An updated list of chironomid species from Italy with biogeographic considerations (Diptera, Chironomidae)

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SUMMARY
In a first list of chironomid species from Italy from 1988, 359 species were recognized. The subfamilies represented were Tanypodinae, Diamesinae, Prodiamesinae, Orthocladiinae and Chironominae. Most of the species were cited as widely distributed in the Palearctic region with few Mediterranean (6), Afrotropical (19) or Panpaleotropical (3) species. The list also included five species previously considered Nearctic. An updated list was thereafter prepared and the number of species raised to 391. Species new to science were added in the following years further raising the number of known species. The list of species known to occur in Italy is now updated to 580, and supported by voucher specimens. Most species have a Palearctic distribution, but many species are distributed in other biogeographical regions; 366 species are in common with the East Palearctic region, 281 with the Near East, 248 with North Africa, 213 with the Nearctic, 104 with the Oriental, 23 species with the Neotropical, 23 with the Afrotropical, 16 with the Australian region, and 46 species at present are known to occur only in Italy. On the basis of new findings in Italy and in nearby areas it is stated that the knowledge of chironomid fauna is still incomplete.
INTRODUCTION

Research on Chironomidae in Italy began in 1900 (Bezzi 1918), but with the exception of a few contributions (Marcuzzi 1949) the study of chironomids in Italy had a substantial progress only after the publication of the identification keys for their aquatic stages, larvae and pupae (Ferrarese and Rossaro 1981, Rossaro 1982a, Ferrarese 1983, Nocentini 1985). Information on species presence and distribution was very scanty before 1968, grew slowly up to 1976 and, in the following 30 years, the number of species known from Italy increased steeply. The list of species belonging to the subfamily of Orthocladiinae was reviewed by Rossaro (1979, 1992a) and of other subfamilies by Ferrarese (1982). Thereafter an updated list of species (Boormann et al. 1995, Ferrarese and Rossaro 2001) had been made available on the website of the Checklist of the Italian Fauna (URL 1), but unfortunately, since its publication, the information present in this website has not been updated. Meanwhile revisions of some genera including also the adult stage were carried out (Rossaro 1992b, Rossaro and Lencioni 2000, 2015, Rossaro et al. 2003, Rossaro 2017, Rossaro et al. 2017). In addition, the distribution of chironomids in running waters (Rossaro et al. 2006) and in glacial areas (Rossaro et al. 2016) gave other contributions to the knowledge of Italian fauna. Chironomid research covers systematic, biogeographic and ecological problems. Italy is in the centre of the Mediterranean area, representing a natural bridge between Central Europe and Africa. In Italy, several very different water types and biotopes can be investigated: cold springs, glacier and alpine streams, large lakes (Garda, Maggiore, Como), large rivers (Po, Adige, Ticino, Adda, etc.), Mediterranean streams, brackish waters (Boggero et al. 2017), and coastal lakes. A very long list of species is to be expected and this is indeed the case, although at present the continuous progress suggests that chironomid knowledge is still very incomplete in Italy, as is in other regions including the relatively well studied West Palaearctic area.

The sampling effort pursued during recent decades was well below the need to have a uniform coverage across the country; entire regions such as Calabria and Basilicata are still almost unstudied (Fig. 1), while others were sampled only in very restricted periods (Sardegna, Sicilia). Only Lombardia, Valle d’Aosta, Trentino Alto Adige and Abruzzo were sampled with a reasonable frequency.

Water pollution of domestic and industrial origin, the capture of springs and the creation of reservoirs for water supply are unfavourable factors for the preservation of an autochthonous, highly diversified fauna and there is a serious risk that some species will disappear before being discovered. On the other hand, many eurytopic and euryoecious species may be favoured. The large spread of insecticides and water drainage to fight malaria in the Mediterranean countries after the Second World War significantly reduced the species living in marshes. Global warming with the risk of total disappearance of glacial areas is also a very serious matter of concern.

Chironomids are a very ancient group going back to the Triassic or even earlier (Cranston et al. 2012) so the possibility of dispersion in terms of available time was significant, but the stringent ecological needs of stenoeious species suggest a rather restricted distribution with possible endemism and risk of species extinctions. For this reason, chironomids provide an excellent system to study biogeographic questions.

The aim of the present paper is to give an updated list of the species present in Italy.

MATERIALS AND METHODS

The list of species is based on determinations of adult males when available, but some species are known only on the basis of pupal exuviae; in fewer cases only the larvae are available. Samples were collected with hand-nets, light traps, surface drift nets, and kick samplers (Rossaro 1982a). Larvae were collected alive in
some sites and reared to adults in the laboratory under controlled conditions. In laboratory-reared material, larvae and pupae are associated with adults; this procedure is highly recommended, but requires a lot of experimental effort.

The species identified were mounted on slides according to Wirth and Marston (1968) and Rossaro et al. (2017). Most of the slides are deposited in the corresponding author’s (Rossaro) personal collection. Some voucher specimens are deposited in the Ferrarese personal collection and at the Museo delle Scienze (Trento), 

Sergentia sp. is deposited in the CNR IRSA (Verbania Pallanza) collection and H. mediterraneus is deposited in the Senckenberg Naturmuseum Frankfurt (Germany) (Hirvenoja 1973).

Sampling efforts were made in different Italian regions, but Lombardia has been the most intensively sampled. The sites in which the most intensive sampling was carried out are shown in Figure 1, but sampling was carried out also in many other sites. Each sampling site can include many different stations and covers a large area. In some sampling sites, as in Ortles-Adamello (6), River Po (10), River Taro (12), Parco Nazionale d'Abruzzo (19) (see Figure 1), captures were made throughout the year. Sites sampled only at intervals are not reported in Figure 1.

On the checklist, species names are given as reported in Fauna Europaea (de Jong et al. 2014), following the nomenclature rules proposed by Spies and Sæther (2004). In the cases in which Fauna Europaea names were updated by more recent publications, the new names are given, for example the genus Paratrichocladius Santos-Abreu, 1918 is now

Figure 1. Location of sampling sites in Italy. Only the sites sampled most intensely are indicated. 1. Cold springs and glacial streams in Veny valley (Valle d'Aosta). 2. River Po near Trino Vercellese and Casale Monferrato (Piemonte). 3. River Ticino near Turbigo and Boffalora (Lombardia). 4. Springs near Milano, called "fontanili" and the River Lambro (Lombardia). 5. Prealpine streams near Bergamo (Brembo and Serio) (Lombardia). 6. Ortles-Adamello mountain group sites; many different biotopes, including springs, streams, small lakes, glacial streams (Lombardia, Trentino). 7. Stream Travignolo near Paneveggio (Trentino). 8. River Tagliamento (Friuli). 9. River Bormida (Piemonte). 10. River Po between Piacenza and Cremona (Emilia Romagna). 11. Mantova lakes, along the River Mincio (Lombardia). 12. River Taro and other streams on the northern side of the northern Apennines (Emilia Romagna). 13. Springs in isle of Elba (Toscana). 14. River Potenza near Macerata (Marche). 15. River Aso near San Benedetto del Tronto (Marche). 16. Rivers Nera, Velino (Lazio). 17. Springs in Roma (Lazio). 18. River Aterno (Abruzzo). 19. Springs and streams in Parco Nazionale d'Abruzzo (Abruzzo). 20. Lake Occhito reservoir between Molise and Puglia, and the River Fortore (Molise). 21. Rivers Sele, Tanagro (Campania). 22. Salterns near Lecce (Puglia). 23. Cedrino and other small streams in northern Sardegna. 24. Lake Bidighinzu reservoir (Sardegna). 25. Rio Mannu and brackish waters in southern Sardegna. 26. Nebrodi springs (Sicilia). 27. Lake Dirillo reservoir (Sicilia).
considered a subgenus of *Cricotopus* van der Wulp, 1874 (Cranston and Krosh 2015).

Table 1. Checklist of the chironomid species currently known from Italy, divided by Subfamily (with all capital letters) and Tribe (in initial capital letter).

**TELMATOGETONINAE**

*Thalassomya frauenfeldi* Schiner, 1856

**PODONOMINAE**

Podonomini

*Parochlus kiefferi* (Garrett, 1925)

Boreochlini

*Paraboreochlus minutissimus* (Strobl, 1894)

**TANYPODINAE**

Clinotanypodini

*Clinotanyus nervosus* (Meigen, 1818)

Tanypodini

*Tanypus (Tanypus) kaszatzi* (Kieffer, 1912)
*Tanypus (Tanypus) punctipennis* Meigen, 1818
*Tanypus (Tanypus) vilipennis* (Kieffer, 1918)

Procladiini

*Procladius (Holotanypus) choreus* (Meigen, 1804)
*Procladius (Holotanypus) culiciformis* (Linnaeus, 1767)
*Procladius (Holotanypus) freemani* Sublette, 1964
*Procladius (Holotanypus) Pe 4 sensu Langton, 1991
*Procladius (Holotanypus) sagitallas* (Kieffer, 1909)
*Procladius (Holotanypus) denticulatus* Sublette, 1964
*Procladius (Holotanypus) tatrensis* Gowin, 1944
*Procladius (Psilotanypus) sp.* A sensu Kieffer, 1906

Macropelopiini

*Apsectrotanypus trifascipennis* (Zetterstedt, 1838)
*Macropelopia adusta* Kieffer, 1916
*Macropelopia fahlmanni* (Kieffer, 1912)
*Macropelopia fittkaui* Ferrarese & Ceretti, 1987
*Macropelopia nebulosa* (Meigen, 1804)
*Macropelopia notata* (Meigen, 1818)
*Macropelopia rossaroi* Lencioni & Marziali, 2005

Natarsiini

*Natarsia nugax* (Walker, 1856)
*Natarsia punctata* (Fabricius, 1805)

Pentaneurini

*Telmatopelopia nemorum* (Goetghebuer, 1921)
*Ababesmyia (Ababesmyia) aspera* (Roback, 1959)
*Ababesmyia (Ababesmyia) longistyla* Fittkau, 1962
*Ababesmyia (Ababesmyia) mallochi* (Walley, 1925)
*Ababesmyia (Ababesmyia) monilis* (Linnaeus, 1758)
*Ababesmyia (Ababesmyia) phatta* (Egger, 1864)
*Hayesomyia tripunctata* (Goetghebuer, 1922)
*Xenopelopia falcigera* (Kieffer, 1912)
*Telopelopia fuscigera* (Verneau, 1970)
*Thiemenimmiaia carnea* (Fabricius, 1805)
*Thiemenimmiaia lentiginosa* (Fries, 1823)
*Thiemenimmiaia geijzkesi* (Goetghebuer, 1934)
*Thiemenimmiaia laetitia* (Meigen, 1818)
*Thiemenimmiaia norhumbirica* (Edwards, 1929)

*Thiemenimmiaia vitellina* (Kieffer In Thienemann & Kieffer, 1916)
*Thiemenimmiaia woodi* (Edwards, 1929)
*Trissopelopia longimanus* (Stäger, 1839)
*Krenopelopia sp.* A Alpen sensu Fittkau, 1962
*Krenopelopia binotata* (Wiedemann, 1817)
*Guttipelopia guttipennis* (van der Wulp, 1861)
*Monopelopia teniucalcar* (Kieffer, 1918)
*Paramerina cingulata* (Walker, 1856)
*Paramerina divisa* (Walker, 1856)
*Paramerina sp.* A Griechenland sensu Fittkau, 1962
*Paramerina sp.* B Dolomiten sensu Ferrarese, 1982
*Zavrelimyia barbatipes* (Kieffer, 1911)
*Zavrelimyia berberi* Fittkau, 1962
*Zavrelimyia hirtimanus* (Kieffer, 1918)
*Zavrelimyia melanura* (Meigen, 1804)
*Zavrelimyia nubila* (Meigen, 1818)
*Zavrelimyia punctatissima* (Goetghebuer, 1934)
*Zavrelimyia signatipennis* (Kieffer, 1924)
*Larsia atrocincta* (Goetghebuer, 1942)
*Labrandinia longipalpis* (Goetghebuer, 1921)
*Pentaneurella katterjokki* Fittkau & Murray, 1983
*Nilotanypus dubius* (Meigen, 1804)
*Conchapelopia pallidula* (Meigen, 1818)
*Conchapelopia viator* (Kieffer, 1911)
*Rheopelopia maculipennis* (Zetterstedt, 1838)
*Rheopelopia ornata* (Meigen, 1838)
*Rheopelopia perda* (Roback, 1971)
*Schiniella schineri* (Strobl, 1880)
*Arctopelopia sp.* A sensu Ferrarese, 1995
*Arctopelopia griseipennis* (van der Wulp, 1859)
*Arctopelopia barbataris* (Zetterstedt, 1850)

