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Selection Strategy of Small Mammalian Preys by the Common Genet *Genetta Genetta* between Natural and Anthropized Environments in Edough Forest Massif (Northeastern Algeria)

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SELECTION STRATEGY OF SMALL MAMMALIAN PREYS BY THE COMMON GENET *GENETTA GENETTA* BETWEEN NATURAL AND ANTHROPIZED ENVIRONMENTS IN EDOUGH FOREST MASSIF (NORTHEASTERN ALGERIA)

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ABSTRACT

We analyzed fluctuations in of small mammals' biodiversity through the winter diet of the common genet *Genetta genetta* (Linnaeus, 1958), to deduce the predator - adopted strategy according to the habitat conditions in which it occurs, particularly in anthropogenic environments. The field sampling was conducted during the 2020 winter season, in two contrasting environments of the Edough mountain range: natural site (Ain Boukal), and anthropized site (Bouzizi landfill). The analysis of 30 collected excrements in each of the two sites, allowed us to identify different food categories including small mammals. The result shows that the common genet is an excellent sampler of small mammals by consuming at least four taxonomic genera. The results also show that despite that the genet is a generalist predator with a wide food spectrum, the results show that it had exercised a selectivity on small mammals, preferentially on genera *Apodemus* which was abundant in the natural habitat. However, in the anthropized habitats, the genet was opportunistic feeding on waste and abundant small mammals, mainly for the genera *Rattus*.

Keywords: *Genetta genetta*, small mammal preys, predation strategy, Edough mountain.

INTRODUCTION

Small mammals are the most diverse group of species within the mammalian class (Aulagnier et al., 2008). They are an excellent animal tool for assessing the quality of ecosystems, due to their low ecological plasticity, their strategic positioning at the heart of food webs and their sensitivity to environmental changes (Krebs et al., 2014; OlimjonQizi, 2020). Small mammals are the main prey of many predators including the common genet (Meek et al., 2012; Boukheroufa et al., 2020). This predator has a generalist diet, but retains selectivity towards small mammalian prey, compared to other more opportunistic predators such as the African

golden wolf *Canis anthus* (Boukheroufa et al., 2009, 2020; Belbel et al., 2022). The objective of this study is to analyze the degree of selectivity of the common genet for its preferred prey in the winter period, between natural and anthropized habitats where small mammals are abundant and trophic resources are artificially available, respectively.

MATERIALS AND METHODS

Study Area

Our study was carried out during the winter period of 2020, on the northern side of the Edough forest massif, between 500 m and 900 m altitude. We sampled two contrasting groups of habitats in terms of

anthropogenic action. The first group of natural habitats located far from dwellings, called Ain Boukal ($36^{\circ}93'03.25''\text{N}$ $7^{\circ}70'95.36''\text{E}$), was composed by four forest habitats: Cork Oak forest, Mixed Algerian Oak, Pure Algerian Oak and Maritime Pine forest (Mechtoub, 2020). The second anthropized habitat group is in Bouzizi

landfill of the Edough forest massif ($36^{\circ}54'16.6''\text{N}$ $7^{\circ}38'23.0''\text{E}$), was composed of two different paths of degraded vegetation (Figure 1). 30 samples of common genet droppings were collected in each of the two studied habitat groups.

