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The first annotated checklist of mayflies (Ephemeroptera: Insecta) of Georgia with new distribution data and a new record for the country

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Abstract: The first comprehensive checklist of mayflies (Ephemeroptera) of Georgia is provided based on literature data supplemented by our unpublished data, including extensive samples in 2013–2017, works with the collections and types, faunistic observations, and taxonomical contributions. Records of 75 species are provided, with one species reported as a new finding for the country. Notes about the taxonomic status of several species are given. The present contribution represents the first publication of this kind for mayflies within the whole Caucasus area.

Key words: Caucasus, Georgia, Ephemeroptera, biodiversity, checklist, new record

Mayflies (Insecta, Ephemeroptera) are probably one of the oldest living groups of winged insects dating back to the Carboniferous (Brittain, 1982). These insects are semiaquatic animals, while much of their lifetime is spent in larval form under the water (Barber-James et al., 2008). Due to specific ecological requirements mayflies are considered as effective indicators in freshwater biomonitoring programs (Resh and Unzicker, 1975; Landa and Soldán, 1991; Buffagni et al., 2009). Therefore, their diversity and distribution is rather well studied in the developed world (Barber-James et al., 2008). In areas where freshwater monitoring is not routine (most of the tropics, developing countries), knowledge about mayflies is relatively poor. Such an example is Georgia (and the Caucasus as a whole), where the data on the diversity and distribution of mayflies (and any other freshwater insects) are poor and fragmentary (Japoshvili et al., 2016).

The first literature sources on the biodiversity of Georgian mayflies appeared as late as the 1940s by Sokolova (1937), Zhadin (1940), Sadovsky (1940a, 1940b, 1942, 1946, 1948, 1950, 1956), and Kakauridze (1946), resulting in 12 species for Georgia. After a break of almost two decades, a second wave of studies was initiated during the early 1970s by Georgian scientists (Sowa and Zosidze, 1973; Meskhidze and Zosidze, 1974), followed by Braasch (1978a, 1978b, 1979a, 1979b, 1979c, 1980a, 1980b, 1980c), Braasch and Zimmermann (1979), Sinitshenkova (1976, 1979), Kluge (1987a, 1987b, 1989, 1994), Zosidze (1999a, 1999b), and Diasamidze and Zosidze (1999). At the end of the 20th century the number of mayfly taxa had increased up to 54 species. The third phase of research of mayflies started in 2012 as a result of a new generation of publications (Sroka, 2012; Sroka et al., 2012; Sroka and Godunko, 2012; Kluge et al., 2013; Godunko et al., 2015; Martynov et al., 2016) and others are on their way. These later works added an additional 21 species, among which four species were described as new for science (Kluge et al., 2013; Godunko et al., 2015; Martynov et al., 2015; Martynov and Godunko, 2017).

Unfortunately, there was no work summarizing the information on species diversity and distribution of Ephemeroptera in all the territory of Georgia. Only the mayfly fauna of NR Kintrishi (Adjara) was investigated, and data published by Martynov et al. (2016). Except for the recently published data, the information contained in the literature needs to be thoroughly revised and adjusted to the modern nomenclature.

The necessary first step in the systematic approach to the study of mayflies of Georgia is gathering all available information about the diversity and distributional patterns of individual species published so far. In the present article, we provide the first annotated check-list of mayfly species.
of Georgia based on the analysis of literature sources, supplementing our original data obtained in recent years.

To compile the checklist of Georgian mayfly fauna, we have studied all available references published to date. Only the works dealing with species-level taxa were considered here as a source of information. For the present work, no extensive treatment of museum-housed materials was conducted. Although we did not check the species identities provided in the literature, we applied nomenclatural changes where necessary. Species geographic distribution data are extracted from the literature and georeferenced by regions according to the Figure.

In this review, we also included our own unpublished data obtained during field surveys in the years 2013–2017 in 19 localities of different lentic and lotic systems of the Javakheti highland. The name of the water source, brief description of habitat, geographic coordinates, and elevation above sea level of each locality are provided in the Table.

