



The status of the European Roller in Portugal



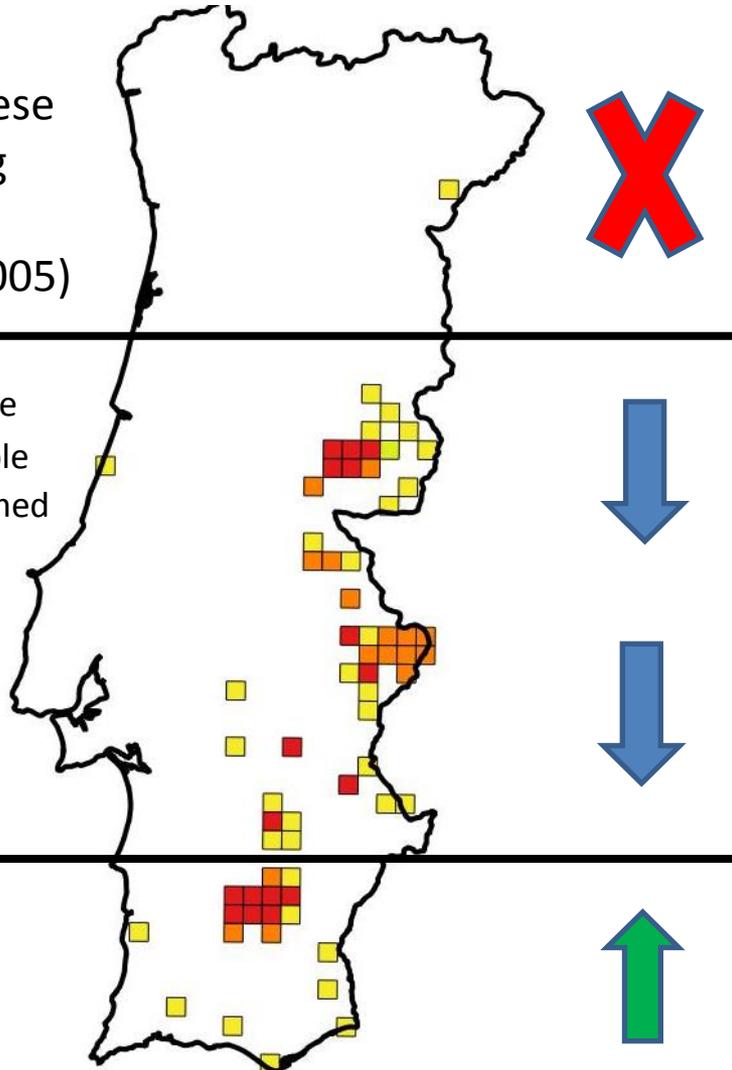
Inês Catry



The status of the European Roller in Portugal

Portuguese
Breeding
Atlas
(1999-2005)

- possible
- probable
- confirmed



Critically endangered
(Portuguese Red Data List - 2005)

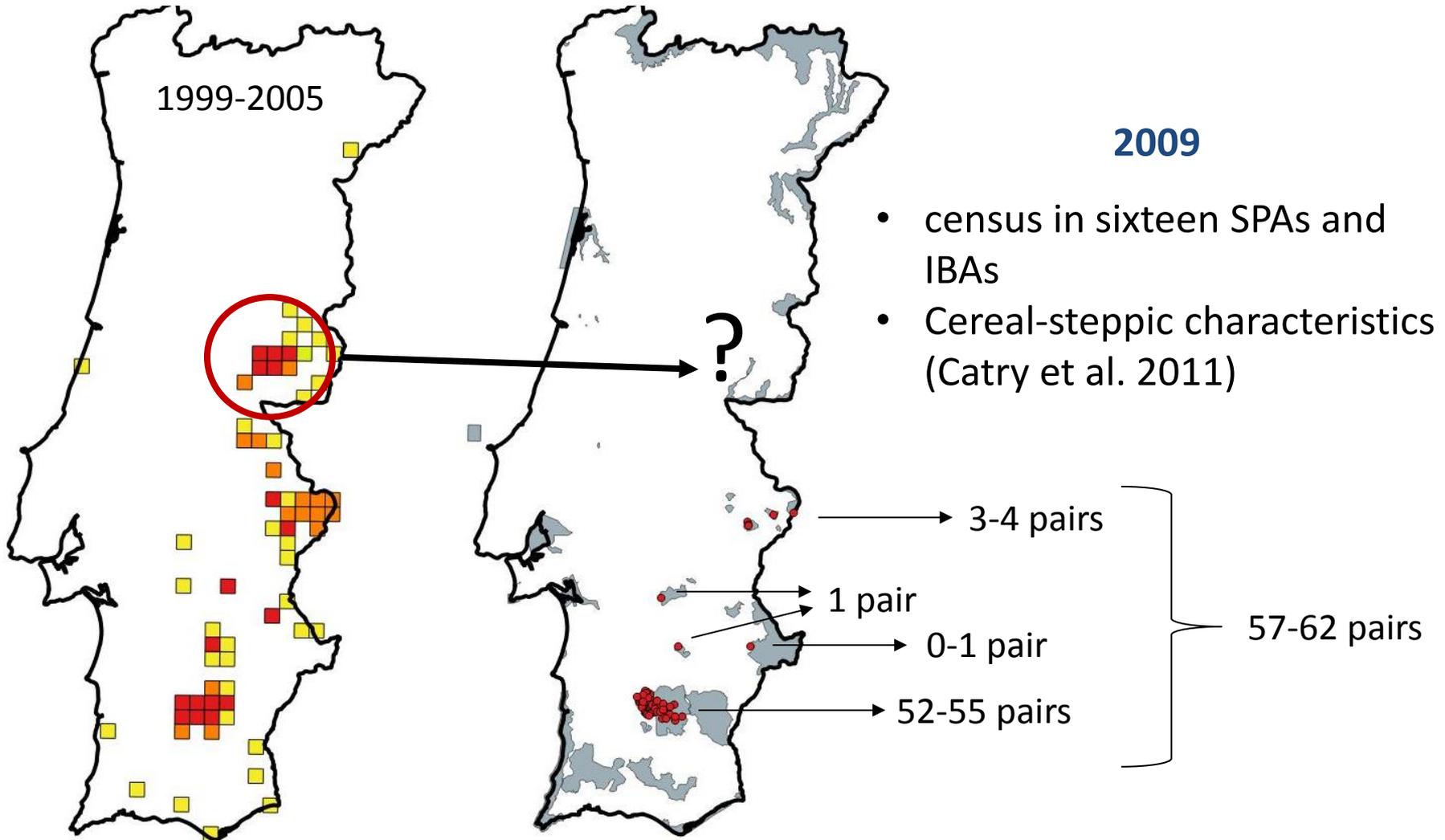
2001-2005:
80-150 breeding pairs
(Action Plan 2008)



