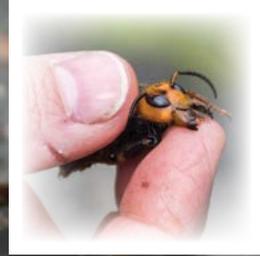


National Pest Alert



Northern Giant Hornet

Vespa mandarinia

The northern giant hornet (*Vespa mandarinia*) is native to temperate and tropical eastern Asia and is widely distributed throughout northern India, Myanmar, Laos, Korea, China, Taiwan, Japan, and parts of Russia. The northern giant hornet is very large, and measures about one and a half to two inches in length and may weigh more than an ounce. Colonies of these hornets begin in the spring when a single queen forms a nest underground in rotten tree roots or abandoned burrows. Above-ground nests are extremely rare but may occur in tree hollows, though still close to the ground. Nests in human structures are even more rare—Matsuura and Koike (2002) reported only three nests in human buildings out of 1,756 total nests observed. The queen lays up to five eggs per day and workers begin to emerge about 30 to 40 days (depending upon temperature) after colony establishment. Colony activity can continue for about six months and ends with the death of the queen in the fall. In the late summer and fall, reproductive males and new queens are produced, mate and disperse, and the new queens overwinter to start colonies in the spring of the following year. During the peak of colony activity there may be as many as 150 to 200 workers per colony (Archer 1995).

Detection in North America

The northern giant hornet was detected in North America in the fall of 2019 in British Columbia and Whatcom County, Washington, where it was probably introduced through international trade on cargo ships. It is unknown when the hornets may have been introduced. A nest in British Columbia was eradicated later that year (Garvey 2020), but the discoveries of queens in late May and



Northern giant hornets are very large, about 1.5 to 2 inches in length.

Photo by Karal Saup, WSDA

June of 2020 in Washington State and British Columbia have renewed concern about the introduction. Modeling suggests that there is ample habitat suitable for northern giant hornet in the United States, including the Pacific Northwest,



Alpsdake, Wikimedia Commons via USDA Vespa mandarinia NPRG

Northern giant hornet colonies start new each spring with a single queen, but can grow to 150–200 workers by fall.

Midwest, and the Eastern seaboard. Most of the intermountain West, desert Southwest, and plains appear to be less suitable (Zhu et al, 2020). According to the Washington State Department of Agriculture (WSDA 2022a), the only confirmed sightings and nest eradications of this hornet have been in northwest Washington State and adjacent British Columbia. Four nests have been located and eradicated since the hornet was confirmed in 2019, and there have been no confirmed sightings in 2022. **A map of sightings is available** (WSDA 2022b). In the past, many confirmed sightings have come from members of the public, demonstrating that citizen science is a useful tool for tracking this species. Suspect hornet sightings can be reported on the **WSDA website** (agr.wa.gov/hornets) or on the **EDDMapS website** (www.eddmaps.org).

Are Northern Giant Hornets a Threat?

The northern giant hornet probably does not pose a serious human health risk. They will vigorously protect their nests if disturbed, inflicting a painful sting. While their venom actually has a lower acute toxicity than that of honey bees, each sting can administer large doses of venom due to the size of the wasp. The potent venom causes pain and swelling (Main 2020). Despite the toxicity and volume of a northern giant hornet sting, human deaths caused by this species seldom exceed a dozen each year in countries where it is native.

All *Vespa* species are predators of numerous insects. Northern giant hornets prey on many species, including caterpillars, chafer beetles, praying mantises, honey bees and other social Hymenoptera. During late summer and autumn, northern giant hornets begin to prey on honey bee hives, including cooperative attacks that can destroy a hive's defenses in under two hours. The northern giant hornet is a natural enemy of Asian honey bee (*Apis cerana*), which has developed numerous defensive behaviors during their coevolutionary history. European honey bees (*Apis mellifera*) lack effective defensive behaviors for northern giant hornets, and the hornets may be a major source of colony loss. The potential impact on commercial honey bee production is among the primary reasons the appearance of northern giant hornet in North America has caused such concern.

Lookalike Wasp Species

Several wasp species that occur in the United States may be mistaken for the northern giant hornet. These lookalikes include the western and eastern cicada killers (*Sphecius grandis* and *S. speciosus*) and others. Comparisons between the northern giant hornet and these lookalikes can be found on the [North Carolina State Extension website](https://entomology.ces.ncsu.edu/murder-hornet-comparison/) (<https://entomology.ces.ncsu.edu/murder-hornet-comparison/>). To date, the only verified finds of the northern giant hornet have been in British Columbia and Washington State ([see map](#)) and it is unlikely that you will find this invasive hornet in other states in the United States. Therefore, citizens should refrain from killing large wasps because they believe them to be northern giant hornets, and instead call your local university Extension office or local agricultural commissioner's office to report a suspected find. Take a picture to help with the identification.

