

California Pest Rating Proposal

Vespa velutina Lepeletier: yellow-legged hornet

Hymenoptera: Vespidae

Current Rating: Q

Proposed Rating: A

Comment Period: **10/30/2023 – 12/14/2023**

Initiating Event:

Two nests of *Vespa velutina* were found in the state of Georgia in 2023. This hornet poses a risk to apiculture and the environment. If it becomes established in the eastern United States, there is an increased risk of it spreading to California through expansion of its distribution or through movement in interstate transport. Therefore, a pest rating proposal is needed.

History & Status:

Background: Nest construction in *Vespa velutina* is initiated by a mated queen. This nest, termed a “primary” nest, houses a growing number of workers. Generally in the summer, this nest is abandoned for a “secondary” nest that is larger. The queen dies at the end of the year after reproductives are produced. Nests are often built on trees or buildings (Budge et al., 2017; Franklin et al., 2017; Rome et al., 2011). The sting of this hornet is painful, but of perhaps wider concern is the impact on honey bees. This hornet preys upon a variety of insects, including honey bees (making up one third of their diet in some cases), wasps (e.g., *Vespa* and *Vespula* species), flies, spiders, and grasshoppers (Rome et al., 2011; Stainton et al., 2023). The Asian bee, *Apis cerana*, is able to defend itself from this hornet with defensive behaviors such as “beecarpeting,” “heat balling,” and “shimmering,” but European honey bees are reported to have only limited defensive ability. In Europe, where this hornet is introduced, impacts on apiculture are already being observed. In one

area in France, it was reported that 30% of honey bee hives were destroyed or weakened due to this hornet (Monceau and Thiery, 2016).

Besides economic impacts, this hornet is also presumed to have environmental impacts, because it attacks a wide variety of insects (likely including pollinators) and can compete with native wasps (e.g., *Vespa crabro* in Europe) (Monceau and Thiery, 2016).

There do not appear to be effective area-wide management methods, but trapping near apiaries is reported to be useful in limiting impacts to honey bees (Rome et al., 2011).

Worldwide Distribution: *Vespa velutina* is native to Southeast Asia, though it has been introduced widely. The reported distribution includes the following: **Asia:** Afghanistan, Bhutan, China, Hong Kong, India, Indonesia, Japan, Korea, Laos, Malaya, Malaysia, Myanmar, Nepal, Pakistan, Taiwan, Thailand, Vietnam, Yemen; **Europe:** Belgium, Great Britain, France, Italy, Portugal, Spain (Budge et al., 2017; Monceau and Thiery, 2016; Rome et al., 2011; Smith-Pardo et al., 2020). In August and September 2023, two nests were found and destroyed on Wilmington Island, Georgia, United States. It is not apparent if the hornet is established in that state. Trapping is underway (Georgia Department of Agriculture, 2023).

Official Control: *Vespa velutina* is presumed to be USDA-reportable. It is a regulated invasive species in Japan (Invasive species of Japan, 2023).

California Distribution: *Vespa velutina* is not known to be present in California (California Department of Food and Agriculture, 2023).

California Interceptions: *Vespa velutina* has not been intercepted in California (California Department of Food and Agriculture, 2023).

The risk *Vespa velutina* poses to California is evaluated below.

Consequences of Introduction:

- 1) **Climate/Host Interaction:** *Vespa velutina* is a generalist predator and likely a scavenger as well. It is known to be established in areas with a Mediterranean climate. Therefore, it receives a **High (3)** in this category.
 - Low (1) Not likely to establish in California; or likely to establish in very limited areas.
 - Medium (2) may be able to establish in a larger but limited part of California.
 - **High (3) likely to establish a widespread distribution in California.**
- 2) **Known Pest Host Range:** *Vespa velutina* is reported to feed on a wide variety of hosts (primarily insects). Therefore, it receives a **High (3)** in this category.
 - Low (1) has a very limited host range.
 - Medium (2) has a moderate host range.
 - **High (3) has a wide host range.**
- 3) **Pest Reproductive and Dispersal Potential:** *Vespa velutina* flies and could be moved in commerce as a hitchhiker. Therefore, it receives a **Medium (2)** in this category.
 - Low (1) does not have high reproductive or dispersal potential.
 - **Medium (2) has either high reproductive or dispersal potential.**
 - High (3) has both high reproduction and dispersal potential.
- 4) **Economic Impact:** *Vespa velutina* preys on honey bees and is reported to cause significant loss of hives. Its presence in apiaries could necessitate trapping or other control measures. It could impact crops that depend on honey bees and other pollinating insects in California. It could impact production of queen bees, which are produced in northern California for export. This

hornet is a pest that is presumed to be USDA-reportable and it is regulated by Japan. Therefore, it receives a **High (3)** in this category.

Economic Impact: B, C, D, F

- A. The pest could lower crop yield.
- B. The pest could lower crop value (includes increasing crop production costs).**
- C. The pest could trigger the loss of markets (includes quarantines).**
- D. The pest could negatively change normal cultural practices.**
- E. The pest can vector, or is vectored, by another pestiferous organism.
- F. The organism is injurious or poisonous to agriculturally important animals.**
- G. The organism can interfere with the delivery or supply of water for agricultural uses.

