

# Review of: "Exploring the Impact of Reaction-Diffusion on an Ecological Diversity Mathematical Paradigm for Understanding Hantavirus Infection Dynamics"

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Potential competing interests: No potential competing interests to declare.

Authors present in this contribution a reaction-diffusion model to discuss the effects of diffusion on Hantavirus infection dynamics. As a novelty, they combined an existing model to build a new one which takes into account predator-prey interactions in the presence of disease.

Although the system is interesting and the results seem to be accurate, I have some comments and suggestions.

1. Some of the theoretical analyses about the stability analysis in the local stability analysis section do not need to be in the main text; I suggest moving them into an appendix.
2. In the subsection "Numerical Experiments and Discussion of Results," on one hand, the first sentence needs revision, and on the other hand, the authors mention two cases of studies ( $q < 1$  and  $\epsilon < 1$ ) and ( $q > 1$  and  $\epsilon < 1$ ), but in the paper, nothing is said about the second case.
3. The same section, first paragraph of page 20, says "the diffusion factor  $D$  and the distance have a stabilization effect and may aid to thrive the intensity of the hantavirus infections." From my point of view, your analysis is not sufficient to draw such conclusions. I suggest, firstly, making the stability analysis of your systems in the absence of diffusion, then considering the unstable case, and then adding diffusion and showing that diffusion can bring stability.
4. The graphs are not really clear.
5. The text itself requires some strong revisions: there are many grammatical or misspelling errors that must be corrected. Below are some examples:
  - Page 3, first paragraph says "Barbera et al ... within the rodent population of." This sentence needs to be revised.
  - Page 4, first paragraph: Authors mention "a simplified one-question method" which is completely unknown to me.
  - Page 5, paragraph 3 "the symbols and correspond ..." needs revision.
  - Page 5, paragraph 1 talks about a transmission rate which is not available in the equation.
  - In the subsection "Diffusion: One Rodent, One Alien," paragraphs 1 and 2 are almost the same and seem redundant.
  - Page 11. Authors say "the steady-state roots of approach (2) are time independent on time.." it should say "the steady-state roots of approach (2) are time independent.."