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**New data on dispersal of several species  
of the genus *Carpelimus* Leach, 1819  
(Coleoptera: Staphylinidae: Oxytelinae)  
from tropical Africa to the Mediterranean Region**

**Новые данные о распространении некоторых видов  
рода *Carpelimus* Leach, 1819 (Coleoptera: Staphylinidae: Oxytelinae)  
из тропической Африки в Средиземноморье**

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**Ключевые слова:** Coleoptera, Staphylinidae, *Carpelimus*, распространение, тропическая Африка, Средиземноморье, Палеарктика.

**Abstract.** The process of the faunal exchange between *Carpelimus* Leach, 1819 of the Ethiopian zoogeographical region and the Palaearctic is discussed with respect to the Mediterranean part of the Palaearctic. Distributional data are provided for 11 species: *C. atomus* (Saulcy, 1864), *C. bilineatus* Stephens, 1834, *C. pusillus* (Gravenhorst, 1802), *C. simplicicollis* (Wollaston, 1857), *C. niloticus* (Erichson, 1840), *C. memnonius* (Erichson, 1840), *C. insularis* (Kraatz, 1858), *C. dieganus* (Fauvel, 1904), *C. kunenensis* Gildenkov, 2013, *C. cederholmi* Gildenkov, 2013, *C. gedyei* (Cameron, 1950). For the first time, *C. dieganus* and *C. kunenensis* are reported to occur in Oman, *C. simplicicollis* in Russia (Irkutsk Region), *C. cederholmi* in Portugal, and *C. gedyei* in Spain.

**Резюме.** Обсуждается процесс взаимопроникновения между фаунами рода *Carpelimus* Leach, 1819 Эфиопской зоогеографической области и Палеарктики в Средиземноморье. Представлены данные для 11 видов: *C. atomus* (Сольси, 1864), *C. bilineatus* Stephens, 1834, *C. pusillus* (Гравернхорст, 1802), *C. simplicicollis* (Уолластон, 1857), *C. niloticus* (Эрихсон, 1840), *C. memnonius* (Эрихсон, 1840), *C. insularis* (Краатц, 1858), *C. dieganus* (Фавель, 1904), *C. kunenensis* Гильденков, 2013, *C. cederholmi* Гильденков, 2013, *C. gedyei* (Кэмерон, 1950). Для *C. dieganus* и *C. kunenensis* впервые в качестве области распространения указывается Оман, для *C. simplicicollis* – Россия (Иркутская область), для *C. cederholmi* – Португалия, для *C. gedyei* – Испания.

## Introduction

Rove beetles of the genus *Carpelimus* Leach, 1819 are typical inhabitants of the supralittoral zone. For these beetles, successful habitat colonisation is dependent not only on the moisture content, but also on the

characteristics of the substrate [Gildenkov, 2001]. Morpho-adaptive features of *Carpelimus* characterize them as the inhabitants of the natural cavities in the soil (except for the active burrowers of the subgenus *Troginus* Mulsant et Rey, 1878). But under favourable trophic conditions their ability to dig burrows in soft substrates allows them also to populate swampy areas in forests and meadows. Thus, as typical intrapolyzonal species, the representatives of *Carpelimus* inhabit the supralittoral zone of various fresh and marine waters, but under favourable conditions they can also move into moist microhabitats of zonal ecosystems, although usually only for a short period, if abundantly humid areas can provide the necessary trophic basis for the successful completion of the reproductive cycle. This also explains the presence of some *Carpelimus* species in compost heaps and moist leaf litter [Gildenkov, 2001]. Like many other coastal species that belong to *r*-strategists, *Carpelimus* shows strong fluctuations in numbers. The strategy of “fight and flight”, in the conditions of constantly changing near-water habitats, entails a high migration activity of *Carpelimus*, but, unlike many other species, *Carpelimus* shows an increased migration activity of females. This can be explained by the retention of sperm in their spermathecas, which allows them to lay eggs for long periods after mating and very far from their own micropopulation, in the complete absence of males [Gildenkov, 2000, 2001]. It was noted that *Carpelimus* can mate already in the teneral state, which extends the period for a possible migration. This characteristic of the genus shows that as typical *r*-strategists with a propensity for migration its representatives cannot be favourable models for classical zoogeographical studies that prefer low dispersers. However, the tendency for dispersal from the Ethiopian zoogeographical region into the Mediterranean Palaearctic can be traced even for this genus.

