

Review as text

This is the second round of revisions of this manuscript. The main results are that: both floral morphs of *Lgh* do not have differences in pollen and stigma shape; there is evidence of LSI acting in *Lgh*, but only on the L-morph; outcrossed pollen is more successful than self-pollen at fertilizing the ovules due to faster pollen tube elongation. The authors use these results to explain the puzzling observation that the L-morph floral is more common in invasive populations despite being SI. This is the first detailed report of LSI in *Ludwigia* and confirms the presence of LSI in a third family within the Myrtales order.

In my opinion, the manuscript, specifically the Introduction and Discussion, has improved substantially by implementing the comments from previous reviewers. As indicated in previous revisions, the methods and results are thorough and sound, and deserve to be published. However, some minor changes in the manuscript need to be made. For instance, some typos (that I indicate above) need to be corrected. I made several suggestions throughout the manuscript in the hope that they increase its readability. In my opinion, most of the suggestions can be implemented quite easily, except for changes in the 2nd part of the Discussion. These of course are suggestions and their suitability should be discussed between the authors and the editor.

Having said the above, I suggest that this paper should be recommended for publication in *PCI Ecology*, provided the authors make the specific changes above.

Abstract

L28: Use 'among' or 'between', but not both.

L31: Maybe change "... questions on the distribution of this breeding system ..." for "... contributes a case of LSI in an additional family within the order Myrtales.", or something similar.

Introduction

L47: Change 'promotes' for 'favors'. SI does not actively promote outcrossing (as in the case of heterostyly) but favors outcrossing.

L49: Eliminate "and fertilization in particular combinations of parents".

L53: Change "diversity" for "variation".

L55: Eliminate "Characterizing the type of SI individuals develop in a species by".

L56: Eliminate "first" or "essential". Keeping both is unnecessary.

L64-66: This sentence could be eliminated or moved to the first sentence of the paragraph. That way the last sentence of the first paragraph would be related to SI, giving a natural flow to the first sentence of the 2nd paragraph.

L72: Eliminate "... , or a continuous variation of floral morphologies not correlated with compatibility. "

L84: Change "occurring" to "it occurs".

L112: It would be good to also introduce and explain the other morph. For example "Conversely, in the S-morph ..."

L119-120: Reduce "... successful invasive species may be mostly composed of individuals able to reproduce using self-fertilization when mating" to "... successful invasive species are the ones capable of self-fertilization".

Methods

L169: Eliminate "usually"

L170: Change 'Opale' to 'Opedal'.

Results

L271-278: Please provide the average herkogamy (+- SD).

Discussion:

368: Eliminate the "from" in the natural populations.

385: Change "present" to "displays".

387-389: Change 'heterostylous' to 'heteromorphic'.

L401: It is unclear what the authors mean when saying "genetic ancestry between individuals may be limited". I think the sentences can be understood without it. IF this information is important, then the authors need to explain in MS why this is important. One or two sentences should be enough.

L384-421: In general this section needs a bit more of work. It feels like the connection between LSI and its presence in HetSI is not clear and the idea goes back and forth, specially in the first three paragraph of the section.

L409: Authors mention 'GSI system' that has not been specified anywhere else in the manuscript. I assume this is gametophytic SI. If so just state it.

L411: "..., most of the self-pollen" is imprecise. If you have the number (i.e., %90 of self-pollen tubes) it would be better to give specific information.

L416: Eliminate 'other'.

L420-421: Eliminate this sentence or fuse it with the previous. Otherwise sound like repetition.

425: Eliminate "at a low, stable rate". It is distracting in this sentence and it is imprecise. 'low' is a relative term, and is better used when comparing two different observations (e.g., lower than ... or higher than ...). A similar thing happen when using "stable".

L426: Eliminate "for some" and change "enabling" to "enables".

L425-428: This sentence has two main clauses (enables self-fertilization AND is present in multiple angiosperms) and is a bit hard to follow. I suggest the authors to split this sentence in two.

L430: I suggest to get rid of 'preferentially'. I think the sentence can be understood without it.

L431: Eliminate "some".

L459: Maybe add a sentence acknowledging that inbreeding depression could counteract the effect of selfing in local regeneration. A suggestion could be "Provided that inbreeding depression would not affect at later stages life cycle."

L460: Maybe change 'regenerate' with 'establish'.

L467: Change "..., better fitting Baker hypotheses." for ", providing support for Baker's Law.". Or if authors decide to keep it needs to be changed to "Baker's hypothesis".

L471: Red 'e' in where.

L473-475: This sentence is hard to follow. Specifically, "... invasive populations worldwide in different ecological contexts ...". I suggest to get rid of everything after 'invasive populations'.

Or break the whole sentence in two.

Fig2: Put '(b)' on the top-right corner for consistency with the other images.