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A DATA BANK ABOUT WILD RODENT SPECIMENS OF ITALY

UNA BANCA DATI SUI RODITORI SELVATICI D'ITALIA

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ABSTRACT

The setting up of a "data bank" dealing with the findings of Rodents specimens (Families: Gliridae, Arvicolidae, Muridae) of peninsular and insular Italy available for 1950-1981 years in the italian museums and collections. The file, wherever possible, has been filled up with cartographic, bioclimatic and synanthropic data. With the use of a microcomputer has thus become possible to make inquires related both to biological and environmental data. Data management allows the following function: file maintenance (insert, delete and modify record); cross - reference search; searach , index; report generation. In the first phase challenges have been formulated, requiring simple data processing. Some informations were obtained as reply about the prevalences in the capturing referred to sex and season, as well as the connections between Rodents coenosis and bioclimatic condition of the territory.

Key words: Data bank, Rodents, Italy.

RIASSUNTO

È stata avviata una "banca dati" dei rinvenimenti di esemplari di Roditori (Famiglie: Gliridae, Arvicolidae, Muridae) dell'Italia peninsulare ed insulare catalogati negli anni 1950-1981 nei Musei e collezioni italiani. L'archivio, laddove possibile, è stato completato con i dati cartografici, bioclimatici e sinantropici. L'uso del microcomputer ha permesso di formulare domande incrociate sia sui dati biologici che su quelli ambientali. La gestione dei dati consente le seguenti funzioni: gestione dell'archivio (inserimento, cancellazione e modifica del record); ricerca incrociata; ricerca per indice; stampa. In una prima fase sono state formulate alcune domande richiedenti semplici elaborazioni sulle preponderanze delle catture in rapporto al sesso ed alla stagione, nonché sui rapporti tra cenosi a Roditori ed assetto bioclimatico dei territorio.

Parole chiave: Banca dati, Roditori, Italia. ,

INTRODUCTION

In various sectors of natural sciences, cataloguing has been carried out in order to deal with the mass of available data in view of

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the widely felt need to extract synthetic and manageable informations from museum collections (Genoways & Schlitter, 1981; Amori et al., **1982;** Anderson, 1985; Kirkland & Koeppl. 1985; Woodward & Eger, **1985).**

A microcomputer has been used to create a magnetic disk file of all the available data from direct finds of Rodent species (Families: Gliridae, Arvicolidae, Muridae) in mainland and island Italy, catalogued' from 1950 to 1981 in the main museums and collections (cf. Amori et al., **1986).** This enables cross-indexed inquiries related both to biological and environmental data without any of the troubles involved in manually consulting paper files. It is thus possible to go beyond a cataloguing limited to exclusively taxonomic criteria which generally make biological and ecological parameters unutilizable except than in an empirical form.

MATERIALS AND METHODS

The record format for data input consists of biological data and environmental data coded by capitol letters and/or numbers (see tab. **1).**

As for the biological data for the chromosomal analysis of a certain number of species was also given wherever possible. As for the environmental data, find sites were identified from the following standpoints: geography (survey map of Italy of the Istituto Geografico Militare), lithology (geological map of Italy 1:100.000 of the Servizio Geologico d'Italia), anthropogeography (soil utilization maps by the Italian National Research Council based on Italian Touring Club type maps).

The following Italian museums and collections supplied data (the total number of specimens and the number of those sexually determined are indicated beside the name):

Comunità Montana Monti della Tolfa-C.M.T. (tot. 123; 67 ♂♂, 30 P ♀); Institute of Parasitology of Rome University-C.P.R. (tot. 56); National Institute of Wild Life Biology of Ozzano Emilia, Bologna - I.N.B.S. (tot. 41; 15 0 6, 14 E ♀); Musemurn of the Insitute of Comparative Anatomy "G.B. Grassi" of Rome University - A.C.B.G. (tot. 1276; 619 ♂♂, 593 ♀ U); Museum of the Zoology Institute "F. Raffaele" of Rome University - M.Z.R. (tot. 586; 293 d ♂, 292 ♀♀); Museum of Natural History of Genoa - M.S.N.G. (tot. 31; 15 ♂♂, 10 ♀♀); Museum of Natural History of Milan - M.S.N.M. (tot. 162); Museum of Natural History of Verona - C.M.V.R. (tot. 301; 123 d d, 124 ♀ U); Zoological Museum of Pavia - M.Z.P. (tot. 31; 15 d ♂, 12 ♀♀); "La Specola" Zoological Museum of the Florence University - M.Z.F. (tot. 233; 108 ♂ d, 87 ♀♀); Rome Society of Natural Sciences - S.R.S.N. (tot. 25; 9 d ♂, 12 E ♀). The initials of certain museums and collections have been taken from Amori et al. (1986), Ciaramelli & Kahmann (1975) and Genoways & Schlitter (1981).

