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New considerations about the gnaphosid fauna of Italy (Araneae: Gnaphosidae)

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Summary

Although the data about the Gnaphosidae of Italy are not exhaustive, as some records have not been verified and not all the Italian regions have been thoroughly investigated, a new analysis of the gnaphosid fauna of Italy has been done. At least 139 species belonging to 21 genera have been recorded and some of them have only recently been found in Italy for the first time. These species are differently distributed in the four faunal provinces into which La Greca (1995) divided Italy: Alpine, Apennine, Tyrrhenian and Adriatic. All species show one of the following patterns of distribution: (a) widespread species, (b) species with a prevailing European distribution, and (c) species with a prevailing Mediterranean distribution. There are differences in the species composition of the four Italian faunal provinces, depending on the territorial differences and on the origin of the fauna of each province. Regarding the Adriatic faunal province, the few data known on the distribution of its species in Italy are insufficient to permit a good analysis of its fauna. The genus *Micaria* has not been included in this study.

Introduction

Although the Italian Araneae are well known, as they have been the subject of numerous studies, some families, like the Gnaphosidae, have been particularly overlooked; however, new data on the Italian species have been acquired during the last ten years (Brignoli & Murphy, 1984; Grimm, 1985; Di Franco, 1986, 1988, 1989, 1992, 1994; Platnick & Murphy, 1984; Ovtsharenko, Levy & Platnick, 1994). Despite this our information on the Italian Gnaphosidae is still full of gaps, as some records have not been verified and not all the Italian regions have been adequately investigated. There are abundant data about the species living in the Alpine regions, Veneto, Lombardia, Piemonte, Liguria, Emilia Romagna, Toscana, Lazio and Sicilia; rather poor are the data concerning some regions, such as Calabria, Puglia, Basilicata, Campania and Sardegna, which because of their great variety of environments and the history of their fauna should contain a considerable number of species. There is a shortage of information about the Gnaphosidae in some regions, such as Umbria, Abruzzo, Marche and Molise.

The purpose of this report is to list the species of Gnaphosidae which have been recorded in Italy, to show how they are distributed in the different parts of the country, and to define better the range of the species found. The genus *Micaria*, definitively included among Gnaphosidae by Platnick & Shadab (1988), has not been included.

Regarding the Italian territory, its peculiar geographical position and the complex geological events that have brought about its constitution have made this country geomorphologically and climatically extremely diversified; also, Italy is notable for the presence of important mountain chains, wide hilly areas, extensive lowlands, lakes, long coasts, two large islands, Sicilia and Sardegna, and many small islands. These are characterised by a great variety of environments that have contributed to the formation of an extremely rich and diversified fauna that retains a high level of naturalness as Italy has not sustained strong human pressure for agricultural purposes. Considering its territorial differences and the results obtained from chorological studies on many other animal groups, Italy can be divided into four faunal provinces (La Greca, 1995), each characterised by a distinctive fauna, rich in endemic and biogeographically significant species (Fig. 1): Alpine, Apennine, Tyrrhenian and Adriatic faunal provinces.

Material and methods

The information reported here has been extracted from the literature and by studying many araneological collections loaned from various Italian museums (Museo Civico di Storia Naturale, Verona; Museo Civico di Storia Naturale "E. Caffi", Bergamo; Museum of Dipartimento di Biologia animale e dell'Uomo, Rome), and from some Professors of Catania University: Prof. P. Alicata, Prof. A. Messina and Prof. I. Marcellino, and by the study of my own collections.

The species have been grouped according to their distribution in Italy and their range, to show the differences among the Gnaphosidae living in the four faunal provinces.

