

# The lotic Chironomidae (Diptera) of Corsica (France)

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Keywords : Diptera, Chironomidae, fauna, rivers, new pupal exuviae, Corsica.

A checklist of Corsica's lotic Chironomidae is given. Collections of pupal exuviae from 32 river sites (July 1995, May 1999) yielded a total of 147 species-level taxa including several previously unknown pupal exuviae. Three of them are figured ? *Hayesomyia* Pe nov., *Eukiefferiella* Pe nov., *Thienemanniella* Pe nov. These unusual forms may possibly be endemic species to Corsica that are new to science. Most of the chironomid species recorded are western Palaearctic. 11 species are circum-mediterranean.

## Les Chironomidés (Diptera) lotiques de Corse (France)

Mots-clés : Diptera, Chironomidae, faunistique, rivières, nouvelles exuvies nymphales, Corse.

Un inventaire des Chironomidés lotiques de Corse est présenté. Des récoltes d'exuvies nymphales dans 32 stations de 24 rivières (juillet 1995, mai 1999) ont permis de recenser 147 espèces ou taxa dont plusieurs exuvies nouvelles. Trois d'entre elles ? *Hayesomyia* Pe nov., *Eukiefferiella* Pe nov., *Thienemanniella* Pe nov. sont figurées. Il peut s'agir d'espèces endémiques à la Corse qui sont nouvelles pour la science. La majorité des espèces de Chironomidés sont ouest-paléarctiques. 11 espèces sont circum-méditerranéennes.

## 1. Introduction

The island of Corsica (41°-43°N, 8°30'-9°30'E) is situated in the Mediterranean Sea to the south-west of France. It lies 160 km from the French coast and 80 km from Italia. The strait of Bonifacio between Corsica and Sardinia is only about 15 km wide.

This paper relates to a part of a study of the benthic communities of the rivers of Corsica undertaken by the CESAC laboratory of Paul Sabatier University (Toulouse) in collaboration with Corte University and DI-

REN (Direction Régionale de l'Environnement) of Corsica (Bastia). Its objective is to improve knowledge of the biodiversity of aquatic invertebrates of Corsica, Area F of the *Limnofauna Europaea* (Illies 1978). Two groups of invertebrates, until now little studied, were more particularly investigated : Diptera Chironomidae, related in this paper, and Oligochaeta Annelidae studied by Narcisse Giani (Toulouse). Régis Cérighino is studying some other groups of aquatic macroinvertebrates in the same sites.

The Chironomidae of Corsica have received limited attention and only 17 species have been recorded in the first chironomid list occurring in continental France and Corsica (Serra-Tosio & Laville 1991). This first list was derived from earlier collections (Edwards 1928, Vaillant 1955, Angelier 1959) and from isolated, more recent citations (Fittkau 1962, Serra-Tosio 1989, Langton 1991). This list of 17 species is copied here from Serra-Tosio & Laville (1991) with updated taxonomy (Table 1).

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Table 1. List of chironomid species recorded in Corsica by Serra-Tosio & Laville (1991). Species not recorded in this study are indicated by an asterisk.

Tableau 1. Liste des espèces de Chironomidés recensées en Corse par Serra-Tosio & Laville (1991). Les espèces non retrouvées dans cette étude sont signalées par un astérisque.

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Tanypodinae

*Rheopelopia maculipennis* (Zett.)

Podonominae

\* *Paraboreochlus minutissimus* (Strobl.)

Diamesinae

- \* *Boreoheptagyia cinctipes* (Edw.)
- Boreoheptagyia* sp 3 Serra-Tosio (1989)
- \* *Diamesa latitarsis* G.
- Diamesa tonsa* (Hal.)
- \* *Onychodiamesa macronyx* (K.)

