ACOUSTICS2008/2544
The effect of courtship song components in Drosophila melanogaster

Yu-Po Chen, Joseph Jackson, James Windmill and Daniel Robert
University of Bristol, D34 School of Biological Sciences, Woodland Road, BS8 1UG Bristol, UK

Courtship between male and female Drosophila melanogaster involves a complex emission of sounds produced by the male. This song comprises two aspects: a low-frequency sine song followed by a series of intense pulses. These songs increase the chances of the female accepting the male. However, the reason for the complexity of the song, and the effect on the female of the song's components, is poorly understood. Using measurements of the male courtship song for a canonical stimulus, we investigate the importance of the sine song on both the mechanical and electrophysiological responses of the female antenna: the nonlinear auditory sensor. While stimulating the antenna with modified courtship songs, antennal motion was measured using laser Doppler vibrometry, and compound potentials were simultaneously measured from the auditory neurones. Results show that, even at the periphery, there exists a significant change in the way the antenna responds to the pulses as a function of the sine song intensity, most emphatically through the neurophysiological signals. Results indicate that the sine song is an advantageous trait used to increase the female perception of the pulses in both time and amplitude sensitivity, and therefore improve the male's chance of successfully courting a female.