Health, zoonotic pathogens and parasites

Tick-borne transmission of African swine fever virus in wild pigs: insights from Europe for preparedness in the USA

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With its spread to the Caribbean basin, African swine fever virus has become a global panzootic of both wild and domestic suids. While the majority of transmission occurs from pig to pig or from fomite to pig, vector-borne transmission via Argasid soft ticks occurs in a sylvatic transmission cycle in Africa. In the Iberian Peninsula, soft ticks are associated with pig farms, and have been implicated in outbreaks of African swine fever. For example, the relevance of soft ticks in transmission was demonstrated in Spain in free ranging pigs living in old facilities (stone-made, extensive farming), but not for wild boar. Using lessons learned from the European experience with African swine fever and its tick vector, we created a species distribution map for *Ornithodoros turicata*, a soft tick in Florida, USA, and estimated contact rates between soft ticks and invasive wild pigs in order to develop a risk model for vector-borne transmission of African swine fever virus. Florida is considered a region at high risk for the importation of African swine fever virus, both because of its proximity to the Caribbean basin, but also because it has >1 million invasive wild pigs.

To create data for the model, we conducted stratified random surveillance of soft ticks in animal burrows throughout Florida. Using soft ticks collected from the sampling effort, we estimated contact rates between wild pigs and soft ticks by conducting molecular-based bloodmeal analysis. We surveyed 591 burrows at 113 sites across Florida, and collected ticks by vacuuming substrate from animal burrows and then sifting the substrate for ticks. 54% (61 of 113) of the sites had burrows that were occupied by *Ornithodoros turicata*. Of the 61 occupied sites, 10 sites had ticks with pig blood in their abdomen. Three additional sites had evidence of recent pig activity around the burrows. Taken together, 21% of sites had soft ticks that had either recently parasitized a wild pig, or a wild pig had come into the proximity of an infested burrow. These results strongly suggest that should the African swine fever virus establish itself in invasive wild pigs in Florida, there would be a high likelihood that it would also become endemic in soft ticks. Outbreak response plans should include a soft tick surveillance protocol, and based on a specific response plan African swine fever virus should be detected in *Ornithodoros turicata* in Florida.