

PERSONAL INFORMATIONS

Stefano Focardi

Job Primo ricercatore

Degree Biological sciences

1. PROFESSIONAL EXPERIENCE

Dal	Al	Mansione	Datore di lavoro
01/10/2011	ora	Primo Ricercatore	Consiglio Nazionale delle Ricerche
25/08/2008	30/09/2011	Primo Ricercatore	Istituto Superiore per la Protezione e Ricerca Ambientale
15/04/1996	25/08/2008	Primo Ricercatore	Istituto Nazionale per la Fauna Selvatica
01/01/1988	15/04/1996	Ricercatore terzo livello	Istituto Nazionale per la Fauna Selvatica
01/10/1982	01/01/1988	Collaboratore Tecnico-Professionale	Istituto Nazionale per la Fauna Selvatica

2. INSTRUCTION & FORMATION

Liceo Scientifico

Licenza liceale

1969-1973

Corso di Laurea in Biologia

Laurea in Scienze Biologiche

1973-1978

Department de Chimie-Physique 2. University of Bruxelles

Modelli matematici del comportamento animale

1980-1982

Ettore Majorana Foundation and Centre for Scientific Culture

International school of ethology research techniques in ethology and animal ecology

28/11-3/12/199

**Scuola di biologia evoluzionistica e conservazione della biodiversità
Università di Torino**

Theory and practice of CMR methods

28/11-3/12/1996

Research unit of Wildlife population assessment (University of St. Andrews)

Distance sampling
 Overview of capture-recapture models
 Analysis of survival data
 17-27/7/1997

Research unit of Wildlife population assessment (University of St. Andrews)

Advanced Distance sampling
 2/8/2001

University of Mytilene. Quantitative methods in population dynamics

Population projection matrix models, capture-recapture distance sampling models. Integrated population modeling.
 11-15/6/2007

3. PERSONAL SKILLS

Mother tongue Italian

Foreign languages

	UNDERSTANDING		SPOKEN		WRITTEN
	Understanding	reading	Interactions	Spoken	
English	B2	C1	B2	B2	C1
French	B1	B2	B1	B2	A2

Driving licence B

Hobbies Biking, kitchen, history

4. SCIENTIFIC COLLABORATIONS

1983-1984 NATO research grant (University of Florence and University of Brussels)
 1980-1990 —University of Brussels, Belgium (J.L.Deneuborg)
 1995—2001 partecipazione al *Sistema informativo territoriale di Castelporziano*
 1995— 2000 University of Udine (E. Piasenter)
 1995— 2002 University of Florence (M.P. Ponzetta)
 1998-1999 —Methods and mathematical models in the study of biological processes. (CNR strategic project):
 1997-2000— McCauley Land Use Research Institute (Scotland) (K. Farnsworth)
 2002 Galileo grant for cooperation between Italy and France (University of Lyon)
 2004—University of Lyon, France (J.M: Gaillard);
 2004 University of Florence, (G. Santini);
 2004—2006 Office Nationale de la Chasse, France (S. Rossi)
 2005— Grimsö Wildlife Research Station (P. Kjellander)
 2006 — 2008 Leonardo da Vinci partnership with University of Aveiro
 2010— Université de Lyon; (Sam Venner) Programme Potenchene
 2010— Partecipazione programma EURODEER

2016— Partecipazione programma EUROBOAR
 2014— Rothamsted Research (Andy Reynolds)
 2010—ISPRA (Barbara Franzetti, Valentina La Morgia, Jacopo Cecere)
 2008—Fondazione Edmund Mach (Francesca Cagnacchi)
 2013—2015 Bulgarian Academy of Sciences (Peter Genov, Atidje Amhed)

5. ORGANIZATION OR PARTICIPATION AS A INVITED LECTURER TO SCIENTIFIC CONFERENCES IN ITALY OR ABROAD

XXVI congress of the international union of game biologists. Braga dal 01-06-2003 al 06-06-2003

Focardi S., Tinelli A. Compensatory growth and ungulate-plant equilibrium in a Mediterranean forest. Vertebrate Pest Conference (Parma 9-12/9/2003) dal 09-09-2003 al 12-09-2003

S. Focardi. Lévy walks and foraging-search efficiency of large herbivores. Gps telemetry workshop (Trento 7-12/9/2008) dal 07-09-2008 al 12-09-2008

Stefano Focardi. Adaptive management, population estimates and spatial structure in ungulate populations: the Italian experience. 1. slovenski posvet z mednarodno udeležbo o upravljanju z divjadjo: srnjad. Velenje (Slovenia) dal 22-11-2008 al 25-11-2008

Focardi S., Conservation of endangered species of ungulates: adaptive management of the residual populations of Italian roe deer. International Conference on Conservation of Hangul & other endangered deer species (Srinagar, Kashmir, India) dal 09-10-2009 al 13-10-2009

Organization of the Fifth European Roe Deer Meeting. Trezzano (BO), 24-27 aprile 2001.