**BUCHONOMYINAE**

*Buchonomyia thiemenanni* Fittkau, 1955

**DIAMESINAE**

Protanypodini

*Protanypus sp.* A sensu Kieffer, 1906

Boreoheptagyini

*Boreoheptagyia alpicola* Serra-Tosio, 1989
*Boreoheptagyia ortladamellica* Rossaro, 2017
*Boreoheptagyia legeri* (Goetghebuer, 1933)
*Boreoheptagyia monticola* Serra-Tosio, 1964
*Boreoheptagyia rotunda* Serra-Tosio, 1983

Diamesini

*Pseudodiamesa branickii* (Nowicki, 1873)
*Pseudodiamesa nivosa* (Goetghebuer, 1928)
*Systiamesa edwardsi* (Pagast, 1947)
*Systiamesa nigra* Rossaro, 1980
*Diamesa dampfi* (Kieffer, 1924)
*Diamesa permacra* (Walker, 1856)
*Diamesa abertrand* Lundbeck, 1898
*Diamesa incalida* (Walker, 1856)
*Diamesa bertramis* Edwards, 1935
*Diamesa novickiana* Kownacki & Kownacka, 1975
*Diamesa martae* Kownacki & Kownacka, 1980
*Diamesa longipes* Goetghebuer, 1941
*Diamesa goetgeheubri* Pagast, 1947
*Diamesa lindrothi* Goetghebuer, 1931
*Diamesa lattarissi* (Goetghebuer, 1921)
*Diamesa modesta* Serra-Tosio, 1967
*Diamesa laticauda* Serra-Tosio, 1964
*Diamesa wuelkeri* Serra-Tosio, 1964
**ORTHOCADIINAE**

- Diamesa insignipes Kieffer in Kieffer & Thiennemann, 1908
- Diamesa sp. A sensu Rossaro, 1981
- Diamesa cinerella Meigen In Gistl, 1835
- Diamesa tonsa (Walker, 1856)
- Diamesa vailiani Serra-Tosio, 1972
- Diamesa zernyi Edwards, 1933
- Diamesa steinbocki Goetghueber, 1933
- Diamesa starmachii Kovnacki & Kownacka, 1970
- Pseudokiefferiella parva (Edwards, 1932)
- Symphasthia spinifera Serra-Tosio, 1968
- Symphasthia zavrei Pagast, 1947
- Potthastia gaedii (Meigen, 1838)
- Potthastia longimanus (Kieffer, 1922)

**PRODIAMESINAE**

- Monodiamesa bathyphila (Kieffer, 1918)
- Odontomesa fulva (Kieffer, 1919)
- Prodiamesa sp. A sensu Kieffer, 1906
- Prodiamesa olivacea (Meigen, 1818)
- Prodiamesa rufovittata (Meigen, 1830)

**ORTHOCADIINAE**

- Drahtalia potamophylaxi Fittkau & Lellák In Lellák, 1971
- Diplodiadius cultriger Kieffer, 1908
- Brilia longifurca Kieffer, 1921
- Brilia bifida (Kieffer, 1909)
- Euryhypsus annuliventris Malloth, 1915
- Cardioliadius fuscus Kieffer, 1924
- Cardioliadius capucinus (Zetterstedt, 1850)
- Tveneta bavarica (Goetghueber, 1934)
- Tveneta calvescens (Edwards, 1929)
- Tveneta discoloripes (Goetghueber In Thienemann, 1936)
- Tveneta verralli (Edwards, 1929)
- Tokunagaia tonollii Rossaro, 1983
- Tokunagaia rectangularis (Goetghueber, 1940)
- Eukiefferiella pseudomontana Goetghueber, 1935
- Eukiefferiella anelya Svensson, 1986
- Eukiefferiella brehmi Guin, 1943
- Eukiefferiella cypraeata (Kieffer, 1923)
- Eukiefferiella cyanea Thiennemann & Harnisch, 1936
- Eukiefferiella dittmari Lehmann, 1972
- Eukiefferiella graeci (Edwards, 1929)
- Eukiefferiella coerulescens (Kieffer In Zavrel, 1926)
- Eukiefferiella ilkeyensis (Edwards, 1929)
- Eukiefferiella devonica (Edwards, 1929)
- Eukiefferiella minor (Edwards, 1929)
- Eukiefferiella fittkai Lehmann, 1972
- Eukiefferiella brevicalar (Kieffer, 1911)
- Eukiefferiella claripennis (Lundbeck, 1890)
- Eukiefferiella fuldensis Fittkau, 1954
- Eukiefferiella lobifera Goetghueber, 1934
- Eukiefferiella tirolensis Goetghueber, 1938
- Heterotanytarsus apicalis (Kieffer, 1921)
- Psectrocladiadius (Psectrocladiadius) brehmi Kieffer, 1923
- Psectrocladiadius (Psectrocladiadius) sordidellus (Zetterstedt, 1838)
- Psectrocladiadius (Psectrocladiadius) bisetus Goetghueber, 1942
- Psectrocladiadius (Psectrocladiadius) limbatellus (Holmgren, 1869)
- Psectrocladiadius (Psectrocladiadius) octomaculatus Wülker, 1956
- Psectrocladiadius (Psectrocladiadius) psilopterus (Kieffer, 1906)
- Psectrocladiadius (Psectrocladiadius) schulzeri Wülker, 1956
- Psectrocladiadius (Psectrocladiadius) oligosetus Wülker, 1953
- Psectrocladiadius (Psectrocladiadius) oxyura Langton, 1985
- Psectrocladiadius (Allopsectrocladiadius) obvia (Walker, 1856)
- Psectrocladiadius (Allopsectrocladiadius) platypus (Edwards, 1929)
- Rheocricotopus sp. A sensu Thiennemann & Harnisch, 1932
- Rheocricotopus (Psilocricotopus) atripes (Kieffer, 1913)
- Rheocricotopus (Psilocricotopus) gallicus Lehmann, 1969
- Rheocricotopus (Psilocricotopus) glabricollis (Meigen, 1830)
- Rheocricotopus (Psilocricotopus) chalybeatus (Edwards, 1929)
- Rheocricotopus (Rheocricotopus) effusus (Walker, 1856)
- Rheocricotopus (Rheocricotopus) fusiceps Kieffer, 1909
- Paracricotopus niger (Kieffer, 1913)
- Nanocladiadius sp. A sensu Kieffer, 1913
- Nanocladiadius balticus (Palmén, 1959)
- Nanocladiadius dichromus (Kieffer, 1906)
- Nanocladiadius rectinervis (Kieffer, 1911)
- Parorthocladiadius nudipennis (Kieffer, 1908)
- Synorthocladiadius semivirens (Kieffer, 1909)
- Orthocladiadius (Eudactylocladiadius) fusimaculatus (Kieffer in Kieffer & Thiennemann, 1908)
- Orthocladiadius (Eudactylocladiadius) gelidus Kieffer, 1922
- Orthocladiadius (Eudactylocladiadius) priomixtus Sæther, 2004
- Orthocladiadius (Eudactylocladiadius) olivaceus Kieffer, 1911
- Orthocladiadius (Euorthocladiadius) ashei Soponis, 1990
- Orthocladiadius (Euorthocladiadius) luteipes Goetghueber, 1938
- Orthocladiadius (Euorthocladiadius) rivulorum Kieffer, 1921
- Orthocladiadius (Euorthocladiadius) saxosus (Tokunaga, 1939)
- Orthocladiadius (Euorthocladiadius) thienemanni Kieffer, 1906
- Orthocladiadius (Mesorthocladiadius) fridgids (Zetterstedt, 1850)
- Orthocladiadius (Mesorthocladiadius) vailani Cranston, 1991
- Orthocladiadius (Orthocladiadius) excuvatus Brundin, 1956
- Orthocladiadius (Orthocladiadius) glabripennis (Goetghueber, 1921)
- Orthocladiadius (Orthocladiadius) marchetti Rossaro & Prato, 1991
- Orthocladiadius (Orthocladiadius) obliquus (Walker, 1856)
- Orthocladiadius (Orthocladiadius) pedestris Kieffer, 1909
- Orthocladiadius (Orthocladiadius) rhyacobius Kieffer, 1911
- Orthocladiadius (Orthocladiadius) rivinus Kieffer, 1915
- Orthocladiadius (Orthocladiadius) rubiconius (Meigen, 1818)
- Orthocladiadius (Orthocladiadius) wetterensis Brundin, 1956
- Orthocladiadius (Symposiocladiadius) lignicola Kieffer, 1914
- Orthocladiadius (Symposiocladiadius) ruffoi Rossaro & Prato, 1991
- Acriotopus lucens (Zetterstedt, 1850)
- Paracladiadius alpica (Zetterstedt, 1850)
- Paracladiadius conversus (Walker, 1856)
- Cricotopus (Paratrichocladiadius) guadalii (Rossaro, 1990)
- Cricotopus (Paratrichocladiadius) micans (Kieffer, 1918)
- Cricotopus (Paratrichocladiadius) nivalis (Goetghueber, 1938)
- Cricotopus (Paratrichocladiadius) oxellai (Rossaro, 1990)
- Cricotopus (Paratrichocladiadius) skirrithensis (Edwards, 1929)
- Cricotopus (Paratrichocladiadius) veronicae (Rossaro, 1992)
- Cricotopus (Paratrichocladiadius) rufiventris (Rossaro, 1991)
- Cricotopus (Paratrichocladiadius) lanzavecchiaii (Rossaro, 1990)
- Cricotopus (Paratrichocladiadius) ruffoi Rossaro & Prato, 1991
- Halocladiadius (Halocladiadius) varianus (Stäger, 1839)
Halocladius (Halocladius) millenarius (Santos Abreu, 1918)
Halocladius (Halocladius) mediterraneus Hirvenoja, 1973
Cricotopus (Cricotopus) gelidus (Kieffer, 1922)
Cricotopus (Cricotopus) tibialis (Meigen, 1804)
Cricotopus (Cricotopus) algarum (Kieffer, 1911)
Cricotopus (Cricotopus) fuscus (Kieffer, 1924)
Cricotopus (Cricotopus) gr. fuscus sp. A sensu van der Wulp, 1874
Cricotopus (Cricotopus) Pe 8 sensu Langton, 1991
Cricotopus (Cricotopus) pirifer Hirvenoja, 1973
Cricotopus (Cricotopus) curtus Hirvenoja, 1973
Cricotopus (Cricotopus) pulchripes Verral, 1912
Cricotopus (Cricotopus) tremulus (Linnaeus, 1756)
Cricotopus (Cricotopus) gr tremulus sensu van der Wulp, 1874
Cricotopus (Cricotopus) tristis Hirvenoja, 1973
Cricotopus (Cricotopus) sp. A sensu van der Wulp, 1874
Cricotopus (Cricotopus) annulator Goetghhebuer, 1927
Cricotopus (Cricotopus) triannulatus Edwards, 1922
Cricotopus (Cricotopus) cylindraceus (Kieffer in Kieffer & Thienemann, 1908)
Cricotopus (Cricotopus) albiforceps (Kieffer, 1916)
Cricotopus (Cricotopus) festivellus (Kieffer, 1906)
Cricotopus (Cricotopus) vierriensis Goetghebuer, 1935
Cricotopus (Cricotopus) bicinctus (Meigen, 1818)
Cricotopus (Cricotopus) trifascia Edwards, 1929
Cricotopus (Cricotopus) Pe 1 sensu Langton, 1991
Cricotopus (Cricotopus) levantinus Moubayed & Hirvenoja, 1986
Cricotopus (Isocladius) sylvestris (Fabricius, 1794)
Cricotopus (Isocladius) trifasciatus (Meigen In Panzer, 1813)
Cricotopus (Isocladius) reversus Hirvenoja, 1973
Cricotopus (Isocladius) intersectus (Stäger, 1839)
Cricotopus (Isocladius) laricomalis Edwards, 1932
Cricotopus (Isocladius) obtusus (Walker, 1856)
Cricotopus (Isocladius) brevipalpis Kieffer, 1909
Hydrobaenus dentistylius Moubayed, 1985
Hydrobaenus conformis Holmgren, 1869
Hydrobaenus distylus (Kieffer, 1915)
Zalutschia megastyla (Shilova, 1971)
Zalutschia tatica (Pagast In Zavrel & Pagast, 1935)
Metriocnemus eurynotus (Holmgren, 1883)
Metriocnemus fascipes (Meigen, 1818)
Metriocnemus ursinus (Holmgren, 1869)
Thienemannia sp. A sensu Kieffer, 1909
Thienemannia gracilis Kieffer, 1909
Chaetocladius aedeagolobatus Rossaro, 2017
Chaetocladius dentiforceps (Edwards, 1929)
Chaetocladius dissipatus (Edwards, 1929)
Chaetocladius gelidus Brundin, 1956
Chaetocladius gracilis Brundin, 1956
Chaetocladius grandilobus Brundin, 1956
Chaetocladius holmgreeni (Jacobson, 1898)
Chaetocladius laminatus Brundin, 1947
Chaetocladius melaleucus (Meigen, 1830)
Chaetocladius perennis (Meigen, 1830)
Chaetocladius piper (Goetghhebuer, 1913)
Chaetocladius subalpinus Rossaro, 2017
Chaetocladius suecicus (Kieffer In Thienemann & Kieffer, 1916)
Chaetocladius ticinioi Rossaro, 2017
Chaetocladius validostanus Rossaro, 2017
Paratrissocladius excerptus Gouin In Gouin & Thienemann, 1942
Heterotrissocladius grimsbawi (Edwards, 1929)
Heterotrissocladius maereri Brundin, 1949
Heterotrissocladius marcidus (Walker, 1856)
Parametriocnemus sp. A sensu Goetghhebuer, 1932
Paratrissocladius borealpinus Gouin In Gouin & Thienemann, 1942
Parametriocnemus stylatus (Kieffer, 1924)
Psilometriocnemus sp. A sensu Saether, 1969
Psilometriocnemus europaeus Tuiskunen, 1985
Paraphaenocladius sp. A sensu Thienemann, 1924
Paraphaenocladius impensus (Walker, 1856)
Paraphaenocladius irritus (Walker, 1856)
Parakiefferiella bathophila (Kieffer, 1912)
Parakiefferiella dentifera Wülker, 1957
Parakiefferiella gracillima (Kieffer, 1924)
Parakiefferiella wuelkeri Moubayed, 1994
Epoicocladius ephemerae Kieffer, 1924
Krenosmittia borealipina (Goetghhebuer, 1944)
Krenosmittia camptophileps (Edwards, 1929)
Krenosmittia hispanica Wülker, 1957
Acamptocladius reissi Cranston & Saether, 1981
Stilocladius montanus Rossaro, 1979
Rheosmittia spinicornis (Brundin, 1956)
Heleniella dorieri Serra-Tosio, 1967
Heleniella ornaticollis (Edwards, 1929)
Heleniella serratoai Ringe, 1976
Parachaeocladius abnohaeus Wülker, 1959
Limnophyes aagardii Sæther, 1985
Limnophyes algerinus Marcuzzi, 1950
Limnophyes asquamatus Andersen, 1937
Limnophyes bidumus Sæther, 1985
Limnophyes difflicilis Brundin, 1947
Limnophyes madeirae Sæther, 1985
Limnophyes minimus (Meigen, 1818)
Limnophyes natalensis Kieffer, 1914
Limnophyes pentaplastus (Kieffer, 1921)
Limnophyes spinigus Sæther, 1985
Paralimnophyes longiseta (Thienemann, 1919)
Pseudotrissocladius sp. A sensu Goetghhebuer & Lenz, 1943
Pseudotrissocladius curtistylus (Goetghhebuer, 1921)
Pseudotrissocladius uniserratus Sæther & Sublette, 1983
Gymnometriocnemus (Gymnometriocnemus) subnudus (Edwards, 1929)
Gymnometriocnemus (Rhaphidocladius) brumalis (Edwards, 1929)
Bryophaenocladius femineus (Edwards, 1929)
Bryophaenocladius flexidens (Brundin, 1947)
Bryophaenocladius ictericus (Meigen, 1830)
Bryophaenocladius illimibatus (Edwards, 1929)
Bryophaenocladius inconstans (Brundin, 1947)
Bryophaenocladius nidorum (Edwards, 1929)
Bryophaenocladius scanicus (Edwards, 1929)
Bryophaenocladius subvernalis (Edwards, 1929)
Bryophaenocladius tuberculatus (Goetghhebuer, 1921)
Bryophaenocladius vernalis (Goetghhebuer, 1921)
Bryophaenocladius xanthogene (Edwards, 1929)
Parasmittia carinata Sæther, 1950
Georhocladius luteicornis (Goetghhebuer, 1941)
Symbiocladius rhithrogenae Kieffer In Zavrel, 1925
Smittia sp. A sensu Holmgren, 1869
Smittia abruazzae Rossaro & Lencioni, 2000
Smittia alpicola Goetghhebuer, 1941
Tanytarsini (Stempellinina)