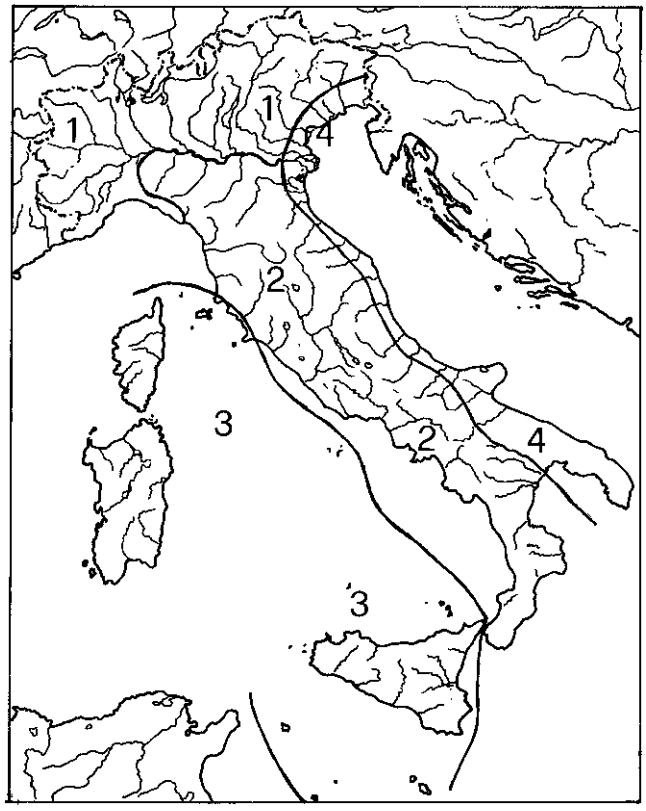

Fig. 1: Map showing the four Italian faunal provinces (after La Greca, 1995). 1=Alpine, 2=Apennine, 3=Tyrrhenian, 4=Adriatic.

Species	Provinces			
	ALP	APE	TYR	ADR
Holarctic				
Berlandina plumalis (O. P.-Cambridge, 1872)		+		+
Gnaphosa muscorum (L. Koch, 1866)	+			
Haplodrassus signifer (C. L. Koch, 1839)	+	+	+	+
Sosticus loricatus (L. Koch, 1866)	+	+		
Synanthropic				
Urozelotes rusticus (L. Koch, 1872)	+	+	+	
Palearctic				
Callilepis schuszteri (Herman, 1879)	+	+		
Drassodes lapidosus (Walckenaer, 1802)	+	+	+	+
D. fugax (Simon, 1878)	+	+	+	
D. luteomicans (Simon, 1878)	+			
D. pubescens (Thorell, 1856)	+	+	+	+
Haplodrassus dalmatensis (L. Koch, 1866)	+	+	+	+
Scotophaeus blackwalli (Thorell, 1871)	+	+	+	+
Eurosiberian				
Zelotes longipes (L. Koch, 1866)	+	+		+
European				
Gnaphosa bicolor (Hahn, 1831)	+	+		+
G. lucifuga (Walckenaer, 1802)	+	+	+	
G. lugubris (C. L. Koch, 1839)	+	+	+	+
G. montana (L. Koch, 1866)	+	+	+	
Callilepis nocturna (Linnaeus, 1758)	+	+	+	
Haplodrassus cognatus (Westring, 1861)	+	+		
H. concertor (Simon, 1878)	+			
H. kulczynskii Lohmander, 1942	+		+	
H. silvestris (Blackwall, 1833)	+	+		
Poecilochroa variana (C. L. Koch, 1839)		+	+	
Echemus angustifrons (Westring, 1861)	+		+	
Scotophaeus quadripunctatus (Linneaus, 1758)	+	+		
Drassyllus praeficus (L. Koch, 1866)	+	+	+	+
D. pusillus (C. L. Koch, 1833)	+	+	+	
D. lutetianus (L. Koch, 1866)		+		
Trachyzelotes pedestris (C. L. Koch, 1837)		+	+	+
Zelotes atrocaeruleus (Simon, 1878)		+	+	
Z. clivicola (L. Koch, 1870)	+	+		
Z. electus (C. L. Koch, 1839)	+	+	+	+
Z. latreillei (Simon, 1878)	+	+		
Z. petrensis (C. L. Koch, 1839)	+	+	+	
Alpine				
Berlandina nubivaga (Simon, 1878)	+			
Gnaphosa alpica Simon, 1878)	+			
G. badia (L. Koch, 1866)	+			
G. petrobia L. Koch, 1872	+			
Drassodes heeri (Pavesi, 1873)	+			
D. hispanus (L. Koch, 1866)	+			
Parasyrisca vinosus (Simon, 1878)	+	+		
Zelotes cyanescens Simon, 1914	+			
Z. devotus Grimm, 1982	+			
Z. talpinus (L. Koch, 1872)	+	+		
North-central Europe				
Gnaphosa leporina (L. Koch, 1866)	+			
Drassodes villosus (Thorell, 1856)	+			
Zelotes subterraneus (C. L. Koch, 1833)	+			
Southeast Europe				
Zelotes caucasius (L. Koch, 1866)		+		
Z. gracilis (Canestrini, 1868)		+		
Z. oblongus (C. L. Koch, 1833)	+	+		
Z. similis (Kulczynski, 1887)	+			
Western Europe				
Gnaphosa corticola Simon, 1914	+	+		
Drassodes difficilis (Simon, 1878)	+			
Zelotes dentatidens Simon, 1914		+		
Z. louronensis Denis, 1960		+		
Eastern Europe				
Drassodes striatus (L. Koch, 1866)				
Haplodrassus minor (O. P.-Cambridge, 1879)		+		
Zelotes bimaculatus (C. L. Koch, 1837)	+	+	+	
Central Europe				
Gnaphosa rhenana Müller & Schenkel, 1895	+			
Scotophaeus retusus (Simon, 1878)	+			
Drassyllus pumilus (C. L. Koch, 1839)	+	+		+
Euromediterranean				
Scotophaeus validus (Lucas, 1846)		+	+	
South Euromediterranean				
Aphantaulax cincta (L. Koch, 1866)	+	+	+	
A. seminigra Simon, 1878	+		+	+
Zelotes listeri (Audouin, 1826)	+			
Z. tenuis (L. Koch, 1866)		+	+	
Southern Europe				
Drassodes albicans (Simon, 1878)			+	
Leptodrassus femineus (Simon, 1873)			+	

