TRAVAUX DU MUSÉUM NATIONAL D'HISTOIRE NATURELLE «GRIGORE ANTIPA»
THE JOURNAL OF "GRIGORE ANTIPA" NATIONAL MUSEUM OF NATURAL HISTORY

Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa" 62 (1): 7–26 (2019)
doi: 10.3897/travaux.62.e38597

CATALOGUE

The Catalogue of Cyclopoid copepods (Crustacea: Copepoda: Cyclopidae) from Andriana Damian-Georgescu Collection ("Grigore Antipa" National Museum of Natural History, Bucharest, Romania)

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Received 21 December 2018 | Accepted 3 June 2019 | Published 31 July 2019

Citation: Gaponova L (2019) The Catalogue of Cyclopoid copepods (Crustacea: Copepoda: Cyclopidae) from Andriana Damian-Georgescu's Collection ("Grigore Antipa" National Museum of Natural History, Bucharest, Romania). Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa" 62(1): 7–26. https://doi.org/10.3897/travaux.62.e38597

Abstract

The catalogue of cyclopoid copepods collected by A. Damian-Georgescu in Romania and deposited in "Grigore Antipa" National Museum of Natural History is presented. It includes 39 species and subspecies belonging to family Cyclopidae (Crustacea: Copepoda). Type material of *Eucyclops graeteri intermedius* Damian, 1955 is designated. For each species the following information is presented: collecting sites, data on general distribution in Romania and worldwide, and types of inhabited biotopes. Species names are listed in systematical order with indication of current taxonomic status.

Keywords

species list, freshwater cyclopoids, slide collection, Europe.

Introduction

Cyclopidae is one of the largest crustacean families, including over 1010 species and subspecies (Papa and Hołyńska 2013). It's a widespread group of copepods which invade a variety of aquatic environments and microhabitats. Cyclopoids are generally associated with substrates and are common in littoral and benthic habi-

tats, although some species are planktonic and may contribute substantially to zooplankton biomass (Reid and Williamson 2009). Cyclopoid copepods are also very common in groundwater environment (Monchenko 2003, Kováč et al. 2014).

Despite a high ecological importance of the family, the biodiversity of cyclopoids has been still weakly studied in some areas. It is especially true of rarely encountered species inhabiting special biotopes, such as groundwaters (Pospisil 1994, Stoch et al. 2011, Brancelj et al. 2016).

The study of cyclopoids was started in Romania in the 2nd part of the 19th century. A series of papers that includes some data on cyclopoids from aquatic reservoirs of Transylvania were published in this period (Daday 1882, 1883, 1897, Gelei 1909). Zooplankton of various reservoirs in the lower Danube area was studied by H. Spandl (1926), who recorded 8 species of cyclopoids in the region.

The study of subterranean Romanian fauna was initiated by P. A. Chappuis. He carried out intensive investigation between 1924–1949 and collected extensive data about copepods from underground aquatic biotopes. On the base of these investigations, Chappuis described several new species of cyclopoids for Romanian fauna (Chappuis 1923, 1925, 1928).

Some years later, a few papers which contained data on the diversity of cyclopoids of Romania were published by several hydrobiologists (Botnariuc 1953, Enăceanu 1947, 1950, 1953, 1955, 1956, Por 1957, Şerban 1960, Damian and Botoşăneanu 1954).

Data dealing with groundwater cylopoids are presented in an article of Damian (1955), who described a new subspecies *Eucyclops graeteri intermedius* (Damian, 1955) (syn. *Eucyclops macrurus intermedius* Damian, 1955) from the springs in the river basin of Arieş. Petkovski (1972) published a list of copepods of the Banat caves.

The most complete data about cyclopoid fauna of Romania have been presented in A. Damian-Georgescu's monograph (1963). In this book, 53 species and subspecies of cyclopoids were recorded for the Romanian fauna, and two of them, *Acanthocyclops phreaticus* (Chappuis, 1928) and *Eucyclops graeteri intermedius*, were found only in Romania. The later species is endemic for the Apuseni and Banat Mountains.

Since the cited monograph of the Romanian cyclopoid fauna, only a few investigations on this group have being conducted (Iepure and Oarga 2011, Iepure et al. 2016). Some data on the biodiversity of cyclopoid copepods in Romania are contained in hydrobiological investigations which were developed in studies related to the assessment of aquatic habitats (Onciu and Radu 2006, Avram et al. 2009, Meleg et al. 2011, Battes and Măluţan 2012, Battes et al. 2014, Ciorca et al. 2017).

The main goal of the present paper is the revision of copepods of the family Cyclopidae in the Damian-Georgescu collection deposited in the "Grigore Antipa" National Museum of Natural History, Bucharest.

Material and Methods

In 2017, a visit to "Grigore Antipa" National Museum of Natural History (Bucharest) was conducted in the frame of Academic Exchange Programme between Romanian Academy of Science and the National Academy of Science of Ukraine.

The 545 microscopic slides including 330 slides (342 specimens) of cyclopoids were investigated using two microscopes Olympus CX21 and Olympus BX41, and a stereomicroscope Zeiss STEMI 2000.

