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A Contribution to the knowledge of Chironomids in Italy

(Diptera, Chironomidae)

By **B. Rossaro**

Abstract

In recent years Chironomid research in Italy has developed greatly. 359 species have been recorded. The subfamilies are represented by 42 Tanypodinae, 23 Diamesinae, 3 Prodiamesinae, 143 Orthocladiinae, 148 Chironominae, 59 belong to the tribe Tanytarsini and 89 to Chironomini. Another 45 taxa tentatively identified must be added to these. Most species are widely distributed in the Palearctic region. Few Mediterranean (6), Afrotropical (5) or Pan-paleotropical (3) species have been found. The list includes five previously considered to be Nearctic species, which have Holarctic distribution according to the present evidence.

Introduction

Chironomid research in Italy is very active. In the last ten years the number of species known to be present has gone up steeply. Information was very scanty before 1968, grew slowly up to 1976, then quickly. One important stimulus has been a series of volumes with identification keys for the aquatic fauna published by the Italian National Research Council (C.N.R.). Four volumes deal with Chironomids: Ferrarese & Rossaro (1981), Rossaro (1982), Ferrarese (1983) & Nocentini (1985). Only the larvae of all subfamilies and the pupal exuviae of all subfamilies except Chironominae are considered in these volumes. The literature about Chironomids in Italy has been reviewed by Rossaro (1979) and Ferrarese (1982).

The interests in Chironomid research are three. There are systematic, zoogeographic and ecological problems that stimulate the study. Italy is in the centre of the Mediterranean area and is a natural bridge between Central Europe and Africa. There are several very different biotopes in Italy: cold springs and glacier streams in the Alps, large lakes in the pre-Alps (Garda, Maggiore, Como), rivers in the Padana lowland (Po, Adige, Ticino, Adda, etc.), Mediterranean streams in central and southern Italy. A very long list of species was to be expected and this is indeed the case, although at present it is very incomplete. The first reason is that no extensive sampling effort has been made. Pollution is the second reason. The capture of springs and the creation of reservoirs for water supply are also unfavourable factors for the preservation of autochthonous, highly diversified fauna. Eury-topic and eury-ecious species are favoured. The large spread of insecticides and water drainage to fight malaria in the Mediterranean countries after the second World War destroyed the species living in marshes. Obviously, pollution is not exclusive to Italy, but in some very urbanized areas it has certainly drastically modified the species composition, favouring the more common ones more than elsewhere. The massive development of *Chironomus salinarius* in the Venetian and Orbetello lagoons is an example (Ali & Majori 1984).

The list of species in a country must be continuously updated, as new species are captured. Genera are submitted to revision, synonyms are created, species change names obeying the principle of priority. Some species can be easily identified thanks to peculiar morphological characters, but it is diffi-

Fig. 1. Location of sampling sites in Italy. Only the sites sampled most intensely indicated.

1– Cold springs and glacier streams in Aosta valley (Valle d'Aosta)
2– Ortles-Adamello group; many different biotopes, springs, streams, small lakes, all above 1 000 m, etc. (Lombardia and Trentino-Alto Adige)
3– the Ticino river near Turbigo and Boffalora (Lombardia)
4– Springs near Milano, called "fontanili" and the Lambro (Lombardia)
5– prealpine streams near Bergamo (Brembo and Serina) (Lombardia)
6– the Po River near Trino Vercellese (Torino) and Casale Monferrato (Piemonte)
7– the Po River between Piacenza and Cremona (Emilia Romagna)
8– Mantova lakes, along the Mincio river (Mantova) (Lombardia)
9– Reno and other streams on the northern side of the northern Apennines (Emilia Romagna)
10– the Potenza near Macerata (Marche)
11– the Aso near San Benedetto del Tronto (Marche)
12– Springs and streams in Parco Nazionale Abruzzi (Abruzzi e Molise)
13– Occhito artificial basin between Molise and Puglia, and the Fortore in Molise
14– the Cedrino and other small stream in northern Sardinia (Sardegna)
15– Rio Mannu and brackish waters in southern Sardinia (Sardegna)
16– Dirillo artificial basin and the Dirillo (Sicilia)

cult to give names to species belonging to genera that requiere revision such as *Chaetocladius, Bryophaenocladius, Smittia, Micropsectra atrofasciata* group, *Microtendipes, Cryptochironomus,* etc.. Therefore, the list in this paper represents only a transitory phase in our developing knowledge.

