

Supplementary Information

Supplementary Tables

Supplementary Table 1. A description of male aggressive behaviours (Nilsen et al, 2004, Dow & von Schilcher, 1974, Chen et al. 2002). Lunging, chasing, tussling and fencing all represent aggressive fighting, whereas wing threat represents an aggressive threat display.

Aggressive behaviours	Description
Lunging	<i>The male raises up on hind legs and rapidly thrusts his upper body at his opponent</i>
Chasing	<i>One male rapidly pursues his opponent, remaining in close proximity. Contact and even aggressive lunging may occur during chasing</i>
Tussling	<i>Both opponents raise up on hind legs and become interlocked in a prolonged aggressive struggle</i>
Fencing	<i>A male uses his forelimbs to bat his opponent. It includes front-on and side-on action with any of the two front or middle legs, and can be performed by one or both opponents, alone or in combination with other behaviours.</i>
Wing Threat	One male faces the rival and raises both wings in unison at an angle of ~45 degrees for a duration of >1s

Supplementary Table 2. Standard molasses-based medium laboratory medium for adult flies

Ingredients	Amount Per Litre
Agar (g)	6.923
Maize (g)	69.231
Soya (g)	8.308
Yeast (g)	14.077
Malt (g)	69.231
Molasses (ml)	23.077
Nipagin (ml)	30.000
Acid mix (propionic acid + orthophosphoric acid, ml)	5.385

Supplementary Table 3. Larval food recipes adjusted from a sugar-yeast-agar recipe (values per litre media)

Ingredients	Amount Per Litre		
	High Yeast	Medium Yeast	Low Yeast
Water (ml)	960	960	960
Agar (g)	15	15	15
Sugar (g)	50	50	50
Yeast (g)	120	20	10
Nipagin (ml)	30	30	30
Propionic acid (ml)	3	3	3

Supplementary Table 4. Sample sizes for each treatment

Focal Diet	Rival Diet	N
L	L	21
L	M	20
L	H	21
M	L	21
M	M	21
M	H	21
H	L	21
H	M	20
H	H	21

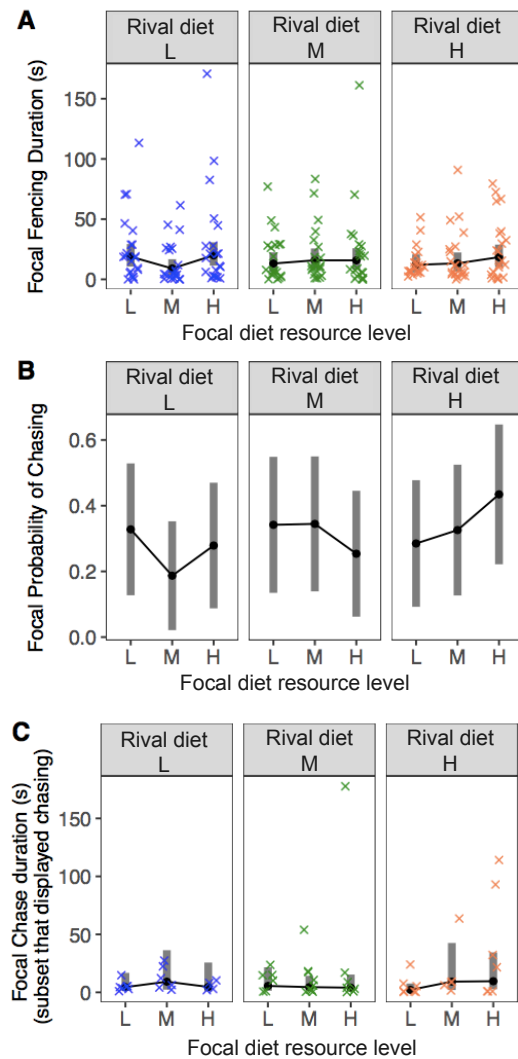
Supplementary Table 5. The influence of focal and rival developmental diet and their interaction on focal male fencing and chasing aggressive behaviours

Behaviour	Focal diet	Rival diet	Focal diet x rival diet
Fencing duration	$F_{2,174}=1.2$ $p=0.291$	$F_{2,174}=0.1$ $p=0.954$	$F_{4,174}=0.8$ $p=0.504$
Chasing probability	$\chi^2_{2,174}=0.3$ $p=0.879$	$\chi^2_{2,174}=1.1$ $p=0.592$	$\chi^2_{4,174}=2.5$ $p=0.645$
Chase duration (among flies that chased)	$F_{2,45}=0.9$ $p=0.431$	$F_{2,45}=0.1$ $p=0.892$	$F_{4,45}=0.7$ $p=0.619$

Supplementary Table 6. The effects of Zeitgeber time and day from models of the influence of larval diet on each behaviour. We included day as a fixed factor and Zeitgeber time as a covariate in all models to account for temporal variation in behaviour.