All the collecting sites were checked; most of them were represented by Romanian fresh waters, except two localities: 1) Împutita (old name), now Vladychen, Bolhrad district, Odessa Region, Ukraine; 2) Srebarna, Nature Reserve in Bulgaria.

Taxonomical position of all species and genera of the family Cyclopidae is according to Dussart and Defaye (2006).

Abbreviations used in the paper: A1 – antennule, A2 – antenna, Fu – furcal branches (caudal rami), Mdb – mandible, Mt. – maxillule, Mxp – maxilliped, P1 – the first pair of thoracic legs, P2 – the second pair of thoracic legs, P3 – the third pair of thoracic legs, P4 – the fourth pair of thoracic legs, P5 – the fifth pair of thoracic legs, cimp.genit – genital segment, Recept.semin. – receptaculum seminis, R.S. – Romania and R. – Romania.

Results

The taxonomy of the cyclopoid species from A. Damian-Georgescu collection was revised. The collection of Copepoda collected by herself, mainly in Romania, consists of 545 microscopic slides; among them, 330 slides belong to 39 species and subspecies, 13 genera and 3 subfamilies of the family Cyclopidae. Within the 53 species and subspecies of Cyclopidae included in Damian-Georgescu's monograph (1963), the Museum Collection contains only 39 species and subspecies. Based on the revision of the collection, a catalogue of the Cyclopidae collected by A. Damian-Georgescu was elaborated.

The given catalogue includes 39 species and subspecies of Cyclopidae and indicates collecting sites, data on distribution in Romania and worldwide, and types of inhabited biotopes. Species names are listed in systematical order with indication of current taxonomic status.

Studied micro-slides have identification label and geographical label, but with no datum of sampling and we can suggest that material was collected between 1955–1975 (Damian 1955, Damian-Georgescu 1963, 1975).

Family Cyclopidae
Subfamily Eucyclopinae Kiefer
Genus *Ectocyclops* Brady, 1904

***Ectocyclops phaleratus phaleratus* (Koch, 1838)**

Examined material: Labelled as «*Ectocyclops phaleratus*»: 2 ♀♀ Porcu (Tulcea County), 1 ♀ Jijila (Tulcea County), 2 ♀♀ Delta Dunării (Tulcea County), 1 ♀ Împuțita (Împutita (old name), now Vladychen, Bolhrad district, Odessa Region, Ukraine), 1 ♀ Cernica (Ilfov County).

Distribution. In Romania: Cluj and Dobrogea (Damian-Georgescu 1960, 1963). World: Africa, America, Asia, Europe, Australia and Tasmania (Dussart and Defaye 2006).

Biotope: backwaters, littoral (benthic) zone of ponds and lakes (Gaviria 1998).

Genus *Eucyclops* Claus, 1893

***Eucyclops macruroides macruroides* (Lilljeborg, 1901)**

Examined material: Labelled as «*Eucyclops macruroides*»: 1 ♀ Frăsinet (Călăraşi County), 1 ♀ Lacul Buhui (Caraş-Severin County), 1 ♀ Turnu Mogurele (Teleorman County).

Distribution. Romania: Braşov, Dobrogea, Galați and Banat regions (Damian-Georgescu 1960, 1963), Cozla (Damian-Georgescu 1975). World: Europe, Africa, Asia (Dussart and Defaye 2006)

Biotope: backwaters, perennial ponds, ponds and littoral zone of lakes (Gaviria 1998), groundwaters (Iepure et al. 2016).

***Eucyclops macrurus* (G.O. Sars, 1863)**

Examined material: Labelled as «*Eucyclops macrurus*»: 2 ♀♀ Crapina-Jijila (Tulcea County).

Distribution. Romania: Bucureşti, Dobrogea, Galați regions (Damian-Georgescu 1960, 1963). World: America, Asia, Europe and North Africa (Dussart and Defaye 2006).

Biotope: rivers, perennial ponds, ponds, littoral zone of lakes (Gaviria 1998).

***Eucyclops graeteri intermedius* Damian, 1955**

Examined material: Labelled as «*Eucyclops macrurus intermedius*»: 8 ♀♀: 8 syntypes designated here and labelled as «*Eucyclops macrurus intermedia*, Apuseni» (The Apuseni Mountains), 2 ♀♀ without information about locality, 1 ♂ without information about locality;

Distribution. Romania: Cluj, Crişana and Banat regions (Damian-Georgescu 1963), Plavişeviţa (Damian-Georgescu 1975). World: only in Romania. It is considered endemic of the Apuseni and Banat Mountains (Damian-Georgescu 1963).

Biotope: groundwaters (Damian 1955, Damian-Georgescu 1963, Iepure et al. 2016).

