



Asian Giant Hornet Look-alikes 101

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Overview

With the recent explosion of news stories covering the Asian Giant Hornet (AGH), this overview of AGH look-alikes is provided to assist with the influx of inquiries on suspect AGH finds in Texas.

First, some clarifications:

- AGH has NOT been found in Texas. In December 2019, USDA confirmed the detection of a single Asian giant hornet (AGH) in Blaine, WA, and Washington State University identified a second AGH later that same month
- Washington Department of Agriculture (WSDA) is currently surveying the state for the pest. Should WSDA locate any AGH nests, they will respond quickly to eradicate them

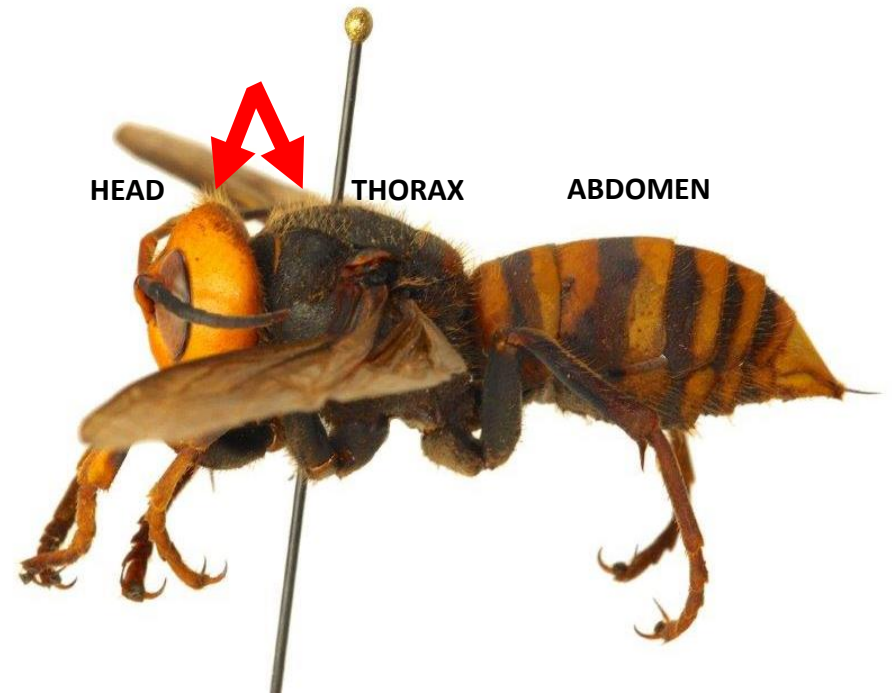
Outline

1. Asian Giant Hornet
2. Sawflies & Horntails
3. Solitary Wasps
4. Social Wasps
5. More information on Asian Giant Hornet
6. Conclusion & How to Report