Newly collected material was identified using the works of Bauernfeind and Humpesch (2001), Eiseler (2005), and Bauernfeind and Soldán (2012), and vouchers are preserved in the Institute of Zoology of Ilia State University (HIDEph). Nomenclature and systematic arrangements follow Bauernfeind and Soldán (2012) except for the genus Nigrobaetis, where we follow more recent classification discussed by Kluge and Novikova (2014) and recently by Martynov and Godunko (2017) (see also Novikova and Kluge, 1987, 1994). Synonyms are provided only for published records in Georgia.

In total, 75 species belonging to 22 genera and 12 families have been recorded from Georgia. Among these, one species, Baetis nexus Navás, 1918, is new for the country. Four species are endemic to Georgia at present (Electrogenera kuranesis (Braasch, 1978); Rhiithrogena lucida Braasch, 1979; Eurypholleta kornevii Martynov et al. 2015; Nigrobaetis (Takobia) katerynae Martynov & Godunko, 2017).

The best studied region of Georgia by means of diversity of Ephemeroptera is Adjara and partly Guria (southwestern Georgia) with 48 species in total (57% of total fauna). In the Kintrishi River (Adjara district) alone, 42 species of mayflies were registered after the work of Zosidze (1999a, 1999b) and Martynov et al. (2016). In contrast, the largest parts of the country (especially the Racha-Lechkhumi and Samegrelo-Svaneti regions with only four species) are very fragmentarily studied (Figure).

It is clear that knowledge of the mayfly diversity of Georgia is far from complete. Although southwestern Georgia (Adjara and Guria regions) is one of the biodiversity centers in the Caucasus region (e.g., Mumladze, 2014), occurrence of 50% of known mayfly fauna in a single river (Kintrishi) indicates that much of the biodiversity data are still awaiting discovery. Thus, the list of species provided in this checklist as well as the distributions of species are only preliminary; it is needed to generate a comprehensive account of the state of the art and gaps in the knowledge of mayfly diversity and distribution in Georgia.

Annotated checklist of Ephemeroptera of Georgia
Family: SIPHLONURIDAE Ulmer, 1920
Genus: Siphlonurus Eaton, 1868
1. Siphlonurus (Siphlonurus) lacustris Eaton, 1870
   Distribution in Georgia: Mtskheta-Mtianeti (Kasymov, 1972).
   Note: The presence in the fauna must be confirmed.

Family: BAETIDAE Leach, 1815
Genus: Baetis Leach, 1815
3. Baetis (Baetis) alpinus (Pictet, 1843)
   Distribution in Georgia: Adjara and Guria (Meskhidze and Zosidze, 1974; Zosidze, 1999a, 1999b; Diasamidze and Zosidze, 1999).
   Note: As the species has a distribution of European mountain areas (Bauernfeind and Soldán, 2012), the Georgian records might be wrong and need to be checked.

4. Baetis (Baetis) buceratus Eaton, 1870
   Distribution in Georgia: Imereti (Palatov, 2013).
   Loc12. 269 specimens; Loc13. 10 specimens; Loc14. 3 specimens; Loc15. 2 specimens.

5. Baetis (Baetis) fuscatus (Linnaeus, 1761)
   Distribution in Georgia: Adjara (Sroka, 2012; Palatov, 2013; Martynov et al., 2016), Guria, Samtskhe-Javakheti (Sroka, 2012), Imereti (Palatov, 2013).
   Loc13. 3 specimens.

   Distribution in Georgia: Imereti and Guria (Sroka, 2012); Adjara (Martynov et al., 2016).
   Loc12. 31 specimens; Loc13. 124 specimens; Loc14. 11 specimens; Loc15. 92 specimens.


7. Baetis (Baetis) nexus Navás, 1918
   Distribution in Georgia: Loc14. 2 specimens.
   Note: A new record for Georgia. Known from Hungary, Turkey, France, Germany, Austria, Slovakia, Lithuania (Bauernfeind and Soldán, 2012).

