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BERNARDINO RAGNI AND THE WILDCAT OF THE OLD WORLD

BERNARDINO RAGNI E IL GATTO SELVATICO DEL VECCHIO MONDO

Lolita Bizzarri[1*] & Andrea Sforzi[2]
Guide Trek Alps, Fraz Echarlod 71, 11015 La Salle (AO) *lolitabizzarri@gmail.com
[2]Museo di Storia Naturale della Maremma, Strada Corsini 5, Grosseto

Abstract. The conference 'The European wildcat in Italy: current knowledge and future prospects' is the first thematic national meeting of a series of annual events called 'Fauna' dedicated to the figure of the zoologist Bernardino Ragni. The meetings started in 2019 with a conference dealing with the person and career of Prof. Ragni one year after his death, and are strongly supported by the Ragni family, the Municipality of Spoleto and the Professor's colleagues and former students. The paper describes the figure of Prof. Bernardino Ragni, commemorating his dedication to research over his entire life and, in particular, to the iconic species he devoted most of his time and energies to, namely the European wildcat.

Riassunto. *Il convegno 'Il gatto selvatico europeo in Italia: conoscenze attuali e prospettive future' è il primo incontro nazionale tematico inserito in una serie di eventi annuali denominati "Fauna" dedicati allo zoologo Bernardino Ragni. Gli incontri, avviati nel 2019 con un convegno sulla figura di Ragni ad un anno dalla sua scomparsa, sono fortemente voluti dalla famiglia Ragni, dal Comune di Spoleto e dai colleghi ed ex studenti del Professore. L'articolo descrive la figura del Prof. Bernardino Ragni, per commemorare la sua dedizione alla ricerca e, in particolare, alla specie iconica a cui ha dedicato la maggior parte del suo tempo e delle sue energie: il gatto selvatico europeo.*

Preface

Why dedicate an annual event to the figure of Bernardino Ragni, why in Spoleto and why choose the European wildcat as the subject of the first scientific conference?

Bernardino Ragni is part of that group of Italian scientists, naturalists and zoologists who, starting from the 1960's, sowed the first seeds of scientific environmentalism, saw them sprout, took care of the new plants allowing them to grow, saw the first leaves blossom and bear the first fruits. He took care that the seeds were dispersed in all directions, that they colonized different sectors of human activities, generating new thinking and critical minds, giving way to an environmental awareness which has never reached useless harmful extremes. His scientific ideas and methodological approaches spread both locally, nationally and internationally. He dedicated every moment of his life to the accurate observation and critical analysis of numerous aspects of nature and human life, never separating one from the other.

Personal notes

Bernardino Ragni was born and lived in Spoleto (PG), a city he loved, in the Region he adored - Umbria, Italy, for which he felt a strong and contrasting feeling of love and hate. Love for the beauty of nature, history, culture and art that characterize this country, hate for any form of mismanagement of its paramount potential. In Spoleto he took his first steps as a naturalist and zoologist. In Spoleto he served the civil society as an administrator, holding the position of Councillor for Urban Planning in the years 1995-2000. Famous at the time was his denial to the request to plug a 'niche' in the thick walls of an old farmhouse under renovation, because a barn owl was nesting there. He fought to include in the staff of the Municipality of Spoleto the figure, perhaps unique in Italy, of a Naturalist, who gives advice on every political decision involving the environment.

The Mountains around Spoleto saw his blossoming as a scientist, and as a zoologist he traveled far and wide in this area, in all seasons, for many years, making them his open-air laboratory. In these mountains, in the late sixties and early seventies, he began to carry out researches on the European wildcat, then an almost completely unknown animal, which he studied for 50 years. Ragni became the greatest expert on this taxon in Italy and developed several national and international collaborations.

Thanks to his figure and activity, it was decided to dedicate to the Late Bernardino Ragni an annual scientific event, to be held in Spoleto. In 2020 the conference was dedicated to *Felis silvestris silvestris*. Over ten speakers described the state of the art on this elusive carnivore in Italy.

This contribution aims to retrace the scientific career of the Late Bernardino Ragni in short stages.

Born in 1946, by the age of 14 he had already

begun to explore the mountains around Spoleto, driven by his strong curiosity. In 1968 this curiosity is flanked by a scientific approach and so began his scientific activity. Mainly two taxa attracted his attention: the wildcat (*Felis silvestris*) and the golden eagle (*Aquila chrysaetos)*. In this context, we will deal with the former.

