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Resolution of Plume Structure: Importance to Orientation and its Disruption

The fine-scale features of odor plumes dispersed in wind are mainly dictated by turbulent diffusion. At the antennal level of perception many moths appear able to decipher filaments of odor encountered at rates as high as 25 Hz. Behavioral observations of several moth species in the wind tunnel suggest that the “flickering” characteristic of the signal is important to upwind flight along the plume. To date the importance of interfering with the plume’s turbulent structure in disruption of orientation has remained unresolved. Pink bollworm (*Pectinophora gossypiella*) males pre-exposed to either rapidly pulsed or continuous streams of pheromone subsequently are able to orient to an upwind, point source of pheromone equally well. This suggests that in this species, the degree of habituation achieved is not elevated by males receiving a flickering of signal from the disputant formulation.