

The French centipede fauna (Chilopoda): updated checklist and distribution in mainland France, Corsica and Monaco

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Abstract

A revised and updated list of the centipedes (Chilopoda) of metropolitan France is given. 145 taxa are recorded from the country (1 Scutigeroforma, 69 Lithobioforma, 9 Scolopendromoforma, 66 Geophiloforma) although the validity and/or the presence of 8 of these taxa in France remains doubtful. Presence in mainland France, Corsica and Monaco is reported, and the distribution of each taxon in France is briefly quoted as well as special features such as endemism, highly halophilous/halobiontic species and highly troglophilous/troglobitic taxa. Some species potentially present in the studied area are also mentioned, being very likely to be found in the very near future.

Keywords: biodiversity, Chilopoda, France, inventory, taxonomy

1. Introduction

For the class Chilopoda in France during the last decade 1998–2008, several new taxa have been described or discovered for the first time in the country (Tab. 1) and many synonymies and nomenclatural aspects have been revised (Spelda 2005a, Bonato et al. 2006, 2008, Iorio & Geoffroy 2007c, 2008, Iorio 2008b, 2008c, Minelli & Bonato 2008) in respect to works published in the early 1980's (Demange 1981, Eason 1982). Also our knowledge of the geographical distribution of the species currently known to occur in France has increased considerably (Iorio 2003, 2004a, 2004b, 2005a, 2005b, 2006, 2007, 2008b, 2008c, Iorio & Geoffroy 2004, 2007b, 2008, Spelda 2005b, Geoffroy 2006, Iorio & Berg 2007, Iorio & Tiberghien 2007, Lindner 2007). For all these reasons, it is useful to review the current state of knowledge of this class of myriapods for the country with the aim of revising and to making more complete the earlier list given at the very end of the Twentieth Century (Geoffroy 2000) and to include elements of comparison with old centipede faunas published for France during the 1930's and 1980's (Brolemann 1930, Demange 1981).

Tab. 1 List of newly described or newly discovered centipede species and subspecies found in France during the decade 1998–2008.

| Taxa | References |
|--|---|
| <i>Eupolybothrus grossipes</i> (C. L. Koch, 1847) | Iorio (2008b) |
| <i>Lithobius ambulotentus</i> Demange & Serra, 1978 | Iorio (2008a) |
| <i>Lithobius crypticola alavicus</i> Matic, 1959 | Iorio (2008c) |
| <i>Lithobius crypticola fresnedensis</i> Serra, 1980 | Iorio (2008c) |
| <i>Lithobius delfosseii</i> Iorio & Geoffroy, 2007 | Iorio & Geoffroy (2007a), Iorio & Berg (2007) |
| <i>Lithobius piceus verhoeffi</i> Demange, 1958 | Iorio & Berg (2007), Iorio (2008b) |
| <i>Lithobius pygmaeus</i> Latzel, 1880 | Spelda (2005b) |
| <i>Lithobius raffaldii</i> Iorio, 2009 | Iorio (2009) |
| <i>Lithobius subtilis subtilis</i> Latzel, 1880 | Spelda (2005b) |
| <i>Lithobius subtilis geoffroyi</i> Iorio & Berg, 2007 | Iorio & Berg (2007) |
| <i>Lithobius valesiacus</i> Verhoeff, 1935 | Iorio (2005d, 2008b), Iorio & Berg (2007) |
| <i>Clinopodes</i> sp. [n. sp. ?] | Iorio (2008b) |
| <i>Geophilus easoni</i> Arthur et al., 2001 | Iorio (2008b) |
| <i>Geophilus pusillifrater</i> Verhoeff, 1898 | Iorio (2006) |
| <i>Geophilus persephones</i> Foddai & Minelli, 1999 | Foddai & Minelli (1999) |
| <i>Strigamia cottiana</i> (Verhoeff, 1935) | Iorio (2008b) |
| <i>Strigamia transsilvanica</i> (Verhoeff, 1928) | Iorio (2005c, 2008b), Iorio & Berg (2007) |

2. Materials and methods

The data published in the present list concerns all the four centipede orders in the class Chilopoda presently found in Western Europe (Scutigermorpha, Lithobiomorpha, Scolopendromorpha and Geophilomorpha). The data used come from the literature, from collections and from recent sampling mainly done by hand-collecting in various habitats or regions.

The presence in mainland France (Fm), Corsica (Co) and Monaco (Mo) is quoted beside each taxon of the list, in order to present the essential distribution and to avoid repetition. Endemic species are noted (E). Some unpublished data are included as ‘Author unpublished record/s’. A short comment on species distribution, habitat, status (common/rare/widespread/...) in France is added, mainly based on the following authors and references: Gadeau de Kerville (1884, 1886, 1890, 1932), Chalande (1886, 1888), Brölemann (1895, 1898, 1899, 1926a, 1926b, 1930), Léger & Duboscq (1903), Ribaut (1909, 1910), Brölemann & Ribaut (1912), Jeannel (1926), Verhoeff (1926, 1943), Attems (1929), Ravoux (1948), Razet & Barbotin (1952), Demange (1955a, 1955b, 1956, 1961, 1981), Matic (1958, 1962, 1968, 1975, 1976), Geoffroy (1979, 1981, 2006), Serra (1980), Minelli & Zapparoli (1985), Foddai et al. (1996), Barber & Jones (1999), Foddai & Minelli (1999), Spelda (1999, 2005b),

Kime (2003), Iorio (2003, 2004a, 2004b, 2005a, 2005b, 2006, 2007, 2008a, 2008b, 2008c, 2009), Iorio & Geoffroy (2004, 2007a, 2007b, 2008), Iorio & Berg (2007), Iorio & Tiberghien (2007), Ranger (2008). The repetition of the references mainly used to give the distribution for each taxon is therefore avoided, except for some very particular cases. The references quoted above are a selection based on their relative importance; papers with a large number of quoted species, papers with detailed lists for a department and/or region which include all earlier references for the studied area, less important papers which treat an almost unstudied sector or uncommon taxa or detailed revisions for some species. See, amongst others, Manfredi (1956), Würmli (1980) and Zapparoli (1992).

