

Aggiornamenti normativi e ricadute operative dei piani di emergenza e sorveglianza in sanità animale



Azioni per la gestione efficace della sorveglianza della bluetongue

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La malattia

- Febbre catarrale degli ovini o bluetongue
- Malattia notificabile OIE, UE (AHL categoria: C+D+E (1-24))
- Malattia virale, infettiva, non contagiosa (1-24), trasmessa da insetti
- Ruminanti domestici e selvatici
- Sintomi da asintomatica a morte (specie, razza, sierotipo, fase produttiva)
- Ruolo epidemiologico bovini/ovini



Importanza socio-economica

- Grandi perdite economiche
- + Dirette: + malattia clinica (calo produzioni)
- ++ Indirette: restrizioni alle movimentazioni di animali/seme/embrio
- Alcune stime:
 - 1970s, bando seme bovino: 24 milioni \$/anno in USA
 - 2007, BTV-8: 1,4 miliardi \$ in Francia
 - 2007, BTV-8: 845 milioni € in Olanda

1881 Hutcheon first description SA Merinos

1906 Theiler hypothesized viral etiology

1908 first L-A vaccines by Theiler (BTV4)

1924 (o 43) 1st description out of Africa: Cyprus

1943 Du Toit confirmed role *Culicoides*

1956 1st Europe: Portugal and Spain (BTV10)





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BTV OCCURRENCE 1943-2017



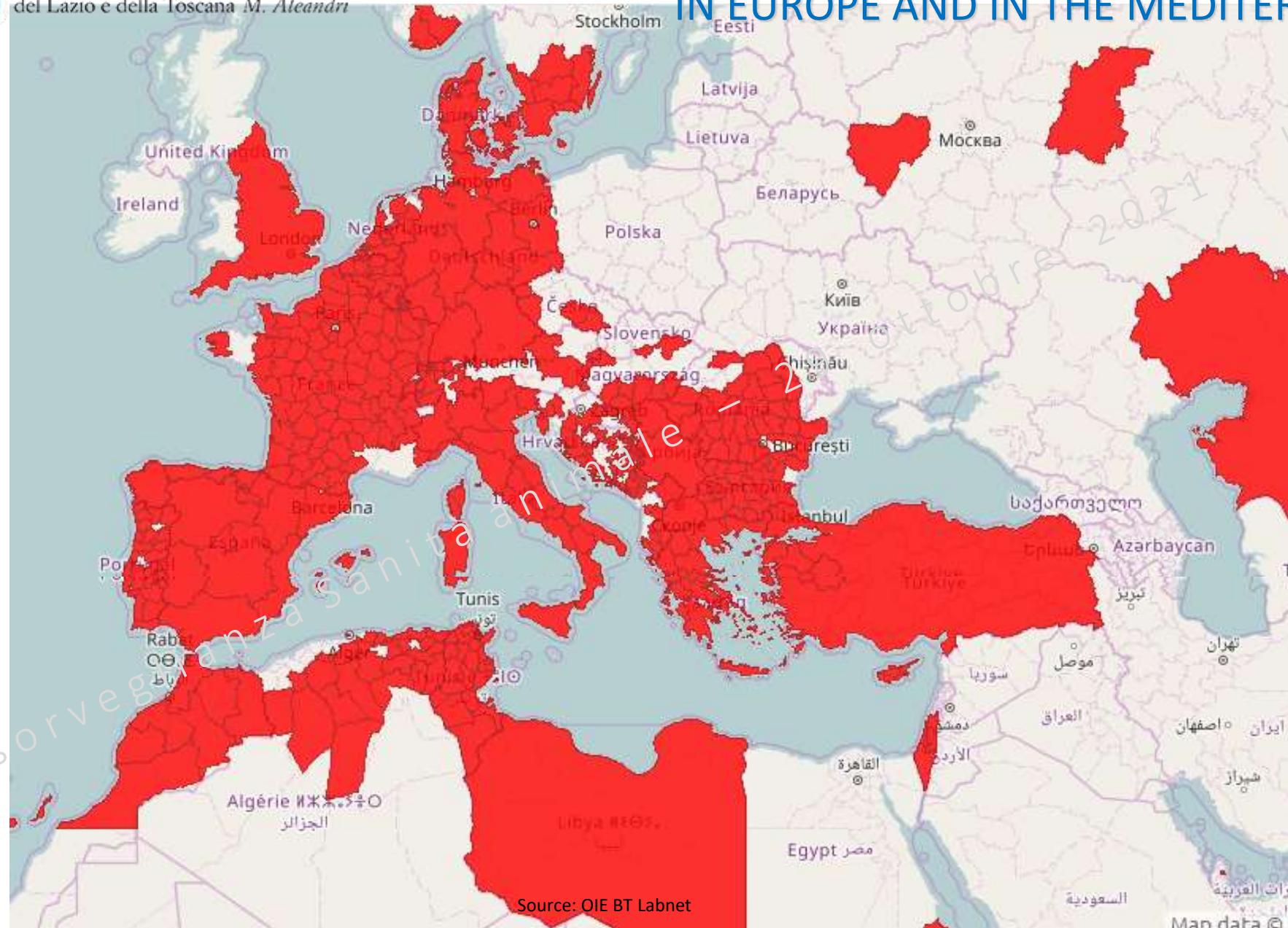
OVERALL BTV OCCURRENCE IN EUROPE AND IN THE MEDITERRANEAN BASIN 2000-2017

9 sierotipi:

BTv1,
BTv2,
BTv3,
BTv4 ,
BTv9 ,
BTv16

BTv8 ,

BTv6 ,
BTv11 ,
BTv14 ,



Family: Reoviridae

Genus: Orbivirus (ex arbo)

Serogroup: BT, AHS, EHD, EE

non-enveloped
double-stranded RNA virus
10 segments of RNA
Encodes 11 proteins 4 NS and 7 VP

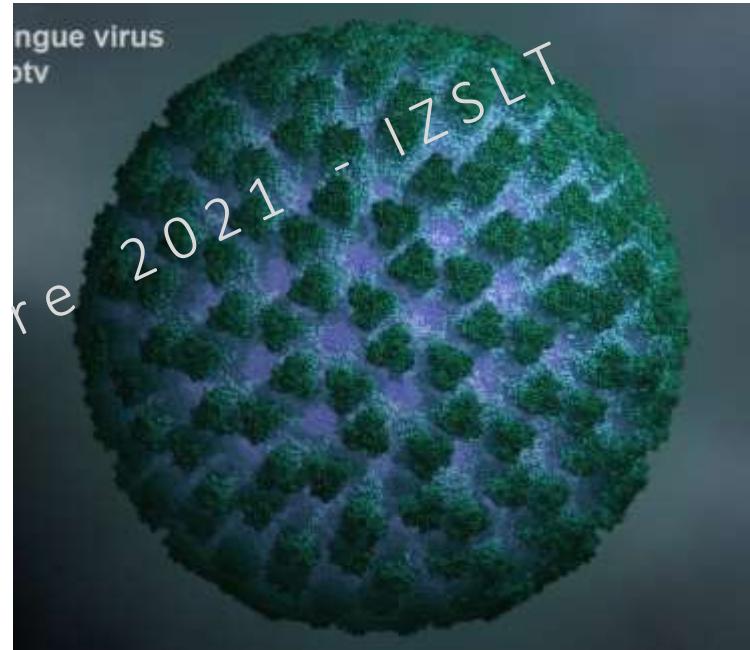
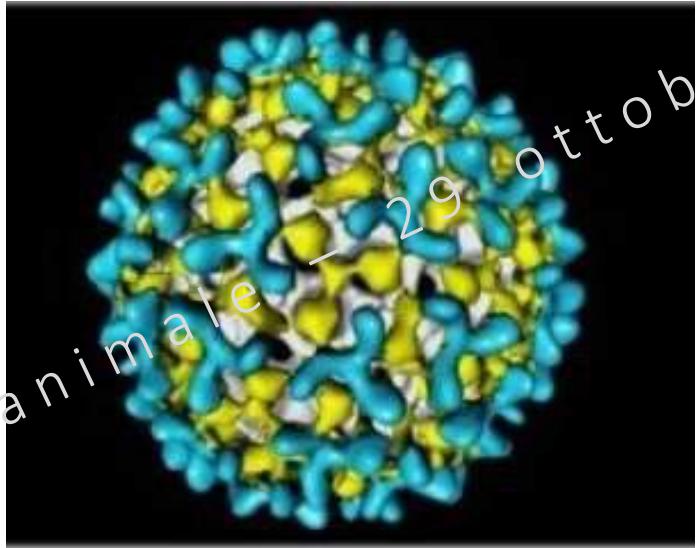
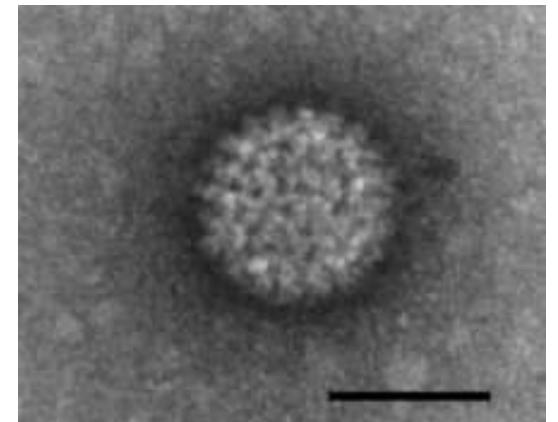
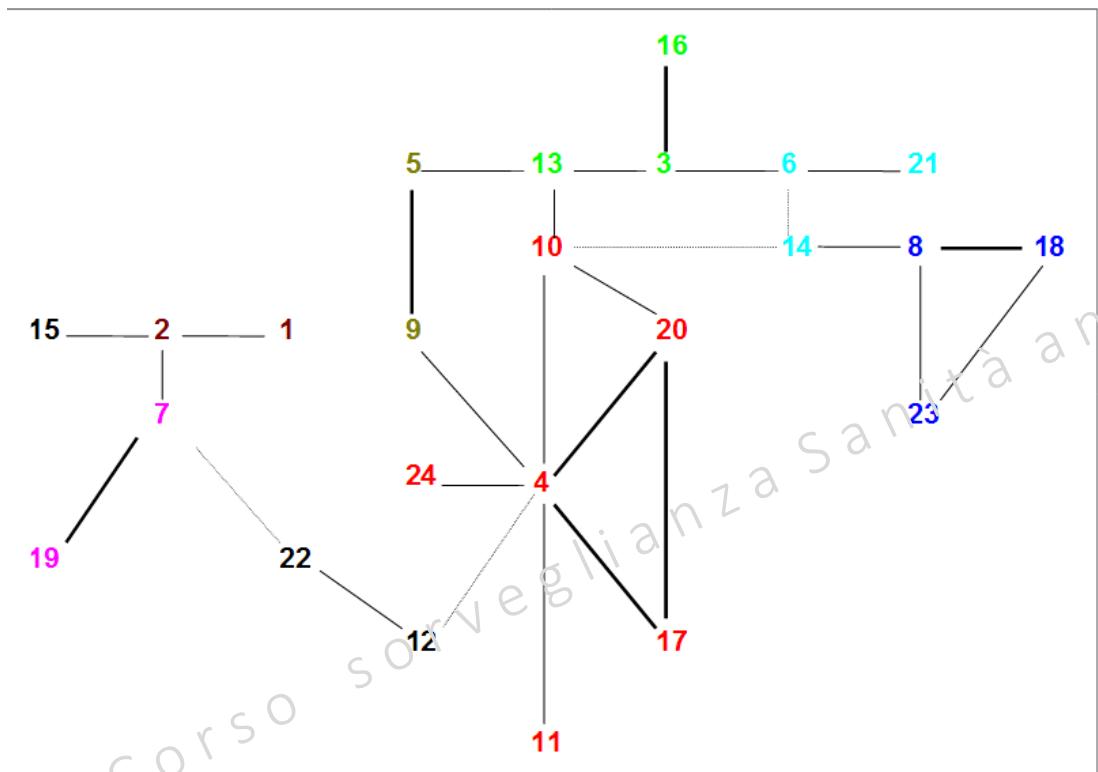


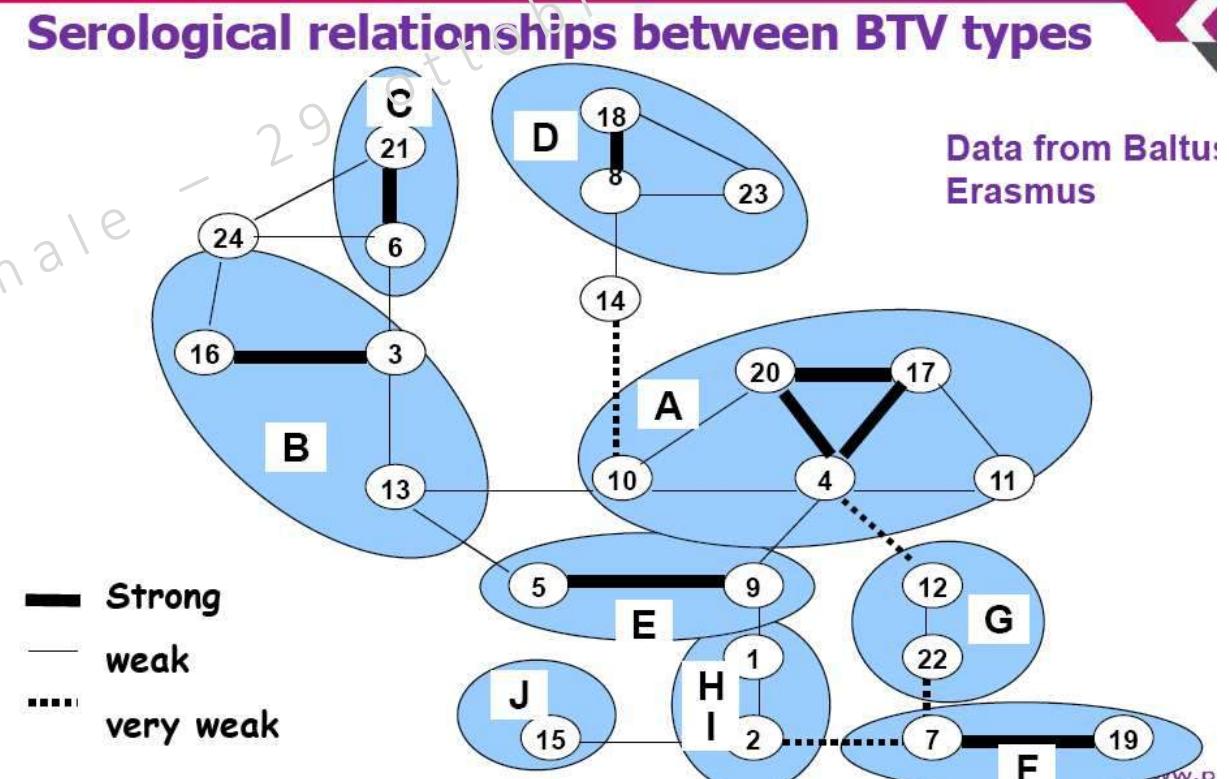
Photo: IZSAM
University
Wisconsin



- 24 sierotipi tradizionali + (prox diapo)
- Parziali reazioni/protezioni crociate (in vitro e in vivo)



Source: Erasmus, B.J., 1990, 'Bluetongue virus', in Z. Dinter & B. Morein (eds.), *Virus infections in ruminants*, pp. 227–237, Elsevier Science Publishers, Amsterdam



Source: Peter Mertens oral presentation

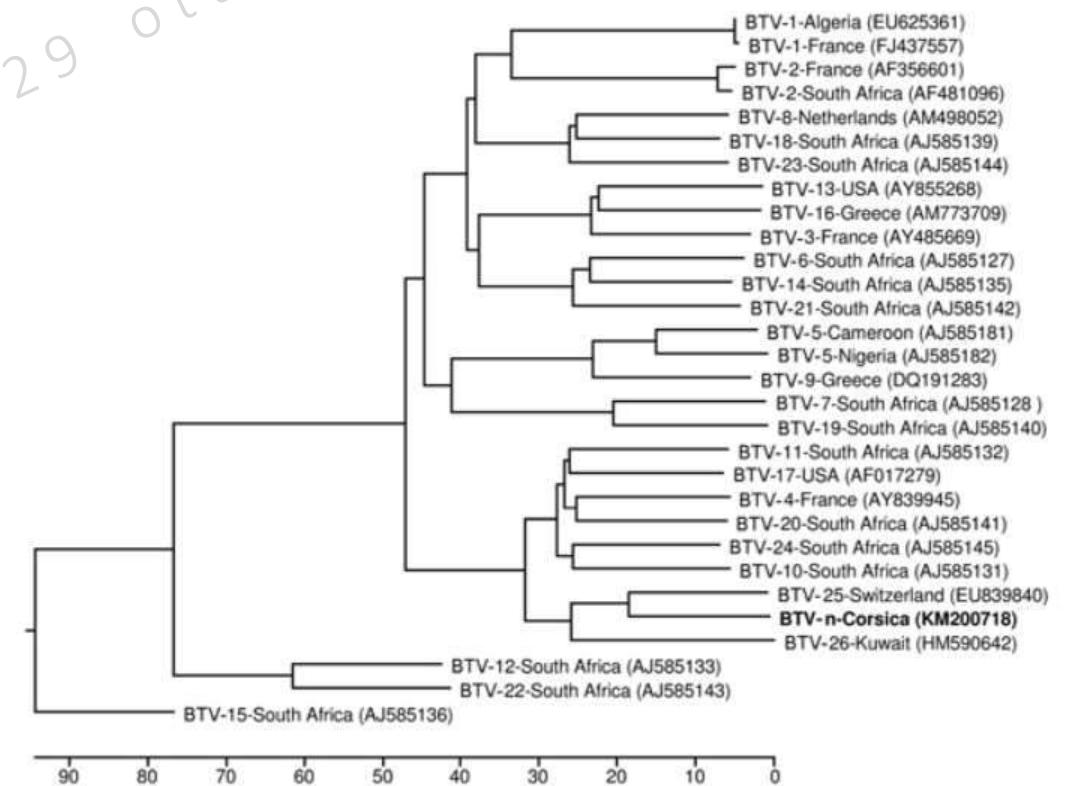
Nuovi sierotipi (no AHL)

- BTV 25 TOV, Swisse
- BTV 26 Kuwait
- BTV 27 Corsica
- ... China, Piedmont
- ...
- BTV 31?