8. Baetis (Baetis) vardarensis Ikonomov, 1962
   Distribution in Georgia: Samtskhe-Javakheti, Guria, Imereti (Sroka, 2012), Adjara (Martynov et al., 2016).
   Loc13. 10 specimens.
Note: Zimmermann (1981) described the subspecies *Baetis vardarensis caucasicus* from Shida Kartli, Kvemo Kartli, and Kakheti.

9. *Baetis (Baetis) vernus* Curtis, 1834
Loc12. 1 specimen.

10. *Nigrobaetis (Nigrobaetis) digitatus* (Bengtsson, 1912)
Distribution in Georgia: Guria (Sroka, 2012), Abkhazia, Adjara (Palatov, 2013; Martynov et al., 2016).

11. *Nigrobaetis (Nigrobaetis) gracilis* Bogoescu & Tabacaru, 1957
Distribution in Georgia: Kvemo Kartli, Kakheti (Zimmermann, 1981), Guria (Sroka, 2012), Adjara (Palatov, 2013; Martynov et al., 2016).

12. *Nigrobaetis (Takobia) katerynae* Martynov & Godunko, 2017
Distribution in Georgia: Adjara (Martynov and Godunko, 2017).

13. *Baetis (Nigrobaetis) niger* (Linnaeus, 1761)
Distribution in Georgia: Kvemo Kartli (Kakauridze, 1946), Adjara, Guria (Zosidze, 1999b).

14. *Nigrobaetis (Takobia) muticus* (Linnaeus, 1758)
= *Baetis muticus* in Zimmermann (1981)

= *Alainites muticus* in Sroka (2012)

Note: Palatov (2013) indicated this species for central Georgia without any details. We do not exclude that some of the previous reports of this species in the high mountain areas (at heights of approx. 1000 m and more) could belong to *N. (T.) katerynae*.

15. *Baetis (Rhodobaetis) baksan* Soldán, 1977

16. *Baetis (Rhodobaetis) braaschi* Zimmermann, 1980
Distribution in Georgia: Mtskheta-Mtianeti (Godunko et al., 2004; Sroka et al., 2012), Imereti (Sroka, 2012; Sroka et al., 2012), Kakheti, Shida Kartli, Kvemo Kartli (Sroka et al., 2012).

Note: Palatov (2013) indicated this species for the central Georgia without any details.

17. *Baetis (Rhodobaetis) cf. gadeai* Thomas, 1999
= *Baetis (Rhodobaetis) gemellus* sensu Novikova, 1987 in Martynov et al. (2016)
Note: Probably undescribed species related to *Baetis (Rhodobaetis) gadeai* Thomas, 1999 from the Pyrenees. Most probably conspecific with some material identified as "*B. gemellus*" (see below). Palatov (2013) indicated that the species also occurs in other parts of Georgia (incl. Abkhazia) without exact distribution data.

18. *Baetis (Rhodobaetis) gemellus* Eaton, 1885

Distribution in Georgia: Racha-Lechkumi, Samegrelo-Svaneti, Samtske-Javakheti, Shida Kartli, Kvemo Kartli, Mtskheta-Mtianeti, Kakheti (Zimmermann, 1981); Abkhazia (Palatov and Sokolova, 2015; Chertoprud et al., 2016).

Note: Confusing species, original description based on adult stage from the Alps and Apennines (Eaton, 1885). Material used for the description of the larval

Table. Description of sampled localities from Javakheti region.

