The potential role of *Ornithodoros sonrai* soft tick for the transmission of African Swine Fever virus in Senegal

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Background

African Swine Fever (ASF) has become endemic in Senegal since its introduction in 1987 and has caused substantial losses to farms in affected regions. The virus is transmitted between domestic pigs through direct contact or through a sylvatic cycle involving warthogs or bush pigs and by soft ticks of the *O. moubata* group in East Africa and *O. erraticus* in North Africa and Europe. Neither of these tick species is present in Senegal, but soft ticks of the *O. sonrai* group were recently found in rodent burrows near pig farms.

This study aims at investigating the potential importance of the tick species *O. sonrai* for the transmission of ASF.

Approach

- Investigate occurrence of ticks in pig pens
- Determine host preference of *O. sonrai* through analysis of tick blood meals
- Test ticks for presence of ASF viral DNA
- Assess vector competence of *O. sonrai* for ASF

Sampling sites

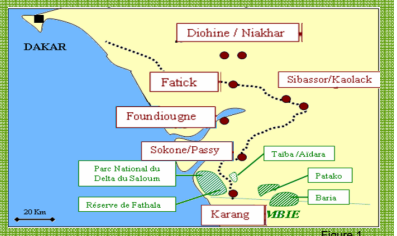

Figure 1

Occurrence of ticks in pig pens

101 pig-farms in eight locations of the ASF affected Sine Saloum region and four warthog habitats were inspected (Figure 1).

Infestation of rodent burrows with *O. sonrai* was found on 44 farms (43.6%, CI95%: 33.9-53.3%). These burrows were located within 10m from the pig-pens. Around 800 ticks were collected.

On four farms ticks were found in rodent burrows inside the building, hence a transmission cycle tick-pig is possible *and O. sonrai* could act as a reservoir.

No *O. sonrai* ticks were found in warthog burrows (under termite buildings). Even though presence in close rodent burrows was confirmed, a transmission cycle tick-warthog seems unlikely.

Host preference

Relatively little is known about *O. sonrai* and its preferred environment, but they are most often found in rodent burrows (Vial et al., 2006).

To assess host preference of *O.sonrai*, tick samples are being tested for the presence of vertebrate specific Cytochrome B using an adapted PCR protocol developed for identification of mosquito blood meals (Lee et al., 2002).

Amplified Cytochrome B fragments isolated from ticks are being sequenced and compared with potential hosts such as pigs, cattle, human, warthog, mice, rats, and other rodents.

This part of the study will give important information to describe the ecological preferences and contiguous habitat of this tick species.

Presence of ASF in ticks

Using a highly sensitive nested PCR protocol with an internal control plasmid (Basto et al., 2006), ticks are tested for the presence of viral DNA.

Assuming a population of 20-100 ticks and a prevalence of 50% in a ASF positive burrow, the probability of diagnosing at least one tick is 96.75-97.96% when 5 ticks per burrow are tested.

Preliminary results: of 80 tested ticks representing different burrows, three were positive for ASF. One of these ticks was positive and two ticks were negative in repeated analysis. This could indicate low virus titres.

Testing of PCR positive samples using haemadsorption and immunofluorescence assays was inconclusive, confirming the likelihood of low virus titres.

Vector capacity

O. sonrai was found to have similar vector capacity for *Borrelia spp.* as other *Ornithodoros* ticks (Vial et al., 2006).

To test whether the same is true for ASF virus, colonies of *O. sonrai* are being reared for experimental infection.

To obtain infection rate of the ticks, the colonies are experimentally fed with ASF positive pig blood, two different virus strains will be used.

Virus titre is being monitored over time using real time PCR to assess if and how long after infection, virus replication is taking place.

The same test protocol is run in parallel in *O. moubata* and *O. erraticus* ticks, which will allow the direct comparison with tick species known to act as a reservoir for ASF.

Vertical transmission (trans-ovarial and trans-stadial) as observed in other *Ornithodoros* ticks will be assessed.

Conclusions and Outlook

The preliminary results of this study indicate that *O. sonrai* has a potential role in the transmission of African Swine Fever in Senegal. To what extent ticks are important for the transmission depends on the outcome of the host preference study and the detection of ASF virus in the collected ticks. However, even if prevalence in ticks is found to be low, it should not be neglected that *O. sonrai* might act as a reservoir. To thoroughly assess this possibility, the outcome of the vector capacity study will be of utmost importance.

References

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