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Abstracts of Oral Communications and Poster Presentations

Home range landscape structure of European hares (*Lepus europaeus* Pallas) in a hilly area of Tuscany

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Photo: Juvenile European hares/*Lepus europaeus kursiv* (Ingo Arndt)

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The trial was carried out in the typical hilly landscape of central Italy (Florence province, X = 1667003 Y = 4844543, ref. Rome, 1940). During the capture operations for the translocation, 20 hares were captured and equipped with a necklace radio tag (Biotrak, TW3): 6 hares (4 males and 2 females) were immediately released in the same non-hunting area where they had been captured and 14 hares (7 males and 7 females) were translocated in a neighbouring hunting territory. The tagged hares were localized, and/or sighted individually, 2-3 times a week, from mid January to mid June, 2007. UTM coordinates were determinated for each localization using a portable GPS and then transferred on Arc View software. Animal movement extension was used to calculate Max, min and average daily movements. Kernel method was used to calculate each home range. Home range sizes also were calculated using the MCP method. Maximum distance from the releasing sites and maximum distance from centroid were also calculated for translocated hares and resident hares, respectively. Aerial photographs (scale 1:10000) geo-referenced and digitalized were used. 14 different land use categories were selected and digitalized in a vector format. These land use were composed by natural uses (woods, shrubs-area, river and ponds), agricultural uses (crops for game, orchards and gardens, grasses and pastures, uncultivated fields, winter and spring cereals, vineyards, tree orchards and poplars, olive orchards) and anthropomorphized uses (extractive and construction sites, road and urban areas). Landscape metrics for home range (patch density, edge density, fractal dimension, contagion) were calculated using FRAGSTATS software after rasterization process.

Results showed that the Max distance from the releasing sites in the translocated hares was significantly greater than the maximum distance from centroid in the resident hares (simple = radius, or doubled = diameter), (1.281 vs. 368 or 736 m, $p<0.05$). Home range sizes also differed between translocated and resident hares (Kernel 173 vs. 23 ha and MCP 63 vs. 9 ha $p<0.05$). Considering landscape structure indices, the translocated hares preferred landscape characterized by a lower density of patches and edges than the resident's (70 vs. 152 n/100 ha and 258 vs. 448 m/ha, $p<0.01$). Moreover translocated hares preferred areas characterized by greater aggregation and a lower path shape complexity than resident's (contagion index: 61 vs. 54%; fractal dimension index: 1.11 vs 1.12, $p<0.01$). Either the home range sizes or the maximum distance from the releasing sites suggest that the translocated hares must be however released in suited habitats or the animal will move from their releasing point searching better habitats. The increased travels increase the risk to be killed by vehicles when crossing roads.

Home range landscape structure of European hares (*Lepus europaeus* Pallas) in a hilly area of Tuscany

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The aim of the research was to study the structure of the home range of the hares in a typical hilly area of Tuscany where the hunt is not allowed.

In the protected area called Bracciatica (Florence province, X = 1667003 Y = 4844543, ref. Rome, 1940) 6 hares (4 males and 2 females) were captured, and equipped with a necklace radio tag (Biotrak, TW3). The tagged hares were localized, and/or sighted individually, 2-3 times a week, from mid January to mid June, 2007. UTM coordinates were determinated for each localization using a portable GPS and then transferred on Arc View software. Localizations were categorized into two different periods 15 January through 15 February (pre reproduction) and 16 February through 15 June (reproduction). Animal movement extension was used to calculate Max, min and average daily movements. Kernel method was used to calculate each home range. Home range sizes also were calculated using the MCP method. Maximum distance from centroid was also calculated for the hares. Aerial photographs (scale 1:10000) geo-referenced and digitalized were used. 14 different land use categories were selected and digitalized in vector format. These land use were composed by natural uses (woods, shrubs-area, river and ponds), agricultural uses (crops for game, orchards and gardens, grasses and pastures, uncultivated fields, winter and spring cereals, vineyards, tree orchards and poplars, olive orchards) and anthropomorphized uses (extractive and construction sites, road and urban areas). Landscape metrics for home range (edge density, contagion, interspersion and juxtaposition, patch richness, Shannon's evenness) were calculated using FRAGSTATS software after rasterization process.