Methods, sampling sites

The list of species is based on determinations on adult males in most cases. Sometimes determinations are made on pupal exuviae. Larvae were obtained alive from some sites (always from sites 4 and 7, sometimes from other sites, see Figure 1) and reared to adults in the laboratory. In laboratory-reared material one can associate larvae and pupae with the adults and this procedure is highly recommended. For species determination in the genus *Chironomus,* salivary gland chromosomal analysis was carried out *C. annularius, C. anthracinus, C. melanotus* and *C. riparius* were identified by this technique.

Sampling efforts were made in different regions in Italy, but Lombardia has been the most intensively sampled. Figure 1 is a map showing the sites at which the most intensive sampling was carried out. Each sampling site includes many different stations and covers a large area. In each sampling site, captures were made throughout the year. Sites that were sampled only at intervals are not reported in Figure 1.

Collecting was done with hand-nets, light traps, surface drift nets.

Results and Discussion

Table 1 lists the known species in Italy. It has been necessary to separate them into the following groups:

1– Species well described and identifiable: within this group, we further separate:

1a– species present in the author's collection (Department of Biology, University of Milan): they are marked with + in Table 1;

1b– species as 1a, new for Italian fauna: they are marked with =;

1c–species reported in the literature as present in Italy, but not in the author's collection; this material is deposited in different collections and it has not been possible for the author to verify the validity of all these findings. All these species are marked with £. In this group, species determinations before 1950 are especially dubious.

2– Species whose presence is unsure because:

2a– determinations were made on ill-preserved specimens or only pre-imaginal stages are available;

2b – species belong to genera that require revision.

Species belonging to 2a– and 2b– are marked with *.

Table 1: Chironomidae taxa from Italy (see text for explanation)

Tanypodinae

\+ *Clinotanypus nervosus* (Mg.)
£ *Tanypus kraatzi* (K.)
\+ *T. punctipennis* (Mg.)
\+ *T. villipennis* (K.)
* *Procladius choreus* (Mg.)
* *P. sagittalis* K.
\+ *Apsectrotanypus trifascipennis* (Zett.)
\+ *Macropelopia fehlmanni* (K.)
£ *M. goetghebueri* (K.)
\+ *M. nebulosa* (Mg.)
£ *M. notata* (Mg.)
\+ *M.* sp. Schweiz
£ *Natarsia punctata* (Fabr.)
\+ *Psectrotanypus varius* (Fabr.)
\+ *Alabesmyia longistyla* Fitt.
£ *A. monilis* (L.)
\+ *Arctopelopia griseipennis* (v. d. W.)
\+ *Krenopelopia binotata* (Wied.)
£ *Conchapelopia melanops* (Wied.)
\+ *C. pallidula* (Mg.)
\+ *Monopelopia tenuicalcar* (K.)
\+ *Paramerina divisa* (Walk.)
\+ *P. cingulata* (Walk.)

* *P.* sp. A
= *Rheopelopia acra* Roback
= *R. maculipennis* (Zett.)
\+ *R. ornata* (Mg.)
= *Telopelopia fascigera* Verneaux
= *Thienemannimyia carnea* (Fabr.)
= *T. fuscipes* (Edw.)
\+ *T. geijskesi* (G.)
= *T. northumbrica* (Edw.)
£ *T. pseudocarnea* Murray
= *T. woodi* (Edw.)
\+ *Xenopelopia falcigera* (K.)
= *Telmatopelopia nemorum* (G.)
£ *Trissepelopia longimana* (Staeg.)
\+ *Zavrelimyia barbatipes* (K.)
£ *Z. hirtimana* (K.)
\+ *Z. melanura* (Mg.)
£ *Z. nubila* (Mg.)
£ *Z. punctatissima* (G.)
\+ *Z. signatipennis* (K.)
£ *Larsia atrocincta* (G.)
£ *Nilotanypus dubius* (Mg.)

