

Vespa: When hunter becomes hunted

A walk in the park. Some peace and quiet. Or so you thought. A near-miss encounter leads you on a path full of unexpected twists and turns.

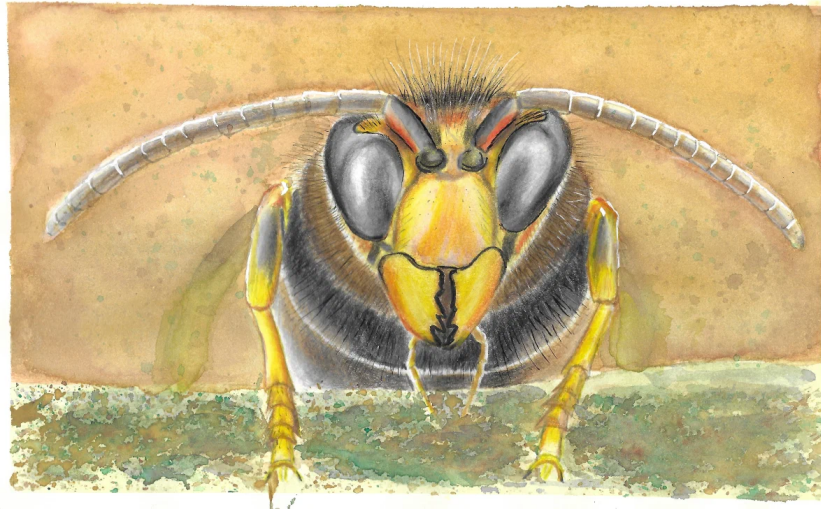
Walking through one of Asia's beautiful natural parks, you hear a loud buzz next to your ear. A hard worker just avoided a mid-air collision with the back of your head. She clearly has her sight set on something nearby and you follow her at a distance. More buzzing sounds become louder and louder and as you stay on the worker's tail, you see her destination: The entrance of a bee hive inside a tree cavity.

As you catch up, you see the worker hovering in front of the hive. Watching, waiting. As soon as she approaches the hive's entrance, the buzzing becomes deafening. Bees are now appearing from everywhere, gathering around the worker. Together, they are clinging on to the worker until she is entirely covered.

While the ball of bee workers is vibrating incessantly, a loud swoosh thrusts air in your face. Big talons appear out of nowhere and grab fiercely into the tree bark protecting the hive. The home that sounded so impressive a second ago is now ripped to pieces. The honey resulting from the hard labour of the bee colony is gushing out, while bees and bee babies are scooped up with great force.

A new fight has arrived for this bee family and in that moment of confusion the worker is released. She falls to the ground, needing a minute to recover. While the violent massacre continues at the bee hive, the worker regains some strength sipping from a flower. She then gets back to business and captures an unfortunate fly passing by. She rips off legs and wings and flies off with the meaty parts that remain.

The worker flies towards a cavity in the ground, not too far away. You see her entering a nest that was made by her queen. She looks around at the queen's brood. There are more than enough hungry larvae ready for a fly snack. But something feels off. As you look inside the nest, you see the majestic queen, but she does not look like the queen you would expect.



Art by Martijn Manneveld. Based on 'Asian hornet' by Gilles San Martin. Licensed under CC BY-SA 2.0.

The worker is a female hornet in the genus *Vespa*¹. When hunting in her native range, she feeds on a variety of insects, including *Apis* honeybees that are social insects sharing a hive. Being grouped together is a strength, but also a weakness. On the one hand, the bee colony collectively rears the queen's offspring and forages for nectar and pollen. On the other hand, a colony with thousands of prey items provides an excellent buffet for a hornet worker that needs to provide food for the offspring of her own queen.

Unlike the western honeybee that is effectively defenseless against hornets, native honeybees evolved several strategies to survive hornet attacks^{2,3}. Heatballing is an example⁴: Bees surround the hornet in a tight ball and start vibrating heavily, raising the internal temperature to a level that is lethal for the hornet. When many hornets attack at once, the bees sometimes abandon the hive. Hive-less swarming bees make hunting by hornets much more difficult. As a swarm, bees can use other tactics to fend off attackers, such as collective short flights⁴. If that fails, the bee clump can extend living "arms" made of worker bees to divert attack away from the queen. That is not what happened here, though. The bee hive was attacked by another predator: a bird of prey that loves eating bees, wasps, hornets, and their brood⁵.

Like bees, hornets are social hymenopterans. The hole in the ground is the entrance of a hornet's nest, and much like a bee hive, it is essentially a factory of breeding cells where larvae develop. What is "off" is that the *Vespa* nest of the foraging worker has been usurped by another species⁶. The original hornet queen that started building a nest and laid eggs to produce her army of workers is now gone. A queen of another *Vespa* species entered the nest to make it her own. The queens must have fought an epic battle, likely to

the death. The social parasite slowly but steadily removed the larvae of the original queen, replacing them with her own brood. Tough luck for the worker that risked her life to provide for the colony. Hunter thus becomes hunted, twice over.

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