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RESEARCH ARTICLE

# Myriapoda (Diplopoda, Chilopoda) of the Southern Cultures Park (Krasnodar Province, Southern Russia): unappreciated biodiversity

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## Abstract

The biodiversity of botanical gardens and arboreta is typically assessed by vegetation, birds, and insects such as beetles and butterflies. At the same time, most of the invertebrate animals live in litter and soil, while remaining hidden and poorly studied. Here we present the results of studies of two classes of myriapods in Southern Cultures Park, Adler, Krasnodar Province, Russia. During 2021, the diversity and abundance of myriapods were assessed by quantitative data obtained using pitfall traps. From these traps, 20 species of diplopods and 14 species of chilopods were recorded. Alpha diversity of myriapods was significantly higher ($p=0.043$) in the spring-summer season in comparison to summer-fall. Beta diversity also significantly differed ($p \leq 0.031$) between these seasons. The abundance of *Brachyiulus lusitanus* ($p=0.018$), *Polydesmus mediterraneus* ($p=0.047$), *Julus colchicus* ($p=0.020$), and *Cylindroiulus placidus* ($p=0.047$) was significantly higher in the spring season, while in the summer season, the abundance of Anthroleucosomatidae Gen. sp.1 ($p=0.047$) was significantly dominant. Also, from 2018 to 2024, using hand collection from litter, 2 additional species of diplopods and 7 species of chilopods were recorded. Species of myriapods that were not previously recorded in Russia and introduced species were identified and illustrated.

**Keywords**
Arboretum, centipedes, iconography, millipedes, new records, statistical ecology

## Introduction

It can be argued that botanical gardens and arboreta play a significant role in the sustainable development and conservation of plant biodiversity (Blackmore 2017, Ren and Blackmore 2023, Neves 2024). Furthermore, botanical gardens, which are home to a vast array of plants, play a pivotal role in the conservation of insects and spiders, both endemic to the region and invasive (Arteaga et al. 2020, Maynard et al. 2023). However, data on soil-dwelling arthropods remain deficient.

The Southern Cultures Park ("Yuzhnye Cultury") is one of the oldest arboreta on the Black Sea coast and Russian part of the Caucasus. The park is a part of the Caucasian State Nature Reserve and is situated at the mouth of the Mzymta River, in the vicinity of Adler (43.417493°N; 39.935222°E), encompassing an area of 19.9 hectares. The plant collection is represented by 665 species, varieties, and garden forms (Soltani 2014, Shiryayeva 2019). To date, studies of invertebrates inhabiting the territory of the arboretum have been limited to data on spiders. A total of 63 species of spiders have been recorded, with two species identified as invasive (Ponomarev et al. 2022).

Myriapods are soil invertebrates, comprising four classes. This study focuses on the two most prominent and species-rich classes: the centipedes, or Chilopoda, and the millipedes, or Diplopoda. Both groups of myriapods exhibit a high percentage of endemism in mountain ranges, including the Caucasus. Chilopods are predatory and may consume insects, nematodes, annelids, molluscs, and others, thereby influencing the population dynamics of their prey. In contrast, diplopods primarily consume dead plant matter, occasionally shifting to feeding on living plants and becoming pests (Minelli 2011, 2014, Minelli and Golovatch 2024).

The present paper presents the results of studies of chilopods and diplopods in Southern Cultures Park, including their species composition and abundance dynamics.

## Materials and methods

### Sampling methods

The collection of material was carried out using pitfall traps (eg Siewers et al. 2014) in 2021 and hand sampling under bark, stones, and litter in 2018 and 2021–2023. At the study site were placed 15 traps (500 ml plastic glasses with 4% formaldehyde solution). Traps were installed on March 25 and checked on April 06, April 28, May 25, June 17, July 14, July 29, August 20, and September 18. Selected myriapods were fixed in 70% alcohol for further identification.

### Imaging

The habitus photographs were taken with a Zeiss StereoDiscovery V.20 microscope using focus-stacking technology; the final image was compiled from multiple layers using ZEN Software. The photographs of chilopods were taken with a Levenhuk D800T digital camera; the final image was compiled from multiple layers using Helicon Focus 8.2.2 Software.

Scanning electron micrographs of the gonopods and other taxonomically significant characters were taken with a Zeiss CrossBeam 340 scanning electron microscope (SEM) (Rostov-on-Don State Technical University, Rostov-on-Don, Russia). For some SEM micrographs, the objects were placed on an SEM-stub and air dried for two days in a glass filled with Silica gel. After examination, material was removed from stubs and returned to alcohol.

All images were processed using Adobe Photoshop 2020 software.

### Statistical analysis

The programming language R v4.4.0 (R Foundation for Statistical Computing, Vienna, Austria) was used for statistical analyses. The "vegan" package (version 2.6-6.1) was used for the calculation of alpha and beta diversity indices (Dixon 2003). For the comparison of the alpha diversity of myriapods in Southern Cultures Park, we used the Shannon index (Shannon and Weaver 1964), the Simpson index (Simpson 1949), and the Pielou index (Pielou 1966). For the beta diversity analysis, we used the Bray–Curtis dissimilarity (Sorenson 1948) and Jaccard similarity (Jaccard 1908) indices. For statistical comparison, observation periods were grouped as follows: March 25–June 16 (spring season), and June 17–September 18 (summer season). For the comparison of the alpha diversity indices and the abundance of studied myriapods, the Mann–Whitney test was used. PERMANOVA with the "adonis" function from the "vegan" package was used to determine differences in beta diversity distances (the number of permutations was set to 999). P-values were considered significant at $p<0.05$. Results were visualized with the "ggplot2" package (Wickham 2016).

## Results

### Species diversity

As a result of sampling using pitfall traps in the Southern Cultures Park, 20 species of diplopods and 14 species of chilopods were recorded (Suppl. material 1: Table).

Also, 9 millipede and 13 centipede species were collected by hand sampling under bark, stones, and litter. Some species have only been defined to the genus or family level due to the fact that only females have been found in the case of diplopods, or undescribed species in the case of chilopods.

Of all the myriapod species found, 7 have a cosmopolitan or subcosmopolitan distribution:

*Brachyiulus lusitanus* Verhoeff, 1898 (Fig. 1) – an ubiquitous anthropochoric species (Kime and Enghoff 2017, Vagalinski and Lazányi 2018). It is an invasive species in the Caucasus, previously recorded in Abkhazia and Georgia, and is formally new to Russia (Vagalinski and Golovatch 2021).

