

Symposium Animal Health

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

STATE OF PLAY AND OUTLOOK

23/09/2021

Marie Léonard, DVM
ARSIA asbl

Why should we care about SD

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

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)

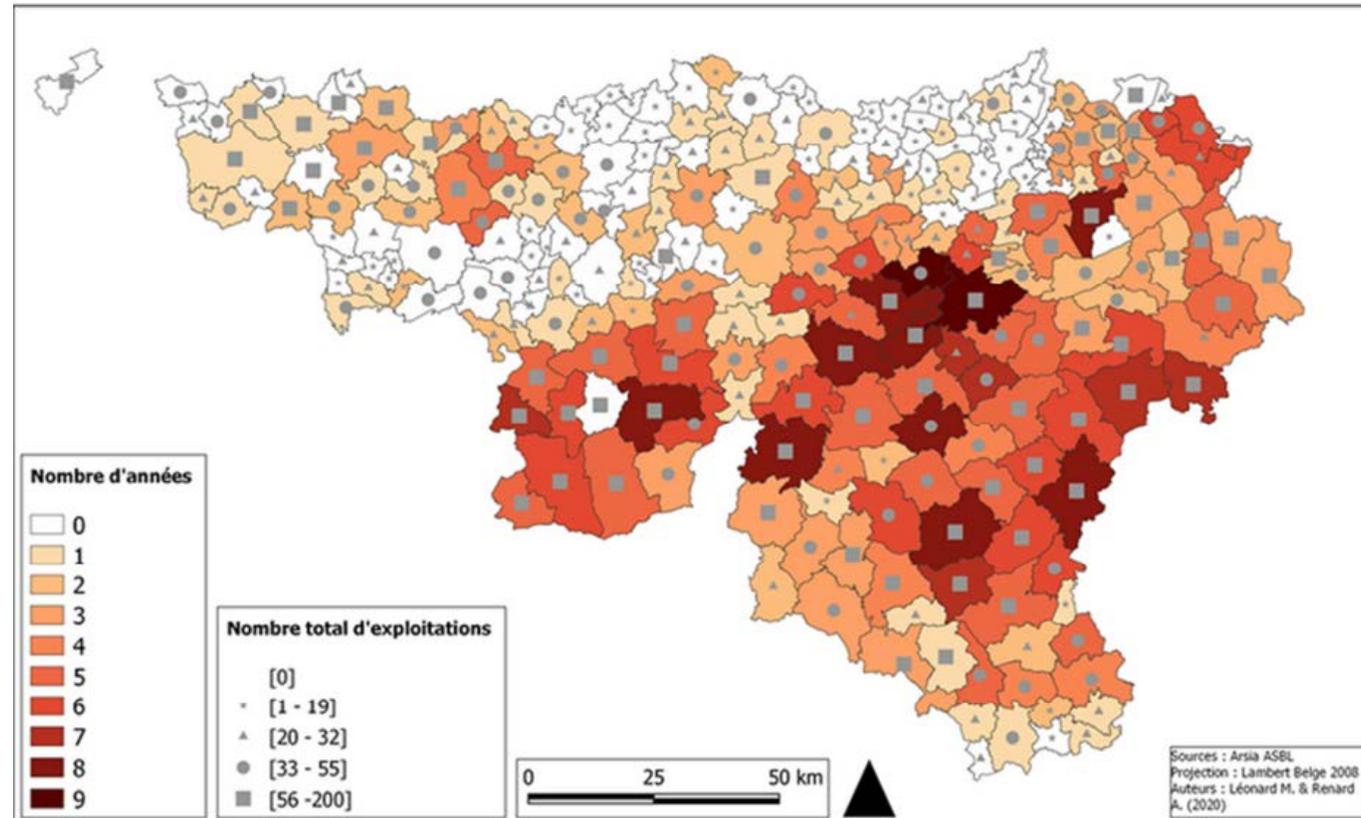
What about the circulation of SD in Walloon cattle herds