Asian Giant Hornet

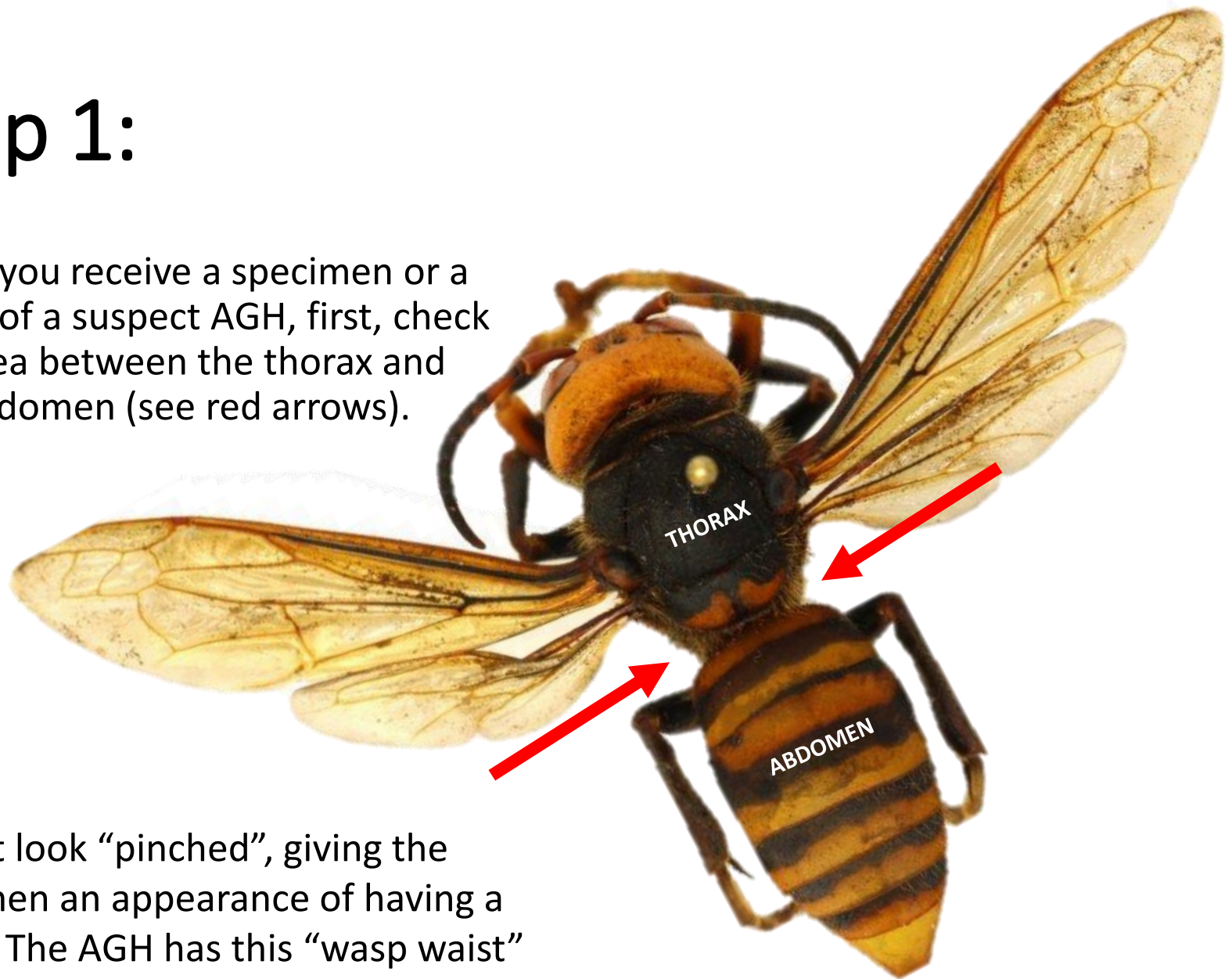
(*Vespa mandarinia*)

- World's largest hornet measuring 1.5 to 2 inches in length
- Distinctive large yellow/orange head with black eyes
 - Antennae dark brown/black with orange at the basal part attaching to the head
- Striking contrast between the color of the head and the color of the thorax (see red arrow)
- Abdomen with complete yellow/orange and brown banding



Step 1:

When you receive a specimen or a photo of a suspect AGH, first, check the area between the thorax and the abdomen (see red arrows).