Species	Provinces			
	ALP	APE	TYR	ADR
Synaphosus sauvage Ovtsh., Levy & Plat., 1994			+	
Zelotes civicus (Simon, 1878)	+	+	+	
Z. labilis Simon, 1914			+	
Z. manius (Simon, 1878)				+
South-central Europe				
Drassodes hypocrita (Simon, 1878)	+	+		
Poecilochroa conspicua (L. Koch, 1866)		+		+
Drassyllus villicus (Thorell, 1875)		+	+	
Zelotes aeneus (Simon, 1878)	+	+	+	
Z. erebeus (Thorell, 1871)	+	+		
Z. femellus (L. Koch, 1866)	+	+	+	
Z. gallicus Simon, 1914		+		
Euromaghrebian				
Phaeocedus braccatus (L. Koch, 1866)	+	+	+	
Scotophaeus scutulatus (L. Koch, 1866)	+	+	+	+
Zelotes apricorum (L. Koch, 1876)	+	+	+	
South Euromaghrebian				
Gnaphosa alacris Simon, 1878	+	+	+	
Drassodes persimilis Denis, 1937			+	
Haplodrassus severus (C. L. Koch, 1839)	+	+	+	+
Trachyzelotes huberti Platnick & Murphy, 1984		+		
Mediterranean–Atlantic				
Nomisia aussereri (L. Koch, 1872)	+	+	+	+
N. exornata (C. L. Koch, 1839)	+	+	+	+
Mediterranean				
Drassodes lutescens (C. L. Koch, 1839)	+	+	+	+
Haplodrassus invalidus (O. P.-Cambridge, 1872)			+	
Gnaphosa tigrina Simon, 1878	+		+	
Trachyzelotes barbatus (L. Koch, 1866)	+	+	+	+
T. fuscipes (L. Koch, 1866)			+	
T. lyonneti (Audouin, 1826)			+	
T. mutabilis (Simon, 1878)		+	+	+
Zelotes carmeli (O. P.-Cambridge, 1872)	+	+	+	
Z. nilicola (O. P.-Cambridge, 1874)		+	+	+
North Mediterranean				
Zelotes callidus (Simon, 1878)		+	+	
East Mediterranean				
Nomisia molendinaria (L. Koch, 1866)				+
West Mediterranean				
Poecilochroa albomaculata (Lucas, 1846)		+	+	
Nomisia recepta (Pavesi, 1880)		+	+	
Drassodes rubidus (Simon, 1878)			+	
Haplodrassus macellinus (Thorell, 1871)		+	+	+
Trachyzelotes costatus (Denis, 1952)			+	
T. holosericeus (Simon, 1878)	+	+		
Zelotes fuscorufus (Simon, 1878)			+	
Z. fuscotestaceus (Simon, 1878)		+	+	
Z. reconditus Simon, 1914			+	
Siculomaghrebian				
Zelotes criniger Denis, 1937			+	
Z. denisi Marinaro, 1967			+	
Z. pluridentatus Marinaro, 1967			+	
Endemic species				
Pterotricha sinoniae Caporiacco, 1953			+	
Gnaphosa basilicata Simon, 1882		+		
G. lonai Caporiacco, 1949			+	
Drassodes canaglensis Caporiacco, 1927	+			
D. decorus (Blackwall, 1870)		+		
Haplodrassus vignai Di Franco, 1995		+		
Leptodrassus diomedeus Caporiacco, 1951				+
Camillina europaea Dalmas, 1922			+	
Zelotes brachialis (Garneri, 1902)			+	
Z. calactinus Di Franco, 1989			+	
Z. caprearum (Pavesi, 1875)			+	
Z. denapes Platnick, 1993			+	
Z. insulanus (L. Koch, 1867)			+	
Z. kochi (Canestrini, 1868)	+	+		
Z. messinai Di Franco, 1994			+	
Z. prognathus (Canestrini, 1876)	+			
Z. sardus (Canestrini, 1873)			+	
Z. siculus (Simon, 1878)			+	
Chorology not defined				
Gnaphosa spadicea Simon, 1914			+	
Poecilochroa phyllobia (Thorell, 1870)				
Camillina algerica Dalmas, 1922			+	
Trachyzelotes adriaticus (Caporiacco, 1953)		+		+
Zelotes hirtus (Thorell, 1875)				
Z. paroculus Simon, 1914		+		
Z. segrex (Simon, 1878)				+
Z. lugens Denis, 1941		+		
Z. semirufus (L. Koch, 1882)				+
Z. vespertinus (Thorell, 1875)				