<table>
<thead>
<tr>
<th>Locality</th>
<th>Habitat description</th>
<th>Geo. coordinates</th>
<th>Elevation a.s.l.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loc1</td>
<td>Northeastern coast of Lake Paravani with sandy and pebbled bottom</td>
<td>N41.47952 E43.83370</td>
<td>2080</td>
</tr>
<tr>
<td>Loc2</td>
<td>Bog with dense vegetation near the northeastern coast of Lake Paravani (100 m from Loc1)</td>
<td>N41.47937 E43.83517</td>
<td>2082</td>
</tr>
<tr>
<td>Loc3</td>
<td>East coast of Lake Paravani with pebbles and stones on the bottom</td>
<td>N41.42547 E43.83358</td>
<td>2080</td>
</tr>
<tr>
<td>Loc4</td>
<td>Southwestern coast of Lake Paravani with large boulders on the bottom</td>
<td>N41.40850 E43.77885</td>
<td>2080</td>
</tr>
<tr>
<td>Loc5</td>
<td>East coast of Lake Paravani with silty bottom</td>
<td>N41.42925 E43.78106</td>
<td>2080</td>
</tr>
<tr>
<td>Loc6</td>
<td>East coast of Lake Saghamo with pebbled bottom</td>
<td>N41.30197 E43.75688</td>
<td>2000</td>
</tr>
<tr>
<td>Loc7</td>
<td>Southern coast of Lake Saghamo near the mouth of Paravani River with stony bottom and sparse aquatic vegetation</td>
<td>N41.29661 E43.73364</td>
<td>2000</td>
</tr>
<tr>
<td>Loc8</td>
<td>West coast of Lake Saghamo with bottom covered by large boulders</td>
<td>N41.30263 E43.72323</td>
<td>2000</td>
</tr>
<tr>
<td>Loc9</td>
<td>Western coast of eutrophic Lake Avchala with dense aquatic vegetation and silty bottom</td>
<td>N41.33632 E43.68034</td>
<td>2060</td>
</tr>
<tr>
<td>Loc10</td>
<td>South coast of eutrophic Lake Avchala with dense aquatic vegetation and silty bottom</td>
<td>N41.32827 E43.69099</td>
<td>2060</td>
</tr>
<tr>
<td>Loc11</td>
<td>Northern coast of eutrophic Lake Avchala with dense aquatic vegetation and silty bottom</td>
<td>N41.34492 E43.68739</td>
<td>2060</td>
</tr>
<tr>
<td>Loc12</td>
<td>Right bank of Bughdasheni River with bottom covered with different sized stones</td>
<td>N41.21806 E43.65790</td>
<td>2045</td>
</tr>
<tr>
<td>Loc13</td>
<td>Right bank of Bughdasheni River with mostly silty bottom with some stones and pebbles</td>
<td>N41.21493 E43.65826</td>
<td>2047</td>
</tr>
<tr>
<td>Loc14</td>
<td>Left bank of Paravani River with silty bottom covered with different sized stones</td>
<td>N41.38531 E43.78557</td>
<td>2075</td>
</tr>
<tr>
<td>Loc15</td>
<td>Left bank of Paravani River with bottom covered by different sized stones</td>
<td>N41.29328 E43.72782</td>
<td>2010</td>
</tr>
<tr>
<td>Loc16</td>
<td>Eastern coast of Lake Kartsakhi with dense medium-sized stones on the bottom</td>
<td>N41.20941 E43.25139</td>
<td>1800</td>
</tr>
<tr>
<td>Loc17</td>
<td>Unnamed small (200 m²) shallow pond near Abuli Mountain with silty bottom and dense aquatic vegetation</td>
<td>N41.40053 E43.69927</td>
<td>2205</td>
</tr>
<tr>
<td>Loc18</td>
<td>Channel of Sulda wetland with silty bottom and dense aquatic vegetation</td>
<td>N41.29560 E43.32333</td>
<td>1860</td>
</tr>
<tr>
<td>Loc19</td>
<td>Lake Didi Tba, eutrophic lake with silty bottom and dense aquatic vegetation</td>
<td>N41.35226 E43.34106</td>
<td>1788</td>
</tr>
</tbody>
</table>
stage in Müller-Liebenau (1969) was later (Thomas, 1999) established as a different species. *Baetis gadeaii* Thomas, 1999. Thus, the larva of *B. gemellus* remains unknown and conspecificity of any (especially larval) material identified as *B. gemellus* from Georgia with adult material described as *B. gemellus* by Eaton (1885) is highly doubtful.

Most probably some data from Georgia (as well as from the whole Caucasus) are confused with *B. braaschii* (see Palatov, 2013).

19. *Baetis (Rhodobaetis) ilex* Jacob & Zimmermann, 1978


20. *Baetis (Rhodobaetis) rhodani* (Picket, 1843)


**Note:** Most probably a series of cryptic species present within the Caucasus.


Distribution in Georgia: Adjara, Imereti (Godunko et al., 2015; Martynov et al., 2016).