*Cylindroiulus truncorum* (Silvestri, 1896) (Fig. 2) – a subcosmopolitan species, probably of North African origin. Found in botanical gardens, greenhouses, parks and other synanthropic habitats (Kime and Enghoff 2017, Stoev et al. 2010). Invasive in the Caucasus, previously found in a greenhouse in Rostov-on-Don, Ciscaucasia (Evsyukov and Golovatch 2013).

*Nopoiulus kochii* (Gervais 1847) – a cosmopolitan species, probably of Caucasian origin (Kime and Enghoff 2017, Golovatch and Enghoff 1990).

*Oxidus gracilis* (C.L. Koch, 1847) (Fig. 3) – a species of East Asian origin, widely distributed in greenhouses and botanical gardens all over the world, where it probably spread with planting material (Stoev et al. 2010, Kime and Enghoff 2011, Evsyukov et al. 2016). It has been successfully naturalised on the Black Sea coast of the Caucasus and is also found in natural habitats.

*Lamyctes africanus* (Porat, 1871) (Fig. 6) – a cosmopolitan species known from Africa, Australia, Europe and anthropogenic habitats in Siberia (Nefediev et al. 2020). The first record for the Caucasus. The genus *Lamyctes* belongs to the family Henicopidae, which is mainly distributed in the southern hemisphere, but some of its representatives are anthropochore species and are extremely widespread (Minelli 2011).

*Lamyctes coeculus* (Brölemann, 1889) (Fig. 7) – a cosmopolitan, found in Europe, Australia, North and South America, Africa, the Middle East and Siberia (Nefediev et al. 2016, Gilgado et al. 2022). This is the first record in the Caucasus.

*Lithobius forficatus* (Linnaeus, 1758) – an anthropochore species of European origin that has been introduced to the Middle East, the eastern Palearctic, Australia, North and South America, and Africa (Nefediev et al. 2016). In the Caucasus, it is restricted mainly to steppe and anthropogenic habitats (Zuev 2016).

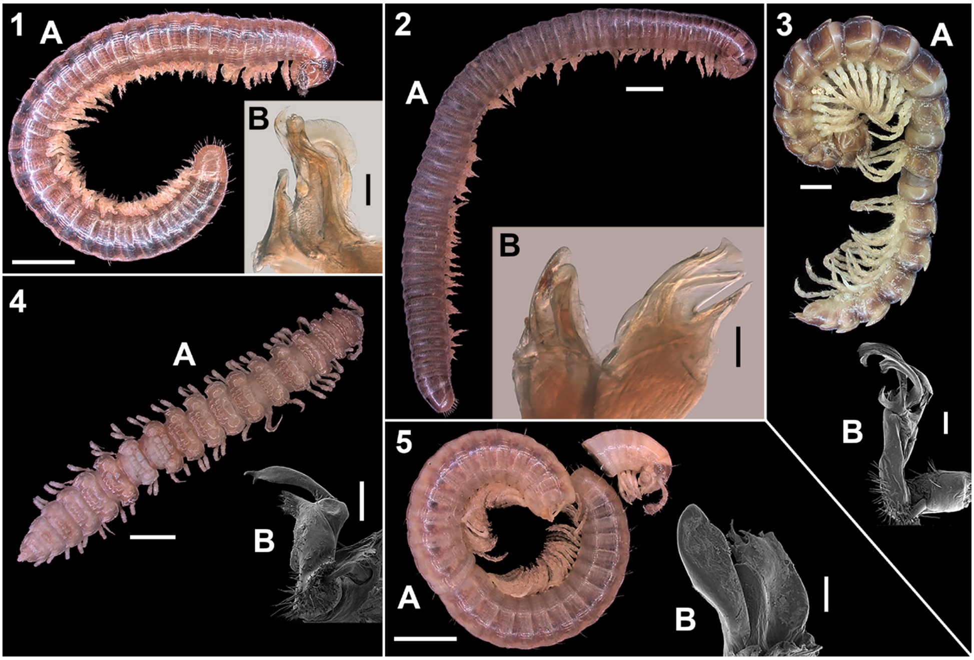
One species has a transpalaearctic chorotype:

*Pachymerium ferrugineum* (C.L. Koch, 1835), a eurybiont species widely distributed in the Caucasus (Dyachkov et al. 2022).

Five species have Mediterranean chorotypes:

*Lophoproctus coecus* Pocock, 1894 – distributed throughout Europe to Central Asia, widely presented in the Caucasus, including Krasnodar Province (Short 2015).

*Polydesmus mediterraneus* Daday, 1889 (Fig. 4) – Eastern Mediterranean species, probably introduced to the Caucasus. New record for Russia, previously recorded in Abkhazia (Kime and Enghoff 2011, Golovatch et al. 2016).




**Figures 1–5.** Habitus (**A**) and gonopods (**B**) of some millipedes, lateral views: **1** – *Brachyiulus lusitanus* Verhoeff, 1898, **2** – *Cylindroiulus truncorum* (Silvestri, 1896), **3** – *Oxidus gracilis* (C.L. Koch, 1847), **4** – *Polydesmus mediterraneus* Daday, 1889, **5** – *Omobrachyiulus hortensis* (Golovatch, 1981). Scale bars: 10 mm (**A**), 0.1 mm (**B**).

*Clinopodes escherichii* (Verhoeff, 1896) – Eastern Mediterranean species, known in the Caucasus from Stavropol Province, Dagestan and the Black Sea coast (Korobushkin et al. 2016, Dyachkov et al. 2022).

*Diphyonyx conjungens* (Verhoeff, 1898) – Eastern Mediterranean species, widely distributed in the Caucasus (Dyachkov et al. 2022).

*Lithobius peregrinus* Latzel, 1880 – Eastern Mediterranean species, widespread in the Caucasus (Zuev 2016).

Seven species are mainly distributed in Europe:

*Clinopodes flavidus* C.L. Koch, 1847 (Fig. 8) – distributed mainly in central and eastern Europe, apparently an anthropochore species in the Caucasus (Bonato et al. 2011).

*Geophilus carpophagus* Leach, 1816 (Fig. 9) – European species, probably introduced. A new species for the Caucasus, from the territory of Russia there was previously a dubious finding in the Ulyanovsk Region (Volkova 2016).

*Geophilus* cf. *flavus* De Geer, 1778 – a European species introduced to North America and Siberia (Nefediev et al. 2017). In the Caucasus, it is known from the Krasnodar and Stavropol Provinces (Zuev 2016), probably also an introduced species.

