Hystrix, (n.s.) 11 *(2)* (2000): 55-59

AN ANALYSIS OF APULIAN MICROMAMMAL POPULATIONS BY STUDYING OWLS' PELLETS

MICHELE BUX *, VINCENZO RIZZI**,
BARBARA COCUMAZZI", ANTONINA PAVONE°°

* *C.da Scizzo "il Poggetto" 38, 70016 Noicattaro (BA), Italy*
** *L.I.P.U., Via Trento 49, 43100 Parma, Italy*
° *Museo provinciale di Storia Naturale, Via Bellavia 1, 71100 (FG), Italy*
°° *C.da Scizzo "Poggioverde" 79, 701016 Noicattaro (BA), Italy*

ABSTRACT - The study contains data from 3302 preys found in Barn owl pellets from 15 sites within the Provinces of Foggia and Bari (Apulia, Southern Italy). Eleven micromammal species were identified. *Microtus savii* and *Apodemus sylvaticus* were the most frequents preys. No specimen of *Clethrionomys glareolus* and *Apodemus flavicollis* were found which is probably due to the habitat typology examined (all thermoxerophilous phytocoenosis). The Sorensen Index showed a high faunistic affinity among all the sites studied and other localities of Apulia. However, by applying the index of biocenotic differences (Renkonen) a difference some in localities, in relation to *Microtus savii* and Insectivores abundance, was found.

Key words: micromammals, Barn owl, pellets, Apulia.

INTRODUCTION

Microtheriocoenosis studies by pellet analysis is a valid instrument used to obtain new data on species presence, on populations' features in relation to bioclimate and vegetation, and biogeographic information.

In a number of Strigiformes, like *Tyto alba*, pellets analysis is used to obtain an exhaustive description of micromammals in predators' hunting territory (Ghigi, 1950; Lovari *et al.*, 1976; Amori *et al.*, 1984). Furthermore this method can produce a lot of information which would otherwise be dispersed over a large area (Contoli, 1986). In this way this method can be used in distribution studies (Amori, 1984).

The purpose of this paper is to give a more detailed faunal description of Apulian micromammals by pellets analysis of *Tyto alba* (Sopoli, 1769).

MATERIAL AND METHODS

The study was carried out on pellets of the Barn owl from 15 sites in the Provinces of Foggia and Bari (Apulia, Southern Italy) (Fig. 1). Pellets were collected from 1995 to 1998 and were studied according to standard procedures (Chaline *et al.*, 1974; Lovari *et al.*, 1976; Contoli, 1980). Preys were determined by the following keys: Toschi and Lanza (1959), Toschi (1965), Chaline *et al.* (1974), Amori *et al.* (1984), Poitevin *et al.* (1986).

A complex morphological-morphometricindex (Filippucci *et al.*, 1984) was applied to the genus *Apodemus*. Further sites, from literature (Sublimi and Quaranta, 1988; Cignini, 1989; Battisti *et al.*, 1997), were considered to examine the whole regional territory and to compare different areas.

The Sorensen (Dice, 1945) and Renkonen (1938) indexes were used on data collected from Barn owl preys. The Sorensen index was used in order to evaluate quantitatively the faunistic differences between various sites (only for those sites with a number of preys greater than 50). The Renkonen index was used in order to evaluate the biocenotic

