Vespa mandarinia Smith, 1852

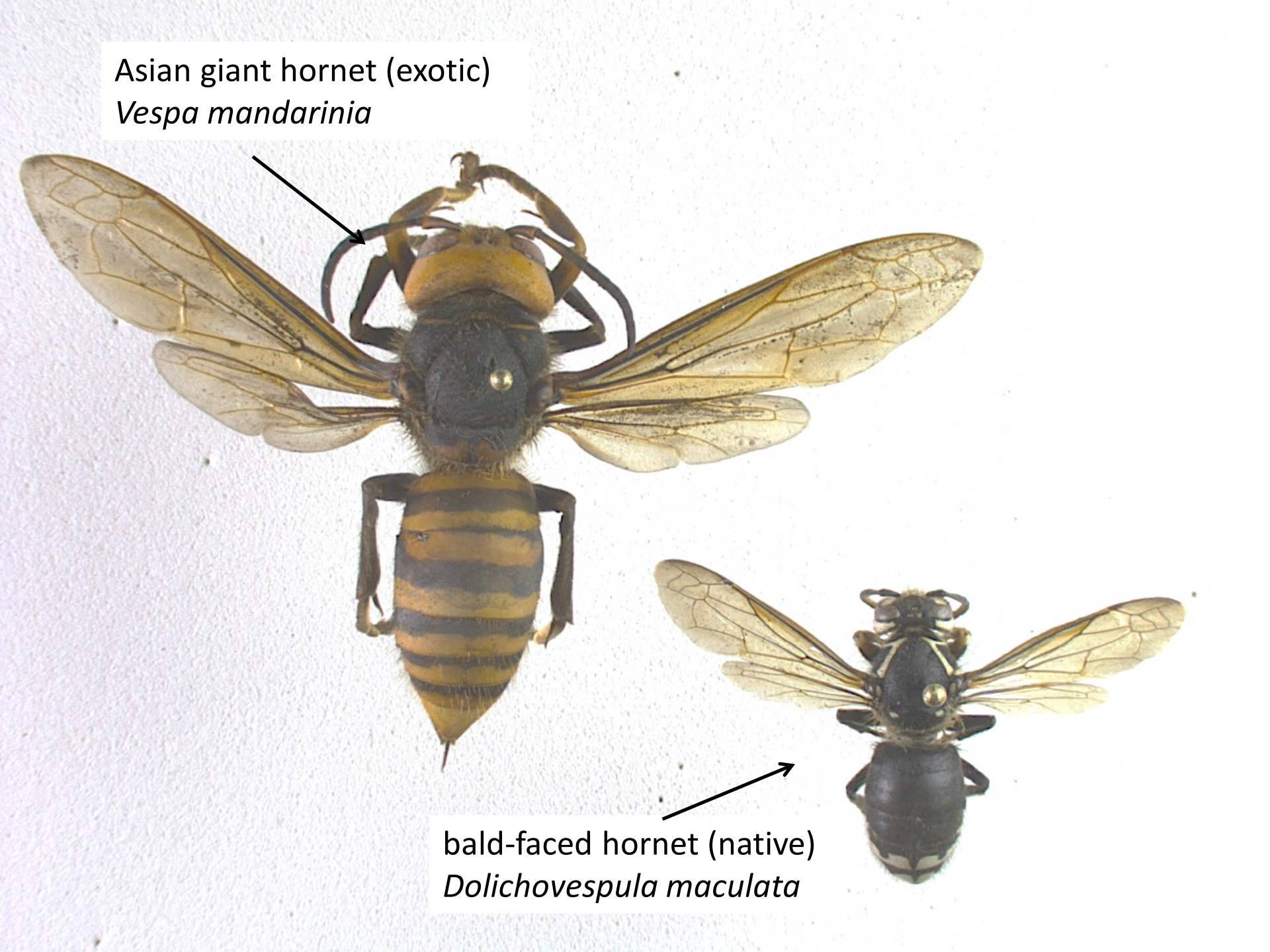
- Asian giant hornet
- Japanese hornet
- yak-killer hornet
- giant sparrow bee

One of ~23 species of “true” hornet, genus *Vespa*

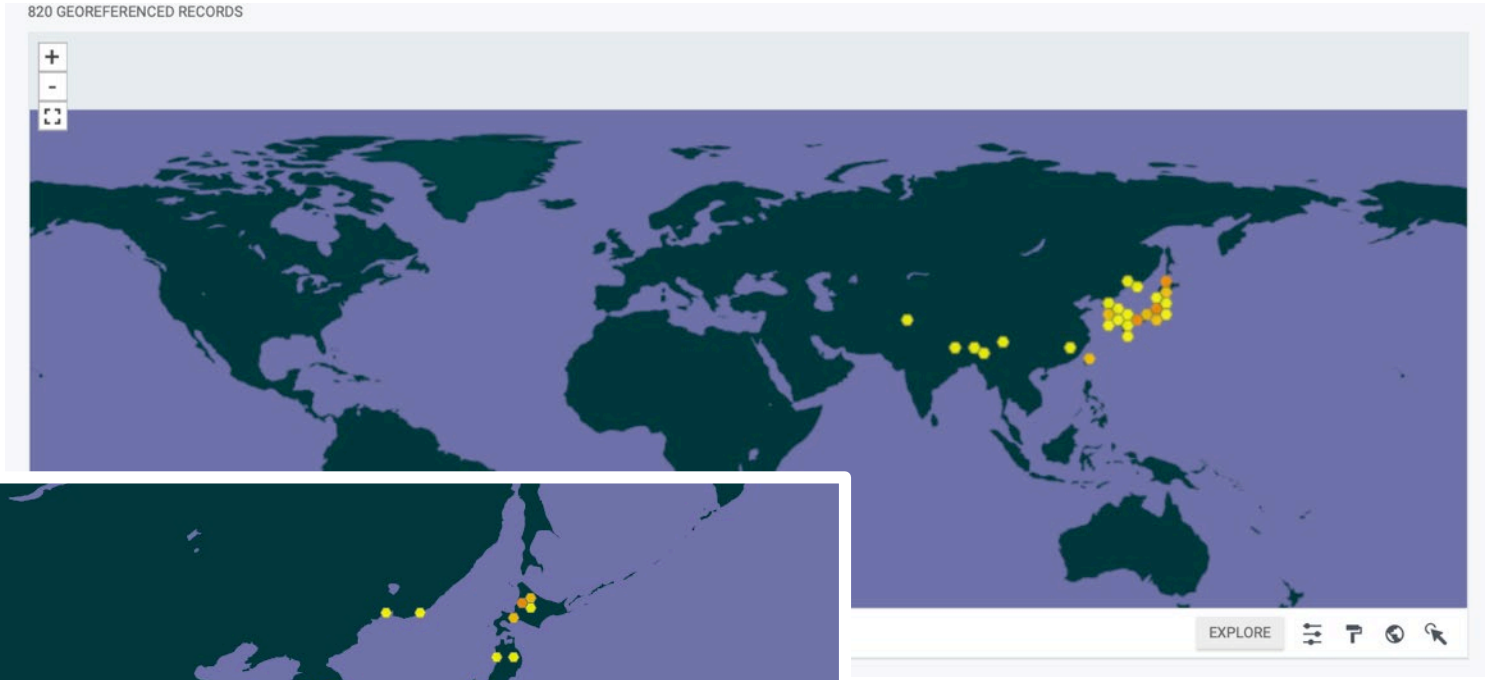
Palearctic - only *Vespa* known from NA before is *V. crabro*, established in the east

