The Scent of the Fly[1]

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(*Z*)-4-undecenal (*Z*4-11Al) is the volatile pheromone produced by females of the vinegar fly *Drosophila melanogaster*. Female flies emit *Z*4-11Al for species-specific communication and mate-finding, figure 1. A sensory panel finds that synthetic *Z*4-11Al has a characteristic flavour, which can be perceived even at the small amounts produced by a single female fly. Since only females produce *Z*4-11Al, and not males, we can reliably distinguish between single *D. melanogaster* males and females, according to their scent, figure 2.

Females release *Z*4-11Al at 2.4 ng/h and we readily sense 1 ng synthetic *Z*4-11Al in a glass of wine (0.03 nmol/L), while a tenfold concentration is perceived as a loud off-flavour. This corroborates the observation that a glass of wine is spoilt by a single *D. melanogaster* fly falling into it, which we here show is caused by *Z*4-11Al. The biological role of *Z*4-11Al or structurally related aldehydes in humans and the basis for this semiochemical convergence remains yet unclear.

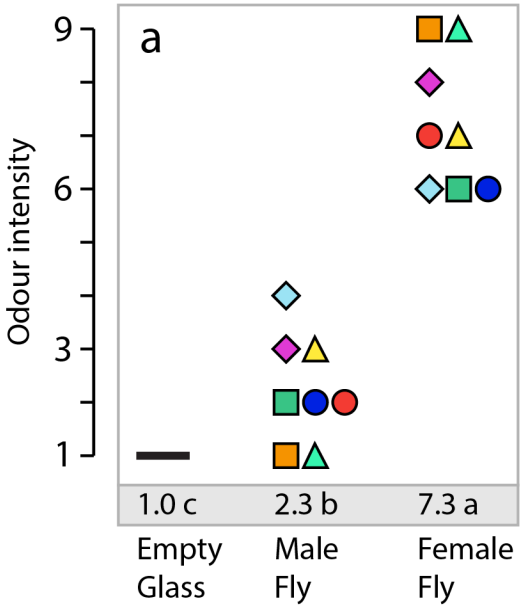

Figure 2. Sensory evaluation of the odor of a single *D. melanogaster* male and female fly adsorbed during 5 min in an empty wine glass (F = 96.711).

Figure 1. Fruitfly *D. melanogaster* female with exposed ovipositor on blueberry (Photo by Cyrus Mahmoudi)

[1] P.G. Becher et al. *J. Chem Ecol* **2018**, *44*, 431- 435.
Ig Nobel Prize in biology 2018 for research on vinegar flies, https://www.improbable.com/ig/