- Notes from previous slide
- This map shows the Portuguese roller distribution as the result of the last Portuguese Breeding Atlas. Fieldwork was conducted between 1999 and 2005. As you can see the population is very concentrated in a few inland areas and quite fragmented. Although there is few information on the past distribution and breeding numbers (no previous national surveys), there is a range contraction and fragmentation, especially in the north and centre of the country. The species became extinct in the north area, it's decreasing in the central part of the country and increasing in the south.
- The fragmentation of the Roller population in the central part of the country can possibly be explained by changes in agriculture practices, particularly through the abandonment of extensive agricultural practices and pastures, as well as the increasing of agriculture intensification and afforestation. Also a decreasing of available nesting places may have occurred.



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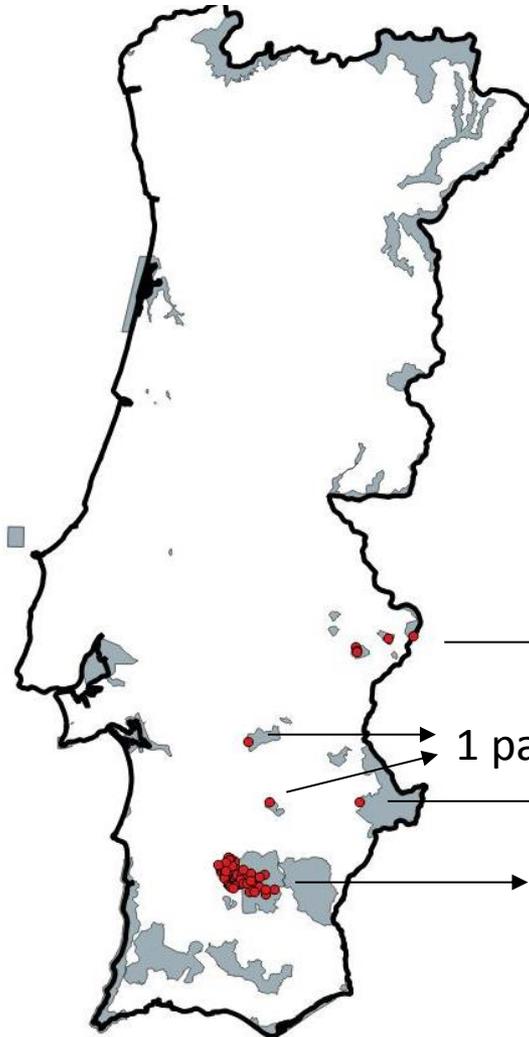




- Notes from previous slide
- In 2009 we organized a census in 16 SPA and IBAs with suitable habitat characteristics for the roller (open areas with extensive agriculture and pastures). The census include two visits to all buildings/human structures potentially suitable for rollers. Results from the census confirmed the range contraction and the concentration of the population in a single SPA.
- We didn't find any breeding pairs in the northern area since around the Tejo Internacional SPA all the nests are located in trees and outside the protected area



The status of the European Roller in Portugal



2009 national estimate:
64-100 breeding pairs

(report under Article 12, Birds Directive, 2008-2012)

3-4 pairs

1 pair

0-1 pair

52-55 pairs

57-62 pairs



- Notes from previous slide
- Based on this survey, we have estimated the national population at 64-100 breeding pairs and this is the last estimative for the Portuguese population.



Country	Breeding pairs.	Quality	Year(s) of the latest estimate	Breeding Population trend in the last 15 years (= 3 generations)	Quality
Albania	10-50	M	2002	decline	P
Armenia	300-650	M	2000-2002	stable	M
Austria	10-18	G	2001-2008	stable	G
Azerbaijan	1000-5000	P	1996-2000	stable	P
Belarus	20-50	M	2008	large decline	M
Bulgaria	2.5-5.5	M	1990-2005	small increase	M
Croatia	0-5	M	2002	large decline	P
Cyprus	2000-4000	P	1994-2000	small increase	P
Czech Republic	0	G	2000	extinct	
Estonia	1-5	G	2003-2007	moderate decline	M
France	800-1000	M	2007	moderate increase	M
Georgia	present				
Greece	200-300	P	1995-2000	small decline	P
Hungary	1000	G	2007	stable	G
Italy	300-400	P	2003	stable	P
Latvia	20-30	G	2005	large decline	M
Lithuania	35-50	G	2007	large decline	G
Macedonia, the Former Republic of Yugoslav	300-1000	P		moderate decline	P
Moldova	50-80	M		large decline	P
Poland	60-80	G	2007	moderate decline	M
Portugal	80-150	M	2001-2005	moderate decline	P
Romania	4600-6500	P	2002	small decline	P
Russia (European)	6000-6500	P	1990-2000	moderate decline	M
Serbia	70-120	M	2007-2008	small increase	M
Slovakia	1-20	P	2008	large decline	P
Slovenia	0	M	2008	possibly extinct	M
Spain	2000-6000	M	2006	moderate decline	P
Turkey	30 000-60 000	P	2001	moderate decline	P
Ukraine	4000-5000	M	1990-2000	large decline	G

Population size and trend between 2000-2016 in your country.

- 64-100 (2009)
(medium quality)
- moderate decline (poor)

Population size and trend by country
(BirdLife International 2008).