The list includes the valid subgenus and subspecies and some main synonyms at the species level. It is not possible to quote here the numerous subspecies and varieties given in Brolemann (1930) and Demange (1981) which have been shown to be synonyms of the typical forms. The reader must bear in mind that the infraspecific taxa of both authors which are not quoted as valid in the following list are synonyms of the typical species as detailed in the Fauna Europaea and Chilobase databases. On the other hand, there have been several changes in the taxonomy of the order Geophilomorpha at the genus level since both faunas were published and these changes are noted before the list (Tab. 2).

Tab. 2 Valid genera of the Geophilomorpha in France and their synonyms in respect to Brolemann (1930) and Demange (1981). After Bonato et al. (2006, 2008), Iorio (2008b) and Minelli & Bonato (2008).

| Valid genus | Synonyms in Brolemann (1930) and Demange (1981) |
|---|--|
| <i>Himantarium</i> C. L. Koch, 1847 | <i>Pseudohimantarium</i> Chalande & Ribaut, 1909 |
| <i>Stigmatogaster</i> Latzel, 1880 | <i>Haplophilus</i> Cook, 1896 |
| | <i>Nesoporogaster</i> Verhoeff, 1924 |
| <i>Schendyla</i> Bergsö & Meinert, 1866 | <i>Brachyschendyla</i> Brölemann & Ribaut, 1911 |
| <i>Arctogeophilus</i> Attems, 1909 | <i>Gnathomerium</i> Ribaut, 1911 |
| <i>Eurygeophilus</i> Attems, 1899 | <i>Chalandea</i> Brölemann, 1909 |
| <i>Geophilus</i> Leach, 1814 | <i>Necrophloeophagus</i> Newport, 1843 |
| | <i>Brachygeophilus</i> Brölemann, 1909 |
| <i>Strigamia</i> Gray, 1843 | <i>Scolioplanes</i> Bergsö & Meinert, 1866 |

3. Results

Annotated list of centipede species and subspecies distributed in mainland France, Corsica and Monaco. Main bibliographic sources are listed in the section 2. Materials and methods.

Order Scutigeromorpha**Family Scutigeridae*****Scutigera coleoptrata* (Linnaeus, 1758)****Fm-Mo-Co**

Distribution and habitat: Widely distributed in mainland France and Corsica, epigeic but also in caves: in natural environments in the Mediterranean regions only; in cave entrances and twilight zone in the Hautes-Pyrénées department. Anthrophile elsewhere (Iorio & Geoffroy 2007b).

Order Lithobiomorpha**Family Henicopidae*****Lamyctes coeculus* (Brölemann, 1889)****Fm**

Distribution and habitat: Greenhouses of the Muséum national d'Histoire naturelle, Paris. Introduced.

Lamyctes emarginatus* (Newport, 1844)*Fm**

Lamyctes fulvicornis Meinert, 1868

Distribution and habitat: Pyrenees, Provence-Alpes-Côte d'Azur, Auvergne and Poitou-Charentes regions, Armorican Massif regions; Morvan in Burgundy (Iorio unpublished records); epigeic. Introduced.

Family Lithobiidae***Eupolybothrus (Eupolybothrus) fasciatus* (Newport, 1845)****Fm**

non *Bothropolys fasciatus*: Brolemann, 1930

Distribution: Alpes-Maritimes department only.

Eupolybothrus (Eupolybothrus) grossipes* (C. L. Koch, 1847)*Fm**

Bothropolys fasciatus: Brolemann, 1930

Distribution: Alpes-Maritimes department only.

Eupolybothrus (Eupolybothrus) longicornis* (Risso, 1826)*Fm**

Distribution and habitat: South-eastern France; epigeic but also in caves.

Eupolybothrus (Allopolybothrus) nudicornis* (Gervais, 1837)*Fm-Co**

Bothropolys elongatus Newport, apud Lucas, 1849

Distribution: South-eastern mainland France and Corsica.

Harpolithobius anodus* (Latzel, 1880)*Fm**

Distribution: Alpes-Maritimes department; rare.

