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Asian Giant Hornet

A potential threat to honey bee colonies in Oregon

E. Topitzhofer, C. Hedstrom, P. Chakrabarti, A. Melathopoulos, S. Rondon, G. Langellotto and R. Sagili

Introduction

The Asian giant hornet (*Vespa mandarinia*) is the world's largest true hornet, and its predatory habits can be devastating to honey bee (*Apis mellifera*) colonies. In 2019, the Asian giant hornet was detected in British Columbia and northwestern Washington. Two wasps were collected that year, and an additional six were collected in 2020. The Asian giant hornet can be easily identified by its massive body size and distinct coloration. However, there are a few wasp and sawfly species in Oregon that are commonly mistaken for the Asian giant hornet. Beekeepers should familiarize themselves with identifying and reporting suspected Asian giant hornets to mitigate potential spread in the Pacific Northwest.

Native distribution and spread in North America

The Asian giant hornet is native to Japan and is well-established throughout eastern Asia, including Laos, Thailand, Cambodia, Myanmar, Vietnam, Sri Lanka, India, Nepal and as far as east Russia.

The first detection of the Asian giant hornet in North America was in August 2019 in Nanaimo (Vancouver Island, BC), followed by a second report in mid-September in Blaine, Washington. A couple of additional reports in southwestern British Columbia and northwestern Washington suggest that the Asian giant hornet could overwinter in these areas. The Washington State Department of Agriculture has current information on the status of the Asian giant hornet in the Pacific Northwest at <https://agr.wa.gov/departments/insects-pests-and-weeds/insects/hornets/reported-sightings>.

Ellen Topitzhofer, faculty research assistant; Priyadarshini Chakrabarti, postdoctoral research associate; Andony Melathopoulos, pollinator health Extension specialist and assistant professor; Gail Langellotto, statewide Extension Master Gardener coordinator and professor; Ramesh Sagili, associate professor; all of the Department of Horticulture; and Christopher Hedstrom, IPM outreach and communications coordinator, Oregon IPM Center; and Silvia Rondon, Extension entomologist and professor, Department of Crop and Soil Science; all of Oregon State University.

Distinguishable Asian giant hornet characteristics

Worker body size	Coloration
<ul style="list-style-type: none"> ▪ 40 mm (~1.5 in.) body length ▪ 76 mm (~3 in.) wingspan ▪ 6 mm (~0.2 in.) barbless sting 	<ul style="list-style-type: none"> ▪ Large yellow/orange head ▪ Black or brown and yellow-striped abdomen



Photo: Washington State Department of Agriculture/CC 3.0
Dorsal view (left) and anterior view (right) of the Asian giant hornet (*Vespa mandarinia*).

