

# Biphyllidae (Coleoptera, Cucujoidea) - a new beetle family to the fauna of Kazakhstan

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False skin beetle *Biphyllus lunatus* (Fabricius, 1787) is firstly recorded from Kazakhstan. The finds of *B. lunatus* from Ulytau Oblast of Central Kazakhstan are currently the eastmost localities for this species and first record for Central Asia. The records of the beetles from family Biphyllidae were absent for Kazakhstan.

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## Keywords

*Biphyllus lunatus*, false skin beetles, new records, Central Kazakhstan

## Introduction

False skin beetles, or biphyllid beetles (Biphyllidae) includes about seven genera and above 185 species in the world fauna (Wegrzynowicz 2015). There are about 29 species in two genera in the Palaearctic region (Jelínek 2007). False skin beetles is cosmopolitan in distribution, occurring in all zoogeographic regions except New Zealand, with highest diversity in the tropics (Shockley and Cline 2011; Wegrzynowicz 2015). They are small, <5mm, and rather drab insects; most are brown or grey with pale or orange markings. Their imagoes and larvae are obligately mycophagous, and develop on ascomycete fungi: *Cryptostroma* P.H. Greg. & S. Waller, *Daldinia* Cesati & de Notaris, 1863, *Hypoxylon* Bull., 1791, *Nummularia* Tul. & C. Tul., 1863, *Tubercularia* Tode, 1790, *Xylaria* Hill ex Schrank, 1789 etc. Beetles of this family may also be found by peeling bark from dead trees, mostly hardwoods, or by sifting moist leaf litter and other decaying plant material (Nikitsky 1992; Shockley and Cline 2011; Wegrzynowicz 2015). Biphyllidae has long been considered as part of the family pleasing fungus beetles (Erotylidae) (Jacobson 1905-1915; Kryzhanovsky 1965).

The genus *Biphyllus* Dejean, 1821 includes 89 species from the world (Wegrzynowicz 2015) and is comprised of 27 species in the Palaearctic region (Jelínek 2007). Beetles from this genus are distributed in the Palaearctic, Afrotropic, Oriental and extends into the Australin regions

(Wegrzynowicz 2015). They are obligate mycetophages that eat various fungi. The larva develops in the fruiting bodies of tree mushrooms, pupates in the soil. At the adult stage, it visits some ground and xylotrophic fungi, using them as an additional food resource (Kryzhanovsky 1965; Nikitsky 1983; 1992; Nikitsky et al. 2008; Wegrzynowicz 2015).

*Biphyllus lunatus* (Fabricius, 1787) is a very local and generally rare species and is considered to be threatened in many countries (Kålås et al 2010; Red Book of the Krasnodar Krai 2017; Tingstad et al 2017). This beetles are usually associated with the fungus King Alfred's cake *Daldinia concentrica* (Bolton) Cesati & de Notaris, *Cryptostroma corticale* (Ellis et Everh.) Greg. et Waller and *Hypoxyton* Bull., 1791 etc, which grows on ash (*Fraxinus* Tourn. ex L.), alder (*Alnus* Mill.), beech (*Fagus* L.), oak (*Quercus* L.), birch (*Betula* L.), plane tree (*Platanus* L.), laurel (*Laurus* L.) and on other broadleaf trees. Imago occurs year-round. The beetles overwinter under the loose rotten bark of various deciduous trees. Larvae develop within fruiting bodies of mushrooms and will often be seen alongside the adults. Pupation occurs within the fungus or in soil. Development cycle is annual. Imago has been found also in galleries of the bark beetle *Hylesinus crenatus* (Fabricius, 1787). Adults were also collected together with *Siagonium humerale* Germar, 1836 (Staphylinidae) and *Cerylon* sp. (Cerylonidae). The natural enemies of this species are by *Thanasimus formicarius* (Linnaeus, 1758) (Coleoptera, Cleridae), *Meteorus vexator* (Haliday, 1835) and *Meteorus* sp. (Hymenoptera, Braconidae) (Roubal 1936; Nikitsky 1983; Wegrzynowicz 2015).

