma applanatum* (Fig. 3).

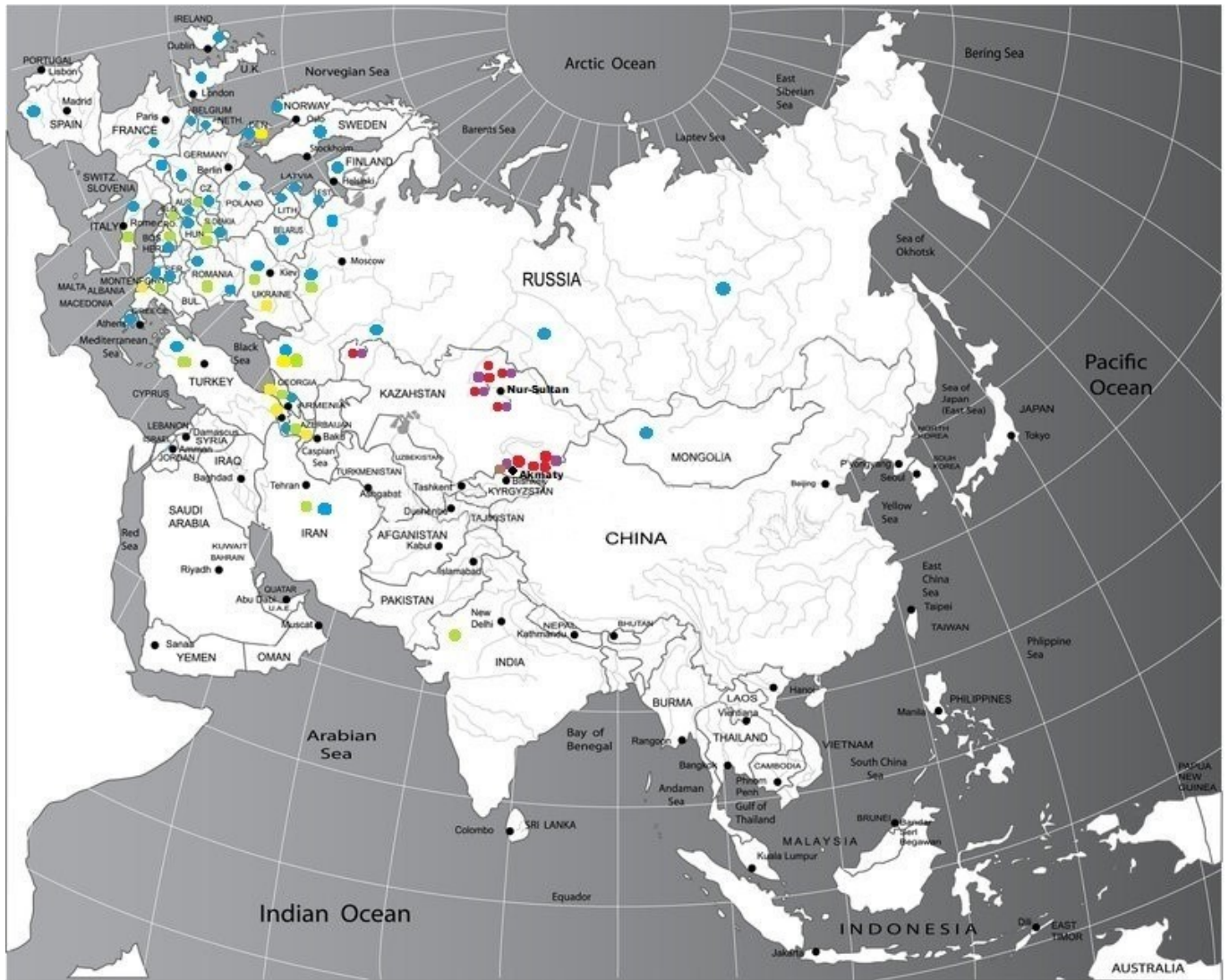


Figure 2. Distribution of some species from genus *Dacne* in world and in Kazakhstan. Blue circles - *Dacne bipustulata*, known records. Red circles - *Dacne bipustulata*, new records. Green circles - *Dacne pontica*, known records. Violet circles - *Dacne pontica*, new records. Yellow circles - *Dacne semirufula*, known records. Brown circles - *Dacne semirufula*, new record.



