

CENTIPEDES AND MILLIPEDES OF BURGUNDYR. Desmond Kime¹ & Etienne Iorio²¹ La Fontaine, 24300 La Chapelle Montmoreau, France.

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ABSTRACT

Fifteen species of centipedes from two almost unsampled departments (Nièvre and Yonne) of the Burgundy region (France) have been identified. A total of 30 valid taxa of centipedes have been found in Burgundy at present. *Lamyctes emarginatus* (Newport, 1844) and *Geophilus osquidatum* Brölemann, 1909 are reported for the first time in north eastern France. Some data on the morphology of *G. osquidatum* and *G. truncorum ribauti* Brölemann, 1908 are given. Altogether 35 species of millipedes have been recorded in Burgundy. Nine are reported for the first time from the departments of Nièvre, Saône-et-Loire and Yonne. The newly recorded species are: *Anthogona variegata* Ribaut, 1913, *Chamaesoma broelemanni* Ribaut & Verhoeff, 1913, *Chordeuma proximum* Ribaut, 1913, *Chordeuma sylvestre* C.L. Koch, 1847, *Cylindroiulus caeruleocinctus* (Wood, 1864), *Leptoiulus bruyanti* Ribaut, 1951, *Ommatoiulus rutilans* (C.L.Koch, 1847), *O. sabulosus* (Linnaeus, 1758) and *Orthochordeumella pallida* (Rothenbühler, 1899).

INTRODUCTION

Burgundy is a large region just east of Central France, almost 250km across from north to south and 200km from west to east. Its altitude varies from about 55m in the valley of the Yonne, a tributary of the Seine, to 901m in the granitic hills of the Morvan. However, most of the region is comprised of a large array of sedimentary rocks and recent deposits; limestone escarpments are a prominent feature of the landscape. This gives a large range of different biotopes. The pivotal position of Burgundy is indicated by the fact that its rivers drain into the Atlantic (via the Loire Basin), the English Channel (via the Seine Basin) and the Mediterranean (via the Rhône-Saône Basin). The western edge of Burgundy is about 375km from the Bay of Biscay, the northern edge is about 250km from the English Channel and the southern edge about 300km from the Mediterranean Sea.

The map (Figure 1) shows the four administrative departments included in Burgundy. They sit astride the Atlantic and Central European biogeographical zones and the eastern departments have a more continental climate than those in the west. It follows that Burgundy contains species representative of these different zones.

Even though the centipedes of north eastern France have been the subject of several recent studies (Iorio, 2003, 2005b, 2007; Spelda, 2005), there remain many gaps in the knowledge of them in this area which is constituted of the regions of Champagne-Ardennes, Lorraine, Alsace, Franche-Comté and Burgundy; several departments of some of these regions are still almost unsampled. With regard to centipedes, in Burgundy only the Côte-d'Or department has been the subject of a detailed study (Ravoux, 1948) and the other departments of this region (Nièvre, Yonne, Saône-et-Loire) remain almost unknown for them; some brief data are quoted by Ravoux (1948), Demange (1959) and Iorio & Geoffroy (2004a, 2007a, 2007b). Likewise for the diplopods, most of the old records came from the Côte d'Or (Brölemann, 1923; Ravoux, 1951; Demange, 1959, 1981) while Jawlowski visited the Nièvre and produced a paper in 1933. The aim of the present work is thus to give a contribution on the myriapods of the less-known departments of Burgundy.

We wish also to indicate the state of knowledge of these arthropods in the Burgundy region and to show in how many of the four departments each species has been found.

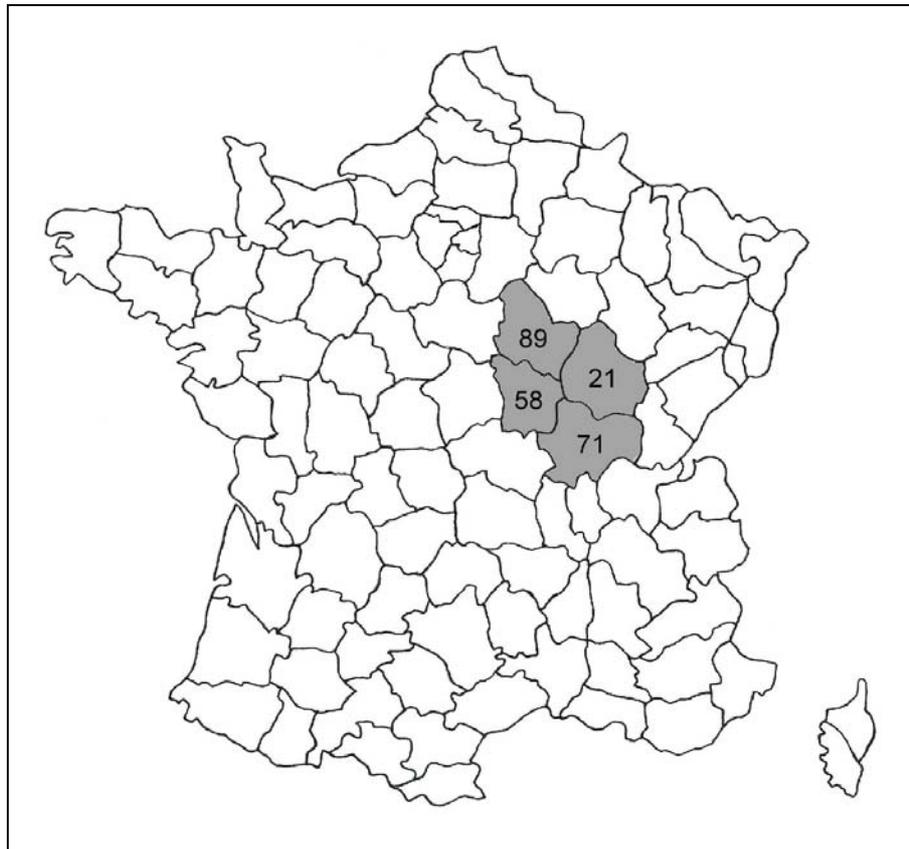


FIGURE 1: Map of France with limit of all departments. Burgundy and its departments are in grey.

MATERIAL AND METHODS

More than one hundred specimens of Chilopoda were collected by a French colleague (Dr. Nuria Ruiz-Camacho) during May 2001 from localities in the Nièvre and Yonne departments and were identified by the second author (E. Iorio) during the year 2003. The Diplopoda and a few Chilopoda were collected and identified over a period of about thirty years during periodical visits to the Burgundy region by the first author (R. D. Kime).

