

The Role of Plants in the Conservation of Stenophagous Rhopalocera

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Quercus trees are the larval foodplants of thousands of insects, including 449 species of butterflies (Soria, 1987). Many rare & threatened lepidoptera live in oak forests, even when the larval foodplants are other than *Quercus*, but depend on this type of floral associations. The larvae of *Neozephyrus quercus* (top), *Satyrus esculi* (center) and *S. ilicis* (bottom) feed exclusively on *Quercus*. It's important to maintain this forests and it's diverse insect fauna.

Introduction During larval stage lepidoptera are primary consumers, living on a great variety of plants (Scoble, 1995). According to it's trophic regime, larvae can be *polyphagous* (those that live on several species of plants) or *monophagous*, those that live exclusively in a vegetal species. The knowledge of the lepidopteran larval foodplants is a base for the studies on the biology and ecology of lepidopteran species (Munguira *et al*, 1997).



Euphydryas aurinia larval nest on honeysuckle (*Lonicera* spp.). The wrong management of field verges and river margins causes plant destruction, and with them the fragile butterflies *Euphydryas aurinia* (top), *Limnitis reducta* (center) and *L. camilla* (bottom), whose larvae feed exclusively on *Lonicera*.

Material e Methods The trophic preferences of the 130 species of Rhopalocera (Lepidoptera: Hesperioidea & Papilionoidea) native from continental Portugal have been analysed. The inventory was based on bibliography. To thi9s information was added the experience of one of the authors (Maravalhas) in raising lepidoptera.



Maculinea alcon is an endangered species, which larvae live exclusively on *Gentiana pneumonanthe*, a plant of damp meadows. The 12 standing *alcon* populations in Portugal depends on the maintenance of gentian high densities, in most places equally threatened by agricultural changes (improvement and/or abandonment).

Results This study reveals a high stenophagy level: from a total of 130 butterfly species, 48 (37%) showed specific preferences towards the foodplants used by the larvae, here considered monophagous *in sensu lato*. Of these, 29 (62%) feed exclusively in a single plant species, being in this case considered monophagous *in sensu stricto*. We also should state that 20 (45%) of them are threatened.

In other way we recorded that certain plants (mainly at generic level), are the food of several monophagous lepidoptera. Thus, the conservation of lepidoptera is highly linked with the protection of their foodplants, being one of the priorities for conservation purposes. The destruction of plants (even partial) led to a decay of populations effectives.

As an example, a study on the extinction of a *Maculinea alcon* colony in a long lasting population of *Gentiana pneumonanthe* (Maravalhas, unp. data), showed that the plant didn't survive to substantial changes in land use: mechanized agriculture and the use of fertilizers. Not only the plant population was lost, but also the butterfly is not seen since 1983.

Discussion This short approach to stenophagy among Rhopalocera introduces us to the importance of the relations between insects and their host plants. In other way, the distribution of butterfly species is confined to habitats where the plants (and other ecological needs) are present. Phytocoenosis are a fundamental restriction for survival, as many lepidoptera larvae have selective trophic regimes.

A different perspective, but no less important, are the plants that are the basic food for a large number of lepidoptera species. For example Soria (1987) made an inventory of the dependent lepidoptera larvae of *Quercus pyrenaica*, the dominant tree species of climatic forests in the mountains of northern and central Portugal, having found 32 species of macro & microlepidoptera, which main foodplant is this tree.

We make here an alert to the need of biological & ecological studies (preferently autoecological ones), in order to manage ecosystems, mainly those where the rarest & threatened butterflies and moths live. Those studies will be the basis of a global Conservation policy, which includes soil, vegetal communities and the entire fauna: the only way to preserve biodiversity in a long-term scale.



The ground-nut (*Arbutus unedo*) is a Mediterranean tree, the only foodplant of *Charaxes jasius* (top) and *Calliphrys avis* (bottom), two butterflies whose larvae are monophagous. Plant and insect species are restricted to the highly threatened Mediterranean forests, frequently converted into *Eucalyptus* crops.

