

Evaluation of *Mycoplasma bovis* diagnostic tools in relation to management in endemic farms in Wallonia

Seys C.¹, Gille L.², Evrard J.³, Bayrou C.¹

¹ Bovine Health Service, Clinical Department of Production Animals, ULiege, Liege, Belgium

² MSD, Animal Health, Watermael-Boitsfort, Belgium

³ Regional Association for Animal Registration and Health (ARSIA) asbl, Ciney, Belgium

Corresponding author: calixte.bayrou@uliege.be



Importance of *M. bovis*

Since its identification in 1961, *Mycoplasma bovis* has spread globally through the cattle trade. This bacterium is a major contributor to several significant cattle diseases, including respiratory infections, mastitis, arthritis, otitis, and more insidious conditions such as reduced production, stunted growth, and cachexia. As a result, it causes substantial economic losses in cattle farming due to the costs of often ineffective treatments, diagnostic efforts, control measures, high mortality rates, and long-term performance decline. Its global prevalence ranges from 0% to 76%, depending on the continent, country, or even individual farms within the same region, with a median of around 20–30%. Among infected animals, 30% to 50% succumb to the disease.

Objectives

In the absence of effective treatments, prevention and diagnosis remain the main approaches to limit the impact associated with this bacteria. In Wallonia, the Regional Association for Animal Health and Identification (ARSIA) is actively involved in preventing this disease through two key measures: (i) detecting carrier animals using bacterial detection methods (culture or PCR) and combined serology (based on IgG2 detection) that can lead to the cancellation of a sale when a bovine is identified as seropositive (>80, MilA ELISA, Bio-X Diagnostics) during purchase blood sampling; (ii) offering an autovaccine developed from *M. bovis* strains isolated from the farm. Although the diseases associated with *M. bovis* presence in farms are well-documented, few studies describe the parameters of farms where *M. bovis* is endemic. The objective of this study is to characterize farms with a known endemic status using the diagnostic tools used in the control of *M. bovis*. An assessment of key management elements in these farms, including autovaccination, was conducted to evaluate their relationship with diagnostic results.