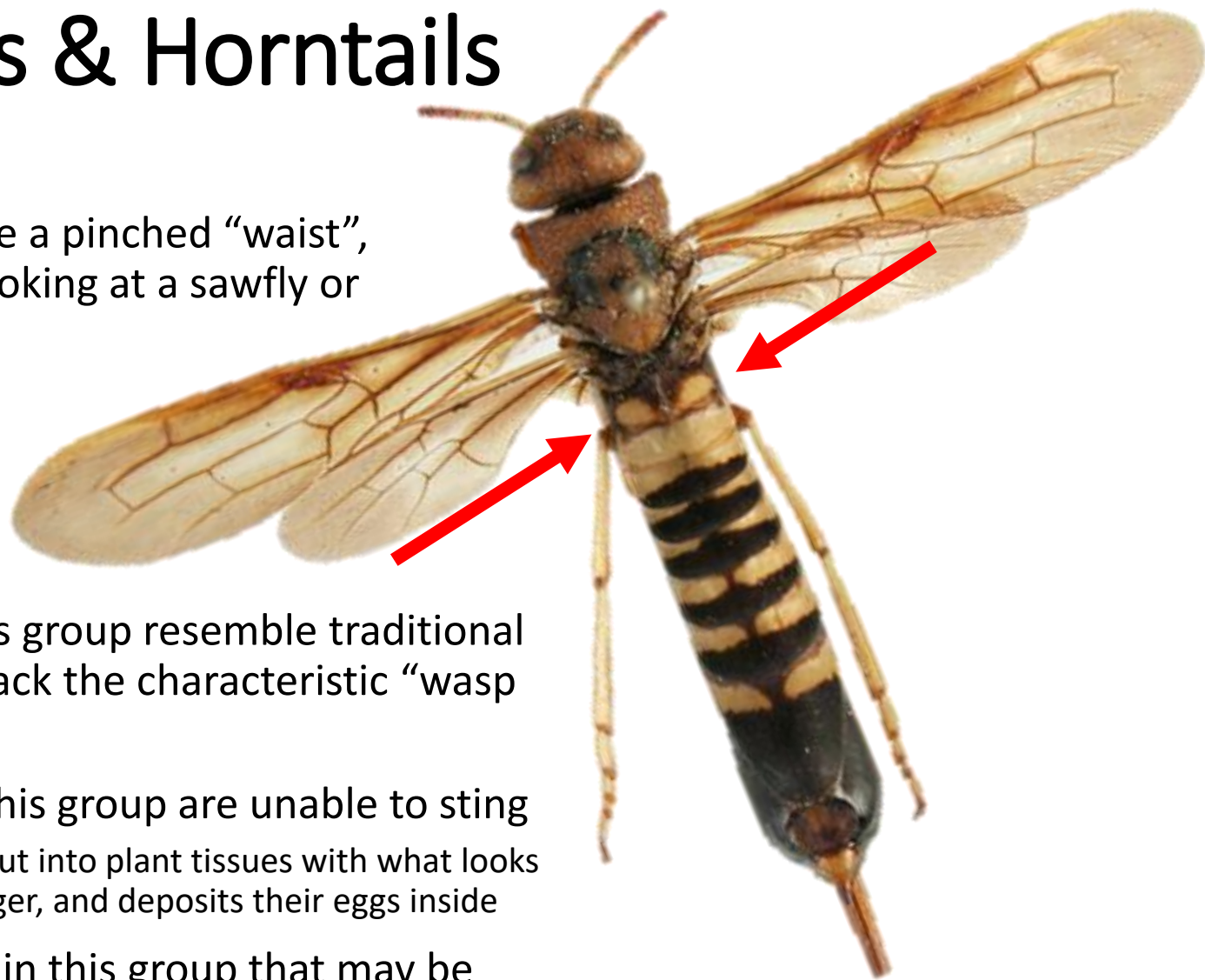


Asian Giant Hornet

Does it look “pinched”, giving the specimen an appearance of having a waist? The AGH has this “wasp waist” feature, as seen in this image.

Sawflies & Horntails

If you do not see a pinched “waist”, you are likely looking at a sawfly or horntail.



- Adults in this group resemble traditional wasps, but lack the characteristic “wasp waist”
- Females in this group are unable to sting
 - Females cut into plant tissues with what looks like a stinger, and deposits their eggs inside
- Two species in this group that may be confused with AGH are on the following slides

Elm Sawfly

(*Cimbex americana*)



- $\frac{3}{4}$ to 1 inch in length
 - The largest sawfly in North America
- Both adult males and females have orange antennae and a yellow spot on the thorax (see red arrow)
- Females will have yellow banding on the abdomen (as pictured on the left) and therefore may be mistaken as AGH
- No pinched “waist” as seen in AGH
- Not capable of stinging