A



B



C



D



E



F

Figure 3. Some mushrooms species, with beetles from genus *Dacne*: A - *Pleurotes dryinus*; B - *Cerioporus squamosus*; C - *Ganoderma applanatum*; D - *Trametes versicolor*; E - *Gloeophyllum sepiarium*; F - *Laetiporus sulphureus*.

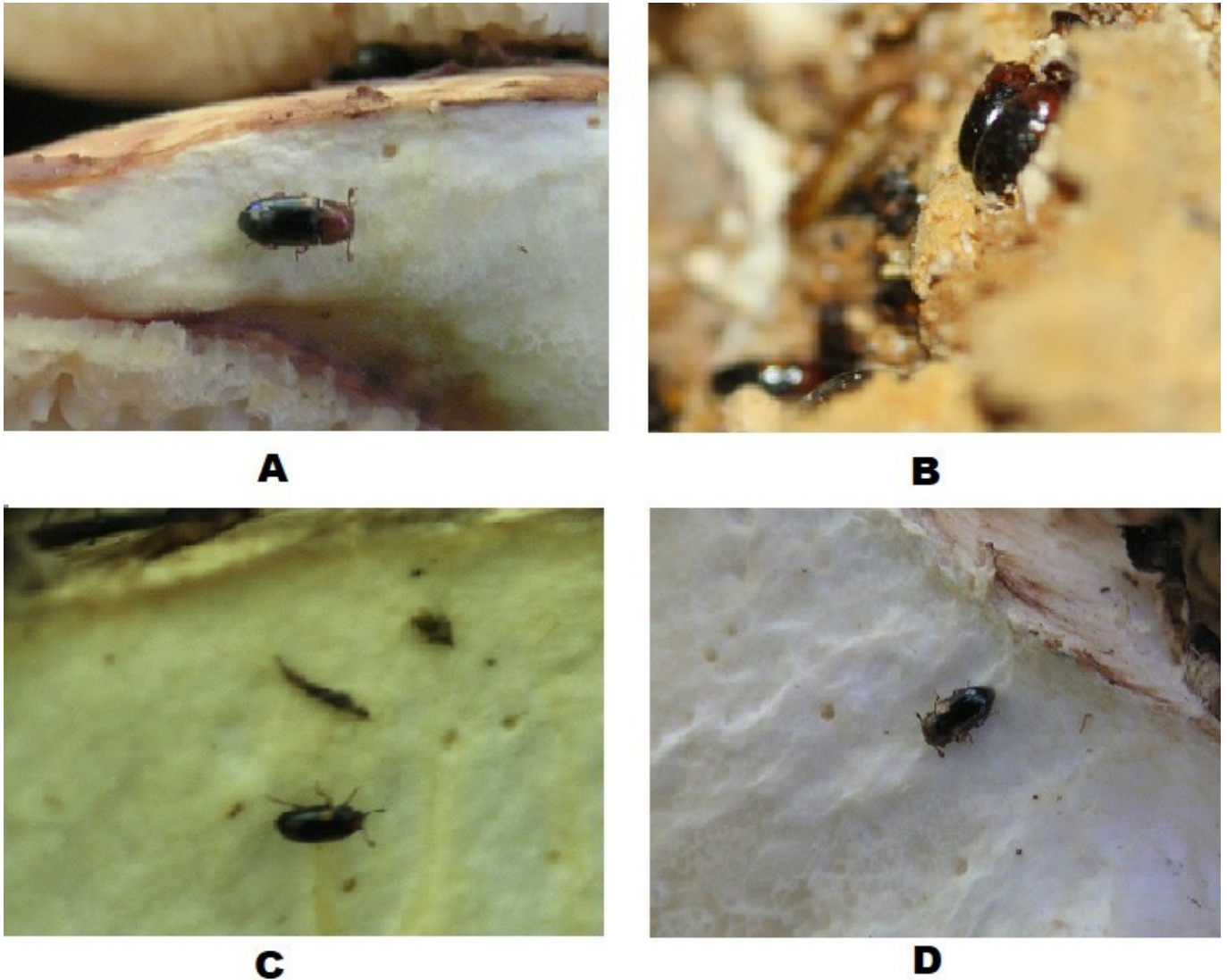


Figure 4. Beetles of genus *Dacne* on mushrooms: A - *D. bipustulata* on *Fomitopsis betulina*; B - *D. bipustulata* on *Ganoderma applanatum*; C - *D. pontica* on *Cerioporus squamosus*; D - *D. semirufula* on *Pleurotes dryinus*.

D. bipustulata is the most abundant species and dominated all mushrooms species, except *F. betulina* and *L. sulphureus*. The most populated mushrooms were *C. squamosus* and *P. dryinus*, both at the level of species diversity and in the total number of collected beetles, the least populated were *N. lepideus* and *P. candolleana* (Fig. 5).

It should be noted that when the beetles of the genus *Dacne* were removed from fungi under laboratory conditions, they developed in several generations, even in already very dried fruit bodies. This confirms the available data that if they accidentally enter museum collections together with fruiting bodies or food stocks of mushrooms, they may be damaged by these species (Krasutsky 2005; Hagstrum and Subramanyam 2009; Denux and Zagatti 2010).

