*Behavioral Sciences*

**Wasps are the worst. The American cockroach uses defense mechanisms to defend against them.**

Cockroach defense moves include kicking, hitting, and biting

If you’re ever attacked, make like a cockroach and repeatedly strike your attacker.

The emerald jewel wasp has the ability to sting an American cockroach, eliminating the cockroach’s ability to escape as it is overcome by the venom.

To prevent itself from wasps and their sting, the cockroach uses defensive mechanisms to give itself the best chance of avoiding the attack.

Kenneth Catania, biologist and professor of biological sciences at Vanderbilt University in Nashville, Tennessee published his findings in *Brain, Behavior, and Evolution* on October 31, 2018. While running was not considered a defense mechanism, some cockroaches “elevated their bodies, bringing their neck out of reach, and kicked at the wasp with their spiny hind legs, often striking the wasp’s head multiple times” writes Catania (Catania).

Using high-speed video to capture the interactions between the jewel wasps and cockroaches, Catania introduced a jewel wasp into a cage with the cockroach. A timer then counted to 3 minutes and if the jewel wasp hadn’t stung it, the cockroach was deemed as successfully defending itself. If the jewel wasp did not attack, the results were not calculated.

Catania separated the interactions between the cockroaches and the jewel wasps into the different behaviors that the cockroaches used to defend as well as listing no defense at all. These interactions were known as trials – one wasp interacting with one cockroach. Of the 55 trials, 28 cockroaches offered no defense leading to 24 being stung by the wasp.

The remaining 27 cockroaches showed signs of defense beginning with a stilt-standing posture, whereby the cockroach elevates its body off the ground, increasing its height and intimidating the wasp. From the stilt standing position, some cockroaches tried to kick the wasp’s head and antennae using its hind legs. While the kicking technique provided temporary safety from the wasps, many of the wasps aggressively reinitiated their attack, only to see the cockroach try and escape, which involves the cockroach quickly turning away and shielding itself. 10 of the cockroaches used small spines on its leg to wade off the wasps. The final defense method discussed is biting. While a useful technique, the risk of getting so close to the wasp make this method less popular.

Phillippe Benoit, prominent vet and leading researcher in equine science at his Equine Clinic in Cardiff, California, also highly recommends the use of high-speed video in research on living beings as he has used similar methods to study the movement of horses. He states that “this technique can discover the gait and the defect of gaits from many animals.”

Catania’s work in his field is highly regarded by other professionals. Patrick Abbot, associate professor of biological sciences at Vanderbilt University, states Catania has “done some of the best work I’ve seen.”

Although much is known about the American cockroach and the emerald jewel wasp already, Catania acknowledges the potentiality of an “arms race of sorts” arising between the two species (Catania). Who will win…future research could provide us with the answer.

Citations

1. Kenneth Catania. Department of Biological Sciences, Vanderbilt University, Nashville, TN, USA. *How Not to Be Turned into a Zombie*. Brain, Behavior, and Evolution. October 31, 2019.
2. Phone Interview with Patrick Abbot
3. Phone Interview with Phillippe Benoit, DVM and DACVSMR