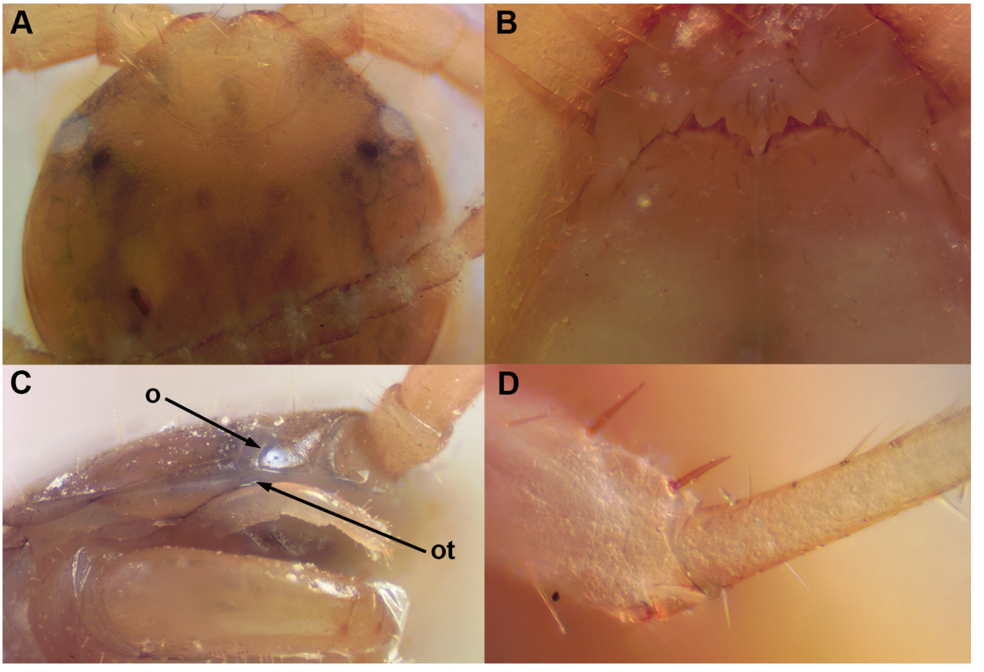



**Figure 6.** *Lamyctes africanus* (Porat, 1871): head, dorsal view (**A**), anterior part of forcipular segment, ventral view (**B**), head, lateral view (**C**), tibia 12, distal spinose projection (**D**). Taken not to scale. Abbreviations: o – ocellus; ot – organ of Tömösvary.

*Henia illyrica* Meinert, 1870 – a southeastern European species, known in the Caucasus from Krasnodar and Stavropol Provinces (Zuev 2016).

*Harpolithobius* cf. *anodus* Latzel, 1880 (Fig. 10) – a south-eastern European species early recorded only from Krasnaya Polyana, Krasnodar Province (Lignau 1903), probably an introduced species. The specimens examined differ from the description of this species by the presence of a small armed dorsodistal swelling on tibia 15 of the male.

*Lithobius mutabilis* L. Koch, 1862 – European species, distributed in the Caucasus (Korobushkin et al. 2016).

*Lithobius sseliwanoffi* Garbowski, 1897 – probably south-eastern European species, the exact distribution is unknown due to confusion in the description. Widespread in the Caucasus (Zalesskaja 1978).

Another species, *Clinopodes* cf. *latisternus* (Attems, 1947) (Fig. 11), was previously known only from two specimens from southern Anatolia (Bonato et al. 2011), and its distribution and biology are virtually unknown. This is the first record of this species in the Caucasus and Russia.

The remaining species are endemic and subendemic to the Caucasus. Of these, only one species is recorded for the first time in Russia:


**Figure 7.** *Lamyctes coeculus* (Brölemann, 1889): head, dorsal view (**A**), anterior part of forcipular segment, ventral view (**B**), head, lateral view (**C**), tibia 12, distal spinose projection (**D**). Taken not to scale. Abbreviation: ot – organ of Tömösvary.

*Omobrachyiulus hortensis* (Golovatch, 1981) (Fig. 5) – endemic to the Colchidan part of the Caucasus, previously recorded in Abkhazia (Vagalinski and Golovatch 2021). The most northeastern locality for the species and new record for Russia.

Two undescribed chilopod species are probably endemic to the Caucasus:

*Harpolithobius* sp. was represented by a single female. Based on the combination of the following characters: 2+2 denticles on the forcipular coxosternite, presence of spurs on the first pair of walking legs, flat and broad tarsungulum of the forcipules, simple claws of the female gonopods (Fig. 12), we cannot assign it to the known representatives of the genus and more material is needed to describe the new species.

*Lithobius* sp. is close to *L. curtipes* C.L. Koch, 1847, but there are some differences: a smaller dorsodistal projection on the 15th tibia of males and the presence of an additional claw on the 15th pair of legs (Fig. 13). Further studies are needed to clarify the taxonomic status of this species.