CHIRONOMINAE

Tanytarsus eminulus
Tanytarsus ejuncidus
Tanytarsus curticornis
Tanytarsus cretensis
Tanytarsus chinyensis
Tanytarsus buchonius
Tanytarsus brundini
Tanytarsus bathophilus
Stempellina bausei
Stempellinella edwardsi
Stempellinella flavidula
Neozavrelia fuldensis
Zavrelia pentatoma
Corynoneura scutellata
Corynoneura lacustris
Corynoneura fittkaui
Corynoneura gratias
Corynoneura coronata
Corynoneura celtica
Corynoneura arctica
Corynoneura corona
tEdwards, 1929
Corynoneura edwardsi Brundin, 1949
Corynoneura gratias Schlee, 1968
Corynoneura fittkau Schlee, 1968
Corynoneura lacustris Edwards, 1924
Corynoneura lobata Edwards, 1924
Corynoneura scutellata Winnertz, 1846

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Pseudochironomini

Pseudochironomus prasinatus (Stäger, 1839)

Chironomini

Genus near Paratendipes Kieffer, 1911
Paratendipes allimbanus (Meigen, 1818)
Paratendipes nabulus (Meigen, 1830)
Paratendipes nusiquama Edwards, 1929
Paratendipes plebejus (Meigen, 1818)
Microtendipes britteni (Edwards, 1929)
Microtendipes chloris (Meigen, 1818)
Microtendipes diffinis (Edwards, 1929)
Microtendipes pedellus (De Geer, 1776)
Microtendipes rydalensis (Edwards, 1929)
Nilothaula brayi (Goetghebuer, 1921)
Lauterborniella agrayloides (Kieffer, 1911)
Paralauberniella nigrohalteralis (Malloch, 1915)
Pagastiella ophroila (Edwards, 1929)
Sergentia sp. A sensu Kieffer, 1922
Phaenopsclera flavipes (Meigen, 1818)
Phaenopsclera punctipes (Wiedemann, 1817)
Polypleditum (Uresipledium) conviculum (Walker, 1856)
Polypleditum (Uresipledium) cuilletatum Goetghebuer, 1931
Polypleditum (Pentapleditum) nabens (Edwards, 1929)
Polypleditum (Pentapleditum) sordens (van der Wulp, 1874)
Polypleditum (Pentapleditum) tritum (Walker, 1856)
Polypleditum (Pentapleditum) uncinatum (Goetghebuer, 1921)
Polypleditum (Tripodura) acifer Townes, 1945
Polypleditum (Tripodura) aegyptium Kieffer, 1925
Polypleditum (Tripodura) aphelbecki (Strobl, 1901)
Polypleditum (Tripodura) hicrenatum Kieffer, 1921
Polypleditum (Tripodura) pullum (Zetterstedt, 1838)
Polypleditum (Tripodura) quadriguttatum Kieffer, 1921
Polypleditum (Tripodura) scalenum (Schrank, 1803)
Polypleditum (Polypleditum) acutum Kieffer, 1915
Polypleditum (Polypleditum) albicorne (Meigen, 1838)
Polypleditum (Polypleditum) laetum (Meigen, 1818)
Polypleditum (Polypleditum) lene Becker, 1908
Polypleditum (Polypleditum) nubeculosum (Meigen, 1804)
Polypleditum (Polypleditum) nubifer (Skeuse, 1889)
Polypleditum (Polypleditum) pedestr (Meigen, 1830)
Polypleditum sp. A sensu Kieffer, 1912
Lipiniella aeraenica Shilova, 1961
Endochironomus alpinipennis (Meigen, 1830)
Endochironomus tendens (Fabricius, 1775)
Synendotendipes dispars (Meigen, 1830)
Synendotendipes impar (Walker, 1856)
Stictochironomus maculipennis (Meigen, 1818)
Stictochironomus pictulus (Meigen, 1830)
Stenochironomus (Stenochironomus) gibbus (Fabricius, 1794)

