Atti del Museo di Storia Naturale della Maremma, 25: 63-72 (31 dicembre 2021)
ISSN 1126-0882

THE EUROPEAN WILDCAT IN THE ITALIAN WESTERN RANGE: SOMETHING NEW?

IL GATTO SELVATICO EUROPEO NEL SUB AREALE OCCIDENTALE ITALIANO: QUALCOSA DI NUOVO?

Patrizia Gavagnin – Via Feraldi 19, Sanremo 18038 (IM)
p_gavagnin@yahoo.it

Abstract. Herein the results of an investigation conducted in these two regions are reported, representing a revision of the sub-area in order to facilitate distribution data updating.
Specimens identified in Museum collections attest wildcat presence in plain woods near Turin up to the early decades of the 20th century. The presence in the Ligurian and Maritime Prealps is confirmed at least until legal protection (1977). The European wildcat absence from Po river areas is linked to forest cover disappearance in plains, hills and mid-mountains. Deforestation of the Po area for agricultural purposes is a remote process that has become pushed over the last two centuries, causing theriocenoses modification and forestry species disappearance. The wild felid, considered harmful like all carnivores and raptors, was huntable, caught with traps to sell the fur, and collectors sought after him; there was also locally food consumption. After decades of missing data, two distinct events in Liguria allowed the identification of two specimens: a male in the western mountains and a female in Ligurian-Piedmontese Apennines - where a clear wild heritage can be found. It is important in this regard to update the distribution framework and contrast risk of variability loss due to hybridization with domestic cats.

Riassunto. *L'areale italiano del gatto selvatico europeo include una sub-popolazione storica segnalata nelle province liguri occidentali e piemontesi a ridosso delle Alpi. Vengono qui descritti i risultati di una indagine condotta in queste due regioni, al fine di fornire una revisione delle conoscenze sulla specie in questo sub-areale storico, ed aggiornare quindi i dati di distribuzione. Esemplari presenti in collezioni museali attestano la presenza del gatto selvatico nei boschi della pianura torinese fino ai primi decenni del XX secolo. La presenza nelle Prealpi Liguri e Marittime è confermata almeno fino alla tutela legale della specie (1977). L'assenza del gatto selvatico europeo dalle aree fluviali del Po è invece probabilmente legata alla scomparsa della copertura forestale in pianura, collina e media montagna. La deforestazione dell'area padana a fini agricoli è un processo remoto che si è realizzato negli ultimi due secoli, causando una modifica nelle teriocenosi, con la scomparsa delle specie forestali. In passato il gatto selvatico, considerato dannoso come tutti i carnivori e i rapaci, era cacciabile, catturato con trappole per la pelliccia, e ricercato dai collezionisti; da segnalare anche il suo consumo come cibo, a livello locale.*
Dopo decenni di dati mancanti, due distinti eventi in Liguria consentono di identificare due esemplari: un maschio trovato nelle montagne occidentali e una femmina proveniente dall'Appennino ligure-piemontese, a conferma della presenza del genotipo selvatico. È importante a questo proposito aggiornare il quadro di distribuzione e contrastare il rischio di perdita di variabilità dovuta alla possibile ibridazione con i gatti domestici.

Introduction

The European wildcat (*Felis s. silvestris*, Schreber 1777) is a carnivore of particular interest in the Italian fauna. The felid distribution is not continuous in Italy, as the risk of hybridization with domestic cats induces variability loss increasing fragmentation problems.

For this reason the conservation *status* of the Italian population is classified as NT *Near Threatened* and it is important to encourage any actions for updating distribution framework.

European wildcat Italian range and its evolution

According to the distribution model proposed by Ragni (Ragni *et al*. 1993), the European wildcat range in Italy is subdivided in three distinct sub-areas:

the largest concerns the Apennines, including Sicily; the second concerns Friulian Prealps; a third one refers to the mountains and western valleys between Liguria and Piedmont.

Compared by the initial model described by Bernardino Ragni, in recent years the Appennines range and the Eastern range have showed some evident expansion phenomena: this carnivore has been spotted in the Foreste Casentinesi National Park, in Pratomagno Aretino and Tuscany Tyrrhenian areas.

This framework expands significantly the central areas of distribution and offers interesting perspectives for Northern Apennines, where the carnivore was not reported in the past and where a suitable habitat can be found.

In the eastern side, the Veneto areas of colonization dates back to about twenty years, as recently the wild felid has been found in Dolomiti Bellunesi National Park (Catello *et al*., this volume); also recently an observation near Trento was achieved by cameratrapping.

The western distribution does not seem to show similar expansion phenomena.

Agricoltural Forestry Ministry D.M. May, 4 1971 and Hunting Law n° 968/1977 have decreed the end of carnivore hunting that was an important cause of rarefaction and local disappearance for the species.

In western Ligurian-Piedmontese areas, objective findings have not been reported for a long time.

The western population isolation is an important critical factor, since wildcat does not occur in the French areas immediately nearby.

French distribution offers actually positive prospects due to a stable presence for about fifteen years in several Departments near the Alps, such as Savoie, Isère, Chartreuse, Vercors, and a South progression towards the Mediterranean areas.

Swiss Jura colonization, by French Jura recently occupied areas, represents an additional potential source areas for the North-West - Central Italian sector and for lowers alpine valleys.

The European wildcat historical distribution in the western area: borders needs to be redefined

In his report on biogeographical distribution of *Felis s. silvestris* in Italy (Ragni *et al*., 1993), Bernardino Ragni defined the western sub-range as the territory corresponding to the Imperia province and part of the Savona and Cuneo provinces. The boundaries of this sub-area were rigidly specified by establishing the limit at Monte Settepani in Savona province and at the watershed between the upper Tanaro basin in the Cuneo province and the Ligurian basins of Argentina and Arroscia.

