Wolf monitoring in the Alps

The natural wolf recolonization of the Western Alps
The natural wolf recolonization of the Western Alps

**ITALY**
- 1999-2001 Regione Piemonte + Interreg Project
- 2002-2012 Regione Piemonte

**FRANCE**
- 1997-2002 LIFE
- 2003-2012 Ministries of Environment and Agricultural/ONCFS

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**WAG : process & products**

**Process**
- regular-meetings to identify new « goals », e.g.:
  - 2002: first meeting
  - 2004: standardizing methods
  - 2005: CMR, HS index, maps
  - 2007: map « sensitivity »
  - 2008: genetic database
  - 2010: map update and new members

**Products**
- Official WAG formation
- Pack definition, monitoring
- Transboundary map
- Mapping techniques
- New calibration for genetics
- New transboundary map
• Wolves are naturally recolonizing the western Alps since the late 80’s through dispersal from the north Apennine wolf subpopulation.
• A moderate bottleneck occurred during the recolonization process, and gene flow between the Apennines and the Alps was moderate (corresponding to 1.25-2.50 wolves per generation).
• Bottleneck simulations showed that a total of 8-16 effective founders explained the genetic diversity observed in the Alps.
• Therefore, the levels of genetic diversity in the current expanding alpine wolf population will depend on future successful migrants from the Apennines, and not only ....


Fig. 1. Approximate wolf (Canis lupus) distribution range in Italy

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## Monitoring of the alpine wolf population

### OBJECTIVES and TECHNIQUES
Assessing the conservation status of wolves in the Alps

THE MONITORING OBJECTIVES

1. Population size: - Number of packs
   - Number of wolves

2. Distribution: - Wolf occurrence
   - Wolf packs

3. Other population parameters (e.g. survival)
   And the relative trends over time

THE MONITORING TECHNIQUES

GOOD FOR INTENSIVE
PREDATOR - PREY STUDY

GOOD FOR LARGE –
SCALE POPULATION
MONITORING

NON INVASIVE METHODS
THE NON-INVASIVE MONITORING TECHNIQUES

1 - Snow-tracking
2 – Genetic analysis on scat/tissue samples
3 – Wolf-howling

Genetic Analysis

Genetic Labs:
- FRANCE: LECA lab (Grenoble, FR)
- ITALY: USFS-RMRS Carnivore Genetic lab (Missoula, USA)
- SWISS: Lab for Conservation Biology (Losanna, CH)
MONITORING SAMPLING DESIGN

OVERALL APPROACH

• Extensive sign surveys at landscape scale to detect new wolf occurrence by a Network of trained wolf experts spatially dispatched

• Intensive sign survey to monitor each pack detected

• Molecular tracking

SPECIFIC APPROACH and OBJECTIVES by Country/Region + yearly modifications and improvements

E.g. Piemonte Region WINTER SAMPLING

WOLF MONITORING NETWORK

Natural and National Parks

Corpo Forestale dello Stato

Polizia Provinciale

Comprensori Alpini
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### Guidelines for Population Level Management Plans for Large Carnivores

#### WOLF (Canis lupus)

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<th>Geographical distribution</th>
<th>Canine and demographic structure</th>
<th>Relation with other populations</th>
<th>Current management</th>
<th>Conservation and Resurgence</th>
<th>IUCN red listing</th>
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<td>Western (EUR) subspecies</td>
<td>The Iberian wolf (Canis lupus signatus) is the only wolf subspecies in the western European region, which includes Spain and Portugal.</td>
<td>The western wolf is a highly social species that forms large pack groups. It is known for its adaptability to various habitats, including forests, mountains, and plains.</td>
<td>They are threatened by habitat fragmentation and loss, as well as illegal hunting.</td>
<td>Management plans focus on habitat conservation and education programs.</td>
<td>They are listed as Near Threatened (NT) on the IUCN Red List.</td>
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<td>Northern (EUR) subspecies</td>
<td>The Norwegian wolf (Canis lupus lupus) is the northernmost subspecies, found in the boreal forests of Norway.</td>
<td>The northern wolf is a smaller and more voracious subspecies, adapted to cold climates.</td>
<td>They are low in number and occur in isolated populations.</td>
<td>Management plans focus on habitat conservation and education programs.</td>
<td>They are listed as Near Threatened (NT) on the IUCN Red List.</td>
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Two complementary « entities »

- **The Wolf Alpine Group (WAG; 2001-)**
  - Biologists from concerned countries (I, CH, F)
  - Exchange data about population status
  - Improve standardization of methods used to monitor wolves
  - …etc.

