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Population trends and conservation of Montagu's Harrier in Spain

J.T. García and **Beatriz E. Arroyo**

Zusammenfassung

Populationstrends und Schutz der Wiesenweihe in Spanien

Für Spanien überblicken wir die grundsätzlichen Schutzprobleme der Wiesenweihe und was aktuell bekannt ist über ihre gegenwärtige Lage. Einige erste Ergebnisse der spanischen Nationalkampagne zum Studium und Schutz der Wiesenweihe aus den Jahren 1999-2000 werden vorgestellt. Die bedeutendsten Probleme für die Art in Spanien stellen die Veränderungen bei Brut- und Jagdhabitat sowie die fortschreitende Intensivierung der Landwirtschaft dar. Diese Tatsachen, zusammen mit dem Mangel an Daten über die Populationstrends auf nationalem Niveau, könnten die Wiesenweihe mittel- bis langfristig in eine gefährliche Situation bringen. Wir haben große Veränderungen von Jahr zu Jahr bei den Brutparametern Populationsdichte, Produktivität und Einfluss der Ernte gefunden. Ebenfalls gab es große Abweichungen bezüglich unterschiedlicher Gegenden in diesen Parametern. Verschiedene Weihenpopulationen scheinen räumlich aufeinander bezogen zu sein, vermutlich durch Dispersion der Jung- oder Altvögel. Der Ernteablauf beeinflusst stark die Überlebensrate der Jungen. Wir diskutieren die Notwendigkeit, die Raum- und Zeitbehandlung in die Studien einzubeziehen, sowie effizientere Schutzmaßnahmen als die gegenwärtig in Spanien angewandten in Betracht zu ziehen.

Introduction

The main purpose of this paper is to point out the principal conservation problems for Montagu's Harrier in Spain and to summarise the actual knowledge of its actual situation. We review current conservation techniques and resources used in Spain with respect to the harvesting problems for the species and present some preliminary results of the Spanish national campaign for the study and conservation of Montagu's Harrier.

In Spain, like in other European countries, landscape changes due to human activities are one of the most important problems for birds. This is especially true for steppe birds, because of the changes in their habitats due to agricultural uses. One of these changes is the progressive substitution of less productive cereal crops for other, non-cereal crops (like olive groves). In a hypothetical extensive agricultural system the availability of area for breeding was more or less unlimited. When the cereal becomes unprofitable, farmers usually change to alternative crops chosen in relation to subsidies provided by the current European Agricultural Policy. The new cultivation types may cover most of the "natural" breeding areas causing a strong decrease in the area available for the species, which in turn may transform into a progressive fragmentation of the harrier population.

The second problem in relation to land-use is the progressive intensification of agriculture occurring in the last decades in

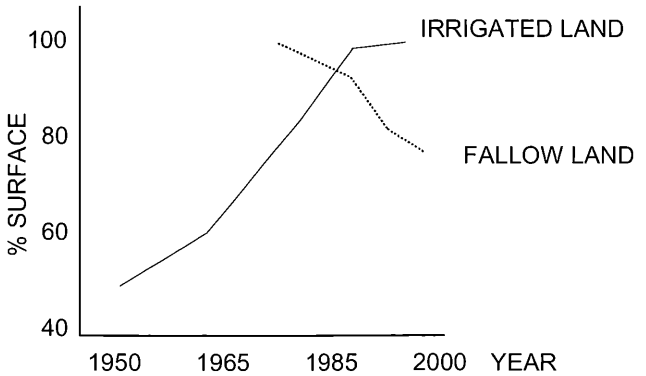

Fig. 1: Trends followed by irrigated and fallow land in the last decades in Spain. – *Abb. 1: Trends (in % der Fläche) von bewässertem (durchgezogene Linie) und Brachland in den letzten Dekaden in Spanien.*

Europe, which is taking place still today in Spain. Fig. 1 shows the trends followed by irrigating fields since 1950 in Spain. This increase in irrigated lands has occurred at the expense of a parallel decrease in fallow land for the last 30 years. The more fallow land in a given area, the more extensive the agricultural system. In Spain, there seems to be a clear trend towards an intensification of agriculture. Obviously, the principal effects for harriers were the reduction of parcel boundaries (the main refuge for birds, insects and mice), and the general decrease in landscape diversity.

