CONCENTRATION PHENOMENA IN SOME INTEGRO-PDE MODELS FOR EVOLUTION OF DISPERSAL

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To study the evolution of dispersal we study the Perthame-Souganidis mutation-selection model and its extensions. We consider some integro-PDE models for a population structured by the spatial variables and one trait variable. Competition for resource is local in spatial variables, but nonlocal in the trait variable. Under proper conditions on the invasion fitness gradient, we show that in the limit of small mutation rate, the positive steady state solution will concentrate in the trait variable and forms one or two Dirac masses. Biologically this suggests that either a single strategy is evolutionarily stable or two strategies as a pair can be evolutionarily stable and resist the invasion of other strategies. This talk is based on joint works with King-Yeung Lam (Ohio State University) and Wenrui Hao (Penn State).