

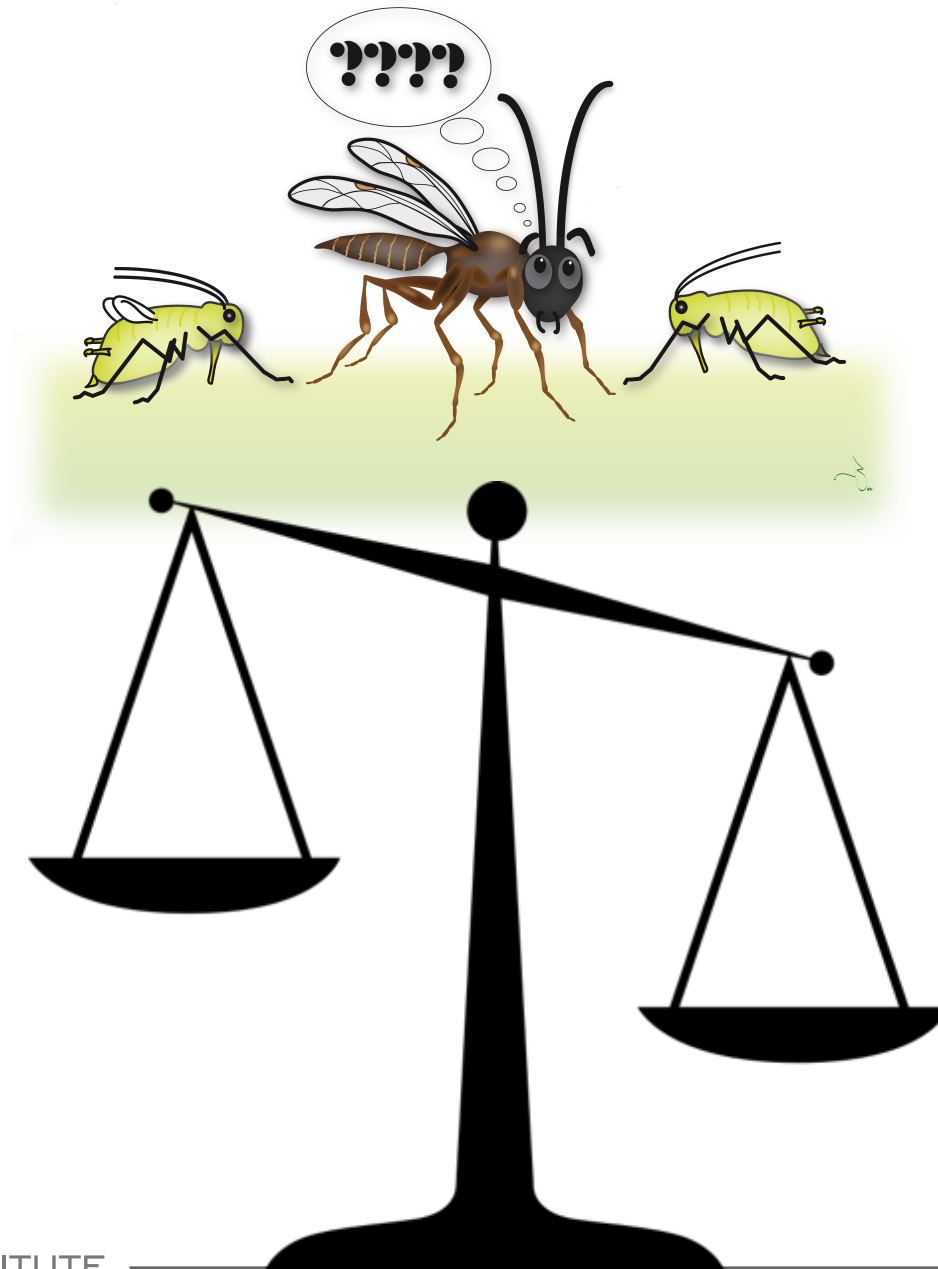


Quality of aphid parasitoids emerging from aphid morphs: do wing buds matter?

Jennifer Pirotte – IEIC5, 17th of October 2017



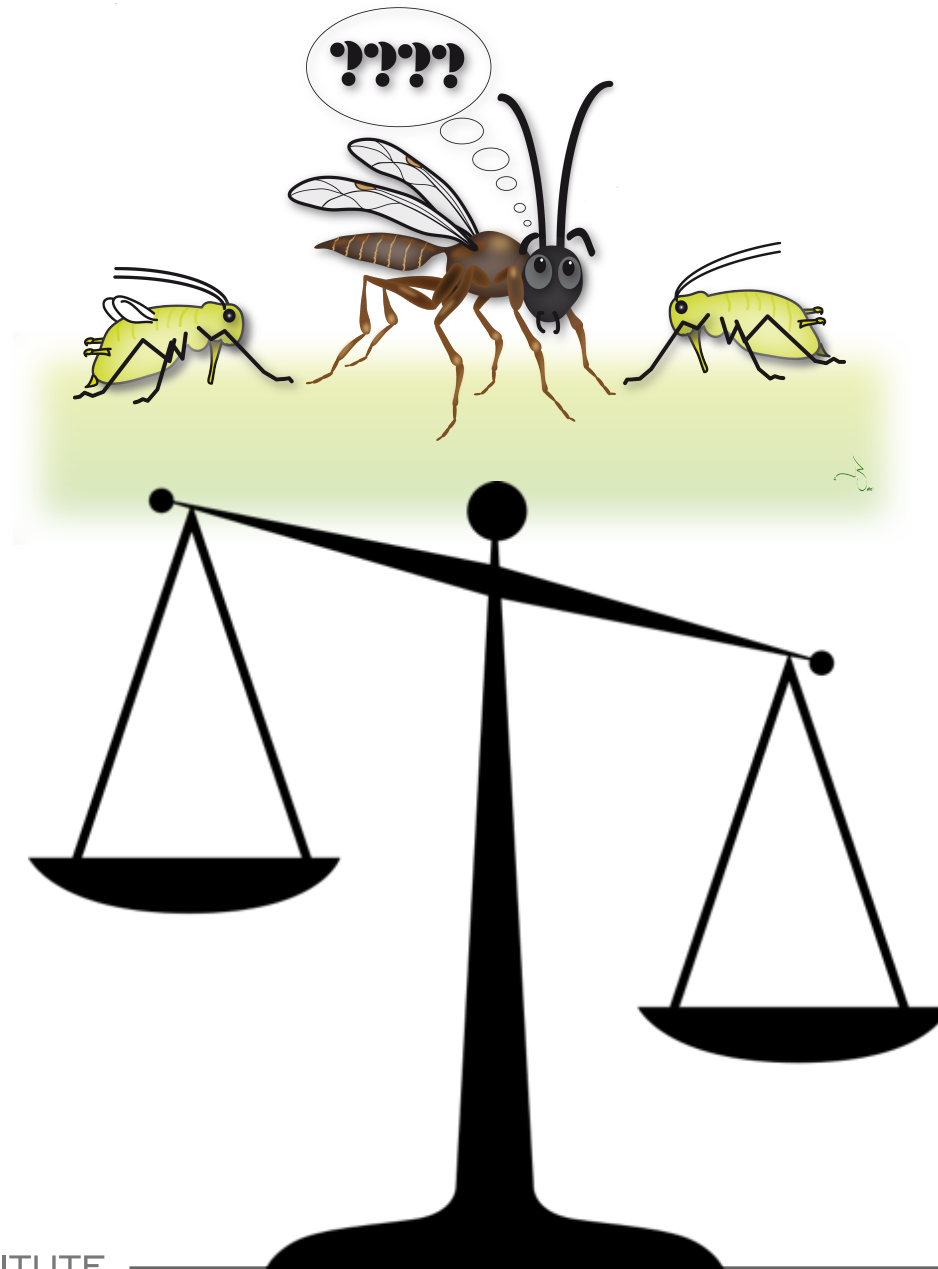
Context of the study





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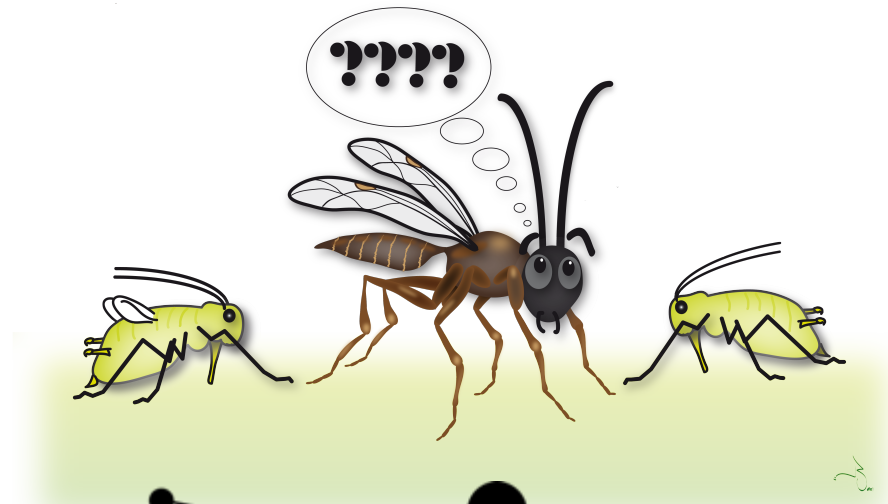
Dispersal





