

# Spread of plant diseases by insects can be described by equations that model interplanetary gravity

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Researchers from Penn State University and the University of Virginia show that the spread of diseases by insects can be described by equations similar to those that describe the force of gravity between planetary objects. Their findings are detailed in the September issue of *The American Naturalist*.

Insects tend to transmit diseases in the course of feeding on plants, and their movement between plants is influenced by plant quality (how good of a meal they'll get) and the distance between plants, or, how far they'll have to travel to get to the next meal, explain Matthew Ferrari, Jessica Partain, Janis Antonovics, and Ottar Bjornstad.

"It turns out insects are more likely to move shorter distances between better plants," write the authors. "Interestingly, then, the probability of disease being passed between two plants goes up if they are closer and/or better, which parallels the stronger gravity between closer and larger planets."

The researchers tracked a fungal disease spread by bees and moths in the course of pollinating and feeding on nectar from white campion flowers at the University of Virginia's Mountain Lake Biological Station. As predicted by the behaviour of insects, the disease was more likely to spread shorter distances between plants that had many flowers.

"This implies that knowledge of insect behaviour can lead to better prediction of where disease will spread," explain the authors. In fact, these patterns are not limited to diseases of plants or diseases carried by insects. Bjornstad and colleagues have previously shown that similar patterns describe the spread of measles among cities, because people tend to travel more between large towns or only short distances.

Source: University of Chicago

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