Remarks. According to A. Damian-Georgescu the main diagnostic characters of *E. graeteri intermedius* are following: antennula 12-segmented without long dence hairs on IV segment; posterior lateral margin of fifth thoracic segment with dence long hairs; caudal rami 3.6–4.6 times as long as wide and lateral margin of caudal rami with short "serra" (longitudinal row of spinules) comprising 6–7 spinules; third endopodal segment of P4 (P4 enp 3) 1.94 times as long as wide; medial apical spines of P4 enp 3 are twice as long as lateral spine and longer than segment (Damian 1955). This species is similar to *E. graeteri graeteri.* The two species can be distinguished by 1) the length of antennula: antennula reaching the posterior margin of cephalothorax in *E. graeteri intermedius* and only the first thoracic segment in *E. graeteri graeteri*; 2) pediger V is laterally pilose in *E. graeteri intermedius,* while pediger V without hair laterally in *E. graeteri graeteri;* 3) length-width proportions of the caudal rami *(*3.6–4.6:1 in *E. graeteri intermedius* and 4–5:1 in *E. graeteri graeteri*); 4) in lateral surface ornamentation of caudal rami in female: a short "serra" is present in *E. graeteri intermedius*, while *E. graeteri graeteri* has naked caudal rami; 5) length-width proportions of P4 enp3 (1.94:1 in *E. graeteri intermedius* and 1.5:1 in *E. graeteri graeteri*).

Eucyclops graeteri graeteri (Chappuis, 1927)

Examined material: Labelled as «*Eucyclops graeteri*»: 1 ♀ Porţile de Fier (Mehedinţi County), 1 ♀ Isu. Mraconia (Mehedinţi County). Labelled as «*Eucyclops macrurus* var. *subterranaeus*»: 3 females without information about locality.

Distribution. Romania: Banat regions (Damian-Georgescu 1963), Mraconia (Damian-Georgescu 1975). World: Austria, Bulgaria, France, Switzerland, the Apeninnine Peninsula and the Balkan Peninsula (Pandourski 1999).

Biotope: a strictly stygobiontic species, inhabiting the karst groundwaters, hyporheic and phreatic biotopes and saturated alluvial quaternary sediments, hydrophyte mosses in the pine forest zone (Pandourski 1999) and groudwaters (Iepure et al. 2016).

Eucyclops serrulatus serrulatus (Fischer, 1851)

Examined material: Labelled as «*Eucyclops serrulatus*»: 1 ♀ Târgu Ocna (Bacău County), 1 ♀ without information about locality, 1 ♀ (cimp. genit) without information about locality, 1 ♀ Delta Dunării (Tulcea County), 1 ♀ Munţii Paring (Hunedoara County), 1 ♀ Jijila (Tulcea County). One slide labelled as «*Eucyclops serrulatus serrulatus*» contain no specimen. Labelled as «*Eucyclops serrulatus proxi-*

mus»: 1 ♀without information about locality, 1 ♀ Sreberna (Srebarna, Nature Reserve in Bulgaria).

Distribution. Romania: Dobrogea, Bucureşti, Crişana, Cluj, Hunedoara, Braşov, Ploieşti, Suceava, Oltenia, Argeş, Banat, Mureş, Maramureş, Bacău regions (Damian-Georgescu 1960, 1963), Tosovaţa (Damian-Georgescu 1975). World: Africa, Asia, Europe, North America, Australia, New Zealand and Vanuatu (Dussart and Defaye 2006).

Biotope: groundwaters, rivers, backwaters, all types of small water bodies, benthic zone of lakes (Gaviria 1998), groundwaters (Iepure et al. 2016).

Genus *Macrocyclops* Claus, 1893

Macrocyclops albidus (Jurine, 1820)

Examined material: Labelled as «*Macrocyclops albidus*»: 6 ♀♀ without information about locality, 1 ♂ without information about locality, 1 ♀ Isichioi (?), 1 ♀ Delta Dunării (Tulcea County), 1 ♀ Azuga (Prahova County), 1 ♀ Târgu-Ocna (Bacău County), 1 ♀ Bicaz (Neamţ County), 1 ♀ Nedeia (Dolj County), 1 ♀ Lacul Buhui (Caraş-Severin County); 1 ♀ (Mt., Mxp) without information about locality, 1 ♀ (Fu., P.4) without information about locality, 1 ♀ (A.1) without information about locality, 1 ♀ (Mdb) without information about locality, 1 ♀ R., 1 ♂ R.

Distribution. Romania: Cluj, Mureş, Braşov, Dobrogea, Banat, Crişana, Oltenia, Bacău, Ploieşti and Argeş regions (Damian-Georgescu 1960, 1963), Cozla, Vărad and Dubova (Damian-Georgescu 1975). World: Africa, America, Asia, Europe and Tasmania (Dussart and Defaye 2006).

Biotope: groundwaters, rivers, backwaters, perennial ponds, littoral zone of ponds and lakes (Gaviria 1998), groundwaters (Iepure et al. 2016).

Macrocyclops distinctus (Richard, 1887)

Labelled as «*Macrocyclops distinctus*».

Examined material: Labelled as «*Macrocyclops distinctus*»: 1 ♀ Delta Dunării (Tulcea County).

Distribution. Romania: Dobrogea, Bucureşti regions (Damian-Georgescu 1963). World: Asia and Europe (Dussart and Defaye 2006).