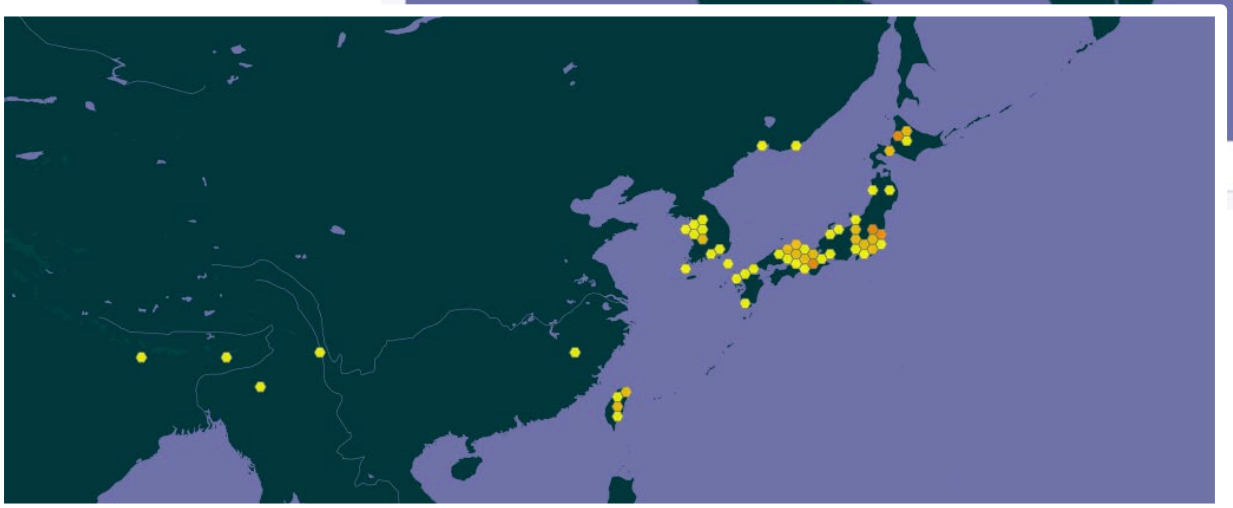
Eusocial – cooperative broodcare and nesting

Haplo-diploid: females have 2 sets chromosomes, males only 1


Asian giant hornet (exotic)
Vespa mandarinia
bald-faced hornet (native)
Dolichovespula maculata