Phylogenetic tree of segment 2, (strains available in GenBank)
Source: Zientara, oral presentation

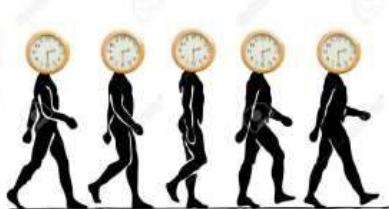
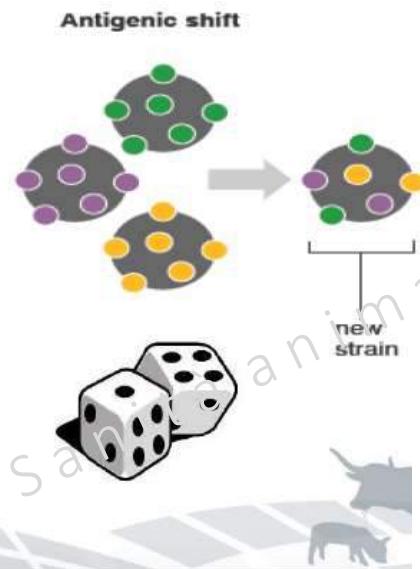
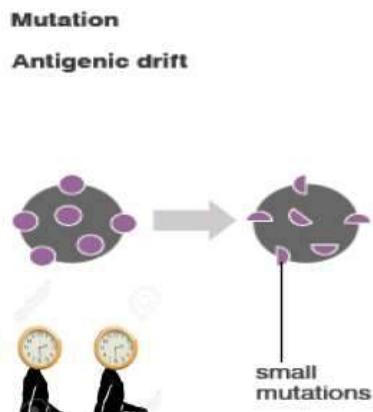
- Poco patogeni
- Serbatoio capre
- Trasmissione orizz, no *Culicoides*



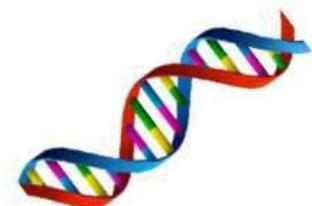


Eziologia

EVOLUTION



Segment	% nt id with BTV-3 TUN2016
Seg 1	93.7
Seg 2	94.1
Seg 3	96.1
Seg 4	96.3
Seg 5	96.3
Seg 6	98.0
Seg 7	95.9
Seg 8	94.0
Seg 9	96.7
Seg 10	80.3



Source: Lorusso,
IZSAM

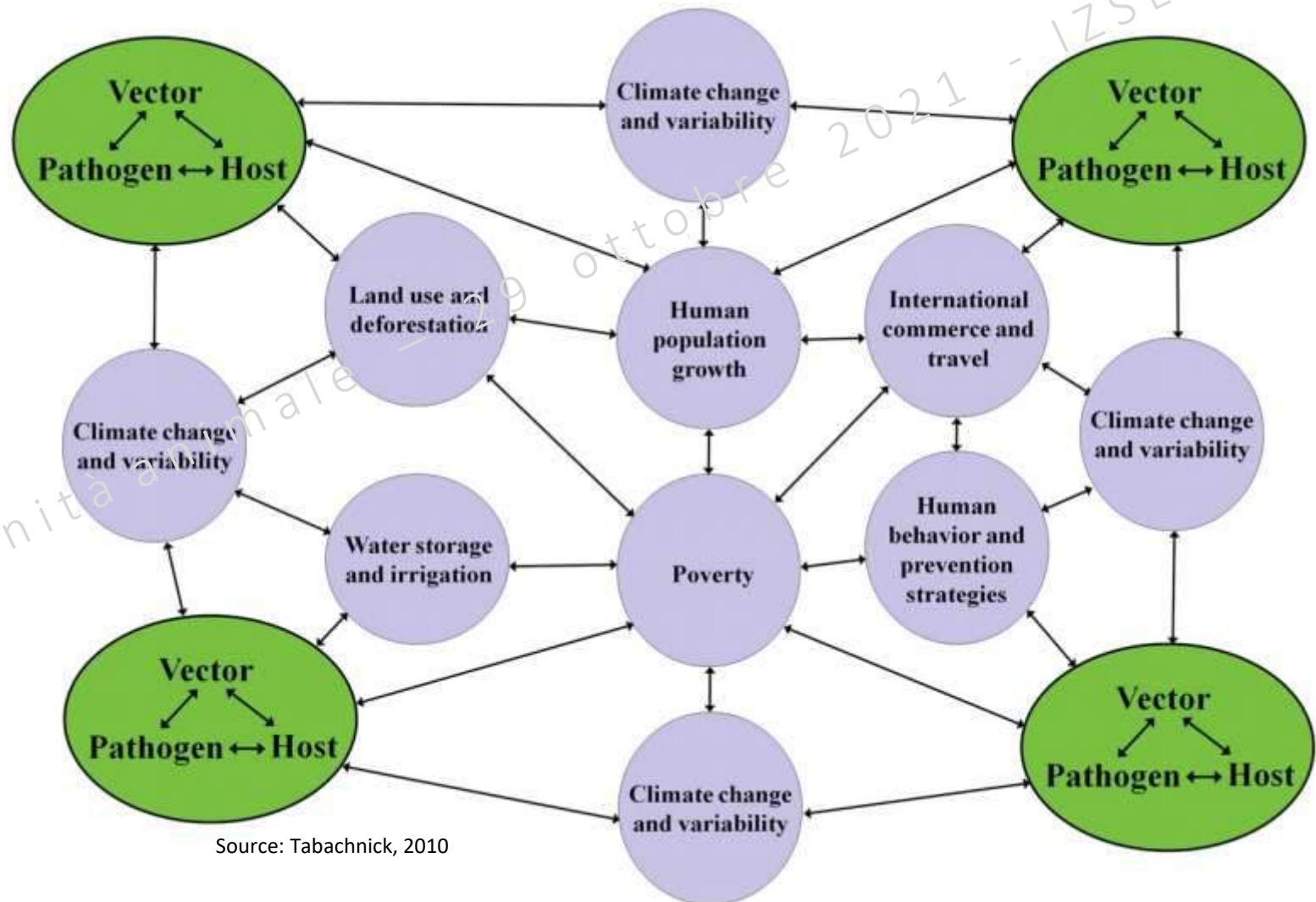
DIFFERENT BTV-3!!!

BTV-3 TUN2016/Zarzis

Natural Cycle

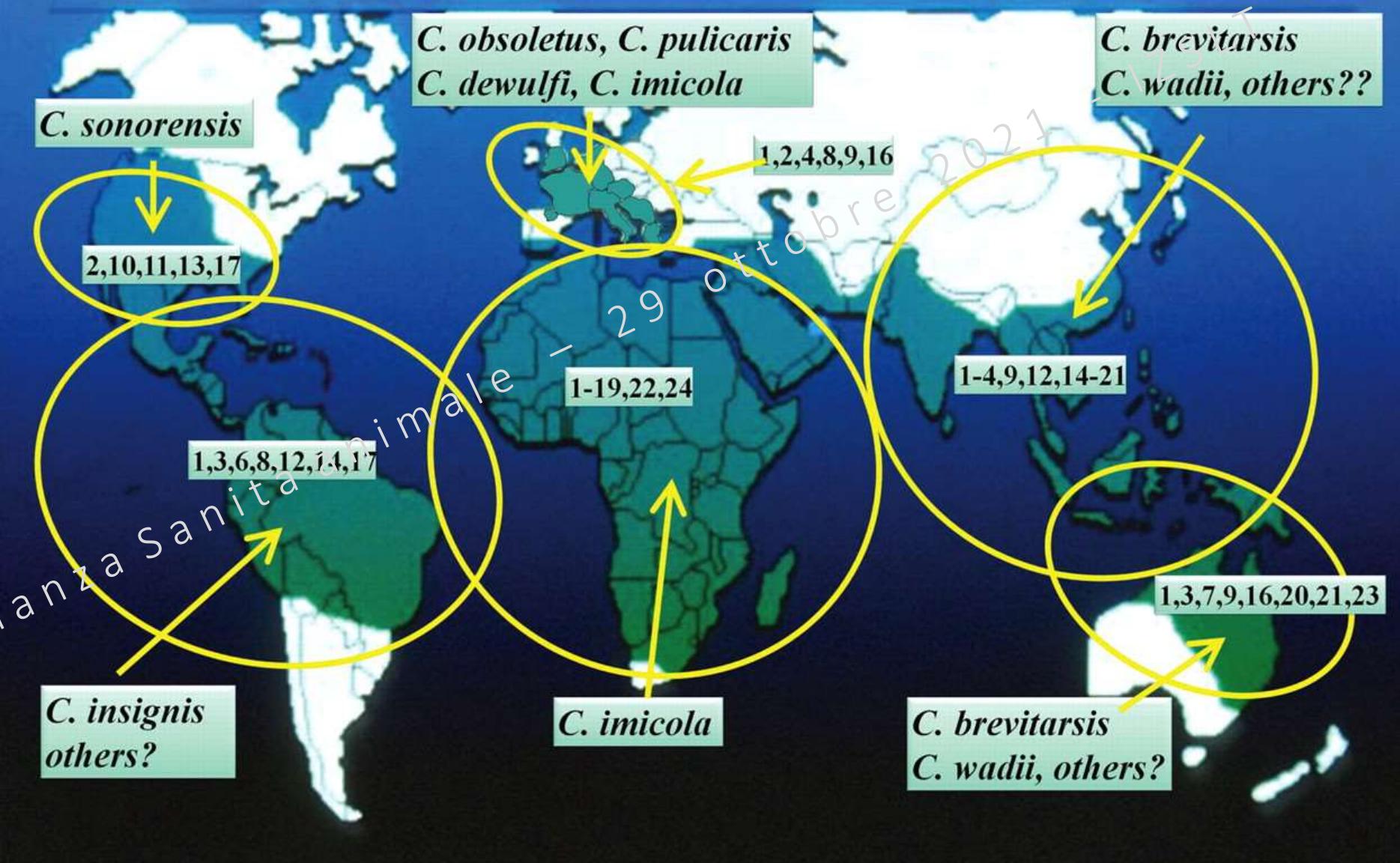
Interaction among
Vector
Virus
Ruminant host

Environment
Temperature
Umidity
Pedology soil type
Predominant Winds



World-wide Distribution of Bluetongue Virus

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C. sonorensis
2,10,11,13,17

**C. obsoletus, C. pulicaris
C. dewulfi, C. imicola**
1,2,4,8,9,16

**C. brevitarsis
C. wadii, others??**

**C. insignis
others?**
1,3,6,8,12,14,17

C. imicola
1-19,22,24

**C. brevitarsis
C. wadii, others?**
1,3,7,9,16,20,21,23

Vettore biologico



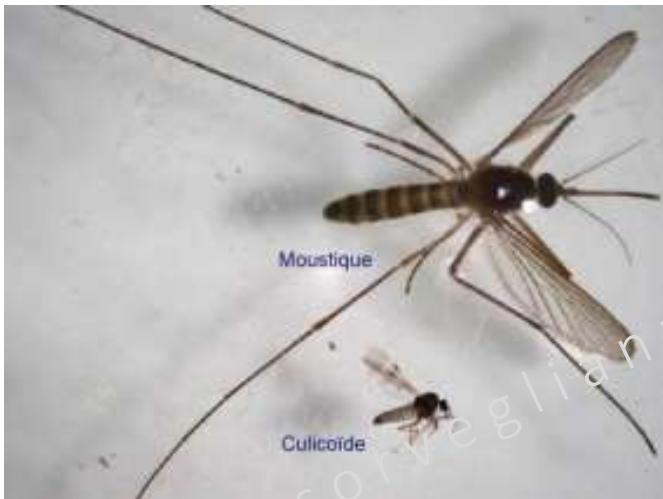
Culicoides

circa 1400 specie, di cui solo < 3% vettori di BT

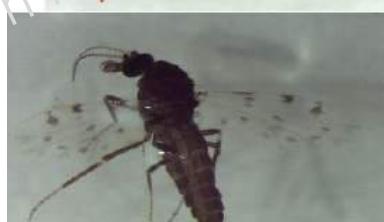
C. Imicola

C. Obsoletus complex

C. Pulicaris complex



C. pulicaris



C. punctatus



C. newsteadi



C. obsoletus/C. scoticus



C. dewulfi



C. chiopterus



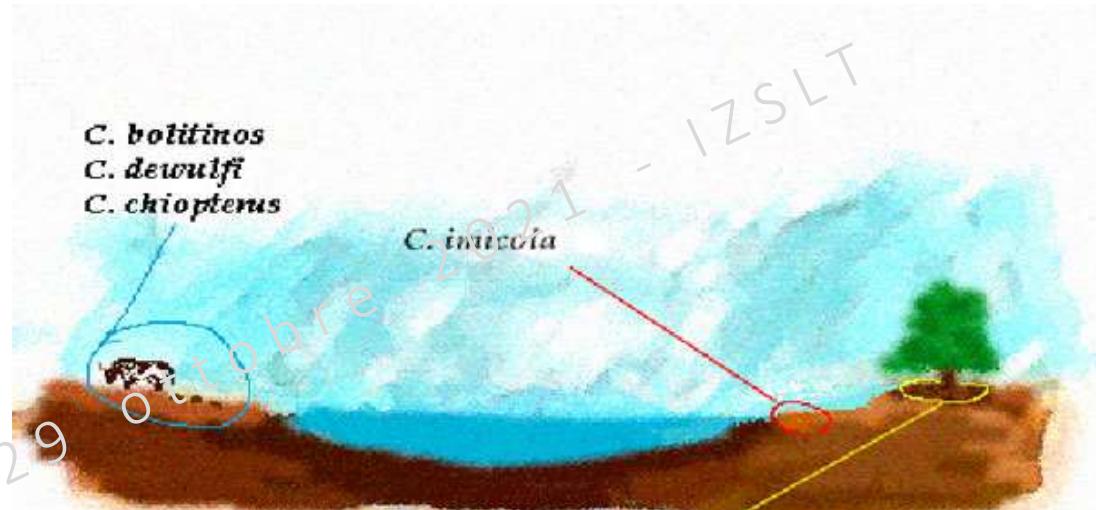
C. imicola

Habitat larvali diversi

- *C. imicola* terreno umido (fango) esposto al sole (argilla)
- *C. obsoletus* aree ombreggiate e con mat organico (boschi)
- *C. chiopterus, dewulfi* breeds in feci bovini (cluster)