Source of this information was the evaluation of finds preserved at "Giacomo Doria" Museum in Genoa and others collections of Northern Italy.

As a first consequence of these territorial limits, the cartographic representation of the wildcat distribution in Italy has so far been limited to the extreme portion of the Ligurian territory, describing a very restricted, almost residual, sub-area.

The distribution map by REN (National Ecological Network for Italian vertebrates Conservation, 2002) similarly only reports the Ligurian portion; the distribution maps relating to Piedmontese carnivores produced by Piedmont Region shows also only a trace of regional historical records.

This representation must be modified, because it appears to be of little significance and indirectly affects the lack of information on the animal, leading to difficulties to promote actions with local authorities in order to update distribution data and improve its conservation *status*.

In year 2008, a new investigation conducted in Liguria and Piedmont regions partially re-defined the western distribution borders (Gavagnin *et al*., 2010). In this research two skins from Valle d'Aosta were included. The survey was conducted by checking Museums, public and private collections in the three Regions cited above. Investigations were also carried out in other museums (Milan, Rome, Florence, Nice), 15 civic collections, Protected Areas and naturalistic collections kept at some Religious Scholastic Institutes of the area. In total, 32 collections were examined.

In addition, some historiographical texts, descriptive of the environmental context of 19th and 20th centuries, such as Chabrol de Volvic (1826), Casalis (1853), Verany (1862) and other works in bibliography, were analyzed. A particular attention was paid to works of specifically zoological nature, such as notes by Ghigi (1911), Balletto (1977) and Vigna-Taglianti (1988).

In addition, annals of the hunting magazines "Diana" and "Rivista di Federcaccia", available until 1964, have been examined to detect reports on pest carnivores killing campaigns. Documents on royal hunts in the hunting domains of Savoia

Fig. 1 - Historical specimen from the Royal Hunting Estate La Mandria

Royal House, in the Turin State Archives and Royal Hunting Reserves in Piedmont were also consulted.

Results were presented at the National Conference on the Conservation of Felidae in Italy in 2008 (Gavagnin *et al*., 2010). We obtained a distribution map that included western Ligurian valleys of Imperia and Savona provinces, up to the Alps-Apennine limit and the Cuneo province, where the presence concerned the medium-lower part of the valleys, not affected by a consistent and lasting snow cover.

Naturalized specimens coming from this geographical area are often accompanied by a fair set of indirect (even if not conspicuous) information, such as old photographs and newspaper clippings and oral testimonies, including also a literary quotation (the famous writer Italo Calvino described a wildcat in his novel "Il Barone Rampante", set in the western Liguria woods).

An area of past presence was found in the residual woods of the Torinese plain and the low valleys, thus creating a belt around Royal Hunting Reserve of ''La Mandria''. These finds date from the late 1800s to the early 1900s (Fig. 1).

Before 1971, the European wildcat was included in the list of "harmful animals", that contained all carnivores and birds of prey. The animal was hunted also for the fur, which had a small trade and was sought after by collectors (Fig. 2). Locally, at least in western Liguria valleys, food consumption was also reported, an habit described even in other areas of Europe, such as France and Spain.

The European wildcat capture, when its coat had to be kept intact for commercialization or naturalization, did not take place by a traditional hunt, but with stalking and use of traps to avoid damaging the fur. It was a specialized hunting game. Baits and poisoned morsels were of little use, as the felid eating habit is the active search for live prey. This factor has largely contributed to the loss of knowledge on the carnivore, even in the hunting world, leading to a scarce information on its presence.

We can find information on the animal by identifying people who managed a market for the sale of the skin or sold specimens to collectors. Despite wildcat was considered "harmful", no capture rewards were paid. The list of the historical specimens that were found is shown in Tab. 1. It has been double-checked and updated, the catalog numbers and sources have been verified and the Regional Museum of Natural Sciences of Turin collection has been reviewed for this purpose.

Based on the specimens provenance, it is possible to state the following:

The past presence of a western sub-area, including the western Piedmont (provinces of Cuneo and Turin). The information about Turin comes from

Fig. 2 - Ligurian hunter (Imperia province) with european wilcats and foxes for coat commercialization

the area located between the plain and the lower Lanzo valley, where the edges of the Po forest cover and surroundings have been longer preserved, kept as a Savoyard Hunting Reserve;

no specimens were reported from the plain woods between Turin and Cuneo (Bosco del Merlino, Caramagna Piemonte), from which there were only bibliographic reports;

no specimens resulted from the Ossola area, despite some bibliographic information was referred to;

The Ligurian side is confirmed as Ragni described it, and in the Savona area it reaches Cadibona. There are no examples or probative historical information coming from the Levant of the Liguria region.

The Imperia sector provides most information, dating back to the 19th century and more recent; it is very likely that the greater isolation in the geographical area of the Ligurian Alps and the southern mountains, favored the carnivore conservation.