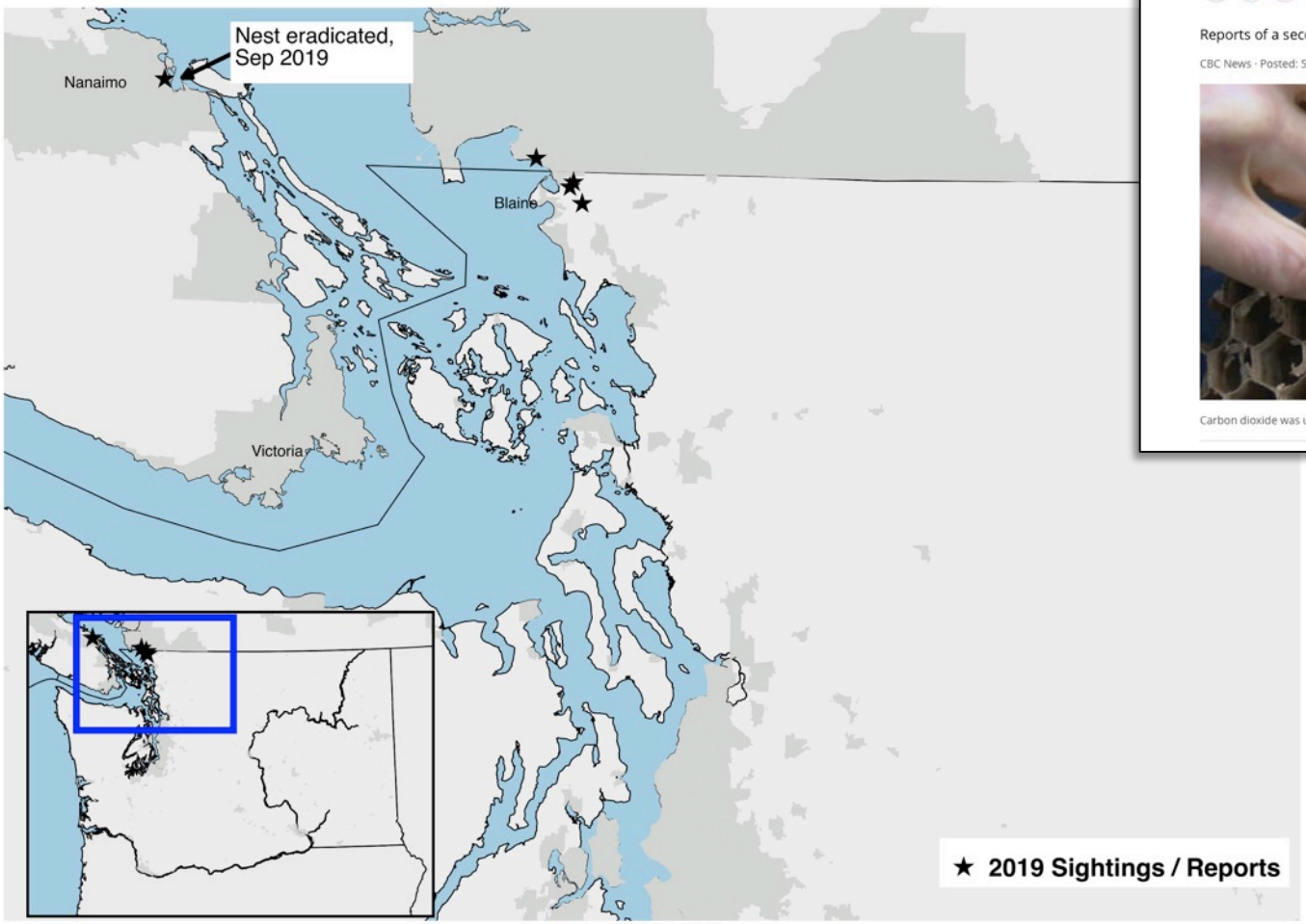
- Native range is Asia, most observations in Japan and Korea
- Generally subtropic to warm or moderate temperate zones
- In 1977 *V. mandarinia* was limited to southern/central Hokkaido
- by 2016 colonies were common ~80 miles/128 km north





data from GBIF.org 2 Jan 2020

- Four wasp sightings in the Pacific Northwest in 2019
- One nest located and destroyed in Nanaimo, BC
- Possible bee kill in Custer, WA
- Report of attacks at hives in Bellingham, WA



British Columbia

Nest of invasive Asian giant hornets destroyed in Nanaimo

Reports of a second nest nearby are under investigation

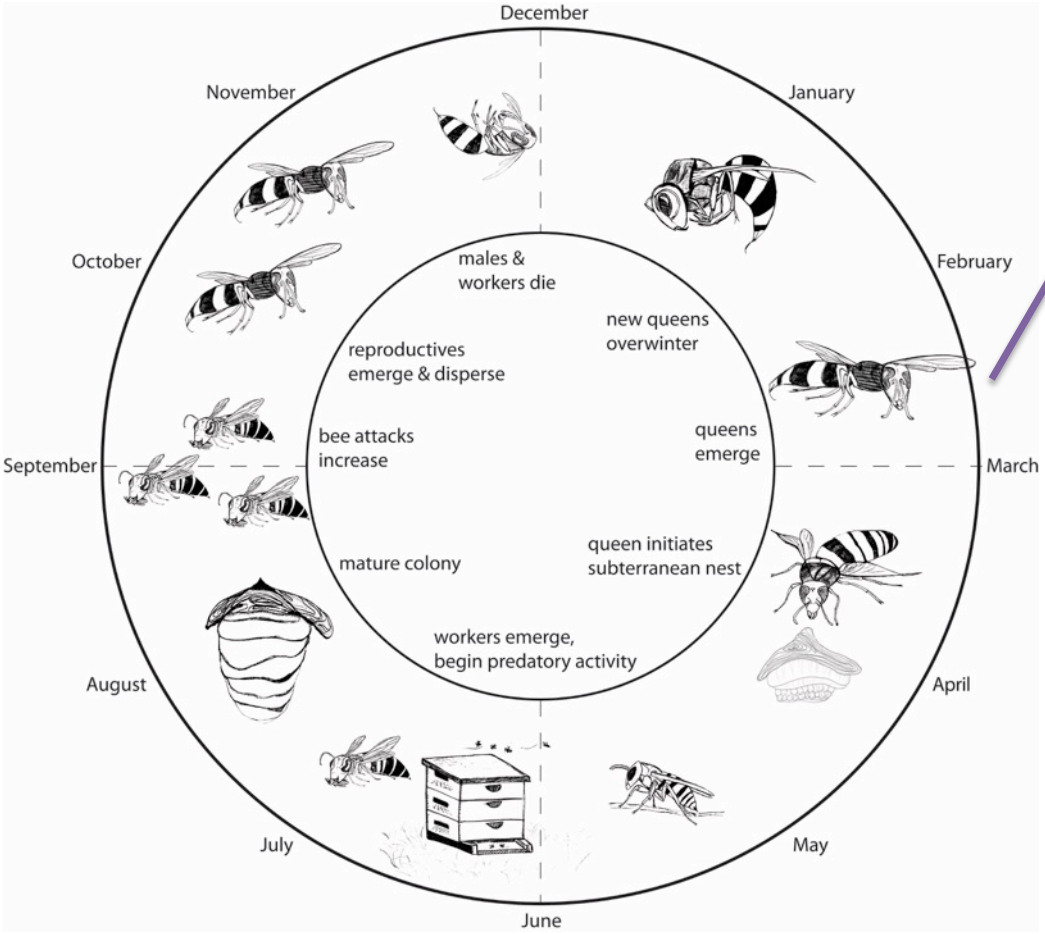
CBC News · Posted: Sep 19, 2019 5:50 PM PT | Last Updated: September 19, 2019