Biotope: small water bodies with macrophytes, littoral zone of ponds and lakes (Gaviria 1998).

***Macrocyclops fuscus* (Jurine, 1820)**

Examined material: Labelled as «*Macrocyclops fuscus*»: 8 ♀ without information about locality, 1 ♂ without information about locality, 1 ♀ Ighiel (Alba County), 1 ♀ Sreberna (Srebarna, Nature Reserve in Bulgaria).

Distribution. Romania: Cluj, Iaşi, Dobrogea, Bucureşti regions (Damian-Georgescu 1963), Ogăşele (Damian-Georgescu 1975). World: North Africa, America, Asia and Europe (Dussart and Defaye 2006).

Biotope: groundwaters, backwaters, perennial ponds, littoral and profundal zone of lakes (Gaviria 1998), groundwaters (Iepure et al. 2016).

Genus *Paracyclops* Claus, 1893

***Paracyclops affinis* (G.O. Sars, 1863)**

Examined material: Labelled as «*Paracyclops affinis*»: 3 ♀♀ Porcu (Tulcea County), 1 ♀ Împuțita (Împutita (old name), now Vladychen, Bolhrad district, Odessa Region, Ukraine), 1 ♀ Dulti (Tulcea County), 1 ♀ Crapina-Jijila (Tulcea County).

Distribution. Romania: Hunedoara and Mureş regions (Damian-Georgescu 1963). World: Africa, Asia and Europe (Dussart and Defaye 2006).

Biotope: groundwaters, benthic zone of small water bodies, littoral zone of ponds and lakes (Gaviria 1998).

***Paracyclops fimbriatus fimbriatus* (Fischer 1853)**

Examined material: Labelled as «*Paracyclops fimbriatus*»: 1 ♀Geapu-Potac (?), 1 ♀ Lacul Buhui (Caraş-Severin County), 2 ♀♀ V. Plavişeviței (Valea Plavişeviței, Mehedinți county), 1 ♀ without information about locality, 1 ♀ Cloşani (Mehedinți County), 1 ♀ Apuseni, Isu, 1 ♂ without information about locality, 1 ♀ R., 1 ♀ Prahova, aval Buşteni (Prahova County).

Distribution. Romania: Banat, Cluj, Crişana, Hunedoara, Argeş, Bucureşti, Iaşi, Ploeşti, Braşov, Oltenia, Dobrogea, Galați, Bacău regions and Dubana (Damian-Georgescu 1960, 1963), Camenița, Vărad, Mraconia, Liuborajdea, Tisovața and Ogăşele (Damian-Georgescu 1975). World: Europe and Asia (Dussart and Defaye 2006).

Biotope: groundwaters, brooks, benthic zone of perennial ponds, littoral and profundal zone of lakes (Gaviria 1998), groundwaters (Iepure et al. 2016).

***Paracyclops poppei* (Rehberg, 1880)**

Examined material: Labelled as «*Paracyclops poppei*»: 1 ♀ Împuțita (Împutita (old name), now Vladychen, Bolhrad district, Odessa Region, Ukraine), 3 ♀♀ Timişoara (Timiş County), 1 ♀ Râul Teleajen (Prahova County).

Distribution. Romania: Banat region (Damian-Georgescu 1963). World: Europe and America (Dussart and Defaye 2006).

Biotope: groundwater, brooks, rivers, benthic zone of perennial ponds, littoral and profundal zone of lakes (Gaviria 1998), groundwaters (Iepure et al. 2016).

Genus Tropocyclops Kiefer, 1927

***Tropocyclops prasinus prasinus* (Fischer, 1860)**

Labelled as «*Tropocyclops prasinus*».

Examined material: 3 ♀♀ Porțile de Fier, Mraconia (Mehedinți County), 3 ♀♀ without information about locality, 1 ♀ r. T. Severin (Mehedinți County), 1 ♀ Casimcea (Tulcea County).

Distribution. Romania: Cluj, Hunedoara, Dobrogea, Oltenia regions (Damian-Georgescu 1963). World: Africa, America, Asia and Europe (Dussart and Defaye 2006).

Biotope: perennial ponds, littoral and pelagic (scarce) zone of ponds (Gaviria 1998).

Subfamily Cyclopinae Kiefer
Genus Acanthocyclops Kiefer, 1927
Subgenus *Acanthocyclops* Kiefer, 1927

***Acanthocyclops phreaticus* (Chappuis, 1928)**

Labelled as «*Acanthocyclops freaticus*».

Examined material: 2 ♂♂ Babadag (Tulcea County).

Distribution. Romania: Dobrogea region (Damian-Georgescu 1963). World: Europe: Romania (Babadag, well) (Dussart and Defaye 2006).

Biotope: groundwaters (Damian-Georgescu 1963; Iepure et al. 2016).

***Acanthocyclops robustus* (G.O. Sars, 1863)**

Labelled as «*Acanthocyclops vernalis robustus*».

