

# ON THE CARABID FAUNA OF THE PROVINCE OF GIRONA, NORTHEASTERN SPAIN (INSECTA, COLEOPTERA)

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*On the Carabid fauna of the province of Girona, Northeastern Spain (Insecta, Coleoptera).*— The Carabidae of the province of Girona are listed based on recent collectings. Several of the 328 species now known from the province are firstly recorded. The faunistic components and their distribution is discussed. The province of Girona is inhabited by a rather large number of Central European species, some of which occur nowhere else in the Iberian Peninsula. The Mediterranean faunal component is less prominent, but montane species are comparatively numerous and some rupicolous montane species go far down the river valleys. The varied ecological conditions throughout the province and its position at the northern border of the Peninsula may account for the diverse fauna, since those conditions facilitate the occurrence of northern faunal elements.

Key words: Carabidae, Girona, Spain.

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## INTRODUCTION

In contrast with the Carabids of France and Italy which were well monographed a long time ago, the rich fauna of the Iberian Peninsula is far less well known. No monographic revision nor a thorough faunistic study on the fauna as a whole has been attempted, in spite of the collecting work of many people especially in the last years (see. f.e. JEANNE, 1965-1973). The work of DE LA FUENTE (1918, 1919, 1920, 1921, 1927) is outdated and, as then usual, his faunistic dates are far from being exact, hence it cannot serve as a basis for faunistical studies. There is, however, a rather new and very useful attempt to catalogize the Carabidae of the Iberian Peninsula (JEANNE, 1965, 1966, 1967a, 1967b, 1967c, 1968a, 1968b, 1968c, 1969, 1971a, 1971b, 1971c, 1972a, 1972b, 1980). Nevertheless, it is compiled mostly from the author's own collections and from the works of his colleagues done in Spain and Portugal, without considering (except for the Museu de Zoologia of

Barcelona) museum collections. This work contains many records from the province of Girona, but these are far from giving a real picture of the composition of the fauna of that province.

Investigation of the provinces fauna is especially interesting because of its position at the extreme northeast of the Iberian peninsula and of the very heterogeneous ecological conditions in the province. In the west, the province has high mountains, lower mountains and hilly country in most of the central and western parts, and costal plains and rather different coastal types in the east. Annual rainfall varies from about 2000 mm in the high mountains to about 600 mm or still less near the coast. Vegetation corresponds well to such contrasting geographical and climatic conditions. There are alpine and subalpine flora and mountain forests in the Pyrenees, dense and wet deciduous forests in the lower mountains, low and dry oak woods in the coastal plain and the hilly country of the southern and northeastern parts, and open medi-

terrestrial vegetation near the coast. There are also some wet plains and swampy areas, specially in the plains of the rivers Fluvià and Ter, as well as lakes. The mountains are well furnished with streams and small rivers. Perhaps, there are few other provinces which possess such a multitude of heterogeneous biotas.

## METHODS

During University outings and private journeys, collections were carried out at various places throughout the province and at different seasons. The small village Les Preses near Olot was mostly used as station, from where excursions, as well into the Pyrenees as to the coast were carried out. Most collecting, however, was done in the western and southwestern parts of the province, whereas the eastern coastal plain and low hilly areas were less thoroughly studied. For compensation the material collected by the late Dr. K.W. Harde between 1963 and 1979, located in the Staatliches Museum für Naturkunde, Stuttgart, was examined. Harde collected for a long time at some localities near the coast and in the southeastern parts of the province.

Most collecting work was by hand, in some places also by installation of pitfall traps (exposed just for short time). Some material was also captured at light, especially near the coast at Empúries. No other special collecting methods were carried out, especially no sifting of earth or debris, nor collecting in caves. Hence some special groups, e.g. soil or cave inhabiting species are not considered. Most collecting was done in spring or early summer, none in autumn. Therefore, some species with larval development in summer have been likely not discovered.

## MATERIAL

About 6000 specimens of 288 species have been examined; with exception of the specimens from the Stuttgart Museum, the mate-

rial was caught as follows: May 1964 (W. Rähle, 33 species, mostly from the vicinity of Les Preses and Olot; 26.V.-4.VI.1975 (M. Baehr, W. Bils, E.G. Burmeister, R. Grimm, H. Kopp, 95 species, mostly from western part of the province; 25.VII.-26.VII.1975 (M. Baehr, R. Grimm), 16 species from Olot; 3.VII.-13.VII.1976 (M. Baehr, R. Grimm), 16 species from Olot; 3.VII.-13.VII.1976 (M. Baehr, B. Baehr, E.G. Burmeister, R. Grimm, E. Jansen, W. Löderbusch), 106 species from western part of the province and from the coast; 17.V.-23.V.1977 (M. Baehr, B. Baehr, R. Grimm), 123 species, a large part from the coast near Empúries; 2.VII.-15.VII.1977 (M. Baehr, B. Baehr, R. Grimm, H. Kopp, C. Rieger), 152 species from the whole province including alpine areas in the Pyrenees; 1.VII.-14.VII.1978 (M. Baehr, B. Baehr, E. Jansen, E. Weigel), 155 species from the whole province, including alpine regions; 30.VII.-3.VIII.1980 (E. Weigel), 16 species from Empúries; 10.IV.-13.IV. and 7.V.-9.V.1981 (M. Baehr, B. Baehr), 94 species, mainly from near Les Preses and from the northeast.

Part of the material is located in the working collection of the author, the bulk is in the special Carabid working collection in the Zoologische Staatssammlung München. Some single specimens are kept by the collectors.

## Localities (fig. 1)

Nos. 51-61 refer to captures made by Harde.