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	24,64	4,66	1,31

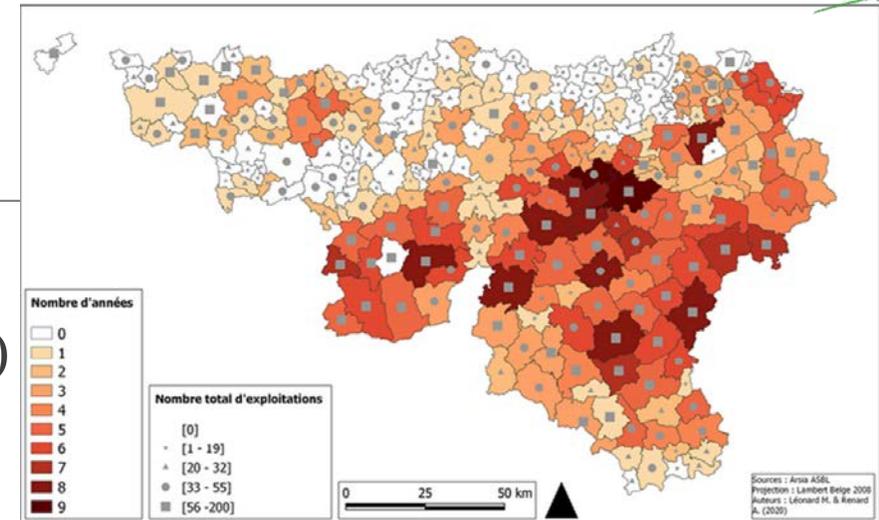
Geospatial distribution of SD

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

- 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

- 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)	49,00%
1P	N	N	N	N	P	7,17% (18)	25,10%
	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)	12,35%
	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)	8,76%
	N	P	N	P	P	0,40% (1)	
	N	P	P	N	P	1,20% (3)	
	N	P	P	P	N	0,40% (1)	
	P	N	N	P	P	0,40% (1)	
	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)	3,59%
	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)	1,20%

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

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

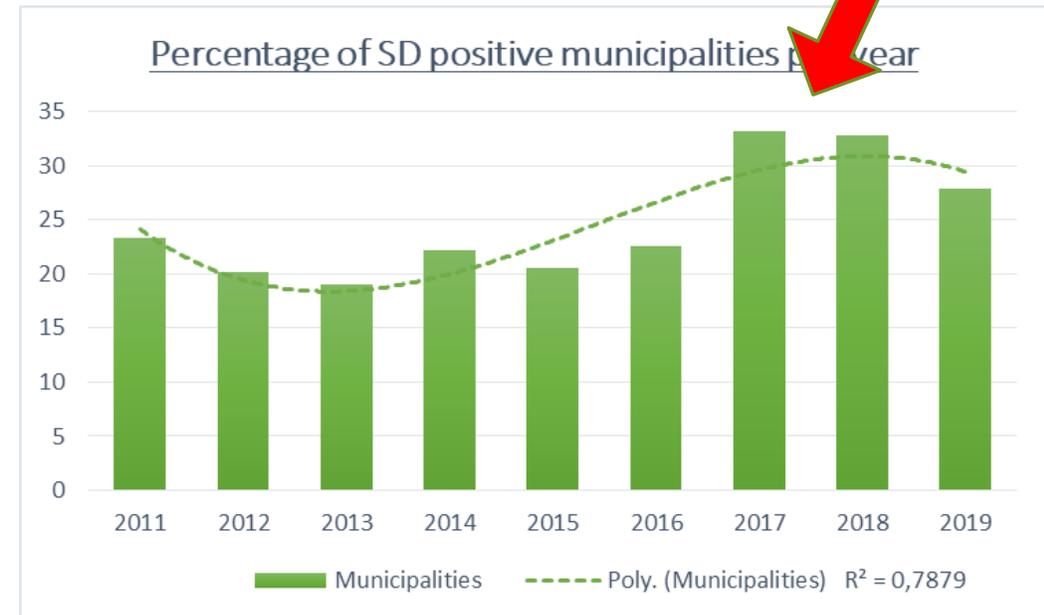
Evolution per year of the percentage of SD positive herds