Plant	Butterfly			
	species	Family	Monophagous larva	Threatened*
<i>Bromus</i> spp.	<i>Thymelicus acteon</i>	HESPERIIDAE	SL	0
<i>Phlomis</i> spp.	<i>Muschampia proto</i>	HESPERIIDAE	SL	0
<i>Scalymus hispanicus</i>	<i>Gegenes nostradamus</i>	HESPERIIDAE	SS	0
<i>Anthyllis vulneraria</i>	<i>Cupido lorquini</i>	LYCAENIDAE	SS	0
<i>Anthyllis vulneraria</i>	<i>Cupido minimus</i>	LYCAENIDAE	SS	0
<i>Arbutus unedo</i>	<i>Calliphrys avis</i>	LYCAENIDAE	SS	0
<i>Astragalus</i> spp.	<i>Polycommatus escheri</i>	LYCAENIDAE	SL	0
<i>Cleonia lusitanica</i>	<i>Pseudophylotes abencerragus</i>	LYCAENIDAE	SS	0
<i>Fraxinus angustifolia</i>	<i>Laesopis roboris</i>	LYCAENIDAE	SS	0
<i>Gentiana pneumonanthe</i>	<i>Maculinea alcon</i>	LYCAENIDAE	SS	0
<i>Helianthemum nummularium</i>	<i>Ancia montensis</i>	LYCAENIDAE	SS	0
<i>Hippocrepis comulata</i>	<i>Polyommatus bellargus</i>	LYCAENIDAE	SS	0
<i>Primula</i> spp.	<i>Hamearis lucina</i>	LYCAENIDAE	SL	0
<i>Quercus</i> spp.	<i>Neozephyrus quercus</i>	LYCAENIDAE	SL	0
<i>Quercus</i> spp.	<i>Satyrus esculi</i>	LYCAENIDAE	SL	0
<i>Quercus</i> spp.	<i>Satyrus ilicis</i>	LYCAENIDAE	SL	0
<i>Rumex acetosa</i>	<i>Lycaena alciphron</i>	LYCAENIDAE	SL	0
<i>Rumex acetosa</i>	<i>Lycaena virgaureae</i>	LYCAENIDAE	SS	0
<i>Rumex acetosa</i>	<i>Lycaena hippothoe</i>	LYCAENIDAE	SS	0
<i>Rumex acetosa</i>	<i>Lycaena tityrus</i>	LYCAENIDAE	SS	0
<i>Rumex</i> spp.	<i>Lycaena phlaeas</i>	LYCAENIDAE	SL	0
<i>Thymus zygis</i>	<i>Pseudophylotes panoptes</i>	LYCAENIDAE	SS	0
<i>Trifolium fragiferum</i>	<i>Zizeeria knysna</i>	LYCAENIDAE	SS	0
<i>Arbutus unedo</i>	<i>Charaxes jasius</i>	NYMPHALIDAE	SS	0
<i>Brachypodium phoenicoides</i>	<i>Arethusana arethusa</i>	NYMPHALIDAE	SS	0
<i>Brachypodium phoenicoides</i>	<i>Pyronia bathseba</i>	NYMPHALIDAE	SS	0
<i>Callitis australis</i>	<i>Libythea callitis</i>	NYMPHALIDAE	SS	0
<i>Centaurea calcitrapa</i>	<i>Melitaea aetharis</i>	NYMPHALIDAE	SL	0
<i>Cynosurus cristatus</i>	<i>Coenonympha pamphilus</i>	NYMPHALIDAE	SS	0
<i>Dorycnium</i> spp.	<i>Brenthis hecate</i>	NYMPHALIDAE	SL	0
<i>Gnaphallium</i> spp.	<i>Vanessa virginiensis</i>	NYMPHALIDAE	SL	0
<i>Lonicera periclymenum</i>	<i>Limnitis camilla</i>	NYMPHALIDAE	SS	0
<i>Lonicera</i> spp.	<i>Euphydryas aurinia</i>	NYMPHALIDAE	SL	0
<i>Lonicera</i> spp.	<i>Limnitis reducta</i>	NYMPHALIDAE	SL	0
<i>Stypa gigantea</i>	<i>Melanargia russiae</i>	NYMPHALIDAE	SS	0
<i>Urtica</i> spp.	<i>Agalis urticae</i>	NYMPHALIDAE	SL	0
<i>Urtica</i> spp.	<i>Inachis io</i>	NYMPHALIDAE	SL	0
<i>Viola</i> spp.	<i>Argynnis adippe</i>	NYMPHALIDAE	SL	0
<i>Viola</i> spp.	<i>Argynnis paphia</i>	NYMPHALIDAE	SL	0
<i>Viola tricolor</i>	<i>Argynnis aglaja</i>	NYMPHALIDAE	SS	0
<i>Viola tricolor</i>	<i>Argynnis pandora</i>	NYMPHALIDAE	SS	0
<i>Aristolochia longa</i>	<i>Zerynthia rumina</i>	PAPILIONIDAE	SS	0
<i>Crataegus monogyna</i>	<i>Aporia crataegi</i>	PIERIDAE	SS	0
<i>Frangula alnus</i>	<i>Gonepteryx rhamni</i>	PIERIDAE	SS	0