Two different files have been defined for data management: a master file and a server file. On the first one are stored all the records containing data, while the second one is used to store all the informations needed for the management of the previous one, such as space occupation, number of records, description of the meaning of each field and their displacement in the record. In the master file, each record has a fixed length. Also the position of each field in the record is fixed (e.g. capture date, lithological enviroment). The definition of the physical file required according to its logical description given by the user, as well as the'other information required for master file management during input, modification and search operations, is automatically done by the system. No technical knowledge **is** necessary for the user. Utility programs-don't need to reside on the same floppy disk where data are, so that a better utilization of the space is given for the user data.

Data management menu comprises the following functions: 1 - input; 2 - deletion; **3** - modification; 4 - cross-referenced search; 5 - index search; ***6*** - print.

Some of the features offered by cross-referenced search, which represents the typical use of the file are reported hereafter. It must be observed that the main characteristic of this function **is** the freedom of choice for the search key. A value for the search key must be supplied possibly together within a set of and/or operators on other fields of the record. Output will consist of all the records corresponding to the data requested. Programs such as file maintenance; copy and expand file, statistical reports have been devised to exploit the file.

The programs are written in APPLESOFT and can run on any APPLE II EUROPLUS **48K** with one disk drive (Piras et al., 1982, 1987).

The archive is amenable to new data input and new report generation.

RESULT

A few questions not requiring complex data processing were put:

a - Number **of** specimens for each species and relative percentage of total;

Table 1 — The record format for data imput (from Piras et al., 1987)

COLLECTION DATA		ENVIRONMENTAL DATA		ENVIRON. DATA REFERENCES
1) Museum	-----	12) Region	..	- Ital. administr. subdiv.
2) Coll. no.	-------	13) Province	..	- Ital. administr. subdiv.
3) Genus	--	14) Municipality	...	-id. with postal refer.
		15) Locality	----------	
4) Species taxon	--	16) Sheet	------	- I.G.M. map. 1:25.000
5) Subspecies t.	--	17) Lithological environ	----------	- Geol. map. 1:100.000
6) Habitus	-	18) Sheet T.C.I. - C.N.R.	..	- Ital. soil map 1:200.000
7) Sex	-	19) Soil use (a)	...	- Ital. soil map 1:200.000
8) Chromosomic no.	--	20) Soil use (b)	..	- Ital. soil map 1:200.000
9) Capture date	------	21) Bioclimate (a)	--	- from Tomaselli et al., 1973
10) Death date	------	22) Bioclimate (b)	--	- from Tomaselli et al.. 1973
11) Age	...	23) Synanthropic features		
		24) Average elevation	..	- in meter

b - A larger number of specimens classified by species, season, sex are listed;

c - The number of I.G.M. sheets in scale 1/100.000 referring to the areas in which at least one faunal find has been made. It was found that about 50% of the area has been convered by us and that the areas with no data are mainly in the south of Italy;

d - The number of *Rattus rattus* to wich a given habitus has been assigned. It was found that *alexandrinus* habitus and *rattus* habitus account for 16,2% and 2,85% respectively, vis-a-vis *frugivorus* habitus;

e - The number of *Mus domesticus* with *brevirostris* and *domesticus* habitus are in relation to the synanthropic characteristics and bioclimate. It appears that whether or not capture took place in a closed area and the *brevirostris* accounts for 70,5% of the *domesticus*. It was confirmed that ***Mus*** *domesticus* is more frequent on the outside of closed spaces in environments with a termoxerophilous bioclimate.

DISCUSSION

Storing up of new data and some further works are considered necessary on the material already available. The possibility of

Table 2 — The species listed in a data bank: specimens for each species and relative percentage of total.

FAMILY	SPECIES	TOT. (M+F)	%
Gliridae	*Eliomys quercinus*	39	1.3
	Myoxus glis	33	1.1
	Muscardinus avellanarius	24	0.8
Arvicolidae	*Arvicola terrestris*	5	0.2
	Clethrionomys glareolus	136	4.6
	Microtus nivalis	4	0.1
	Microtus (Pitymys) sp.	2	0.0
	Microtus (Pitymys) multiplex	1	0.0
	Microtus (Pitymys) savii	72	2.4
Muridae	*Apodemus* sp.	135	4.6
	Apodemus flavicollis	223	7.6
	Apodemus sylvaticus	597	20.3
	Micromys minutus	7	0.2
	Mus domesticus	912	31.0
	Rattus sp.	6	0.2
	Rattus nowegicus	284	9.4
	Rattus rattus	454	15.4

configuring new parameters (e.g. biornetric data) will enable the archive to be utilized in other ways. During the record definition stage it was found necessary the full utilization on the biological and environmental data. This is not always possible, however, in the case of faunal observations made on wild animals. Moreover, the results obtained reveal the need for further faunal observations in localities and by taxonomic groups that are comparatively unrepresentative (cf. Niethammer and Krapp, 1978). Archive reports reveal **a** wide prevalence in the capturing of male specimens and confirm that murine populations are more frequent in autumn and spring, even

Table 3 — Number of specimens classified in the data bank by species, season and sex.