Organization of the I Eurodeer meeting (Ozzano dell'Emilia, Bologna)

Organization of the 1st Euroboar meeting (Moscheta, Firenze) dal 26-06-2016 al 28-06-2016

Organization of the VIII Eurodeer Meeting (Moscheta, Firenze) dal 29-06-2016 al 02-07-2016

Organization of "Current status and future directions of Lévy walk research". High level international forum on the application of Lévy distributions to biological processes. Finanziato dalla 'Company of Biologists', Cambridge, UK, si terrà a Winston house, West Sussex UK (10-13/9 2017).

Organization of the II EUROBOAR meeting, Ub, Serbia (November 2017)

Organization of the III EUROBOAR meeting Prague, Repubblica Ceca (September 2018)

6. DIRECTION OR PARTICIPATION IN THE ACTIVITIES OF A RESEARCH GROUP WITH EXTERNAL FUNDINGS

The list of projects shows the overall budget and a single ISPRA / INFS reference protocol, unless otherwise specified. For the CNR, with reference to projects that do not require agreements, the Reference Cost Center is reported.

Valutazione dell'uso di scanner termici per la stima di popolazioni di fauna selvatica mediante distance sampling. Ministry of Agriculture €179799 dal 01-01-2000 al 01-01-2005. Decreto MIPAF 21129 del 11/4/2000.

Gestione della Tenuta Presidenziale di Castelporziano Segretariato Presidenza della Repubblica —Accademia delle Scienze €185333 dal 01-01-2000 al 01-01-2009. Protocollo 411 del 12/5/1995

Reintroduzione del Capriolo italiano (*Capreolus capreolus italicus*) sui Monti della Tolfa. Sviluppo di modelli vocazionali e Monitoraggio in Provincia di Roma €165239 dal 01-06-2000 al 01-06-2004. Protocollo 4349/T-A38 del 14/7/2000.

Competizione inter-specifica in una comunità di ungulate e dinamica degli ecosistemi forestali. Ministero dell'Agricoltura e Foreste €59160 dal 01-01-2006 al 01-01-2007. Decreto MIPAF 20588 del 1/3/2006.

Biodiversità degli ambienti Mediterranei in Italia. Piano d'azione del Capriolo italiano. Ministero dell'Ambiente, della tutela del territorio e del mare €70150 dal 01-01-2006 al 01-01-2007. Protocollo 8483/2006.

Monitoraggio del Cervo nelle Alpi orientali e direzione del Centro di ricerca, formazione e gestione di Pian Cansiglio €40000 dal 01-01-2007 al 01-01-2008. Protocollo 2698/2006.

Conservazione degli ungulati nei Parchi Nazionali Italiani. Ministero dell'Ambiente, della tutela del territorio e del mare €67469 dal 01-01-2007 al 01-01-2009. Minamb DPN/IID/2005/21785 del 2/09/2005. Convenzione INFS/MINAMB del 25/10/2005.

Conservazione del capriolo italiano. Ministero dell'Ambiente, della tutela del territorio e del mare €54000 dal 01-01-2007 al 01-01-2008. Protocollo 8483/2006.

Gestione del Cervo nel Parco Nazionale "Foreste Casentinesi". Ministero dell'Ambiente, della tutela del territorio e del mare €50000 dal 01-01-2007 al 01-01-2008. Protocollo 6897 del 16/10/2006.

Censimento della popolazione di Capriolo. Parco Nazionale del Pollino €30000 dal 01-01-2009 al 31-12-2009. Protocollo 8614 del 30/12/2008.

