Programme & Abstract Book

31st IUGB Congress

27>29.08.13

BRUSSELS - BELGIUM

P.TL.12 - Use of pellet count in the European hare

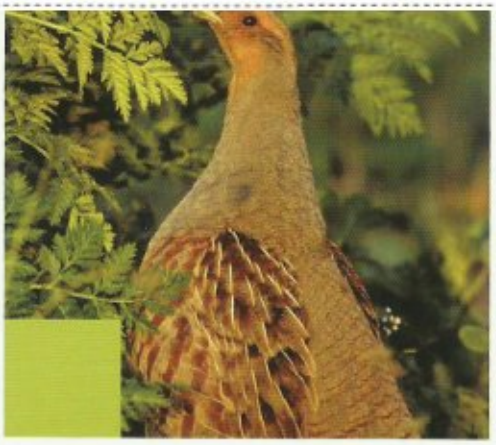
Jacopo Cerri[1], Marco Ferretti[2], Gisella Paci[3], Clara Sargentini[1], Antonella Grazzini[4], Marco Bagliacca[3]

[1]Università degli Studi di Firenze, FIRENZE, Italy

[2]Game and wildlife management office, PISTOIA, Italy

[3]Department of Veterinary Medicine, University of Pisa, PISA, Italy

[4]Oasi WWF „Dynamo„, freelancer biologist, LIMESTRE, Italy



INTERNATIONAL UNION OF GAME BIOLOGISTS

P.TL.12

Use of pellet count in the European hare

Jacopo Cerri[1], *Marco Ferretti*[2], *Gisella Paci*[3], *Clara Sargentini*[1], *Antonella Grazzini*[4], *Marco Bagliacca*[3]
[1]Università degli Studi di Firenze, FIRENZE, Italy
[2]Game and wildlife management office, PISTOIA, Italy
[3]Department of Veterinary Medicine, University of Pisa, PISA, Italy
[4]Oasi WWF „Dynamo„, freelancer biologist, LIMESTRE, Italy

KEYWORDS : censuses ; land use ; mountain

Introduction

The European Brown Hare (Lepus europaeus) is a wide-distributed lagomorph and a countryside flagstone species. The reduction of its number, observed in many Countries during the last decades, has led many researchers to better investigate its ecology to improve its management. The base of wildlife management policies is the knowledge of a population consistence; for this reason hares are usually monitored by spotlights counts in their ecosystems, in Italy mainly characterized by agricultural land uses localized in lowlands and hilly environments. However several hare populations also live in Mediterranean woodlands and mountainous environments, where the lack of monitoring tools does not allow a correct management. For this reason we started to investigate their presence and habitat selection in such environments by pellet-count based techniques.

Materials and methods

We used two protected areas (where hunting is not allowed) and one farmland located in the Tuscan Apennines (area approx. 900, 181 and 120 ha and average altitude 950, 1100 and 1250 m) to detect habitat selected by hares in this mountainous environment. We randomly selected 178, 37 and 40 plots (3 m^2 each) inside each area. Plots were chosen in different soil cover classes; selected land uses were : meadows and pastures, coniferous woodlands, chestnut, beech, mixed deciduous forest, mixed coniferous and broad-leaved woodland, shrubs. Pellet presence/absence was checked in each plot, starting from April every 30 days. To estimate hare population, we compared consistencies obtained by two different techniques : pellet counts (the Fecal Accumulation Rate method and the Fecal Standing Crop method) and spotlight counts. Consistency checks were carried out in a protected area (area approx.900 ha and average altitude 950 m) and in two hunting estates (area approx.16 and 370 ha and average altitude 850 and 120 m), regularly checked by both public and private gamekeepers. Pellet decay was calculated in each protected area by placing 800 fresh dungs in 16 small enclosures and recounting them in correspondence of the pellet counts of cleared plots. Expected land uses were analyzed by Jacob's index of preference, chi-square and Bonferroni confidence intervals. Population censuses were submitted to regression analysis and the effect of different sampling intensities was evaluated on the accuracy of the estimates.

Use of the pellet count in the european brown hare *(Lepus europaeus)*

Università degli Studi di Firenze
Università di Pisa Dipartimento Scienze Veterinarie
Oasi Dynamo AFFILIATA WWF
Provincia di Pistoia- Ufficio Caccia e Pesca
IUGB 2013 Bruxelles

