Scent of a killer: How killer yeast boost its dispersal

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Abstract

Vector-borne parasites often manipulate hosts to attract uninfected vectors. For example, parasites causing malaria alter host odor to attract mosquitoes. Here we discuss the ecology and evolution of fruit-colonizing yeast in a tripartite symbiosis – the so-called "killer yeast" system. "Killer yeast" consists of *Saccharomyces cerevisiae* yeast hosting two double stranded RNA viruses (M satellite dsRNAs, L-A dsRNA helper virus). When both dsRNA viruses occur in a yeast cell, the yeast converts to lethal toxin-producing "killer yeast" phenotype that kills uninfected yeasts. Yeasts on ephemeral fruits attract insect vectors to colonize new habitats. As the viruses have no extracellular stage, they depend on the same insect vectors as yeast for their dispersal. Viruses also benefit from yeast dispersal as this promotes yeast to reproduce sexually, which is how viruses can transmit to uninfected yeast strains. We tested whether insect vectors are more attracted to killer yeasts than to non-killer yeasts. In our field experiment, we found that killer yeasts were more attractive to *Drosophila* than non-killer yeasts. This suggests that vectors foraging on yeast are more likely to transmit yeast with a killer phenotype, allowing the viruses to colonize those uninfected yeast strains that engage in sexual reproduction with the killer yeast. Beyond insights into the basic ecology of the killer yeast system, our results suggest that viruses could increase transmission success by manipulating the insect vectors of their host.

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