Orthocladiinae

- \* *Brillia flavifrons* Johannsen (sub *B. longifurca* K.)
- Cardiocladius capucinus* (Zett.)
- Corynoneura celtica* Edw.
- Cricotopus annulator* G. (sub *C. motitatrix* L.)
- \* *Limnophyes minimus* (Mg.) (sub *exiguus* G.)
- Paracricotopus niger* (K.)
- \* *Parorthocladius nudipennis* (K.)

Chironominae

- \* *Stictochironomus maculipennis* (Mg.)
- \* *Stempellinella bausei* (K.)

Telmatogetoninae

- \* *Thalassomyia frauenfeldi* Schiner
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## 2. Methods and sampling sites

New collections of Corsican Chironomidae were made in running water sites by sampling floating pupal exuviae with three Brundin drift nets for about one hour : 8 sites were visited in 5-8 July 1995 (Table 2) and 24 sites in 16-23 May 1999 (Table 3). For each site the place and situation in the river, its altitude, the date and hour of sampling and the temperature of the water at the sampling time are recorded.

The 1995 collections were made in 5 rivers of the north half of the island ; the 1999 collections were made in 19 rivers belonging to 12 river systems and distributed over the whole island (Fig. 1). Overall, 21 of the sites are distributed in North Corsica and 11 sites in South Corsica.

## 3. Results

The collected material was sorted by the authors. Slide mounts were prepared and the faunal lists of the 32 studied sites compiled and recorded in Table 4 and in most cases the number of collected individuals giving a relative abundance of the species. With 8628 studied specimens, a total of 147 species-level taxa were identified in the 24 rivers of Corsica.

We record the distribution of the species in the main chironomid families or tribes in the table 5. The Orthocladiinae predominate with 81 species (55.1 %) as is usual in lotic waters.

The occurrence of the 42 most frequent (> 0.46 %) chironomid species found in these lotic freshwater habitats reflects other similar habitats over the palaeartic region.

Three species *Eukiefferiella clypeata* (16.4 %), *Thienemanniella* Pe 2a (10.1 %) and *Synorthocladius semivirens* (8.1 %) generally dominate the collections. 12 relatively frequent species (2-3.5 %) have a wide western palaeartic distribution :

*Cardiocladius capucinus*  
*Cricotopus annulator*, *C. curtus*, *C. similis*  
*Eukiefferiella devonica*, *E. lobifera*  
*Orthocladius ashei*, *O. carlatus*  
*Rheocricotopus chalybeatus*  
*Tvetenia calvescens*, *T. verralli*  
*Rheotanytarsus pellucidus*

Eleven corsican species have a circum-mediterranean distribution : for the majority, their area of presence can be found in Laville & Reiss (1992).

- *Paramerina* spec. Griechenland (Fittkau 1962) : Greece, Spain, Italy, Morocco (Kettani et al. 2001)
- *Boreoheptagyia* sp3 Serra-Tosio : France (Massif Central), Corsica (Serra-Tosio 1989)
- *Chaetocladius algericus* Moubayed 1989 : Algeria
- *Cricotopus beckeri* Hirvenoja 1989 : S-Spain, Madeira, S-E France, Algeria, Morocco, Turkey
- *Cricotopus levantinus* Moubayed & Hirvenoja (1989) : Lebanon, Morocco (Kettani et al 2001)
- *Eukiefferiella bedmari* Vilchez & Laville 1987 : S-Spain, Greece, Lebanon, Morocco, Turkey
- *Krenosmittia hispanica* Wülker 1957 («Orthocladiinae gen. ? sp. ? Pe1» Langton 1991) : Tunisia, Italy, Turkey, Morocco (Kettani et al 2001)
- *Orthocladius vaillanti* Langton & Cranston 1991 : Algeria
- *Pseudorthocladius berthelemyi* Moubayed 1989 : France (Pyrenees, Massif Central), S-Spain (Sierra Nevada), Morocco, Bulgaria, Turkey