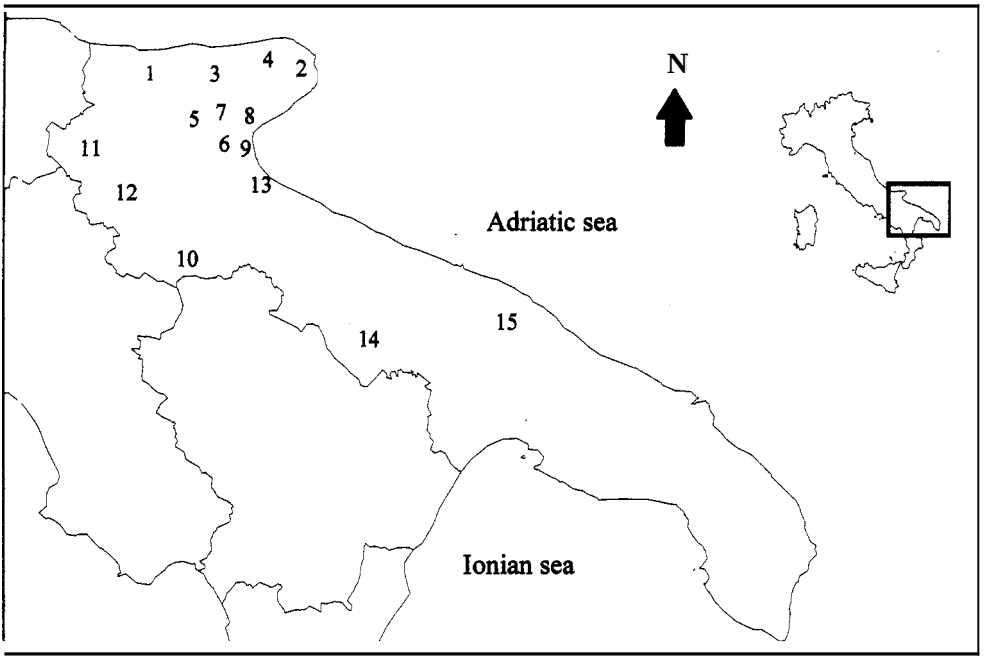

Figure 1 – Sites considered in the study. See Table 1 for number reference.

differences between sites (only for those sites with a number of preys greater than 100).A correspondence analysis carried out to describing similarity between sites.

RESULTS

Table 1 contains data relative to 3302 micromammal preys. Eleven micromammal species were preyed upon by the Barn owl. In order of total abundance, the preyed species were: *Microtus savii, Apodemus sylvaticus, Crocidura leucodon, Suncus etruscus, Crocidura suaveolens, Rattus rattus, Mus domesticus, Rattus norvegicus, Muscardinus avellanarius, Talpa romana* and *Sorex samniticus.* From 4 to 9 (mean = 6) species were recorded in each site. The Sorensen Index shows a high faunistic affinity among all sites studied and others localities of Apulia (mean = 0.79). By applying the Renkonen Index some differences were found between sites (mean = 0.68). Figure *2* shows two main separable clusters of sites in relation to the relative abundance of *Microtus savii.* In the CAG, CAT, PUL, and SAL sites *Microtus savii* was a very important preyed species with frequencies of 80%. The INF site was different, probably due to high frequencies of insectivores **(42%).**

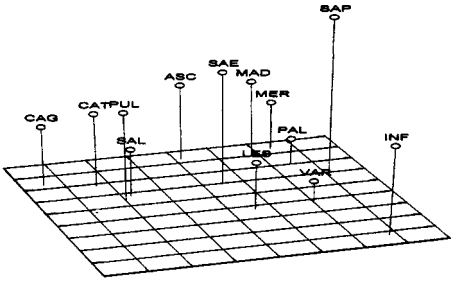

Figure *2* – Correspondence analysis obtained by affinity biocenotic matrix. For the sites' abbreviations see Table 1. Further sites taken from literature are: CAT (Castellaneta, TA), SAP (S. Pietro in Balsignano, BA): Sublimi and Quaranta, 1988; CAG (Gravina di Castellaneta, TA): Cignini, 1989; SAE (Salento): Battisti *et al.*, 1997.

Table 1 – Micrommals preyed by the Barn owl in 15 different sites in Apulia. Fragmented skull were considered to be *Apodemus* sp., in the Gargano and Sub-Appennino Dauno sites only. These are areas in which A. *flavicollis* is sure or probable. In the other sites all the skulls which were not measured were considered A. *sylvatticus*.

