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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comprehensive checklist of mayflies (Ephemeroptera) of Georgia is provided based on literature data supplemented by our unpublished data, including extensive samples in 2013–2017, works with the collections and types, faunistic observations, and taxonomical contributions.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

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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 (*Electrogena kuraensis* (Braasch, 1978); *Rhithrogena lucida* Braasch, 1979; *Eurylophella korneyevi* 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).

2. *Siphlonurus* (*Siphlurella*) *alternatus* (Say, 1824)

= *Siphlonurus linnaeu* in Zosidze (1999b)

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

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.

6. *Baetis* (*Baetis*) *lutheri* Müller-Liebenau, 1967

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.

Note: Zimmermann (1981) and Martynov et al. (2016) reported subspecies *Baetis lutheri georgiensis* Zimmermann, 1981 from Adjara, Abkhazia, Samegrelo-Svaneti, Racha-Lechkhumi, Shida Kartli, Mtskheta-Mtianeti, and Kakheti (see also Sroka, 2012).

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.

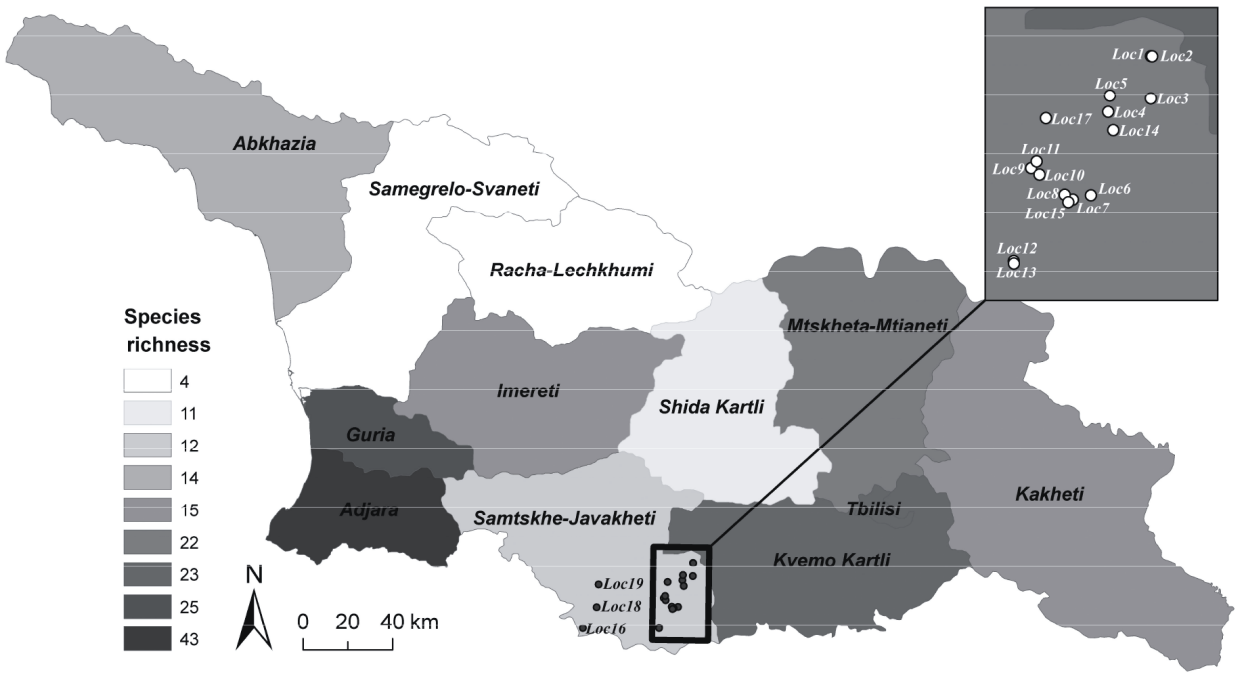

Figure. Map of Georgia with main administrative divisions delimited. Shade intensity indicates the richness of mayfly species for respective administrative unit. Dots indicate localities sampled for mayflies prior to this study.

Note: Zimmermann (1981) described the subspecies *Baetis vardarensis caucasicus* from Shida Kartli, Kvemo Kartli, and Kakheti.

9. *Baetis* (*Baetis*) *vernus* Curtis, 1834

Distribution in Georgia: Shida Kartli, Kvemo Kartli (Zimmermann, 1981).

