

Symposium Animal Health

# Infection with *Salmonella enterica* subspecies *enterica* Dublin (SD) in Walloon cattle farms

STATE OF PLAY AND OUTLOOK

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23/09/2021

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ARSIA asbl

# Why should we care about SD

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## One Health : SD is a zoonotic pathogen

- Not so many human cases reported here in Belgium but in France despite the fact that Dublin is not the most common serotype in cattle but Typhimurium.
- Latest episode to date: 13 cases in France between late 2019 and early 2020 linked to the consumption of “**Morbier**” (French cheese) from the same farm. (CNR, 2020)
- ⇒ Probably linked to consumption practices, French people eat more raw milk cheese than Belgians ?
- SD is not the most common pathogen found in humans, but the illness it can cause is often more severe than that caused by other serotypes of *Salmonella*.
- ⇒ “United States: 1 November 2019, 10 cases of people infected with *Salmonella* Dublin in 6 states. Of these people, eight were hospitalised and **one died**. This infection is linked to ground beef but the common supplier has not yet been identified.” (cdc.gov, 2020)

# Why should we care about SD

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## In cattle

- Host-adapted bacteria / sheltered
- Severe disease
- For recent data on the circulation of the bacteria in Walloon cattle herds
  - Publi of Pohls ('77)

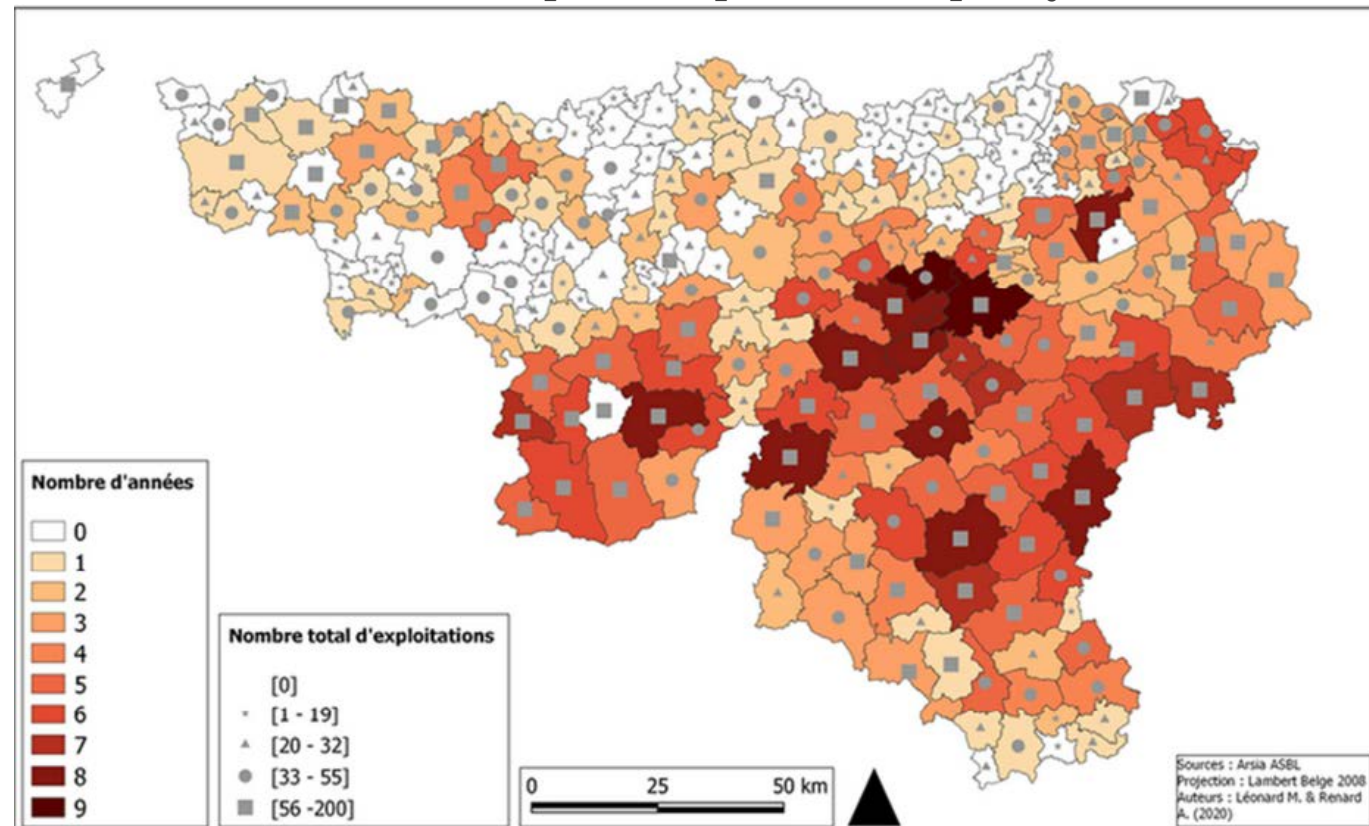
# What about the circulation of SD in Walloon cattle herds

