RECENT RESEARCH ACTIVITIES

# Comparison of behavioral changes in the termite, *Coptotermes formosanus* (Isoptera), inoculated with six fungal isolates

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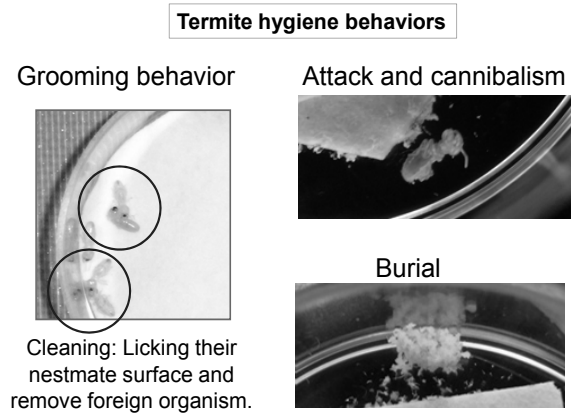
Hygiene behaviors in termites play an important role to protect the insect from pathogenic infection. To clarify the termite behavioral responses after their contact with pathogens, we compared behavioral changes in the subterranean termite *Coptotermes formosanus* caused by contact with entomopathogenic fungi with different levels of virulence.

When untreated termites were allowed to contact their fungus-inoculated nestmates, mutual grooming was frequent during 30 min after inoculation. Since the inoculated termite were often attacked and eaten by their uninoculated nestmates, and then buried after death, these behaviors were also examined. Although no influence of fungal virulence were observed in these behaviors, the fungal isolates and genera affected not only the frequency of the mutual grooming behavior but also the horizontal transmission pattern, the number of dead individuals and the survival period before the first death following infection. The results indicated that the pathogen-resistance behaviors of termites are affected by features associated with genera and isolates of fungi, but not by pathogen virulence.

The survey sites and protocols are as follows:




*Insects*

Matured termites, *C. formosanus*, were obtained from a laboratory colony maintained since 2002 (Okayama, Japan) in the dark at 28 ºC and more than 85% R.H.

*Fungi*

Three isolates of highly virulent entomopathogenic fungi, *M. anisopliae* 455, *I. fumosorosae* K3 and *B. brongniartii* 782, and three low-virulence isolates, *M. anisopliae* UZ, *I. fumosorosae* 8555 and *B. bassiana* F1214 were selected. Termites show 90–100% mortality on highly virulent fungi and 10-50% mortality on low virulent fungi at 7 days after inoculation, and there are 10- to 100-fold difference in $LD_{50}$ between lower- and higher- virulence fungi when 5 termites are kept in a dish.

*Bioassay*

Termite behaviors were observed daily under the microscope and compared between fungi treated population and non-treated population.

This study provides the first information that termite increased their hygiene behaviors to resist against infection of entomopathogenic fungi. Beside the result suggests that the pathogen-resistance behaviors of termites are affected by features associated with genera and isolates of fungi, but not by pathogen virulence.

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