Diamesinae

= *Boreoheptagyia cinctipes* Edw.
\+ *Pseudodiamesa branickii* (Now.)
\+ *P. nivosa* (G.)
\+ *Syndiamesa nigra*
\+ *Diamesa dampfi* (K.)
\+ *D. permacer* (Walk.)
\+ *D. steinboecki* (G.)
= *D. longipes* G.
\+ *D. latitarsis* (G.)
\+ *D. goetghebueri* Pag.
* *D. lindrothi* G.
* *D. laticauda* Ser.-Tos.
* *D. modesta* Ser.-Tos.
\+ *D. bertrami* Edw.
\+ *D. aberrata* (Lundb.)
* *D.* sp. A
\+ *D. incallida* (Walk.)
\+ *D. insignipes* K.
\+ *D. cinerella* (Mg.)
\+ *D. thienemanni* K.
\+ *D. vaillanti* Ser.-Tos.
\+ *D. zernyi* Edw.
\+ *Pseudokiefferiella parva* (Edw.)
\+ *Potthastia gaedii* (Mg.)
\+ *P. longimanus* K.
\+ *Sympotthastia spinifera* Ser.-Tos.

Prodiamesinae

\+ *Prodiamesa olivacea* (Mg.)
\+ *P. rufovittata* (G.)
* *Monodiamesa* sp.
\+ *Odontomesa fulva* (K.)

Orthocladiinae

= *Diplocladius cultriger* K.
= *Euryhapsis annuliventris* (Mall.)
\+ *Brillia longifurca* K.
\+ *B. modesta* (Mg.)
= *Cardiocladius capucinus* (Zett.)
= *C. fuscus* K.
\+ *Tvetenia bavarica* (G.)
\+ *T. calvescens* (Edw.)
\+ *T. discoloripes* (G.)
\+ *T. verralli* (Edw.)
* *T. scanica* (Br.)
\+ *Eukiefferiella gracei* (Edw.)
\+ *E. coerulescens* (K.)
\+ *E. devonica* (Edw.)
\+ *E. ilkleyensis* (Edw.)
\+ *E. fittkaui* Lehm.
\+ *E. minor* (Edw.)
= *E. brehmi* Gow.
\+ *E. cyanea* Th.
\+ *E. clypeata* (K.)
\+ *E. pseudomontana* G.
* *E. dittmari* Lehm.
\+ *E. fuldensis* Lehm.
\+ *E. lobifera* G.
\+ *E. brevicalcar* (K.)
\+ *E. tirolensis* G.
\+ *E. hospita* Edw.
\+ *Tokunagaia rectangularis* (G.)
\+ *T. tonollii* (Ross.)
\+ *Psectrocladius (Psectrocladius) psilopterus* K.
= *P. (P.) brehmi* K.
= *P. (P.) edwardsi* Br.
= *P. (P.) limbatellus* (Holm.)
= *P. (Monospectrocladius) octomaculatus* Wülk.
= *P. (M.) schlienzi* Wülk.
* *P. (Allopectrocladius)* gr. *dilatatus*
= *Rheocricotopus (Psilocricotopus) atripes* (K.)
\+ *R. (P.) chalybeatus* (Edw.)
= *R. (P.) glabricollis* (Mg.)
\+ *R. (Rheocricotopus) effusus* (Walk.)
\+ *R. (R.) fuscipes* (K.)
\+ *Paracricotopus niger* (K.)
£ *Nanocladius balticus* Pal.
\+ *N. bicolor* (Zett.)
\+ *N. rectinervis* (K.)
= *N. spiniplenus* Saether
\+ *Parorthocladius nudipennis* (K.)
\+ *Synorthocladius semivirens* (K.)
\+ *Orthocladius (Eudactylocladius) fuscimanus* (K.)
= *O. (E.) gelidus* (K.)

