Comment on
"The emergence of a birth-dependent mutation rate in asexuals: causes and consequences"
by F. Patout, R. Forien, M. Alfaro, J. Papaïx and L. Roques

In the standard models of asexual adaptation, the Malthusian growth rate, the difference between the birth rate and the death rate, determines the fitness landscape. However, they have mostly ignored the effect of the mutation rate that is potentially associated with the phenotypes. The authors note that, in unicellular organisms, mutations mainly occur during the reproduction, and that the mutation rate per unit of time is positively correlated with the birth rate. This dependence can influence the trajectory of adaptive evolution within a species. From a stochastic time-continuous individual-based model that takes this dependence into account, they derived the reaction-diffusion model as a limit of population size and the scaling of time. They confirmed that the existing models are still valid as far as the phenotypic effect of the mutation is small and the heterogeneities of the birth rate and the death rate are weak. However, when these conditions are not met, the birth rate is included nonlinearly in the mutation operator. They investigated the asymmetric effect of birth rate and the death rate by numerical simulation and theoretical proof on the initial behavior of the adaptive trajectory and the equilibrium distribution. It was first attracted by the trait value maximizing the birth rate and then directed toward the value maximizing the survival rate. The manuscript is well written and clearly shows the value of the new model and the derived findings. I have only a minor comment. It may be easily answered. If not, my comment is discretional.

Minor comment:
They examined the case where the landscape of the birth rate $b(x)$ and that of the survival rate $s(x)$ have the same functional with different maximum points (equations 9 and 33). It would be great if they can take a glance at the case of strict tradeoff between the birth rate and survival rate, where $b(x)+s(x)$ is constant.