

CONTRIBUTIONS OF EXPIRATORY MUSCLES TO SONG PRODUCTION IN ZEBRA FINCHES. E. Goller\*. Dept. of Biology, University of Utah, Salt Lake City, UT 84112.

Birdsong production requires coordinated activity of syringeal and respiratory muscles. Phonation occurs during the expiratory phase of the respiratory cycle, and expiratory muscles generate the pressure head for sound production. Together with the syringeal muscles, expiratory muscles may also contribute to the fine regulation of the airflow conditions that are required for production of stereotyped acoustic signals. To study the role of expiratory muscles during spontaneous song production in zebra finches (*Taeniopygia guttata*), I have recorded electromyograms (EMG) and muscle length changes (using sonomicrometry) of the M. obliquus externus abdominis together with subsyringeal air sac pressure and the vocalizations.

During quiet respiration as well as song each expiratory pulse is accompanied by a shortening of the abdominal muscle, which is reversed during inspiration. Compared to quiet respiration, EMG activity and expiratory air sac pressure increase drastically for each expiratory pulse of the song, but abdominal muscle length does not decrease proportionally. Intersyllable inspirations are accompanied by rapid lengthening of the abdominal muscle such that the following contraction is initiated from a stretched position. Some, but not all modulations of air sac pressure during the course of a single expiratory pulse are correlated with respective changes in muscle length, suggesting a complex interplay between syringeal and abdominal muscles in regulating airflow and pressure conditions during song.