Percentage of Walloon municipalities affected by one of the 3 serotypes according to the year

Year	S . Dublin	S . Typhimurium /Enteritidis	S . spp.
2011	23,28	2,67	0,38
2012	20,23	2,67	0
2013	19,08	2,29	0,38
2014	22,14	3,05	1,14
2015	20,61	1,91	1,91
2016	22,52	6,87	1,14
2017	33,21	7,63	2,67
2018	32,82	6,87	1,91
2019	27,86	8,02	2,29
Mean	<b>24,64</b>	<b>4,66</b>	<b>1,31</b>

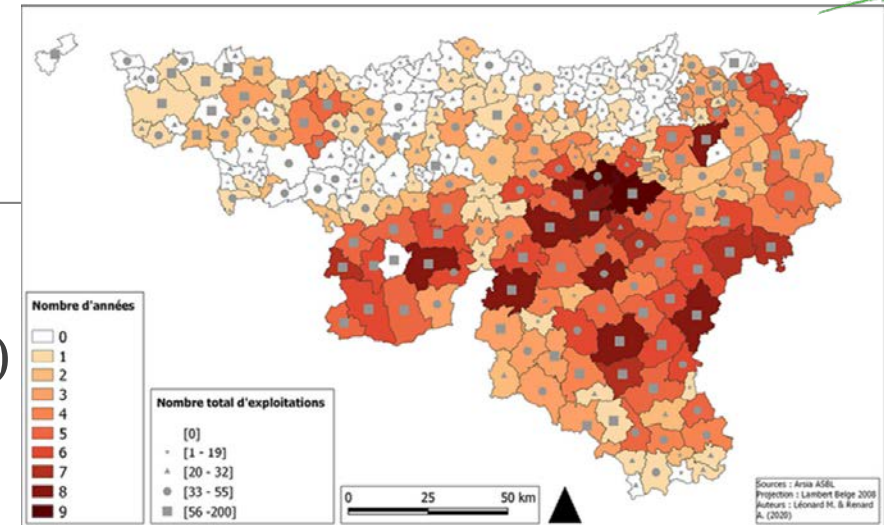
# Geospatial distribution of SD

Municipalities affected from 1 to 9 years, successive or not, bySD / From 2011 to 2019 included / Total number of farms present per municipality in 2015



# Geospatial distribution

Farm-dense zone (66,28% have more than 32 herds)



Number of herds/municipality	1 à 19 (1st quartile)	20 à 32 (2nd quartile)	33 à 55 (3rd quartile)	56 à 200 (4th quartile)
Positive	10,46%	23,26%	31,40%	34,88%
Negative	54,45%	28,89%	12,22%	4,44%

Link between number of farms present per municipality and positivity to SD:  $X^2: 58,18; p < 0.001;$   
**OR=9,73** (CI: 5,02-19,92)