Table 1: List of species of Gnaphosidae recorded in Italy and their distribution in the four faunal provinces, Alpine (ALP), Apennine (APE), Tyrrhenian (TYR) and Adriatic (ADR). The species are arranged according to their chorology.

Regarding the Adriatic faunal province, it is important to emphasise that the smaller number of species currently known from this area, and the few data on their distribution in Italy, do not allow us to carry out a good analysis of the fauna of this province.

Results

There are 139 species of Gnaphosidae that have been recorded from Italy, belonging to 21 genera (Table 1), and some of these have been found in Italy only during the last 10–12 years: *Drassodes persimilis* Denis, 1937, *Leptodrassus femineus* (Simon, 1873), *Phaeocedus braccatus* (L. Koch, 1866), *Echemus angustifrons* (Westring, 1861), *Callilepis nocturna* (Linnaeus, 1758), *Trachyzelotes costatus* (Denis, 1952), *T. huberti* Platnick & Murphy, 1984, *T. lyonneti* (Audouin, 1826), *Synaphosus sauvage* Ovtsharenko, Levy & Platnick, 1994, *Drassyllus lutetianus* (L. Koch, 1866), *D. villicus* (Thorell, 1875), *Zelotes fuscorufus* (Simon, 1878), *Z. fuscotestaceus* (Simon, 1878), *Z. labilis* Simon, 1914, *Z. lugens* Denis, 1941, *Z. paroculus* Simon, 1914, *Z. pluridentatus* Marinaro, 1967 and *Z. reconditus* Simon, 1914. Seventy-three species have been found in the Alpine faunal province, 77 species in the Apennine, 75 in the Tyrrhenian and 30 in the Adriatic, and they mainly show one of the following patterns of distribution: (a) widespread species, (b) species with a prevailing European distribution, and (c) species with a prevailing Mediterranean distribution (Table 2).

Among the four provinces there are significant differences both in the species compositions and in the proportions of species with each pattern of distribution, especially among the species with a prevailing European range and in those with a prevailing Mediterranean range. The proportion of widespread species (Fig. 2) in each of the four provinces is more or less the same, and even the species are much the same, with the exception of *Gnaphosa muscorum* (L. Koch, 1866) and *Drassodes luteomicans* (Simon, 1878), recorded only in the Alpine province, and *Callilepis schuszteri* (Herman, 1879) and *Sosticus loricatus* (L. Koch, 1866), absent from the Tyrrhenian and Adriatic provinces; this is probably due to their ecological valence.