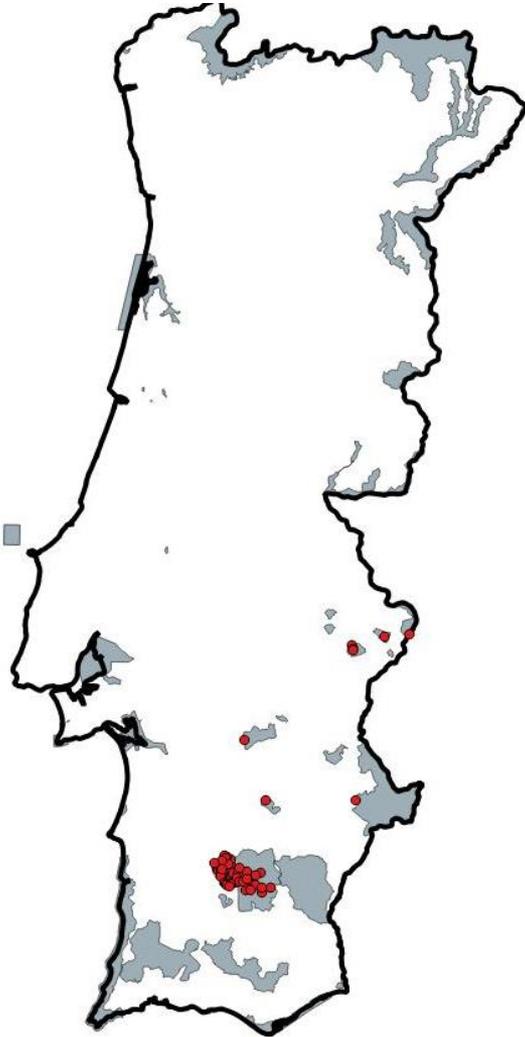
Notes: G – Good; M – Medium; P – Poor.



- Notes from previous slide
- So, in the 2008 Action Plan report the pop was estimated 80-150 breeding pairs with a moderate decline. My suggestion is to change it to 64-100 breeding pairs



What are the main threats for rollers in Portugal?





- Notes from previous slide
- Before stating the threats I guess it is important to give an idea of the habitat type occupied by rollers in Portugal. Most of the pairs are found in open treeless landscapes, areas with traditional extensive agriculture of cereals with large areas of fallow land and pastures and low grazing pressure.





- Notes from previous slide
- In such areas where trees are lacking, nests are frequently located in human buildings and artificial nest-sites. Many times in abandoned buildings.



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- Notes from previous slide
- Many rollers in the Castro Verde SPA benefited from the provisioning of nest-sites for lesser kestrels. Breeding walls and towers, clay pots, wooden nest-boxes and cavities in buildings were provided in the last decades to improve the nesting habitat of lesser kestrels. And rollers took advantage of this situation and occupied all kinds of provided nests.
- Apart from Castro Verde, few nest-sites have been provided for rollers.



What are the main threats for rollers in Portugal?

Critical:

- Increase in monoculture: intensive olive plantation and fodder
- Conversion of permanent grasslands to other land use
- Steep declines in the extent of fallow land
- Increase of irrigated crops
- Collapse of old buildings and renovation



High:

- Land abandonment (abandonment of pastoral systems, lack of grazing)
- Intensive grazing (increasing grazing pressure and replacement of traditional systems of extensive sheep grazing by more rewarding cattle production systems)
- Competing species for nest sites
- Afforestation of pastures



- Notes from previous slide
- Thus, most threats related with decreasing suitability of foraging habitat and availability of nest-sites. And these factors were most likely the causes of declines in past distribution ranges.
- In Portugal, most of the areas used in the past by rollers suffered large habitat losses in the last decades, showing declines in the extent of fallow land, cereal and legume fields, and increases of unsuitable habitats, such as irrigated crops, intensive olive plantation.
- Subsidies are encouraging cattle production systems and previous studies have shown that intensive grazing has a negative effect on prey populations.



What are the main threats for rollers in Portugal?

Medium:

- Use of biocides, hormones and chemicals;
- Removal of dead and dying trees;
- Electricity and phone lines (electrocution);
- Human disturbance (locally);
- Predation



Please list any long term threats that have no solution yet? Habitat and nest-site loss

Please list any threats that started fairly recently? Replacement of sheep by cattle

Please list any threats that have been solved/or gotten better since the last ISAP (2008) application of anti-collision and anti-electrocution measures (e.g. 40km of power lines in the Castro Verde SPA)



- Notes from previous slide
- The measures applied to minimize the danger of electrocution of birds were the covering of supports of the power lines through the application of cable looms and coatings and by converting horizontal conductors into the vertical position.
- anti-electrocution measures: Bird Flight Diverters



Have there been any changes in your country regarding the policies and legislations relevant to the management of the species?
What percentage of the breeding territories are protected?

- > 50% (57-89%) of the population inside SPAs
- Majority of the population in a single SPA (Castro Verde)

2008:

- Designation of 4 new SPAs where the breeding of the species occurs: Vila Fernando, Évora, S.Vicente, Cuba.
- Two SPAs were increased: Moura-Mourão-Barrancos and Castro Verde (due to a compensation measure from a highway construction) but did not include all the nests in the area.



Have there been any changes in your country regarding the policies and legislations relevant to the management of the species?

2008:

- Agro-environmental measures made available for farmers who can voluntarily apply, as part of the Rural Development Program (Proder) of the Common Agricultural Policy (CAP) of the European Union.
- These Agro-Environmental Measures are currently available for several SPAs through the Integrated Territorial Intervention (ITI) of Castro Verde and Alentejo Nature Network Areas
- In these ITI the “Cereal-Fallow Rotation” Agro-environmental measure includes the main rules of agricultural management that are compatible with the conservation of the steppe habitat, namely the proportion of fallows (superior to 50%), the restriction of work during the nesting period or the growth of specific crops for steppe birds, among others.



The case of the Castro Verde SPA ~ 85 000 ha



very extensive
agricultural practices and
low densities of trees

- 1) the implementation, in 1995, of the agri- environmental measure “Castro Verde Zonal Plan”, that aims to maintain favourable feeding habitat for a range of steppe-birds;
- 2) the high availability of adobe-built structures and the massive provisioning of artificial nest-sites.



- Notes from previous slide
- If adopted this could be a very important step for the conservation of the roller.
- Most important area for a huge number of steppe bird species. Harbours the majority of lesser kestrels, rollers, great bustards, etc.
- In the Castro Verde SPA (which harbours 80% of the Portuguese population) there is a particularly good conservation context where the implementation of conservation actions coincide with the existence of an agri-environmental measure “Castro Verde Zonal Plan” that aims to maintain favourable feeding habitat for a range of steppe bird species,
- The presence and abundance of the species in the Castro Verde area, characterized by very extensive agricultural practices and low densities of trees, is probably the result of two main driving factors: 1) the implementation, in 1995, of the agri- environmental measure “Castro Verde Zonal Plan”, that aims to maintain favourable feeding habitat for a range of steppe-bird species (Moreira et al. 2007) and 2) the high availability of adobe-built structures and the massive provisioning of artificial nest-sites.