	1 Lesina posta		2 Merino		3 Idroscalo Varano		4 Baia di manacore		5 Valle palombara		6 SS.89 Tratturo		7 V di Mezzanot		8 Valle Inferno		9 San Leonardo		10 Ascoli Satriano		11 Casal Monter		12 Lucera collina		13 SS159 Ippoc		14 Pulicchio		15 M di Palazzo	
	n	%n	n	%n	n	%n	n	%n	n	%n	n	%n	n	%n	n	%n	n	%n	n	%n	n	%n	n	%n	n	%n	n	%n	n	%n
Sorex samniticus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,06	-							
Crocidura leucodon	9	4.60	1	0.60	124	8.00	1	1.14	15	7,50	5	11,10	10	14.30	34	20.10	7	4.50	1	0.92	4	4.26	2	3,70	-	-	21	8,3	-	-
Crocidura suaveolens	9	4.60	3	1,90	166	10.70	1	1.14	7	3,50	2	4.40	6	8.60	5	3.00	4	2,50	2	1.86	3	3,19	1	1,85	-	-	4	1.6	-	-
Crocidura sp.	-	-	-	-	6	0,40	-	-	-	-	-	-	-	-	1	0,60	-	-	-	-	1	1,06	-		1	1,82	-	-		
Suncus etruscus	15	7,60	5	3.10	113	7.30	10	11.36	9	4.50	14	31.10	6	8.60	31	18.30	1	0,60	1	0.92	1	1,06	2	3.70	2	3.64	8	3,1	7	6.9
Talpa romana	-	-	-	-	-	-	-	11,36	-	-	-	-	-	-	-	-	1	0 . 6 0	-	-	-	-	-	-	-	-	-	-	-	-
Insectivora	33	16.80	9	5.60	409	26.40	12	11,36	31	15.50	21	46.60	22	31.50	71	42.00	13	8.20	4	3.70	10	10.64	5	9.26	3	5.46	33	13.0	7	6.9
Muscardinus avellanarius					5	0.30	-	-																-	-	-	-	-	-	-
Microtus savii	99	50.30	65	40,10	590	38.10	-	-	76	38.00	6	13.30	22	31.40	58	34.30	119	78.40	66	61.12	50	53.19	29	53.70	16	29.09	198	78,0	48	47.5
Apodemus sylvaticus	37	21.30	58	46.90	333	28.10	35	78.41	58	46,00	13	37.90	14	32,80	31	21.30	20	15.80	33	35,18	26	36.17	13	33.33	25	45.45	23	9,0	44	43.6
Apodemus sp.	5		18		102		34		34		4		9		5		5		5		8		5		-	-	-	-	-	-
Rattus rattus	10	5,10	10	6.20	59	3.80	7	7.95	1	0.50	1	2.20	-	-	2	1,20	-	-	-	-	-	-	-	-	4	7.27	-	-	2	2.0
Rattus norvegicus	6	3,00	-	-	5	0,30	-	-	-	-	-	-	-	-	-	-	1	0,60	-	-	-	-	-	-	1	1,82	-	-	-	-
Mus domesticus	7	3.50	2	1,20	40	2.70	-	-	-	-	-	-	3	4,30	-	-	-	-	-	-	-		2	3.70	6	10.91	-	-	-	-
Mnridae n.d.	-	-	-	-	4	0,30	-	-	-	-	-	-	-	-	2	1,20	-	-	-	-	-	-	-							
Rodentia	164	83.20	153	94.40	1138	73.60	76	86.36	169	84.50	24	53.40	48	68.50	98	58.00	145	91.80	104	96.30	84	89.36	49	90.74	52	94,54	221	87,0	94	93.1
	197		162		1547		88		200		45		70		169		158		108		94		54		55		254		101	
	LES		MER		VAR				PAL						INF		SAL		ASC								PUL		MAD	

DISCUSSION

Five insectivore species were recorded. *Sorex samniticus* was only recorded in a site of Sub-Apennino Dauno. The two species of *Crocidura* were present over the whole regional territory. *Suncus etruscus* was present everywhere. It was very important among *Tyto alba* preys with frequencies ranging from 0.60% to 31.10% (mean = 7.47%). *Microtus savii* was the most frequent species (mean = 46.19%) even if we did not find this species among Barn owl preys in the Garganic coast site (n° 4). By using the Index of Reliability of Absence (Contoli, 1986) we were able to rule out the predation in this site of *Microtus savii* (minimum sample: N = 20; see Contoli *et al.*, 1991). *Apodemus sylvaticus* was the most widespread of Murinae with frequencies ranging from 9.00% to 78.41% (mean = 35.32%). The rats species, *Rattus rattus* and *Rattus norvegicus,* were recorded in many sites. The first species, which was also present in non-urban areas, was the most abundant. *Mus domesticus* was not very important among the preyed species of the Barn owl. Among the Gliridae, *Muscardinus avellanarius* was only recorded in one site (n° 3). Otherwise, the minimum sample of preys needed to estimate its statistic absence was never reached in the other remaining sites (minimum sample: N = 1151; see Contoli *et al.*, 1991), so its presence cannot be verified. *Clethtriunomys glareolus* and *Apodemus flavicollis* were not recorded among preys even if they have been recorded in the Gargano promontory (Umbra Forest; Amori *et al.*, 1984) in previous studies. This is probably because these two species are linked to wooden coenosis which have an elevated tree cover (Lovari *et al.*, 1976). All examined sites in the Gargano promontory and Sub-Appennino Dauno are distinguishable by their more thermoxerophilous phytocoenosis.

