Honey Bees Avoid Food Sources Near Predatory Hotspots

October 3, 2013

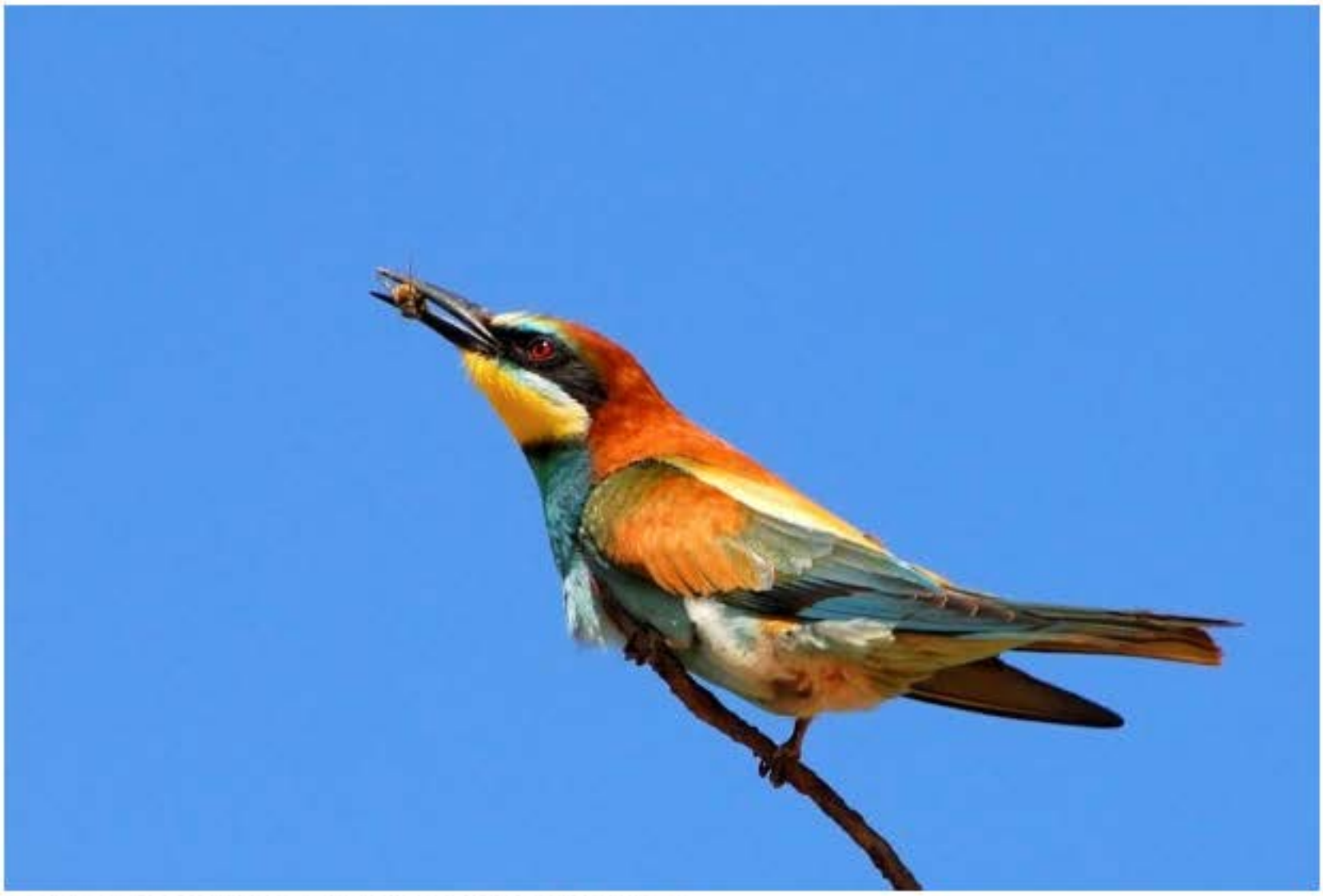

Image Caption: Bee-eater after catching its bee meal. Credit: Thinkstock.com

April Flowers for redOrbit.com – Your Universe Online

The life of a bee is bucolic and pastoral – flitting from flower to flower, collecting nectar to turn into honey. At least, that's how we all think of bees.

Although bees are capable of defending themselves using their painful stings, the life of a honey bee is fraught with dangerous predators that seize them from the sky and wait to ambush them on flowers. The fear of such predators drives bees to avoid food sources closely associated with these predators. It also makes the colonies of bees less risk-tolerant than individual bees, according to a new study.

"This strategy of colonies collectively exhibiting significantly more caution than the riskier individual foragers may help honey bees exploit all of the available food sources, with some intrepid foragers visiting more dangerous food while the colony judiciously decides how to best allocate its foraging," says James Nieh, a professor of biology at UC San Diego.

Collaborating with scientists from the Yunnan Agricultural University in China, Nieh studied the impact on foraging Asian honey bees of the monstrous-looking Asian giant hornet, *Vespa tropica*. The team also examined the impact of a smaller hornet species, *Vespa velutina*, that has invaded Europe and poses a threat to European honey bees. The results of their study were published in *PLoS ONE*.

"The Asian Giant hornets are dangerous, heavily armored predators," says Ken Tan, who works at the Chinese Academy of Science's Xishuangbanna Tropical Botanical Garden. "Bee colonies respond by forming balls of defending bees, encasing the hornet and, in some cases, cooking it to death with heat generated by the bees."

The Asian Giant hornet is four times larger than the *Vespa velutina*, and the researchers found the bees treated the larger hornets as more dangerous. The team created a set of experiments in which they presented bees with different combinations of safe and dangerous feeders — depending on their association with the larger or smaller hornets — containing varying concentrations of sucrose.

"Bees avoided the dangerous feeders and preferred feeders that provided sweeter nectar," says Nieh. "However, predators are clever and can focus on sweeter food, ones which bees prefer. So we also tested how bees would respond when sweeter food was also more dangerous. What we found was that the individual bees were more risk-tolerant. They avoided the giant hornet at the best food, but continued to visit the lower quality food with the smaller hornet."