What is the main goal in your country regarding the roller population?



Maintain suitable nest-sites and foraging habitat
Highly dependent on the Common Agricultural Policy (CAP)



- Notes from previous slide
- The challenge is to maintain suitable foraging and nesting habitats



Please list the recent conservation activities (national species action plans, monitoring programmes, habitat restorations, research programmes) that are relevant to the species within your country.

2009 census in SPAs/IBAs:

- 1st national survey - breeding numbers in “pseudo-steppe” areas
- information on habitat and nest preferences (Catry et al. 2011)



2010-2012: conservation of Great Bustard, Little Bustard and Lesser Kestrel in the Baixo Alentejo cereal steppes

Monitoring programme (from 2009 onwards):

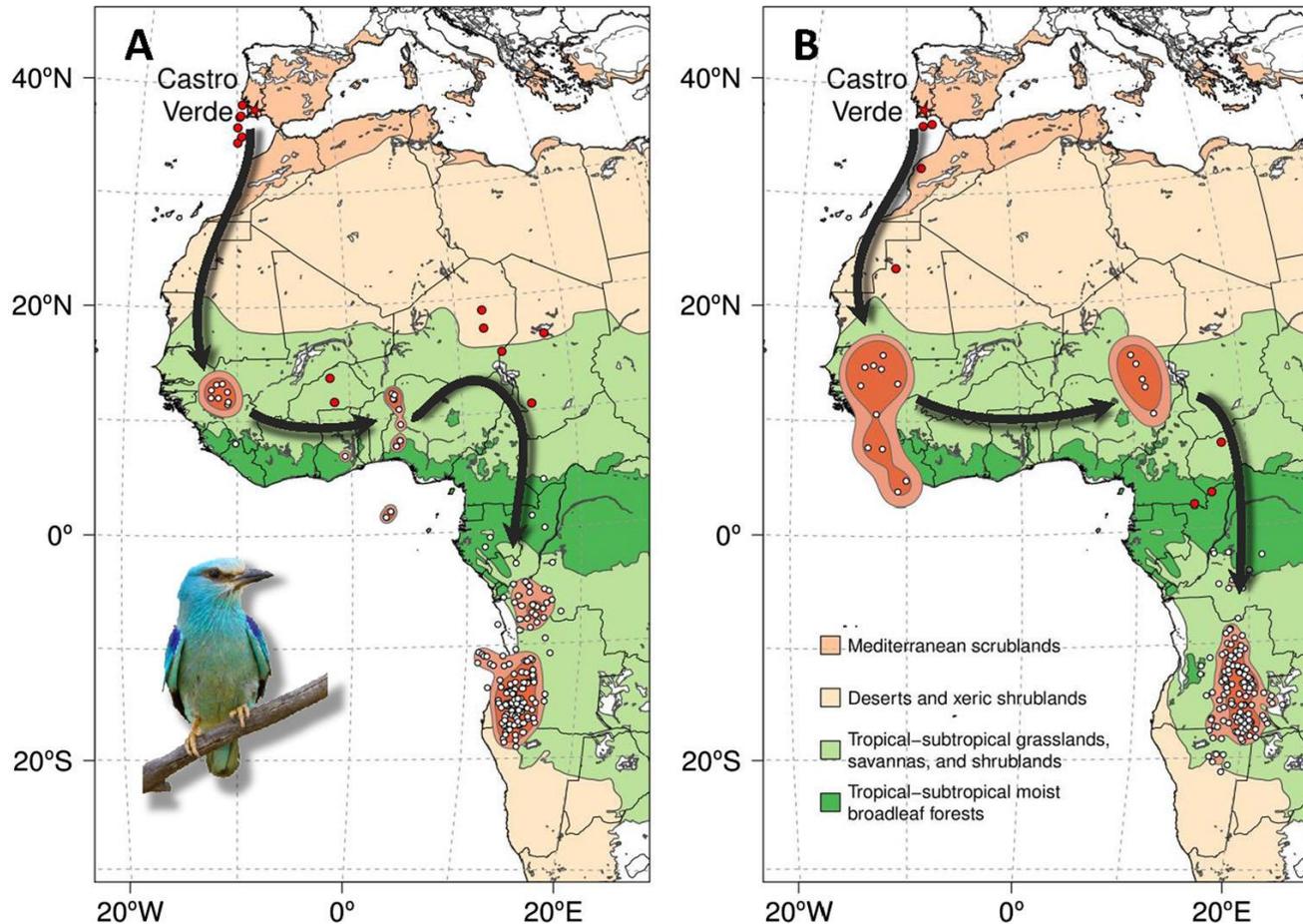
40 nests/year – breeding parameters

Ringling of adults and chicks (~150 per year) - colour rings



Relevant research for the conservation of the roller

Unravelling migration routes and wintering grounds of European rollers using light-level geolocators ([Catry et al. 2014, *Journal of Ornithology*](#))





Relevant research for the conservation of the roller

Habitat selection:

Landscape determinants of European roller foraging habitat: implications for the definition of agri-environmental measures for species conservation
([Catry et al. 2016](#), *Biodiversity and Conservation*)

- 95% fixed Kernel estimators averaged 70.9 ha (range = 34-118 ha)
- most foraging trips (80%) occurred in the close vicinity of the nest (< 500 m)

Overall, our results suggest that traditional extensive practices of cereal cultivation, with large areas of low-intensity grazed fallows, represent a high-quality foraging habitat for rollers and should be promoted through agri-environmental schemes within at least 1-km radius from the nest.