Specimens and news from the Savona area are quite limited, as it was difficult to find memories and tales among elderly hunters. Finds from that area, namely the skins and skeletal parts that Ragni had examined at the Giacomo Doria Museum, date back to the early decades of the 1900s; we examined only

Tab. 1 - Specimens List

SAMPLE TYPE	ORIGIN	COLLOCATION	REGION-PROVINCE	CATALOG NUMBER
1 - Naturalized specimen	Valdieri, 1911 Gesso Valley	Natural Sciences Museum Turin	Piedmont- Cuneo	N. 2218 CG 1
2 - Naturalized specimen	Valdieri Gesso Valley	Natural History Museum Milan	Piedmont - Cuneo	N. MSNM MA 3676
3 - Naturalized specimen	South Western Maritime Alps, 1932	National Mountain Museum "Duca degli Abruzzi"Turin	Piedmont - Cuneo	N. 124
4 - Naturalized specimen	"Maritime Alps"	National. Mountain Museum "Duca degli Abruzzi"Turin	Piedmont - Cuneo	N. 124 A
5 - Naturalized specimen	Ormea, Tanaro Valley	Private collection Cuneo (Naturalized specimen List Cuneo Province Bureau)	Piedmont - Cuneo	Private collection - naturalized by Angelo Giuliano, Borgo S. Dalmazzo
6 - Unprepared skin	Cuneo Province Locality/year not specified	Natural Sciences Museum Turin	Piedmont - Cuneo	N. 14/306 CG 1
7 - Skin + skeletal parts Only in catalog	Valdellatorre, 1898 Val Casternone (Lanzo Valley)	Natural Sciences Museum Turin	Piedmont - Turin	N. 1533 CG skin + N. 4072 CG skeletal parts
8 - Naturalized specimen	Royal Hunting Estate La Mandria	Estate La Mandria Royal Parcs Protected Areas	Piedmont - Turin	Royal Apartments
9 - Naturalized specimen	Venaria Reale, Year not specified	Private school collection Istituto Scolastico S.Giuseppe Turin	Piedmont - Turin	Late 19th century
10 - Naturalized specimen	Year not specified "Torinese"	Wild fauna collection Italian Hunting Federation Turin	Piedmont - Turin	Italian Hunting Federation – Turin 21, Mantova Street
11 - Naturalized specimen	La Mandria (TO) Year not specified	Natural Sciences Museum Turin	Piedmont - Turin	N. 1678 CG
12 - Naturalized specimen	Near La Mandria, late 19th century	Institute and Museum of Ethnography and Natural Sciences Missioni della Consolata	Piedmont - Turin	---------
13 - Skin + skeletal parts	Calizzano (SV) 18/1/1914 (Hunter Agostino Vacca)	G.Doria, Natural History Museum. Genova	Ligury - Savona	N. 10516 skull + 10515 skin
14 - Skull	Rocca Carpanea (Carpe, SV) 18/4/1983 (Hunter Agostino Vacca)	G.Doria, Natural History Museum Genova	Ligury - Savona	N. 47888 SKULL (Ragni 1986 Cranial Index)
15 - Naturalized specimen	Cadibona, year 1960	Taxidermist Ugo Sapetti (Contrada S. Bernardino, Ceva). (Naturalized specimen List Savona Province Bureau)	Ligury - Savona	----------
16 - Skin + skeletal parts	Bric Cornarea, Ligurian Alps (IM), 26-1-1915 (Hunter Agaccio)	G.Doria, Natural History Museum. Genova	Ligury - Imperia	N. 2333 skull + N. 2332 skin (Ragni, Cranial Index 1986)
17 - Naturalized specimen	Tavole (IM) December 1972 (Hunter Mario Vassallo)	G.Doria, Natural History Museum. Genova	Ligury - Imperia	N. 47531
18 - Naturalized specimen	Agaggio ArgentinaValley (Hunter Antonio Oliva - years 1930-40)	Voghera Natural History Museum, Coming from Giribaldi Collection, Bordighera	Ligury - Imperia	N. V870 Naturalized by Michelangelo Giuliano (Borgo S. Dalmazzo - Milano)
19 - Naturalized specimen	S. Bernardo Bosco di Rezzo, Rezzo (IM)	At private home, not reported Imperia	Ligury - Imperia	Reviewed thanks to intermediaries
21 – Naturalized specimen	Glori, Molini di Triora ArgentinaValley	At private home not reported Arma di Taggia	Ligury - Imperia	Reviewed thanks to intermediaries
22 – Naturalized specimen	Volpiaira, Arroscia Valley	At private home not reported Pornassio	Ligury - Imperia	Reviewed thanks to intermediaries

23 – Skin	Argentina Valley Locality non specified	Naturalized specimen List Imperia Province Bureau)	Ligury - Imperia	Imperia Province Hunting and Fishing Bureau
24 - Naturalized specimen	Bosco di Rezzo, Rezzo (IM)	Naturalized specimen List Savona Province Bureau)	Ligury - Imperia	Private collection hunter Giardini Ubaldo Alassio (SV)
25 – Skin	Locality not specified	Regional Natural Sciences Museum. St Pierre	Aosta Valley	N. M721I (Regional Natural Sciences Museum)
26 – Skin	Locality not specified	Regional Natural Sciences Museum St Pierre	Aosta Valley	N. M741I (Societè de la Flore Valdotaine)

a single specimen that shows a more recent date.

Most likely wildcats were preserved at the Natural History Museum of Savona (Mingozzi *et al*., 1988), whose collections were unfortunately lost in a bombing attack during 1943; only few finds of birds remain, and the incomplete registers do not allow to verify the data.

At the Provincial Administration there are four complaints of ownership by private individuals, but only one of them could be verified.

Several quotations from zoologists (Ghigi, Vigna Taglianti, Balletto), historical-ethnographic descriptions (Casalis, Chabrol de Volvic, Diana), and also stories and statements by hunters concern the Imperia- Savona areas. From Monregalese, Cuneo province, there are testimonies from hunters and tanners who had prepared leathers but there are not objective specimens.

