LONG TERM MONITORING SIZE OF MALE IBERIAN IBEX TROPHIES

Jesús M. Pérez1, José E. Granados2, E. Serrano3,4, Miguel A. Simón5, Ramón C. Soriger4 and P. Fandos4

1. Departamento de Biología Animal, Biología Vegetal y Ecología; Universidad de Jaén; Campus Las Lagunillas, s.n.; E-23071, Jaén, Spain
2. Parque Nacional de Sierra Nevada; Carretera Antigua de Sierra Nevada, Km 7; E-18071, Pinos Genil, Granada, Spain
3. Consejería de Medio Ambiente, Junta de Andalucía, Delegación Provincial de Jaén, Jaén, Spain
4. Estación Biológica de Doñana (C.S.I.C.); Av. María Luisa, s.n.; Pabellón del Perú; E-41013, Sevilla, Spain

* Current address: Equipe Écologie des Populations, Laboratoire de Comportement et Ecologie de la Faune Sauvage, Institut National de la Recherche Agronomique, Chemin de Borde-Rouge- Auzelle, BP 52627, 31326, Castanet-Tolosan Cedex, France

Size of horns in bovids has important and diverse biological implications and researchers have been trying to understand which factors determine this trait (Jorgenson et al., 1998; Giacometti et al., 2002).

In addition to factors, such as genotype, population density, habitat quality or climatology, anthropic actions like trophy hunting may also influence this phenotypic character (Coltman et al., 2003).

In our study we have used biometrical data from 1284 male Iberian ibex (Capra pyrenaica) hunted in Sierra de Cazorla, Segura y Las Villas National Park, southern Spain, during the period 1968 – 2004.

From 1988 to 1995 ibexes were not hunted because a drastic reduction of population density due to a sarcoptic mange outbreak; no data for 1998 were available; age of animals ranged from 7 to 15 years; in this National Game Reserve the most frequent strategy for ibexes harvest is trophy hunting which is focused to older males particularly in winter.

Dependent variables were basal perimeter and length of horns (average of left and right ones).

Climatological variables used were: mean temperature and rainfall during spring months (when maximum horn growth occurs) and also mean temperature and rainfall values accumulated over the entire animals life.

Both mean and accumulated values were highly correlated each other (r = 0.751, F = 1227.085, p < 0.001) and, therefore they can not been used simultaneously in a multivariate analysis.

Horn growth was related sometimes to temperature (Giacometti et al., 2002) and to rainfall in other occasions (Bunnell, 1978).

Therefore the Gaussen Index (GI) was calculated (Gaussen and Bagnouls, 1953; Gaillard et al., 1997) (this index is defined as GI = Rainfall – 2Temperature).

To reduce environmental information to a single variable (IG) we can use univariate statistics, and this index is used as independent variable.

Each year class was treated separately.

Firstly we made a linear correlation between horn length (HL) and horn basal perimeter (HBP) with IG.

To make a comparison between years, we must exclude variability due to environmental factors.

As an example, in 1998 the rainfall reached 1500 mm and males aging 8 years culled during this year averaged 67 cm for horn length; in 1999 the rainfall decreased drastically (800 mm) and 8-yr males harvested during the year had an average horn length of 58 cm.

This decrease of horn growth is partially explained by the low rainfall level and in order to assess a size trend we estimate horn size (length and basal perimeter) at a mean rainfall level of 1150 mm.

New length (corrected length) was then calculated according to the following equation:

\[
\text{Corrected } HL = \text{ObHL} + [(\text{MR} – \text{IR})^* \beta]
\]

\[
\text{ObHL} = \text{horn length observed (measured)}
\]

\[
\text{MR} = \text{mean rainfall through the study period}
\]

\[
\text{IR} = \text{rainfall rate assigned to each ibex according to its age and year of death}
\]

\[
\beta = \text{slope of the regression line horn length (observed) versus rainfall (observed)}
\]

Horn length was more sensible than the horn basal perimeter.

Then, we applied a linear regression between corrected lengths and years to obtain the trend of horn size due to factors other than environmental ones (e.g. density, harvest intensity, diseases, variation in habitat quality).

Decrease of horn length through years was significant only in males aging de 10, 11, 12 and 14 years.

Current work involves including data on ibex and livestock densities into the analysis.

Authors wish to thank the gamekeepers of the Sierras de Cazorla, Segura y Las Villas Natural Park for their valuable effort in obtaining data.

Our research activity is partially supported by the Plan Andaluz de Investigación (Junta de Andalucía): RNM 188.