

Northern Giant Hornet (*Vespa mandarinia*)

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Distribution

Northern Giant Hornets (NGH - *Vespa mandarinia*) are native to temperate and tropical eastern Asia. In the fall of 2019, NGH was discovered in two locations in British Columbia, Canada. Shortly after that detection, a nest of NGH was located and destroyed on Vancouver Island, BC. That December, two reports of NGH were verified near Blaine, WA. In 2020 and 2021, both Washington State and Vancouver Island had new detections of NGH. In October 2020 the Washington State Department Agriculture (WSDA) collected several live specimens. They attached tiny radio transmitters to the live wasps, released them, and followed the signal from the transmitters back to the colony. That colony they located was destroyed. As of the end of 2021, WSDA had located and eradicated four Northern giant hornet nests in Whatcom County. There were no NGH detections in 2022 in either Washington or Vancouver Island.

DNA evidence showed that the hornets in Washington and Vancouver were unrelated and originated from two different parent populations (South Korea and Japan, respectively). This suggest that there may have been multiple independent introductions of the wasps.

At this time, Northern Giant Hornets are not known to occur outside of Washington state and Vancouver Island and are not present in Maine.

Description*

Northern giant hornet is the world's largest hornet. They are typically 1.5 - 2 inches in length and have a wingspan of up to 3 inches. NGH have bright yellow heads, a black thorax with greyish wings, and yellow and black or brown striped abdomens.

NGH typically build their nests underground, usually in abandoned rodent burrows or in dead, hollow trunks/ roots of trees in forests. Aerial nests (more than 6 feet off the ground) are rare.

Lifecycle

Like most social wasps, NGH colonies have an annual life cycle and build new nests every year. An overwintered mated queen emerges early in the spring and searches for a good nesting site. Upon finding an appropriate site, she will build a small paper nest, lay eggs, and provision young with masticated insects. After a few sets of workers emerge, the workers take over rearing young and building the nest, leaving the queen to lay eggs. In the fall, the colony raises new queens and males. The mated queens overwinter in sheltered locations, starting new nests the following spring. The colony dies after the first hard frost in the fall. At its peak, the population of a NGH nest can reach up to 700 individuals.

Northern Giant Hornet and Honey Bees

NGH can be a voracious predator of Western honey bees (WHB - *Apis mellifera*) and social wasps late in the season. These types of prey provide a dense, protein rich, easily accessible food source for NGH. A hornet attack on a colony occurs in three phases known as the hunting, the slaughter, and the occupation phase.

In the hunting phase, a hornet scout locates and marks the colony with a food-site marking pheromone produced in a gland located on the last abdominal segment. This pheromone recruits additional hornets to the area. After hornets (up to 50) have been recruited to a prey colony, the slaughter phase starts. In this phase, NGH will attack and kill the adult worker bees, dispatching a whole hive in a few hours. Finally, in the occupation phase, the hornets occupy the colony and guard the entrance to protect their food source for a week or two following the slaughter phase. They harvest the bee brood (chewed into a paste) to feed the hornet larvae back in their nest.

Western honey bees have no defense mechanisms against hornet attacks. This is not the case for the Asian honey bee (AHB - *Apis cerana*). AHB has coevolved with the hornets and has developed several defensive mechanisms and strategies.

The hornet's marking pheromone is recognized by AHB and when detected, the AHB colony will emit warning sounds and exhibiting warning behaviors (shaking their abdomens and waving their wings). This will sometimes repel the hornet scout before others can be recruited. If the hornet persists, several hundred bees will mass attack the hornet, engulfing it in a ball. The AHB vibrate their flight muscles and heat the hornet to a lethal temperature. The center of the AHB heat ball reaches 117°F and has high levels of carbon dioxide. This temperature is tolerated by the AHB but kills NGH. The AHB colony defense is highly effective in interrupting the NGH hunting phase by eliminating the scout hornet, preventing recruitment and slaughter.

What can you do?

For the past couple of years, the Maine Apiary Program has been monitoring for NGH in Maine through a grant from the U.S. Department of Agriculture Plant Protection Act's Section 7721 program awarded to the Pennsylvania Apiary Program. Baited sentinel traps are placed in various locations around the state. Along with this effort we ask for beekeepers to keep an eye out for NGH, especially from July-September when the wasps are more abundant and active. If you think you see a NGH, try and take a picture of it and submit it to the Exotic Hornet Reporting Website (<https://www.maine.gov/dacf/php/apiary/hornets/>).

*There are several species of native wasps that look a lot like NGH. Some of the more common ones include the pigeon tremex, the Eastern cicada killer and the great golden digger wasp. A Powerpoint on distinguishing NGH from native wasps can be found here:

<https://www.maine.gov/dacf/php/apiary/hornets/index.shtml>

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