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# Relationship between vaginal microbiota composition at whelping and neonatal mortality in the dog

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## INTRODUCTION

- It is admitted nowadays that microbiota has many essential functions within the host, mostly immune regulation and metabolism.
- The mother is the first source of microbial communities for the newborn, with maternal microbiota influencing its short and long-term health<sup>[1]</sup>.



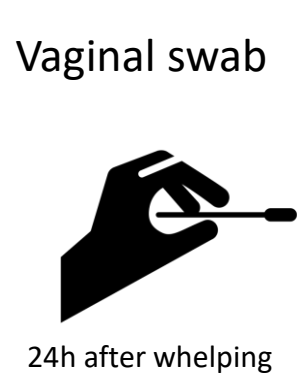
## Aim

To assess whether maternal vaginal microbiota profile is associated with low birth weight and neonatal mortality in dogs.

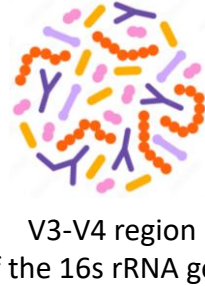
## MATERIAL AND METHOD



36 bitches from 2 medium and 7 large breeds and their 284 puppies

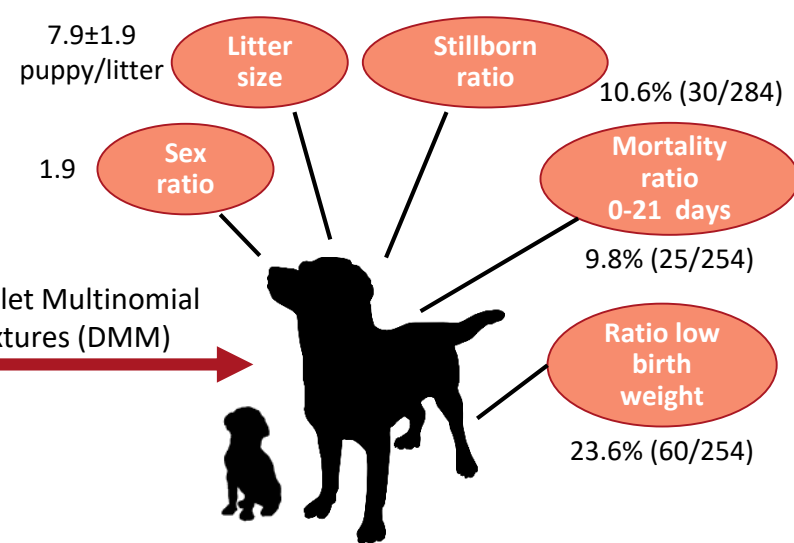


24h after whelping



V3-V4 region of the 16s rRNA gene

Dirichlet Multinomial Mixtures (DMM)



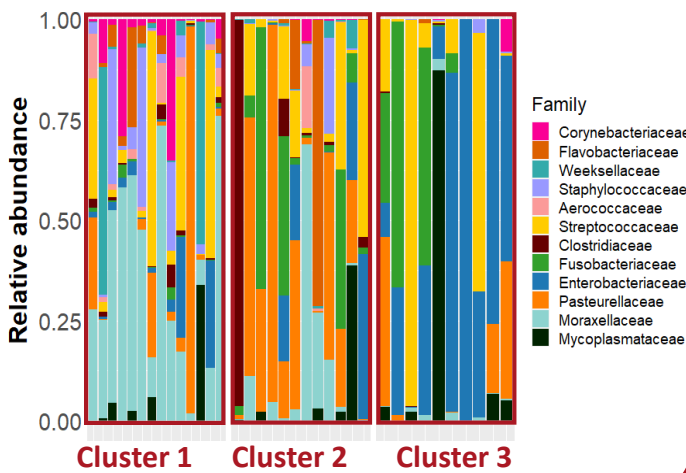
Vaginal microbiota

Reproductive performances

## RESULTS

There are 3 distinct clusters of vaginal microbiota in bitches at Day 1 after whelping

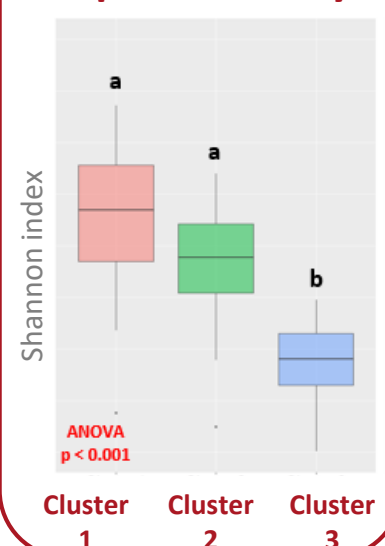
### Bacterial families with mean relative abundance > 1%