For each species we give our own unpublished records and we quote previous data published by other authors. We present an updated list of the Chilopoda of Burgundy in Table 1 and of the Diplopoda in Table 2. French administrative departments are numbered in alphabetical order and for the sake of brevity we use these numbers in the following account. In Burgundy they are as follows (also see Figure 1): **21:** Côte d'Or; **58:** Nièvre; **71:** Saône-et-Loire; **89:** Yonne.

CHILOPODA – LIST OF IDENTIFIED SPECIES

Scutigermorpha

SCUTIGERIDAE

Scutigera coleoptrata (Linnaeus, 1758)

- 21:** Dijon, Quartier de Montchapet, in a cellar; Plombières-les-Dijon, in a cellar (Ravoux, 1948). Dijon, in apartments; Montbard, houses (Iorio & Geoffroy, 2007a).

- 58:** Corbigny, in a cellar of house; Garchy (Centre CNRS); Pouilly-sur-Loire, in cellars; Saint-Pierre-le-Moutier, houses (Iorio & Geoffroy, 2007a).
- 71:** Autun, in the town, on the pavement; Mâcon, houses; Sивignon, wall and cellar of house (Iorio & Geoffroy, 2007a).

Lithobiomorpha

HENICOPIDAE

Henicopinae

Lamyctes emarginatus (Newport, 1844)

- 58:** Saint-Didier, grassland: 4 females.
- 89:** Rouvray, field of wheat: 1 female.

This species is reported for the first time in Burgundy and more widely in north-eastern France (Iorio, 2007).

LITHOBIIDAE

Lithobiinae

Lithobius (Lithobius) agilis C. L. Koch, 1847

- 21:** Asnières-les-Dijon, carrière souterraine d'Asnières (Demange, 1959). Ravoux (1948) has found *L. (L.) agilis* in several localities in Côte-d'Or but he has perhaps confused it sometimes with *L. (L.) tricuspis*: Plombières-les-Dijon, near Ferme de Champmoron, forest on limestone escarpment; Bois de Champlaran, under dead wood; Route de Pasques near Ferme de Faily, under dead leaves; near Ferme de Contard in forest, in the soil under dead leaves; Prenois, Bois des Muliers and Bois des Sablées, under dead leaves; Lantenay, in forest under stones and under dead leaves; Darois, Bois du Chêne, in the soil under dead leaves; Villy-le-Moutier, Forêt de Borne, in the soil under mosses; Urcy, under a stump; Marsannay-la-Côte; Ancy, in forest.

Lithobius (Lithobius) calcaratus C. L. Koch, 1844

- 21:** Plombières-les-Dijon, in forest near Ferme de Contard, under stones; Talant, uncultivated field, under stones; Lamargelle, under stones (Ravoux, 1948).

Lithobius (Lithobius) dentatus C. L. Koch, 1844

- 21:** Lantenay, under dead leaves in a beech forest; Forêt de Citeaux, in the soil under dead leaves; Villy-le-Moutier, Forêt de Borne, in the soil under dead leaves; Plombières-les-Dijon, in forest near Ferme de Contard, at feet of trees; Bois de Champlaran, in the soil under dead leaves; Prenois, Bois des Sablées (Ravoux, 1948).
- 89:** Quarre-les-Tombes, beech/oak forest: 1 male, 1 female.

Lithobius (Lithobius) forficatus (Linnaeus, 1758)

- 21:** Plombières-les-Dijon, Bois de Champlaran, under stump; Prenois, Bois des Sablées, under dead leaves; Messigny, under stone near a fountain; Arcelot, forest, under mosses; Dijon, quartier Montmuzard, in a garden; Forêt de Citeaux; Gevrey-Chambertin; Lamargelle; Flacey; Corgoloin, Bois de Bornotte; Talant; Saint-Seine-l'Abbaye (Ravoux, 1948).
- 58:** Saint-Didier, grassland: 1 male; Montambert, Forêt Domaniale de Buremont, 9.iv.1994: Azy-le-Vif, Forêt du Perray, Oak/Hornbeam forest on heavy loam, 250m, 25.iii.1998.
- 71:** Azé, grotte de la Balme, grotte d'Azé, grotte de Rizerolles (Demange, 1959). Originally described as *L. forficatus* var. *biunguis* Demange, 1959 which is synonymous with the typical form (Eason, 1970).
- 89:** Nuits-sous-Ravières, under stone near a road (Ravoux, 1948).

[Lithobius (Lithobius) latro Meinert, 1872]

- 21:** The record of this species in Plombières-les-Dijon by Ravoux (1948) is uncertain (Iorio, 2007).

Lithobius (Lithobius) macilentus L. Koch, 1862

- 21:** Prenois, Bois des Muliers and Bois des Sablées, in the soil under dead leaves and dead wood; Plombières-les-Dijon, Bois de Champlaran near Fontaine des Tuileries, in a dead trunk; Darois, Bois du Chêne, under dead leaves; Val-Suzon, in a hole under dead leaves; Fixey; Velars (Ravoux, 1948).

Lithobius (Lithobius) melanops Newport, 1845

- 21:** Prenois, Bois des Muliers, under dead leaves; Plombières-les-Dijon; Neuvon, near l'Ouche, plant fragments in the trunk of a willow; Fontaine-les-Dijon, plant fragments; Marsannay-la-Côte, beech forest under dead leaves; Gevrey-Chambertin; Flacey; Talant, under stones (Ravoux, 1948).

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

- 89:** Nuits-sous-Ravières, under stone near a road (Ravoux, 1948).

Lithobius (Lithobius) piceus piceus L. Koch, 1862

- 21:** Prenois, Bois des Muliers, under dead leaves; Plombières-les-Dijon, Bois de Champlaran, under dead leaves; Marsannay-la-Côte, beech forest of the Combe du Pré, in the soil; Saint-Seine-l'Abbaye; Lamargelle; Bois de Pasques (Ravoux, 1948). Saint-Victor-sur-Ouche, grotte des Rochers de Matre; Meursault, carrière souterraine de Porée Piarde (Demange, 1959).

- 58:** Larochemillay, Les Corseries, Beechwood with Chestnut and Hornbeam, 495m, 10.v.2001

- 71:** Auxe, Bois de Repas, mixed deciduous forest, mull on brown earth, 400m, 11.v.2001.

Lithobius (Lithobius) tenebrosus Meinert, 1872

- 21:** Plombières-les-Dijon, Route de Pasques near Ferme de Faily, in forest under dead leaves; Bois de Champlaran near Fontaine des Tuileries, under mosses and dead leaves; near Ferme de Contard (Ravoux, 1948).

