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Froghoppers and planthoppers – a neurobiological perspective (Auchenorrhyncha)

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Froghoppers and planthoppers are the champion jumpers of the animal kingdom. We investigated the neuromuscular apparatus responsible for such jumps in the froghopper *Philaenus spumarius* and the planthopper *Issus coleoptratus.* In both species the main power for the jump is provided by the massive trochanter depressor muscles of the hind legs. In *Issus* these muscles make up for 10-15% of the whole body weight. In addition to the large muscles, small accessory muscles insert on the trochanter depressor tendon. Their innervation is unusual and they may be involved in triggering the jumps.

In a second line of research the sensory pits of *Issus* nymphs were investigated. In principle these pits consist of a bowl-shaped depression in the cuticle underneath a single, horizontally-oriented sensory hair. In *Issus* and a few other families the pits are covered by a transparent cupola and additional small sensory bristles insert into the base of this cupola. All sensory hairs of the pits are innervated by only one sensory neuron each. Ultrastructural investigations indicate that the large sensory hairs are highly modified mechanoreceptors. Older notions that the pits might be hygroreceptors are not supported by our results.

Finally we have just started to investigate complicated arrangements of scolopidial organs in the first abdominal segments of froghoppers, planthoppers and leafhoppers. Some of these look like vibration detectors and might play a role in intraspecific communication.