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SMALL MAMMALS FOUND IN DISCARDED BOTTLES IN ALPINE AND PRE-ALPINE AREAS OF NW-ITALY

PAOLO DEBERNARDI (*), ELENA PATRTARCA (*), AURELIO PERRONE (*), MARCO CANTINI (+) AND BARBARA CHIARENZI (°).

(*) Centro Ricerche in Ecologia Applicata, Via Catti 12, I - 10146 Tor-ino, Italy
(+) Amm. Prov. di Como. Servizio Caccia. Via Borgovico 148 Como, Italy
(°) Centro Studi "Arvicola" . Museo Civico di Storia Naturale di Milano, C.so Venezia 55, I - 20121 Milano, Italy

ABSTRACT - 189 bottles and 6 cans, containing the remains of 904 small mammals were collected in alpine and pre-alpine areas of Piedmont, Aosta Valley and Lombardy. The following taxa were recorded: *Sorex alpinus* , *Sorex araneus, Sorex minutus, Neomys fodiens, Crocidura leucodon, Crocidura suaveolens, Eliomys quercinus, Clethrionomys glareolus. Microtus arvalis, Microtus multiplex/subterraneus, Microtus savii, Chionomys nivalis, Apodemus* spp.. *Mus domesticus. Soricidae* was the best represented family in the sample (73.5% of the specimens found). with a different occurrence of *Crocidurinae* and *Soricinae* in xerothermic and non-xerothermic areas.

Key words: Discarded bottles/cans, Small mammals, Alps, Prc-Alps, NW-Italy.

Discarded bottles and cans can become killer traps for several species of small mammals. It has been suggested that mammals are attracted inside by residual liquids and/or by living or decaying organisms (Invertebrates, Reptiles, Mammals) which have previously entered the container. Otherwise or in addition. entry could occur in response to exploratory drives (Morris & Harper. 1965).

The aim of the survey was to study the species and their relative abundance found in a sample of discarded bottles and cans collected in alpine and pre-alpine areas of Piedmont. Aosta Valley and Lombardy (Fig. 1: Table 1).

The following data were recorded for all bottles found containing mammal remains: environmental typology of the collection site, kind of container, number of specimens of each occurring species (identification from skulls according to Chalinc *et al.*, 1974: Erome & Aulagnier, 1982; Amori *et al.*, 1986; Niethammer & Krapp. 1978. 1982, 1990). For part of the sample minimum dimensions of the container apertures were recorded too.

Apodemus identification was carried out only at the genus level, since literature taxonomic criteria have never been tested on material from the study area. Moreover *Apodemus sylvaticus*, A. *flavicollis* and *A. alpicola* could be sympatric in the area (Vogel *et al.*, 1991).

189 bottles and 6 cans were collected. They contained the remains of 904 small mammals. The average value of specimens per bottle/can was 4.6; the most frequent value being 1 and the maximum value being 32 (Fig. 2).

The number of different species found in each container varied from 1 to 4 (mean value= 1.5) and on the total sample at least 14 species were found (Table 2).

Among Soricidae, Microtidae and Muridae. 4 species. which are known to occur in the study area (Baratti *et al.*, unpublished: Can-

