

# LONG TERM SURVEILLANCE ON AUJESZKY'S DISEASE IN WILD BOAR OF CENTRAL ITALIAN ALPS



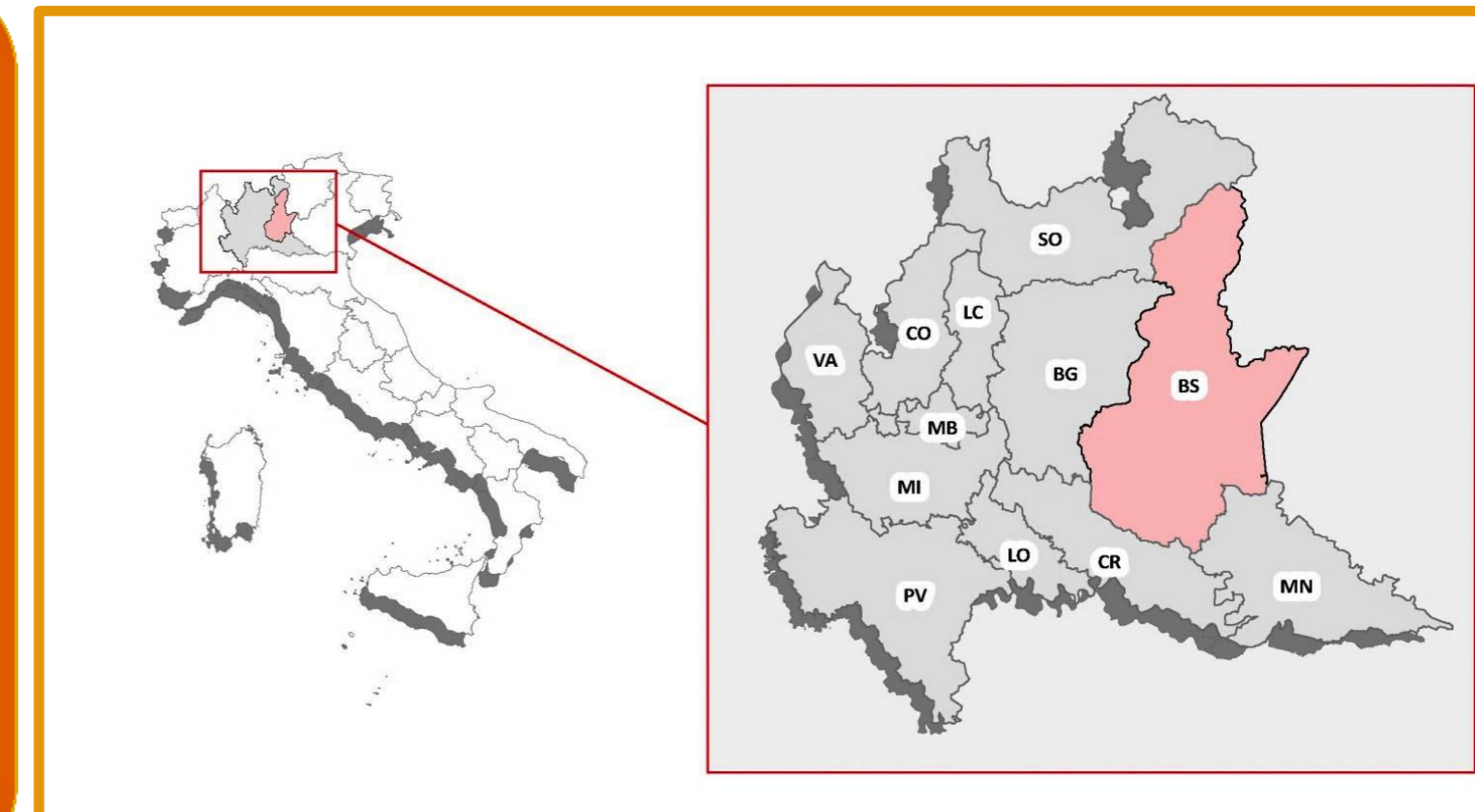
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## Background