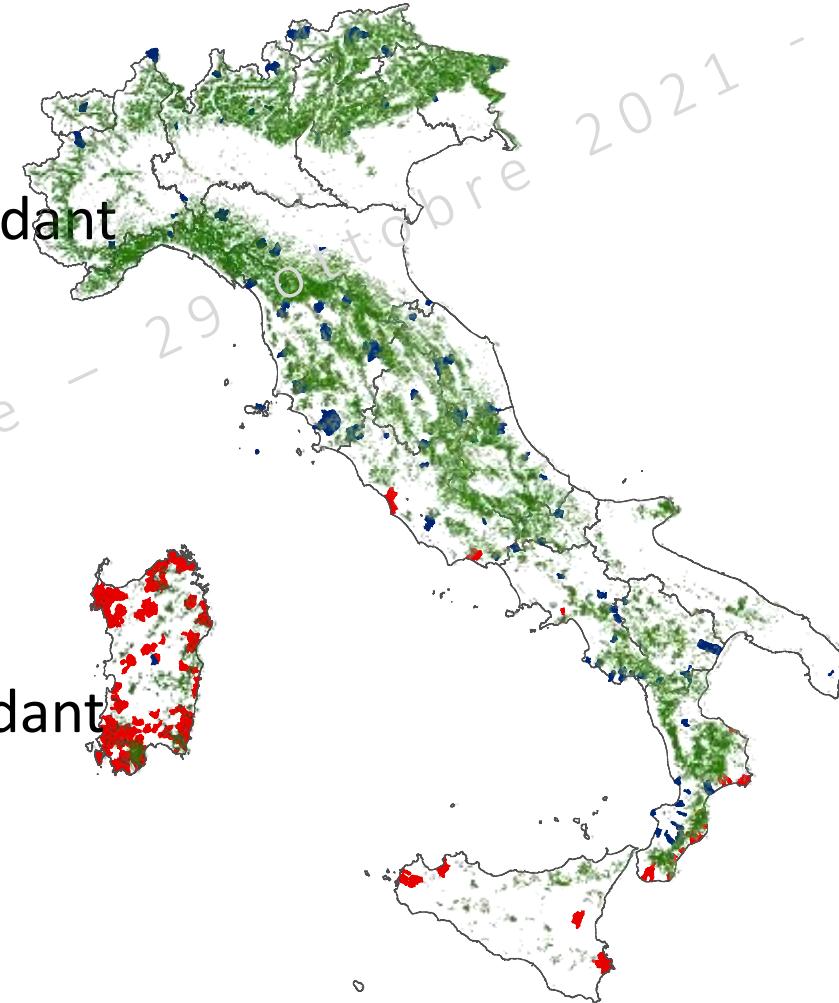
Adulti si muovono:

- attivamente (centinaia di metri)
- passivamente con i venti:
 - di superficie -> 10-50 Km
 - di altitudine -> centinaia Km



Obsoletus Complex vs *C. imicola* forest coverage

- *C. imicola*
100 catches more abundant
- Obsoletus Complex
100 catches more abundant



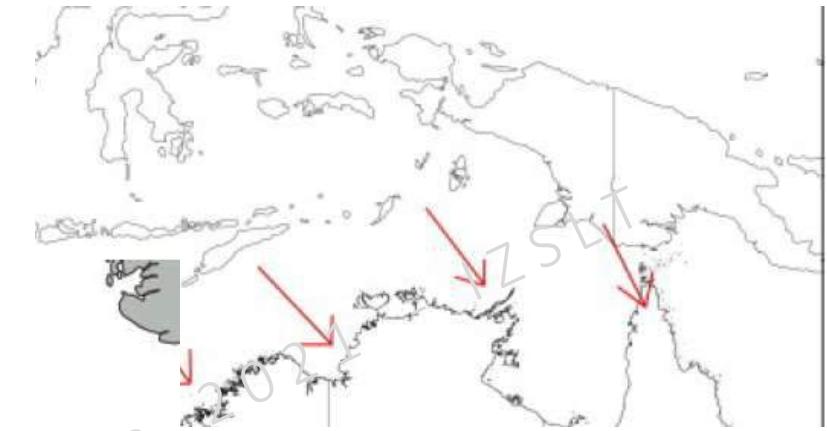
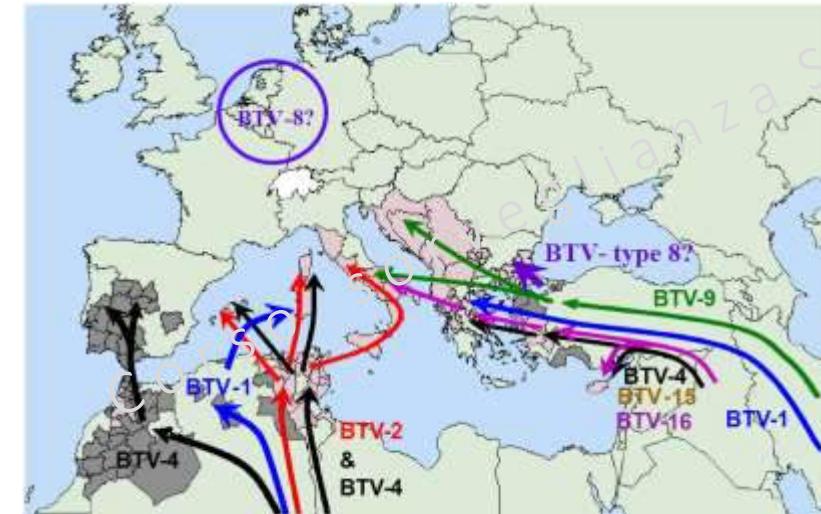


BT trasmissione Oltre i culicoides ?

- Zecche degli ovini (*melophagus ovine*)
- In utero
- Meccanica (aghi e material chirurgico)
- Orizzantale (contatto diretto)
 - Nuovi sierotipi e vecchi in via sperimentale
- Venerea?
- Carnivori infettati da ingestione di carni di animali infetti

Da dove arriva:

- **Trasporto passivo (vento) di vettori infetti**
- **Movimenti animali**
- Trasporto di seme/embrio ?
- Inanimato (aerei? navi?)
- **Determinanti antropogenici ?**



Source: www.earthobservatory.nasa.gov/NaturalHazards

- OVINI
 - Severità segni clinici
 - razza
 - sierotipo
 - stress, patologie concomitanti
 - Morbilità
 - fino a 100%
 - Mortalità
 - di solito da 0 a 30%
- BOVINI, CAPRINI
 - morbidità: fino al 5%
 - morte rara
- Cervi, antilopi, lama, ecc
 - ancora + variabile

Morbidità/Mortalità teoria

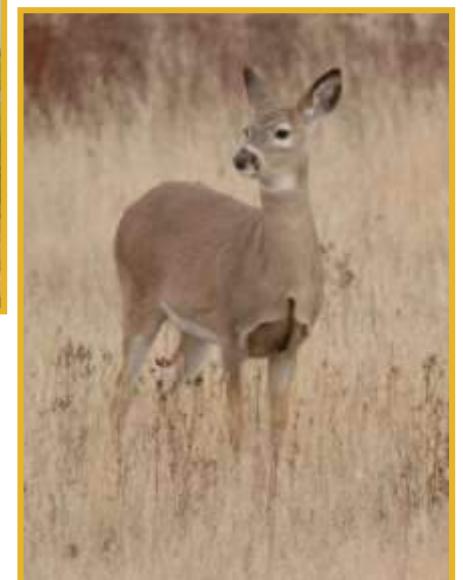


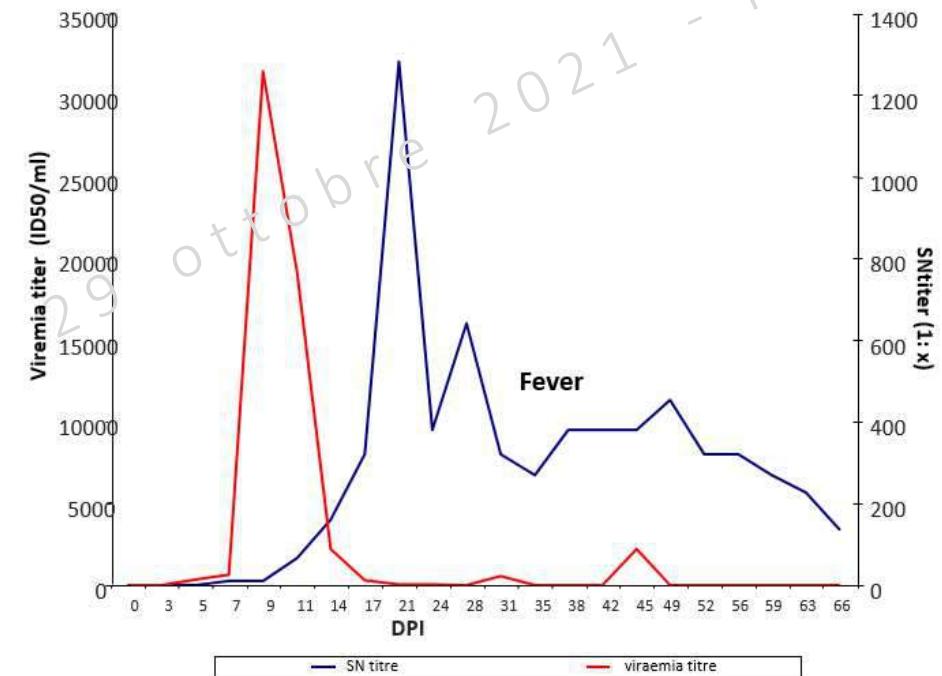
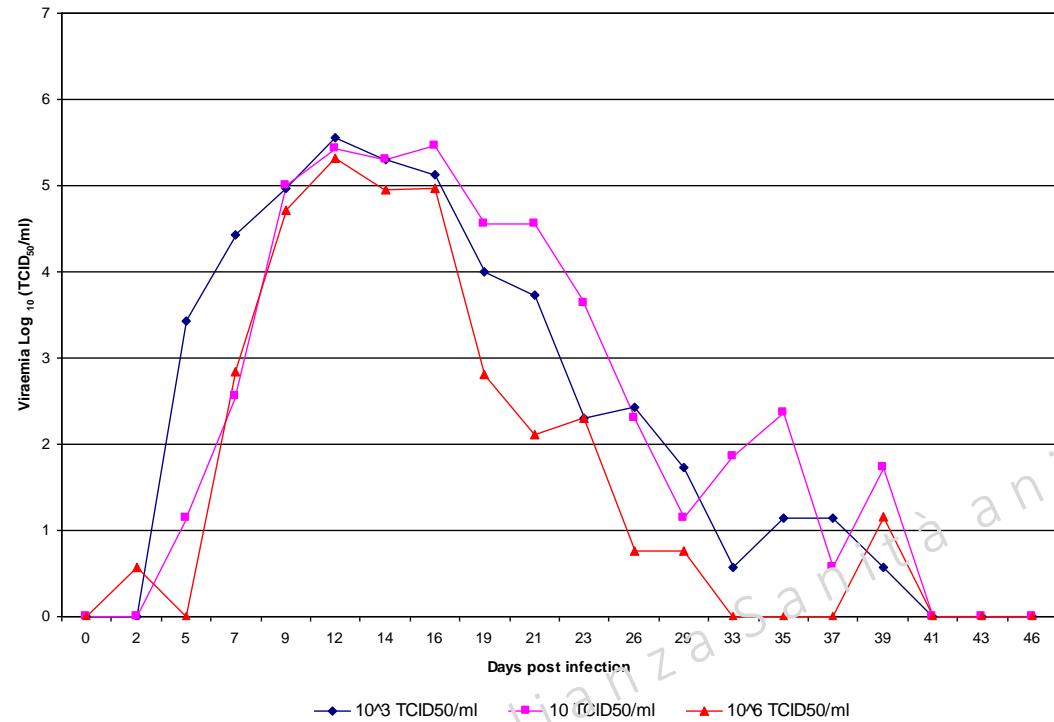
Photo: A flock of sheep. USDA ARS

Photo: (Top) Alice Welch/USDA; (Middle): www.wikimedia-commons.org ; (Bottom): Bob Nichols/USDA

Morbidità/Mortalità pratica

Species	Susceptible	Cases	Deaths	Morbidity	Mortality	Fatality
BTV1	204125	12168	3070			
Sheep	180911	10957	3062	6.1%	1.7%	27.9%
Cattle	20725	1127	4	5.4%	0.0%	0.4%
Goats	2489	84	4	3.4%	0.2%	4.8%
BTV4	99348	6927	1217			
Sheep	45748	3733	470	8.2%	1.0%	12.6%
Sheep / goats	21921	980	735	4.5%	3.4%	75.0%
Cattle	31058	2207	12	7.1%	0.0%	0.5%
Goats	621	7	0	1.1%	0.0%	0.0%
BTV8	262992	3603	484			
Cattle	218451	2041	4	0.9%	0.0%	0.2%
Sheep	17952	745	214	4.1%	1.2%	28.7%
Sheep / goats	26540	812	265	3.1%	1.0%	32.6%
Goats	49	5	1	10.2%	2.0%	20.0%

viremia bovini vs ovini

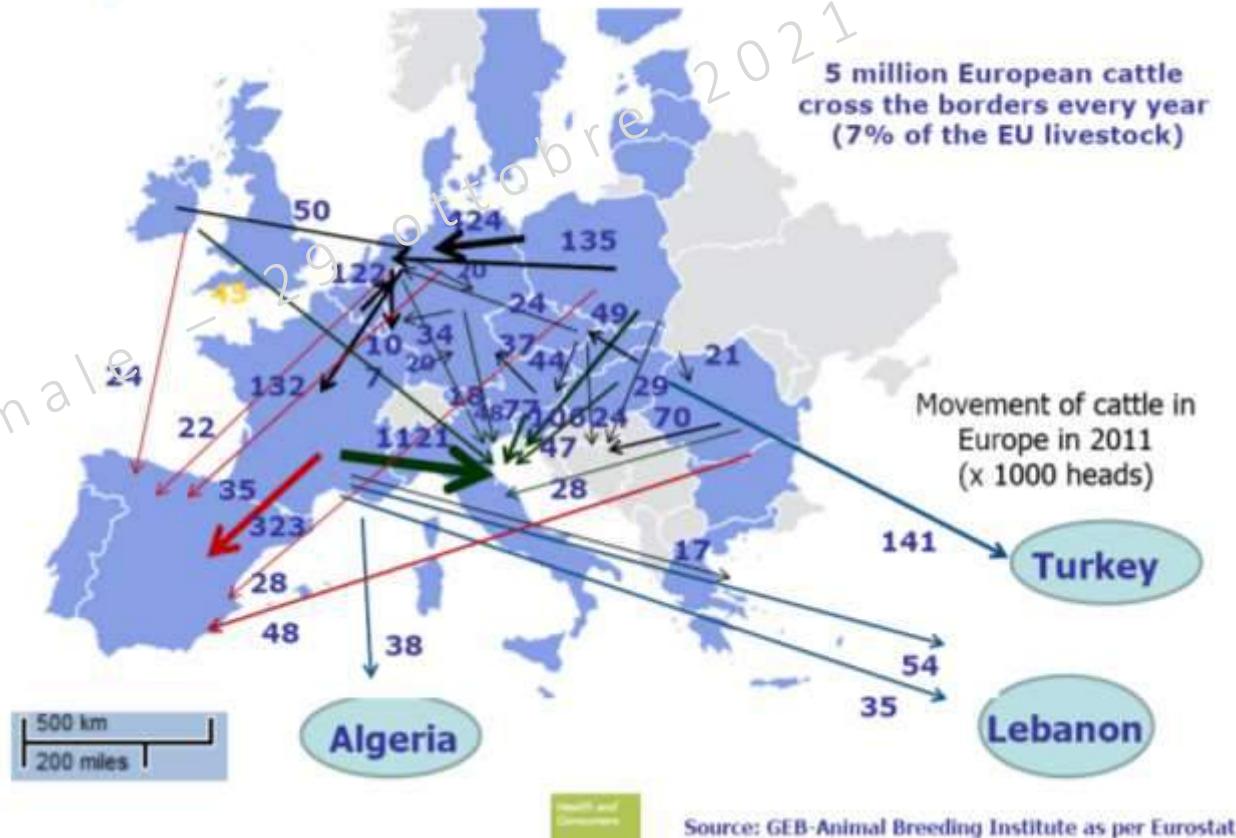


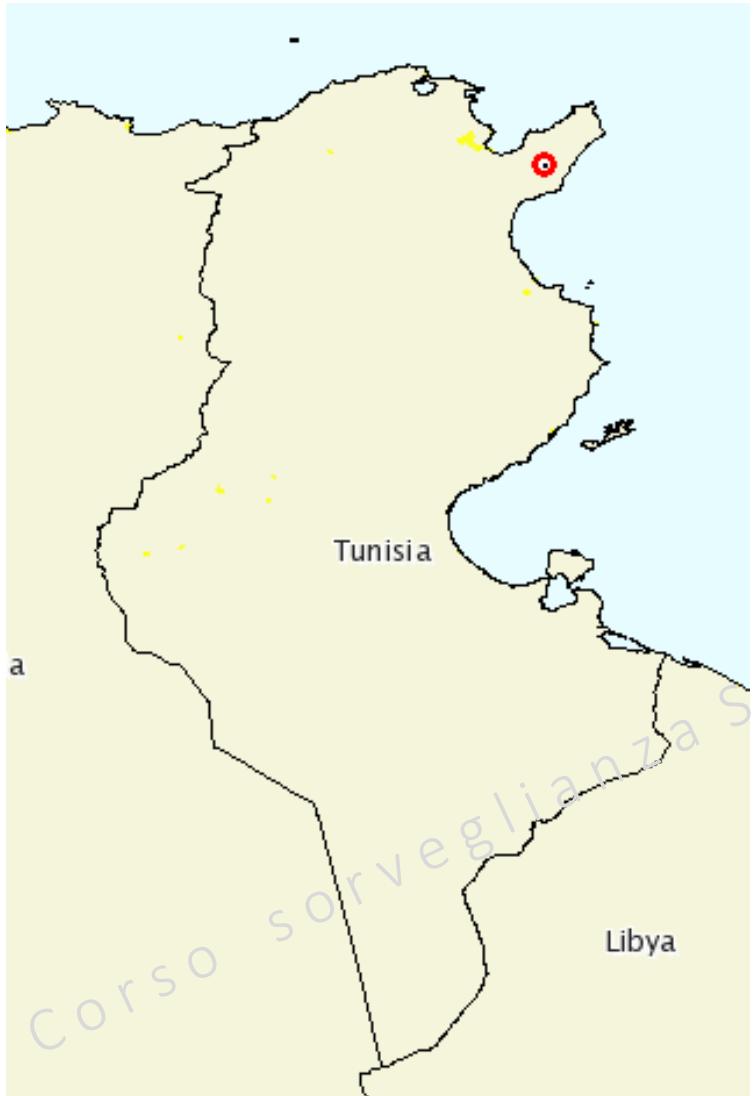
Depends on

- Condition for virus persistence
 - Wheather
 - Density susceptible animal
- Importance of trade
 - Mainly sending
 - Or receiving animals
- Virus serotype
- Susceptible population
 - Mainly ovine
 - Mainly bovine