Stenochironomus (Stenochironomus) ranzi Rossaro, 1982
Stenochironomus (Stenochironomus) spatuliger Kieffer, 1922
Flearia lacustris Kieffer, 1924
Dicrotendipes lobiger (Kieffer, 1921)
Dicrotendipes nervosus (Stäger, 1839)
Dicrotendipes notatus (Meigen, 1818)
Dicrotendipes pinguicuandus (Kieffer, 1924)
Dicrotendipes pulsus (Walker, 1856)
Dicrotendipes tritomus (Kieffer In Thienemann & Kieffer, 1916)
Glyptotendipes (Caulochironomus) folicola Kieffer, 1918
Glyptotendipes (Caulochironomus) imbecilis (Walker, 1856)
Glyptotendipes (Heynototendipes) signatus (Kieffer, 1909)
Glyptotendipes (Glyptotendipes) cauliginellus (Kieffer, 1913)
Glyptotendipes (Glyptotendipes) palens (Meigen, 1804)
Glyptotendipes (Glyptotendipes) peripipes (Edwards, 1929)
Benthalia carbonaria (Meigen, 1804)
Chiromon (Lobochironomus) dorsalis Meigen, 1818
Chiromon (Chiromon) tentans Fabricius, 1805
Chiromon (Camptochoironomus) sp. A sensu Malloch, 1915
Chiromon (Chiromon) alpesis Goetghebuer, 1934
Chiromon (Chiromon) sp. A sensu Meigen, 1803
Chiromon (Chiromon) annularis Meigen, 1818
Chiromon (Chiromon) aceriphilus Tokunaga, 1939
Chiromon (Chiromon) anthracicus Zetterstedt, 1860
Chiromon (Chiromon) venustus Pinder, 1978
Chiromon (Chiromon) apilitens Meigen, 1818
Chiromon (Chiromon) caliperpus Kieffer, 1908
Chiromon (Chiromon) luridus Strenzke, 1959
Chiromon (Chiromon) melanos Keyl, 1961
Chiromon (Chiromon) obtusidens Goetghebuer, 1921
Chiromon (Chiromon) plumosus (Linneus, 1758)
Chiromon (Chiromon) riparius Meigen, 1804
Chiromon (Chiromon) salinae Kieffer in
Thienemann, 1915
Chiromon (Chiromon) lugubris Zetterstedt, 1850
Chiromon (Chiromon) praxitus Meigen, 1804
Chiromon (Chiromon) pseudothommi Strenzke, 1959
Kiefferus tendipediformis (Goetghebuer, 1921)
Kloosia pusilla (Linneus, 1767)
Baeotendipes notitivagus (Kieffer, 1911)
Einfeldia pagana (Meigen, 1838)
Xenochironomus xenolabis (Kieffer, 1916)
Cyphomella cornea Sæther, 1977
Cladopelma bicarinatum (Brundin, 1947)
Cladopelma edwardsi (Kruseman, 1933)
Cladopelma virescens (Meigen, 1818)
Cladopelma viridulum (Linneus, 1767)
Cryptotendipes holsatus Lenz, 1959
Cryptotendipes pseudotener (Goetghebuer, 1922)
Microchironomus tener (Kieffer, 1818)
Parachironomus gracilior (Kieffer, 1918)
Parachironomus bionbulatus (Stäger, 1939)
Parachironomus cinctellus (Goetghebuer, 1921)
Parachironomus frequens (Johannsen, 1905)
Parachironomus parilis (Walker, 1856)
Parachironomus monochromus (Lenz, 1921)
Parachironomus varus (Goetghebuer, 1921)
Parachironomus vitiosus (Goetghebuer, 1921)
Acalcarella sp. A sensu Shilova, 1955
Paracladopelma nigritulum Goetghebuer, 1942
Paracladopelma laminatum (Kieffer, 1921)
Paracladopelma mikianum (Goetghebuer in Goetghebuer & Lenz, 1937)
Paracladopelma camptolabii (Kieffer, 1913)
Beckidia tethys (Townes, 1945)
Beckidia zabolotzskyi (Goetghebuer, 1938)
Harnischia angularis Albu & Botnariuc, 1966
Harnischia curtillamellata (Malloch, 1915)
Harnischia fuscimanus (Kieffer, 1921)
Cryptochironomus albofasciatus (Stäger, 1839)
Cryptochironomus defectus (Kieffer, 1913)
Cryptochironomus obreptans (Walker, 1856)
Cryptochironomus rostratus Kieffer, 1921
Cryptochironomus supplicans (Meigen, 1830)
Saetheria reissi Jackson, 1977
Chernovskiia macrocera Sæther, 1977
Robackia demeijrei (Kruseman, 1933)
Robackia sp. A sensu Sæther, 1977
Demicryptochironomus vulneratus (Zetterstedt, 1838)

RESULTS

A total of 580 species are now known to occur in Italy (Table 1, Table 2) and their distributions in Europe and in areas outside Europe are cited on the Fauna Europaea website (de Jong et al. 2014, URL 5). Other 28 species were previously cited as occurring in Italy (Boormann et al. 1995, Ferrarese and Rossaro 2001), but at present we consider these species as misidentifications.

The discussion about the distribution of species is based on the information present in the Fauna Europaea website (URL 5), but this information has been updated considering contributions published later (Bitušík and Trnková 2019).

Most of the species of the Italian fauna are widespread in the Palearctic region, only some of them have more restricted areas of distribution. As expected the majority of the species are shared with nearby European countries (483 with Germany, 463 with France, 436 with Austria, 411 with the British Isles, 409 with The Netherlands, 368 with Spain, 365 with Sweden, 347 with Ireland, and 345 with Poland).

Outside of Europe, 366 species are shared with the East Palearctic region, 281 with the near East, 248 with North Africa, 213 with the Nearctic Region, 104 with the Oriental region, 23 with the Neotropical region, 23 with the Afrotropical, and 16 with the Australian region. Interestingly, 46 species are known to occur only in Italy.

It is well accepted that chironomid species distribution can be explained both by ecological and by biogeographical reasons. Cold-stenothermal species are restricted to highlands (most Diamesinae and a part of Orthocladiinae): species belonging to these two subfamilies are widespread in the Alps (Region 4) (Illies 1978, Fittkau and Reiss 1978, Griffith 2006), and many of them are also present in cold countries of Northern Europe. For some species a boreo-alpine vicariance has been proposed: Diamesa arctica (Boheman, 1865) is restricted to Scandinavia, while D. goetghebueri to the Alps, but new findings such as the presence of D. lindrothi in the Alps, contradicted the hypothesis that this species was restricted to the Arctic. Many species found in the Alps are not present in the Apennines, this is likely linked to the lack of glaciers in the latter (Rossaro et al. 2006).

The progress of knowledge in recent decades has been intensive. Three species (Syndiamesa nigra, Tokunagaia tonolii and Stilocladius montanus) were first reported as present only on the southern side of the Italian Alps, but not on the northern one (Rossaro 1988); S. montanus was also cited as present in the Apennines (Rossaro 1984). This supported the existence of cold-stenothermal species with an endemic distribution on the southern side of the Alps or with a wider southern distribution. To support this hypothesis it was observed that there were other cold-stenothermal species in the Mediterranean area belonging to the cold-stenothermal genus Diamesa (Rossaro and Lencioni 2015, Montagna et al. 2016a) as D. lavilleii Serra-Tosio, 1970 and D. thomasi Serra-Tosio, 1970 cited to be known only from the Pyrenees (Serra-Tosio 1973). To contradict this hypothesis new findings were highlighted; for example, D. veletensis Serra-Tosio, 1971 previously considered endemic from the Sierra
Nevada (Spain) was later captured in the Atlas Mountains (Morocco) and in Mongolia, suggesting that the cited species has a much wider distribution including southern and oriental parts of the Palearctic Region (Serra-Tosio 1983). *Diamesa thomasi* was captured in Germany and Poland and *D. lavillei* in the Near East and Caucasus. The area of distribution of *T. tonollii* has been enlarged including England, Scandinavia and the Far East (Makarchenko and Makarchenko 2007) and the area of distribution of *S. montanus* was enlarged to include the northern side of the Alps, Spain, Germany, and Slovakia. The capture of other species of *Stilocladius* (*S. clinopecten* Sæther, 1982) in the southeastern United States, *S. intermedius* and *S. orientalis* Makarchenko et Makarchenko, 2003 (Wang 1998, Makarchenko and Makarchenko 2003) in the Eastern Palaearctic, Eastern European Russia and Finland, further supported the evidence of a much wider distribution of these species. To sum up, even if the existence of endemic species cannot be excluded, the progression of knowledge suggests a large area of distribution for many species.

The lack of substantial differences in species composition of lakes on the northern and southern sides of the Alps convinced us that the Alps are not a zoogeographical barrier for chironomids, as suggested half a century ago (Reiss 1968) and confirmed by more recent contributions (Reiss 1986b, Laville and Serra-Tosio 1996, URL 2, URL 3).

The percentage of Mediterranean, Afro- and Panpaleotropical species in Italy is of interest. The chironomids from the Mediterranean area are estimated to contain 22.7% of Palearctic Mediterranean species and 9% of Ethiopian species (Reiss 1977). Prat (1979, 1980), Moubayed and Laville (1983) and Reiss (1985, 1986a) provided lists of species from single countries within the Mediterranean area but observed low percentages of endemic Mediterranean species. Some species are confirmed to be endemic to the Mediterranean area including North Africa and the Near East: *Zavrelimyia beriberi, Boreoheptagyia cinctipes* (Edwards, 1928), *Cricotopus (Cricotopus) levantinus, Krenosnmitia hispanica, Paratanaytarsus mediterraneus*. In any case, some species are not restricted to the Mediterranean area, but are present in other areas outside Europe. *Cricotopus (Paratrichocladius) micans* for example is present in six Mediterranean countries, the Near East and North Africa and is present in the Afrotropical region, and *Cricotopus (Paratrichocladius) lanzavecchiai* is present in Italy, France, Near East and Eastern Palaearctic China (Fu et al. 2012).

The halobiont species *Baeotendipes noctivagus* and *Halocladus millenarius* were included in the Mediterranean faunal component (Reiss 1977), but the former species is now also known from Bulgaria, Romania and Ukraine, while the latter is also present in the Canary Islands. Another *Halocladus* species is cited from Italy (*H. mediterraneus*), Corsica, Near East, Spain, Madeira Isle, so this species seems restricted to the Mediterranean area and Madeira. Other species captured in Italy and previously considered endemic Mediterranean species (Reiss 1977), but now known to have a more extended area, are: *Virgatanytarsus albisutus*, present also in Madeira, Canary Islands and Portugal, *Polypedilum acifer* Townes, 1945 which results widespread in Europe and present also in the Nearctic, while *Harnischia angularis* is widespread in Europe and present also in the Eastern Palaearctic and Oriental regions.

About Afro- and Panpaleotropical species, two species previously known with a Panpaleotropical distribution (Reiss 1985, 1986a) now extend their presence to the Mediterranean region and are restricted to southern areas in Italy. They are *Chironomus calipterus*, found in Sardegna, and *Dirotendipes peringueyanus*, in Sicily. *Polypedilum aegyptium* was supposed to have an Afrotropical distribution, but was collected in northern Italy (Rossaro 1988); after a revision of the species it was discovered that it
had been captured also in Sweden and in other 14 European countries. *Pseudosmittia subtrilobata* was supposed to be an Afrotropical species, but was captured in Sardegna (Boormann et al. 1995); a re-examination of the material deposited in the corresponding author’s collection suggests *P. subtrilobata* is a junior synonym of *P. trilobata* even if they are both still considered valid species (Ferrington and Sæther 2011). Another formerly supposed Afrotropical species is *Tanytarsus formosanus* Kieffer, 1911 (= *T. horni* Goetghebuer, 1934), reported from Sicilia by Reiss (1977) and recently captured in other 7 European countries, as in Oriental and Australian regions; yet, no voucher specimens are available in the corresponding author’s collection so its presence in Italy should be confirmed.

The following species are reported only from Italy in Fauna Europaea, but they are present outside Europe in other regions: *Cricotopus (Paratrichocladius) pierfrancescoi* presently known from the Eastern Palaearctic; *Euryhopsis annuliventris* present in the Nearctic, *Hydrobaenus dentistylius* present in the Near East, *Limnophyes algerinus* present in North Africa, *Stenochironomus spatuliger* known to occur in different Afrotropical countries (Freeman 1957), and that was captured in Italy in River Mincio (Mantova lakes).

About *Polypedilum (Tripodura) pruina* Freeman, 1954, it is of interest to emphasize that it was considered a valid species and not a junior synonym of *P. (T.) aegyptium* (Chattopadhyay 2000); if accepted as a valid species, *P. (T.) pruina* should be an Oriental species but could be present also in Italy. Another species with an interesting distribution is *Polypedilum nubifer*, apparently originating in the Australian region, but now present almost worldwide, except in the Afrotropical and Neotropical regions. It is an invasive species, recently found in the Nearctic (Wallace et al. 2009); its absence from the Afrotropical region should be confirmed because of its similarity with some Afrotropical species (Cranston et al. 2016); in Italy, it was collected in rice fields (Nocentini 1985, Ferrarese 1992, Rossaro and Cortesi 2013). It is interesting to note that a few species, such as *Rheopelopia perda* and *Saetheria reissi*, formerly reported as Nearctic, were later found in Europe including Italy, *Euryhopsis annuliventris* is still reported only in the Nearctic and in Italy.