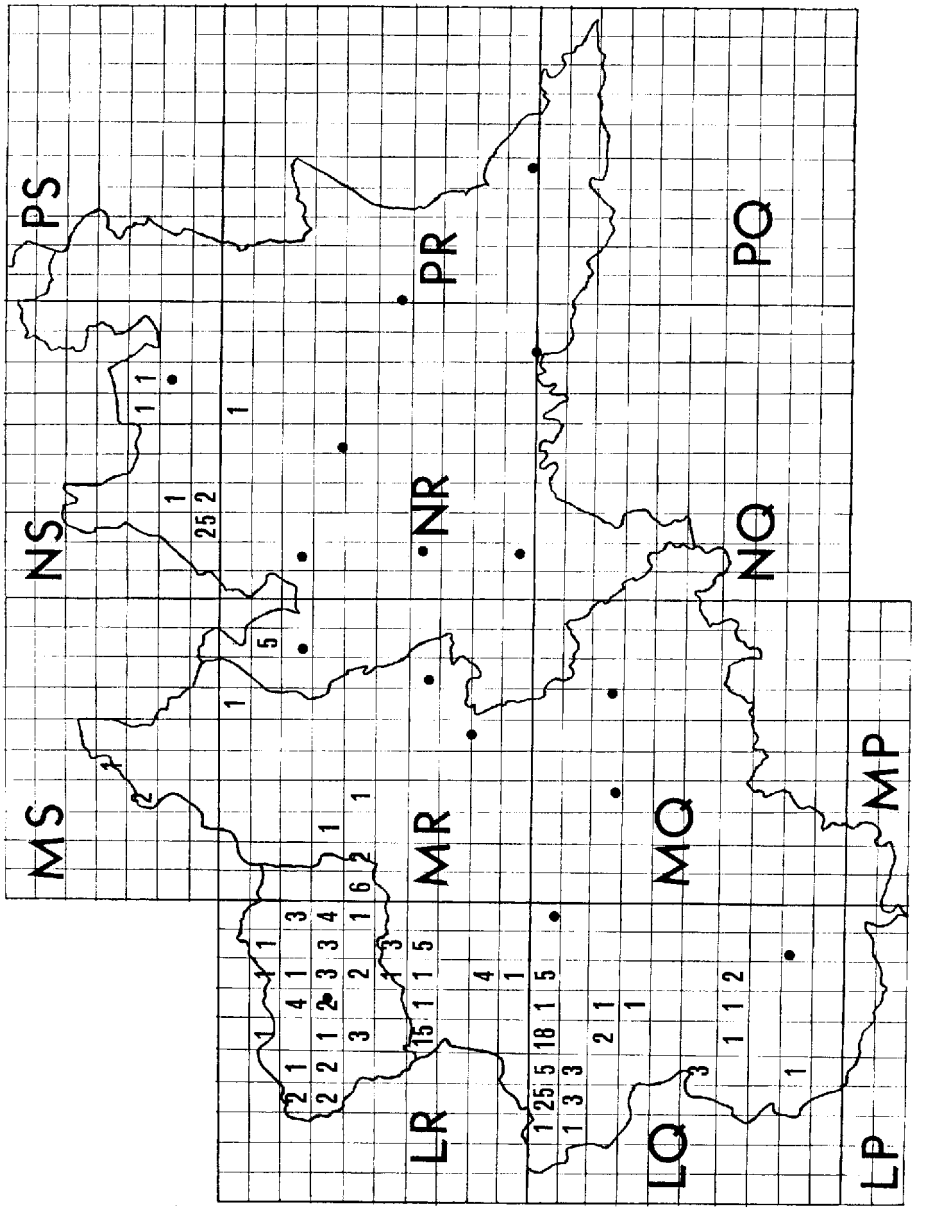

Figure 1 - Collection area of the bottles/cans. Values in the squares (UTM 10 km grid) indicate the number of bottles/cans (containing remains of mammals) collected.

Table I - Environmental features of bottles/cans collection sites. Values indicate the number of bottles/cans collected.

A - Agroecosysterns: lowland cultivated fields and meadows mixed with uncultivated fields and small fragmented woods (mainly coppices) (no.=11).
B - Downy oak (*Quercus pubescens*) woods and plant communities dominated by xerophile grasses and shrubs (no.=10).
C - Scots pine (*Pinus sylvestris*) woods (no.=3).
D - Un-xerophile deciduous forests (no.=20).
E - Mixed (deciduous and coniferous trees) forests (no.=17).
F - Coniferous forests (Scots pine cxccpted) (no.=34).
G - Slope plant communities dominated by non-xerophile grasses and shrubs and close to forests (no.= 84).
H - Green alder (*Alnus viridis*) shrubwoods (no.= 3).
I - Alpine open habitats far from woodland (no.=13).

tini, 1991; Stazione Teriologica Piemontese, in press), were not found: Miller's Water shrew (*Neomys anomalus*) which is stenoecious and probably an uncommon species, and the large size species Water vole (*Arvicola terrestris*), Brown rat (*Rattus norvegicus*) and Black rat (*Rattus rattus*). The finding of two young Garden dormice in two of the bottles (internal neck diameters of 20 and 40 mm) nevertheless suggests that the

