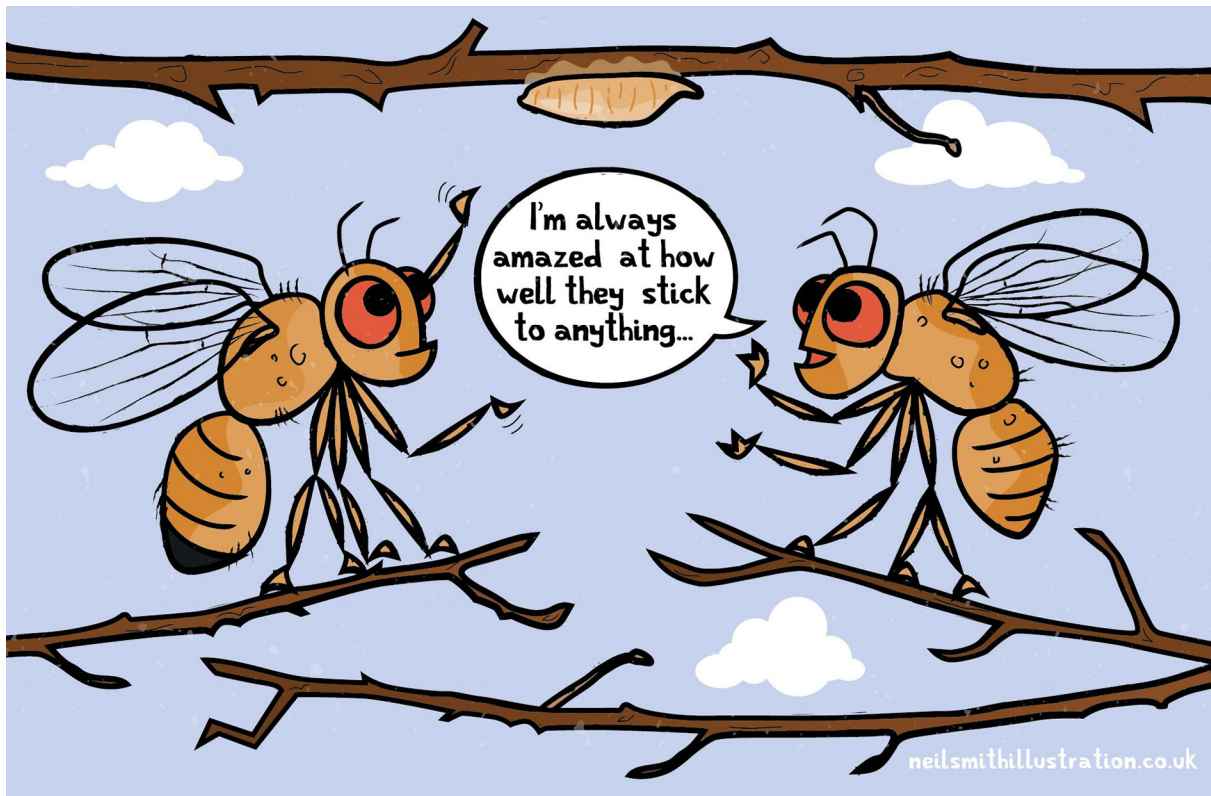


INSIDE JEB

Drosophila larval glue sticks to anything

Sticking to a surface is all part of the rite of passage from larva to adult for fruit flies (*Drosophila melanogaster*). After spitting out their sticky secretions, the larvae wriggle around to ensure that their salivary adhesive is smeared evenly between their body and the surface before it cures to form a secure bond. ‘The glue is composed of a small number of proteins called salivary gland secreted proteins’, says Virgine Courtier-Orgogozo, from the Institut Jacques Monod, France, who wants to identify the genes involved in glue adhesion to understand how the adhesive has evolved. However, before she could begin unravelling the details, Courtier-Orgogozo and her PhD student Flora Borne teamed up with insect attachment experts Alexander Kovalev and Stanislav Gorb from the University of Kiel, Germany, to find out how well the adhesive attaches to different surfaces.

Using glass slides, which water spreads across with ease, slides treated to make them water-repellent and electrically chargeable epoxy resin surfaces, the team allowed 328 fruit fly larvae to settle on the different surfaces and secure themselves in preparation for pupation. Then, the scientists attached a force transducer to each pupa, before tugging on them to find out how tightly they had adhered, with only 56 detaching cleanly as the glue gave way. Calculating the force required to tear the pupae free, Courtier-Orgogozo was amazed that the adhesive could hold on with a force of ~217 mN, 15,500 times the weight of a pupa. But she was most intrigued that the adhesive took hold successfully on all of the different surfaces, regardless of how water-repellent or chargeable they were.

‘Amazing! How lucky to have such a universal glue at hand!’ exclaimed Courtier-Orgogozo, who is now eager to find out how well the adhesive adheres to more natural surfaces. And she is also keen to find out if she can learn how the adhesive gained its strength. ‘Our study paves the way for a genetic dissection of the components of *D. melanogaster* glue that confer its particular adhesive properties’, she says.

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Borne, F., Kovalev, A., Gorb, S. and Courtier-Orgogozo, V. (2020). The glue produced by *Drosophila melanogaster* for pupa adhesion is universal. *J. Exp. Biol.* **223**, jeb22068. doi:10.1101/2019.12.19.882761

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