Gamekeepers registers in La Mandria Royal Reserve, near Turin, show that wildcats were caught and apparently distinguished from feral cats (Passerin d'Entreves, 2000).

The two leathers from Valle d'Aosta are a separate mention: they have a relatively recent dating and their real origin is doubtful. There are no other news or reports of catches.

The fragmentation of Northern sub-areas: habitat loss in historical times?

The European wildcat is a carnivore associated to forest habitats and this ecological preference usually influences the probability of presence in a specific area.

Highly disjointed areas can be found in several countries in Europe, and for this reason the conservation status of European wildcat is not homogeneous and in some areas it is classified as NT "Near Threatened".

French distribution has the greatest interest for N-W Italy, as it describes a consolidated presence in central-northern regions (Alsace, Lorraine), in continuity with the populations of Germany and Belgium; a cluster in progressive expansion towards south on the eastern side of the country, near the Alps and a further area of presence very separate and distant, located in the Pyrenees, currently also expanding towards the Southwest.

The Northern Italian distribution shows a similar fragmentation model.

Cagnolaro (Cagnolaro *et al*., 1976) provides a detailed distribution framework for the period prior to the achievement of full protection. In years 1968-1972, a still significant presence is described in western Liguria and southwestern Piedmont (Cuneo province), and more remote data are found for the Turin area. Balletto (1977) provides further details for Western Ligurian provinces.

Cagnolaro *et al*., (1976) carried out a national survey distributing specific questionnaires accompanied by a descriptive card of the wildcat and its identifying characteristics. The widespread diffusion of the questionnaires was guaranteed by the National Forestry Corps Stations, Provincial Administrations and hunting associations. Doubtful results were discussed and furtherly investigated; in some areas sightings were eventually classified as feral cats.

Cagnolaro *et al*., (1976) highlighted "the European wildcat disappearance in almost the entire Alpine arc, an absence dating back to over a century, for many areas even more, and supported by very little historical information". They also reported the complete data lack from the Emilian Apennines.

The distribution model is the same classically described by Ragni (Ragni *et al*. 1993) and confirmed for this contribution purposes: there are not specimens from central Po area in museum collections and there is no historical and bibliographic information relating to this felid in the naturalistic works and historical-naturalistic publications referring central northern Italy.

What possible explanation can we give?

Productive transformation of the Po Valley has been a remote process over the centuries that progressively involved profound changes in the natural environment. Starting the 15th century, after

the demographic crisis caused by the plague, a period of reorganization of the countryside started, driven by the emerging of new urban and rural classes; at that time small properties, canals, canals dug and livestock farms began to develop. In the following centuries, this process became more and more evident, with the progressive concentration of small properties in larger agricultural estates. Plain woods disappeared from the Po area, and a forest cover remained only in the valleys; this phenomenon caused an evident fragmentation in many animal communities. Bogliani (2014) provided a naturalistic description of the environmental change in the central Po area over the centuries. The progressive forest cover elimination in the Po plains led to the gradual disappearance of the theriofauna inhabiting this horizon, and the replacement with species linked to open environments, such as the hare, and to ecotonal zones, such as roe deer. Some species of mammals - ungulates as deer, wild boar, roe deer and carnivores such as the wolf - managed to survive longer until the 18th century, thanks to their greater ecological plasticity, while mammals more specifically dependent to the forest habitat were among the first to succumb.

The European wildcat is a forest carnivore, not adapted to a live in a particularly open environment. Because of its ecological needs and the fact that it suffers from a long lasting snow cover, he has not been able to occupy, if not in a limited way, more mountainous areas.

Low alpine valleys may have constituted refuge areas, but such areas are not sufficient to preserve viable populations. A report by Cornalia (Fauna d'Italia, 1870) reveals that a specimen dated 1868 from the Maccagno Mountains, near Lake Maggiore, would have been kept at the Natural History Museum in Milan. However, there are no documented signs of this specimen, as confirmed also by a recent check. Part of the old collections and registers was lost after the damage suffered by the Museum during World War II. The relentless hunting exercised against carnivores is added to the habitat loss. Bogliani (2014) recalls that in the Ticino valley predators have been object of control actions for centuries and that the territory not strictly dedicated to agriculture was occupied by noble hunting reserves, later replaced by the private reserves of large industrial and land properties, whose guardsmen exercised a real persecution towards the species considered harmful.

Two recent cases suggest that the NW population is not extinct

In March 2017 on the Imperia side of Ligurian Alps, hikers reported the death of two dogs due to alleged poisoning. The area is located on the mountain ridge on the border between the Nervia Valley and the French Roya Valley. In order to identify the presence of poisoned morsels and dead