## Material and methods

The present study is a result of the analysis of the vast material from private and museum collections and the evaluation of the data collected over many years of study. The study used standard methods of insect taxonomy. The preparations of genitalia were treated with 10% KOH and fixed in Euparal. Labels are given in the original transcription.

The depositories of the material are abbreviated as follows:

cASh – private collection of Alexey Shavrin (Daugavpils, Latvia);

cMG – private collection of Mikhail Gildenkov (Smolensk, Russia);

cMSch – private collection of Michael Schülke (Berlin, Germany);

cVA – private collection of Volker Assing (Hanover, Germany);

cVG – private collection of Volker Golkovsky (Dresden, Germany);

ZIN – Zoological Institute, Russian Academy of Science (St Petersburg, Russia).

## Results and discussion

In this study, the natural boundaries of the Palaearctic and the Ethiopian (Afrotropical) regions are generally defined as commonly accepted in the zoogeographical studies. The Palaearctic comprises all Europe, North Asia and North Africa. In Africa, I use the southern border of Sahara as the boundary between the Palaearctic and the Ethiopian region, and, in addition to the Saharan oases (for instance, Ahaggar), include in the Palaearctic also Western Sahara, the Canary Islands and the Cabo Verde islands [Gildenkov, 2015]. I consider the entire Arabian Peninsula, except Yemen (Ethiopian region), to be part of the Palaearctic, because the natural boundary between the regions runs along the Yemen mountains, which only slightly extend to the territory of Oman, the country that is usually placed in the Palaearctic. Madagascar, Seychelles, Comoros and Mascarene Islands are also included into the Ethiopian region. I am not inclined to regard the Ancient Mediterranean [Kryzhanovskii, 2002] or any other interpretation of the Mediterranean as a separate zoogeographical area, but there is no doubt that this territory is biogeographically peculiar.

Only a few species of *Carpelimus* were able to spread both into the Ethiopian region and the Palaearctic. Only one species, *C. atomus* (Saulcy, 1864), is very widely distributed [Gildenkov, 2015] and occur in the Ethiopian and Oriental Regions; as well as in the Palaearctic, but with a much narrower distribution there: Mediterranean region (reaching into Southern Europe and even Southern Germany), Palaearctic part of China, Japan and the Korean Peninsula. *Carpelimus atomus* is also distributed in the Australian region, but how widely is not known. *Carpelimus atomus* is likely to be an autochthonous species of the Oriental region.

Two species, widely distributed in the Palaearctic, have undoubtedly spread into the Ethiopian region [Gildenkov, 2015]: *C. bilineatus* Stephens, 1834 (which is known from tropical Africa only in Yemen and South African Republic, where it has apparently spread by unintentional introduction) and *C. pusillus* (Gravenhorst, 1802) (which is known from tropical Africa only in Nigeria, where it has apparently spread by unintentional introduction).