**Genus: Centropodilum Eaton, 1869**

22. *Centropodilum luteolum* (Müller, 1776)

Distribution in Georgia: Adjara (Meskhidze and Zosidze, 1974; Zosidze, 1999b; Martynov et al., 2016), Guria (Meskhidze and Zosidze, 1974; Zosidze, 1999b), Abkhazia (Palatov, 2013).

**Note:** Most probably cited by Lampert (1900) for all Caucasus and Transcaucasia as "*Baetis bioculatus I*".

**Genus: Cloeon Leach, 1815**

23. *Cloeon (Cloeon) dipterum* (Linnaeus, 1761)

Distribution in Georgia: Samtske-Javakheti (Kalandadze and Jashi, 1952), Kakheti (Kutubidze, 1957; Kalandadze and Jashi, 1952), Adjara (Zosidze, 1999b; Palatov, 2013; Martynov et al., 2016), Guria (Zosidze, 1999b).

Loc2. 4 specimens; Loc9. 4 specimens; Loc10. 12 specimens; Loc11. 5 specimens; Loc18. 6 specimens; Loc19. 253 specimens.

**Note:** Palatov (2013) indicated the presence of the *Cloeon dipterum* group including *C. dipterum* and *C. inscriptum* in the Samegrelo-Svaneti, Abkhazia, and Adjara regions without any differentiation of these two taxa.

24. *Cloeon (Similicloeon) similir Eaton, 1870*

Distribution in Georgia: Adjara, Guria (Zosidze, 1999b); Abkhazia (Sokolova, 1937), Kvemo Kartli (Kasymov, 1965).

**Genus: Procloeon Bengtsson, 1915**

25. *Procloeon (Procloeon) bifidum* (Bengtsson, 1912) = *Cloeon rafifum* in Kalandadze and Jashi (1952)

Distribution in Georgia: Samtske-Javakheti (Kalandadze and Jashi, 1952).

26. *Procloeon (Pseudocentroptilum) pulchrum* (Eaton, 1885)

Distribution in Georgia: Adjara (Palatov, 2013; Martynov et al., 2016), Imereti (Palatov, 2013).

27. *Procloeon (Pseudocentroptilum) unguiculatum* (Tshernova, 1941)

Distribution in Georgia: Imereti (Palatov, 2013).

**Family: ISONYCHIIDAE Ulmer, 1914**

28. *Isonychia Eaton, 1871*

29. *Oligoneuriella iskhomeledzei Sowa & Zosidze, 1973*

Distribution in Georgia: Adjara and Guria (Sowa and Zosidze, 1973; Zosidze, 1999b).

30. *Oligoneuriella rhenana* (Imhoff, 1852) = *Oligoneuria rhenana* in Elanidze (1947)

Distribution in Georgia: Kvemo Kartli (Elanidze, 1947), Adjara and Guria (Zosidze, 1999b).

**Note:** Some records most probably belong to *O. tskhomeledzei*.

**Family: HEPTAGENIIDAE Needham & Betten, 1901**

31. *Ecdyonurus Eaton, 1868*

32. *Ecdyonurus (Ecdyonurus) autumnalis* Braasch, 1980

Distribution in Georgia: Imereti and Kakheti (Braasch, 1980b).

33. *Ecdyonurus (Helvetoraeticus) adjaricus* Kluge, Godunko & Apanaskevich, 2013

Distribution in Georgia: Adjara (Kluge et al., 2013; Martynov et al., 2016).

**Genus: Electrogena Zurwerra & Tomka, 1985**
34. Electrogena azerbajdshanica (Braasch, 1978)  
= Ecdyonurus azerbajdshanicus in Braasch (1980b)  
Distribution in Georgia: Kakheti (Braasch, 1980b).

35. Electrogena kuraensis (Braasch, 1978)  
= Ecdyonurus kuraensis in Braasch (1978a)  
Distribution in Georgia: Shida Kartli (Braasch, 1978a).