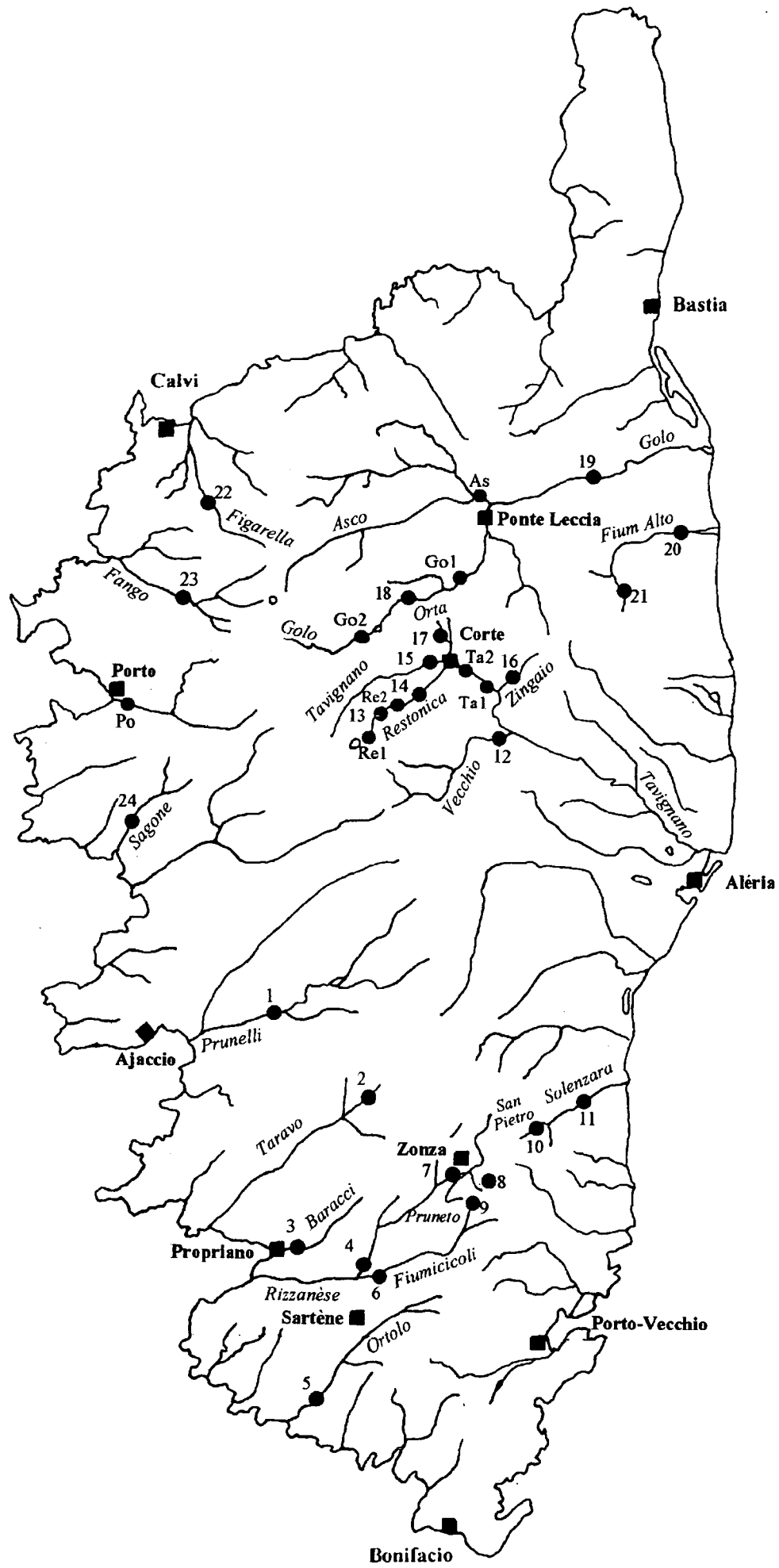


Fig. 1. Collection sites on the island of Corsica.  
Fig. 1. Stations de récoltes sur l'île de Corse.