	Spring		Summer		Autumn		Winter	
SPECIES	M	F	M	F	M	F	M	F
Apodemus spp. (tot.)	126	102	98	63	117	96	47	47
Apodemus flavicollis	42	31	37	25	25	24	15	12
Apodernus sylvaticus	77	67	82	68	69	60	24	30
Mus domesticus	69	78	59	60	167	143	83	82
Rattus sp. (tot.)	82	79	39	25	156	167	68	52
Rattus nowegicus	5	9	1 0	8	93	106	21	15
Rattus rattus	75	70	28	i7	63	61	46	36

though it may be objected that this depends on the subjective choise of the collectors. It was also observed that the ratios between colour form in *Rattus rattus* display frequencies comparable to that of the genetic dominance of the *frugivorus* habitus over the *alexandrinus* (Caslick, 1956). Eventually, the use of differential parameters shown in the table 1 reveals several types of coenosis that can be related back to synanthropic and bioclimatic characteristics (cf. Cristaldi et al., 1978; Amori et al., 1984). The observation in Apennines of copresences typical of temperate bioclimates (*Clethrionomys glareolus, Apodemus flavicollis, Myoxus glis*) leads beck to the coenotic arrangements already amply studied in temperate Europe (Niethammer and Krapp, 1978; Amori et al., 1986) while the more typically mediterranean bioclimate is characterized by species which, although existing in close commensalism with man, are normally found in outdoor environments *(Mus domesticus, Rattus* sp.).

Further, more integrated questions will form the subject of subsequent investigations.

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REFERENCES

AMORI, G., CRISTALDI, M. & L. CONTOLI. 1986. Sui Roditori (Gliridae, Arvicolidae, Muridae) dell'Italia peninsulare ed insulare in rapporto all'ambiente bioclimatico mediterraneo. Animalia (1984), **11** (1-3): 217-269.

AMORI, G., CRISTALDI, M., FEDERICI, R., & D. PIRAS. 1982. Evaluation of environmental parameters through the use of microcomputer in catalogiung italian small mammal specimens. Abstr. III Int. Theriol. Congress, Helsinki (15-20 Aug. 1982): 10.

AMORI, G., FEDERICI, R., & D. PIRAS. 1984. Utilizzazione di una banca dati per la distribuzione del sottogenere *Sylvaemus* nell'Italia centro meridionale. Suppl. Ric. Biol. Selvaggina, 9: 65-73.

ANDERSON, S. 1985. Developments in information retrieval systems. Acta Zool. Fennica, 170: 61-63.
CASLICK, J.W. 1956. Color phases of the Roof rat, *Rattus rattus*. J. Mamm., 37: 255-257.
CIARAMELLI, F., & H. KAHMANN. 1975. Die Gattung Eliomys (Mamm.. Rod.) in Italien der Gartenschlafer Eliomys *quercinus sardus* (Barret-Hamilton 1901). Ann. Mus. Civ. St. Nat. Genova, 80: 304-312.
CRISTALDI, M., AMORI, G. & L. CONTOLI. 1978. Synecological features of micromammals communities in central and lower Italy. Abstr. II Congressus Theriol. Internationalis, Bmo (20-26 June 1978): 34.
GENOWAYS, H.H., & D.A. SCHLITTER. 1981. Collections of recent Mammals of the world exclusive of Canada an United States. Ann. Carnegie Museum, 50: 47-80.
KIRKLAND, G.L. Jr., & J.W. KOEPPL. 1985. Status of information retrieval in mammalogical collections. Acta Zool. Fennica, 170: 65-66.
NIETHAMMER, J., & F. KRAPP. 1978. Handbuch der Saugetiere Europas. Band i. Nagetiere I. Akad. Verlagsgesell., Wiesbaden.
PIRAS, D., FEDERICI, R., CRISTALDI, M. & G. AMORI. 1987. Un esempio di utilizzazione del microcomputer nella catalogazione e nello studio di elementi faunistici. in "Atti I Seminario italiano sui censimenti faunistici", Urbino, 1982, Pandolfi M. Ed.: 189-195.
TOMASELLI, R., BALDUZZI, S., & S. FILIPELLO. 1973. Carta bioclimatica d'Italia. Coll. Verde, Min. Agric. Foreste, Roma, 33.
WOODWARD, S.M., & J.L. EGER. 1985. Computer management of mammal collections Royal Ontario Museum. Abstr. IV Int. Theriol. Congress Edmonton, Alberta, Canada (13-20 August 1985): 670.