The following species were described as new to science (Rossaro 1982b, Rossaro and Lencioni 2000, Rossaro et al. 2017, Rossaro 2017) and at present are reported only from Italy: *Boreheptagyia ortaladamellica, Chaetocladius aedeagolobatus, Chaetocladius subalpinus, Chaetocladius ticinoi, Chaetocladius valdostanus, Smittia abruzzae, Stenochironomus ranzii*. Other species new to science captured the first time in Italy are now known from a few other countries: *Orthocladius marchetti* from Germany, *S. alpilong*a from Finland, *Syndiamesa nigra* from Corsica, and *P. corsicanus* initially described from Corsica is now known from Italy (in Molgora, a stream near Milano).

Some notes on some species given in Table 1 and whose presence in Italy was unexpected are here added.

*Procladius (Holotanypus) fremani*: this species was known in North America (Roback 1971) but more recently it was collected in the Russian Far East (URL 4), its presence in Italy (Fucino) is supported by an adult male with associated exuvia and suggests a major range expansion of this species.

*Procladius (Holotanypus) denticulatus*: this species is currently known only from the Nearctic (Roback 1971) and in Italy (Milano Botanical garden) where only pupal exuviae were collected; its presence should be considered as a tentative identification.

*Ablabesmyia (Ablabesmyia) aspera*: formerly known only from the Nearctic (Roback 1971). The capture of an adult male in Italy in a disused clay quarry (Oasi Le Foppe, Lombardia) extends its range in the world.
Ablabesmyia (Ablabesmyia) mallochi: known from the Nearctic (Roback 1971) and from the East European Russia (URL 5), now captured in Italy (Lake Dirillo reservoir, Sicilia).

Chaetocladius holmgreni: it appears to be a northern species present in Sweden and in Svalbard, its presence in Italy is supported by an adult male captured in the River Aso in Central Apennines.

Cricotopus gelidus: a northern species, a male was captured in Italy near a glacial stream (Estellette glacier), but it is also known from Romania and Austria.

Heterotrissocladius maereri: a northern species, only pupal exuviae from Italy (Bors glacial stream, Monte Rosa); its identification should be confirmed.

Limnophyes aagardii: northern species, but extended to the Russian Far East, and collected as adult males in Sardegna near a spring (Rio Mannu, Sardegna).

Orthocladius (Eudactylocladius) priomixtus: apparently widespread but not generally confirmed in Europe, it was identified on the basis of an adult male collected in the River Acqualba in Northern Italy.

Psilometriocnemus europaeus: a northern species captured near a glacial stream in Adamello mountain group (Vedreta Lobbia).

Pseudorthocladius uniserratus: this species is described as Nearctic (Saether and Sublette 1983), only exuviae found in Italy (Lake Variola, Piemonte), but the species can be easily recognized on the basis of exuviae alone.

Boreoheptagyia ortladamellica: present in the Alps in Ortles Adamello mountain group. Its presence in other sites must be confirmed.

Chironomus (Chironomus) lugubris: with a northern European distribution, but known also from Switzerland and Hungary, in Italy captured in Oasi Le Foppe (Lombardia).

Beckidia tethys: described from Nearctic (Saether 1977), but present in Italy (River Po) and in the Balkans; another species of the same genus, B. zabolotzskyi was just known from Palaearctic including the Russian Far East.

CONCLUSIONS

Chironomids have represented important contributions in the development of biogeographic theories. They were a critical group in supporting transantarctic relationships (Brundin 1966), but unfortunately the lack of knowledge and uncertain information from large areas suggests caution in drawing conclusions about the significance of their distributions. As emphasized above, new findings often extended the distribution of some species greatly (Rossaro 1995). The examples given above for S. montanus and D. veletensis are instructive. In contrast, the discovery of new species with very restricted distribution suggests that the family may contain both widespread and very restricted distribution species. More extensive knowledge of chironomid species distributions is very desirable, at present there are many unexplored regions (see Figure 1 for Italy) and sampling was often concentrated in restricted areas. The resolution of many taxonomic questions will profit from molecular analysis (Montagna et al. 2016b), but new collections accompanied by traditional morphological analysis remain essential.

In conclusion, it can be stated that present knowledge is far from complete. Some regions in the Western Palaearctic are very well studied and revision of checklists is rather recent; 598 species were reported from France in 1990 (Serra-Tosio and Laville 1991), raised to 646 in a 1996 updated list (Laville and Serra-Tosio 1996); a species list from Corsica updated in 2012 included 368 species (Moubayed and Ashe 2012); a checklist of species in Germany updated in 2014 listed 987 species (Orendt et al. 2014); 780 species were reported from Finland updated in 2014.
(Paasivirta 2014). Some countries in the Western Palaearctic are not well studied, even if recently some efforts were made; for example, the fauna of Albania included 35-40 species before a recent update (Bituššik and Trnková 2019) raising it to 85-90 species. Recent research (Plóciennik and Pešić 2012; Plóciennik et al. 2014, 2016) updated to 30 the list of species present in Montenegro, 77 in Croatia and 36 in Bosnia-Herzegovina. The Italian fauna checklist rose from 391 (in 2002) to 580 (in 2019) with the present contribution, but despite efforts species number is still low in comparison to nearby countries (Germany, France).

Table 2. A list of the voucher Chironomid specimens deposited in different collections (one voucher specimen per species is provided here). Column names are as follows: Codespec: abbreviated species name. Stage: stage of the voucher specimen present in the collection as L = Larva, Pe = pupal exuvia, M = adult male. Collection: abbreviated name of the collections as R = corresponding author personal collection, F = Ferrarese personal collection, T = MUSE (Trento Museum) collection, SNF = Senckenberg Naturmuseum Frankfurt collection, CNR IRSA = Verbania, Water Research Institute collection. Sampling date: sampling date of the voucher specimen. Locality: sampling station (river, lake, spring, etc.). Codesample: more detailed sampling site name. UTM-long and UTM-lat: longitude and latitude expressed as Universal Transverse Mercator zone 32.

| Codespec               | Stage | Collection | Sampling date | Locality      | Codesample | UTM-long | UTM-lat |
|-----------------------|-------|------------|---------------|---------------|------------|----------|---------|
| T_frauenfeldi         | L     | F          | 1989.VIII.25  | Udine         | Lignano    | 819947   | 5067853 |
| P_kiefferi            | M     | T          | 2016.VIII.5   | Amola         | Amola      | 633080  | 5118514 |
| P_minutissimus        | M     | T          | 2003.VI.16    | Bolzano       | Bad Säss  | 688581  | 5162072 |
| C_nervosus            | L     | R          | 1978.XI.8     | PoCremona     | CRTNconcanavig | 571269 | 4993342 |
| T_T_kraatz            | L     | F          | 1978.VII.15   | PoPiacenza    | DCO22A    | 570493  | 4992088 |
| T_T_punctipennis      | MPe   | R          | 1978.XI.21    | PoCremona     | CRTN      | 571218  | 4993370 |
| T_T_vilipennis        | L     | R          | 1967.XI.10    | PoVercelli    | TrinoC2   | 444645  | 5002554 |
| P_H_choreus           | M     | R          | 1980.V.26     | PoCremona     | CRTNconcanavig | 571269 | 4993342 |
| P_H_culiciformis      | L     | R          | 1994.IV.1     | Orta          | Orta      | 452689  | 5075484 |
| P_H_fremani           | MPe   | R          | 1989.V.5      | Fucino       | FucinoCa  | 874712  | 4674619 |
| P_H_Pe 4              | MPe   | R          | 1991.XII.30   | Aterno        | Aterno    | 857967  | 4699723 |
| P_H_sagittalis        | M     | R          | 1995.XII.4    | MaggioreVares e | Magg30Angera | 467223 | 5068528 |
| P_H_denticulatus      | Pe    | R          | 2002.III.20   | Milano        | OrtoBotanico | 518361 | 5035791 |
| P_H_tatrensis         | Pe    | R          | 1987.VI.15    | Lys           | Varga     | 415559  | 5053976 |
| Procladius_Psilotanypus_spA | L     | R          | 1982.I.6     | PoPiacenza    | DCO62I    | 567578  | 4993863 |
| A_trifascipennis      | PeL   | R          | 1980.VI.30    | Oiona         | QuintoRomano | 505212 | 5034890 |
| M_aduacta             | MPe   | R          | 2016.II.16    | Milano        | MilanoAllevDeFNS | 518171 | 5035890 |
| M_fehlmanni           | Pe    | R          | 1982.I.10    | ComoComo      | Como01Piona | 526211 | 5108134 |
| M_fittkaui            | Pe    | F          | 1984.VI.08    | Passo Gavia   | S.Apollonia | 615706 | 5128697 |
| M_nebulosa            | MPe   | R          | 1986.VI.4     | Milano        | MilanoCelorla26 | 518230 | 5035914 |
| M_notata              | Pe    | R          | 1989.IX.30    | Aterno        | Aterno    | 857967  | 4699723 |
| M_rossaroi            | M     | T          | 2003.X.16     | Amola         | Amola     | 633080  | 5118514 |
| P_varius              | MPe   | R          | 1980.V.15     | AddaBergamo   | CorennoPlinio | 524170 | 5041020 |
| N_nugax               | L     | R          | 1990.V.4      | Ofanto        | Ofanto1L  | 1014965 | 4546227 |
| N_punctata            | L     | F          | 1978.VII.15   | Avisio        | Misurina  | 789569  | 5162298 |
| T_neumour             | L     | F          | 1981.IV.5     | PoPiacenza    | DCO22A    | 570493  | 4992088 |
| A_A.aspera            | M     | R          | 2010.IX.8     | AddaMilano    | OasiLEpoppe01 | 539786 | 5016808 |
| A_A.longistyla        | M     | R          | 1986.IV.14    | MantovaSup    | MantovaBesutti | 641545 | 4999432 |
| A_A_mallochi          | MPe   | R          | 1984.IX.27    | Dirillo       | Dirillo125 | 1005111 | 4123980 |
| A_A_monilis           | M     | R          | 1995.VII.14   | ComoComo      | Como350nno | 523700 | 5083321 |
| A_A_phatta            | L     | F          | 1978.VII.15   | PoPiacenza    | DCO22A    | 570493  | 4992088 |
| H_tripunctata         | L     | R          | 2003.VI.26    | TicinoMilano  | TicCast5  | 482342  | 5037704 |
| X_falcigeri           | PeM   | R          | 1983.III.21   | Milano        | Milanonordparco | 515866 | 5039811 |

