

Non-biting midges from Continental France: new records, faunal and biogeographical outline [Diptera, Chironomidae]

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Material recently collected in Continental France has allowed me to generate a list of 163 chironomid taxa, of which 40 species are new for the fauna of this country. 721 chironomid species are hitherto known from France. Continental France is parcelled into ten major regions and subregions on the basis of both faunal and biogeographic potential of localized species. The taxonomy and geographic distribution of the species listed are based on the last version of the section on Chironomidae (SAETHER & SPIES 2004) in Fauna Europaea, on recent revisions of genera and other recent publications relevant to taxonomy and nomenclature.

Citations de Chironomes nouvelles pour la faune de France Continentale. Aperçu faunistique et biogéographique [Diptera, Chironomidae]

Mots-clés : Chironomidae, citations nouvelles, France Continentale, biogéographie.

De récentes récoltes de Diptères Chironomidae en France Continentale nous ont permis d'établir une liste de 163 taxa, dont 40 espèces sont nouvelles pour la faune de ce pays et portent à 721 le nombre d'espèces actuellement connues du territoire français. Un découpage de la France continentale en dix régions et sous-régions est effectué selon les potentialités faunistiques et biogéographiques d'éléments à répartition étroite. La taxonomie et la distribution géographique des espèces recensées ont été réalisées en prenant en compte la dernière version de la Fauna Europaea sur les Chironomidae (SAETHER & SPIES 2004), les récentes révisions de genres et enfin de récentes publications se rapportant à la taxonomie et la nouvelle nomenclature.

1. Introduction

French regions include one of a large variety of European aquatic ecosystems with respect to physiography and hydrography. Data in literature on the chironomid fauna of France show some regions better sampled than others. The best sampled areas are (see § 2): the Alps, the Northern (5a) and Southern Regions (5b); the Pyrenees, including the Western (6), Central (7) and Eastern Regions (8); South-Central France, including inland and coastal rivers (9a and 9b). The remaining regions located in the North, the Middle and the South-East of France have received little attention and are unfortunately still partially explored: they need to be more prospected in the years to come.

Published data accumulated since 1991 allow us to generate a list of 681 registered species from France (SERRA-TOSIO & LAVILLE 1991, LAVILLE & SERRA-TOSIO 1996, MOUBAYED et al. 2000, GARCIA & LAVILLE 2000, DELETTRE 2001, SÆTHER & SPIES 2004).

Field work carried out during the last two decades through Continental France including high altitude and lower reaches of peat pits, springs and streams, mountain and lowland lakes, ponds and reservoirs, temporary streams and pools allowed us to sample fully developed pharates, adults, pupae, pupal exuviae and larvae from chironomid populations throughout various geographic regions. In the current paper, a complementary checklist of both new records and some other already listed species from France is provided as well as a faunal and biogeographic outline.

2. Sites and methodology

The identification of slide mounted (in polyvinyl lactophenol solution) specimens was aided by recent taxonomic revisions and keys to adults or pupal exuviae (REISS & SÄWEDAL 1981; TUISKUNEN 1986; SERRA-TOSIO 1989; SÆTHER 1990; SOPONIS 1990; LANGTON 1991; SÆTHER & WANG 1995; KYEREMATEN & SÆTHER 2000; MICHIELS & SPIES 2002; VARDAL et al. 2002; LANGTON & WISSER 2003; SÆTHER & SPIES 2004; STUR & EKREM 2006; EKREM 2006, 2007; LANGTON & PINDER 2007), incorporating recent general recommendations on taxonomy and nomenclature (SÆTHER & FERRINGTON 2003; SPIES & SÆTHER 2004).

Previous known geographical distribution of the species listed was based on the last version of the section on Chironomidae in Fauna Europaea (SÆTHER & SPIES 2004), on the latest unpublished data for Fauna Europaea (SÆTHER et SPIES, pers. comm.), as well as on the taxonomic publications listed above.

The collection sites were located in the ten major physiographic and biogeographic regions and sub-regions of France (Corsica not included) delimited in Figure 1). The habitats sampled include springs, permanent and temporary streams and pools, peat pits, rhithral and potamal of rivers, estuaries, lakes and ponds. An informative map on the biogeographic regions of France is also given by SERRA-TOSIO & LAVILLE (1991). Within the ten prospected regions, two are located in Northern France (1 and 2), three in Central-South and Central France (3, 5 and 4) and five (6, 7, 8, 9 and 10) in Southern France. The geographic delimitation of these regions and sub-regions is:

- 1, North-West France (Continental), including both the Channel and the North Sea coastal streams (1a), and potamic parts of the Seine river basin (1b).
- 2, North-East France (Continental), rivers located in the plain and piedmont including the upper stream of the Seine river basin.
- 3, Central-South-West France (Atlantic), including both the Atlantic coastal rivers from the Northern part (3a) to the Southern part (3b).
- 4, Central-France, including the upper stream and rhithral of the Sioule river basin, located in the volcanic region of Auvergne (4a); the upper streams of both the Allier and the Loire river basins, and surrounding piedmont and lowland wetland areas including ponds, peat pools and marshes located below 1000 m (4b).
- 5, Central-East France, including the upper stream of the Rhône river basin (5a) and the Alps (especially located in high and middle mountain areas, 5b).

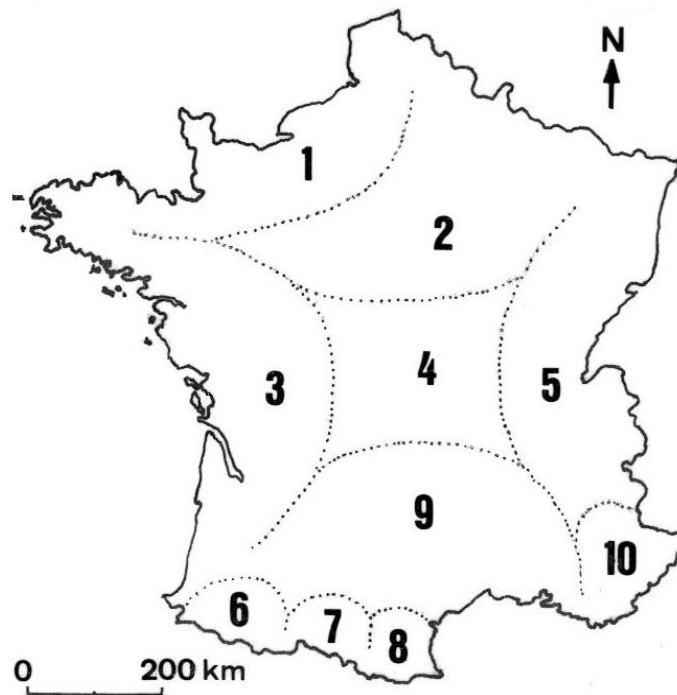


Figure 1. The ten major regions and sub-regions of Continental France after the current study.