Loc12. 1 specimen.

10. *Nigrobaetis* (*Nigrobaetis*) *digitatus* (Bengtsson, 1912)

? = *Baetis* (*Nigrobaetis*) *digigracilis* Novikova [nomen nudum] in Novikova and Kluge (1994) (for NW of Caucasus within Russia).

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)

= *Baetis* (*Nigrobaetis*) *muticus* in Novikova and Kluge (1994), Palatov (2013)

= *Alainites muticus* in Sroka (2012)

Distribution in Georgia: Racha-Lechkhumi, Samegrelo-Svaneti, Kakheti (Zimmermann, 1981), Mtskheta-Mtianeti (Zimmermann, 1981; Novikova and Kluge, 1994), Samtskhe-Javakheti, Imereti (Sroka, 2012), Adjara (Sroka, 2012; Martynov et al., 2016).

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

Distribution in Georgia: Mtskheta-Mtianeti (Zimmermann, 1981), Guria (Sroka, 2012), Abkhazia (Palatov, 2013).

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)

Table. Description of sampled localities from Javakheti region.

Locality	Habitat description	Geo. coordinates	Elevation a.s.l.
Loc1	Northeastern coast of Lake Paravani with sandy and pebbled bottom	N41.47952 E43.83370	2080
Loc2	Bog with dense vegetation near the northeastern coast of Lake Paravani (100 m from Loc1)	N41.47937 E43.83517	2082
Loc3	East coast of Lake Paravani with pebbles and stones on the bottom	N41.42547 E43.83358	2080
Loc4	Southwestern coast of Lake Paravani with large boulders on the bottom	N41.40850 E43.77885	2080
Loc5	East coast of Lake Paravani with silty bottom	N41.42925 E43.78106	2080
Loc6	East coast of Lake Saghamo with pebbled bottom	N41.30197 E43.75688	2000
Loc7	Southern coast of Lake Saghamo near the mouth of Paravani River with stony bottom and sparse aquatic vegetation	N41.29661 E43.73364	2000
Loc8	West coast of Lake Saghamo with bottom covered by large boulders	N41.30263 E43.72323	2000
Loc9	Western coast of eutrophic Lake Avchala with dense aquatic vegetation and silty bottom	N41.33632 E43.68034	2060
Loc10	South coast of eutrophic Lake Avchala with dense aquatic vegetation and silty bottom	N41.32827 E43.69099	2060
Loc11	Northern coast of eutrophic Lake Avchala with dense aquatic vegetation and silty bottom	N41.34492 E43.68739	2060
Loc12	Right bank of Bughdasheni River with bottom covered with different sized stones	N41.21806 E43.65790	2045
Loc13	Right bank of Bughdasheni River with mostly silty bottom with some stones and pebbles	N41.21493 E43.65826	2047
Loc14	Left bank of Paravani River with silty bottom covered with different sized stones	N41.38531 E43.78557	2075
Loc15	Left bank of Paravani River with bottom covered by different sized stones	N41.29328 E43.72782	2010
Loc16	Eastern coast of Lake Kartsakhi with dense medium-sized stones on the bottom	N41.20941 E43.25139	1800
Loc17	Unnamed small (200 m^2) shallow pond near Abuli Mountain with silty bottom and dense aquatic vegetation	N41.40053 E43.69927	2205
Loc18	Channel of Sulda wetland with silty bottom and dense aquatic vegetation	N41.29560 E43.32333	1860
Loc19	Lake Didi Tba, eutrophic lake with silty bottom and dense aquatic vegetation	N41.35226 E43.34106	1788

Distribution in Georgia: Imereti, Samtskhe-Javakheti (Sroka, 2012), Abkhazia (Palatov, 2013), Adjara (Martynov et al., 2016; Sroka, 2012).

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, Samtskhe-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

stage in Müller-Liebenau (1969) was later (Thomas, 1999) established as a different species, *Baetis gadeai* 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. braaschi* (see Palatov, 2013).

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

Distribution in Georgia: Samtskhe-Javakheti (Jacob and Zimmermann, 1978; Sroka, 2012), Racha-Lechkhumi, Samegrelo-Svaneti, Shida Kartli, Kvemo Kartli, Mtskheta-Mtianeti (Zimmermann, 1981), Adjara (Palatov, 2013).