Context of the study

Dispersal



Reproduction

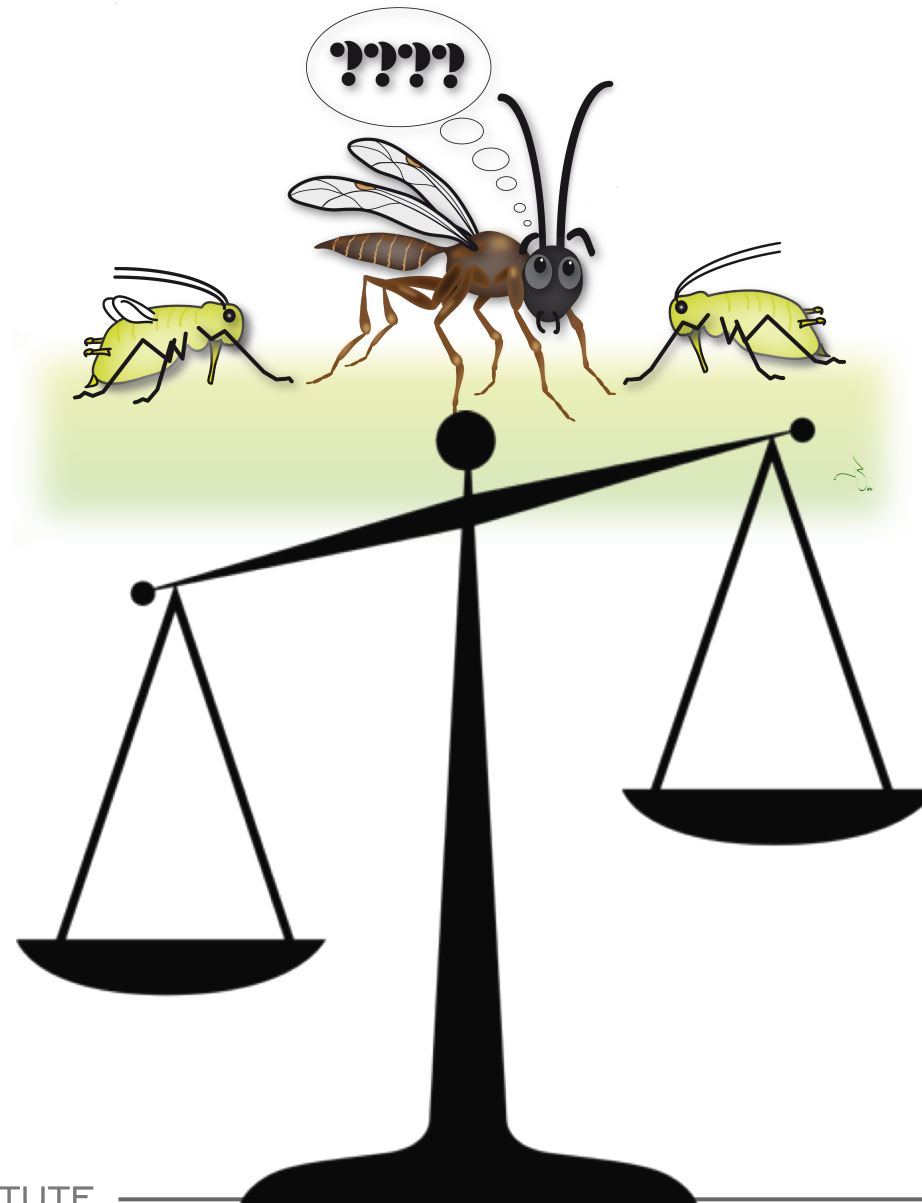




Higher level of resources in winged aphids

Dispersal

Reproduction



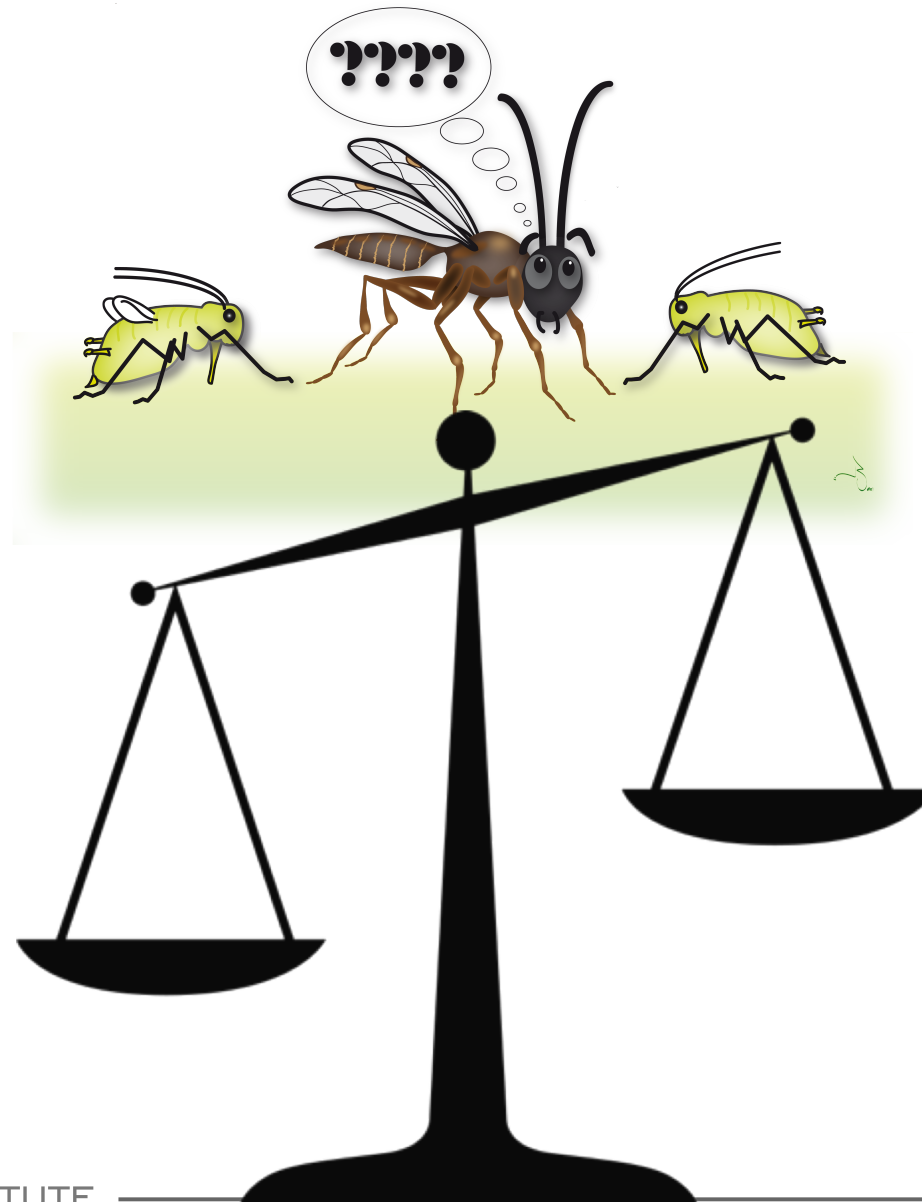
Lipids (except at
3rd stage)
Proteins
Sugars



Higher level of resources in winged aphids

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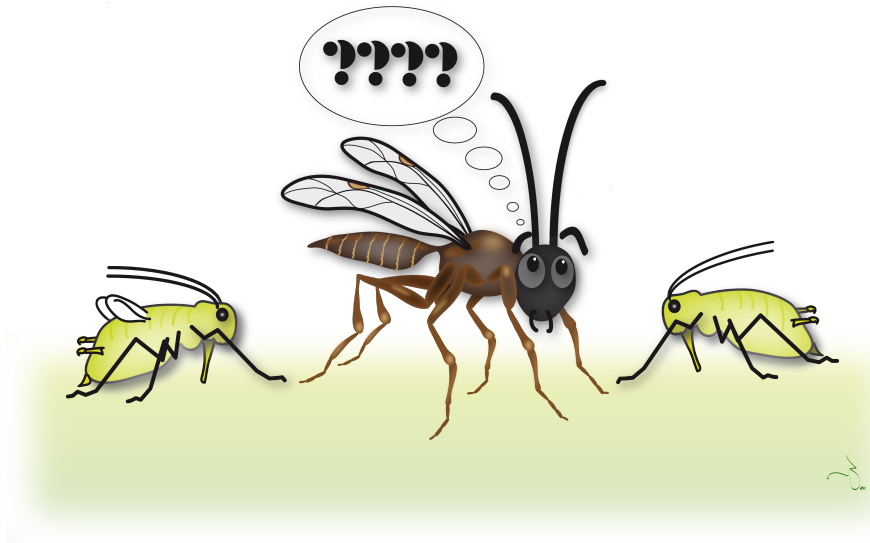
Lipids (except at
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Proteins
Sugars

Glycogen

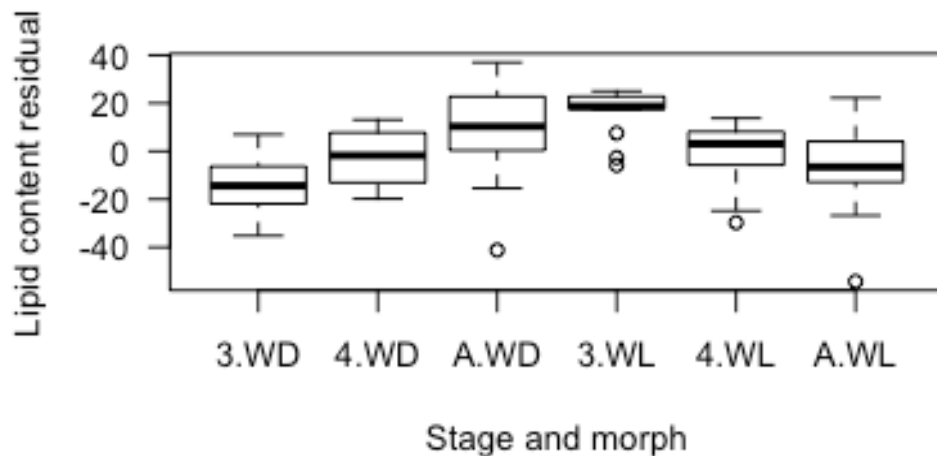


Higher level of lipids during the development of winged aphids

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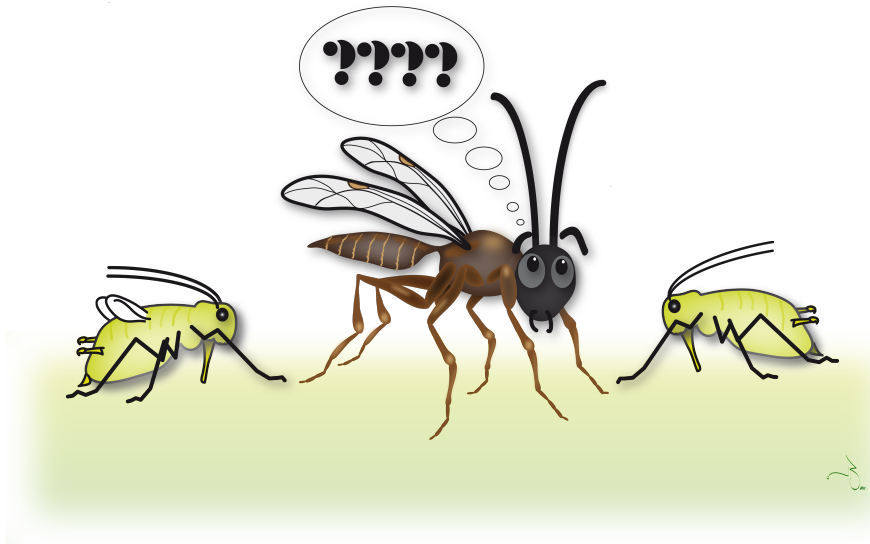
Reproduction



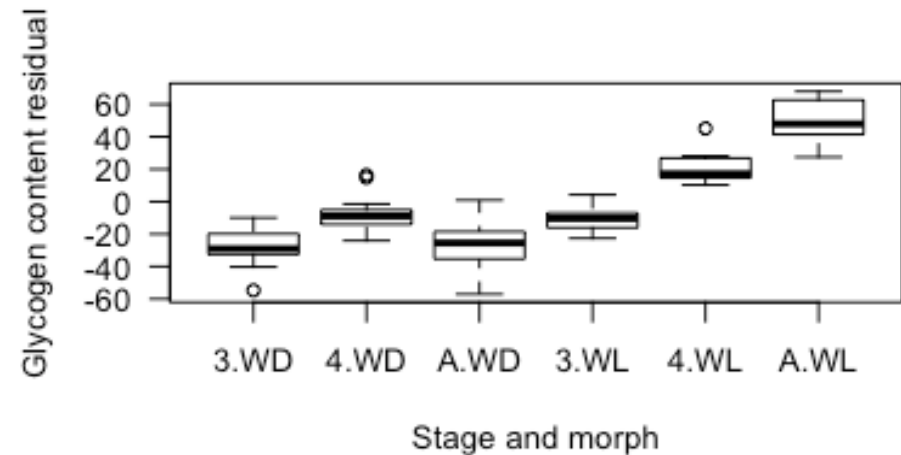
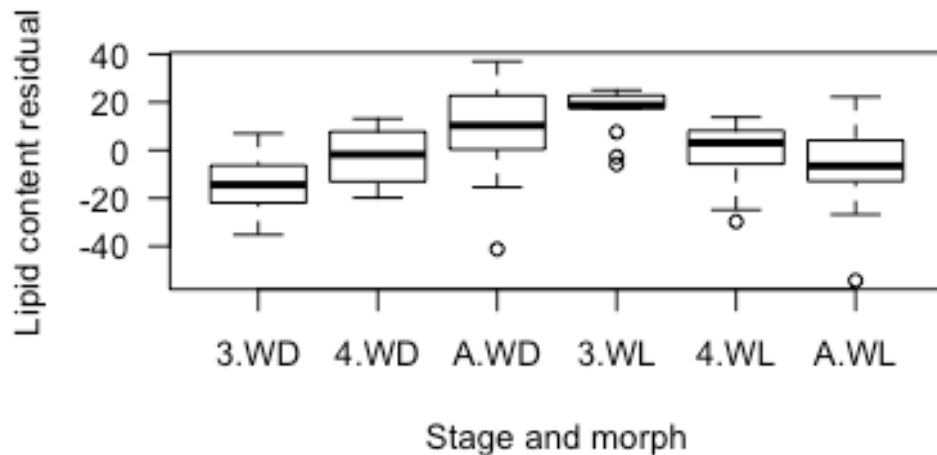


Higher level of lipids during the development of winged aphids

Dispersal



Reproduction





Parasitoids and host wings...

