

THE PRESENT KNOWLEDGE ON THE EUROPEAN FAUNA OF LITHOBIOMORPHA (CHILOPODA)

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INTRODUCTION

Lithobiomorpha is an order of centipedes of about 1100 species, distributed in all the continents except the Antarctic, from sea level up to 4000 m (Lewis, 1981). Although they mainly inhabit forest habitats, where they are one of the most important components of soil fauna, their habitat preferences are rather wide and also include open habitats, dry areas, caves and anthropogenic habitats.

This paper aims to give a general picture of the present knowledge about the fauna of these arthropods in Europe. The area examined (10,522,176 square km wide) can be considered as the most studied from the faunistic point of view, not only as regards lithobiomorphs but also as regards myriapods in general. The number of specialists who have studied its fauna is quite large and, as a consequence, the data available is considerable, even though sometimes fragmentary and in need of reviewing and updating.

HISTORICAL BACKGROUND

The principal historical phases regarding the study of the fauna of Lithobiomorpha in Europe have been synthesised by Negrea (1989). Further information can be found in Manfredi (1981), Hopkin (1996) and Stagl (2000). From these contributions it is clear that the study of European lithobiomorphs is strictly related to the progress of the research on centipedes in general and on their systematics in particular. These studies began as early as the second half of the 18th century when Linné (1758) published the 10th edition of "*Systema Naturae*". In this fundamental work – in which under the genus *Scolopendra* Linné, *Lithobius forficatus* (Linné) is described as the first lithobiomorph species – besides laying the foundations of zoological classification, the connection between systematics and faunistics is evidenced for the first time as notes on the geographic distribution of each named species are given.

The monographs on the classification of Myriapoda by England's greatest authority on crustaceans William Elford Leach (1790-1836) and the entomologist George Newport (1803-1854), were published about fifty years later. Together with the paper later published by Reginald Innes Pocock (1863-1919) at the end of the 19th century, these works lay the foundations of present day classification of centipedes and in addition the first lithobiomorph species from the British Isles, the Iberian peninsula and Italy, were described (Leach, 1814; Newport, 1844, 1845, 1856, Pocock, 1895).

Further data were published by the German arachnologists and myriapodologists Carl Ludwig Koch (1778-1857) and his son Ludwig Carl Christian Koch, who described many species from S. Germany, Austria, as well as N. Italy and insular Greece (e.g.: C.L. Koch, 1844, 1847, 1863; L. Koch, 1862). Other species have been described by the Danish myriapodologist Frederik Vilhelm August Meinert (1833-1912), from scattered areas such as Spain, Germany, Austria and Italy (Meinert, 1872).

In the second half of the 19th century the first faunistic monographs began to be published. These works are often the results of specific research, more detailed and more continuative than those carried out before. Among these papers the most important is that of the Austrian myriapodologist Robert Latzel (1845-1919) "*Die Myriopoden der österreichisch-Ungarischen Monarchie*", the part dealing with centipedes was published in 1880 (Latzel, 1880). Other papers that merit a mention are those on the Italian fauna by Filippo Fanzago and Giacinto Fedrizzi (1850-1878), the pioneers of myriapodology in Italy, and by Jenő Daday (1855-1920) on the Hungarian fauna (Fanzago, 1874; Fedrizzi, 1877; Daday, 1889). A prominent figure in this period was Antonio Berlese (1863-1927), Italian entomologist of world-wide fame. Among the numerous works he published, of particular interest is "*Acari, Myriapoda et Scorpioles hucusque in Italia reperta*" (Berlese, 1882-1903), with plates drawn by Berlese himself, in which all the species so far known in Italy were depicted for the first time.

From the end of the 19th and through the first half of the 20th century three great specialists, namely H.W. Brölemann, K.W. Verhoeff and C.G. Attems contributed more than anyone else to the knowledge of these arthropods publishing mainly systematic and faunistic papers on the European fauna. The French myriapodologist Henry W. Brölemann (1860-1933) worked especially on the W. Mediterranean fauna. In the framework of the "Faune de France" series he published his important monograph on centipedes (Brölemann, 1930). The German zoologist Karl Wilhelm Verhoeff (1867-1945), well known also as a specialist of isopods, mainly studied the Central European fauna as well as that of Italy and of the Balkans (eg., Verhoeff, 1943). Among the most important papers published, one may remember "*Zur Kenntnis der Lithobiiden*" (Verhoeff, 1937). Other significant papers are those by Verhoeff (1925, 1934). The Austrian myriapodologist Carl Graf Attems (1868-1952), curator of the Natural History Museum in Wien from 1910 up to his death in 1952, is probably the most important specialist of myriapods so far. Although Attems published more than 130 papers on myriapods, his studies on the European fauna are few and they concern mainly Spanish, Eastern Alps and Balkan fauna (e.g., Attems, 1895, 1929, 1949, 1954, 1959).

In the same period an important role was played by Filippo Silvestri (1876-1949). A world-famous entomologist, he not only studied myriapods but also many groups of insects. As far as centipedes are concerned, although he mainly studied tropical and subtropical faunas, his early works were devoted to the Mediterranean fauna (Manfredi, 1981). Another Italian specialist that should be mentioned is Paola Manfredi (1889-1989), the doyen of the European myriapodologists. Of the papers she published the majority deal with epigeic and cave fauna of Italy and other Mediterranean countries.

In recent years the leading figure in Eastern Europe was the Rumanian Zachiu Matic (1924-1994), who studied the centipede fauna of his country as well as those of other Southern European areas (Negrea, 1989; Zapparoli & Minelli, 1995). Other myriapodologists that worked on the Eastern European fauna were the Czech Božena Folkmanová (1903-1960) and Ludek Dobroruka.

Lastly, some contemporary myriapodologists should be mentioned, such as the French Jean Marie Demange, who chiefly studied the cave fauna of the Pyrenees (e.g., Demange, 1958, 1959b; Demange & Serra, 1978); the Dutch Casimir A.W. Jeekel, with his accounts on the genus *Eupolybothrus* Verhoeff and on the Central European fauna (e.g., Jeekel, 1967, 1977); Bjarne A. Meidell and Goran Andersson, who have both studied the Scandinavian centipedes (eg. Meidell, 1979; Andersson, 1983, 1985); Stefan Negrea, who directed his studies mainly on the Balkan cave fauna; Nadezda Zalesskaja, who devoted her studies on the Lithobiomorpha of the former Soviet Union (Zalesskaja, 1978, 1990; Zalesskaja & Golovatch, 1998); Antoni Serra, who largely studied the Iberian fauna (e.g., Serra, 1982, 1983); Pavel Stoev, whose research is mainly on the Balkan fauna (e.g., Stoev, 1997, 2002).