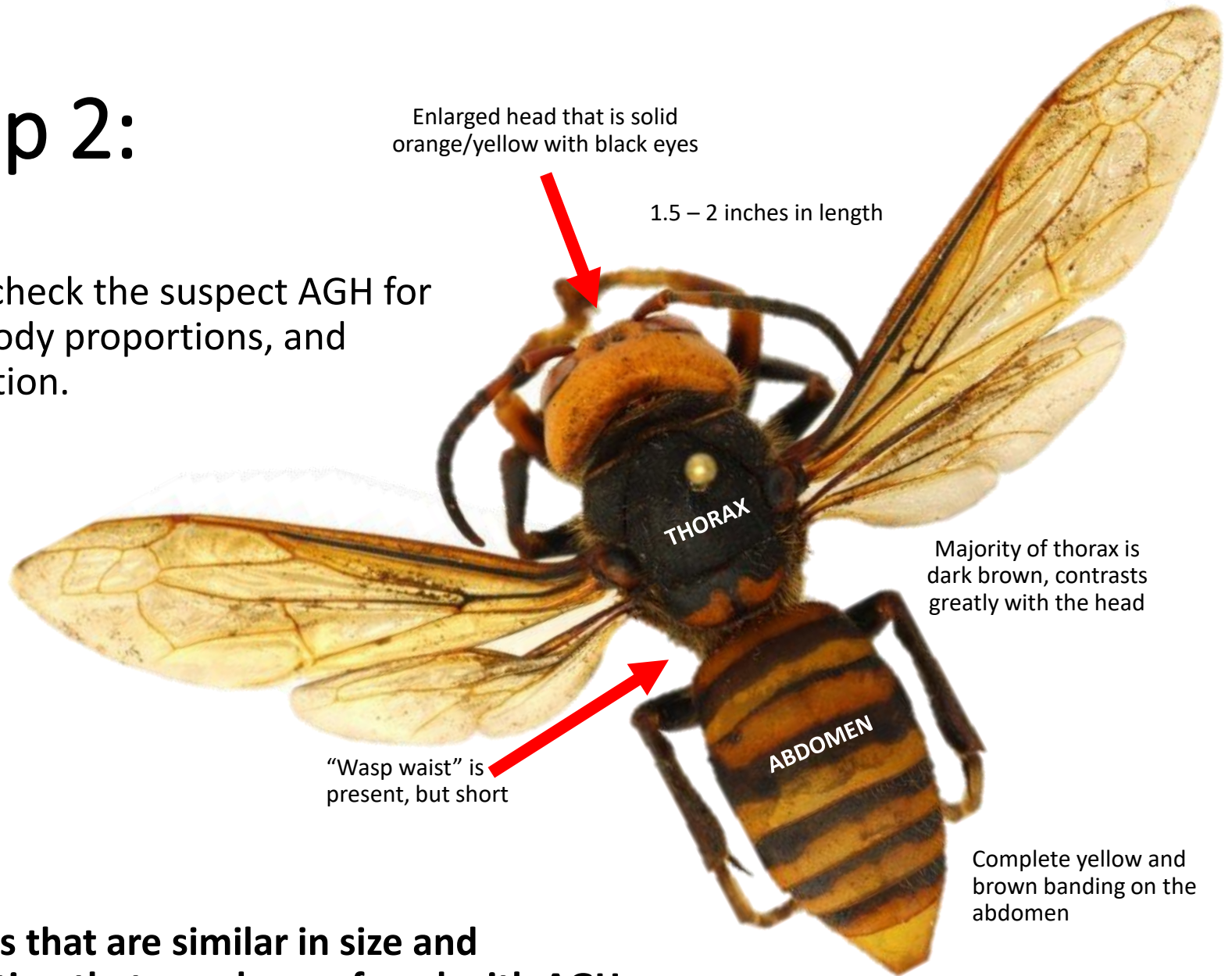
Pigeon Tremex Horntail

(*Tremex columba*)

- Males about $\frac{3}{4}$ to 1 inch in length, females larger, 1 inch to 1.5 inches
- The yellow banding on their abdomen and their large size may result in them being mistaken for AGH
- No pinched “waist” as seen in AGH
- Not capable of stinging

Step 2:

Next, check the suspect AGH for size, body proportions, and coloration.



Asian Giant Hornet

Species that are similar in size and coloration that may be confused with AGH in the field are in the following slides

Solitary Wasps

- All have the characteristic “wasp waist”
- Do not have a colony with a queen like social wasps
- Not likely to be stinging threat
 - Most stings are a result of being accidentally stepped on, trapped in clothing, or being carelessly handled
- Can nest on or near human dwellings
- Most hunt prey that will be food source for their future young

Tarantula Hawks

(*Pepsis* spp.)

- Large in size like AGH (up to 1.5 inches in length) but the whole body has a metallic blue/black sheen, and most have orange wings
- They fly low over the ground to hunt spiders, which they immobilize and take back to their nest (a burrow in the soil)
- In the nest, the female lays an egg on the spider, which will be used as food source when babies hatch.
- Adults feed on nectar, can be seen at flowers
- Can deliver painful stings if provoked





Mud Daubers

(*Sceliphron* spp. and *Chalybion* spp.)