- Lithobius (Lithobius) acuminatus* Brölemann, 1892** **Fm**
 Distribution: Alpes-Maritimes department only.
- Lithobius (Lithobius) agilis* C. L. Koch, 1847** **Fm**
 Distribution: Widely distributed in France but uncommon.
- Lithobius (Lithobius) aidonensis* Verhoeff, 1943** **Co (E)**
 Distribution: Corsica only.
- Lithobius (Lithobius) allotyphlus* Silvestri, 1908** **Fm**
 Distribution and habitat: Pyrénées-Atlantiques department; only in caves, troglobiont.
- Lithobius (Lithobius) ambulotentus* Demange & Serra, 1978** **Fm**
 Distribution and habitat: Recently found in a cave in Prats-de-Mollo-la-Preste (Pyrénées-Orientales). Troglobiont.
- Lithobius (Lithobius) blanchardi* Léger & Duboscq, 1903** **Co (E)**
 Distribution: Corsica only.
- Lithobius (Lithobius) borealis* Meinert, 1868** **Fm**
 non *L. borealis* : Brolemann, 1930
 Distribution: Pyrenees and Alps. Also recorded from Brittany and Haute-Normandie regions.
- Lithobius (Lithobius) bostryx* Brölemann, 1897** **Fm (E)**
 Distribution: Western Pyrenees. It seems rare.
- Lithobius (Lithobius) brandensis* Verhoeff, 1943** **Co (E)**
 Distribution: Corsica only.
- Lithobius (Lithobius) calcaratus* C. L. Koch, 1844** **Fm-Mo-Co**
 Distribution and habitat: Widely distributed in the whole area and very common. *L. calcaratus* is one of the French species which best tolerates xeric ecosystems; this is confirmed for German populations (Spelda pers. comm.).
- Lithobius (Lithobius) cassinensis* Verhoeff, 1925** **Fm?-Co**
 Distribution: Corsica only after Verhoeff's data (Verhoeff 1925, 1926, 1943). The presence of this species in south-eastern France is uncertain.
- Lithobius (Lithobius) castaneus* Newport, 1844** **Fm-Co**
 Distribution: Pyrenees, Alpes-Maritimes and Corsica.

- Lithobius (Lithobius) cavernicola* Fanzago, 1877** **Fm (E)**
 Distribution and habitat: Pyrenees and Aude departments. Only in caves, troglobiont.
- Lithobius (Lithobius) crypticola crypticola* Ribaut, 1926** **Fm (E)**
L. crypticola bicuspidata Matic, 1958: synonymised by Iorio (2008c)
 Distribution and habitat: Pyrénées-Atlantiques and Landes departments; in caves, troglobiont.
- Lithobius (Lithobius) crypticola alavicus* Matic, 1959** **Fm**
 Distribution and habitat: Caves from Ariège (rather highly troglophilous than strictly troglobitic). The exact status of this subspecies requires further research (specific level would probably be justified).
- Lithobius (Lithobius) crypticola fresnedensis* Serra, 1980** **Fm**
 Distribution and habitat: Pyrénées-Atlantiques; only in caves, troglobiont.
- Lithobius (Lithobius) delfosseii* Iorio & Geoffroy, 2007** **Fm (E)**
 Distribution: Endemic in the French Alps and south-western Pre-Alps up to Mont Ventoux.
- Lithobius (Lithobius) dentatus* C. L. Koch, 1844** **Fm-Co?**
 Distribution and habitat: Sylvicolous species recorded in Haute-Normandie, Picardie, Champagne-Ardenne, Lorraine, Burgundy and Provence-Alpes-Côte d'Azur regions. Relatively uncommon. Its presence in Corsica is doubtful.
- Lithobius (Lithobius) erythrocephalus* C. L. Koch, 1847** **Fm-Mo**
 Distribution: South-east France and Monaco.
- Lithobius (Lithobius) fagniezi* Ribaut, 1926** **Fm (E)**
 Distribution and habitat: Var department; only in caves, troglobiont.
- Lithobius (Lithobius) forficatus* (Linnaeus, 1758)** **Fm-Mo?-Co**
 Distribution: Euryecious species widely distributed in France and very common; it seems to be frequently replaced by *L. pilicornis* at high altitude and is less common in the department of Alpes-Maritimes. Also in Corsica, where it has perhaps been introduced.
- Lithobius (Lithobius) henroti* Demange, 1955** **Fm (E)**
 Distribution and habitat: Hérault department; caves only, troglobiont.
- Lithobius (Lithobius) jeanneli* Matic, 1958** **Fm (E)**
 Distribution and habitat: Hautes-Pyrénées department; caves only, troglobiont.

***Lithobius (Lithobius) lapidicola* Meinert, 1872** **Fm-Co**

L. pusillus pusillifrater Verhoeff, 1925; non *L. lapidicola*: Brolemann, 1930

Distribution and remarks: Alps, Vosges Mountains and Corsica. Its presence in the Pyrenees requires confirmation because it has been confused with *L. borealis* for many years both before and after Brolemann (1930).

***Lithobius (Lithobius) latro* Meinert, 1872** **Fm**

Distribution: Alps only; the record in Burgundy by Ravoux (1948) is uncertain.

***Lithobius (Lithobius) lucifugus* L. Koch, 1862** **Fm**

Distribution and remarks: Alps and Pre-Alps. Its presence in the Lorraine region needs to be confirmed, and its record from Ille-et-Vilaine by Razet & Barbotin (1952) is probably an error of identification.

***Lithobius (Lithobius) macilentus* L. Koch, 1862** **Fm**

L. aulacopus Latzel, 1880

Distribution and habitat: Sylvicolous species widely distributed in France; however, it is uncommon in the Mediterranean area.

***Lithobius (Lithobius) marcuzzii* Matic, 1975** **Fm (E)**

Distribution and remarks: Hautes-Pyrénées department. It would be useful to verify the validity of this species by new captures and examination of specimens.

