Public Abstract
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While the importance of the female preference for exaggerated male traits is largely understood, the evolutionary origins remain under debate. During the evolution of the female preference for leading signals via a sensory bias, an important factor is the processing of sensory information. In katydids, contralateral inhibition on two bilaterally paired ascending auditory neurons (AN1 & TN1) acts to enhance directionality of neural responses to a male call, but may also act to suppress responses on the side of following calls. Here, I investigate the sensory processing underlying the preference for leading calls (LP) in Neoconocephalus katydids and test for a sensory bias in a phylogenetic and behavioral context. When presented with three different chirp patterns, AN1 and TN1 responded directionally, but no leader bias was found in AN1. There was a strong leader bias in TN1, but only for the call model of N. ensiger, a species with LP. These results for AN1 and TN1 were similar in all species tested, both with and without LP. The strength of the leader bias in TN1 was reduced after removing contralateral auditory inputs by cutting the contralateral leg. The leader bias in N. ensiger correlates to LP, suggesting that this LP may be due to a sensory bias mechanism but only after TN1 was incorporated into call recognition. Alternatively, TN1 might not be important for LP if higher centers in the auditory system extract the location of the leading call from other auditory neurons, such as AN1.