+ *O. (E.) olivaceus* (K.)
+ *O. (E.)* sp. A
= *Orthocladius (Euorthocladius) ashei* Soponis
+ *O. (E.) frigidus* (Zett.)
+ *O. (E.) luteipes* (G.)
+ *O. (E.) rivicola* (K.)
+ *O. (E.) rivulorum* (K.)
+ *O. (E.) saxosus* (Tok.)
+ *O. (E.) thienemanni* (K.)
+ *Orthocladius (Orthocladius) excavatus* Br.
+ *O. (O.) rubicundus* (Mg.)
* *O. (O.) tubicula* K.
= *O. (O.) wetterensis* Br.
+ *O. (O.)* sp. A Pinder
+ *O. (O.)* Pe 1 Langhton
* *O. (O.)* Pe 10 Langhton
+ *Symposiocladius lignicola* (K.)
+ *Acricotopus lucens* (Zett.)
+ *Paratrichocladius rufiventris* (Mg.)
+ *P. skirwithensis* (Edw.)
* *P.* sp. A
+ *Paracladius conversus* (Walk.)
* *P. alpicola* (Zett.)
+ *Halocladius stagnorum* (G.)
+ *H. varians* (Staeg.)
= *Cricotopus (Cricotopus) polaris* K.
= *C. (C.) tibialis* (Mg.)
+ *C. (C.) fuscus* (K.)
+ *C. (C.) tremulus* (L.)
+ *C. (C.) annulator* G.
= *C. (C.) curtus* Hirv.
= *C. (C.) pulchripes* Verr.
+ *C. (C.) triannulatus* (Macq.)
= *C. (C.) cilindraceus* (K.)
= *C. (C.) patens* Hirv.
= *C. (C.) festivellus* (K.)
+ *C. (C.) bicinctus* (Mg.)
+ *C. (C.) vierriensis* G.
+ *C. (C.) trifascia* Edw.
= *Cricotopus (Isocladius) ornatus* (Mg.)
+ *C. (I.) sylvestris* (Fabr.)
= *C. (I.) glacialis* Edw.
+ *C. (I.) trifasciatus* (Mg.)
+ *C. (I.) intersectus* (Staeg.)
+ *C. (I.) tricinctus* (Mg.)
= *Hydrobaenus distylus* (K.)
= *Zalutschia tatrica* (Pag.)
+ *Metriocnemus fuscipes* (Mg.)
+ *M. hirticollis* (Staeg.)
= *M. hygropetricus* K.
= *Thienemannia gracilis* K.
= *Chaetocladius dissipatus* (Edw.)
* *C. gelidus* Br.
= *C. laminatus* Br.
= *C. perennis* (Mg.)
£ *C. setilobus* Marc.
= *C. suecicus* (K.)
+ *Paratrissocladius fluviatilis* (G.)
= *Heterotrissocladius marcidus* (Walk.)
* *H. grimshavi* (Edw.)
+ *Parametriocnemus stylatus* (K.)
= *P. boreoalpinus* Gow.
* *P. eoclivus* Saether
= *Paraphaenocladius impensus* (Walk.)
+ *Parakiefferiella gracillima* (K.)
£ *P. bathophila* (K.)
£ *P. coronata* (Edw.)
+ *Epoicocladius* sp. A
+ *Rheosmittia spinicornis* Br.
+ *Krenosmittia boreoalpina* (G.)
+ *K. camptophleps* (Edw.)
+ *K.* sp. A (? = *hispanica* Wülk.)
+ *Stilocladius montanus* Ross.
+ *Heleniella dorieri* Ser.-Tos.
+ *H. ornaticollis* (Edw.)
* *H.* sp. A
+ *Parachaetocladius abnobaenus* Wülk.
= *Limnophyes bidumus* Saether n. sp. (Saether in press)
+ *L. minimus* (Mg.)
= *L. natalensis* K.
= *Pseudorthocladius curtistylus* (G.)
= *Gymnometriocnemus subnudus* Edw.
£ *G. volitans* (G.)
* *Bryophaenocladius aestivus* Br.
* *B. illimbatus* Edw.
* *B. inconstans* (Br.)
* *B. scanicus* Br.
* *B. subvernalis* (Edw.)
* *B. tuberculatus* (Edw.)
* *B. vernalis* (G.)
* *Smittia aterrima* (Mg.)
£ *S. edwardsi* G.
* *S. foliacea* (K.)
£ *S. giordani-soikai* Marc.
£ *S. gridellii* Marc.
£ *S. littorella* G.
£ *S. malarodai* Marc.
* *S. nudipennis* G.
* *S. pratorum* G.
= *Parasmittia carinata* Str.
= *Camptocladius stercorarius* (d. Geer.)
= *Mesosmittia flexuella* (Edw.)
£ *Pseudosmittia angusta* Edw.
+ *P. d'anconai* (Marc.)
£ *P. gracilis* (G.)
+ *P. holsata* T. & Str.
£ *P. mathildae* Albu
= *P. recta* Edw.
= *P. subtrilobata* (Freem.)

£ *P. trilobata* (Edw.)
* *Georthocladius* sp. A
* *Thienemanniella clavicornis* K.
* *T. obscura* Br.
= *T. partita* Schlee
= *Corynoneura coronata* (Edw.)
+ *C. edwardsi* Br.
= *C. fittkaui* Schlee
= *C. lacustris* Edw.
= *C. lobata* Edw.
+ *C. scutellata* Winn.