Lithobius (Lithobius) tricuspis Meinert, 1872

- 21:** Forêt de Citeaux, under dead leaves at foot of tree; Marsannay-la-Côte, beech forest, under dead leaves; Plombières-les-Dijon, under leaves (Ravoux, 1948). Norges-la-Ville, carrière souterraine de Malpertuis (Demange, 1959).

- 58:** Dun-les-Places, fir forest: 6 males, 3 females; Villapourçon, Bois de Lissard, Oak, Beech and Holly wood, 10.iv.1994,

- 89:** Quarre-les-Tombes, beech/oak forest: 11 males, 3 females; Druyes-les-Belles-Fontaines, Forêt de Frétoy, mixed woodland, Beech, Oak, Pine, *Cornus mas*, Upper Jurassic, 300m, 8.iii.2001.

- 71 :** Antully, Forêt Domaniale de Planoise-les-Feullies, Pine and beech forest, 540m, 11.v.2001

Lithobius (Monotarsobius) aeruginosus L. Koch, 1862

- 21:** Prenois, Bois des Muliers and Bois des Sablées, under dead leaves; Marsannay-la-Côte, beech forest of the Combe du Pré; Mont-Afrique, under dead leaves of a beech forest (Ravoux, 1948).

- 89:** Nuits-sous-Ravières, under stone near a road (Ravoux, 1948).

Lithobius (Monotarsobius) crassipes L. Koch, 1862

- 21:** Plombières-les-Dijon, Bois de Champlaran, under mosses; Darois, Bois du Chêne, in the soil under dead leaves; Ancy, in the ground at the foot of a tree; Prenois, Bois des Muliers, under dead wood; Forêt de Citeaux, in dead leaves; Villy-le-Moutier, Bois de Borne, in dead leaves (Ravoux, 1948). Asnières-les-Dijon, carrière souterraine d'Asnières (Demange, 1959).

- 58:** Dun-les-Places, fir forest: 1 female.

- 71 :** St. Prix, La Croisette, mixed forest.

- 89:** Quarre-les-Tombes, beech/oak forest: 2 males, 2 females.

Lithobius (Sigibius) microps Meinert, 1868

- 21:** Talant, in an uncultivated field, under stones; Prenois, in an uncultivated field, under stone (Ravoux, 1948).

- 58:** Dun-les-Places, fir forest: 2 males, 1 female; Montambert, Forêt Domaniale de Buremont, 9.iv.1994.

- 89:** Rouvray, field of wheat: 3 males, 3 females.

Scolopendromorpha

CRYPTOPIDAE

Cryptops anomalans Newport, 1844

- 21:** Dijon, in a garden near Fontaine de Suisse; Plombières-les-Dijon, garden near the river l'Ouche; Flacey; Velars, field near the river l'Ouche and limestone field; Montchapet, garden (Ravoux, 1948; Iorio & Geoffroy, 2007b).

Cryptops hortensis (Donovan, 1810)

- 21:** Ravoux (1948) has found this species in several places in Côte-d'Or, but this author does not describe the aspect of the labrum in his descriptions and it is difficult to be sure of the validity of all his data (Iorio & Geoffroy, 2007b). The localities quoted by Ravoux (1948) are: Plombières-les-Dijon, Bois de Champlaran; Arcelot, Forêt de Citeaux; Prenois, Bois des Sablées; Saint-Seine-l'Abbaye; Bois de Pasques; Carrières de Corgoloin; Flacey; Talant; Dijon. It is, however, confirmed in Côte-d'Or department by Iorio & Geoffroy (2008).
- 58:** Dun-les-Places, fir forest: 2 specimens; Azy-le-Vif, Forêt du Perray, Oak/Hornbeam forest on heavy loam, 250m, 25.iii.1998; Narcy, Forêt Domaniale de Bertranges (Oak and Hornbeam), 255m, 8.iii.2001.
- 71:** Autun, south of Croix de la Liberation, Beech/ Oak/ Chestnut woodland with Silver Birch and Rowan on granite, 580m, 11.v.2001
- 89:** Quarre-les-Tombes, beech/oak forest: 6 specimens; Druyes-les-Belles-Fontaines, Forêt de Frétoy, mixed woodland, Beech, Oak, Pine, *Cornus mas*, Upper Jurassic, 300m, 8.iii.2001

Cryptops parisi Brolemann, 1920

- 21:** Abbaye de Fontenay; Flavigny-sur-Ozerain; Saint-Seine l'Abbaye (Iorio & Geoffroy, 2004a). For the following places in which Ravoux (1948) has found this species, same remark as above for *C. hortensis*: Forêt de Citeaux; Lantelay, beech forest; Plombières-les-Dijon, Route de Pasques near Ferme de Failly; Bois de Champlaran, near Fontaine des Tuileries; near Ferme de Contard; Prenois, Bois des Sablées; Forêt de Borne; Marsannay-la-Côte.
- 58:** Garchy (Centre CNRS) (Iorio & Geoffroy, 2004a). Dun-les-Places, fir forest: 4 specimens; Saint-Didier, grassland: 2 specimens; Narcy, Forêt Domaniale de Bertranges (Oak and Hornbeam), 255m, 8.iii.2001.
- 71:** Auxy, Bois de Repas, mixed deciduous forest, mull on brown earth, 400m, 11.v.2001.
- 89:** Quarre-les-Tombes, beech/oak forest: 12 specimens; Arces-Dilo, Forêt Domaniale des Rajeuses, Mixed forest, 260m, 9.iii.2001; Merry-la-Vallée, Forêt de Merry-Vaux, Oak/Hornbeam woodland, Upper Cretaceous, 240m, 8.iii.2001.

Geophilomorpha

HIMANTARIIDAE

Stigmatogaster subterranea (Shaw, 1789)

- 89:** Nuits-sous-Ravières, under stone (Ravoux, 1948).

DIGNATHODONTIDAE

Henia (Chaetechelyne) vesuviana (Newport, 1845)

- 21:** Perrigny-les-Dijon; Prenois, Bois des Sablées, in the sand; Velars, near l'Ouche; Plombières-les-Dijon, Bois des Pisseux, in the ground, under leaves and near Ferme de la Pérouse; Chenôve; Lantelay; Lamargelle; Flacey (Ravoux, 1948).