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

Distribution in Georgia: Kvemo Kartli (Kakauridze, 1946; Zimmermann, 1981), Abkhazia (Zimmermann, 1981; Palatov, 2013), Racha-Lechkhumi, Samegrelo-Svaneti, Shida Kartli, Kakheti (Zimmermann, 1981), Mtskheta-Mtianeti (Zimmermann, 1981; Kownacki, 1987), Adjara (Zosidze, 1999b; Sroka, 2012; Martynov et al., 2016), Guria (Zosidze, 1999b), Samtskhe-Javakheti (Sroka, 2012).

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

21. *Baetis* (*Rhodobaetis*) *vadimi* Godunko, Palatov & Martynov, 2015

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

Genus: *Centroptilum* Eaton, 1869

22. *Centroptilum 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* L.".

Genus: *Cloeon* Leach, 1815

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

Distribution in Georgia: Samtskhe-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*) *simile* 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 rufulum* in Kalandadze and Jashi (1952)

Distribution in Georgia: Samtskhe-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

Genus: *Isonychia* Eaton, 1871

28. *Isonychia ignota* (Walker, 1853)

Distribution in Georgia: Imereti (Zhadin, 1940), Kakheti (Kutubidze, 1957).

Family: OLIGONEURIIDAE Ulmer, 1914

Genus: *Oligoneuriella* Ulmer, 1924

29. *Oligoneuriella tskhomelidzei* 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. tskhomelidzei*.

Family: HEPTAGENIIDAE Needham & Betten, 1901

Genus: *Ecdyonurus* Eaton, 1838

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

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

32. *Ecdyonurus* (*Ecdyonurus*) *ornatipennis* Tshernova, 1938

? = *Ecdyonurus* [sic!] *fluminum* Pictet in Kasymov (1972)

Distribution in Georgia: Shida Kartli (Braasch, 1980a), Mtskheta-Mtianeti (Kasymov, 1972), Kvemo Kartli (Kasymov, 1972; Braasch, 1980a)

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 pseudaffinis* (Braasch, 1980)

= *Ecdyonurus pseudaffinis* in Braasch (1980a, b), Kazanci & Braasch (1988)

Distribution in Georgia: Mtskheta-Mtianeti, Kvemo Kartli (Braasch, 1980a, 1980b), 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: Mtskheta-Mtianeti (Braasch, 1978a), Abkhazia, Imereti, Kvemo Kartli (Braasch, 1980b), 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); Samtskhe-Javakheti (Jacob, 1972), Mtskheta-Mtianeti (Jacob, 1972; Sinitshenkova, 1976; Braasch, 1979a).

40. *Epeorus* (*Caucasiron*) *alpestris* (Braasch, 1979)

= *Iron alpestris* in Braasch (1979)

Distribution in Georgia: Mtskheta-Mtianeti (Chzhun, 1999).

41. *Epeorus* (*Caucasiron*) *longimaculatus* (Braasch, 1980)

= *Iron longimaculatus* in Braasch (1980c)

Distribution in Georgia: Mtskheta-Mtianeti (Braasch, 1980c), Adjara (Martynov et al., 2016).

42. *Epeorus* (*Caucasiron*) *magnus* (Braasch, 1978)

= *Iron magnus* in Braasch (1980c)

Distribution in Georgia: Mtskheta-Mtianeti (Braasch, 1980c; Chzhun, 1999), Abkhazia (Chzhun, 1999), Adjara (Martynov et al., 2016).

43. *Epeorus* (*Caucasiron*) *nigripilosus* (Sinitshenkova, 1976)

= *Iron nigripilosus* in Sinitshenkova (1976).

Distribution in Georgia: Mtskheta-Mtianeti (Sinitshenkova, 1976).

44. *Epeorus* (*Caucasiron*) *sinitshenkovae* (Braasch & Zimmermann, 1979)

= *Iron sinitshenkovae* in Braasch & Zimmermann (1979)

Distribution in Georgia: Mtskheta-Mtianeti (Braasch and Zimmermann, 1979).

45. *Epeorus* (*Caucasiron*) *znojkoi* (Tshernova, 1938)

= *Iron znojkoi* in Sinitshenkova (1976)

Distribution in Georgia: Mtskheta-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 micracantha* Kluge, 1989

= *Heptagenia* (*Dacnogenia*) *coerulans* in Kluge (1987b)

Distribution in Georgia: Kvemo Kartli (Kluge, 1987b, 1989).