Fig 1 – Portuguese stenophagous Rhopalocera

SS – Monophagous *sensu stricto*
SL – Monophagous *sensu lato* (stenophagous at generic level)
* - vulnerable, endangered or critically endangered in the country

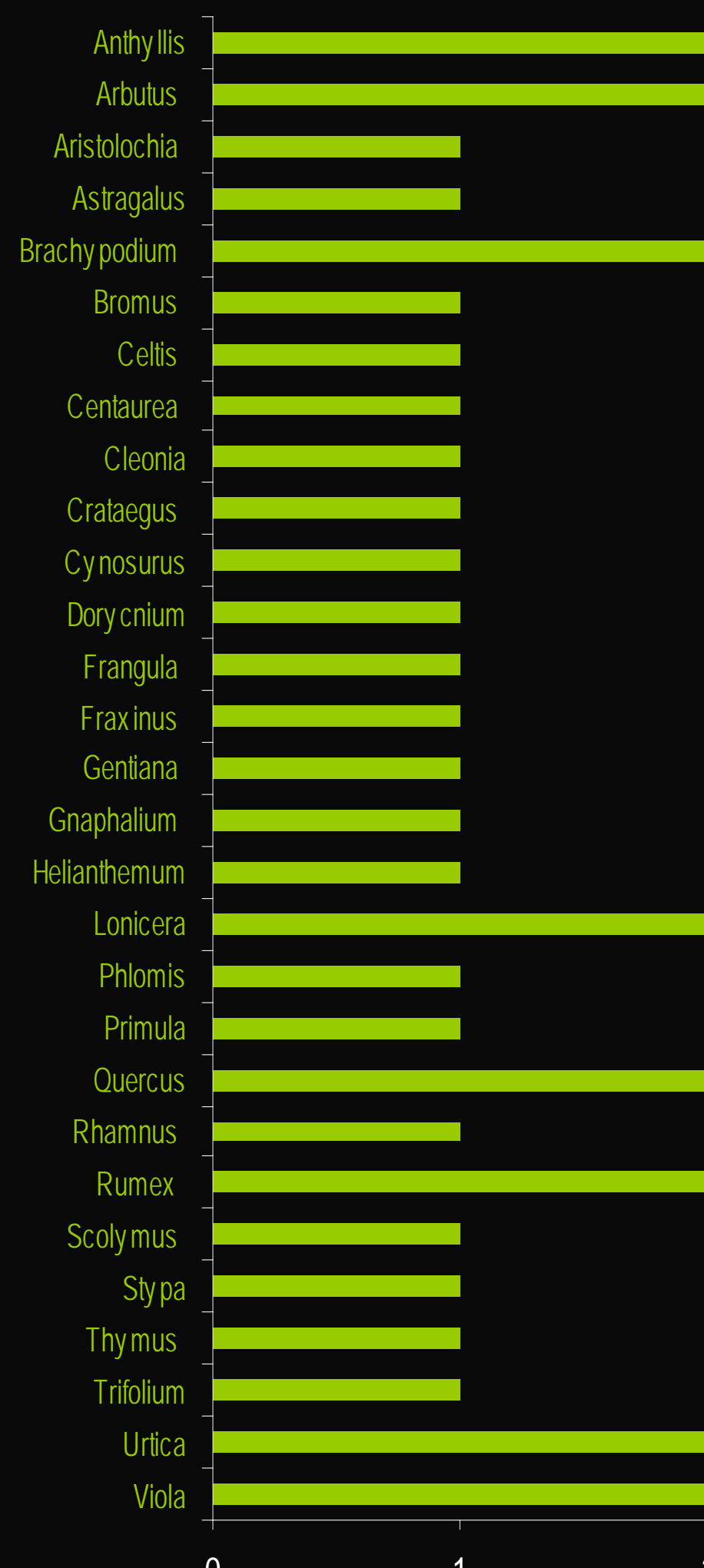


