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PATHOGEN GROWTH RATE IS CONSTRAINED BY HOST DIET

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The use of bacteria and other pathogens as biological pesticides against insect crop pests is growing due to environmental concerns over traditional chemical pesticides. However, we have only a rudimentary understanding of how factors such as host nutrition impact on the efficacy of biopesticides. The Egyptian cotton leafworm, *Spodoptera littoralis*, is a major pest throughout much of Africa. Several studies have shown that the outcome of host-pathogen interactions in this and related species varies with dietary macronutrient composition, with individuals on a higher-protein diet inhibiting disease progression for longer. Using the gram-negative entomopathogenic bacterium *Xenorhabdus nematophila*, we investigated the nutrition dynamics in the host-pathogen relationship from the perspective of the parasite. Synthetic haemolymphs (bloods) were designed to replicate the *in vivo* host nutritional state when fed on a range of diets varying in their macronutrient compositions. We found that the *in vitro* population growth profiles of *X. nematophila* cultivated in these synthetic bloods varied in a consistent manner, reflecting our *in vivo* findings; bacterial replication rate decreased inversely with solution protein content. This implies that the insect's preference for dietary protein may not only boost immune function, but may directly inhibit pathogen proliferation, further increasing the host's chances of survival.

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