Collaborazione bilaterale CNR-Bulgarian Academy of Science. Centro di spesa P110. €12000 al 01-01-2013 a oggi

Tetris. Gestione impatti multipli ecosistemi costieri. PRIN 2013. Centro di spesa P90. € 43041 dal 01-03-2013 al 01-03-2016

Ecologia dei grandi mammiferi. Centro di spesa P93. dal 01-01-2016 a oggi

Sperimentazione delle tecniche di fototrappolaggio per la definizione di indici e stime della popolazione di cinghiali nella Tenuta di Castelporziano. Federazione italiana della Caccia. €20000 dal 20-07-2016 a oggi. Protocollo ISC-CNR 1308 del 20/7/2016.

Coordinamento del progetto a scala europea EUROBOAR relativo allo studio dell'ecologia e del comportamento del cinghiale <http://euroboar.org/>

Sperimentazione delle tecniche di fototrappolaggio per la definizione di indici e stime della popolazione di cinghiali nella Tenuta di Castelporziano. Federazione italiana della Caccia. €20000 dal 19-07-2018. Protocollo ISC-CNR 746 del 19/07/18. Programma prorogato anche nel 2019 con ulteriore finanziamento di €20000.

Programma bilaterale Galileo Plasticity of migration in two ungulates species across Europe in the context of global change con INRA Tolosa di durata biennale (20/12/2019)-20/12/2020. Fianziamento ottenuto €6100

Associated Editor di Wildlife Biology in Practice (online journal). <http://socpvs.org/journals/index.php/wbp/index> dal 01-01-2006 a oggi

Subject Editor di Wildlife Biology dal 01-01-2013 a oggi

7. DIRECTION OR PARTICIPATION IN EDITORIAL COMMITTEES

8. TEACHING

Professor. Conservazione della Natura e delle sue risorse. Politecnico delle Marche. AA 2006/2007 e 2007/2008. dal 01-01-2006 al 31-12-2008

Invited professor (Department of Biology and CESAM, University of Aveiro): Population estimation and dynamics of large mammals dal 01-12-2008 al 15-12-2008

9. COMMISSIONS

Professor Zoologia dei Vertebrati SSD BIO/05 Corso di studi in Scienze della Natura e dell'Uomo, Università di Firenze 18/09/2018-30/04/2020

Interactions Forêt-Ongulés : de la compréhension des populations d'ongulés à l'étude de l'influence de ces populations sur les peuplements forestiers HDR soutenue Université Claude Bernard Lyon 1, Spécialité Ecologie, le 4 décembre 2014, par Sonia Saïd.

10. EVALUATION COMMITTEES

AERES valutazione dell'unità di ricerca INRA *Comportement et Ecologie de la Faune Sauvage* (Castanet-toulousane 2-5 /12/2009)

ONCFS Programmes de recherche menés sur la démographie sanglier. Birieux (Lyon) 12/11/2013

HCERES valutazione dell' Unité de Recherche Mixte *Évolution Génomes Comportement et Écologie* Gyf-su-Yvette (Paris) 12-15/11/2018.

11. PARTICIPATION IN THE TEACHER COLLEGE OF RESEARCH DOCTORATE

Doctoral Thesis Commission Sarine Servanty 2007 Dynamique d'une population chassée de sangliers (*Sus scrofa scrofa*) en milieu forestier Université Claude Bernard, Lyon sostenuta il 01-01-2007

Doctoral Thesis Commission Manuel Lembke L'habitat alimentaire du bouquetin des Alpes (*Capra i. ibex*) ai cours de la saison de végétation sur le massif de Belledonne-Sept Laux (Isère, France) Université de Savoie 03-03-2005

Doctoral Thesis Commission Marilyn Pellerin 2005 Utilization et selection de l'habitat chez le chevreuil à différentes échelles spatio-temporelles, Université de Poitiers 09-12-2005

Doctoral Thesis Commission Pablo Michelena 2006 Organisation spatio-temporelle des groupes chez les ongulés: une étude expérimentale de la ségrégation des sexes chez le mouflon merinos (*Ovis aries*), Université Toulouse III 20-01-2006

Doctoral Thesis Commission Gaelle Darmont 2007 Influence des interactions interspécifiques sur l'utilisation de l'habitat par les ongulés sauvages 11-07-2007

Doctoral Thesis Commission Vincent Tolon 2010 Du processus de sélection d'habitat à la survie des proies dans le paysage du risque: implication pour l'exploitation de la faune sauvage. Université de Savoie dal 21-06-2010 al 21-06-2010