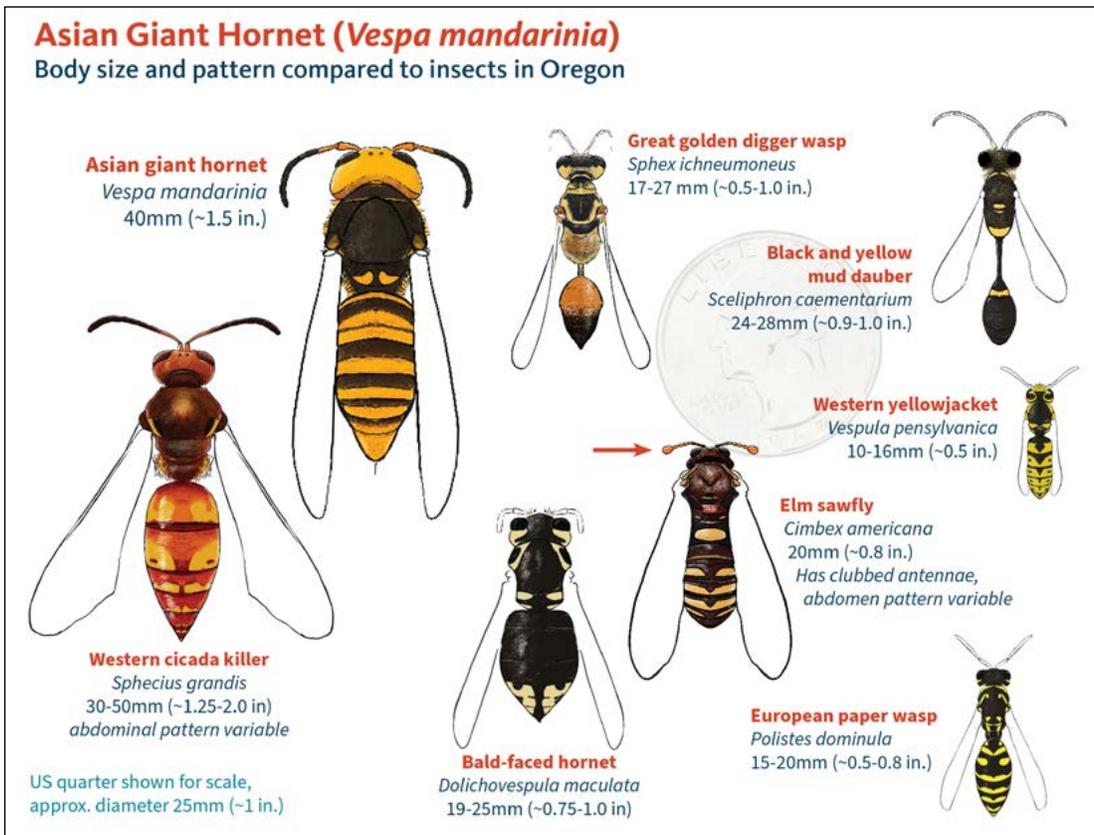


Illustration: Chris Hedstrom © Oregon IPM Center

Identification

There are several large hymenopteran species (i.e., wasps, hornets, bees and sawflies) that are commonly mistaken for the Asian giant hornet. So far, most reported sightings of Asian giant hornet have been false. Identifications are being made by the Ministry of British Columbia or Washington State Department of Agriculture officials.

Despite their large size and fearful appearance, many of these commonly mistaken species will not sting people. Some, like elm sawflies, only feed on plants. Others, such as the western

cicada killer, the great golden digger wasp or mud daubers, only use their stings to paralyze insect prey.

Life cycle

Currently, there is no information about the biology and ecology of the Asian giant hornet in North America. Information coming from Asia indicates that the hornet prefers low mountain lands and forests. Queens mate in late fall and overwinter alone under the soil. They emerge from hibernation in the spring and feed on tree sap while searching for a nesting site. Queens nest in underground cavities, and prefer spaces with narrow openings, such as rotting tree roots or abandoned rodent nests. Nests in Japan have infrequently been found in tree hollows 3–6 feet above the ground.

A queen starts building the nest’s framework of comb cells with paper made from mixing her saliva and woody fibers. She lays eggs in these comb cells and feeds developing larvae with tree resin and a chewy paste of insect and spider tissues foraged within a mile of her nesting site. After 40 days, workers emerge and take over foraging and nest building while the queen continues to lay eggs.

Starting in August, the Asian giant hornet colony rapidly increases in size and raises males and queens. Males and queens mate very close to their nest near the end of their nesting phase. Once brood rearing ceases, workers and males forage for nectar, tree sap and mushrooms while the newly mated queens find overwintering sites. Nests in Japan typically disband by late-October or November.

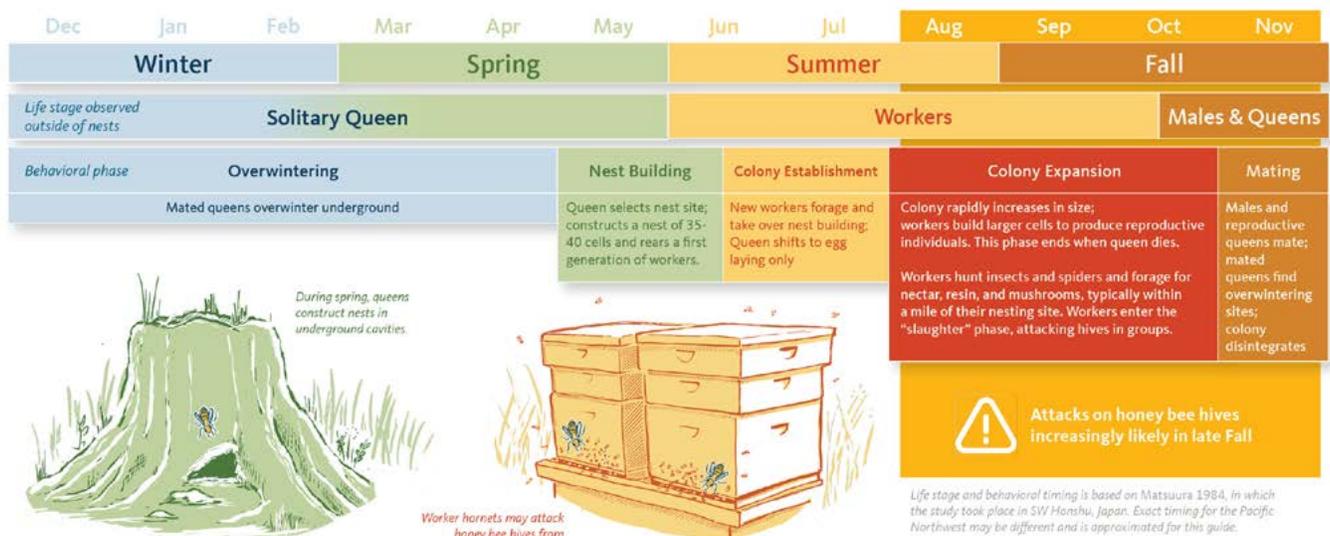


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Damage to honey bee colonies

Asian giant hornets forage for protein-based food from May to November. They mostly feed on beetles, but will also consume various insects and spiders. Asian giant hornet workers increase *bee-hawking*, or hunting alone for honey bees, in August.