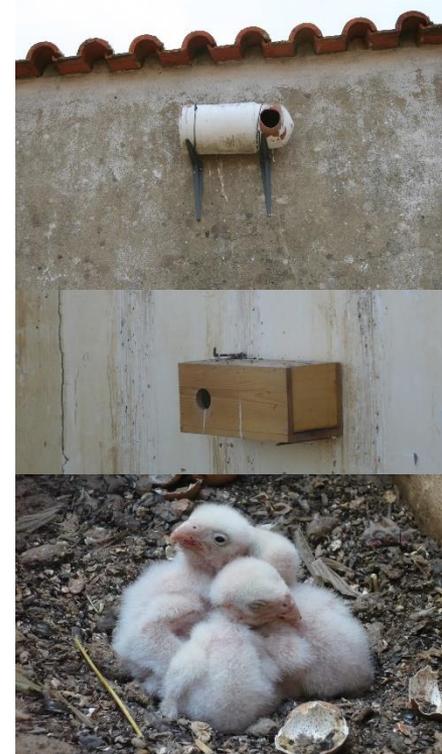
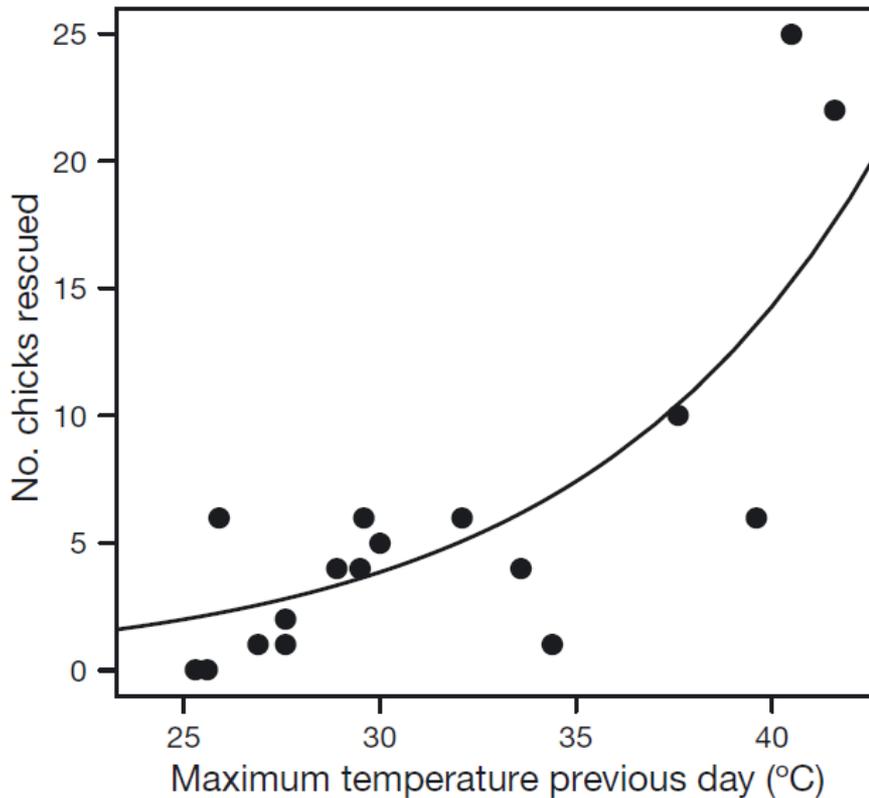


- Notes from previous slide
- Research on Habitat selection:
Traditional olive groves and stubble fields were positively and negatively associated with the occurrence of rollers, respectively.
Additionally, analysis of hunting strikes showed that rollers highly prefer foraging in fallows (higher abundance of grasshoppers) rather than cereal or stubble fields.



Relevant research for the conservation of the roller

Heat-related die-offs due to extreme weather events:
Impacts of high temperatures on the growth and survival of lesser kestrels



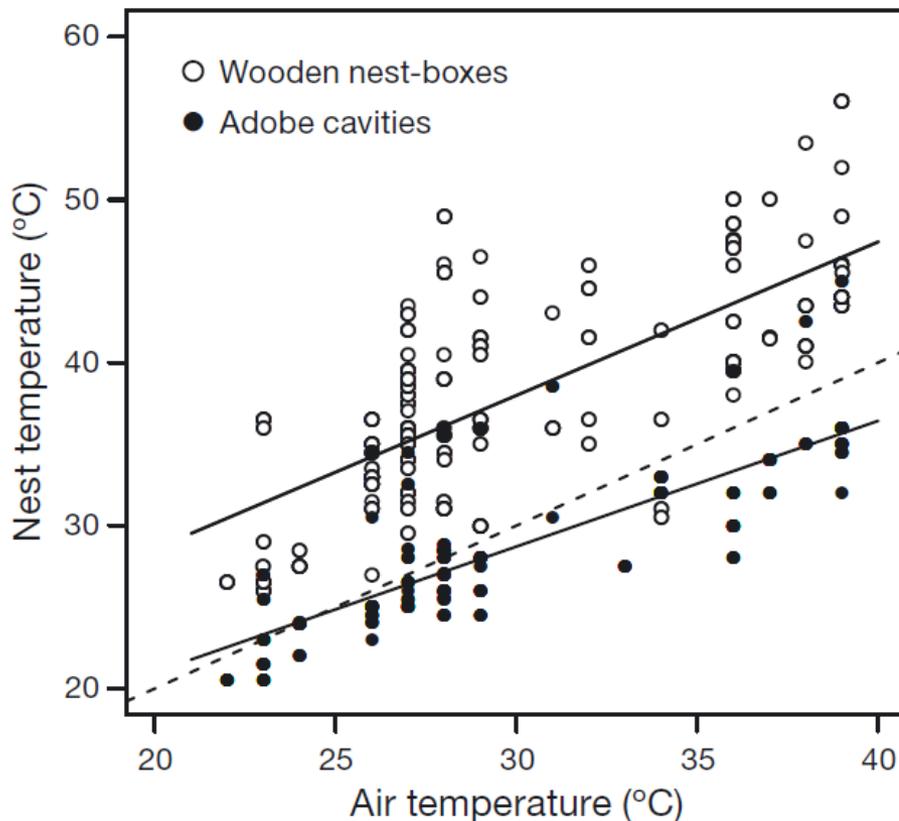


- Notes from previous slide
- Important research regarding nest-site provisioning for rollers, using our experience with lesser kestrels and under a climate warming scenario. The main distribution area of lesser kestrels and rollers is in Castro Verde, where air temperatures during the breeding season regularly achieve 40°.
- Within our work with lesser kestrels we noticed that in very hot days, lesser kestrel chicks (especially younger ones) couldn't survive inside some nests and that the predicted probability of mortality increased with increasing air temperatures.