The situation with *C. simplicicollis* (Wollaston, 1857) is unclear, and the direction of its dispersal is not obvious. In the Ethiopian region [Gildenkov, 2015] it is known from the western (Senegal, Gambia, Ghana), southern (Namibia, South African Republic) and eastern (Madagascar, Socotra islands, Kenya) areas. In Palaearctic it is widespread in the Mediterranean region: North Africa including the Canary Islands, islands of Cabo Verde and Madeira; Southern Europe (Italy, Spain) [Gildenkov, 2015] reaching up to the Odessa Region of the Ukraine [Gildenkov, Gontarenko, 2010]; Middle East (Saudi Arabia, Israel, Jordan, Syria, Iraq, Iran); Middle Asia (Kazakhstan, Turkmenistan, Uzbekistan, Tajikistan) [Gildenkov, 2015]. I have recently confirmed the data on distribution of this species in Oman: 1♂, 4 ex. (cMSch; 1 ex. – cMG), “OMAN: Dhofar Prov. Wadi Nashib, 50 m 25-28.VII.2007 leg. St. Jakl”, “*Carpelimus* spec. 2 det. M. Schülke 2017”, and Irkutsk Region of Russia: 1♂ (ZIN), “Russia, Irkutsk Prov., Malta station, 17.06.1907, D. Smirnov”; 1♀ (cASh), “Russia, Irkutsk Prov., Alarsk Region, vicinity of the Alar’ village, 26-28.06.1997, A. Shavrin”, this specimen was previously identified [Gildenkov, Shavrin, 2001] as *C. halophilus* (Kiesenwetter, 1844).

*Carpelimus niloticus* (Erichson, 1840) is apparently Mediterranean in origin. It was described from Egypt and is also known [Gildenkov, 2015] from Kenya, Sudan, Ethiopia, Yemen, Saudi Arabia and Pakistan, and there is evidence of its presence in Orissa (India).

A significantly greater number of species has spread from the Ethiopian region into the Palaearctic.

*Carpelimus niloticus* (Erichson, 1840) is apparently Mediterranean in origin *memnonius* (Erichson, 1840) is very widely distributed in the Ethiopian region and was described [Gildenkov, 2015] from the western (Gambia, Nigeria), southern (Botswana, Zambia, Zimbabwe, Namibia, Swaziland, South African Republic) and eastern parts (Madagascar, Ethiopia, Sudan) of this region. In the Mediterranean, this species is distributed only within North Africa, in Egypt and Tunisia.

*Carpelimus niloticus* (Erichson, 1840) is apparently Mediterranean in origin *insularis* (Kraatz, 1858) is highly widespread in the Ethiopian region, where it is known from 25 areas [Gildenkov, 2015]. In the Palaearctic, this species is widely distributed in the Mediterranean region (in a wide sense), extending into North Africa, Middle East, Southern Europe, Turkey, Caucasus and Central Asia [Gildenkov, 2015]. It has apparently dispersed from the African continent along all possible dispersal routes: across Sinai and the Straits of Gibraltar and Bab el Mandeb.

Recently, two widespread African species were shown to have dispersed from the African continent to Oman: *C. dieganus* (Fauvel, 1904): 1♀ (cMSch), “OMAN: Dhofar Prov.

Wadi Nashib, 50 m 25-28.VII.2007 leg. St. Jakl"; *C. kunenensis* Gildenkova, 2013: 4♂, 46 ex. (cMSch; 1♂, 6 ex. – cMG), "OMAN: Dhofar Prov. Wadi Nashib, 50 m 25-28.VII.2007 leg. St. Jakl".

*Carpelimus dieganus* is known in the Ethiopian region from 29 areas [Gildenkova, 2015], including Kenya, Sudan and Ethiopia. This species has apparently been spreading into the Palaearctic along a natural route, across the Strait of Bab el Mandeb.

*Carpelimus kunenensis* is now only known from the southern regions of Africa: Angola, Botswana, Zimbabwe, Namibia, and the South African Republic. It cannot be ruled out that this species has reached Oman by unintentional introduction.

Recent findings of two African species in Southern Europe (Fig. 1), in Portugal and Spain, are of special interest.

#### *Carpelimus (Trogophloeus) cederholmi* Gildenkova, 2013

**Material.** 5♂, 1♀ (cMSch; 1♂ – cMG), "Portugal mer. reg. Faro Vilamoura /1/-prosev 08.03.2014 Mantičlgt. močál-rákosina", "37°04'00"N 08°05'53" W vyšlapání z detritu"; 1 ex. (cVG), "P - Algarve, Sotavento Reserva Natural de Sapal de Castro Marim, Quinta do Sobral, env. Castro Marim (H=0 m) (Lichtfalle) N 37°12'33.6" / W 007°28'49.2" M-E.IV.2017 leg. M. Langer".