SCHENDYLIDAE

Schendyla nemorensis (C. L. Koch, 1837)

- 21:** Saint-Apollinaire, under bark of *Platanus*; Arcelot, under wood, ground, mosses at feet of trees; Plombières-les-Dijon; near Ferme de Champmoron, under leaves; Larrey-les-Dijon, under stone near the brook; Lantelay, beech, under leaves; Prenois, Bois des Sablées, under leaves; Marsannay, Combe du Pré, under leaves; forêt de Citeaux, at feet of trees; Chenôve; Talant; Bevy; Ternant; Corgoloin, Bois de Bornotte (Ravoux, 1948).
- 58:** Dun-les-Places, fir forest: 2 males, 8 females; Montambert, Forêt Domaniale de Buremont, 9.iv.1994; Narcy, Forêt Domaniale de Bertranges (Oak and Hornbeam), 255m, 8.iii.2001.

89 : Chailley, Forêt d'Othe, Oak, Hornbeam, Beech, silty soil on ochre clay, 26.ix.1992; Merry-la-Vallée, Forêt de Merry-Vaux, Oak/Hornbeam woodland, Cretaceous, 240m, 8.iii.2001.

GEOPHILIDAE

Geophilus carpophagus Leach, 1815 s. str.

21: Fontaine-les-Dijon, in the soil near a road; Flacey (Ravoux, 1948).

The number of leg-bearing segments quoted by Ravoux (1948) allow confirmation that his specimens correspond to *G. carpophagus* s. str.

Geophilus electricus (Linnaeus, 1758)

21: Prenois, Bois des Sabliers, dead wood; Plombières-les-Dijon, near Ferme de la Pérouse; Dijon, in a garden (Ravoux, 1948).

Geophilus flavus (De Geer, 1778)

21: Daix, under stone of a small wall; Forêt de Citeaux, under trunk; Forêt de Borne, in the soil at foot of tree; Prenois, Bois des Mulières, under leaves; Velars-sur-Ouche, near l'Ouche river; Plombières-les-Dijon, ground of a garden near l'Ouche; near Ferme de Contard; Chenôve; Marsannay, under leaves in the beech forest of the Combe du Pré; Dijon, at the foot of a tree, and in a garden; Flacey; Saint-Seine-l'Abbaye (Ravoux, 1948).

58: Saint-Didier, grassland: 4 males, 8 females.

89: Rouvray, field of wheat: 4 males, 10 females; Quarre-les-Tombes, beech/oak forest: 1 female.

Geophilus insculptus Attems, 1895

21: Val Suzon, in the ground at the foot of a tree in the Val Courbe; Hauteville, in the forest near Ferme de Champ-Rouge; Plombières-les-Dijon, forest near Ferme de Contard (Ravoux, 1948).

58: Dun-les-Places, fir forest: 1 male, 2 females.

89: Quarre-les-Tombes, beech/oak forest: 1 female.

Geophilus osquidatum Brölemann, 1909

89: Quarre-les-Tombes, beech/oak forest: 2 females; Rouvray, field of wheat: 2 females.

This species is reported for the first time in Burgundy and more widely in north eastern France. In the south, it is known in the Hautes-Alpes department and even in Italy but not in the Balkan Peninsula (Geoffroy, 1981; Stoev, 1997; Zapparoli & Minelli, 2006). It seems to be more common in western France than in eastern France even if it is perhaps under recorded (Brölemann, 1930; Iorio, 2006). Finally, it is interesting to note that *G. osquidatum* is not known in south western Germany (Spelda, 1999, 2005) and that it has not been recorded in France for more than twenty years. We detail some morphological aspects below.

Two females have 55 leg-bearing segments, one female 57 leg-bearing segments, and one female 59 leg-bearing segments. Three females have 3 + 3 coxal pores on the last pair of legs, and one female has 2 + 3 coxal pores on the last pair of legs; when 3 pores are present on the coxa, the most anterior pore is smaller than the 2 other pores. When *G. osquidatum* has 2 + 2, 2 + 3/3 + 2 or 3 + 3 coxal pores on the last pair of legs we think that the number of coxal pores could help the recognition of *G. osquidatum* in comparison with *G. seurati* Brölemann, 1924 (= *G. gracilis* Meinert, 1870) with the number of crenulations on the concavity of the poison claw, a character used in recent dichotomous keys for north western France and United Kingdom (Iorio, 2006; Barber, 2009). The number of 4 + 4 coxal pores quoted by Eason (1964) and Barber (2009) for this species seems to be uncommon because it was never seen on French specimens (Brölemann, 1909, 1930; this study) and is occasional in UK specimens after Eason (1964). On the other hand, *G. seurati* has at least 4 + 4 coxal pores on the last pair of legs, or even sometimes 5 + 5 coxal pores. Finally, this latter is a halobiontic species contrary to *G. osquidatum*.

Geophilus truncorum ribauti Brölemann, 1908

21: Marsannay-la-Côte, under leaves in the beech forest of the Combe du Pré; Talant, under stone (Ravoux, 1948).

58: Dun-les-Places, fir forest: 2 males, 3 females; Saint-Didier, grassland: 1 male, 1 female.

The morphology of these individuals corresponds well with *G. truncorum ribauti* which differs from *G. truncorum truncorum* Bergsö & Meinert, 1866 by its fewer number of leg-bearing segments (less than 37 pair of legs in males, less than 39 pair of legs in females) and its higher number of coxal pores on the last pair of legs (3 or 4 on each coxa instead of 2). Our three males have 33 pair of legs, and our four females have 35 pair of legs; their numbers of pores on last coxae are 3 + 3, 3 + 4 and 4 + 4. After Brölemann (1908, 1930), there are a fewer number of teeth on mid-piece of the labrum of *G. truncorum ribauti* than on the same piece in *G. truncorum truncorum* (2 or 3 instead of 5 or 6); all our specimens have 2 teeth except one which has 3 teeth. As Iorio (2005a) has written, the distribution of both taxa seems also to be different; in our country, *G. truncorum truncorum* is only recorded in regions of north western France and is clearly an occidental species while *G. truncorum ribauti* is present in all mountainous areas of France (Pyrenees, Alps and Pre-Alps, Morvan mountains and hills near Dijon in Burgundy, and Vosges mountains) (Brölemann, 1908, 1930; Ravoux, 1948; Iorio, 2007; Geoffroy & Iorio, 2009). Even if all these data justify the validity of the taxa *ribauti*, it is still difficult to determine its precise status (species or subspecies) and we quote here the original rank of Brölemann (1908).