## Materials and methods

The material was collected by manual method from 2023 in Central Kazakhstan, Ulytau Oblast. Standard techniques (Fasulati 1971) used in entomology were used during the collection of the material. The following sources (Jacobson 1905-1915; Roubal 1936; Kryzhanovsky 1965; Nikitsky 1983; 1992; Nikitsky et al. 2008; Kålås et al 2010; Shapovalov et al 2011; Shockley and Cline 2011; Egorov 2014; Wegrzynowicz 2015; Mühlfeit 2017; Tingstad et al 2017) 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 of I.I. Temreshev (Almaty, Kazakhstan).

Photographs of *B. lunatus* were taken with a camera Canon EOS 50 D by author (Fig. 1). Photographs of the mushrooms and habitat of *B. lunatus* were taken with a camera Redmi 7 by author (Fig. 2). Descriptions and body measuring were performed using a Micromed MC var 1-C dissecting stereomicroscope and Digital microscope G 1200.

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

## Result

**Superfamily Cucujoidea Latreille, 1802**

**Family Biphyllidae LeConte, 1861**

**Genus *Biphyllus* Dejean, 1821**

***Biphyllus lunatus* (Fabricius, 1787)**

= *Diphyllus normatus* Reitter, 1888

= *Diphyllus lunatus* (Fabricius, 1787)

= *Dermestes lunata* Fabricius, 1787 Figure 1

**Material examined.** 12 ex. - 24.08.2023, Central Kazakhstan, Ulytau Oblast, Ulytau District, neighborhoods Korgasyn village, N 49°14'4.02" E 66°39'23.48", birch grove, in mushroom King Alfred's cake *Daldinia concentrica* (Bolton) Cesati et Notaris and under the bark of dead European white birch *Betula pendula* Roth., I.I. Temreshev (Fig. 2).

**Remarks.** *B. lunatus* is distributed in Europe (Albania, Azerbaijan, Austria, Belgium, Bosnia Herzegovina, Belarus, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Great Britain, Greece, Hungary, Italy, Latvia, Liechtenstein, Lithuania, Macedonia, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine), North Africa (Algeria, Canary Island, Libya, Madeira Archipelago, Morocco), Asia (Iran, Pakistan, Syria, Turkey) (Jacobson 1905-1915; Kryzhanovsky 1965; Jelinek 2007; Nikitsky et al. 2008; Shapovalov et al 2011; Egorov 2014; Wegrzynowicz 2015; Mühlfeit 2017) (Fig. 3). The records of *B. lunatus* and species from family Biphylidae were absent for Kazakhstan (Jelinek 2007; Wegrzynowicz 2015).

