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Innate immunity, developmental speed and their trade-offs in two hexapod models

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Stellingen

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Innate immunity, developmental speed and their trade-offs in two hexapod models

1. Absence of a serosa does not imply the absence of immune competence in eggs of the springtail (Chapter 2).
2. Fast development trades off with weight and fecundity, but not with immunity, in the red flour beetle (Chapter 3).
3. Resequencing selection lines of *Tribolium castaneum* revealed three genomic regions, located on chromosomes 3, 6 and 9, that make large contributions to developmental time (Chapter 3 and 4).
4. Reconstruction by CRISPR/Cas9 of a single allele shows its large effect on life-history traits in a beetle (Chapter 4).
5. Finishing dorsal closure requires a pulse of ecdysone during late embryonic development of insects (Chapter 4).
6. Proper regulation of the developmental hormone ecdysone is not only essential for dorsal closure, but also for early embryonic development in insects.
7. Only in true insects (Ectognatha), the serosa provides the egg with a potent, full range immune response.
8. Alleles such as the Fast allele I identified in *Tribolium* may be crucial when climate change requires rapid adaptation of insect developmental time.
9. The most prominent trade-offs in life histories are associated with the cost of reproduction (Stearns, *Funct Ecol*, 1989).
10. The art of great work is patience.

Shixiong Cheng

Leiden, 28th November 2023