- Winged aphids $\neq$ low quality hosts
- Host nutritional status = cue to host quality assessment
- High quality hosts $\rightrightarrows$ high fitness for the parasitoid (Li and Mills, 2003)



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- **Parasitoid fitness also depends on resources quality** (Häckermann *et al.*, 2007) and **ability to collect resources** (Sampaio *et al.*, 2008)
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- **Important for egg production** (Rivero and Casas, 1999) as no lipogenesis (Visser and Ellers, 2008)



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- Winged aphids = interesting source of lipids
- Important for egg production (Rivero and Casas, 1999) as no lipogenesis (Vissers and Ellers, 2008)
- ***Aphidius colemani* do not host feed at adult stage** (Romeis *et al.*, 2003)
- **All nutrients for reproduction are acquired during larval development** (Romeis *et al.*, 2003)

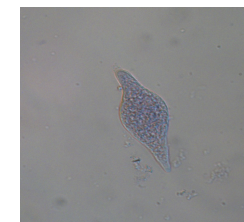


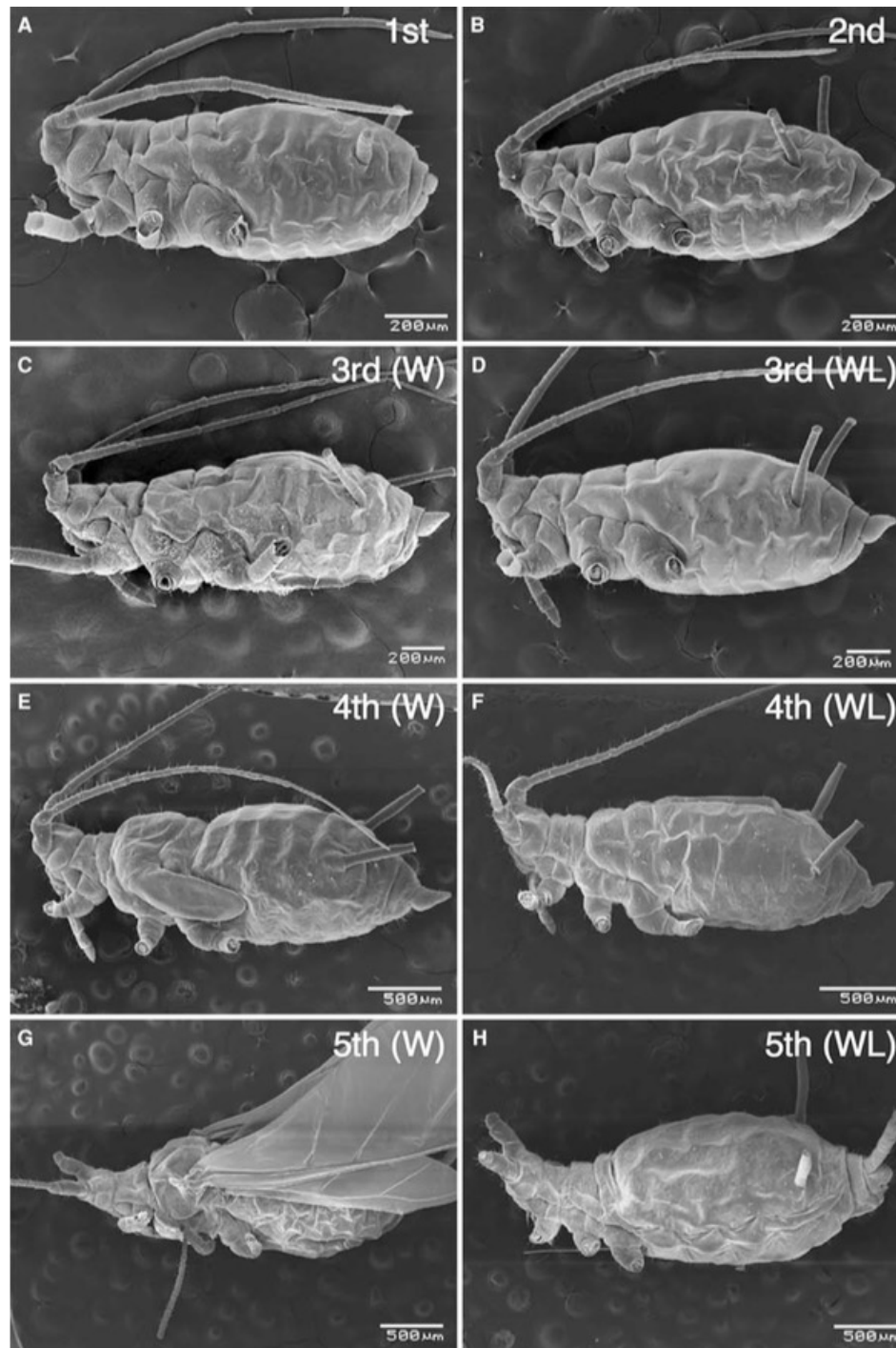
Experimental design

	First experiment	Second experiment
Aphid stage	3 rd and 4 th	3 rd and 4 th
Parasitoid sex	Females and males	Females
Aphid/parasitoid species	<i>Myzus persicae</i> / <i>Aphidius colemani</i>	
Parameters measured	- Fresh weight - Dry weight - Lipid content	- Tibia size - Fresh weight - Egg load (3rd) - Reproductive effort (3rd) - Wing load