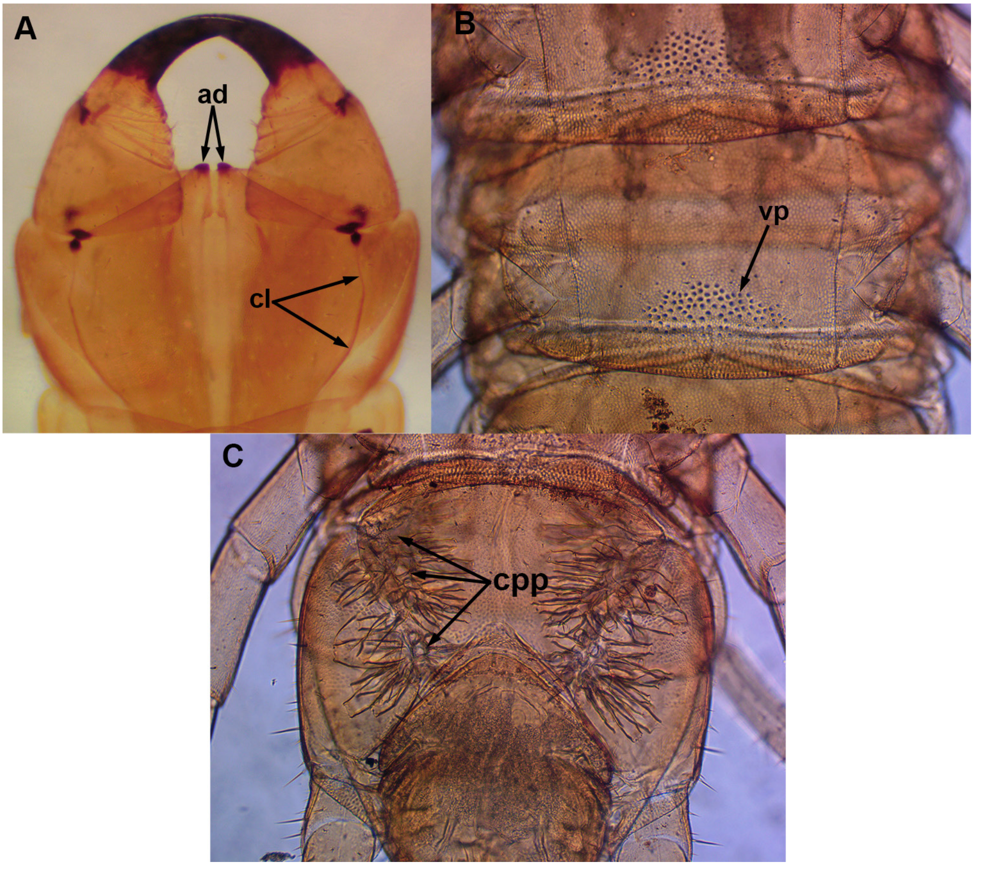



**Figure 8.** *Clinopodes flavidus* C.L. Koch, 1847: forcipular segment (**A**), metasternites of the most posterior leg-bearing segment (**B**), ultimate leg-bearing segment (**C**), ventral views. Taken not to scale. Abbreviations: ad – anterior denticles, cl – chitin-lines, cpp – coxopleural pit, vp – ventral pore field.

## Diversity and abundance of myriapods in 2021

There were 34 species of myriapods according to the data obtained using pitfall traps between March 25, 2021, and September 18, 2021 (Suppl. material 1: Table). Among dominant species, there were *Brachydesmus kalischewskyi*, *Harpolithobius* cf. *anodus*, *Brachyiulus lusitanus*, *Lophoproctus coecus*, *Lithobius striatus monosulcatus*, *Polydesmus mediterraneus*, *Trachysphaera radiosa*, *Clinopodes escherichii* and others (Fig. 14).

Alpha diversity values, Shannon and Simpson index, in particular, were significantly lower in the summer season (p=0.043). However, there were no significant differences in Pielou indices, which indicates that the evenness of the Myriapoda species in the studied area is not affected by seasonal changes (Fig. 15).

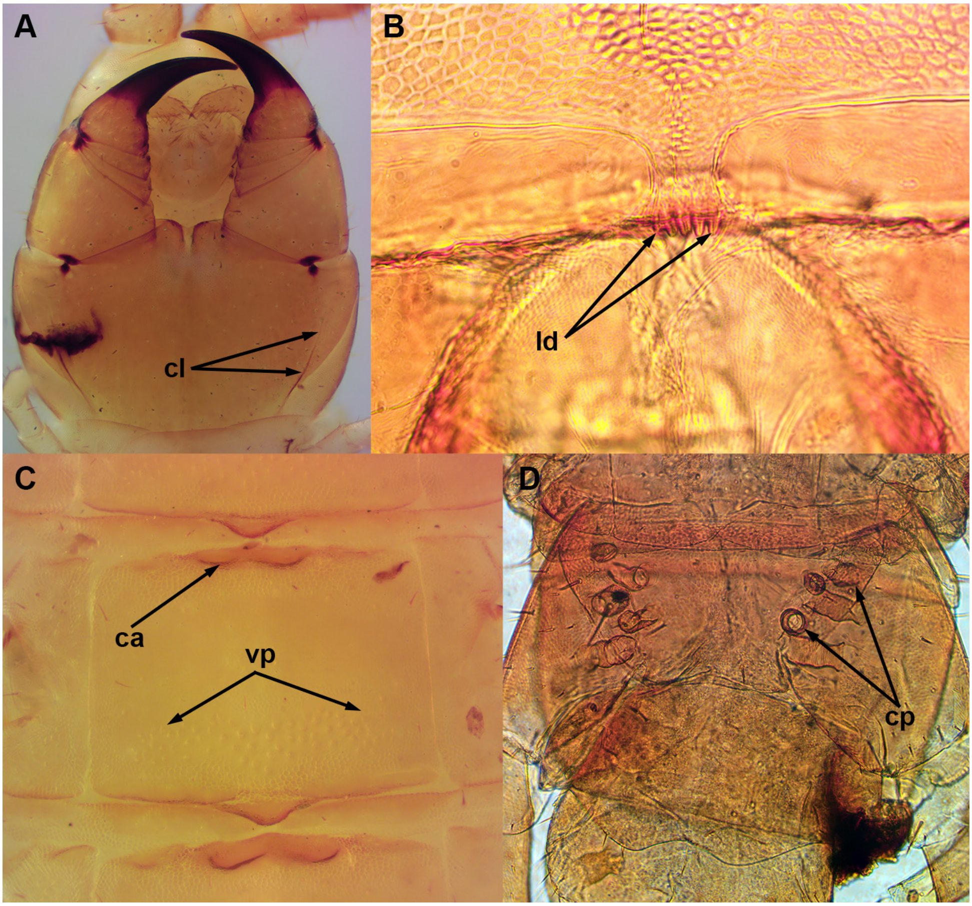



**Figure 9.** *Geophilus carpophagus* Leach, 1816: forcipular segment (**A**), labrum (**B**), metasternite of 5th leg-bearing segment (**C**), ultimate leg-bearing segment (**D**), ventral views. Taken not to scale. Abbreviations: ca – carpophagus pit, cl – chitin-lines, cp – coxal pores, ld – labral denticles, vp – ventral pore field.

Beta diversity of studied myriapods also significantly differed between spring and summer seasons ($p \leq 0.031$). Principal component analysis plots (Fig. 16) show that the observations grouped as "spring" and "summer" seasons are distant from each other, which on par with the results of PERMANOVA justifies the grouping of periods of observations and indicates that the beta diversity of studied myriapods changes with the onset of fall.

The abundance of *Brachyiulus lusitanus* ($p=0.018$), *Polydesmus mediterraneus* ($p=0.047$), *Julus colchicus* ($p=0.020$), and *Cylindroiulus placidus* ($p=0.047$) was significantly higher in the spring season, while in the summer season, the abundance of Anthroleucosomatidae Gen. sp.1 ($p=0.047$) was significantly dominant (Fig. 17).

Additionally, the relative abundance of Diplopoda and Chilopoda in the studied area was investigated and their ratio was compared. As a result, there were significant differences in the Chilopoda to Diplopoda abundance ratio (p=0.043) accompanied by an increase in the abundance of chilopods and a decrease in the abundance of diplopods in the summer season (Fig. 18).