CHECKLIST OF CENTIPEDE SPECIES RECORDED IN EACH DEPARTMENT OF BURGUNDY REGION

TABLE 1: Centipede species recorded in each department of Burgundy

Species	Côte d'Or	Nièvre	Yonne	Saône-et-Loire
<i>Scutigera coleoptrata</i>	X	X		X
<i>Lamyctes emarginatus</i>		X	X	
<i>Lithobius aeruginosus</i>	X		X	
<i>Lithobius agilis</i>	X		X	
<i>Lithobius calcaratus</i>	X			
<i>Lithobius crassipes</i>	X	X	X	
<i>Lithobius dentatus</i>	X		X	
<i>Lithobius forficatus</i>	X	X	X	X
<i>Lithobius latro</i> ⁽¹⁾	X			
<i>Lithobius macilentus</i>	X			
<i>Lithobius melanops</i>	X			
<i>Lithobius microps</i>	X	X	X	X
<i>Lithobius muticus</i>			X	
<i>Lithobius piceus piceus</i>	X	X		X
<i>Lithobius tenebrosus tenebrosus</i>	X			
<i>Lithobius tricuspis</i>	X	X	X	X
<i>Cryptops anomalans</i>	X			
<i>Cryptops hortensis</i>	X	X	X	X
<i>Cryptops parisi</i>	X	X	X	X
<i>Stigmatogaster subterraneus</i>			X	
<i>Henia vesuviana</i>	X			
<i>Schendyla nemorensis</i>	X	X	X	
<i>Geophilus carpophagus</i> s. str.	X			
<i>Geophilus electricus</i>	X			
<i>Geophilus flavus</i>	X	X	X	
<i>Geophilus insculptus</i>	X	X	X	
<i>Geophilus osquidatum</i>			X	
<i>Geophilus truncorum ribauti</i>	X	X		
<i>Strigamia acuminata</i>	X	X	X	
<i>Strigamia crassipes</i>	X			

⁽¹⁾ This species is quoted in Bourgogne by Ravoux (1948), but its presence in this area needs to be confirmed.

DIPLOPODA – LIST OF IDENTIFIED SPECIES**Polyxenida**

POLYXENIDAE

Polyxenus lagurus (Linnaeus, 1758)

No new records. This small Holarctic species has been reported from all four departments (M. Nguyen-Duy, pers. comm.)

Glomerida

GLOMERIDAE

Glomeris intermedia (Latzel, 1884)

21: Corcelles-les-Citeaux, Bois des Perreaux (Oak & Hornbeam wood), 205m, 12.ix.1978.

58: Fâchin, Les Buteaux, Beechwood with Holly, Broom, Bracken and heathers, 750m, 4.viii.1979; Nancy, Forêt Domaniale de Bertranges (Oak and Hornbeam), 255m, 8.iii.2001; Larochemillay, Les Corseries, Beechwood with Chestnut and Hornbeam, 495m, 10.v.2001; Villapourçon, Le Puits, Beechwood with Oak and Holly, 595m, 10.v.2001.

71: Authumes, Forêt d'Authumes, Oak and Hornbeam with Pine, Robinia and Hazel, mull on heavy brown earth, 210m, 28.ix.1999; St-Prix, Forêt Domaniale on Haut Folin, Beech, Spruce and Fir with *Myrtillus edulis*, 873m, 10.v.2001; Broye, Oak and Beech forest with holly on granite, 560m, 11.v.2001; Antully, Forêt Domaniale de Planoise-les-Feullies, Pine and Beech forest, 540m, 11.v.2001; Auxe, Bois de Repas, Mixed deciduous forest, mull on brown earth, 400m, 11.v.2001.

89: Asquins, Bois de Vaux-Lannes, deciduous woodland on Jurassic limestone, 230m, 3.xi.1985; Chailley, Forêt d'Othe, Oak, Hornbeam, Beech, silty soil on ochre clay, 280m, 26.ix.1992; Druyes-les-Belles-Fontaines, Forêt de Frétoy, mixed woodland, Beech, Oak, Pine, *Cornus mas*, Upper Jurassic, 300m, 8.iii.2001.

This Western European species is found from the North of Spain to Western Germany including apparently most parts of France. It is almost always in woodland.

Glomeris marginata (Villers, 1789)

21: There are several old records in the Paris database (Geoffroy, pers. comm.)

58: St-Amand-en-Puisaye, deciduous forest, 260m, 15.v.1988; Alligny-en-Morvan, Beech, Oak, Birch and Hazel woodland on granite, 480m, 10.iv.1994; Oudan, Forêt Domaniale d'Arcy, Oakwood with deep litter, 280m, 8.iii.2001; Larochemillay, Les Corseries, Beechwood with Chestnut and Hornbeam, 495m, 10.v.2001; Larochemillay, Mont Beuvray, Beech forest with Holly, 800m, 10.v.2001; Villapourçon, Le Puits, Beechwood with Oak and Holly, 595m, 10.v.2001.

71: Chagny, Oak forest with Hornbeam on heavy soil, 200m, 28.ix.1999; Champrougier, Oakwood, 218m, 28.ix.1999; St-Prix, Forêt Domaniale on Haut Folin, Beech, Spruce and Fir with *Myrtillus edulis*, 873m, 10.v.2001; Roussillon-en-Morvan, mixed forest, 555m, 10.v.2001; Autun, south of Croix de la Liberation, Beech/ Oak/ Chestnut woodland with Silver Birch and Rowan on granite, 580m, 11.v.2001; Antully, Forêt Domaniale de Planoise-les-Feullies, Pine and beech forest, 540m, 11.v.2001; Auxe, Bois de Repas, mixed deciduous forest, mull on brown earth, 400m, 11.v.2001.

89: Asquins, Bois de Vaux-Lannes, deciduous woodland on Jurassic limestone, 230m, 3.xi.1985; Chailley, Forêt d'Othe, Oak, Hornbeam, Beech, silty soil on ochre clay, 280m, 26.ix.1992; Chichée, Oakwood on Jurassic limestone, 155m, 27.ix.1992; Joigny, Oak/Hornbeam woodland, 220m, 9.iii.2001; Arces-Dilo, Forêt Domaniale des Rajeuses, Mixed forest, 260m, 9.iii.2001.

A West European species, very common in France, especially in woodland.

Polyzoniida

POLYZONIIDAE

Polyzonium germanicum Brandt, 1831

21: Reported from Marsannay-la-Côte by Ravoux (1951).

58: Alligny-en-Morvan, Beech, Oak, Birch and Hazel woodland on granite, 480m, 10.iv.1994.

Julida

BLANIULIDAE

Blaniulus guttulatus (Fabricius, 1798)

21: Reported from around Dijon (Brolemann, 1923). This common synanthropic species should be found in all four departments of Burgundy.

Nopoiulus kochii (Gervais, 1847)

58: Reported from greenhouses in Nevers by Jawlowski (1933).

Proteroiulus fuscus (Am Stein, 1857)

58: Reported from a forest near La Charité by Jawlowski (1933).