Figure 1. Les dix régions et sous régions majeures de France Continentale selon la présente étude.

- **6, 7 and 8**, the French part of the Pyrenees and Pre-Pyrenees, including Western-Pyrenees (6), Central-Pyrenees (7) and Eastern-Pyrenees (8). The Pyrenees possess both mountain and high mountain rivers (6a, 7a, 8a), the Pre-Pyrenees have only piedmont and mountain rivers (6b, 7b, 8b).

- **9**, South-Central France (Mediterranean), including the inland rivers, streams and lakes of the Northern part (9a); the coastal rivers, swamps, pools, marches, ponds, and rice fields of the Southern part (9b). Nevertheless, with respect to the chironomid fauna, three geographical zones of biogeographical significance have been identified in the Mediterranean region between the Spanish and the Italian borders (MOUBAYED et al. 2000).

- **10**, South-East France (Mediterranean): including both the lower Alps (lakes, reservoirs and rivers) and Mediterranean coastal rivers especially located in the Alpes-de-Haute-Provence, Var and Alpes-Maritimes departments. The Western limit of region 10 is restricted to the Eastern part of Var department including : permanent and temporary springs and streams located in Massif des Maures, extending westward to Hyères city; the Argens river basin which includes permanent and temporary springs, pools and streams extending to Fréjus city.

Sampling methods mainly used were: Surber net for benthos; Brundin drift net for pharates, pupae and pupal exuviae; troubleau net for individuals floating on the surface of the water; sweep net for adults.

3. List of species

In total, material of 163 chironomid taxa was collected throughout the ten biogeographical areas in Continental France since 1980 (Table 1). Among these taxa there were: 15 Tanypodinae, 9 Diamesinae, 77 Orthocladiinae and 62 Chironominae (27 Chironomini and 35 Tanytarsini). Based on recent published data (SERRA-TOSIO & LAVILLE 1991, FRANQUET 1996, LAVILLE & SERRA-TOSIO 1996, ANGELIBERT et al. (1999), GARCIA & LAVILLE 2000, MOUBAYED et al. 2000, VALA et al. 2000, DELETTRE 2001, SÆTHER & SPIES 2004), 40 species are new records for France (*), and 20 species are belonging to new undescribed species (**). The remaining species (P) are considered as new records for some regions or subregions of France.

Therefore, 721 chironomid species are hitherto known from France, including the already listed 40 new records, which represent 5.6 % of the French chironomid fauna. Of the European total diversity of 1200 listed and updated species in the new version of Fauna Europaea for Chironomidae by SÆTHER & SPIES (2004), 60.1 % are actually recorded from France. In the current study, the highest regional diversity (85 and 74 species respectively) was encountered in two areas located in Southern France: South-Central France (region 9: 52.2%), and the Eastern Pyrenees (subregion 8: 45.4 %).

Table 1. List and geographical distribution of species.

* = new record for France; ** = undescribed species; P = previous record.

Im = imago; N = nymph or pharate ; Pe = pupal exuviae ; L = larva.

Tableau I. Liste des espèces et leur répartition géographique.

* = citation nouvelle pour la France ; ** = espèce non décrite ; P = citation antérieure.

Im = imago ; N = nymphe ou pharate ; Pe = exuvie nymphale ; L = larve.

SPECIES	Record	Stage	Distribution
Subfamily Tanypodinae , 15 species:			
<i>Arctopelopia barbitarsis</i> (Zetterstedt, 1850)	P	Pe	9b
<i>A. griseipennis</i> (van der Wulp, 1859)	P	Pe	7b, 8b, 9b
<i>Arctopelopia</i> sp. 1	**	Pe	8b, 9a
<i>Conchapelopia hittmairorum</i> Michiels & Spies, 2002	P	Pe	2, 5a, 8b, 9, 10
<i>Larsia atrocincta</i> (Goetghebuer, 1942)	P	N, Pe	8b
<i>L. curticalcar</i> (Kieffer, 1918)	P	N, Pe	8b, 10
<i>Pentaneurella katterjokki</i> Fittkau & Murray, 1983	P	N, Pe, L	6a, 7a, 8a
<i>Procladius crassinervis</i> (Zetterstedt, 1838)	P	N, Pe	1b, 2
<i>P. lugens</i> Kieffer, 1915	*	Im, N, Pe	2, 4b, 5, 9
<i>P. rufovittatus</i> (van der Wulp, 1874)	*	Pe	2, 4b
<i>P. (Psilotanypus) flavifrons</i> Edwards, 1929	P	Im	4b
<i>Procladius</i> sp. 1 (= <i>P.</i> sp, from Norway, in Fittkau & Murray)	**	Pe	8a
<i>Thienemannimyia carnea</i> (Fabricius, 1805)	P	Pe	8b
<i>T. pseudocarnea</i> Murray, 1976	P	Pe	9b, 10
<i>Zavrelimyia signatipennis</i> (Kieffer, 1924)	P	Pe	10
Subfamily Diamesinae , 9 species:			
<i>Boreoheptagyia rugosa</i> (Saunders, 1930)	P	Im, Pe	8b, 10
<i>Boreoheptagyia</i> sp. 1 (near <i>rotunda</i> Serra-Tosio)	**	Im	10
<i>Diamesa aberrata</i> Lundbeck, 1889	P	Im, N, Pe	7a, 8a
<i>D. bertrami</i> Edwards, 1935		Im, N, Pe	8a