Examined material: 1 ♀ Porțile de Fier (Mehedinți County), 1 ♀ Porțile de Fier, km 46 Izvoarele (Mehedinți County and Caraș-Severin County), 1 ♀ Jijila (Tulcea County), 1 ♀ Giurgiu (Giurgiu County), 2 ♀♀ R., 1 ♂ R.

Distribution. Romania: Timișoara, Cluj, Mureș, Ploiești, Dobrogea, Suceava regions and Făgăraș, Andronache, Motrul, Rodnei (Damian-Georgescu 1963). World: North Africa, America, Asia, Australia and Europe (Dussart and Defaye 2006).

Biotope: groundwaters, rivers, backwaters, littoral of ponds, pelagic zone of lakes (Gaviria 1998), groundwaters (Iepure et al. 2016).

***Acanthocyclops vernalis* (Fischer, 1853)**

Labelled as «*Acanthocyclops vernalis*».

Examined material: 1 ♀ Peri (Mehedinți County), 3 ♀♀ Munții Paring, 1 ♀ (cimp. genit) Munții Paring (The Parâng Mountains), 1 ♀ Munții Apuseni, 1 ♀ Azuga (Prahova County), 11 ♀♀ without information about locality, 1 ♂ without information about locality, 1 ♀ Bicaz (Neamț County), 1 ♀ Garla Nedeia (Dolj County).

Distribution. Romania: Brașov, Iași, Bucureşti, Oltenia, Suceava, Argeş, Dobrogea, Galați, București, Crişana, Hunedoara, Banat, Bacău, Ploieşti, Cluj regions (Damian-Georgescu 1960, 1963). World: Africa, Asia, Europe, North America, South America, Australia and Kerguelen Islands (Dussart and Defaye 2006).

Biotope: groundwaters, bogs, ponds, littoral zone of lakes (Gaviria 1998), groundwaters (Iepure et al. 2016).

***Acanthocyclops* sp.**

Labelled as «*Acanthocyclops*».

Examined material: 3 ♂♂ R., 1 copepodit R.

Subgenus Megacyclops Kiefer, 1927

***Megacyclops gigas* (Claus, 1857)**

Labelled as «*Acanthocyclops gigas*».

Examined material: 2 ♀♀ without information about locality.

Distribution. Romania – no records. World: Africa, America, Asia and Europe (Dussart and Defaye 2006).

Biotope: perennial ponds, profundal zone of lakes (Gaviria 1998).

***Megacyclops viridis viridis* (Jurine, 1820)**

Labelled as «*Acanthocyclops viridis*».

Examined material: 1 ♀ Porțile de Fier, Ogradena (Caraş-Severin County), 1 ♀ Cloşani (Mehediniți County), 1 ♀ Pestera Racos (Hunedoara County), 14 ♀♀ without information about locality, 1 ♂ without information about locality, 1 ♀ Doftana (Prahova County), 2 ♀♀ Motrul Mare (Gorj County), 1 ♀ Izvorul Moldovei, 1 ♀

Beclean pe Someş (railway station) (Bistriţa-Năsăud County), 1 ♀ Guirgiu (Giurgiu County), 1 ♀ Cernica (Ilfov County).

Distribution. Romania: Crişana, Cluj, Hunedoara, Braşov, Banat, Oltenia, Iaşi, Bucureşti, Dobrogea, Galaţi, Ploieşti, Bacău, Oltenia regions (Damian-Georgescu 1960, 1963). World: Africa, America, Asia and Europe (Dussart and Defaye 2006).

Biotope: groundwaters, rivers, periodic ponds, littoral and sublittoral zone of lakes (Gaviria, 1998), groundwaters (Iepure et al. 2016).

Genus Cyclops Muller, 1776

Cyclops insignis Claus, 1857

Labelled as «*Cyclops insignis*».

Examined material: 1 ♀ without information about locality.

Distribution. Romania: Dobrogea, Bucureşti, Cluj regions (Damian-Georgescu 1960, 1963). World: Europe, America and Asia (Dussart and Defaye 2006).

Biotope: rivers, floodplain lakes, ponds, pools (Monchenko 1974).

Cyclops furcifer furcifer Claus, 1857

Labelled as «*Cyclops furcifer*».

Examined material: 3 ♀♀ without information about locality, 1 ♀ (Recept.semin.) without information about locality, 1 ♀ Câmpulung Muscel (Argeş County).

Distribution. Romania: Dobrogea, Crişana, Banat, Oltenia regions (Damian-Georgescu 1963). World: Asia, Europe, North Africa and North America (Dussart and Defaye 2006).

Biotope: temporary ponds, shallow lakes (Gaviria 1998).

Cyclops strenuus strenuus (Fisher, 1851)

Labelled as «*Cyclops strenuus*».

Examined material: 5 ♀♀ without information about locality.

Labelled as «*Cyclops rubens*».

Examined material: 1 ♀ without information about locality, 1 ♀ Bicaz (Neamţ County), 1 ♀ Spre Giurgiu (Giurgiu County).