1. 2 km S Agullana; 2. 1 km W Viure; 3. 8 km W Besalú; 4. 3 km N Banyoles; 5. 4 km W Banyoles; 6. 2 km E Mieras; 7. Besalú; 8. Argelague; 9. Sant Jaume de Llierca; 10. Castelfollit de la Roca; 11. 1 km E Olot; 12. Sant Miquel del Corb; 13. Les Preses; 14. Sant Privat de Bas; 15. 10 km W Olot, 800 m; 16. 2 km S Vallfogona; 17. Sant Juan de les Abadesses, 800 m; 18. Camprodon, 900 m; 19. Molló, 1600 m; 20. Coll d'Ares, 1600 m; 21. 3 km S Setcases, 1050 m; 22. 2 km S Setcases, 1100 m; 23. 1 km N Setcases, 1200 m; 24. 2 km N Setcases, 1300 m; 25. 3 km N Setcases, 1400 m; 26. 6 km N Setcases, 1800 m; 27. Ull de Ter, 2200-2300 m; 28. 5 km S Ribas de Freser, 800 m; 29. 2 km S Queralbs, 1100 m; 30. Caralps, 1200 m; 31. Núria, 2000-2100 m; 32. Port de Toses, eastern slope, 1400 m; 33. Port de Toses, 1800-1850 m; 34. Port de Toses,

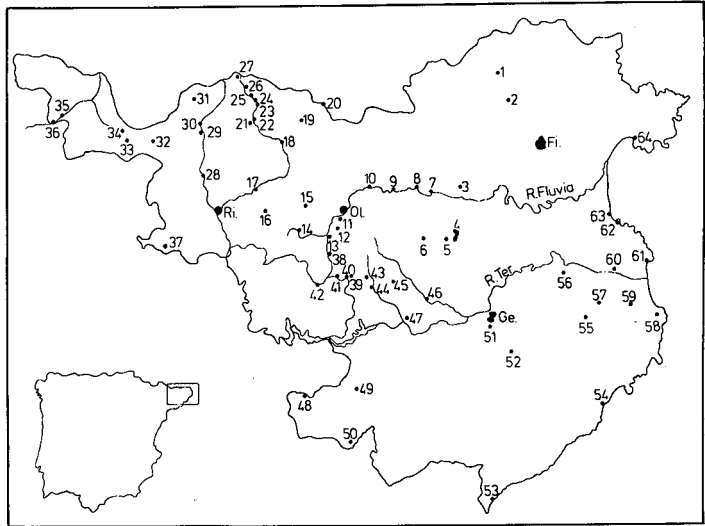


Fig. 1. Collecting localities in the province of Girona.

*Localidades de recolección en la provincia de Girona.*

western slope, 1700-1750 m; 35. 5 km E Bellver de Cerdanya; 36. 3 km E Bellver de Cerdanya; 37. 20 km S Ripoll, 750 m; 38. Sant Esteve de Bas; 39. N.S. de Salut, 1000 m; 40. 2 km W N.S. de Salut, 900 m; 41. Cantonigros, 1000 m; 42. 25 km N Roda de Ter, 850 m; 43. 2 km N Les Planes; 44. Les Planes; 45. Les Ansies, 4 km E Les Planes; 46. 3 km S Sant Martí de Llémna; 47. 2 km SW Amer; 48. 18 km E Sant Joan de Vilatorrada, 800 m; 49. 2 km W Sant Hilari Sacalm, 700 m; 50. Serra de Montseny near Sant Marsal, 1000 m; 51. Girona; 52. Llambilles; 53. Blanes; 54. Platja d'Aro; 55. La Bisbal; 56. La Fosca; 57. Peratallada; 58. Begur; 59. Pals; 60. Torroella de Montgrí; 61. Estarrit; 62. L'Escala; 63. Empúries; 64. Roses.

## RESULTS

Records are based on personally examined specimens. Localities are cited with their numbers (see above and in map). Additional species recorded in the lists of JEANNE (1965-1973, 1980) and VIVES & VIVES (1978, 1981), but not discovered by the author during collecting work, are added, without repeating of localities.

Species are mostly arranged in the same order as in JEANNE (1965, 1966, 1967a, 1967b, 1967c, 1968a, 1968b, 1968c, 1969, 1971a, 1971b, 1971c, 1972a, 1972b), notwithstanding that there are some differences in the generic and suprageneric arrangement, as f.e.

in Pterostichinae and Bembidiinae. Moreover, I do not follow the practice of most french-speaking authors, to treat the traditional subfamilies or even tribes as families, nor I follow the extreme splitting of such well known genera as *Carabus*, *Bembidion*, or *Chlaenius*. Subspecies are only cited, when they are justified without doubt. The species and their distribution in the province Girona are listed in the table. Some rare or remarkable species are subsequently discussed in detail.

## List of species

Species without localities refer to the lists of JEANNE (1965, 1966, 1967a, 1967b, 1967c, 1968a, 1968b, 1968c, 1969, 1971a, 1971b, 1971c, 1972a, 1972b, 1980). Numbers refer to the localities. Species not recorded by Jeanne from the province of Girona are marked by an asterisk (\*).