<i>D. bohemani</i> Goetghebuer, 1932	*	Im, N, Pe	8a
<i>D. thomasi</i> Serra-Tosio, 1970	P	Im, N, Pe, L	7a, 8a
<i>D. veletensis</i> Serra-Tosio, 1971	*	Im, N, Pe, L	8a
<i>Potthastia</i> sp. 1	**	Pe	4b
<i>Syndiamesa edwardsi</i> (Pagast, 1947)	P	Im, N, Pe, L	8a
Subfamily Orthocladiinae, 77 species:			
<i>Brillia pudorosa</i> Cobo, Gonzales & Vieira-Lanero, 1995	*	Im, N, Pe	3b
<i>Bryophaenocladus aestivus</i> (Brundin, 1947)	P	Im	8b
<i>B. muscicola</i> (Kieffer, 1906)	P	Im, Pe	10
<i>B. nidorum</i> (Edwards, 1929)	P	Im, Pe	9b
<i>B. propinquus</i> (Brundin, 1947)	P	Im	4b
<i>B. scanicus</i> (Brundin, 1947)	*	Im	4, 8b, 9a
<i>Bryophaenocladus</i> sp. 1	**	Im	9b
<i>Chaetocladus algericus</i> Moubayed, 1989	P	Pe	10
<i>C. gracilis</i> Brundin, 1956	P	Im	8a, 8b
<i>C. suecicus</i> (Kieffer, 1916)	P	Im, N, Pe	6a, 7a, 8a
<i>Corynoneura arctica</i> Kieffer, 1923	P	Pe	8a
<i>C. fittkaui</i> Schlee, 1968	P	Pe	8a, 8b, 9a
<i>C. gratias</i> Schlee, 1968	P	N, Pe	1a, 3, 8a, 8b
<i>C. lacustris</i> Edwards, 1924	P	N, Pe	2, 3, 8, 9, 10
<i>Cricotopus algarum</i> (Kieffer, 1911)	P	Im, N, Pe	1a, 1b, 2, 3
<i>C. beckeri</i> Hirvenoja, 1973	P	Im, N, P	8b, 9b, 10
<i>C. caducus</i> Hirvenoja, 1973	P	Im, N, Pe	1a, 3, 9b
<i>Cricotopus</i> sp. 1 (near <i>levantinus</i> Moubayed & Hirvenoja)	**	N, Pe	9b, 10
<i>Epoicocladus ephemerae</i> (Kieffer, 1924)	P	N, Pe, L	1, 2, 8b, 9a
<i>Eukiefferiella bedmari</i> Vilchez-Quero & Laville, 1987	*	Im, Pe	1a, 3b
<i>E. brehmi</i> Gouin, 1943	*	Pe	8a, 8b, 9a, 10
<i>Eurycnemus crassipes</i> (Meigen, 1810)	P	N, Pe, L	1a
<i>Euryhopsis fuscipropes</i> Sæther & Wang, 1992	*	N, Pe	6b, 9b
<i>Georthocladus luteicornis</i> (Goetghebuer, 1941)	P	Pe	7a, 7b
<i>Georthocladus</i> sp. 1	**	Pe	8a
<i>Heterotrissocladus grimshawi</i> (Edwards, 1929)	*	N, Pe	2, 5a, 10
<i>H. subpilosus</i> (Kieffer, 1911)	P	Im, Pe	8a
<i>Heterotrissocladus</i> sp. 1	**	Pe	9b
<i>Hydrobaenus conformis</i> (Holmgren, 1869)	P	Im, N, Pe	9b
<i>H. distylus</i> (Kieffer, 1915)	P	Im, Pe, L	9b
<i>H. pilipes</i> (Malloch, 1915)	P	Im, Pe	4b, 8b
<i>Krenosmittia hispanica</i> Wüelker, 1957	*	Im, Pe	8a, 8b
<i>Limnophyes bidumus</i> Sæther, 1990	*	Im, N, Pe	5b, 8a, 9, 10
<i>L. difficilis</i> Brundin, 1947	P	Im	9b, 10
<i>L. edwardsi</i> Sæther, 1990	P	Im	8b, 9b
<i>L. gelasinus</i> Sæther, 1990	*	Im, N, Pe	9b, 10
<i>L. inanispatina</i> Langton & Moubayed, 2001	P	Im, N, Pe	9b
<i>L. roquehautensis</i> Langton & Moubayed, 2001	P	Im, N, Pe	9b
<i>L. ninae</i> Sæther, 1975	P	Im, Pe	8b, 9b, 10
<i>L. punctipennis</i> (Goetghebuer, 1919)	P	Im	9b
<i>L. spinigus</i> Sæther, 1990	*	Im, Pe	7a, 8a
<i>Mesosmittia flexuella</i> (Edwards, 1929)	P	Im	9b
<i>Metriocnemus atriclavus</i> Kieffer, 1921	P	Im	9b
<i>M. corticalis</i> Strenzke, 1950	P	Im	8a
<i>Orthocladus calvus</i> Pinder, 1985	P	Im, N, Pe	4b, 9b
<i>O. holsatus</i> Goetghebuer, 1937	*	Pe	7b, 9b

<i>O. lignicola</i> Kieffer, 1914	P	Im, N, Pe, L	1a, 2, 4, 8b, 9
<i>Parachaetocladius</i> sp. 1	**	Im	8a
<i>Parakiefferiella pyrenaica</i> Moubayed, 1991	P	Im, N, Pe	6, 7, 8, 9b, 10
<i>Parakiefferiella</i> sp. 1	**	Im, N, Pe	1a, 9a
<i>Paralimnophyes longiseta</i> (Thienemann, 1919)	P	Im, Pe	3, 4b, 5a
<i>Paraphaenocladius intercedens</i> Brundin, 1947	*	Pe	8a
<i>Paratrachocladius lanzavecchiai</i> Rossaro, 1990	*	Im, N, Pe	8b, 9a, 9b, 10
<i>P. veronicae</i> Rossaro, 1991	*	Im	8b, 9b
<i>Psectrocladius platypus</i> (Edwards, 1929)	P	Pe	9b
<i>Pseudorthocladius berthelemyi</i> Moubayed, 1989	P	Im, Pe	7b, 8b, 9b, 10
<i>Pseudorthocladius</i> sp. 1	**	Pe	8a, 8b
<i>Pseudosmittia angusta</i> Edwards, 1929	P	Im	1a, 1b, 2, 3a, 5a
<i>P. baueri</i> Strenzke, 1960	P	Im	9b, 10
<i>P. forcipata</i> (Goetghebuer, 1921)	P	Im	8a
<i>P. holsata</i> Thienemann & Strenzke, 1940	P	Im, Pe	8b, 9b, 10
<i>P. nanseni</i> (Kieffer, 1926)	*	Im	3b, 6b
<i>Rheocricotopus tirolus</i> Lehmann, 1969	P	Pe	8b
<i>Smittia aquatilis</i> Goetghebuer, 1940	*	Im	1b, 2
<i>S. betuletorum</i> Edwards, 1941	*	Im	2
<i>S. foliacea</i> (Kieffer, 1921)	P	Im	1a, 2, 3a, 5, 9, 10
<i>S. paranudipennis</i> Brundin, 1947	*	Im	7a, 8a
<i>S. reissi</i> Rossaro & Orendt, 2001	*	Im	9b
<i>S. rupicola</i> (Kieffer, 1923)	P	Im	9b
<i>S. scutellosetosa</i> Caspers, 1988	P	Im	1, 2, 8b, 9b
<i>S. superata</i> Goetghebuer, 1939	P	Im	9b
<i>S. vesparum</i> Goetghebuer, 1921	P	Im	9b
<i>Smittia</i> sp. 1	**	Im	1b, 2
<i>Thienemannia fulvofasciata</i> (Kieffer, 1921)	P	N, Pe	8b
<i>T. libanica</i> Laville & Moubayed, 1985	P	Pe	5b, 10
<i>Thienemanniella flavescens</i> (Edwards, 1929)	P	Im, N, Pe, L	1, 2, 3
<i>Tvetenia discoloripes</i> (Goetghebuer, 1936)	P	Im, N, Pe, L	1a, 2, 3, 6b
Subfamily Chironominae, 62 species:			
Chironomini, 27 species:			
<i>Chironomus lacunarius</i> Wülker, 1973	P	Im, Pe	2, 8
<i>Chironomus</i> sp. 1	**	Im, N, Pe, L	1b, 2
<i>Cryptotendipes nigronitens</i> (Edwards, 1929)	*	Im, N, Pe	2, 3b, 9a
<i>C. usmaensis</i> (Pagast, 1931)	P	N, Pe	1b, 2, 4b, 9b
<i>Demicryptochironomus neglectus</i> Reiss, 1988	P	Im, N, Pe	6b, 7b, 8b
<i>Dicrotendipes fusconotatus</i> (Kieffer, 1922)	P	Im, Pe	9b
<i>D. lobiger</i> (Kieffer, 1921)	P	Im, Pe	2, 8
<i>D. pallidicornis</i> (Goetghebuer, 1934)	*	Im, Pe	1b, 2
<i>D. peringueyanus</i> Kieffer, 1924	P	Im	9b
<i>Glyptotendipes signatus</i> (Kieffer, 1909)	P	Im, N, Pe	1b, 2, 5, 9b
<i>Kloosia pusilla</i> (Linnaeus, 1767)	P	Pe	9b
<i>Microchironomus deribae</i> (Freeman, 1957)	P	Im, N, Pe, L	1b, 2, 3, 9b
<i>Parachironomus digitalis</i> (Edwards, 1929)	*	Im, N, Pe	9a, 9b
<i>P. parilis</i> (Walker, 1856)	P	Im, Pe	9b
<i>Parachironomus</i> sp. 1	**	Im, N, Pe, L	1b, 2
<i>Paralauterborniella nigrohalteralis</i> (Malloch, 1915)	P	Im, Pe, L	1a, 2, 9, 10
<i>Polypedilum acutum</i> Kieffer, 1915	P	Im, N, Pe, L	8a, 8b, 9b
<i>P. arundineti</i> (Goetghebuer, 1921)	P	Im, N, Pe	2, 8, 9