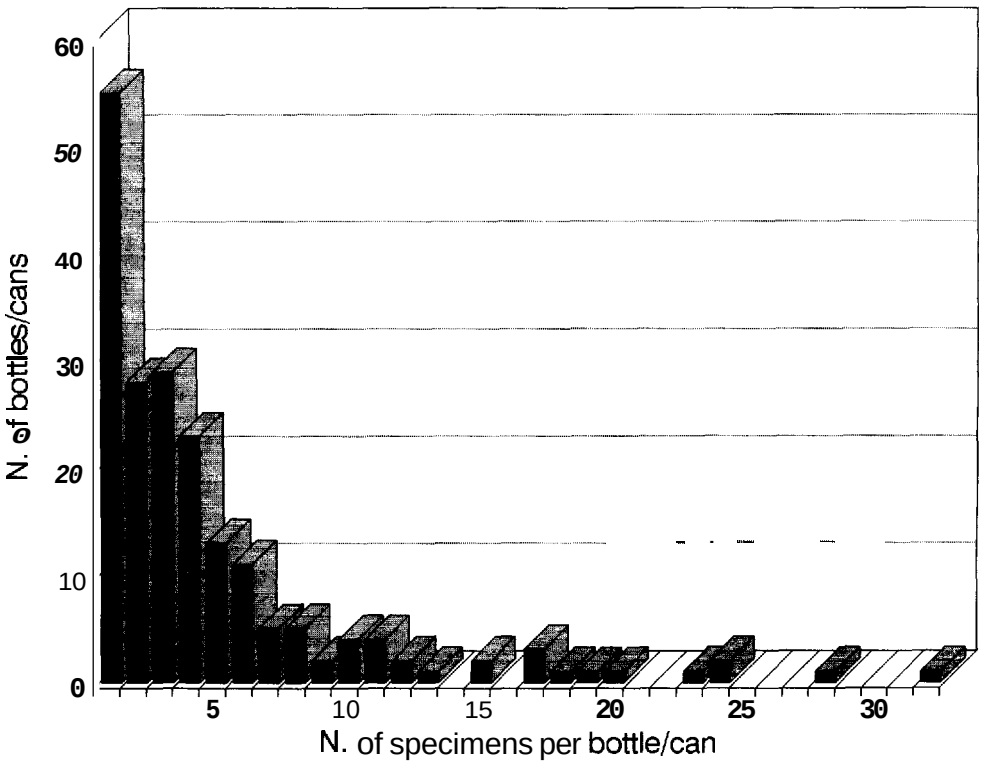

Figure 2 - The frequency with which different numbers of mammals per bottle/can occurred.

Table 2 - Abundance and occurrence of Mammals in the bottles/cans.
A = abundance (number of specimens of **a** specific taxon found in the bottles/cans); A% = percentage abundance (on total number of specimens); F = occurrence (number of bottles/cans containing a specific taxon); F% = frequency of occurrence (on total number of bottles/cans); Fr% = relative frequency (on total number of occurrences); Altitude = altitudinal range of observations.

TAXA	A	A%	F	F%	Fr%	ALTITUDE (m)
INSECTIVORA						
***Sol-ex** alpinus*	3	*0.3*	1	0.5	0.3	1660
Sorex araneus	424	46.9	93	47.7	31.9	365-2290
S. araneus vel *alpinus*	127	14.9	22	11.3	7.5	
Sorex minutus	48	5.3	26	13.3	8.9	365-1995
Neomys fodiens	3	0.3	1	0.5	0.3	1000
Crocidura leucodon	20	2.2	9	4.6	3.1	413-990
Crocidura suaveolens	39	4.3	16	8.2	5.5	365-2000
RODENTIA						
Eliomys quercinus	2	0.2	2	1.0	0.7	1800
Clethrionomys glareolus	121	13.4	56	28.7	19.2	365-1945
Microtus arvalis	42	4.6	12	6.2	4.1	940-2381
Microtus multiplex/subterraneus	7	0.8	5	2.6	1.7	990-2120
Microtus savii	1	0.1	1	0.5	0.4	1620
Microtus (Terricola) spp.	6	0.7	4	2.1	1.4	
Chionomys nivalis	6	0.7	5	2.6	1.7	1770-1955
Microtidae undetermined	2	0.2	2	1.0	0.7	
Apodemus spp.	52	5.8	36	18.5	12.3	300-1900
Mus domesticus	1	0.1	1	0.5	0.3	1100
Total no. of specimens	= 904					
Total no. of bottles/cans	= 195					
Total no. of occurrences	= 292					

bottles with a wide neck can catch also these species and particularly their young individuals. The occurrence of a Brown rat in a bottle was reported by Morris and Harper (1965).

The examined sample shows a prevalence of Soricidae, which constitute 73.4% of the total specimens found, against 0.2% of Myoxidae, *25.5%* of Microtidae and 5.9% of Muridae. In lowland agroecosystems and xerotherniic areas (typologies A, B and C, Table 1) Crocidurinae dominate Soricinae were obtained (thermoxerophily index (Contoli, 1976) = 0.79). In other environmental typologies the opposite results (thermoxerophily index = 0.02). According to the overall data *Sorex araneus* is the species with the largest number of specimens found, and also with the highest frequency of occurrencc in different bottles and cans (see A and F values in Table 2).

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