

Response to Initial Submission

07-Apr-2010

Dear Prof. McGlynn,

Manuscript ID JTE-10-066 entitled 'A thermophile in the shade: light-directed nest relocation in the Costa Rican ant *Ectatomma ruidum*' which you submitted to the Journal of Tropical Ecology, has been reviewed. The comments of the reviewers are included at the bottom of this letter.

The reviewers have recommended publication, but also suggest major revisions to your manuscript. Therefore, I invite you to respond to the reviewers' comments and revise your manuscript. Normally I would return an annotated copy of the manuscript but you submitted pdf which I cannot edit. Please do not submit pdf next time.

[how to use online system]

If it is not possible for you to submit your revision within six months, we may have to consider your paper as a new submission.

Once again, thank you for submitting your manuscript to the Journal of Tropical Ecology and I look forward to receiving your revision.

Yours sincerely,

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Editor in Chief, Journal of Tropical Ecology

Reviewer(s)' Comments to Author:

Reviewer: 1

Comments to the Author

This article reports results of a short-term field manipulation at LaSelva. The authors added shade and/or food to square meters of forest floor in a 2x2 factorial design, and then watched to see if those manipulations had effects on the density of their focal ant species.

The paper is curious in what it chooses to include for results. The first line states that the initial nest densities were equal across treatment groups, which led me to expect additional results on nest densities. However, the only data reported here are instances of immigration to the forest patches that were watched. I suspect that translated into nest densities, but it actually is not clear.

It becomes important to see the data expressed in that form when the reader tries to understand the discussion section. The authors set out originally to explain why *E. ruidum* appears to reach high densities in areas of the forest that are well-lit. So density is the variable of interest to begin with, and the discussion interprets the results in that light. Thus the authors must establish a link between immigration (what they measured) and overall nest density (what they set out to explain).

Reviewer: 2

Comments to the Author

This manuscript reports data from an experimental manipulation to ascertain whether a widespread neotropical ant, *Ectatomma ruidum*, relocates nests to more favorable sites associated with increased food availability or a better microclimate (related to solar insolation). Ant emigration is a little-studied phenomenon, and probably much more common than believed. So I think this manuscript is a solid contribution that should be published. In general it is well-written and easy to follow the arguments.

As indicated below, however, I think it could be made stronger with some revisions and hopefully the addition of more information. First, I think the reader probably needs a little more background information on *E. ruidum* foraging behavior. It is worth pointing out that they are highly omnivorous (this is alluded to by stating they eat peanut cheese, cookies and tuna, p. 4, line 37, but it will not click with a number of readers), including scavenging dead insects, and when it comes to food and foraging behavior, they are also champion learners (e.g., Schatz et al. 1999 *J Exp Biol*; Franz & Wcislo 2003; *J Insect Behav*), including for example, ambushing bees as they return to their nests (Wcislo & Schatz, *BES* 2003; Schatz & Wcislo 1999, *J Insect Behav*). I think these facts are important because it shows they are highly attuned to food and its spatial and temporal variability.

To my knowledge the authors are correct that this is the first report of colony emigration in *Ectatomma ruidum*. I wished that the authors had provided more information on the colony movements themselves, nest re-establishment, etc. even if they are anecdotal. Were none of the colony movements observed? No transfer of brood? No nest excavations or accumulation of excavated soil around the new entrance? Apart from the general interest in any such observations, they would immediately dispel the potential criticism that the "new nests" were (alternatively) simply overlooked during the initial establishment of the plots. Given the numbers, I personally do not think such a criticism is warranted, but the manuscript is somewhat open to it.

I think the Discussion also could profit from some additional effort. I think the authors are too quick to jump into the "interspecific competitive exclusion" argument to explain the apparent paradox that these ants prefer shade but are competitively excluded by other species. In this context I think the paper by Levins & Franks (*Ecology* 1982) should be considered, especially since it also deals with the spatial distribution of *E. ruidum* and other soil nesting ants. The argument that this species is competitively excluded is difficult to square with its incredibly high density in many places, including older growth forest on BCI. Likewise, I think it is important to consider the argument made by Slobodkin 1962, *Growth and Regulation of Animal*

Cover Letter for Revised Manuscript

We are pleased to resubmit our article entitled, “A thermophile in the shade: light-directed nest relocation in the Costa Rican ant *Ectatomma ruidum*.” We have made the changes prescribed by the reviewers, which we explain in detail below.

Reviewer 1 presented a suggestion that helped us improve the paper. As our work was directed at understanding preferred microhabitats and nest movements, we have deemphasized our mentions of nest density from prior work so that readers may focus on our specific aims.

Reviewer 2 prescribed a number of small changes (with respect to word choice and formatting) to fix the paper, which we have made. We also have provided additional information about the biology of this species as requested, citing additional information about its foraging behavior. We also provided more information about the natural history of nest movements that we inferred during our experiment.

We changed the discussion about the interpretation of the results, and indicated as the reviewer argued well that interspecific competition was an unlikely cause for the observed pattern. We added a paragraph about the artefacts of experimentation so that shade does not mimic natural forested shade, and also suggested that differences in colony sizes could explain the well-documented differences between shaded and sunny habitats.

The only recommendation that I did not adopt was the elimination of Table 1. I did this as the reviewer was full of great ideas, but I saw that the information was a jumble of symbols and numbers that was more difficult to comprehend than in the table, which is how GLMM results are most often presented in other studies. If you feel that the data belongs in the text instead of a table, though, I'd be pleased to make the change back from the table to the text.

I look forward to your decision.

Sincerely,
Terry McGlynn, Ph.D.
Associate Professor of Biology

Response to First Revision

04-Jun-2010

Dear Prof. McGlynn,

I have been through JTE-10-066.R1 entitled 'A thermophile in the shade: light-directed nest relocation in the Costa Rican ant *Ectatomma ruidum*' which you submitted to the Journal of Tropical Ecology.

I am happy with the revision. Please see minor corrections required on the attached copy of the manuscript.

[how to use the online system]

Once again, thank you for submitting your manuscript to the Journal of Tropical Ecology and I look forward to receiving your revision.

Yours sincerely,

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Editor in Chief, Journal of Tropical Ecology