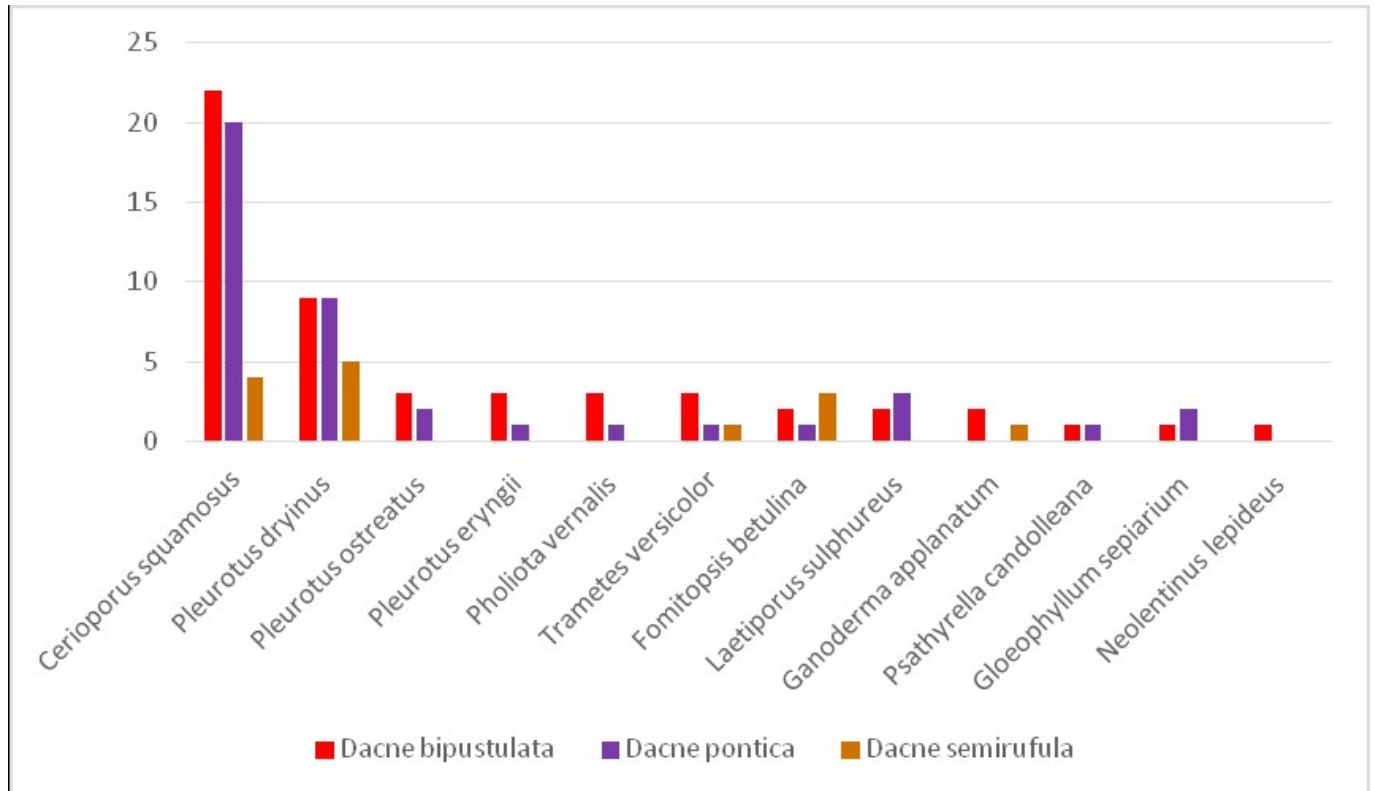


Figure 5. Indicators of the population of mushrooms by beetles of the genus *Dacne*.

Discussion

In total, three species of pleasing fungus beetles are additionally recorded for Kazakhstan. All species of fungi discovered as a result of research belong to one genus *Dacne* of the tribe Dacnini (Erotylinae). *D. bipustulata* is the most widespread and numerous species. It is followed by *D. pontica* in abundance and occurrence. The third species, *D. semirufula*, recorded only in Almaty city and neighborhoods. It is possible that it is adventive, the introduction took place relatively recently, and the beetle did not have time to settle outside the site of invasion. For SNNP "Ile-Alatau", all the three specified Erotylidae species were recorded. In SNNP "Zhongar-Alatau" two species (*D. bipustulata* and *D. pontica*) were found. For GNPP "Altyn-Emel" only one species (*D. bipustulata*) is indicated. Thus, at present, the Ile-Alatau State national natural park is the richest in species diversity of the Erotylidae from the specially protected natural areas in which the research was carried out. For *D. pontica* and *D. semirufula* finds in Almaty and Almaty region are the easternmost locations of these species.

Key to known species of genus *Dacne* from Kazakhstan

1. Pronotum shining, predominantly red to pure black; microsculpture poorly developed Light humeral spots, as rule, large, widened posteriorly, reaching base of elytra and overlying epipleura. If pronotum completely black, then humeral spots smaller, not extended onto epipleura. Elytra dark at apex or, at most, little lighter there. 2-3,5 mm. *Dacne pontica* (**Bedel, 1868**)..... 2
