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Population dynamics in non-homogeneous environments KIM M.J. ALARDS, FRANCESCA TESSER, FEDERICO TOSCHI, Eindhoven University of Technology — For organisms living in aquatic ecosystems the presence of fluid transport can have a strong influence on the dynamics of populations and on evolution of species. In particular, displacements due to self-propulsion, summed up with turbulent dispersion at larger scales, strongly influence the local densities and thus population and genetic dynamics. Real marine environments are furthermore characterized by a high degree of non-homogeneities. In the case of population fronts propagating in "fast" turbulence, with respect to the population duplication time, the flow effect can be studied by replacing the microscopic diffusivity with an effective turbulent diffusivity. In the opposite case of "slow" turbulence the advection by the flow has to be considered locally. Here we employ numerical simulations to study the influence of non-homogeneities in the diffusion coefficient of reacting individuals of different species expanding in a 2 dimensional space. Moreover, to explore the influence of advection, we consider a population expanding in the presence of simple velocity fields like cellular flows. The output is analyzed in terms of front roughness, front shape, propagation speed and, concerning the genetics, by means of heterozygosity and local and global extinction probabilities.

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