Lipid content =
Dry weight – Lean dry weight

Reproductive effort =
Mean egg volume x Total number of eggs

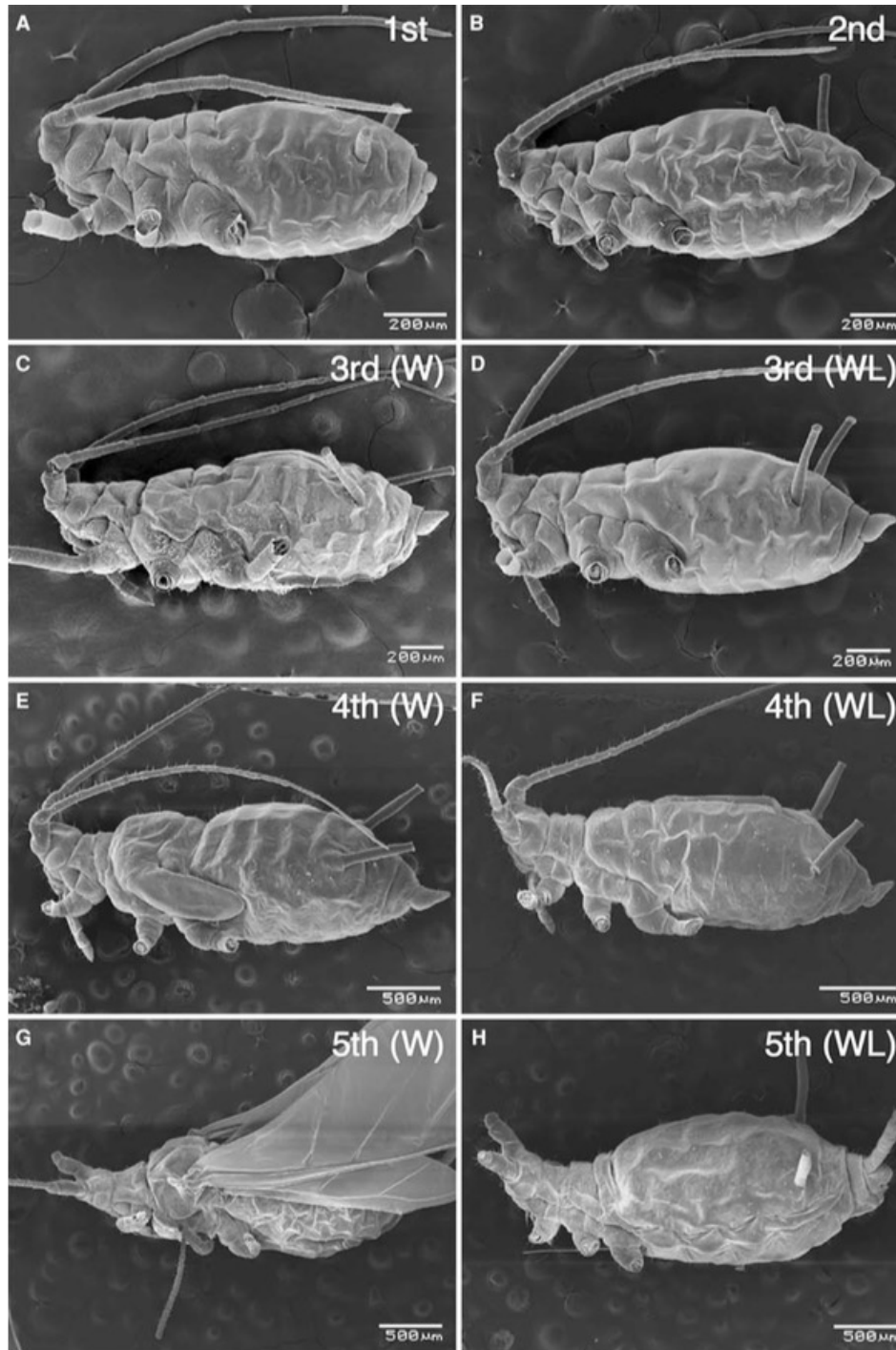




Ishikawa *et al.*, 2008



Wing inhibition



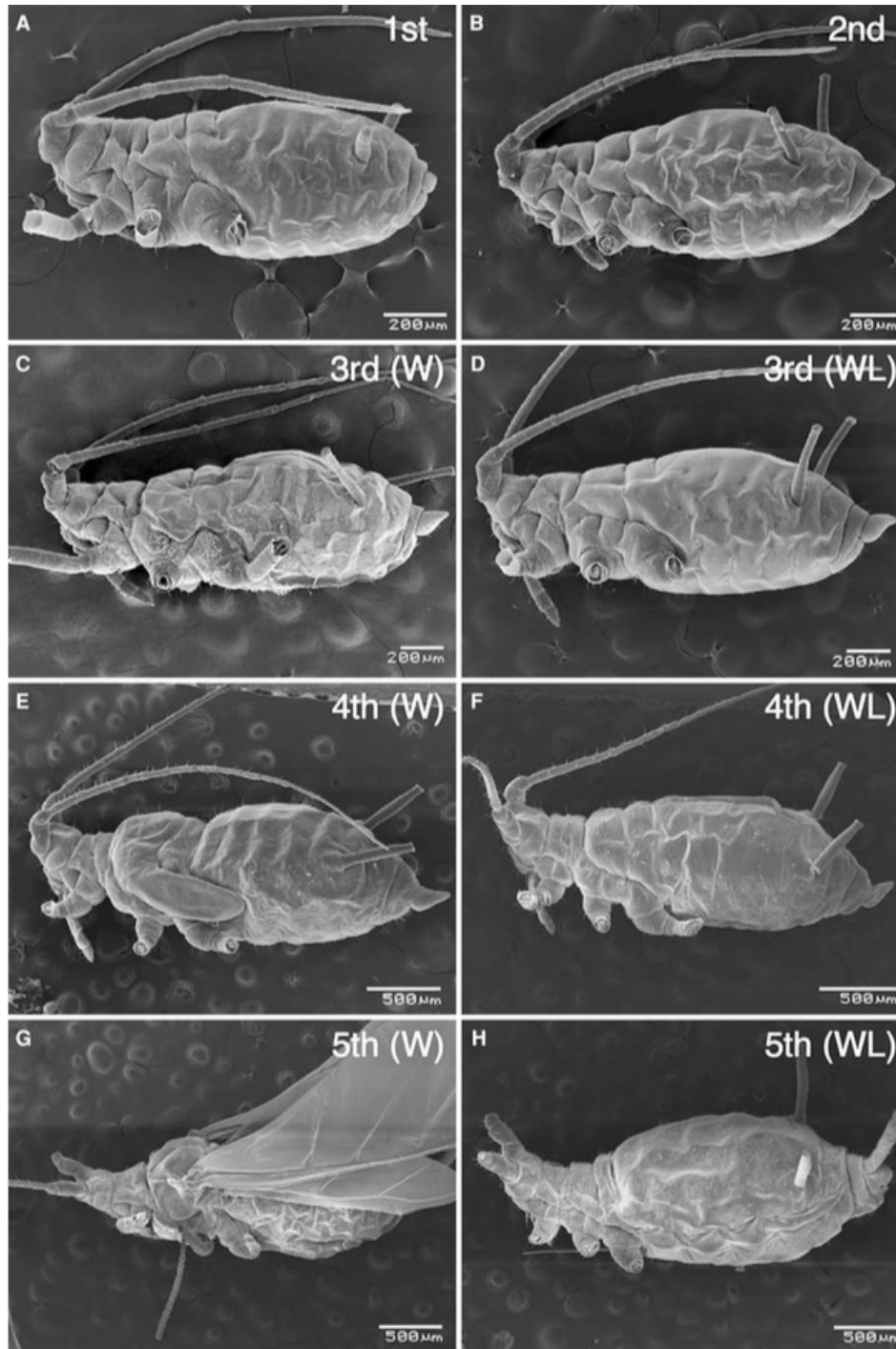
Ishikawa *et al.*, 2008



Wing inhibition



Wing development



Ishikawa *et al.*, 2008



Parasitoids produced in the experiment



Aphid morph





Parasitoids produced in the experiment



Aphid morph



Parasitoid sex





Parasitoids produced in the experiment



Aphid morph



Parasitoid sex

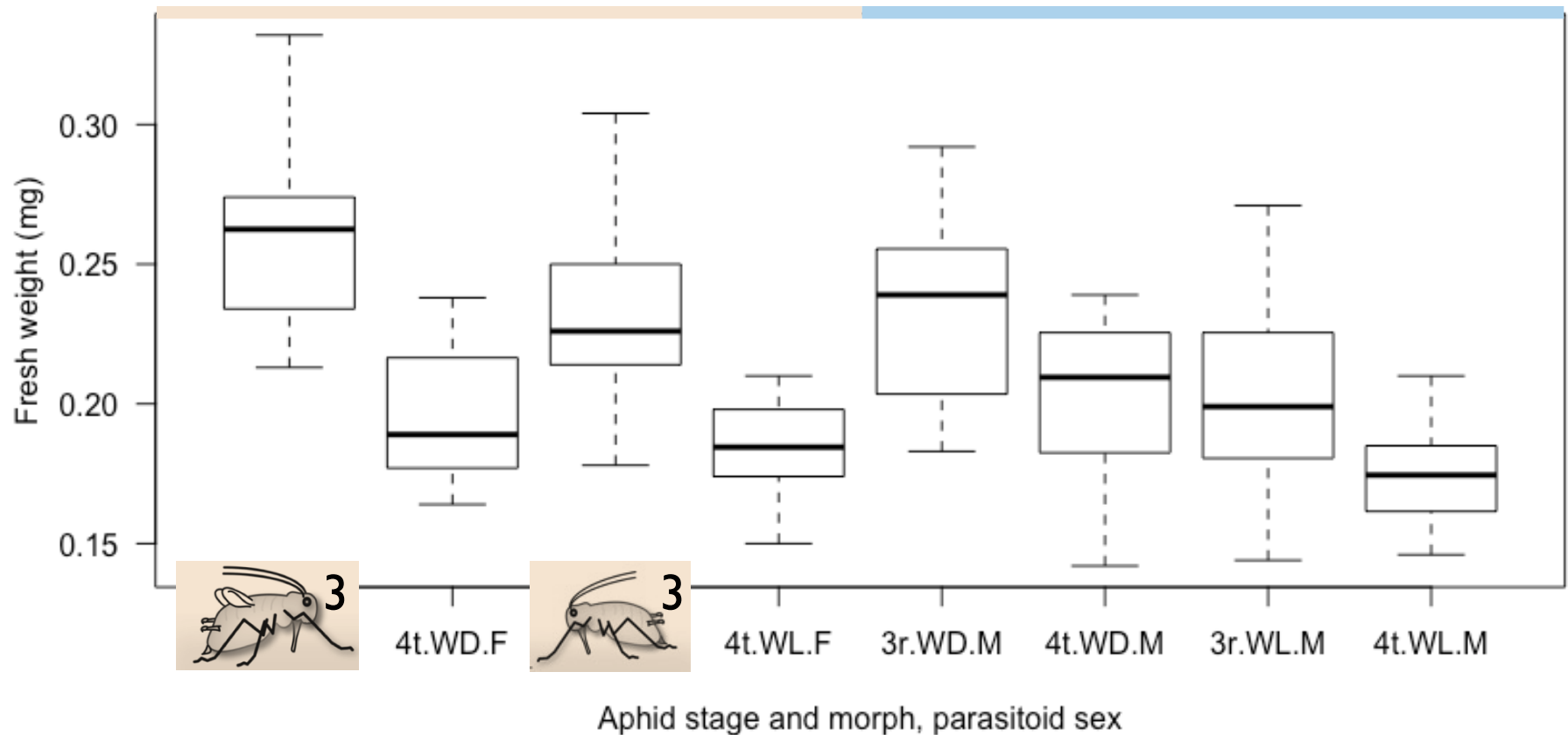


Aphid stage





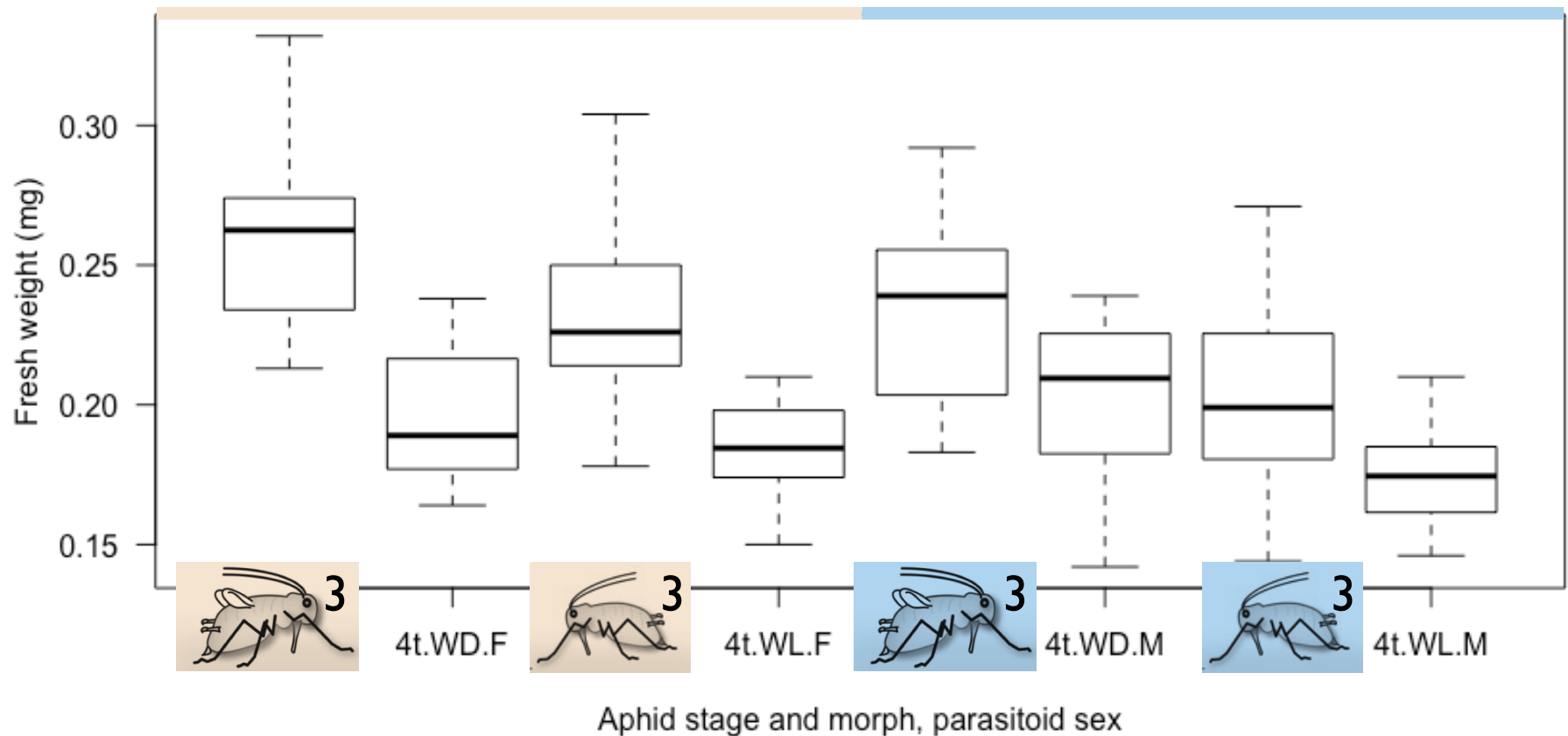
Results of the first experiment