Chironominae

Tanytarsini

* *Zavrelia pentatoma* K.
£ *Zavreliella marmorata* (v. d. W.)
£ *Stempellinella brevis* Edw.
£ *Stempellina bausei* (K.)
£ *S. subglabripennis* Br.
£ *Neozavrelia fuldensis* Fitt.
£ *Tanytarsus bathophilus* (K.)
+ *T. brundini* Lind.
+ *T. buchonius* Reiss & Fitt.
£ *T. chinyensis* G.
£ *T. curticornis* K.
+ *T. eminulus* Walk.
+ *T. fimbriatus* Reiss & Fitt.
= *T. gracilentus* Holm.
+ *T. heusdensis* G.
£ *T. horni* G.
= *T. lestagei* G.
+ *T. lugens* K.
£ *T. miriforceps* K.
+ *T. nemorosus* Edw.
+ *T. nigricollis* G.
+ *T. pallidicornis* Walk.
£ *T. recurvatus* Br.
+ *T. sylvaticus* v. d. W.
= *T. usmaensis* Pag.
+ *Virgatanytarsus maroccanus* (Kügler & Reiss)
+ *V. triangularis* (G.)
+ *Stilotanytarsus inquilinus* Krüger
= *Cladotanytarsus atridorsum* (K.)
£ *C. mancus* (Walk.)
+ *Rheotanytarsus curtistylus* G.
= *R. montanus* Lehm.
£ *R. muscicola* K.
£ *R. nigricauda* Fitt.
+ *R. pentapoda* K.
+ *R. photophilus* G.
+ *R. ringei* Lehm.
+ *Paratanytarsus austriacus* K.
+ *P. bituberculatus* (Edw.)
+ *P. confusus* Pal.
£ *P. inopertus* (Walk.)
+ *P. lauterborni* K.
+ *P. mediterraneus* Reiss & Sawedal
£ *P. penicillatus* G.
= *P. tenellulus* (G.)
+ *Micropsectra (Lauterbornia) coracina* K.
£ *Micropsectra apposita* (Walk.)
+ *M. atrofasciata* K.
= *M. attenuata* Reiss
+ *M. bidentata* G.
= *M. clastrieri* Reiss
£ *M. groenlandica* And.
= *M. junci* (Mg.)
£ *M. lindrothi* G.
£ *M. miki* Marc.
+ *M. notescens* (Walk.)
£ *M. pharetrophora* Fitt.
+ *M. recurvata* G.
£ *M. roseiventris* K.
= *M. tenellula* G.

Pseudochironomini

* *Pseudochironomus prasinatus* (Staeg.)

Chironomini

£ *Pagastiella orophila* (Edw.)
£ *Paratendipes albimanus* (Mg.)
+ *P. nubilus* (Mg.)
= *P. plebejus* (Mg.)
+ *Microtendipes britteni* Edw.
+ *M. chloris* K.
* *M. diffinis* Edw.
+ *M. pedellus* (de Geer)
£ *M. tarsalis* (Walk.)
£ *Nilothauma (= Kribioxenus) brayi* (G.)
£ **Paralauterborniella nigrohalteralis* (Mall.)
+ *Phaenopsectra flavipes* (Mg.)
= *P. punctipes* (Wiedemann)
+ *Polypedilum (Pentapedilum) nubens* Edw.
+ *P. (P.) sordens* (v. d. W.)
+ *Polypedilum (Polypedilum) acutum* K.
+ *P. (P.) albicorne* (Mg.)
+ *P. (P.) convictum* (Walk.)
+ *P. (P.) cultellatum* G.
+ *P. (P.) laetum* (Mg.)
+ *P. (P.) nubeculosum* (Mg.)
* *P. (P.) pedestre* (Mg.)
£ *P. (P.) nubifer* (? = *aberrans* Chern.) (Skuse)
+ *Polypedilum (Tripodura) acifer* Townes
+ *P. (T.) aegyptium* (? = *pruina* Freeman) K.
+ *P. (T.) apfelbecki* (? = *elongatum* Albu) (Strobl.)
+ *P. (T.) bicrenatum* K.
£ *P. (T.) breviantennatum* Chern.

