

# Influence of vaccination on the seroconversion of 2 major respiratory pathogens in German beef rearing farms.

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## INTRODUCTION

BRD (Bovine Respiratory Disease) is the main health problem in German beef rearing farms. Causes are multifactorial, but the contribution of different pathogens is widely accepted.

Bovine Respiratory Syncytial Virus (BRSV) and *Mannheimia haemolytica* (Mh) are 2 major pathogens playing a pivotal role in the BRD complex.

Nowadays, the diagnostic of pathogens is mainly done by antigen detection on respiratory samples, rather than serological identification of antibodies.

## OBJECTIVE

As serological studies during the rearing time in beef calves are not commonly available, a study was performed in German beef rearing farms to obtain insights in the serodynamics of BRSV and Mh using paired blood samples including different BRD vaccination schemes.

## MATERIALS AND METHODS

- ▶ 2 beef rearing farms in different regions of Germany.
- ▶ 2 winter seasons (2017-2018).
- ▶ All calves were vaccinated with a live intranasal BRSV-Parainfluenza-3 vaccine (Risposal® RS-Pi3, Zoetis) and received metaphylactic antimicrobial treatment at arrival on the rearing unit.
- ▶ The vaccination protocol was continued with either 2 administrations at 2 and 6 weeks after arrival with a monovalent attenuated vaccine (Risposal® RS) (control group (cg)) or a multivalent, inactivated BRSV-Parainfluenza-3-Mh vaccine (Bovilis® Bovipast® RSP, MSD Animal Health) trial group (tg).
- ▶ Paired serum samples from subset of animals: just before first vaccination and 12 weeks later.
- ▶ BRSV and Mh antibodies were measured (expressed as log<sub>2</sub>).
- ▶ Seroconversion defined as titer change of 2 log<sub>2</sub> steps or more.

Vaccination with a trivalent inactivated BRSV-Parainfluenza-3-*Mannheimia haemolytica* vaccine (Bovilis® Bovipast® RSP) leads to a clear humoral response during a field infection with *Mannheimia haemolytica* in German beef calf rearing farms.

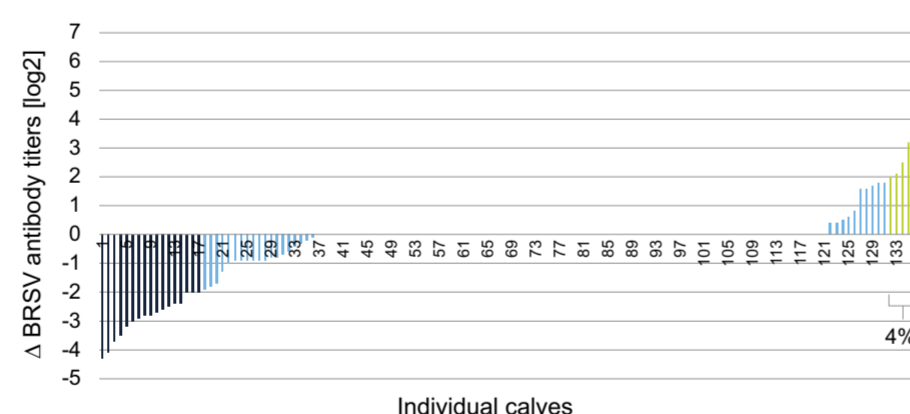


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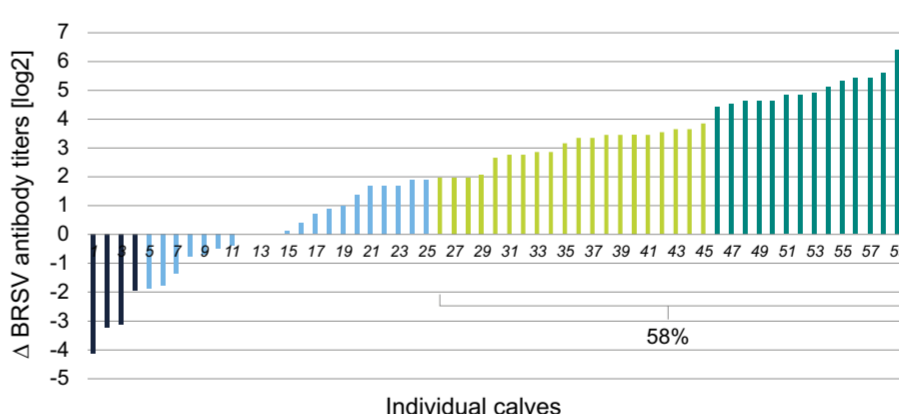
## RESULTS