IMPACT OF BT

Impact: Trade movements within the EU





Outbreak 1	Beni khalled, Hannous, Beni khalled, NABEUL					
Date of start of the outbreak	01/11/2016					
Outbreak status	Resolved (31/01/2017)					
Epidemiological unit	Farm					
Affected animals	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered
	Cattle	8	0	0	0	0
	Goats	7	0	0	0	0
Affected population	Sheep	46	1	0	0	0
	This is a Barbarine ewe over three years old. It showed dejection, fever, loss of weight, salivation, facial and submandibular oedema, nasal discharge, tachycardia and dyspnoea.					
Summary of outbreaks	Total outbreaks: 1					
Total animals affected	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered
	Cattle	8	0	0	0	0
	Goats	7	0	0	0	0
Outbreak statistics	Sheep	46	1	0	0	0
	Species	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*	
	Cattle	0.00%	0.00%	-	0.00%	
	Goats	0.00%	0.00%	-	0.00%	
	Sheep	2.17%	0.00%	0.00%	0.00%	

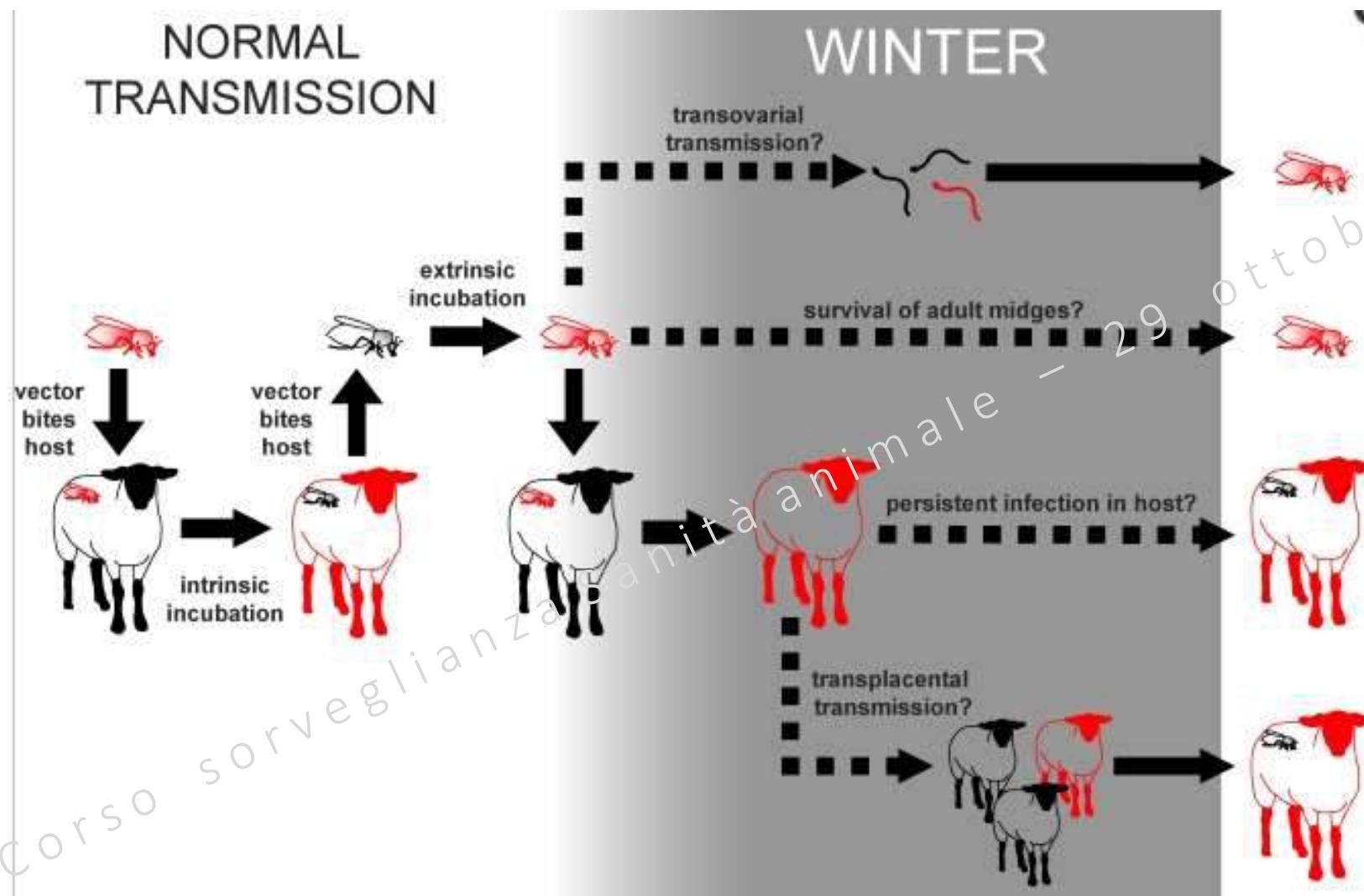


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E in inverno ?



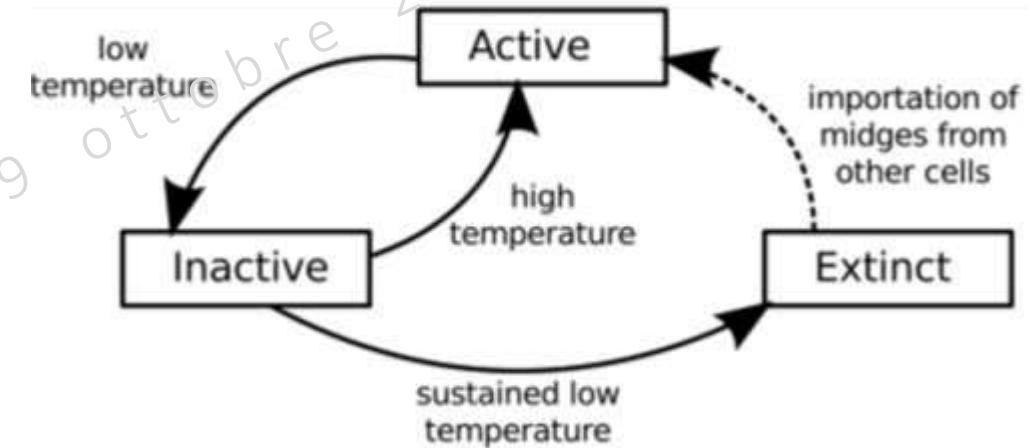
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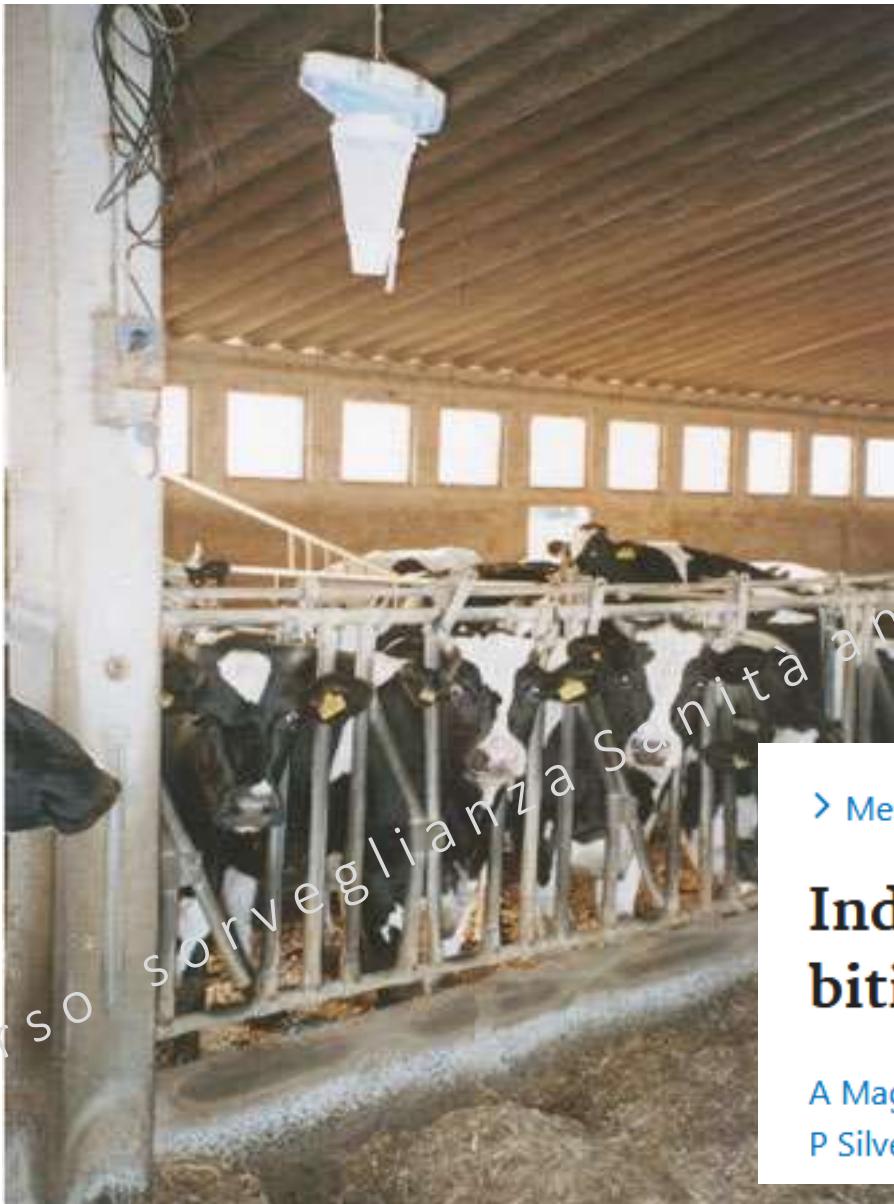
Plos Biol. 2008 Aug; 6(8): e210.

And in winter ?

- individuals surviving for up to three months at 10 °C in the laboratory
- *C. imicola* eggs survive 2 months <6°C
- *C. imicola* adults survive 2 weeks -1,5 °C
- Adults <12°C not active
- Death only if 0°C > 7 days
- most species of *Culicoides* at northern latitudes survive the winter as larvae



Kelso et al, 2014



Obsoletus complex

All'interno delle stalle

Può sopravvivere anche 3 mesi

Resiste alle basse temperature

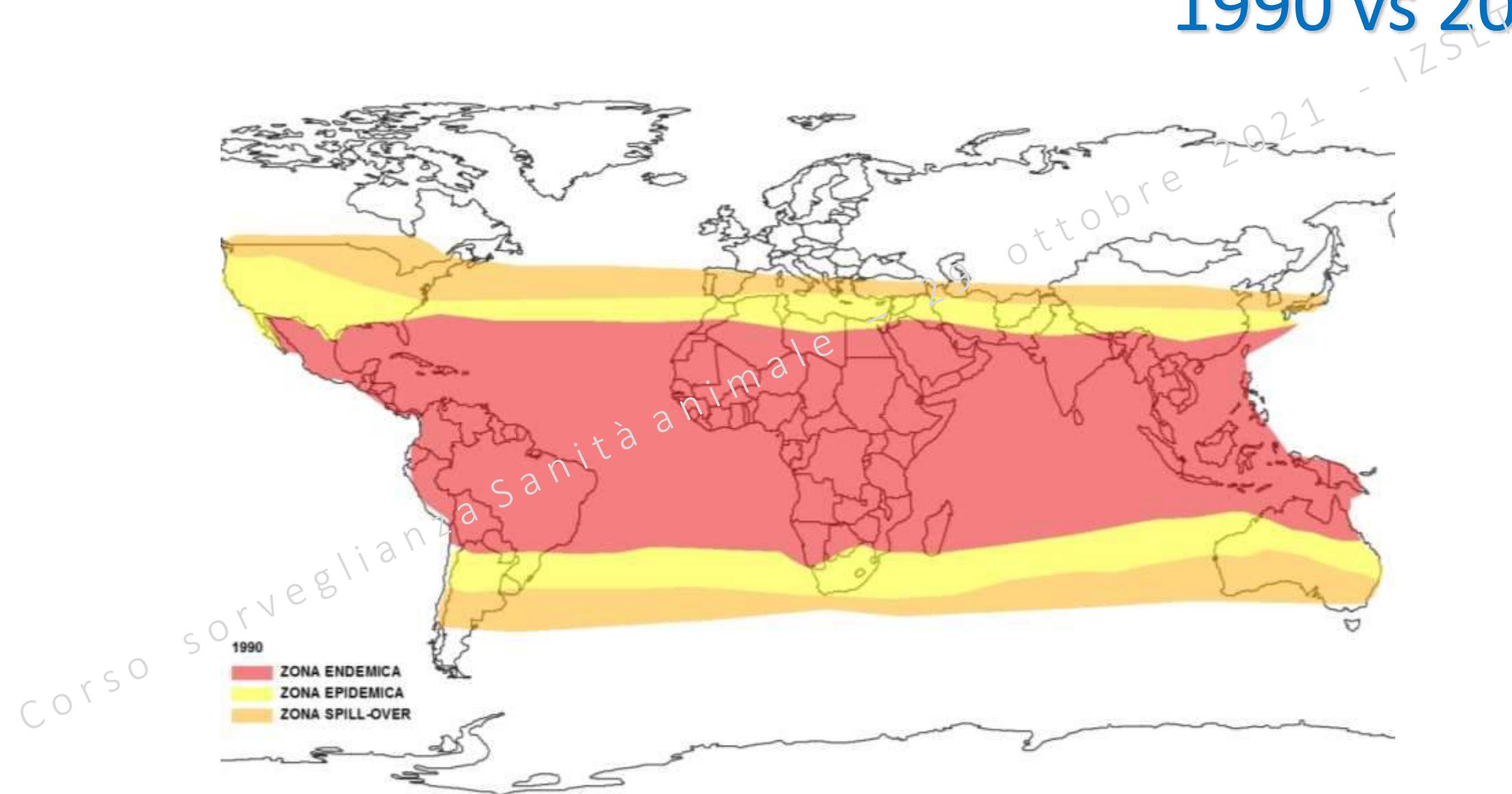
Attivo durante il giorno

> *Med Vet Entomol.* 2018 Mar;32(1):70-77. doi: 10.1111/mve.12260. Epub 2017 Aug 22.