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T. fascigera  Pe  R  1986.VIII.6  PotenzaMacerta  Groane  Potenza13  878102  4818597
T. carnea  MPe  R  2002.IV.23  Taro  Taro2Cv  552575  4926848
T. lentiginosa  M  R  2016.I.10  Milano  MilanoAllevDeF  NS  5135890
T. gejsklesi  M  R  1988.VIII.6  Avisio  Paneveggio  712885  5129515
T. laeta  L  R  2002.III.28  AddaLo  Comazzo1  539192  5018345
T. northumbrica  Pe  R  1986.VIII.6  PotenzaMacerta  Groane  Potenza13  878102  4818597
T. vitellina  Pe  R  2002.VII.1  Taro  Taro5  594500  4962000
T. woodi  Pe  R  1982.IV.18  Gleno  BremboBr  546629  5072907
T. longimanus  M  R  1990.IV.1  Aterno  Veraspring01  867141  4700417
Krenop_Alpen  Pe  R  1988.VIII.5  Avisio  Travignolo1  701635  5131948
K. binotata  MPe  R  1984.IX.-  Arno  Barber  701008  4856489
G. guttipennis  Pe  R  2004.VI.2  Segrino  Segrino51  520640  5072553
M. temucalcar  PeM  R  1986.VIII.30  Milano  MilanoVCeloria20  518119  5035967
P. cingulata  M  R  1996.X.23  Olena  Campo_dei_Fiori  487090  5092306
P. divisa  M  R  1996.VI.1  ComoComo  Como35Onno  523700  5083321
Paramerina_Griechenland  Pe  R  1984.VI.14  Agogna  Cameri  473957  5038645
Paramerina_spB_Dolomiten_sensu_Ferrarese  Pe  R  2004.IV.14  Avisio  MalgaCiapela  723591  5145516
Z. barbatipes  Pe  R  1979.IX.14  Olena  SettMilanese  504121  5035671
Z. berberi  MPe  R  1990.VIII.8  Aterno  Veraspring01  867141  4700417
Z. hirtimanus  MPe  R  1992.III.22  Aterno  Vetoio  859058  4699334
Z. melanura  M  R  1989.X.30  Aterno  Aterno  857967  4699723
Z. nubila  PeF  R  1987.VII.17  Toce  Variolasup  438928  5114153
Z. punctatissima  Pe  R  1990.IX.5  Zittola  ZittF5  923764  4632066
Z. signatipennis  MPe  R  1979.XII.30  Arno  ElbaMCalamita  609211  4728448
L. acroicentra  L  R  1986.III.27  Cedrino  Siniscola  559243  4492818
L. longipalpis  L  F  1995.VI.24  Catania  Grammichele  998897  4135006
P. katterjokki  L  F  2009.I.15  Como  Como staz 20  505897  5074082
N. dubius  L  R  1988.VIII.5  Avisio  Paneveggio  712885  5129515
C. pallidula  M  R  1977.VII.12  Olena  SettMilanese  504121  5035671
C. viator  M  R  1990.VI.24  Aterno  Veraspring01  867141  4700417
R. maculipennis  M  R  1986.IV.21  MantovaSup  MantovaPtaPrete  641545  4999432
R. ornata  M  R  1979.VII.6  PoCremona  CRTNconcavag  571269  4993342
R. perda  Pe  R  1986.IV.1  Cedrino  Siniscola  559243  4492818
S. schineri  Pe  R  1994.VI.18  Avisio  Fiave  642644  5096224
Arcetopelopia_spA  L  R  1991.IV.9  AdigeBZ  Braies  736653  5175805
A. griseipennis  M  R  1992.IV.12  Aterno  Vetoio  859058  4699334
A. barbitarsis  L  F  1978.VII.15  PoPiacenza  DC022A  570493  4992088
B. thienemanni  Pe  R  2002.VII.3  Taro  Taro2Cm  552307  4926989
Protanypus_spA  L  R  2011.VII.-  Palu  Palu  549870  5122190
B. alpicola_spC  M  R  1996.IX.7  Estellette  CdSeigne3bis  332169  5070368
B. ortladamellica  Pe  R  1977.II.28  Gallavesa  Gallavesa  537551  5073888
B. legeri  L  R  1988.VIII.5  Avisio  Paneveggio  712885  5129515
B. monticola  Pe  R  1978.VI.9  AltoOgio  Temu  612869  5122614
B. rotunda  M  R  1988.VIII.5  Avisio  Paneveggio  712885  5129515
P. branickii  MPe  R  1979.IX.8  Adamello  Aviolo00b  609268  5116531
P. nivosa  MPe  R  1984.IX.-  Metebianco_Mi age_Combatol  334391  5071364
Snd_edwarlsi  M  R  1997.VIII.16  Disgrazia  Bignami  573147  5130940
S. nigra  Pe  R  1980.VII.20  AltoOgio  SApollsorgsopra  615524  5128571
D. dampafl  M  R  1995.IX.16  Lys  Gressoney_St_Jaques  408029  5078131
D. permacra  MPe  R  1976.II.28  Acqualba  Acqualba02  449489  5075773
D. aberrata  MPe  R  2003.IX.17  Sforzellina  Gaviasforz1  615524  5128571
D. incallida  MPe  R  1979.VII.9  Adamello  Aviolo01  609179  5116498
D. bertramii  M  R  2001.IX.18  Forni  Formig  620489  5141848
D. nowickiana  MPe  R  1990.IX.13  Presena  Presenaalphatorrag  623419  5122224
| Species                  | Author(s)             | Date       | Location 1       | Location 2       |
|-------------------------|-----------------------|------------|------------------|------------------|
| D. martae               | M T                   | 2014.VIII.11 | Amola            | AmolaAM1         |
| D. longipes             | M R                   | 1978.VIII.12 | Venerocolo       | Bnd04a           |
| D. goethhebueri         | M R                   | 1978.VIII.12 | Venerocolo       | Bnd04k           |
| D. lindrothi            | PeM                   | 1995.IX.10  | Estellette       | RifElisabetta    |
| D. lattiaris            | M Pe R                | 2013.IX.25  | Forni            | Formig           |
| D. modesta              | M                     | 2001.IX.18  | Sforzellina      | GaviaBerni2      |
| D. laticauda            | M                     | 1998.IX.11  | Estellette       | RifElisabetta    |
| D. wuceleri             | M Pe R                | 1978.VIII.12 | Venerocolo       | Bnd04k           |
| D. insignipes           | M Pe R                | 1980.II.29  | Nure             | Nure             |
| Diamesa_spA            | L R                   | 1978.IV.14  | Presanella       | Volpaia          |
| D. cinerella            | M Pe R                | 2001.IX.18  | Sforzellina      | GaviaBerni2      |
| D. tonsa                | M PeL R               | 1979.VII.   | AltoOglio        | Vezza2           |
| D. vaillanti            | M                     | 2001.IX.18  | Sforzellina      | GaviaBerni2      |
| D. zernyi               | M                     | 2001.IX.18  | Sforzellina      | GaviaBerni2      |
| D. steinboecki          | L R                   | 1978.IX.25  | Adamello         | Venerocolo       |
| D. starmachi            | L R                   | 2007.XII.28 | Presanella       | Volpaia          |
| P. parva                | M Pe R                | 2013.VIII.21| Forni            | Formig           |
| S. spinifera            | M PeL R               | 1981.I.15   | TicinoMilano     | TicinoBoff       |
| S. zavrelli             | L R                   | 1986.I.2    | Cedrino          | Siniscola         |
| P. gaedii               | M Pe R                | 1995.II.16  | TicinoNO         | TicOleggio       |
| P. longimanus           | M Pe R                | 1981.I.15   | TicinoMilano     | TicinoBoff       |
| M. bathyphila           | L R                   | 2008.VI.10  | Vernago          | Vernago           |
| O. fulva                | L R                   | 1996.X.28   | Lambro           | Lamb09La         |
| Prodiamesa_spA          | Pe R                  | 1978.VIII.19| Tonale           | Capriolilake     |
| P. olivaceae            | M Pe R                | 1989.VI.5   | Aterno           | Aterno           |
| P. rufovittata          | Pe R                  | 1981.VI.6   | PoPiacenza       | DC022A           |
| D. potamophylaxi        | L F                   | 1993.VII.11 | val Pusteria     | Fundres          |
| D. cultriger            | M R                   | 1985.IX.26  | MeBianco_Mil     | Combalou          |
| B. longifurca           | M Pe R                | 1977.VIII.31| Gallavesa        | Gallavesa        |
| B. bifida               | M R                   | 1996.II.9   | ComoComo         | Como10Bellagio   |
| E. annuliventris        | M R                   | 1985.V.11   | TicinoMilano     | TicinoBoff       |
| C. fuscus               | L R                   | 1986.III.13 | AddaCremona      | AddaRivolta1     |
| C. capucinus            | M R                   | 1979.VIII.14| Mandrione         | RifBedoleValGen  |
| T. bavarica             | M Pe R                | 2001.IX.18  | Sforzellina      | Dosegu42         |
| T. calvenses            | M R                   | 1996.IX.7   | Estellette       | CdSeigne2bis     |
| T. discoloripes         | Pe R                  | 1990.IV.17  | Velino           | Velino           |
| T. verralli             | Pe R                  | 2004.XII.1  | GardaBrescia     | Garda01Rivalit   |
| T. tonollii             | M R                   | 1983.VI.26  | AddaSondrio      | ChiareggGhPorul  |
| T. rectangularis        | M R                   | 2003.IX.17  | Sforzellina      | Gaviassorz1      |
| E. pseudomontana        | Pe R                  | 1979.III.27 | Bidente          | Bidente          |
| E. ancaia               | Pe R                  | 2001.IX.17  | Toro             | Toro1            |
| E. brehmi               | L R                   | 1992.V.26   | Zittola          | ZittF1           |
| E. clypeata             | Pe R                  | 2001.XII.4  | AddaCremona      | AddaRivolta1     |
| E. cyanea               | Pe R                  | 2003.III.4  | Toro             | Toro3CN          |
| E. dittmani             | M Pe R                | 1980.XI.4   | Endine           | Gaiano01         |
| E. gracei               | M R                   | 1985.IX.16  | AddaSondrio      | RifViolaAEM      |
| E. coerulescens         | M R                   | 1977.IX.8   | Gallavesa        | Gallavesa        |
| E. ikleyensis           | M R                   | 1978.IV.30  | rioMannu         | rioMannu         |
| E. devonica             | L R                   | 1977.VIII.14| Stelvio          | StelBrual        |
| E. minor                | Pe R                  | 1978.I.26   | Lambro           | Lamb03La         |
| E. fitkau               | M R                   | 1978.III.25 | AltoOglio        | Vezza2           |
| E. brevicalcar          | M R                   | 1985.IX.16  | AddaSondrio      | Adda00           |
| E. claripesiennis       | M R                   | 1990.V.29   | Brasimone        | Brasimone        |
| E. fuldensis            | M Pe R                | 1990.IX.17  | Mandrione         | RifBedoleValGen  |
| E. lobifera             | Pe R                  | 1978.VII.12 | PoVercellii      | TrinoA3          |
| E. tirolensis           | Pe R                  | 1978.III.4  | AltoOglio        | Vezza2           |
| H. apicalis             | M R                   | 1995.VII.7  | Miage            | Miatargobiera    |
| P_P. brehmi             | M R                   | 1984.IX.14  | Ofanto           | Torremag         |
| P_P. sordidellus        | M R                   | 1995.XI.20  | MaggioreVaresca  | Magg30Angera     |