Cicindelinae	
<i>Cicindela hybrida riparia</i> Latr. *	22
<i>Cicindela campestris</i> L.	14,20,22,24,27, 33,34,63
<i>Cicindela maroccana</i>	
<i>pseudomaroccana</i> Roeschke *	50
<i>Cicindela trisignata</i> Dej. *	63
<i>Cicindela germanica</i> L. *	11,13

<i>Cicindela paludosa</i> Duf. *	14,47	<i>Scarites terricola</i> Bon.	63
<i>Cicindela melancholica</i> F.	63	<i>Scarites buparius</i> Forst.	62,63
<i>Cicindela flexuosa</i> F. *	54,63		
Carabinae		Apotominae	
<i>Calosoma sycophanta</i> L.	13	<i>Apotomus rufus</i> Rossi *	63
<i>Carabus coriaceus</i> L. *	54	Trechinae	
<i>Carabus granulatus</i> L.	12	<i>Perileptus areolatus</i> Creutz. *	2,9,13,46,63
<i>Carabus cancellatus celticus</i> Lap.	13	<i>Thalassophilus longicornis</i> Sturm	17
<i>Carabus convexus pyrenaicola</i> Cs.	21,24,33,34,40	<i>Trechus quadristriatus</i> Schrank *	7,13,14,42,46, 54,63
<i>Carabus nemoralis</i> Müll.	14,20,32,34,39	<i>Trechus obtusus</i> Er.	13,14,34,46,47, 63
<i>Carabus problematicus solidus</i> Lap.	11,14,54	<i>Trechus fulvus</i> Dej. *	63
<i>andorranus</i> Barthe	25,27,33	<i>Trechus pyrenaeus</i> Dej.	
<i>Carabus rutilans</i> Dej.	13,14,39,54	<i>Trechus latebricola</i> Kiesw. *	27
<i>Carabus punctatoauratus</i> Germ.		Bembidiinae	
<i>Carabus pyrenaicus</i> Serv.	27	<i>Microtyphlus zariquieyi</i> Bol.	
<i>Carabus purpurascens mülleri</i> Haury	4,5,13,22,24, 27,31,33,54	<i>Microtyphlus schauvi</i> Saulcy	
		<i>Microtyphlus ganglbaueri</i> Breit	
Cychrinae		<i>Tachys bistratus</i> Duft.	14,42,63
<i>Cychnus caraboides pyrenaicus</i> Kr.		<i>Tachys micros</i> Fisch. *	14
		<i>Tachys scutellaris</i> Steph.	63
Nebriinae		<i>Tachys parvulus</i> Dej.	13,14,27,29,36, 42,46,47
<i>Leistus munganasti</i> Reitt.		<i>Tachys sexstriatus</i> Duft. *	9,13,14,29,35, 36,63
<i>Leistus nitidus</i> Duft. *	24,34	<i>Tachys inaequalis</i> Kol. *	9,47,63
<i>Eurynebria complanata</i> L.	61	<i>Sphaerotachys haemorrhoidalis</i> Dej. *	63
<i>Nebria brevicollis</i> F.	11,13,14	<i>Porotachys bisulcatus</i> Nic. *	13,14
<i>Nebria salina</i> Fairm.	4,42,54	<i>Asaphidion flavipes</i> L.	13,14,61,63
<i>Nebria lafresnayei</i> Serv.	27	<i>Asaphidion stierlini</i> Heyd.	13,46,63
<i>Nebria picicornis</i> F.	17,21,48	<i>Asaphidion rossii</i> Schaum	63
<i>Nebria jockischi</i> Sturm	14,27,37	<i>Bembidion varium</i> Oliv.	14,44
		<i>Bembidion minimum</i> F.	
Notiophilinae		<i>Bembidion rivulare</i> Dej. *	63
<i>Notiophilus pusillus</i> Waterh. *	27,34	<i>Bembidion normannum</i> Dej.	63
<i>Notiophilus rufipes</i> Curtis	39,50	<i>Bembidion tenellum transversum</i>	
<i>Notiophilus biguttatus</i> F.	25,27,33,34	Müll. *	63
<i>Notiophilus substriatus</i> Waterh. *	13	<i>Bembidion aspericolle</i> Germ.	63
		<i>Bembidion assimile</i> Gyllh. *	63
Lorocerinae		<i>Bembidion octomaculatum</i> Gze.	
<i>Lorocera pilicornis</i> F.	21	<i>Bembidion articulatum</i> Panz.	4,13,14,34,43, 46
		<i>Bembidion biguttatum</i> F. *	13
Elaphrinae		<i>Bembidion lunulatum</i> Fourc.	63
<i>Elaphrus pyrenaicus</i> Fairm. *	20	<i>Bembidion iricolor</i> Bed.	4,63
		<i>Bembidion guttula</i> F.	
Omoproninae		<i>Bembidion unicolor</i> Chaud.	26
<i>Omopron limbatum</i> F. *	17,46	<i>Bembidion quadripustulatum</i> Serv.	63
		<i>Bembidion quadrimaculatum</i> L. *	9,13,14,28
Scaritinae		<i>Bembidion punctulatum</i> Drap.	2,9,44,46,63
<i>Clivina fossor</i> L. *	21,63	<i>Bembidion bipunctatum</i> F. *	27
<i>Clivina contracta</i> Fourc.	4,11,12,13,14, 42,61	<i>Bembidion atrocoeruleum</i> Steph.	9,10,17,18,21, 22,24,25,28, 29,35,36,46
<i>Reicheia lucifuga</i> Saulcy		<i>Bembidion coeruleum</i> Serv.	9,13,46,63
<i>Dyschirius rugicollis</i> Fairm. *	63	<i>Bembidion egyptium</i> Dan.	2,7,9,10,17, 18,21,22,24,
<i>Dyschirius salinus</i> Schaum *	63		
<i>Dyschirius chalybaeus</i> Putz.	63		
<i>Dyschirius aeneus</i> Dej.	4		
<i>Dyschirius apicalis</i> Putz.	63		
<i>Dyschirius globosus</i> Herbst *	63		
<i>Dyschirius importunus</i> Schaum *	63		
<i>Scarites laevigatus</i> F. *	61		

