Intra- and inter-generational responses in behaviour, gene expression, and fitness to artificial light at night in a diurnal parasitoid

Aurore GALLOT (aurore.gallot@univ-lyon1.fr), Maxime VERDIER, Malo LOUBIERE, Adil EL FILALI, Isabelle AMAT, Emmanuel DESOUHANT

LBBE, univ. Lyon 1, France, Villeurbanne, FR

Artificial light at night (ALAN) constitutes a pervasive source of anthropogenic pollution. Exposure to ALAN can induce immediate behavioral and physiological alterations in animals. Nevertheless, many organisms persist in light-polluted environments, while the effects of multigenerational exposure remain poorly understood. Here, we exposed the parasitoid wasp *Venturia canescens* to an ecologically realistic ALAN intensity (0.42 lux). We looked at the consequences of ALAN exposure on life-history traits and gene expression after on a single generation exposed and after four generations exposed. The first generation of wasps exposed to ALAN exhibited a reduced lifespan, but no detectable effects on gene expression. Conversely, gene expression was markedly altered after four generations exposed to ALAN. The physiological functions most strongly affected involved photoreception and immunity. Wasps exposed to ALAN showed a preference for host odors over food odors, although no effect was observed on fecondity. The results show a decoupling between rapid life history trait responses and a slower progressive modification of gene expression. These results support that ALAN exposure represent a stressor for *V. canescens*. Nevertheless, gene expression change recorded on light perception after only few generations exposed to ALAN could be a potential way of adaptation to the stressor.

Mots clés : ALAN - light pollution - transcriptomic.