2. Pronotum red or more or less two-colored, darkened at base, slightly shiny. 9th and 11th antennal segments approximately equal in width. Elytra more or less darkened, less often black with wide yellow humeral spot, often extended to epipleura. Elytral apex lighter or with couple of yellowish or reddish spots, but not always. 2,5-3 mm. *Dacne semirufula* (**Reitter, 1897**)..... 3

3. Pronotum red or orange, narrowly blackened at base, weak microsculpture. Segment 9 of antennae somewhat narrower than segment 11. Elytra and scutellum black; antennae and paws red. Shoulder spots not extended to epipleura; undercolored yellowish or reddish exemplars often found. 2,5-3,5 mm. ***Dacne bipustulata* (Thunberg, 1781)**.

In total, three species of Erotylidae from genus *Dacne* are recorded for Kazakhstan. This shows that the fauna of saproxylic Coleoptera in Kazakhstan needs further study. As in the case of representatives of the families Melandryidae (Temreshev 2017b), Mycetophagidae (Temreshev 2019) and Endomychidae (Temreshev 2021), it is possible to find other species of fungus beetles in the country.

Acknowledgements

The author thanks to Valentina Antonovna Glushen (Zerendinskaya regional territorial inspection of the Committee of state inspection in the agro-industrial complex of the Ministry of agriculture of the Republic of Kazakhstan, Zerenda village, Akmola region, Kazakhstan) and to doctor of biological sciences, professor Vladimir Longinovich Kazenas (Almaty, Kazakhstan) for the provided materials, and anonymous reviewers for the valuable comments that improved the manuscript.