Centipedes are a rather difficult group to study from the systematic and faunistic point of view. Many species have been described in the past in a very concise way and on unstable characters. This has led to considerable problems in the identification of the species and both taxonomy and nomenclature have become more and more chaotic. As a consequence, it is difficult to define the range of some taxa and the studies on the local faunas are problematic. In order to be able to use centipedes not only in the faunistic and zoogeographic research but also in auto- or syn-ecological studies, both basic or applied, the taxonomic identity of the species obviously has to be stated exactly. As far as concerns Lithobiomorpha, one must pay tribute to Edward Holt Eason (1916-1999) with his precise work of revision directed to the definition of the taxonomic identity of the species described by many of the older Authors. A world specialist, from the fifties, he devoted many of his papers to the critical re-examination of the diagnostic characters so far used and re-described the type specimens of most of the species and subspecies of C.L. Koch, L. Koch, Newport, Meinert, Porat, Pocock, Stuxberg, Verhoeff, Fanzago and Fedrizzi (Eason, 1970a, 1970b, 1972a, 1972b, 1974b, 1981, 1982, 1983, 1992a; Eason & Minelli, 1976). Through these revisions it has been possible to better define the range of many species and genera and on this subject Eason presented a lecture here in Manchester in 1972 during the 2nd International Congress of Myriapodology, organised by Gordon Blower (Eason, 1974a), and another at the International Congress in Innsbruck (Eason, 1992b). Dr. Eason carried out extensive studies on the taxonomy of European Lithobiomorpha and his work forms an important point of reference for future research as many species still need to be critically examined.

STUDY AREA AND METHODS

The area considered in this paper partially overlaps that of the “Fauna Europaea” database, a research project supported by the European Commission (e.g., Los et al., 2000), to which I contributed the sections on Lithobiomorpha and Scutigermorpha. I shall here examine the geographic Europe up to the Ural Mountains including European Turkey, excluding Kazakhstan, the Russian Caucasian republics and territories, the independent Transcaucasian republics and Asian Turkey. The Macaronesian islands (excl. Cape Verde Is.) are here included.

In the “Fauna Europaea” project are also included some geopolitical units, such as the S. Sporades and Cyprus, whose fauna is biogeographically closer to that of Anatolia and the Middle East rather than that of Europe. Lithobiomorpha of Anatolia and Middle East as well as N. Africa are not discussed in this paper, except for those species whose natural range also includes these areas as well as Europe. However, it should be noted that the Maghreb, and Near and Middle East all represent areas of a great zoogeographic interest in understanding the Europaeian fauna.

The following considerations are partly based on the data I have collected in the framework of the “Fauna Europaea” project. These data are based on a critical review of the main literature reports as well as some unpublished material recently studied. Available information about the habitat preferences of the species, mainly deduced from studies recently carried out in Central and Southern Europe, have been also taken into consideration (e.g., Minelli & Iovane, 1987; Spelda, 1999; Wytwer, 2000; Stoev, 2002; Zapparoli, 2002). The classification scheme for families and subfamilies follows Eason (1992b).

FAUNISTICS AND DIVERSITY

About 310 species/subspecies of Lithobiomorpha, divided in eight genera, five belonging to Lithobiidae, three to Henicopidae, have been so far recorded in Europe (Table 1). However, in spite of the revisions and faunistic research to-date published, the number of the species present in the area is still difficult to define since the taxonomic identity of a number of these is uncertain and many areas have not been much explored. For instance, of the about eighty species so far recorded in Italy, the taxonomic identity of a fifth of them is unreliable (cf. Foddai et al., 1995).

Table 1

Family, genera and species/subspecies numbers for Lithobiomorpha in Europe.

Families	Genera	Species/subspecies
Henicopidae	<i>Lamyctes</i> Meinert	3
	<i>Lamyctinus</i> Silvestri	1
	<i>Rhodobius</i> Silvestri	1*
Lithobiidae	<i>Eupolybothrus</i> Verhoeff	22
	<i>Lithobius</i> Leach	261
	<i>Harpolithobius</i> Verhoeff	18
	<i>Pleuroolithobius</i> Verhoeff	2
	<i>Hessebius</i> Verhoeff	2
Total		310

* Only in Is. Rhodos (Greece, S. Sporades).

In order to give a comparative account of the global diversity of Lithobiomorpha, Table 2 lists the number of species so far known in some continental or sub-continental areas. The number of species recorded in Europe seems comparable only with that recorded in N. America (U.S. only, 9,372,614 square kms). However, it must be pointed out that the N. American fauna, intensely studied until the sixties, the last studies being those by Ralph V. Chamberlin and Ralph E. Crabill, has never been revised. Therefore, the picture of the actual diversity could be very different from that here presented.

Table 2

World Lithobiomorpha: Continental/subcontinental areas, approximate number of species/subspecies (n) and main sources.

Areas	n	References
Europe	310	FaEu Project
North Africa (Maghreb)	14	Brölemann, 1921
Eastern ex-USSR	58	Zalesskaja, 1978
China	47	Wang & Mauries, 1996
Nepal	11	Eason, 1989
Thailand	8	Eason, 1986
Australia	>18	Edgecombe, 2001a
North America (U.S.A.)	376	Crabill, unpublished
Central America	?	-
South America	?	-
Anatolia	73	Zapparoli, 1999
Caucasus	48	Zalesskaja, 1978; Zapparoli, unpublished
Middle East	10	Zapparoli, unpublished
South Africa	15	Lawrence, 1955

The number of species so far known in other extra-European areas is much smaller. This could be partly due to the lack of knowledge of the fauna as well as to the fact that in tropical and subtropical areas the number of species of lithobiomorphs tends to decrease. It is however obvious that very heterogeneous data are compared here, due to the different sizes of the areas considered, the different intensity of the research and its level of updating. The extra-European areas for which modern check-lists are available are very few. Whereas many revisions have been published for the W. Palearctic and, at least partly, for the E. Palearctic and Oriental fauna, almost nothing has been done so far for the Nearctic, Neotropical and Afrotropical fauna. A revision of the Australasiatic Lithobiomorpha has been started only in the last years by Edgecombe (2001b).