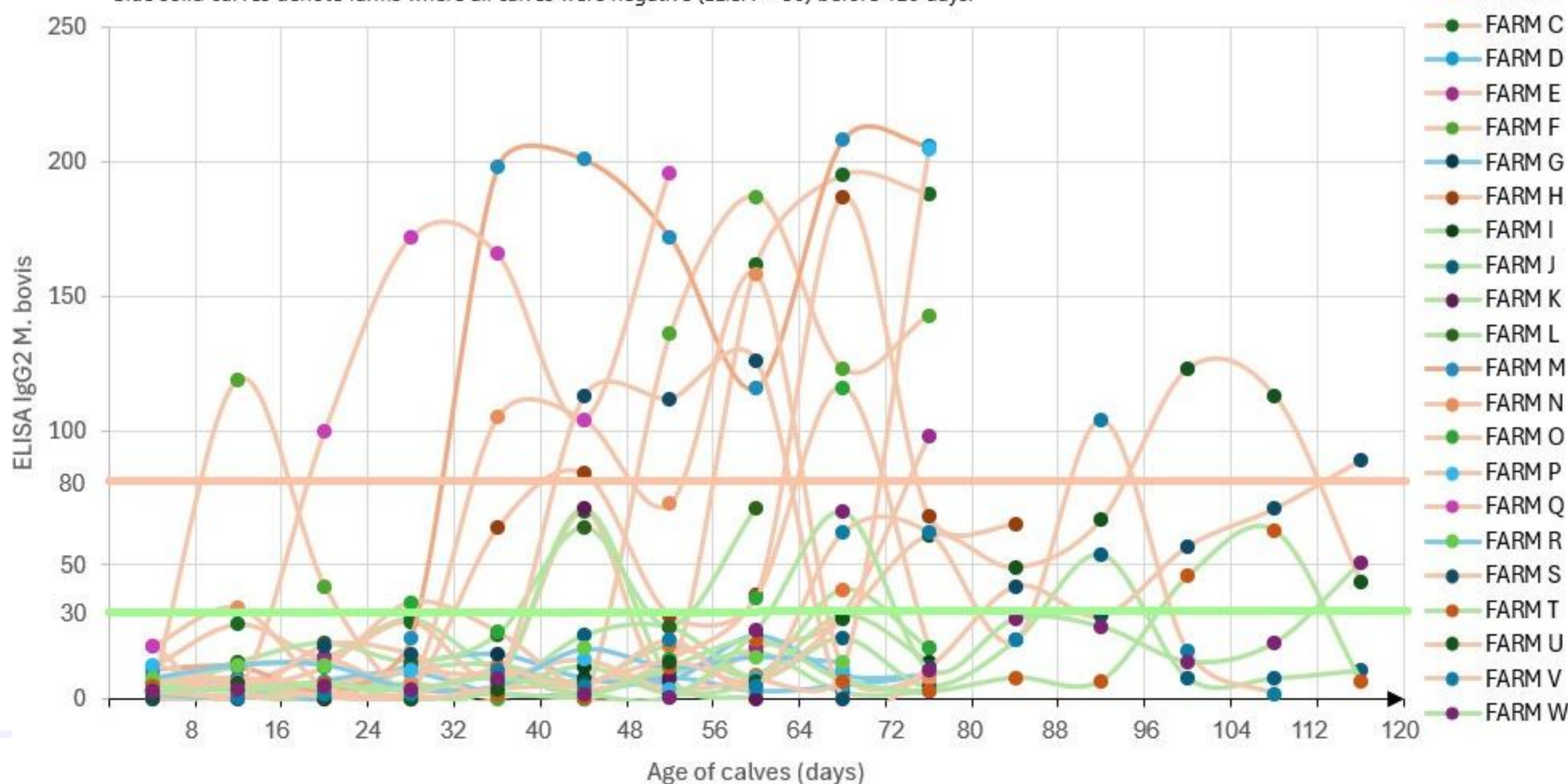
Material and methods

Twenty-three farms with endemic *M. bovis* (according to ARSIA data) were evaluated using questionnaires and farm visits on their overall management practices (clinical signs, environmental and animal management, feeding, supplementation, vaccination, biosecurity, preventive measures) as well as through culture, PCR, and serology (IgG2) on randomly collected samples across different age groups.

Results:

Despite the endemic presence of *M. bovis* in these farms, the serological behavior of calves under 120 days varies between farms. In nearly half of the farms (11/23), calves remain seronegative (<80), whereas in the other farms (12/23), seropositivity appears early in the calves' lives (Fig.1). The factors significantly differentiating the two groups ($p < 0.05$) are the association of positive culture and PCR results, as well as better body condition scores among adults in farms where calves are seropositive. No other management elements, including autovaccination (Table 1), are significantly associated with calves exceeding the seropositivity threshold before 120 days.

Figure 1: *Mycoplasma bovis* serological follow-up of 23 Belgian farms from the first week to three months.
Orange solid curves represent farms where calves were seropositive (ELISA > 80) before 120 days.
Green solid curves indicate farms where all calves tested negative but had ELISA levels above 30 before 120 days.
Blue solid curves denote farms where all calves were negative (ELISA < 30) before 120 days.



Farms (number of calves <120d sampled)	ELISA IgG2 <30	30-80	>80	PCR	Culture	Symptomatic calves observed during sampling	Autovaccines implemented on the farm
D (10)	10	0	0	1	neg	0	yes
R (9)	9	0	0	0	pos	1	yes
G (10)	10	0	0	0	neg	2	no
A (10)	9	1	0	0	neg	0	yes
J (15)	14	1	0	0	absent	0	yes
K (8)	7	1	0	0	neg	0	no
I (10)	9	1	0	0	neg	1	yes
T (15)	13	2	0	0	pos	1	no
W (15)	12	3	0	5	absent	1	no
L (10)	6	2	0	2	neg	4	yes
B (10)	9	1	0	0	neg	5	no
Q (7)	2	0	5	2	pos	0	no
S (15)	7	4	4	pool+	neg	0	no
U (15)	8	5	2	0	pos	0	no
V (14)	11	2	1	0	absent	1	no
C (10)	6	1	3	3	pos	1	yes
F (10)	4	1	5	6	pos	1	no
P (10)	9	0	1	2	pos	2	no
H (11)	4	5	2	3	pos	3	no
O (10)	7	2	1	0	neg	3	yes
E (10)	8	1	1	1	neg	4	yes
M (10)	4	0	6	2	neg	8	no
N (10)	5	2	3	5	pos	8	yes

Total of 254 calves
Table 1: Results of various tests for *Mycoplasma bovis* detection in calves across 23 Belgian farms, in conjunction with the use of *Mycoplasma bovis* autovaccination.
There is no correlation between the use of autovaccination and the serostatus of farms.

Conclusion

This study demonstrates that serology (evaluated by the MilA ELISA at a threshold of 80) is not a sufficient tool to detect the endemic status of a farm in calves under 120 days old, as half of the farms are seronegative. The positive association between seropositivity before 120 days and positive PCR results suggests that animals are more likely to be seropositive when *M. bovis* is actively circulating within these age groups. The absence of a link between autovaccination and seropositivity is noteworthy and requires further investigation. One hypothesis is that vaccination results in only a modest increase in IgG2 compared to IgG1, making it less detectable by an IgG2-specific ELISA.