References

- Denux O, Zagatti P (2010) Coleoptera families other than Cerambycidae, Curculionidae sensu lato, Chrysomelidae sensu lato and Coccinelidae. Chapter 8.5. In: Roques A et al. (Eds) Alien terrestrial arthropods of Europe. *BioRisk*, 4 (1): 315-406. doi: 10.3897/biorisk.4.61
- Dai C-C, Zhao M-J (2013) Two new species of *Dacne* Latreille (Coleoptera, Erotylidae) from China, with a key to Chinese species and subspecies of *Dacne*. *ZooKeys*, 261: 51-59. doi: 10.3897/zookeys.261.4495
- Drake JA (2009) Handbook of Alien Species in Europe. Invading nature Springer series in invasion ecology. Volume 3. Springer Science + Business Media B.V., 399 p.
- Drilling K, Dettner K & Klass K-D (2013) The distribution and evolution of exocrine compound glands in Erotylinae (Insecta: Coleoptera: Erotylidae), *Annales de la Société entomologique de France* (N.S.). *International Journal of Entomology*, 49 (1): 36-52, doi: <https://10.1080/00379271.2013.763458>
- Drogvalenko AN (1997) Reviw of Erotylidae (Coleoptera) fauna of Ukraine. The Kharkov Entomological Society Gazette, V (1): 74-78. [In Russian]
- Drogvalenko AN (2002) The new and rare species of beetles ((Insecta, Coleoptera) for fauna of Ukraine. Informaton 2. The Kharkov Entomological Society Gazette, IX (1-2): 9-19. [In Russian]
- Fasulati KK (1971) Field study of terrestrial invertebrates. Moscow: Higher school, 424 p. [In Russian]
- Jacobson GG (1905-1915). Beetles of Russia and Western Europe. St. Petersburg: Publication A.F. Devrient, 1024. [In Russian]
- Hagstrum DW, Subramanyam B. (2009). Stored-product insect resource. AACC International, Inc., 509 p.
- Khalidov AB (1984) Insects - fungus destroyers. Kazan: Kazan University Press, 151 p. [In Russian]