Parasitoids developing in winged are heavier, $p < 0.0001$



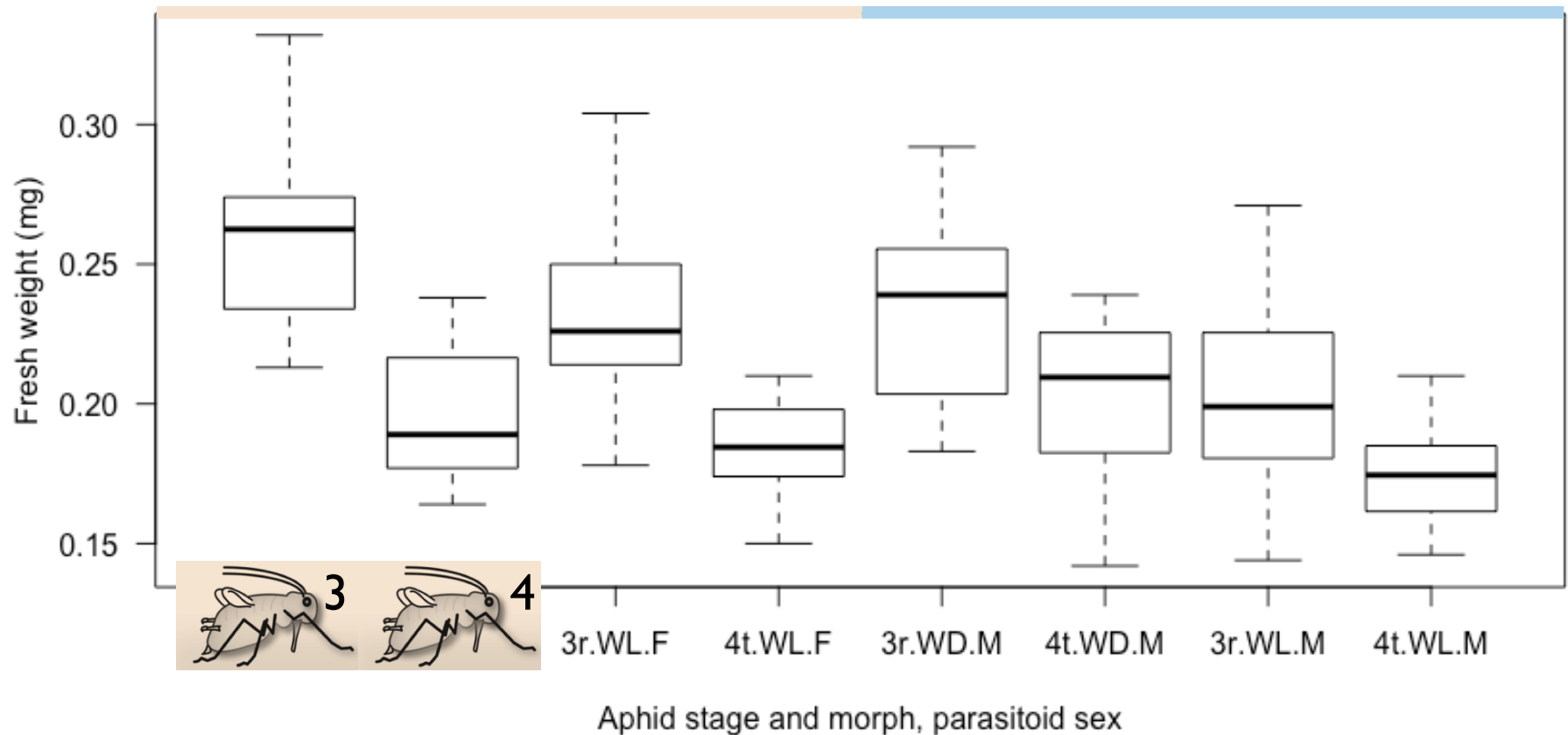
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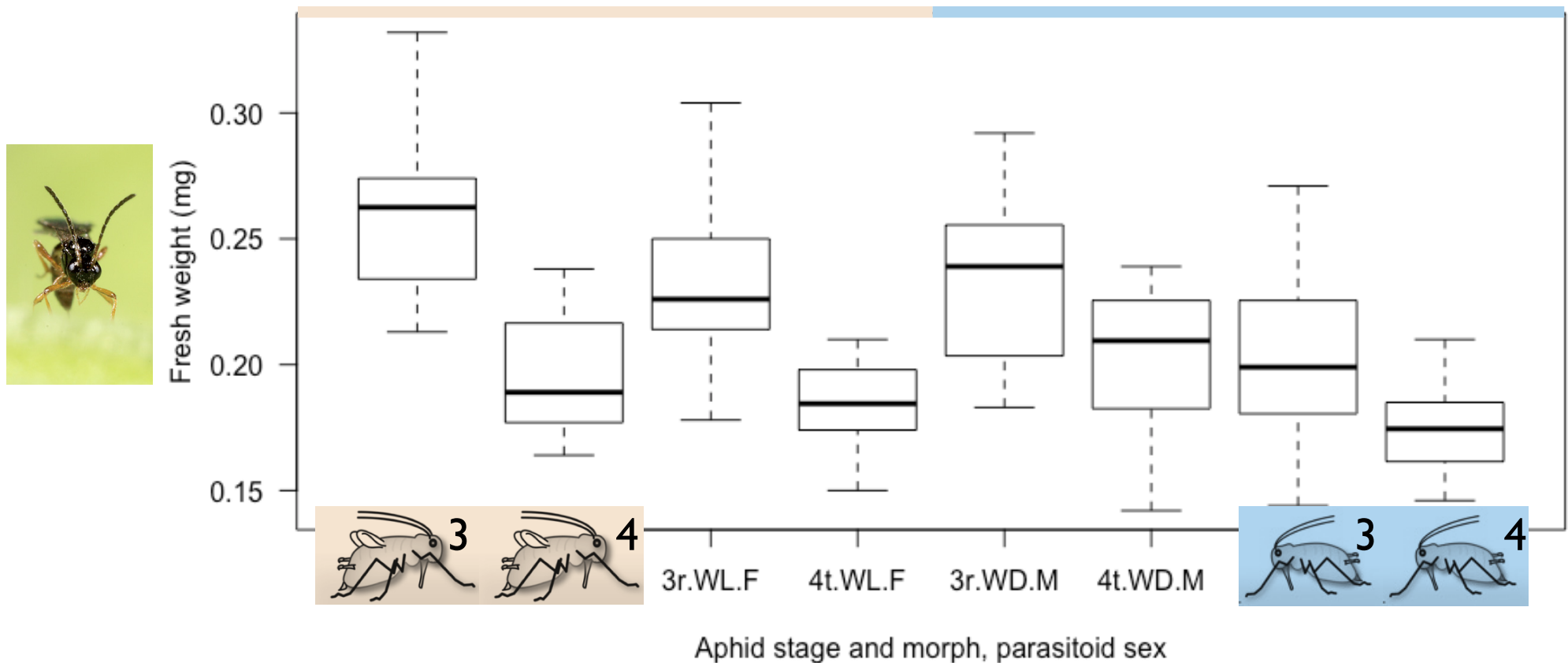
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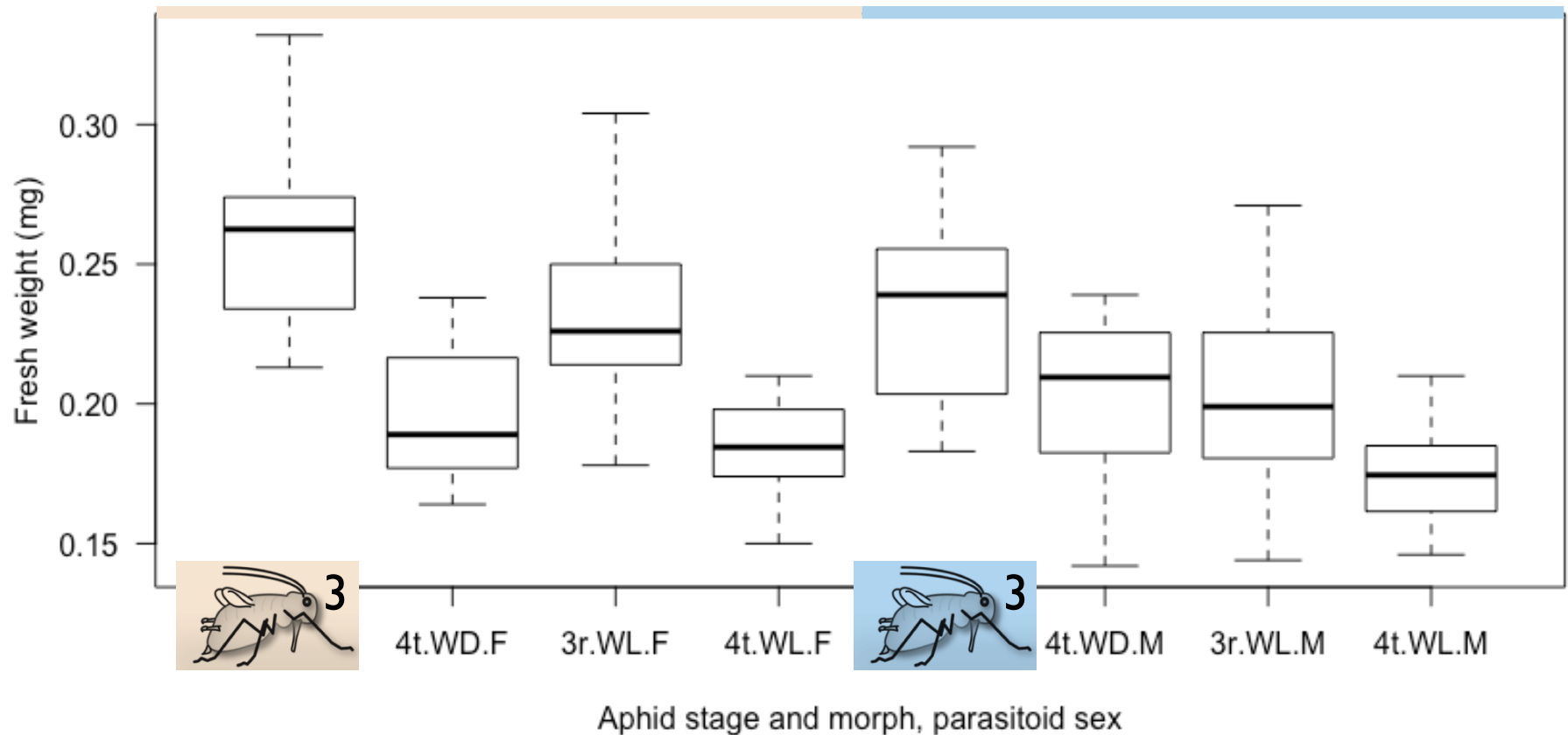
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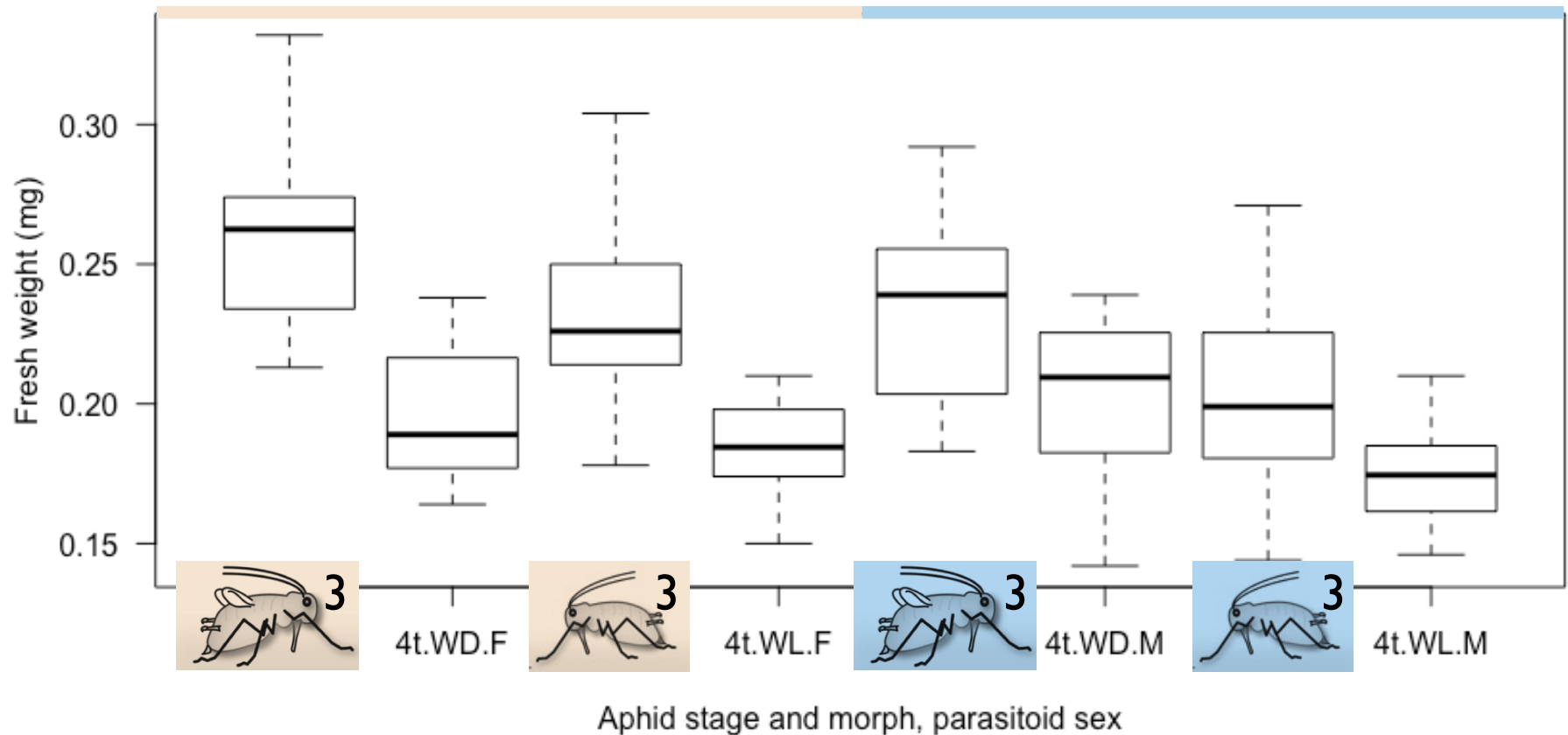
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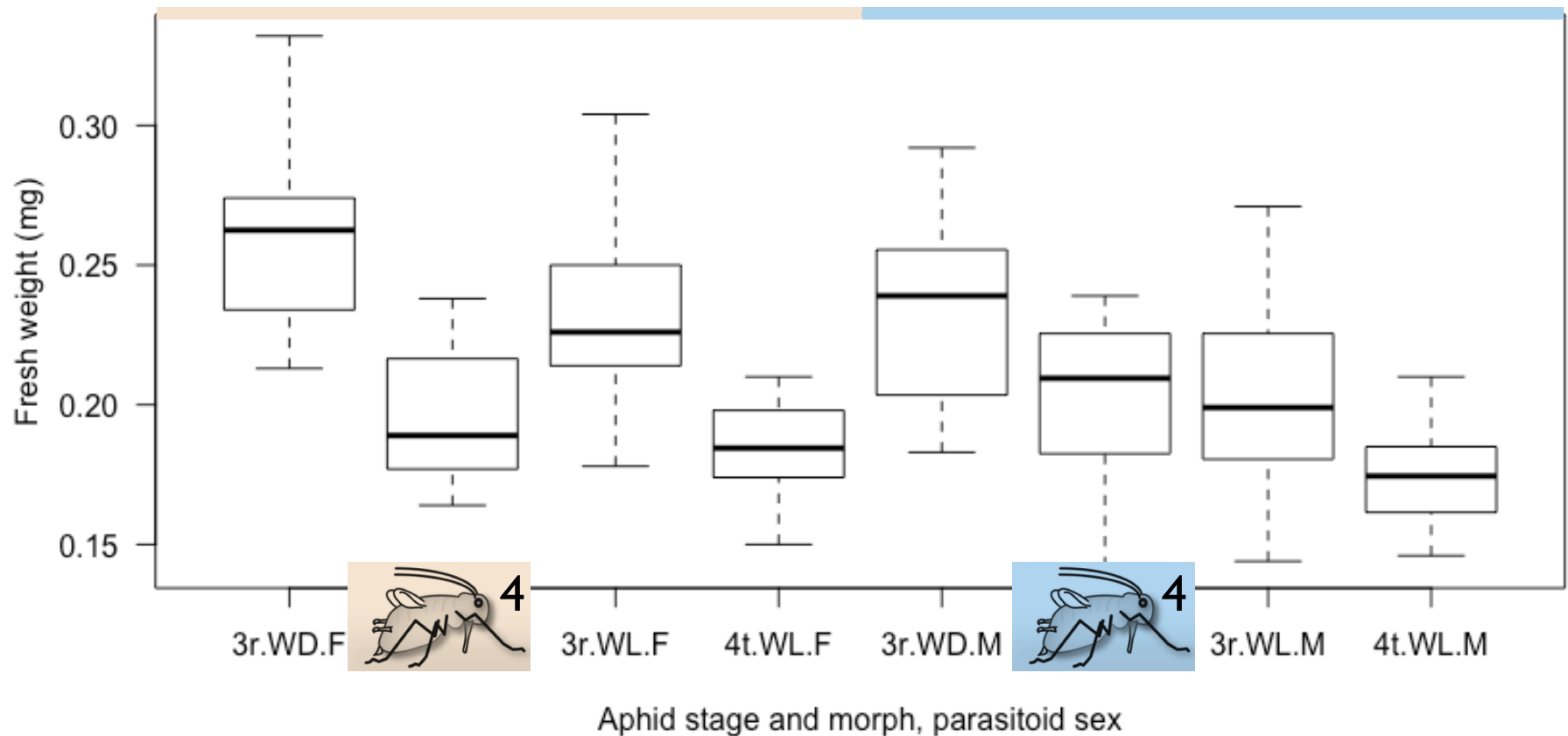
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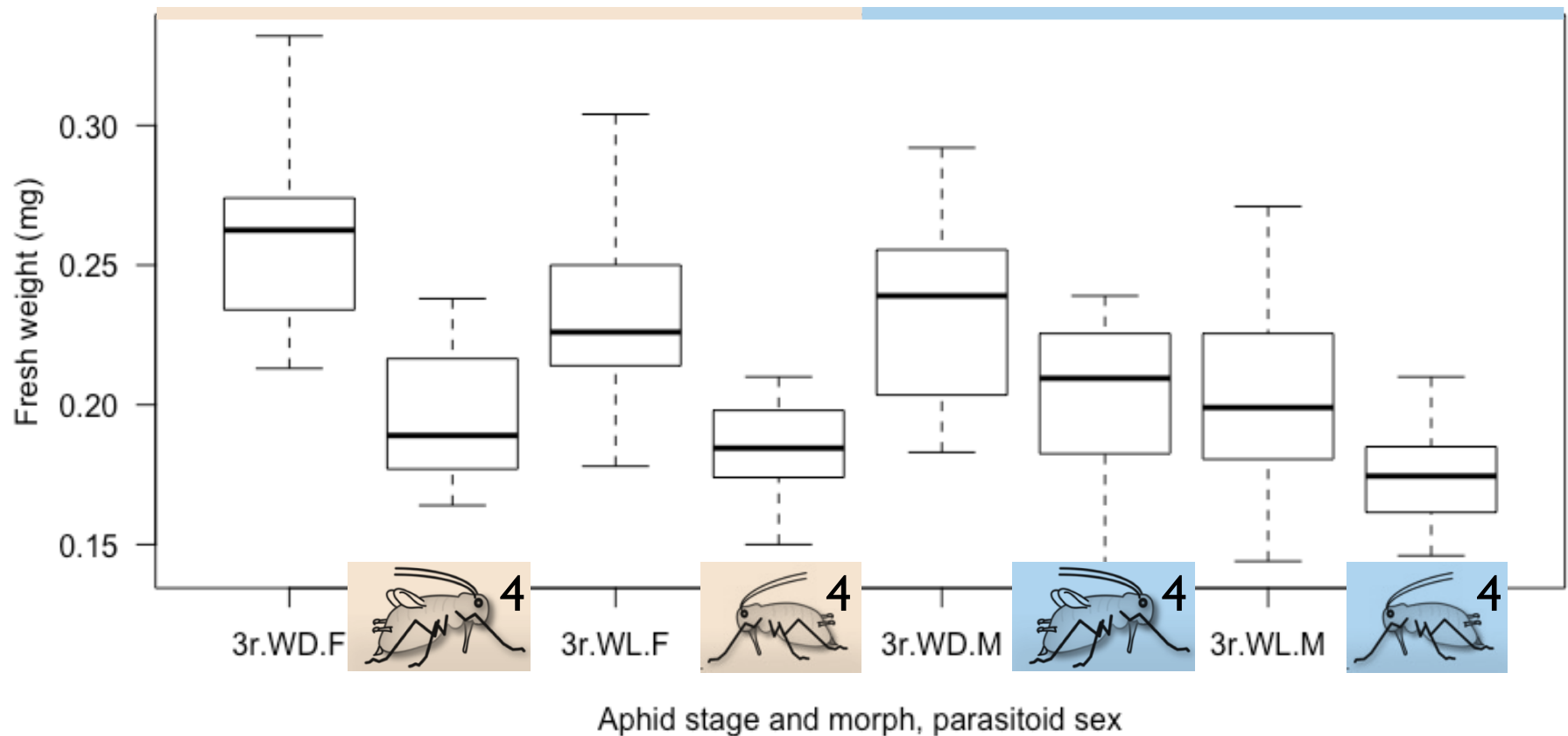
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Interaction Aphid stage:parasitoid sex significant, $p = 0.005$



