Diet composition and reproductive success of Eurasian kestrels in an agricultural area of central Italy

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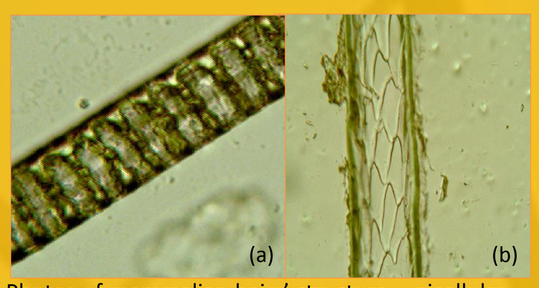
We analysed the diet of Eurasian kestrels breeding in an agricultural area of central Italy in relation to the reproductive success.

The birds used next boxes on power lines and in parallel to the collection of reproductive data we collected pellets and prey remains during a three-years period.

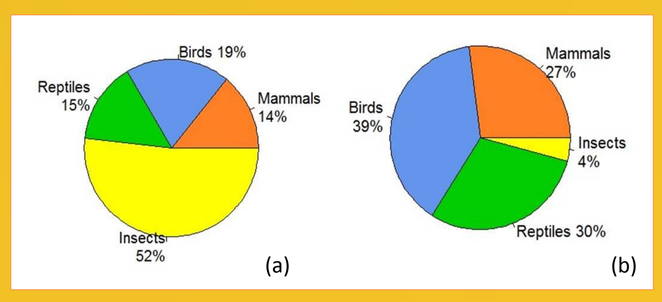
We described the diet composition of each breeding pair through pellets analysis and microscope analysis of hair structure of mammalian preys, using hair cuticle and *medulla* to recognize mammals at species level.



Photos of mammalian hairs' structure: unicellular *medulla* of *Muscardinus avellanarius* (a); scale pattern of *Apodemus flavicollis* cuticle (b).

Through the analysis of 335 pellets we recorded 1405 prey items, corresponding to 14823.2 g of biomass.

All preys were identified at class level (Mammals, Birds, Reptiles or Insects), while the number of preys identified at lower levels (family, genus or species) was 1092 (72% of total preys amount).



Average diet composition of 25 breeding pairs: number of prey irems (a); biomass contribution (b).

During two years, a maximum of 25 different nest boxes have been successfully occupied (72%) with an average laying date between 24 and 28 of April.

The mean *per* pair production consisted of (4.2±0.14) eggs and (3.13±0.22) juvenile fledged, with a fledging rate of 75%.

Juveniles neare to fledge.

Among mammals, the most common preys are *Microtus savii* (30% of identified mammals), *Apodemus sp.* (26%) and *Myodes glareolus* (16%).

Among reptiles the most common prey is *Lacerta bilineata* (25%)

The most represented bird preys belong to the genus *Passer* (21%)

The class *Insecta* was the most hunted but its biomass contribution amounts to 4% only.
The most represented orders are *Coleoptera* (72%, of which 50% are *Pentodon bidens*) and *Orthoptera* (22%, of which 88% *Acrididae*).

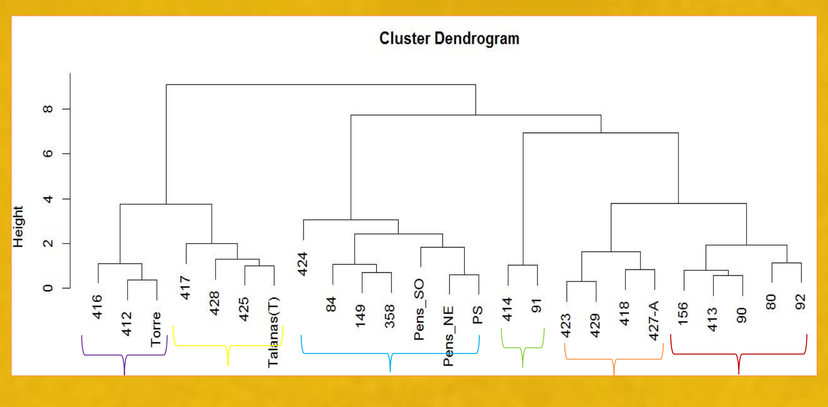
Results have shown a wide prey spectrum of the monitored population, but the comparison of diet composition between the 25 breeding pairs outlines a clear differentiation in prey selection and the existence of groups with similar food preferences.

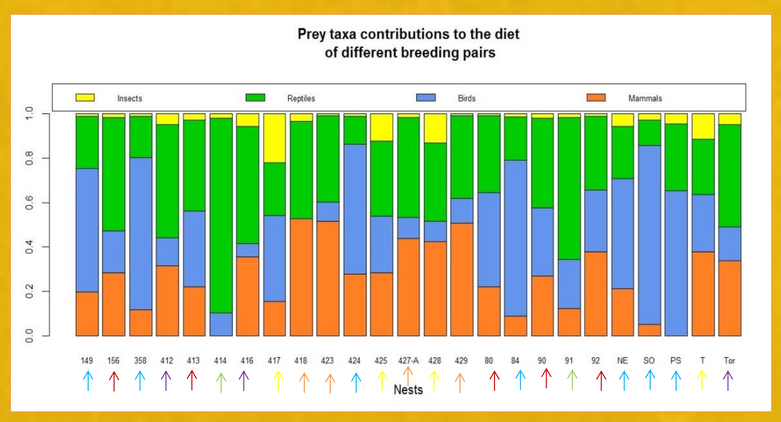
Furthermore, results from linear regression models on compositional data show that differences in diet composition have no influence on the reproductive success (clutch size, number of fledglings) of our population.

Biomass contribution of each prey category to diet composition of the 25 monitored breeding pairs.

Dendrogram show groups of pairs with similar food preferences, while barplot outlined the same pairs with the corresponding colours:

Violet: few birds and more mammals and reptiles in diet.
Yellow: great insect contribution.
Blue: much birds.
Green: much reptiles.
Orange: great mammals contribution.
Red: more generalist diet.

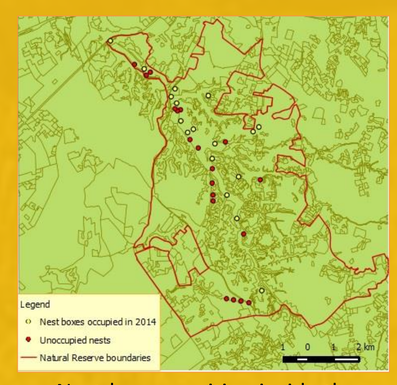




Previous studies reported a generalist diet in kestrels breeding in Mediterranean areas and related this to availability of different prey types and to an opportunistic behaviour [1,3-5].

Nevertheless in our study area, considering the proximity of different nest boxes, the hunting grounds of neighboring breeding pairs overlap widely, probably offering a similar availability of prey types.

Moreover, diet composition seems to be unaffected by the laying date of different breeding pairs, although the availability of prey types may change along the breeding season.



Nest-boxes position inside the study area.

Therefore, the observed differences in prey selection among pairs could be associated with different individual food preferences, instead of an opportunistic use of food resources, as recent behavioral studies suggest [2,6,7].
However, the absence of effects of the different pair's diet composition on its reproductive performance suggests that individual food preferences are not maladaptive.

In conclusion, provisioning artificial nest sites in the study area allowed us to establish a population of European kestrel; this proved to be a successful strategy for the conservation of this species in an agricultural environment, while also opening up the possibility to collect useful information about its diet, reproductive performance and individual behaviour in an anthropized environment.

References:
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