- Much smaller in size than AGH ($\frac{3}{4}$ to 1 inch in length)
- Their “wasp waist” is very narrow and long (red arrow)
- Species can vary in color (black with yellow, dark iridescent black/blue, or entirely black)
- Mud nests are built around human dwellings, in attics, carports, porches, etc.
- Common at sites of water in order to carry mud back to nest
- Can sting if mishandled or provoked

Mud Dauber

(*Sceliphron caementarium*)

This particular mud dauber species may be confused with AGH due to the yellow in its coloration, but it is much smaller in size than AGH ($\frac{3}{4}$ to 1 inch in length) with a very narrow and long “wasp waist”



Great Golden Digger Wasp

(*Sphex ichneumoneus*)

- Much smaller than AGH (½ - 1 inch in length)
- Their “wasp waist” is also very narrow and long
- Abdomen is black with solid orange/red towards front end, no banding like in AGH
- Nests are burrows in the ground, where immobilized crickets/katydids are brought in as food source for future young



Cicada Killer

(*Sphecius* spp.)

Three species of cicada killers, see image to the right

Top: *Sphecius speciosus*

Middle: *Sphecius grandis*

Bottom: *Sphecius convallis*

Females (left specimens) are larger than the males (right specimens)

This is the group that is most commonly mistaken as AGH due to:

- **Large size (1.2 – 1.6 inches in length) and**
- **Yellow banding on the abdomen**



Cicada Killer

(*Sphecius* spp.)

- Cicada Killers have a smaller head in comparison to the width of their thorax than seen in AGH



- The contrast of the head color versus the thorax color is much more apparent in AGH than in Cicada Killers
- The banding on the abdomen also differs





Cicada Killer

(*Sphecius* spp.)

- These species hunt cicadas, which they immobilize and take back to their nest (burrow in the soil, see red arrow). The female lays egg inside, and the cicada will be used as food source when eggs hatch and young emerge
- These nests can be around human dwellings in soil areas of lawns, gardens, or flower beds, thus highly encountered
- Males will be territorial of nest site, but cannot sting. Females will sting if provoked or handled or will sting feet if you accidentally walk on their nest

Social Wasps

- Have the characteristic “wasp waist”
- One queen for the entire colony, she is solely responsible for reproduction
- Defensive at nest sites and will readily sting. Will also sting if disturbed while foraging
- Nests are aerial or underground

Paper Wasps

(*Polistes* spp.)

- Much smaller than AGH ($\frac{3}{4}$ to 1 inch in length)
- All species have an open nest (the combs are visible) oriented downwards that hangs by a single filament
 - Nests are commonly formed under protected areas around human dwellings, thus highly encountered
 - Nests are built from wood fibers, thus it's common to see them at wood posts, on fences, etc. gathering wood fibers
- Soft bodied insects are hunted and fed to their larvae
- The paper wasp queen is not much larger than workers, unlike yellowjackets and hornets (queen larger)





Texas Paper Wasp

(*Polistes apachus*)

- May be confused with AGH due to face and abdomen coloration, but this species is much smaller
- The thorax has significant yellow markings and is not majority dark brown, like in AGH



