

Abstract Submitted
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Can you hear better if you're lopsided? Tympanal asymmetry may enhance hearing in a parasitoid fly¹ MAX MIKEL-STITES, PAUL MAREK, ANNE STAPLES, Virginia Tech — *Ormia ochracea* is a parasitoid fly endemic to the Americas. Gravid females respond phonotactically to calls of their male *Gryllidae* cricket hosts. Astonishingly, *Ormia* can locate their hosts with an azimuthal precision of 2° – equal to that of humans, in spite of their small size, which should prohibit this level of precision because of fundamental constraints imposed by the physics of sound propagation (Mason *et al.*, *Nature*, 2001). Miles *et al.* demonstrated that *Ormia* is capable of resolving nanosecond time differences due to a direct mechanical coupling of the fly's tympanal membranes (Miles *et al.*, *J Acoust Soc Am*, 1995). This mechanical coupling increases the interaural time delay (ITD) between the tympana, thus enhancing the fly's sound localization precision. Here, we introduce an asymmetry in tympanal area into the mathematical model provided by Miles *et al.* and demonstrate that an asymmetry of less than 10% between the left and right tympanal areas can more than double the ITD. We further present initial measurements of 44 *Ormia* tympana that demonstrate an average asymmetry in tympanal area of approximately 5%.

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