Do hunting bag changes match the population trends of Turtle Dove? The case of Spain.

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General Introduction

Population trends

Hunting

Population and Hunting trends

General conclusions

Talk structure
General Introduction


- Western Flyway, population of 9 countries
- Strong decline in Europe = -79% (1980-2014)
- Several causes could explain the decline
- Since 2015 up-listed as **vulnerable**.
- Spain → 3.5 millions of individuals (2004-2006) about 90% of the total Western Flyway population.
European countries where TDs are hunted

1. **Spain** → 800,000
2. Greece
3. Italy
4. **Portugal** → 190,000
5. Bulgaria
6. **France** → 91,704
7. Cyprus
8. Austria
9. Malta
10. Slovakia
11. Romania

How are breeding populations in Spain changing?

- Data from monitoring programmes for the common breeding species (SACRE, SEO/birdlife)

- SACRE
  - Squares 10 x 10
  - 20 points
  - 2 visits
    - 15 April - 15 May
    - 15 May - 15 June
How are breeding populations in Spain changing?

Statistics analysis

Data used:

- Maximum turtle dove numbers per square
- Data since 15th of May to avoid Migrants

GLM $\Rightarrow$ Zero inflated, Negative Binomial distribution.

Explanatory variables $\Rightarrow$ squares+ year

\[ \text{Weight} = \frac{1}{\frac{\text{Surface}_{\text{sampled}}}{T.\text{surface}_{\text{province}}}} \]
How are breeding populations in Spain changing?

- Decline of 2.9 % per year
- ≈ 44% since 1996
How are breeding populations in **Western Flyway** changing?

- Combined the annual monitoring indices for each country with population estimates (from a single point in time) to construct a population change history for the entire flyway.
  - Spain
  - Denmark
  - United kingdom
  - Italy**
  - Portugal
  - Netherlands
  - Switzerland
  - Belgium
  - France
  - Germany

- Overall decline of 57% in 16 years
- 5.1 % per annum
How have hunting bags in Spain changed through time?

- Data from official hunting statistics collected from annual hunting reports

Under-reporting problems

MISSING DATA

INCOMPLETE REPORTING

DATA COLLECTION

GLM

“predicted”

“completed”

Hunting estates

National

Regional

Province
How have hunting bags in Spain changed through time?

To predict the NAs -> GLM with province, year and region*year, as variables.
How have hunting bags in Spain changed through time?

- Under-reporting
- Turtle dove hunting has not increased
- Underestimated hunting bags
Hunting Bags

How have hunting bags in Spain changed through the TERRITORY?

Response variable: hunting bags (completed & predicted)
Explanatory variables: province + year + region*year

Regional hunting trends:
- Not significant decline
- Significant decline
- Not significant increase

TDs hunted annually:
- No data
- No hunting
- < 3,000
- 3,000 - 10,000
- 10,000 - 20,000
- 20,000 - 40,000
- 50,000 - 113,000

GLM, Negative binomial distribution
Changes in the numbers of turtle doves breeding and hunted in **Spain**

- From 2007-2014
  - Hunting -16%
  - Spanish population -27%
  - Western flyway population -31%

Changes in the numbers of turtle doves breeding in **Western Flyway population** and hunted in Spain

- Hunting
- Spanish population
- Western flyway population

Population & Hunting Bags
What proportion of the Western Flyway population is extracted by hunting in Spain?

- Population size in Western Flyway countries considering productivity intervals. Hunting bags in Spain are considered for each year with data “completed & predicted”.

<table>
<thead>
<tr>
<th>Productivity Interval</th>
<th>Min Population Min. Productivity</th>
<th>Min population Max. Productivity</th>
<th>Max population Min. Productivity</th>
<th>Max population Max productivty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25 %</td>
<td>16 %</td>
<td>12 %</td>
<td>8 %</td>
</tr>
</tbody>
</table>

Productivity intervals from:
Browne & Aebischer 2004
Fontoura & Dias 1995
General conclusions

- Turtle Dove is **declining** around 44% since 1996 with a decline of 2.9% per annum in Spain and 57% in the Western flyway population from 1998.

- Between 2007-14, hunting bags fell more slowly (16%) than either the Spanish (-27%) or the western flyway (-31%) population.

- **Hunting bags underestimate** true hunting levels although official reports have become more accurate over recent years.

- Hunting pressure **increased** during 2007-9, but has remained fairly stable since.

- Up to 25% of the western flyway population may be shot in Spain alone.
Future Work

- We need better information on breeding productivity and survival.
- Improve hunting statistics.
- Estimate origins of turtle doves hunted.
- Assess the sustainability of hunting.
Thanks for your attention!

Questions?

Acknowledgements to:

All the collaborating hunters