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Hunting and breeding success of rock partridge *Alectoris graeca saxatilis* on the Italian Alps (2006-2010)

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Abstract – In the Italian Alps, in the 2006-2010 years, 4874 rock partridges have been hunted: the highest number in Sondrio province (733 animals), followed by the province of Torino (648), Como (639) and Cuneo (580). The other Italian provinces show lower numbers (less than 500), the lowest in Vicenza province (9). In almost all regions where this species is present, hunting is allowed. Hunting season occurred between October and November. In the Lombardia (2150, 44%) and Piemonte (1677, 34%) regions, the highest numbers of killed animals were recorded Thus, rock partridge seems to be concentrated in the central-Western Alps. In 2010, the mean young/adults ratio was 2.15 (minimum: 0.94, in Pordenone province; maximum: 7.21 in Como province), the mean number of young per brood was 4.35 (minimum: 3.8 in Bolzano province, maximum 5.39 in Bergamo province).

Key-words: rock partridge, hunting, reproductive success, Italian alpine range, 2006-2010 period.

INTRODUCTION

The Alpine rock partridge populations decreased in last decennia and suffered significant habitat loss and areale shrinkage (Bocca 1990, Bernard-Laurent & De Franceschi 1994, De Franceschi & Odasso 1998, Bernard-Laurent & Leonard 2000, Cattadori *et al*. 2003). Therefore, conservation measures such as environmental recovery and hunting and agro-silvo-pastoral management should be implemented (De Franceschi & Odasso 1998, Odasso *et al*. 2002, Artuso 2008, Sorace *et al*. 2011). This species has a high conservation value (All. 1 Directive 2009/147/EC; BirdLife International 2004, IUCN 2012). Sampling should be sustainable and based on demographic and ecological evaluation, in particular regarding population dynamics, density, yearly reproductive success and suitable habitat (Artuso 2008).

In this work some results are shown of an investigation aims at creating a database on aspects related to the hunting of rock partridge in the Italian Alps. In particular information is given on the variation of hunting and breeding success in alpine provinces.

MATERIAL AND METHODS

The study area includes the Italian Alps. The territorial unity of investigation is the "province" (as a whole there were 24 provinces, grouped in 7 regions). The study covers five years (2006-2010). The work was promoted by National Hunters of the Alpine Area Union (UNCZA) that created a "Technical Board" (9 members and 1 coordinator) to collect data from the Provincial Hunting Departments and Alpine Hunting Districts in order to investigate: if the species was present in 2010 year; if the species was hunted in the 2006-2010 years; the number of hunted animals in the 2006-2010 years; the period in which hunting was allowed in the year 2010; the data collected in rock partridge surveys in 2010 spring and/or summer; the breeding success in 2010 year (expressed as: young/adults; young per brood); if environmental recovery was performed. Data on breeding success were available only for some provinces. Thus in some regions it was not possible to calculate the total regional value. Data on breeding success were collected from different surveying techniques (number of sampling areas, survey methods, etc). Therefore, they were not used to compare the success among provinces or regions.

RESULTS

Excluding the three most extremes provinces in the Alpine range (Savona on the west and Gorizia and Trieste on the east), rock partridge is spread throughout all prov-

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inces. In 2010, in 15 out of 21 surveyed provinces, hunting was allowed (Tab. 1). In 2010, the hunting period was concentrated in October and November (according to the National Law 157/92), except in Alto Adige where hunting was prolonged until 15 December. The allowed hunting days ranged from a minimum of 5 days (Imperia province) to a maximum of 43 (Val d'Aosta region; Tab. 1). In 2010 year, for the young/adults ratio, the following values were obtained: max 4.56 in Lombardia region, min 1.32 in Belluno province (in Veneto region); average in the Italian Alps: 2.15 ± 1.26 (Fig. 1).

Data on the number of young per brood were available only for Lombardia region (5.11) and Trentino Alto Adige region (3.97).

