Mycoplasma agalactiae in Iberian ibex (*Capra pyrenaica*) in Spain

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Letters

WILDLIFE

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CONTAGIOUS agalactia syndrome (CAS) is a highly infectious disease of sheep notifiable to the World Organisation for Animal Health (OIE). *Mycoplasma agalactiae* is the major causal agent of this disease in both sheep and goats, and its occurrence can lead to serious economic losses (Madanat and others 2001). Although outbreaks of CAS in domestic goats occur throughout the world (Cokrevski and others 2001), to date, no case has been reported in a free-ranging member of the Caprinae.

This letter describes an outbreak of CAS in Iberian ibex (*Capra pyrenaica*) during the record drought of 1998 in the Sierra Nevada mountain range (south-east Spain, 36°55′-37°10′N, 2°56′-3°38′W). During the drought, precipitation was reduced by over half the average yearly precipitation of the past 35 years (average yearly precipitation in 1998 was 131.55 mm whereas the mean for 1974 to 2009 was 300.19 mm), coinciding with an exceptional period of ibex density (summer density of ibex of the three years before the outbreak was 9.46 ibex/100 ha, whereas for the years 2001 to 2003 it was 6.9 ibex/100 ha, 1.3 times lower), provoking unusual local concentrations of both ibex and small ruminants that traditionally share summer pastures in this area (Martinez 2000).

In the Sierra Nevada, a disease survey of the ibex population has been carried out annually since 1991. Samples are collected from live-captured (by drive-nets and corral traps) or shot animals (mainly during campaigns aimed at reducing local ibex densities). In 1998, a total of 130 live ibex (47 females and 83 males) were collected as

part of this programme; in spring/summer of that year, 35 of them (23 males and 12 females) (Table 1) were observed to have partial or total blindness and locomotion difficulties (which were thought to be signs of keratoconjunctivitis and polyarthritis); 17 fresh carcases (five young and three adult females and six young and three adult males) were collected during this period.

Given that previous studies conducted in the same population had provided evidence of the presence of *M agalactiae* (González-Candela and others 2007), we suspected that *M agalactiae* could be causing the clinical signs. Blood from the shot individuals and conjunctival and external ear canal swabs from all animals were taken to perform ELISAs and microbiological analysis. In addition, we collected synovial fluid, mammary secretions (in the case of females) and exudates from the conjunctiva and external ear canal for mycoplasmal culture using a modified Hayflick's medium. The identification of isolated strains was made by classical microbiological, biochemical and serological methods. Tissue samples from the mammary glands of one dead female were fixed in 10 per cent buffered formalin for further histological examination (haemalum-eosin staining). Detection of specific *M agalactiae* antibodies in the ibex sera was performed using a commercial enzyme immunoassay kit (CHEKIT *M agalactiae* Biphasic; Idexx Laboratories).

M agalactiae was isolated from three females and two males showing clinical signs of CAS, and was confirmed by ELISA in 85.7 per cent (30 of 35) of sick animals and in 66 per cent (83 of 130) of apparently healthy ibex. In addition, both sexes (12 of 47 females and 23 of 83 males, chi-squared=0.01, P=0.89) and age classes (23 of 85 yearlings and 12 of 45 adults, chi-squared=0.02, P=0.87) of the sampled animals were affected. A similar pattern was found in the dead animals (eight females and nine males out of the 17 dead animals, chi-squared=0.05, P=0.81, and 11 yearlings and six adults of the 17 dead animals, chi-squared=1.47, P=0.22). Regarding the observed clinical signs, severe keratoconjunctivitis was more frequent (29 of 35, 82.8 per cent) than arthritis (15 of 35, 42.8 per cent). All dead animals showed corneal ulcerations. Mastitis was detected in three of the four adult females.

TABLE 1: Results from samples taken to test for *Mycoplasma agalactiae* from 130 ibex (*Capra pyrenaica*)

	Females		Males	
	Yearlings (n=8)	Adults (n=4)	Yearlings (n=15)	Adults (n=8)
Isolation by culture	2	1	1	1
Detection by ELISA	8	3	14	5
Keratoconjunctivitis	7	4	13	5
Arthritis	3	1	7	4
Mastitis	0	3	0	0

During the outbreak, this ibex population shared pastures with domestic sheep and goat herds that were exceptionally concentrated around the mountain lakes of the Sierra Nevada. Although this strongly suggests that in periods of drought or high density of ibex, this traditional practice may be a potential threat to local ibex herds, further comparisons between the molecular profiles of *M agalactiae* isolated from ibex and from domestic flocks/herds are still required to confirm this hypothesis.

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