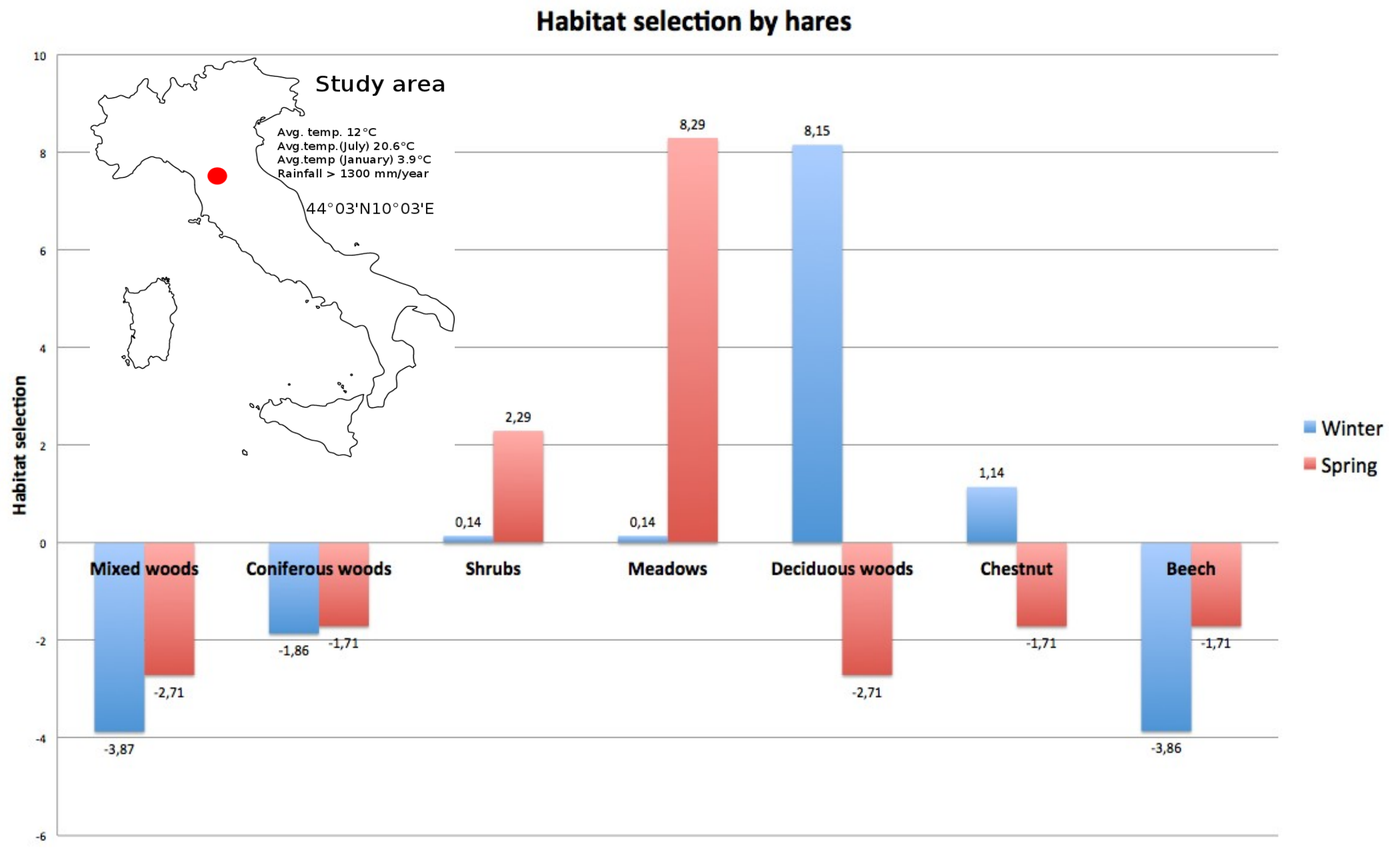
Cerri J.; Ferretti M.; Paci G.; Sargentini C.; Grazzini A. & Bagliacca M.

Introduction

The European Brown Hare (*Lepus europaeus*) is a flagstone species for rural ecosystems that suffered a great decline in the last decades. Italian hare populations are usually monitored by spotlight counts in lowlands and hilly environments but there is a lack of monitoring tools for mountain or woody environments, where the road network is poor or missing. At the same time little is known about hare ecology in mountain environments. For these reasons we wanted to refine the pellet-count techniques to estimate hare densities in the mountain environment and detect their density and habitat selection.

