13
AVR.
2011

de 14h à 17h

SÉMINAIRE

Beyond R_0: Demographic models for variability of lifetime reproductive output

SEMOVI : Hal CASWELL
Woods Hole Oceanographic Institution

The net reproductive rate, R_0, measures the expected lifetime reproductive output of an individual, and plays an important role in demography, ecology, evolution, and epidemiology. Well-established methods exist to calculate it from age- or stage-classified demographic data. Because it is an expected value, however, R_0 provides no information on variability. Many empirical measurements of lifetime reproduction have revealed high levels of variability, and often positive skewness. This is often interpreted as evidence of heterogeneity, and thus of an opportunity for natural selection. However, variability provides evidence of heterogeneity only if it exceeds the level of variability that would be expected in a cohort of identical individuals all experiencing the same vital rates. Such comparisons require a way to calculate the statistics (variance, coefficient of variation, skewness) of lifetime reproduction from demographic data. These calculations have not been possible; here, I present a new approach, using the theory of Markov chains with rewards, that gives all the moments of the distribution of lifetime reproduction. The approach applies to age- or stage-classified models, to constant, periodic, or stochastic environments, and to any kind of reproductive schedule. As examples, I analyze data from several empirical studies of a variety of animal and plant taxa.For more details, please go to http://cgphimc.univ-lyon1.fr/CGphiMC/Semovi/13avril2011.php