The percentage of species with a prevailing European distribution (Fig. 2) is highest in the Alpine province (71.2%), decreases in the Apennine (61.0%), and is very reduced in the Tyrrhenian (42.7%) and Adriatic (40.0%); there is a corresponding increase in the species with a prevailing Mediterranean distribution: 9.6% in the Alpine province, 16.9% in the Apennine, 26.7% in the Adriatic and 30.7% in the Tyrrhenian faunal province.

In the Alpine faunal province the European species are divided into 13 chorotypes (Table 2). The species widespread in Europe (32.7%) and the alpine species (19.2%) are the most conspicuous. The high percentage and number (10) of alpine species in this province is significant, while in the Apennine province there are only two alpine species: *Parasyrisca vinosus* (Simon, 1878) and *Zelotes talpinus* (L. Koch, 1872); no alpine species have been found in the other provinces. Also interesting is the presence only in the Alpine province of some species with a central European range (*Gnaphosa rhenana* Müller & Schenkel, 1895 and *Scotophaeus retusus* (Simon, 1878)) and with a northern central European range (*Drassodes villosus* (Thorell, 1856), *Gnaphosa leporina* (L. Koch, 1866) and *Zelotes subterraneus* (C. L. Koch, 1833)). The species with other ranges are less important, as many of them occur also in the Apennine province and often also in the Tyrrhenian faunal province.

In the Alpine province there are only seven species with a prevailing Mediterranean distribution, and four of them are widespread in the Mediterranean area (Table 2). Two species, *Nomisia aussereri* (L. Koch, 1872) and *N. exornata* (C. L. Koch, 1839), also extend their range to the Atlantic coasts and only one species, *Trachyzelotes holosericeus* (Simon, 1878) shows a narrower range restricted to the western Mediterranean.

	Alpine n (%)	Apennine n (%)	Tyrrhenian n (%)	Adriatic n (%)
Total fauna				
WSP	11 (15.1)	10 (13.0)	7 (9.3)	6 (20.0)
EUR	52 (71.2)	47 (61.0)	32 (42.7)	12 (40.0)
MED	7 (9.6)	13 (16.9)	23 (30.7)	8 (26.7)
END	3 (4.1)	4 (5.2)	11 (14.7)	1 (3.3)
ND		3 (3.9)	2 (2.7)	3 (10.0)
Total	73	77	75	30
European component				
SIE	1 (1.9)	1 (2.1)		1 (8.3)
EUR	17 (32.7)	18 (38.3)	13 (40.6)	5 (41.7)
ALP	10 (19.2)	2 (4.3)		
NCEU	3 (5.8)			
SEEU	2 (3.9)	3 (6.4)		
WEU	2 (3.9)	3 (6.4)		
EEU	1 (1.9)	2 (4.3)	1 (3.1)	
CEU	3 (5.8)	1 (2.1)		1 (8.3)
EUME		1 (2.1)	1 (3.1)	
SEME	3 (5.8)	2 (4.3)	3 (9.4)	1 (8.3)
SEU	1 (1.9)	1 (2.1)	5 (15.6)	1 (8.3)
SCEU	4 (7.7)	7 (14.9)	3 (9.4)	1 (8.3)
EUMG	3 (5.8)	3 (6.4)	3 (9.4)	1 (8.3)
SEMG	2 (3.9)	3 (6.4)	3 (9.4)	1 (8.3)
Total	52	47	32	12
Mediterranean component				
MAT	2 (28.6)	2 (15.4)	2 (8.7)	2 (25.0)
MED	4 (57.1)	5 (38.5)	9 (39.1)	4 (50.0)
NME		1 (7.7)	1 (4.4)	
EME				1 (12.5)
WME	1 (14.3)	5 (38.5)	8 (34.8)	1 (12.5)
SIMG			3 (13.0)	
Total	7	13	23	8

Table 2: Number of species and their percentage for each range in the four Italian faunal provinces. Abbreviations of ranges: WSP=widespread, EUR=European, MED=Mediterranean, END=endemic, ND=not defined, SIE=Eurosiberian, ALP=Alpine, NCEU=North-central Europe, SEEU=Southeast Europe, WEU=Western Europe, EEU=Eastern Europe, CEU=Central Europe, EUME=Euromediterranean, SEME=South Euromediterranean, SEU=Southern Europe, SCEU=South-central Europe, EUMG=Euromaghrebian, SEMG=South Euromaghrebian, MAT=Mediterranean–Atlantic, NME=North Mediterranean, EME=East Mediterranean, WME=West Mediterranean, SIMG=Siculomaghrebian.