ACKNOWLEDGEMENTS

We would like to thank Giovanni Scillitani for his useful comments on the draft. We also like to thank Giuseppe Giglio and Rocco Sorino for their help in the field.

REFERENCES

Amori, G., Cristaldi, M. and Contoli L., 1984. Sui Roditori (Gliridae, Arvicolidae, Muridae) dell'Italia peninsulare in rapporto all'ambiente bioclimatico mediterraneo. Animalia, 11(1-3): 217-269.

Battisti, C., Cignini, B. and Contoli, L., 1997. Geographical peninsular effects on the trophic system "*Tyto alba* – micromammals" in Salento (Italy). Hystrix, 9(1-2): 7-13.

Chaline, J., Baudvin, H., Jammot, D. and Saint Girons, M.C., 1974. Les proies des rapaces. Doin, Paris.

Cignini, B., 1989. La nicchia trofica del barbagianni nella gravina di Castellaneta (TA). Umanesimo della pietra verde, Martina Franca, 4: 63-66.

Contoli, L., 1980. Borre di strigiformi e ricerca teriologica in Italia. Natura e montagna, 3: 73-94.

Contoli, L., 1986. Sistemi trofici e corologia: dati su Soricidae, Talpidae, Arvicolidae dell'Italia predati da *Tyto alba* (Scopoli 1769). Hystrix, 2: 95-118.

Contoli, L., Aloise, G., Amori, G. and Ranazzi, L., 1991. Sull'uso dei predatori nel censimento dei micromammiferi terragnoli. Atti II Sem. Ital. Censim. Faun. Vert., Suppl. Ric. Biol. Selvaggina, 26: 449-463.

Dice, L.R., 1945. Measures of the amount of ecological association between species. Ecology, 26: 297-302.

Filippucci, M.G., Cristaldi, M., Tizi, L. and Contoli, L., 1984. Dati morfologici e morfometrici in popolazioni di *Apodemus (Sylvaemus)* dell'Italia centro-merid-

ionale determinati ellettroforeticamente. Suppl. Ric. Biol. Selvaggina, 9: 85-126.

Ghigi, M., 1950. La vita degli animali. UTET, Torino.

Lovari, S., Renzoni, A. and Fondi, R., 1976. The predatory habits of the barn owl (*Tyto alba)* in relation to the vegetation cover. Boll. Zool., 43: 173-191.

Poitevin, F., Catalan, J., Fons, R. and Croset, H., 1986. Biologie evolutive des populations ouest-europbennes de Crocidura. Critbres d'identification et repartition biogeographique de *Crocidura russula* et *Crocidura suaveolens*. Rev. Ecol. (Terre Vie), 41: 299-314.

Renkonen, O., 1938. Statisch oekologische untersuchungen die terrestrische der Finnischen bruch moore. Ann. Zool., Soc. Zool. Fenn., Vanamo 6: 1-231.

Sublimi Saponetti, S. and Quaranta, A., 1988. Dati sulla predazione del barbagianni (*Tyto alba*) in agro di Castellaneta ed altri due siti pugliesi. Atti IV Conv. Ital. Orn. Naturalista Siciliano, 12: 165-168.

Toschi, A., 1965. Fauna d'Italia. Vol. 7. Edizioni Calderini, Bologna.

Toschi, A. and Lanza, B., 1959. Fauna d'Italia. Vol. 4. Edizioni Calderini, Bologna.