

Evaluation of anti-Gp40 serological titers of *Cryptosporidium parvum* in French beef cattle

Clara BOUREL, Thibault JOZAN, Geert VERTENTEN, André PRETO

INTRODUCTION

- ▶ Cryptosporidiosis, caused by *Cryptosporidium parvum*, is a severe disease in young calves characterized by diarrhea, decreased weight gain, and sometimes mortality. *Cryptosporidium* is detected in approximately 60% of fecal samples from diarrheic calves in France (1).
- ▶ Until now, the disease has been controlled either with halofuginone or paromomycin (an antibiotic used only for curative purposes).
- ▶ A new vaccine, Bovilis Cryptium®, is now available in France to reduce the disease. The active component of the vaccine is glycoprotein 40 (Gp40), a surface antigen of the parasite.

OBJECTIVE

The aim of the study was to evaluate the anti-Gp40 serological titers in French beef cattle before and after calving, from their entry into the barn until their release in the following spring, in order to determine their immune status in the absence of vaccination and compare them to published titers of Gp40-vaccinated cattle (2).

MATERIALS AND METHODS

- ▶ Sixteen representative French cattle farms were included in the study from November 2022 to April 2023.
- ▶ First sample (S1): after barn entry (autumn-winter)
- ▶ Second sample (S2): one or two months after the first sampling
- ▶ Third sample (S3): before the next year's spring turnout.
- ▶ Among the 16 farms, 8 conducted an initial sampling before calving. For this group, the first sample (S1) was taken according to the date of barn entry for each farm, between November 23, 2022, and January 13, 2023. For the other 8 farms, the cows and heifers had already calved before the barn entry, which occurred between November 2022 and January 2023.
- ▶ Blood samples were sent to the Center for Diagnostic Solutions (MSD Animal Health, Boxmeer, Netherlands) for analysis of anti-Gp40 serological titers.

The serological titers of anti-Gp40 antibodies in French beef cattle remained stable along the period from the first to the last sample. These titers were low and comparable to those of the control group in the publication by Timmermans et al. 2024.