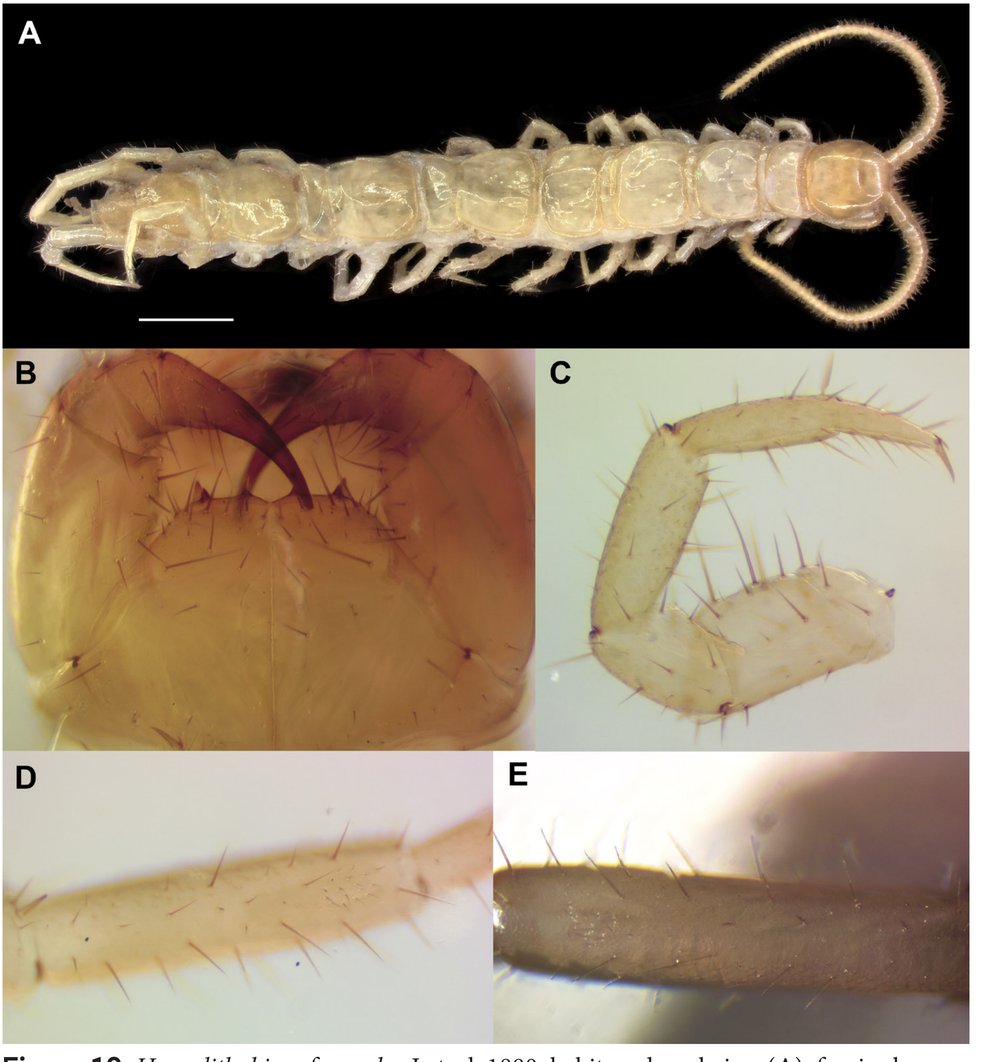



**Figure 10.** *Harpolithobius* cf. *anodus* Latzel, 1880: habitus, dorsal view (**A**), forcipular segment, ventral view (**B**), leg 1 (**C**), tibia of leg 14 (**D**), tibia of leg 15 (**E**), dorsal views. Taken not to scale or 10 mm (**A**).

