CONSERVATION OF A RAPTOR IN AN INTENSIVELY CULTIVATED AGROECOSYSTEM: THE CASE OF LESSER KESTREL (*Falco naumanni*) IN THESSALY PLAIN, CENTRAL GREECE

Sfougaris A., Alivizatos C., Giannakopoulos A., Weigelt C.

Department of Agriculture, Crop Production and Rural Environment, University of Thessaly, Volos, Greece

Department of Landscape Use and Nature Protection, Applied University of Sciences of Eberswalde, Berlin, Germany
Lesser kestrel distribution

The lesser kestrel (*Falco naumanni*) is a small, hole-nesting colonial falcon.

In the past it was considered as one of the most abundant European birds of prey.

It has a Palearctic distribution, south of 55°N and breeds in the Mediterranean countries and as far east as north-east China.

In winter it migrates in large numbers to Africa and in smaller numbers to India.
Εικόνα 1. Παγκόσμια εξάπλωση του κιρκινεζιού.
Lesser kestrel breeding pairs in European Union.
POPULATION

The population of the lesser kestrel has suffered a strong population decline throughout its range.

It is now classified as a globally threatened species.

Its European population (including that of Turkey) has been estimated at 10,000-17,000 pairs [Tucker et al. (1994)].
Lesser kestrel distribution in Greece.
In present days it has disappeared from many European countries as well as from many areas of Greece.

GREECE

It is legally protected and included in the Red Data Book of Greece as a Vulnerable species.

The Thessaly region supports the largest and most important lesser kestrel population in Greece.
POSSIBLE CAUSES OF THE LESSER KESTREL POPULATION DECLINE

• The use of pesticides
• Land-use and agroecosystems structure changes
• Nest-site availability
• Interspecific competition with other hole-nesting birds
• The loss of non-intensively cultivated landscapes
HABITAT AND NESTING

The lesser kestrel is a bird of the open country. It occurs in continental and forest steppes and semi-deserts, up to an altitude of 500 m.

Breeding colonies are mostly located in buildings within towns and villages, surrounded by non-intensively cultivated landscapes.

Only a few nests are located in natural habitats like rock-, cliff- and tree holes. In Thessaly, they can be frequently seen breeding together with other bird species, like pigeon, collared dove and jackdaw.
MATERIAL AND METHODS

POPULATION

Three researchers were taking observations on the number of lesser kestrels flying over the colony. This figure was being incremented by 40%, to include the individuals flying away in search for food or hiding in appropriate places. Then, 10% was subtracted as the proportion of young individuals not participating in the breeding. Finally, the resulting figure was divided by a factor of 2 in order to estimate the pairs.
DIET

The diet was studied by analyzing 3,564 pellets from 16 roosting sites, representative to species distribution.

Reference collections of insects and other invertebrates were made in order to facilitate the identification of the prey.
Land uses and prey availability of each habitat were investigated following the method proposed by Parr *et al.*, 1997.

The method of Tella *et al.*, 1999, was followed for habitat selection measures.
These parameters were recorded by choosing 3 transects, of 2 Km each, for every selected village. The proportion of the area occupied by each type of crop (land use) was recorded.

Potential prey was sampled in five 20x0.5m walked transects, placed in each habitat recorded in the land use survey. The number of invertebrates and vertebrates were recorded by walking at a slow fixed speed.

The time that the bird hunted in the air or from a perch, and the number of hovering bouts were noted. Each bird observed foraging was counted only once to the habitat where it was first seen.
RESULTS

Distribution and population trends

In the 2003 survey, 102 lesser kestrel breeding colonies were found in the 210 villages surveyed in the Thessaly region.
2003: The **size of colonies** was generally small.

- 64% of colonies: up to 10 breeding pairs (b.p.) each
- 20% : 11-20 b.p.
- only 7% : over 30 b.p.

**Censuses of breeding population in Thessaly**

Breeding pairs

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>2,441</td>
</tr>
<tr>
<td>1999</td>
<td>1,158</td>
</tr>
<tr>
<td>2003</td>
<td>941</td>
</tr>
</tbody>
</table>

Years

1999, 2003: Sfougaris et al., unpubl. data
### Lesser kestrel changes in breeding pairs (b.p.) in Thessaly

<table>
<thead>
<tr>
<th>Years</th>
<th>b.p. changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995 – 1999</td>
<td>-52.6%</td>
</tr>
<tr>
<td>1999 – 2003</td>
<td>-8%</td>
</tr>
<tr>
<td>1995 – 2003</td>
<td>-56.4%</td>
</tr>
</tbody>
</table>

Number of colonies

1999: Sfougaris et al., unpubl. data
1995 – 2003 changes

Number of colonies

2003: Sfougaris et al., unpubl. data
Land uses in the study area.
HABITAT AVAILABILITY

• Dominant habitat: Cotton fields
• Cereals: also an extended crop
• Fallow land and grassland: smaller part of the habitat
HABITAT USE

HOVERING OBSERVATIONS:
• Cereals are the main foraging habitat.
• Fallow land and grassland are also important.
• Cotton fields were rarely selected, despite the fact that 49.8% of the study area is covered by cotton.