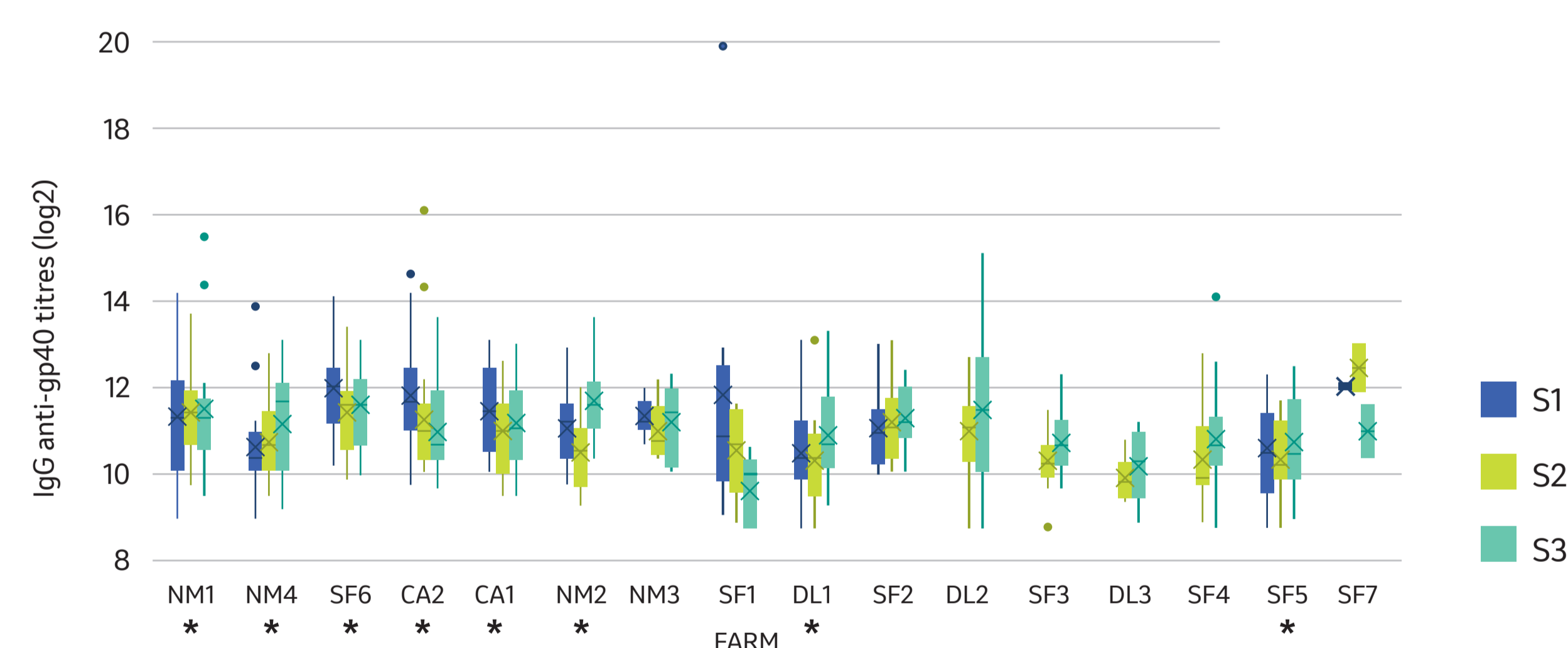


To download this paper, scan the QR code!

RESULTS

- ▶ A total of 236 cows (37 heifers, 199 multiparous) were included in this study: 148 cows were sampled three times, 88 cows were sampled once or twice.
- ▶ The average time between S1 and calving for the 54 cows sampled before calving was 35 days. The anti-Gp40 titers are presented in the Table 1. There were no significant differences between the farms before or after calving. There were no differences between heifers and cows (Table 1).
- ▶ The anti-gp40 antibody titers before calving in our study were low and very close to those of the non-vaccinated control group in trial (2) with the Gp40 protein-containing vaccine (Table 2). Cattle that received the vaccine had average anti-Gp40 antibody titers of 17.5 (log₂), which were significantly higher (x194) than the non-vaccinated control group (Table 2).

FIGURE 1. Distribution of anti-Gp40 antibody titers during the observation period in the 16 beef cattle farms.



First sample (S1): after barn entry (autumn-winter); Second sample (S2): one or two months after the first sampling; Third sample (S3): before the next year's spring turnout.

*Farms in which the first samples (S1) were taken before calving: 8 farms, 54 cows.

TABLE 2. Titers of anti-Gp40 IgG in non-vaccinated and vaccinated heifers with the *Cryptosporidium* Gp40 vaccine, Timmermans (2024) (2).

Group	Anti-gp40 titers (log ₂)									
	Before vaccination		4 weeks post prime		1 week post boost		Milking 1		Milking 2	
	Avg	SD	Avg	SD	Avg	SD	Avg	SD	Avg	SD
Vaccine	10,2	1,2	16,8	2,2	17,5	1,3	21,4	1,6	20,1	1,2
Control	9,9	0,9	NT		NT		13,8	1,5	11,6	1,8

SD : confidence interval NT : Not tested

TABLE 1. Titers of anti-Gp40 IgG in animals before and after calving

Group	Anti-gp40 titers (log ₂)								
	Heifers + cows			Heifers			Cows		
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Before calving (n=81 samples)	9	14,6	11,1	9,8	13,4	10,9	9,0	14,6	11,2
After calving (n=526 samples)	8,8	19,9	11	8,8	13,7	10,9	8,8	19,9	11,0

AUTHORS' AFFILIATION

1. MSD Animal Health, Beaucouze

REFERENCES

- ▶ C Ninio, K Pecceu, A Dupont. Actualisation sur la prévalence terrain des principaux agents de diarrhées néonatales des veaux en France. Journées Nationales GTV, Reims, 2017.
- ▶ Timmermans, M., Hubers, W., Schroer, D., Gevers, K., Segers, R.P., Niessen, R., van Roosmalen, M.H., 2024. The first commercially approved efficacious cryptosporidium vaccine protecting New-Born calves from severe diarrhea. Vet. Vaccine 3, 100054. <https://doi.org/10.1016/J.VETVAC.2024.100054>