***Lithobius (Lithobius) melanops* Newport, 1845** **Fm**

Distribution: Widely distributed in mainland France.

***Lithobius (Lithobius) mononyx* Latzel, 1888**

L. tricuspis mononyx Latzel, 1888

Distribution: According to Tobias (1969) and Eason (1974), *L. mononyx* is considered as a valid species from the Pyrenees.

***Lithobius (Lithobius) mutabilis* L. Koch, 1862** **Fm**

Distribution and remarks: Northern France: Haute-Normandie and Alsace; also from the Alps (possible confusion with *L. glacialis* in the Alps may occur). Quoted as *L. mutabilis steffeni* (n. subsp.) by Matic (1976).

***Lithobius (Lithobius) muticus* C. L. Koch, 1847** **Fm**

Distribution and remarks: Widely distributed in mainland; common in western regions. Quoted in France as *L. sexdentatus* Verhoeff, 1937 by Matic (1976).

- Lithobius (Lithobius) nicoeensis* Brölemann, 1904** **Fm-Mo**
possible junior synonym of *L. tylopus* Latzel, 1882
Distribution and remarks: Alpes-Maritimes department only. It would be useful to determine the status of this taxon by further research, particularly by a detailed comparison with the Italian *L. tylopus*.
- Lithobius (Lithobius) pelidnus* Haase, 1880** **Fm**
Distribution and habitat: Rare sylvicolous species from Basse-Normandie, Haute-Normandie, Lorraine, Alsace and Franche-Comté. The apparent rarity might partly result from the arboricolous habitat of this species (Spelda 1999).
- Lithobius (Lithobius) peregrinus* Latzel, 1880 (?)** **Fm**
Distribution and remarks: Cave of Pont-Saint-Esprit (Gard department); this record remains doubtful (Zapparoli 1992).
- Lithobius (Lithobius) piceus piceus* L. Koch, 1862** **Fm**
L. piceus gracilitarsis Brölemann, 1898
Distribution and remarks: Widely distributed in France, perhaps replaced in the south-east by the following subspecies (?). *L. aculeatus* Matic, 1975, described on a single female from Pénes Blanques (France), most probably belongs to *L. piceus* (cf. Chilobase and Fauna Europaea databases).
- Lithobius (Lithobius) piceus verhoeffi* Demange, 1958** **Fm**
L. pedemontanus Matic et Darabantzu, 1970
Distribution and remarks: South-eastern France. The validity of this subspecies needs to be confirmed by further research, because its differentiation is based on some weak and more or less variable criteria.
- Lithobius (Lithobius) pilicornis* Newport, 1844** **Fm-Co**
Distribution: Whole Armorican Massif, whole Pyrenean Massif, Mediterranean area and whole Alpine regions; also quoted from Aquitaine, Limousin and Auvergne regions. Also in Corsica.
- Lithobius (Lithobius) pygmaeus* Latzel, 1880** **Fm**
Distribution: Only recorded in Servafälle (Bas-Rhin department).
- Lithobius (Lithobius) pyrenaicus* Meinert, 1872** **Fm**
Distribution: Whole Mediterranean area.

- Lithobius (Lithobius) racovitzae* Matic, 1958** **Fm (E)**
 Distribution and habitat: Ariège department, caves only, troglobiont.
- Lithobius (Lithobius) raffaldii* Iorio, 2009** **Co (E)**
 Distribution and habitat: A new troglobitic species which has been very recently found in a cave from Corsica (Iorio 2009).
- Lithobius (Lithobius) ribauti* Chalande, 1907** **Fm**
 Distribution: Pyrenees and Montagne Noire. Uncommon.
- Lithobius (Lithobius) salicis* Verhoeff, 1925** **Fm**
 Distribution: Only known from la Brigue in the Alpes-Maritimes department (Minelli & Zapparoli 1985).
- Lithobius (Lithobius) scotophilus* Latzel, 1887** **Fm**
 Distribution and habitat: Alpes-Maritimes department. Caves only, troglobiont.
- Lithobius (Lithobius) speluncarum* Fanzago, 1877** **Fm**
L. speluncarum daminguetae Demange, 1962
 Distribution and habitat: Caves of the Pyrenees. Troglobiont.
- Lithobius (Lithobius) subtilis subtilis* Latzel, 1880** **Fm**
 Distribution: Vosges mountains only.
- Lithobius (Lithobius) subtilis geoffroyi* Iorio & Berg, 2007** **Fm (E)**
 Distribution: Recently described subspecies present in the south-western Pre-Alps (Mont Ventoux, Montagne de Lure).
- Lithobius (Lithobius) tenebrosus* Meinert, 1872** **Fm-Co?**
L. nigrifrons Latzel & Haase, 1880
 Distribution and remarks: Rare species. Burgundy and Vosges mountains in Lorraine (Iorio unpublished records). Its presence in Corsica is doubtful.
- Lithobius (Lithobius) tricuspis* Meinert, 1872** **Fm-Co**
L. alpicosiensis Matic, 1973: synonymised by Iorio (2008b)
 Distribution and habitat: Common and widely distributed lithobiid; epigeic, mainly in forests.
- Lithobius (Lithobius) troglodytes rupicola* Brölemann, 1898** **Fm**
 Distribution and habitat: Caves from the Pyrénées-Atlantiques and Hautes-Pyrénées departments.