- **The Permanent Committee for the management of wolves in the Alps (2006-)**
  - gov. representatives from I, CH, F.
  - promote the coordination of management strategies
  - implement expert groups to deal with monitoring of wolves and with livestock-related issues.
Assessing the conservation status of wolves in the western Alps

1- how to define the wolf alpine population?

2 - how to evaluate the conservation status from an operational point of view?

1a – defining the geographical boundaries: biology and politics
1b – demographic vs. genetic point of view: a matter of scale

2a – a yearly map of packs + wolf occurrence
2b – an index of changes over years in the no. of packs.
2c – description of each wolf territory (lone individual; pack; transboundary; breeding ..etc.)

First report to the Permanent Committee:

Wolves in the western Alps:
Monitoring and Conservation Status
Wolf packs distribution in the Alps 2009

Document available at www.lcie.org

Pack definition: at least 1M+1F during 2 consecutive winters or breeding evidence

Wolf packs in the Alps 2009

NB/ packs = at least 1M + 1 F during two consecutive winters or breeding evidence

Number of packs

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<tr>
<th>Winter</th>
<th>92-93</th>
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<th>94-95</th>
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Innsbruck, 27 April 2012
WOLF DISPERSALS

Progetto Lupo Piemonte – Regione Piemonte

WOLF DISPERSALS

DISPERAL

Car accident
Potential wolf populations which can recolonize the Eastern Alps

Carpathian/Baltic
Dinaric
Italy/western Alps

Origin of wolves
- Italy/western Alps
- Dinaric
- Carpathian

Wolf signs prior to 2009 (dead wolf, foto, DNA)
DNA samples in 2009 (scats, saliva, urine)

Data source: LJV OÖ/Stmk/K; Amt LReg Tirol/Vbg. AJV Graubünden

SOLITARY WOLVES IN AUSTRIA

Andreas Kranz & Georg Rauer
THE WOLF IN THE SOUTH-EASTERN ALPS

The story of the wolf “Slavc”

Info from: Progetto LIFE Slowolf 2010-2014
Source: http://www.volkovi.si
FIRST WOLF SIGNS IN THE CENTRAL ALPS

From the Italian wolf population

27 May 2010
Valle Ultimo (BZ)

13 April 2010
Adamello Brenta (TN)

27 December 2009
Cantone Grigioni (CH)

M24

WOLF PACKS DOCUMENTED ONLY IN THE WESTERN ALPS (ITALY-FRANCE)
GOAL: monitor the wolf population in the Alps as a unique population

MONITOR POPULATION SIZE AND DISTRIBUTION
- Wolf occurrence on a large scale
- Number of packs (reproductive units)
- Number of wolves?

Still some issues:
1. Exchange data on genotypes (calibrate a procedure between labs)
2. Common estimate of population size from genetic CMR analysis
Still some issues:

1. Exchange data on genotypes (calibrate a procedure between labs)

   - In the short term, exchange raw material (i.e. scats) to make redundant analyses when needed to answer questions such as the identification of a transboundary pack
   
   - In the long term, calibrate a genetic procedure between the different labs, to possibly use the data for population size estimate

Transboundary packs highlighted by cross validation in genetic analysis between FR and IT

(see QDN letter N°22 – example of year 2006)
Still some issues:

1. Exchange data on genotypes (calibrate a procedure between labs)

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Where are we up?

Genotyping of reference samples

- 15 wolf tissues from the Alps
  - Leca1
  - Leca2
  - Leca3
  - Leca4
  - Leca5
  - T13
  - T6
  - WT212
  - WT315
  - WT481
  - WT482
  - WCH014
  - WCH109
  - WCH331
  - WCH342

  - France
    - Italy
    - Switzerland

Will be performed by all labs
- 8 microsatellite loci
  - FH 2054
  - FH 2088
  - FH 2096
  - FH 2137
  - FH 2140
  - FH 2161
  - PEZ17
  - CPH5

Assignation and standardisation

LCB, work in progress...
2. Common estimate of population size

Which one is the best method to estimate the wolf population?

LESSON LEARNED

- If the goal is to monitor the wolf population in the Alps as a unique population, we should focus on estimating pack numbers and distribution over the years, more than population size, because a common robust CR estimate of population size is hard and expensive to obtain given the difficulties in calibrating the datasets in between different genetic labs.
- Pitfalls should be considered in designing sampling and lab protocols to minimize errors.
- Defining wolf occurrence over the boundaries will also need an assessment of standards for data mapping.