

A rapid test for evaluating *B. melitensis* infection prevalence in an Alpine ibex (*Capra ibex*) reservoir in the French Alps

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A rapid test for evaluating *B. melitensis* infection prevalence

2012-...



High prevalence (> 45%)
in protected Alpine ibex
(*Capra ibex*) (Haute-Savoie, France)



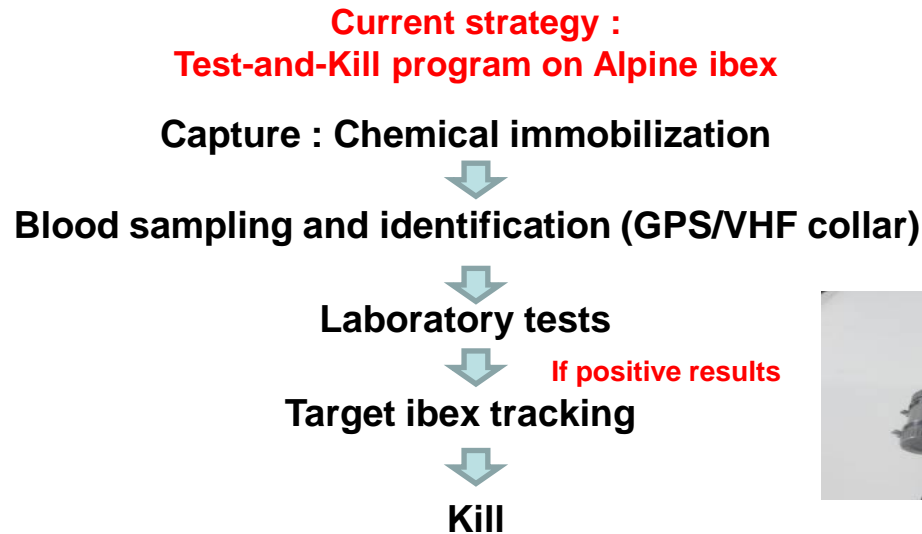
Bovine brucellosis outbreak
in the French Alps
(Haute-Savoie, France) due to
B. melitensis biovar 3 [2]

Fresh raw
cheese
→
consumption

2 human cases
in 2012-2013
without risk factor



Unlike hunted species, protected animals killed only for sanitary reasons



Background

- For eradication strategy need of **a rapid test (time of anaesthesia)**
- Sample : whole blood
- Applicable on many samples directly in the field by unskilled staff

What about LFIA ?? (Laminar Flow Immuno-chromatographic Assay)



Objectives

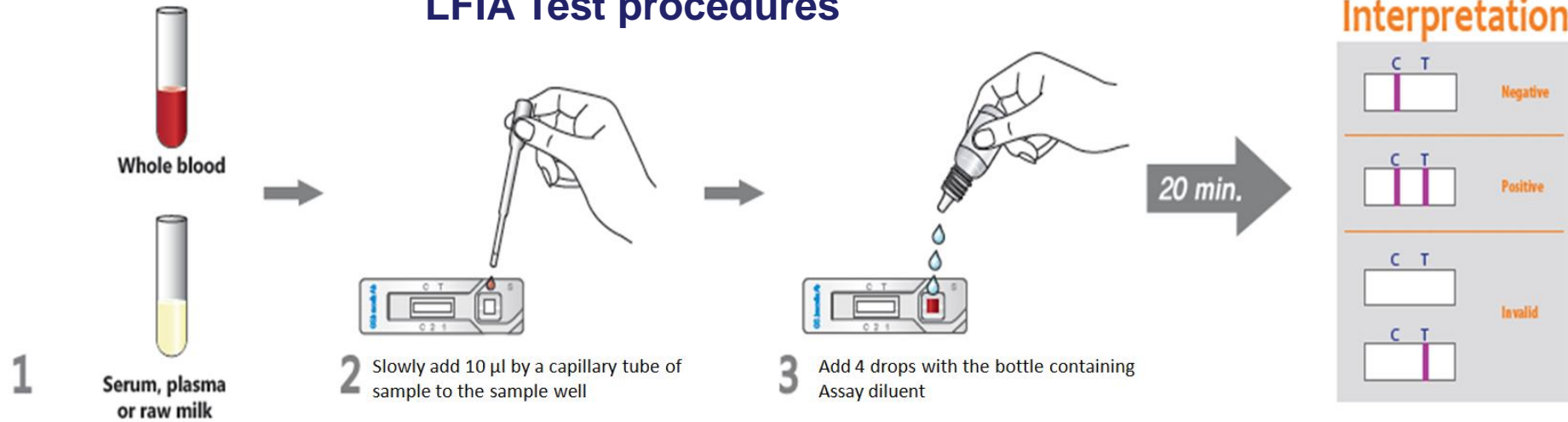
- Evaluation and comparison of a commercial LFIA to the OIE prescribed tests for small ruminant brucellosis on Alpine ibex samples