- ▶ 1.127 calves (farm A n=931, farm B n=196).
- ▶ Paired samples were taken from 195 calves: approx. 12 % (n=136) of the calves in cg and 5 % (n=59) of the calves in tg.
- ▶ BRSV antibodies
  - > cg : only 4% seroconversion (Fig. 1).
  - > tg : 58% seroconverted (Fig. 2).
- ▶ Mh antibodies
  - > cg : 42% seroconverted (Fig. 3).  
→ indicative for field infection.
  - > tg : 81% seroconverted (Fig. 4).  
→ higher in tg compared to cg due to the vaccination with the trivalent inactivated vaccine.

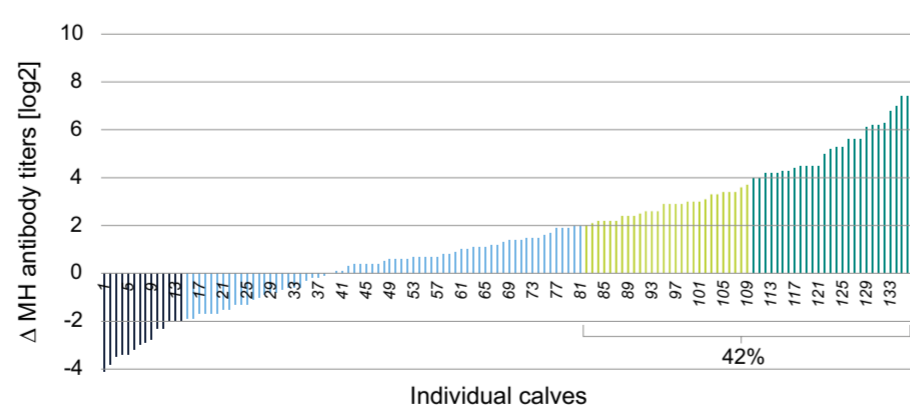
**FIGURE 1.** Difference of paired serum samples for BRSV antibodies in control group (n=136)



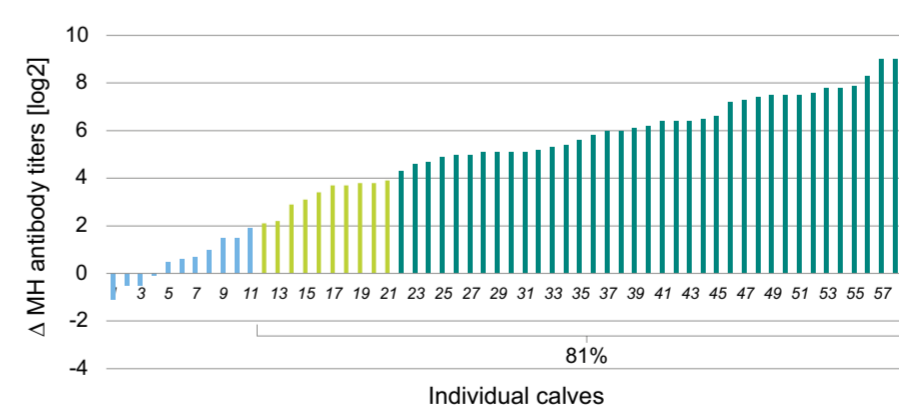
**FIGURE 2.** Difference of paired serum samples for BRSV antibodies in trial group (n=59)



**FIGURE 3.** Difference of paired serum samples for *Mannheimia haemolytica* in control group (n=136)



**FIGURE 4.** Difference of paired serum samples for *Mannheimia haemolytica* antibodies in trial group (n=59)



One bar represents one individual calf.  
■ Lime green bars = titer change  $\geq 2 < 4$  log<sub>2</sub> steps.  
■ Dark teal bars = titer change  $\geq 4$  log<sub>2</sub> steps.

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