Doctoral Thesis Commission Emmanuelle Richard, 2010, Déterminants et conséquences des interactions entre grand herbivores: L'exemple du cerf (*Cervus elaphus*) et du chevreuil (*Capreolus capreolus*) en milieu forestier. Université Claude Bernard, Lyon dal 16-12-2010 al 16-12-2010

Comité d pilotage Marlene Gamelon Université Claude Bernard 2011-2012

Doctoral Thesis Commission Nadège Bonnot Cohabitation between Human and Wildlife; impact of human activities on the management of the trade-off between risk avoidance and resource acquisition in roe deer Université de Toulouse 31/5/2013

Doctoral Thesis Commission Pascal Marchand, Déterminants spatio-temporels de la sélection de l'habitat chez le mouflon méditerranéen *Ovis gmelini musimon* x *Ovis* sp. Université de Grenoble dal 20-12-2013 al 20-12-2013

Doctoral Thesis Commission Kevin Morelle, 2015, Wild boar movement ecology across scales. Université de Liege Gembloux dal 29-06-2015 al 29-06-2015

Maria Letizia di Bartolo Modellizzazione per la gestione di impatti multipli nei sistemi costieri. Dinamica Non Lineare e Sistemi Complessi, facoltà di Ingegneria, Firenze 2015-

Sonia Lombardi, Copulatory success in lekking fallow (*Dama dama*) bucks: hypotheses testing using structural equation models. Dottorato in Biologia, Università di Firenze. 2015-2018

Milo Abolaffio, Complex behaviour of animals in turbulence, dottorato in Fisica Università di Padova 2015-2018

Comité pilotage Laura Touzot, Université Claude Bernard 2018-

12. RESEARCH

The unifying aspect of the research activity of Focardi is represented by the interest in the quantification and mathematical modeling of ecological and behavioral processes. The awareness of the importance for mathematical modeling and sophisticated statistical analysis is now widely acquired by the scientific community but was absolutely innovative, at least in the Italian academic world, in 1980, when Focardi began his post-graduate scientific career. Especially since this type of scientific activity was viewed with "suspicion" in an environment such as the "game biologists", a reference community after Focardi won a post of technical-professional collaborator (ie researcher) at the at that time the National Institute of Game Biology in Ozzano Emilia in 1982. A more detailed description of the candidate's multiple research activities is reported in points. The general topics are: (A) management and research on ungulate populations in the Presidential Estate of Castelporziano, (B) other projects for conservation and management of bird and mammal populations carried out within the institutional activities of INBS, INFS and ISPRA and (C) the application of mathematical-statistical models to ecological processes both for research purposes and for better conservation and management of the fauna.

SUMMARY OF RESULTS OF INTERNATIONAL RELEVANCE

Nocturnal distance sampling

Estimating the size of ungulate forest populations was not realistically feasible until the end of the 1990s when the application of thermal viewers, combined with the use of distance sampling, made it possible to obtain adequate estimates. was a pioneer in both aspects with works dating back to 1988. This was an important development to improve wildlife monitoring.

Movement ecology and olfactory navigation maps

Focardi has developed pioneering work on the simulation of trajectories of animal movement and on their statistical analysis. Subsequently, Focardi demonstrated the use of olfactory maps in the Corey shearwater (using an innovative statistical-mathematical approach based on Lévy flights).

Long-term analysis of population dynamics.

Following the example of the famous lynx / hare study in Canada, several countries have tried to develop forms of quantitative monitoring of the wildlife population to understand the origin of the observed fluctuations and the mechanisms that regulate these populations. Focardi has followed and continues to follow what is the most complete national project focused on the study of wild boar demography in Castelporziano.