Status of Montagu's Harrier in Spain

Apart from the changes in land use, we have another "great conservation problem" We don't know the *real* status of Spanish Montagu's Harriers, because population trends have never been established at the National level (even today we lack a national census of the species). This may be explained because of the great environmental variation in Spain, which makes it difficult to do a good census without making a very strong effort. Climate in Spain ranges from alpine to coastal. The altitudinal contrast is also large in Spain, causing sharp differences in primary production in spring. In addition, there are large areas with a very stressing summer drought. We can differentiate three biogeographic units in Spain: The north has a typical Eurosiberian climate. The northern plateau has a marked seasonal contrast between the very productive spring and the harsh winter, and the southern lowlands represent typical dry and warm Mediterranean environments. All these features make the Iberian peninsula a very contrasting territory in climate and thus in land use.

Tracking for both climate and land use changes between areas, the density of the main prey for harriers also changes, which implies that there also exists a wide margin of variation in harrier abundance between regions.

Apart from the problems linked to "spatial scale", the effect of "temporal scale" also leads to problems in harrier conservation: cyclic preys, like voles or grasshoppers, together with the between-year variations in weather, also cause year-to-year

fluctuations in harrier abundance and distribution. For all these problems it is difficult to get faithful information about trends at a large geographic scale.

But what we get with Spanish harriers will be important for all Europe, because Spain hosts nearly half of the whole breeding population (excluding Russia). If we interprete Spanish population trends in the wrong way, the consequences for harriers may be "catastrophic", because the establishment of conservation status of species at European level is usually based on recent trends.

The most recently published estimate for Spanish Montagu's Harriers considers a breeding population between 3600 and 4600 pairs. Beatriz Arroyo (1995) stated that Spanish populations of Montagu's Harrier were probably stable. However, we have observed large between-years variation in abundance in some areas (like Extremadura) whereas in other areas the population seems to show just small fluctuations (like Madrid, results of the national campaign, see Tab. 1). It is also clear that, at least in some areas, the mortality due to harvesting activities is quite large. Almost all efforts for conservation of Spanish harriers have been invested on nest protection and chick rescue during harvesting activities. However, up to date nobody has studied if these actions were sufficient or always effective.

Table 1: Variations in the number of breeding pairs in some of the study areas. – *Variation in der Zahl der Brutpaare in einigen Untersuchungsflächen.*

	1999	2000	2001
Extremadura A	43	28	49
Extremadura B	49	25	60
Extremadura C	140	20	No data
Madrid A	48	37	No data
Madrid B	50	62	No data
Madrid D	26	32	No data
Toledo	47	72	63

Our project: linking study and conservation

In the last years the potential impact of harvesting has been analysed in different geographic regions. There has been a considerable effort to link conservationist groups, researchers and ornithological groups. We get together every second year to discuss and to unify ideas and working methods (Iberian Working Group on harriers). We have begun a National campaign of study and conservation of Montagu's Harrier as a result of the last meeting of the Group (Fig. 2, 3).

The project started in 1999 thanks to the efforts of two conservationist groups (AMUS from Extremadura and GREFA from Madrid). More than 12 ornithological groups are working on this project in different geographic areas and we also have the collaboration of the most important farmer's associations in Spain. Next year we will get basic financial support from the Spanish Ministry of Environment, which will pay for educational material (T-shirt, hat, or informative folders for the farmers). The co-ordination of the project was assumed by researchers on harriers. The main goals of the project are summarised as follows:

1. Evaluate the status of Montagu's Harrier at a large geographic scale (Breeding density, productivity, harvest impact, spatial and temporal variations)
2. Suggest further medium/long-term conservation measures
3. Improve and unify data collection.