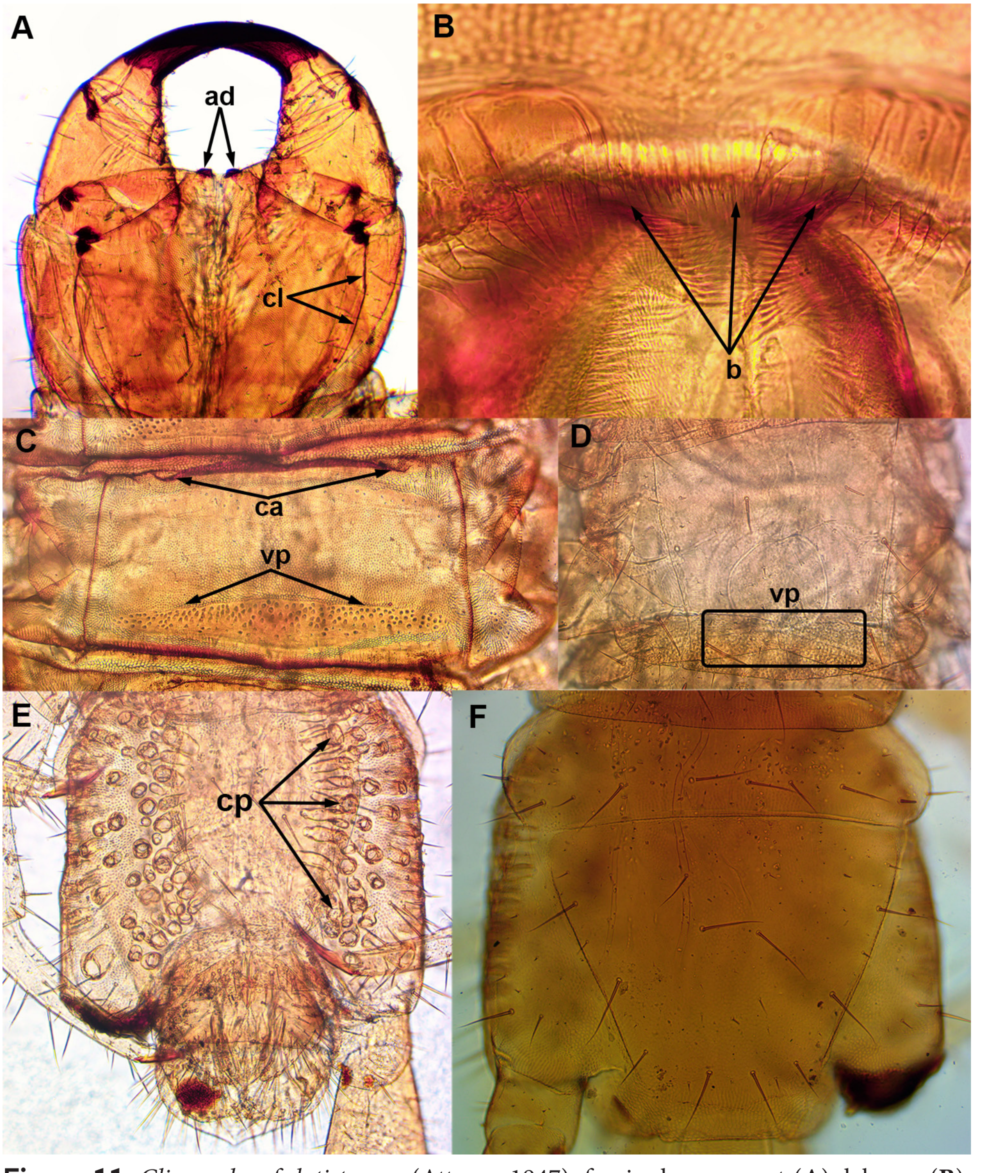



**Figure 11.** *Clinopodes* cf. *latisternus* (Attems, 1947): forcipular segment (**A**), labrum (**B**), metasternite of 15th leg-bearing segment (**C**), metasternite of 67th leg-bearing segment (**D**) ventral views, ultimate leg-bearing segment, ventral (**E**) and dorsal (**F**) views. Taken not to scale. Abbreviations: ad – anterior denticles, b – bristles, ca – carpophagus pit, cl – chitin-lines, cp – coxal pores, vp – ventral pore field.

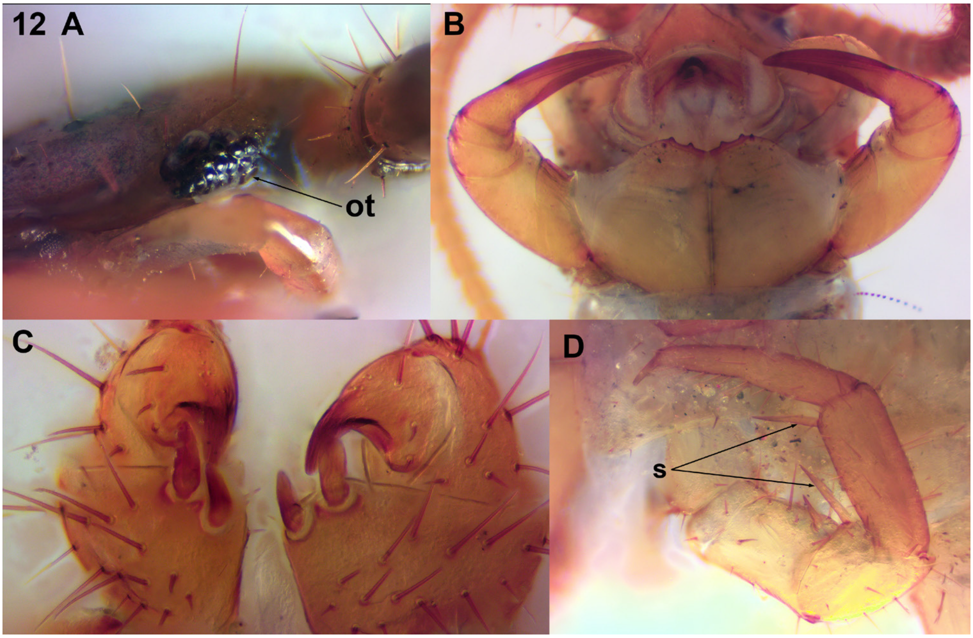



**Figure 12.** *Harpolithobius* sp.: head, lateral view (**A**), forcipular segment, ventral view (**B**), female gonopods, ventral view (**C**), leg 1 (**D**). Taken not to scale. Abbreviations: ot – organ of Tömösvary, s –spurs.


**Figure 13.** *Lithobius* sp.: habitus, dorsal view (**A**), tibia of 15 leg, inner view (**B**). Scale bars: 10 mm (**A**), 0.1 mm (**B**).

## Discussion

The diversity of myriapods in the Southern Cultures Park was low compared to natural ecosystems. For example, in a yew-boxwood grove in the same area, the class Diplopoda alone is represented by 26 species (Evsyukov et al. 2025).

Using pitfall traps, 34 species of myriapods were collected, including 20 Diplopoda and 14 Chilopoda species. Hand collecting allowed for the collection of an additional 2 millipede and 7 centipede species.

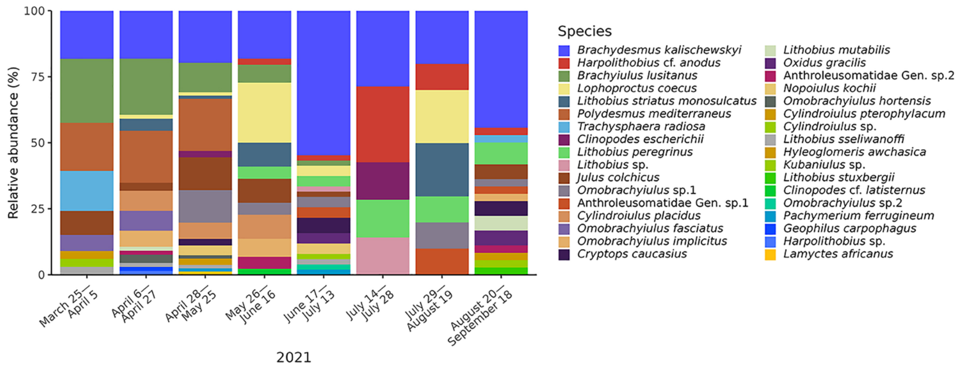



**Figure 14.** The relative abundance of recorded Myriapoda species in the Southern Cultures Park (Krasnodar Province, Southern Russia) according to the data obtained using pitfall traps between March 25, 2021, and September 18, 2021.