Predator-prey models

Two important contributions in the field of Lotka Volterra models was the demonstration that the coexistence between two species of herbivores was also possible with a complete niche overlap based on differences in the functional response and the introduction of scavenging in multi-trophic models, a very important effect but never studied before. Further Focardi developed food web models of ecosystems and investigate the dynamics of scavenging

CONSERVATION AND MANAGEMENT OF THE UNGULATES IN THE PRESIDENTIAL ESTATE OF CASTELPORZIANO

in 1987, the INFS began to follow the management of ungulates on the estate, also carrying out research on the ecology of ungulates in the Mediterranean environment. Focardi has been responsible for the research activities in the Estate since 1992 when the Secretariat for the Presidency of the Republic financed the activities of the Territorial Information System of Castelporziano (SITAC). At the conclusion of the SITAC, the management and research activities continued through a series of multi-year agreements between INFS (later ISPRA) and the Secretariat, and through funding from the Province of Rome, aimed at reintroducing the Capriolo Italo over the Monti della Tolfa, and the Ministry of the Agriculture and Forests for the study

Population monitoring	<p>of competitive interactions between the various species of ungulates, in particular Capriolo and Daino. Focardi ceased to be responsible for this research in 2010 when he moved to the ISC-CNR but continued to collaborate with the ISPRA and the Université de Lyon for the analysis of the data collected in Castelporziano. On the ecology of ungulates in the Presidential Estate 48 scientific products were produced.</p> <p>The first problem to be addressed in 1987 was to build an ungulate monitoring system that could be continued over many years and that could provide reliable population trends. At the time, only counts of wild boar were carried out on the government, that is, areas of supplementary feeding. The counting of the Deer was then introduced on the "first green" to be carried out in March-April before the fall of the daini stages. This method makes it possible to evaluate the structure by sex and age of the populations and calculate the annual useful increase.</p> <p>None of these methods allows us to estimate the actual number of populations. To do this it is necessary to evaluate the contactability (ie the probability of observing) the various species. For the Boar, in 1995 the individual marking was introduced which allows the estimation of the percentage of individuals present on the government. The application of nocturnal and the wild boar, while daytime sampling was applied to the roe deer (a rare species and difficult to contact). These data represent some of the longest and most reliable time series of wild ungulate populations collected throughout Europe.</p>
Ungulate/vegetation interactions	<p>One of the most critical aspects of the conservation of the Castelporziano ecosystem is the reduced renewal of the forest top also because of the impact due to the browsing of the ungulates. Initially a project was carried out to assess the impact of ungulates on herbaceous and shrub species, and the different response of various plant species to stripping, which may even lead to over-compensation, was highlighted. Numerous works have involved the calculation of the nutritional load-bearing capacity of the Daino.</p> <p>The growth of the wild boar population is linked to the grazing events of the oak forest. Between 1995 and 2011, a system was set up to monitor the production of acorns, using seed traps, which made it possible to correlate the fertility and birth of the wild boar with the production of acorns. Finally, in 2016 a dendrochronological sampling (in collaboration with the University of Bordeaux) of some of the previously monitored oaks was carried out to assess the use of mechanistic models of grazing events, activities currently underway. These studies are also relevant for understanding the mechanisms of oak renewal.</p>
Wild boar ecology	<p>In 1995 an individual boar marking program begun. The aim of the project was to make quantitative estimates of the population and to evaluate the natural survival of the species in relation to biological and climatic factors. For duration and number of marked animals, the program is almost unique at European level and, in order to make the most of the data collected, a collaboration was developed with the Université de Lyon and the Office de la chasse et de la faune sauvage to compare the population dynamics of the wild boar in Castelporziano with that observed in Arc-en-Barrois where a similar program is going to be developed. The results of the collaboration are relevant to address the problems of boar management in Europe. In 2016 the ISC-CNR obtained a loan to carry out a study of the wild boar in Castelporziano through photo-trapping. Finally, a study on the dispersion of young wild boar is currently underway.</p>
Ecology of the Italian roe deer	<p>660/5000</p> <p>The conservation of the Italian roe deer represents another of the critical elements for the conservation of the biodiversity of Castelporziano. The studies carried out have made it possible to ascertain that the main, if not the only, cause of the negative trend observed for the species since 2000, is</p>

represented by competitions with the fallow deer, which has led the administration of the Tenuta to increase considerably the harvesting plans of fallow deer from 2002. The study combined the results of population monitoring by day distance sampling with a study of its spatial behavior carried out through the use of radio collars. Interestingly the number of roe deer are again increasing in the area.

Ecology and behavior of fallow deer

For this species, a survival study was carried out by individually marking several individuals from 2001 to 2010, a study of spatial behavior with the use of radio collars and a study in the reproductive period. The study of population dynamics is relevant because the fallow deer is the cause of the reduction of the roe deer and because it severely impacts tree renewal. Moreover, in scientific literature there are currently no complete studies on the survival and population dynamics of this species. The publication of these results, currently underway, fills a gap in ecological knowledge.