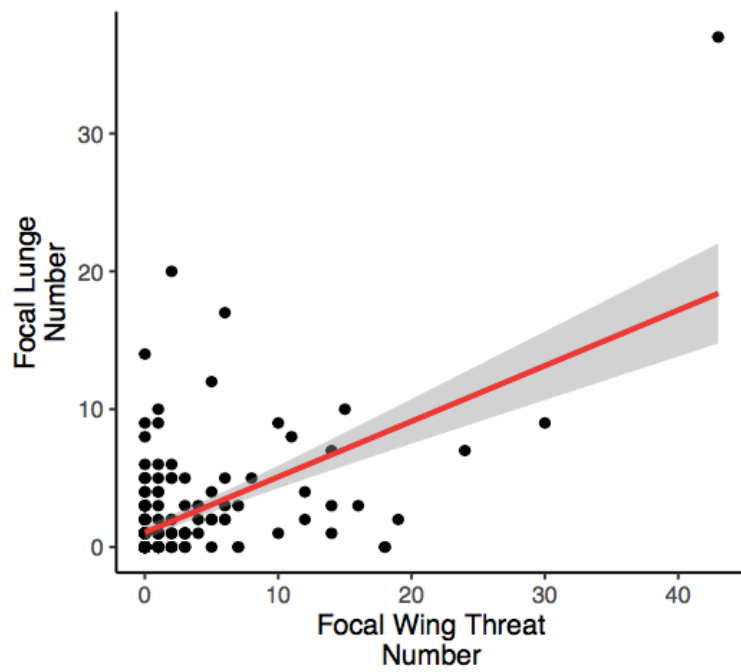
Behaviour	Zeitgeber time	Day
Lunge probability	$\chi^2_{1,174}=2.9$, $p=0.089$	$\chi^2_{3,174}=3.6$, $p=0.309$
Lunge frequency	$\chi^2_{1,88}=4.8$, $p=0.029$	$\chi^2_{3,88}=1.5$, $p=0.6378$
Wing threat	$\chi^2_{1,174}=1.9$, $p=0.662$	$\chi^2_{3,174}=8.0$, $p=0.047$
Locomotion	$F_{1,174}=3.2$, $p=0.077$	$F_{3,174}=6.1$, $p<0.001$
Fencing	$\chi^2_{1,174}=1.2$, $p=0.270$	$\chi^2_{3,174}=3.0$, $p=0.031$
Chase probability	$\chi^2_{3,174}=2.3$, $p=0.508$	$\chi^2_{1,174}=1.4$, $p=0.230$
Chase frequency	$\chi^2_{3,45}=0.5$, $p=0.707$	$\chi^2_{1,45}=0.0$, $p=0.995$
Total aggression	$F_{1,174}=1.9$, $p=0.167$	$F_{3,174}=2.2$, $p=0.091$

Supplementary Figures



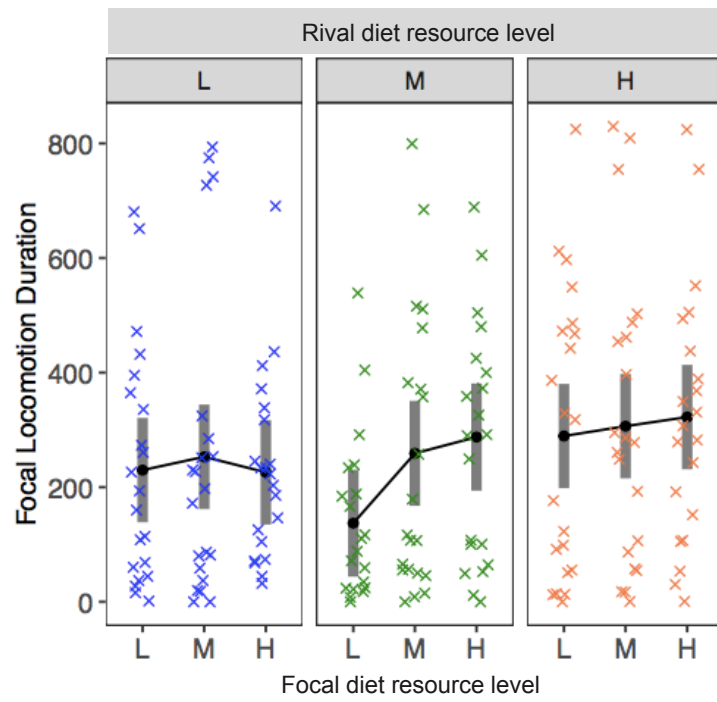
Supplementary Figure 1

The influence of focal and rival developmental diet on focal male fencing duration (back-transformed from square root transformation, A), chase probability (B), chase duration of those that chased (back-transformed from log transformation, C), Grey bars represent 95% confidence intervals.



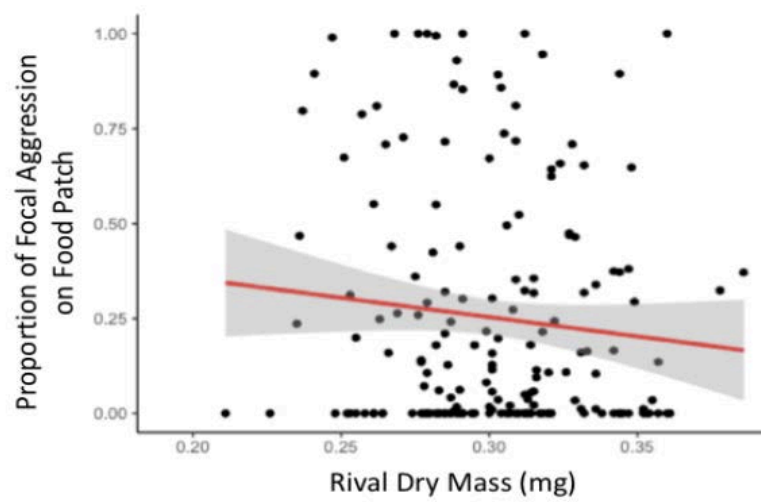
Supplementary Figure 2

The relationship between focal male wing threat number and lunge number. Black points show raw data; red line shows the line of best fit; grey shaded area represents confidence intervals



Supplementary Figure 3

The influence of focal and rival developmental diet on focal male locomotion duration. Grey bars represent 95% confidence intervals.



Supplementary Figure 4

The relationship between rival male dry mass and the proportion of aggression the focal male performed on the food patch, relative to off the food patch