Hoverflies were the only group of predators that appeared in relatively high numbers on the sticky traps. This was particularly the case in Perkins, where >20 flies per trap were found. It is important to note that there were very low densities of hoverfly larvae in the suction samples (Table 2). This implies either low reproductive activity during the sampling period or that the adults were not resident in the plots but only got attracted to the yellow color of traps.

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ii. An evaluation of how Coccinellids deal with the starvation that likely occurs in the field during transitions among crops in a diversified cropping system.

Written by Mpho Phoofolo
Other Participants, Kris Giles and Norm Elliott

How do coccinellids deal with nutritional stress?

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- Nutritional stress is a common phenomenon among insect predators, including coccinellids

Evidenced by

- field observations
  - Lack of co-occurrence of coccinellid larvae and prey spp. on plants
  - Intra-guild predation, cannibalism, and omnivory are feeding behaviors that indicate nutritional stress
- Large variation on body sizes of field collected adult coccinellids

Objectives

- Determine how*Hippodamia convergens*, *Colleomegilla maculata*, and *Harmonia axyridys* respond, in terms of their life history traits, to nutritional stress (starvation)
- Determine existence of threshold weight for metamorphosis in the three species

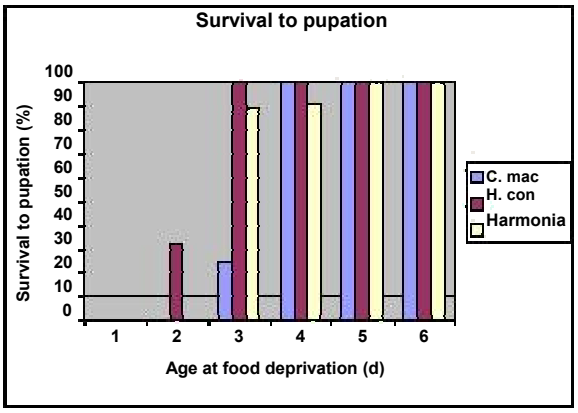
Fitness traits evaluated (at 22° C, L16:D8)

- Survival to pupation
- Age at metamorphosis
- Body size at metamorphosis
- Length of pupal stadium
- Adult size

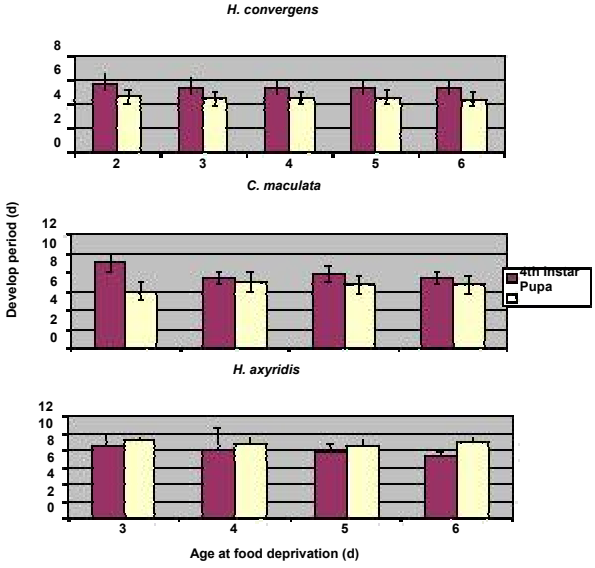
Stage subjected to different levels of nutritional stress = 4th instar

