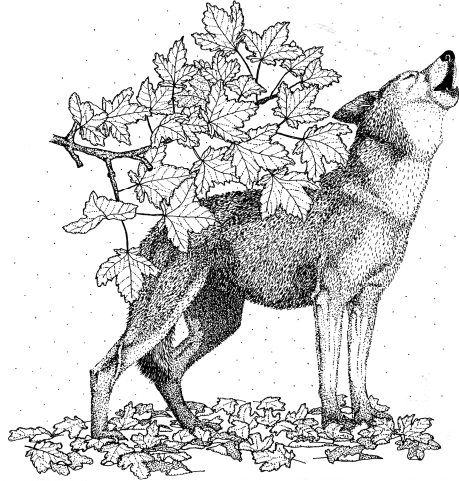


**OPENING AND PLENARY LECTURES**



## HOW MANY WOLVES ARE ENOUGH? THE WOLF-HUMAN INTERFACE AND THE ROLE OF BIOLOGY, ETHICS AND POLITICS

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Large carnivores are often deeply hated or loved, rarely indifferent to human societies. The reasons for their high conflicts with human interests are well known as well as the motivations of those who want carnivores to be fully protected or eradicated. The outcome of confrontation on large carnivores management is always dependent on the mutual strengths of biological, ethical and socio-economic factors. All have wide ranges of variations: in the case of wolves, wolf populations are remarkably resilient under a broad range of environmental variation, ethics and policies are as diverse as human societies can be. Their wide variations allows a great variety of solutions for wolf management; however, these factors often interact in complex and confused patterns and keeping them clearly distinct would greatly improve the speed and efficiency of finding solutions to the many facets of the wolf-human interface. In this presentation I examine how these factors interact and the extent of their flexibility in some recurrent questions in wolf management such as a) wolf management in protected areas vs. external areas, b) wolf control to increase ungulate populations, c) the limits to wolf recovery and distribution, d) wolf and livestock coexistence. I compare the main differences in management strategies adopted in Eurasia and North America to show that many potential and viable answers are possible to the same management question.

PRIORITIES FOR MAMMAL CONSERVATION IN EUROPE:  
CONSERVING BIODIVERSITY IN THE CONTEX  
OF CLIMATE CHANGE

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In the short term European conservation agencies have interest in focusing their conservation work in restoring the habitats of a number of critically endangered species or populations such as the Iberian lynx (*Lynx pardina*), the Monk Seal (*Monachus monachus*) or the European Mink (*Mustela lutreola*) to name just a few. However the major threat to European mammals in the mid and long-term will likely come from the fast and dramatic ecological transformation of some habitat types, from global change – including climate change, further urbanisation, degradation of natural habitats and increase in numbers and degree of invasiveness of invasive alien species. Mediterranean mountains, freshwater ecosystems, marine and coastal habitats, high mountain alpine habitats and arctic habitats are expected to undergo major ecological change that will threaten many mammal species. Even if this taxonomic group, because of its relatively good habitat plasticity, mobility and dispersion capability is expected to adapt relatively better to ecological change than other groups –such as vascular plants, freshwater fish or amphibians- variability of some species may be drastically reduced in the process of adaptation and many, like the Polar bear (*Thalarctos maritimus*) or the Broom hare (*Lepus castroviejo* –a Spanish endemic) may be facing extinction in the wild by lack of appropriate habitats or end of genetic isolation. Conservation agencies have interest in identifying soon which species are more vulnerable to global change, in increasing their monitoring and conservation efforts on those species through specific action plans. They need also to adopt more innovative and forward-looking policies, as the present system of protected areas, conceived in the 1950's and 1960's, is too static and may prove to be poorly adapted to a changing biological reality.

## NATURAL AND ARTIFICIAL SELECTION ON UNGULATE REPRODUCTIVE STRATEGIES

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Large herbivores can have substantial effects on community dynamics and typically have important conservation and economic values. Because they are long-lived, with strongly age-dependent probabilities of survival and reproduction, their reproductive strategies are affected by complex trade-offs between current effort and remaining reproductive potential. I will first explore the links between reproductive strategies and population dynamics. I will argue that under natural conditions ungulate females are selected to restrain reproductive effort in any one year, even to the detriment of their current offspring, not to compromise their future reproductive potential. Consequently, population dynamics of ungulates are strongly affected by density-dependent changes in maternal effort and in female age structure. Male reproductive strategy is generally more risk-prone and more variable among species and populations than female reproductive strategy, partly in response to changes in the age structure and phenotypic quality of potential competitors. Consequently, male age-specific mortality schedules are more variable than those of females, although in general male mortality is higher than female mortality. Sport hunting can have a profound evolutionary impact on ungulate reproductive strategies by forcing age-specific probabilities of mortality opposite to those of naturally-regulated populations. Sport hunting should select for a much stronger reproductive effort in young individuals of both sexes. Finally, trophy hunting that selectively removes males with large horns or antlers can have evolutionary impacts on both reproductive strategy and morphology of males. Selective removal of males of a normally highly successful phenotype, in some cases before that phenotype can have a positive effect on fitness, changes the fitness payoffs of different behaviors and physical attributes. The evolutionary consequences of selective harvesting have mostly been ignored by wildlife and fisheries managers, yet they can have profound consequences on population dynamics, population genetics and conservation.

## THE ROLE OF KARST IN THE CONSERVATION OF BAT BIODIVERSITY

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There is a good correlation between those areas of the world with high bat biodiversity and karstic areas – those rich in calcium carbonate. Although shortage of calcium is hypothesised as a major constraint on reproduction in bats, there is no clear evidence that bats select karstic areas for access to calcium. Instead, because of the abundance of caves, karst provides them with many roosting opportunities. Roosts are selected according to four main variables: temperature, humidity, airflow and light intensity. Roosts in temperate latitudes are selected because they are cold and suitable for hibernation and the bats alter their position in the roost with changing winter temperature. Roosts in the tropics are selected because they are warm and suitable for reproduction. This warmth results from convected air from outside the roost or from the body heat of large numbers of bats. Several long term studies of population ecology of bats have been carried out in karst and have revealed the importance of this habit for the conservation of bats.

## CHROMOSOMES, GENES, AND COLONIZATION EVENTS IN EUROPEAN MAMMALS

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Chromosome research in mammals in the European continent has been extensively performed during the last 50 years. The findings of these studies were implied in various issues of systematics and phylogeny, and have substantially contributed to the knowledge of the European mammalian fauna.

The pattern of chromosomal variation has been studied in details in several model *taxa* and conclusions related to the population structuring within species and possible colonization routes in the past were derived. Chromosomal traits have recently been largely substituted by molecular markers and diverse phylogeographic studies revealed certain unexpected features of the recent and past colonization events within the continent. Among others, the concept of northern refugia in the last glaciations' period has attracted much attention.

In this talk, a review of chromosome research into European mammals is given, with emphasis to implications of its results in the modern approaches to studies of colonization events and northern refugia.

