**Chemical confusion: sex pheromones trigger mistaken identity by male widow spiders**

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Chemical communication is common among animal taxa and plays an important role in sexual selection, where pheromones can allow individuals to distinguish species, breeding condition and feeding history of potential mates at a distance. In many web-building spiders, chemicals released from females and their webs (pheromones) attract mate-searching males in the field and are critical to mate localization. We are studying evolutionary variation in the structure and function of these airborne pheromones across the genus *Latrodectus* (the ‘widow’ spiders), which includes over 30 species worldwide. Here we report the first evidence that species from two distinct biogeographical regions may have highly similar airborne pheromones. We tested the attraction of male redback spiders (*L. hasselti*, an Australian species) to airborne pheromones in a 2-choice olfactometer bioassay in which males walked a T-maze in an open-topped arena to one of two sources ventilated with a fan. We first show that our apparatus allowed males to make reasonable choices. Male redbacks reliably moved towards a conspecific female and her web over a control (a source with no web or spider present). However, when one source was a conspecific female and the other a heterospecific female (*L. mirabilis*, a species from Uruguay), male choosiness disappeared—males were equally likely to approach the heterospecific source. This suggests considerable conservation of sex pheromone structure across relatively distantly related species. We discuss this result in light of contrary field studies suggesting males of other *Latrodectus* species do distinguish hetero- compared to con-specifics based only on sex pheromones.