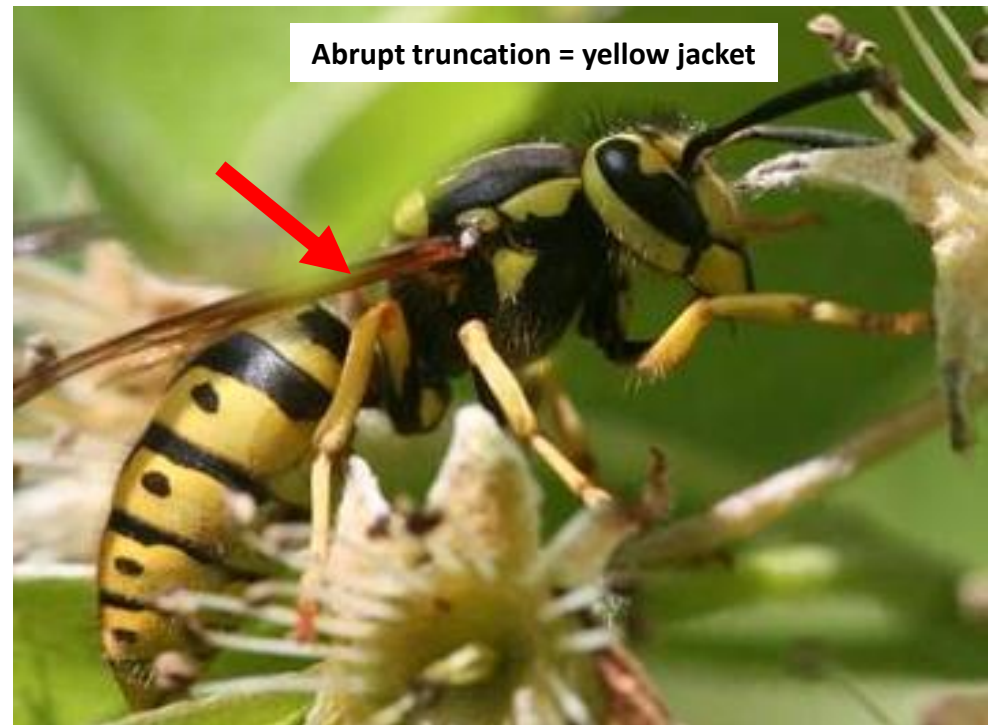
Paper Wasp

(*Polistes flavus*)

- May be confused with AGH due to coloration, but this species is much smaller
- The thorax is not majority dark brown, like in AGH
- The abdomen does not have the same band pattern as seen in AGH

Paper Wasps vs. Yellowjackets

- There are some paper wasp species that resemble yellow jackets. The best way to tell them apart is to look at the front most part of the abdomen.
- Does it slope gradually to the “waist” area. If yes, then the specimen is a paper wasp
- Or, does it truncate abruptly? If yes, then it is a yellow jacket
- AGH also has a truncated front area of the abdomen



Yellowjackets

(*Vespula* spp. and *Dolichovespula* spp.)

- “Yellowjacket” is a term used for all species in the genera *Dolichovespula* and *Vespula*, referring to their yellow and black striped pattern
 - HOWEVER, there are some black and white species, like the baldfaced hornet (*Dolichovespula maculata*)
- Yellowjacket nests can be aerial or subterranean, with a papery outer covering
 - Do not make or store honey
- Workers will forage outside the nest seeking soft bodied insects as prey
 - Commonly seen around picnics, garbage cans, etc.



Southern Yellowjacket

(*Vespula squamosa*)

- Smaller than AGH (½ inch in length)
- Black and yellow banding is seen throughout the body, as opposed to banding just on the abdomen in AGH
 - Queen is larger and predominately orange





Eastern Yellowjacket

(*Vespula maculifrons*)

- Smaller than AGH ($\frac{1}{2}$ inch in length)
- Similar banding on abdomen as seen in AGH, however the thorax is not majority dark brown
 - Queen looks similar to workers but is larger
- Generally found in eastern Texas

Bald-faced Hornet

(*Dolichovespula
maculata*)

- $\frac{3}{4}$ inch in length
- May be mistaken for AGH due to large head and banding on abdomen
- Majority black with white markings on the head, thorax, and abdomen instead of yellow/orange banding seen on abdomen of AGH
 - No distinct size gap between queen and workers



Bald-faced Hornet

(*Dolichovespula maculata*)

Size comparison of AGH (left) to the Bald-face hornet (right).
Also note difference in color on the head and the color and banding pattern on abdomen.



European Giant Hornet

(*Vespa crabro*)

- The only *Vespa* species established in North America (was introduced in the 1800s)
- Common throughout the eastern U.S. and has spread west to the Rocky Mountains
- Nests in hollows, generally away from human dwellings



European Giant Hornet

(*Vespa crabro*)

- EGH (right) has darker red-brown on the face and thorax than AGH (left)
- EGH has a dark band on the front of the abdomen right after the “wasp waist” compared to yellow in AGH
- Black “teardrops” common on the yellow bands of EGH