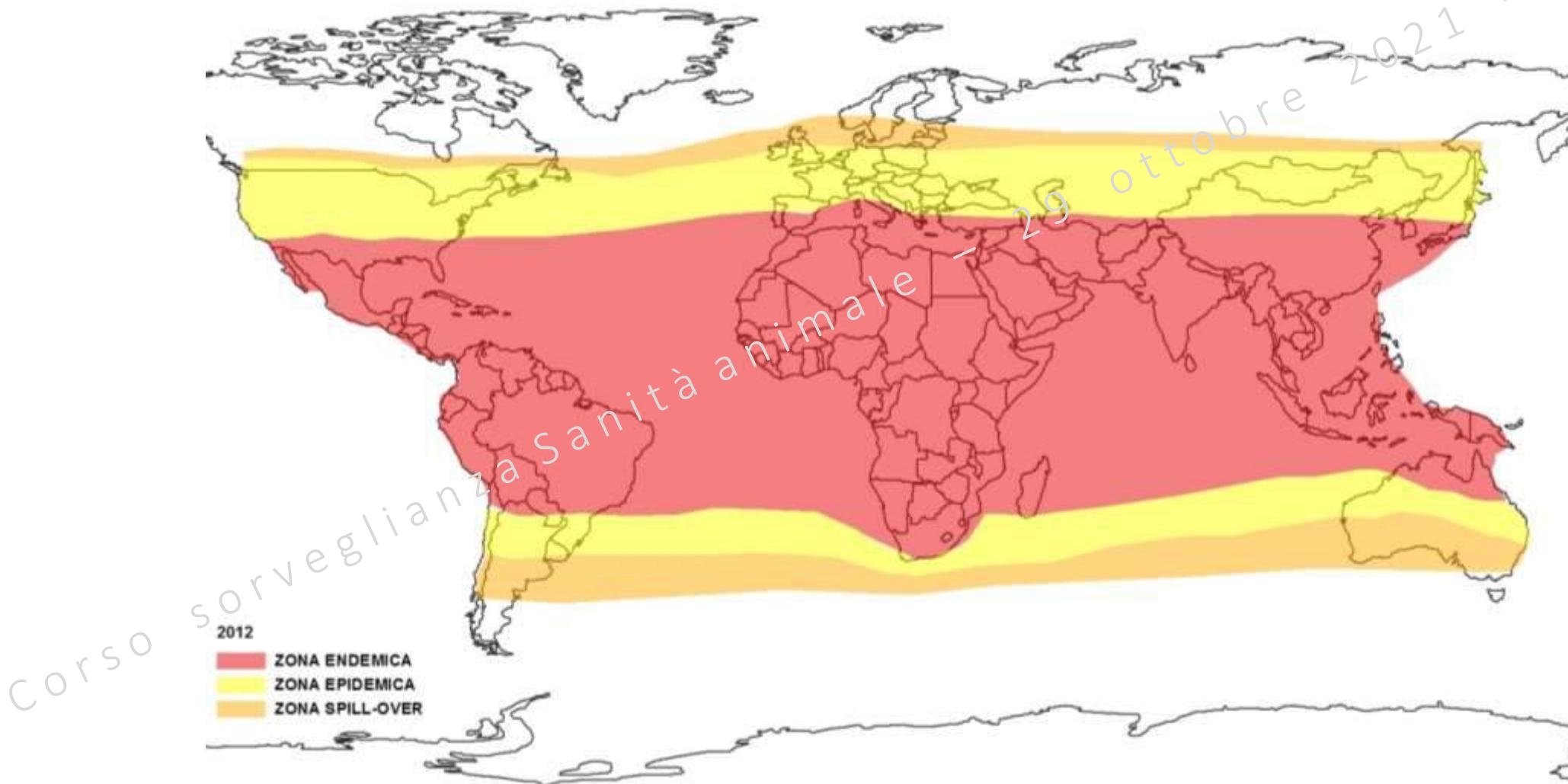
Indoor and outdoor winter activity of Culicoides biting midges, vectors of bluetongue virus, in Italy

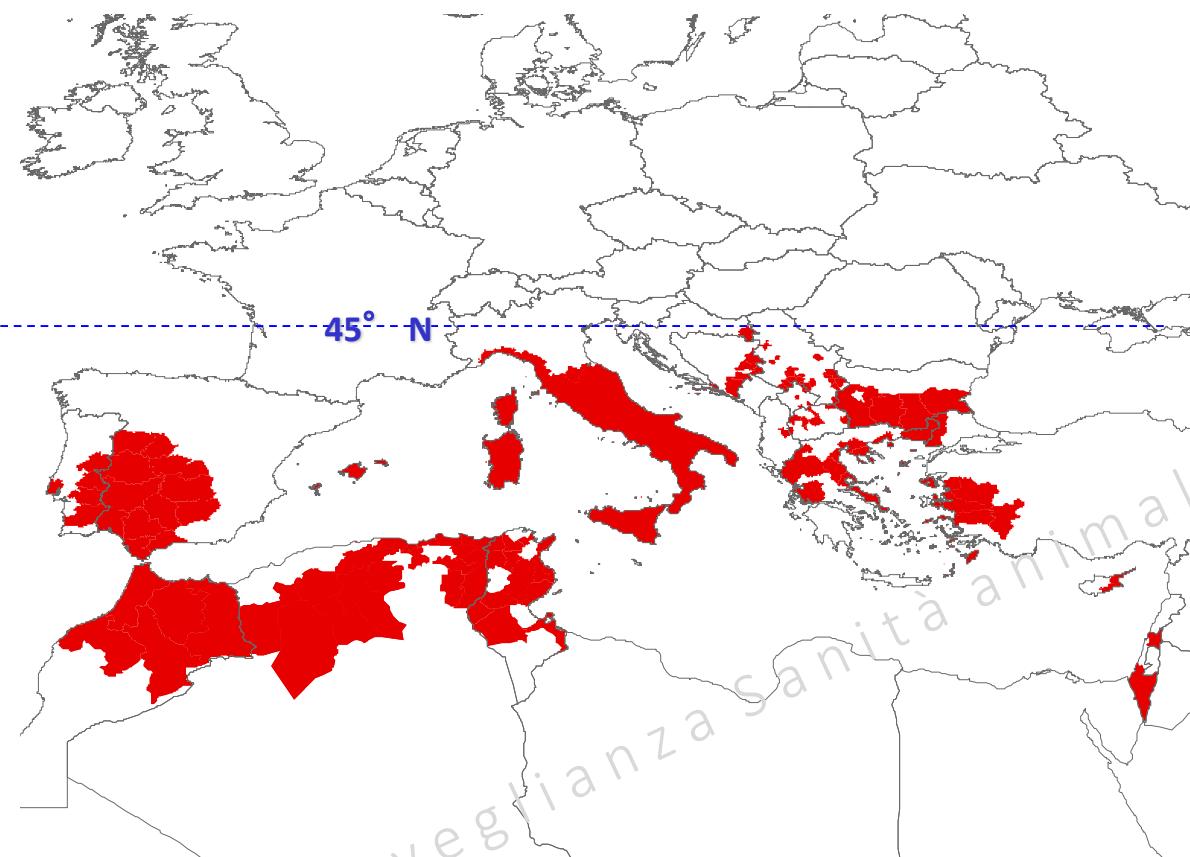
A Magliano ¹, P Scaramozzino ¹, S Ravagnan ², F Montarsi ², G DA Rold ², G Cincinelli ³, A Moni ⁴, P Silvestri ⁵, A Carvelli ¹, C DE Liberato ¹

BLUETONGUE DISTRIBUTION 1990 vs 2021



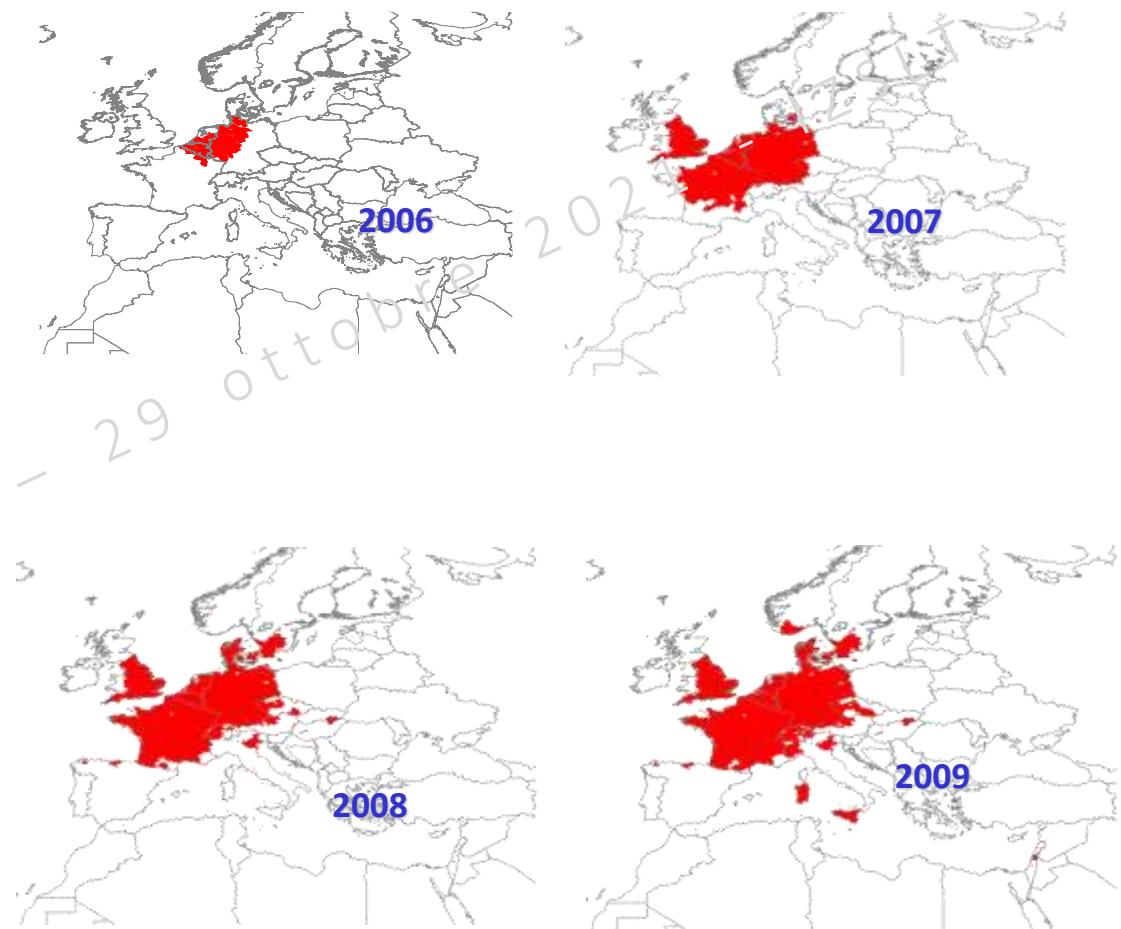
BLUETONGUE DISTRIBUTION 1990 vs 2021





Corso sorveglianza sanità animale

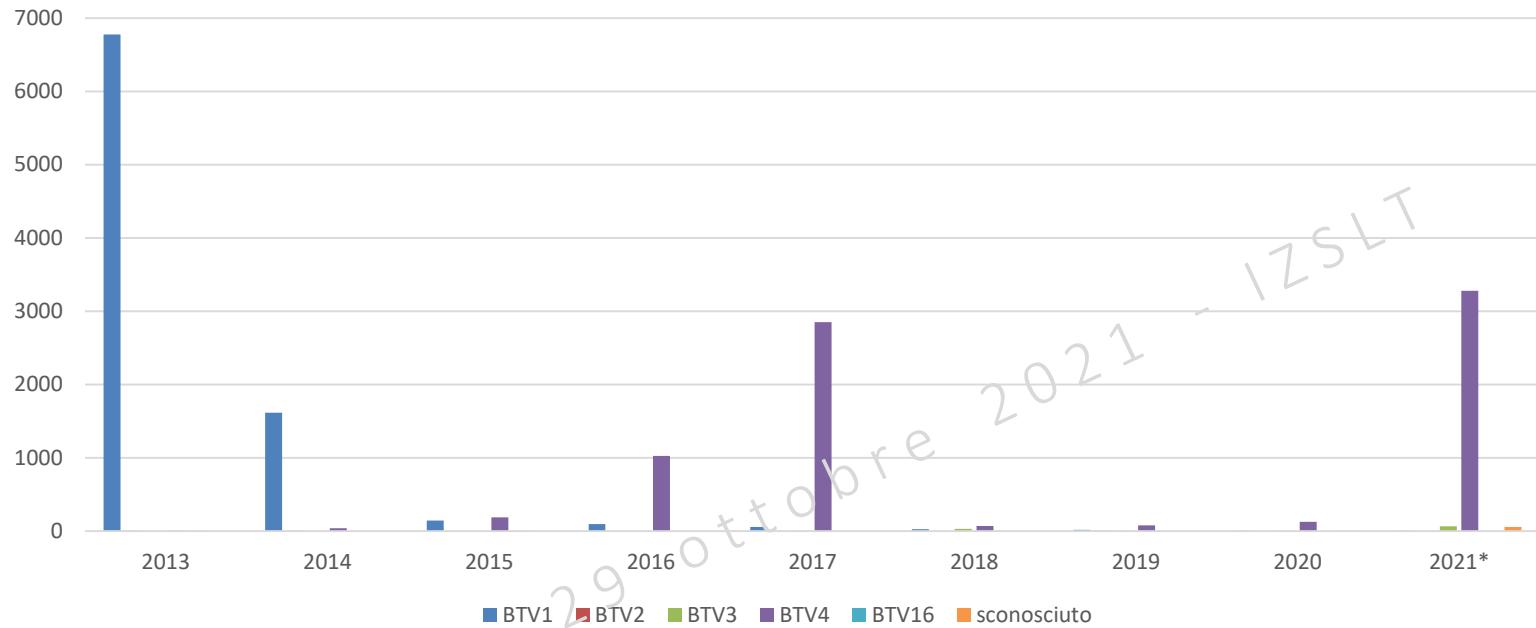
Spartiacque: 2000 e 2006





- **DATA**
 - Siman, Wahis, ADNS, grey
 - Surveillance data
- **LEGISLATION:**
 - ~~Council Directive 2000/75/EC~~
 - ~~Commission Regulation (EC) No 1266/2007~~
 - AHL 429/2016 688/2020 689/2020
 - Commission Decisions: Approval of programmes (monitoring, vaccination)
 - Opinions of EFSA
 - OIE Terrestrial Animal Health Code
 - 17522/2019 + 24826/2020 + 1512/2021 disponibili:
<https://www.izslt.it/sorveglianza-sanita-animale/approfondimenti/>

Focolai Italia



	2013	2014	2015	2016	2017	2018	2019	2020	2021*
BTv1	6776	1614	145	97	59	26	18	6	8747
BTv2	3	3					1		7
BTv3					1	30	1	2	100
BTv4	2	38	188	1026	2852	68	77	129	3277
BTv16	3			1					4
sconosciuto							6	58	64
totale	6784	1655	334	1123	2912	124	97	143	16579

Tabella 1. Focolai di bluetongue per sierotipo e macroregione nel 2019 (fonte: Siman)

Macroregione	BTv1	BTv2	BTv3	BTv4	Totale
Nord	1			3	4
Centro	3				3
Sud	12	1	1	65	79
Sardegna	2			9	11
Totale	18	1	1	77	97

Tabella 2. Focolai di bluetongue per sierotipo e macroregione nel 2020 (fonte: Siman)

Macroregione	BTv1	BTv3	BTv4	Sierotipo sconosciuto	Totale
Nord			1		1
Centro	2		59	3	64
Sud	2		63	3	68
Sardegna	2	2	6		10
Totale	6	2	129	6	143

Tabella 2. Focolai di bluetongue per sierotipo e macroregione nel 2021 (fonte: Siman)

Macroregione	BTv1	BTv3	BTv4	Sierotipo sconosciuto	Totale
Nord			1		1
Centro	2		9	2	13
Sud	1		21	11	33
Sardegna	3	66	3246	45	3360
Totale	6	66	3277	58	3407