Table 2. Collection sites in July 1995.

Tableau 2. Station des récoltes en juillet 1995.

Site	River	Situation	Alt/m	Date	Time	T° C
Ta <sub>1</sub>	Tavignano	St Jean (Pont Génois) : 15 km Corte downstream	183	06/07	17 h	22
Ta <sub>2</sub>		Corte, University foot-bridge	400	06/07	19 h	18
Re <sub>1</sub>	Restonica	South-West Corte, Tragone bridge	943	05/07	12 h	11.5
Re <sub>2</sub>		Near Bergerie de Grotelle	1350	05/07	10 h	11
Go <sub>1</sub>	Golo	Castirla bridge, 11.5 km North Corte	280	07/07	19 h	18
Go <sub>2</sub>		2 km barrage upstream ; bridge on D 84 road	840	08/07	11 h	17
As	Asco	2 km North Ponte Leccia ; bridge on N 197 road	193	07/07	10 h	19
Po	Porto	Near mouth, Porto upstream	50	08/07	15 h	20

- *Thienemanniella* Pe 4 Langton 1991 : S-France (Aude river : Carcassonne) (Gendron & Laville 1997)

- *Paratrichocladius micans* (Kieffer 1918) : Circum-mediterranean and Afrotropical distribution in Laville & Reiss (1992 : Fig. 2)

The chironomid diversity of a site or river is difficult to appreciate with only a single annual collection as we did in Corsica. Nevertheless, we found different species richness in the 32 sampling sites : in 17 sites, 15 to 27 species were recorded and 29 to 54 species in 11 sites. The sites with the highest species richness are in lowland rivers : Fium Alto downstream (160 m), Golo downstream (100 m), Sagone (40 m), Ortole (160 m). Conversely, the two highest sites (> 1000 m) in the Restonica river (13,R<sub>2</sub>) have provided the lowest richness with only 6-8 species. The two sites of the Fium Alto, a little river on the east coast, about 28 km on length, one in the potamon zone (160 m) and one in the lower rhithron zone (500 m) appear the most diverse with a total of 70 species.

Ecological, Corsica seems particularly favourable to rheophilic low and middle altitude species. As we have described in the introduction, Corsica is an island quite close to Italia and France. It does not seem that this geographic isolation relative has impoverished the rheophilic chironomid fauna.

In the new corsican list 24 species/unnamed taxa listed below are new for the French fauna. 3 pupal exuviae indicated with an asterisk are apparently new and are figured for the first time by the second author (Pe-

ter Langton) (Figs. 2 and 3). 8 taxa from the list can be identified by the exuvial descriptions in Langton (1991).

\* ? *Hayesomyia* Pe nov. Langton

*Larsia atrocincta*

*Paramerina* spec. Griechenland

*Chaetocladius algericus*

*Corynoneura* Pe 2a Langton 91

*Cricotopus ephippium*

*Cricotopus levantinus*

*Eukiefferiella bedmari*

\* *Eukiefferiella* Pe nov. Langton

*Krenosmittia hispanica*

*Limnophyes ninae*

*Parametriocnemus* Pe 1 Langton 91

*Paratrichocladius micans*

*Thienemanniella* Pe 3 Langton 91

*Thienemanniella* Pe 4 Langton 91

\* *Thienemanniella* Pe nov. Langton

*Phaenopsectra* Pe 1 Langton 91

*Polypedilum* Pe nov.

*Polypedilum* ? *convictum* var.

*Micropsectra* Pe 3 Langton 91

*Neozavelia* Pe 1 Langton 91

*Rheotanytarsus* sp A n. sp.

*Stempellinella flavidula*

*Virgatanytarsus* Pe 1 Langton 91

Table 3. Collection sites in May 1999.

Tableau 3. Stations de récoltes en mai 1999.