**Distribution.** *Carpelimus cederholmi* is known [Gildenkova, 2015] primarily from West Africa: Senegal, Gambia, and Ghana, but one specimen was collected in Madagascar (Fig. 1). It cannot be ruled out that this species has spread to Madagascar by natural dispersal, but there is also the possibility of unintentional introduction. This species has apparently dispersed to Portugal across the Strait of Gibraltar in the very recent times.

#### *Carpelimus (Trogophloeus) gedyei* (Cameron, 1950)

**Material.** 1♂, 1♀ (cVA), "SPAIN – Murcia Jumilla, Publiacion VIII-IX.2014 leg. Lencina".

**Distribution.** *Carpelimus gedyei* is very widely distributed throughout tropical Africa [Gildenkova, 2015], from the west (Côte d'Ivoire, Ghana) through the central (Nigeria, Kongo-Kinshasa) and southern regions (Angola, South African Republic), to the east (Madagascar, Uganda, Kenya) (Fig. 1). The males are little known, which is an indication of the cryptic lifestyle and the predominant migration of females. There is the possibility of commensalism with termites. This species has apparently dispersed into Spain only very recently, across the Strait of Gibraltar.

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Fig. 1. Distribution of *Carpelimus cederholmi* and *C. gedyei*.  
Рис. 1. Современное представление о распространении *Carpelimus cederholmi* и *C. gedyei*.

### References

- Gildenkova M.Yu. 2000. Non-random migration patterns in *Carpelimus* (Coleoptera: Staphylinidae). In: Ekologo-faunisticheskie issledovaniya v Tsentral'nom Chernozem'e i sopredel'nykh territoriyakh. Materialy vtoroy regional'noy konferentsii [Ecological and faunistic studies in the Central Chernozemye and adjacent territories. Materials of the second regional conference (Lipetsk, Russia, 26–28 October 2000)]. Lipetsk: Lipetsk State Pedagogical University: 52–54 (in Russian).
- Gildenkova M.Yu. 2001. Fauna *Carpelimus* Palearktiki (Coleoptera: Staphylinidae). Problemy vida i vidobrazovaniya. Chast' 1. Istoriya izucheniya. Morfo-ekologicheskie osobennosti. Sistema roda. Opisaniya vidov [Fauna of the *Carpelimus* of the Palaearctic (Coleoptera: Staphylinidae). Problems of species and speciation. Part 1. History of the study. Morphological and ecological features. System of the genus. Descriptions of species]. Smolensk: Smolensk State Pedagogical University. 304 p. (in Russian).
- Gildenkova M.Yu. 2015. Fauna *Carpelimus* Starogo Sveta (Coleoptera: Staphylinidae) [Fauna of *Carpelimus* of the Old World (Coleoptera: Staphylinidae)]. Smolensk: Smolensk State University. 414 p. (in Russian).
- Gildenkova M.Yu., Gontarenko A.V. 2010. A new species and additional records of *Carpelimus* Leach, 1819 from Ukraine (Coleoptera: Staphylinidae: Oxytelinae). *Caucasian Entomological Bulletin*. 6(1): 45–49 (in Russian). DOI: 10.23885/1814-3326-2010-6-1-45-49
- Gildenkova M.Yu., Shavrin A.V. 2001. Materials on the fauna of *Thinodromus* Kraatz and *Carpelimus* Leach (Coleoptera: Staphylinidae: Oxytelinae) of Eastern Siberia. In: Bioraznoobrazie baykalskogo regiona. Trudy Biologo-pochvennogo fakul'teta Irkutskogo gosudarstvennogo universiteta. Vyp. 5 [Biodiversity of the Baikal region. Proceedings of the Biology and Soil Department of the Irkutsk State University. Vol. 5]. Irkutsk: Irkutsk University: 70–77 (in Russian).
- Kryzhanovskiy O.L. 2002. Sostav i rasprostraneniye entomofaun zemnogo shara [Composition and distribution of entomofaunas of Earth]. Moscow: KMK Scientific Press Ltd. 237 p. (in Russian).

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