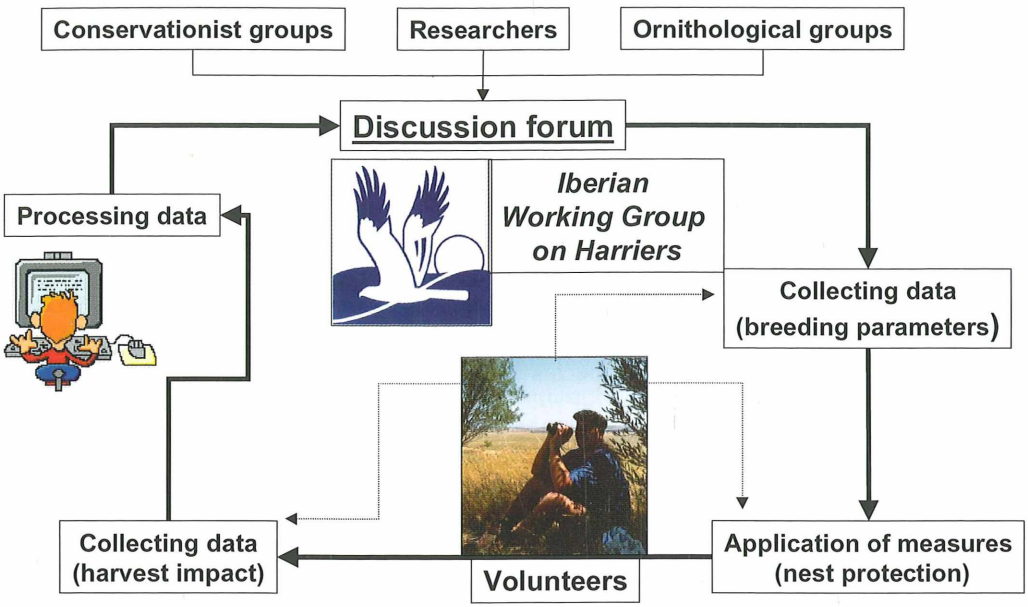

Fig. 2: Spanish planning for study and conservation of Montagu's Harrier. – *Abb. 2: Spanisches Programm zum Studium und Schutz der Wiesenweihe (Verlaufsdiagramm).*

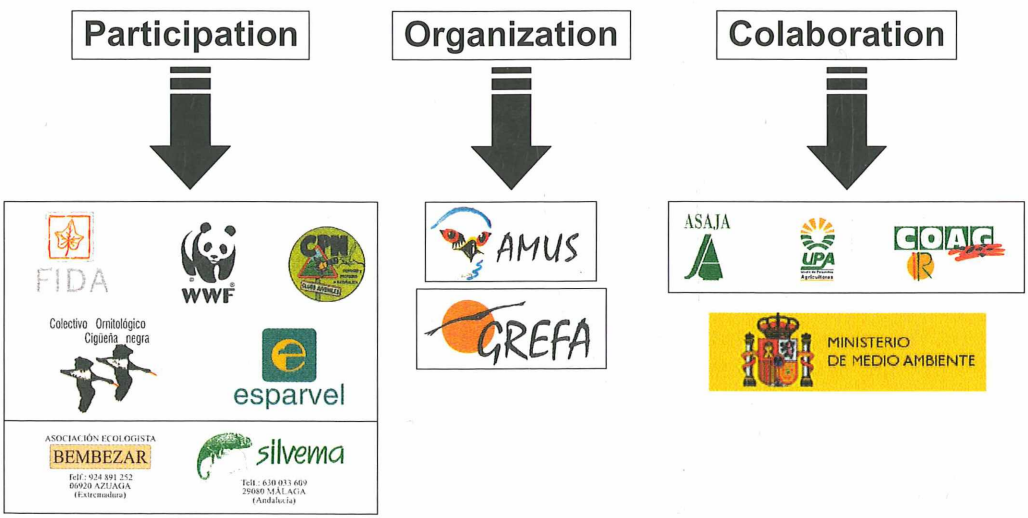

Fig. 3: Participants of the National Campaign of the Study and Conservation of Montagu's Harriers. – *Abb. 3: Teilnehmer am spanischen Programm "Nationale Kampagne zum Studium und Schutz der Wiesenweihe".*

