

Fungal infection and gender confusion in the wing-banger cicada *Platypedia putnami*

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Abstract

Platypedia putnami, a cicada active in the early summer of each year, inhabits mixed coniferous forests of the southern Rocky Mountains. We observed in a population of *P. putnami* in the San Mateo Mountains of New Mexico, that 1-2% of the adult cicadas were infected by a fungus yet to be identified, but probably of the genus *Massospora*. Though both males and females are susceptible to infection, a sample of 22 individuals revealed a higher frequency of infection among males (Chi-square=14.7, $P < 0.001$, $df = 1$). The fungus destroys the posterior abdomen, including the genitalia, of the cicadas, rendering them unable to mate. However, the cicada thorax and appendages remain intact and apparently function normally. Consequently, locomotion and courtship signaling (i.e., crepitations, or wing-banging) of infected cicadas were not obviously impaired. Infected individuals exhibited courtship signaling with characteristics intermediate between those of uninfected males and females. In focal studies of 14 infected individuals, all exhibited courtship signaling and constant movement toward other signaling cicadas, regardless of sex. In every focal study, the infected cicada made abdomen-to-abdomen contact with at least one other cicada. Results suggest that the fungus has evolved to permit and even induce infected cicadas to make contact with any sexually receptive conspecific cicada, as well as to solicit contact from other cicadas. This is perhaps a way the fungus can be transmitted to new host individuals.