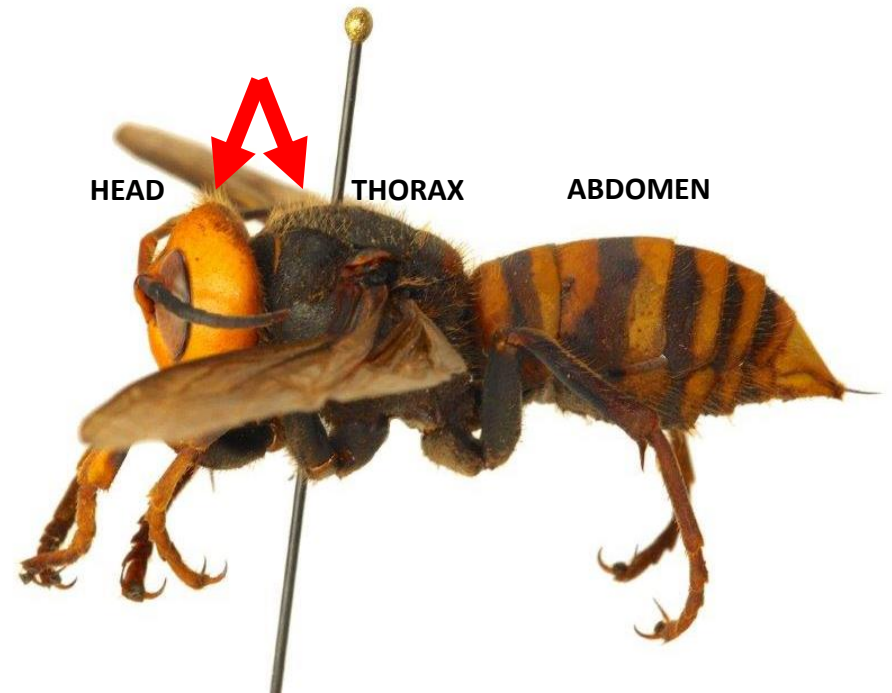


TO RECAP:

Asian Giant Hornet

(*Vespa mandarinia*)

- World's largest hornet measuring 1.5 to 2 inches in length
- Distinctive large yellow/orange head with black eyes
 - Antennae black with orange at the basal part attaching to the head
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Asian Giant Hornet

(*Vespa mandarinia*)

- Social insect native to eastern Asia
- In September 2019, a nest was found on Vancouver Island, British Columbia, and was destroyed
 - In December 2019, USDA confirmed the detection of a single Asian giant hornet (AGH) in Blaine, WA. This was the first record of this species in the United States, and has not been found in any other US state (as of May 2020)
- Each AGH colony has one queen and many workers
 - Adult queens live about a year
 - Workers live average 15 days, maximum 35 days
- One solitary queen will start a colony in the spring and will raise sterile workers who will eventually take over the nest duties (rearing larvae, forage for food)
- AGH does not sting people unless it feels threatened



AGH Nest

- AGH nests underground, usually in pre-existing cavities
 - Rodent burrows, or low hollows in tree trunks/roots are common nesting sites
- See top image of a nest site in a cavity within a soil embankment
- Bottom image shows stages of development (adults on the left side, pupae in center, larvae on the right) within the comb of the nest



AGH Size vs. Look-alikes

To-scale comparison of the size of AGH and other insects provided by [Washington State Dept. of Agriculture](http://www.wa.gov/agriculture)



Sphecius sp.
cicada killer



Sphex ichneumoneus
great golden digger wasp



Vespa crabro
European hornet
(does not occur in WA)



Cimbex americana
elm sawfly



Vespa mandarinia
Asian giant hornet



Vespula pensylvanica
western yellowjacket



Polistes dominula
European paper wasp



Apis mellifera
western honey bee



Dolichovespula maculata
bald-faced hornet



Tremex columba
pigeon tremex



Bombus flavifrons
yellow head bumble bee

Asian giant hornet *Vespa mandarinia*

AGH Biology & Life Cycle

If you're interested in learning more about AGH, please see:

- [AGH Fact Sheet](#) (image to the right) by Center for Invasive Species and Ecosystem Health
- [AGH PowerPoint](#) by Center for Invasive Species and Ecosystem Health
- [USDA New Pest Response Guidelines](#)
 - See page 14 for predation strategies and information on "slaughter and occupation" colony phase

Overview

The Asian giant hornet, *Vespa mandarinia*, is native to East Asia, South Asia, Mainland Southeast Asia, parts of the Russian Far East. Outside its native range, it has been detected in Washington and British Columbia (Canada). *It has not been found in any US state other than Washington (May 2020).*



