

Preliminary survey of the butterflies of Sierra de Gredos (Central Spain) (Lep. : Hesperioidea et Papilionoidea)

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Introduction and area description

The Sierra de Gredos is located in the Sistema Central, a mountain range which extends in a southwest-northeast direction, through the centre of the Iberian Peninsula. The Central portion of the Sierra de Gredos is about 60 km long, from Puerto del Pico (eastern limit) to Puerto de Tornavacas (western limit), being 20-30 km wide. This mountainous area rises from a flat region which is 800 m in altitude northwards and 500 m southwards; the peaks themselves reach more than 2,500 m in their uppermost zones (Pico Almanzor, 2,592 m). Lithologically, Sierra de Gredos is composed of granitic rocks, mainly in the upper zones, resulting in acid soils. Both slopes are geomorphologically different; the southern slope descends abruptly from the ridge to the southern plateau in some hundreds of metres, while the northern slope decreases smoothly and is several kilometres long.

Both slopes have therefore different climatic features. The southern slope has milder weather conditions, while the northern slope is colder, with longer, more severe winters and short cool summers. The southern slope has short winters with virtually no frosts and longer, hotter summers.

Vegetation ranges from an evergreen forest of *Quercus ilex* at low altitudes, to a grassland of *Festuca indigesta*, at the highest altitudes; oak forests of *Quercus pyrenaica* and shrubs of broom (*Cytisus purgans*) occur in between (RIVAS MARTINEZ, 1975).

The lower zones of the southern slope are suitable for agriculture and grazing, and there are orchards of cherry trees, chestnuts, walnuts, etc.; there are also herds, mainly of goats and sheep. On the northern slope there are low pastures and a few orchards.

Most of this area is given over to forestry, with pinewoods of *Pinus pinaster* on the southern slope, and *Pinus sylvestris* on the northern one. Some of these forests are 500 years old.

In spite of its proximity to Madrid (150 km from the nearest point), Sierra de Gredos has not been thoroughly surveyed from the Lepidoptera point of view, this being mainly due to the very poor network of roads.

Table I

Species abundance on both Sierra de Gredos slopes (sites above, 1,300 m have been considered in northern slope)

	N	S		N	S
PAPILIONIDAE			<i>Pandoriana pandora</i>	++	+++
<i>Papilio machaon</i>		++	<i>Argynnis paphia</i>	++	++
<i>Iphiclidides podalirius</i>		+	<i>Fabriciana adippe</i>	++	++
<i>Zerynthia rumina</i>	+	+++	<i>Fabriciana niobe</i>	++	+++
PIERIDAE			<i>Issoria lathonia</i>	+++	+++
<i>Aporia crataegi</i>	+		<i>Brenthis daphne</i>	+	+
<i>Pieris brassicae</i>		+	<i>Clossiana selene</i>	+++	
<i>Pieris rapae</i>	++	+++	<i>Mesoacidalia aglaja</i>	++	+
<i>Pieris napi</i>	++	+++	<i>Melitaea phoebe</i>	+	+++
<i>Pontia daplidice</i>	+	+++	<i>Melitaea didyma</i>		+++
<i>Euchloe ausonia</i>	+	+	<i>Melitaea trivialis</i>	+	+
<i>Anthocharis cardamines</i>	+	++	<i>Melitaea athalia</i>	+	+
<i>Anthocharis belia</i>	+	++	<i>Melitaea deione</i>	+	+
<i>Colias croceus</i>	+++	+++	<i>Melitaea parthenoides</i>	+++	+
<i>Gonepteryx rhamni</i>	++	++	<i>Melitaea cinxia</i>	++	++
<i>Gonepteryx cleopatra</i>		+	<i>Euphydryas aurinia</i>		+++
<i>Leptidea sinapis</i>	+	+++	LIBYTHEIDAE		
LYCAENIDAE			<i>Libythea celtis</i>		+
<i>Quercusia quercus</i>	+	++	SATYRIDAE		
<i>Laeosopis roboris</i>	++	+	<i>Melanargia lachesis</i>	+++	+++
<i>Nordmannia ilicis</i>	+		<i>Melanargia russiae</i>	++	
<i>Nordmannia esculi</i>	+	+	<i>Melanargia ines</i>		+
<i>Strymonidia spini</i>	++		<i>Hipparchia alcyone</i>	++	+++
<i>Callophrys rubi</i>		+	<i>Hipparchia semele</i>	+	+
<i>Lycaena phlaeas</i>	+++	+++	<i>Hipparchia stailinus</i>	+	++
<i>Heodes virgaureae</i>	++		<i>Pseudotergumia fidia</i>	+	+
<i>Heodes tityrus</i>	+	+	<i>Satyrus actaea</i>	+++	++
<i>Heodes alciphron</i>	+++	+	<i>Brintesia circe</i>	++	+
<i>Lampides boeticus</i>	+	+	<i>Arethusana arethusia</i>	++	+
<i>Syntarucus pirthous</i>	++	+	<i>Erebia meolans</i>	++	
<i>Zizeeria knysna</i>		+	<i>Maniola jurtina</i>	+	+++
<i>Cupido minimus</i>	+		<i>Hyponphele lupina</i>	++	+
<i>Celastrina argiolus</i>	+	+++	<i>Pyronia tithonus</i>	+++	+++
<i>Glaucopsyche alexis</i>	+	++	<i>Pyronia cecilia</i>		++
<i>Aricia cramera</i>	+++	+++	<i>Pyronia bathseba</i>	+	++
<i>Aricia morronensis</i>	+++		<i>Coenonympha pamphilus</i>	++	++
<i>Eumedonia eumedon</i>	++		<i>Coenonympha iphioides</i>	+++	
<i>Cyaniris semiargus</i>	+++		<i>Coenonympha arcania</i>	+	
<i>Lysandra bellargus</i>		+	<i>Pararge aegeria</i>	++	+++
<i>Lysandra albicans</i>	+		<i>Lasiommata megera</i>	+++	+++
<i>Philotes panoptes</i>		+	<i>Lasiommata maera</i>	++	
<i>Polyommatus icarus</i>	++	++	HESPERIIDAE		
NYMPHALIDAE			<i>Pyrgus armoricanus</i>	+	
<i>Charaxes jasius</i>		+	<i>Pyrgus serratulae</i>	+++	
<i>Limenitis reducta</i>	+	+	<i>Spialia sertorius</i>		++
<i>Inachis io</i>	+	+	<i>Carcharodus alceae</i>	+	+
<i>Vanessa atalanta</i>	+	+	<i>Thymelicus acteon</i>		+++
<i>Cynthia cardui</i>	++	+	<i>Thymelicus lineola</i>	+	+
<i>Aglais urticae</i>	+++	+	<i>Thymelicus flavus</i>	+++	++
<i>Polygonia c-album</i>		+	<i>Hesperia comma</i>	++	+
			<i>Ochlodes venatus</i>	+	+