	29,36,43		
<i>Bembidion tibiale</i> Duft.	13,14,17,18,21, 22,24,25,28, 29,31,34,35, 36,37,65		<i>Poecilus cupreus</i> L. * 1,4,6,11,12,13, 14,15,21,30, 39,40,41,42, 46,49,55,61,63
<i>Bembidion geniculatum</i> Heer	31,34		<i>Poecilus versicolor</i> Sturm * 14,21,22
<i>Bembidion complanatum</i> Heer *	25,31		<i>Poecilus cursorius</i> Dej. * 2
<i>Bembidion longipes</i> Dan. *	25		<i>Poecilus kugelanni</i> Panz. * 3,6,11,14,20, 33,40,42,45, 47,54,61,63
<i>Bembidion monticola</i> Sturm	14,17		
<i>Bembidion siculum winkleri</i> Net.			<i>Poecilus koyi</i> Germ.
<i>Bembidion decorum</i> Zenk.	9,10,13,14,17, 18,44,46,63		<i>Poecilus purpurascens</i> Dej. * 47
			<i>Poecilus puncticollis</i> Dej.
<i>Bembidion ripicola</i> Duf.	35		<i>Orthomus planidorsis</i> Fairm.
<i>Bembidion tetracolum</i> Say	9,10,12,13,17, 18,21,23,25, 28,29,31,35, 36,46,61,63		<i>Pterostichus vernalis</i> Panz. * 4,13,14,21,24, 29,61
			<i>Pterostichus cursor</i> Dej. * 63
<i>Bembidion andreae bualei</i> Duv.	7,9,17,21,22, 23,24,25,28, 29,31,35,36,44		<i>Pterostichus strenuus</i> Panz. * 22,23,24,27,46
			<i>Pterostichus aterrimus nigerrimus</i> Dej. * 2,46
<i>Bembidion dudichi</i> Cs.	12,13,14,17,28, 37,42,44,46,47		<i>Pterostichus nigrinus</i> Payk. 2,4,12,13,14, 16,17,21,22,28 42,43,46,48,61
<i>Bembidion maroccanum</i> Ant.			<i>Pterostichus niger</i> Schall. 13
<i>Bembidion nitidulum</i> Marsh	13,14,20,23,33, 34,39,54		<i>Pterostichus melanarius</i> Ill. 11,12,13,14
			<i>Pterostichus madidus</i> F. * 20,33
<i>Bembidion pyrenaicum</i> Dej.	27,31		<i>Pterostichus ferreri</i> Esp. & Mat.
<i>Bembidion jeanneli</i> Dew.			<i>Pterostichus xatarti</i> Dej. * 34
<i>Bembidion hypocrita</i> Dej.	13,14,39,42		<i>Pterostichus cristatus</i> Duf. 8,13,14,15,17, 20,22,23,25, 26,27,29,31, 32,33,34,37, 38,39,46,50,54
<i>Bembidion callosum</i> Küst.	13,14,29,34,46		<i>Haptoderus pumilio</i> Dej. 26,27,33,34
<i>Bembidion genei</i> Küst.	12,13,14,17,37, 46		<i>Haptoderus amaroides</i> Dej. 27,31,33,34
			<i>Haptoderus infimus</i> Chaud. 27
<i>Bembidion cribrum</i> Duv. *	46,61		<i>Haptoderus glacialis</i> Chaud. 27
<i>Bembidion dahli</i> Dej.	44,46,61,63		<i>Zariquieya troglodytes</i> Jeann.
<i>Bembidion ruficorne</i> Sturm	21,28,29		<i>Abax pyrenaicus</i> Dej. 11,13,14,15,17, 20,21,22,23, 24,25,33,34, 39,48,50
<i>Bembidion stomoides</i> Dej.	16,21,24,25,28, 29,31,34		<i>Percus patruelis navaricus</i> Dej. 5,62,63,64
			<i>Molopidius spinicollis</i> Dej. 14
<i>Bembidion elongatum</i> Dej.	10,13		<i>Synychus nivalis</i> Panz. 21,33,34
<i>Bembidion ambiguum</i> Dej. *	63		<i>Platyderus ruficollis</i> Marsh. 11,13,14,17,39, 39,46,47,50
<i>Bembidion properans</i> Steph.	4,11,12,13,14, 30,34,42,46,47		<i>Calathus ambiguus</i> Payk. * 36
			<i>Calathus erratus</i> Sahlb. 21,22,23,24,25 27,29
<i>Bembidion lampros</i> Herbst	14,20,30,33,34, 37		<i>Calathus circumseptus</i> Germ. * 11,46,54,63
<i>Bembidion obtusum</i> Serv. *	42,63		<i>Calathus mollis</i> Marsh. * 11,61,63
<i>Ocys harpaloides</i> Serv. *	11,14,16		<i>Calathus melanocephalus</i> L. 7,11,20,21,22, 23,24,25,27, 31,33,34,46, 54,63
			<i>Calathus fuscipes intermedius</i> Gaut. 1,11,12,13,14, 16,20,21,33, 46,54,63
Pogoninae			<i>Calathus luctuosus</i> Latr. 33,34
<i>Pogonus riparius</i> Dej. *	63		<i>Dolichus halensis</i> Schall. 63
<i>Pogonus chalceus</i> Marsh.	61,63		
<i>Pogonus littoralis</i> Duft.	63		
<i>Pogonus gilvipes</i> Dej.	61		
<i>Pogonus meridionalis</i> Dej.	63		
Patrobiniae			
<i>Penetretus rufipennis</i> Dej. *	46,55		
Pterostichinae			
<i>Abacetus salzmanni</i> Germ.	2,7,8,13,14,35, 36,46,61,63		
<i>Stomis pumicatus</i> Panz. *	63		
<i>Poecilus laevigatus</i> Duf.	62		