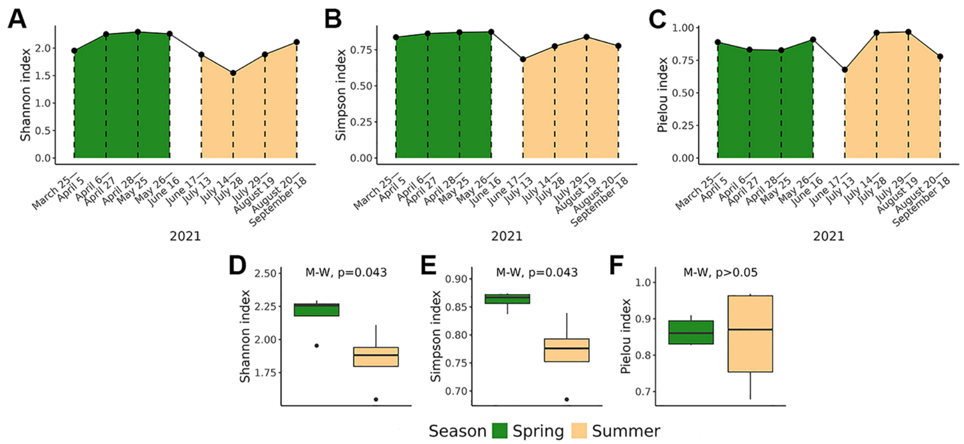



**Figure 15.** Alpha diversity of studied myriapods in the Southern Cultures Park (Krasnodar Province, Southern Russia) according to the data obtained using pitfall traps between March 25, 2021, and September 18, 2021: Shannon index (**A** and **D**), Simpson index (**B** and **E**), Pielou index (**C** and **F**). M-W=Mann–Whitney test.

Most of the diplopod species recorded are endemic or subendemic to the Caucasus, and only 6 of them have a wide distribution (Table 1). Of these, 4 species (*Brachyiulus lusitanus*, *Cylindroiulus truncorum*, *Oxidus gracilis*, and *Polydesmus mediterraneus*) can be considered invasive, as they are mainly distributed in anthropogenic habitats and were probably introduced.

The species we recorded as *Kubaniulus* sp., found in fall and represented by a single female, is probably *K. gracilis* Lohmander, 1936, included in the Red Data Book of the Republic of Adygea (Evsyukov 2022). The unidentified species of the family Anthroleucosomatidae may also be local endemics (Antić and Makarov 2016).

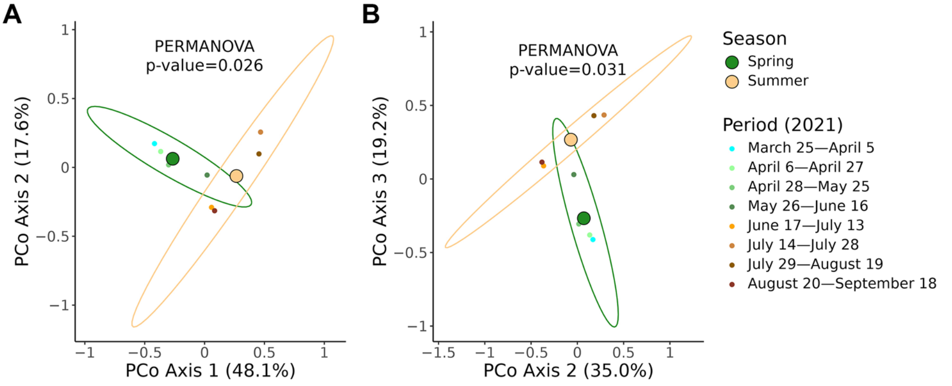



**Figure 16.** Beta diversity of studied myriapods in the Southern Cultures Park (Krasnodar Province, Southern Russia) according to the data obtained using pitfall traps between March 25, 2021, and September 18, 2021: Bray–Curtis index (**A**), Jaccard index (**B**). PCoA=principal component analysis.

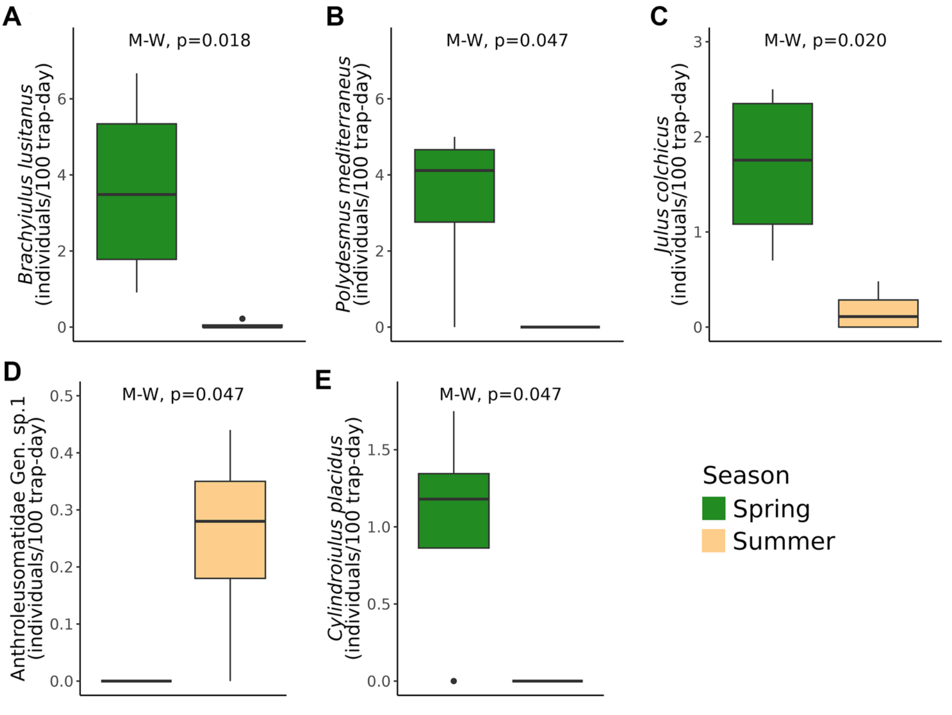



**Figure 17.** Myriapoda species, whose relative abundance significantly differs between spring and summer seasons: *Brachyiulus lusitanus* (**A**), *Polydesmus mediterraneus* (**B**), *Julus colchicus* (**C**), *Cylindroiulus placidus* (**D**), and Anthroleucosomatidae Gen. sp.1 (**E**). M-W=Mann–Whitney test.

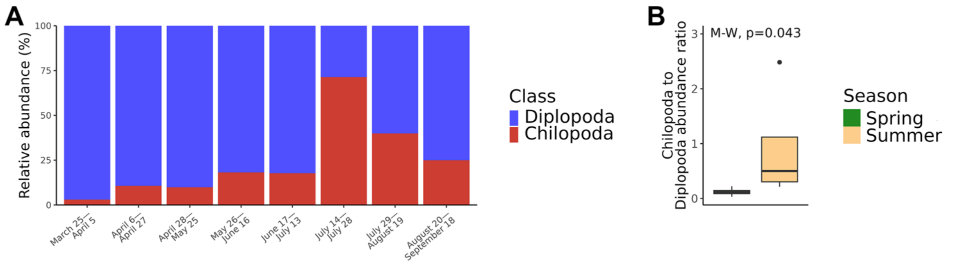



**Figure 18.** Relative abundance of Diplopoda and Chilopoda (**A**), and Chilopoda to Diplopoda abundance ratio (**B**) in the Southern Cultures Park (Krasnodar Province, Southern Russia) according to the data obtained using pitfall traps between March 25, 2021, and September 18, 2021. M-W= Mann–Whitney test.

