

“Life history variation and ecological gradients”

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Abstract

To examine the evolution of the major life history traits (age and size at maturity, reproductive investment, reproductive span and aging) it is necessary to consider their impact on lifetime fitness. There are important trade-offs among age and size at maturity, reproductive investment, and lifespan. Variation within and among species in these trade-offs leads to life history variation along a continuum between slow developing, long-lived, low fecundity organisms and rapidly developing, short-lived, high fecundity organisms. As a general rule, populations of harsh environments adopt ‘slow’ life cycles, involving long lifespan, delayed maturity, slow reproductive rates and strong investments in parental care to enhance the chance of recruitment. Less severe environments use to determine ‘fast’ life cycles, including short life span, precocious maturation and strong reproductive investment. These patterns can be observed in both within and among species variation, and exceptions in both animals and plants are often rooted in evolutionary legacies. Intrinsic responses leading to life-history variation can be explained by both phenotypic plasticity and local adaptation. Plastic genotypes bear a cost when compared to locally adapted genotypes, and are generally considered poorly efficient for coping with extreme environments. However, in the case of plants, local adaptation is less common than generally assumed and its existence is independent of life cycle duration.

Keywords: life-history trade-offs, costs of reproduction, slow-fast life-history trade-offs, local adaptation, phenotypic plasticity.

This study was funded by grant CGL2017-85191-P from the Spanish Ministry of Science.