Carbon dioxide was used to destroy a nest of Asian giant hornets discovered in south Nanaimo. (CHEK News)

www.cbc.ca

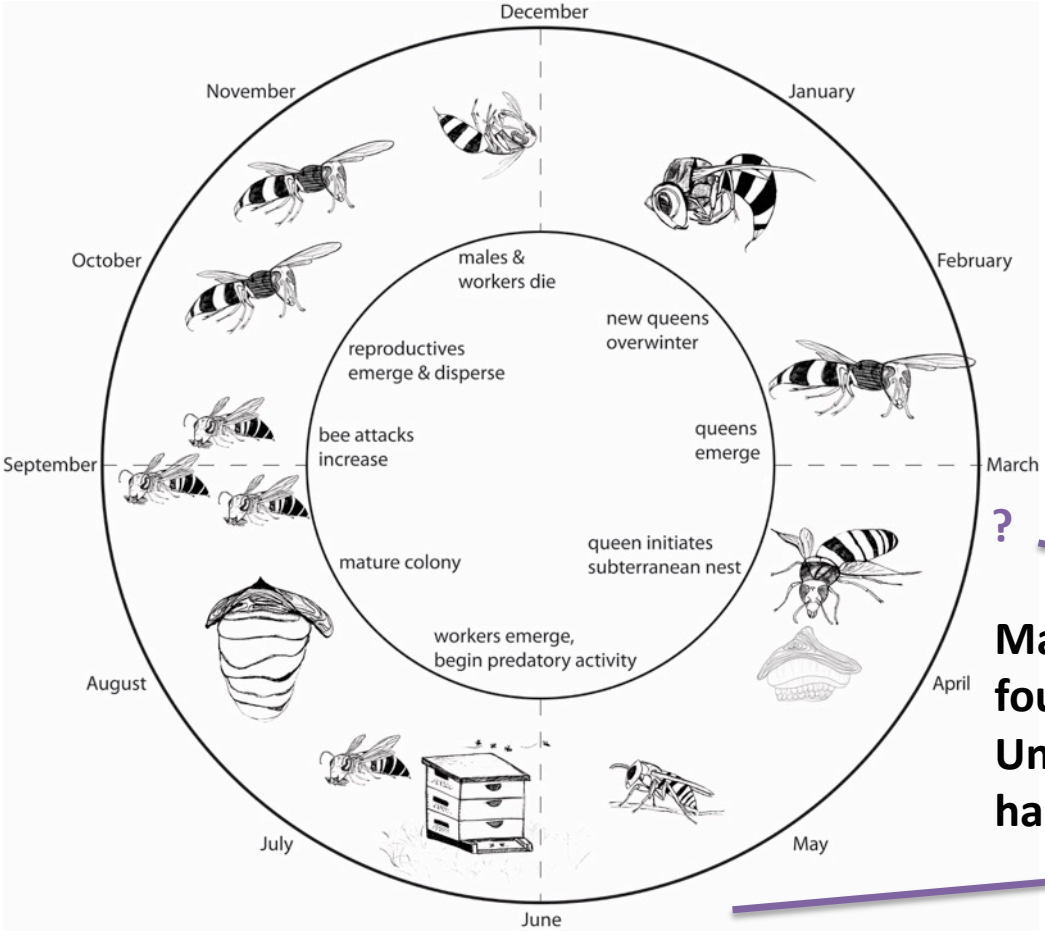
Colony Cycle

Mated and unmated queens overwinter in the soil or other sheltered areas



V. mandarinia life cycle
after Matsuura 1984, Archer 1995
(illustrations J. Orr)

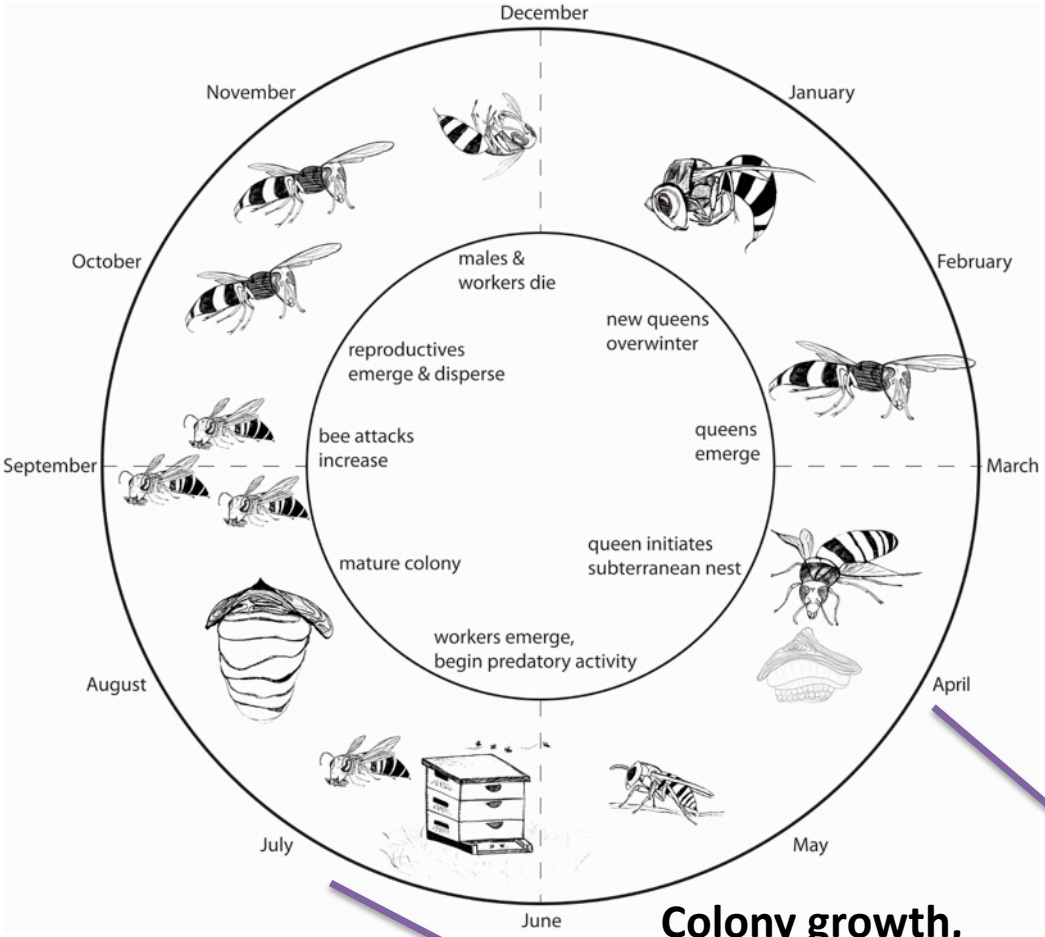
Colony Cycle



Mated queens emerge, found colony
Unmated queens just hang about eating sap

V. mandarinia life cycle