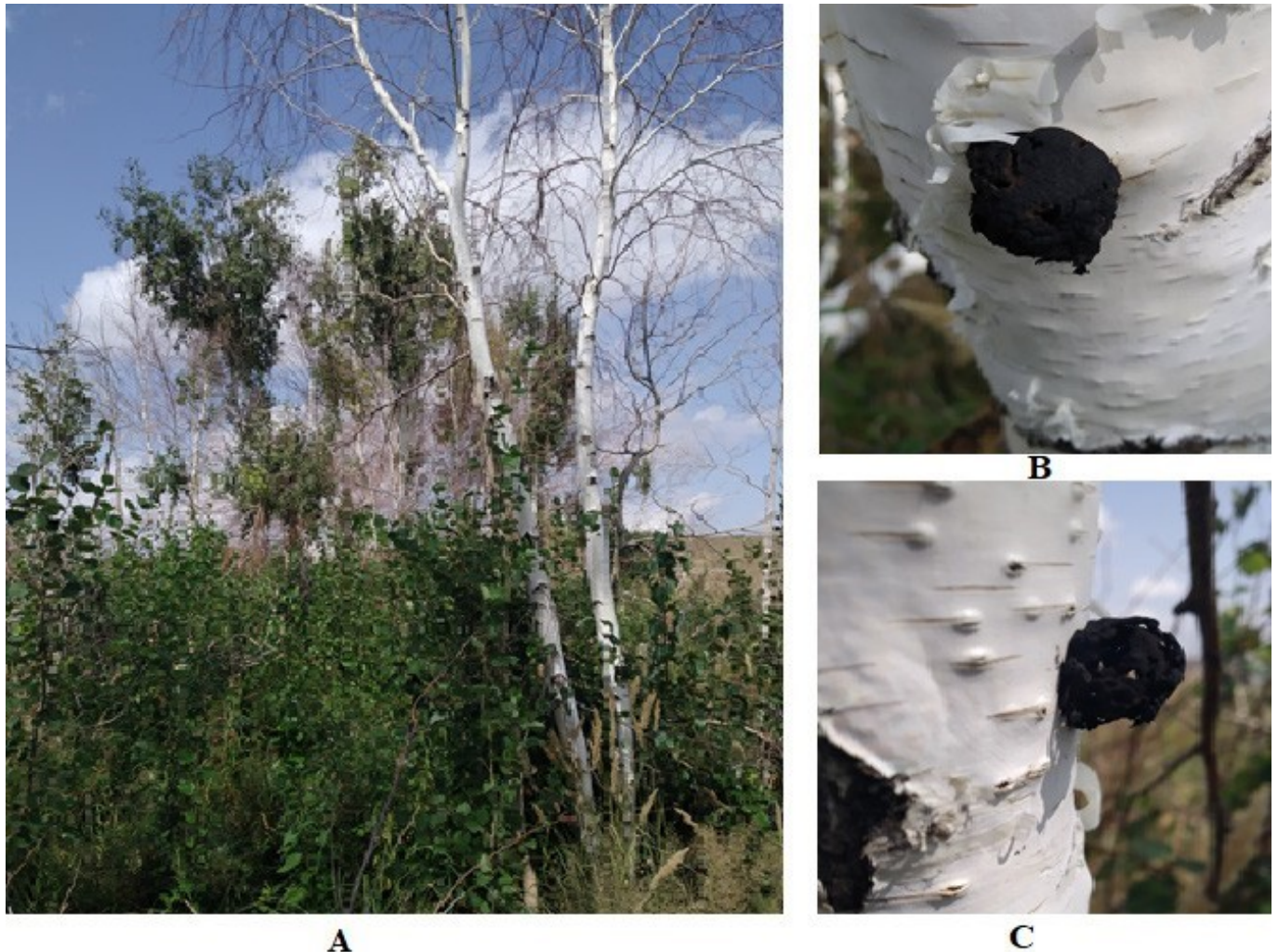
**Note.** The species was found along with lined flat bark beetles (Laemophloeidae) - *Placonotus testaceus* (Fabricius, 1787), pleasing fungus beetles (Erotylidae) - *Dacne bipustulata* (Thunberg, 1781), *Triplax russica* (Linnaeus, 1758) and hairy fungus beetles (Mycetophagidae) - *Litargus connexus* (Geoffroy, 1785), *Mycetophagus multipunctatus* Fabricius, 1792, for which the Ulytau Oblast is also a new distribution records in Kazakhstan (Temreshev 2011; 2019; 2022; 2023b).