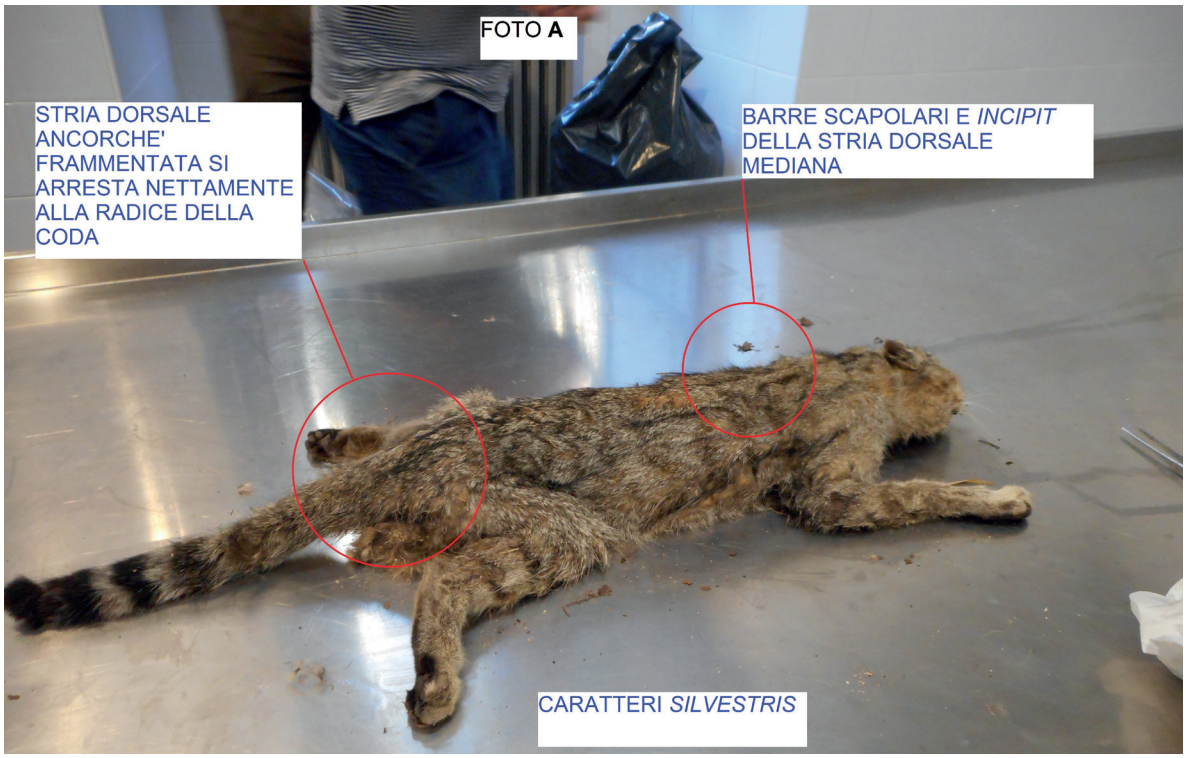

Fig. 3 - Ligurian Alps specimen necropsy May, 25 2017

animals, an inspection of the Anti-poison Dog Operative Unit by Carabinieri Forestali of Cuneo was urged. A first check on March 23th carried out with molecular dogs allowed the find of three dead foxes and morsels consisting of chicken wings. A second excursion on the same path was conducted on April 8th, and other morsels and a specimen of felid, not present before, were identified (Fig. 4).

The cat-specimen has been taken over by the Forestry Police of the competent station, and frozen to be stored. On April 13th a first examination of the carcass has been performed, keeping it frozen in order to avoid further decomposition processes. Evident diagnostic characteristics of *silvestris* resulted: Caudal drawing; the distal part of the tail has four black rings (the fourth is less pronounced) not connected to each other; scapular drawing and occipito-cervical drawing are present. The basic color of the coat is compatible with that of an European wildcat; remarkably, a single dorsal band (not a particularly defined one) ends at the base of the tail.

On May 25th the necropsy has been performed at the Giacomo Doria Museum in Genoa (Fig. 3). The specimen has been evaluated according to the dorsal norm, the only one possible due to bad conditions of cat body.

The information framework achieved is detailed in table below.

Tab. 2 - Ligurian Alps Cat

Table 2	**Ligurian Alps specimen**	
April 8 2017	Ligurian Alps - Gola del Corvo Passo Muratone (Pigna IM)	Anti-poison Dog Operative Unit Carabinieri Forestali Cuneo
Preliminary examination Aprile 11 2017 Carabinieri Forestali Station (Rocchetta Nervina IM)		Patrizia Gavagnin
Necropsy May 25 2017 G.Doria, Natural History Museum Genova		Patrizia Gavagnin Walter Mignone Zooprophylactic Institute Enrico Borgo Giuliano Doria G.Doria, Natural History Museum Sebastiano Salvidio DISTAV UNIGE
Felis silvestris ssp. Sex: **M** Presumable age: 2-3 years Weight (g): 3208	Total lenght TL (mm) : 835 Tail lenght (mm)**:** 290 Head-trunk lenght (mm): 545 Hind leg length (mm): 116 Auricle height (mm): 57 Intestinal lenght cardias-anus mm): 1435	Ectoparasites : Diptera Endoparasites : Ascaridae (stomach) Skeletal musculature: good state Coat and skin: advanced state of decomposition Good condition of plantar pads and nails
Stomach: *Apodemus* sp. + Bird tissues (chicken)	Toxicology outcomes: organochlorine pesticides	Zooprophylactic Institute Piedmont-Ligury-Aosta Valley
Stomach: *Apodemus* sp		DISTAV UNIGE Sebastiano Salvidio Patrizia Gavagnin
Intestinal Index (intestinal lenght cardias-anus / Head Body Lenght) mm = 1435 /545 **= 2,63**	Schauenberg, 1977 <3,15 range *silvestris* >3,15 range *catus*	Patrizia Gavagnin Enrico Borgo
Osteometric findings July 11 2017. G.Doria, Natural History Museum Genoa	Skull total lenght (mm) = 99,3 Neurocranium capacity (cc) = 36,8	Patrizia Gavagnin Enrico Borgo
Cranial Index: 99,3/36,8 = **2,70**	Schauenberg, 1969 <2,75 range *silvestris* >2,75 range *catus*	
Foramen occipitalis area= 132,75; Zygomatic apophysis distance: Sn <1,4 , Dx 1,4	Jaw stability test = *silvestris* Nose-frontal suture = *silvestris*	
Prot. 26623/2017 – Molecular markers Italian Institute for Environmental Protection and Research - ISPRA		Wild component very close to that of the Central European wild population and domestic component *F.s. silvestris* x *F.s.catus*
10DG122- Genetic markers for forensic use Zooprophylactic Institute Piedmont-Ligury-Aosta Valley	Mitochondrial fraction analysis : examination polymorphisms in mitochondrial genes sequences : ND5, ND6, cytb. Primer: F1CR4; F2BR3; F3BR2A; F4BR1C x 13 polymorphic sites.	In female parental line it is found *Felis s. catus*