48. *Heptagenia* (*Heptagenia*) *samochai* Demoulin, 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: Imereti (Zhadin, 1940; Kluge, 1987b), Kakheti (Kutubidze, 1957), Adjara (Martynov et al., 2016), Mtskheta-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: Mtskheta-Mtianeti (Braasch, 1979b; Chzhun, 1999), Abkhazia (Chzhun, 1999).

54. *Rhithrogena expectata* Braasch, 1979

Distribution in Georgia: Shida Kartli (Braasch, 1979c), Kvemo Kartli, Mtskheta-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).

Family: LEPTOPHLEBIIDAE Banks, 1900

Genus: *Habroleptoides* Schoenemund, 1929

60. *Habroleptoides caucasica* Tschernova, 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).

Genus: *Leptophlebia* Westwood, 1840

62. *Leptophlebia vespertina* (Linnaeus, 1758)

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

Genus: *Paraleptophlebia* Lestage, 1917

63. *Paraleptophlebia submarginata* (Stephens, 1835)

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

64. *Paraleptophlebia werneri* Ulmer, 1920

Distribution in Georgia: Abkhazia (Palatov and Sokolova, 2015).

Family: EPHEMERIDAE Latreille, 1810

Genus: *Ephemera* Linnaeus, 1758

65. *Ephemera* (*Ephemera*) *danica* Müller, 1764

Distribution in Georgia: Kvemo Kartli (Sadovsky, 1948), Samtskhe-Javakheti (Sadovsky, 1950).

66. *Ephemera* (*Ephemera*) *vulgata* Linnaeus, 1758

Distribution in Georgia: Adjara, Guria (Zosidze, 1999a, 1999b).

Family: PALINGENIIDAE Albarda, 1988

Genus: *Palingenia* Burmeister, 1839

67. *Palingenia longicauda* (Olivier, 1791)

Distribution in Georgia: Adjara and Guria (Zosidze, 1999a, 1999b).

Family: POTAMANTHIDAE Albarda, 1988

Genus: *Potamanthus* Pictet, 1843

68. *Potamanthus luteus* (Linnaeus, 1767)

Distribution in Georgia: Kvemo Kartli (Kakauridze, 1980).

Note: Sadovsky (1948) indicated *Potamanthus* sp. for the Samtskhe-Javakheti region; however, no species identity is available. Formally we did not include this distributional report here.

Family: EPHEMERELLIDAE Klapálek, 1909

Genus: *Ephemerella* Walsh, 1863

69. *Ephemerella ignita* (Poda, 1761)

= *Serratella ignita* in Martynov et al. (2015), Martynov et al. (2016)

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.

Genus: *Eurylophella* Tiensuu, 1935

70. *Eurylophella korneyevi* Martynov, Palatov & Godunko, 2015

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

Family: CAENIDAE Newman, 1853

Genus: *Caenis* Stephens, 1836

71. *Caenis luctuosa* (Burmeister, 1839)

= *Ordella moesta* in Kasymov (1972)

Distribution in Georgia: Kvemo Kartli (Kasymov, 1972).

Loc16. 20 specimens.

72. *Caenis macrura* Stephens, 1836

= *Ordella macrura* in Zhadin (1940), Sadovsky (1948), Kutubidze (1957), Kalandadze and Jashi (1952), Kakauridze (1980), Kasymov (1972), Zosidze (1999b)

Distribution in Georgia: Imereti (Zhadin, 1940), Shida Kartli (Kalandadze and Jashi, 1952), Kvemo Kartli (Kasymov, 1972), Kakheti (Kutubidze, 1957; Braasch, 1980b), 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.

73. *Caenis pseudorivulorum* Keffermüller, 1960

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

74. *Caenis robusta* Eaton, 1884

= *Ordella incus* in Nozadze (1962)

Distribution in Georgia: Guria (Nozadze, 1962).

Family: PROSOPISTOMATIDAE Laméere, 1917

Genus: *Prosopistoma* Latreille, 1833

75. *Prosopistoma pennigerum* (Müller, 1785)

= *Prosopistoma foliaceum* in Elanidze (1956), Sadovsky (1940a, 1946, 1948)

Distribution in Georgia: Kakheti (Elanidze, 1956), Kvemo Kartli (Sadovsky, 1940a, 1946, 1948), Samtskhe-Javakheti (Sadovsky, 1940a).

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*s) *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* Latreille, 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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