36. Electrogena pseudoaffinis (Braasch, 1980)  
= Ecdyonurus pseudoaffinis in Braasch (1980a, b), Kazanci & Braasch (1988)  
Distribution in Georgia: Mtskhet-Mtianeti, Kvemo Kartli (Braasch, 1980a, b), Adjara (Kazanci and Braasch, 1988; Martynov et al., 2016).

37. Electrogena squamata (Braasch, 1978)  
= Ecdyonurus squamatus in Braasch (1978a, 1980b)  
= Electrogena squamatus in Martynov et al. (2016)  
Distribution in Georgia: Adjara and Guria (Zosidze, 1999a, 1999b), Abkhazia (Chzhun, 1999), Adjara (Martynov et al., 2016).

38. Electrogena zimmermanni (Sowa, 1984)  
= Ecdyonurus zimmermanni in Sowa (1984)  
Distribution in Georgia: Abkhazia (Palatov and Sokolova, 2015; Chertoprud et al., 2016).

Genus: Epeorus Eaton, 1881

39. Epeorus (Caucasiron) caucasicus (Tshernova, 1938)  
= Epeorus (Iron) caucasicum in Jacob (1972)  
= Iron fuscus Sinitshenkova, 1976; jun. syn. in Braasch (1979a)  
Distribution in Georgia: Adjara (Martynov et al., 2016); Samskhe-Javakheti (Jacob, 1972), Mtskhet-Mtianeti (Jacob, 1972; Sinitshenkova, 1976; Braasch, 1979a).

40. Epeorus (Caucasiron) alpestris (Braasch, 1979)  
= Iron alpestris in Braasch (1979)  
Distribution in Georgia: Mtskhet-Mtianeti (Chzhun, 1999).

41. Epeorus (Caucasiron) longimaculatus (Braasch, 1980)  
= Iron longimaculatus in Braasch (1980c)  
Distribution in Georgia: Mtskhet-Mtianeti (Braasch, 1980c), Adjara (Martynov et al., 2016).

42. Epeorus (Caucasiron) magnus (Braasch, 1978)  
= Iron magnus in Braasch (1980c)  
Distribution in Georgia: Mtskhet-Mtianeti (Braasch, 1980c; Chzhun, 1999), Abkhazia (Chzhun, 1999), Adjara (Martynov et al., 2016).

43. Epeorus (Caucasiron) nigripilosus (Sinitshenkova, 1976)  
Distribution in Georgia: Mtskhet-Mtianeti (Sinitshenkova, 1976).

44. Epeorus (Caucasiron) sinitshenkovae (Braasch & Zimmermann, 1979)  
= Iron sinitshenkovae in Braasch & Zimmermann (1979)  
Distribution in Georgia: Mtskhet-Mtianeti (Braasch and Zimmermann, 1979).

45. Epeorus (Caucasiron) znojkoi (Tshernova, 1938)  
= Iron znojkoi in Sinitshenkova (1976)  
Distribution in Georgia: Mtskhet-Mtianeti (Sinitshenkova, 1976; Braasch, 1980c), Abkhazia (Chzhun, 1999), Adjara (Martynov et al., 2016).

46. Epeorus (Epeorus) torrentium Eaton, 1881  
Distribution in Georgia: Adjara and Guria (Zosidze, 1999a, 1999b; Diasamidze and Zosidze, 1999).  

Note: This species is known to occur in southwestern Europe; according to Braasch (1978b) occurrence of this species in the Caucasus Region is doubtful and records are probably misidentifications.

Genus: Heptagenia Walsh, 1863

47. Heptagenia (Dacnogenia) coerulans micrantha Kluge, 1989  
= Heptagenia (Dacnogenia) coerulans in Kluge (1987b)  
Distribution in Georgia: Kvemo Kartli (Kluge, 1987b, 1989).