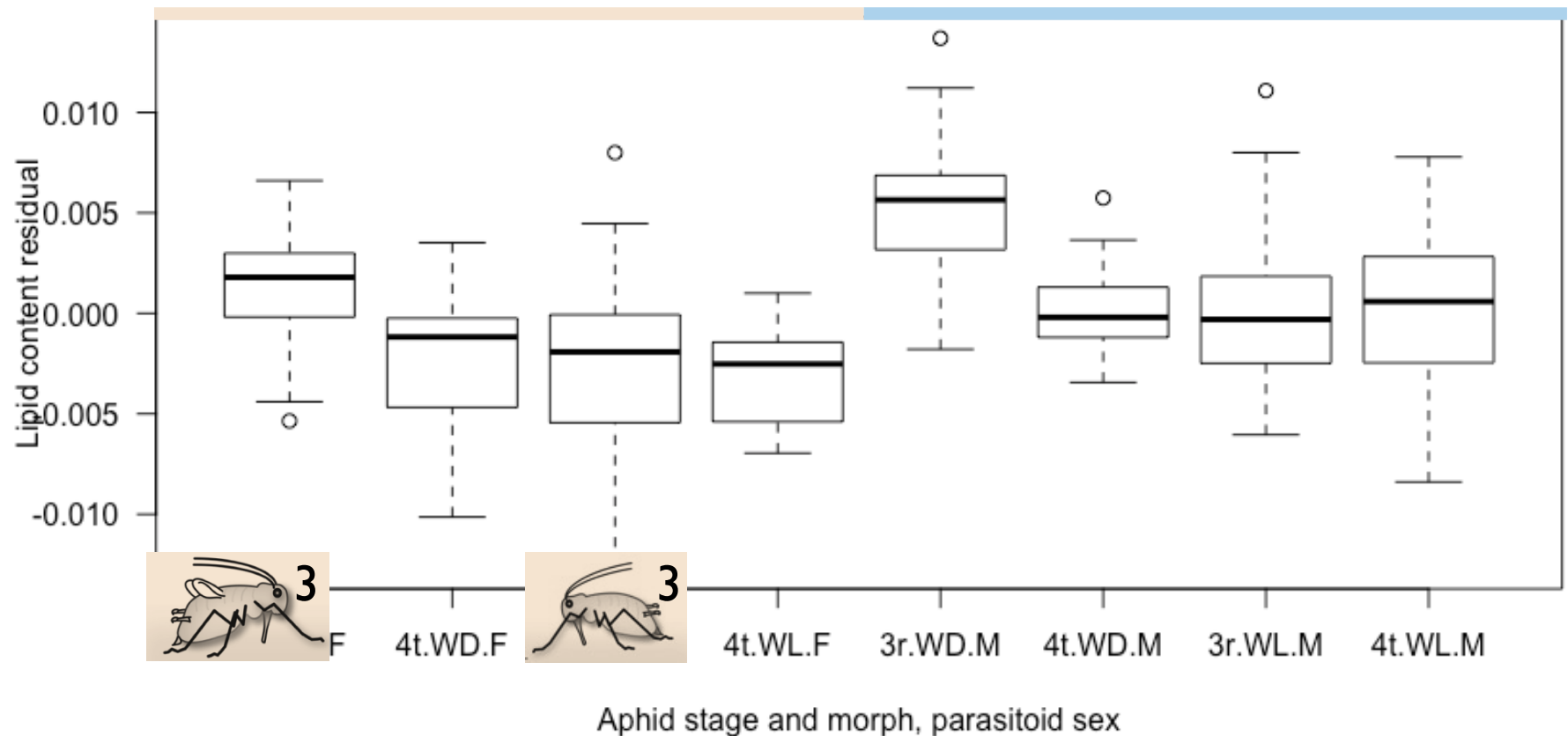
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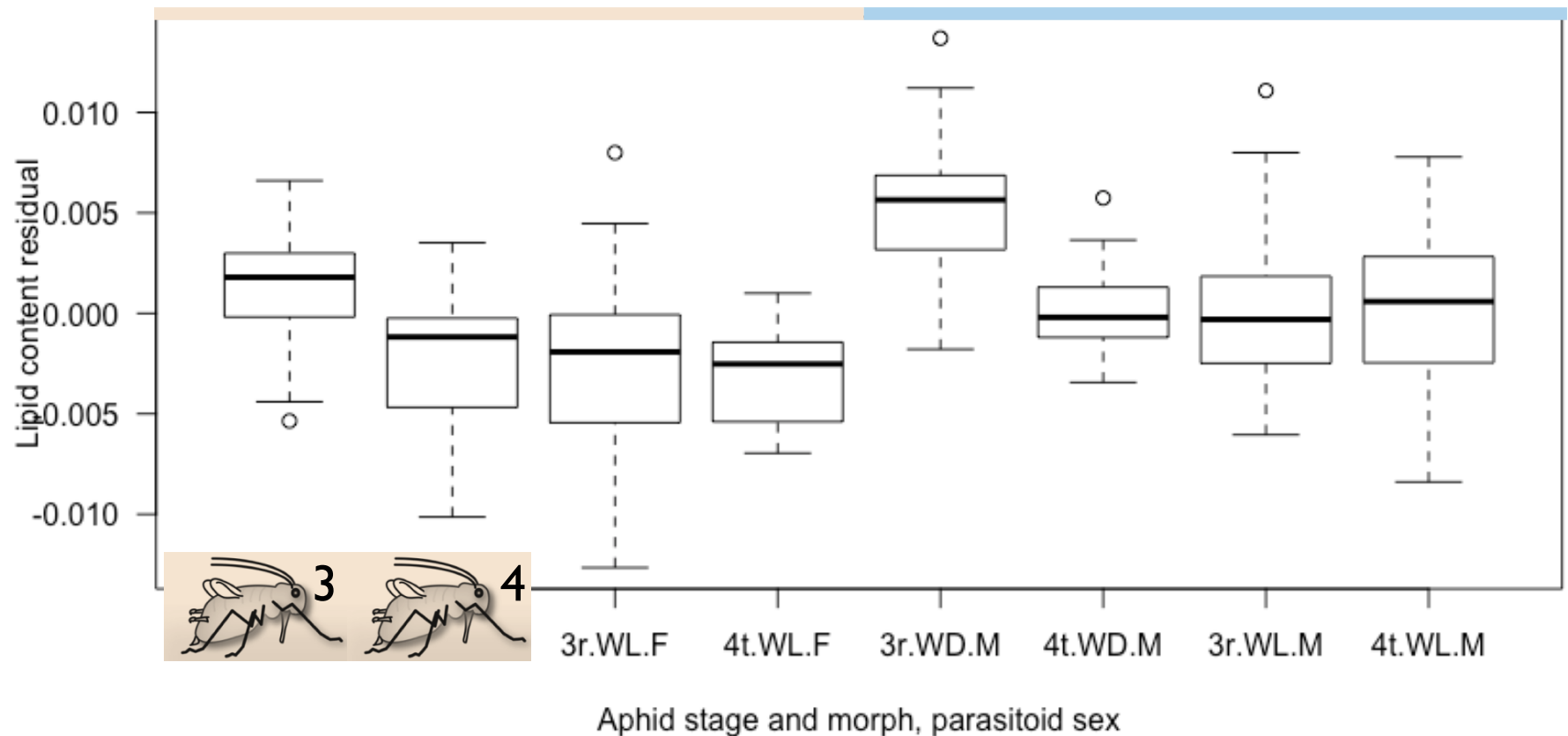
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Parasitoids developing in winged are fatter, $p < 0.0001$



