A study implemented at the periphery of 3 National Parks (NPs) in Zimbabwe, with 3 permeable interfaces without fences and free animal movements:

- 36 GPS collars were deployed on sympatric bovine to assess the contact between reservoir population: African buffalo (*Syncerus caffer*) and sensitive population: *Bos taurus*, *Bos indicus*). Simultaneously a repeated serological survey was undertaken on cattle close to (Dete-Hwange, Malipati-Gonarezhou, Pesvi-Kruger) and far from NPs (Choumpani and Tinde) to estimate FMD dynamic with or without vaccination sessions on cattle.

**Results**

- **Contact** definition for FMD transmission: cattle GPS record 15 days and 300 meters after buffalo GPS record.
- Contacts variation between buffalo and cattle among sites, seasons and individuals (Cf. b).
- Contacts peak during Hot dry season: « risky period » for the 3 sites (Cf. b).
- Contacts often localized close to water: « risky area » (Cf. a).

**Modelling**

FMD survey: NSP (natural antibodies detection) and SATs (SAT 1 & 3: natural and vaccine antibodies detection) laboratory tests

- Generalized linear mixed model used NSP and SATs results with individual and herd random effects
- Higher natural sero-incidence in sites close to NPs (Cf. c).
- Peak of natural sero-incidence in hot dry season (s.) except for Hwange-Dete (rainy s.) (Cf. c).
- Higher sero-reversion in sites far from NPs or with few contacts with buffalo or without vaccination (Cf. c).
- Peak of semi-reversion in cold dry s. (Cf. c).
- Sero-incidence and reversion (NSP & SATs) significantly related to contact rate with buffalo (Cf. d).

**Discussion**

First demonstration in natural condition of the African buffalo role as FMD virus reservoir.

- Short lasting immunity investment for cattle in endemic areas with light symptoms and low detection
- Vaccination strategy seemed efficient with significant immunity protection for cattle but not enough to avoid the virus introduction from the wild compartment in risky areas and seasons. Frequency of vaccination sessions and number of cattle vaccinated have to be increased. Is the antigen used in vaccine adapted to the circulated strain?
- Why different levels of infection for similar unfenced interfaces? Resource distribution, owners strategies, predation risk? Theses questions have to be answered to understand the interaction mechanisms between wild and domestic populations to eradicate the disease at the continent scale.

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3. **Wildlife-livestock interactions**
4. Frequency of contact with buffalo and transmission of foot-and-mouth disease in cattle populations at the periphery of protected areas in Southern Africa

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