after Matsuura 1984, Archer 1995
(illustrations J. Orr)

Colony Cycle



Colony growth,
workers assume most tasks
Unmated queens start to die off

V. mandarinia life cycle
after Matsuura 1984, Archer 1995
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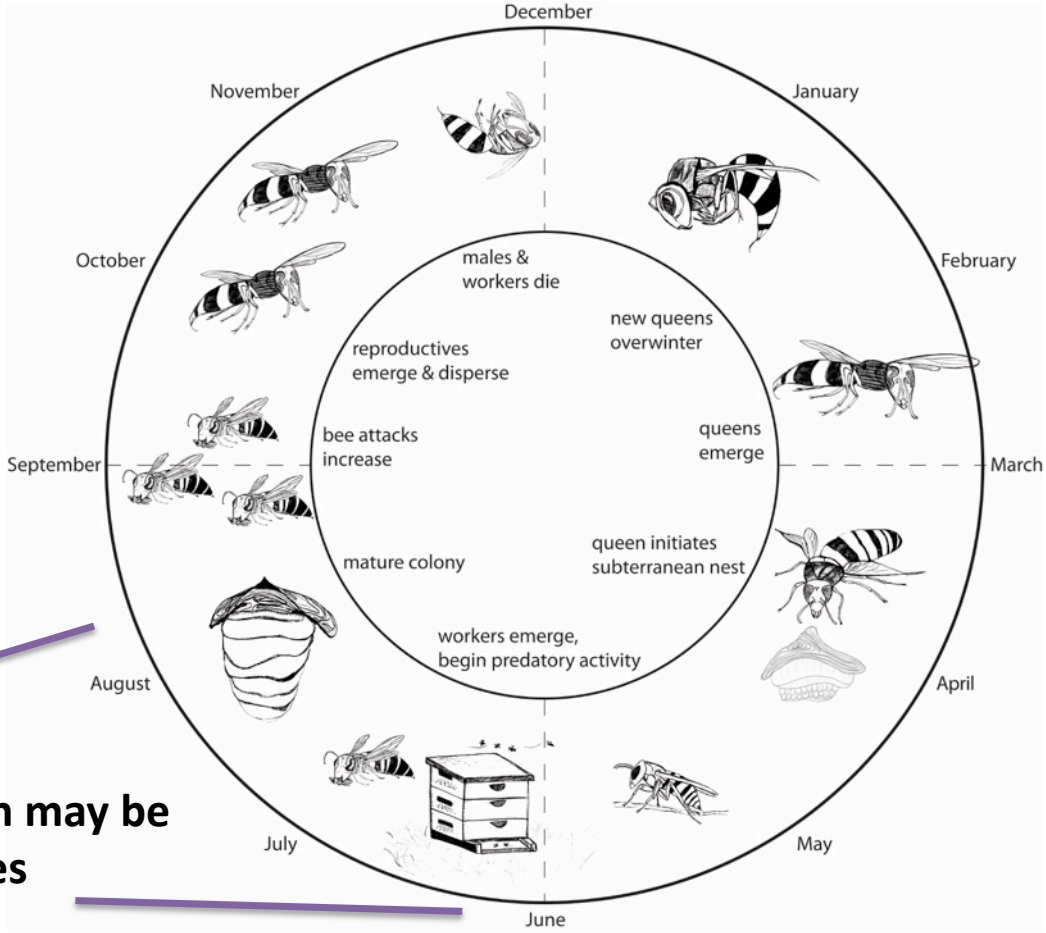
Colony Cycle



Occasional predation may be observed at bee hives

V. mandarinia life cycle
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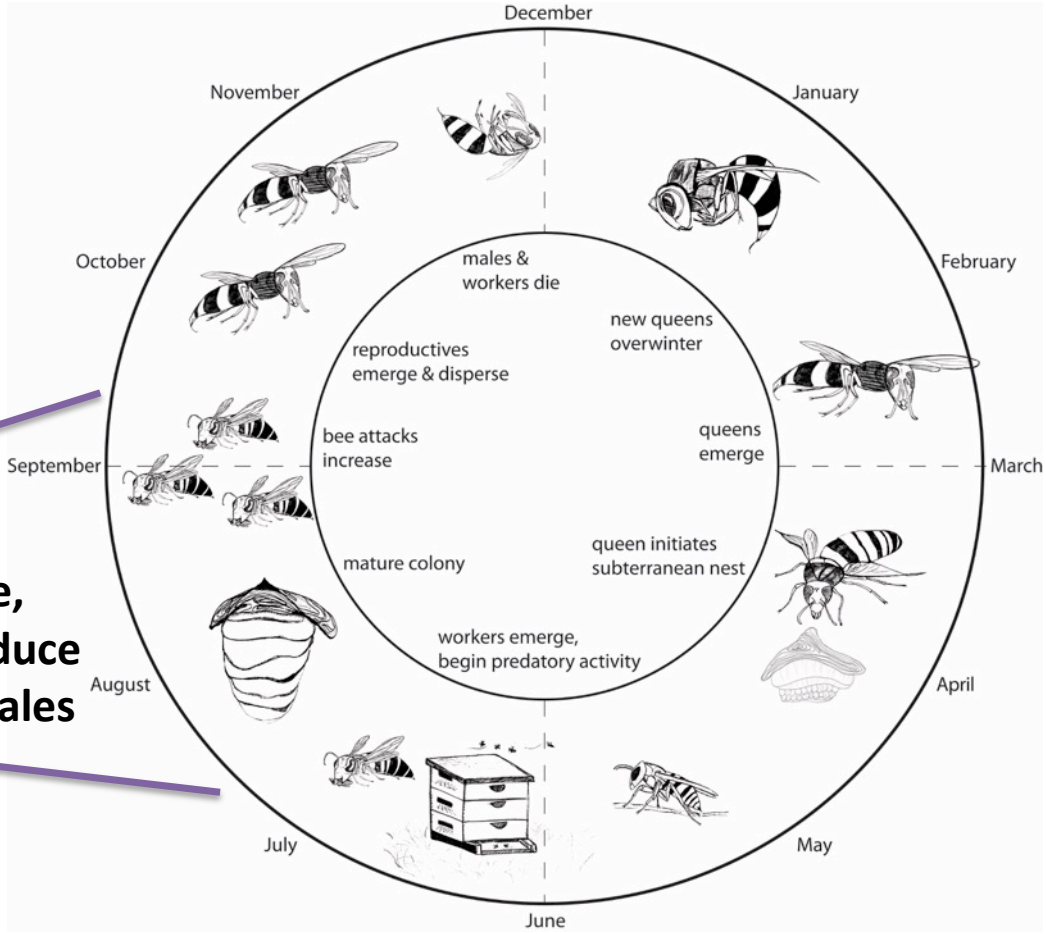
Colony Cycle