Site	River	Situation	Alt/m	Date	Time	T° C
1	Prunelli	Bridge on D103 road, near cauro	350	16/05	15 h	14
2	Taravo	Bridge on D26 road, West Olivese	450	16/05	17 h	12.5
3	Baracci	Bridge on D257 road, old hot spring	100	17/05	10 h	13
4	Rizzanèse	Acoravo bridge on the D64 road	400	17/05	12 h	14
5	Ortolo	Bridge on N196	160	17/05	14 h	14
6	Fiumicicoli Rizzanèse affluent	Bridge on D148 road Caldane springs downstream	430	17/05	17 h	16
7	Rizzanèse	On D268 road, South Zonza	780	18/05	11 h	10
8	Rizzanèse affluent	Brook on D368 road near the source East Zonza	860	18/05	13 h	9.5
9	Pruneto Fiumicicoli affluent	Road D368, Zonza camping	860	18/05	14 h	11.5
10	San Pietro LB Solenzara	Bridge on D268 road, coming down the col of Bavella	730	18/05	16 h	10.5
11	Solenzara	Bridge on D268 road, coming down the col of Bavella	260	18/05	18 h	17
12	Vecchio Tavignano affluent	Bridge in D143-N200 cross- roads, 3 km Pont Génois upstream	200	19/05	11 h	10
13	Restonica Tavignano affluent	D623 road, Tragone upstream	1000	19/05	15 h	7
14	Restonica	D623 road, Tuani camping	680	19/05	17 h	9
15	Tavignano	Corte, below the citadel Restonica confluence upstream	420	20/05	11 h	10.5
16	Zingaio Tavignano affluent	Near D39 road	300	20/05	16 h	16
17	Orta Tavignano affluent	D18, 3 km North Corte	600	20/05	19 h	10.5
18	Golo	D84, 5 km upstream Pont de Castirla	463	21/05	11 h	9.5
19	Golo	Railway bridge near N193 road, 3 km upstream Barchetta	100	21/05	13 h	10.5
20	Fium Alto downstream	Bridge on D506, 4 km upstream Folelli	160	21/05	15 h	17
21	Fium Alto upstream	Bridge on D506, near Eaux d'Orezza	500	21/05	17 h	10
22	Figarella	Bridge on D51 road, South-East of Calvi	160	22/05	11 h	12
23	Fangò	Bridge on D351 road, near Manso	120	22/05	14 h	14
24	Sagone	Bridge on D181 road, 4.5 km North of Sagone	40	22/05	18 h	15