<i>Sphodrus leucophthalmus</i> L. *	13	<i>Amara consularis</i> Duft.	63
<i>Pristonychus terricola reichenbachi</i> Schauf.	11,13,14,16,46,48,54	<i>Amara apricaria</i> Payk.	36
<i>Ceuthosphodrus oblongus</i> Dej.	14,19,20,22,24,25,33,39	<i>Amara aulica</i> Panz.	13,21,24,33,34
<b>Agoninae</b>		<b>Zabrinae</b>	
<i>Cardiamera genei</i> Bassi		<i>Zanus tenebrioides</i> Gze.	63
<i>Platynus dorsalis</i> Pont.	1,5,11,12,13,14,15,17,20,21,30,38,41,42,45,46,47,48,49,54,61,63	<i>Zabrus curtus pyrenaicus</i> Fairm.	33
<i>Platynus cyaneus</i> Dej.	21,22,28,29	<b>Harpalinae</b>	
<i>Platynus ruficornis</i> Gze.	2,10,13,14,17,20,21,29,41,42,43,44,46,54,61,63	<i>Scybalicus oblongiusculus</i> Dej.	13
<i>Platynus assimilis</i> Payk. *	28	<i>Gynandromorphus etruscus</i> Quens.	63
<i>Agonum viridicupreum</i> Gze.		<i>Diachromus germanus</i> L.	4,12,13,14,42
<i>Agonum sexpunctatum</i> L.	34	<i>Anisodactylus binotatus</i> F.	2,11,12,13,14,16,17,30,42,46,48,49,54,61,63
<i>Agonum mülleri</i> Herbst	4,10,11,12,13,14,21,30,31,34,42,49	<i>Anisodactylus signatus</i> Panz. *	13,14,42
<i>Agonum lugens</i> Duft. *	63	<i>Anisodactylus intermedius</i> Dej.	54,61,63
<i>Agonum viduum</i> Panz.		<i>Anisodactylus virens</i> Dej.	54,61,63
<i>Agonum moestum</i> Duft. *	2,63	<i>Carterus fulvipes</i> Latr.	
<i>Agonum marginatum</i> L.	54	<i>Ditomus capito</i> Serv.	
<i>Agonum nigrum</i> Dej.		<i>Ditomus clypeatus</i> Rossi	9,13,46,47
<i>Odontonyx fuscatus</i> Dej. *	5,46,54,63	<i>Ditomus sphaerocephalus</i> Oliv.	54,60,61,62,63
<i>Odontonyx elongatus</i> Woll.	63	<i>Metophonus cordatus</i> Duft.	27
<b>Amarinae</b>		<i>Metophonus puncticeps</i> Steph.	9,11,13,14,61,63
<i>Amara fulvipes</i> Serv.		<i>Metophonus zigzag</i> Costa *	13
<i>Amara similata</i> Gyllh.	6,12,13,14,28,31,34	<i>Metophonus incisus</i> Dej.	54,56
<i>Amara ovata</i> F.	13,14,42,63	<i>Metophonus schaubergianus</i> Puel	42
<i>Amara eurynota</i> Panz.	13,21,24,63	<i>Metophonus brevicollis</i> Serv.	46
<i>Amara nitida</i> Sturm		<i>Metophonus cribricollis</i> Dej.	46
<i>Amara lucida</i> Duft.	11	<i>Metophonus azureus</i> F.	11,13,14,42,47
<i>Amara familiaris</i> Duft.	11,14,34,42,46,49	<i>Metophonus subquadratus</i> Dej.	63
<i>Amara convexior</i> Steph. *	14,20,42	<i>Ophonus diffinis</i> Dej. *	14,47,63
<i>Amara communis</i> Panz.	34,48	<i>Ophonus rotundicollis</i> Fairm.	13,14,63
<i>Amara lunicollis</i> Schiödte		<i>Ophonus opacus</i> Dej.	63
<i>Amara curta</i> Dej.	24,25,27,33,34	<i>Pseudophonus rufipes</i> Dej.	5,9,11,12,13,14,33,34,46,54,60,63
<i>Amara aenea</i> Dej.	1,2,6,7,9,11,12,13,14,30,33,34,46,61,63	<i>Pseudophonus griseus</i> Panz.	4,11,12,13,14,54,63
<i>Amara erratica</i> Duft.	24,31	<i>Semiophonus signaticornis</i> Duft. *	46
<i>Amara fusca</i> Dej.		<i>Harpalus dispar</i> Dej.	63
<i>Amara ingenua</i> Duft.	63	<i>Harpalus aeneus</i> F.	6,9,11,12,13,14,20,25,33,34,36,38,54
<i>Amara bifrons</i> Gyllh.	33,34	<i>Harpalus distinguendus</i> Duft.	4,7,9,11,12,13,34,40,41,42,46,54,58,61,63
<i>Amara montana</i> Dej.		<i>Harpalus smaragdinus</i> Duft.	11,34,63
<i>Amara meridionalis</i> Putz.		<i>Harpalus cupreus</i> Dej. *	14,63
<i>Amara eximina</i> Dej.		<i>Harpalus dimidiatus</i> Rossi	1,4,11,13,14,46,47,49,54,61
<i>Amara puncticollis</i> Dej.		<i>Harpalus attenuatus</i> Steph.	11,13,14,46,54,61,62,63
<i>Amara cursitans</i> Zimm. *	20	<i>Harpalus tenebrosus</i> Dej.	9,11,13,15,47,54,63
<i>Amara equestris</i> Duft.		<i>Harpalus rubripes</i> Duft.	1,9,11,12,13,14,20,21,25,33,45,46,47,
<i>Amara fulva</i> Dej.	63		

