

# Development of a health surveillance program for the Enclosure-Reservoir El Toril (Dílar, Granada)

**Background:**

The Iberian Ibex (*Capra pyrenaica*) is an endemic specie of the Iberian Peninsula and one of its most emblematic animals. In the last few years several outbreaks of sarcoptic mange have seriously threatened some of its most important populations, including the one in Sierra Nevada Natural Park. This motivated the creation of enclosure-reservoirs of Iberian ibex. Therefore, in case of new massive mortalities, a stock of healthy individuals could be used for reintroduction or repopulation.



Image 1. Iberian ibex infested by *Sarcoptes scabiei* next to a healthy one in Sierra Nevada Natural Park



Image 2. Distribution of *Iberian Ibex* in Spain (MAGRAMA)



Image 3. Aerial view of the enclosure-reservoir El Toril and detail of its corral-trap and quarantines

**Objective:**

Since the creation of the reservoir El Toril 25 years ago, only one protocol addressed to control sarcoptic mange has been established. The aim of this study is to establish a health surveillance program including the principal disease that affects or could potentially affect the Iberian ibex, taking into account that the epidemiology and pathology of this disease in captive conditions could defer from those observed in wild populations. Two different situations have been considered: one for the quarantine of new animals and another for the ones maintained in the enclosure.



Image 4. Iberian ibexes from El Toril infected by different pathogens **a)** Sarcoptic mange **b)** Caseous lymphadenitis **c)** infectious keratoconjunctivitis

**Conclusions**

By the study of the seroprevalence and outbreaks of different infectious diseases in Iberian ibex or other wild ungulate species and domestic goat (*Capra aegagrus hircus*) when those were not available, 11 diseases have been considered in the protocol. Different protocols have been established for each of them as seen in Table 1. A quarantine period of 30 days minimum and two annual managements are recommended.

Table 1. Resume of the health surveillance program for quarantines and the enclosure

	QUARANTINE		ENCLOSURE	
Disease	Diagnosis	Treatment	Diagnosis	Treatment
Sarcoptic mange	ELISA and visual inspection	Ivermectin (IVOMEK GOLD®) to all animals	ELISA and visual inspection	Ivermectin (IVOMEK GOLD®) to all animals
Tuberculosis	Tuberculin test. Confirm positives with <i>post-mortem</i> PCR	Do not enter positives	Annual tuberculin test if free enclosure and every two months if positive. Confirm with <i>post-mortem</i> PCR.	Sacrifice positives
Brucellosis	Rose Bengal test	Do not enter positives	Annual Rose Bengal test if free enclosure and every three months if positive.	Sacrifice positives
Blue tongue	ELISA. Confirm positives with PCR	Do not enter positives	Annual ELISA. Confirm positives with PCR	Positives eliminatio
Mycoplasmas	PCR <i>M. agalactiae</i> , <i>M. mycoides</i> and <i>M. conjunctivae</i>	Free enclosure: Do not enter positives Positive enclosure: Treat positives with long-term antibiotic: tulathromycine (Draxxin®)	PCR <i>M. agalactiae</i> , <i>M. mycoides</i> and <i>M. conjunctivae</i> in free enclosure or eradication program. If not ELISA.	Eradication program: Positives elimination and prophylactic antibiotic to all animals tulathromycine (Draxxin®). No eradication program: prophylactic antibiotic to al animals.
Caseous lymphadenitis	ELISA and visual inspection	Free enclosure: Do not enter positives Positive enclosure: Treat positives (Penicillin), add autovaccine if outbreak	ELISA and visual inspection	Eradication program: positives elimination, autovaccine and enclosure disinfection. No eradication program: treat positives (Penicillin) or to all animals and add autovaccine if outbreak
Pasteurelosis		Management measures		Management measures
Chlamydophila	Complement Fixation test. Confirm positives with PCR	Free enclosure: Do not enter positives. Positive enclosure: antibiotic treatment to positives	Annual complement fixation test. Confirm positives with PCR	Prophylactic antibiotic treatment to all animals and isolation of positives with clinic.
Johne's disease	Nested PCR if positive enclosure. Culture if free enclosure	Free enclosure: Do not enter positives. Positive enclosure: Do not enter positive for a different strain	Free enclosures or no eradication program: Annual ELISA and PCR confirmation Eradication program: ELISA or culture	Eradication program: elimination of positives to culture or >2 consecutive ELISA. No eradication program sacrifice positives with severe clinic.
Q Fever	ELISA. Confirm positives with PCR	Treat positives with long-term oxytetracycline (Duramycin 300®). Vaccination if vaccination program.	ELISA and positives confirmation with PCR if no current vaccination program	Annual revaccination if vaccination program. Positive enclosure: Positives treatment with oxytetracycline if no current vaccination program
Babesia ovis	ELISA and blood smear of anaemic animals	Positives treatment with Imidocarb (Imidox 120®)	ELISA and blood smear of anaemic animals	Imidocarb as in quarantine