£ *P. (T.) pullum* (Zett.)
\+ *P. (T.) quadriguttatum* K.
\+ *P. (T.) scalaenum* Schr.
\+ *Endochironomus albipennis* (Mg.)
£ *E. dispar* (Mg.)
£ *E. lepidus* (Mg.)
\+ *E. tendens* Fabr.
* *Stictochironomus pictulus* (Mg.)
\+ *Stenochironomus ranzii* Ross.
£ *S. gibbus* Fabr.
= *S. spatuliger* K.
* *Fleuria lacustris* K.
= *Dicrotendipes lobiger* K.
\+ *D. nervosus* (Staeg.)
\+ *D. notatus* (Mg.)
= *D. peringueyanus* Freem.
£ *D. pulsus* (Walk.)
\+ *D. tritomus* K.
* *Glyptotendipes gripekonveni* K.
* *G. pallens* (Mg.)
* *G. paripes* Edw.
£ *G. severini* G.
\+ *Camptochironomus pallidivittatus* (Mall.)
\+ *Chironomus annularius* (Mg.)
\+ *C. anthracinus* Zett.
\+ *C. calipterus* K.
£ *C. cingulatus* (Mg.)
£ *C. dorsalis* (Mg.)
= *C. melanotus* Keyl
\+ *C. obtusidens* G.
\+ *C. plumosus* L.
\+ *C. riparius* Mg.
\+ *C. salinarius* K.
\+ *Kiefferulus tendipediformis* G.
\+ *Halliella noctivaga* K.
£ *Einfeldia carbonaria* Mg.
= *E. longipes* (Staeg.)
£ *E.* gr. *pagana*
* *Sergentia* sp.
\+ *Xenochironomus xenolabis* K.
£ *Cladopelma edwardsi* Krus.
\+ *C. virescens* (Mg.)
\+ *C. viridula* (Fabr.)
\+ *Cryptotendipes holsatus* Lenz
\+ *Microchironomus tener* K.
\+ *Parachironomus arcuatus* G.
\+ *P. longiforceps* K.
= *P. monochromus* (v. d. W.)
\+ *P. parilis* (Walk.)
\+ *P. varus* G.
\+ *P. vitiosus* G.
\+ *Paracladopelma camptolabis* K.
£ *P. nigritula* G.
* Genus near *Paracladopelma*
\+ *Harnischia angularis* Albu & Botn.
\+ *H. curtilamellata* (Mall.)
\+ *H. fuscimana* (K.)
£ *Demicryptochironomus vulneratus* (Zett.)
\+ *Cryptochironomus albofasciatus* (Staeg.)
\+ *C. defectus* K.
\+ *C. obreptans* (Walk.)
\+ *C. rostratus* K.
\+ *C. supplicans* (Mg.)
\+ "*Cryptochironomus*" sp. Pagast
\+ *Saetheria* sp. 1 Jackson
£ *Chernovskiia macrocera* (Chern.)
\+ Genus near *Robackia*
\+ *Robackia pilicauda* Saether
= *Beckidia tethys* (Townes)

Table 2 summarizes the present knowledge of Chironomids in Italy. 76 species new to the Italian fauna and 45 dubious determinations that require further study and additional material emphasize that there is still room for knowledge about Italian Chironomids to progress.

Most species are widely spread in the Palearctic region, some have more restricted areas of distribution. This is due to their ecology more than to zoogeographical reasons. Cold-stenothermal species are restricted to highlands (most Diamesinae and many Orthocladiinae): most of these species are widespread in the Alps (Region 4 in Fittkau & Reiss 1978), many are also present in cold countries in Northern-Europe (Fittkau & Reiss 1978). Many species found in the Alps are not present in cold waters in the Apennines, but this may be because of insufficient sampling. A lack of glaciers and of very cold water in the Apennines might be other reasons.

Three species *(Syndiamesa nigra, Tokunagaia tonollii* and *Stilocladius montanus)* were found on the southern side of the Italian Alps, but not on the northern side. *S. montanus* is also present in the Apennines (Rossaro 1984). This supports the existence of cold-stenothermal species with an endemic distribution in the Alps or with a wider southern distribution, as there are known to be for other species in the Mediterranean area. For example, *Diamesa lavillei* and *D. thomasi* are known from the Pyrenees only (Serra-Tosio 1973), whereas *D. veletensis* was previously known only in the Sierra Nevada

(Spain) but was then captured in the Atlas mountains (Morocco) and in Mongolia, suggesting it has a wider distribution in southern and oriental parts of the Palearctic Region (Serra-Tosio 1983). The capture of another species of *Stilocladius (S. clinopecten* Saether) in the southeastern United States favours a Gondwanian origin for this genus (Saether 1983). The southern side of the Alps has large extensions of Gondwanian origin, so this hypothesis has good geological support.