	54,61,63		14,17,21,22, 28,43,46,54, 55,61
<i>Harpalus latus</i> L.	24		
<i>Harpalus atratus</i> Latr.	11,14,21,30,54		
<i>Harpalus sulphuripes</i> Germ.	11,45,54	<i>Chlaenius variegatus</i> Fourc. *	4
<i>Harpalus honestus</i> Duft.	1,2,7,9,11,13, 14,20,21,22, 23,24,25,27, 29,30,33,34, 46,48,53,54, 56,60	<i>Chlaenius tibialis</i> Dej.	2,4,12,13,17, 18,21,46
		<i>Chlaenius nigricornis</i> F.	4,13,14
<i>Harpalus rufitarsis</i> Duft. *	33	<i>Chlaenius decipiens</i> Duf.	5
<i>Harpalus neglectus</i> Serv.	61,62,63	<i>Oodes gracilis</i> Villa	63
<i>Harpalus reichei</i> Jac. *	63		
<i>Harpalus anxius subcylindricus</i> Dej.	46,54,63	<b>Lebiinae</b>	
<i>Harpalus tardus</i> Panz.	11,13,14,24,34, 46,54,61	<i>Lebia cyanocephala</i> L.	52
<i>Harpalus serripes</i> Quens.	1,9,11,13,42, 46,61,63	<i>Lebia rufipes</i> Dej.	
<i>Acinopus picipes</i> Oliv.	47,56	<i>Lebia crux-minor</i> L.	33
<i>Parophonus hirsutulus</i> Dej. *	61,63	<i>Lebia scapularis</i> Fourc. *	14
<i>Parophonus maculicornis</i> Duft.	11,12,13,14,42, 46,61,63	<i>Cymindis vaporariorum</i> L.	27
<i>Dichrotrichus obsoletus</i> Dej.	63	<i>Cymindis scapularis</i> Schaum	20,50
<i>Bradycellus lusitanicus</i> Dej. *	54,61,63	<i>Cymindis limbatella</i> Chaud.	25
<i>Bradycellus distinctus</i> Dej. *	63	<i>Cymindis melanocephala</i> Dej.	25,27,33,34
<i>Bradycellus verbasci</i> Duft.	11,13,46,63	<i>Cymindis humeralis</i> Fourc.	27
<i>Acupalpus meridianus</i> L. *	13,42	<i>Cymindis axillaris</i> F.	11
<i>Acupalpus elegans</i> Dej. *	63	<i>Cymindis lineola</i> Duf.	62,64
<i>Acupalpus dorsalis</i> F.	63	<i>Trymosternus onychinus</i> Dej.	
<i>Acupalpus maculatus</i> Schaum *	14,61,63	<i>Demetrias atricapillus</i> L.	54
<i>Acupalpus notatus</i> Muls. *	13,14,46,54,63	<i>Dromius linearis</i> Oliv.	14,46
<i>Anthracus consputus</i> Duft. *	63	<i>Dromius agilis</i> F.	
<i>Egadroma marginatum</i> Dej. *	63	<i>Dromius meridionalis</i> Dej.	
<i>Stenolophus skrimshireanus</i> Steph. *	12,13,61,63	<i>Dromius quadrimaculatus</i> L.	23
<i>Stenolophus teutonius</i> Schrank	4,7,12,23,24, 27,44,46,54, 61,63	<i>Dromius melanocephala</i> Dej. *	63
		<i>Metabletus obscuroguttatus</i> Duft. *	63
<i>Stenolophus abdominalis</i> Gené *	61,63	<i>Metabletus truncatellus</i> L.	
<i>Stenolophus mixtus</i> Herbst	63	<i>Metabletus foveatus</i> Fourc.	1,2,11,14,30, 34,46,61,63
<i>Stenolophus proximus</i> Dej. *	63	<i>Microlestes corticalis</i> Duf. *	63
		<i>Microlestes maurus</i> Sturm *	11
<b>Amblystominae</b>		<i>Microlestes luctuosus</i> Holdh.	36,63
<i>Amblystomus niger</i> Heer	61,63	<i>Microlestes gallicus</i> Holdh.	39
		<i>Microlestes minutulus</i> Gze.	11,14,34
<b>Licininae</b>		<i>Microlestes negrita</i> Woll. *	5,11,42,61,63
<i>Licinus punctatulus granulatus</i> Dej.	57,59,61,63	<i>Microlestes abellei</i> Bris. *	14,47
<i>Licinus aequatus</i> Serv.	13,14,47	<i>Apristus europaeus</i> Mat. *	42,45
<i>Badister bipustulatus</i> F.	13	<i>Lionychus quadrillum</i> Duft.	22,29,36
<i>Badister meridionalis</i> Puel *	46,63		
		<b>Dryptinae</b>	
<b>Panagaeninae</b>		<i>Drypta dentata</i> Rossi	46
<i>Panagaeus crux-maior</i> L.	13,63		
		<b>Brachininae</b>	
<b>Chlaeniinae</b>		<i>Aptinus displosor</i> Duf.	61,62
<i>Callistus lunatus</i> F.	5,12,13,14,42	<i>Aptinus pyrenaeus</i> Dej.	13,14,20,23,25, 30,48
<i>Chlaenius velutinus</i> Duft. *	2,14,46,47,54, 55	<i>Brachinus crepitans</i> L.	7,12,13,47,63
<i>Chlaenius spoliatus</i> Rossi	61	<i>Brachinus ganglbaueri</i> Apf. *	63
<i>Chlaenius vestitus</i> Payk.	2,9,10,11,13,	<i>Brachinus plagiatus</i> Rche.	63
		<i>Brachinus explodens</i> Duft.	1,11,13,14,30, 41,42,47,48
		<i>Brachinus variiventris</i> Schauf.	40,46,47,54,62
		<i>Brachinus sclopetia</i> F. *	5,6,7,11,13,14, 38,42,46,51, 54,61,63

## Remarkable species

### *Cicindela melancholica* F.

Rare species, firstly noted from province Girona by VIVES & VIVES (1978).