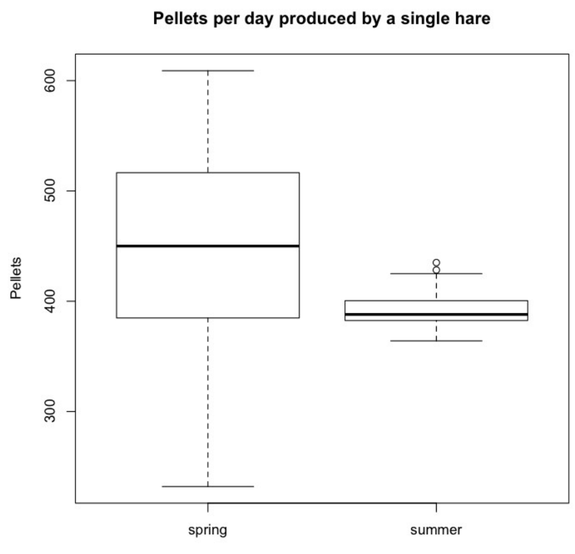
Matherials and methods

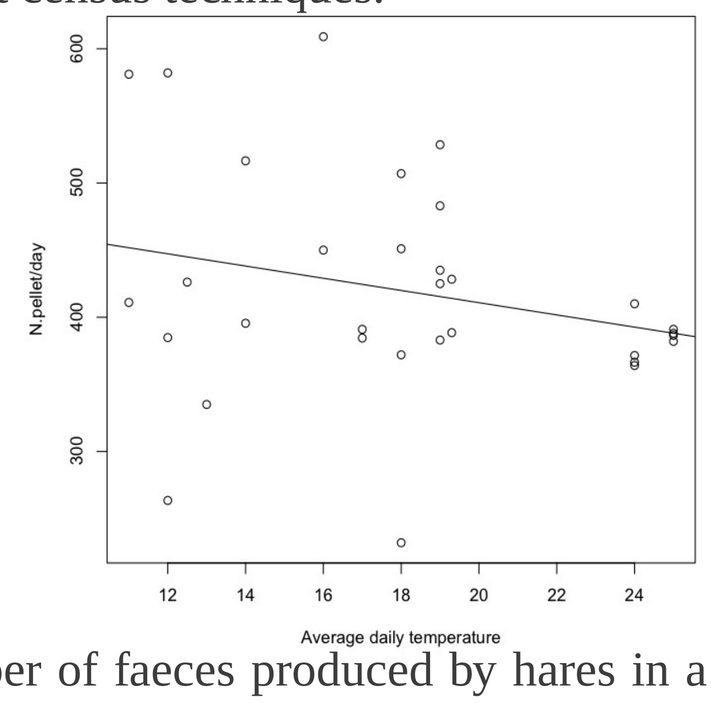
The three study areas (900 ha, 180ha and 120ha) were located in Northern Tuscany, on the Apennines in the surroundings of Pistoia (Italy). Landscape was characterized by meadows and crops surrounded by woods of both broad-leaved and coniferous species. To estimate pellet persistence in the environment decay plots were checked on a weekly basis. To assess defecation rate we counted the number of pellets produced daily in April and in July by 4 couples of caged hares (Hares were *ad libitum* fed with commercial pellet and water). To evaluate habitat use 7 land uses were selected. 6m^2 randomly located plots were created in each land use and pellet presence was checked every 90 days. Moreover, in the first study area a snow-tracking session was carried out in February, to assess the hare winter habitat use. To check the hare density we carried out pellet count surveys in the study areas and in two additional sites: a hunting estate and an enclosure adopted as training ground for hounds. Spotlight counts were carried out contemporaneously to pellet count sessions, to test correlation between the two different census techniques.



Results

Defecation rate. Defecation rate in caged hares was 442±55.3 pellet per day in spring and 393±12.1 in summer. Wilcoxon's test showed that the daily number of pellet produced in April was larger than that produced in July (Chi^2=3.93, $p<0.05$). Correlation analysis showed a weak and non-significant correlation between the average daily temperature and the daily pellets produced by hares (b=-4.55; R^2=0.25). The linear regression equation is shown in the figure.





There are slight evidences that temperature could play a role in determining the number of faeces produced by hares in a day, but further analysis will require a larger sample to reach the statistical significance.

Habitat selection Chi-square goodness of fit test revealed a non-random habitat selection both in winter (Chi^2*=26.2, df=6, p<0.01)* and in spring *(X^2=35.9, df=6, p<0.01)*, with hares that select open areas like meadows and shrubs. However Chi-square homogeneity test showed significant differences in habitat selection between the two seasons (Chi^2*=32.6, df=6, p<0.01)*: hares seem to avoid mixed broad-leaved woods and chestnut *(Castanea sativa)* in spring, while they select them during the winter.

Hare density: Many density plots were removed in the 1st two areas by rain, wild animals and soil tillage; in the 3rd area no hare was spotted and no pellet was found in the plots; only in the last area the density was estimated (8.6 hares/km^2).

Discussion and conclusions

Pellet count based techniques could be a useful tool to assess the habitat selected by the hares in the mountain environment with a very low invasive impact on the wildlife. Our data achieved significant results even in low-density condition. In 2013, the weather from January to May was too anomalous to evaluate pellet count goodness as census techniques (snow remained until the first half of May) but some limitations have been noticed. Pellet-count must be better calibrated in term of time interval chek in low density condition, since long intervals cannot be used to increase the number of pellet found in the density plots: pellets decay quicker than deposition in snowy/rainy conditions and increases the probability of plot-loose.

Keywords: *Land use, censuses, mountain, Lepus europaeus*

Info and details: jacopo.cerri@stud.unifi.it