The Scientific work of Bernardino Ragni

Right from the start, in the late sixties-early seventies, Bernardino Ragni dealt with four aspects relating to *Felis silvestris*: distribution, eco-ethology, morphology, morphometry and genetics.

Concerning the first two, he mainly used two methods: survey-interview and field data collection. The surveys-interviews included those categories of people who, for pleasure or for their job, could come in contact with the species of interest. Hunters first of all, but also breeders-farmers, nature enthusiasts, practitioners and researchers working in Natural History Museums, State Forests Administrations and Universities. There are many statements, mainly from hunters, reported in his notes. Very often they were embellished with side comments, useful to grasp one of his strongest character aspects: being direct, without filters, towards everyone. The field research was carried out in person, often accompanied by his first wife, friends and colleagues. He faithfully reported everything observed in his usual field notebook, often accompanying the text with drawings of the environment, burrows, footprints, tracks and drawings of the coats of the cats he observed.

In 1972 he published "The cat of the woods", his first popular publication, including all the information on the European wildcat personally collected to date.

He carried out ethological observations in captivity on wildcats found injured, animals he tried to recover in order to release them back into the wild. Over the years, several individuals, of both sexes and all ages, have been hosted and nursed. This allowed him to define the basis for the description of the ethogram of the European wildcat; to detect differences in the coat pattern and to define a method to estimate the age of individuals.

There are also numerous wildcats that he recovered dead (shot, poisoned or hit by cars). The corpses, sad evidences of individuals being subtracted from the wild populations, were nevertheless a precious source of data: morphological (coat colour and pattern markings), morphometric (measures such as head-trunk length, tail length, gut length, cranial capacity, etc.), ecological (diet in particular) and obviously distributive, (the locality of origin for each corpse was noted).

The first ethological publication dates back to 1977, 'Observations on the wildcat in captivity'. The following year Prof. Ragni published 'Observation on the ecology and behavior of the wildcat (*Felis silvestris* Schreber) in Italy', his first international paper.

In 1981 he published for the Italian National Council of Research (CNR) the fact sheet 'The wildcat', within the framework of the wider publication 'Distribution and biology of 22 mammal species in Italy,' which became the handbook that he distributed to anyone willing to approach this taxon.

In the second half of the Eighties he started a fruitful and long-lasting collaboration with Ettore Randi, geneticist of the then National Institute for Wild Fauna (INFS). The first scientific outputs are from 1986: 'First results of the electrophoretic analysis of a sample of Italian populations of wildcat and domestic cat' and 'Multivariate analysis of craniometric characters in European Wildcat, Domestic cat and African wildcat (Genus *Felis*)'.

As already mentioned, the research on the wildcat does not only concern the Umbria region, but it extended over a large part of the country. In 1987 two publications regarding two geographically distant areas of Italy were published: one about Sicily 'The wildcat: knowledge and conservation of a species. News on the lynx and the wolf' written in collaboration with S. Seminara; and the other about the North-East 'Current situation of the wildcat (*Felis silvestris*) and of the lynx (*Lynx lynx*) in the area of the south-eastern Alps', marking the start of other very important collaborations, namely those with the researchers Luca Lapini and Franco Perco.

In the same year, Ragni launched the longest project of his career; the reintroduction of the European wildcat in the Maremma Regional Park. A project that continued in alternate phases until 2006. It began with the involvement of collaborators who at that time were students or new graduates and who would later have become valid and historical collaborators of Ragni: Mariagrazia Possenti, Marina Gigante and Andrea Sforzi. The project in Maremma acted also as the 'cradle' that helped to 'raise' most of the other researchers who collaborated with Ragni for many years: Alberto Sangiuliano, Domenico Cristofari, Marco Catello, Christian Losso, Daniele Paoloni, Andrea Mandrici, Lolita Bizzarri, Roberta Mazzei and Anna Maria Fabrizi. Some of these researchers are still engaged in projects dealing with the species. The project produced publications and the results were presented at national and international conferences from 1996 to 2017.