<i>P. bicrenatum</i> Kieffer, 1929	P	Im, N, Pe	3a, 3b, 9b, 10
<i>P. nubens</i> (Edwards, 1929)	P	Im, N, Pe, L	8a, 8b, 9
<i>P. nubifer</i> (Skuse, 1889)	P	Im, N, Pe, L	9b
<i>P. tetracrenatum</i> Hirvenoja, 1962	*	Im, N, Pe	1b, 2
<i>P. (Cerobregma) lotensis</i> Moubayed-Breil, 2007	P	Im, N, Pe	9a
<i>P. (C.) saetheri</i> Moubayed-Breil, 2007	P	Im, N, Pe	4a, 4b, 9a
<i>Polypedilum (Tripodura)</i> sp. 1	**	Pe	8b, 9b
<i>Sergentia coracina</i> (Zetterstedt, 1850)	*	Im, Pe	1b, 2, 4b, 9
<i>Zavreliella marmorata</i> (van der Wulp, 1859)	P	Im, L	9b
Tanytarsini , 35 species:			
<i>Cladotanytarsus conversus</i> Johannsen, 1932	P	Im, N, Pe, L	1b, 2
<i>C. nigrovittatus</i> (Goetghebuer, 1922)	P	Im, Pe	1b, 2, 8a, 8b
<i>Constempellina brevicosta</i> (Edwards, 1937)	*	Im, N, Pe	5b, 9a
<i>Constempellina</i> sp. 1	**	Pe	1b, 2
<i>Krenopsectra nohedensis</i> (Moubayed & Langton, 1996)	P	Im, N, Pe	8a
<i>Micropsectra aristata</i> Pinder, 1976	*	Im, N, Pe	1a, 3a, 3b, 8b
<i>M. auvergnesis</i> Reiss, 1969	P	Im, N, Pe	4, 8a
<i>M. bavarica</i> Stur & Ekrem, 2006	*	Im, N, Pe	4a, 4b, 5, 8, 9, 10
<i>M. schrankelae</i> Stur & Ekrem, 2006	*	Im, N, Pe	1, 2, 3, 4, 5a, 8b, 9, 10
<i>M. sofiae</i> Stur & Ekrem, 2006	*	Im, N, Pe	1, 2, 4, 5a, 8, 9, 10
<i>Micropsectra</i> sp. 1	**	Im, N, Pe, L	8a
<i>Neozavrelia cuneipennis</i> (Edwards, 1929)	*	Im, N, Pe	1a, 2, 8a, 9a
<i>N. luteola</i> Goetghebuer, 1941	*	Im, N, Pe	9a, 9b
<i>Parapsectra uliginosa</i> Reiss, 1969	*	Im, N, Pe	8a
<i>Paratanytarsus grimmii</i> (Schneider, 1885)	P	Im, Pe	8, 9
<i>P. laccophilus</i> (Edwards, 1929)	P	Im, Pe	4, 8a, 9a
<i>Rheotanytarsus</i> sp. 1	**	Im, N, Pe, L	8a, 8b
<i>Stempellina almi</i> Brundin, 1947	P	Im, N, Pe, L	1b, 2, 5b, 9b, 10
<i>S. subglabripennis</i> (Brundin, 1947)	P	N, Pe	9a, 9b, 10
<i>Stempellinella brevis</i> (Edwards, 1929)	P	Im, N, Pe, L	2, 3, 4, 5a, 8b, 9, 10
<i>S. reissi</i> Casas & Vilchez-Quero, 1991	P	Im, N, Pe, L	8a, 8b, 4b, 9a
<i>Tanytarsus buchoni</i> Reiss & Fittkau, 1971	P	Pe	8a, 8b
<i>T. chinyensis</i> Goetghebuer, 1934	P	Im, Pe	2, 9, 10
<i>T. cretensis</i> Reiss, 1987	P	Pe	9b
<i>T. gibbosiceps</i> Kieffer, 1922	P	Im, Pe	8, 9a
<i>T. glabrescens</i> Edwards, 1929	*	Im, Pe	4, 10
<i>T. longitarsis</i> Kieffer, 1911	*	N, Pe	1b, 2
<i>T. multipunctatus</i> Brundin, 1947	*	Im, N, Pe	1b, 2
<i>T. occultus</i> Brundin, 1949	P	Im, N, Pe	2, 9
<i>T. signatus</i> (van der Wulp, 1859)	P	Im, Pe	2, 9, 10
<i>T. telmaticus</i> Lindeberg, 1959	*	Pe	2
<i>T. tika</i> (Tourenq, 1975)	P	Pe	9b
<i>Virgatanytarsus</i> sp. 1	**	Pe	8b, 9a, 9b
<i>Virgatanytarsus</i> sp. 2	**	Pe	1b, 2
<i>Zavrelia pentatoma</i> Kieffer, 1913	P	Im, Pe	9a, 9b

4. Faunal and biogeographical outline

New records and some other localized species are recapitulated in Table II (pp. 12-15), which includes for each species the corresponding collecting sites throughout Continental France. Fau-

nal significance associated together with biogeographic potential of the listed species is believed to outline the parcelling out in ten major biogeographic regions and sub-regions of the French territory (Figure 1).

