
Iteroparity



Guilherme S. Lopes
Department of Psychology, Oakland University,
Rochester, MI, USA

Synonyms

[K strategy](#)

Definition

A reproductive strategy characterized by multiple reproductive cycles over the course of a lifetime.

Introduction

The term *iteroparity* refers to a reproductive strategy characterized by multiple reproductive cycles over the course of a lifetime and contrasts with *semelparity* (see “► [Semelparity](#)”). The iteroparous and semelparous reproductive strategies received special attention in the study of reproductive strategies of species (e.g., Cole 1954; Charnov and Schaffer 1973; Stearns 1976). Both reproductive strategies are observed in the plant and animal kingdoms. Humans (*Homo sapiens*) are an example of iteroparous species – humans are biologically capable of

having several offspring during their lives. Iteroparous vertebrates include birds, reptiles, fishes, and mammals (Angelini and Ghiara 1984). Among invertebrates, most Mollusca and insects (e.g., cockroaches and mosquitoes) present an iteroparous reproductive strategy (e.g., Fritz et al. 1982). Most perennial plants reproduce multiple times during their life span, thus are considered iteroparous species (Watkinson and White 1986).

Theoretical Models

The evolution of iteroparity (and semelparity) has been subject of several theoretical models. One set of models attempts to explain the differential evolution of iteroparity by examining the trade-offs between reproductive effort involved in offspring produced and offspring forgone (for a review, see Roff 1993). According to the trade-off models, the reproductive effort of an organism occurs optimally when the benefits of offspring produced outweigh the costs of offspring forgone. That is, the greatest distance states the optimal reproductive strategy for a given species. For species with higher life expectancy (i.e., low forgone offspring rate), the optimal reproductive strategy is to reproduce several times in a lifetime. Trade-off models have found limited supportive evidence from living systems. Moreover, the bet-hedging models investigate whether iteroparity was selected

over the evolutionary time because it functions against unpredictable infantile survival rates (see Fox and Rauter 2003). The bet-hedging models have not found empirical support – in living systems, many semelparous species live in habitats with high environmental unpredictability.

The models based on demographic parameters have good support from living systems. Cole (1954) studied demographic explanations for the evolution of iteroparous and semelparous reproductive strategies. Cole's models resulted in an iteroparous species bearing annual litters of an average of three offspring having the same rate of population growth than a semelparous species that has one litter of four and dies afterward. This suggested that an advantage of just one offspring would select for semelparity. Charnov and Schaffer (1973) then identified that sensible variances in adult and infantile mortality were responsible for costs of a semelparous reproductive strategy that were not accounted by Cole's model. These demographic models have been successful when tested with real-world systems. That is, according to these models, humans are an iteroparous species because the benefits of devoting reproductive efforts to multiple offspring outweigh the risk of infantile mortality.

Conclusion

The iteroparous reproductive strategy played a key role in the evolution of human's reproduction and parenting systems (Jones 2009). Although optimal reproductive strategies may vary between species, theoretical models have shown that

iteroparous species have higher life expectancy, making it more optimal for humans to devote reproductive effort to more than one reproductive occurrence in a lifetime.

Cross-References

- ▶ [Reproductive Strategies](#)
- ▶ [Semelparity](#)

References

- Angelini, F., & Ghiara, G. (1984). Reproductive modes and strategies in vertebrate evolution. *Italian Journal of Zoology*, *51*, 121–203.
- Charnov, E. L., & Schaffer, W. M. (1973). Life-history consequences of natural selection: Cole's result revisited. *The American Naturalist*, *107*, 791–793.
- Cole, L. C. (1954). The population consequences of life history phenomena. *The Quarterly Review of Biology*, *29*, 103–137.
- Fox, C. W., & Rauter, C. M. (2003). Bet-hedging and the evolution of multiple mating. *Evolutionary Ecology Research*, *5*, 273–286.
- Fritz, R. S., Stamp, N. E., & Halverson, T. G. (1982). Iteroparity and semelparity in insects. *The American Naturalist*, *120*, 264–268.
- Jones, J. H. (2009). The force of selection on the human life cycle. *Evolution and Human Behavior*, *30*, 305–314.
- Roff, D. (1993). *Evolution of life histories: Theory and analysis*. New York: Springer Science & Business Media.
- Stearns, S. C. (1976). Life-history tactics: A review of the ideas. *Quarterly Review of Biology*, *51*, 3–47.
- Watkinson, A. R., & White, J. (1986). Some life-history consequences of modular construction in plants. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, *313*, 31–51.