Initial submission: Editor's reply to Initial Submission

Dear Prof. McGlynn,

Manuscript ID BITR-08-070 entitled "Stoichiometric determinants of ant nest density, size, diversity, and growth in a Costa Rican tropical wet forest" which you submitted to Biotropica, has been reviewed. The comments from reviewers and Subject Editor are included at the bottom of this letter.

We received comments from only one reviewer reviewer, but the comments raise some important points about the relevance of the manuscript in terms of the relative weight given to variables of apparently limited explanatory power. In view of this issue, and to avoid delaying the decision further, I have decided to decline the manuscript for publication in Biotropica at this time. I do, however, encourage you to submit a new manuscript that takes into consideration these comments, as the manuscript overall deals with an interesting subject. This would obviously require reflection on the reviewers comments and, if you recognize their validity, a considerable rewriting of the manuscript. Alternatively, you would need to convince me that the reviewer's comments are not valid, and if I am indeed convinced, then I would send the manuscript to an additional reviewer.

Please note that resubmitting your manuscript does not guarantee eventual acceptance, and that your resubmission will be subject to re-review before a decision is rendered. Please submit a cover letter with your revised manuscript in which you detail your responses to the reviewers' comments and describe the changes made to the manuscript.

Resubmission Reviews:

Subject Editor Comments to the Author:
This paper is potentially of great interest in understanding the abiotic and biotic drivers of diversity and distribution at the meso scale in tropical forests. However, there are methodological issues raised by Reviewer 1 that need to be addressed by the authors.

Reviewer: 1
Comments to the Author: Do not include your recommendation to accept or reject the paper in these comments.
In this paper, McGlynn and colleagues seek to explain spatial variation in nest density, species richness, and nest demographics at La Selva. It builds on a growing body of work linking stoichiometrics to community- and ecosystem-level patterns and processes.
Though I am always fascinated by papers on tropical ant communities, I found this one to be a bit perplexing. Unless I' m missing something, there were about 70 species and 20 or so genera that were collected. Of those 70 species/20 genera, we see that nest density was always best predicted by litter biomass; nest size was best predicted by either soil C:P or soil Mg. Species richness was best predicted by litter biomass, with Soil Fe and Soil Al accounting for an additional 11% of the variation. My read is that soil stoichiometry isn' t as important as the amount of litter habitat. No one would argue with that, I think. But if litter accounts for nearly half of the variation (or more) in most of the response variables, and stoichiometry account for ~10-20% of the variation, why make such a big deal of it? That is, if I did a study looking at the determinants of lliana abundance in the tropics, and I found that the number of trees accounted for 50% of the variation, and soil moisture accounted for an additional 10% of the vari[redacted] I frame the entire paper around how soil

moisture affects lianas? Or would it be about how tree density affects lianas?
Why aren't the data from McGlynn 2007 used here as predictors in the model, if the links that McGlynn constructs go from, say, P to ant prey, to ants? Wouldn't a path analysis be useful here? And I don't really get how one can go from growth rate of ant colonies to productivity to richness.

So, my feeling after reading this paper is that it's easy to use existing data on soil nutrients from 18 plots in a regression model that looks at attributes of ant communities. Bu then, what do you get out of it, except that different taxa are correlated in different ways with the predictors.

Small comments:
Intro
Page 2:
2,6: change "nearly all" to "a substantial portion"
2, 15-19: what about Gotelli and Ellison's paper in 2002 – was that a mesoscale study?
3,8: minimize may explain; mix in "may account for"; my own view is that "explain" is too strong a word.
4,6: Hölldobler has the two little dots over the first o.
4,10: change to "unlike many other invertebrate taxa
"
Productivity estimates: productivity, at least in the plant world, is an estimate of a rate. Here, the authors use productivity to mean something else that might be related to a rate, but it's unclear. I'd like to see it fleshed out a bit more.

Reviewer 2

Overview
The paper is well written and concise. It provides further understanding of the underlying controls that determine the spacing of ants and their nests in a tropical environment. I have mainly commented on typographical issues.

Specific comments:
Abstract
Pg 2 line 5. Comma after here in 'Here we measure….'
Pg 2 line 9. Should carbon and phosphorus be in capitals? The elements throughout the ms are variable in their capitalization.
Introduction
Pg 3 line 6. '…density and richness' add "of a community."
Pg 3 line 10. '…and potentially size…' size of what?
Pg 4 line 14 and line 18. Is there a reason why the bracket style for element symbol don't match?
Pg 4 line 23. The elements do not require capitalisation.
Pg 5 line 3. Give a few examples of rare micronutrients.
Pg 5 line 3. Spelling 'accelerate'
Pg 5 line 20. 'Here...' add comma after here.
Methods
Pg 6 line 17. Please have a space between a number measure and its units. Make it