Relevant research for the conservation of the roller

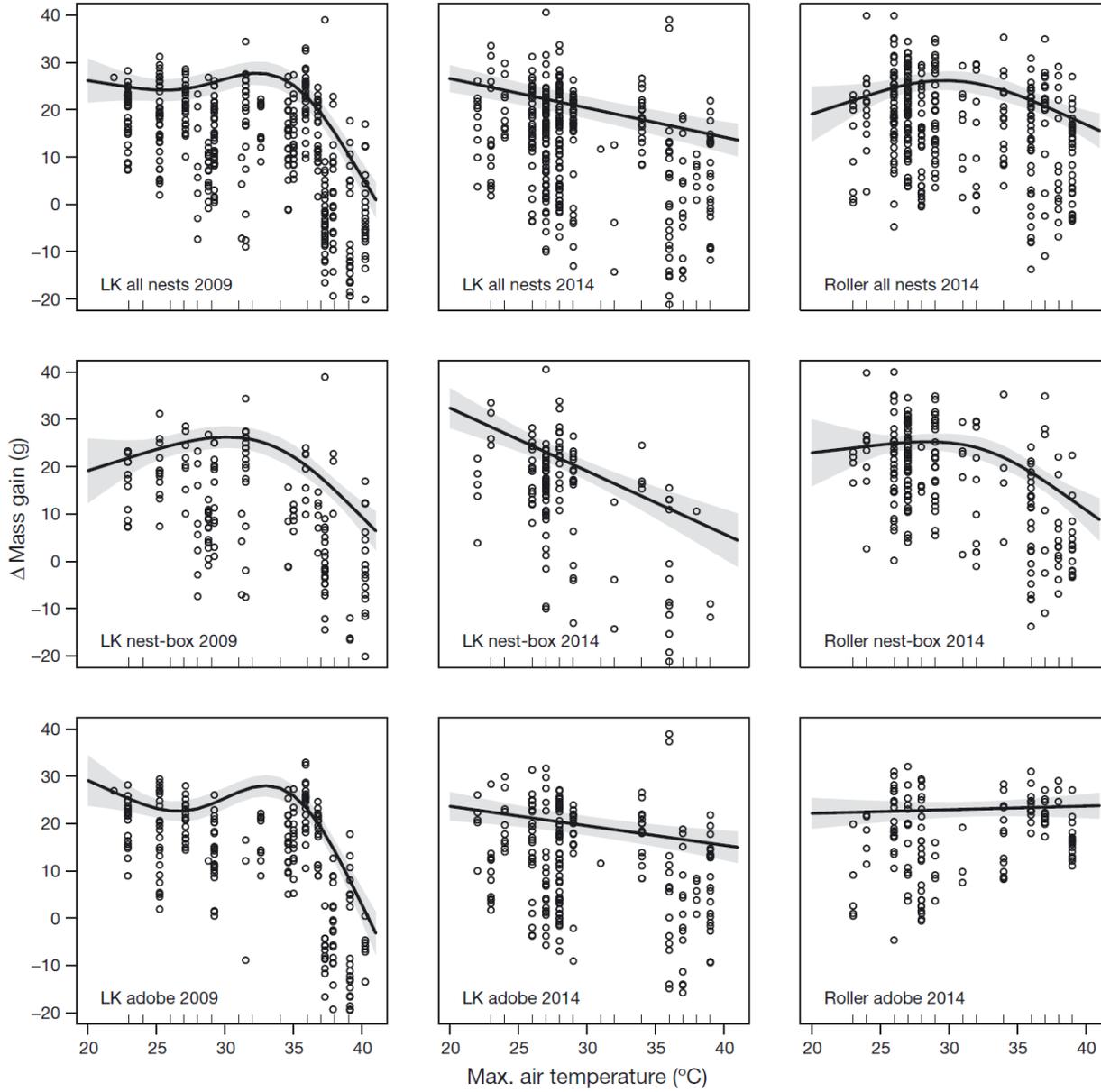
Differential heat tolerance in nestlings suggests sympatric species may face different climate change risks ([Catry et al. 2015, *Climate Research*](#))



Fatal hyperthermia among Lesser Kestrels (36% mortality) but not among Rollers (even with $T > 50^{\circ}$)