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| Species                        | Country   | Province | City       | Date     |
|-------------------------------|-----------|----------|------------|----------|
| C. C. algarum                 | M         | R        | Aterno     | 1992.V.13|
| C. C. fuscus                  | MPe       | R        | Asso01     | 1981.III.21|
| Cricotopus gr_fuscus_sp      | M         | R        | TovelPM    | 1988.VIII.3|
| Cricotopus Pe_8               | Pe        | R        | Sangro     | 1988.XI.11|
| C. C. pictus                  | Pe        | R        | AdigeTN    | 1991.IX.4|
| C. C. pulcheripes             | MPe       | R        | VezzafontanaA | 1978.IV.23|
| C. C. tremulux                | MPe       | R        | Vezza2     | 1979.IX.8|
| Cricotopus gr_tremulus_spA   | L         | R        | Aterno     | 1990.IV.1|
| Cricotopus Cricotopus_s      | Pe        | R        | Vezza2     | 1978.VIII.24|
| C. C. tristis                 | M         | R        | DC073      | 1982.V.7.7|
| C. C. annulator               | MPe       | R        | Lambro     | 1978.VI.27|
| C. C. triannulatus            | M         | R        | Como350mno | 1996.VI.17|
| C. C. cylindraceus            | Pe F      | R        | Udaia      | 1991.IV.4|
| C. C. albiforescens           | M         | R        | Como350mno | 1995.X.21|
| C. C. festivellus             | M         | R        | Molentargius | 1978.IV.29|
| C. C. vieriensis              | MPe       | R        | TicC5      | 2003.IX.24|
| C. C. bicinctus               | MPe       | R        | Molgora    | 2016.XII.27|
| C. C. trifascia               | M         | R        | Limito     | 1995.XI.9|
| Cricotopus Pe_1               | Pe        | R        | TicC5      | 2003.VI.9|
| C. C. levantinus              | M         | R        | DCO71      | 1988.XI.11|
| C. I. sylvestris              | M         | R        | PoPiacenza | 1982.V.5|
| C. I. trifasciatus            | M         | R        | Limito     | 1977.V.2|
| C. I. reversus                | Pe R      | R        | Garlate    | 2004.X.24|
| H. dentistylus               | M         | R        | Scanno     | 1978.V.20|
| H. conformis                  | M         | R        | PNA08      | 1992.IV.22|
| H. distylus                   | L         | R        | Cremona    | 1978.XI.21|
| Z. megastyla                  | Pe R      | R        | Pesena     | 1978.VIII.4|
| Z. tatraica                   | M         | R        | ValViola   | 1985.VI.14|
| M. eurynotus                  | MPe       | R        | SApollsorg1 | 1980.II.24|
| M. fuscipes                   | M         | R        | SettMilanese | 1978.III.15|
| M. urinus                     | MPe       | R        | ZittF5     | 1991.XI.27|
| Thiennemanni_spA              | M         | R        | Aterno     | 1989.V.3|
| T. gracilis                   | M         | R        | Aterno     | 1992.I.23|
| C. aedeagolobatus             | M         | R        | Miage      | 1995.IX.10|
| C. dentiforceps               | MPe       | R        | Sforzella  | 2001.IX.18|
| C. dissipatus                 | M         | R        | Estillette | 1997.IX.4|
| C. gracilis                   | M         | R        | Estillette | 1977.XII.3|
| C. grandilobus                | M         | R        | AltoOglio  | 2014.IV.18|
| C. holmogreni                 | M         | R        | Aterno     | 1979.III.28|
| C. laminatus                  | MPe       | R        | Lambro     | 1978.I.20|
| C. melaleucus                 | M         | R        | Aterno     | 1979.XI.7|
| C. perennis                   | MPe       | R        | Mandrone   | 1990.IX.13|
| C. piger                      | M         | R        | Aterno     | 1997.II.10|
| C. subalpinus                 | MPe       | R        | Varese     | 1997.IX.14|
| C. suecicus                   | MPe       | R        | AltoOglio  | 1978.III.25|
| C. ticinaii                   | M         | R        | Aterno     | 1994.III.30|
| C. valdostanus                | MPe       | R        | Estillette | 1997.IX.13|
| P. excerptus                  | M         | R        | Aterno     | 1992.V.27|
| H. grimmshavi                 | MPe       | R        | Sangro     | 1978.V.21|
| H. mareri                     | Pe R      | R        | MteRosa    | 1978.VII.27|
| H. marcidus                   | MPe       | R        | PoTO       | 1981.VIII.1|
| Species                          | Author | Date    | Location | Genus          | Code      | Code            |
|---------------------------------|--------|---------|----------|----------------|-----------|----------------|
| Parametriocnemus_spA            | MPe    | R       | 1981.III.5 | Magra          | Abetone  | Ps 65997       |
| P._borealpinus                  | MPe    | R       | 1978.VI.10 | AltoOGlio      | SApoli    | 651524         |
| P._stylatus                     | M      | R       | 1987.IV.15 | Reno           | PdVen    | 659977         |
| Psilocetiocnemus_spA            | MPe    | R       | 2013.VIII.21 | Forni        | Formig   | 620489         |
| P._europeus                     | M      | R       | 1990.IX.12 | Mandrone       | LobiaVedretta | 622751       |
| Paraphaenocladius_spA           | M      | R       | 1978.VII.10 | AltoOGlio      | CividatCamuno | 606727         |
| P._impenus                      | M      | R       | 1986.IV.21 | MantovaSup     | MantovaBelfiore | 641545         |
| P._irritus                      | M      | R       | 1990.IX.12 | Mandrone       | LobbiaVedretta | 622751       |
| P._bathophila                   | M      | R       | 1994.IV.7  | Orta           | Orta     | 452689         |
| P._dentifera                    | Pc     | R       | 2004.IX.28 | Tovel          | Tovel12m  | 650248         |
| P._gracillima                   | MPE    | L       | 1981.III.2 | Magra          | AbetonePeso | 635997         |
| P._spD_Walker                   | Pe     | R       | 2003.V.13  | Tarro          | Tarro3CN  | 573000         |
| E._epimeerae                    | M      | R       | 1986.V.8   | MantovaSup     | MantovaBelfiore | 641545         |
| K._borealpina                   | MPe    | R       | 1997.VII.29 | AddaSondrio    | ChiareggGhPorl a | 559393       |
| K._campthopleps                 | M      | R       | 1978.V.21  | Tasso          | PNA11     | 904671         |
| K._hispanica                    | Pe     | R       | 1986.VIII.6 | PotenzaMacera  | Potenza06 | 859400         |
| A._reissi                       | L      | F       | 1991.IX.4  | Avisio         | Udai     | 707395         |
| S._montanus                     | MPe    | R       | 2014.IV.4  | Presanella     | Baita_Velon | 627124         |
| R._spinicornis                  | MPe    | R       | 1975.VI.1  | PPlacencia     | DC022A   | 570493         |
| H._dorieri                      | MPe    | R       | 2014.III.28 | Presanella     | Baita_Velon | 627124         |
| H._ornaticollis                 | MPe    | R       | 1978.VI.10 | AltoOGlio      | SapollrusC1 | 617231         |
| H._serratosoiyi                 | MPe    | R       | 1980.IX.21 | Cervino        | Cervin_e_t  | 393244         |
| P._abnoaeus                      | L      | R       | 1977.VI.18 | Livongo        | Foscanogo | 593140         |
| L._aagardi                      | M      | R       | 1978.III.1 | rioMannu       | STeraAvisi | 513088         |
| L._algerinus                    | M      | R       | 1990.II.17 | Zittola        | ZiffS      | 923764         |
| L._asquamatus                   | M      | R       | 1995.VII.7  | MiBiancoMi age_Combal | Combalau | 334391         |
| L._bidimus                      | M      | R       | 1978.VII.30 | AltoOGlio      | Frigidolfol | 616851         |
| L._difficilis                   | M      | R       | 1987.VI.30 | Lys            | Lys1fronteghiacchio | 406854         |
| L._madeira                       | M      | R       | 1992.IV.22 | Tasso          | PNA10     | 906135         |
| L._minimus                      | M      | R       | 1995.X.21  | ComoComo       | Como35Onno | 523700         |
| L._nataenesis                   | M      | R       | 1978.VII.30 | AltoOGlio      | Frigidolfol | 616851         |
| L._pentaplastus                 | MPe    | R       | 1981.V.15  | PoVercellli    | Morano    | 451155         |
| L._spinigus                     | M      | R       | 1992.X.30  | Aterno         | Vetoio    | 859058         |
| L._longiseta                    | M      | R       | 1992.VII.14 | Aterno         | Vetoio    | 859058         |
| Pseudorhochladus_spA            | M      | R       | 1989.V.3   | Aterno         | Vera      | 867092         |
| P._curtisius                    | M      | R       | 1989.V.3   | Aterno         | Vera      | 867092         |
| P._unserratus                   | Pe     | R       | 1987.VII.17 | Toce           | Variolainf | 439536         |
| G._G._subnudus                  | M      | R       | 1979.III.27 | Bidente        | Bidente   | 733199         |
| G._R._brunalis                  | M      | R       | 1990.IX.11 | Mandrone       | RifBedoleValGenova | 623091         |
| B._femineus                     | M      | R       | 1985.VII.17 | AddaSondrio    | ValViola | 604062         |
| B._flexidens                    | L      | R       | 1986.III.8  | PotenzaMacera  | Potenza09 | 872396         |
| B._ictericus                    | M      | R       | 2004.IV.3  | AnnoneEst      | Annone    | 527310         |
| B._illimatus                    | M      | R       | 1992.VII.28 | Aterno         | Vetoio    | 859058         |
| B._inconstans                   | M      | R       | 2004.IX.22 | Forni          | Fornia    | 620394         |
| B._nidorum                      | M      | R       | 1985.VI.15  | TicinoMLano    | TicinoBoff | 484665         |
| B._scanicus                     | M      | R       | 1978.V.19  | Sangro          | PNA02fontanaSS83 | 898127         |
| B._subvernalis                   | M      | R       | 1988.XI.11 | Sangro         | Sangro09 | 918567         |
| B._tuberculatus                 | M      | R       | 1992.X.30  | Aterno         | Vetoio    | 859058         |
| B._vermalis                     | M      | R       | 1996.IX.29  | ComoComo       | Como35Onno | 523700         |
| B._xanthogyne                   | M      | R       | 1996.IX.24  | Carealto       | carC5    | 626285         |
| P._carinata                     | M      | R       | 1979.III.27 | Bidente        | Bidente   | 733199         |
| G._luteicornis                  | Pe     | F       | 1992.VI.18  | Verbania       | ValOnsernone | 460876         |
| S._rhythrogenae                 | L      | R       | 1989.V.28  | Agogna         | Agogna04b | 467462         |
| Smitteria_spA                  | M      | R       | 1994.IV.1   | Orta           | Orta     | 452689         |
| S._abruzzae                     | M      | R       | 1992.IV.22 | Scanno         | PNA08Pescassereo | 903686         |
| S._alplicola                    | M      | R       | 1978.V.3   | PoPiacenza     | IsSerafiniCattivell | 571320         |