Fig. 4 - Dead cat found April, 8 2017 Ligurian Alps, Passo Muratone (IM)

In the same period, many kilometers away, another cat has been identified. It is an animal that died of collusion with a vehicle found in a lay-by of the A26 motorway in Rossiglione, near Turchino Pass on Ligurian-Piedmontese Apennines. The carcass has been collected by a volunteer and delivered it to the Siena University. A portion of the tongue was sent to ISPRA Genetics Laboratory for biomolecular analysis, then the animal was given to the Maremma Natural History Museum where the necropsy has been performed on 31st July 2017 by Bernardino Ragni, Andrea Sforzi and Emiliano Mori.

The relevant information is shown in the table below.

Discussion and conclusions

In the framework of the historical findings related to the European wildcat distribution in the NW sub-area, the two specimens found in 2017 allow various food for thought. Both are adult individuals of about 2-3 years; in both cases the *silvestris* inheritance is evident, as most of the pelage markings suggest, that means that at least some truly wild specimens might be still present in the area. Hybridization with *catus* has been demonstrated, the variability loss due to introgression with domestic cat is one of the major risk factors for the European wildcat population in Europe. Remarkably, hybridization is a particularly critical factor for a very isolated, potentially relict, population, like the western one. In the male specimen from the Ligurian Alps the set of diagnostic characters is placed in the *silvestris* range, as referred to the coat-color system and Schauenberg's diagnostic indices, in particular Intestinal Index, which is robustly in the wild range. *Pinnae* show an almost imperceptible dark apex instead of a uniform ocher color and an equally almost imperceptible outline of hair. This characteristic could perhaps be part of the geographical variability found in other sub-populations; there is currently not enough information to prove it. This cat is the first carcass found after a long time.

Genetic *status* of the western population is not known because we can rely only on (often quite old)

Tab. 3 - Turchino Cat

Table 3	**Chat Passo del Turchino**	
11 april 2017	Rossiglione (GE) Piazzola di sosta Autostrada A26	Walter Marini
Preliminary examination: april 2017	Research Unit f Behavioural Ecology, Ethology and Wildlife Management, Department of Life Sciences, University of Siena. Via P.A. Mattioli, 4 53100 Siena.	Emiliano Mori
Removal of tissue flap (tongue) for biomolecular marker research.	ISPRA	Exemplary *F.s. silvestris* x *F.s.catus* (Edoardo Velli- ISPRA)
Necropsy – 31 july 2017	Maremma Natural History Museum (GR)	Bernardino Ragni Andrea Sforzi Emiliano Mori
Felis silvestris ssp. Sex: **F** Presumable age: 3 years	Occipito cervical design = *silvestris* Scapular drawing= *silvestris* Dorsal drawing= *silvestris* Caudal drawing= *silvestris* Rinario = *silvestris* Gulare = *silvestris* Pinnae = *silvestris* Lateral drawing Sn = *catus* Lateral drawing Dx = *catus*	Pregnant 2 phoetuses 40 gg (male, female), Everted nipples (previous pregnancies) Subcutaneous fat (traces) Stomach: 3 *Apodemus* sp. Pattern of the coat reveals dominance of eumelanin, a character related with *catus*.
Intestinal Index = 3,20	Schauenberg, 1977 <3,15 range *silvestris* >3,15 range *catus*	

naturalized specimens, for which genetic analyses can be a challenge. The existence of different allelic frequencies can be assumed in this population, as it was found in other Italian subpopulations (Mattucci *et al*., 2013). The isolation of the North-Western population dates back to past centuries, probably following the historical disappearance of the species from the central Po areas. Information framework of the North-Western area in Liguria and Piedmont needs to be increased; also there's need to improve systems to describe the genetics of this population.

The control of possible hybridization events by promoting sterilizations of rural feline colonies and the limitation of the free-rangin behaviour of rural cats is very important for the European wildcat conservation.

The female from Turchino Pass has an intestinal index in the *catus* range (3.20), but this value is very close to the wild / domestic discriminating limit, which is 3.15. The dominance of eumelanin in the coat is evident, despite the markings typical of the wild phenotype is clearly visible. This specimen comes from an area outside the known historical distribution model.

There is no past information about European wildcats from Central Levante Liguria and Piedmontese Apennines, as no naturalized specimens come from these geographical areas. The absence of wildcats from the Ligurian Levant was discussed by Ragni *et al*. (1993); Cagnolaro *et al*., (1976) also reported of a dubious specimen coming from the Aveto area, concluding that that specimen was ultimately considered not wild. In a survey conducted in 2008 (Gavagnin *et al*., 2010) and for the current data update, Cagnolaro's notes were reviewed, a former taxidermist of the G. Doria Museum was contacted and the documentation about the samples kept at the La Spezia Museum was reviewed, confirming absence of any objective data.

Lack of information and the absence of stuffed specimens does not demonstrate the real absolute absence of the wildcat from the NW area during the past decades, when the carnivore hunting was allowed; the wildcat could be hunted as harmful without leaving a particular trace.