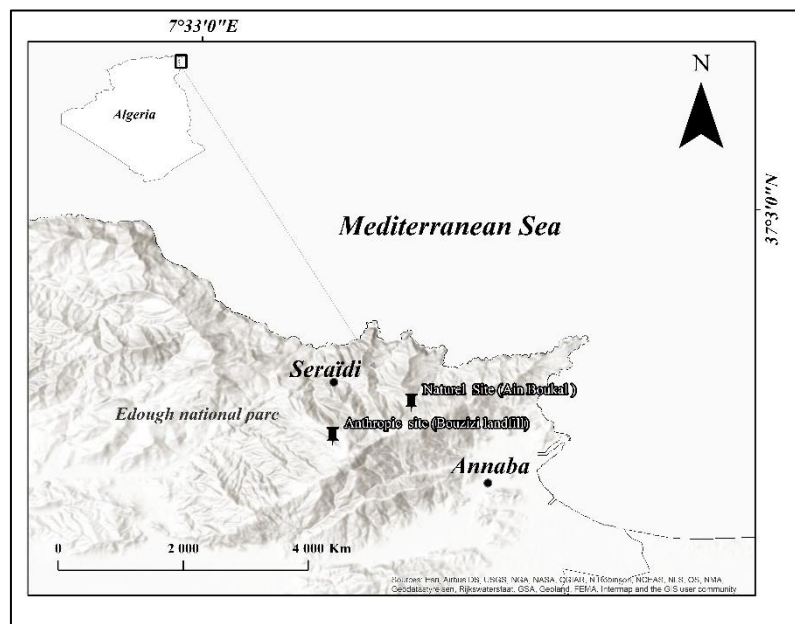


Figure 1: Geographical situation of the study locality (with indication of the two sites)

Procedures

The droppings are easy recognizable, because the predator deposits them in height on rocky escarpments (Lozé, 1984; Livet and Roeder, 1987). Once collected, scats were oven dried at 80°C for 24 hours, dilacerated in an aqueous medium, and washed with hot water and detergent. The scats were then filtered through a 0.25 mm diameter sieve and dried for 24 to 36 hours (Hamdine et al., 1993). The remains of preys were sorted and classed: Arthropods, Small mammals, Plants, reptiles / Amphibians, Birds and anthropogenic waste. The mammalian prey identification down to the order level was based on the examination of the cross-sections of the recovered hairs from droppings (Debrot et al., 1982).

Data Analysis

The results were illustrated in Microsoft Office Excel by histograms and sectors. The analysis of the Genet's diet is based on the calculation the frequency of occurrence or the presence index (Pi) expressed by the number of occurrences of a food category over the total number of scats, and relative frequencies (Fi) for small mammals, expressed by the number of occurrences of each genera of small mammals over the total number of small mammals stand. Analysis of variance (ANOVA) was performed using Minitab 17 (2015 Eds), to compare the measured dataset between the two studied habitats, but tested before for normality and homogeneity of distribution using Kolmogorov – Smirnov and Levene's tests.

RESULTS

i. Comparative Analysis of the Overall Diet Between the Two Environments

In overall, the results show that the diet of the common genet consists of 05 food categories in the natural environment (arthropods, small mammals, plants, reptiles/amphibians and birds), and 06 food categories in the anthropized environment (arthropods, small mammals, plants, reptiles/amphibians, birds and wastes). However, there are significant differences in the frequency of occurrence of each category between the two habitat groups.

The analysis of the results reveals that common genet in the natural site, consumes more frequently small mammals

than the other categories (in 100 % of collected scats), followed by Arthropods (in 66,67 % of the collected scats). In the anthropized site, the genet consumes more frequently plants that the other food categories (in 100 % of collected scats), followed by anthropogenic wastes and reptiles - amphibians (both in 96,67 % of collected scats). We note that small mammals are consumed less in anthropized than natural sites (in 40 % of collected scats) (Table 1).

The conversion of occurrence frequency into percentages allowed us to visualize differential food preferences between the two environments, more plants than small mammals and birds in the anthropized environments, in the opposite of natural habitat (Figure 2).

Table 1: Occurrence frequencies of different food categories in both sites.

Food items	Natural site	Anthropized site
Small mammals	100	40
Arthropods	66,67	86,67
Birds	46,67	10
Reptiles / amphibians	46,67	96,67
Plants	46,67	100
Wastes	0	96,67