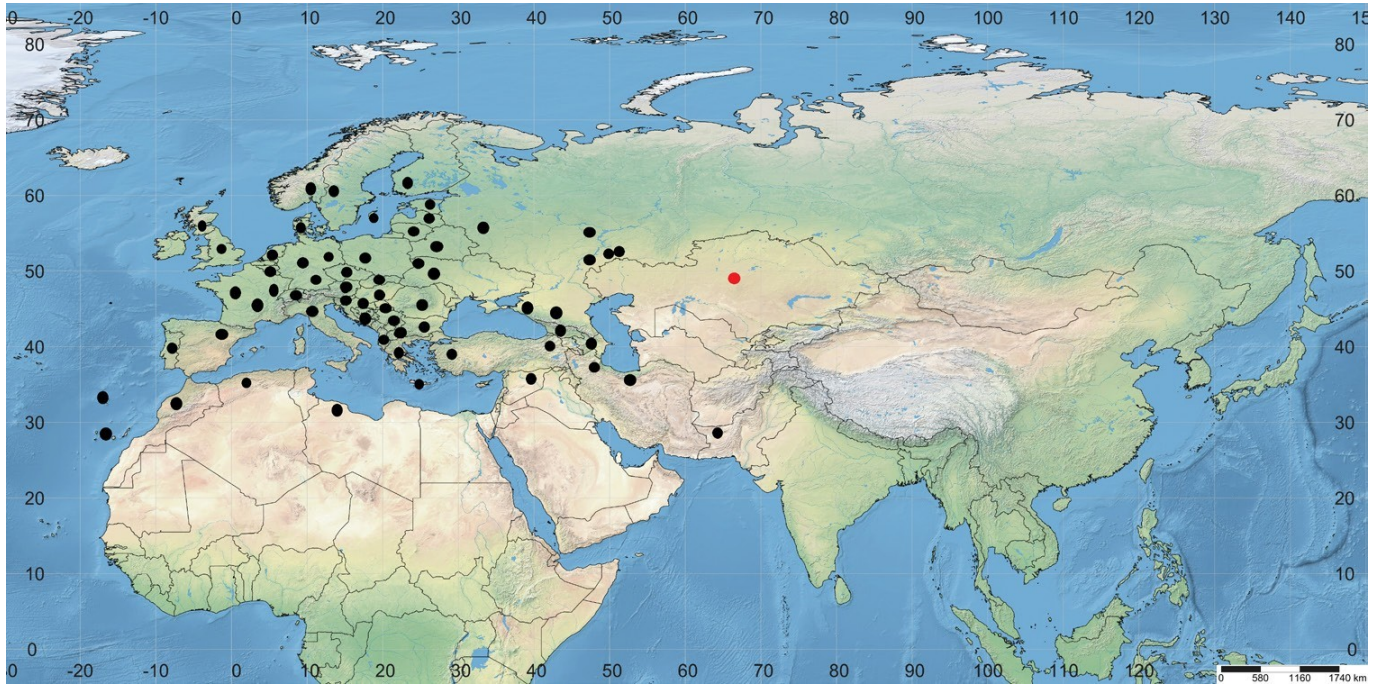
**Figure 1.** *Biphyllus lunatus*, habitus. Central Kazakhstan.

## Discussion

One species of false skin beetles (Biphyllidae) *B. lunatus* are recorded for Kazakhstan (Jelínek 2007; Wegrzynowicz 2015). The finds of *B. lunatus* from Ulytau Oblast of Central Kazakhstan are currently the eastmost localities for this species and first record for Central Asia. Previously, representatives of this family were not found in country. Since the species was discovered in Central Kazakhstan, it can be assumed that in the future it will be found in the west and north of the country. These regions of the country border with the regions of the Russian Federation in which the *B. lunatus* was recorded. In future it is possible that another species from this family may be found on the territory of Kazakhstan - *Diplocoelus fagi* (Chevrolat, 1837). The discovery of representatives of the family indicates that the fauna of mycetophilic beetles in Kazakhstan requires further study. As in the case of representatives of the families Melandryidae (Temreshev 2017), Mycetophagidae (Temreshev 2019), Endomychidae (Temreshev 2021) and Erotylidae (Temreshev 2022; 2023) it is possible to find other species of fungus beetles in the country.



**Figure 2.** Habitat of *Biphyllus lunatus*: European white birch grove (A) and mushroom King Alfred's cake *Daldinia concentrica* on the bark of dead European white birch *Betula pendula* (B, C). Central Kazakhstan.



**Figure 3.** Distribution of *Biphyllus lunatus*. New record in Kazakhstan is indicated as red circle. Known ones indicated as black circles.

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