48. Heptagenia (Heptagenia) samochai Demolin, 1973  
= Heptagenia perflava Br. in Zhadin (1940), Kutubidze (1957), non Brodsky 1930  
= Heptagenia perflava Brod. in Kasymov (1972), non Brodsky 1930  
= Heptagenia lutea Kluge, 1987 in Kluge (1987b), non Clemens 1913  
Distribution in Georgia: Imeti (Zhadin, 1940; Kluge, 1987b), Kakheti (Kutubidze, 1957), Adjara (Martynov et al., 2016), Mtskhet-Mtianeti, Kvemo Kartli (Kluge, 1987b).

49. Heptagenia (Heptagenia) sulphurea (Müller, 1776)  
Distribution in Georgia: Kakheti (Kutubidze, 1957), Adjara and Guria (Zosidze, 1999a, 1999b).

Genus: Rhithrogena Eaton, 1882

50. Rhithrogena beskidensis Alba-Tercedor & Sowa, 1987  
= Rhithrogena aurantiaca in Zosidze (1999b)  
Distribution in Georgia: Adjara and Guria (Zosidze, 1999b).

51. Rhithrogena binerve Kluge, 1987  
Distribution in Georgia: Kvemo Kartli (Kluge, 1987a).

52. Rhithrogena cf. braaschi Jacob, 1974  
Distribution in Georgia: Adjara (Martynov et al., 2016).

53. Rhithrogena caucasica Braasch, 1979  
Distribution in Georgia: Mtskhet-Mtianeti (Braasch, 1979b; Chzhun, 1999), Abkhazia (Chzhun, 1999).

54. Rhithrogena expectata Braasch, 1979  
Distribution in Georgia: Shida Kartli (Braasch, 1979c), Kvemo Kartli, Mtskhet-Mtianeti (Chzhun, 1999), Abkhazia (Palatov and Sokolova, 2015).

55. Rhithrogena decolorata Sinitshenkova, 1973  
Distribution in Georgia: Adjara (Sinitshenkova, 1979; Martynov et al., 2016).
56. **Rhithrogena iridina kownackii** Sowa & Zimmermann, 1975  
Distribution in Georgia: Mtskheta-Mtianeti (Sowa and Zimmermann, 1975), Adjara (Martynov et al., 2016).

57. **Rhithrogena lucida** Braasch, 1979  
Distribution in Georgia: Mtskheta-Mtianeti (Braasch, 1979b).

58. **Rhithrogena potamalis** Braasch, 1979  
Distribution in Georgia: Shida Kartli, Kvemo Kartli (Braasch, 1979c).

59. **Rhithrogena znojkoi** (Tshernova, 1938)  
Distribution in Georgia: Kvemo Kartli (Chzhun, 1999).

60. **Habroleptoides caucasica** Tshernova, 1931  
Distribution in Georgia: Abkhazia (Kluge, 1994), Adjara (Martynov et al., 2016).

61. **Habroleptoides confusa** Sartori & Jacob, 1986  
Distribution in Georgia: Adjara (Martynov et al., 2016).

62. **Leptophlebia vespertina** (Linnaeus, 1758)  
Distribution in Georgia: Adjara and Guria (Zosidze, 1999).

63. **Paraleptophlebia submarginata** (Stephens, 1835)  
Distribution in Georgia: Adjara and Guria (Zosidze, 1999b).

64. **Paraleptophlebia werneri** Ulmer, 1920  
Distribution in Georgia: Abkhasia (Palatov and Sokolova, 2015).

65. **Ephemera (Ephemera) danica** Müller, 1764  
Distribution in Georgia: Adjara and Guria (Zosidze, 1999b).

66. **Ephemera (Ephemera) vulgaris** Linnaeus, 1758  
Distribution in Georgia: Adjara, Guria (Zosidze, 1999a, 1999b).

67. **Ephemera robusta** Eaton, 1884  
Distribution in Georgia: Adjara (Martynov et al., 2016).

68. **Palingenia longicauda** (Olivier, 1791)  
Distribution in Georgia: Adjara and Guria (Zosidze, 1999a, 1999b).

