Biomathematics Seminar Series

Department of Mathematics and Statistics

Anthrax-rabies interactions in zebra-jackal cycles

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Etosha National Park (ENP) is located in Namibia, where an annual anthrax outbreak (caused by Bacillus anthracis) occurs among grazing animals such as zebras. This increases the number of carcasses in ENP, allowing for scavengers such as jackals to feed off these carcasses. Carcasses provide a location of conspecific interaction between jackals and may be a means of disease transmission among the jackals. We study how disease in the zebra population may help to propagate a different disease (rabies) in the jackal population. How do anthrax and rabies affect each other's ability to spread? Standard qualitative analysis techniques on a compartmental ODE model distinguish outcomes (stable equilibria) using reproduction numbers as threshold quantities. We found that rabies helps anthrax, and a little anthrax helps rabies invade, but a lot of anthrax prevents rabies by reducing the jackal population through its food source.

*Joint work with Crystal Mackey.

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