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November 8, 2022

Dr. Ricardo Castro Santis
Editor Journal of mathematical modeling of biological systems

Dear Editor:

Together with this letter you will find the revised version our manuscript *Modeling macroparasite infection dynamics* by Gonzalo M. López and Juan P. Aparicio.

Following the observations of both referees we carefully rewrote the manuscript. Major changed paragraph are in red, while many typos were corrected but not highlighted.

I hope this new version would be suitable for publication in the Journal of mathematical modeling of biological systems.

Thank you for your attention.

Sincerely,

Gonzalo Maximiliano López

REPLY to the referees

Reviewer 1

We thank the reviewer for his/her careful reading of our manuscript.

1. Perform an in-depth review of the manuscript, including the writing in English.
   This new version of our manuscript was carefully edited, and the English was revised.
2. The authors must use the Template of the Journal.
   Done.
3. The original contributions need to be much better presented in the last paragraphs of section "INTRODUCTION". All improvements, if they are, and new results must be described in this paragraph.
   We included a paragraph following the reviewer advice.
4. λ_0 is not defined.
   Done.
5. In Fig 2, Put the saddle-node bifurcation.
   Done.
6. Include a Theorem with hypothesis about when the systems (5-6) undergoes the saddle-node bifurcation.
   Done.
7. In model (21) $F(m)$ is not defined.
   We included the definition of $F(m)$ in this new version.
8. In heterogeneous model (21), bifurcation analysis is more complicated, however numerical tests by considering different values of R_i can be considered, in order to better understand the dynamics of the model. A similar analysis can be found in Bürger, R. , et al. "Modelling the spatial-temporal progression of the 2009 A/H1N1 influenza pandemic in Chile." Mathematical Biosciences & Engineering, 2016, vol. 13, no1, p. 43.
   Done.

Reviewer 2

We thank the reviewer for his/her carefull reading of our manuscript.

1. Title: I suggest replacing "Modelling macroparasitic diseases dynamics" by "Modeling macroparasite diseases dynamics".
   Done.?
2. Abstract: if an abstract does not contain "we" or phrases like "in this paper" usually is well received. I suggest changing these expressions. Similarly, I also recommend mentioning the homogeneous and heterogeneous focus.
3. Introduction: I think that information is missing, for example, indicate:
   - Problem to solve, principal objective or motivation.
   - Route of solution or response indicating the sections
4. General framework: Here, I consider the authors should connect it with the objective or motivation of your proposal. Also, include comments about your previous work cited as [9].
5. Subsection 3.1: In the first line, the authors mention that their model a is based on a model developed by Anderson and May, but they do not explain or mention the modifications applied to it for their proposal.
6. Equations: I suggest ending the equation with "." or "," to give continuity to the text and the reading.
   Done.
7. I recommend including an informative figure or graph about the phenomenon or dynamics studied.
   Done.
8. Equation (1): What does the function $\Gamma()$ represent? Can you say something about the fractions $k/(m+k)$ and $m/(m+k)$?
   Done.
9. Page 5 in the second paragraph, I recommend mentioning what information is taken from reference [7]. Similarly, with reference [5], in the third paragraph.
   We included the reviewer advice in this new version.
10. Replace "([9])" by "[9]".
    Done.

11. Page 6 in the text of equations (5)-(6), I suggest including a paragraph to conclude the homogeneous case of the proposed model. Maybe they need to explain a little more about it.
    We included a paragraph following the reviewer advice.
12. Equilibria and basic reproduction number: I consider it important to define or introduce what represents the equilibrium and the R_0 basic reproduction number in the model proposed. Can the authors say something about the expression $R_0\lambda_0\alpha\rho/(\mu_h+\mu_p)$?
    We included a paragraph following the reviewer advice.
13. Page 7: Sensitivity analysis, Do they have any references for this analysis? Could the authors show some graphs to represent these indices?
    We included a sensitivity analysis in this new version.
14. Page 8: Expand equation (19) and terms $A=(\mu_h+\mu_p)m/R_0$ and B for to have a better read.
    Done.
15. Equation (21), I recommend explain and extend the meaning of the terms m_i, β_i, ρ_i...etc. Maybe also include an explanation of these equations in terms of the phenomenon or dynamic studied.
    We included a paragraph following the reviewer advice.
16. Subsection 4.1 What is the difference between the indexes " i" and "j"?
    We clarify the difference between the indices in this new version.
17. Page 11. Expand equations of R_0^i and m_i . Replacing by "where we define the basic reproductive number of each subpopulation H_i by which is the number of adult females that are born of a adult female from a host in subpopulation H_i in the absence the effects of density-dependence and the mating probability. Note what for a large N value the reproduction number for each H_i is given by"
    Done.
18. Discussion and Conclusions: I suggest including a summary of the results, with analysis and conclusions. Also, I recommend including an example of some scenarios, perhaps, varying parameters, these to evidence the need for future works. I feel that you could comment more here.