Coping with change

how can chemical communication systems overcome disruption?

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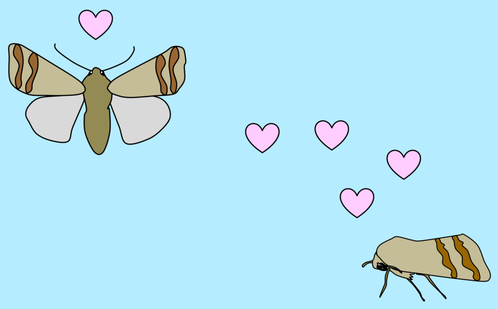
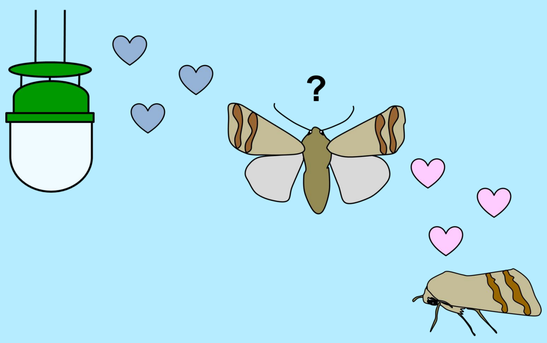
1

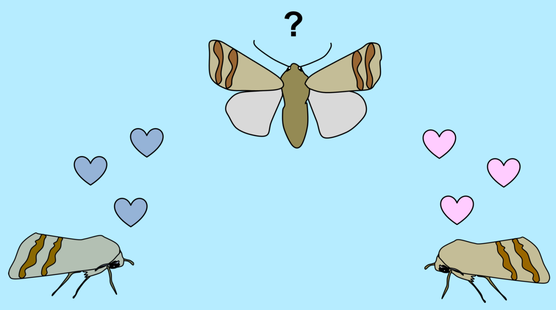
In many insect species females **attract** mates via long-range pheromones.





Human activities can **disrupt** this signaling system – often intentionally. But how will species adapt?

To answer this we can study how species have **adapted** to interference from closely related species.



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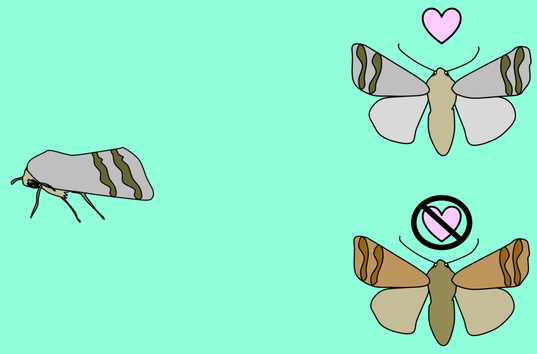
Two closely related species, *Heliothis subflexa* (Hs) and *H. virescens* (Hv) have similar pheromone compositions and can hybridise. However, **mating is costly** and hybrids have low fitness.

Hs females produce acetates, which **repel** Hv males.

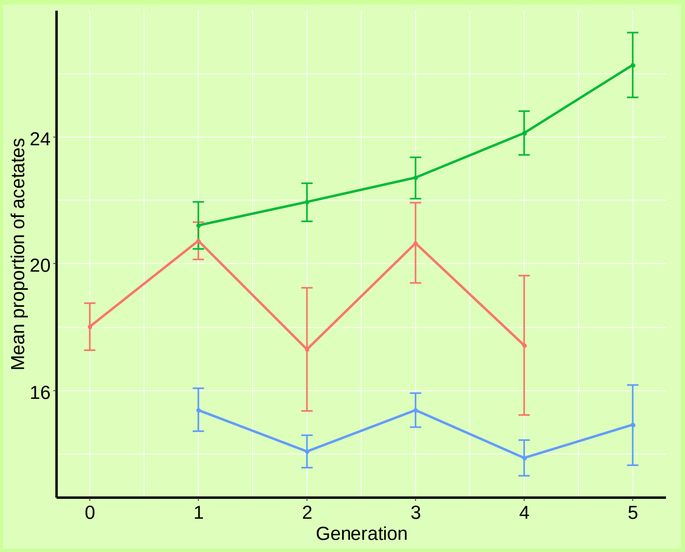


And they produce more acetates when in sympatry with Hv

3

Acetate production is **heritable.**

We can observe a clear shift in the proportion of acetates produced by Hs females after **5 generations of selection** for high (>22%) or low (<16%) acetate levels.



Above: The mean **proportion of acetates** produced in the pheromone blend of Hs females across **five generations** from high (green) and low (blue) selection lines. The non-selected back-up line is shown in red. Pheromone blends were extracted from the glands of females and analysed using GC-FID. Bars represent standard error. N ~ 1600

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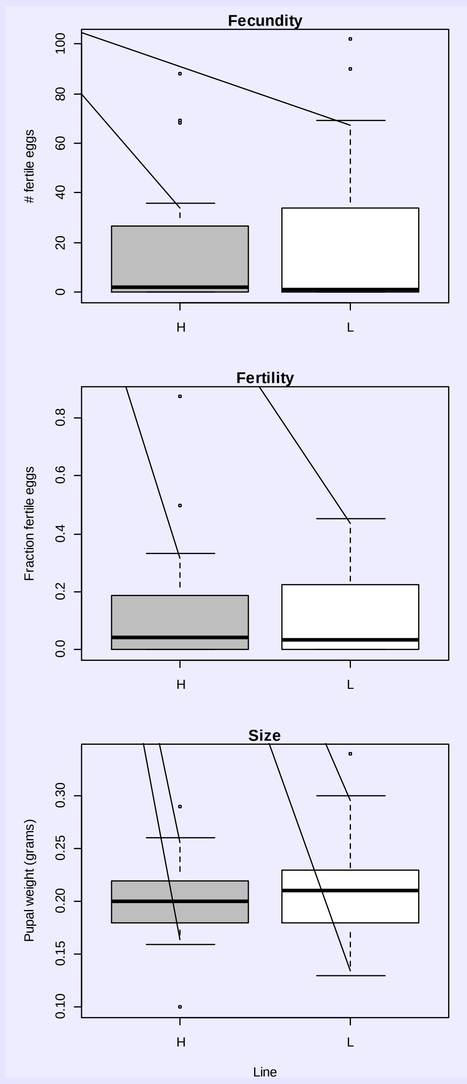

Above: The **fecundity** (the total number of fertile eggs laid), **fertility** (the fraction of total eggs laid that proved fertile) and **pupal weight** (g) of the high and low Hs selection lines. Individuals were always mated with a partner from their own line.

Despite changes in acetate production, females from the high and low lines showed **no significant differences** in size, fecundity or fertility at the third generation of selection.

This suggest that production of the acetates is **not costly.**

Future work will test if higher acetate production reduces **heterospecific harassment** by Hv.

Questions? Comments?
Contact me @MothProf or at e.r.burdfieldsteel@uva.nl

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