

## Conservation of *Lucanus cervus* in Spain: an amateur's perspective

Marcos Méndez, Working Group on Iberian Lucanidae,  
 Entomological Society of Aragón, Spain.

### Abstract

In Spain, *Lucanus cervus* is protected by law within the "special interest" category. This means that a management plan for this species must be issued by Spanish authorities, but this does not give it a high priority from a conservation point of view. The main interest in conservation of the species in Spain comes from amateur entomologists, namely the "Working Group on Iberian Lucanids" (GTLI). GTLI has mainly worked on the distribution map for *L. cervus* and other Iberian lucanids. Based on those data, *L. cervus* in Spain rates as "Least Concern" (LC) according to IUCN red list categories. This can help to explain why Spanish authorities have not prioritised *L. cervus* protection. However, when the current status of *L. cervus* is considered in a broader, European perspective, Spanish populations get higher relevance. Conservation - or at least monitoring - of the species is desirable, and likely to rely in amateur efforts in the near future. Some aspects in which advance is required include a better network of observers, an improved distribution map which allows us to extract historical trends and habitat preferences for the species, and an easily applicable method to quantify abundance. Studies of genetic diversity and isolation in different populations would also be desirable.

### 1. Legal status of the Stag Beetle

#### *Lucanus cervus* in Spain

The Spanish government has subscribed to the international treaties in which *Lucanus cervus* is included, i.e. the Bern Convention and the Habitats Directive. In addition, several Spanish national laws are relevant for the protection of the stag beetle. The Spanish Catalogue of Endangered Species (CGEA) was created in 1990, but no invertebrate was added to it until 1996. Only in 2000 were some insect species included in the CGEA, namely those specifically mentioned in the Bern Convention and Habitats Directive. *Lucanus cervus* is considered "of special interest" in this list. Such protection status is the mildest of the four considered by Spanish law, the other three being "Vulnerable", "Sensitive to the alteration of its habitat", and "At risk of extinction", by increasing order of threat. At a regional level, at least the autonomous communities of Madrid and Aragón have prepared lists of protected invertebrates and *L. cervus* is included in them.

### 2. Actions to preserve *L. cervus* in Spain

Rosas *et al.* (1992) compiled the information available about all Spanish invertebrates protected by international laws. At that time, the information for *L. cervus* was very scarce and almost limited to a very rough distribution map. During 1995-96 the Spanish Entomological Society was asked to

prepare a report about the status in Spain of all arthropods listed in the Habitats Directive. The Working Group on Iberian Lucanidae (GTLI) collaborated in that report by compiling a more precise distribution map and basic data on the taxonomy, biology and threat status of the stag beetle in Spain. This report has been recently published (Galante & Verdú, 2000). The new distribution map (Fig. 1) allowed us to assess the status of the species according to the criteria B of the IUCN (Comisión de Supervivencia de Especies de la UICN, 1994). The species was classified as Lower Risk (LR) for Spain (LC, Least Concern according to the new nomenclature). However, three zones were worth distinguishing. North-western Spain was considered as LR and the gaps in distribution were considered a result of lack of prospection. North-eastern Spain was considered as Data Deficient (DD) due to the poor quality of the data gathered. Finally, the southernmost part of the distribution range of stag beetle in Spain was considered as Vulnerable (VU). This decision was taken, against IUCN criteria, after considering the apparent isolation of southernmost populations from those in northern Spain, and the fact that this was the southernmost limit of distribution of the species, with increasing human pressure on the habitats occupied by stag beetles in that area. In retrospect, such a decision seems sensible in the light of the new directives for the use of IUCN criteria at a national or regional level (Gardenfors, 2001).

As mentioned above, this assessment effort has been translated into the inclusion of the stag beetle in the CGEA within the category "of special interest". Law obligates Spanish and autonomy governments to issue management plans for all species included in such category. At present, however, I am not aware of any official action plan to protect either the species or its habitats. It is supposed

