30-Sept-2016

Dear Editor,

Thank you for the invitation to submit a revised version of our manuscript ECY16-0167.R2, entitled ‘Caterpillar seed predators mediate shifts in selection on flowering phenology in their host plant’.

We have now carefully addressed all the edits suggested by the editor. We provide below a list of responses to several of the issues addressed. Otherwise, we agree with the changes suggested by the editor and we have modified the text accordingly.

Thanks again for your consideration of our manuscript.

Yours sincerely,

Alicia Valdés, on behalf of both authors

Response to review

Editor’s comments

*110.  For accuracy, you should state here if shoots were selected randomly or haphazardly.*

The focal shoot was not selected randomly. Instead, we visually evaluated the height of all the shoots belonging to the same individual, and selected the one having median height as the focal shoot. We have tried to clarify this now, by writing “For recordings, we selected one focal shoot in each individual as the one having median length among all the shoots belonging to the same individual”.  
  
*135.  I am sorry to have to return to this section, which has been confusing to reviewers and I'm still confused by your explanation.  I have no objections to your methods, I'm just going in circles with the language of these few lines.  First, what does it mean for two individuals to have "the same difference" in developmental stage?  Do you mean at two points in time? The two individuals shift their phenology across time? or the "difference" is between individuals at different times?  I'm thinking that my confusion stems from that (and from "equal differences" in developmental stage), and the next couple of lines don't work because of that confusion.  Please take another shot at re-writing this.*

We agree that our explanation still was not clear enough. In particular, the meaning of “the same difference” might have been confusing. What we are referring to is that a given difference in development at a given point in time might be associated with smaller or larger differences in date of first flowering depending on temperatures. We have now tried to rewrite this part to clarify our reasoning, and now provide a more specific example. We hope that the explanation is now easier to understand.

*211.  Maybe this is correct (in which case don't change it) but it seems odd to me that your nested models would really have the "same causal structure."  If they had the same causal structure, what is the point of comparison?*

By “sharing the same causal structure” we meant that the nested models maintained the direction of the paths considered in the saturated model, i.e. the effects were in the same direction. But we agree that this could lead to confusion, and have now removed this statement.   
  
*286.  Should that be 22%?  As it is, 0.22% is implied.*

0.22% is correct. We now changed to 0.2 to avoid misunderstanding.  
  
*311.  It would be helpful if you suggested parenthetically why this might be.  For example: ". . . directly increasing fitness (for example through exposure to a different suite of pollinators), or from other...".*

This is mentioned earlier in this paragraph, but now we repeat it here: “directly increasing fitness, e.g. by increasing time and resources for seed maturation, …” .  
  
*319.  The logic of this paragraph is a tad slippery to me.  If you get a positive effect of later flowering after removing the effect of the eggs, wouldn't that suggest the importance of some other factor (such as exposure to a different set of pollinators, or better abiotic conditions, etc.).  Instead, you suggest an effect of escaping predation, after you have statistically removed the effect of predation.*

It is true that these analyses accounted for the effect of the total number of eggs that were laid on the whole shoot. However, phenology might not only influence the total number of eggs, but also the distribution of eggs among flowers within the shoot. Such effects on distribution among flowers within shoots were not accounted for in the analyses. Our point is that in early-flowering shoots all flowers are exposed to butterfly oviposition resulting in a relatively even distribution of eggs among flowers within shoots, while in late-flowering shoots late-opening flowers might often escape predation because they develop after the period of butterfly oviposition. As a result, a given number of eggs might result in that a higher proportion of fruits escape butterfly attack in late- than in early-flowering individuals (i.e. the eggs would be more aggregated in late-flowering individuals, and more evenly distributed among the different flower buds in early-flowering individuals). The implication of this would be that also some of the positive direct effects of a later flowering in the path models might be mediated by predation, and that the effects of phenology via predation are stronger than suggested than the path coefficients.

*336.  This has now been said many times, consider removing this sentence (the one that starts with "Because of its preference...").*

We have now merged this sentence with the previous one. Although it has been said before, this is our main finding so we would still want to highlight here that the butterfly mediates shifts in selection from favoring early to favoring late flowering.