- In high and middle mountains areas (Alps, Pyrenees) distribution of characteristic elements is restricted to springs, streams, peat pools and lakes above 1500 m elevation. Communities occurring in high mountain include: *Procladius* sp. 1, *Diamesa aberrata*, *D. bertrami*, *D. bohemani*, *D. thomasi*, *D. veletensis*, *Syndiamesa edwardsi*, *Chaetocladius suecicus*, *Georthocladius* sp. 1, *Parachaetocladius* sp. 1, *Paraphaenocladius intercedens*, *Pseudosmittia forcipata*, *Smittia paranudipennis*, *Krenopsectra nohedensis*, *Micropsectra auvergnensis*, *Micropsectra* sp. 1, *Parapsectra uliginosa*.

- Populations occurring in Northern regions (1, 2) include in general widely distributed species in North Europe and England. Southern border for some North European elements is limited to areas located in the half Northern part of France: *Procladius crassinervis*, *P. rufovittatus*, *Eurycnemus crassipes*, *Dicrotendipes pallidicornis*, *Polypedilum tetracrenatum*, *Tanytarsus longitarsis*, *T. multipunctatus*, *T. telmaticus*.

- Chironomid communities with Mediterranean faunal affinities are encountered in southern regions (8, 9, 10), which especially include Mediterranean elements and some well known Afrotropicals from the Mediterranean region: *Chaetocladius algericus*, *Cricotopus beckeri*, *C. caducus*, *Cricotopus* sp. 1, *Eukiefferiella bedmari*, *Krenosmittia hispanica*, *Parametriocnemus valescurensis*, *Parakiefferiella pyrenaica*, *Paratrichocladius lanzavecchiai*, *P. veronicae*, *Pseudorthocladius berthelemyi*, *Thienemannia libanica*, *Dicrotendipes fusconotatus*, *D. peringueyanus*, *Polypedilum nubifer*, *Zavreliella marmorata*, *Micropsectra schrankelae*, *M. sofiae*, *Tanytarsus cretensis*, *T. tika*.

- Chironomid fauna of some regions or sub-regions (1, 2, 3, 4, 5a, 10) is still little known and needs to be more explored. Their biogeographical significance is still underestimated and deserves greater consideration in the years to come. Nevertheless, likewise for *Brillia pudorosa* and *Eukiefferiella bedmari*, it can be assumed that these two species, as well as some other ones, have reached respectively sub-regions 3a and 1a by a migration path from streams and rivers located in North East of Spain through the Atlantic coastal streams.

5. Distribution of some species and remarks

• *Procladius* sp. 1

Pupal material of *Procladius* sp. 1 was collected in a high altitude lake in the Eastern Pyrenees. It fits the description of *Procladius* sp., reported from Norway by FITTKAU & MURRAY (1985: 96, fig. 5.31, C). This undescribed species can be easily recognized on the basis of the following thoracic horn characters: elliptic plastron; rim weakly represented, almost absent; respiratory atrium oval, elongated and larger at apex.

• *Procladius crassinervis* (Zetterstedt, 1838)

P. crassinervis was first reported by SERRA-TOSIO & LAVILLE (1991) as a probable species from South Eastern France. The present record is based upon mature male adults, pharates adults and pupal exuviae collected in lakes, ponds and large reservoirs located in Northern areas at low altitude (1b, 2).

• ***Boreoheptagyia* sp. 1**

One male adult was collected in a spring located in South Eastern France (region 10). The species is morphologically similar to *Boreoheptagyia rotunda* Serra-Tosio but can be distinguished from this species by the following combination of characters: - antenna, 715 µm long; AR = 0,67; last flagellomere 185 µm long, elongated, longer than preceding 4 segments combined; - hypopygium : presence of anal point on tergite IX; absence of notch on gonostylus.

• ***Diamesa thomasi* Serra-Tosio, 1970**

In France, *D. thomasi* has been recorded from only the two type localities, in the Central Pyrenees (7a, 4 adults) by SERRA-TOSIO (1970). I have found it in the Eastern Pyrenees (subregion 8a) where very large populations (adults, pharates adults, pupae and larvae collected) inhabit high altitude peat pits located at 2250 m; examples of some associated species are *D. aberrata*, *D. bohemani*, *D. bertrami*, *D. veletensis*, *D. zernyi*, *Pseudodiamesa nivosa*, *P. branickii*, *Syndiamesa edwardsi*, *Chaetocladius suecicus*, *Krenopsectra nohedensis*, *Micropsectra auvergnensis*, *Neozavrelia cuneipennis*.

• ***Cricotopus* sp. 1**

This species is morphologically similar to *C. levantinus* Moubayed and Hirvenoja known from the lotic part of the Orontes river in the Lebanon. Recently this species has been recorded from South-West Europe including Continental France, Spain, Corsica (LAVILLE & LANGTON 2002; Fauna Europaea, SÆTHER & SPIES 2004). Associated material including male adults, pharates adults, pupae and pupal exuviae of *Cricotopus* sp.1 was recently reported also from Algeria by MOUBAYED-BREIL et al. (2007) and shows that it belongs to a new species or new subspecies different from *C. levantinus* : the male imago lacks a notch on the gonocoxite lobe, the distribution of anterior armament on tergites III-VI of the pupal exuviae are not crescent-like and the size of spines on the pupal abdominal tergites are stronger in *levantinus*. Comparison of material from both Algeria and France, with type material from the Lebanon, allow us to conclude that *Cricotopus* sp.1 from France belongs to the same new species or subspecies as reported from Algeria. In addition, despite several lists of species reported from intense investigations in Syrian and Turkish territories along the extended basin of the Orontes river (REISS 1985, 1986; CASPERS & REISS 1989) populations of *C. levantinus* are not recorded from these two neighbouring countries.