### *Cicindela maroccana pseudomaroccana* Roeschke

First record from province Girona, also northernmost record of this species which was recorded from the part of the Massís del Montseny which belongs to province Barcelona.

### *Carabus coriaceus* L.

One specimen, labelled "Playa de Ara", collected by Harde. If there was no confusion of locality, this would be the first record of this species from the peninsula. The small specimen would go with *excavatus* Charp. However, this record is rather doubtful and should be confirmed.

### *Carabus granulatus* L.

Northern species, only recorded from the vicinity of Olot and the valley of river Fluvià. No other record from the peninsula known.

### *Leistus nitidus* Duft.

Species recorded thus far from central Pyrenees. It reaches just to the westernmost parts of the province.

### *Notiophilus pusillus* Waterh.

According to JEANNE (1965-1973) recorded from two localities in central Pyrenees and from the province Barcelona. Rare species.

### *Notiophilus substriatus* Waterh.

Rare species of wet places and swampy areas.

### *Omophron limbatum* F.

Rare and scattered, perhaps due to its aberrant habits and the special catching methods required.

### *Dyschirius globosus* Herbst

Northern species, cited by DE LA FUENTE (1918-21) for Catalonia. Apparently no recent record from Spain available.

### *Trechus fulvus* Dej.

According to JEANNE (1967) only recorded from the northwest or as cave dwelling or subterranean species. However, JEANNEL (1941) recorded the species from Banyuls.

### *Tachys micros* Fisch.

Cited by DE LA FUENTE (1918-21) from southern Spain. Perhaps first true record from the

peninsula.

### *Bembidion tenellum transversum* Müll.

Apparently first record from the peninsula, perhaps not recognized before.

### *Bembidion assimile* Gyllh.

Rare species everywhere.

### *Bembidion biguttatum* F.

Northern species, rare in Spain, distribution unknown.

### *Bembidion complanatum* Heer

Rare northern species thus far recorded from central Pyrenees. One of the central Pyrenean species which penetrate just into the westernmost parts of the province Girona.

### *Bembidion longipes* Dan.

Very rare species, also known only from central Pyrenees.

### *Bembidion monticola* Sturm

Rare species, preferring damp places as for example small waterfalls.

### *Bembidion cribrum* Duv.

Rare species with scattered distribution.

### *Bembidion obtusum* Serv.

Only few scattered records available throughout the peninsula.

### *Poecilus laevigatus* Duf.

Species from northeastern Spain, always rare.

### *Poecilus cursorius* Dej.

Rare species, distribution in Spain virtually unknown.

### *Pterostichus cursor* Dej.

Halophile species recorded from Balears (DE LA FUENTE, 1918-21) and, just recently, from the mainland (JEANNE, 1980).

### *Pterostichus melanarius* Ill.

Northern species, so far known only from the vicinity of Olot (VIVES & VIVES, 1978), where it is rather common.

### *Molopidius spinicollis* Dej.

Very rare, subterranean species which was lost for about 100 years since description. Some records are from last 30 years.

### *Dolichus halensis* Schall.

Very rare species, some scattered records given by VIVES & VIVES (1981).

### *Agonum lugens* Duft.

Rare species with scattered distribution.

### *Amara convexior* Steph.



Northern species, firstly recorded from the peninsula by JEANNE (1968).

*Amara cursitans* Zimm.

Rare northern species, cited by DE LA FUENTE (1918-21), recently recorded from the provinces of Huesca and Barcelona (JEANNE in litt.).

*Anisodactylus signatus* Panz.

Northern species, only cited by DE LA FUENTE (1918-21).

*Metophonus zigzag* Costa

Rare species, whose distribution is almost unknown. JEANNE (1971) did not distinguish it from *M. melleti* Heer. From my view *M. zigzag* is a separate species or at least a well defined subspecies of *M. melleti*.

*Metophonus cribricollis* Dej.

A rare species of eastern origin.

*Ophonus diffinis* Dej.

Apparently a rare species in Spain, distribution rather unsettled.

*Semiophonus signaticornis* Duft.

An eastern species, very rare in the Iberian peninsula.

*Harpalus cupreus* Dej.

Rare species with scattered distribution in northern Spain.

*Harpalus rufitarsis* Duft.

A montane species, recorded from central and western Pyrenees. It reaches just the westernmost parts of the province.

*Parophonus hirsutulus* Dej.

According to JEANNE (1971) very rare and sporadic.

*Anthracus consputus* Duft.

Rare species, firstly recorded by VIVES (1976) from extreme southern Spain.

*Stenolophus skrimshireanus* Steph.

Rare species everywhere.

*Oodes gracilis* Villa

Cited by DE LA FUENTE (1918-21) from province Girona, also discovered by JEANNE (in litt.).

*Badister meridionalis* Puel

Apparently rare or partly mistaken for *B. bipustulatus* F.

*Microlestes maurus* Sturm

Northern species, rare in the peninsula.

*Apristus europaeus* Mat.

Rare species everywhere.

## DISCUSSION

The species recorded from the province of Girona altogether total well over 1/3 of the whole Iberian Carabid fauna. This large number is certainly due to the variety of habitats in the province which makes the fauna one of the richest and most diverse of the whole peninsula.