The picture is different for the chilopods. Of the 21 species found, only 4 are endemic or subendemic to the Caucasus (Table 1). Two species, *Harpolithobius* sp. and *Lithobius* sp., should probably be added to this list.

The remaining 15 species have wider ranges, and at least 7 of them (*Clinopodes flavidus*, *Clinopodes* cf. *latisternus*, *Geophilus carpophagus*, *Lamyctes africanus*, *L. coeculus*, *Harpolithobius* cf. *anodus*, *Lithobius forficatus*) can be classified as anthropochores.

**Table 1.** Chorotypes and sampling techniques of myriapods in the Southern Cultures Park

| Species/subspecies | Chorotype | Sampling techniques | |
|---|---|---|---|
| | | Pitfall traps | Hand sampling |
| Class Diplopoda | | | |
| Order Polyxenida | | | |
| Family Lophoproctidae | | | |
| *Lophoproctus coecus* Pocock, 1894 | M | + | + |
| Order Glomerida | | | |
| Family Glomeridae | | | |
| *Hyleoglomeris awchasica* (Brandt, 1840) | CE | + | - |
| *Trachysphaera radiosa* (Lignau, 1911) | CE | + | - |
| Order Julida | | | |
| Family Blaniulidae | | | |
| *Nopoiulus kochii* (Gervais, 1847) | A | + | + |
| Family Julidae | | | |
| *Brachyiulus lusitanus* Verhoeff, 1898 | A | + | + |
| *Cylindroiulus placidus* (Lignau, 1903) | CE | + | + |
| *Cylindroiulus pterophylacum* Read, 1992 | CE | + | - |

| Species/subspecies | Chorotype | Sampling techniques | |
|---|---|---|---|
| | | Pitfall traps | Hand sampling |
| *Cylindroiulus truncorum* (Silvestri, 1896) | A | - | + |
| *Julus colchicus* Lohmander, 1936 | CE | + | - |
| *Kubaniulus* sp. | CE | + | - |
| *Omobrachyiulus fasciatus* Vagalinski, 2021 | CE | + | - |
| *Omobrachyiulus hortensis* (Golovatch, 1981) | CE | + | - |
| *Omobrachyiulus implicitus* (Lohmander, 1936) | CE | + | + |
| *Omobrachyiulus* sp. 1 | ? | + | - |
| *Omobrachyiulus* sp. 2 | ? | + | - |
| Order Polydesmida | | | |
| Family Polydesmidae | | | |
| *Brachydesmus furcatus* Lohmander, 1936 | CE | - | + |
| *Brachydesmus kalischewskyi* Lignau, 1915 | CSe | + | + |
| *Polydesmus mediterraneus* Daday, 1889 | M | + | - |
| Family Paradoxosomatidae | | | |
| *Oxidus gracilis* (C.L. Koch, 1847) | A | + | + |
| Order Chordeumatida | | | |
| Family Anthroleucosomatidae | | | |
| Gen. sp. 1 | ? | + | - |
| Gen. sp. 2 | ? | + | - |
| Class Chilopoda | | | |
| Order Geophilomorpha | | | |
| Family Geophilidae | | | |
| *Clinopodes escherichii* (Verhoeff, 1896) | M | + | + |
| *Clinopodes flavidus* C.L. Koch, 1847 | EM | - | + |
| *Clinopodes* cf. *latisternus* (Attems, 1947) | M? | + | - |
| *Diphyonyx conjungens* (Verhoeff, 1898) | M | - | + |
| *Geophilus carpophagus* Leach, 1816 | EM | + | - |
| *Geophilus* cf. *flavus* De Geer, 1778 | EM | - | + |
| *Pachymerium ferrugineum* (C.L. Koch, 1835) | TRa | + | + |
| *Henia illyrica* Meinert, 1870 | M | - | + |
| Order Scolopendromorpha | | | |
| Family Cryptopidae | | | |
| *Cryptops caucasius* Verhoeff, 1934 | CSe | + | + |
| Order Lithobiomorpha | | | |
| Family Henicopidae | | | |
| *Lamyctes africanus* (Porat, 1871) | A | + | - |
| *Lamyctes coeculus* (Brölemann, 1889) | A | - | + |

| Species/subspecies | Chorotype | Sampling techniques | |
|---|---|---|---|
| | | Pitfall traps | Hand sampling |
| | Family Lithobiidae | | |
| *Harpolithobius* cf. *anodus* Latzel, 1880 | EM | + | - |
| *Harpolithobius* sp. | ? | + | - |
| *Lithobius forficatus* (Linnaeus, 1758) | A | - | + |
| *Lithobius mutabilis* L. Koch, 1862 | EM | + | + |
| *Lithobius peregrinus* Latzel, 1880 | M | + | - |
| *Lithobius sectilis* (Zalesskaja, 1976) | CE | - | + |
| *Lithobius striatus monosulcatus* Folkmanová, 1958 | CE | + | - |
| *Lithobius stuxbergii* Sseliwanoff, 1881 | CSe | + | + |
| *Lithobius sseliwanoffi* Garbowski, 1897 | M? | + | + |
| *Lithobius* sp. | ? | + | - |

Chorotypes, from wider to increasingly narrower distributions: A — cosmopolitan/subcosmopolitan anthropochore; TPa — trans-Palaearctic; EM — Euro-Mediterranean; M — Mediterranean; CSe — subendemic to the Caucasus; CE — endemic to the Caucasus.

In 2021, the endemic species *Brachydesmus kalischewskyi* was among the dominant species during the quantitative observations. Only in the spring season, the second dominant diplopod species was the Eastern Mediterranean *Polydesmus mediterraneus* and was not encountered in the summer season. Among chilopods, *Harpolithobius* cf. *anodus* had the highest abundance in the summer season (Fig. 14, Suppl. material 1: Table). In general, when comparing the abundance of the two classes of myriapods by season, diplopods are represented by a greater number of species and abundance during the spring season, while chilopods are more abundant and diverse during the summer season.

In conclusion, research should be continued for possible identification of species and their population dynamics in order to determine the role of the Southern Cultures Park in the conservation of rare and endemic Caucasian species.

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## Supplementary material 1

**Table 1S. Results of sampling using pitfall traps in the Southern Cultures Park in 2021 (individuals per 100 traps per day)**

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