During this phase, the hornets may be seen waiting near hive entrances, catching one bee at a time and carrying it back to the hornet’s nest. As their nest expands later in the season, the hornets may prey on honey bees with group-synchronized attacks within about 0.6 miles of the hornets’ nest. These *slaughter attacks* involve a group of Asian giant hornet workers that rip apart the guard bees’ heads at the hive entrance and continue attacking the rest of the colony to feed on brood. Following this phase, beekeepers may notice a pile of dead, beheaded or dismembered worker honey bees at the hive entrance. Reports from Japan indicate that colony occupation can occur rapidly

during the slaughter attack phase, occurring on average two hours after the attack is initiated. Attacks typically involve eight to 20 hornets and only a few honey bee colonies will survive.

Japanese beekeepers have developed entrance-mounting hornet traps that protect their bees from late-summer slaughter attacks. Currently, there are no reports of honey bee colony deaths related to Asian giant hornets in North America. In 2019, there was a report of suspected damage to a honey bee colony, but Washington State Department of Agriculture officials said the report was unconfirmed and lacked documented evidence.

Asian honey bees (*Apis cerana*), another *Apis* species, have evolved with Asian giant hornets, and have behavioral adaptations to protect their hives from Asian giant hornet slaughter attacks. If an Asian giant hornet enters the hive, Asian honey bees are able to surround and form a “ball” around the hornet. They kill the hornet by vibrating their wings, warming the “ball” cluster and the hornet within it, thus elevating the temperatures at the center of the cluster to about 120°F. However, European honey bees (*Apis mellifera*) are defenseless against slaughter attacks, as they do not possess these defense strategies.

Asian giant hornet and the public

Similar to other stinging social wasps like yellowjackets, Asian giant hornet stings can result in a severe allergic response known as anaphylaxis in some people. Hornet stings are more powerful and potent than those of yellowjackets, and can cause serious injuries. Beekeepers are the most likely to encounter a large number of Asian giant hornets during attacks on their bee colonies. Regular beekeeping suits do not provide sufficient protection, so beekeepers encountering Asian giant hornets should not try to kill the wasps, but rather contact the Oregon Department of Agriculture immediately. Encounters with Asian giant hornets will be less likely for the general public compared to beekeepers. Unlike yellowjackets, Asian giant hornets are not expected to nest in and around homes in urban areas. They appear more associated with forests or forest fragments. If a nest is discovered, contact the Oregon Department of Agriculture immediately rather than attempt to kill the hornets.

Reporting Asian giant hornet sightings

If you are confident that you have seen an Asian giant hornet or you suspect an Asian giant hornet attack on a honey bee colony, please submit a report to the Oregon Department of Agriculture or contact your local Extension agent. Recent modeling from the Washington State Department of Agriculture and Washington State University suggest low winter temperatures and low precipitation make it unlikely that Asian giant hornets can establish east of the Cascades.

Report a suspected Asian giant hornet sighting to the Oregon Department of Agriculture at <https://beav.es/47y> or call 503-986-4636.

Details to include in an Asian giant hornet sighting report:

- Your detailed contact information (name, phone number and e-mail).
- The date and location of the sighting or attack.
- High resolution photograph of Asian giant hornets or suspected predated hive.
- Description of hive damage in case you do not have images from the scene of an Asian giant hornet attack.

CAUTION: Asian giant hornets pose a threat to human health. We urge people to be cautious if they see a suspected Asian giant hornet. Do not approach a suspected Asian giant hornet, which can sting humans if threatened or disturbed. Do not attempt to remove a suspected Asian giant hornet nest.

Trapping for Asian giant hornet

Trapping is not recommended at this time in Oregon. Asian giant hornets have not been detected outside of northwest Washington, so Asian giant hornet traps in Oregon are more likely to capture other insects that are not a concern. These include beneficial insects. The Washington State Department of Agriculture has launched a trapping program that focuses on areas near all confirmed sightings in Washington. In July 2020, Washington trapped the first Asian giant hornet in a trap set near Birch Bay in Whatcom County. Commercially available hornet traps will not trap Asian giant hornets because the trap entrance is not large enough. However, some modification can be made to those traps to accommodate Asian giant hornets.

Recent reports on Asian giant hornet sightings

- Washington State Department of Agriculture. Reported Asian giant hornet sightings. <https://agr.wa.gov/departments/insects-pests-and-weeds/insects/hornets/reported-sightings>.
- Washington State Department of Agriculture. Detection data. <https://agr.wa.gov/departments/insects-pests-and-weeds/insects/hornets/data>.

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- Zhu, G., J.G. Illan, C. Looney, D. Crowder. 2020. Assessing the ecological niche and invasion potential of the Asian giant hornet. *bioRxiv* <https://www.biorxiv.org/content/biorxiv/early/2020/06/01/2020.05.25.115311.full.pdf>

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