Results showed significant differences only between periods. The hares showed greater number of meters moved per day during the first period than the second period (Maximum speed 350 vs. 48 m/d; mean daily speed 54 vs. 19 m/d; $p<0.05$). Considering landscape structure indices, during the second period, the hares preferred landscapes characterized by a higher density of patches and edges than the first period (227 vs. 154 n/100 ha and 575 vs. 444 m/ha, $p<0.05$). In the first period hares preferred areas characterized by a greater aggregation and a lower interspersion (contagion 53 vs. 48%; interspersion and juxtaposition 75 vs. 88%; $p<0.01$). Moreover the hares showed lower Shannon's evenness index during the first period than the second period (0.78 vs. 0.90, $p<0.01$; $p<0.05$).

The differences observed between periods for the structure of the hare home range showed that the hare home ranges change significantly during the year. The differences could be related mainly to the improved availability of food and protection given by the growing plants during the second period, even if the change of the physiological status, pre reproductive condition for most of hares in the first period and reproductive condition for most of hares during the second period, could affect the home range selection.

Using spatial Bayesian methods to define management units in a continuous population of Wild boar (*Sus scrofa*): clusters or isolation-by-distance?

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Recently developed spatially explicit Bayesian methods offer a powerful tool for ecology and wildlife management, as genetic divisions can be correlated with landscape features. However, there is uncertainty about possible biases associated with the various methodologies. An issue of particular concern is the overestimation of genetic clustering due to deviations from random mating that are not caused by genetic discontinuities, such as isolation-by-distance. I aimed to analyse the genetic structure of European wild boar (*Sus scrofa*) in a spatial Bayesian framework using programs BAPS and GENELAND. My objective was to identify geographical barriers to gene flow that might be useful for delimiting management units in case of outbreaks of classical swine fever. The programs did not converge on the same clustering solution and some clusters were difficult to explain biologically. Therefore we simulated genetic data with an isolation-by-distance pattern and found that the Bayesian programs could wrongly superimpose clusters on these datasets. Simulated barriers were identified correctly, but the programs superimposed further clusters at higher levels of isolation-by-distance. As the empirical data were characterised by isolation-by-distance, it was not possible to come to a definite conclusion as to whether the empirical clusters inferred using the various methods were an accurate reflection of population genetic structure in the study area, or whether they were artefacts.

Play behaviour in immature gelada *(Theropithecus gelada)*: the significance of age and sex

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Play is considered as a pivotal behaviour in juvenile development of primates for the acquisition of social skills in a relaxed and relatively safe environment. To benefit the individual as a kind of training for adult life it will differ according to the requirements needed. This assumption was investigated among Gelada baboons *(Theropithecus gelada)* a species living in one-male units with extreme sexual dimorphism. Males are twice the size of females indicating that fighting ability is essential for their reproductive success. They disperse as adolescents and try to take over a female group in adulthood. Accordingly, immature male baboons should spend much more time with rough play-fights than immature females. By contrast, female geladas remain in their natal groups and maintain strong bonds with their matrilineal relatives. Therefore immature females are expected to spend more time with care and bonding behaviour than immature males. Additionally, for both sexes stimulation thresholds should vary as the need for security decreases while the need for exploration increases with age. These predictions were tested and confirmed within a gelada group at the zoo "Tierwelt Herberstein", Austria, containing two adult males, three adult females and six immatures with a balanced sex and age ratio. Generally, juvenile males spent more time with social play than females did. Females preferred non-contact play such as play-chases whereas males preferred play-fights and choose their play partners accordingly. Each immature female invested more time in care and bonding behaviour measured as active social grooming than its male peer of similar age class. In both sexes, active social grooming increased with increasing age, at the same time social play behaviour decreased. These data support the notion that play serves to develop sex specific social skills.