N: northern slope; S: southern slope; +: 1 to 5; ++: 6 to 15; +++: more than 16 specimens (over 1,850 total specimens).

Results

Since 1984 a faunal project has been under way in this mountainous area. This study involves (among other things) collecting butterflies and skippers at a dozen sampling sites, which constitute the main habitats of the Sierra.

The results of this preliminary study are shown in Table I, where the species abundances are given. Nomenclature follows HIGGINS & RILEY (1983), with modifications.

The number of species found thus far in the central portion of Sierra de Gredos amounts to 94 (77 on the northern slope and 17 on the southern). There is no difference in the number of species recorded on the two slopes. There are, however small differences in the faunistic composition and the relative abundance of some species.

These 94 species represent 44% of the Iberian butterflies and skippers (see Table II). Of the families, the Pieridae and Nymphalidae stand out, with 55% and 61%, respectively, of the Iberian total, while the Lycaenidae and Hesperidae are the poorest represented, having 35% and 32%, respectively of the Iberian total.

Table II

Number of species of each family in comparison with total number of Iberian species

Family	N. spp.	S.Spp.	Total spp.	% Iberian spp.
Papilionidae	1	3	3	60%
Pieridae	10	11	12	54%
Lycaenidae	20	16	24	35%
Libytheidae		1	1	100%
Nymphalidae	19	22	23	60%
Satyridae	20	17	22	43%
Hesperidae	7	7	9	32%
Total	77	77	94	44%

N.spp. : number of northern slope species ; S.spp. : number of southern slope species.

From the biogeographical point of view, Sierra de Gredos acts as a crossroads, where some butterfly and skipper species have their limits of distribution, converging as wet-climate species (for Iberian standards) like *Heodes virgaureae*, *H. tityrus*, *H. alciphron*, *Cupido minimus*, *Limenitis reducta*, *Argynnis paphia*, *Clossiana selene* and *Coenonympha arcania*, as typical Mediterranean species, like *Zerynthia rumina*, *Anthocharis belia*, *Laeosopsis roboris*, *Nordmannia esculi*, *Lysandra albicans*, *Charaxes jasius*, *Melitaea deione*, *Libythea celtis*, *Pseudotergumia fidia*, *Saturys actaea*, *Hyponphele lupina*, etc., including the irregularly distributed species *Zizeeria knysna* (HIGGINS & RILEY, 1983 ; GOMEZ BUSTILLO & FERNANDEZ RUBIO, 1974).

Finally, it should be worth mentioning that some very local species have one of their few occurrences in the Sierra de Gredos, e.g. *Aricia morronensis*, *Eumedonia eumedon*, *Coenonympha iphioides* and *Erebia meolans* (EITSCHBERGER & STEINIGER, 1973 ; GARCIA DE VIEDMA & GOMEZ BUSTILLO, 1976 ; HIGGINS & RILEY, 1983 ; MUNGUIRA & MARTIN, 1986).

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