Since the beginning of his career, scientific research for Prof. Ragni has never been an end in itself. The knowledge acquired and the results obtained in his studies have always primarily represented a useful tool in wildlife management. In 1988 the work 'Analysis of genetic variability in some species of carnivores and management applications' was published, in collaboration with Ettore Randi.

After almost twenty years of studies, in 1990 he finally published 'Contribution to the ethogram of *Felis silvestris* Schreber, 1777'.

His collaboration with the geneticist Ettore Randi became closer and closer and in 1991, they jointly published 'Genetic Variability and Biochemical Systematics of Domestic and Wildcat Populations (*Felis silvestris*: Felidae)'.

Compiling all the information available at that time on the presence of *Felis silvestris*, at national level in 1994 Ragni, (together with Possenti, Sforzi, Zavaloni and Ciani) published an article that for many years lasted as a milestone on the distribution of the European wildcat in Italy: 'The Wildcat in Central-Northern Italian peninsula: a biogeographical dilemma'.

The second milestone was published in 1996, in collaboration with M. Possenti: 'Variability of coat-color and marking system in *Felis silvestris*'. This is a reference paper, still used today to phenotypically distinguish the European wildcat from the African wildcat and the domestic cat.

In 1997 Prof. Ragni's research on the European wildcat stepped beyond the Italian borders and reached Crete. The wildcat on the island were thought to be extinct, as the last sighting dated back to the 50's. The research involving two students (Alessandra Belardinelli and Paola Cicconi) under the coordination of Andrea Sforzi and in collaboration with P. Lymberakis (Natural History Museum of Crete), brought the capture of an adult male on the Greek island. It was released and his movements were followed through a radiotelemetry study. In 1999 Ragni published 'The Carnivores on the Island of Crete, Greece', together with the two students, the local researcher T. Roussos and his colleague M. Masseti.

In 2001, the development of a protocol to genetically distinguish the wildcat from the domestic cat was published: 'Genetic identification of wild and domestic cats (*Felis silvestris*), and their hybrids using Bayesian clustering method', together with E. Randi, M. Pierpaoli, M. Beaumont and A. Sforzi.

In 2007 a research programme through camera trapping was launched in Sicily, in collaboration with Stefano Anile. The project led, three years later, to a first estimate of the Sicilian population: 'Estimation of European wildcat population size in Sicily (Italy) using camera trapping and capture – recapture analyze'.

In the same year, under the coordination of Lolita Bizzarri and in collaboration with Moreno Lacrimini, a project of trapping and studying eco-ethology of the European wildcat through radio telemetry was launched in one of the historical areas of presence of the species in the Apennines. Outputs from the project included a protocol for the trapping method used, published in the 2010 paper: 'Live capture and handling of the European wildcat in central Italy'.

Fieldwork has always been complemented by laboratory studies. Collaboration with Francesca Vercillo enabled numerous necropsies to be carried out, and samples collected for genetic analysis, like those, that allowed the 2013 publication 'Genetic structure of wildcat (*Felis silvestris*) populations in Italy'.

In 2017, the paper 'Home-range size of the European wildcat (*Felis silvestris silvestris*): a report from two areas in Central Italy' was published. The work provided a summary and a comparison of the telemetry studies carried out on the species in two areas of Central Italy- the Apennines and Maremma, representing the two projects that Ragni probably cared most about.

Conclusions

To sum up, the main results obtained by Prof. Ragni in almost 50 years of scientific research on *Felis silvestris* are:

- the description of the Italian wildcat populations (with particular reference to morphological, genetic, health, ethological aspects and the main conservation problems);
- the reintroduction in the Maremma Regional Park (including a radio telemetry study on the first and subsequent generations);
- the biogeography of the Italian wildcat populations;
- radio telemetry study on an 'historical' population in the Apennines.

Bernardino Ragni did not only study wildcats. He was a multifaceted zoologist, who always took the widest ecological perspective. Among the taxa he dealt with can be listed: the golden eagle (his second totemic animal), Eurasian lynx, wolf, beech marten, stone marten, chiroptera, wild boar, ungulates in general, micro-mammals, reptiles and amphibians.

There are over 140 scientific publications bearing his name, of which more than 60 are on *Felis silvestris*. He was a Professor at the University

of Perugia, holding courses on Vertebrate Zoology, Zoogeography and Wildlife Management. Over 30 students and collaborators took part in his research activities over the years.