The Blaniulidae are undoubtedly under-recorded in Burgundy, probably because of their synanthropic tendencies. Most collecting has been done in rural situations, especially in forests. In addition to the three species above there are two other common species for which we have not yet found records. These are *Archiboreoiulus pallidus* and *Choneiulus palmatus* both of which occur in surrounding regions.

NEMASOMATIDAE

Nemasoma varicorne C.L.Koch, 1847

58: Raveau, forest (Jawlowski, 1933)

A subcorticole European species.

JULIDAE

Allajulus nitidus (Verhoeff, 1891)

21: Corcelles-les-Citeaux, Bois des Perreaux (Oak & Hornbeam wood), 205m, 12.ix.1978.

71: Authumes, Forêt d'Authumes, Oak and Hornbeam with Pine, Robinia and Hazel, mull on heavy brown earth, 210m, 28.ix.1999 ; Champrougier, Oakwood, 218m, 28.ix.1999.

89: Chailley, Forêt d'Othe, Oak, Hornbeam, Beech, silty soil on ochre-coloured clay, 280m, 26.ix.1992.

A Central European species almost at the western end of its range.

Cylindroiulus caeruleocinctus (Wood, 1864)

89: Druyes-les-Belles-Fontaines, Forêt de Frétoy, mixed woodland, Beech, Oak, Pine, *Cornus mas*, Upper Jurassic, 300m, 8.iii.2001.

A common species found in grassland and in association with habitation. It should occur in all four departments.

Cylindroiulus latestriatus (Curtis, 1845)

58: Nevers, woodyard (Jawlowski, 1933).

A mainly coastal species which occurs synanthropically inland.

Cylindroiulus londinensis (Leach, 1815)

58: Guérigny (Jawlowski, 1933).

An Atlantic species found in the west and centre of France, northern Spain, Britain and Ireland.

Cylindroiulus parisiorum (Brölemann & Verhoeff, 1896)

58: Nevers, gardens and woodyards (Jawlowski, 1933).

A largely synanthropic species associated with dead wood. It has been found in semi-natural sites in England, Belgium and Switzerland.

Cylindroiulus truncorum (Silvestri, 1896)

58: Nevers, greenhouses (Jawlowski, 1933).

Another largely synanthropic species with isolated records in Western Europe.

While there is no especial reason to doubt the records of the tailless species of *Cylindroiulus* made by Jawlowski it should perhaps be mentioned that there has been some past confusion about them. Finding three such species in a woodyard in Nevers must be unique. Interestingly, among these tailless species, *Cylindroiulus britannicus*, plentiful in Britain, has not yet been recorded in France.

Equally interesting is the fact that the very common Western European *Cylindroiulus punctatus* has not yet been recorded in Burgundy. While common in western areas of France it is rare in the more continental eastern parts of the Country.

Julus scandinavius Latzel, 1884

58: Oudan, Forêt Domaniale d'Arcy, Oakwood with deep litter, 280m, 8.iii.2001.

71: St-Prix, Forêt Domaniale on Haut Folin, Beech, Spruce and Fir with *Myrtillus edulis*, 873m, 10.v.2001.

89: Bussy-en-Othe, Forêt de l'Abbesse, Oakwood with Hornbeam, 240m, 9.iii.2001.

A common Central European species at its western limit.

Leptoiulus belgicus (Latzel, 1884)

21: In Paris database.

58: Tracy-sur-Loire, below wood on sand on the east bank of the Loire, next to deciduous woodland with rank undergrowth, 150m, 8.viii.1985.

A Western European species not yet found further east in France.

Leptoiulus bruyanti Ribaut, 1951

58: Larochemillay, Mont Beuvray, Beech forest with Holly, 800m, 10.v.2001; Villapourçon, Le Puits, Beechwood with Oak and Holly, 595m, 10.v.2001.

71: St-Prix, Forêt Domaniale du Haut Folin, Beech, Spruce and Fir with *Myrtillus edulis*, 873m, 10.v.2001; Antully, Forêt Domaniale de Planoise-les-Feullies, Pine and Beech forest, 540m, 11.v.2001.

An endemic French species now recorded from four departments. The other two departments are Puy-de-Dôme (Ribaut, 1951, type locality) and Lozère (Kime, previously unpublished): Le Massegras, Causse de Sauveterre, in litter under a few trees, 900m, 4.xi.1981.

All the sites are montane. In the Morvan mountains they were all forests with Beech trees.

Ommatoiulus rutilans (C.L.Koch, 1847)

58: Tracy-sur-Loire, below wood on sand on the east bank of the Loire, next to deciduous woodland with rank undergrowth, 150m, 8.viii.1985.

A thermophile species mainly found in open sites in Western Europe.

Ommatoiulus sabulosus (Linnaeus, 1758)

71: Roussillon-en-Morvan, mixed forest, 555m, 10.v.2001.

Another thermophile species widespread in Europe. There should be more records in Burgundy.

Tachypodoiulus niger (Leach, 1815)

21: Corcelles-les-Citeaux, Bois des Perreaux (Oak & Hornbeam wood), 205m, 12.ix.1978.

58: Alligny-en-Morvan, Beech, Oak, Birch and Hazel woodland on granite, 480m, 10.iv.1994; Azy-le-Vif, Forêt du Perray, Oak/Hornbeam forest on heavy loam, 250m, 25.iii.1998.

71: Authumes, Forêt d'Authumes, Oak and Hornbeam with Pine, Robinia and Hazel, mull on heavy brown earth, 210m, 28.ix.1999; Chagny, Oak forest with Hornbeam on heavy soil, 200m, 28.ix.1999; Champrougier, Oakwood, 218m, 28.ix.1999; Autun, south of Croix de la Liberation, Beech/Oak/Chestnut woodland with Silver Birch and Rowan on granite, 580m, 11.v.2001.

89: Asquins, Bois de Vaux-Lannes, deciduous woodland on Jurassic limestone, 230m, 3.xi.1985; Druyes-les-Belles-Fontaines, Forêt de Frétoy, mixed woodland, Beech, Oak, Pine, *Cornus mas*, Upper Jurassic, 300m, 8.iii.2001; Merry-la-Vallée, Forêt de Merry-Vaux, Oak/Hornbeam wood-land, Upper

Cretaceous, 240m, 8.iii.2001; Bussy-en-Othe, Forêt de l'Abbesse, Oakwood with Hornbeam, 240m, 9.iii.2001; Arces-Dilo, Forêt Domaniale des Rajeuses, Mixed forest, 260m, 9.iii.2001.

A very common species in the woodlands of Western Europe.