In the province of Sondrio the highest number of birds was hunted (733), followed by Turin (648), Como (639), Cuneo (580), Bolzano (486) and Brescia (419). In these six provinces 3,505 birds were harvested which is almost 72% of the total (Fig. 2).

The rock partridge was especially hunted in Lombardia region (N = 2,150; 44% of the total) followed by Piemonte region (N = 1,677; 34%) and Trentino-Alto Adige (N = 591; 12%). In these three regions 4,418 birds were harvested (91% of the total; Tab. 2). On the whole, in the

Table 1. Data on hunting period of rock partridge in 2010 in the Alpine provinces where the species was present. It is also reported if survey of the species and activities of environmental recovery were conducted.

Province	Survey	Hunting	Hunting period	Hunting days	Environmental recovery
Imperia	yes	no	no	no	yes
Cuneo	yes	yes			
Torino	yes	yes			
Biella	yes	yes	3.10 - 3.11	< 10	yes
Vercelli	yes	yes			
Verbanio-Cusio-Ossola	yes	yes			
Aosta	yes	yes	2.10 - 30.11	43	yes
Varese	no	no	no	no	no
Como	yes	yes	3.10-3.11	10	yes
Lecco	yes	yes	10.10-14.11	< 11	yes
Sondrio	yes	yes	3.10-21.11	15	no
Bergamo	yes	no	hunting stop		yes
Brescia	yes	yes	3.10 - 28.11	?	yes
Bolzano	yes	yes	15.10 - 15.12	30	no
Trento	yes	no	hunting stop		yes
Verona	?	no	hunting stop		?
Vicenza	yes	no	hunting stop		yes
Treviso	yes	yes	?		?
Belluno	yes	yes	2.10 - 29.11	27	yes
Pordenone	yes	yes	15.10 - 15.11	6	yes
Udine	yes	yes	15.10 - 15.11	6	yes

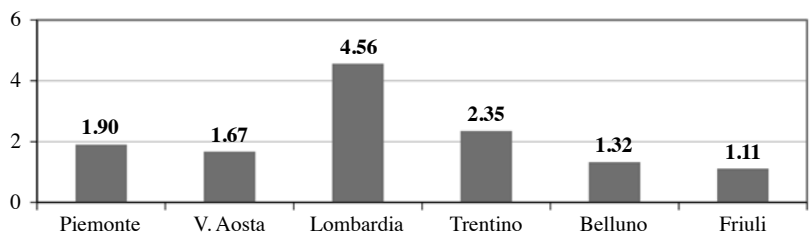

Figure 1. Values of young/adults ratio of rock partridge in alpine regions in 2010 year. In Veneto region only data from Belluno province were available.

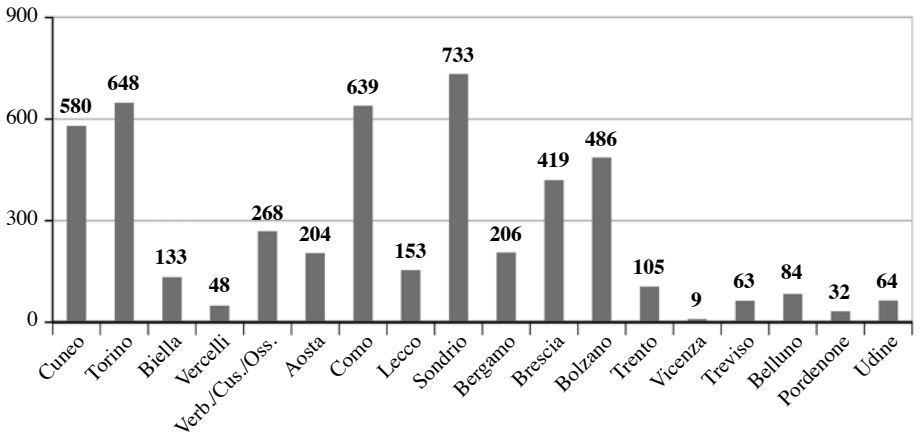

Figure 2. Number of harvested rock partridge in each alpine province (2006-2010).

