Another Sexual Attraction is Possible...

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The coming summer vibrates with expressions of insect love and desire. The cicada's songs or the butterflies' bright colours are examples of how an emitting sex attracts conspecific members of the responding sex.

Moth odours (pheromones), though less conspicuous for us humans, are also signals by which females guide males towards them, even on the darkest nights. Such mating recognition systems tend to be very specific, hence they are thought to play a major role in the evolution of mating barriers and in the formation of new species.

The fact that conspecific males and females recognize each other by their common use of a highly specific "language" is likely to decrease the fitness of mutants that might use slightly different signals. Such "atypical" individuals would either - and most probably - die without leaving any offspring, or - in the unlikely event that they find a mutant partner - they might found a new line that may eventually become a new species. As such, the offspring of such parents would inherit the mutant communication system of their parents, which could "spark" the divergence leading to the formation of a new species.

The European corn borer, Ostrinia nubilalis, is a model species that is particularly well-suited to study the first steps along the road to speciation and the deep mysteries of reciprocal attraction - or lack thereof - between potentially interfertile individuals. Indeed, two types of females and two corresponding types of males coexist within this species: one type communicates with the so-called "E" pheromone while the other communicates with the "Z" pheromone. Although hybrid

matings produce perfectly viable offspring, both types very rarely mate in nature. At a first glance, it is tempting to believe that this is due to their different pheromones.

However, in a study published in the June 20th issue of the online, open-access journal PLoS ONE, researchers from the Institut National de la Recherche Agronomique, from the Centre National de la Recherche Scientifique and from the University of Toulouse show that, while pheromones are probably used for meeting, they may not be used for mating per se. Performing crosses and backcrosses between different pheromone races of this moth, they obtained groups of individuals sharing the same pheromone type but differing in their overall genetic relatedness with the "pure" races, and, conversely, groups of individuals sharing a very similar genetic background but using different pheromones.

The former were expected all to show similar mating performances with a group of pure-race individuals - but they didn't. The latter were expected to show differences in mating succes s with pure-race individuals - but, again, they didn't. Therefore, overall relatedness rather than pheromone type seems a good predictor of the ability to mate, at least within this species studied here.

These results suggest that the role of pheromone divergence in speciation may not be quite as strong as previously thought - at least within this model species - since another recognition system seems to coexist and constitute a powerful mating barrier. Why, then, don't the corn borer Capulets and Montagues mate more often? So far, the researchers can only dream of their next findings...

Citation: Pélozuelo L, Meusnier S, Audiot P, Bourguet D, Ponsard S (2007) Assortative Mating between European Corn Borer Pheromone Races: Beyond Assortative Meeting. PLoS ONE 2(6): e555.

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