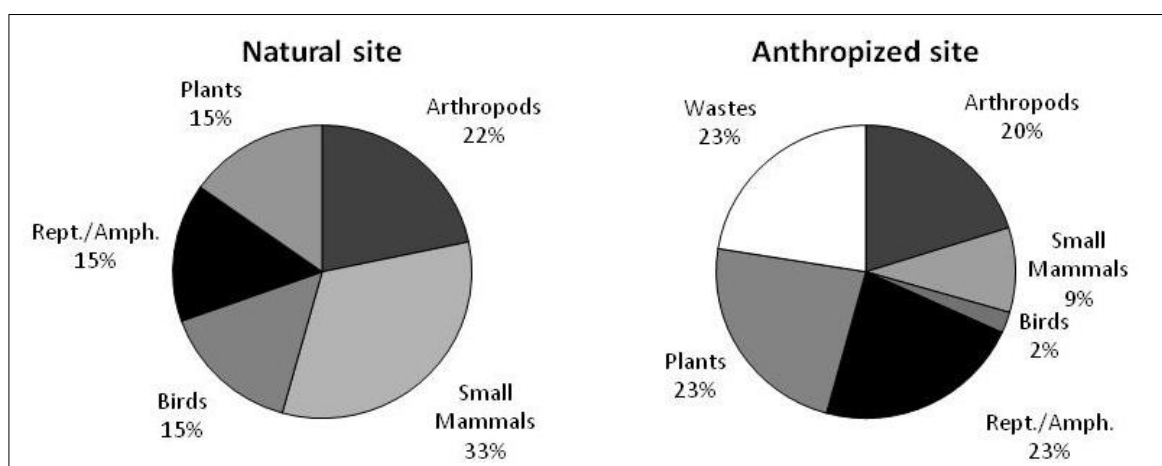


Figure 2: Diets of common genet in natural site (Left) and anthropized site (Right) in the study area.

ii. Taxonomic Identification and Proportion of Small Mammal Preys

In the two sites, we identified the small mammals consumed by the Common Genet. The use of identification keys from bones and cross-sections of the covered hairs from droppings, allowed us to identify at least 03 genera: *Apodemus*, *Rattus*, *Mus* (Figure 3).

iii. Comparative Analysis of Structural Parameters of Small Mammals Prey

Relative Frequency

Comparative analysis concerning the structural parameters of small mammal preys between the studied contrasting habitats were realized. The consumption of prey items by genera belonging to small mammal preys, calculated in relative frequencies was significantly different in

the studied habitat groups, dominated by *Apodemus* genera within natural habitat ($F_{(0,39)} = 45.72$; ***: $P < 0.001$), and by *Rattus* genera In the anthropized habitat ($F_{(2,11)} = 6,66$; **: $P=0.002$) (Figure 4).

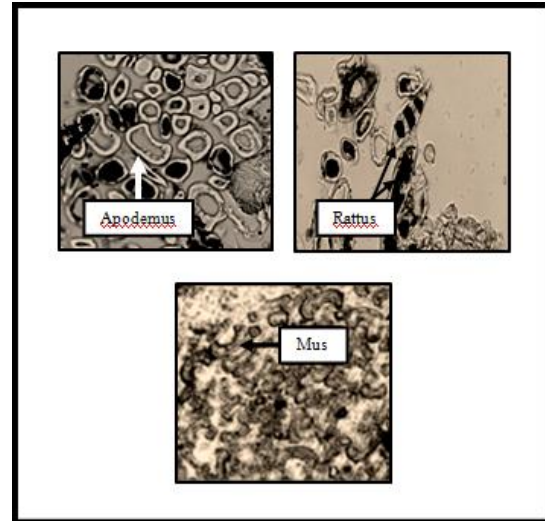


Figure 3: Cross-sections of the recovered hairs from droppings (Present work).