# Risk factors for herd or animal to become infected

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- Cattle purchase (Van Schaik, 2002)
- Contact between herds (Van Schaik, 2002)
- Status of neighboring herds and prevalence within a geographic area (Wedderkopp, 2001; Agren, 2017)
- Herd size (Vaessen, 1998)
- Group housing (Nielsen, 2012)
- Organic farming (Agren, 2017)
- Low level of hygiene and biosecurity (Nielsen, 2012)
- Age (calf between 14 d and 3 m) (Nielsen, 2013)
- Time around calving (Nielsen, 2013)
- Nutrition (Nielsen, 2013)
- Summer grass feeding/ Origin of amendments/ Grazing (Vaessen, 1998)
- Water area of a farm (*Fasciola hepatica*) (Vaessen, 1998)
- Hot summer (Steffensen and Blom, 1999)

# Risk factors in a meat herd (observational study)

- Questionnaire de l'ARSIA (Dr J Evrard)
- 96 exploitations possédant au minimum 30 vêlages/an et 75% de viandeux
  - 18 + et 78 -
- Exploitation positive à SD -> au moins 1 résultat positif à SD entre 2017 et 2020

Variables	Comparison	OR	CI	
Housing	Individual	0,056	0,0053	0,36
	% Group			
Nutrition	Bucket	28,96	3,96	374,73
	% Suckling			
Allotment	2/4 weeks	10,04	1,029	270,68
	% <2 weeks			
Allotment	2/4 weeks	5,34	1,29	29,81
	% >4 weeks			



## Studies conducted by ARSIA measured Salmonella antibodies

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- On 800 tank milk samples taken once in February 2009 and 2011 (Dr G Czaplicki)
- On 264 tank milk samples taken once in February of the years 2015-2017-2019 (Dr J Evrard)

⇒ Results...

# Results E/P TM between 2009 and 2019

	2009	2011	2015	2017	2019		
Neg	N	N	N	N	N	49,00% (123)	<b>49,00%</b>
1P	N	N	N	N	P	7,17% (18)	<b>25,10%</b>
	N	N	N	P	N	1,99% (5)	
	N	N	P	N	N	3,19% (8)	
	N	P	N	N	N	2,79% (7)	
	P	N	N	N	N	9,96% (25)	
2P	N	N	N	P	P	0,80% (2)	<b>12,35%</b>
	N	N	P	N	P	0,80% (2)	
	N	N	P	P	N	1,99% (5)	
	N	P	P	N	N	1,99% (5)	
	P	N	N	N	P	1,20% (3)	
	P	N	N	P	N	0,40% (1)	
	P	N	P	N	N	0,80% (2)	
	P	P	N	N	N	4,38% (11)	
3P	N	N	P	P	P	2,39% (6)	<b>8,76%</b>
	N	P	N	P	P	0,40% (1)	
	N	P	P	N	P	1,20% (3)	
	N	P	P	P	N	0,40% (1)	
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	P	N	P	N	P	0,40% (1)	
	P	P	N	N	P	0,80% (2)	
	P	P	N	P	N	1,20% (3)	
P	P	P	N	N	1,59% (4)		
4P	N	P	P	P	P	0,80% (2)	<b>3,59%</b>
	P	N	P	P	P	0,80% (2)	
	P	P	N	P	P	0,80% (2)	
	P	P	P	N	P	0,40% (1)	
	P	P	P	P	N	0,80% (2)	
5P	P	P	P	P	P	1,20% (3)	<b>1,20%</b>

➤ Overall herd prevalence of salmonellosis over the 10 years : 51 %

➤ Herd prevalence of recurrent salmonellosis positives over the 10 years : 25,9 %