Table 2: Summary of the present information about Chironomids in Italy:
+ taxa well identified, deposited in the author's collection
= species new to the Italian fauna
£ species belonging to the Italian fauna according to the literature but not present in the author's collection
total: sum of +, =, £
* species only tentatively identified because of a lack of adult males, ill-preserved material or species belonging to genera that require revision

	+	=	£	total	*
Tanypodinae	21	8	13	42	3
Diamesinae	21	2	0	23	4
Prodiamesinae	3	0	0	3	1
Orthocladiinae	82	47	14	143	27
Tanytarsini	26	11	22	59	1
Pseudochironomini	0	0	0	0	1
Chironomini	61	8	20	89	8
Total	214	76	69	359	45

Reiss (1968) did not find any differences in Chironomid species composition in lakes on the northern and southern sides of the Alps, suggesting that the Alps are not a zoogeographical barrier for Chironomids. This does not contradict our findings. Indeed Chironomid species from the upper reaches of the mountains and their springs (Brundin 1966) have more chance of showing an endemic distribution than species from lakes. In any case the number of endemic species seems to be very low.

The percentages of Mediterranean, Afro- and Panpaleotropical species in Italy are also of interest. The Chironomids from the Mediterranean area have been studied only recently, but rather intensively in recent years. According to Reiss (1977), the Mediterranean fauna contains 22.7% of Palearctic Mediterranean species and about 9% of Ethiopian species. Prat (1979, 1980), Moubayed & Laville (1983) and Reiss (1985, 1986) give lists of species from single countries within the Mediterranean area. There are low percentages of endemic Mediterranean species and lower percentages of Afro- and Panpaleotropical species in most cases, with a dominance of Palearctic species. Even lower percentages are known in Italy. Two species with a Panpaleotropical distribution (Reiss 1985, 1986) that extend their presence to the Mediterranean region are restricted to southern areas of Italy. These are *Chironomus calipterus,* found in Sardinia, and *Dicrotendipes peringueyanus* in Sicily. Another species with a Panpaleotropical distribution, *Polypedilum nubifer,* is probably present in northern Italy, in the Po and Adige rivers (Nocentini, 1985), but unfortunately only larvae are available and species determination is uncertain. On the other hand, some species with an Afrotropical distribution are definitely present in northern Italy: they are *Rheotanytarsus montanus, Polypedilum aegyptium* and *Stenochironomus spatuliger.* Two other Afrotropical species known to occur in Italy are *Pseudosmittia subtrilobata* from Sardinia and *Tanytarsus horni* from Sicily (Reiss 1977). *R. montanus* was collected from the Ticino (Lombardia) and the Potenza (Marche) (stations 3 and 10, Figure 1). It fits all the details in the description of Lehmann (1979) except for the A. R., which is larger (= 0.8). It does not fit the descriptions of the other European species. *P. aegyptium* comes from the Po river, *S. spatuliger* from the Mantova lakes (Figure 1). The halobiont species *Haliella noctivaga* and *Halocladius stagnorum* were

included in the Mediterranean faunal component by Reiss (1977). Other endemic Mediterranean species captured in Italy are: *Paratanytarsus mediterraneus, Tanytarsus maroccanus, Polypedilum açifer* and *Harnischia angularis*.

It is interesting to note that five species reported as Nearctic have been found in Italy: *Rheopelopia acra, Euryhapsis annuliventris, Nanocladius spiniplenus, Parametriocnemus eoclivus* and *Saetheria* sp. 1 Jackson. According to this, Holarctic distribution must be assigned to them.

In any case, the lack of knowledge or uncertain information for large areas suggests caution in drawing conclusions about geographical distribution. Very often new findings extend the distribution area of species very greatly. For example, *T. tonollii* was recently captured in Norway (Tuiskunen pers. comm.). More extensive knowledge of the Chironomids in Italy is very desiderable, because of its strategic position between the Palearctic and Afrotropical regions.

There is very scanty information for central and southern Italy at present. More detailed knowledge about these areas will probably raise the number of Mediterranean and Afrotropical species. Another very interesting field is the faunal composition in the cold waters on the southern side of the Alps and in the Apennines: it is important to confirm or refute the existence of cold-stenothermal Chironomid species with a southern distribution.

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