Distribution. Romania: Crişana, Cluj, all in Retezat Mountains, Hunedoara, Braşov, Mureş, Dobrogea, Bucureşti regions (Damian-Georgescu 1963). World: Africa, Asia, Europe and North America (Dussart and Defaye 2006).

Biotope: groundwaters, rivers, backwaters, periodic ponds, littoral and pelagic zone of lakes (Gaviria 1998).

***Cyclops vicinus vicinus* Uljanin, 1875**

Labelled as «*Cyclops vicinus*».

Examined material: 1 ♀ Bicaz (Neamț County), 7 ♀♀ (Mehedinți County), 4 ♀♀ (Piese bucale - mouth parts) without information about locality, 1 ♂ without information about locality, 1 ♀ Lacul Bălătău (Bacău County), 4 ♀♀ without information about locality, 1 ♀ Hangu, Bicaz (Neamț County), 1 ♀ Sorogari (Iași County), 1 ♀ Bugeac, Northern Dobruja (Constanța County), 1 ♀ Tăbăcăriei, Constanța (Constanța County).

Distribution. Romania: Dobrogea, București, Oltenia regions (Damian-Georgescu 1960, 1963). World: Asia, America and Europe (Dussart and Defaye 2006).

Biotope: rivers, backwaters, pelagic zone of eutrophicated lakes (Gaviria, 1998).

***Cyclops* sp.**

Labelled as «*Cyclops*».

Examined material: 1 ♀ Tăul Dintre Brazi (Retezat Mountains, Hunedoara County), 1 ♀ (P1, P2, A1) Tăul Dintre Brazi (Retezat Mountains, Hunedoara County), 1 ♀ (Fu, P5, P4) Tăul Dintre Brazi (Retezat Mountains, Hunedoara County), 1 ♀ (P1, P2, P3, P4, Fu) R.S., 1 copepodit R.

Genus Diacyclops Kiefer, 1927

***Diacyclops bicuspidatus bicuspidatus* (Claus, 1857)**

Labelled as «*Acanthocyctis bicuspidatus*».

Examined material: 1 ♀ Colentina (București), ♀ without information about locality, 1 ♀ Ceahlău, Bicaz (Neamț County), 2 ♀♀ Timișoara (Timiș County), 1 ♀ Giurgiu (Giurgiu County).

Distribution. Romania: Crapina-Jijila (Damian-Georgescu 1960), Banat, București, Cluj, Hunedoara regions (Damian-Georgescu 1963). World: Africa, Asia, Europe and North America (Dussart and Defaye 2006).

Biotope: groundwaters, rivers, periodic and perennial small water bodies, littoral zone of ponds and lakes, profundal zone of lakes (Gaviria 1998), groundwaters (Iepure et al. 2016).

***Diacyclops bicuspidatus odessanus* (Shmankevich, 1875)**

Labelled as «*Acanthocyclops bucuspidatus odessana*».

Examined material: 4 ♀♀ Peri (Mehedinți County), 2 ♀♀ r. T. Severin (Mehedinți County), 7 ♀♀ without information about locality.

Distribution. Romania: Dobrogea and Oltenia regions (Damian-Georgescu 1963). World: Africa, Asia and Europe (Dussart and Defaye 2006).

Biotope: groundwaters, littoral zone of reservoirs and seas, pools (Monchenko 1974), groundwaters (Iepure et al. 2016).

***Diacyclops bisetosus* (Rehberg, 1880)**

Labelled as «*Acanthocyclops bisetosus*».

Examined material: 1 ♀ Pitești (Argeș County), 2 ♂♂ without information about locality, 7 ♀♀ without information about locality, 4 ♀♀ Munții Apuseni (Alba County), 2 ♂♂ Peri (Mehedinți County), 4 ♀♀ Peri (Mehedinți County), 1 ♀ r. T. Severin (Mehedinți County), 1 ♀ Sovata (Mureș County), 3 ♀♀ Râul Teleajen (Prahova County), ♀ Fundata (București), 1 ♀ Valea Cerbului, Busteni (Prahova County), 1 ♀ Vîrghiș e etichetă Sirghis (Covasna County), 1 ♀ Brăila (Brăila County), 1 ♀ Buzău (Buzău County), 2 ♀♀ Hațeg (Hunedoara County).

Distribution. Romania: București, Cluj, Dobrogea, Hunedoara, Mureș, Ploiești, Oltenia regions (Damian-Georgescu 1963). World: Africa, Asia, Europe, Australia, Cuba, New Zealand, Novaya Zemlya and Quebec (Dussart and Defaye 2006).

Biotope: groundwaters, interstitial zone, periodic and perennial small water bodies, bogs, salt-ponds, fitotelms (Gaviria 1998), groundwaters (Iepure et al. 2016).

***Diacyclops crassicaudis crassicaudis* (G.O. Sars, 1863)**

Labelled as «*Acanthocyclops crassicaudis*».

Examined material: 1 ♀ R., 1 ♀ (antenna) Village Trăisteni (Prahova county), 1 ♂ without information about locality, 1 ♀ village Trăisteni (Prahova County), 2 ♀♀ Ampoița (Alba County), 3 ♀♀ without information about locality, 1 ♀ Azuga (Prahova County), 1 ♀ Vîrghiș (Covasna County).