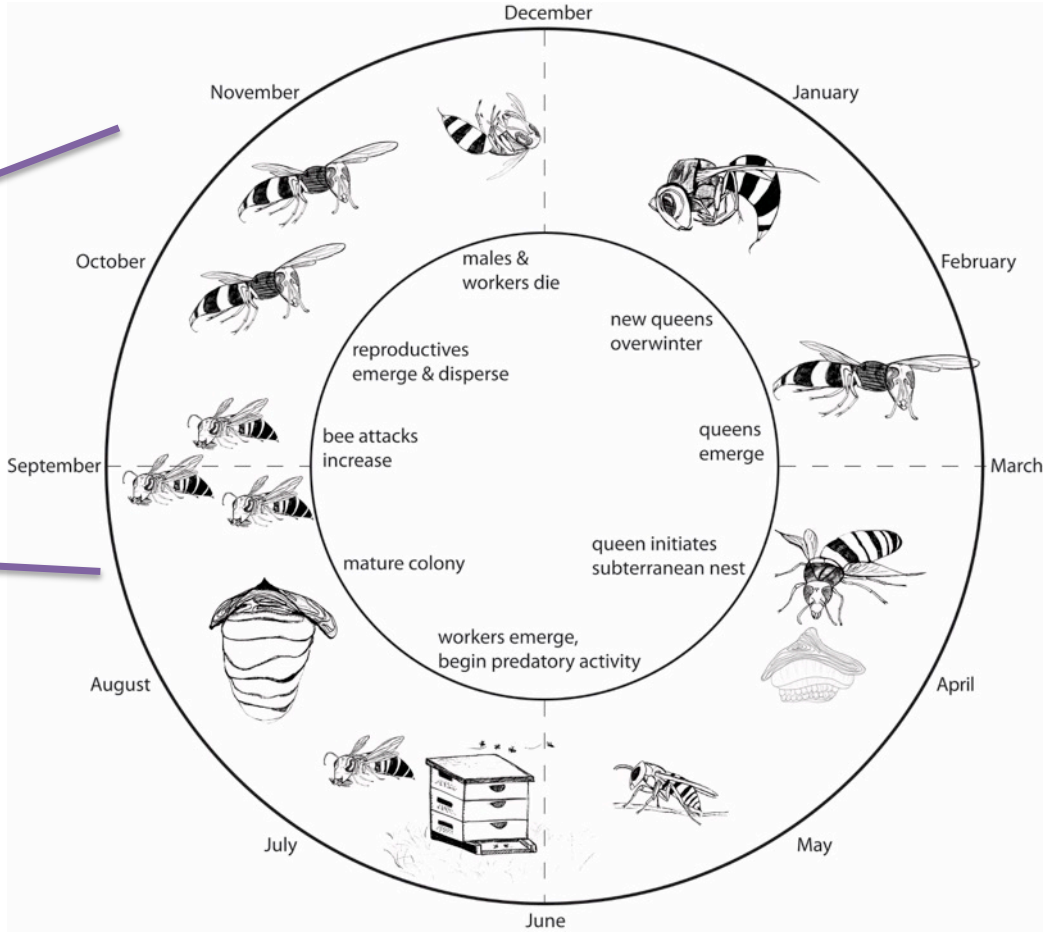


Maximum colony size, colony begins to produce young queens and males

V. mandarinia life cycle
after Matsuura 1984, Archer 1995
(illustrations J. Orr)

Colony Cycle

Group predation on honey bee colonies in late summer – early fall

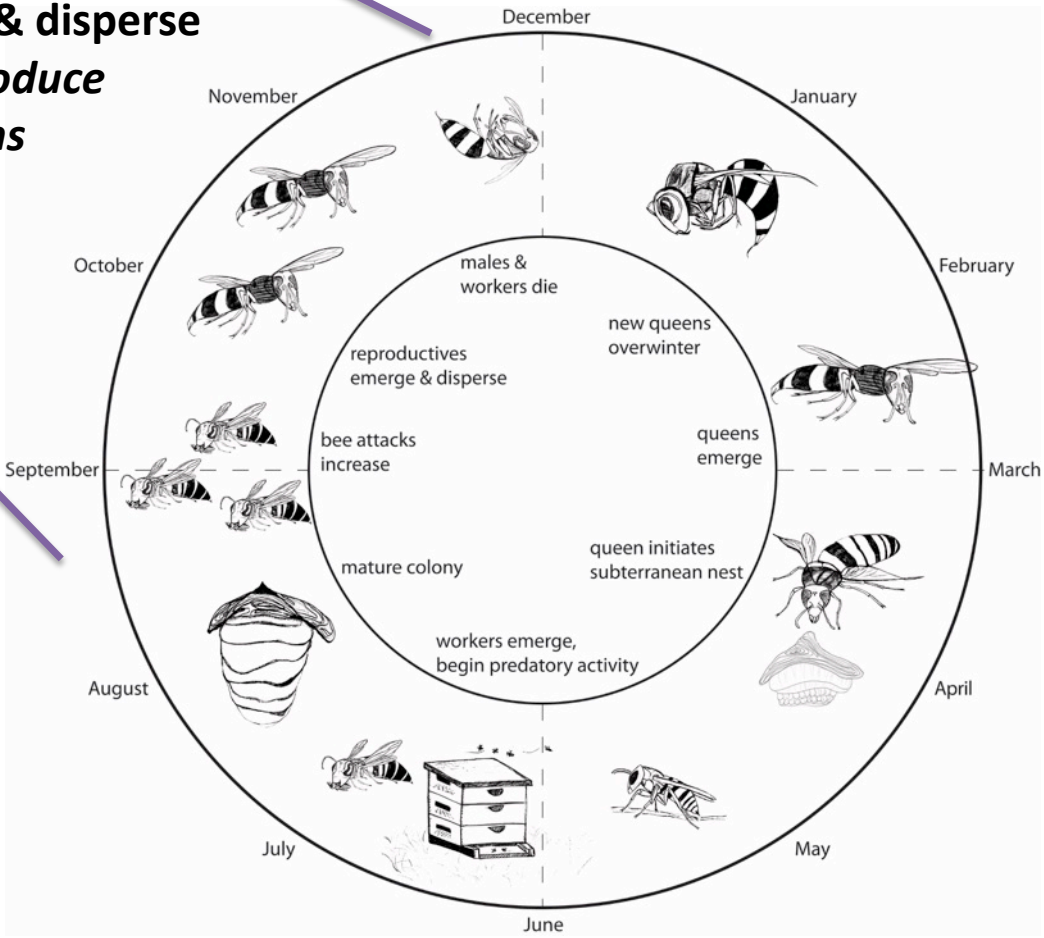


V. mandarinia life cycle
after Matsuura 1984, Archer 1995
(illustrations J. Orr)

Colony Cycle

Dispersal distance of *V. mandarinia* queens is unknown; related species may travel up to 18 miles/28km

virgin queens and males emerge,
some queens mate & disperse
a single nest can produce
over 300 new queens