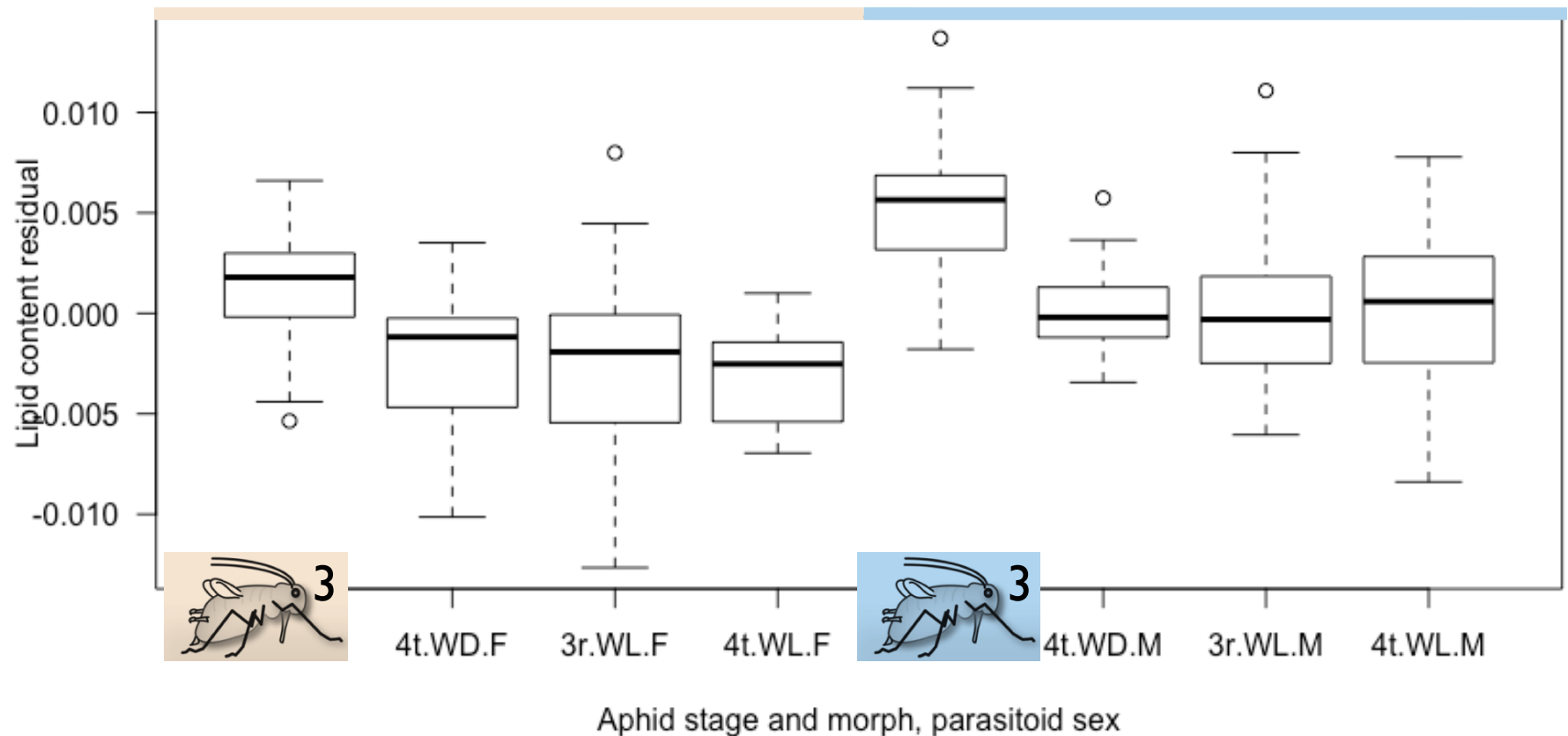
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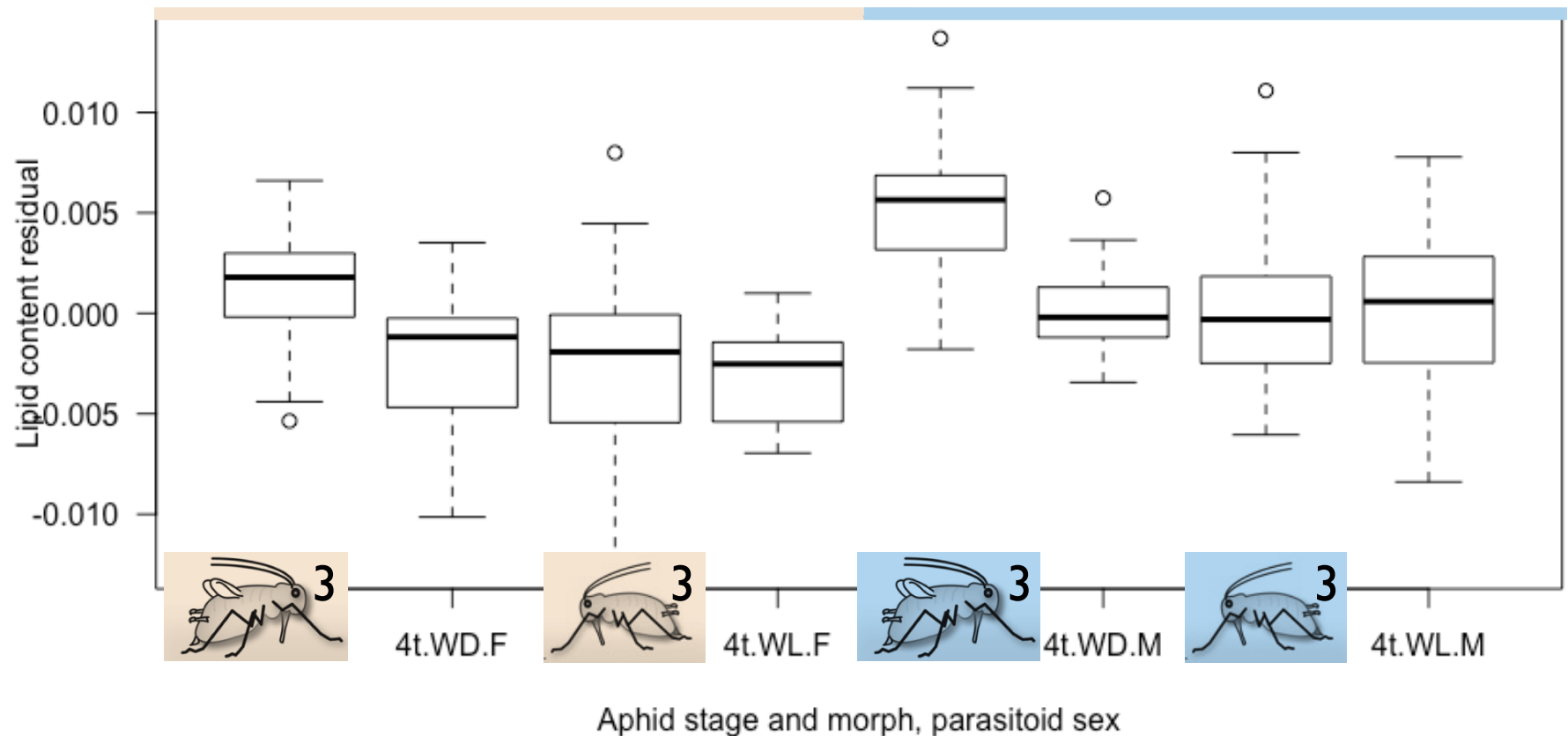
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Males have more lipids for the same weight, $p < 0.0001$



