

IDEAL FREE DISTRIBUTIONS WITH LIMITED PERCEPTION AND POPULATION DYNAMICS

The distribution of animals around their environment is one of the cornerstones of ecology. The ideal free distribution (IFD) describes the distribution of animals which are “ideal,” meaning they are assumed to always go to the patch where their intake is highest, and “free” in that they can enter any patch without restriction or cost in terms of time or energy. However, experiments show that there is a bias for overusing poor patches and underusing good patches in many animals. Considerable effort has been devoted to studying potential causes for departures from IFD. One of such possible causes is perceptual constraints – animals might not be able to distinguish between good and bad patches. By incorporating population dynamics into the model we show that if animals reproduce according to their resource uptake, then highly fecund animals still approach IFD even if their perception of patches is limited.