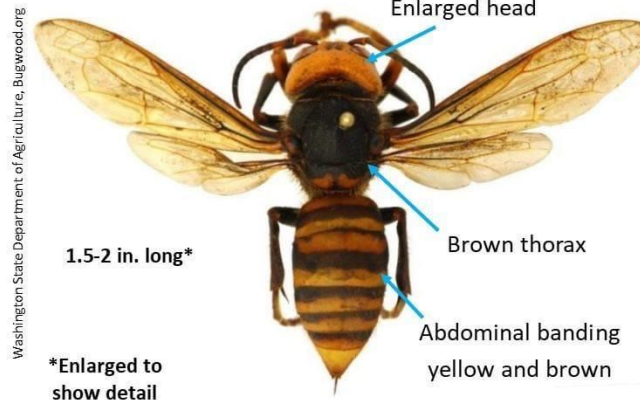
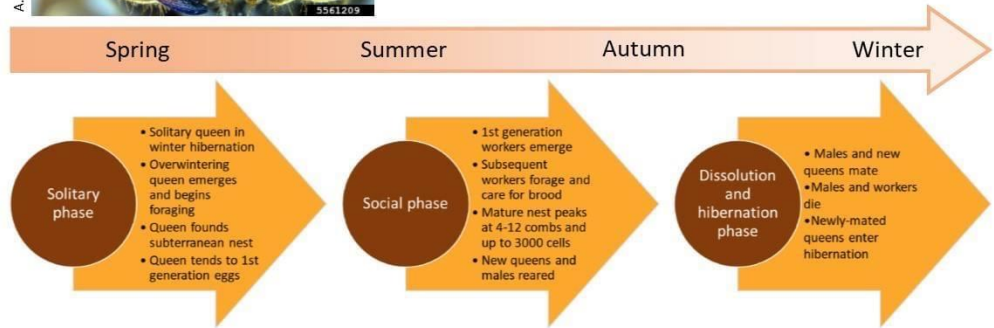
A. Smith-Pardo, USDA APHIS PPQ, Bugwood.org

Life Stages

Eggs, up to 1000, are laid by the queen in comb cells Spring-Summer. The first generation of eggs are laid in small nests of about 40 cells and tended by the queens; subsequent generations are tended to by workers.

Larvae and pupae develop through five instars in the comb cells and are fed regurgitated food by the queen and then workers.

Adults are queens (reproductive females), workers (sterile females), and drones (males). Queens build the first nest of the season and produce offspring. Workers provide food, and enlarge and protect the nest. Drones mate with the queen to produce offspring.



Washington State Department of Agriculture, Bugwood.org

More Info

Predators of honey bees, they quickly decapitate the bee and harvest the thorax for food

Nests in the ground

A mature nest will have 4-12 combs with up to 3000 cells.

Easily confused with other native and non-native insects; key characteristics include:

- * Size
- * Thorax and abdomen color
- * Enlarged head

Conclusion

- Although there are a number of unconfirmed AGH sightings from the public, neither USDA nor WSDA has any evidence that AGH populations are established in Washington or anywhere else in the United States
- These unconfirmed sightings may be look-alike species that are known to occur in the United States

How To Report Suspect AGH

In Washington, people can report possible sightings through the Washington State Department of Agriculture [website](#). Outside Washington, people can contact their [state apiary inspector](#)

In Texas, please contact:

Mary Reed, Chief Apiary Inspector
Texas Apiary Inspection Service
2475 TAMU
College Station, TX 77843-2475
979-845-9714
mary.reed@tamu.edu
txbeeinspection.tamu.edu

References & Resources

Buck, M., Marshall, S.A. and Cheung D.K.B. 2008. Identification Atlas of the Vespidae (Hymenoptera, Aculeata) of the northeastern Nearctic region. Canadian Journal of Arthropod Identification No. 5: 492 pp. (PDF version). doi: 10.3752/cjai.2008.05.

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Tripodi, A, and T. Hardin. 2020. [New pest response guidelines, *Vespa mandarinia*, Asian giant hornet](#). United States Department of Agriculture.

Washington Department of Agriculture (<https://agr.wa.gov/departments/insects-pests-and-weeds/insects/hornets>)