Fig 2 – Plant genus and the nr. of stenophagous butterflies that depends on them

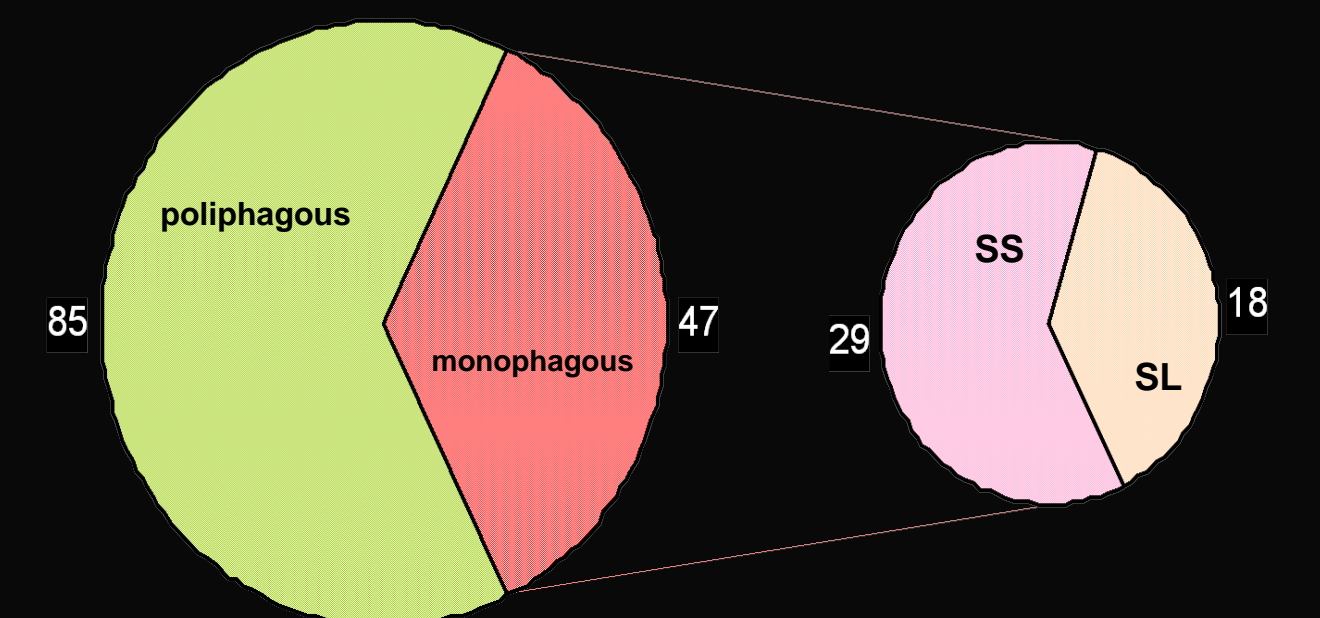


Fig 3 – Trophic regimes of Portuguese Rhopalocera (n=130)

Photography: Fernando Romão, Victor Sarto, Thomas Schmitt & E. Maravalhas

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