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Material & Methods

- 260 Alpine ibex samples (2012 to 2014; Haute-Savoie, France)
- Standard sera : ISaBmS & EUGBSS
 - dilution made in serum & in whole blood
- OIE prescribed tests for small ruminants : Rose Bengal Test (RBT; Idexx, France), Complement Fixation Test (CFT; Idexx, France), indirect ELISA (iELISA; Idexx, France)
- Blocking ELISA (bELISA; Ingenasa, Spain)
- LFIA (Anigen Rapid GS *Brucella* Ab Test Kit, Bionote, Korea)

LFIA Test procedures



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Results

Comparison of LFIA & iELISA on standard sera

Standard serum	Dilution	LFIA		iELISA	
		Serum ^{***}	Blood ^{***}	Serum ^{***}	Blood ^{***}
ISaBmS (International Standard anti- <i>B. melitensis</i> Serum)	1/64 [*]	Pos	Neg	Pos	N/A
	1/300 ^{**}	Neg	N/T	Neg	N/A
EUGoatBSS (EU Goat <i>Brucella</i> Standard Serum)	1/8 [*]	Pos	Pos	Pos	N/A
	1/256 ^{**}	Neg	N/T	Neg	N/A

*Limit of detectability (positive result expected); **Dilution > Lower limit of Detection (negative result expected);

***Dilution conditions

N/A : Not applicable; N/T : Not tested

 **LFIA sensitivity equivalent to iELISA on standard serum samples**

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Results

Laboratory trial
2012-2013

Comparison of LFIA, RBT, CFT, iELISA & bELISA on ibex field sera

n = 172		RBT		CFT		iELISA		bELISA	
		Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos
LFIA	Neg	137 (79.65 %)	1 (0.58 %)	138 (80.23 %)	0 (0 %)	138 (80.23 %)	0 (0 %)	135 (78,49 %)	3 (1.74 %)
	Pos	3 (1.74 %)	31 (18.02 %)	2 (1.16 %)	32 (18.60 %)	2 (1.16 %)	32 (18.60 %)	0	34 (19,77 %)
Concordance		97.67 %		98.84 %		98,84%		98,26%	



Very good correlation/specificity between RBT/CFT/iELISA/bELISA and LFIA on sera

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First field trial (n=88)

April 2014, Haute Savoie, France

Results

Under real conditions → concordance= 100 %
LFIA (on whole blood) vs RBT & CFT



1 – Anaesthesia & sampling



2 – LFIA testing on whole blood by unskilled staff



3 – Fast & easy interpretation < 20 min



LFIA can be easily used in the field

Positive result

Immediate slaughtering

Bacteriology

Discussion & conclusion

LFIA on Alpine ibex :
very good in terms of **sensitivity** and **specificity**
according to OIE approved tests for small ruminant brucellosis

LFIA advantages :
Performed by **unskilled staff**
Directly in **the field**
Fast (< 20 min)
Easy interpretation

LFIA can be used for immediate serological diagnosis of brucellosis in Alpine ibex in order to make a rapid sanitary decision



Thank you