- Lithobius (Lithobius) troglodytes scutigeropsis* Brolemann, 1930** **Fm**
 Distribution and habitat: Caves from the Pyrénées-Atlantiques and Haute-Garonne departments.
- Lithobius (Lithobius) troglodytes troglodytes* Latzel, 1886** **Fm**
 Distribution and habitat: Whole of the Pyrenees and Aude department, frequently found in caves but also in open habitats. Serra (1980) has shown that all the subspecies and the varieties described by former authors are not valid. However, until further formal data are published on the case, we still maintain the three subspecies as valid.
- Lithobius (Lithobius) typhlus* Latzel, 1886** **Fm (E)**
 Distribution and habitat: Pyrénées-Orientales and Aude departments; caves only, troglobiont.
- Lithobius (Lithobius) validus* Meinert, 1872** **Fm**
L. punctulatus Brolemann, 1930; non *L. punctulatus* C. L. Koch, 1847
 Distribution: Pyrenees and the southern Alps.
- Lithobius (Lithobius) valesiacus* Verhoeff, 1935** **Fm**
L. lusitanus valesiacus Verhoeff, 1935
 Distribution: Southern Alps and Pre-Alps (Hautes-Alpes, Vaucluse and Alpes-Maritimes departments). Very probably present in the whole Alps.
- Lithobius (Lithobius) variegatus* Leach, 1817** **Fm**
 Distribution: Armorican Massif regions, perhaps present in other regions of the Atlantic coast.
- Lithobius (Monotarsobius) aeruginosus* L. Koch, 1862** **Fm**
 Distribution and habitat: Uncommon species in forests of Lorraine, Franche-Comté, Burgundy, Rhône-Alpes and Auvergne regions and Maine-et-Loire department which constitutes its western limit. Probably very rare or absent in the majority of the western regions of France.
- Lithobius (Monotarsobius) crassipes* L. Koch, 1862** **Fm**
 Distribution: Common and widely distributed.
- Lithobius (Monotarsobius) curtipes* C. L. Koch, 1847** **Fm**
 Distribution: Champagne, Picardie, Haute-Normandie, Brittany and Pays-de-la-Loire regions.
- Lithobius (Sigibius) micropodus* (Matic, 1980)** **Fm-Mo?**
L. microps auct. non Meinert, 1868
 Distribution: Present in the Alpes-Maritimes and Var departments.

Lithobius (Sigibius) microps* Meinert, 1868*Fm-Mo?***L. duboscqui* Brölemann, 1896

Distribution and habitat: Euryecious lithobiid, common and widely distributed.

Order Scolopendromorpha**Family Scolopendridae*****Scolopendra cingulata* Latreille, 1829****Fm**

Distribution: Occurring in the whole Mediterranean area, although it is still difficult to determine its exact distribution limits. In the Rhône valley, it has been recorded in Beauchastel, at 15 km south of Valence. Rare in Alpes-Martimes department.

Scolopendra oraniensis* Lucas, 1846*Co**

Distribution: Corsica only.

Family Cryptopidae***Cryptops anomalans* Newport, 1844****Fm-Co***C. savignyi*: sensu Brolemann 1930 ; Demange 1981

Distribution: Widely distributed in France, sometimes quite rare. Also in Corsica.

Cryptops hortensis* (Donovan, 1810)*Fm-Mo?-Co***C. hortensis* Leach, 1814 Autc.; *C. longipes* Goux, 1950: synonymised by Iorio & Geoffroy (2007c)

Distribution: Widely distributed in mainland France, more common in western and central France than in eastern France.

Cryptops lobatus* Verhoeff, 1931*Fm**

Distribution: Restricted to the Mediterranean coast in south-eastern France (Alpes-Maritimes and Var departments) and to the Italian Riviera.

Cryptops parisi* Brolemann, 1920*Fm**Distribution: Contrary to *C. hortensis*, *C. parisi* is common in the centre and especially in the east of France and rarer in the west.***Cryptops sublitoralis* Verhoeff, 1931 (?)****Fm (E)**

Remark: The validity of this species found in the department of Alpes-Maritimes is uncertain.

Cryptops trisulcatus* Brölemann, 1902*Fm-Mo-Co**

Distribution: Present in the Mediterranean area.

***Cryptops umbricus* Verhoeff, 1931** **Fm**

C. jeanneli Matic, 1960: synonymised by Iorio & Geoffroy (2007c)

Distribution and habitat: Departments of Alpes-Maritimes and Alpes-de-Haute-Provence. Highly troglophilous.

Order Geophilomorpha**Family Himantariidae*****Himantariella scutellaris* Brolemann, 1926** **Fm (E)**

Distribution: Pyrénées-Orientales department only.

***Himantarium gabrielis* (Linnaeus, 1767)** **Fm-Mo-Co**

Distribution and habitat: Present and common in southern mainland France and Corsica. Also recorded from the greenhouses of the Muséum national d'Histoire naturelle de Paris and perhaps introduced elsewhere in the north.

***Himantarium mediterraneum* (Meinert, 1870)** **Fm**

Distribution: Pyrénées-Orientales and Aude departments; a record from near Paris is doubtful.

***Stigmatogaster arcisherculus* Brölemann, 1904** **Fm-Mo**

possible junior synonym of *S. dimidiatus*

Distribution: Coast of the Alpes-Maritimes department.

***Stigmatogaster dimidiatus* (Meinert, 1870)** **Fm**

Distribution: Departments of Alpes-Maritimes and Pyrénées-Orientales only.