However, the European wildcat does not seem to be a known carnivore in the Levante area, among hunters. The specimen preserved in the Federcaccia wildlife fauna collection in Genoa is classified as a "wild cat" but, according with the examination carried out in 2013, it is in fact by no means *silvestris*.

In recent years, through amateurs and photographers some camera-trapping images have been produced, highlighting traits of probable wild ancestry in the coat and in the tail of the specimens. The geographical location of these shots describes a probable north-Apennine expansion close to the Liguria borders.

Camera-trapping shots from the Parma Apennines, near Monchio delle Corti, are also very interesting and open new scenarios that deserve to be studied.

Some interest have also other videos about a cat female, clearly *silvestris*, with cubs in a beech and chestnut trees mixed forest, reported for the Trebbia valley.

In order to increase the conservation status of the European wildcat in Italy, it is important to update and deepen the distribution framework, particularly to clarify the existence of the Nort-Western population that, due to the long-lasting geographic isolation, can provide interesting bio molecular information.

Acknowledgements

I wish to express my gratitude to: Enrico Borgo (Giacomo Doria Museum in Genova) who shared determinations carried out on the specimen found in Ligurian Alps, his experience was very valuable; Luca Ghiraldi (Regional Museum of Natural Sciences Turin) and Giorgio Giuseppe Bardelli (Natural History Museum Milan) contributed at revision of western finds preserved in collections; Emanuele Gallo (Forestry Carabiniere, Anti-poison Dog Nucleus Cuneo) with his Malinois dog Kira identified the specimen from Ligurian Alps and allowed us to find a sign of western population; Remigio Luciano (Wild Animals Recovery Center in Cuneo) kept European wildcats from Eastern Europe, and he provided advice, suggestions and many useful contacts to update information framework.

The fondest memory and thanks to Bernardino Ragni for his support, advice and constant help he has provided to get any best information from the specimen found in Ligurian mountains.

Selected Bibliography

Arzelà Grassi A., 1973 - Carnivori Fissipedi del Museo di Storia Naturale di Genova. *Ann. Mus. Civ. St. Nat. Genova*, 79.

Balletto E., 1977 - Analisi faunistico venatoria ed ecologica della Regione Liguria. *Ed. Db*. Genova: 44-46.

Bazzetta G., 1905 - I Mammiferi ossolani. Annali R.Acc. Agr. Torino, *Tip. V.Bona*, Torino, 68.

Boano G., Mingozzi A., 1981 - Analisi della situazione faunistica in Piemonte. Uccelli e Mammiferi. In: Piemonte – ambiente – fauna – caccia. *Regione Piemonte EDA*: 43-66.

Bogliani G., I mammiferi del Parco del Ticino. In Casale F., Sala D., Bellani A., 2014 - Il patrimonio faunistico del Parco del Ticino negli anni 2000. Parco Lombardo della Valle del Ticino e fondazione Lombardia per l'ambiente.

Cagnolaro L., Rosso D., Spagnesi M., Venturi B., 1976 -

Inchiesta sulla distribuzione del Gatto selvatico - *Felis silvestris* Schreber- in Italia e nei Cantoni Ticino e Grigioni (Svizzera) e del Gatto selvatico sardo – *Felis lybica sarda* Lataste – in Sardegna con notizie sulla Lince – *Lynx lynx*. *Ric*. *Biol*. *Selvaggina*.

Calvino I., 1957 - Il Barone rampante. *Einaudi*, Torino, pp.61.

Camerano L., 1906 - I manoscritti di F.A. Bonelli: appunti intorno ai Mammiferi. *Boll.Mus.Zool*. *e Anat*. *Comp*. *R*. *Univ*. *Torino,* 21: pp. 536.

Campedelli T., Londi G., Cutini S., Tellini Florenzano G. & D., Scaravelli. 2017 - La presenza del gatto selvatico (*Felis silvestris silvestris*) nel Massiccio del Pratomagno (Toscana Orientale). *Atti Soc*. *Toscana Sci*. *Nat*. *Memorie*, 124(B).

Carazzi D., 1898 - Guida catalogo del Museo Civico della Spezia. *Stab*. *Tipografico Fiorentino*, Firenze.

Casalis g., 1853 - Dizionario geografico, storico, statistico, commerciale degli Stati di S.M. il Re di Sardegna. *Tipografia Marzorati*, Torino.

Castelli G., 1939 - Fauna estinta o in via di estinzione sulle Alpi. *Venatoria Diana*, 10: 377-378.

Chabrol de Volvic M., 1826 - Statistique des provinces de Savone, d'Oneille et d'Acqui et de partie de la province de Mondovi formant l'ancien Département de Montenotte. *J*. *Didot Ainè*, Paris.

Comincini M., 2002 - L'uomo e la bestia antropofaga. Storia del lupo nell'Italia Settentrionale dal XV al XVIII secolo. *Edizioni Unicopli*, Abbiategrasso (MI).

Delle Piane G., 1916 - Alpi e Appennini liguri. CAI Genova.

Diana C., 1864 - Memoria intorno al Bosco di Rezzo. *Tipografia Ghilini*, Oneglia.

Feretti F., Sboarina C., Tattoni C., Vitti A., Zatelli P., Geri F., Pompei E., Ciolli M. 2018 - The 1936 Italian Kingdom Forest Map rewiewed: a dataset for landscape and ecological research. *Annales of Silvicultural Research*, 4 (2): 3-19.

