Evolution of dispersal of social animals under threat of parasitism

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論　文　内　容　の　要　旨

Dispersal, defined as any movement that leads to spatial gene flow, is ubiquitous across taxa, and is considered to be one of the most fundamental traits because it is subject to various pressures of natural selection. Particularly, in the context of social evolution, dispersal plays critical roles, as it affects the interaction structure of social behaviour. Accordingly, understandings of the evolutionary consequences for dispersal evolution have been central to social evolution. Social evolution is hampered by amounts of factors, one of which is parasitism. In particular, parasitism is severe in group-living animals, and thus social animals have developed several mechanisms against parasites, one of which is dispersal. It is well established that dispersal can govern co-evolutionary processes of host–parasite interactions (e.g., arms race). For example, simultaneous migration, in which host dispersal can carry parasites, can have determinant effects on the local adaptation between hosts and parasites. Hence, dispersal can link the relationship between social evolution and parasite infection. Despite this, however, few theoretical studies are available for predicting the evolutionary consequences for dispersal of socialized animals faced with parasitism. In the present thesis, I would model the evolution of dispersal in the face of parasitism, aiming to how infection drives the evolution of dispersal of host animals. Specifically, I consider (1) the subsequent modifications of host population structure due to dispersal evolution, (2) how the timing of parasite infection affects the evolutionary dynamics of dispersal, and (3) the effects of horizontal transmission on the evolution of host dispersal. I assume that host species dispersal occur conditionally on the disease-status (healthy or sick) and use kin selection models to obtain analytical expressions for the direction of selection on dispersal.