Long-term population trends

In the years 1995-2000 an archival study was carried out on the hunting records carried out between 1878 and 1980. This study showed us the extreme complication of the temporal evolution of the ungulate community by highlighting how long-term regulation is based on density-dependent processes and on interspecific competition. In this context, a database was also drawn up of the evolution of the estate's tree cover over the last century based on aerial photogrammetries and cadastral maps.

Management models

These studies have also been used for the formulation of Management Plans based on established scientific facts. Focardi has formulated two ungulate management plans. The first in 1999, lasting for ten years, and a second in 2010 for a five-year term. Moreover since 1987 reports have been formulated annually on the performance of the fauna counts and withdrawal plans have been formulated for fallow deer and wild boar.

The basic principle on which the 2010-5 Plan is based is that of adaptive ecosystem management through the adoption of an iterative process of knowledge integration based on an ecosystem model, on the verification of model predictions using reliable data from monitoring, on the modification of the model to improve its predictive capabilities, and finally on the implementation of the management policy. This approach is highly innovative and the experience made at Castelporziano represents an "example" for a better faunal management in Italy and in Europe.

OTHER CONSERVATION AND MANAGEMENT ACTIVITIES

Birds

In 1986 Focardi developed the database of Italian aquatic killers by participating regularly in the winter censuses in Puglia and in the Venice Lagoon. He also collaborated on the National Atlas Project and research on the conservation of the Falco della Regina. In particular, in 2005-6 he collaborated in studies related to the avian influenza epidemic in wild bird populations in Italy by developing a forecasting model for the spread of the epidemic.

Of particular relevance, in the period 1995-2003, Focardi developed a demographic model to explain the causes of the (almost complete) extinction of natural starna populations in Italy, in collaboration with the Polytechnic of Milan.

Conservation of the Italian roe deer

In 2007 the Ministry of the Environment financed the formulation of the action plan for the Italian roe deer in order to preserve this endemic form of roe deer which in Italy is now present only in a few locations. After the publication of the Action Plan the conservation actions continued with the development of specific projects in various protected areas.

Conservation of the Brown bear in Central Italy	The small bear population in Abruzzo is at serious risk of extinction. During a meeting held in Pescasseroli (14-16 / 12/2006) it was decided to collect all the material then available and to attempt a first estimate of the population, then published in 2008. This analysis, later confirmed by subsequent studies, showed for the first time the extreme vulnerability of this population.
European roe deer project	In the period 1995-2005 an intensive radiotelemetry monitoring program was carried out on the European roe deer population, in the Apennines in an area where hunting was permitted. This project was the first in Italy to have > 200 radiocollared animals, a sample comparable to the best studies carried out in other European countries].
MATHEMATICAL-STATISTICAL MODELS OF ECOLOGICAL PROCESSES.	During his scientific career, Focardi has always had a specific interest in the aspects related to the quantification of ecological processes with particular reference to their statistical analysis and their mathematical modeling. The interest was so strong as to have actively collaborated with the Department of Mathematics of the University of Florence, with the Department of Engineering, with the Service de Chimie-Physique 2 of the University of Brussels and with Rothamsted Research in UK.
Optimal foraging theory	The theory of optimal foraging in ungulates has been developed in collaboration with the Institute of Mathematics of the University of Florence in the years 1994-1996. The study was methodologically complex by making use of the variation calculation and because the predictions of the developed model were successfully compared with that of animals kept in controlled conditions and in wild environments]. In collaboration with the Department of Mathematics of the University of Milan, a study on the optimal aggregation of ungulates was developed.
Physiologically-based models of the hare	In the period 1996-2000 physiological-based models of the hare were developed.
Demographic models	Demographic models are of considerable importance in understanding ungulate demographics. In particular, models for multi-trophic systems have been developed, in which there are both producers and primary and secondary consumers. The research program is based on the development of models that integrate the most recent empirical findings concerning the regulation mechanisms. Over the past three years, an important evolution of these models has been presented, introducing necrophagy and competition between guilds, two concepts that were not present in the literature until now. These mechanisms can indeed stylize trophic chains and generate new types of trophic cascades. A second way of development is the introduction in the Lotka-Volterra models of non-consumer effects of predation, effects that have been experimentally highlighted only in recent years. In collaboration with the Department of Information Engineering and the Department of Physics of the University of Florence.
Euroungulates	In recent years, technological development with the introduction of GPS collars has led Focardi to develop various types of analysis on the movement of wild ungulates with particular reference to migratory phenomena, within the framework of European cooperation EURODEER (the first nucleus of EURO-UNGULATES) and in the development of new technologies in collaboration with the Mach Foundation of Trento. EURODEER represents an innovative approach to ecological research to which Focardi is proud to have made a significant contribution since its inception by organizing the first meeting of the group. The turning point does not consist only in the development of an IT platform (data repository) as is done by many other platforms (eg. MoveBank) but in organizing in a structured and continuous scientific collaboration between the partners that share both data and expertise. Recently EURODEER has spurred the parallel EUROBOAR group of which Focardi is the scientific coordinator. The management of the wild boar represents a