Callipodida

CALLIPODIDAE

Callipus foetidissimus (Savi, 1819)

21: Demange (1981)

A Mediterranean species which extends northwards through France.

Chordeumatida

CHORDEUMATIDAE

Chordeuma proximum Ribaut, 1913

58: St-Amand-en-Puisaye, deciduous forest, 260m, 15.v.1988; Oudan, Forêt Domaniale d'Arcy, Oakwood with deep litter, 280m, 8.iii.2001.

An Atlantic species replaced by the following species further east.

Chordeuma sylvestre C.L.Koch, 1847

58: Larochemillay, Mont Beuvray, Beech forest with Holly, 800m, 10.v.2001; Alligny-en-Morvan, Beech, Oak, Birch and Hazel woodland on granite, 480m, 10.iv.1994.

71: Champrougier, Oakwood, 218m, 28.ix.1999; St-Prix, Forêt Domaniale on Haut Folin, Beech, Spruce and Fir with *Myrtillus edulis*, 873m, 10.v.2001.

89: Asquins, Bois de Vaux-Lannes, deciduous woodland on Jurassic limestone, 230m, 3.xi.1985.

A Central European species at its western limit.

Melogona gallica (Latzel, 1884)

21: Plombières (Ravoux, 1951).

58: St-Amand-en-Puisaye, deciduous forest, 260m, 15.v.1988.

89: Mailly-la-Ville, woodland near Château de Bruyères, 200m, 3.xi.1985; Chailley, Forêt d'Othe, Oak, Hornbeam, Beech, silty soil on ochre clay, 280m, 26.ix.1992; Chichée, Oakwood on Jurassic limestone, 155m, 27.ix.1992; Merry-la-Vallée, Forêt de Merry-Vaux, Oak/Hornbeam woodland, Upper Cretaceous, 240m, 8.iii.2001; Joigny, Oak/Hornbeam woodland, 220m, 9.iii.2001; Arces-Dilo, Forêt Domaniale des Rajeuses, Mixed forest, 260m, 9.iii.2001.

A fairly common Western European species, especially in the northern half of France and neighbouring countries.

Orthochordeumella pallida (Rothenbühler, 1899)

58: Narcy, Forêt Domaniale de Bertranges (Oak and Hornbeam), 255m, 8.iii.2001; Oudan, Forêt Domaniale d'Arcy, Oakwood with deep litter, 280m, 8.iii.2001.

89: Chailley, Forêt d'Othe, Oak, Hornbeam, Beech, silty soil on ochre clay, 280m, 26.ix.1992.

A species with a most unusual distribution. In France it has been found almost entirely in the Massif Central and in some north-eastern departments, continuing through the Belgian Ardennes and Luxemburg to the Rhineland. In Central Europe it is found in the Alps. These are the first records from Burgundy.

ANTHOGONIDAE

Anthogona variegata Ribaut, 1913

89: Druyes-les-Belles-Fontaines, Forêt de Frétoy, mixed woodland, Beech, Oak, Pine, *Cornus mas*, Upper Jurassic, 300m, 8.iii.2001.

The most easterly record of this species which is found in the Pyrenees and the western half of France as far north as Calvados on the coast of the English Channel.

CHAMAESOMATIDAE

Chamaesoma broelemanni Ribaut & Verhoeff, 1913

89: Chailley, Forêt d'Othe, Oak, Hornbeam, Beech, silty soil on ochre clay, 280m, 26.ix.1992.

This has a similar distribution to *Anthogona variegata* but extends further east into Lorraine.

CRASPEDOSOMATIDAE

Nanogona polydesmoides (Leach, 1814)

21 : St-Victor-sur-Ouche (Demange, 1959).

Found in many parts of France except the East, the Pyrenees and the far South-west. Many records are from caves, especially in the South. There are five other endemic species of *Nanogona* in South East France.

Rhymogona hessei (Ravoux in Brolemann, 1935)

21: Ancy, Beaune, Lantenet, Prenois, Vernot (Spelda, 1999).

An endemic species apparently confined to the French departments of Côte d'Or, Jura, Doubs and Haute-Saône to the west of Switzerland.

Polydesmida

POLYDESMIDAE

Brachydesmus superus Latzel, 1884

21: Corcelles-les-Citeaux, Bois des Perreaux (Oak & Hornbeam wood), 205m, 12.ix.1978.

58: St-Amand-en-Puisaye, deciduous forest, 260m, 15.v.1988.

89 : Asquins, Bois de Vaux-Lannes, deciduous woodland on Jurassic limestone, 230m, 3.xi.1985.

Common in much of Europe.

Polydesmus angustus Latzel, 1884

21: Forêt de Citeaux, Corgoloin, Flacey, Velars (Geoffroy, pers.comm., Paris Database)

58: Tracy-sur-Loire, below wood on sand on the east bank of the Loire, next to deciduous woodland with rank undergrowth, 150m, 8.viii.1985; Alligny-en-Morvan, Beech, Oak, Birch and Hazel woodland on granite, 480m, 10.iv.1994; Larochemillay, Les Corseries, Beechwood with Chestnut and Hornbeam, 495m, 10.v.2001; Larochemillay, Mont Beuvray, Beech forest with Holly, 800m, 10.v.2001.

71: Roussillon-en-Morvan, mixed forest, 555m, 10.v.2001: Autun, south of Croix de la Liberation, Beech/Oak/Chestnut woodland with Silver Birch and Rowan on granite, 580m, 11.v.2001; Antully, Forêt Domaniale de Planoise-les-Feullies, Pine and beech forest, 540m, 11.v.2001; Auxy, Bois de Repas, mixed deciduous forest, mull on brown earth, 400m, 11.v.2001.

89: Joigny, Oak/Hornbeam woodland, 220m, 9.iii.2001; Arces-Dilo, Forêt Domaniale des Rajeuses, Mixed forest, 260m, 9.iii.2001; Bussy-en-Othe, Forêt de l'Abbesse, Oakwood with Hornbeam, 240m, 9.iii.2001.

One of the commonest Western European millipedes.

Polydesmus denticulatus C.L.Koch, 1847

89: Arcy-sur-Cure (Ribaut, unpublished, Paris database)

This common European species should occur throughout the region.

Propolydesmus germanicus (Verhoeff, 1896)

21: Baulme-la-Roche, Dijon (Paris database)

An infrequently recorded species from Western and Central Europe, usually on limestone.

Propolydesmus helveticus (Verhoeff, 1894)

21: Antheuil, Bligny-sur-Ouche (Ribaut, Paris database).

58: Prémery (Jawlowski, 1933).

