Appendix S7

Indirect control of decomposition by an invertebrate predator

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Appendix S7 Maximal model structures of the linear and generalised linear mixed effects models used to analyse data.

Maximal model structure	Model type
Effect of ant suppression on ant abundance	
a) mean ant activity score ~ treatment + (1|date)	lmer
Responses of termites to ant suppression	
b) termite abundance ~ treatment + (1|OLRE) + (1|site), family = poisson(link='log')	glmer
c) sheeting length ~ treatment × month + (1|site)	lmer
Role of termites in decomposition	
d) sheeting presence ~ percentage mass loss + (1|site/plot), family = binomial (link = 'logit')	glmer
Effect of ant suppression on decomposition in open and closed bags	
e) logit transformed proportional mass loss ~ treatment × bag type + (1|site/plot)	lmer

Notes: Where treatment is included in the model, there are two levels: ant suppression and control. Where the random effects structure is site, this was to account for lack of spatial independence between plots where there was one observation per plot (models b and c). Where the random effects structure is 'plot' nested within 'site' (models d and e), this was to account for lack of spatial independence between multiple observations in each plot, and because plots are not spatially independent within sites. In all cases, data for each substrate was analysed separately. For specific models:

a) The response variable, ant activity score, was calculated by averaging the scores from all bait cards per monitoring date for each treatment (giving one mean activity score for ant suppression and one for control on each monitoring date). 'Date' was coded as a 'date' variable in R.
b) We used a 'poisson' error term with a log error structure as the response variable is count data. Termite abundances from individual soil pits were pooled within each plot to give one observation

per plot. We included an 'observation-level-random-effect' (OLRE) to account for overdispersion in poisson glmers.

c) The response variable, sheeting length, is the length of sheeting recorded on each 200m transect in each plot. Month was included as a fixed effect because we expected that termite activity would be dependent on seasonal effects.

d) The response variable, sheeting presence per bag, was a binomial variable where each decomposition bag was given either a 1 (sheeting present) or a 0 (sheeting absent). The binomial error term and logit error structure were used to account for the binomial distribution of the response variable. We used data from all collection time points in these analyses to capture the full scale of termite attacks on the substrates. Only data from open (termite-accessible) bags were used.

e) The response variable was the proportional mass loss of substrates per bag, and was logit transformed to meet Gaussian assumptions as advised for proportional data (Warton & Hui 2011).

Warton, D.I. & Hui, F.K.C. (2011) The arcsine is asinine: the analysis of proportions in ecology. *Ecology,* **92,** 3-10.