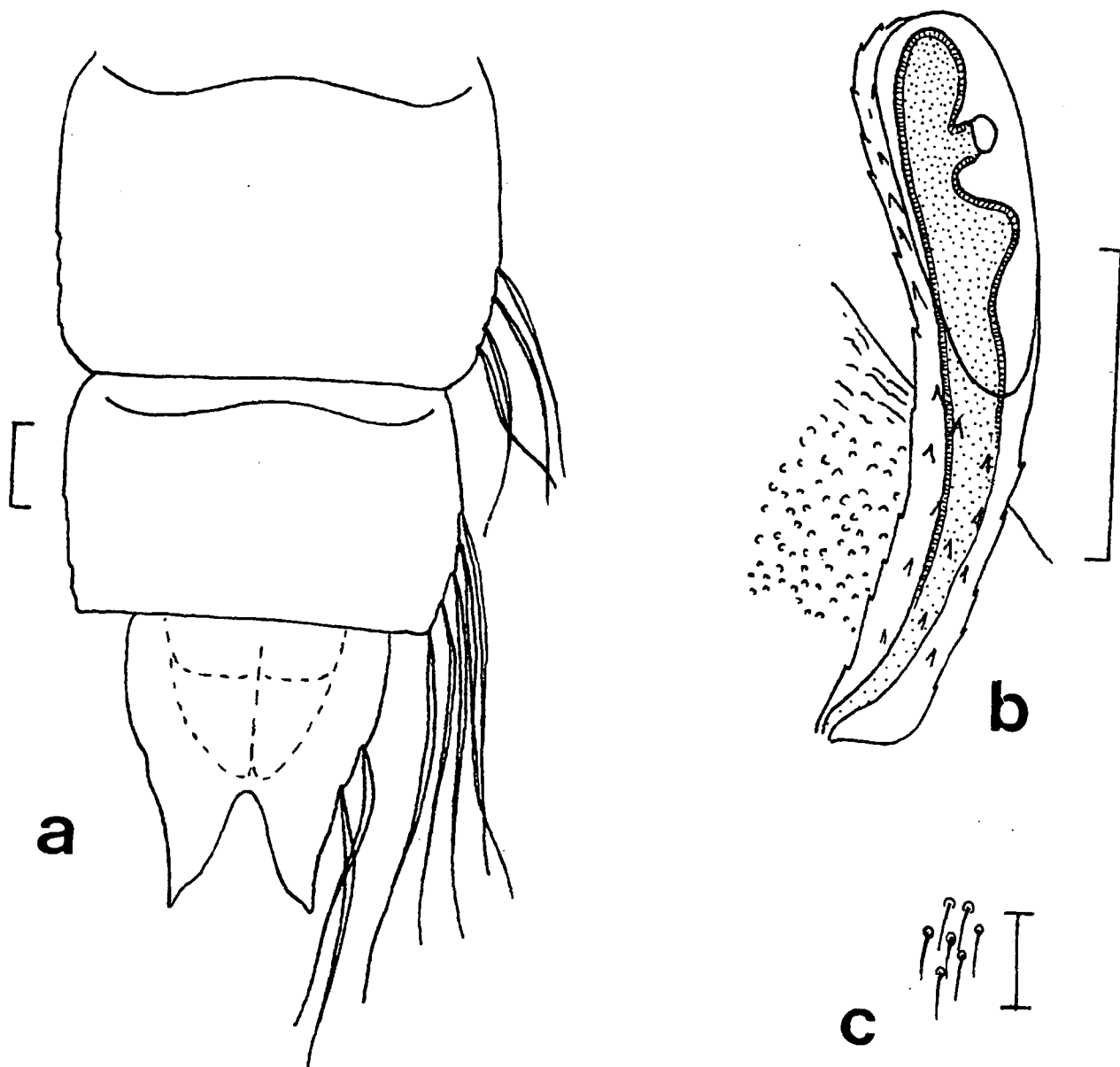
Table 4. Continued.  
Tableau 4. Suite.

	1	2	3	4	5	6	7	8	9	10	11	12	R2	R1	13	14	15	Ta2	Ta1	16	17	Go2	18	Go1	19	20	21	As	22	23	Po	24	Total Ind.		
Tanytarsini (22)																																			
<i>Micropsectra</i> Pe3 Langton 91	1																																		1
<i>Micropsectra</i> atrofasciata K.				1											1																				7
<i>Micropsectra</i> bidentata G.				4																															16
<i>Micropsectra</i> notescens (Walk.)			7																															8	
<i>Neozavrelia</i> Pe1 Langton 91																																		1	
<i>Rheotanytarsus</i> curtistylus G.									2																									35	
<i>Rheotanytarsus</i> pellicidus (Walk.)				245		1																												301	
<i>Rheotanytarsus</i> nigricauda Fittkau			1																															15	
<i>Rheotanytarsus</i> pentapoda K.	3	32	2				9																											63	
<i>Rheotanytarsus</i> spA n. sp.									12	2	2	70																						115	
<i>Rheotanytarsus</i> reissi Lehmann																																		2	
<i>Rheotanytarsus</i> rhenanus Klink.	1																																	1	
<i>Rheotanytarsus</i> Pe1 nov.	1							23	21	1					1	27	5																	104	
<i>Stempellinella</i> brevis (Edw.)	2	1	2	6	1	1	2	2	1																									20	
<i>Stempellinella</i> flavidula (Edw.)																																		36	
<i>Tanytarsus</i> brundini Lindeberg																																		9	
<i>Tanytarsus</i> eminius Walk.																																		5	
<i>Tanytarsus</i> heusdensis G.				5																														79	
<i>Tanytarsus</i> usmeensis Pagast				2																														2	
<i>Virgatanytarsus</i> arduennensis (G.)																																		3	
<i>Virgatanytarsus</i> triangularis (G.)																																		1	
<i>Virgatanytarsus</i> Pe1 Langton 91																																		7	
TOTAL spp	32	25	23	24	46	27	19	19	19	25	15	31	6	20	8	18	26	18	8	30	19	15	37	29	39	54	45	18	22	36	11	48	8628		

