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Abstract

Genetic Variation of Candidate Genes for Timing and Effectuating Photoperiodic Diapause Induction in the Parasitoid *Nasonia vitripennis* †

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Abstract: Seasonal variation of photoperiod and temperature often leads to a latitudinal gradient in season-dependent behavior. The parasitic wasp *Nasonia vitripennis* exhibits a latitudinal cline in photoperiodic diapause induction. Allelic variation of the clock gene *period* was shown to be associated with this behavioral cline. In addition, circadian expression of the clock genes *period* (*per*), *cryptochrome-2* (*cry-2*), *clock* (*clk*), and *cycle* (*cyc*) shows photoperiodical and latitude-of-origin associated variation. Apart from these clock genes, a Genome Wide Association Study revealed five possible non-clock effector genes for diapause induction: *Helicase DDX28*, *APC11*, *SIPA1L1*, *OR175*, and *CBFA2TI*. Here we use sequence data of isogenic *N. vitripennis* lines from different latitudes to screen for variation in these additional clock and non-clock candidate genes for photoperiodic diapause induction. Polymorphisms in *cry-2*, *cycle and SIPA1L1* showed a haplotype distribution according to latitude-of-origin. Our results support a role of clock gene and *SIPA1L1* variation in the difference of diapausing brood production of the northern and southern lines and hints at different selection pressures for diapause effector genes in high end low latitudes.

Keywords: parasitoid wasp; photoperiodic diapause; circadian clock; effector genes; seasonal adaptation; latitudinal effect; single nucleotide polymorphisms (SNPs)

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