### Relative abundance of the most representative families in the vaginal microbiota

	Cluster 1 N=14	Cluster 2 N=12	Cluster 3 N=10
<i>Moraxellaceae</i>	28%	10%	1%
<i>Pasteurellaceae</i>	10%	22%	0.9%
<i>Enterobacteriaceae</i>	5%	8%	41%

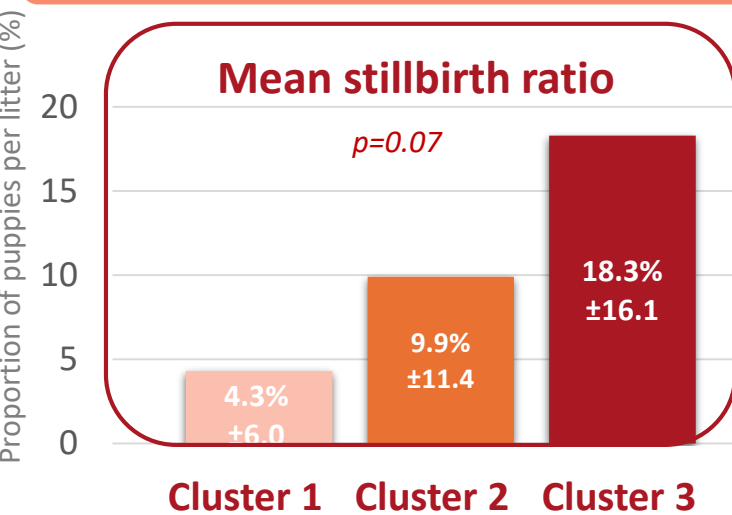
### Alpha diversity



There is a correlation between the maternal vaginal microbiota and puppy outcome per litter

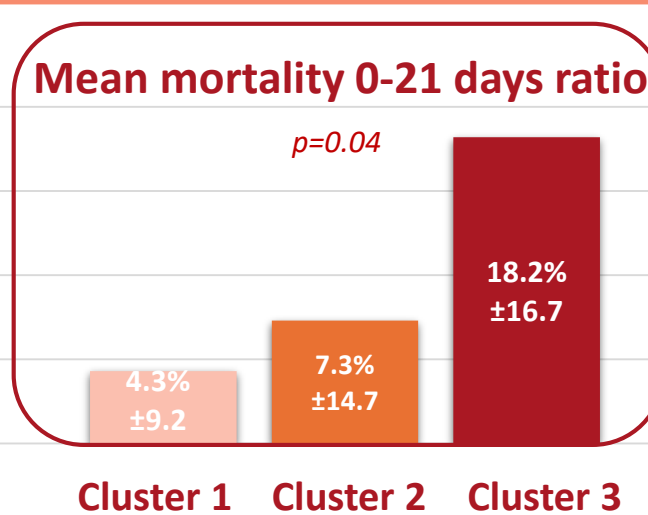
### Mean stillbirth ratio

$p=0.07$



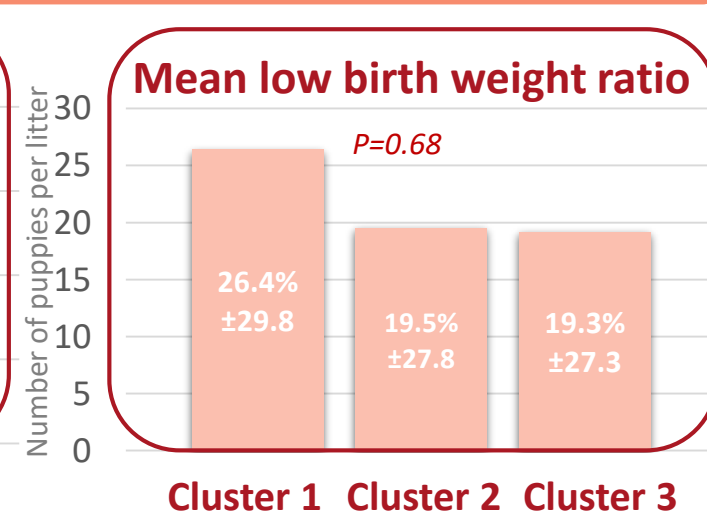
### Mean mortality 0-21 days ratio

$p=0.04$



### Mean low birth weight ratio

$P=0.68$



## DISCUSSION AND CONCLUSIONS

Bitches with a relatively high stillbirth and neonatal mortality rate presented lower bacterial richness and higher abundance of some opportunistic bacteria such as *Pasteurellaceae* and *Enterobacteriaceae*. Indeed, those families are commonly isolated from dying newborn dogs under post-mortem exams [2]. Further studies are needed to investigate the role of the maternal vaginal microbiota during gestation and neonatal health as well as to identify effective strategies for modulating it.



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### References:

- [1] Alves et al., Biosci Microbiota Food Health. 2020; 39 (2): 23–32.
- [2] Meloni et al., Veterinaria Italiana 2014, 50 (4): 293-299.