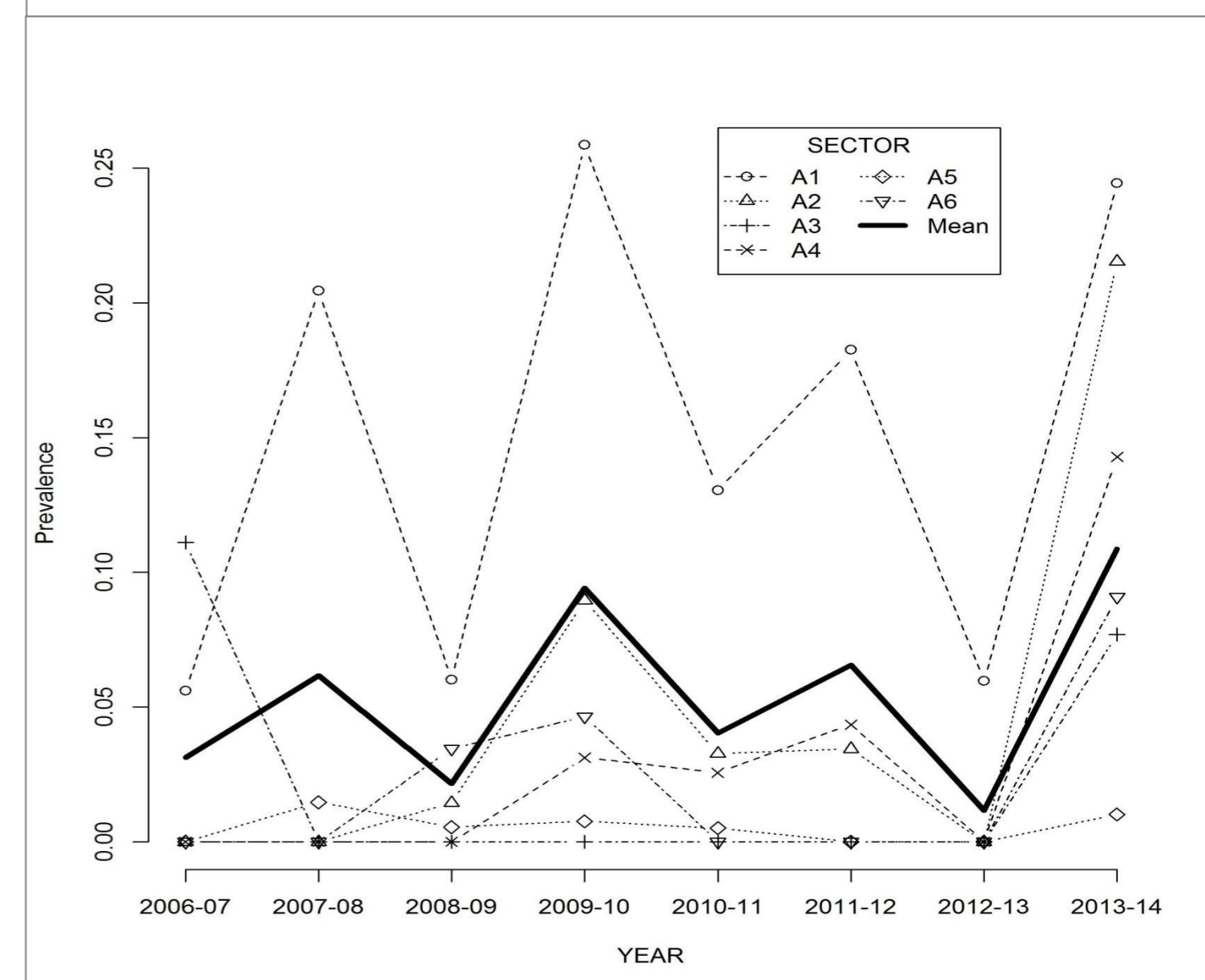
- AUJESZKY'S DISEASE (AD) IS ONE OF THE MOST ECONOMICALLY IMPORTANT DISEASES OF PIGS
- DESPITE WILD BOAR CAN SERVE AS A PERSISTENT RESERVOIR, FEW DATA ARE AVAILABLE ON THE LONG TERM EPIDEMIOLOGY IN FREE RANGING WILD BOAR LIVING IN ABSENCE OF INDUSTRIAL SWINE HERDS
- THE SUCCESS IN DISEASE ERADICATION PROGRAMS IN THE DOMESTIC SPECIES COULD BE INFLUENCED BY WILDLIFE RESERVOIRS
- DIFFERENCES IN THE COMPOSITION OF WILD BOAR POPULATIONS AMONG DISTRICTS AND FACTORS AFFECTING SERO-POSITIVITY WERE INVESTIGATED
- THESE DATA MAY BE USEFUL TO PROVIDE INFORMATION ON THE NATURAL DYNAMICS OF AD INFECTION



## Sample and Data Collection

- 3260 SERA SAMPLES WERE COLLECTED FROM 2006 TO 2014 FROM 4007 HUNTED FREE-LIVING WILD BOAR IN THE ALPINE FOOTSTEP MOUNTAINS (6 HUNTING DISTRICTS, BRESCIA, IT) AND TESTED FOR ANTI-AD TOTAL GB ANTIBODIES.
- VARIABLES REGARDING WILD BOARS (AGE; SEX; ABUNDANCE) AND PIG FARMS (TOTAL NUMBER OF FARMS; DENSITY; AVERAGE NUMBER OF ANIMALS) WERE RECORDED.
- ALL HUNTING DISTRICTS WERE LOCATED IN THE ALPINE FOOTSTEP MOUNTAINS, CHARACTERIZED BY THE PRESENCE OF SMALL, BUT NOT FREE RANGING, PIG FARMS WITH USUALLY A SMALL NUMBER OF PIGS BRED FOR A LIMITED PERIOD OF THE YEAR