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T. ejunctidus  Pe R  2003.VIII.23  GardaBrescia  Garda46SirmGrCattullo  625707  5039722
T. eminus  M R  2016.X.29  Lambro  Lamb08Me  518672  5070470
T. excavatus  M R  1996.IX.10  Varese  VareseSchiranna  483302  5071733
T. gibbosiceps  MPe R  1979.XII.30  Arno  ElbaMCalamita  609211  4728448
T. gracilens  Pe R  2004.III.22  Iseo  IseoSarnico  574536  5056353
T. gregarius  Pe R  1995.V.1  MaggioneVares  e  467223  5068528
T. heudesi  M R  2018.IV.19  AddaLC  Curone  530323  5060630
T. inaequalis  Pe R  1995.III.2  MaggioneVares e  467223  5068528
T. lestagei  M R  2004.IV.27  MaggioneVares e  469336  5063754
T. mendax  M R  1996.VI.5  Varese  VareseSchiranna  483302  5071733
T. miriforceps  MPe R  2005.IV.6  Lamar  Lamar  659332  5107182
T. nemorosus  Pe R  2004.IV.8  Montorfano  Montorfano  510738  5070196
T. nigricollis  M R  1986.IV.8  MantovaSup  MantovaPtaPrete  641545  4999432
T. paletta  M R  1989.VII.31  Brasimone  Brasimone  669194  4887903
T. pallidicornis  Pe R  1984.IX.14  Ofanto  Torremag  1022953  4635666
Tanytarsus Pe23_Langton  n
T. signatus  Pe R  1986.IV.1  Cedrino  Siniscola  559243  4492818
T. sinuat us  M R  1995.VII.7  MetBianco_Mi age_Combal  334391  5071364
T. sylvaticus  M R  1996.II.13  MaggioneVares e  467223  5068528
T. usmaensis  M R  2009.III.17  Milano  OrtoBotanico  518361  5035791
T. volgensis  MPe R  1978.IX.21  PoPiacenza  DC022A  570493  4992088
V. albiscutus  MPe R  2002.VIII.30  Taro  Taro5  594500  4962000
V. arduennensis  MPe R  2016.V.31  Milano  InverigoLagoon  470860  5083575
V. triangularis  MPe R  1998.IX.28  Quiliano  QuilianoSolco  449005  4904297
C. atridorsum  M R  1989.IV.24  TeverePG  TevSovara  767687  4799507
C. muncus  M R  1986.IX.16  MantovaSup  MantovaBelfiore  641545  4999432
C. nigrovittatus  M R  1985.V.11  TicinoMilano  TicinoBoff  484665  5032855
C. vanderwulpi  M R  2017.IV.19  Lambro  Lamb05SC  519023  5076193
R. ringei  M R  1984.VI.12  Dirillo  Dirillo  100511  4139890
R. curtistylus  MPe R  1979.VII.  Coghinas  Gologoni  545815  4462198
R. nigricauda  M R  1989.VII.24  Brasimone  Brasimone  669194  4887903
R. pellucidus  MPe R  1998.X.24  Quiliano  Dano  451570  4904412
R. pentapoda  MPe R  1976.V.30  Acqualba  Acqualba02  449489  5075773
R. photophilus  M R  1989.V.5  Pescara  Gizio  909259  4663301
R. reissi  M R  1986.III.8  PotenzaMacera ta  Potenza07  862786  4809622
R. rhenus  M R  1985.V.25  TicinoMilano  TicinoBoff  484665  5032855
Paratanytarsus spA  Pe R  2004.VI.1  GardaBrescia  Garda21Padenghe  618397  5039143
P. austriacus  M R  1997.IX.14  MetBianco_Mi age_Combal  334391  5071364
P. bituberculatus  M R  2009.IV.24  Milano  OrtoBotanico  518361  5035791
P. corsicanus  M R  2012.X.9  AddaLC  Molgora  530613  5041608
P. dissimilis  M R  1986.IV.8  MantovaSup  MantovaPtaPrete  641545  4999432
P. grimmii  L R  1976  Trebia  PiaArda26  571898  4976514
P. hyperboerus  Pe R  1988.VIII.6  Avisio  Paneveggio  712885  5129515
P. inopertus  M R  1992.I.23  Aterno  Vetoio  859058  4699334
P. lacophilus  Pe R  2004.III.19  GardaBrescia  Garda50Peschiera  631591  5034162
P. laetipes  M R  1982.VI.22  GardaBrescia  Garda46Sirmione  625665  5040038
P. lauterborni  M R  1977.VIII.12  Olona  SettMilanese  504121  5035671
P. mediterraneus  M R  1986.VI.13  MantovaMezzo  MantovaMezzo  641437  5003452
P. navig  M R  2009.III.22  Agogna  Rile  468067  5024198
P. penicillatus  Pe F  1996  Avisio  Udi  707395  5148429
P. tenellulus  M R  1986.IV.14  MantovaSup  MantovaPtaPrete  641545  4999432
P. tenuis  M R  1995.X.21  ComoComo  Como350mo  523700  5083321
M. appendicida  Pe R  1976.VIII.12  Gallavese  Gallavese  537551  5073888

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P._P._acutum  M R  1978.IV.23  Presanella  Stavel  627964  5126164
P._P._albicorne  MPeL R  1976.VI.-  Acqualba  Acqualba02  449489  5075773
P._P._laetum  MPe R  1982.IV.19  Brembo  BremboAlm  546934  5065510
P._P._lene  M R  2001.VI.18  Milano  OasiLipu  510278  5052140
P._P._nubeculosum  M R  1995.VII.1  MaggioneVares  e  Magg30Angera  467223  5068528
P._P._nubifer  M R  2017.III.15  AddaLC  Curone  530323  5066036
P._P._pedestre  M R  1983.VI.6  Olona  SettMilanese  504121  5035671
Polypedilum_Pe_1  Pe R  1991.IV.9  Bacchiglione  Ferrarese  673948  5088492
L._araenica  L R  2006.X.5  Milano  CavaCaMorta  505565  5069712
E._albipennis  Pe R  1994.IV.27  Varese  VareseSchiranna2  483302  5071733
E._tendens  M R  1984.VII.9  Endine  Endine  573105  5069667
S._dispar  L R  1974.VII.26  PoPiacenza  IsSerPc  517564  4994569
S._impars  M R  1995.VII.7  Mige  Mige  334131  5071516
Ste._maculipennis  Pe R  1982.V.17  PoPiacenza  DC0621  567578  4993863
S._pictus  M R  1995.X.7  ComoComo  Como35Onno  523700  5083321
S._gibbus  M R  2004.VIII.3  Lugano  LuganoPorlezza  498709  5094041
S._ranzii  M R  1982.VII.6  PoPiacenza  DC073  570823  4992986
S._spatuliger  M R  1986.V.8  MantovaSup  MantovaPra  641545  4999432
F._lacustris  L R  2006.V.3  Viverone  ViveroneVTI1II  452298  5028684
D._lobiger  M R  1988.VIII.3  Tovel  TovelPM  650303  5125065
D._nervosus  L R  1987.V.12  Varese  VareseSchiranna2  483302  5071733
D._notatus  MPe R  2009.VIII.14  Milano  AllevamentoBiodi  p
D._peringueyanus  M R  1983.X.6  Dirillo  Dirillo125  1005111  4123980
D._pulsus  M R  1996.VI.15  ComoComo  Como35Onno  523700  5083321
D._tritomus  Pe R  2004.VI.22  Lugano  LuganoPorlezza  498709  5094041
G._C._folicola  Pe R  2005.IX.28  AnnoneEst  AnnoneE01  526888  5073664
G._C._imbecilis  Pe R  2001.IX.10  GardaBrescia  Garda50schiera  lit
G._H._signatus  Pe R  2004.VI.22  Montorfano  Montorfano  510738  5070196
G._G._cauliginellus  MPe R  1981.I.15  PoPiacenza  IsSerfiniCattivel  i
G._G._pallens  M R  1995.IX.21  MaggioreVares  e  Magg30Angera  467223  5068528
G._G._paripes  L F  1978.---  PoPiacenza  DC022A  570493  4992088
B._carbonaria  L R  2005.III.17  AnnoneEst  AnnoneE07  527182  5073692
C._L._dorsalis  MPe R  2010.IV.27  AddaMilano  OasiLeFoppe01  559786  5051680
C._C._tentans  M R  1982.III.26  PoPiacenza  DC073  570823  4992986
C._C._pseudomaculipennis  MPe R  1995.IX.21  Trebbia  Bobbiofio  531655  4957200
Chironomus_spA  Pe R  2004.VI.3  Garlate  Garlate  532270  5072531
C._C._anularius  MPe R  1997.IV.8  Trebbia  Bobbiofio  531655  4957200
C._C._acribiphilus  chrom R  1993.III.24  Toce  Toce01  446435  5105763
C._C._anthracinus  M R  1996.X.31  Monate  Monate370  473415  5071716
C._C._venustus  M R  2005.IV.3  Caldonazzo  Caldonazzo  673408  5099231
C._C._aprilinus  MPe R  2016.I.26  Secchia  Poiano  614494  4915686
C._C._calipetrum  MPe R  1979.VII.2  rioMannu  PulaFoce  501348  4317627
C._C._luridus  MPe R  1997.III.19  Trebbia  Bobbiofio  531655  4957200
C._C._melanotus  MPe R  2000.III.10  PoPiacenza  IsSerfiniCattivel  i
C._C._obtusidens  chrom R  2006.XII.4  PoPiacenza  IsSerfiniCattivel  i
C._C._plumosus  MPe R  2006.VII.10  Milano  AllevamentoBiodi  p
C._C._riparius  MPe R  1982.IV.18  Brembo  BremboClan  ezz0  561912  5098159
C._C._salinarus  chrom R  2016.V.25  Lecce  Lecce  1281713  4516495
C._C._lugubris  M R  2010.IX.9  AddaMilano  OasiLeFoppe03  539786  5051680
C._C._prasinus  MPe R  1980.XII.18  PoCremona  CRTCnconavig  571269  4993342
K._tendipediformis  M R  1981.IV.23  PoCremona  CRTCnpb1  571166  4993338
K._pusilla  Pe R  1981.VIII.31  PoPiacenza  DC022L  570493  4992088
B._nigrovagus  M R  1978.IX.6  rioMannu  Molel  502876  4344594
E._pagana  L F  1978  PoPiacenza  DC022A  570493  4992088

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| Species                  | Genus | Record Year | Location | Unique ID |
|-------------------------|-------|-------------|----------|-----------|
| X_xenolabris            | M R   | 1986.X.9    | MantovaSup | 641545   |
| C_cornea                | L F   | 1981        | MantovaPtaPrete | 4999432 |
| C_bicornaturnum         | Pe R  | 2004.V.11   | Segrino   | 520640   |
| Cladopelma_edwardsi     | Pe R  | 2004.IX.30  | Segrino51 | 5075253  |
| C_virescens             | M R   | 1996.VII.1  | VareseSchiranna2 | 483302  |
| C_viridulum             | MPe R | 1996.I.4    | Varese    | 5071733  |
| C_holsatus              | L R   | 2005.IV.6   | Lamar     | 5107182  |
| C_pseudotener           | Pe R  | 2003.V.13   | Taro      | 4962000  |
| M_tener                 | M R   | 1986.V.8    | MantovaSup | 641545   |
| P_gracilior             | Pe R  | 2004.IX.20  | Monate822 | 5070929  |
| P_biannullatus          | Pe R  | 2004.VI.23  | Isoe      | 5056535  |
| P_cinctellus            | M R   | 1994.IV.27  | VareseSchiranna2 | 483302  |
| P_frequens              | Pe R  | 2004.VI.1   | GardaBrescia | 626038   |
| P_parilis               | MPe R | 1980.VI.15  | AddaMilano | 539786   |
| P_monochromus           | M R   | 1982.VI.23  | Viverone2A | 424549   |
| P_varus                 | MPe R | 2006.V.3    | Monate    | 473629   |
| P_vitiosus              | Pe R  | 2004.VI.16  | Mignone   | 4653385  |
| Acalcarella_spA         | L R   | 1990.IX.16  | GardaBrescia | 626127   |
| P_nigrimentum           | Pe R  | 2004.VII.30 | TicinoMilano | 482342  |
| P_mikianum              | Pe R  | 1979.IX.8   | Pisgana   | 607753   |
| P_camptolabis           | Pe R  | 2004.V.20   | MaggioreVares | 469336   |
| B_tethys                | M R   | 1981.VII.15 | PoPiacenza | 567578   |
| B_zabolotskyi           | MPe R | 1979.IX.4   | PoPiacenza | 570493   |
| H_angularis             | M R   | 1981.IV.23  | PoCremona | 571269   |
| H_curtillameletta       | Pe R  | 1978.IX.21  | PoPiacenza | 570493   |
| H_fuscinusans           | M R   | 1986.V.8    | MantovaMezzo | 641730  |
| C_albofasciatus         | M R   | 1986.V.20   | MantovaSup | 641545   |
| C_defectus              | Pe R  | 2004.VI.7   | Varese    | 5073420  |
| C_obreptans             | Pe R  | 2004.VII.12 | VareseSchiranna | 483302  |
| C_rostratus             | MPe R | 1981.I.15   | PoPiacenza | 571168   |
| C_suppliancs            | MPe R | 1978.I.18   | PoPiacenza | 571168   |
| Saetheria_reissi        | PeM R | 1986.VIII.6 | PotenzaMacera ta | 878102  |
| C_macrora               | L F   | 1978.-   .- | PoPiacenza | 570493   |
| R_demeijrei             | MPeL R | 1980.VII.14 | PoPiacenza | 575998   |
| Robackia_spA            | Pe R  | 1980.IX.15  | PoPiacenza | 570493   |
| D_vulneratus            | Pe R  | 2004.VII.30 | GardaBrescia | 623421   |

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