***Stigmatogaster gracilis* (Meinert, 1870)** **Fm-Mo-Co**

Distribution: Very common in the Mediterranean region. There is also a surprising record from Ahusquy (Pyrénées-Atlantiques department) (Brölemann 1898).

***Stigmatogaster souletinus* (Brölemann, 1907)** **Fm**

Distribution: Western Pyrenees.

***Stigmatogaster subterraneus* (Shaw, 1789)** **Fm**

Distribution: Widely distributed in France, but seems to be rare in the north-east and absent in the south-east.

Family Dignathodontidae***Dignathodon microcephalus* (Lucas, 1846)** **Fm-Mo-Co**

Distribution and habitat: Mediterranean region; frequently found in xeric ecosystems.

***Henia (Meinertia) bicarinata* (Meinert, 1870) Fm-Co**

Distribution and habitat: Mediterranean coast and in Corsica; halophilous but not strictly halobiontic.

***Henia (Pseudochaetechelyne) brevis* (Silvestri, 1896) Fm-Mo**

Chaetechelyne montana oblongocribellata Verhoeff, 1898

Distribution: Recorded in the department of Alpes-Maritimes only.

***Henia (Chaetechelyne) montana* (Meinert, 1870) Fm-Co**

Distribution: Hautes-Alpes department and Corsica.

***Henia (Chaetechelyne) vesuviana* (Newport, 1845) Fm-Mo-Co**

Chaetechelyne corsica Verhoeff, 1943; *C. duboscqui* Verhoeff, 1943

Distribution: Widely distributed and fairly common.

Family Mecistocephalidae***Mecistocephalus maxillaris* (Gervais, 1837) Fm**

Distribution and habitat: Greenhouses of the Muséum national d'Histoire naturelle, Paris. Introduced.

Family Schendylidae***Hydroschendyla submarina* (Grube, 1869) Fm**

Distribution and habitat: Restricted to the seashore of the Atlantic and Mediterranean coasts (halobiont).

***Schendyla apenninorum* (Brölemann & Ribaut, 1911) (?) Fm**

Remark: One specimen found in the department of Alpes-Maritimes; requires further research for confirmation (Iorio 2008b).

***Schendyla armata* Brölemann, 1901 Fm-Mo**

Distribution and habitat: Littoral of the department of Alpes-Maritimes, from Cannes to Menton.

***Schendyla carniolensis* Verhoeff, 1902 Fm-Mo**

S. zonalis Brölemann & Ribaut, 1911

Distribution: Pyrenees (in Tarn and Haute-Garonne departments) and Alpes-Maritimes department.

- Schendyla dentata* (Brölemann & Ribaut, 1911)** **Fm**
 Distribution: Department of Haute-Garonne and Montagne Noire. Probably rare.
- Schendyla incubationum* Verhoeff, 1943** **Co (E)**
 Distribution: In Corsica only.
- Schendyla mediterranea* Silvestri, 1897** **Fm-Mo**
 Distribution: Mediterranean region; Alpes-Maritimes and Pyrénées-Orientales departments. Monaco.
- Schendyla monodi* (Brolemann, 1924)** **Fm**
 Distribution and habitat: Seashore of the Atlantic coast, Finistère and Gironde departments. Probably halobiontic, or at least highly halophilous.
- Schendyla monoeci* Brölemann, 1904** **Fm-Mo**
 Distribution and habitat: Littoral of Alpes-Maritimes department and Monaco. It seems to be very rare.
- Schendyla montana* (Attems, 1895)** **Fm**
 Distribution: Mountainous area of southern France (Massif Central, Montagne Noire, Pyrenees, south-western Pre-Alps, Alpes-Maritimes).
- Schendyla nemorensis* (C. L. Koch, 1837)** **Fm-Mo**
 Distribution and habitat: Widely distributed and very common in France, particularly in forest soils.
- Schendyla peyerimhoffi* Brölemann & Ribaut, 1911** **Fm**
 Distribution and habitat: Only recorded on the seashore of Pointe de Bénodet in Finistère (Blower 1987); halobiont.
- Schendyla vizzavonae* Léger & Duboscq, 1903** **Co (E)**
 Distribution: Endemic of Corsica.
- Family Geophilidae**
- Arctogeophilus inopinatus* (Ribaut, 1910)** **Fm**
 Distribution: Brittany, Haute-Normandie and Auvergne regions. Probably rare.
- Clinopodes* sp. [n. sp. ?]** **Fm (E ?)**
 Distribution and remark: Possibly a new species of the genus *Clinopodes*, which has been recorded several times in the Alpes-Maritimes department. It will be the subject of a future study.

***Eurygeophilus pinguis* (Brölemann, 1898) Fm-Co**

Distribution: Pyrenees, Corsica and from one locality in the department of Alpes-Maritimes.

***Eurygeophilus multistiliger* (Verhoeff, 1899) Fm**

Distribution: Department of Pyrénées-Orientales only.

***Galliophilus beatensis* Ribaut & Brolemann, 1927 Fm**

Distribution: Department of Haute-Garonne only.

***Geophilus algarum* Brölemann, 1909 Fm (E)**

Distribution and habitat: Seashore of the Atlantic coast (halobiont).

***Geophilus bobolianus* Verhoeff, 1928 (?) Fm**

Remark: A doubtful species known only from one locality in the department of Alpes-Maritimes and which has not been found since the original description (Verhoeff 1928). Originally described as a subspecies of *G. longicornis* (= *G. flavus*).