Table 3 lists the European geopolitical units and their approximate number of species/subspecies of Lithobiomorpha. Most of the species/subspecies have been recorded from the Mediterranean and the adjacent areas. In the European countries that look on the Mediterranean basin (Spain, France, Italy, Slovenia, Croatia, Albania, Greece) about 200 species in all, equal to 65% of the whole fauna, have been recorded. Among these countries, Italy shows the higher diversity value. Apart from Sardinia and Sicily, in mainland Italy nearly 70 species are known, about 23% of the European species. Of these, 55 have been recorded from northern regions (Alps and Po Plain), 47 from central and southern regions (Foddai et al., 1995). From a general faunistic and biogeographic point of view, the Italian peninsula represents an area of special significance. The terrestrial fauna hosts a higher number of species than all the other European countries. Moreover, the Italian fauna is characterised by a higher number of endemic species, about a third of the total as far as Lithobiomorpha are concerned. The richness and variety of this fauna is mainly due to the highly composite paleogeographic structure of the Italian territory and by its extreme present day environmental diversity (La Greca, 1995).

Table 3

European Lithobiomorpha: Geopolitical units, approx area (in square kms), approx. number of species/subspecies (n) and main sources.

Geopolitical units	Area	n	References
Albania	28.748	27	Stoev, 2000
Austria	83.853	35	Würlmli, 1972; Eason, 1982
Azores Is., Portugal	2.247	8	Eason, 1985; Eason & Ashmole, 1992
Balearic Is., Spain	5.014	11	Verhoeff, 1924; Demange, 1959a; Matic et al., 1967; Negrea & Matic, 1973; Eason, 1975; Serra, 1983a
Belarus	207.600	4	Zalesskaja, 1978; Golovatch & Zalesskaja, 1992
Belgium	30.514	16	Lock, 2000
Bosnia-Herzegovina	51.129	37	Kos, 1992; Stoev, 1997
Britain	230.709	14	Eason, 1964
Bulgaria	110.994	61	Stoev, 2002
Canary Is., Spain	7.242	15	Eason & Enghoff, 1992; Zapparoli & Oromi, 2001
Corsica, France	8.682	12	Foddai et al., 1996
Crete, Greece	8.258	9	Zapparoli, 2002
Croatia	56.538	38	Kos, 1992; Stoev, 1997
Cyclades Is., Greece	2.572	6	Zapparoli, 2002
Cyprus	9.251	4	Turk, 1952
Czech Republic	78.864	42	Tajovsky, 2001
Danish mainland	43.077	14	Enghoff, 1983
Dodecanese Is., Greece	2.714	14	Zapparoli, 2002
Estonia	45.100	-	-
Faroe Is., Denmark	1.399	4	Meidell, 1990
Finland	338.127	9	Palmén, 1948
Franz Josef Land, Russia	16.100	-	-
French mainland	542.818	54	Geffroy, 2000
Germany	356.974	36	Effenberg, 1945; Jeekel, 1964; Eason, 1982; Spelda, 1991, 1999
Greek mainland	114.210	40	Zapparoli, 2002
Hungary	93.032	30	Daday, 1889; Loksa, 1955
Iceland	102.829	4	Eason, 1967
Ireland	70.284	7	Eason, 1964
Italian mainland	251.480	73	Foddai et al., 1994
Latvia	64.600	4	Zalesskaja, 1978; Golovatch & Zalesskaja, 1992
Liechtenstein	160	27*	-
Lithuania	65.200	4	Zalesskaja, 1978; Golovatch & Zalesskaja, 1992
Luxembourg	2.586	16	Remy & Hoffman, 1959; D. Kime pers. com., 2003
Macedonia, FYR of	25.713	15	Stoev, 2001a
Madeira Is., Portugal	790	6	Eason, 1985
Malta	316	3	Matic et al., 1967
Moldova, Republic of	33.700	8	Zalesskaja, 1978; Golovatch & Zalesskaja, 1992
The Netherlands	40.844	19	Jeekel, 1977
North Aegean Is., Greece	3.900	2	Zapparoli, 2002
Northern Ireland	14.120	5	Eason, 1964
Norwegian mainland	262.225	10	Meidell, 1978, 1979
Novaya Zemlya, Russia	90.650	-	-
Poland	312.677	33	Wytwer, 1997
Portuguese mainland	88.790	10	Machado, 1952; Serra, 1988
Romania	237.500	58	Matic, 1966
Russia, Central European	851.600	13	Zalesskaja, 1978; Golovatch & Zalesskaja, 1992
Russia, East European	777.500	5	Zalesskaja, 1978; Golovatch & Zalesskaja, 1992
Russia, North European	1.466.300	9	Zalesskaja, 1978; Golovatch & Zalesskaja, 1992
Russia, NW European	195.200	6	Zalesskaja, 1978; Golovatch & Zalesskaja, 1992

Geopolitical units	Area	n	References
Russia, South European	435.100	5	Zalesskaja, 1978; Golovatch & Zalesskaja, 1992
Sardinia, Italy	24.090	18	Foddai et al., 1994
Selvagens Is., Portugal	4,4	-	-
Sicily, Italy	25.708	14	Foddai et al., 1994
Slovakia	49.036	37	Országh, 2001
Slovenia	20.251	38	Kos, 1992; Stoev, 1997
Spanish mainland Serra,	492.526	51	Matic et al., 1967; Demange & Serra, 1978; Eason & 1981, 1986; Serra, 1977a, 1977b, 1979, 1980a, 1980b, 1981a, 1981b, 1982, 1983b, 1986, 1987
Svalbard Is., Norway	62.050	-	-
Sweden	449.964	16	Andersson, 1981, 1983, 1985
Switzerland	41.293	33	Eason, 1982; Schatzmann, 1990
Turkey, European side	23.764	15	Zapparoli, 1999
Ukraine	603.700	32	Zalesskaja, 1978; Golovatch & Zalesskaja, 1992
Yugoslavia (Serbia, Kosovo, Voivodina, Montenegro)	102.173	24	Kos, 1992; Stoev, 1997

* = n. of species in common between Austria, Switzerland and SW Germany.

In the south-westernmost areas of the European continent almost equivalent diversity values have been recorded in the Iberian peninsula (51 species) and France (54 species). However, it should be noted that whereas a check-list of the French centipedes has been recently published (Geoffroy, 2000) and the knowledge of this area is quite updated, it is not possible to say the same for the Iberian peninsula, although a number of papers devoted to its fauna have been recently published (cf. Table 3). Moreover, the Portuguese fauna, although we can assume that it is not very rich, is poorly known, since only ten species have been so far been recorded (Machado, 1952).