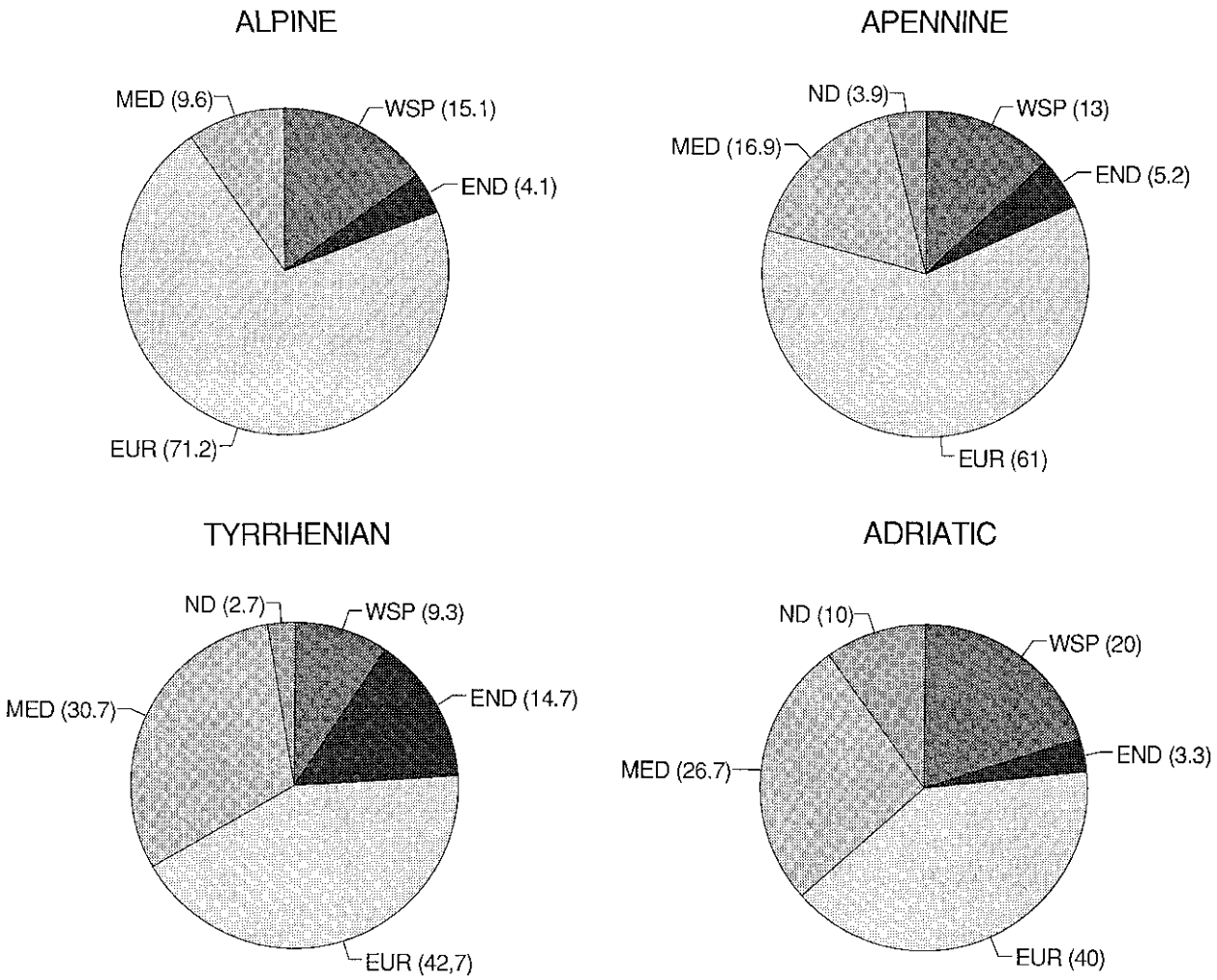

Fig. 2: Percentages of the widespread species (WSP), species with prevailing European distribution (EUR), species with prevailing Mediterranean distribution (MED), endemic species (END) and species with non-defined range (ND) in the four Italian faunal provinces.