Despite its painful sting and pestiferous attacks on honey bees, northern giant hornets have characteristics that are distinctly useful to people. Northern giant hornets probably play an important role in the ecology of regions where they are endemic and are even considered a conservation priority species in Korea where deforestation has caused habitat loss. Northern giant hornet larvae and prepupae are considered a delicacy by people that coexist with the hornet within its natural range. And the northern giant hornet is a source of *Vespa* amino acid mixture (VAAM); a mixture that may enhance athletic performance (Sasai et al. 2011, Tsuchita et al. 1997, Abe et al. 1995).

Additional information can be found in the following resources:

[Washington State University Extension fact sheet](#) available at pubs.extension.wsu.edu/download/sample/4552

[Washington State Department of Agriculture fact sheets](#) available at agr.wa.gov/hornets

[New Pest Response Guidelines](#)—*Vespa mandarinia*, Asian giant hornet. 2020. USDA APHIS PPQ. Available at [cms.agr.wa.gov/WSDAKentico/Documents/PP/PestProgram/Vespa_mandarinia_NPRG_10Feb2020-\(002\).pdf](https://cms.agr.wa.gov/WSDAKentico/Documents/PP/PestProgram/Vespa_mandarinia_NPRG_10Feb2020-(002).pdf)
2020 Strikes again: Murder Hornets. Presented by Chris Looney on June 2, 2020.

[Washington State Department of Agriculture](#). 2022a. The Asian giant hornet story map. <https://agr.wa.gov/departments/insects-pests-and-weeds/insects/hornets/ngh-story-map>

[Washington State Department of Agriculture](#). 2022b. Reported Asian Giant Hornet Sightings. agr.wa.gov/departments/insects-pests-and-weeds/insects/hornets/reported-sightings

Zhu, G., J.G. Illan, C. Looney, and D.W. Crowder. 2020. Assessing the ecological niche and invasion potential of the Asian giant hornet.



Northern giant hornets were nicknamed 'murder hornets' by the popular press. Although they are large with a painful sting, they do not pose a widespread human health risk.



Northern giant hornets feed primarily on other insects and can be a big problem for honey bees as they are known to prey heavily on honey bee hives.

Proceedings of the National Academy of Sciences, 117(40):24646-24648. doi.org/10.1073/pnas.2011441117

[National Geographic articles](#) on Asian giant hornet arrival in the U.S. available at www.nationalgeographic.com.

Authors: Chris Looney (Washington State Department of Agriculture), Timothy Lawrence (Washington State University Extension Service), Matt Baur (Western IPM Center), Steve Elliott (Western IPM Center).

Cited Literature

- Abe T, Takiguchi Y, Tamura M, Shimura J, Yamazaki K. 1995. Effects of *Vespa* amino acid mixture (VAAM) isolated from hornet larval saliva and modified VAAM nutrients on endurance exercise in swimming mice—improvement in performance and changes of blood lactate and glucose. *Japanese Journal of Physical Fitness and Sports Medicine*, 44:225–238. doi: 10.7600/jspfsm1949.44.225
- Archer M. 1995. Taxonomy, distribution and nesting biology of the *Vespa mandarinia* group (Hym: Vespinae). *Entomologists Monthly Magazine* 131: 47-53.
- Garvey K. 2020. [About those Asian Giant Hornets...](#) May 4, 2020. Available at ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=41391
- Main D. 2020. Why are 'murder hornet' stings so intense? *National Geographic Magazine*. Published May 14, 2020.
- Matsuura M. 1988. Ecological study of Vespine wasps (Hymenoptera, Vespinae) attacking honeybee colonies. 1. Seasonal-changes in the frequency of visits to apiaries by vespine wasps and damage inflicted, especially in the absence of artificial protection. *Applied Entomology and Zoology*, 23: 428-440
- Matsuura, M., Koike, K. 2002. Studies on the ecology of social wasps and bees in urban environments 1. Records on aerial nests of the giant hornet, *Vespa mandarinia japonica* (Hymenoptera : Vespidae) within human buildings, *Medical Entomology and Zoology*, 53(3): Pages 183-186
- Sasai H, Matsuo T, Fujita M, Saito M, Tanaka K. 2011. Effects of regular exercise combined with ingestion of vespa amino acid mixture on aerobic fitness and cardiovascular disease risk factors in sedentary older women: a preliminary study. *Geriatrics and Gerontology International*, 11:24-31.
- Tsuchita H, Shirai-Morishita Y, Shimizu T, Abe T. 1997. [Effects of a Vespa amino acid mixture identical to hornet larval saliva on the blood biochemical indices of running rats](#). *Nutrition Research*, 17: 999-1012. doi.org/10.1016/S0271-5317(97)00064-X

For information about the Pest Alert program, please contact the [North Central IPM Center](mailto:northcentral@ncipmc.org) at northcentral@ncipmc.org

This work is supported by the Crop Protection and Pest Management Program (2022-70006-38001) from the USDA National Institute of Food and Agriculture.

December 2022