V. mandarinia life cycle
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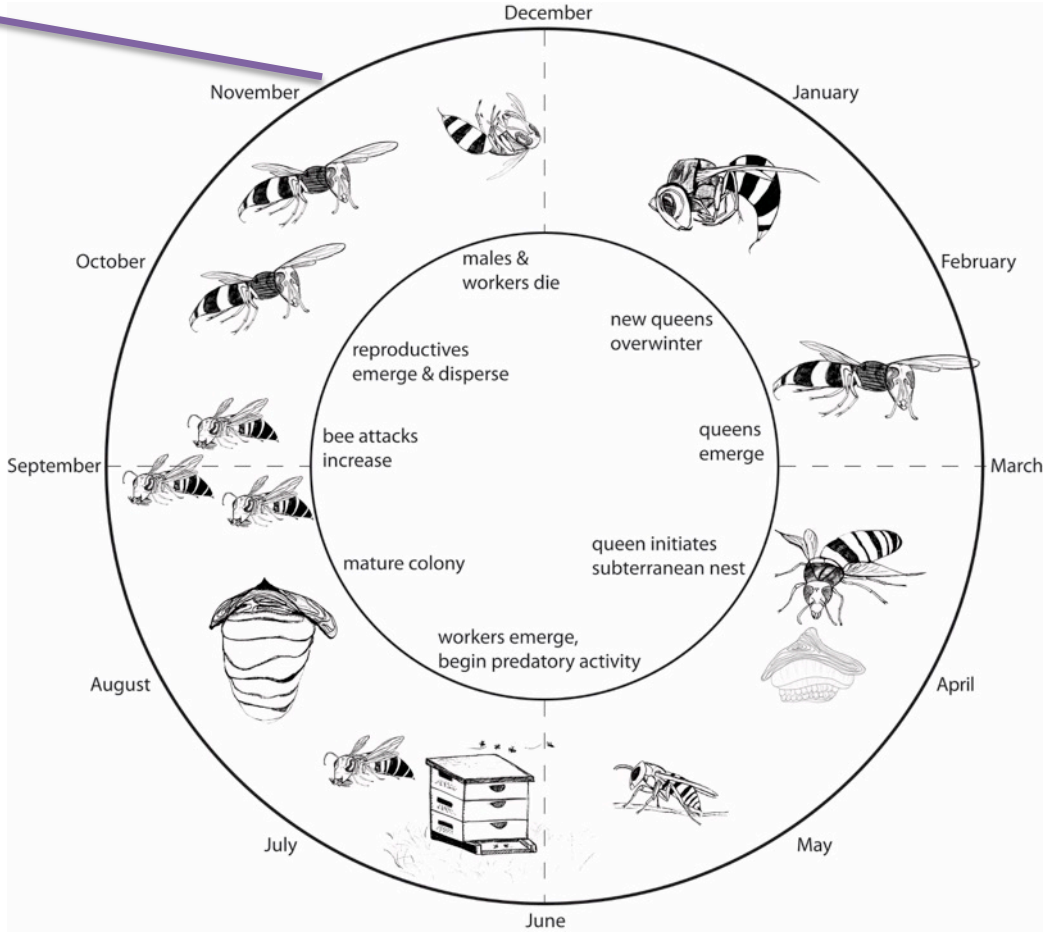
Colony Cycle

workers, males, and late-emerging queens die



V. mandarinia life cycle
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Nesting Habits

- Usually underground nests in hollows formed by rotting pine roots, hollow trunks, and rodent burrows (Matsuura & Sakagami 1973)
- **Very rarely** recorded above ground in hollow trees (Yamane & Makino 1977) and human structures (Matsuura & Koike 2002)
- Nests can be more than 2 feet/61 cm wide and contain hundreds of adult hornets
- Prefer forested habitats