Population estimates of
wildlife population using
Distance Sampling

serious problem in many European countries and the group has a good chance of representing in the near future a point of reference for this issue. Since 2001, Focardi has directed a research project aimed at developing reliable but reasonably simple and economic methods to estimate the population density of wild ungulates. The precise and accurate knowledge of the population size allows an effective monitoring of the species of interest and the formulation of appropriate collection or reintroduction plans. The idea was to use line transects as the sampling method, coupled with the use of thermal scanners that allow night vision of animals without any need for lighting. The research has developed through various phases that have benefited from the progressive reduction in the prices of thermal scanners, their technological improvement and the refinement of statistical analysis techniques. Today this methodology is very reliable and the most recent research developed is aimed at minimizing the costs of the methodology, so that it can be applied in normal management contexts.

Movement ecology

The study of animal orientation was the subject of his thesis in 1978, an interest that has always remained alive passing from one species to another based on the opportunities of research. The study was very often based on the adoption of innovative methodologies based on an idea developed by statistical mechanics, Lévy's flights a particular statistical distribution with a "fat tail". This theoretical background allows the development of methodologies for understanding movements in natural conditions. This study was carried out on ungulates, but especially on seabirds and intertidal molluscs in cooperation with Rothamstead Research. In particular, the presence of an olfactory map in the Corey's shearwater has been demonstrated.

African ecology

A long-term research was carried out on the Indian ocean shore in Somali. Participation in the study goes from 1980 to 1990 with a field mission in 1987. In cooperation with G. Chelazzi (University of Florence) and J.L. Deneubourg. (Université Libre de Bruxelles). Recently Focardi was involved in a conservation study on the giant forest pig in Uganda.

13. BIBLIOMETRIC INDEXES

Google scholar

Documents 123

Citations 2121

H index 27

i10-index 48

Scopus

Documents 76

Citations 1282

H index 22

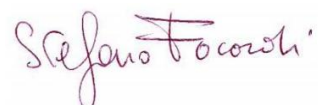
ULTERIORI INFORMAZIONI

14. PUBBLICAZIONI

Annex A contains the list of scientific publications (110) while Annex B contains

management publications aimed at administrations and stakeholders (26). These last publications represent the indispensable tool to disseminate results of scientific researches among wildlife managers.

Firenze 21/02/2020



Stefano Focardi

#	Annexe 1. Scientific publications (peer reviewed)
1	Chelazzi G., Pineschi F. & Focardi S., 1982, Initial orientation of feral pigeons belonging to an urban population. <i>Monitore zool. Ital. (N.S.)</i> 16:177-185.
2	Chelazzi G. & Focardi S., 1982, A laboratory study on the short-term zonal oscillations of the trochid <i>Monodonta turbinata</i> (Born) (Mollusca: Gastropoda). <i>J. exp. Mar. Biol. Ecol.</i> 65:263-273.
3	Chelazzi G., Focardi S. & Deneubourg J.L., 1983, A comparative study on the movement patterns of two sympatric chitons (Mollusca: Polyplacophora). <i>Mar. Biol.</i> 74:115-125.
4	Chelazzi G., Focardi S., Deneubourg J.L. & Innocenti R., 1983, Competition for the home and aggressive behaviour in the chiton <i>Acanthopleura gemmata</i> (Blainville) (Mollusca: Polyplacophora). <i>Behav. Ecol. Sociobiol.</i> 14:15-20.
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Annexe 2. Management publications	
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