***Geophilus carpophagus* Leach, 1815 Fm-Mo-Co**

Distribution: Widely distributed and common in France, except in north-eastern France where it seems to be less common; also present in Corsica and Monaco.

***Geophilus chalandei* Brölemann, 1909 Fm**

Distribution: Known from the Pyrenees, and from the departments of Cantal and Hautes-Alpes.

***Geophilus easoni* Arthur, Foddai, Kettle, Lewis, Luczinsky & Minelli, 2001 Fm**

Distribution and remark: Present only at the Atlantic coast. *G. easoni* and *G. carpophagus* are sympatric in this area. However, the distribution limits in France of the former species remain insufficiently known; many specimens in collections need to be checked.

***Geophilus electricus* (Linnaeus, 1758) Fm**

Distribution: Widely distributed in France but generally uncommon.

***Geophilus evinensis* Verhoeff, 1943 Co (E)**

Distribution: In Corsica only.

***Geophilus flavus* (De Geer, 1778) Fm**

Necrophloeophagus longicornis (Leach, 1815)

Distribution and habitat: Euryecious species widely distributed in France and very common.

- Geophilus fucorum* Brölemann, 1909** **Fm**
 Distribution and habitat: Seashore of the Mediterranean coast (halobiont).
- Geophilus gavoyi* Chalande, 1910** **Fm**
 Distribution: Pyrenees and Montagne Noire, and regions of Brittany, Centre, Auvergne and Provence-Alpes-Côte d'Azur.
- Geophilus insculptus* Attems, 1895** **Fm-Mo-Co**
 Distribution and remark: All the mountainous areas of France. It could be absent in north-western France but it is difficult to delimit the precise distribution of this species because of the successive taxonomical and nomenclatural confusions with *G. proximus* and some other species by different authors. Also present in Corsica and Monaco.
- Geophilus joyeuxi* Léger & Duboscq, 1903** **Fm-Co (E)**
 Distribution: Departments of Alpes-Maritimes, Pyrénées-Orientales and Corsica. Uncommon.
- Geophilus litorivagus* Verhoeff, 1943** **Co (E)**
 Distribution: In Corsica only.
- Geophilus osquidatum* Brölemann, 1909** **Fm**
 Distribution: Western Pyrenees, regions of Brittany, Basse-Normandie and Auvergne, and the department of Hautes-Alpes.
- Geophilus persephones* Foddai & Minelli, 1999** **Fm (E)**
 Distribution and habitat: Only recorded from the Gouffre de la Pierre Saint-Martin (Pyrénées-Atlantiques department). This is the only troglobitic species known in the order Geophilomorpha.
- Geophilus pinivagus* Verhoeff, 1928 (?)** **Fm (E)**
 Distribution and remark: Doubtful species based on one male from the department of Alpes-Maritimes only; not found since the original description.
- Geophilus promontorii* Verhoeff, 1928 (?)** **Fm (E)**
 possible junior synonym of *G. insculptus*
 Distribution and remark: Doubtful species based on one immature specimen from the department of Alpes-Maritimes only; it has not been found since the original description.

***Geophilus proximus* C. L. Koch, 1847** **Fm**

Distribution and remark: It is difficult to estimate the precise distribution of this species because it has probably been confused with *G. insculptus* by former authors. We think that records of it in Haute-Normandie and Ile-de-France regions are reliable.

***Geophilus pusillifrater* Verhoeff, 1898** **Fm**

Distribution and habitat: Only known in Plouharnel (Morbihan); a possibly halophilous (or even halobiontic) species.

***Geophilus richardi* Brölemann, 1904** **Fm-Mo**

Distribution: Department of Alpes-Maritimes only.

***Geophilus seurati* Brolemann, 1924** **Fm**

G. gracilis Meinert, 1870

Distribution, habitat and remark: As shown by Eason (1961), *G. gracilis* Meinert, 1870 is a synonym of *G. seurati* for which the species level seems to be justified; the former must be considered as a junior homonym of *G. gracilis* Gervais, 1849. It is recorded on the seashore in Brittany (halobiont).

***Geophilus studeri* Rothenbühler, 1899** **Fm**

G. pyrenaicus Chalande, 1909

Distribution and habitat: Whole of the mountainous areas of France and old forests of the hills surrounding the valley of the Rupt-de-Mad (Meurthe-et-Moselle department) where it seems to be very rare.

***Geophilus truncorum truncorum* Bergsö & Meinert, 1866** **Fm**

Distribution: Brittany, Basse-Normandie, Haute-Normandie, Nord-Pas de Calais, Picardie and Ile-de-France regions where it is common. Perhaps present in south-western France.

***Geophilus truncorum ribauti* Brölemann, 1908** **Fm**

Distribution: Pyrenees, Montagne Noire, Massif central and the department of Alpes-Maritimes, Burgundy (hills near Dijon); also recorded in the Morvan and in Vosges mountains (Iorio, Geoffroy unpublished records).

Remark: The precise status of this taxon (species or subspecies) requires further studies. Until these have been done we preserve the original rank of Brölemann (1908).

***Pachymerium ferrugineum* (C. L. Koch, 1835)** **Fm-Mo-Co**

Distribution and habitat: Widely distributed in mainland France and Corsica. It favours the seashore without being strictly halobiontic or highly halophilous.