Link between herds and municipalities

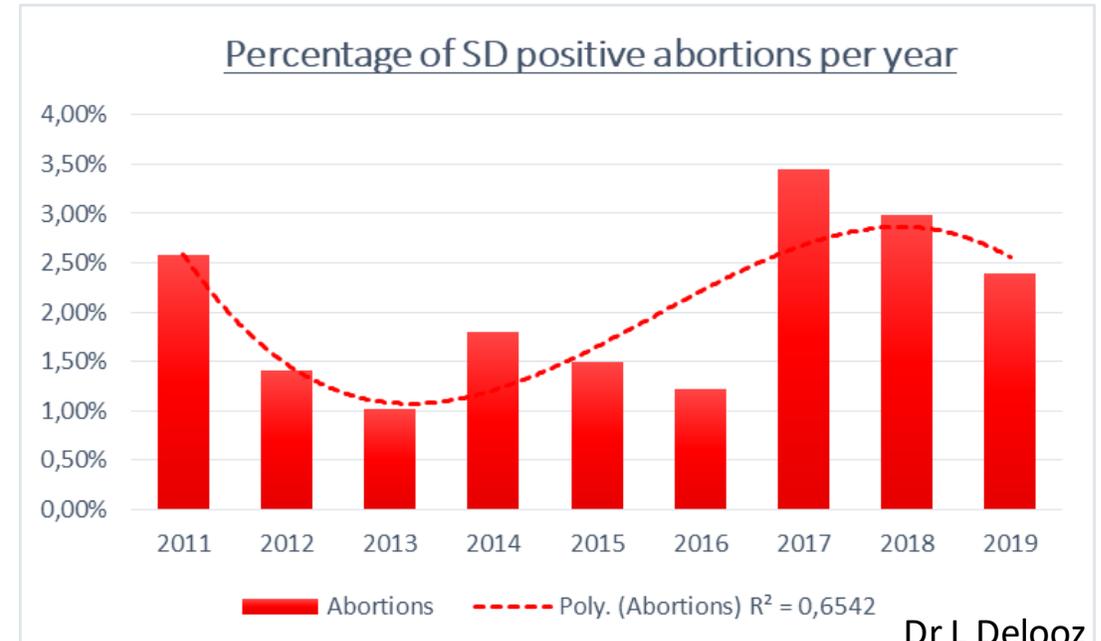
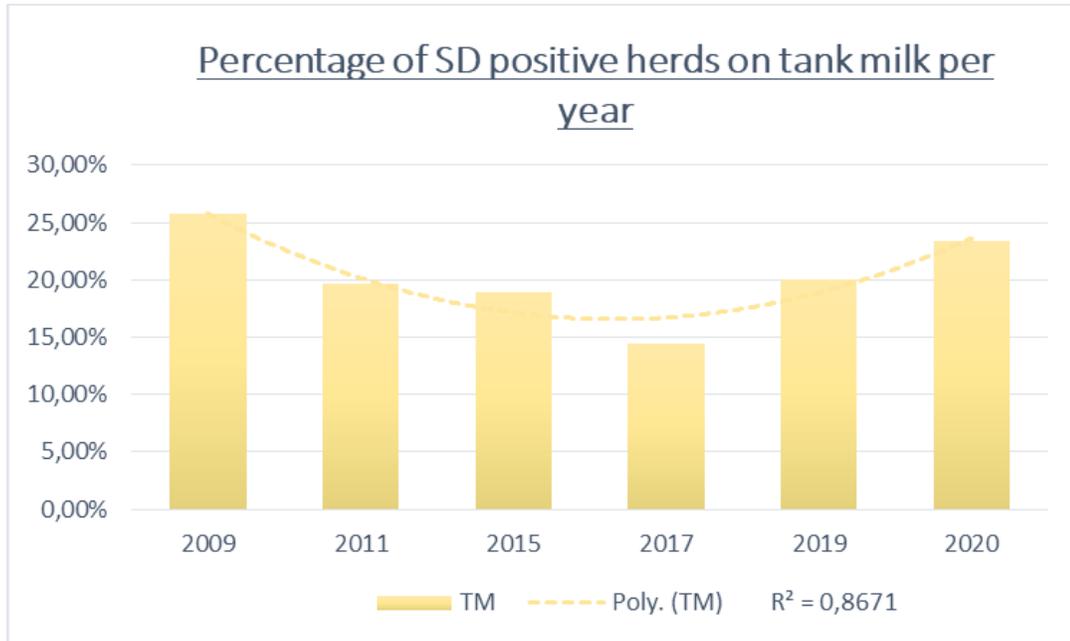
Percentage of Walloon municipalities affected by one of the 3 serotypes according to the year