The impact of road traffic (Brno-Vienna) on a bat community

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Roads and highways have a negative effect on the life of bats both when constructed and afterwards due to the traffic. During the construction there is a direct loss of habitats, when in operation, commuting and foraging bats continue to be killed by night traffic. The present study is dealing with the impact of the existing main road E461 Brno-Vienna on bat mortality, with the prognosis of this impact after road reconstruction and extension into a speed-way R52, and with recommendations to decrease the risk of bats being killed. Two sections of the road, Ivan-Perná (4.5 km) and Pohorelice-Ivan (3.5 km) were selected where (1) all published as well as unpublished records of bats in a 2 km wide belt were collected; (2) bat cadavers were picked from

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HOME RANGE LANDSCAPE STRUCTURE OF THE EUROPEAN HARE (*Lepus europaeus* Pallas) IN A HILLY AREA OF TUSCANY

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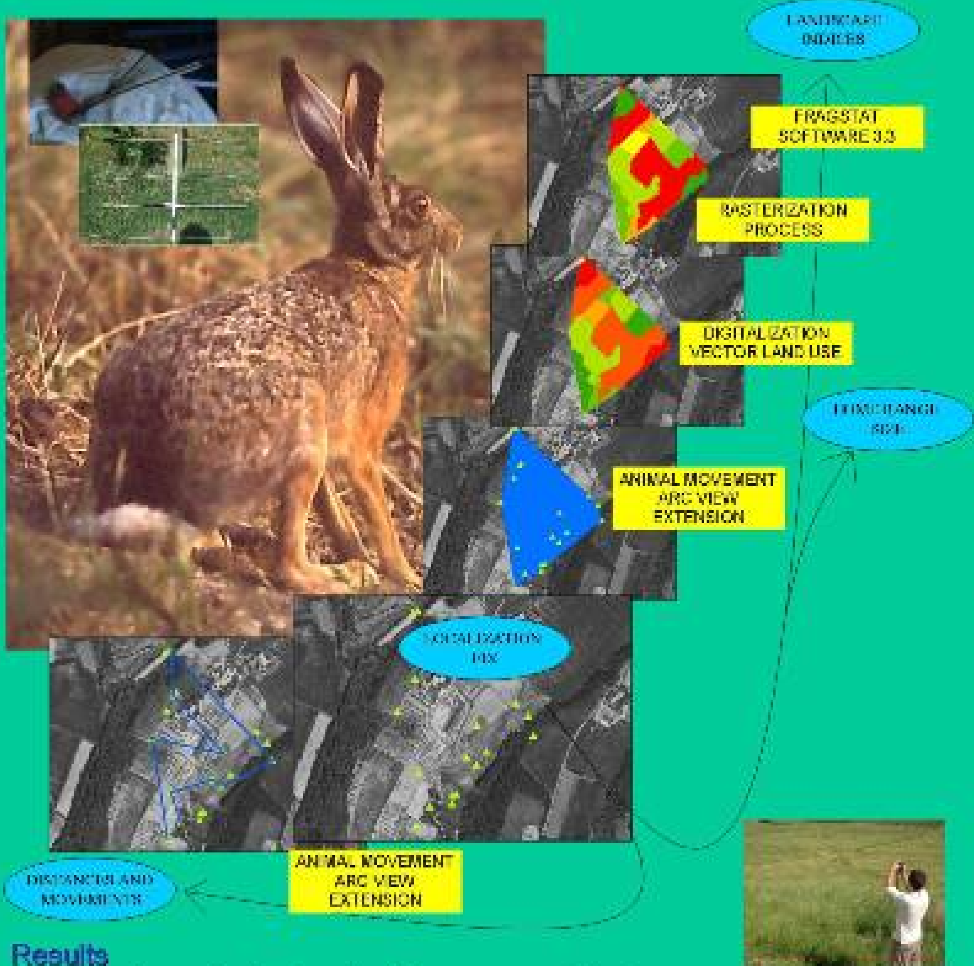
Introduction

The aim of the research was to study the structure of the home range of the resident hares in a typical hilly area of Tuscany where the hunt is not allowed. During the January-June period we have analyzed also the Max, min and average daily movements and the home-range sizes.