In the Apennine faunal province the European species belong to 13 chorotypes, the most conspicuous group being the species widespread in Europe (38.3%); the high percentage of these species recorded in this province may be due to the presence of species adapted to cold habitats, also recorded in the Alpine province, and those of warm climates, found also in the Tyrrhenian province. The same explanation may be offered for the fairly high percentage of species with a south-central European range (14.9%).

The number of species with a prevailing Mediterranean distribution is higher (13) in this province than in the Alpine province. Five species are widespread in the Mediterranean region (38.5%), but some additional species with a narrower range have been recorded: *Zelotes callidus* (Simon, 1878) with a northern Mediterranean range, and *Haplodrassus macellinus* (Thorell, 1871), *Nomisia recepta* (Pavesi, 1880), *Poecilochroa albomaculata* (Lucas, 1846) and *Zelotes fuscotestaceus* (Simon, 1878) with a western Mediterranean range.

The species with a prevailing European distribution recorded in the Tyrrhenian province belong to 8 chorotypes, including mainly territories of central and southern Europe. The percentage of species widespread in Europe is high (40.6%) but they are fewer in number than those recorded in the Alpine and Apennine provinces; some of these species show a wide ecological valence, while others are adapted to warm climates. Species with a southern European range are well represented (15.6%), and include elements very interesting for the scarcity of information known about their distribution, e.g. *Drassodes albicans* (Simon, 1878), *Leptodrassus femineus* (Simon, 1873) and *Zelotes labilis* Simon, 1914.

The percentage of species with a prevailing Mediterranean distribution is high (30.7%) and they belong to 5 chorotypes. The percentage of these species which are widespread in the Mediterranean basin is high (39.1%), but interesting also is the high percentage of species with a western Mediterranean range (34.8%) and the presence of Siculomaghrebian elements (3 species); these last elements are species which have been recorded both in Sicily and Maghreb.

Only 30 species have been recorded in the Adriatic faunal province, and 20% of these are widespread species, 40% have a prevailing European range and 26.7% are species with a prevailing Mediterranean distribution. These percentages are probably not very meaningful, considering the low number recorded here of eastern European species, which should characterise this region. Interesting is the discovery only in this province of *Nomisia molendinaria* (L. Koch, 1866), a

species with an eastern Mediterranean range, and *Leptodrassus diomedeus* Caporiacco, 1951, an endemic species.

The proportion of endemic species (Fig. 2) is different in the four faunal provinces: 4.1% in the Alpine province, 5.2% in the Apennine, 14.7% in the Tyrrhenian and 3.3% in the Adriatic province. The high percentage and number of endemic species in the Tyrrhenian faunal province is possibly related to the history of its fauna, the presence of many different habitats, and to the shortage of our knowledge about the distribution of the species. The degree of affinity between Italian endemic species and the European and Mediterranean species is still not known, and will be interesting for a better understanding of the origin of the gnaphosid fauna of Italy.

For some interesting species, recorded especially in the Apennine and Tyrrhenian faunal provinces (Table 1), it has not been possible to define their range as there are very few data about their distribution.

Conclusions

These results demonstrate that the gnaphosid fauna of each Italian faunal province, into which La Greca (1995) subdivided Italy, shows a distinctive pattern determined by the origin of the fauna and by the ecological valence of each species.

In the Alpine faunal province there are especially species adapted to the cold climate, mainly distributed in the Alps, in the whole of Europe and in central and northern Europe.

The great variety of environments in the Apennine province has contributed to the settlement in this area of both species adapted to cold climates coming from northern Europe and species adapted to warm climates coming from the Tyrrhenian and Adriatic provinces. The Apennine province is therefore characterised by the presence mainly of European species, especially those which have a range including the territories of central and southern Europe.

More diversified is the gnaphosid fauna of the Tyrrhenian faunal province, and the relatively high percentage of species with a prevailing Mediterranean distribution and the presence of many endemic species show the influence that the Mediterranean countries have had in the origin of its fauna.

Regarding the Adriatic faunal province it is possible to say only that further researches may enable us to indicate better its fauna pattern that probably is related to the influence of the adjacent eastern Mediterranean and European territories.

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