A West Alpine species which extends into parts of France.

Propolydesmus testaceus (C.L.Koch, 1847)

21: Antheuil, Velars (Paris database); Bèze, Meursault (Demange, 1959); Savigny-les-Beaune (Mauriès, pers.comm.).

A West European and calcicole species. Much of the Côte d'Or is limestone.

CHECKLIST OF MILLIPEDE SPECIES RECORDED IN EACH DEPARTMENT OF BURGUNDY REGION

TABLE 2: Millipede species recorded in each department of Burgundy

Species	Côte d'Or	Nièvre	Yonne	Saône-et-Loire
<i>Polyxenus lagurus</i>	X	X	X	X
<i>Glomeris intermedia</i>	X	X	X	X
<i>Glomeris marginata</i>	X	X	X	X
<i>Polyzonium germanicum</i>	X	X		
<i>Blaniulus guttulatus</i>	X			
<i>Nopoiulus kochii</i>		X		
<i>Proteroiulus fuscus</i>		X		
<i>Allajulus nitidus</i>	X	X	X	X
<i>Cylindroiulus caeruleocinctus</i>			X	
<i>Cylindroiulus latestriatus</i>		X		
<i>Cylindroiulus londinensis</i>		X		
<i>Cylindroiulus parisi</i>		X		
<i>Cylindroiulus truncorum</i>		X		
<i>Julus scandinavus</i>		X	X	X
<i>Leptoiulus belgicus</i>	X	X		
<i>Leptoiulus bruyanti</i>		X		X
<i>Ommatoiulus rutilans</i>		X		
<i>Ommatoiulus sabulosus</i>				X
<i>Tachypodoiulus niger</i>	X	X	X	X
<i>Nemasoma varicorne</i>		X		
<i>Callipus foetidissimus</i>	X			
<i>Chordeuma proximum</i>		X		
<i>Chordeuma sylvestre</i>		X	X	X
<i>Melogona gallica</i>	X	X	X	
<i>Orthochordeumella pallida</i>		X	X	
<i>Anthogona variegata</i>			X	
<i>Chamaesoma broelemanni</i>			X	X
<i>Nanogona polydesmoides</i>	X			
<i>Rhymogona hessei</i>	X			
<i>Brachydesmus superus</i>	X	X	X	
<i>Polydesmus angustus</i>	X	X	X	X
<i>Polydesmus denticulatus</i>			X	
<i>Propolydesmus germanicus</i>	X			
<i>Propolydesmus helveticus</i>	X	X		
<i>Propolydesmus testaceus</i>	X			

DISCUSSION

While some of the species present in Burgundy occur throughout much of Western Europe there are some Central European species there, which do not reach Western France, and some Atlantic species, which do not reach Eastern France. In addition a few species are largely Mediterranean in origin and as far as we can see from our present knowledge of distribution one or two more appear to be endemics confined to central and eastern parts of France.

With the first discoveries of *Lamyctes emarginatus* and *Geophilus osquidatum* in Burgundy, 30 species of centipede have been recorded in this region and 42 in the whole area of north eastern France (see Iorio (2007) for a complete list). North eastern France contains, in addition to species with wide distribution, several taxa, mainly central-European (*Lithobius (Lithobius) dentatus*, L. (L.) *pelidnus* Haase, 1880, L. (L.) *pygmaeus* Haase, 1880, L. (L.) *subtilis subtilis* Latzel, 1880, L. (L.) *tenebrosus tenebrosus*, L. (*Monotarsobius*) *aeruginosus* and *Strigamia transsilvanica* (Verhoeff, 1928)), which become rarer or absent westward (Iorio & Geoffroy, 2004b; Iorio, 2006, 2008; Iorio & Tiberghien, 2007; Barber, 2009). As Atlantic species we can quote *Stigmatogaster subterranea* which is much more common in western France, UK and other western countries, and also *Geophilus osquidatum* (Spelda, 1999; Iorio, 2006, 2008; Iorio & Tiberghien, 2007; Lindner, 2007; Barber, 2009). It is also remarkable to note that *Cryptops parisi* is much more common than *C. hortensis* in north eastern France (Iorio & Geoffroy, 2008). Moreover, in this latter region there are some taxa which highly prefer mountainous environments (*Geophilus studeri* Rothenbühler, 1899 and *G. truncorum ribauti*) and it is notable that records of "*Geophilus carpophagus*" belong to *G. carpophagus* Leach, 1815 s. str. The centipede fauna of north eastern France is thus constituted by an assembly of species of diverse origins, but it seems to be characterized by a closer resemblance to the central-European fauna than with the Atlantic fauna.

With regard to the millipedes 35 species have been recorded in the region and 63 in the whole of North-eastern France. Several species, which occur in surrounding regions, have not yet been found and, as there are both Central-European and Atlantic species in Burgundy we might expect to find at least 50 in due course. There are shades of atlanticism from those species which occur only within a relatively short distance from the Bay of Biscay to those that inhabit a large part of Western Europe. According to present records some of these species are really confined to the west and do not even reach Burgundy whereas others occur in the northern departments of France and extend eastwards sometimes as far as Scandinavia, e.g. *Cylindroiulus punctatus* a species not yet recorded in Burgundy, although it probably will be as it occurs just across the Loire in the Cher Department.

Because of the continental climate away from the sea (Bay of Biscay, English Channel, North Sea) the eastern boundary of the Atlantic species tends rather to run north-east from Central France (see the maps in Kime, 1999; 2001). The Central-European species, on the other hand, have western boundaries which run from south-east to north-west from the Alps to the North Sea or further west along the English Channel as far as Normandy so that some of these Central species which occur as far west as Britain and Ireland may not occur in Burgundy, e.g. *Craspedosoma rawlinsi* which has not been recorded as far west as the River Seine in France. It should show a north-eastern orientation in Britain, which it does, if less clearly than in the obvious case of the Central-European *Allajulus nitidus*. It is informative to compare the British and Irish distributions with those on the Continent.

Chordeuma proximum and *C. sylvestre* are allopatric and both occur in Burgundy and Normandy. The former is Atlantic and this shows up well in its British distribution; the latter is Central-European and Lee (2006) has commented on this. It is tempting to relate these diagonal boundaries to temperature, especially in the unfavourable winter months.

There are fairly large differences between the faunas of the East and the West of France. According to present data the proportion of Central European millipedes in Burgundy is rather less than for the centipedes. It would be interesting to continue the study of myriapods in North East France in the future to explore several almost unsampled sectors of this area and to know better the precise distribution and frequency of the recorded species, as well as to find perhaps other taxa unrecorded in this area.

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