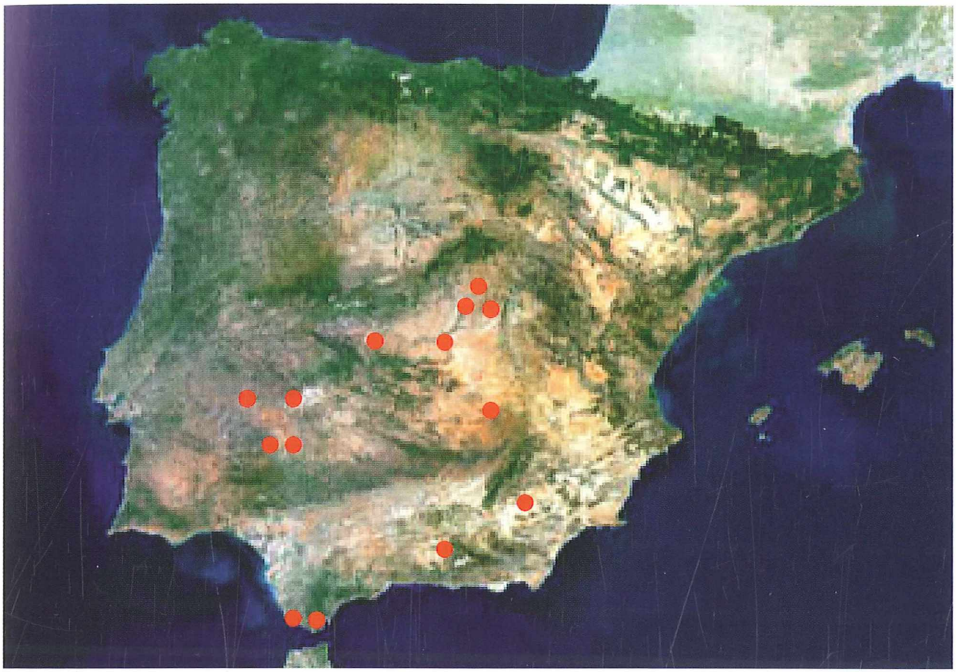

Fig. 4: Current study areas (red dots) in the Spanish National Campaign of the Study and Conservation of Montagu's Harrier. – *Abb. 4: Gegenwärtige Studiengebiete (Punkte) der spanischen Nationalkampagne zum Studium und Schutz der Wiesenweihe.*

Study Areas

The current study areas are shown in Fig. 4. The next years we would like to add new study areas, mainly in the north, because this region contains the most important population breeding in natural vegetation, which could serve as a control for parameters like productivity, predation or natural mortality.

We present some preliminary data of the two initial study years (1999 and 2000). For the year 2001 I only have data from two areas in Extremadura (West of Spain) and another one in Toledo, Southern Plateau).

Results

Data collected and breeding parameters

Up to the moment, we have a good sample size (N=771 nests) that allows us to get a good picture of the current situation of harriers. We found a large variation between areas in population density (Tab. 1). Within only two years, some populations decreased but others increased. Even in areas that are close to each other (for example Madrid A and B), populations can show opposite trends, which suggests some population interchange between ar-

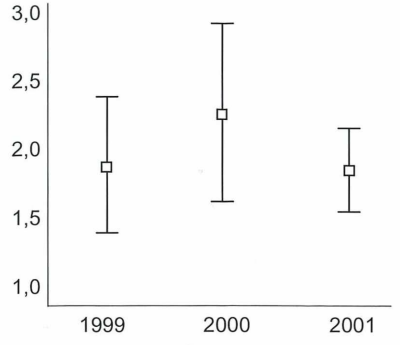

Fig. 5: Productivity (mean ± standard deviation) of the different areas in the three study years (n = 3 in 2001). Productivity = number of fledglings / pair. – *Abb. 5: Reproduktionsrate (Durchschnitt und Standardabweichung) verschiedener Untersuchungsflächen in 3 Untersuchungsjahren. Reproduktionsrate = Zahl der flüggen Jungen/Paar.*

