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Honey bees use a contagious warning signal to scare off hornets

By **Chrissy Sexton**
Earth.com staff writer

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As a result of conflict with hornets, some honey **bees** have evolved a powerful defense mechanism that is contagious throughout the colony. Guard bees use an intimidating visual approach, known as an “I see you” (ISY) warning signal, to discourage hornets from launching an attack.

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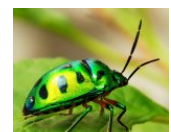


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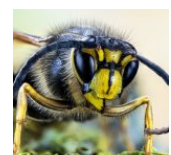
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Honey bees use a contagious warning signal to scare off hornets

The ISY signal involves guard bees shaking their abdomens sideways, and the movement speeds up as the threat intensifies. The alarm also alerts the bee colony to an urgent need for reinforcements.

Even the so-called murder hornets, or Asian giant hornets, recognize the ISY signal as a warning to back off. The hornets are aware that ISY can lead to a violent counter attack by a mass of honey bees that form a “heat ball,” trapping the victims inside of a deadly combination of heat, carbon dioxide, and stinging.

A team of biologists at the [University of California San Diego](#) has investigated interactions between Asian honey bees and hornets. The study shows, for the first time, that the ISY signal is visually driven and contagious across the bee colony.

“The beauty of the ISY signal is that hornets are only deterred if enough defending bees quickly gather to synchronously produce the signal, thereby showing the hornet that further attack is futile,” said study senior author Professor James Nieh. He explained that the ISY signal is contagious and attracts other defenders who immediately copy the signal and rush towards the signaler, even if they cannot detect any danger.

“Hornets give off smell and sound but we found that the visual of a hornet alone can elicit the signal, which was not known,” said Nieh. Previously, experts had speculated that guard bees may produce a pheromone to alert the colony to an approaching predator.

“Using just a contagious visual signal is better because guards who are too far away to smell or hear the hornet can immediately head towards the threat. In some ways, it’s like a fast chain reaction,” said Professor Nieh.

Since animal communication often contains errors, and a false ISY alarm could rapidly spread within the colony, Professor Nieh compares the concept of ISY to “fake news.” Unlike many people, the honey bees are extremely selective about what they consider a true threat. Using an iPad to display videos, the researchers found that the visual appearance and motion of the hornet alone could trigger ISY signals. However, the honey bees did not respond to visual displays of a butterfly.

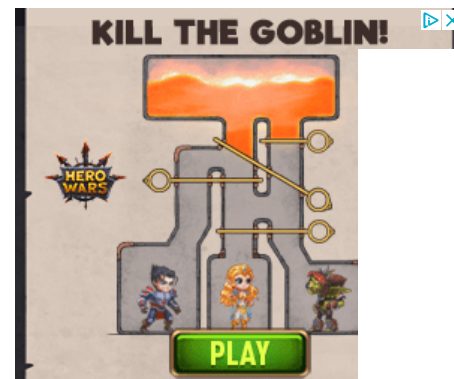
The bees turned out to be even more particular about what they considered to be a real ISY signal. “We played back videos of bees performing ISY signals at different speeds, but only the correct bee image at the right speed caused other bees to respond. This helps keep the signal spread honest,” said Professor Nieh. He thinks that evolution has limited errors in communication among the honey bees because of how very costly such errors could become, and believes that the findings provide a cautionary tale about fake news.

“Individuals in a honey bee colony are completely interdependent. They can’t go out and make it on their own. Cooperation is paramount, especially when faced with a large, heavily armored predator like hornets,” said Professor Nieh. “A couple of hornets can kill thousands of bees in a single day. Yet through teamwork that correctly produces synchronized, massed ISY signals, they can get the hornet to back off without harming a single bee. Maybe that’s a lesson for us all.”

The study is published in the [Journal of Animal Ecology](#).

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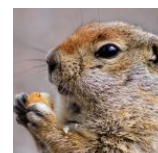
By [Chrissy Sexton](#), [Earth.com](#) Staff Writer



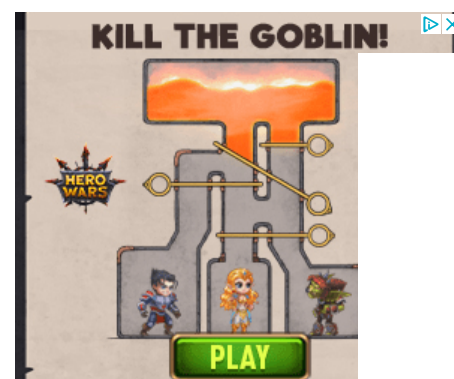
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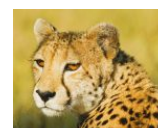
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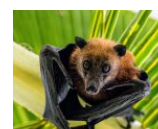
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