Another region showing high values of diversity is the Balkan peninsula. In this territory at least one hundred species have been recorded. The Balkans also represent an area of particular zoogeographic interest, where endemic elements of ancient origin are present, especially in the cave fauna. Although many taxonomic revisions, as well as faunistic surveys, check-lists and local catalogues have been published in the last years (cf. Table 3), the present knowledge of this fauna is still incomplete. Detailed and updated information is available for Slovenia, Albania, Makedonia, Greece and Bulgaria.

With regards to the large Mediterranean islands, those of the western sector (Balearic Isl., Corsica, Sardinia and Sicily) are the richer in number of species and endemics. These areas have been longer and repeatedly explored, especially Sardinia, which has the highest number of species and endemics. Much poorer is the fauna of the eastern Mediterranean islands (Crete, Cyprus), but the faunistic knowledge on these areas is still lacking. As far as the Atlantic islands, the fauna of the Canary Islands is quite well known and shows diversity values higher than those of the Azores and Madeira.

Central Europe (Switzerland, Austria, Germany, Belgium, the Netherlands) is an area which has been studied for a long time and therefore its fauna is comparatively well known. Moreover, the identity of most of the species has been recently revised (cf. Eason, 1982). The Alpine regions are the richest, with 33-35 species known to occur in Switzerland and Austria respectively. Going northwards the number of species tends to decrease: from 29 species recorded in SW. Germany (e.g., Spelda, 1991, 1999), to 16-18 species in Belgium and the Netherlands (cf. Jeekel, 1977; Lock, 2000).

The number of species/subspecies in the Carpathians-Danubian region (Czech Republic, Slovakia, Hungary, Romania) is seemingly comparable with that recorded in Central Europe, with 30-37 species in Hungary and Slovakia respectively and about 40 in Czech Republic. The taxonomic identity of some of these species is however uncertain, thus the actual diversity values are likely to be lower than those here

indicated. Whereas for Czech Republic and Slovakia a synthesis of the knowledge has been recently published (Országh, 2001; Tajovsky, 2001), the most recent studies on the Hungarian fauna date from the eighties (cf. Table 3). A higher number of species has been recorded in Romania (58), but the most recent studies date from the end of the sixties (Matic, 1966) and need to be updated.

The Lithobiomorpha of the Russian Plain has been the subject of some recent in-depth research (Zalesskaja, 1978, 1990, Zalesskaja & Golovatch, 1996). These investigations, beside describing the composition of the local fauna have also elucidated the main patterns of distribution of the species. The better known areas are Ukraine, which seems to host the highest number of species (32), and Central European Russia (13). Lower is the diversity in some peripheral zones, such as those now included within the Belarus and Baltic Republics boundaries. Although the fauna of these countries is not well known, we may assume that it is not richer and different than that of S. Finland and E. Poland (cf. Palmén, 1948; Wytwer, 1997, 2000). In European Russia a gradual decrease in the number of the species from the more central sectors southwards, where steppe habitats dominate, and northwards, where taiga and tundra prevails, is noted. A similar trend is also observed going from west to east, from Carpathians and Moldova towards the Urals (Zalesskaja & Golovatch, 1996).

Northern Europe (Iceland, Scandinavia, Denmark, British Isles) is the poorest area, 7-14 species have been recorded in the British Isles, 14 in Denmark, 9-16 in Scandinavia, only four in Iceland. 25-30% of the species recorded in these areas are synanthropic as they have been mostly collected indoors (e.g., Meidell, 1979, Barber, 1985; Andersson, 1985). In Scandinavia only four species extend beyond the Polar Circle (*Lithobius erythrocephalus* C.L. Koch, *L. forficatus* (L.), *L. curtipes* C.L. Koch, *Lamyctes emarginatus* (Newport)) (Palmén, 1948; Meidell, 1979). No data are known for the northernmost subarctic insular areas, such as Svalbard, Novaja Zemlja and Franz Josef Land.

The picture of the diversity of the European Lithobiomorpha is completed by comparing the number of species recorded in the Maghreb and in SW. Asia (Table 2). Although in these cases the knowledge is also fragmentary, the richest areas are the Anatolia and the Caucasus (Zapparoli, 1999 and unpublished). The number of species known at present in the Middle East and in the Maghreb is quite low (Brölemann, 1921; Zapparoli, 1991; Negrea & Matic, 1996). However, in addition to being poorly known faunistically, the habitats in both regions are not very suitable to Lithobiomorpha.

DISTRIBUTION PATTERNS

In order to define the main zoogeographic components of the European fauna, the distribution pattern (chorotypes, cf. Vigna Taglianti et al., 1992, 1999) of some of the most significant species, selected from those whose taxonomic identity and geographic distribution is better known, are discussed here for each genus or subgenus.

About 83% of the European lithobiomorphs belong to the large genus *Lithobius* Leach s.l., whose natural range includes the Holarctic and Oriental Regions. This is a rather heterogeneous group, divided into some subgenera but whose identity is controversial (e.g. Eason, 1974a, 1992b). Besides the nominotypical subgenus, five other taxa have been recorded in Europe, *Monotarsobius* Verhoeff, *Sigibius* Chamberlin, *Dacolithobius* Matic, *Tracholithobius* Matic and *Porobius* Porat.

Lithobius s. str. represents about 60% of the European Lithobiomorpha. Apart from a few species whose distribution is peripheral to the study area, such as *L. carinatus* L. Koch, a species ranging mainly in the Near and Middle East and which in Mainland Greece reaches its western limit, *L. skelicus* Zalesskaja, a troglobitic species probably with SW. Asiatic affinities (Caucasian or Iranian), only known in Crimea, and *L. proximus* Sselivanoff, a Sibero-European species not recorded westwards of the Volga flow, the rest of the fauna is represented by species mostly ranging in Europe.

A European pattern is shown by those species widespread in Europe, with possible extensions to Anatolia, Caucasus, Macaronesia and Maghreb. The species showing this pattern are few (8%). Generally, they are epigeic elements, with rather wide habitat preferences. Among these are some eurieic elements, such as *L. melanops* Newport recorded from European Russia to Macaronesia; *L. melanops* in the Azores is represented by an endemic subspecies, *L. m. borgei* Eason & Ashmole.

