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COMPARISON BETWEEN BARN OWL PELLET AND FOX SCAT ANALYSIS IN SMALL MAMMAL SURVEY

ANALISI DI BORRE DI BARBAGIANNI E DI FECI DI VOLPE: CONFRONTO TRA DUE METODOLOGIE PER IL RILEVAMENTO DI PICCOLI MAMMIFERI

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ABSTRACT

In the course of **a** small mammal survey 100 barn owl (*Tyto alba* Scop.) pellets and 50 **fox** (*Vulpes vulpes* L.) scats were collected at "Villa Demidoff Park" (Florence, Italy) during *six* weekly samplings in the spring. **Scat** and pellet analyses were compared in order to point out advantages and disadvantages of these techniques as a tool in small mammal surveys.

Key words: Small mammal survey; *Vulpes vulpes; Tyto alba.*

RIASSUNTO

In uno studio sul popolamento di piccoli mammiferi nel "Parco di Villa Demidoff" (Firenze, Italia) realizzato durante il periodo primaverile, sono state analizzate 100 borre di barbagianni (*Tyto alba* Scop.) e 50 feci di volpe (*Vulpes vulpes* L.), raccolte nel corso di sei campionamenti a frequenza settimanale. Queste due metodologie sono state messe **a** confronto evidenziandone applicabilita' e funzionalità come strumento di indagine per il rilevamento di piccoli mammiferi.

Parole chiave: Rilevamento di piccoli mammiferi; *Vulpes vulpes; Tyto alba.*

Owl pellets, especially those of the barn owl, provide quite a complete description of small mammal fauna (Saint Girons et al., **1966;** Gerdol et al., **1982;** Contoli, 1984). Fox scats have been analyzed mainly to study the feeding habits of this carnivore, but seldom in mammal surveys (Brunner et al., **1976).** This research aimed at evaluating the amount of information gained by using these two methods simultaneously and at optimizing the time and work involved.

The study was conducted at "**Villa** Demidoff" Park (about **12** km N of Florence, Italy). The area (158 ha, altitude **327-541** m) is a mosaic of oakwood (55%), sowlands (25%) and uncultivated fields (20%). The annual average rainfall is 1100 mm and the average temperature 13.5 "C.

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Tab. 1 – Detected taxa, according to Corbet & Hill (1991); * = preyed on ; - = unpreyed on.

TAXONOMIC GROUP	BARN OWL	FOX
Sorex araneus vel *samniticus*	*	
Sorex minutus	*	-
Neomys fodiens	*	
Suncus etruscus	*	-
Crocidura suaveolens	*	-
Crocidura leucodon	*	-
Oryctolagus vel *Lepus*	-	*
Eliomys quercinus		*
Glis glis		*
Muscardinus avellanarius	*	
Clethnonomys glareolus	*	*
Pitymys multiplex	*	
Pitymys savii	*	
Pitymys sp.	-	*
Apodemus sylvaticus	*	-
Apodemus flavicollis	*	-
Apodemus sp.	-	*
Mus musculus	*	-

During six weekly samplings (April-May 1990) 100 barn owl pellets were collected in three deserted houses, ignoring old pellets in order to compare samples from the same season. Mammalian remains were identified by examining the skull according to Toschi in Toschi and Lanza (1959), Toschi (1965), Chaline et al. (1974) and Filippucci et al. (1984). At the same time a total of 50 samples of foxes faeces were collected along 18 Km transects running through each vegetation type. Mammalian remains were identified from hairs, teeth and bones, according to Day (1966), Faliu et al. (1980), Keiler (1980, 1981), Debrot et al. (1982) and Teerink (1991).

The pellet and scat analyses were compared for number of detected taxa, field collection time and laboratory analysis time (Tab. 1).

Soricidae, *Muscardinus avellanarius* and *Mus musculus* were found only in the pellets. Like other carnivores (Ognev, 1935) the fox has no taste for insectivores but does prey on *Muscardinus avellanarius* and *Mus musculus* (Reig and Jedrzejewski, 1988; Pandolfi, 1988). These rodents were not found in fox scats probably because they are uncommon in the study area (only 1 *Muscardinus avellanarius* and 3 *Mus musculus* out of 341 specimens observed in the pellets).

Glis glis, Eliomys quercinus, Oryctolagus cuniculus and/or *Lepus europaeus* were found only in the scats. These dormice are seldom included in the trophic niche of barn owl (Amori et al., 1984) and rabbits or hares are not preyed on because of their large size. The presence of rabbits and hares, garden and fat dormice, can be also revealed by research of Leporidae faeces and trapping of Glindae. The

former is easy to do, but the latter requires expertise, much time and disturbs the biocenosis.

The total time required for the pellet analysis was 39 hours (collection time 9 hours, laboratory analysis time 30 hours). In every weekly sampling new species were recorded and added to the list of the Park mammals even after examining 341 specimens. The presence of species uncommon in the study area such as *Sorex minutus, Neomys fodiens, Suncus etruscus, Muscardinus avellanarius* and *Mus musculus* probably influenced these results.

Scat analysis needed 73 working hours (collection time 26 hours, laboratory analysis time 47 hours). The scats provided useful information only during the first 3 weeks of the study after analyzing 22 of the 50 scats. In the next three weeks no other taxonomic group was recognised.

In a small mammal survey for environment quality research, the number of species detected is equally as important as the time required and simplicity of the method employed. Pellet analysis has no shortcomings in applied ecology research, where time and means are sometimes the main restrictions. Scat analysis supplements the data provided by pellet analysis, allowing the recognition of larger mammals such as *Eliomys quercinus, Glis glis* and Lepondae, but working time and working effort are the basic disadvantages of this method: 73 hours were necessary for six weekly samplings. Nevertheless the working time can be optimized considering the minimum sample size of scats (in this case the faeces collected in three weekly samplings with a total working time of 36 hours). Moreover the efficiency of scat analysis can be improved using a practical guide for hair identification (De Marinis and Agnelli, in preparation).

Therefore the study of the small mammal fauna in applied ecology research can be based on both pellet and scat analyses, if the work schedule is carefully budgeted.

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