• ***Eukiefferiella bedmari* Vilchez-Quero & Laville, 1987**

Reported as a circum-mediterranean element well known from both Atlanto-Mediterranean (Spain, Morocco, Corsica) and Ponto-Mediterranean (Greece, Lebanon, Turkey) regions (VILCHEZ-QUERO & LAVILLE 1987; LAVILLE & REISS 1992; LAVILLE & LANGTON 2002). However, *E. bedmari* shows an unexpectedly large geographical distribution in France northward along both South-West and Central-West Atlantic coastal streams (3a, 3b) to the North-Western areas reaching the Channel coastal streams (1a), but have not been encountered in Southern France including Mediterranean coastal streams and rivers. This is the first record for this species for France. The material examined consists of a few pupal exuviae collected in some small Atlantic coastal rivers located in subregions 1a, 3a and 3b.

• ***Limnophyes gelasinus* Sæther, 1990**

Described from a single male adult from Korea. Here, *L. gelasinus* is recorded for the first time from the European continent (France), but it has also recently been recorded from the North African region (Algeria) by MOUBAYED-BREIL & LOUNACI (2007). The material consists of a

few male pharate adults and pupal exuviae, and the species seems to be well represented in both South Eastern France (region 10) and the Aïssi oued basin in Algeria.

• ***Paralimnophyes longiseta* Thienemann, 1919**

In Continental France, this species has been exclusively encountered in the Central and Northern regions (SERRA-TOSIO & LAVILLE 1991, DELETTRE 2001). Male adults of *P. longiseta*, are quite common in wetland areas near marshes and ponds located eastward and westward of Central-France.

• ***Pseudosmittia angusta* Edwards, 1929, *Smittia foliacea* (Kieffer, 1921) and *S. contingens* (Walker, 1856)**

These three species were previously reported from France for the first time by DELETTRE (2001), but were overlooked in the new version of Fauna Europaea. Only male imagines of *P. angusta* and *S. foliacea* were collected in wetland and river basins located in both the Western and the Eastern parts of France: Atlantic and Channel coastal streams in the West (1a, 3a); inland rivers in the East (5). In addition, a few populations of *S. foliacea* are recorded from wetland areas located in the Mediterranean region (9a, 9b, 10).

• ***Micropsectra schrankelae* Stur & Ekrem, 2006 and *M. sofiae* Stur & Ekrem, 2006**

These two species were recently described from Europe. Their identification in the male adult or pupal stage must be considered with care as they are morphologically very similar to *M. atrofasciata* (Kieffer). I have recorded these two species from many regions throughout France, and will expect to see more records throughout the Holarctic region as the species' descriptions become better known. Undoubtedly, many specimens previously believed to be *M. atrofasciata* are probably different species in the *atrofasciata* group, and *M. atrofasciata* might be less widespread than it has been regarded in previous literature.

• ***Stempellinella reissi* Casas & Vilchez-Quero, 1991**

S. reissi was until recently only known from its type locality in the Sierra Nevada, Andalucia, Spain. The material I collected in the French Eastern Pyrenees was included in a recently published revision on *Stempellinella* (EKREM 2007). Large populations of *S. reissi* have been captured from middle and high altitude springs and streams located in the Eastern Pyrenees (8a) and Central France (region 4b). Larvae of *S. reissi* inhabit sandy and gravely habitats of cold waters near springs, peat pits and streams located at various altitudes. Dense populations are more common in streams located in high altitude areas.

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Table II. Sampling sites: geographical location of the new records for French fauna, and localized species.

Tableau II. Localisation géographique des sites correspondant aux citations nouvelles pour la France et aux espèces localisées.

New records and localized species	Geographical location of collecting sites
Tanypodinae:	
<i>Arctopelopia barbitarsis</i>	Springs in lowland : Crau, Coucou
<i>Arctopelopia</i> sp. 1	Swamps, emergent water : Crau, Salat
<i>Larsia atrocincta</i>	Steams : Massane, Nohèdes
<i>L. curticalcar</i>	Streams : Mantet, Malière, Verne, Saint-Daumas, Rascas
<i>Procladius crassinervis</i>	Rivers : Essonne basin, Seine basin
<i>P. lugens</i>	Lakes, reservoirs : Rophemel, Charpal, Raviège, Castillon, Chaudane
<i>P. rufo vittatus</i>	Lakes, ponds : Valière, Ferté-Alais, Dombes, Charpal