A wide European distribution is also shown by the polymorphous *L. erythrocephalus* C.L. Koch, although the range and the taxonomic identity of some subspecies is still uncertain. *L. erythrocephalus* s.l. ranges in Central and South-Eastern Europe, Anatolia, Middle East and Caucasus where it inhabits forest as well as open and steppe habitats; records from Sardinia and N. Africa are uncertain. Restricted to the Balkans is *L. e. borisi* Verhoeff, a good species according to Stoev (2002), mainly inhabiting alpine habitats. *L. e. cronebergii* is known from Georgia and Russian plain (Zalesskaja, 1978; Zalesskaja & Golovatch, 1996), but this taxon has been also recorded from Mainland Greece (Zapparoli, 2002) and from Arabian Peninsula (Sana'a), where it was probably introduced (Eason in Lewis, 1996). Closely related to *L. erythrocephalus* are *L. schuleri* Verhoeff, spread in Central and Eastern Europe, inhabiting open montane habitats; *L. stygius* Latzel, widely spread in the Balkan caves; *L. sexustumidus* Eason & Serra, restricted to the Iberian peninsula, but its habitat preferences are unknown.

Among the species with a wide European distribution pattern we may include *L. forficatus* (L.), ranging also along the Pontus and in the Caucasus. This eurieicous species easily settles in anthropogenic habitats, therefore its European range has been probably heavily influenced by man who also introduced this species in many extra-European areas (e.g., N. Africa, St. Helena, N. America, S. America).

A Central European pattern is shown by those species ranging mainly from Southern Scandinavia to the Po Plain, and from the Rhine river basin, east to Ukraine (Sarmatian plain and the Don river basin); extensions are possible to S Europe, the British Isles and N Caucasus. This group represents about a fifth of the European *Lithobius* s.str. and is chiefly represented by epigeic, forest dweller species, mainly inhabiting broadleaved deciduous forests but sometimes also in coniferous woods. Many of these species are more or less common under mesophilous conditions (e.g., *L. mutabilis* C.L. Koch, *L. dentatus* C.L. Koch, *L. tricuspis* Meinert, *L. macilentus* L. Koch, *L. tenebrosus* Meinert, *L. nodulipes* Latzel), others are mostly related to more thermophilous habitats (e.g. *L. muticus* C.L. Koch). However, some of these species are also able to settle in habitats other than woodlands such as caves, open habitats or urban ecosystems. Some other species show a seemingly disjunct range. Besides a more or less continuous Central European main range, isolated populations are also known to occur in some southernmost areas, as in *L. agilis* C.L. Koch, with scattered records from Sardinia, Greece, Anatolia and Crete, or in *L. subtilis* Latzel, also recorded from the Caucasus. Some cave-dwellers and epigeic species restricted to the Alps, mainly in the western or in the southern slopes, such as *L. fagniezi* Ribaut, *L. scotophilus* Latzel and *L. alpicosiensis* Matic, are of uncertain central or southern European affinities.

A S. European pattern is shown by those species more or less widespread in S Europe, north to the Loire River basin, the Alps and the Carpathians; extensions may be possible to Central Europe, the British Isles and the Caucasus. A more or less southern European distribution pattern is shown by about half (55%) of the European *Lithobius* s.str. species. Among these are, for instance, those of the *L. piceus* group. This group ranges from the Caucasus to the N. Iberian peninsula, across the Middle East, Anatolia, the Balkans and Central Europe. It includes about ten species/subspecies (*L. p. piceus* L. Koch, *L. p. verhoeffi* Demange, *L. p. unguitridens* Serra, *L. p. tabacarui* Negrea & Matic, *L. peregrinus* Latzel, *L. viriatus* Sseliwanoff, *L. romanus* Meinert, *L. cretaicus* Matic, *L. nigripalpis* L. Koch), whose taxonomic identity and geographic distribution have been recently revised, especially for the eastern species/subspecies. Some species endemic to the Sardinian caves (*L. aligherus* Manfredi, *L. doderoi* Silvestri) may also belong to the *L. piceus* species group.

Other common S. European species are *L. punctulatus* C.L. Koch s.l. and *L. castaneus* Newport. The former shows a disjunct range including the main European and SW. Asiatic mountain systems, from the Caucasus to the Pyrenees, mostly inhabiting broadleaved or coniferous woodlands, rarely above the tree line, often in caves. Morphological differences may exist between populations and some subspecies or closely related species have been described, but their status is uncertain. *L. castaneus* is a very common woodland species, mostly recorded in the more thermophilous forest habitats. It is known from the NW. Balkans to the Iberian peninsula, across peninsular Italy, Corsica, Sardinia, Sicily and N. Africa, easternmost records from Bulgaria are uncertain; the absence of records from Balearic Islands as well as from S. France is noteworthy.

Although it is not always possible to state their affinities exactly as more data on distribution and taxonomy as well as ecology are necessary, some of the species endemic to the Pyrenees, the Apennines, the Balkans, Corsica, Sardinia, and Crete are here tentatively referred to the S. European pattern. As in other Lithobiidae genera/subgenera some species of the Balkan fauna also range in N. Anatolia. Although some epigeic species are also known (*L. mucronatus* Verhoeff, *L. decui* Matic & Negrea, *L. dimitrescui* Matic & Negrea, *L. silvivagus* Verhoeff), the Balkan endemics mostly belong to the cave fauna and a number of species more or less adapted to this habitat have been described. *L. matulici* Verhoeff, a troglobitic species of the Dinaric karst is one of the most specialized; closely related to *L. matulici* are a number of cave species described from the same area, such as *L. sketi* Matic & Darabantu, *L. troglomontanus* (Folkmanová) and *L. jugoslavicus* (Hoffer), but their identity is uncertain.

Lithobius decapolitus Matic, Negrea & Prunescu is a common species in the S. Carpathian caves and morphologically close is *L. rushovensis* Matic, known from Bulgarian caves (Stoev, 2001b). A *Lithobius* s.str. close to *L. rushovensis* has been recorded from the Pontus range (Zapparoli, 1999 sub *L. beschkovi* Matic & Golemansky).

Of special interest is the cave fauna of the Pyrenees and N. Spain, where the main part of the cave Lithobiomorpha so far known in the world is found (Negrea & Minelli, 1994). In this area about twenty species/subspecies have been recorded, but some of these need a careful revision. Species with different degrees of cave adaptation are present both in the French (e.g., *L. cavernicolus* Fanzago, *L. allotyphlus* Silvestri, *L. jeanneli* Matic, *L. racovitzai* Matic) and in the Spanish side of the Pyrenees (e.g., *L. typhlus* Latzel, *L. lorioli* Demange, *L. anophthalmus* Matic, *L. jorbai* Serra). Distinctive of the Pyrenees are also some species group, e.g. *L. troglodytes* Latzel s.l., *L. crypticola* Ribaut s.l. and *L. derouetae* Demange s.l., each including species/subspecies of uncertain status, both epigeic and cave-dwellers, but the latter not highly adapted to this habitat.