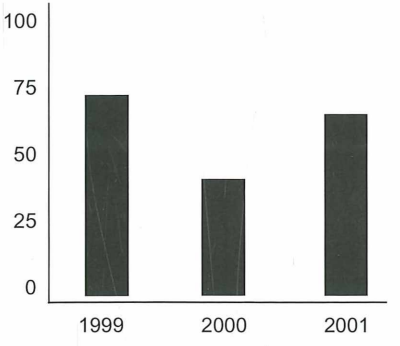

Fig. 6: Percentage of nests that need management (with unfledged chicks at harvest time). – *Abb. 6: Prozentsatz der Nester (mit noch nicht flüggen Jungen zur Erntezeit), die Schutzmaßnahmen benötigen.*

eas (i.e. populations may be spatially related). However, inferring population trends based on very few years may be too tentative, as shown by the very different results found for these populations during the last breeding season.

With reference to productivity, we can observe large differences between areas in the same year, as well as differences between years for the same area (Fig. 5).

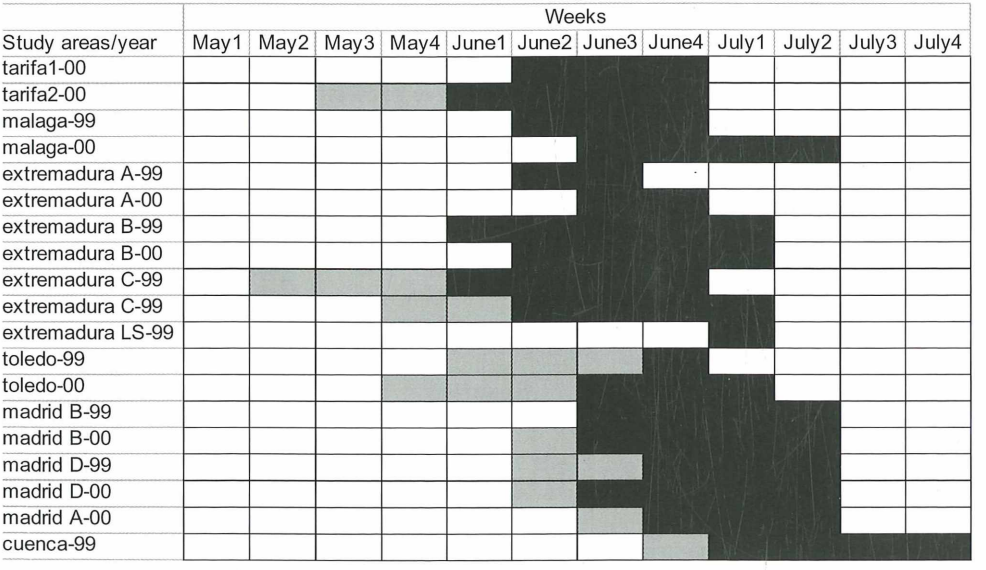

Fig. 7: Harvest phenology in each of the study areas (99 = data from 1999; 00 = data from 2000). Grey bars = barley crops; Black bars = Wheat crops. – *Abb. 7: Feldfruchtschema (Ende des Balkens = Erntezeit) in den Untersuchungsflächen. Balken: grau = Gerste, schwarz = Weizen.*

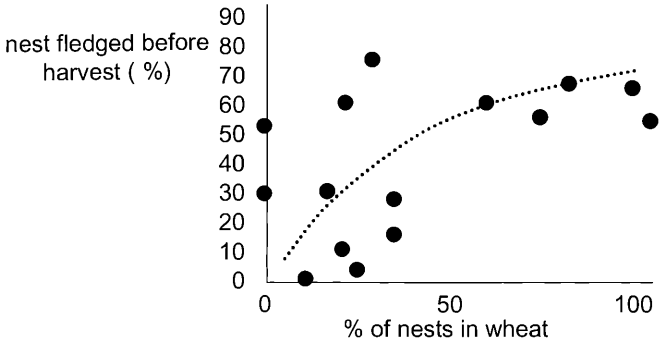

Fig. 8: Influence of the proportion of nests in wheat on the probability of fledging without conservation management. – *Abb. 8: Einfluss des Anteils der Nester in Weizen auf die Wahrscheinlichkeit des Flüggewerdens ohne Schutzmaßnahmen.*