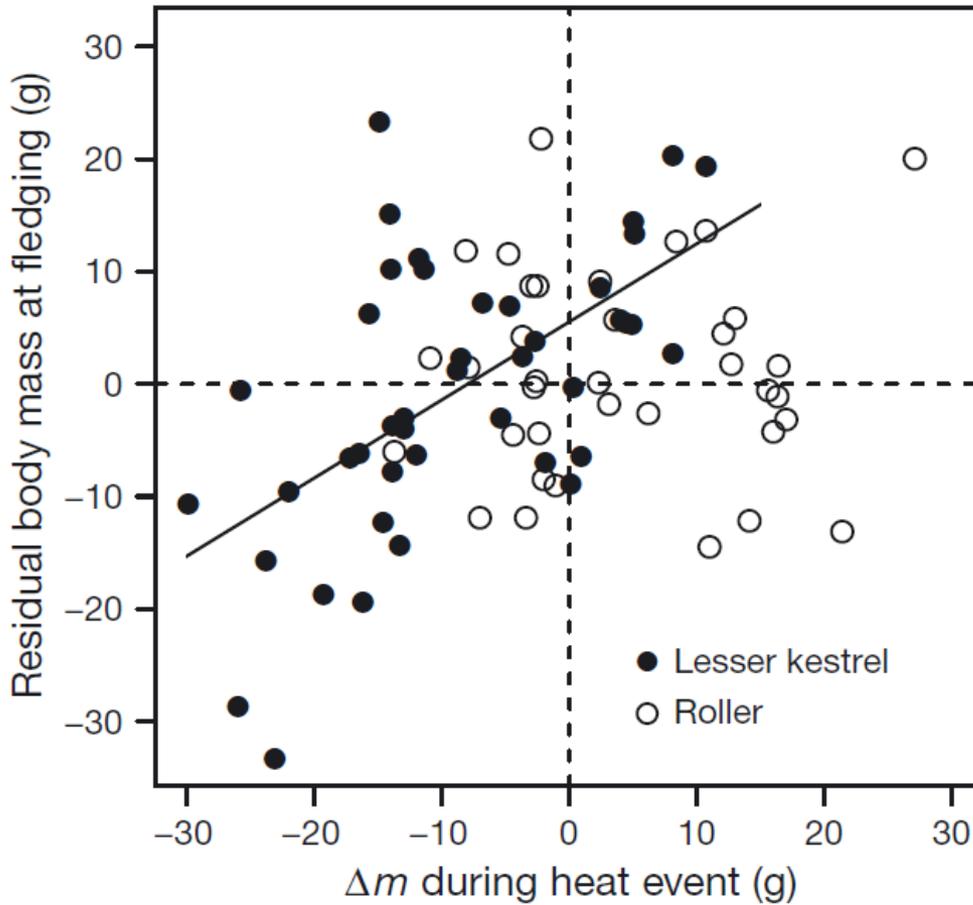


- Notes from previous slide
- Thus, we decided to investigate what was going on with rollers. We knew that different nests had different inside temperatures and that some nests (especially wooden nest-boxes facing south) could achieve more than 50° C in very hot days. We've checked nests every two days to relate temperature with chick survival and growth.





- Notes from previous slide
- Results of the GAMM models show a species specific response to increasing air temperatures. While among lesser kestrels rates of mass gain significantly decreased with increasing temperatures in both
- wooden nest-boxes and adobe cavities, rollers were only affected in wooden nest-boxes, and not at cooler adobe cavities.
- Air temperature thresholds above which mass gain rates are predicted to decrease were lower in lesser kestrels than in rollers occupying nest-boxes, suggesting a higher vulnerability of lesser kestrels to increasing temperatures.
- During hot days, nestling mass gain declined significantly, whilst no changes in wing length were detected. Lesser kestrels lost up to 30 g (27%) and rollers up to 14 g (10%) of body mass, suggesting
- a direct physiological effect of thermoregulation on body condition.





- Notes from previous slide
- Rollers exhibited greater resilience to heat than lesser kestrels, surviving nest temperatures approaching 50°C and recovering from mass losses, suggesting that nestling development is plastic enough to
- buffer the constraints
- Body mass change during a heat event significantly affected residual body mass at fledging of lesser kestrels but not of rollers, showing that lesser kestrels, contrarily to rollers, do not recover totally from previous mass losses during growth imposed by occasional hot days.



Relevant research for the conservation of the roller

Ardeola 64(1), 2017, XX-XX

DOI: 10.13157/arla.64.1.2017.sc5

FIRST RECORD OF SOCIAL POLYGYNY WITH MULTI-BROOD PATERNAL CARE IN THE EUROPEAN ROLLER *CORACIAS GARRULUS*

we recorded a male Roller simultaneously attending two neighbouring nests throughout the incubation and chick-rearing periods

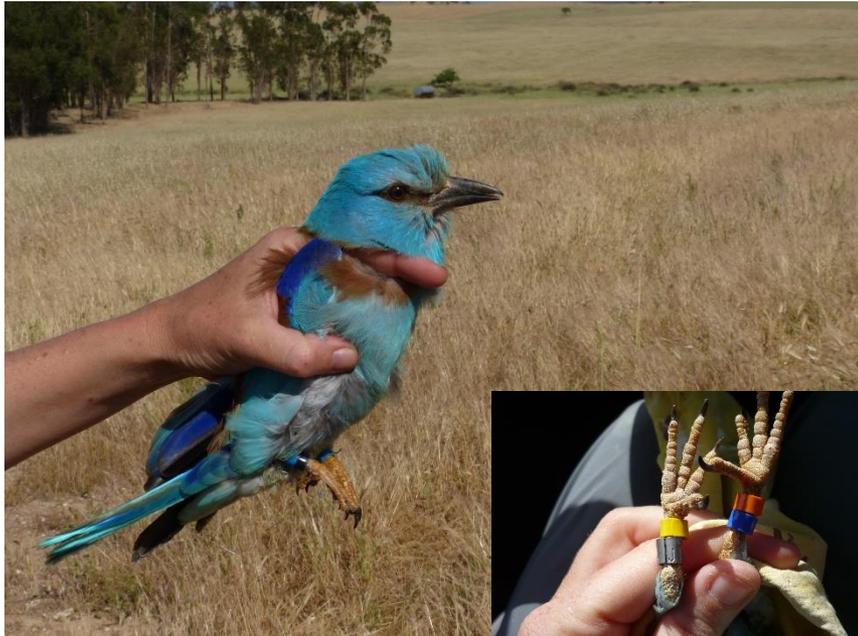




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Ongoing and future research in Portugal



- Nest monitoring
- Survival analysis
- Diet (pellets and stable isotopes)
- 2017 census in the Castro Verde SPA



Please explain your monitoring methods.



April-May:

search for nests and identify the parents in each nest
ringing adults



May-July:

visits once a week to estimate breeding parameters
(laying date, # fledglings, etc)



June-July:

ring all chicks with unique colour combinations
blood and feathers samples



Please list all the goals and actions from the last ISAP (2008) that are now considered complete

1.1.3 Develop site management plans for Roller priority areas or include Roller conservation measures in existing ones

The provisioning of new nest-sites for lesser kestrels and rollers (new nests in old buildings but also new structures) is encouraged through the ITI agro-environmental measures – 100% eligible expense for reimbursement.

1.2.1. Develop monitoring schemes and implement annual monitoring on Roller populations and breeding success.

Annual nest monitoring (since 2009, ~40 pairs/year), ringing, etc

1.2.2. Fill critical knowledge gaps, develop and implement research plans focusing on Roller mortality, survival rates, factors influencing productivity and factors limiting expansion - **ongoing**



Please list all the goals and actions from the last ISAP (2008) that are now considered complete.

1.2.4. Design and promote best practice agro-environmental measures targeting Roller.

Studies on habitat selection and identification of best agricultural practices

1.2.6. Develop best practice guide for nest box placement, design and maintenance to reduce nest site competition with other species and natural predation.

Potential problems identified; best nest materials, design and placement identified.

1.3.1 Raise the awareness about the value and conservation status of the Roller among key stakeholders (nature conservation organisations, landowners, farmers, experts on chemical plant protection, foresters, municipalities, electric utilities, urban and infrastructure development planners, general public

League for the Protection of Nature (LPN) - actions with general public and farmers



Please list all the goals and actions from the last ISAP (2008) that are now considered complete.