Distribution. Crișana, Ploiești, Hunedoara regions (Damian-Georgescu 1963). World: North Africa, Europe, North America, Turkey, Iran, Mongolia and Japan (Dussart and Defaye 2006).

Biotope: groundwaters, brooks, periodic small water bodies (cold stenothermic) (Gaviria 1998), groundwaters (Iepure et al. 2016).

***Diacyclops crassicaudis brachycercus* (Kiefer, 1927)**

Labelled as «*Acanthocyclops crassicaudis brachycercus*».

Examined material: 1 ♀ Vîrghiș (Covasna County).

Distribution. Romania: Mureș (Damian-Georgescu 1963). World: Europe and North America (Dussart and Defaye 2006).

Biotope: living in small temporary ponds, in groudwaters (sometimes found in caves, in springs, in stream hyporheic zones) (Dussart and Defaye 2006), groundwaters (Iepure et al. 2016).

***Diacyclops languidus languidus* (G.O. Sars, 1863)**

Labelled as «*Acanthocyctis languidus*».

Examined material: 1 ♂ Cloșani (Mehedinți County), 1 ♂ Ponor (Alba County), 1 ♀ Ponor (Alba County), 1 ♀ Cloșani (Mehedinți County), 1 ♀ without information about locality, 1 ♀ Motru (Gorj County), 2 ♀♀ Motrul. Mare (Gorj County), 1 ♀ Tăul dintre Brazi (Retezot Mountains).

Distribution. Romania: Hunedoara region (Damian-Georgescu 1963). World: America, Asia and Europe (Dussart and Defaye 2006).

Biotope: groundwater, bogs, ponds, littoral zone of lakes (Gaviria, 1998), groundwaters (Iepure et al., 2016).

***Diacyclops clandestinus* (Kiefer, 1926)**

Labelled as «*Acanthocyclops languidoides clandestinus*».

Examined material: 3 ♀♀ Topolovăț (Timiș County), 2 ♀♀ without information about locality, 2 ♂♂ without information about locality, 5 ♀♀ R., 2 ♂♂ R., Crustanta.

Distribution. Romania: Crișana, Cluj, Banat and Bucureşti regions (Damian-Georgescu 1963). World: Asia, Europe, Syria (Dussart and Defaye 2006).

Biotope: in waters of caves, fountains, pipes (Damian-Georgescu 1963), interstitial zone, mountain rivers (Monchenko and Samchyshyna 2009), groundwaters (Iepure et al. 2016).

Genus *Mesocyclops* Sars, 1913

***Mesocyclops leuckarti* (Claus, 1857)**

Labelled as «*Mezocyclops leuckarti*».

Examined material: 2 ♀♀ Jijila (Tulcea County), 1 ♀ Crapina–Jijila (Tulcea County), 1 ♀ Greaca (Giurgiu County).

Distribution. Romania: Crişana, Cluj, Ploieşti, Bucureşti, Galaţi, Argeş, Timişoara and Dobrogea regions (Damian-Georgescu 1960, 1963). World: Palaearctic: All Europe, and Asia from Turkey to Japan (Hokkaido, Honshu) (Dussart and Defaye 2006).

Biotope: rivers, floodplain lakes, ponds, bogs and astatic water-bodies (Monchenko 1974, Gaponova 2016), groundwaters (Iepure et al. 2016).

Genus Thermocyclops Kiefer, 1927

***Thermocyclops crassus* (Fischer, 1853)**

Labelled as «*Mezocyclops crassus*».

Examined material: 2 ♀♀ Târgu Ocna (Bacău County), 1 ♀ Jijila (Tulcea County).

Distribution. Romania: Dobrogea, Cluj, Braşov and Galaţi regions (Damian-Georgescu 1960, 1963). World: cosmopolitan (Dussart and Defaye 2006), introduced to America (Mirabdullayev et al. 2003).

Biotope: backwaters, perennial ponds, pelagic zone of lakes (Gaviria 1998), groundwaters (Iepure et al. 2016).

***Thermocyclops dybowski* (Lande, 1890)**

Labelled as "*Mezocyclops dybowskii*».

Examined material: 7 ♀♀ Urlaţi (Prahova County), 1 ♀ Turnu Severin (Mehedinţi County), 2 ♀♀ Bicaz (Neamţ County).

Distribution. Romania: Mureş, Ploieşti, Galaţi, Oltenia and Bucureşti regions (Damian-Georgescu 1963). World: Africa, Asia, Europe and Cuba (Dussart and Defaye 2006).

Biotope: perennial ponds, littoral (occasional) and pelagic zone of ponds and lakes (Gaviria 1998).

***Thermocyclops oithonoides* (G.O. Sars, 1863)**

Labelled as «*Mezocyclops oithonoides*».

Examined material: 1 ♀ Jijila (Tulcea County).