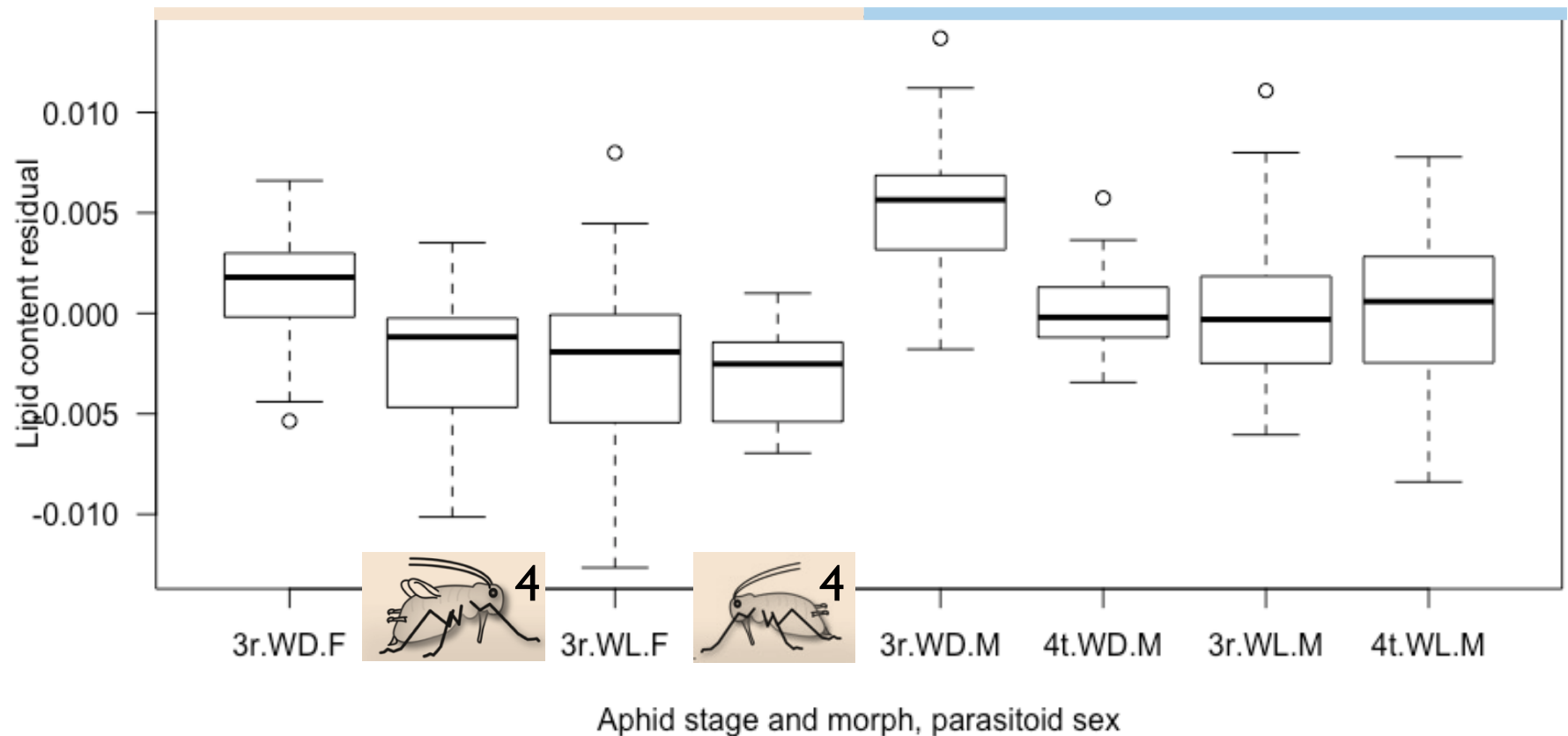
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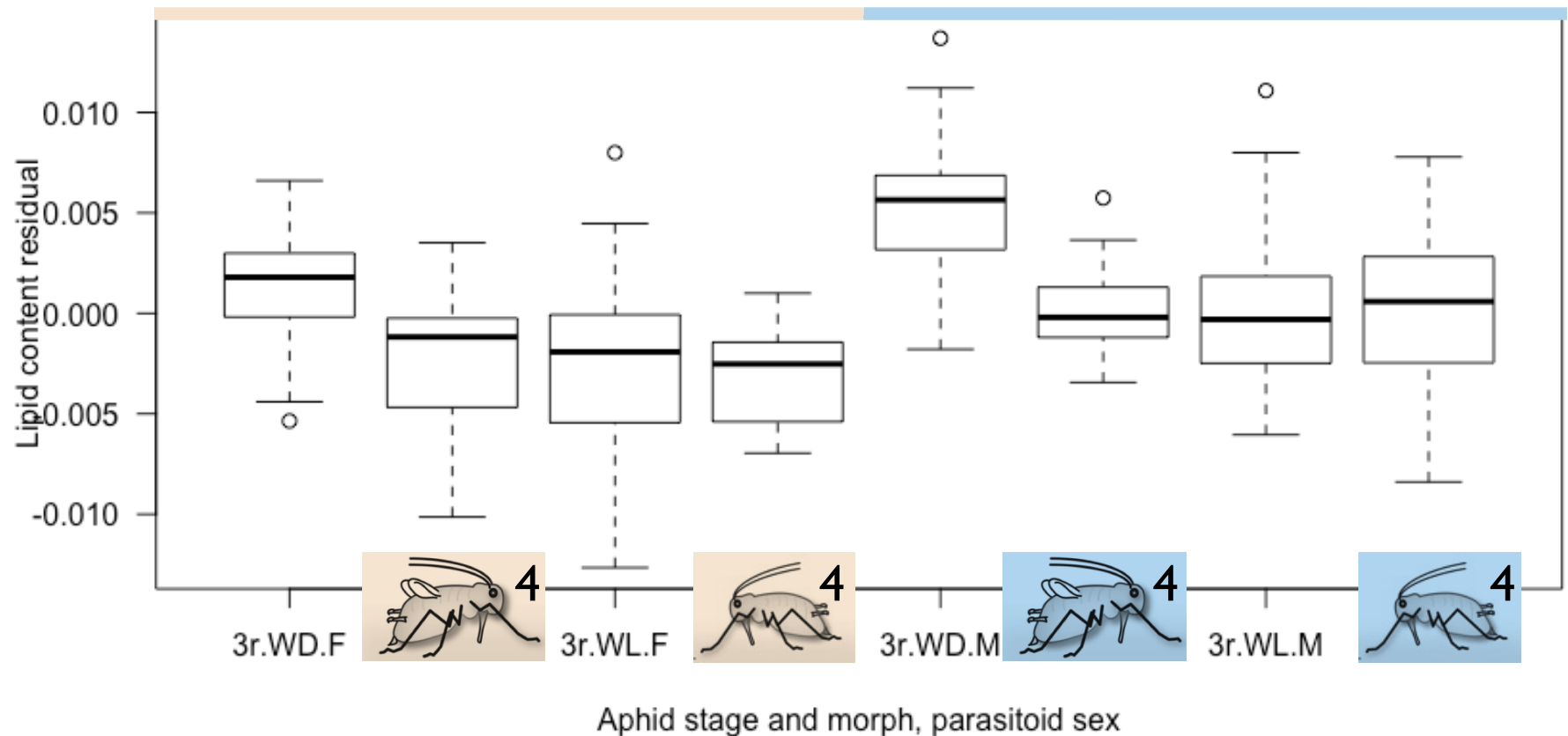
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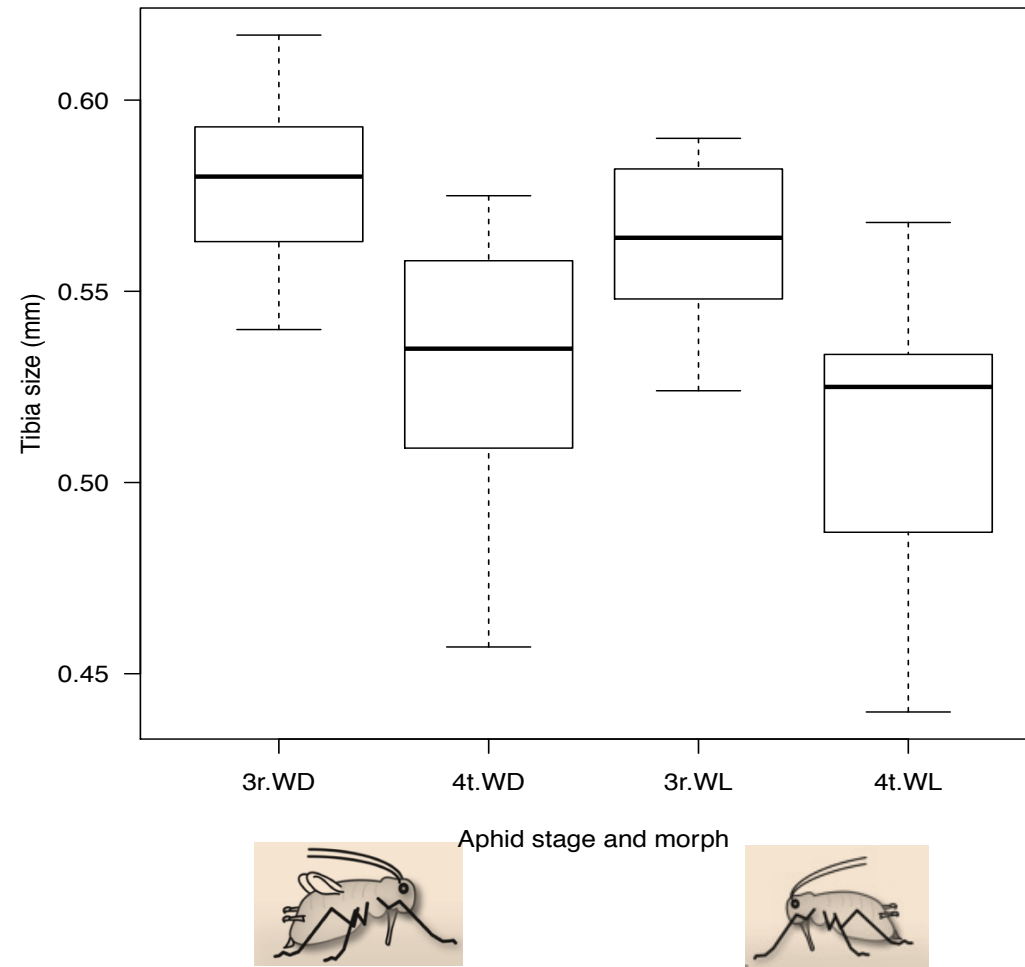
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Results of the second experiment



Females are bigger if they develop in winged ($p = 0.0081$) and 3rd stage ($p < 0.0001$)



Wings or not, does it really matter?

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- **Females are usually bigger and heavier** (Häckermann *et al.*, 2007)
- **When fresh weight taken into account, more lipids in males** (not in total, females heavier)



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- Previous studies :
 - No morph effect on male dry weight, (Mackauer, 1986)
 - Presence of wings reduces parasitoid thorax length, (Demmon et al., 2004)
 - System specific? ($><$ *Acyrtosiphon pisum*; *Aphidius ervi* or *Aphidius smithi*)

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Thanks for your
attention !