Gavagnin P., Ghirardi M., Costa S. & V. Civallero - Distribuzione storica del gatto selvatico europeo (*Felis s*. *silvestris*, Schreber 1777) nell'arco alpino occidentale. in E. Randi, B. Ragni, L. Bizzarri, N. Agostini, G. Tedaldi (Eds), 2010. Biologia e conservazione dei felidi in Italia. *Atti del Convegno*. *S*. *Sofia (FC) 7-8 Novembre 2008*. Ente Parco Naz. Foreste Casentinesi.

Genè G., 1853 - Dei pregiudizi popolari intorno agli animali. *Tip*. *Ferrero e Franco*, Torino. pp. 72-75.

Genovesi P. - Il gatto selvatico in Fauna d'Italia. (a cura di Luigi Boitani, Sandro Lovari e Augusto Vigna Taglianti), 2003 - *Mammalia* III, *Carnivora-Artiodactyla*. *Calderini Edagricole*, Bologna.

Ghigi A., 1911 - Ricerche faunistiche e sistematiche sui Mammiferi d'Italia che formano oggetto di caccia. *Natura*, 2, Milano.

Ghigi A., 1911 - I Mammiferi d'Italia considerati nei loro rapporti con l'agricoltura. *Natura*, 8: 85-137.

Lamberti A., 1974 - Faune quaternarie della Provincia di Savona, nota preliminare. *Atti e Mem*. *Soc*. *Savonese di Storia Patria*, 8.

Lazzeri L., Bandinelli A., 2016 - The presence of the wildcat in Val di Cecina. X Congresso Italiano di Teriologia. Acquapendente, (VT), 20-23 Aprile 2016.

Léger F., Sthal P., Ruette S., Wilhelm J.L., 2008 - La repartition du chat foréstier en France: évolutions récentes. Office National de la Chasse et de la Faune Sauvage, *Suivi des espèces*, Birieux pp. 39.

Lessona M., 1889 - Storia naturale illustrata. Vol. I I Mammiferi. Sonzogno, Milano.

Marguerretaz P., 1968 - Fauna e caccia in Valle d'Aosta. Aosta.

Masnata E., 1931 - Cacce di Liguria. *Edizioni Tigullio*, Rapallo.

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*) in Italy. *Ecolgy and Evolution,* 3(8): 2443-2458.

Mermod C. Ph, Liberek m., 2002 - The role of snowcover for European wildcat in Switzerland. *Z*. *Jagdwiss*, 48: 17-24.

Mezzana N., 1925 - Il Museo Civico di Storia Naturale di Savona. *Arch*. *St*. *Sci*., 6 (3).

Micheletti G., 1930 - Il Museo Ornitologico Giribaldi a Bordighera. In: L'Eco della Riviera, 15 (6).

Mingozzi T., Guidali F., Tosi G. - *Dati storici sulla presenza della Lince*, Lynx lynx (L.) *nell'Italia Nord-Occidentale* in Spagnesi M., S.Toso (Eds.), 1988. *Atti del I Convegno nazionale dei Biologi della Selvaggina*. Suppl. Ric. Biol. Selvaggina XIV pp. 479-500.

Nowell K., Jackson P., 1996 - Status survey and conservation action plan. Wild Cats. IUCN/SSC Cat Specialist Group. IUCN, Gland.

Passerin d'Entreves P., 2000 - La gestion démographique du gibier et des animaux nuisibles dans les domaines royaux de chasse en Piémont au XVIIIème siècle. *Ibex J*. *Mt*. *Ecol*. : 137-145.

Ragni B., 1981 - Gatto selvatico (*Felis silvestris,* Schreber 1777). In: Distribuzione e biologia di 22 specie di Mammiferi in Italia. Consiglio Nazionale delle Ricerche, Roma.

Ragni B., 1987 - Requisiti per la reintroduzione del gatto selvatico e della lince in Italia. In AA.VV. *Atti del seminario internazionale: reintroduzione dei predatori nelle aree protette*. Regione Piemonte, Torino, 24-25 giugno 1987, pp. 67-81.

Ragni B., Possenti M.G., Sforzi A., Zavalloni D., Ciani F. 1993 - The Wildcat in Central-Northern italian peninsula: a biogeographical dilemma. *Biogeographia*, 17.

Ragni B., 2003 - L'areale italiano del gatto selvatico europeo (*Felis silvestris silvestris*): ancora un dilemma? *Hystrix, the Italian Journal of Mammalogy*, 14: 67.

Riols C., 1984 - Le chat sauvage. In A. Fayard (ed.) *Atlas des Mammiferès sauvages de France*, pp. 134-135. Societè Française pour l'Etude et la protection des Mammiferès, Paris.

Schauenberg P., 1969 - L'identification du Chat forestier d'Europe *Felis s*.*silvestris*, Schreber 1777, par une methode ostéométrique. *Revue Suisse de Zoologie*, 76: 433-441.

Schauenberg P., 1977 - Longueur de l'intestin du Chat forestier *Felis s*. *silvestris*. *Mammalia* 41: 357-360.

Sereni E., 1968 - Storia del paesaggio agrario italiano. Laterza, Bari, pp. 337-339.

Verany J.B., 1862 - Zoologie des Alpes Maritimes (ou catalogue des animaux observés dans le Département de Nice) - *Imprim*. *et Libr*. Cauvin, Nice.

Vigna-Taglianti A., 1988 - Introduzione alla sessione sui Carnivori. In: in Spagnesi M., S. Toso (Eds.), 1988. *Atti del I Convegno Nazionale dei Biologi della Selvaggina*, 14 (Ric. Biol. Selvaggina).