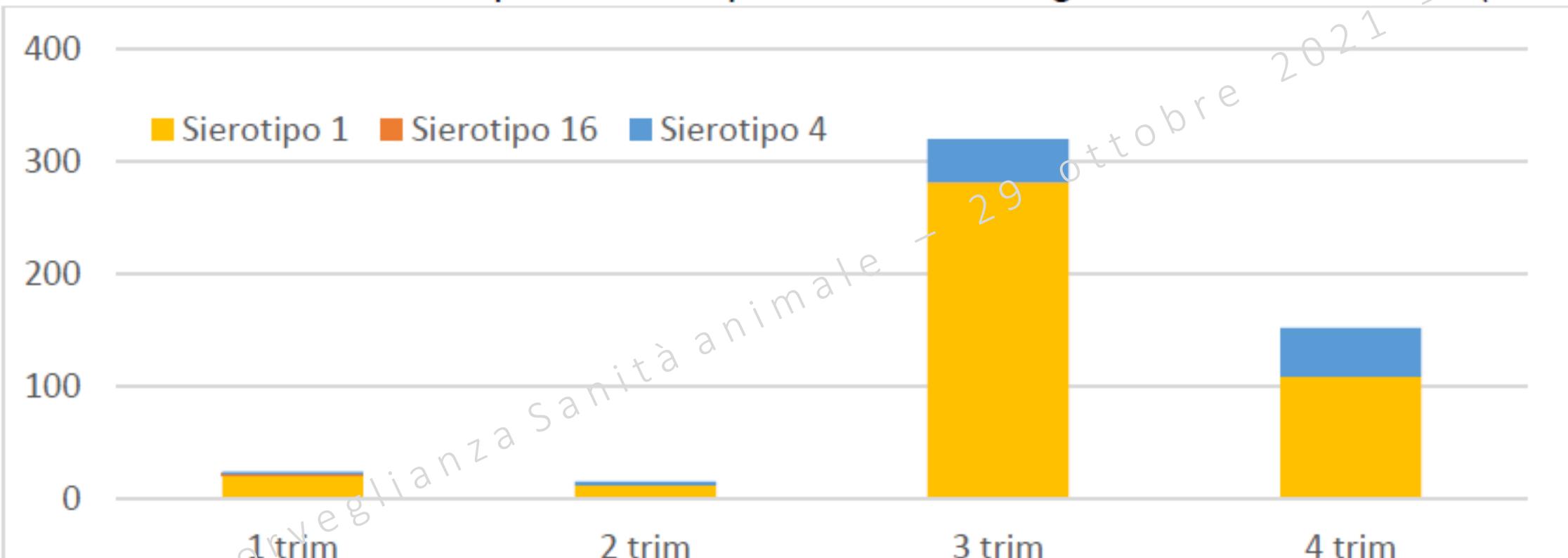


		Sierotipo			
		Sconosciut	Sierotipo 1	Sierotipo 4	Totale
2019	LAZIO		1		1
	TOSCANA				
2020	LAZIO	1	2	28	31
	TOSCANA			6	6
2021	LAZIO	2		6	8
	TOSCANA		1		1
Totale		3	4	40	47

Focolai Lazio e Toscana



Grafico 3. Distribuzione temporale delle epidemie di Bluetongue 2013-2020 nel Lazio (fonte: Siman)



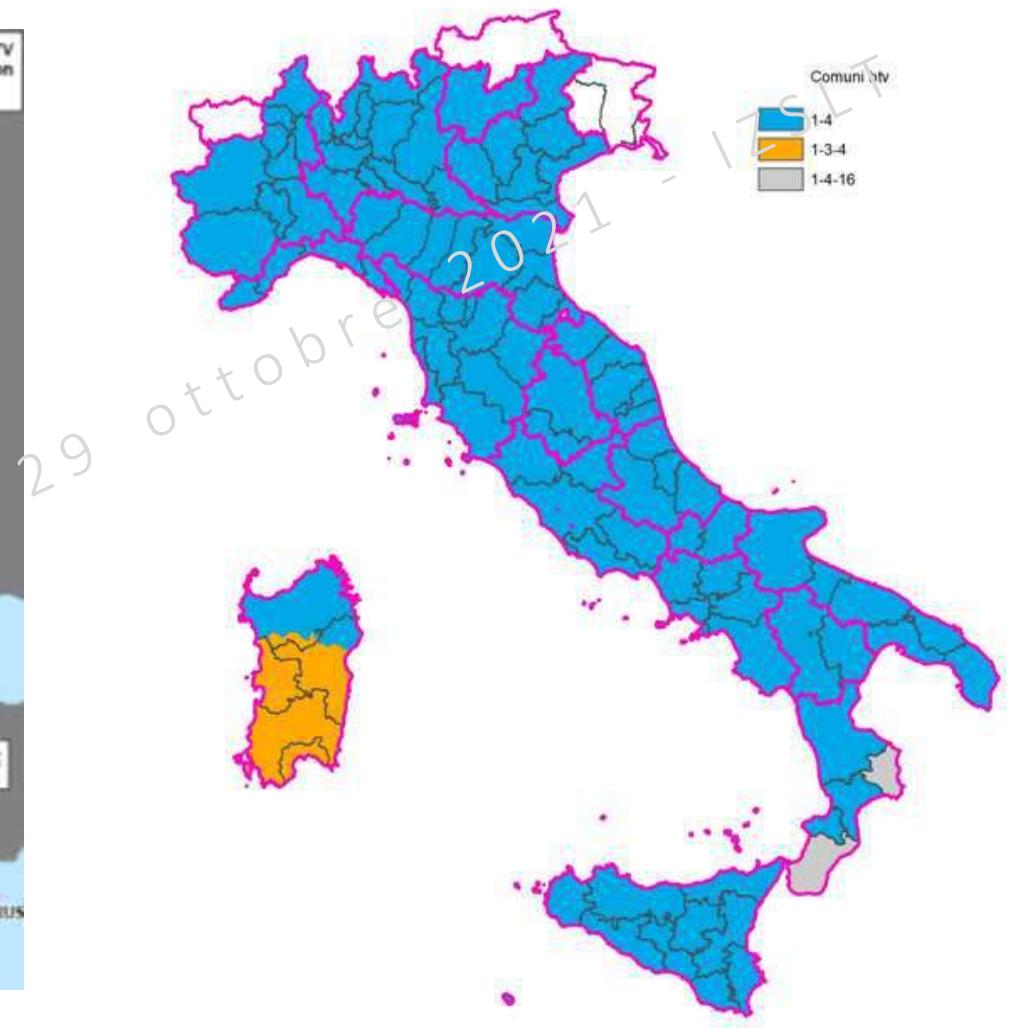
Problemi SIMAN

- Positività diagnostica
(nota 24286 Min Sal)

Regione	Tipo focolaio	■ Totale
■ LAZIO	FOCOLAIO CLINICO	8
	POSITIVITA' DIAGNOSTICA	20
	SIEROCONVERSIONE	9
■ TOSCANA	FOCOLAIO CLINICO	1
	POSITIVITA' DIAGNOSTICA	4
	RISCONTRO ANATOMO-PATOLOGICO	1
	SIEROCONVERSIONE	1
Totale complessivo		44

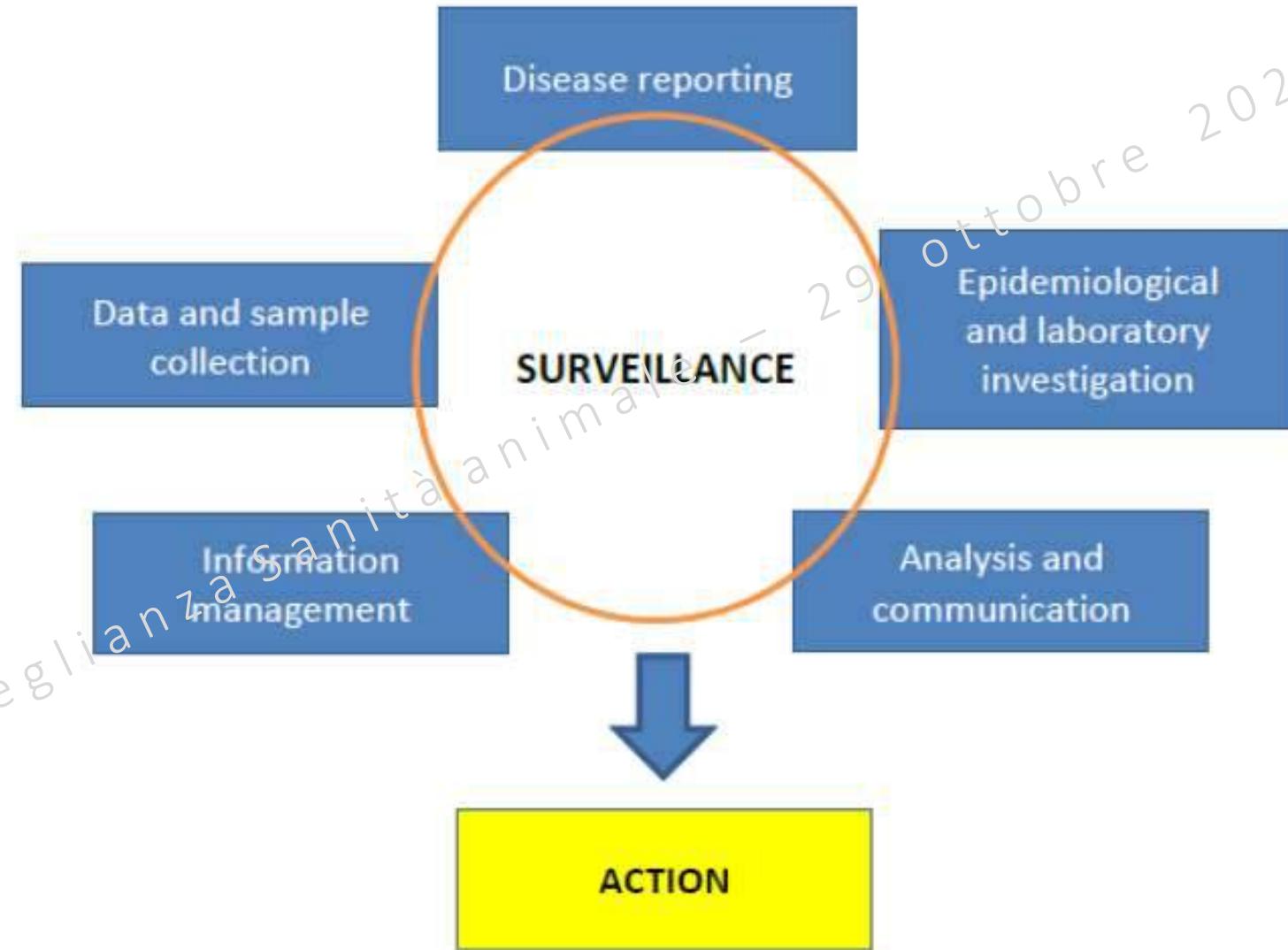
- Sospetti non risolti

RI	Sospetto	6/7/2020
FR	Sospetto	14/12/2020
LT	Sospetto	19/11/2020
LT	Sospetto	19/3/2021



CORSO SANITÀ ANIMALE
Corso sorveglianza

Surveillance



Definizione di CASO

OIE

- BTV **isolated** from a ruminant or camelid
- **antigen or RNA** in samples + **clinical** signs consistent with bluetongue, or + epidemic linked to a suspected or confirmed case
- **antibodies** to structural or nonstructural proteins of BTV (not a consequence of vaccination + **clinical** signs consistent with bluetongue, or + epidemic linked to a suspected or confirmed case

1266/2007

- **clinical** signs consistent with bluetongue
- **sentinel animal seroconverted**
- BT virus **isolated**
- animal positive to **serological tests**
- **antigen or RNA** specific identified

AND epidemiological data indicate that this is the result of virus circulation in the holding and not the result of the introduction of vaccinated *or seropositive* animals from RZ

17522

Caso SOSPETTO:
sintomo riferibile + dati epidemiologici
(sieroconversione sospetta non genera più restrizione)

Caso CONFERMATO:

- **sieroconversione** entro 60 gg dal prelievo precedente
- **clinica** anche da sola se epidemia
- **PCR**
- **isolamento** del virus



SORVEGLIANZA DELLA BT

1. **CLINICAL** surveillance
2. **SEROLOGICAL** and **VIROLOGICAL** surveillance on domestic ruminants (mainly cattle)
3. **ENTOMOLOGICAL** surveillance
4. Supplementary measures: wildlife surveillance, etc

Unità epidemiologica: dalla griglia alla provincia

- If a farm is in a grid cell of 40x40 km
- all the sentinel animals in the cell react negative to the BT tests,
- given the sample size used
 - it means that

with 95% probability, during the previous month, in that cell the incidence of BT has been below the design incidence (derived from the affected areas of southern Europe) or possibly nil,

or, in other words

the nearest BTV circulation is more than 20 km apart



SORVEGLIANZA DELLA BT

CLINICA

- Passiva (sensibilità max in early warning/detection)
- Meglio se conferma con test laboratorio se non epidemia
- Allevatore chiama la Asl?

SIEROLOGICA

- Bovini + sensibili
- Possibile usare sieri raccolti per altri piani o mattatoio o rimonte (novità 15722)
- cross reazioni con epidemie e vaccinazioni anni precedenti
- Arruolamento sempre con motivo: altro
- Problema arruolamento aziende (Toscana contributo, Lazio no)
- Anticorpi contro BT derivano da:
 - infezione naturale (quanto vecchia?)
 - vaccinazione
 - anticorpi materni

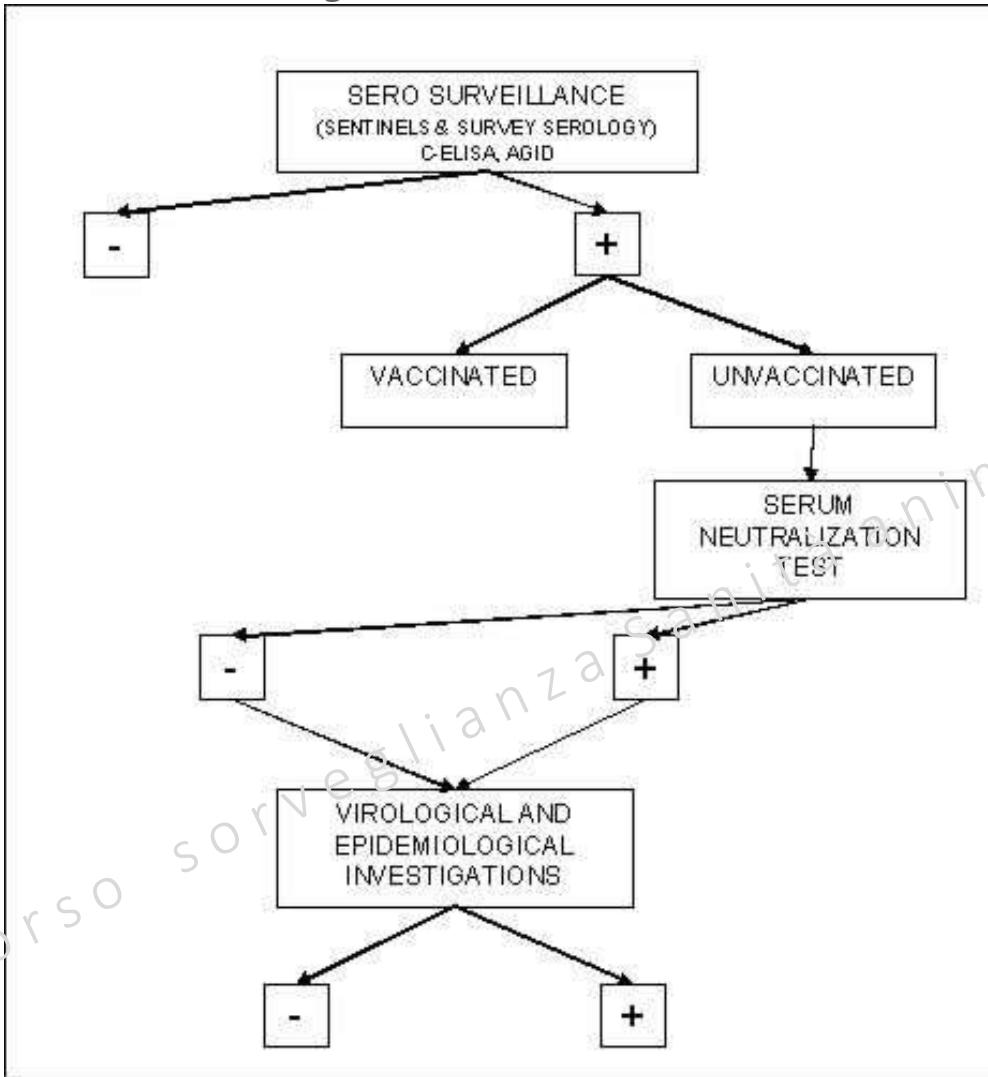


La sorveglianza sierologica in Italia

Year	No. of tested animals	No. of ELISA tests	No. of virus neutralization tests	No. of RT-PCR
2009	62 705	476 327	105 472	6 577
2010	53 915	397 347	30 734	1 664
2011	51 068	361 736	20 952	1 012
2012	39 677	266 950	11 277	1 156
2013	35 657	255 436	25 585	1 304
2014	31 352	243 519	63 819	3 321