Impact of harvesting activities

The potential impact of harvesting is high (that is, a large number of chicks could die during harvesting), but also variation is large, especially between areas (Fig. 6). These differences may be partially explained by differences in harvesting phenology in Spain. Harvest starts earlier in southernmost areas and advances to the north (Fig. 7). We also found a large variation between areas, due to variations in cereal types. In general, barley is harvested earlier and in more variable dates than wheat.

It is the proportion of nests in different crop types in a given area, which is important to the probability of fledging before harvest. The probability of fledging without conservation management increases as the proportion of nests in wheat increases (Fig. 8). This is because of the relatively late harvesting time of wheat, which allows chicks to fledge in time.

In Spain, harvesting date seems to be a critical variable for harriers. The difference between the two first study years in the probability of being killed by harvesters is very high (Tab. 2). These differences in harvesting dates could be partially due to weather: In 2000 the rain delayed the harvest just one week on average.

Table 2: Percentage of nests with fledged and unfledged chicks at harvesting dates in the two study years. – *Prozentsatz von Nestern mit flüggen und noch nicht flüggen Jungen zur Erntezeit in 2 Untersuchungsjahren.*

Year	1999	2000
Nests with unfledged chicks	70	38
Nests with fledged chicks	30	62

The future

Conservation efforts made in Spain in the last years do not have the necessary funds to guarantee the good success of the measures employed. Managing the nest or the chicks when harvesting needs hundreds of people and a lot of money. In addition, a very strong field work is necessary previous to harvesting in order to locate the nest and check its contents. Even if we have enough people and money, this kind of measure does not guarantee the success of each nest or chick, as they are subject to several unexpected events.

We think that habitat management is probably more efficient than nest manage-

ment on the long term. We must focus our conservation effort in delaying the harvesting dates, for example by insuring the whole crop over large areas (cheaper and beneficial for the whole steppe bird communities), or by favouring slow growing cereal crops. The latter will be more efficient than managing nests, as we will eliminate mortality and minimise our protection efforts. This kind of measures would also benefit the whole steppe bird community.

Conclusions

1. We have found large year-to-year variations in both breeding parameters and the impact of harvesting.
2. These variables also differ between geographical areas.
3. Different harrier populations may be spatially related.
4. The harvesting phenology largely influences probability of survival.

Thus, we need

1. to incorporate the spatial and temporal scales (studies at medium/long term and at large spatial scale) in our studies.
2. to consider alternative and more efficient options to chick rescue like, for example, the delay of harvesting or favouring slow growing cereal crops.

Summary

In this paper we review the principal conservation problems for Montagu's Harrier in Spain and the actual knowledge of the current situation of the species. We also present some preliminary results of the Spanish national campaign for the study and conservation of Montagu's Harrier obtained from the two first study years (1999-2000). In Spain, the alteration of breeding and hunting habitats as well as the progressive intensification of agriculture seem to be the most important problems for the species. These problems, together with the lack of knowledge of the population trends at national level, could bring Montagu's Harriers into a dangerous situation at medium/long term.

We have found large year-to-year variations in breeding parameters (population density, productivity, and impact of harvesting). We also found large between-areas variations in these parameters. Different harrier populations seem to be spatially related, possibly throughout juvenile or adult dispersion. The harvesting phenology largely influences the probability of chick survival. We discuss the need for incorporating the spatial and temporal scales in our studies and to consider more efficient conservation actions than those that are actually used in Spain.

References

Please see combined literature in our other paper (ARROYO, GARCIA & BRETAGNOLLE) in this volume.

J. T. García & Beatriz E. Arroyo, Depto. Biología Animal I (Zoologia), Facultad de Biologia, Univ. Complutense, E–28040 Madrid, Spain
e-mail: jtgarcia@bio.ucm.es