Characterization of tick species and vector-transmitted hemoparasites in captive wild ungulates in a French zoological park

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CHARACTERIZATION OF TICK SPECIES AND VECTOR-TRANSMITTED HEMOPARASITES IN CAPTIVE WILD UNGULATES IN A FRENCH ZOOLOGICAL PARK

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CASES OBSERVED IN DEER

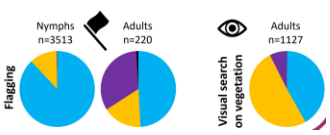
- Non-specific symptoms of severe apathy and hypothermia in several recently arrived cervids; sometimes death when not treated immediately
- Newborn mortalities
- No specific pathogens detected (anatomo-pathology)

➔ Hypothesis of vector-borne diseases:

COLLECTION OF TICKS

- 15855 ticks
- 101 sampling points, 28m² each
- Twice with a 2 weeks interval

Ticks collected: abundance and diversity



Ixodes ricinus (+++), *I. acuminatus, I. frontalis*

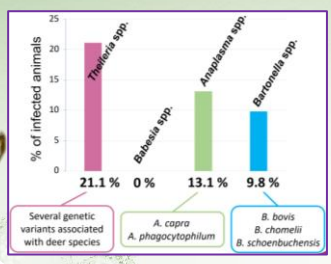
Haemaphysalis concinna et *H. inermis* (++)

Dermacentor marginatus and D. reticulatus (+)

BLOOD SAMPLES

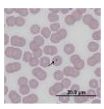
- Over a four-years-period
- 828 animals
- 64 different species, most of them ungulates
- Nested PCRs + Sequencing
- *Theileria/Babesia* spp. 18S *rRNA* gene
- *Anaplasma* spp. 23S *rRNA* gene
- *Bartonella* spp. *gltA* gene

Microorganisms found

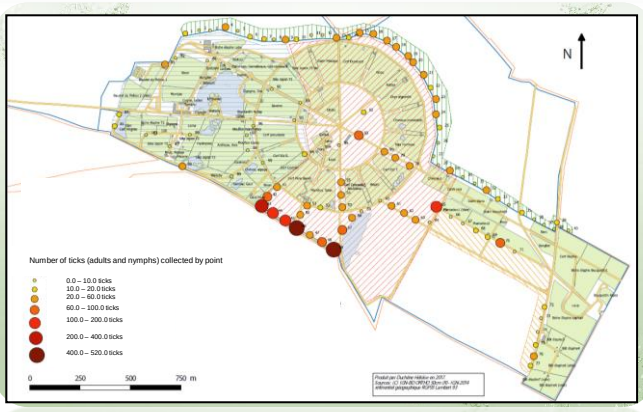


Co-infections only in cervids, especially in symptomatic ones

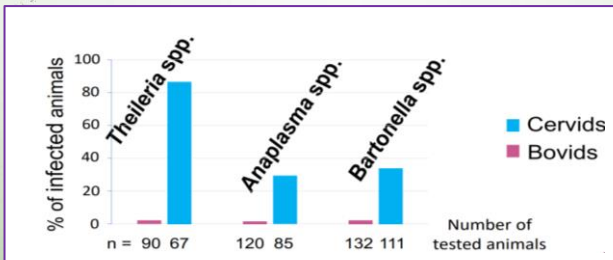
% of co-infected animals
- ✓ 32,8% with 2 hemoparasites
- ✓ 8,6% with 3 hemoparasites
- ✓ 1,7% with 3 hemoparasites



Map of the relative abundance of ticks in the park



Cervids are more infected than bovids



PREVENTIVE AND CURATIVE MEASURES

- Transfer from high-density tick area to a lower one → newborn mortalities in a swamp deer group stopped
- Systematic injection of long-acting oxytetracyclin (Cyclosol LA®, Dechra, France) and NSAI to treat symptomatic deer → Successful if applied quickly
- Cutting of specific grass (*Asphodelus albus*) where ticks are concentrated → Tick concentration decreases

CONCLUSION

This study shows that a high diversity of vector-transmitted microbes are endemic in this multi-specific collection of animals. These findings allowed us to better understand the etiology behind the non-specific symptoms and to adapt our management to prevent them.

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