PLOT OF ADV PREVALENCE FOR DIFFERENT HUNTING DISTRICTS. THE INCREASING TREND ALONG YEARS IS EVIDENT



N° OF WILD BOAR SAMPLES AND SEROPOSITIVE ANIMALS (IN BRACKETS)	
HUNTING SEASON	TOTAL
2006-07	233 (7)
2007-08	444 (10)
2008-09	519 (11)
2009-10	445 (42)
2010-11	476 (19)
2011-12	373 (24)
2012-13	355 (4)
2013-14	415 (45)
<b>TOTAL</b>	<b>3260 (162)</b>
<b>PREVALENCE</b>	<b>4.97%</b>
<b>(95% C.I.)</b>	<b>(4.25-5.77)</b>

## Wild boar Population Results

- 75 SAMPLES OUT OF 1201 (6.2%) FEMALES WERE POSITIVE
- MALES POSITIVE SAMPLES WERE 64 ON A TOTAL OF 1129 (5.6%)
- OUT OF 517 YOUNG, 698 SUB-ADULTS AND 1177 ADULTS TESTED, 14 (2.7%), 37 (5.3%) AND 92 (7.8%) RESPECTIVELY RESULTED POSITIVE
- MULTINOMIAL: SERO-POSITIVE ANIMALS FREQUENCY IN AREA 1 IS SIGNIFICANTLY HIGHER THAN IN THE OTHER ONES. HUNTING DISTRICTS DIFFERED IN THE SEROPREVALENCE VALUES AND IN THE SEX AND AGE COMPOSITION AND BETWEEN YEARS
- CONSIDERING THE STRUCTURE OF THE WILD BOAR POPULATIONS, IN AREA 6 THERE WAS A HIGHER PROPORTION OF MALES THAN IN AREA 1. CONCERNING AGE, COMPARING AREA 1 TO AREA 2, 5 AND 6, THERE WAS A SIGNIFICANTLY LOWER PERCENTAGE OF OLDER BOARS ("SUB-ADULTS" AND "ADULTS") COMPARED TO "YOUNG"
- ALONG THE YEARS, IN AREA 5 THERE WAS AN INCREASING TREND OF WILD BOAR'S DENSITY IN COMPARISON WITH AREA 1

## MODELS COMPARISON WITH ANOVA: WE CHOOSE THIS LAST MODEL AS THE BEST FIT

MODEL	D.F.	DEVIANCE	CHISQ. STAT	TEST DF	P-VALUE
AGE + YEAR	5	902.13			
NULL MODEL	2	930.66	28.5	3	<0.001
AGE + YEAR + PIGS/FARM	6	896.29	5.84	1	0.015

## GLMM OUTPUT: EFFECT OF AGE, YEAR AND AVERAGE OF PIGS PER FARM ON THE RESPONSE VARIABLE. THE DISTRICT IS USED AS RANDOM FACTOR

	ESTIMATE	STD. ERROR	Z VALUE	PR(> Z )
(INTERCEPT)	-3.48660	0.51139	-6.818	<0.001
AGE (1)	0.40723	0.32671	1.246	0.2126
AGE (2)	0.99728	0.29879	3.338	<0.001
YEAR	0.18140	0.05348	3.392	<0.001
AVG(PIGS)/FARM	-0.09865	0.03035	-3.255	<0.001

## Statistical Modelling

### ANOVA:

- SIGNIFICANT VARIABLES: AGE, YEAR AND AVERAGE NUMBER OF PIGS PER FARM
- NOT SIGNIFICANT VARIABLES: WILD BOAR ABUNDANCE, TOTAL NUMBER OF PIG FARMS AND INTERACTIONS AMONG AGE, YEAR AND SEX

### GLMM:

- THE ODDS OF BEING POSITIVE INCREASED ALMOST THREE TIMES FOR ADULTS BY COMPARISON WITH YOUNG BOARS (O.R.=2.7)
- FOR EACH INDIVIDUAL PIG INCREASE (ON AVERAGE) PER FARM, THE ODDS OF WILD BOAR BEING POSITIVE DECREASED BY 9% (O.R.= 0.91)
- A POSITIVE TREND HAS BEEN OBSERVED DURING YEARS, WITH AN INCREASE IN SEROLOGICAL POSITIVITY OF 20% EACH YEAR (O.R.= 1.2)

## Conclusions

- THE PRESENT LONG TERM SURVEILLANCE TESTED HOW THE STRUCTURE OF WILDLIFE POPULATION INFLUENCE THE DYNAMICS OF ADV TRANSMISSION
- ADV TRANSMISSION IN WILD BOAR WAS TESTED AS INDEPENDENT FROM THE AREA'S LIKELIHOOD OF CONTACT WITH DOMESTIC PIGS. THIS FINDINGS PROVIDE BASELINE INFORMATION ON THE DYNAMICS OF THE INFECTION UNDER NATURAL CONDITIONS AS IN THE ALPS