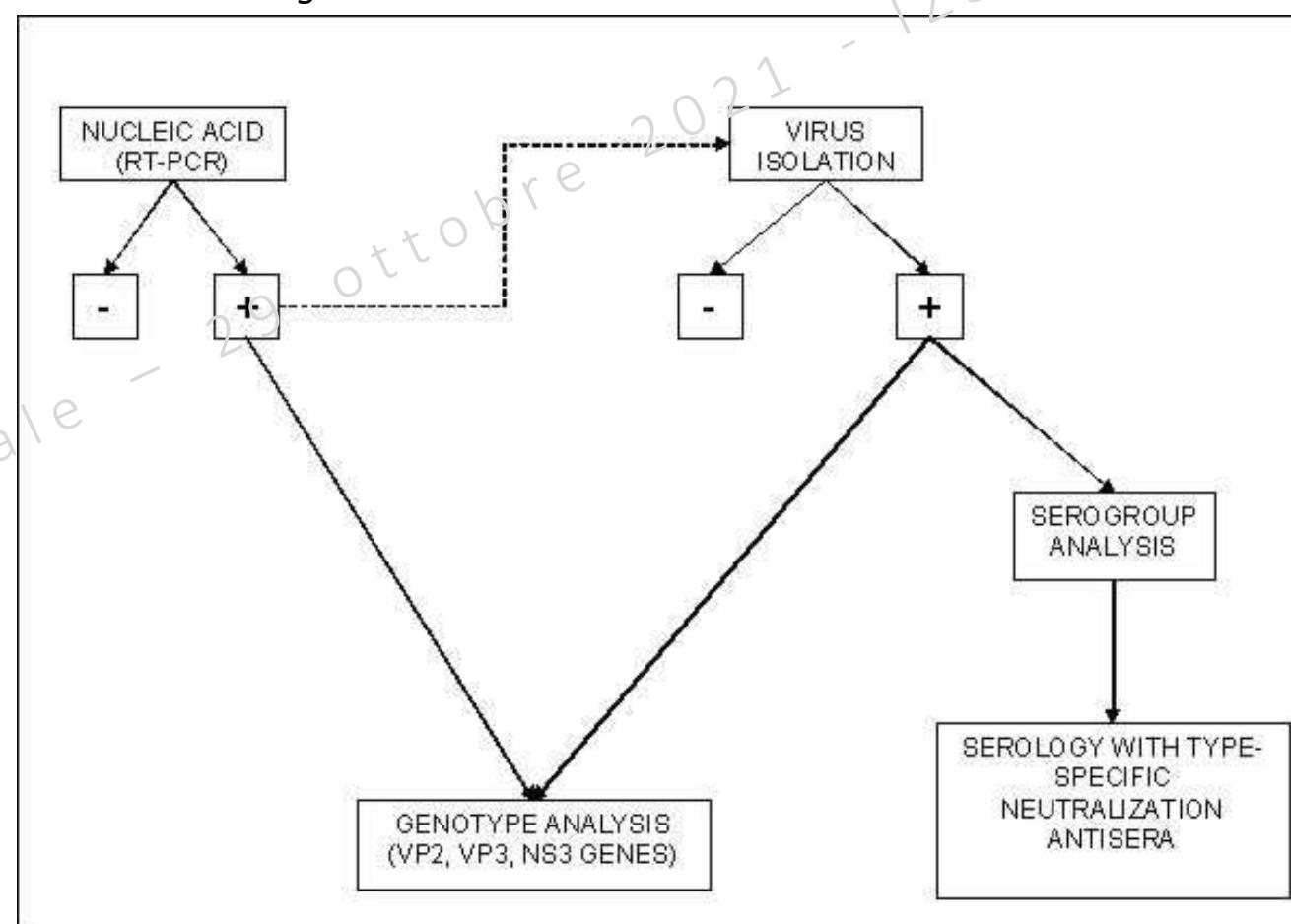
Dal luglio del 2019 (dispositivo 17522):
~~sorveglianza sierologica mensile~~
~~territorio epidemiologicamente sconosciuto~~
frequenza trimestrale
numero di animali sentinella per provincia costante

**Fig. 1. Application of laboratory tests
in serological surveillance**



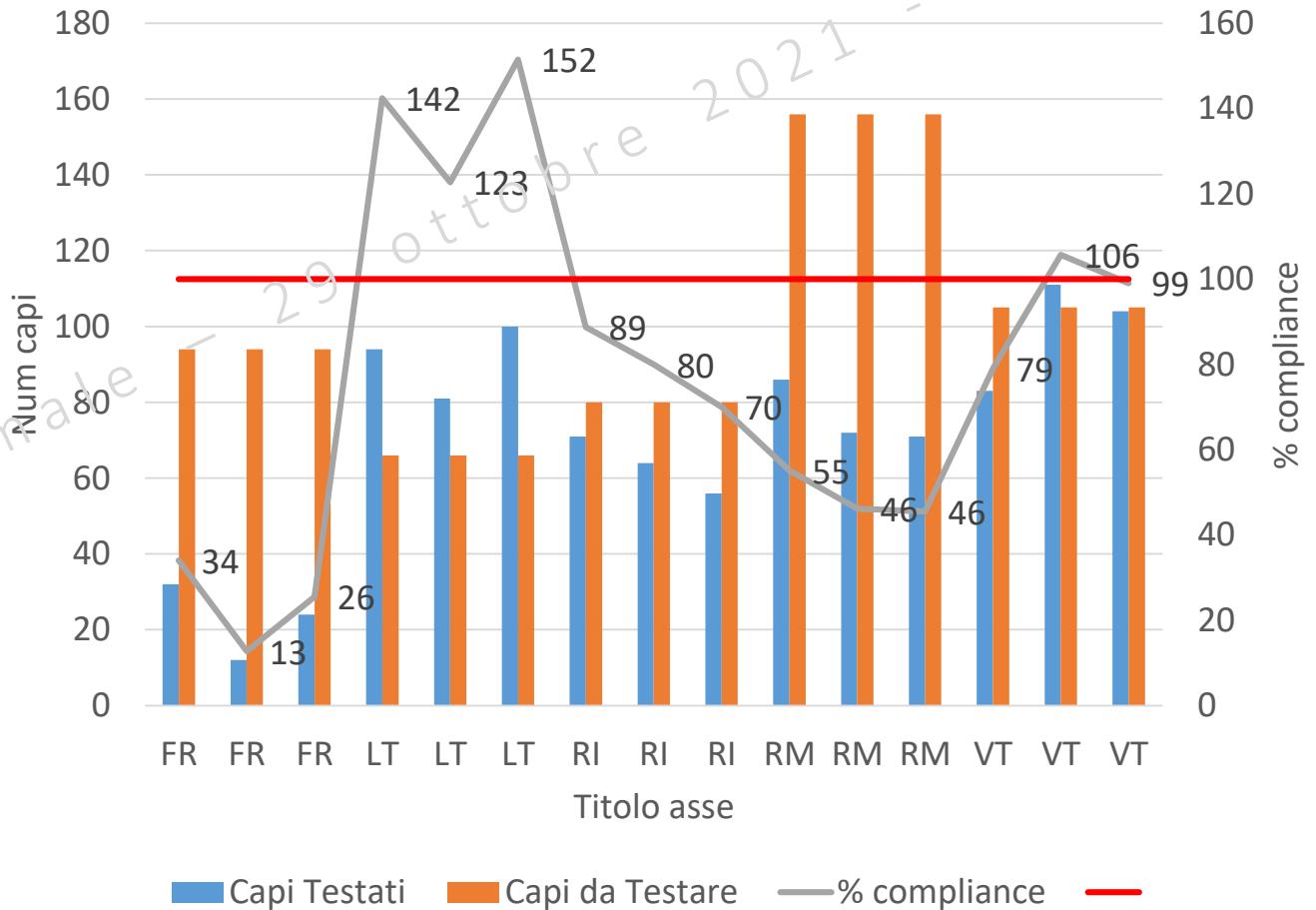
Flusso diagnostico

**Fig. 2. Application of laboratory tests in
virological surveillance**



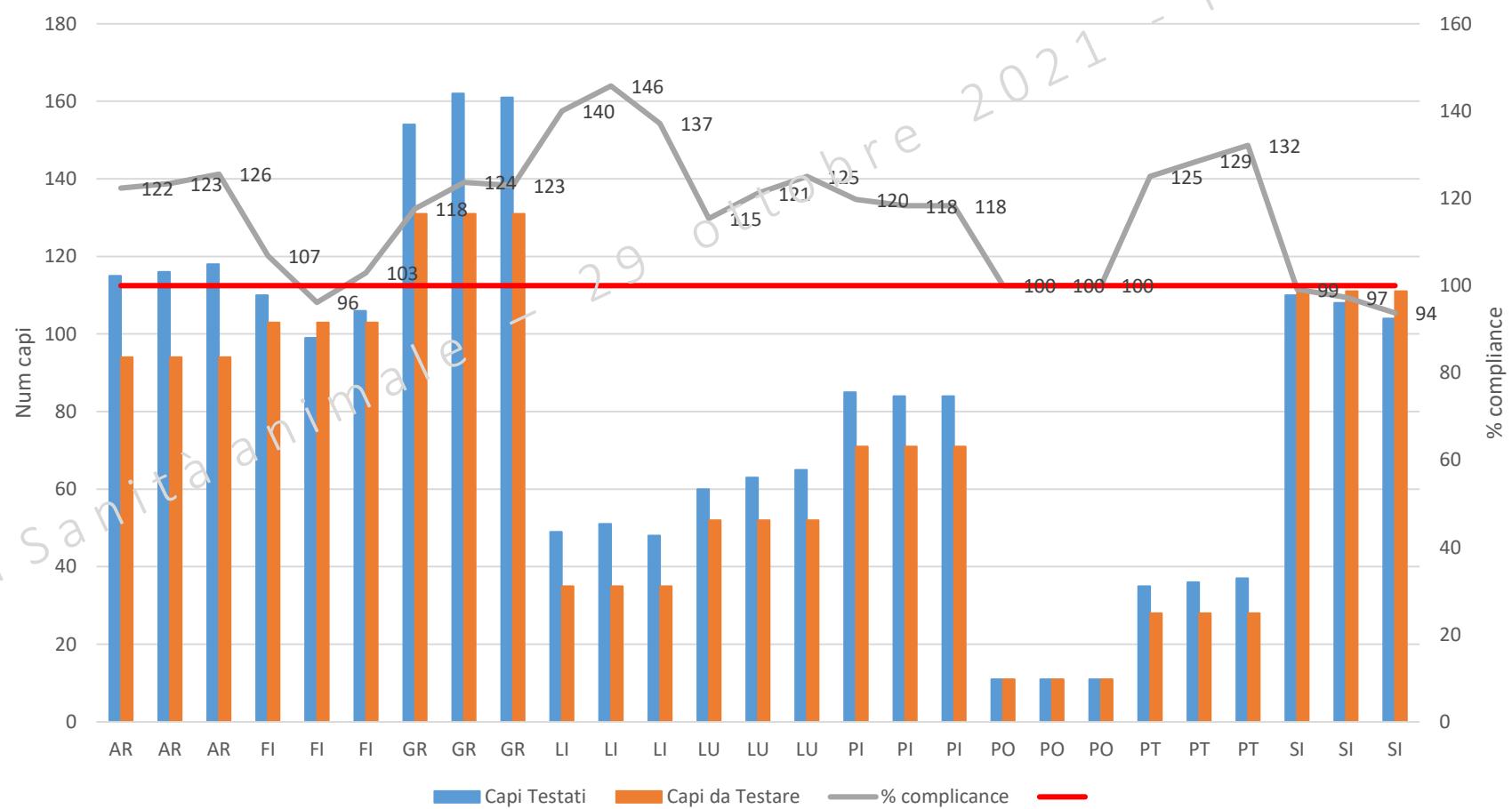
Provincia	Trimestre	% bovini	% ovini	Capi Testati	Capi da Testare	% compliance
FR	1	53	47	32	94	34
FR	2	0	100	12	94	13
FR	3	38	63	24	94	26
LT	1	100	0	94	66	142
LT	2	100	0	81	66	123
LT	3	100	0	100	66	152
RI	1	7	93	71	80	89
RI	2	6	94	64	80	80
RI	3	5	95	56	80	70
RM	1	17	83	86	156	55
RM	2	33	67	72	156	46
RM	3	38	62	71	156	46
VT	1	57	43	83	105	79
VT	2	46	54	111	105	106
VT	3	43	57	104	105	99

La sorveglianza sierologica – Lazio 2021



La sorveglianza sierologica – Toscana 2021

Prov	Trime	% bovini	% ovini	Capi Testati	Capi da Testare	% compli ance
nzia	stre					
AR	1	42	58	115	94	122
AR	2	41	59	116	94	123
AR	3	40	60	118	94	126
FI	1	12	88	110	103	107
FI	2	5	95	99	103	96
FI	3	11	89	106	103	103
GR	1	29	71	154	131	118
GR	2	26	74	162	131	124
GR	3	27	73	161	131	123
LI	1	53	47	49	35	140
LI	2	63	37	51	35	146
LI	3	54	46	48	35	137
LU	1	37	63	60	52	115
LU	2	37	63	63	52	121
LU	3	31	69	65	52	125
PI	1	33	67	85	71	120
PI	2	32	68	84	71	118
PI	3	32	68	84	71	118
PO	1	100	0	11	11	100
PO	2	100	0	11	11	100
PO	3	100	0	11	11	100
PT	1	31	69	35	28	125
PT	2	33	67	36	28	129
PT	3	35	65	37	28	132
SI	1	89	11	110	111	99
SI	2	89	11	108	111	97
SI	3	88	13	104	111	94



Meglio ridurre un'azienda o dei capi?

