2022_84_SPH_Donnelly: Countering the threat of African Swine Fever to Borneo’s Bearded pig

Supervisors: Prof Christl Donnelly (mailto:c.donnelly@imperial.ac.uk); Prof Robert Ewers

Department: School of Public Health

African Swine Fever (ASF) has breached the island of Borneo where it is devastating populations of the Bearded pig *Sus barbatus*. The first outbreak was reported in the Malaysian State of Sabah in mid-February 2021 and in less than 8 weeks it drove a precipitous decline in this IUCN Vulnerable species, which is both an ecosystem engineer and the dominant game animal.

ASF can have a 100% mortality rate in the closely related wild boar *Sus scrofa*, but transmission and lethality rates in other species have not been documented. The new outbreak in Borneo provides a globally unique opportunity to characterise the transmission dynamics and control of this important pathogen. This work is crucial: Bearded pigs are possibly the single most important species in the Bornean environment and their loss will have cascading effects on society and the rainforest environment.

We will address ASF transmission in Bearded pigs through two complementary objectives: (1) urgent data gathering to describe the rate and pattern of ASF spread, along with relevant environmental and anthropogenic correlates of ASF spread; and (2) fitting transmission models to gain insight into ASF transmission. An immediate pathway to impact will be using these models to gain insight into the impacts of possible control strategies.

Data gathering: Our initial focus is on collecting data on the spatial spread of ASF using citizen science. We will need to confirm the cause of death from selected reports, conducting field work to visit reported carcasses with collaborators from the Sabah Wildlife Department and extending into Sarawak, Kalimantan (Indonesian Borneo), and Brunei. Samples from these carcasses will need sequencing to confirm the presence of ASF. We need to rapidly map pre-ASF, and collect new camera trap data on post-ASF, Bearded pig population density, group sizes, and age distribution across Borneo using archived camera trap data. We will also collate data on Bearded pig movement behaviour, including migratory routes. We will map hunting pressure and collate data on domestic pig farming, including farm locations, sizes and movement of livestock among them. Finally, we will urgently compile all of the above information into a Geographic Information System, along with digital maps of relevant variables that may influence the spread of ASF.

Transmission model: We will parameterise a spatially explicit model of ASF spread. The modelling will be used to: (1) gain early insights into the rate of spread and the most likely trajectories of ASF across Borneo as well as its local impacts on Bearded pig populations; and (2) examine the relative importance of human-assisted versus natural pig movements on ASF spread. Finally, we will seek to address a critical question: Will ASF become endemic in Borneo as it has in Europe’s wild boar, or will it drive the Bearded pig to extinction?

For more information on how to apply to us please visit: https://www.imperial.ac.uk/grantham/education