

# The impact of food resources on predatory hoverfly *Episyrphus balteatus* fitness



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## Introduction

The foraging behavior of aphidophagous syrphids plays a key role in biological control. Their larvae feed on aphids while adults depend on pollen and nectar for reproduction and longevity. However, in agroecosystems there is a change in the spatial and temporal pattern of crops. Consequently, food resources are fluctuating which may limit syrphid predatory performance. It is therefore important to know how syrphids react to changing food resources. The aim of the study was to determine the impact of food resource availability on *Episyrphus balteatus* DeGeer (Diptera: syrphidae) longevity and egg laying.

## Materials & Methods

- 2 x 2 x 2 m net cages were used (Fig. 1).
- Egg laying of 4d old mated females was monitored daily on rape plants infested with 50 *Brevicoryne brassicae* aphids.
- Crushed bee pollen and crystalline sugar were used as standardized food.
- Food supply was manipulated in different treatments to simulate limitation in food resources (N = 5):
  1. Sugar & pollen (control).
  2. Pollen withdrawal from day 11 – 25.
  3. Pollen withdrawal from day 1 – 11.
  4. Sugar only.
  5. Pollen only.



Fig. 1 Experimental net cages

## Results

- Provision of pollen only resulted in similar longevity (ca. 1.5 month) and fecundity (ca. 100 eggs/d) as in the control (pollen & sugar).
- Withdrawal of pollen from day 11 - 25 (peak egg laying period) did not affect longevity, but reduced fecundity by 50% compared to the control.
- Withdrawal of pollen from day 1 - 11, i.e. at pre-oviposition period, and provision of sugar only reduced longevity more than 80% and fecundity to 0% compared to the control (Fig. 2).
- Reproductive phase was shortest and peak egg laying period less pronounced if pollen was withdrawn from day 11 - 25 compared to the control and when pollen was the only food source (Fig. 3).

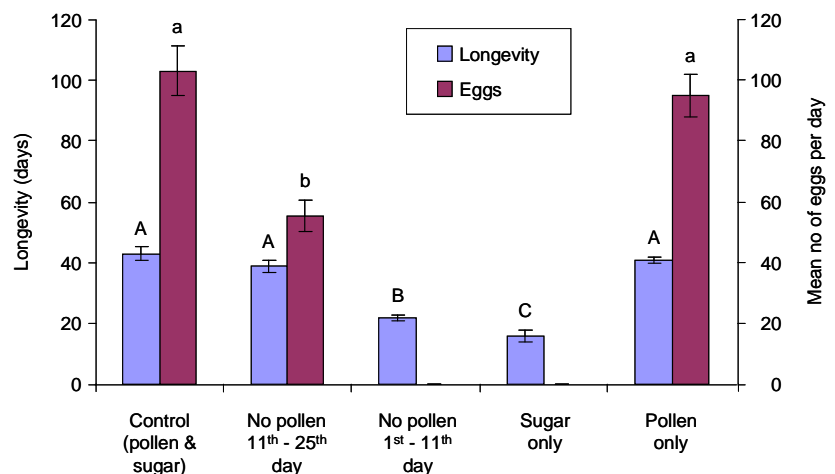


Fig. 2 Impact of food availability on longevity and egg laying (mean ± SE)

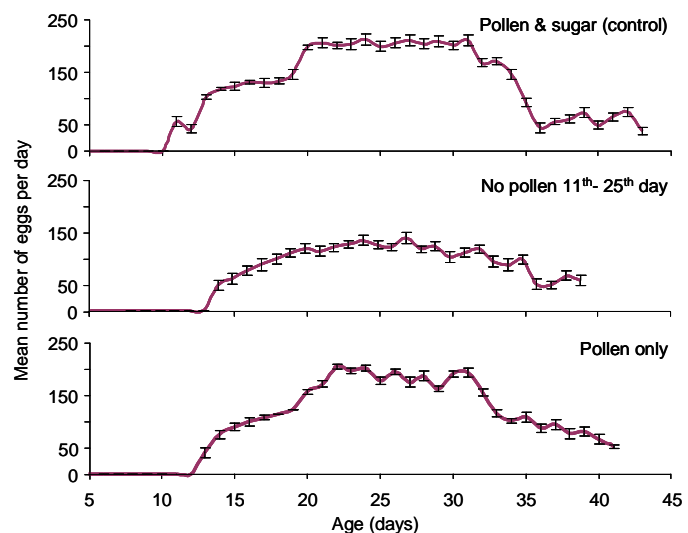


Fig. 3 Temporal pattern of egg laying (mean ± SE) in relation to availability of food resources

## Discussion and Conclusion

Pollen is a source of protein and important during pre-oviposition. Our results demonstrate that a lack or sparse distribution of pollen sources when syrphids are young strongly impairs the egg output. Additionally, pollen availability enhances longevity. Current research is focussing on investigating the effects of pollen and nectar from different flowers on the fitness of *Episyrphus balteatus*.