<i>Procladius</i> sp. 1	Mountain lakes : Nohèdes basin, Gorg Estelat (2020 m)
<i>Thienemannimyia carnea</i>	Rivers : Tech, Têt, Mantet, Nohèdes
<i>T. pseudocarnea</i>	Streams : Argens basin (Endre), Roya
<i>Zavrelimyia signatipennis</i>	Rivers, streams : Argens, Valescure
Diamesinae	
<i>Boreoheptagyia rugosa</i>	Streams : Massane, Malière
<i>Boreoheptagyia</i> sp. 1	Streams : Verne
<i>Diamesa aberrata</i>	Mountain streams : Neste d'Oô, Aston, Ressec, Ferrado, Caret, Tech
<i>D. bertrami</i>	Mountain streams : Ressec, Mantet, Alemany, Caret, Tech
<i>D. bohemani</i>	High mountain springs : Tech, Mantet, Ferrado, Ressec, Nohèdes
<i>D. thomasi</i>	High mountain springs : Aston, Louron, Ressec, Ferrado
<i>D. veletensis</i>	Upper course of streams : Tech, Mantet, Rotja, Ferrado
<i>Pothastia</i> sp. 1	Springs and upper course of stream : Allier
<i>Syndiamesa edwardsi</i>	High mountain streams : Mantet, Ressec, Soques, Ferrado, Tech
Orthoclaadiinae:	
<i>Brillia pudorosa</i>	Streams : Nivelle, Escource
<i>Bryophaenocladus aestivus</i>	Upper and middle course of streams : Caret, Massane
<i>B. muscicola</i>	Helocrenes : Massif des Maures, Valescure, Argens
<i>B. nidorum</i>	Helocrenes : Roque-Haute, Buèges
<i>B. scanicus</i>	Peat pits, wet moss : Dombes, Pinet
<i>Bryophaenocladus</i> sp. 1	Helocrenes, seepages : Roque-Haute
<i>Chaetocladus algericus</i>	Springs, seepages : Valescure, Argens basin, Soronne
<i>C. gracilis</i>	Streams, wet moss : Mantet, Alemany, Caret, Massane
<i>C. suecicus</i>	Streams : Holadoco, Aston, Mantet, Nohèdes, Ferrado, Rotja, Caret, Tech
<i>Corynoneura arctica</i>	Lakes, Pools : Nohèdes, Têt
<i>C. fitzkau</i>	Springs : Mantet, Tech
<i>C. gratias</i>	Streams : Durdent, Avre, Varenne, Dronne, Isle, Nive, Nohèdes, Caret
<i>C. lacustris</i>	Rivers, streams : Essonne, Isle, Adour, Nohèdes, Tech, Buèges, Verne
<i>Cricotopus algarum</i>	Lakes, ponds, pools : Arques, Risle, Lacanau, Adour
<i>C. beckeri</i>	Streams : Massane, Libron, Argens, Collobrier
<i>C. caducus</i>	Marshes, ponds : Risle, Lacanau, Adour basin, Clamadour, Lairan, Bagnas
<i>Cricotopus</i> sp. 1	Streams : Collobrier, Argens, Valescure, Malière
<i>Epoicocladus ephemerae</i>	Middle course of streams : Avre, Béthune, Guiel, Essonne, Massane, Lot
<i>Eukiefferiella bedmari</i>	Streams : Mesnil-Andelle, Nivelle
<i>E. brehmi</i>	Streams : Tech, Cady, Lentille, La Roque, Argens
<i>Eurycnemus crassipes</i>	Streams : Charentonne, Guiel
<i>Euryhopsis fuscipropes</i>	Middle and lower course of streams : Saison, Têt
<i>Georthocladus luteicornis</i>	Upper and middle course of streams : Ariège, Salat
<i>Georthocladus</i> sp. 1	Upper course of stream : Tech
<i>Heterotrissocladus grimshawi</i>	Upper and middle course of streams : Aire, Aube, Doubs,
<i>H. subpilosus</i>	Swamps in middle course of streams : Aude basin
<i>Heterotrissocladus</i> sp. 1	Temporary helocrenes : Roque-Haute
<i>Hydrobaenus conformis</i>	Temporary helocrenes and pools : Roque-Haute
<i>H. distylus</i>	Wet moss, wet litter : Roque-Haute
<i>H. pilipes</i>	Lower course of streams : Têt, Vauxonne
<i>Krenosmittia hispanica</i>	Middle course of streams : Tech, Caret, Carança
<i>Limnophyes bidumus</i>	Springs, streams : upper Verdon, Mantet, Buèges, Ardèche, Argens
<i>L. difficilis</i>	Wet litter : Roque-Haute, Verne, Rascas, Saint-Daumas
<i>L. edwardsi</i>	Wet moss, hygropetric : Massane, Agout, Espinouse
<i>L. gelasinus</i>	Wet moss, temporary streams : La Roque, Péguière, Soronne

<i>L. inanispatina</i>	Madicolous, helocrenes : Roque-Haute
<i>L. ninae</i>	Hygropetric : Massane, Roque-Haute, Santa-Fé, Valescure, Esterel
<i>L. punctipennis</i>	Wet litter : Roque-Haute, Bagnas, Buèges, Agout, Santa-Fé
<i>L. roquehautensis</i>	Madicolous, helocrenes : Roque-Haute
<i>L. spinigus</i>	Hygropetric, streams : Aston, upper Ariège, upper Têt
<i>Mesosmittia flexuella</i>	Wet moss, wet litter : Roque-Haute
<i>Metriocnemus atriclavus</i>	Wet moss, wet litter : Roque-Haute, Haut-Languedoc, Buèges, Lamalou
<i>M. corticalis</i>	Wet moss, hygropetric : Nohèdes
<i>Orthocladius calvus</i>	Lower course of streams : Vauxonne, Libron, Ardèche, Vidourle
<i>O. holsatus</i>	Middle course of streams, inflow of lakes : Lys, Pique, Castillon
<i>O. lignicola</i>	Streams : Béthune, Velvette, Sioule, Alagnon, Massane, Caret, Thoré
<i>Parachaetocladius</i> sp. 1	High mountain streams : upper Tech
<i>Parakiefferiella pyrenaica</i>	Streams : Saison, Holadoco, Pique, Aston, Mantet, Tech, Dourbie, Argens
<i>Parakiefferiella</i> sp. 1	Middle course of streams : Guiel, Arn
<i>Paralimnophyes longiseta</i>	Wetland areas, ponds : Essonne basin, Charente basin, Dombes
<i>Paraphaenocladius intercedens</i>	Upper course of streams : Tech, Mantet
<i>Paratrachocladius lanzavecchiaie</i>	Springs, streams : Massane, Roque-Haute, Lamalou, Crès, Vis, Verne, Argens
<i>P. veronicae</i>	Springs, streams : Riberette, Roque-Haute, Santa-Fé, Vissec, Lamalou
<i>Psectrocladius platypus</i>	Lowland swamps and springs : Crau, Coucou, Crès, Buèges
<i>Pseudorthocladius berthelemyi</i>	Hygropetric habitats : Lys, Aston, Mantet, Tech, Clamoux, Argens, Malière
<i>Pseudorthocladius</i> sp. 1	Hygropetric habitats : Mantet river, Carança
<i>Pseudosmittia baueri</i>	Lowland springs and streams : Roque-Haute, Valescure
<i>P. forcipata</i>	Wetland areas, pools : upper Têt, Grave, Formiguères, upper Aude
<i>P. holsata</i>	Wet moss : Massane, Orb, Ardèche, Argens, Soronne
<i>P. nanseni</i>	Lower course of streams : Gave de Pau, Pierrefitte, Adour basin
<i>Rheocricotopus tirolus</i>	Middle course of streams : Massane
<i>Smittia aquatilis</i>	Wetland areas : Essonne basin, Seine basin
<i>S. betuletorum</i>	Wetland areas : Essonne basin
<i>S. paranudipennis</i>	High mountain wetlands : Tech basin, Mantet basin
<i>S. reissi</i>	Wet litter and wet moss in helocrenes : Roque-Haute, Bagnas
<i>S. rupicola</i>	Wet litter and wet moss near temporary pools : Roque-Haute
<i>S. superata</i>	Wet litter and wet moss near temporary pools : Roque-Haute
<i>S. vesparum</i>	Wet litter and wet moss near temporary pools : Roque-Haute
<i>Smittia</i> sp. 1	Wetland areas : Guiel basin, Velvette basin
<i>Thienemannia fulvofasciata</i>	Middle course of streams : Massane, Eyne, Caret
<i>T. libanica</i>	Streams : Buech, Verdon, Valescure
<i>Thienemanniella flavescens</i>	Rivers, streams : Avre, Essonne, Maisse, Erdre, Dronne, Isle
<i>Tvetenia discoloripes</i>	Rivers, streams : Risle, Esonne, Misery, Erdre, Nivelle
Chironominae Chironomini:	
<i>Chironomus lacunarius</i>	Ponds : Hirondelles, Echarcon, Clot, Formiguères
<i>Chironomus</i> sp. 1	Rivers, potamal : Seine basin, Essonne basin
<i>Cryptotendipes nigronitens</i>	Rivers : Essonne, Adour, Lot
<i>C. usmaensis</i>	Rivers : Valmont, Seine, Essonne, Allier, Ardèche
<i>Demicryptochironomus neglectus</i>	Rivers, potamal : Saison, Ariège, Têt
<i>Dicrotendipes fusconotatus</i>	Potamal, rice fields : Petit Rhône, Mas d'Yvan, Sylveréal, Vidourle
<i>D. lobiger</i>	Ponds, lakes : Hirondelles, Echarcon, Clot, Bouillouses
<i>D. pallidicornis</i>	Brackish pools : Risle basin, Arques basin
<i>D. peringueyanus</i>	Potamal, rice fields : Vidourle, Petit Rhône, Mas d'Yvan
<i>Kloosia pusilla</i>	Rivers, potamal, rice fields : Petit Rhône, Vidourle, Mas d'Yvan
<i>Microchironomus deribae</i>	Rivers, potamal : Seine, Essonne, Dronne, Dordogne, Hérault, Vidourle