69. **Palingenia foliaceum** in Elanidze (1956), Sadovsky (1948, 1946, 1948)  
Distribution in Georgia: Kakheti (Kutubidze, 1957), Adjara, Guria (Zosidze, 1999a, 1999b; Martynov et al., 2015; Martynov et al., 2016).  
Loc3. 1 specimen; Loc7. 1 specimen; Loc13. 10 specimens; Loc14. 4 specimens; Loc15. 1 specimen.

70. **Eurylophella korneyevi** Martynov, Palatov & Godunko, 2015  
Distribution in Georgia: Adjara (Martynov et al., 2015; Martynov et al., 2016).

71. **Caenis macrosoma** Stephens, 1836  
Distribution in Georgia: Imereti (Zhadin, 1940), Shida Kartli (Kalandadze and Jashi, 1952), Kvemo Kartli (Kasymov, 1972), Adjara, Guria (Zosidze, 1999b; Martynov et al., 2016).  
Loc1. 49 specimens; Loc2. 43 specimens; Loc3. 206 specimens; Loc4. 554 specimens; Loc5. 101 specimens; Loc6. 25 specimens; Loc7. 42 specimens; Loc8. 4 specimens; Loc12. 293 specimens; Loc13. 512 specimens; Loc14. 1215 specimens; Loc15. 11 specimens; Loc16. 73 specimens; Loc17. 1 specimen.

72. **Caenis pseudorivulorum** Keffermüller, 1960  
Distribution in Georgia: Adjara (Martynov et al., 2016).

73. **Caenis pseudorivulorum** Keffermüller, 1960  
Distribution in Georgia: Adjara (Martynov et al., 2016).

74. **Caenis robusta** Eaton, 1884  
Family: **PROSOPISTOMATIDAE** Laméere, 1917  
**Genus: Prosopistoma** Latreille, 1833  
75. **Prosopistoma pennergerum** (Müller, 1785)  
Distribution in Georgia: Elanidze (1956), Sadovsky (1940a, 1946, 1948).  
Several publications reporting the occurrence of some (sub)genera without indication on species level are absent in the list above. These include the following:
1. Sadovsky (1946, 1948) indicated the existence of the genus *Ametropus* Albarda, 1978 (family *Ametropodidae*) in the river Kura (near Tbilisi). However, there are neither vouchers available nor other sources corroborating the occurrence of any representatives of the family *Ametropodidae* in Georgia. Additional work is needed to confirm these findings. The same can be said about the representatives of the genus *Brachycercus* Curtis, 1834, reported by Sadovsky (1948) in Kakheti (Alazani River) and Kvemo Kartli (Kura River).

2. Sadovsky (1948), Elanidze (1951), Palatov (2013), and Godunko et al. (2015) reported subgenus (of *Baeti*) *Acentrella* Bengtsson, 1912 from Kakheti (Alazani), Kvemo Kartli (Kura), Imereti (Rioni and Tskaltsitela), Abkhazia, and Adjara. Further work is needed to determine the species identity of these specimens.

3. Schletterer and Kuzovlev (2007) reported the genus *Prosopistoma* Lateirelle, 1833 from Samtskhe-Javakehti (Lake Tabatskuri). It represents most probably *Prosopistoma pennigerum* (Müller, 1785), since there is only one species of the genus *Prosopistoma* reported in Europe and the Caucasus at present (Bauernfeind and Soldán, 2012).

We did not include Lampert (1900) or Puthz (1978) in the references for individual species, since these papers only mention occurrence in the “Caucasus” area, without specification of the country.

The list is intended to serve as a basis and stimulation for further research, since the records of many species and/or their distribution patterns within Georgia can surely be corrected in the future. Moreover, given the extremely high diversity of the Georgian freshwater habitats and the generally low number of published studies, findings of species new for the country (or even new to science) are highly expected.

The improved knowledge about the mayfly diversity in Georgia will be highly beneficial for further investigation and biomonitoring of the environmental changes in freshwater habitats of this country including the evaluation of climate change and other anthropogenic impacts.

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### References


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Chzhun C (1999). Mayflies of the tribe Rhithrogenini (Ephemeroptera, Heptageniidae) of Russia and neighboring countries. Saint Petersburg, Russia: Institute of Zoology, the Academy of Sciences of Russia (in Russian).