***Pleurogeophilus mediterraneus* (Meinert, 1870) Fm-Mo**

Distribution: Mediterranean species known from the Alpes-Maritimes department including Monaco.

***Stenotaenia linearis* (C. L. Koch, 1835) Fm-Mo-Co**

Distribution: Fairly common in southern France (Rhône-Alpes, Provence-Alpes-Côte d'Azur, Languedoc-Roussillon and Midi-Pyrénées regions; Monaco) but rare in the north (known from Bas-Rhin, Haut-Rhin and Maine-et-Loire departments). Also recorded in Corsica.

***Tuoba poseidonis* (Verhoeff, 1901) Fm-Co**

Distribution and habitat: Seashore of Alpes-Maritimes and Pyrénées-Orientales departments and Corsica (halobiont).

Linotaeniidae***Strigamia acuminata* (Leach, 1815) Fm**

Distribution: Widely distributed and common in mainland France.

***Strigamia cottiana* (Verhoeff, 1935) Fm**

Distribution: Department of Alpes-Maritimes only; probably rare.

***Strigamia crassipes* (C. L. Koch, 1835) Fm**

Distribution: Widely distributed and common in mainland France.

***Strigamia engadina* (Verhoeff, 1935) Fm**

Distribution: Only recorded from Ens (Hautes-Pyrénées department) (Matic 1975).

***Strigamia maritima* (Leach, 1817) Fm**

Distribution and habitat: Seashore of the Atlantic coast (halobiont).

***Strigamia transsilvanica* (Verhoeff, 1928) Fm**

Distribution: Departments of Meurthe-et-Moselle, Alpes-de-Haute-Provence and Alpes-Maritimes. Absent in western France.

4. Discussion

Richness and biodiversity of centipede taxa

Looking at the list established above, we can see that knowledge of the species biodiversity of French centipedes (Tab. 3) has considerably increased in comparison with a preceding appraisal (Geoffroy 2000), not only with respect to the comprehensive nomenclature of the group but also in respect of the progress in systematics of the group in general and the status of many of its components.

There are 145 taxa of the class Chilopoda in France belonging to the species group, of which 28 are endemic. They include 18 troglobitic/highly troglophilous taxa and 9 (10 ?) halobiontic/highly halophilous species. We can draw attention to the fact that species richness in France is fairly high, as France includes 29.6 % of the total European fauna (489 taxa according to Zapparoli & Minelli (2006) and this work). This richness increases markedly in the regions of the south in comparison with those of the north. For example, we record at present 81 species in the region Provence-Alpes-Côte d'Azur (Iorio 2008b) compared with only 40 in the whole of the north-east of France (Iorio 2007) and 43 in the Armorican region (Iorio 2006, 2008b).

However, this list represents only a temporary state of knowledge, because the validity and/or the presence in France of 8 taxa remains doubtful (*Lithobius (Lithobius) peregrinus*, *L. (L.) troglodytes rupicola*, *L. (L.) troglodytes scutigeroopsis*, *Cryptops sublitoralis*, *Schendyla apenninorum*, *Geophilus bobolianus*, *G. pinivagus*, *G. promontorii*) and moreover the species described from Corsica by Verhoeff (1943) will also require revision. Also several species live in certain regions close to the area studied: *Eupolybothrus (Schizopolybothrus) excellens* (Silvestri, 1894), *E. (Leptopolybothrus) tridentinus* (Fanzago, 1874), *Lithobius (Lithobius) anophthalmus* Matic, 1957, *L. (L.) derouetae* Demange, 1958, *L. (L.) nodulipes* Latzel, 1880, *L. (L.) schubarti* Demange, 1959, *Geophilus pygmaeus* Latzel, 1880 (Serra 1980, Spelda 1999, Zapparoli & Minelli 2006) and could possibly be found there in the course of further research. Nor can we exclude the possibility that new species remain to be described. This is supported by the recent discovery of *Lithobius (Lithobius) delfosseii* Iorio & Geoffroy, 2007 in the French Alps and south-western Pre-Alps. Finally, in France, the exact area of distribution of quite a number of species is still poorly defined and several regions are almost unexplored: Nord Pas-de-Calais, Picardie, Champagne-Ardennes, Franche-Comté, Rhône-Alpes, Auvergne, Limousin, Poitou-Charentes. Even in the better studied regions, several departments are still unsampled. Also, researches in certain particular ecosystems (such as caves of southern France and Corsica) could bring new and particularly interesting records as shown by the discovery of the troglobitic *Lithobius (Lithobius) raffaldii* Iorio, 2009. Thus, there remains a lot to discover, describe and explain about the French chilopod fauna, and it would be very useful if more French zoologists or naturalists were to begin and support the study of centipedes in the near future.

Tab. 3 Taxonomic biodiversity of the Class Chilopoda in France (s.l.) (Mainland France, Corsica and Monaco).

| Orders | Number of taxa of the species group | % of the species richness | Family richness | Genus richness |
|------------------------|-------------------------------------|---------------------------|-----------------|----------------|
| | (species + subspecies) | | (Families) | (Genera) |
| Scutigermorpha | 1 | 0.7 | 1 | 1 |
| Lithobiomorpha | 69 | 47.6 | 2 | 4 |
| Scolopendromorpha | 9 | 6.2 | 2 | 2 |
| Geophilomorpha | 66 | 45.5 | 6 | 18 |
| Class Chilopoda | 145 | 100 | 9 | 25 |

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