

Many predator-prey interactions involve a behavioral evolutionary game of movement on a landscape. Some predators (e.g., fish-eating egrets) move at a larger scale than their prey, and must allocate their time among different patches of prey. Within a patch, the prey allocate their time between relatively safe refuges and riskier foraging habitats. Often a patch will contain multiple prey in which case the prey may choose to form a social foraging group. Social foraging groups provide prey additional antipredator benefits of risk dilution and shared vigilance. But social groups also pose the problem of how the prey within a group coordinate their movements between the refuge and foraging habitat in a manner that is adaptive and accounts for the benefit and costs of sociality. I present an adaptive dynamics model that considers the movements of predator and prey as well as the evolution of a social parameter that modifies prey movement based on the spatial distribution of prey. The sequence of movements results in a continuous time Markov process that I use to calculate fitnesses and solve for the adaptive behaviors of predators and prey. I consider the effect on behaviors of spatial variation among patches of prey density, prey resources and predator lethality. I also consider the influence of the prey energy state, which can change the qualitative predictions of the model.