PERCHING OBSERVATIONS:
• Cereals are the main foraging habitat.
• Cotton, fallow land and grassland are also important.
FOOD AVAILABILITY

According to the literature:

• Orthoptera and coleoptera constitute over 90% of the total prey items taken by lesser kestrel.

• Other prey consumed: hymenoptera, odonata, lepidoptera and diptera.

Estimation of the main prey (orthoptera and coleoptera) availability in Thessaly:

Different habitats supply lesser kestrels with significantly different quantities of the main prey, as well as of all invertebrate prey.
It mainly feeds on insects (98.3%)

- Orthoptera (56.2%)
  families Tettigoniidae and Acrididae
- Coleoptera (32.3%)
  families Carabidae and Scarabidae
Other insects:

Hymenoptera
  family Formicidae
Dermaptera
  family Forficulidae
Hemiptera
  family Cicadidae

In small proportions:
Odonata, Mantodea, Lepidoptera and Diptera
Other prey categories:

Small mammals
Chilopoda
Mollusca
Birds (exclusively passerines)
Arachnida
Amphibians
Reptiles
Diet (prey biomass)

Insects (86%)

- Orthoptera (57%)
  - Families Tettigoniidae (42.4%)
  - Acrididae (12%)
- Coleoptera (24.8%)
  - Family Scarabidae (11.7%)

Small proportions:

- Hemiptera (mainly family Cicadidae)
- Dermaptera
The main threats for the lesser kestrel in Thessaly are:

(a) the loss of hunting areas and therefore the reduced availability of food due to agricultural intensification.

(b) the loss of nest sites due to the destruction and restoration of old buildings.

(c) pesticide use in its foraging habitat.
RECOMMENDATIONS
FOR THE CONSERVATION
OF THE LESSER KESTREL IN THESSALY

• Promotion of agricultural policies which maintain and enhance lesser kestrel habitat

An important tool in achieving this aim is the implementation of the Agri-environmental regulation (EU 2078/92) which favors fallow lands and cereals.
• The avoidance of further intensification of agriculture, at least in the key breeding and foraging habitats.

• The promotion of the crops preferred by the kestrels, i.e. cereals.

• To allow for uncultivated plots and hedges between fields, in order that good populations of insects to develop.

• The intensity of grazing on pasture land must be regulated in order to keep down vegetation so that invertebrate prey remain accessible (Biber 1990). Overgrazing must be avoided.
• Pesticide use in feeding habitats of the lesser kestrel must be regulated and alternative pest control techniques must be applied where possible (Biber 1990).

• The impact of pesticides on prey should be studied further in order to understand the true impacts of pesticides on lesser kestrel.

• If it is proved that nest sites are locally limited, artificial nests could be used.
• Monitoring of the population trends, as well as more research on its habitat requirements and the effects of the various farming management practices is essential.

• Public awareness especially focused on school children and farmers is an important parameter.
• Implementation of a national action plan for the lesser kestrel.

• The establishment of one or more rural areas of special management in Thessaly could contribute effectively to its conservation.
CONCLUSIONS

Conservation of the lesser kestrel is an important issue because of its global population decline.

The agricultural practices should accord with lesser kestrel conservation.

Intensive agriculture must turn to sustainable agriculture.
In Thessaly, recent land use changes have restricted the foraging habitat available to lesser kestrel and therefore prey availability.

The domination of cotton farming in the Thessaly plain has lead to the restriction of more suitable habitats, i.e. cereals, fallow land and grasslands.

Moreover, the intensive use of agrochemicals in cotton fields is a potential threat for the lesser kestrel.
In order to reverse the decline and secure the survival of the lesser kestrel, the reorientation of agricultural policy implemented in the Thessaly plain is needed.

The new policy should be targeted in a more diverse agricultural landscape with low input practices, less cotton and more cereal farming, and more uncultivated patches and grasslands. In the long run it will contribute to the enrichment of total biological diversity.
THANK YOU

FOR YOUR ATTENTION!