This wealth of knowledge, skills and interpersonal relationships deserves to be valued. Some of his closest collaborators continue, in his name, some of the work started by Ragni, in order to ensure that what has been sown continues to bear fruit.

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Selected Bibliography

Anile S., Bizzarri L., Ragni B., 2010 - Estimation of European wildcat population size in Sicily (Italy) using camera trapping and capture–recapture analyses. *Italian Journal of Zoology*, 77(2): 241–246.

Anile S., Bizzarri L., Lacrimini M., Sforzi A., Ragni B., Devillard S., 2017- Home-range size of the European wildcat (*Felis silvestris silvestris*): a report from two areas in Central Italy. *Mammalia*, 82. Bizzarri L., Lacrimini M., Ragni B., 2010 - Live capture and handling of the European wildcat in central Italy. *Hystrix It. J. Mamm.*, 21(1): 73-82.

Mattucci F., Oliveira R., Bizzarri L., Vercillo F., Anile S., Ragni B., Lapini L., Sforzi A., Alves P. C., Lyons L. A., Randi E., 2013 - Genetic structure of wildcat (*Felis silvestris*) populations in Italy. *Ecology and Evolution*, 3(8): 2443-2458.

Ragni B., 1972 - Il gatto dei boschi. In: Una vita per la natura. *Edizioni WWF*. Camerino Tipografia Succ. Savini – Mercuri.

Ragni B., 1977 - Osservazioni sul gatto selvatico in cattività. *Natura*, Milano, 68 (1-2): 65-82.

Ragni B., 1978 - Observation on the ecology and behaviour of the wildcat (*Felis silvestris* Schreber) in Italy. *Carnivore genetics newsletter*, Newtonville, Mass.tts, 3 (7): 270-274.

Ragni B., 1981 – Gatto selvatico *Felis silvestris* Schreber, 1777. In Pavan M. (ed.): Distribuzione e biologia di 22 specie di mammiferi in Italia. CNR, Roma: 105113.

Ragni B., Randi E., 1986 - Multivariate analysis of craniometric characters in European Wildcat, Domestic cat and African wildcat (Genus *Felis*). *Saugetierkunde*, 51: 243-251.

Ragni B., Lapini L., Perco Fr., 1987 - Situazione attuale del gatto selvatico (*Felis silvestris)* e della lince (*Lynx lynx*) nell'area delle Alpi sud-orientali. *Biogeographia*, 13: 867-901.

Ragni B., Seminara S., 1987 - Il gatto selvatico: conoscenza e conservazione di una specie. Notizie sulla lince e sul lupo. Regione Sicilia, *WWF Sicilia*, Palermo: 29 pp.

Ragni B., Possenti M., 1990 - Contribution to the ethogram of *Felis silvestris* Schreber, 1777. *Ethology, Ecology and Evolution*, 2: 324-325.

Ragni B., Possenti M., Sforzi A., Cavalloni D., Ciani F, 1994 - The Wildcat in Central-Northern italian peninsula: a biogeographical dilemma. *Biogeographia*, (17).

Ragni B., Possenti M., 1996 - Variability of coat-colour and markings system in *Felis silvestris*. *Italian Journal of Zoology*, 63 (3): 285-292.

Ragni B., Masseti M., Roussos T., Belardinelli A., Cicconi P., 1999 - The Carnivores on the Island of Crete, Greece. *Contributions to the Zoogeography and Ecology of the Eastern Mediterranean Region*, (1): 117-123.

Randi E., Ragni B., 1986 - Primi risultati dell'analisi elettroforetica di un campione di popolazioni italiane di gatto selvatico e gatto domestico. I.N.B.S. Posters, 3. Bologna, 4 pp.

Randi E., Ragni B., 1988. Analisi della variabilità genetica in alcune specie di carnivori ed applicazioni gestionali. Atti del I Convegno Nazionale dei Biologi della Selvaggina. *Suppl. Ric. Biol. Selv.*, Bologna, 14: 501-506.

Randi E., Pierpaoli M, Beaumont M., Ragni B., Sforzi A., 2001 - Genetic identification of wild and domestic cats (*Felis silvestris*), and their hybrids using Bayesian clustering methods. *Mol Biol Evol,* 18: 1679-1693.