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Individual's memory as a parameter to differentiate population distribution patterns

Recent studies including satellite analysis have shown that movement of Mongolian gazelles can be classified as nomadic. One explanation emerges from the fact that their habitat is a dynamic environment. It was proposed recently the dependence on spatial heterogeneity and temporal predictability of resources for migration, nomadism and residence movement. One can define residence as distributions in which an individual over its lifetime occupies a relatively small area compared to the population range; migration as a regular, long-distance pattern of movement, and is typically observed in systems with regular, seasonal fluctuations in environmental conditions; and nomadism occurs when animals are neither resident nor migratory, and instead move across the landscape in routes that do not repeat across years. Here, we propose, at the individual level, that a dependence on memory is also an important parameter characterizing the population distribution pattern. The movement decisions are based on known areas due to the animal's memory. Migratory animals may have a long memory, perhaps they know all way between different locations in their journey. In another way, nomadic animals remember some last visited areas, where they stayed for a while. Therefore, the comparison between the memories together with the landscape predictability can clarify the individual behavior behind the population distribution pattern. Based on this approach, we propose some tools for analyzing animals movement.