consistent throughout, i.e. 1 m2. And is a dash necessary between 10 and m?
Pg 7 line 2. (10 cm depth) and (2 mm)
Pg 7 line 4. Ensure same style of brackets is used for element symbol.
Pg 7 line 5. What is an ICP-AES?
Pg 7 line 8 and 9. Authors have written out elements before using the symbols, same must be done for the elements in this line. Aluminuim, Calcium etc.
Pg 7 line 9. Is the Varian SpectrAA a registered trademark? If so, indicate with a ®.
Pg 7 line 11. Over six months.... Remove 'over.'
Pg 7 line 12 0.25-m2 remove dash, insert space.
Pg 7 line 13. 'a ground level square...' of what material?
Pg 7 line15. What is reproductive litter?
Pg 7 line 15. Degrees sign is missing from temperature.
Pg 7 line 19. Space. 1 m2
Results
Pg 9 line 15. Is a period and a dash necessary at paragraph beginning? Ant densities.-
Pg 9 line 22. Please ensure that all *P* (in *P* values) are capitalised and italicised.
Pg 10 line1, line5, line7. Ibid.
Pg 10 line 11. '(r2 < 0.01).' Keep format consistent with r squared results in line 5 on same page. Add in F and *P* values.
Pg 10 line 14. Spelling of parsimonious.
Pg 10 line 19, line 20 line 21. Italicise *P*.
Pg 11 line1. Write out Figure rather than abbreviating to Fig.
Discussion
Pg 12 line 8. 'That *Pheidole*....' Change to "The fact that *Pheidole*....
Pg 12 line 17. P should be written out (Phosphorous) as it is at the beginning of a sentence.
Pg 13 line 9. Please explain 'odd-numbered trophic cascade....'
Literature cited
Cleveland *et al.* 2006, Colwell 2005, Gattuso *et al*. 1999, Kaspari *et al*. 2001, Waide *et al*. 1999 could not be found in text.
Check that all book titles and journal names are in capitals and italics.
Pg 15 line 21. Estimates should be EstimateS
Pg 16 line 8. Period missing after E in S.E Hobbie.
Pg 16 line 14. Capitals
Pg 16 line 17 and line 19. No caps after a colon.
Pg 16 line 21. Capitalise title and check format for publisher and location; should be Belknap Press of Harvard University Press, Cambridge MA.
Pg 16 line 23, Check colon. Princeton:NJ
Pg 17 line 23. Remove caps after colon
Pg 18 line 4. Milton and Kaspari 2007. Not in press anymore- Oecologia 153:163-172.
Pg 19 line 21. Dodson, et al?
Table 1
Pg 21 Italicise and capitalise *P*
Figure Legends
Pg 22 line 13. Taking the mean of **the** all of the soil C:P values. Remove 'the'
Supplemental Table 1
Solenopsis *JTL-008* and *JTL 018*; remove italics in sp number
Insert space between sp and A in spA for all genera.

Final Covering Letter

24 July 2008

I am pleased to submit our second revision of our manuscript, "Litter biomass and nutrient determinants of ant density, nest size and growth in a Costa Rican tropical wet forest" to be reevaluated for publication in Biotropica.

We have made many changes following the recommendations of the reviewers. Below, I comment on these changes and provide a response to the few instances where I feel the suggested additions of text would hinder the readability of the manuscript.

I made all of the changes recommended by Reviewer 1, except for the inclusion of data on stray workers. I have not added data on stray workers for two reasons. First, our sampling technique was designed to specifically collect nests of ants and including workers on stray foragers would be heavily biased in favor of larger-bodied species. Second, because of this bias, we did not collect stray foragers so these data are not available. The other concern of this reviewer was that the one-time sample of nests would not provide a time-integrated measure of taxon-specific growth rates. I suspect this has not caused taxon-specific biases. In a previous study, I found that growth rates did not significantly vary over a five month period including major fluctuations in rainfall (McGlynn 2006 in Biotropica). Moreover, based on month-to-month variation in the flights of reproductives (Kaspari et al. 2001 in Behav. Ecol Sociobiol), it appears that any differences would not vary with the litter-dwelling taxa in the present study.

Reviewer 2 offers many detailed suggestions that would increase the accessibility of the manuscript. I have made most of the recommended revisions. In few instances, I have opted to make only slight for the sake of brevity and to maintain the flow of the manuscript. Specifically: I did not provide a detailed explanation of the statistics behind path analysis. I did not explain why we used mean values from six evenly spaced cores to characterize the soil of the plots while we used transects with ten quadrats to characterize the ant nests of the plots. (The short explanation is that there is very little variance in the soil nutrients of the plots and that six samples were more than adequate to characterize a site, whereas 10 ant quadrats were required to document the biology of the ant nests.)

Another request that I did not dwell on is trophic position of litter-dwelling ants, as the diets of nearly all of these ants are undocumented; for instance the suggestion a mention of *Pyramica* as predators on collembolans, though in the present study this is speculative. For these recommended changes, readers would learn about the natural history of ants in tropical rainforests (such as how their nests are stuctured, what we suspect they eat, and how tiny their nests are), but would be distracted from the central issue in the manuscript. If in your editorial opinion you think the paper would be strengthened by these additions, please let me know and I'll make the changes.

I made all of the changes recommended by Reviewer 3, except those that were not in form with the format of Biotropica (such as italizing the statistic P and journal titles).

I value the insights of the reviewers and am believe that this manuscript is much tighter and clearer.

Sincerely,

[submitted electronically]

Terry McGlynn