

Identification of Neural Circuits Generating Calls in Katydid

Central pattern generators (CPGs) are neural circuits that generate rhythmic behaviors, such as walking, breathing, and, e.g., in insects, the rhythmic and repetitive advertisement calls. In many acoustic insects, these advertisement calls are species-specific and highly diverse among species. My current research studies aspects of call diversity in *Neoconocephalus* katydids (Orthoptera: Tettigoniidae). In this group, male calls are the most diverse trait among species. Understanding how this diversity emerges is an excellent model for the evolution of new behaviors (Katz, 2011). My part of this research is to study where the CPGs which generate the call patterns are located in the central nervous system (CNS) of these insects. Katydids are ectotherms, organisms whose body temperature changes with ambient temperature. When their internal temperature increases, so do the rate of biological processes, including calling (Pires et al., 1992). I manipulated the temperature of various ganglia during calling to estimate their contribution to pattern production. If a ganglion is cooled and the pulse rate goes down, then that the ganglion is involved in generating the pulse pattern. I found that cooling of the T3 segment, which contains two ganglia (T3A1 and A2A3) led to a significant reduction in pulse rate, indicating that one or both of these ganglia play a central part in pulse pattern generation. Upcoming experiments will cool these two ganglia separately, as well as cool ganglia in T1 and T2 segments. Identifying the precise location of the pulse CPG is required for a more detailed analysis of the CPG and its evolution at the neural and genetic levels.