Few endemic species are known for other mainland and insular S. European areas. *L. cassinensis* Verhoeff and *L. tylopus* Latzel are the most common *Lithobius* s.str. species in the Apennines, the former restricted to the Central regions and in xerothermophilous habitats, the latter in a wider range of forest habitats of the whole peninsular Italy. As regards the large Mediterranean islands, among the endemic *Lithobius* s.str. species of Sardinia, the most distinctive is *L. sbordonii* Matic, a troglobitic species only known from the karst of the east side of the island. The identity of the supposed endemic species from Corsica (*L. aidonensis* Verhoeff, *L. blanchardi* Léger & Duboscq, *L. brandensis* Verhoeff, *L. remyi* (Verhoeff)) needs to be revised. Besides the above mentioned *L. cretaicus* Matic, only one species is known for Crete (*L. creticus* Dobroruka).

A few species seem to show a W. European pattern (about 13%), ranging in the western part of Europe approximately from Scandinavia to the Iberian peninsula. Among the most distinctive species is the polymorphous, mostly nemoral, *L. pilicornis* Newport, distributed with a number of subspecies (*pilicornis* Newport, *hexodus* Brölemann, *doriae* Pocock, *luridus* Serra) from the Central Alps to the Atlantic coast of W. Europe and SW. Britain, westward to the Iberian peninsula. *L. pilicornis* has also been recorded in Macaronesia, where it was probably introduced; quotations from N. Africa are uncertain.

Lithobius calcaratus C.L. Koch is probably a W. European species, although its range, besides Germany, France and N. Iberia, also includes S. Scandinavia, Britain and N. Apennines, and recent Slovakian records are also known. This species has also been recorded in Austria and Corsica, but these data need confirmation. *L. calcaratus* is known as a thermophilous species mostly in forest habitats.

Other *Lithobius* s.str. species are more or less spread in the western part of Europe but their range also includes N. Africa. Among these species is *L. variegatus* Leach, discontinuously distributed with a northern subspecies, *L. v. variegatus*, found in the British Isles, Brittany and N. Iberia, and a southern one, *L. v. rubriceps* Newport, spread in Central and S. Iberia and N. Africa; old records from Sicily and S. Italy are also known but they need to be confirmed. Close to *L. variegatus* s.l. is the cave-dweller *L. nuragicus* Zapparoli, from S. Sardinia.

Another species whose natural range includes Western Europe (Iberian peninsula) and N. Africa is *L. obscurus* Meinert, but it has also spread in many areas of the world due to trade. This species is also present in Macaronesia from where two cave adapted subspecies have been described in the Azorean lava tubes (*L. o. azoreae* Eason & Ashmole, *L. o. mediocris* Eason & Ashmole).

The *L. inermis* species group, including *Lithobius* s. str. species with a latero-internal furrow on 15th or on 14th and 15th legs, also belongs to the W. European fauna. Besides *L. inermis* L. Koch, distributed in the Iberian peninsula, N. Africa, Sardinia and Sicily, this group also includes both epigeic (*L. pyrenaicus* Meinert, *L. gadarramus* Matic, *L. longiscissus* Serra) and cave species (*L. schubarti* Demange, *L. pedisulcus* Serra) endemic to the Iberian peninsula. Closely related to the *inermis* species group seem some species from the S. Balkans and Pontus areas showing the same character on the last legs, such as *L. lakatnicensis* Verhoeff, *L. ergus* (Chamberlin) and a few others, mostly recorded from caves but also from epigeic sites.

Among the western species should be also included *L. lusitanus* Verhoeff, widespread in the Iberian peninsula and N. Africa, and the closely related cave species *L. fagei* Demange, endemic to the Balearic Islands. Besides the nominotypical subspecies, two others have been described under *L. lusitanus*, namely *L. l. valesiacus* Verhoeff, from Central Europe, but good species in Spelda's (1999) opinion, and *L. l. tataricus* Folkmanová & Dobroruka, from Central European Russia, but of uncertain identity according to Zaleskaja & Golovatch (1996). Another western European species/subspecies group, whose range also includes the Maghreb, is that of *L. microdon* Latzel. It includes *L. m. microdon*, found in Iberian peninsula and N. Africa, *L. m. clarki* Eason and *L. vivesi* Serra, both endemic to the Balearic Islands, the former epigeic, the latter from caves, and the epigeic *L. trinacrius* Verhoeff, only known from Sicily.

The widespread Euro-Asiatic subgenus *Monotarsobius* includes about 25-30 species in Europe. A few of these species show wide distribution patterns, Sibero-European (*L. crassipes* L. Koch), Centralasiatic-European (*L. curtipes* C.L. Koch, *L. ferganensis* (Trotzina)), Central European (*L. aeruginosus* L. Koch, *L. austriacus* (Verhoeff)). They are all epigeic and quite common species, especially in the eastern and northern European countries, fairly well known from the taxonomic point of view. Their habitat preferences are heterogeneous, *L. curtipes* and *L. crassipes* seem rather euriecious; *L. ferganensis*, is recorded from open montane habitats, *L. aeruginosus* and *L. austriacus* are mainly related to mesophilous forests.

Most European *Monotarsobius* are species whose range is restricted to three main areas of Southern Europe. About ten of them have been described from the Balkans, five are from Italy, only two occur in mainland Spain. Moreover, five species are known from Madeira and Canary Islands, each one endemic to an individual island. In all the above mentioned cases, the species are poorly known, mostly recorded from very few sites. Many species are epigeic, mainly from more or less thermophilous forest as well as open habitats, but some are known only from caves. Their affinities are still uncertain, probably Asiatic or European, but taxonomic identity needs to be confirmed in some cases.

The subgenus *Sigibius* includes about thirty species/subspecies and is largely confined to Italy, the Balkans and the Near East (Eason, 1992b). The habitat preferences of these species are poorly known, although they seem mostly related to forest habitats or euriecious; cave species are also included. Although the taxonomic identity of some species has been recently reviewed, the whole subgenus needs to be re-examined. The most common species in Europe are *L. microps* Meinert and *L. micropodus* Matic, but their range is not well stated since *L. microps* has been often confused with *L. micropodus* by the older Authors (Eason, 1974b). Both species are however certainly present in Southern Europe and in Anatolia. Although they were recorded from a wide range of habitats, *L. microps* seems more frequent in the thermophilous ones. *L. microps* has been quoted also from N. Europe, but only in anthropogenic habitats.

