

269.20

TRACHEAL LENGTH CHANGES AND UPPER VOCAL TRACT RESONANCES DURING ZEBRA FINCH SONG. M.A. Daley, F. Goller*. *Biology, Univ. of Utah, Salt Lake City, UT, USA*

Upper vocal tract resonances in singing birds could be modified by beak opening, laryngeal adjustments and tracheal length changes. Beak movements during song correlate with song frequency, suggesting that the upper vocal tract length is effectively modified to adjust resonance frequency (e.g., Westneat et al., *J. exp. Biol.* 182:147-171, 1993). It is not known, however, whether direct changes of tracheal length also contribute to adjusting upper vocal tract resonances. To investigate this possibility, we recorded tracheal length using sonomicrometry (Sonometrics) together with subsyringeal air sac pressure and vocal output in four spontaneously singing zebra finches (*Taeniopygia guttata*). Sonomicrometry crystals were attached (6-7.5 mm apart) to the trachea a few mm above the point where it exits the interclavicular air sac. Tracheal shortening occurs at the beginning of each song and with every expiratory pulse during the song, whereas some lengthening occurs during minibreaths. The pattern of shortening is stereotyped and follows largely, but not entirely, the pattern of expiratory pressure, suggesting that both pressurization of the air sac system and syringeal muscle action contribute to the observed length changes. There does not appear to be a correlation between particular sound frequencies and tracheal length changes. The magnitude of shortening (maximally 0.6 mm) is small and is typically no greater than that generated by slight head turning. Calculations of resonance shifts based on these measurements suggest that length changes of the trachea play only a minor role in adjusting upper vocal tract resonances in singing zebra finches. *Supported by: NIH.*