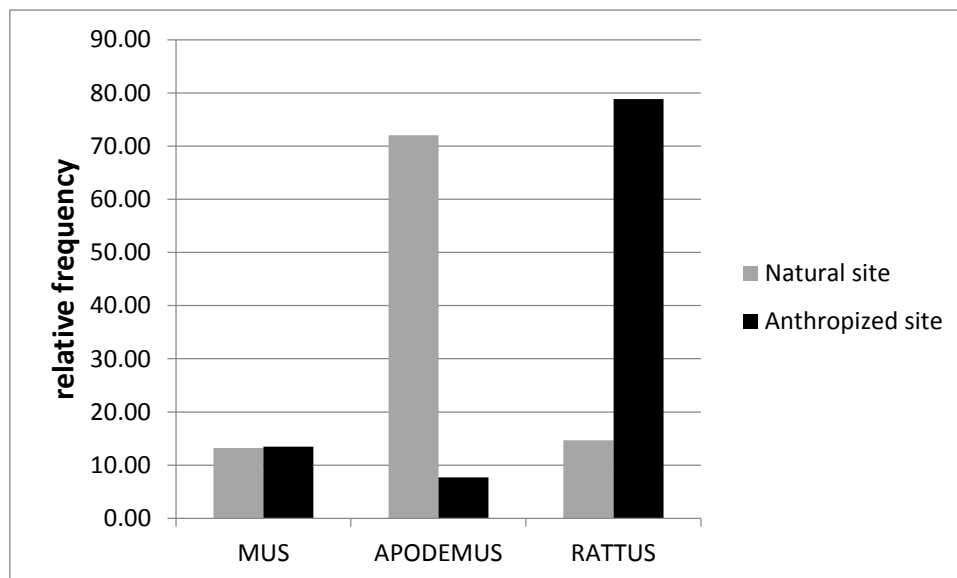


Figure 4: Cross-sections of the recovered hairs from droppings (Present work).

DISCUSSION

Our results show the great variety of preys consumed by the common genet (*Genetta genetta*), between natural and anthropized environments. All studies

confirm the ecological plasticity, and the large spectrum, in prey consumption, of common genet diet in the Mediterranean region, with a great selectivity on small mammals, which are their preferred prey (Ruiz-Olmo and Martin, 1993; Hamdine et

al., 1993; Rosalino and Santos-Reis, 2002; Boukheroufa et al., 2009; Torre et al., 2013; Brahmi et al., 2014; Amroun et al., 2014; Boukheroufa et al., 2020). In the natural environment, this predator consumes much more rodents than insectivores in relation to the total number of small mammals consumed (Brahmi et al., 2014; Amroun et al., 2014). Our results support this works since we have been able to identify the genera *Apodemus*, *Rattus* and *Mus*, all belonging to Rodents order. For the anthropogenic environment, we observed the increase in the category of waste, since it is found in all droppings collected, which causes a readjustment of the proportions of other food categories including small mammals. More opportunist in the anthropic environments, the genets adapt their diet strategy according to the presence of trophic resources that are easy to acquire and do not require hunting efforts (Ordeñana et al., 2010; Newsome et al., 2015). When we compare the predation strategy of this viverrid between the two types of environments, we find that the common genet systematically hunts the *Apodemus*, and develops a predation strategy that is particularly adapted to this murid in a natural environment. This preference has already been noted by several authors (Lodé et al., 1991; Hamdine et al., 1993; Rosalino & Santos-Reis, 2002; Amroun et al., 2006; Boukheroufa et al., 2009; Bensidhoum, 2010; Torre et al., 2013; Boukheroufa et al., 2020). However, the genet feeding strategy is strongly modified in anthropized environments, since the predator consumes mostly *Rattus*. This small mammal is a human commensal which occupies different habitats with higher density than other species of rodents, mainly facilitated by anthropic activities or an abundance of organic wastes (Wilson and Reeder, 2005; Burgin et al., 2018). Thus, the common genet adjusts its selective strategy towards small mammals by consuming not its preferred prey, but the one that is most profitable in

terms of abundance and biomass, *Rattus* in this case.

CONCLUSION

In this study, we were able to highlight the feeding strategy of the common genet according to the environments it exploits. We confirmed the generalist and opportunistic character of the predator, which adapts its diet according to the resources available in the environment. Furthermore, this viverrid displays a specific selectivity towards small mammals in both types of environments, by consuming the genera *Apodemus*, its preferred prey which is very abundant in natural environments, and by substituting it by *Rattus*, small mammal very abundant and dependent on anthropized environments.

AUTHORS CONTRIBUTIONS

Conceptualization: F.S and M.B.; methodology, F.B and K.H.B., F.S and M.B; data collection F.B, K.H.B and R.L.I.H.; data validation, F.S., M.B. and R.S.; data processing F.B, K.H.B and M.B.; writing—original draft preparation, F.B, K.H.B , F.S, and R.S.; writing—review and editing F.S., M.B., and R.S.

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CONFLICT OF INTEREST

The authors declare no conflict of interest".

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