Quite widespread in the Carpathians and in the Balkans is the *L. burzenlandicus* species group, including *L. b. burzenlandicus* Verhoeff, *L. b. wardaranus* (Verhoeff), *L. b. euxinicus* Prunescu and other related taxa now considered as endemic to the Balkans. The taxonomic value of these subspecies is however uncertain and, since the range of *burzenlandicus* and *wardaranus* somewhat overlaps, they should be considered as good species (Stoev, 2002).

Another interesting, but problematic, species group is that of *L. reiseri*, including *L. reiseri* Verhoeff, *L. apfelbecki* Verhoeff, *L. electrinus* (Verhoeff), *L. orghidani* Matic & Negrea, *L. paucicollatus* (Matic & Laslo) and *L. subterraneus* Matic. Although this group as a whole shows a rather wide S. European distribution, the above mentioned species are known from a few scattered localities in the Toros (Anatolia), the Balkans, the southern slopes of the Alps and the Pyrenees.

Among the species of *Sigibius* whose taxonomic status is quite clear and with a more restricted range, *L. trebinjanus* Verhoeff, known from Herzegovina, Albania and Macedonia (FYROM), and *L. jurinici* Matic & Golemansky, so far only known from Pontus and Rodopi Mts, should be mentioned, both being epigeic.

In the Balkan area two small and little known subgenera, *Thracolithobius* and *Dacolithobius* whose taxonomy is somewhat uncertain, are also present. *Thracolithobius* includes two species endemic to the Carpathia-Danubian region, *L. inspectatus* Matic, epigeic, and *L. dacicus* Matic, troglobitic; a third species, *L. remyi* Jawlowski, was described from a Serbian cave. *Dacolithobius* includes only one species, *L. domogledicus* Matic, epigeic, known only from a very restricted area of the Carpathian-Danubian region.

In the most peripheral SE. European areas the representatives of two species groups (or subgenera) of *Lithobius* s.l., the subgenus *Porobius* Porat and the *L. elegans* Sseliwanoff species group, are also present. The pattern of distribution of both groups is SW. Asiatic, and in the E. Mediterranean region, they respectively reach their westernmost and southernmost limit. *Porobius* is mainly distributed in the Middle East, westward along the Toros up to the S. Sporades, southward up to Cyprus, and it includes only *L. parvicornis* Porat and *L. pamukkalensis* (Matic) (Zapparoli, 1999 and unpublished), both inhabiting arid Mediterranean or submediterranean habitats. The *L. elegans* species group occurs mainly in the Caucasus but it extends westward up to the Crimea and southward, across Turkish Armenia and the Toros (Zapparoli, 1999), up to Cyprus (Zapparoli, unpublished). This group includes a dozen of species/subspecies whose habitat preferences range from forest habitats in the north to open habitats in the south, and probably form an undescribed subgenus close to the Oriental *Australobius* Chamberlin (Eason, 1992b; Zapparoli, 1999).

The genus *Harpolithobius* Verhoeff shows a disjunct range extending from the Caucasus, to the Middle East, in Anatolia along the Pontus and the Toros, in SE. Europe through the Carpathians, the Balkans, the Alps, westwards up to the Ligurian Apennine (Figure 1).

The species of this genus are mostly related to mesophilous broadleaved montane or submontane woods; some species also inhabit caves. About thirty species/subspecies are recognised in all, fifteen in Europe and ten in Anatolia and in the Caucasus respectively (e.g., Zaleskaja, 1978; Stoev, 1997; Zapparoli, 1999). The taxonomy of this genus is however chaotic, many species have been described on morphological characters whose variation is still unknown and the number of species/subspecies really present in the



Figure 1. Range of the genus *Harpolithobius* Verhoeff.

different areas is probably lower than those above mentioned. The most common species is *H. anodus* (Latzel), whose distribution largely overlaps that of the genus, but the identity of the SW. Anatolian records must be confirmed. Owing to the uncertain taxonomy of the genus, it is difficult to emphasise the endemic species, especially in the Balkans from where many species/subspecies have been described. Of some interest is however *H. oltenicus* Negrea, a troglobitic species only known from some caves of the Transilvanic Alps (Romania), the only cave species of this genus in Europe. Besides this, the only other two troglobitic *Harpolithobius* so far known are *H. birsteini* Zaleskaja, from the southern slopes of the W. Caucasus, and *H. vignatagliantii* Zapparoli, from the W. Toros.

The genus *Pleuroolithobius* Verhoeff shows a range mainly including W. Anatolia, S. Balkans and S. Italy. *P. patriarchalis* (Berlese) and *P. orientis* (Chamberlin), whose identity has been recently discussed (Zapparoli & Minelli, 1993), are the only two representatives of this genus. *P. orientis* is recorded from the Bosphorus area, Central Greece and S. Sporades. *P. patriarchalis* ranges from W. Anatolia, S. Balkans and S. Italy, but it was also recorded from Cyrenaica and in some Thyrrenian islands where it may have been introduced. Both species are mainly thermophilous, their habitat preferences includes Mediterranean open and sclerophyllous forest habitats as well as mixed broadleaved thermo-mesophilous woodlands.

The genus *Hessebius* Verhoeff ranges from Central Asia (Kirghizistan, Tagikistan, Turkmenistan, Kazakistan), across Southern Russia, Middle East (Iran, Iraq, Armenia, Syria, Palestine), westward up to Anatolia (Toros, including S. Sporades), Cyprus and NE. Africa (Egypt, Libya) (Zaleskaja, 1978; Zapparoli, 1999). It includes about ten species, some of which, especially those from Central Asia, recorded only from few localities. The habitat preferences of the representatives of this genus are poorly known, but they are probably related to open Mediterranean habitats as well as steppes, deserts or sub-deserts. *Hessebius* is marginally present in Europe where only two species are known to occur. *H. multicalcaratus* Folkmanová, whose distribution extends from Southern European Russia to the eastern part of Ukraine (Zaleskaja, 1978; Golovatch & Zaleskaja, 1996: Figure 2), and *H. barbipes*, a common species known from Iran to the E. Mediterranean region, where it reaches its eastern limit (Figure 2) (Zapparoli, 1999).



Figure 2. W. Palearctic range of the genus *Hessebius* Verhoeff.

Hessebius is marginally present in Europe where only two species are known to occur. *H. multicalcaratus* Folkmanová, whose distribution extends from Southern European Russia to the eastern part of Ukraine (Zaleskaja, 1978; Golovatch & Zaleskaja, 1996: Figure 2), and *H. barbipes*, a common species known from Iran to the E. Mediterranean region, where it reaches its eastern limit (Figure 2) (Zapparoli, 1999).