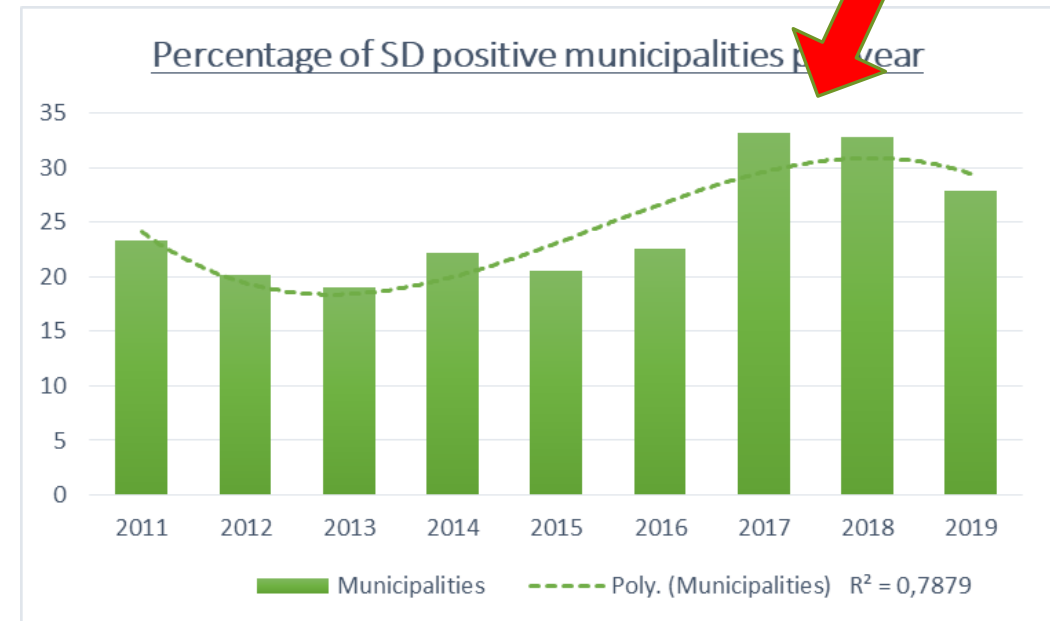
# Evolution per year of the percentage of SD positive herds



