Reduction in milk yield associated with *Mycobacterium avium* ssp *paratuberculosis* infection in French dairy herds

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INTRODUCTION

- Paratuberculosis: chronic infectious disease of Ruminants, word-wide distributed
- Current debates on its involvement in Chron's disease in Humans
- No effective treatment
- Voluntary control schemes: protection of susceptible animals through improved management practices and test-and-cull
- Cost/benefit of these strategies currently challenged
- For *ex-ante* assessment of alternative control schemes, need to get accurate estimates of production effects associated with Map-infection

- In literature, estimates of reduced milk yield associated with *Map*-infection only assessed by comparing milk yield for those positive-tested *versus* negative-tested cows both of which coming from Positive herds, i.e. comprising at least one infected cow
- Because of the long incubation period of *Map*-infection and of the poor sensitivity of diagnostic tests leading to the existence of false-negative animals in infected herds, estimates found in the literature might be underestimated

Aim: to quantify the variation in individual test-day milk yield of dairy cows according to their *Map*-infection status in French farming conditions, by taking as a reference cows from herds certified to be free of *Map*-infection

MATERIAL AND METHODS

Study population

- 15,490 cows from 569 herds located in Western France and monitored for Map
- Negative herds: all tested animals found to be negative
- Certified free-herds: all present animals > 24 m tested negative, no clinical signs in relation to Map

Map-infection cow-status

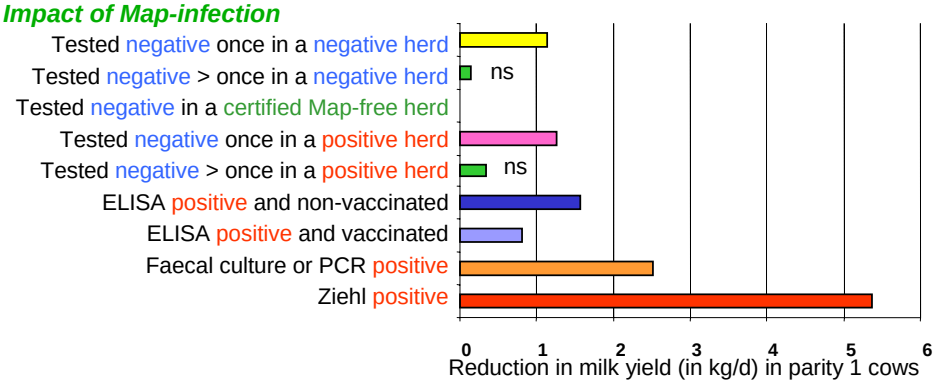
- For a cow, based on (Figure):
  - the result of individual testing(s): ELISA, Faecal culture, PCR, Ziehl staining
  - the status of the herd: Negative, Positive, Certified-free
  - its possible vaccination when ELISA-tested
  - the number of test-results when tested negative

Statistical modelling

- Statistical unit: Test-Day Milk Yield (TDMY) in the lactation concomitant to the testing used to define the Map-infection status
- Mixed linear model with adjustment for herd-season (random), breed, days in milk on test-day
- Stratification on parity (1, 2, 3 and more)

RESULTS & DISCUSSION

Impact of Map-infection



- Significant reduction in milk yield in positive-tested cows
- Increase in loss with increased parity
- Significant reduction in milk yield in negative-tested cows located in positive herds when tested once
- No significant loss in milk yield in cows in a Negative herd, except the primiparous cows tested once

- **Largest loss in Ziehl positive-tested cows; test mainly implemented in animals suspected to experience clinical paratuberculosis**
- **Presumed preclinical shedders (i.e. FC or PCR positive-tested), as well as unvaccinated and ELISA-positive cows, had a lower reduction in milk yield, suggesting that the reduction in milk yield starts early in a cows's productive career, before occurrence of clinical signs**
- **The lack of sensitivity of the tests applied at the individual level, leading to the existence of false-negative animals, could explain the significantly lower milk yield observed in once-tested negative cows from Positive herds**
- **In relation to the interference of vaccination on immune responses, it is likely that truly infected and truly non-infected animals (i.e. false-positive) coexist among the cows which were both ELISA tested-positive and vaccinated, leading to a mean reduction in milk yield to a lesser degree in that group.**