Distribution. Romania: Galați, Dobrogea and București regions (Damian-Georgescu 1960, 1963). World: Palaearctic (Dussart and Defaye 2006).

Biotope: backwaters, pelagic zone of ponds and lakes (Gaviria 1998).

Genus *Metacyclops* Kiefer, 1927

***Metacyclops gracilis* (Lilljeborg, 1853)**

Labelled as «*Microcyclops gracilis*».

Examined material: 5 ♀♀ Oradea (Bihor County), 1 ♀ without information about locality, 1 ♂ Jijila (Tulcea County).

Distribution. Romania: Cluj and Crişana regions (Damian-Georgescu 1963). World: Asia, Europe, Africa, South America (Dussart and Defaye 2006).

Biotope: backwaters, perennial ponds, littoral and pelagic zone of lakes (Gaviria 1998), groundwaters (Iepure et al. 2016).

***Metacyclops minutus* (Claus, 1863)**

Labelled as «*Microcyclops minutus*».

Examined material: 1 ♀ Dunăre, 4 ♀♀ Peri (Mehedinți County), 1 ♀ r. Turnu Severin (Mehedinți County), 1 ♀ Măgurele (Ilfov County), 1 ♀ Berceni, Bucharest (București).

Distribution. Romania: Cluj, Braşov, and Oltenia regions (Damian-Georgescu 1963). World: Africa, Asia and Europe (Dussart and Defaye 2006).

Biotope: astatic water bodies (Monchenko 1974), groundwaters (Iepure et al. 2016).

***Metacyclops planus* (Gurney, 1909)**

Labelled as «*Microcyclops planus*».

Examined material: 10 ♀♀ R., 3 ♂♂ R.

Distribution. Romania: București region (Damian-Georgescu 1963). World: Africa, Asia and Europe (Dussart and Defaye 2006).

Biotope: perennial, periodic and aperiodic small water bodies (Gaviria 1998).

Genus Cryptocyclops G.O. Sars, 1927

***Cryptocyclops bicolor bicolor* (G.O. Sars, 1863)**

Labelled as «*Microcyclops bicolor*».

Examined material: 1 ♀ Crapina-Jijila (Tulcea County), 1 ♀ Jijila (Tulcea County), 3 ♀♀ without information about locality.

Distribution. Romania: Cluj, Dobrogea and Galați regions (Damian-Georgescu 1960, 1963). World: Europe, Africa, America and Asia (Dussart and Defaye 2006).

Biotope: in floodplain water bodies – lakes, oxbow lakes, ponds, bogs, pools (Monchenko 1974).

***Microcylops* sp.**

Examined material: 1 ♀ Jijila (Tulcea County), 1 ♀ Peri (Mehedinți County).

Subfamily Halicyclopinae Kiefer
Genus *Halicyclops* Norman, 1903

***Halicyclops rotundipes rotundipes* Kiefer, 1935**

Labelled as «*Halicyclops rotundipes*».

Examined material: 1 ♂ Jijila (Tulcea County).

Distribution. Romania: Dobrogea and Galați regions (Damian-Georgescu 1960, 1963). World: Europe (Dussart and Defaye 2006).

Biotope: interstitial zone (Monchenko and Samchyshyna 2009).

Conclusions

Finally, 39 species and subspecies, belonging to 13 genera and 3 subfamilies of the family Cyclopidae have been registrated in A. Damian-Georgescu's collection, deposited in "Grigore Antipa" National Museum of Natural History, Bucharest. For each species the following information is presented: collecting sites, data on general distribution in Romania and worldwide, and types of inhabited biotopes. Species names are listed in systematical order with indication of current taxonomic status. Among all these species, one species – *Acanthocyclops phreaticus* (Chappuis, 1928) and one subspecies – *Eucyclops graeteri intermedius* (Damian, 1955) have been recorded only on the territory of Romania and could be regarded as rare for Europe. Other studied species have wider distribution and have been recorded in Romania and other European countries. The type material of *Eucyclops graeteri intermedius*

(Damian, 1955) (syn. *Eucyclops macrurus intermedius* Damian, 1955) is designated in this paper and could be used for the future possible taxonomic revision of *Eucyclops graeteri*-complex. Revised data on the distribution of 39 species of the family Cyclopidae could be used for ecological monitoring of the biodiversity of cyclopoid copepods in different aquatic reservoirs of Romania and other European countries.

Acknowledgments

This investigation was carried out in frame of the Ukrainian – Romania Joint Research Project, supported by the Romanian Academy of Science and the National Academy of Science of Ukraine. I gratefully acknowledge the help and hospitality received during my stay in "Grigore Antipa" National Museum of Natural History: special thanks to Dr. L. O. Popa, General Director, Dr. C. Adam, Dr. M. Stan, Dr. I. C. Constantinescu, Dr. G. B. Chişamera, and last but not least to P. B. Matei. Sincere gratitude is expressed to Dr. Maria Hołyńska for helpful advice on some taxonomic issues and for sending necessary literature. Thanks are offered to Dr. V. N. Fursov and Dr. A. G. Kostenko for their kind help and critical reading of the manuscript.

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