

Poster #17

Temporal and Quantitative Changes in Sexual Reproductive Cycling of the Cladoceran *Daphnia magna* by a Juvenile Hormone Analogue

Olmstead, A.W. and LeBlanc, G.A.,

North Carolina State University, Raleigh, NC.

Gal@ncsu.edu, T 919-515-7404, F 919-515-7169

Cyclic parthenogens, such as the cladoceran, *Daphnia magna*, utilize both asexual (parthenogenetic) and sexual reproduction in order to maximize population fitness in variable environments. Parthenogenetic reproduction is the default strategy among *D. magna*, while various environmental cues trigger cycles of sexual reproduction. Experiments were conducted with the juvenile hormone analog methoprene to test the hypothesis that members of the insect juvenile hormone/vertebrate retinoic acid family of transcription factors are involved in the regulation of sexual reproduction in daphnids. Neither methoprene, food reduction, or crowding independently stimulated entry into the sexual reproductive phase of the daphnids. However, the combination of food deprivation and crowding stimulated entry into the sexual reproductive phase characterized by an initial high production of males and the subsequent intermittent production of haploid egg-containing ephippia. Exposure to 160 nM methoprene along with food deprivation and crowding caused a significant reduction in the percentage of males produced during the early phase of the sexual cycle and significantly increased the percentage of males produced during the later stages of the cycle. Methoprene concentrations as low as 1.3 nM significantly reduced the number of resting eggs produced and proportionately increased the production of parthenogenetically-produced neonates. These experiments demonstrate that methoprene uncouples the coordinate production of males and resting eggs during the sexual reproductive period of *D. magna*. Methoprene stimulates male offspring production and defers their production to latter stages of the sexual reproductive period, while inhibiting the production of resting eggs and promoting the continuance of parthenogenetic reproduction.