

---

# Cost of mate attraction and female mate competition in the common European glow-worm

Arja Kaitala\*<sup>1</sup>, Juhani Hopkins<sup>†</sup>, Gautier Baudry, and Anna-Maria Borshagovski

<sup>1</sup>Department of Ecology and Genetics, University of Oulu – P.O. Box 3000, FI-90014 Oulu, Finland

## Abstract

Sexual signaling is widely studied in males but costs and benefits of female signaling are not well established. Female mate attraction is not expected due to high offspring investment. In the common glow-worm (*Lampyrus noctiluca*; Lampyridae) wingless females glow to attract flying males. Adults do not eat, so female resources for maintenance, eggs and signalling are limited, meaning that females should mate as soon possible. We manipulated female time unmated and glowing to estimate costs of signalling. Extra glowing time did not affect female fecundity but waiting for extra nights did. Results showed significant costs in mate attraction but these costs are mainly due to extended waiting, not signaling as such. Thus need to mate soon may drive evolution female sexual signaling. Males prefer large bright females. Small dull females may be forced to glow for several nights without mating and may lose up to 20% of their eggs each night. How could dull females increase their attractiveness to be selected soon? We tested optimal spacing for each female in relation to their attractiveness compared to neighbors. To be selected dull females should be far from bright competitors. Avoidance of competition may explain why females in nature are commonly glowing far from each other.

**Keywords:** glow worm, *Lampyrus noctiluca*, sexual signalling, cost of signalling

---

\*Speaker

<sup>†</sup>Corresponding author: juhani.hopkins@oulu.fi