Photo: Kim, Hyun-tae

Photo: still from **Bugs the film**

Foraging Habits

- Emerged queens feed on carbohydrates, mostly sap
- Workers acquire protein from insects, feed to larvae
- Attack scarab and longhorn beetles, other large insects, and honey bees
- Workers forage nearly 5 miles/8 km from their nests (average 1 mile/ 2km)

Photo: unknown

Photo: T. McFall

Foraging Habits

- Honey bee attacks have three distinct stages
  - Hunting phase: Individual hornets catch bees, form a “meat ball” from the bee thorax, and return it to their nest
  - Slaughter phase: One hive is the focus. Hornets capture adult bees, kill them, and dump the bodies. Hornets will vigorously defend attacked hives during this phase.
  - Occupation phase: Hornets wander the hive at will, select pupae and larvae, and return them to their own nest for food

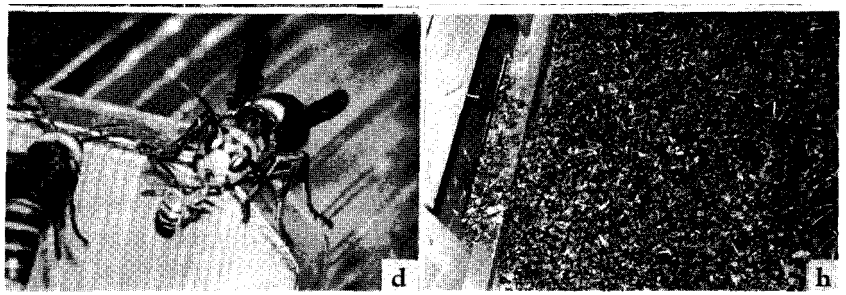


Fig. 6. Attacks by *V. mandarinia* on a hive of *Apis mellifera* at slaughter phase. a∼c. Sequence of slaughter phase with gradual decrease of defense and increase of bees killed by hornets, d. Hornet crushing the head of a bee, e. Hornet attempting to pull a bee, f. Hornet biting a bee and receiving the counter-attack of another, g. Hornet biting a counter-attacking bee, h. Result of a slaughter, photographed after removing hornets.

from Matsuura & Sakagami 1973

Human Health

- Venom impacts are similar to other Hymenoptera - but can be a little worse
    - Localized tissue necrosis and massive pain are the most likely outcomes of a sting
- Anaphylactic shock is always a risk from stinging Hymenoptera
- *V. mandarinia* delivers large doses, but typically sting only when handled, defending the nest, or defending a hive they are attacking
- Mass attacks are very rare, but in extreme cases can cripple or even kill victims
- Treat stings with cold to slow venom spread, and seek medical attention if you are stung multiple times or have signs of an allergic reaction

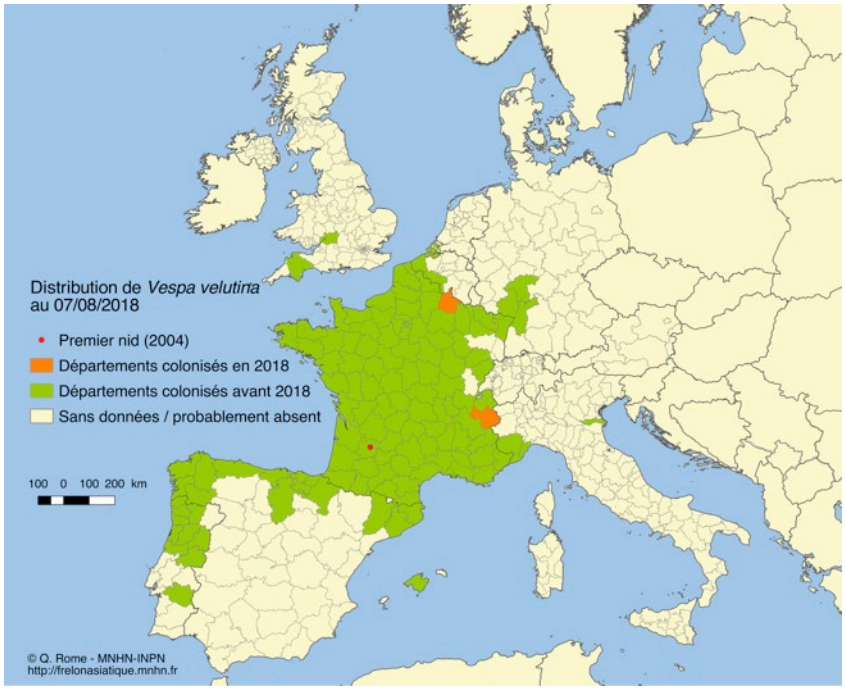
Photo: the Guardian

This photo shows an extreme example of venom damage from a rare mass stinging event.

What can we expect?

- A similar species, *V. velutina*, became established in Europe by 2004, in central France
- Spreading at about 60km year
- At least 2 human deaths (FR)
- Some beekeepers report about 2/3 reduction in honey, 30% hives impacted

Photo: Abellas Hailas



What will we do?

- Washington State and British Columbia are exploring response options
- Washington State will conduct various types of trapping this spring
- Our shared hope is to work with stakeholders in both countries and eradicate this species
- In Washington State, please report any suspect sightings to:

WSDA Pest Program: PestProgram@agr.wa.gov

WSDA Pest Hotline: 1-800-443-6684

Online at: agr.wa.gov/hornets

Operators are standing by for your hornet report!

You can also follow our hornet activities on facebook: www.facebook.com/groups/hornets