- The following two groups of scenarios were considered:

- a decrease in the number of **sentinel herds** (sentinel herds = 100, 90, 80, 70, 60, 50, 40, 30, 20, 10), and a constant number of sentinel animals per herd (sentinel animals = 12)
- a decrease in the number of **sentinel animals per herd** (sentinel animals = 12, 11, 10, 9, 8, 7, 6, 5, 4), and a constant number of sentinel herds (sentinel herds = 100)

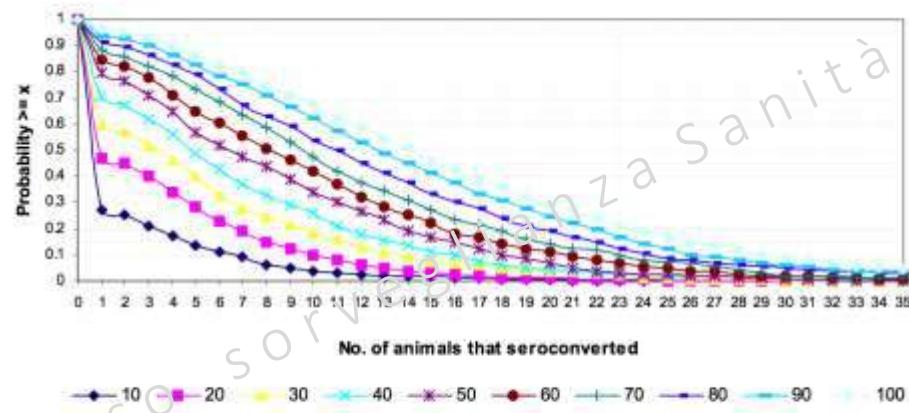


Figure 5

Model outcome: inverse cumulative distribution of probability of having one or more animals to seroconvert
Consideration is made of different scenarios of tested herds (10, 20, 30 ... 100) and the following variables:
5% incidence of infected herds
25% incidence of infection within herds
12 sentinel animals tested for each herd

Source: IZSAM

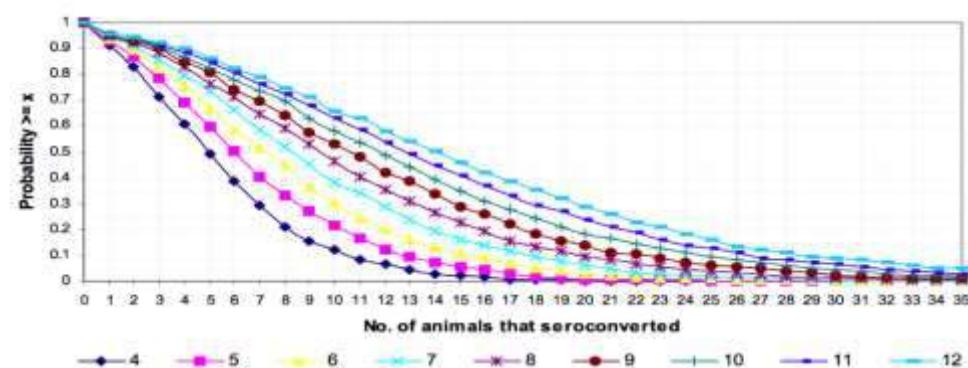


Figure 6

Model outcome: inverse cumulative distribution of probability of having one or more animals that seroconvert
Consideration is made of different scenarios of tested animal for each herd (4, 5, 6 ... 12) and the following variables:
5% incidence of infected herds
25% incidence of infection within herds
100 sentinel herds tested



SORVEGLIANZA DELLA BT

ENTOMOLOGICA

- Trappole permanenti
 - specie...
 - abbondanza
 - distribuzione
 - over-wintering (stagionalmente libero)
 - dati consolidati, necessita di revisione
 - Importanza per espungere un sierotipo da un territorio
- NO diagnosi viologica (diverso da WND)(low vector infection rate)

Catture *culicoides* effettuate

		atteso	effettuato	compliance
LAZIO	FR	43	25	58%
	LT			0%
	RI		6	14%
	RM		25	58%
	VT			0%
TOSCANA	AR	43	11	26%
	FI		36	82%
	GR		28	62%
	LI		42	91%
	LU		35	74%
	MS		42	88%
	PI		44	90%
	PT			0%
	PO			0%
	SI		31	60%

MOVIMENTAZIONI DA MACELLO

Riferimenti normativi: Nota MinSal 17522/2019

DA	A MACELLO SITO IN	CONDIZIONI	MOVIMENTAZIONE
ovunque	ovunque	vaccinati o figli di madri vaccinate < 90gg	
ZONA RESTRIZIONE	ZR = SIEROTIPI	tutti (anche non vaccinati)	<ul style="list-style-type: none"> nessuna, anche impianto non designato
ZONA RESTRIZIONE	Zona INDENNE o ZR ≠ SIEROTIPI	tutti (anche non vaccinati)	<ul style="list-style-type: none"> Macello 1266 <u>All IV</u> Trasporto senza sosta* vincolo sanitario <u>proc</u> canal. notifica tra ASL almeno 48h prima Macellati entro 24 h (+ BDN 3 gg)

MOVIMENTAZIONI DA VITA

Riferimenti normativi: Nota MinSal 17522/2019

DA	A	ANIMALI	CONDIZIONI	MOVIMENTAZIONE
ovunque	ovunque		vaccinati o figli di madri vaccinate < 90gg	
ZONA RESTRIZIONE	ZR = SIEROTIPI	tutti	<ul style="list-style-type: none"> no segni clinici giorno trasporto 	
		Ovini in azienda in buffer 20 km da caso confermato	<ul style="list-style-type: none"> no segni clinici 24h prima Vet Ufficiale (riportato su Mod 4) 	
	<u>Stabilimenti a prova di vettore</u> in Zona INDENNE o ZR ≠ SIEROTIPI	Non vaccinati < 90 gg	<ul style="list-style-type: none"> az origine no buffer 20 km caso confermato trasporto ore diurne (8-18); insetto repellenti + insetticida visita clinica ovini 24- 48 ore prima vincolo sanitario + notifica almeno 48 ore permanenza destino almeno 7 giorni. test PCR individuale entro 24-36 ore dall'arrivo divieto di movimentazione verso UE. 	CONSENTITA (MinSal)
	Zona INDENNE o ZR ≠ SIEROTIPI	non vaccinati	<ul style="list-style-type: none"> PCR negativa 7 gg prima (a campione, max 57) trasporto ore diurne (8-18) insetto repellenti an.li 7 gg prima test, fino a trasporto compiuto insetticidi mezzo attestati vincolo sanitario notifica almeno 48 ore 	
		vaccinati	<ul style="list-style-type: none"> > 90 gg vaccinati (anche 30 gg dopo prima dose) < 90 gg figli di madri vaccinate 	
ZONA RESTRIZIONE	<u>PSL</u> Zona INDENNE o ZR ≠ SIEROTIPI	Non vaccinati	<ul style="list-style-type: none"> TSL origine e/o destino per almeno 60 gg 	

MOVIMENTI INTRA-UE

- 429/2016
- Art 13 688/2020
- Art. 43 e All V 689/2020
(simile a 1266, ricordate 2 Elisa +)

Movements within the EU

Commission Delegated Regulation (EU) 2020/688 provides for the rules regarding the movements within the EU of live animals.

The rules allow for certain derogations whereby the Member State of destination accepts compliance with certain animal health conditions. To make these derogations operational the Member State of destination must inform the Commission and the other Member States that movements in compliance with certain animal health conditions are authorised.

The Commission has received the following information concerning the derogations:

- [Belgium](#) [EN | ***]
- [France](#) [EN | ***]
- [Germany](#) [EN | ***]
- [Italy](#) [EN | ***]
- [Luxembourg](#) [EN | ***]
- [The Netherlands](#) [EN | ***]
- [Portugal](#) [EN | ***]
- [Spain](#) [EN | ***]

La ricerca dell'IZSLT: dopo un'epidemia quanto sono protetti gli ovini?

- 2001 BTV2 epidemics
- 2002-2006 BTV-16 and BTV2 sporadic
- 2013/2014 epidemics 352 outbreaks (77% Cl Ou, 23% SC) (83% ovine)
- BTV1
- in 151 Municipalities . Almost 95% holding infected or buffer 4km

ASL	SPECIE	TIPO FOCOLAIO	NUM CASI SIMAN	NUM MORTI SIMAN	NUM Anni PRESENTI	MORBILITÀ	MORTALITÀ	LETALITÀ
A.S.L. FROSINONE	OVINO	Focolaio Clinico	494	344	7661	6,45	4,49	69,64
A.S.L. LATINA			60	32	1514	3,96	2,11	53,33
A.S.L. RIETI			363	177	9916	3,66	1,78	48,76
A.S.L. 5 ROMA			26	16	2860	0,91	0,56	61,54
A.S.L. 6 ROMA			14	2	937	1,49	0,21	14,29
A.S.L. 7 ROMA/G			445	262	10755	4,14	2,44	58,88
A.S.L. 8 ROMA/H			90	88	853	10,55	10,32	97,78
A.S.L. VITERBO			594	273	11864	5,01	2,30	45,96
Totale			2086	1194	46360	4,50	2,58	57,24

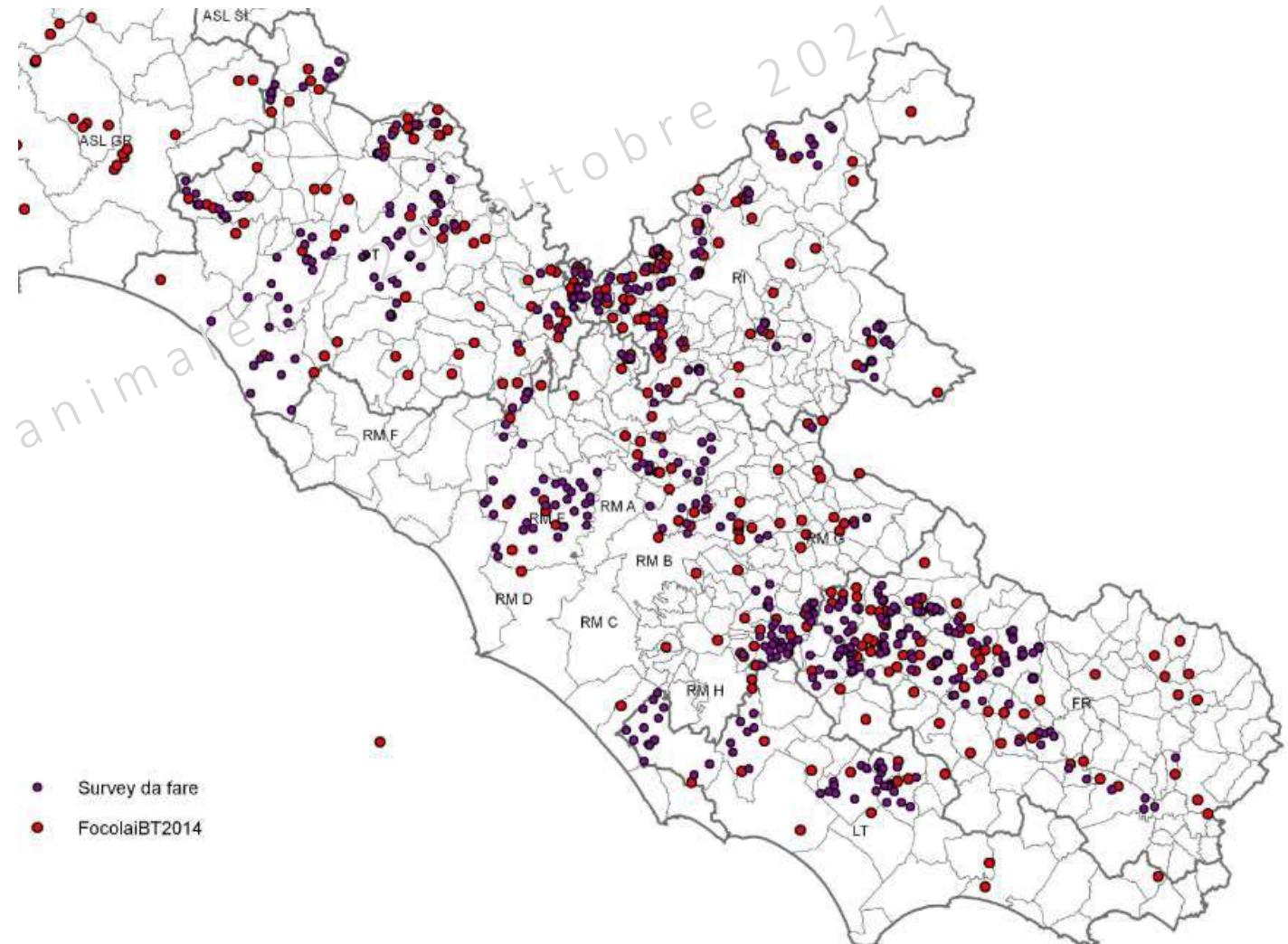


SURVEY 1.0 Around Outbreak

- *Kind of study: cross-sectional*
- *Area target: municipalities with at least 2 confirmed outbreak (77 with 285)*
- *sub-areas target stratified by LHU*
- *Design of study:*
 - Denominator ovine and caprine in BDN
 - C-Elisa
 - Exp P= 60%
 - SE= 5%
 - CL= 95%
- Stratified sample by No heads per Municipalities
- *No tested head per holdings= 4/6*
 - Number to reveal at least 1 positive if seroprev intraherd ≥ 0.60
 - Simple Random holdings selection.
 - No infected holdings
 - No vaccination holdings

SURVEY 2.0 – In Outbreak

- Kind of study: cross-sectional
 - Area target: holdings ovine confirmed outbreak
 - Design of study:
 - 40 holdings * 30 Animals
 - C-Elisa
 - Exp P= 60%
 - SE= 5%
 - CL= 95%
 - Stratified sample by LHU outbreaks
 - Simple Random holdings selection
 - No vaccination holdings



La ricerca dell'IZSLT: dopo un'epidemia quanto sono protetti gli ovini?

RESEARCH ARTICLE

A cross-sectional serosurvey in a sheep population in central Italy following a bluetongue epidemic

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Table 2. The seroprevalence of bluetongue in the sheep population.

Province†	No outbreak/100 Km ²	Survey AO				Survey IO			
		Herds		Animals		Herds		Animals	
		Tested	% positive (CI 95%)	Tested	% positive (CI 95%)	Tested	Tested	% positive (CI 95%)	
FR	3.0	59	62 (49–74)	233	32 (26–39)	11	331	31 (26–36)	
LT	1.1	52	49 (35–63)	310	18 (14–23)	1	30	29 (14–48)	
RI	2.7	76	64 (52–74)	308	29 (24–35)	10	299	42 (36–47)	
RM	2.2	129	43 (34–52)	603	15 (12–19)	9	275	22 (17–28)	
VT	2.3	81	21 (12–31)	325	5 (3–9)	9	270	7 (4–11)	
Lazio region	2.3	397	46 (41–51)	1,779	19 (17–21)	40	1,205	26 (23–29)	

Che fine hanno fatto le politiche vaccinali ?

VACCINATION AGAINST BLUETONGUE						
COMPULSORY			VOLUNTARY			No program
Whole territory	Part territory (free zone)	Restricted zone	Whole territory	Part territory (free zone)	Restricted zone	
Bulgaria (BTV4), Slovenia (2017, BTV4), Cyprus (BTV8)	Spain (bovine, ovine BTV8)	Croatia (BTV4), Portugal (ovines BTV1, BTV4), Spain (bovine, ovine BTV1, BTV4)	Austria (BTV4 , BTV8), Netherlands (BTV4, BTV8), Romania (BTV4), Slovak Republic (BTV4), UK (BTV1, BTV2, BTV4, BTV8), Germany (BTV4, BTV8), Luxembourg (BTV8), Belgium (BTV 8)	Spain (bovine, ovine BTV8)	Hungary (BTV4), Portugal (bovines, caprine BTV1, BTV4), Spain (caprine BTV1, BTV4)	Czech Republi Denmark, Finla Latvia, Swede Lithuania, Mal Poland, Eston

Bluetongue: control, surveillance and safe movement of ani

Published: 8 March 2017 Adopted: 18 January 2017



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DOI: <https://doi.org/10.2903/j.efsa.2017.4698>

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Animal Health and Welfare

Contact: alpha@efsa.europa.eu

Panel members at the time of adoption

Miguel Angel Miranda, Jan Arend Stegeman, Dominique Bicout, Anette Botner, Andrew Butterworth, Paolo Calistri, Klaus Depner, Sandra Edwards, Bruno Garin-Bastuji, Margaret Good, Christian Gortazar Schmidt, Virginie Michel, Simon More, Mohan Raj, Søren Saxmose Nielsen, Lisa Sihvonen, Hans Spolder, Hans H. Thulke, Antonio Velarde, Preben Willeberg and Christoph Winckler.

Abstract

The performance of different bluetongue control measures related to both vaccination and protection from bluetongue virus (BTV) vectors was assessed. By means of a mathematical model, it was concluded that when vaccination is applied on 95% of animals even for 3 years, bluetongue cannot be eradicated and is able to re-emerge. Only after 5 years of vaccination, the infection may be close to the eradication levels. In the absence of vaccination, the disease can persist for several years, reaching an endemic condition with low ib/4698#panel-members-at-the-time-of-adoption sms for bluetongue persistence, the persistence in the wildlife, the transplacental



CONSIDERAZIONI CONCLUSIVE

- Lazio e Toscana in restrizione per BTV1 e BTV4

Forse si potrà chiedere la rimozione per BTV1...

triennio 2019-2021 circolazione virale limitata

- nuova normativa prevede condizioni per movimentare gli ovini molto meno restrittive
eliminate le restrizioni bovini e caprini

favoriti scambi commerciali, ma potenziale diffusione
informare allevatori del cambio di strategia

- sorveglianza sierologica, entomologica e SIMAN gestita dalle ASL con alcune difficoltà

CONSIDERAZIONI CONCLUSIVE

- vaccinazione volontaria e a carico dell'allevatore (costi/benefici)
polizze assicurative?
- L'ampia variabilità delle caratteristiche delle epidemie dal 2013 al 2020 e l'assenza di associazione con campagne vaccinali o biosicurezza aziendale, rendono difficile l'individuazione di trend utili all'applicazione di strategie di controllo
- Non si parli più di eradicazione (dopo EFSA) né di malattia esotica (dopo 21 anni)
- Chiarire il ruolo dei determinanti antropogenici di malattia BTV 8 (x2!), 6, 11
- Ceppi riassortanti e cambiamento climatico e abbassamento della guardia



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- [Survey per la stima della copertura anticorpale nei confronti della Bluetongue della popolazione ovina nelle aree intorno ai focolai](#)
- [Survey per la stima della copertura anticorpale nei confronti della Bluetongue della popolazione ovina nelle aziende sede di focolaio](#)
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