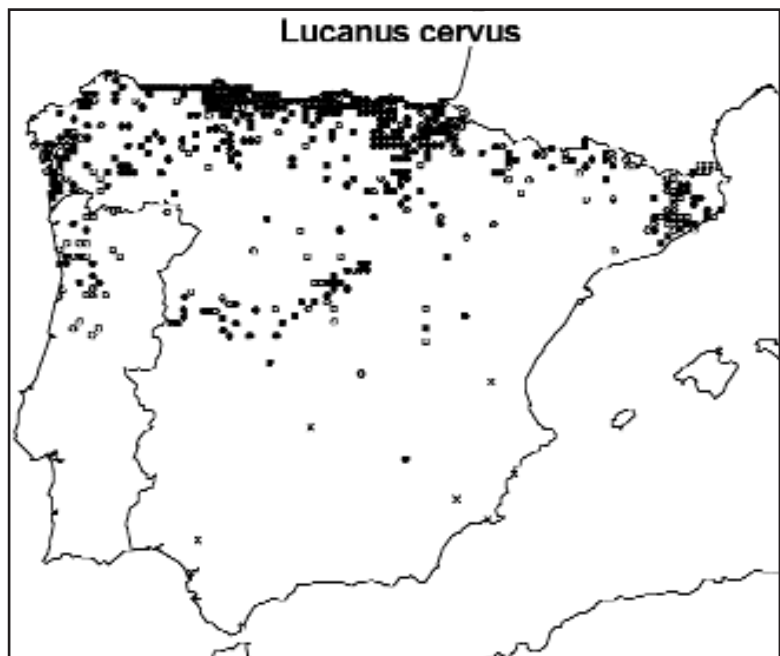


Fig. 1. Distribution map of *Lucanus cervus* in the Iberian Peninsula, according to the records in GTLIs data base in May 2002. Filled dots: records from 1980 onwards. Empty dots: records previous to 1980. Crosses: doubtful records.

that natural areas for the protection of the species will be designated in the near future, according to the recommendations of the Habitats Directive.

### 3. The role of amateurs in the conservation of *Lucanus cervus* in Spain

My personal opinion is that insects in general, and *L. cervus* in particular, are not a priority from the conservation point of view in the near future in Spain. I base this statement on the fact that only those species already mentioned in international laws were included in the Spanish CGEA. A considerable part of the entomological community in Spain seems unhappy with this decision. Criticisms of a “middle-european centrism” in prioritisation of species, without any regard for the real status of those species in Spain, or for the real protection needs of Spanish entomofauna, have been repeatedly expressed in Spanish entomological media (e.g. Melic, 1993). Notwithstanding this apparent willingness to get involved in conservation or assessment projects I perceive that lack of communication and co-ordination between Spanish entomologists, as well as bureaucratic and economical problems, are hindering progress in this matter.

Excepting recent monitoring efforts of butterflies in north-eastern Spain (Stefanescu, 2000), any assessment of the conservation status of insects in Spain is very likely to be exclusively dependent on distribution maps. This is due to lack of abundance data for most species. In addition, a poorly developed tradition of natural history in Spain prevents the detection of any decline in abundance or distribution by studying old records. The role of amateur entomologists in this mapping activity is going to be important, due to limited pre-existing museum and literature information, and lack of funding for extensive field research by academic entomologists. Several mapping initiatives are presently ongoing in Spain, led by regional authorities, universities, or entomological societies. Unfortunately, co-ordination of this mapping effort is mostly lacking and co-operation between parties is also scarce.

Concerning the stag beetle, the GTLI has mainly worked on the improvement of the distribution map for the species. Attempts have also been made to develop a simple method of estimating abundance, but its widespread application has proved hard. Knowledge of the status of *L. cervus* in Spain is clearly inadequate and should greatly improve in order to inform future management of the species as required by law. In the following I provide an agenda for research priorities in the coming years. This agenda is based in a “worst case” scenario, in which amateurs will have a major role in gathering and interpreting data relevant for conservation decisions regarding the stag beetle.

First, the distribution map for the species needs to be improved to fill obvious gaps even in the areas where coverage has been higher. The number of public and private collections examined is coming to a limit and further improvements will be increasingly dependent on field surveys or reports by amateur entomologists. This will make the progress strongly dependent on the ability of GTLI to recruit amateurs.

Second, this map should be utilised to:

- (a) designate areas of special importance for the species,
- (b) assess temporal trends in the distribution of the species; the



**Fig 2b.** Distribution map of *Pseudolucanus barbarossa* Fabricius 1801 in the Iberian Peninsula, according to the records in GTLI's data base in May 2002. Filled dots: records from 1980 onwards. Empty dots: records previous to 1980. Crosses: doubtful records.

records in GTLI's data base go back to the 20s, 30s, or 60s depending on the areas, and should allow us to detect temporal trends in stag beetle distribution, as is done using museum data in other species (McCarthy, 1998),

- (c) correlate current distribution to environmental factors, such as temperature, rainfall or distribution of forests.

Third, complementary ways to assess the status of the stag beetle populations aside from distribution maps should be developed. GTLI has tried several simple methods (counts of dead specimens on roads, transects at dusk) to quantify abundance of stag beetles, suitable for their use by amateurs. But calibration of those methods has not been feasible and recruitment of volunteers willing to carry out censuses has also proved hard.

Fourth, suitable habitat for the species in Spain needs to be characterised in order to establish important areas for protection.

Fifth, potential or current threats to the species should be quantitatively assessed, not only listed or assumed. In particular, (a) genetic differences between populations of the species should be studied, with emphasis on the apparently isolated southernmost populations, and (b) effect of habitat fragmentation and degradation should be thoroughly studied.