The Carabid fauna of this province can be roughly divided into eight components:

1. Species distributed over the whole mediterranean region. Mostly rather polythermophilous and xerophilous species.
2. West-mediterranean species, partly endemic to the peninsula. Most rather stenothermophilous or xerophilous, normally not transgressing the zone of the olive-tree.
3. Species of the mediterranean littoral. Sand living or halophile species.
4. Alpine or montane species of central and southern Europe. To a large extent rupicolous.
5. Endemic species of the Pyrenees. Mostly alpine or subalpine species.
6. Endemic species of Catalonia. To a large extent subterranean.
7. Central European species, most rather cool-adapted species which penetrate just into northeastern Spain and live there in rather wet and cool habitats.
8. All-European species or ubiquitous.

These faunal components naturally occupy different habitat types and thus, they are heterogeneously distributed over the province. Generally, the cool preferent northern species occur in the northern, mountaneous part, whereas the mediterranean components are rich in the southern parts and along the coast. But this general pattern is interrupted in some areas. One example is the mountaneous outlayer of the Massís del Montseny at the southern border of the province, where some northern species occur together with a mediterranean fauna. Another remarkable example is the mountain surrounded plain near Olot, where especially many northern species occur, some of them living nowhere else in the peninsula.

A short account of the different faunal components shall illustrate the pattern of faunal distribution:

1. Mediterranean species are naturally richest in the warmer and drier areas along the southeastern border of the province and near the coast. But such species occur also in all other parts with exception of the high areas of the Pyrenees. Their number is apparently low also in areas with high rainfall.
2. Xerophilous and thermophilous west-mediterranean species occur only in the southern part adjacent to the province Barcelona and near the coast, and they are mostly restricted to mediterranean types of vegetation on dry ground, especially on sandstone country and on clayish soils in areas where the olivetree grows.
3. Littoral and halophile species occur only at the very coast, in sand dunes and in the large swampy areas at the mouths of the Fluvià and Ter rivers.
4. Alpine and montane species live naturally in the main chain of the Pyrenees, but they go rather far down in the valleys of the rivers Ter and Freser. More eurybiotic species occur also in the lower reaches of these rivers as well as of the Fluvià. Some are mountain-living species in the Iberian peninsula, whereas they are not in Central Europe (e.g. *Harpalus latus*, *Amara bifrons*).
5. Endemites of the Pyrenees occur mostly in the high zones above 1800 m, but some live especially in the densely forested regions further down.
6. Endemites of Catalonia are mostly subterranean species of the lower mountains and hills.
7. Cool adapted Central European species live only in rather wet areas, in swamps and wet meadows, especially in the lowlands of the upper river Fluvià.
8. Ubiquists occur in all parts of the province, but they are less well represented in the high mountains and in the areas with extreme mediterranean climate and vegetation.

Hence, the faunal composition of the province of Girona is distinguished from that of most other parts of the peninsula by the following features: the number of mediterranean species is comparatively low specially with regard to western mediterranean and endemic species; montane or alpine species which occur also in the mountains of Central Europe, are rather numerous; the number of endemic montane species of the Pyrenees, however, is rather low, because few of these species actually penetrate into the province; species which do, reach to the westernmost parts; special to the province is the relatively high percentage of species endemic to Catalonia and, the occurrence of some Central European species nowhere else occurring in the Iberian peninsula.

As a summary, it seems evident, that due to the highly varied character of the province, with respect to geology, geography, climate, and vegetation, there is apparently space for a great variety of faunal components. Due to the position of the province at the northern border of the peninsula and to the low altitude of the Pyrenees in most parts of the province, in the past it was a most appropriate way for immigration of northern faunal elements into the Iberian peninsula. However, just few species were able to immigrate further down the peninsula, perhaps because in most other regions ecological conditions become drastically different and far less suitable to such northern species.

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## RESUMEN

*Carábidos (Insecta, Coleoptera) de la provincia de Gerona.*—Se citan 328 especies de carábidos de la provincia de Gerona, partiendo del material recolectado y de la bibliografía existente. Para muchas especies, constituye éste el primer registro en la provincia de Gerona, y para otras incluso en la Península Ibérica.

Se discuten la composición de la fauna de la provincia de Gerona, así como sus requerimientos ecológicos y su dispersión. Se encuentran en Gerona numerosos elementos faunísticos norteños; las especies mediterráneas son menos abundantes que las montañas o las alpinas; algunas especies montañas i rupícolas descienden de un modo notable por los valles fluviales.

Las diversas condiciones ecológicas de la provincia, su situación en el límite norte de la Península Ibérica y la relativa poca altitud de los Pirineos pueden justificar la composición de la población de carábidos, ya que tales condiciones favorecen la inmigración de especies provenientes del norte.

## ZUSAMMENFASSUNG

Die Laufkäfer der Provinz Girona werden aufgelistet. Auf Grund des gesammelten Materialen und der vorliegenden Literaturangaben sind nun 328 Laufkäferarten aus der Provinz Girona sicher nachgewiesen. Mehrere Arten werden erstmalig für die Provinz Girona genannt und einige Arten werden vermutlich erstmals für die Iberische Halbinsel nachgewiesen. Die Zusammensetzung der Fauna, die ökologischen Ansprüche ihrer Komponenten und deren Veröreitung in der Provinz Girona wird diskutiert. Es kommen zahlreiche nördliche Faunenelemente in der Provinz vor, manche von ihnen nur hier. Die mediterranen Faunenelemente sind weniger prominent, dafür sind montane und alpine Arten ziemlich reich vertreten. Manche montane, ripicole Arten gehen außerdem sehr weit in die Flußtäler hinunter. Die sehr verschiedenartigen ökologischen Verhältnisse in der Provinz, ihre Grenzlage am Nordrand der Iberischen Halbinsel und die meist relativ geringe Höhe der Pyrenäen sind wohl für die diverse Fauna verantwortlich, insbesondere, weil diese Bedingungen die Einwanderung nördlicher Arten begünstigten.

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