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Food smell and crowd motion switch on courtship in one fruit fly species

In Drosophila erecta, a 2026 Nature study finds, food odour sparks male arousal and the motion of a crowd amplifies it; without that setting, mating does not happen.

16 November 2026 · based on a paper in Nature

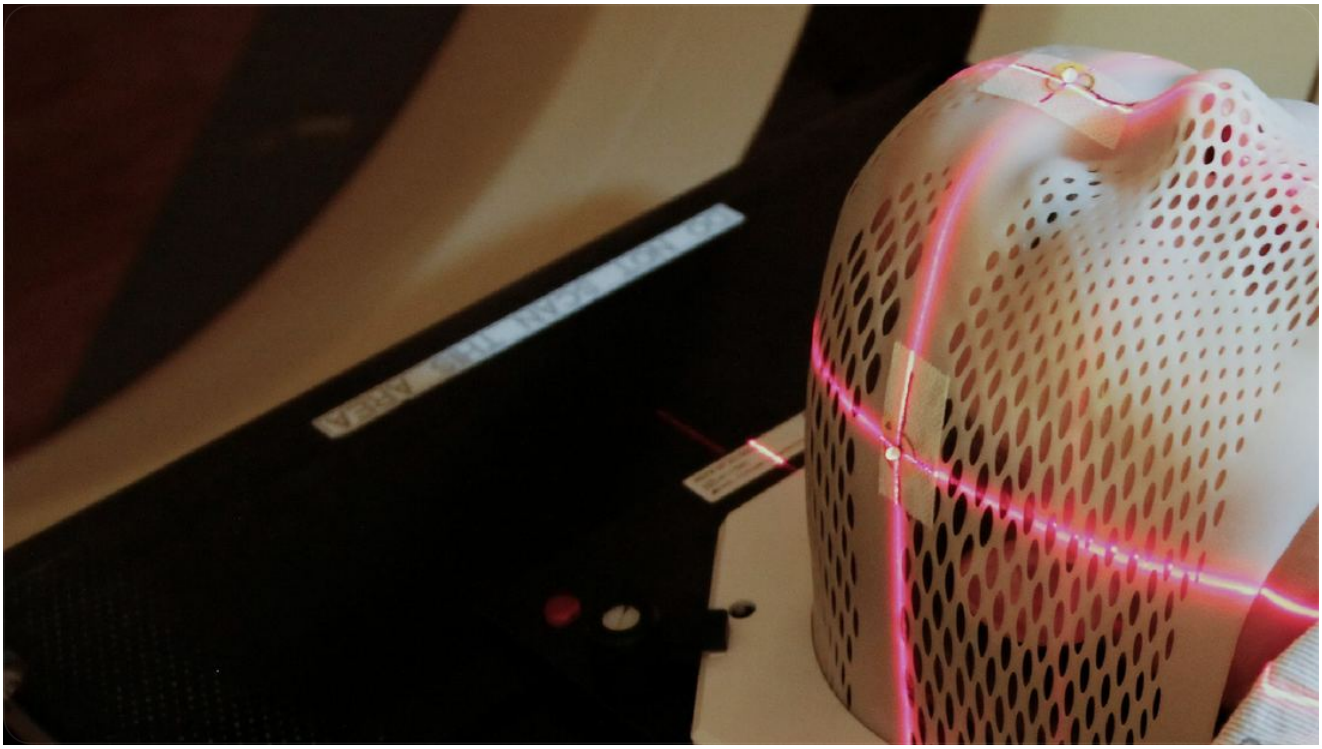


Photo: National Cancer Institute

Courtship in animals is usually studied as an exchange between two partners: one sends signals, the other reads them. A 2026 study in Nature, by researchers at Boston University, the Howard Hughes Medical Institute, the Max Planck Institute for Brain Research and New York University, argues that for one species of fruit fly the setting is essential. In Drosophila erecta, the authors report, mating depends strictly on the ecological and social environment that forms when flies crowd densely onto a patch of food.

According to the study, the process starts with smell. Food volatiles, the airborne chemicals that give food its odour, directly raise male sexual arousal. Aroused males begin to sample and pursue potential mates, and these pursuits set off a chain of interactions across the group. Once flies are moving around one another, the motion changes what each male sees, and that altered visual field

raises his arousal further. The authors describe this as a multisensory feedback loop: odour gets courtship going, and the visual commotion it creates amplifies it, so that courtship rises in concert across individuals.

The researchers compared D. erecta with Drosophila melanogaster, the fruit fly most widely used in laboratories. In D. melanogaster food odour can also promote arousal, but it is not needed: males court vigorously without it. The authors suggest that the strict dependence seen in D. erecta appears in latent form in related species.

To find where the species differ, the team compared their brain circuits. They report that each species has its own threshold for sexual arousal, and that the difference lies in how olfactory input acts on conserved nodes, parts of the circuitry shared across species, that control courtship drive. In other words, smell modulates the same underlying machinery differently, and only in D. erecta does food odour work as a strict gate on mating. The available text does not name the specific circuit components involved or describe the experimental setups in detail, and the experiments were done in flies.

The idea that watching others can reshape an animal's internal state echoes a braintankAI report on a separate 2026 Nature animal study, in which observing aggression mimicked the brain activity of fighting itself (earlier story). In both cases, visual input from other individuals' behaviour shifts a drive that is usually attributed to direct encounters.

PAPER	*Ecological and social cues orchestrate concerted courtship in Drosophila*
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