### 4. Why care about *L. cervus* monitoring in Spain?

#### The European picture

The agenda outlined above will require lot of work, and is going to be difficult for GTLI or any other amateur group to advance in many of those areas. In an ideal scenario, the Spanish authorities should take the leadership in this monitoring project but, as mentioned above, *L. cervus* does not appear to be a priority. For example, two other Lucanidae in Spain are endemic species and could have higher priority for conservation than stag beetles. One of them, *Pseudolucanus barbarossa* (Fabricius) (Fig. 2a), is only present in the Iberian Peninsula (Spain and Portugal) and Magreb. Its size is similar to the one of stag beetle and threats are also likely to be similar. GTLI has gathered distribution data for the species (Fig. 2b). Those data indicate that the species is not particularly threatened although scatter of the records could indicate that local populations are more

isolated (it could also be an artefact due to lack of records in many areas). The second species, *Platycerus spinifer* Schauffus, shows a distribution limited to North-Western Spain, although sampling effort for this species has been very limited until now.



Fig.2a *Pseudolucanus barbarossa*

No doubt, the status of those -and other- endemic species requires more attention by Spanish and European authorities as well as academic and amateur entomologists. Notwithstanding, a bigger picture of the current status of the widespread stag beetle can also help to assess its importance at a national level. The GTLI has tried to get a European perspective of the status of *L. cervus*: the information available is still rather fragmentary but, in general terms, the situation seems to be one in which the centre of the distribution of stag beetle (Germany, Belgium, The Netherlands, Switzerland) has been more affected by human interference than the periphery (Spain, France, Italy). The situation in the northern or northwestern limit of the distribution range is variable (extinct in Denmark, very rare or extinct in Baltic countries, declining in Britain, apparently stable in Sweden). Their status seems also reasonably good in many countries of Eastern Europe (Czech Republic, Slovakia) but the prospect of an increased rate of forest disappearance in those countries does not seem favourable to the persistence of the stag beetle in the years to come. This information has to be analysed from a biogeographical

perspective. Usually it has been assumed that declining species contract their distribution range from the periphery, where conditions for the species are more stressful, towards the centre, in which conditions are supposed to be optimal (Fig 3a). A recent review (Channell & Lomolino, 2000), however, has detected a

significant number of cases in which the opposite is true and the species thrive now only in the borders of the original distribution range. The very assumption that species are more abundant in the centre of their distribution range has also been questioned (Sagarin & Gaines, 2002; Fig. 3b). This has potentially important consequences. For the stag beetle, it seems that the northern range is not specially favourable. Eastern European populations seem to be big but potentially negatively affected in the near future by increased forest exploitation. Southern populations (Spain and Italy) seem to be healthy. This puts a big responsibility on those countries to preserve the best remaining populations of this threatened species. Under a scenario according to Fig. 3a, right diagram, these apparently healthy populations could be more endangered than currently thought and susceptible to climate change. Under a scenario according to Fig. 3b, these populations are the ones from which the species can recolonise the lost territories in the distribution centre. In both cases, the responsibility to preserve Spanish and Italian populations increases when considered from a European, compared to a purely national, perspective.

#### Final remarks

In Spain, and in other countries, monitoring of the status of *L. cervus* is dependent on the collaboration of amateur entomologists. Simple tools for monitoring need to be developed to help in this monitoring, and collaboration between authorities and amateurs has to be promoted. At the same time, improved transnational collaboration and information sharing seems essential to a more rational assessment and management of endangered species.

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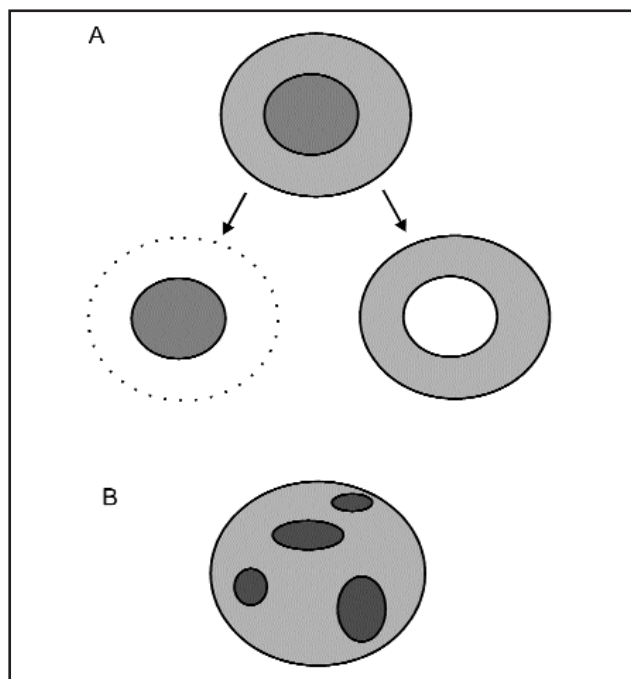


Fig 3 a & b. Models for the abundance of a species within its distribution range. Increasing darkness indicates both higher densities and better environmental conditions for the species. A. Higher abundance in the distribution centre, with two possibilities for range contraction: towards the distribution centre (left) or towards the periphery (right). B. Abundance is not higher at the distribution centre but is spread in several "high density pouches", some of which can be peripheral.

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