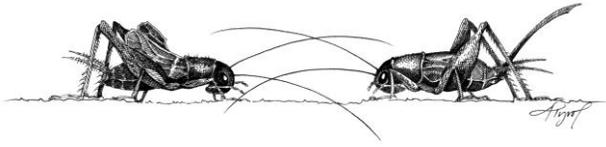


# The Outside Story



## Chirp, Click, Buzz – Last Call for the Insect Orchestra

By: Meghan McCarthy McPhaul

This time of year, I keep the windows cracked open on even marginally warm nights, savoring the sweet air that sifts through the screens. On that air comes the sound of others relishing the last bit of warmth before frost settles in: namely, crickets and katydids.

With trills and chirps, clicks and buzzing, these winged insects – all members of the order *Orthoptera*, along with grasshoppers – woo potential mates. This music is ancient – and has been a key to the insects' survival for some 200 million years.

“It may be noise to you and me,” said Daniel Howard, a biology professor at the University of New Hampshire who specializes in insect communication, “but it’s a love song.”

Well, maybe not in a romantic sense, he clarified: “It’s all about sex and survival.”

Orthopterans produce sounds by rubbing parts of their body together, a process called stridulation. It’s the males (as with most birds and frogs) who are the primary musicians, although females do sometimes respond. Crickets and katydids stridulate by rubbing the sharp edge of one outer wing against the ridged edge of the other outer wing – think of

running your finger down the tined edge of a comb – as their raised wings vibrate together. Grasshoppers create a similar effect by rubbing a portion of the hind leg against their outer wing. Another similar-but-different characteristic is that katydids and crickets perceive this communication with tympana – hearing organs – located on their front legs, while grasshoppers’ tympana are on their abdomens.

But how does one species – say, a snowy tree cricket – differentiate the buzzes and trills and chirps of its own kind from a landscape of sound? Partly it’s in the timing, partly in the tone.

“The acoustic environment is a resource, so it gets partitioned,” explained Howard. He likened the fall insect orchestra to the spring succession of different frog songs. “This time of year, there are so many things calling at the same time that they partition out different parts of the day along with the frequency spectrum within which they call.”

Most of the soundscape this time of the year is occupied by tree crickets, who are trilling just as it gets dark and well into the night, with some species chirping robustly at dawn. As you’d guess by their name, most tree crickets call from trees, but some of them set up shop on grasses and shrubs.

The buzzing trill I hear from the field beginning with the warmth of mid-day and carrying through late afternoon, is most likely meadow katydids, although other katydid species are primarily nocturnal. (These are different than the common katydid, *Pterophylla camellifolia*, which makes the namesake buzzy *Katy did...* *Katy didn't* and calls from high up in trees at night.)

Grasshoppers are still in abundance, too, and go hop-buzzing away from my careless feet as I walk through the field. They generally sing their mating songs during the daylight hours, but their song is much quieter than those of their cricket and katydid cousins.

Some species of katydids produce such high-frequency sounds that they're above the hearing even of bats. There's an evolutionary reason for that. "It's dangerous producing these sounds, because the insects are also sending out a signal that other species can hear," said Howard, noting that bats, rodents, and other insects are all potential predators. "You're making yourself conspicuous to something that might want to eat you, but the payoff is the continuation of your species."

Some species use more than one song for seduction. After a female cricket has located a suitable male based on the quality of his song, she'll touch her antennae to his, and he'll move on to his courtship song, which Howard describes as almost a purr. If she likes both the initial song and the purr, mating ensues. Mating may also involve a nuptial gift; in many species, the male includes with his sperm either secretions or a tiny packet of nutrition to help her produce many eggs.

Once mating is completed, the male returns to his music, and the female moves on to laying her eggs. This she does either in the ground or under the bark of a tree, depending on the species. The eggs overwinter, and the nymphs emerge in the spring, developing through several instars until becoming sexually mature at the final molting.

Then the songs begin again, a serenade to summer as it fades into fall.

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