Title:	Molecular signatures of nicotinoid-pathogen synergy in the termite gut
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Abstract:	Previous studies in lower termites revealed unexpected synergies between nicotinoid insecticides and fungal entomopathogens. The present study investigated molecular mechanisms of nicotinoid-pathogen synergy in the lower termite Reticulitermes flavipes, using the nicotinoid, imidacloprid, in combination with fungal and bacterial entomopathogens. Particular focus was placed on metatranscriptome composition and microbial dynamics in the sym-biont-rich termite gut, which houses diverse mixes of protists and bacteria. cDNA microarrays containing a mix of host and protist symbiont oligonucleotides were used to simultaneously assess termite and protist gene expression. Five treatments were compared that included single challenges with sublethal doses of fungi (Metharizium anisopliae), bacteria (Serratia marcescens) or imidacloprid, and dual challenges with fungi + imidacloprid or bacteria + imidacloprid. Our findings point towards protist dysbiosis and compromised social behavior, rather than suppression of stereotypical immune defense mechanisms, as the dominant factors underlying nicotinoid-pathogen synergy in termites. Also, greater impacts observed for the fungal pathogen than for the bacterial pathogen suggest that the rich bacterial symbiont community in the R. flavipes gut (>5000 species-level phylotypes) exists in an ecological balance that effectively excludes exogenous bacterial pathogens. These findings significantly advance our understanding of antimicrobial defenses in this important eusocial insect group, as well as provide novel insights into how nicotinoids can exert deleterious effects on social insect colonies
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