INVESTIGATION OF THE VIBRATORY INTERNEURONS IN THE VENTRAL NERVE CORD OF *HALYOMORPHA HALYS*: MORPHOLOGY AND PHYSIOLOGY

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The invasive Brown Marmorated Stink Bug, *Halyomorpha halys* (Stål), is a notorious agricultural and household pest. It relies on substrate-borne vibrations during courtship for mate finding and recognition. Here, we tackled the neuronal mechanisms involved in vibratory communication of *H. halys* to increase our understanding of the mating process of this invasive pest, needed to develop reliable behavioral manipulation techniques.

Adult *H. halys* of both sexes from the North of Italy were used. The animals were fixed on a holder dorsal side-up, central ganglion was exposed and the leg tarsi were attached with wax on the mini-shaker as the source of vibratory stimuli. Sine-wave pulses of frequencies ranging from 30−2000 Hz and intensities from 0.001−7 m/s2 were used for stimulation, and glass electrodes of resistance between 90−130 MΩ were used for registering neuronal activity. Following physiological characterization, the recorded neuron was filled iontophoretically with Lucifer Yellow dye. The ganglion was excised, fixed, dehydrated and cleared in methyl salicylate. The neurons were analyzed morphologically using fluorescent microscopy.

So far, we physiologically and morphologically characterized two neuron types, labeled CG-AC-1 and CG-AC-2, with the soma in the cortex between the 2nd and 3rd thoracic neuromere and a soma-contralateral ascending axon. In the supra-threshold range, these neurons are tuned to 50 and 200 Hz, respectively. Their thresholds, tested at 80 and 160 Hz, lie at 0.18 and 0.32 m/s2, and at 0.032 and 0.018 m/s2, respectively. Here, the responses of both neurons increase throughout the tested intensity range (40–60 dB). For CG-AC-1, the shortest response latency (12.5 ms) suggests a direct synaptic connection to receptors. At 50−100 Hz of high intensities, CG-AC-2 receives a delayed inhibition. Both neurons have clear homologues of nearly the same response properties identified in the green stink bug, *Nezara viridula*.