Study design

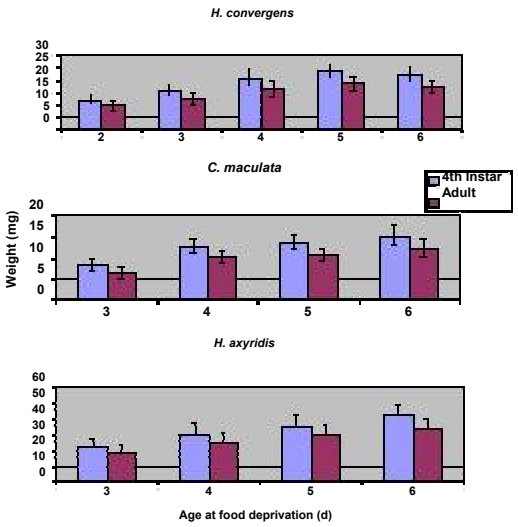
Age at food deprivation (d)	Feeding regimen of 4th instars
1	Starved throughout
2	Fed for 1 day only
3	Fed for 2 days
4	Fed for 3 days
5	Fed for 4 days
6	Fed for 5 days



Age at metamorphosis



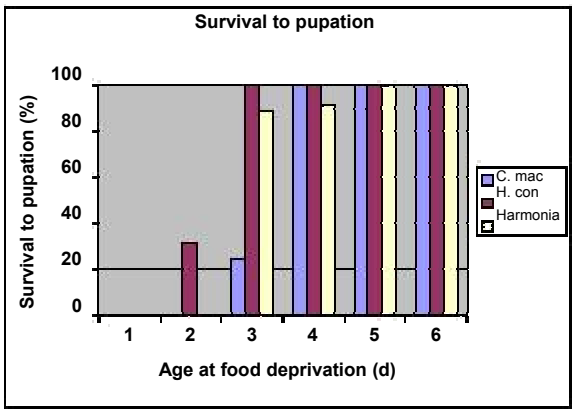
Size at metamorphosis



Coccinellids express:

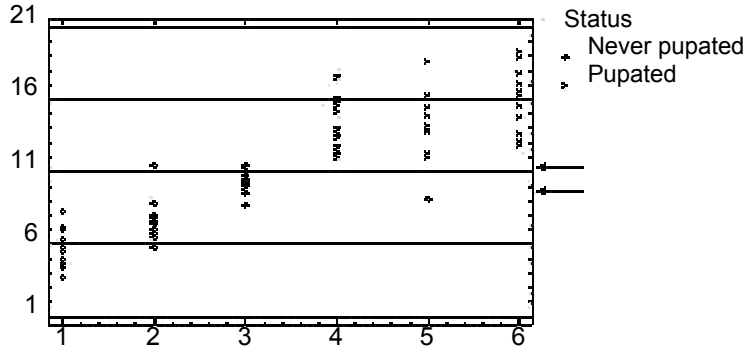
1. Developmental homeostasis or canalization
   - In age at metamorphosis = development time
   - i.e., the case in which the same phenotype results regardless of environmental variation.
2. Phenotypic plasticity
   - In body size (larval size at metamorphosis and adult size)
   - i.e., the case in which a change in the phenotype that depends on the environment.

Is there a threshold weight for metamorphosis?

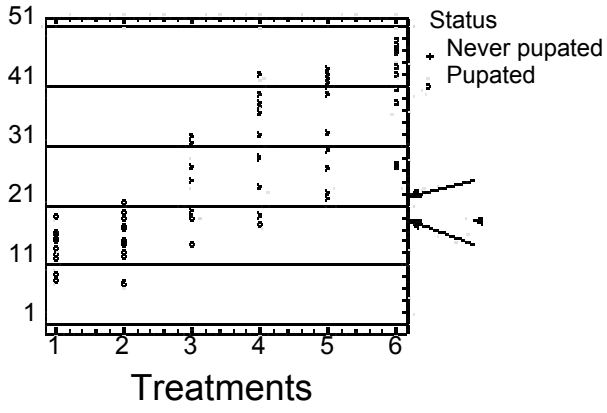


H. convergens max. larval weight

C. maculata max. larval weight



Harmonia max. larval weight



Summary

- Coccinellids respond to nutritional stress by
  1. Maintaining the same development time
  2. Changing body size at metamorphosis and maturation

- Coccinellids display a threshold body size, below which further development is not possible (unless they are released from nutritional stress.