Materials and methods

In the protected area called Bracciatica (Florence province, X = 1667003 Y = 4844543, ref. Rome 1940) 6 hares (4 males and 2 females) were captured and equipped with a necklace radio tag (Biotrak. TW3). The tagged hares were localized, and/or sighted individually, 2-3 times a week, from half January to half June 2007. UTM coordinates were determinated for each localization using a portable GPS than transferred on Arc View software. Localizations were categorized in two different periods 15 January through 15 February (pre reproduction) and 16 February through 15 June (reproduction). Animal movement extension was used to calculate Max, min and average daily movements. Kernel method was used to calculate each home range. Home range sizes also were calculated using the MCP method. Maximum distance from centroid was also calculated for the hares.

Aerial photographs (scale 1:10000) digitalized and geo-referenced were used. 14 different land use categories were selected and digitalized in vector format. These land use were composed by natural uses (woods, shrubs-area, river and ponds), agricultural uses (crops for game, orchards and gardens, grasses and pastures, uncultivated fields, winter and spring cereals, vineyards, tree orchards and poplars, olive orchards) and anthropomorphized uses (extractive and construction sites, road and urban areas). Landscape metrics for home range (edge density, contagion, interspersion and juxtaposition, patch richness, Shannon's evenness) were calculated using FRAGSTATS software after the rasterization process.

Results

Results showed significant differences only between periods. The hares showed greater number of meters moved per day during the first period than the second period (Maximum speed 350 *vs.* 48 m/d; mean daily speed 54 *vs.* 19 m/d; $p<0.05$). Considering landscape structure indices, during the second period, the hares preferred landscapes characterized by a higher density of patches and edges than the first period (227 *vs.* 154 n/100 ha and 575 *vs.* 444 m/ha; $p<0.05$).

In the first period hares preferred areas characterized by a greater aggregation and a lower interspersion (contagion 53 *vs.* 48%, $p<0.01$; interspersion and juxtaposition 75 *vs.* 88%, $p<0.05$). Moreover the hares showed lower Shannon's evenness index during the first period than the second period (0.78 *vs.* 0.90, $p<0.01$).

Effect::		time				sex	
		first period		second period		males	female s
Min daily movements (m/day)	Least Sq Mean	19		11		13	17
	Std Error	6.7		7.2		6.0	7.9
Max daily movements (m/day)	Least Sq Mean	350	A	48	B	184	214
	Std Error	48.9		52.4		44.2	58.0
Average daily movements (m/day)	Least Sq Mean	54	a	19	b	38	34
	Std Error	7.7		8.3		7.0	9.2
Kernel 95 Home-Range (ha)	Least Sq Mean	208		76		174	110
	Std Error	48		57		41	64
MCP Home-range (ha)	Least Sq Mean	66		42		57	50
	Std Error	13		16		11	17
Patches density in the H.R. (n/100 ha)	Least Sq Mean	154	b	227	a	175	206
	Std Error	20.8		25.8		18.8	28.8
Edge density in the H.R.(m/100 ha)	Least Sq Mean	444	b	575	a	504	515
	Std Error	37.6		46.9		33.6	52.1
Contagion Index (%)	Least Sq Mean	53	A	48	B	51	50
	Std Error	0.9		1.1		0.8	1.2
Interspersion and Juxt. Index (%)	Least Sq Mean	75	b	88	a	82	81
	Std Error	2.5		3.2		2.3	3.5
Patch Richness (n)	Least Sq Mean	8	a	5	b	6	7
	Std Error	0.8		1.0		0.7	1.1
Shannon's Evenness Index (n)	Least Sq Mean	0.78	B	0.90	A	0.84	0.83
	Std Error	0.020		0.025		0.018	0.027

[illegible]

Conclusions

The differences observed between periods for the structure of the hare home ranges showed that the hare home ranges change significantly during the year. The differences could be related mainly to the improved availability of food and protection given by the growing plants during the second period. The change of the physiological status, pre-reproductive condition for most of hares in the first period and reproductive condition for most of the hares during the second period, may contribute to the observed different behavior.