2.2.7 Provide alternative nest sites (nest boxes) near old buildings with nests to avoid nest-site destruction.

National NGO projects from 2003 include nests-site provisioning in some areas

2.3.1 Promote international cooperation for the study of Roller movements and the threats along flyways.

Finch et al. 2015 - first large-scale analysis of migration patterns and migratory connectivity

2.3.2. Promote bird friendly electric pylon design. Replace or modify or retrofit power lines to prevent Roller electrocution in priority areas.

ICNB, Electric companies and NGO's are acting together in minimising the impact of dangerous power lines (application of anti-collision and anti-electrocution measures in 40km of power lines in the Castro Verde SPA).



Please list new objectives that should be incorporated in the new ISAP.

Research on the species distribution and ecology in the non-breeding range:

- Identify threats and promote conservation measures;
- Wintering areas and stopover sites.

Research on the effects of climate change

- Impacts on breeding success and distribution range
- Identification of mitigation measures



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Thank you!



Range states	Breeding	Migration	Wintering
Albania	yes	No	no
Armenia	yes	No	no
Austria	yes	Yes	no
Azerbaijan	yes	No	no
Belarus	yes	No	no
Bosnia and Herzegovina	yes	No	no
Bulgaria	yes	Yes	no
Croatia	yes	No	no
Cyprus	yes	Yes	no
Czech Republic	extinct	No	no
Estonia	extinct	No	no
France	yes	Yes	no
Georgia	yes	No	no
Greece	yes	Yes	no
Hungary	yes	Yes	no
Italy	yes	No	no
Latvia	yes	Yes	no
Lithuania	yes	No	no
Macedonia, the former Yugoslav Republic of	yes	No	no
Montenegro	yes	No	no
Moldova	yes	Yes	no
Poland	yes	Yes	no
Portugal	yes	Yes	no
Romania	yes	Yes	no
Russia (European)	yes	No	no
Serbia	yes	Yes	no
Slovakia	yes	Yes	no
Slovenia	extinct	No	no
Spain	yes	Yes	no
Turkey	yes	Yes	no
Ukraine	yes	Yes	no

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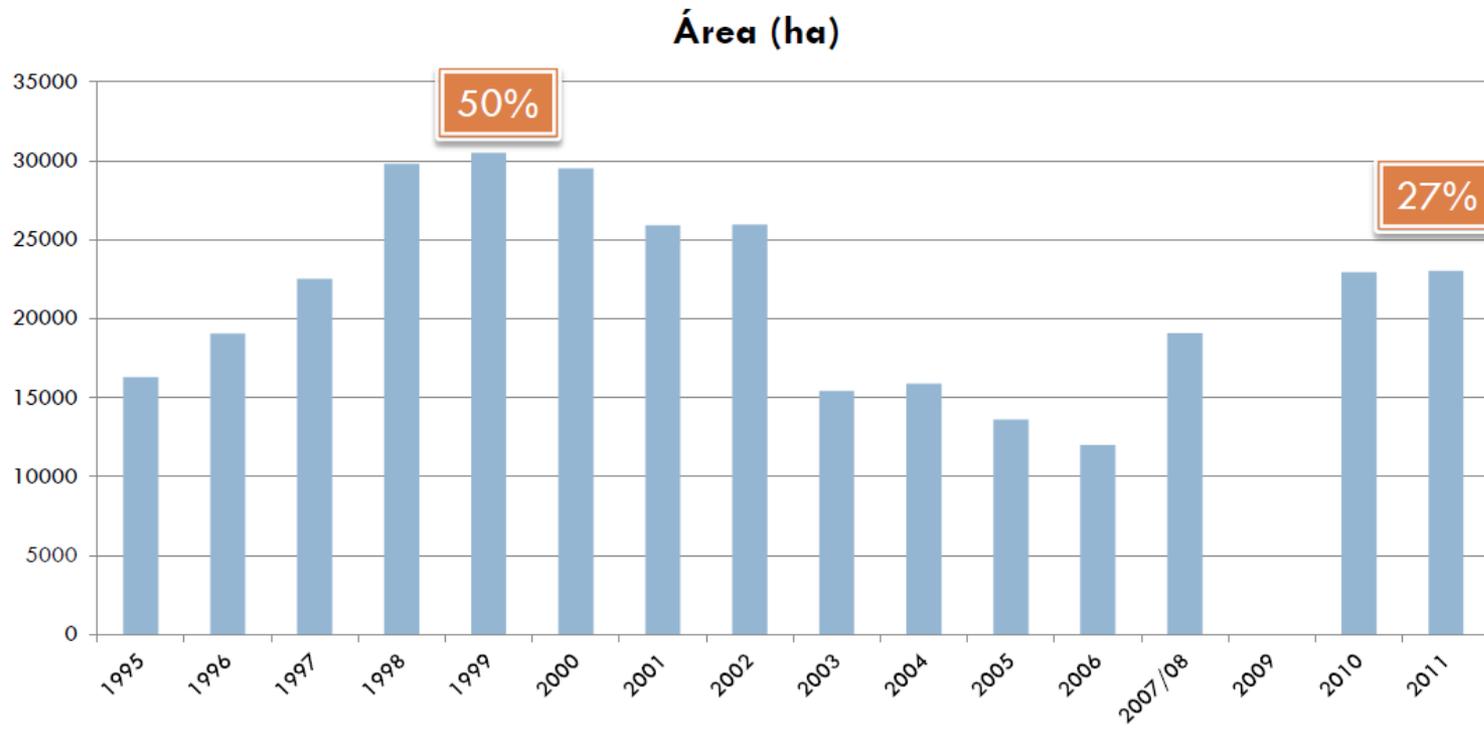
Table 1. European range states of the European Roller. Member states of the EU in bold (BirdLife International 2008).



The case of the Castro Verde SPA

1995: agri-environmental measure “Castro Verde Zonal Plan”

2008: enlarged and ITI (Integrated Territorial Intervention) but ...
subsidies (€€) for farmers are the same as 15 years ago





decline of traditional systems
of extensive sheep grazing and
their eventual replacement by
more rewarding cattle
production systems



Increase nest-site availability
for lesser kestrels and rollers
(providing new nests in old
buildings and new structures)