Ethopolinae are represented in Europe only by the genus *Eupolybothrus* Verhoeff. This genus so far includes 22 species and ranges from Central and S. Europe (incl. Sicily, Sardinia and Crete), to W. Anatolia, Middle East (incl. Cyprus) and Maghreb; records from Spain (Attems, 1927, 1952) need to be confirmed (Figure 3). *Eupolybothrus* species are mostly nemoral, mainly related to broadleaved as well as montane coniferous woods; some species are also cave-dwellers. Only two species, *E. litoralis* (L. Koch) and *E. nudicornis* (Gervais), show preferences for warmer habitats and their range extends out of Europe, the former eastward in Anatolia and in the Middle East, and the latter southward and westward in N. Africa.

Although the subgeneric classification of the genus and the identity of a number of species has been recently investigated by modern Authors (e.g., Jeekel, 1967; Eason, 1970b, 1972a, 1972b, 1982, 1983; Eason & Minelli, 1976; Zapparoli, 1984, 1995, 1998), some taxonomic and faunistic problems still affect the group. For instance, the taxonomic identity of some species, especially from the Balkans (e.g., *E. spiniger* (Latzel), *E. macedonicus* (Verhoeff), *E. walkanovi* (Kaczmarek), *E. sketi* Matic), needs to be re-examined. Moreover, although their taxonomic identity has been revised (Eason, 1970b), the SE. European range of three of the most common species, *E. grossipes* (C.L. Koch), *E. litoralis* (L. Koch) and *E. fasciatus* (Newport), all closely related one to another and often confused by older authors, is still not precisely known.



Figure 3. Range of the genus *Eupolybothrus* Verhoeff s.l.

The most interesting area from a faunistic and biogeographic point of view is the Balkans. This area harbours about two thirds of the European *Eupolybothrus* species. More than half of the Balkan *Eupolybothrus* is represented by species with more or less restricted ranges. Among these at least three are cave species, *E. gloriastigis* (Absolon), *E. leostygis* (Verhoeff) (Herzegovina, Montenegro) and the troglobitic *E. andreevi* Matic (Bulgaria, W. Stara Planina Mts.). Other endemic representatives are the epigeic *E. dolops* Zapparoli, *E. wernerii* (Attems), *E. caesar* (Verhoeff), *E. herzegovinensis* (Verhoeff).

Few *Eupolybothrus* species are restricted to the Alps. *E. excellens* (Silvestri), for example, is known in W. Italy where it has been mainly recorded from caves as well as from epigeic sites. *E. obrovensis* (Verhoeff), a troglobitic species, is endemic to the karst of Istria. Another species with a restricted range but poorly known is *E. verrucosus* (Sselivanoff), from Moldova.

Henicopidae, a family essentially confined to the tropics and the southern hemisphere, is represented in Europe by few species without any particular interest from the faunistic or biogeographic point of view, since they were probably all introduced by man. The commonest species are the cosmopolitan *Lamyctes emarginatus* (Newport) and *Lamyctinus coeculus* Brölemann both always recorded from artificial habitats. They are known to occur in natural habitats only in the Canary Islands, where two other *Lamyctes* Meinert, both probably widely spread by man in the tropics and subtropics, have also been recorded from natural habitats. Finally, a monobasic Anopsobiinae genus of uncertain identity (*Rhodobius* Silvestri, *R. lagoi* Silvestri) is known from orchards in Rhodos (S. Sporades, Greece).

CONCLUSION

Some concluding remarks should be made:

1. Although the number of species is comparatively small, centipedes are of great interest in faunistic, biogeographic and ecological studies due to their close relationship with the ecosystems, their low dispersal power and their apical position in the ecological chains. Nonetheless the results of such studies will not be reliable without a valid and stable classification system of the group.
2. As far as lithobiomorphs are concerned, the European species has been the subject of both systematic and faunistic research for a long time. The data collected so far highlights the presence in this area of a rich and complex fauna, to which both historical and ecological factors have contributed.
3. The picture however is not yet complete and a number of taxonomic problems on the identity and classification of some genera/subgenera (e.g., *Thracolithobius*, *Dacolithobius*), as well as of individual species (e.g., in *Lithobius* s.str., *Sigibius*, *Monotarsobius*, *Harpolithobius*) need to be solved. In order to give more details on the local distribution of the species, intensive faunistic surveys need to be carried out, especially in some areas where knowledge is still patchy, such as the Iberian peninsula, the Balkans, Eastern Europe, the Mediterranean macro and micro-insular systems, as well as other areas, such as Central Europe, only apparently well known.
4. The zoogeographical studies on the European fauna cannot give satisfactory results without taking into account the fauna of the adjacent areas, especially Anatolia, Caucasus and the Middle East. These regions are however poorly known, both from systematic and faunistic points of view, and further data is necessary.
5. Although some centipedes have a wide range of habitat preferences, a large number of species show rather precise preferences, and auto- and syn-ecological information could be very useful in taxonomical, faunistic and zoogeographical studies.

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SUMMARY

After a short history of the systematic and faunistic research highlighting the contribution of Dr. E.H. Eason (1916-1999), a synthesis of the present day knowledge on the lithobiomorph fauna of Europe (geographic Europe, incl. Macaronesia) based on literature and unpublished data examined by the author is presented. About 310 species/subspecies, mostly represented by Lithobiidae (genera *Lithobius* Leach s.l.,

Hessebius Porat, *Harpolithobius* Verhoeff, *Pleuroolithobius* Verhoeff, *Eupolybothrus* Verhoeff s.l.), have been recorded so far. Only 4-5 probably introduced species of Henicopidae are known as present in the study area (genera *Lamyctes* Meinert, *Lamyctinus* Silvestri, *Rhodobius* Silvestri). The number of the species present in Europe is however difficult to define since the taxonomic identity of a number of these is uncertain and many areas have not been much explored. The majority of the European lithobiomorpha fauna occurs in the southernmost mainland areas (Iberian Peninsula, Italy, Balkans) and a general pattern of species richness decreasing from south to north is noted. In order to give a zoogeographic picture of the fauna the distribution patterns of some of the most significant species are discussed for each genus or subgenus: a larger number of species widely spread in Europe (mainly S. European) in addition to a small component of species widely spread in the whole Palearctic Region (Sibero-European, Centralasiatic-European, SW. Asiatic), are represented in the fauna.

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