<i>Parachironomus digitalis</i>	Rivers, potamal : Lot, Ardèche, Vidourle
<i>Parachironomus parilis</i>	Rivers, potamal, pools : Vidourle, Petit Rhône, Roque-Haute
<i>Parachironomus</i> sp. 1	Potamal, ponds : Seine basin, Hironnelles, Vert le Petit, Echarcon
<i>Paralauterborniella nigrohalteralis</i>	Rivers, streams : Corbie, Essonne, Ardèche, Argens
<i>Polypedilum acutum</i>	Streams : Mantet, Soques, Estables, Tech, Buèges
<i>P. arundineti</i>	Rivers, streams : Essonne basin, Nohèdes, Massane, Arn, Ardèche
<i>P. bicrenatum</i>	Lakes, reservoirs : Isle, Dordogne, Adour basin, Aven, Valescure
<i>P. nubens</i>	Upper and middle course of streams : Tech, Mantet, Têt, Orb, Lergue
<i>P. nubifer</i>	Marshes, pools, rice fields : Crau (Coucou), Mas d'Yvan, Roque-Haute
<i>P. tetracrenatum</i>	Rivers, potamal : Essonne basin, Seine basin
<i>P. (Cerobregma) lotensis</i>	Rivers, hyporhithral : Lot
<i>P. (C.) saetheri</i>	Rivers, hyporhithral : Sioule, Allier basin, Lot
<i>Sergentia coracina</i>	Ponds : Seine basin, Essonne basin, Dombes, Allier basin, Charpal
<i>Zavreliella marmorata</i>	Permanent pools, submerged vegetation : Crau (Coucou), Quercy (Nave)
Chironominae Tanytarsini:	
<i>Cladotanytarsus conversus</i>	Rivers, potamal : Seine basin, Essonne, Erdre, Hyrôme, Aubance
<i>Constempellina brevicosta</i>	Northern and mountain lakes : Chèze, Castillon, Charpal
<i>Constempellina</i> sp. 1	Northern lakes : Chèze, Valière
<i>Krenopsectra nohedensis</i>	Upper course of streams : Nohèdes, Mantet, Tech
<i>Micropsectra aristata</i>	Streams : Guil, Avre, Planche de Mozé, Isle, Dronne, Nivelles, Riberette
<i>M. auvergnensis</i>	Mountain streams : Dore, Enfer, Nohèdes, Mantet
<i>M. bavarica</i>	Streams : Allier, Dore, Ognon, Bléone, Buech, Mantet, Orb, Agout, Verne
<i>M. schrankelae</i>	Rivers, streams : widespread species
<i>M. sofiae</i>	Streams : Béthune, Cerny, Allier, Doubs, Têt, Tech, Lot, Buèges, Argens
<i>Micropsectra</i> sp. 1	High mountain springs and peat pits : Ressec, Mantet, Soques
<i>Neozavrelia cuneipennis</i>	Peat pools, wet litter : Durdent, Valmont, Velvette, Ressec, Espinouse
<i>N. luteola</i>	Southern calcareous streams : Lergue, Buèges, Lez
<i>Parapsectra uliginosa</i>	Mountain pools : Têt, Grave (Carlit), Mantet, Nohèdes
<i>Paratanytarsus grimmii</i>	Shallow pools : Nohèdes, Riberette, upper Orb, Roque basin
<i>P. laccophilus</i>	Mountain lakes and ponds : Gorg Estélat, Clot, Charpal, Aven
<i>Rheotanytarsus</i> sp. 1	Mountain streams : Nohèdes, Tech, Mantet
<i>Stempellina almi</i>	Lakes, ponds : Essonne basin, Rophemel, Castillon, Charpal, Chaudane
<i>S. subglabripennis</i>	Emergent water, small streams : Buèges, Crau, Valescure,
<i>Stempellinella reissi</i>	Springs, streams : Mantet, Tech, Rotja, Alemany, Allier, Haut-Languedoc
<i>Tanytarsus buchoni</i>	Mountain peat pools and boggy seepages : Preste, Nohèdes, Tech, Têt
<i>T. chinyensis</i>	Lakes, reservoirs : Rophemel, Raviège, Salagou, Valescure
<i>T. cretensis</i>	Lower course of streams : Petit Rhône, Ardèche
<i>T. gibbosiceps</i>	Boggy swamps and pools : Nohèdes, upper Orb, Haut-Languedoc
<i>T. glabrescens</i>	Lakes, reservoirs : Charpal, Valescure
<i>T. longitarsis</i>	Potamal, ponds : Seine basin, Echarcon, Vert le Petit, Maisse
<i>T. multipunctatus</i>	Lakes, reservoirs, ponds : Valière, Rophemel, Locquet, Ballancourt
<i>T. occultus</i>	Lakes, ponds, reservoirs : Vinça, Raviège, Aurette, Salagou, Valescure
<i>T. signatus</i>	Lakes, reservoirs : Rophemel, Aurette, Raviège, Chaudane, Valescure
<i>T. telmaticus</i>	Lakes, reservoirs : Rophemel, Chèze
<i>T. tika</i>	Coastal wetland areas : near Aigue-Morte, near Sylveréal, Camargue
<i>Virgatanytarsus</i> sp. 1	Lower course of streams, pools : Massane basin, Causses du Quercy
<i>Virgatanytarsus</i> sp. 2	Rivers, potamal : Seine basin, Essonne basin
<i>Zavrelia pentatoma</i>	Peat bogs and boggy seepages : Pinet, Haut-Languedoc (Roque basin)