

7 years ago

#Science in Photos

#trochanter

#exoskeleton

#science friday

#biology



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### The hip bone's connected to the ...

In the award-winning image above, courtesy of [Igor Siwanowicz](#) at HHMI's [Janelia Research Campus](#) in Virginia, the secret of the green boneheaded planthopper's (*Acanalonia conica*) ability to, well, hop is revealed.

These are [trochanters](#), gear-like ends of the insect's femurs that connect to the "hipbone." Insects don't actually have bones — or at least what humans consider bones. Insects (along with crustaceans, molluscs, some kinds of sponge and microscopic organisms like diatoms) have exoskeletons — hardened external shells or skins that support and protect the body. These trochanters are part of the exoskeleton.

The [planthopper \(and assorted kin\)](#) use their prodigious jumping ability (relative to their size, which is tiny) to evade predators (of which they have many) and to move from plant to plant.

These gears, the [first functional cogs ever discovered in nature](#), are found only on planthopper nymphs, an immature, developmental stage of the insect. They're made of the same material as the adult exoskeleton and help synchronize hind leg movements. If one leg moves, so does the other, allowing the insects to

accelerate to around 400 to 500 times the force of gravity in just two milliseconds.

“They have to synchronize their legs to move at exactly the same time, or else they’d go left or right instead of straight when they jump,” said Malcolm Burrows, a professor emeritus of zoology at the University of Cambridge in England and co-discoverer of the gears in 2013.

You can [see other images and read more here](#).

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Theme: Linear by Peter Vidani