- Krasutsky BV (1996) Mycetophilic beetles of the Urals and Trans-Urals. Vol. 1. Brief illustrated guide to determining the most common coleoptera in the entomocomplexes of wood-destroying basidiomycetes. Ekaterinburg: Ekaterinburg Publishing House, 146 p. [In Russian]
- Krasutsky BV (2005) Mycetophilic beetles of the Urals and Trans-Urals. Vol. 2. System "Mushrooms-insects". Chelyabinsk, 213. [In Russian]
- Krasutsky BV (2007) Brief key of mushroom beetles. Teaching manual. Chelyabinsk: Izd. CSPU, 140 p. [In Russian]
- Krivolutskaya GO (1992) Family Erotylidae - Pleasing fungus beetles. In: Key to insects of the Far East. T. III. Part 2. Coleoptera, or beetles. St. Petersburg: Science, 285-303. [In Russian]
- Kryzhanovsky OL (1965) Family Erotylidae - Pleasing fungus beetles. In: Key of insects in the European part of the USSR. T. II. Beetles and twisted-wing insects. Moscow-Leningrad: Science, 316-317. [In Russian]
- Lyubarsky GYu, Ghahari H (2020) Annotated checklist of the Iranian Erotylidae (Coleoptera: Cucujoidea). Entomological News, 129 (3): 244-256. doi: <https://10.3157/021.129.0303>
- Mordkovich YaB, Sokolov EA (1999) Key of quarantine and other dangerous pests of raw materials, storage products and seed. VNII plant quarantine. Moscow: Kolos, 384 p. [In Russian]
- Muller J, Jarzabek-Muller A, Bussler H (2013) Some of the rarest European saproxylic beetles are common in the wilderness of Northern Mongolia. Journal of Insect Conservation, 17: 989-1001. doi: <https://10.1007/s10841-013-9581-9>
- Mushroom classification. (n.d.). In: Mushrooms of Kazakhstan, from http://fungi.su/infusions/advanced_articles_sort/fungi_cl.php [In Russian]. (Retrieval date: 6.03.2021).
- Nikitsky NB, Bibin AR, Dolgin MM (2008) Xylophilous beetles (Coleoptera) of the Caucasian State Biospheric Natural Reserve and adjacent territories. Siktivkar: Institute of Biology of Komi centre of science. Ural branch of the Russian Academy at sciences, 452 p. [In Russian]
- Robinson WH (2005) Handbook of Urban Insects and Arachnids. Cambridge: Cambridge University Press, 456 p. doi: <https://doi.org/10.1017/CBO9780511542718>
- Samgina DI (1981) Flora of spore plants of Kazakhstan. V. 13. Gilled mushrooms. 1. Agaricales. Alma-Ata: Science of the Kazakh SSR, 272 p. [In Russian]
- Samgina DI (1985) Flora of spore plants of Kazakhstan. V. 13. Book 2. Gilled mushrooms (Agaricales). Alma-Ata: Science of the Kazakh SSR, 269 p. [In Russian]
- Schigel DS (2002) Beetle complexes in polypore fungi in East European plain and Crimea. Bulletin Moscow Society Naturalists, 107 (1): 8-21. [In Russian]
- Skelley PE (2003) The genus *Dacne* Latreille (Coleoptera: Erotylidae) in tropical America. Papers in Entomology. Insecta mundi. 17 (1-2): 111-117. <https://digitalcommons.unl.edu/entomologypapers/108>
- Skelley PE, Gasca-Álvarez HJ (2020) Michyrus, a new genus of pleasing fungus beetles with coarsely faceted eyes (Coleoptera: Erotylidae). Insecta mundi. 0836: 1-8.
- Skelley PE, Leschen RAB, Liu Z (2021) New Australian Erotylinae with notes on Dacnini

(Coleoptera: Cucujoidea: Erotylidae). Zootaxa, 4948 (3): 363-380.

Ślipiński SA, Leschen RAB, Lawrence JF (2011) Order Coleoptera Linnaeus, 1758. In: Zhang Z.-Q. (ed.) Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness. Zootaxa, 3148: 203-208.

Tang W, Skelley P, Pérez-Farrera MA (2018) *Ceratophila*, a new genus of erotylid beetles (Erotylidae: Pharaxonothinae) inhabiting male cones of the cycad *Ceratozamia* (Cycadales: Zamiaceae). Zootaxa, 4508 (2): 151-178.

Temreshev II (2017a) Pests of storage and raw materials, distributed in the territory of the Republic of Kazakhstan, and some accompanying and quarantine species (species composition and brief technology protection measures). Second edition, revised and supplemented. Almaty: LLP "Nur-Print", 419 p. [In Russian]

Temreshev II (2017b) New records of false darkling beetles of the genus *Melandrya* Fabricius, 1801 (Coleoptera: Melandryidae) in Kazakhstan. Euroasian entomological journal, 16 (3): 205-206. [In Russian]

Temreshev II (2019) Hairy Fungus beetles (Coleoptera, Mycetophagidae) of the Almaty oblast (South-East Kazakhstan). Acta Biologica Sibirica, 5 (1): 63-70. <https://doi.org/10.14258/abs.v5.i1.5193>. [In Russian]

Temreshev II (2021) First record of *Lycoperdina succincta* (Linnaeus, 1767) (Coleoptera, Endomychidae) from Kazakhstan. Acta Biologica Sibirica 7: 441-450. <https://doi.org/10.3897/abs.7.e77663>

Wegrzynowicz P (2007) Erotylidae. In: Löbl I. & Smetana A. [eds.], Catalogue of Palaearctic Coleoptera, Vol. 4: Elateroidea-Derodontoidea-Bostrichoidea-Lymexyloidea-Cleroidea-Cucujoidea. Stenstrup: Apollo Books, 531-546.