Economic Impact Score: High

- Low (1) causes 0 or 1 of these impacts.
- Medium (2) causes 2 of these impacts.
- **High (3) causes 3 or more of these impacts.**

- 5) **Environmental Impact:** If *V. velutina* became established in California, it could impact ecosystems through predation of insects and competition with native wasps. It could also trigger treatments. Therefore, *V. velutina* receives a **High (3)** in this category.

Environmental Impact: A, D

- A. The pest could have a significant environmental impact such as lowering biodiversity, disrupting natural communities, or changing ecosystem processes.**
- B. The pest could directly affect threatened or endangered species.
- C. The pest could impact threatened or endangered species by disrupting critical habitats.

D. The pest could trigger additional official or private treatment programs.

E. The pest significantly impacts cultural practices, home/urban gardening or ornamental plantings.

Environmental Impact Score: High (3)

- Low (1) causes none of the above to occur.
- Medium (2) causes one of the above to occur.
- **High (3) causes two or more of the above to occur.**

Consequences of Introduction to California for *Vespa velutina*: Medium (14)

Add up the total score and include it here.

- Low = 5-8 points
- Medium = 9-12 points
- High = 13-15 points**

6) **Post Entry Distribution and Survey Information:** *Vespa velutina* is not known to be established in California. It receives a **Not established (0)** in this category.

–**Not established (0) Pest never detected in California, or known only from incursions.**

–Low (-1) Pest has a localized distribution in California, or is established in one suitable climate/host area (region).

–Medium (-2) Pest is widespread in California but not fully established in the endangered area, or pest established in two contiguous suitable climate/host areas.

–High (-3) Pest has fully established in the endangered area, or pest is reported in more than two contiguous or non-contiguous suitable climate/host areas.

Final Score:

7) The final score is the consequences of the introduction score minus the post-entry distribution and survey information score: High (14)

Uncertainty:

There is some uncertainty regarding the environmental impacts this hornet could cause in California.

Conclusion and Rating Justification:

Vespa velutina poses a threat to California agriculture and the environment. Honey bees are critical for pollination of some of the state's leading crops, including almonds. In addition, queen bees are produced in northern California for export. For these reasons, an A rating is justified.

References:

Budge, G. E., Hodgetts, J., Jones, E. P., Ostojá-Starzewski, J. C., Hall, J., Tomkies, V., Semmence, N., Brown, M., Wakefield, M., and Stainton, K. 2017. The invasion, provenance and diversity of *Vespa velutina* Lepeletier (Hymenoptera: Vespidae) in Great Britain. PLoS ONE <https://doi.org/10.1371/journal.pone.0185172>

California Department of Food and Agriculture. Pest and damage record database. Accessed October 6, 2023.

Franklin, D. N., Brown, M. A., Datta, S., Cuthbertson, A. G. S., Budge, G. E., and Keeling, M. J. 2017. Invasion dynamics of Asian hornet, *Vespa velutina* (Hymenoptera: Vespidae): A case study of a commune in south-west France. Applied Entomology and Zoology 52:221-229.

Georgia Department of Agriculture. Accessed October 6, 2023: <https://agr.georgia.gov/pr/commissioner-tyler-harper-announces-eradication-second-yellow-legged-hornets-nest-georgia>

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Monceau, K., Thiery, D. 2016. *Vespa velutina*: Current situation and perspectives. Atti Accademia Nazionale Italiana di Entomologia 64:137-142.

Rome, Q., Perrard, A., Muller, F., and Villemant, C. 2011. Monitoring and control modalities of a honeybee predator, the yellow-legged hornet *Vespa velutina nigrithorax* (Hymenoptera: Vespidae). *Aliens* 31:7-15.

Smith-Pardo, A. H., Carpenter, J. M., and Kimsey, L. 2020. The diversity of hornets in the genus *Vespa* (Hymenoptera: Vespidae; Vespinae), their importance and interceptions in the United States. *Insect Systematics and Diversity* 4:1-27.

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<https://doi.org/10.3390/ani13030511>

Responsible Party:

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***Comment Period: 10/30/2023 – 12/14/2023**

*NOTE:

You must be registered and logged in to post a comment. If you have registered and have not received the registration confirmation, please contact us at [permits\[@\]cdfa.ca.gov](mailto:permits[@]cdfa.ca.gov).

Comment Format:

- ❖ Comments should refer to the appropriate California Pest Rating Proposal Form subsection(s) being commented on, as shown below.

Example Comment:

Consequences of Introduction: 1. Climate/Host Interaction: [Your comment that relates to “Climate/Host Interaction” here.]

- ❖ Posted comments will not be able to be viewed immediately.
- ❖ Comments may not be posted if they:

Contain inappropriate language which is not germane to the pest rating proposal;

Contains defamatory, false, inaccurate, abusive, obscene, pornographic, sexually oriented, threatening, racially offensive, discriminatory or illegal material;

Violates agency regulations prohibiting sexual harassment or other forms of discrimination;

Violates agency regulations prohibiting workplace violence, including threats.

- ❖ Comments may be edited prior to posting to ensure they are entirely germane.
- ❖ Posted comments shall be those which have been approved in content and posted to the website to be viewed, not just submitted.

Proposed Pest Rating: A