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	24,64	4,66	1,31



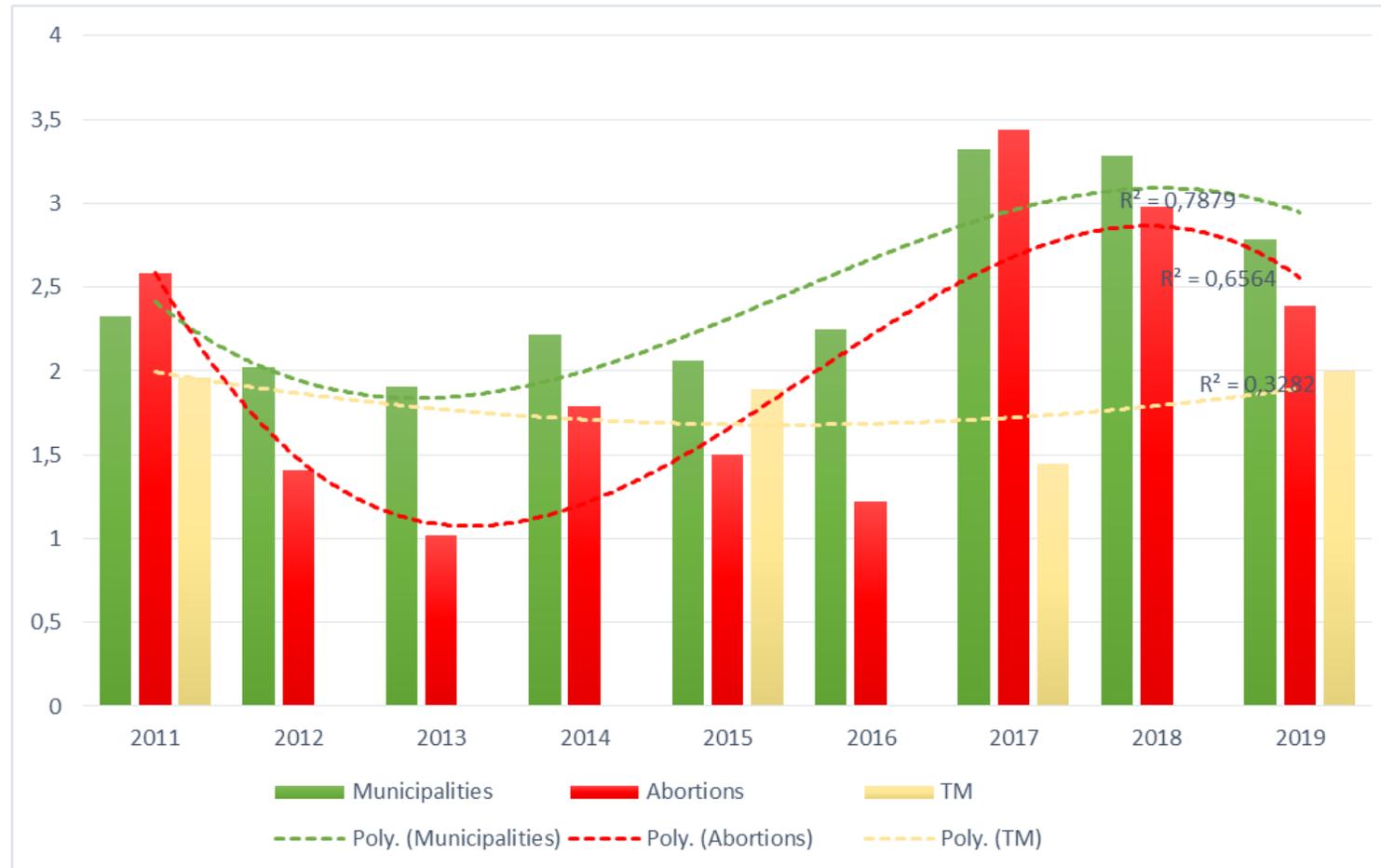
Significant increase of almost 11% between 2016 and 2017

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

- 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

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



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