Table 2. Number of harvested rock partridge in each alpine region (2006-2010).

Region	Harvest
Liguria	0
Piemonte	1,677
Val D'aosta	204
Lombardia	2,150
Trentino Alto Adige	591
Veneto	156
Friuli V. Giulia	96
Total	**4,874**

years between 2006 and 2010, 4,874 rock partridges were harvested in the Italian Alps (Tab. 2). The yearly number of killed partridges decreased during the five study years (Test Spearman, $t_5 = 3{,}58$; $P = 0.037$). In the first two years (2006-2007) were harvested 2,502 birds (51% of the total) vs. 1,324 birds (27% of the total) in the last two years (2009-2010) (Fig. 3).

DISCUSSION

The reproductive indices were not similar among areas because there is no agreement about surveying methods or data handling. Although future standardization of methods is required among different provinces, the collected data represent a starting point for the future monitoring of the local conditions of rock partridge in each province. In general, the obtained values for the index young per brood falls in the known ranges for the species (Priolo & Bocca 1992, Meriggi *et al*. 1998, Artuso *et al*. 2003, Sorace *et al*. 2011).

Data on harvested partridges seem to indicate a higher abundance of rock partridge in the central-Western Alps. However, hunting is not comparable among the provinces and regions because they have different surfaces, morphologies and suitable habitats.

Data presented here about hunting appear particularly relevant since they are the only known reference and first complete historical data collection available for the rock partridge for the whole Alpine range. This work follows a

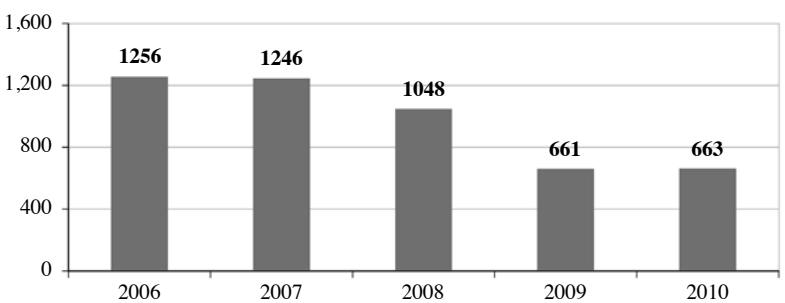

Figure 3. Number of harvested rock partridge in each study year (2006-2010).

similar attempt conducted for the period 2003- 2006 (Artuso, 2009) that was not published on scientific journal because of partial data missing .

Results showed that hunting significantly decreased in the short term. This might be due to a general situation in which the species' numbers are decreasing (Bernard-Laurent & Boev 1997, BirdLife International 2004, IUCN 2012) and/or to a greater awareness of the importance of a careful management of the species and its habitat. Surveys (in spring and in summer) and environmental recoveries (mowing, shrubs cutting) are widespread measures in the Alps that contribute to a responsible and active managing of rock partridge, especially if compared with the past. Nowadays, the legal hunting permit has to be currently supported by data collected during the surveys. Indeed the only recording of rock partridge in an area is not sufficient to establish that the local population of the species can be hunted and above all to evaluate how many individuals can be killed during the hunting season.

CONCLUSIONS

This investigation represents a noteworthy effort to collect data relative to the rock partridge populations of Italian Alps, supplied by the wildlife management authorities of the Italian alpine provinces. These data have been generally filed but they are difficult to consult. This work is a first attempt to fill a data gap at national level in order to highlight the problem to the boards in charge of managing wildlife and game animals.

A national database of this species (even better for all species of Galliformes) should be created and be available. This might be managed by an institution dealing with the collection, storing and handling of data that, if collected with standardized methods, might give a great support to establish the conservation status of rock partridge and management priority.

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