# Link between herds and municipalities

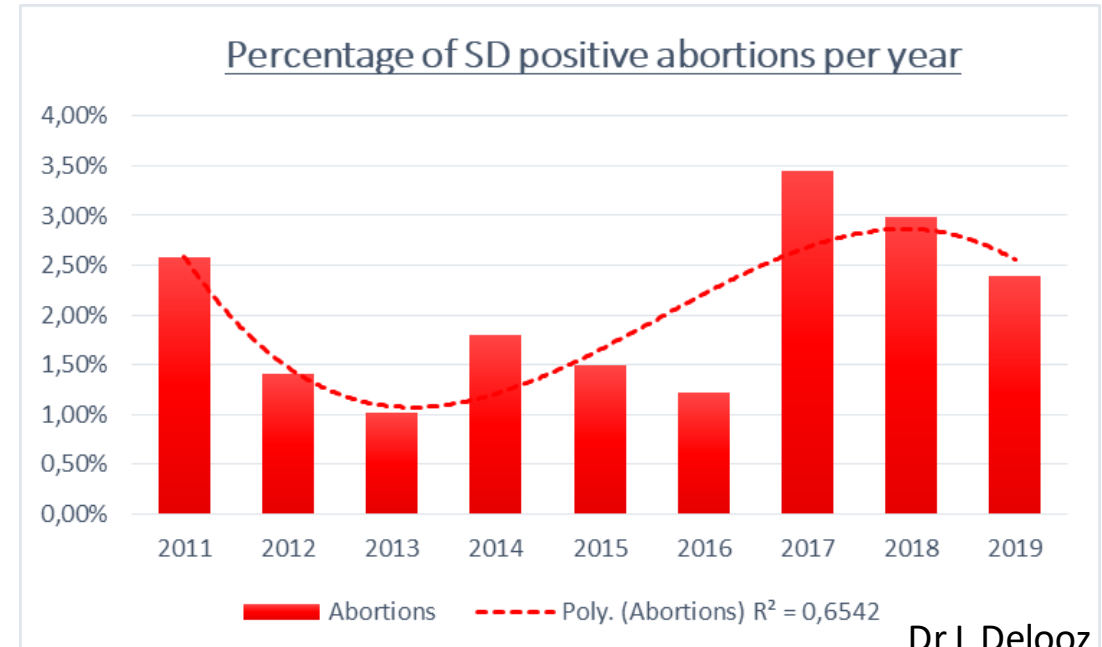
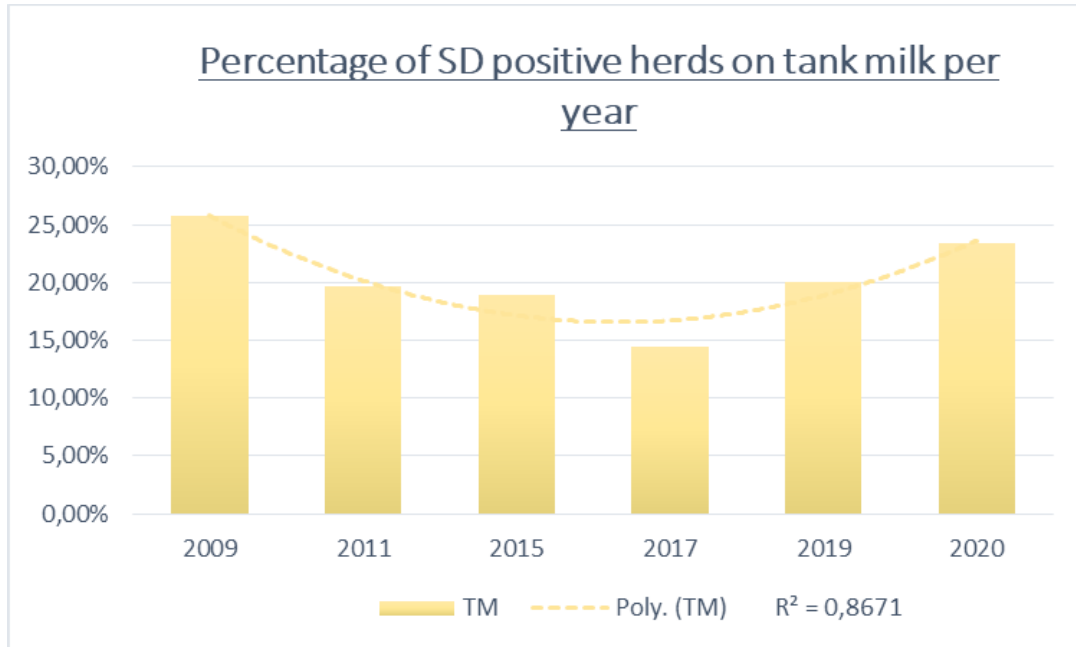
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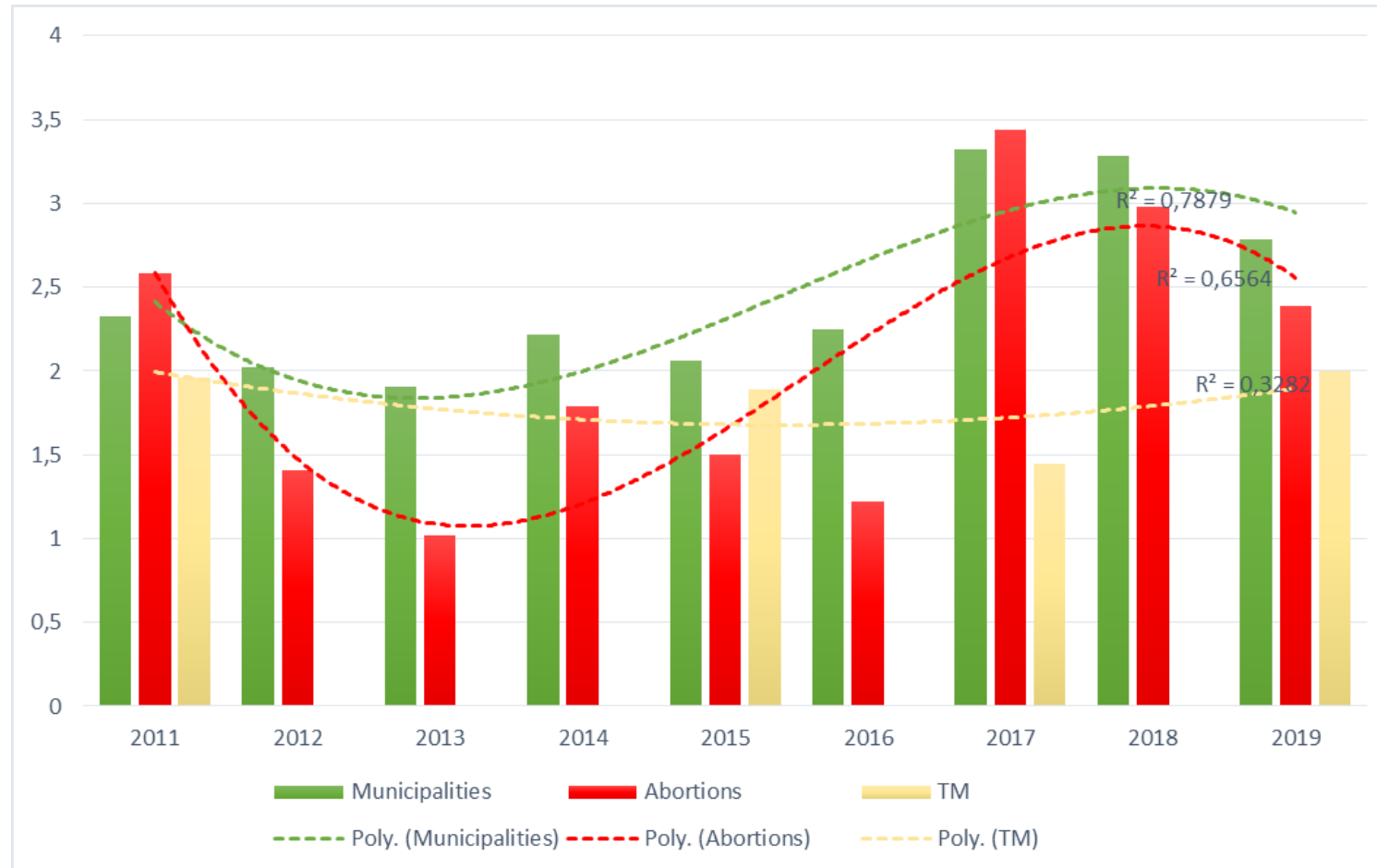
Significant increase of almost 11% between 2016 and 2017

# Link between abortions and antibodies milk tank



Dr L Delooz

# Percentage of municipalities, abortions and tank milk returned positive to SD per year



# Hypothesis to explain the differences with tank milk

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- Tank milk only concerns dairy farms
- Just measured on a sample of the dairy farm population
- On tank milk, it is the antibodies that are measured, unlike abortions and the number of herds considered positive
- Vaccination against SD is widespread in Belgium and therefore "distorts" the detection of re-emergence of SD (No DIVA-Vaccine)

⇒ In this context, tank milk could therefore be considered more as a general predictor of the level of infection than as a predictor of epidemic

# Conclusions

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## Control of SD at the moment

- On-farm biosecurity measures
- Vaccination (Salmopast®... Autovaccine ARSIA)

## For the future

- Paying attention to farms selling raw processed feed
- Direct detection of the bacteria to be able to keep the vaccination



Thank you for your attention

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Thanks to Dr E. Moyse from Ulg and thanks to my ARSIA colleagues