Team uncovers how microsporidian parasites prevent locust swarm behavior

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Grassopper of Acrididae family: Anacridium aegyptium. Credit: Alvesgaspar/Wikipedia.

(Phys.org) —A team of researchers in China, with assistance from U.S. entomologist Raymond St. Leger has uncovered the means by which a microbe can reduce swarming tendencies in locusts. In their paper published in *Proceedings of the National Academy of Sciences*, the team

describes how they were able to isolate the mechanism by which *Paranosema locustae* infections in locusts' leads to less pheromone production and release in scat, which in turn causes less swarming response in other locusts.

Scientists have known for some time that *P. locustae* infections in individual locusts leads to less swarming in locusts around them. What was not known was how it happened. To find out the researchers with this new effort infected several locust specimens with *P. locustae* and then set them in chambers with uninfected locusts to see how they would respond. The team found that the infected locusts caused less swarming behavior in the healthy locusts, proving that there was truly a connection.

Next, the team analyzed the scat from the infected locusts and compared it with the scat of healthy locusts—the two had different levels of the type of pheromones that have been suspected as signals between locusts—that convinced the team that the means by which the microbes were able to cause a reduction in swarming behavior was by causing a reduction in the production of pheromones in the infected locusts. Finally, to learn how the microbes were causing pheromone level changes in the locusts, the researchers examined the guts of both healthy and infected locusts. That led to the discovery that infected locust guts were more acidic than non-infected locusts, which led to a dampening of pheromone levels.

The researchers are still puzzled as to why *P. locustae* would "want" to cause less swarming, as doing so would seem to lead to more difficulty in spreading from one of the insects to another. They are hopeful more research will solve the puzzle and in the meantime believe it might be possible to develop a pheromone based agent for use on crops to prevent them from being destroyed by swarming locusts, as a replacement for the toxic chemicals now in use.

More information: "Unveiling the mechanism by which microsporidian parasites prevent locust swarm behavior," by Wangpeng Shi et al. *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.1314009111