Table 5. Number and frequency of chironomid species/taxa of Corsica in the main subfamilies or tribes.

Tableau 5. Nombre et fréquence des espèces/taxa de Chironomidés de Corse dans les principales sous-familles ou tribus.

	Serra-Tosio & Laville (1991) (*) Table 1	This study	Total	Frequency
Telmatogetoninae	1		1	0.6
Podonominae	1		1	0.6
Buchonomyiinae		1	1	0.6
Tanypodinae	1	16	17	10.8
Diamesinae	3	6	9	5.7
Orthoclaudiinae	3	81	84	53.2
Chironomini	1	21	22	13.9
Tanytarsini	1	22	23	14.6
<b>Total</b>	<b>11</b>	<b>147</b>	<b>158</b>	<b>100.0</b>

Fig. 2. ? *Hayesomyia* Pe nov. a. segments VII-IX : scale 0,1 mm ; b. thoracic horn : scale 0.01 mm ; c. spinules of abdominal tergite I : scale 0.01 mm.Fig. 2. ? *Hayesomyia* Pe nov. a. segments VII-IX : échelle 0,1 mm ; b. corne thoracique : échelle 0,01 mm ; c. spinules du tergite abdominal IV : échelle 0,01 mm.

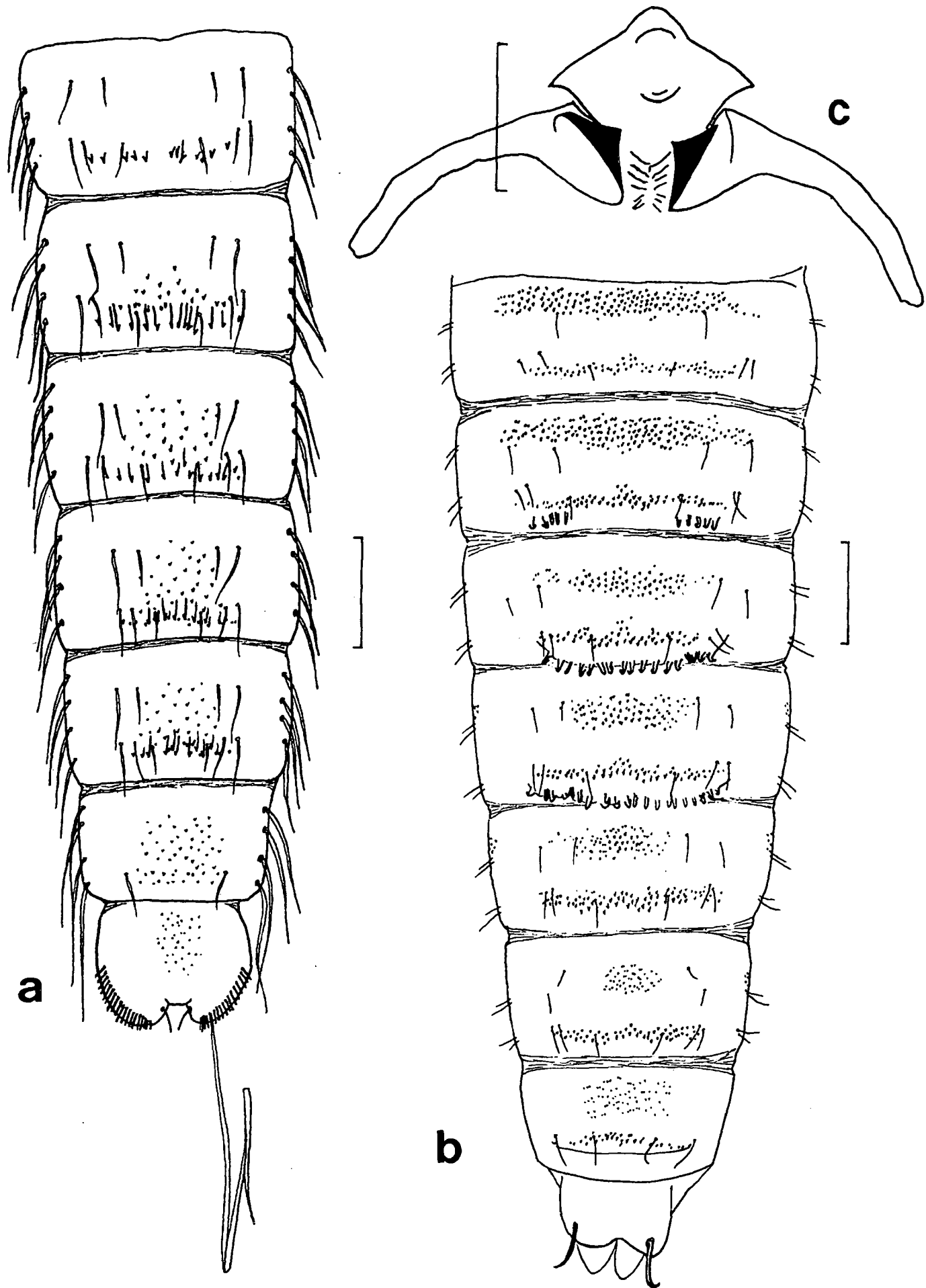


Fig. 3 a. *Thienemanniella* Pe nov. segments III-IX dorsal. b. *Eukiefferiella* Pe nov. segments III-IX dorsal ; c. frontal apotome and antennal sheaths. Scale 0.1 mm.

Fig. 3.a. *Thienemanniella* Pe nov. tergites III-IX ; b. *Eukiefferiella* Pe nov. tergites III-IX ; c. apotome frontal et fourreaux antennaires. Echelle 0,1 mm.

#### 4. Conclusion

It would be interesting to compare this preliminary chironomid list of Corsica with other island populations and especially with the two other tyrrhenian islands Sardinia and Sicilia. However few studies concerning these two Italian islands are available.

In a list of chironomids of Italy Rossaro (1988) recorded only two collecting sites in Sardinia and one in Sicilia but without identifying them in the corresponding list of the three sites.

On the other hand, studies of Chironomidae in the Canary islands have recorded 59 species-level taxa in seven permanent freshwater streams in Tenerife (Armitage et al 1995) and 53 species-level taxa from a variety of freshwater habitats in Madeira (Hughes & Murray 2000). In comparison the list of 147 species-level taxa collected for a short time and in only 24 rivers implies a greater biodiversity in the island. The Corsican list of 158 species (Table 1 & 5) represents 23.6 % of the 670 chironomid species recognized in the French inventory : 646 compiled by Laville & Serra-Tosio (1996) plus 12 more recently listed in the River Loire (Garcia & Laville 2000) and 12 in the River Garonne (Garcia & Laville 2001). This Corsican list represents 50 % of the 317 chironomids species recently reported from Morocco by Kettani et al. (2001).

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