

Review

This is an interesting paper where the authors investigate N_e across species, and are lead to modify the dfe. Indeed they plausibly motivate an extension of the gamma form of the dfe, to include an effectively lethal class.

While the paper is quite nicely written, some of the introductory material could be made more accessible, so a wider set of readers can benefit from this paper. Thus in particular, I make the suggestion that the following points are addressed.

1. P3 Different N_e 's are mentioned in the literature. could the authors explicitly state the one they mean
2. P3 The authors say "In a Wright-Fisher population the power of drift is inversely proportional to the effective population size, N_e , ..." but what is precisely meant by "the power of drift"?
3. π is mentioned and results alluded to. It would be helpful to provide some known concrete results for this, and its implied connection with heterozygosity
4. P3 Expand a bit on Lewontin's paradox
5. P4: The authors say
" Secondly, π_N/π_S is expected to approach its equilibrium faster than π when N_e fluctuates".
When N_e fluctuates could the authors say what is known about π_N/π_s and what equilibrium means, in this case. What sort of fluctuations of N_e are envisaged or the results restricted to?
6. P4 They also say "For this reason π_N/π_S might be less sensitive than π to ancient bottlenecks and selective sweeps. Empirically, there is evidence that π_N/π_S is negatively correlated to population size in *Drosophila*..." These statements are a bit worrying. They suggest the statistic of choice by these authors is not well understood in the sort of scenarios considered (the use of *might*, the appeal to *empirical* results). Is this really the case?
7. P5. "the ratio of \bar{S} " means ratio of what to what, \bar{S} values of different species?

8. Lastly, the authors talk about N_e . They do not, as far as I can see, refer to actual population sizes, yet N_e is, in some way related to the population size. Could they say if their estimates of N_e scale with the census size in a way that is plausible?