

Asian Hornet (*Vespa velutina*) Fact Sheet

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Origin: Afghanistan, India, Bhutan, China, Taiwan, Myanmar, Thailand, Laos, Vietnam, Indonesia

Method of Establishment: In Japan, a worker was first identified in Tsushima City, Nagasaki Prefecture, in 2012. In 2013, 56 nests were found on Tsushima and Kamijima islands, confirming colonization. While distribution was confirmed only in 2013, from interviews with beekeepers on the islands, it is possible that the hornets had invaded the islands as early as 2011.

Beyond Japan, this species has invaded Korea and several European countries (France, Spain, Portugal, Belgium, Italy).

Reasons for formal evaluation:

- The species has a high rate of dispersal. In Korea, the species can move as fast as 10-20 km in one year. By estimation, the species is dispersing at a rate of 100km per year in Europe.
- New queens can easily establish new colonies, thus the potential for this species to quickly disperse and rapid population growth is very high.
- The Asian hornet species which invaded Tsushima Island [Japan], France, and Korea is confirmed as the subspecies *V. v. Nigrithorax* (Native distribution: Northeast India, Southern China, Bhutan).
- Because both native hornets and these invasive hornets feed on the same insects species, there is a risk of damage to the ecosystem and insect populations.
- Additionally, are concerns about these hornets stinging humans, as well as concerns that they could cause damage to the beekeeping industry due to predation upon honey bees.

Current situation and predicted damage:

1. Ecosystem Damage
 - In Busan, South Korea, the invasion of the Asian hornet caused a severe population decline in the native Japanese hornet (*Vespa simillima simillima*) due to competition pressure. Asian hornets are now the dominant species in the area². Japanese hornet distribution in Japan ranges from Hokkaido to the southern part of Honshu, where the yellow-legged Japanese hornet subspecies can also be found (*V. s. xanthoptera*).
 - Its diet consists mainly of insects and the like, such as honey bees, paper wasps, caterpillars, butterflies, flies, dragonflies, spiders^{6,8}. Because it competes with other predatory insects in higher trophic levels, it has a significant impact on the ecosystem by reducing the availability of prey via competition.
2. Agriculture, Forestry, and Fisheries damages
 - Losses to beekeepers in Korea have been reported. One apiary reported that over the course of 2-3 weeks, they lost 50 out of 300 hives².
 - More Asian honey bees are kept than European honey bees in China. Asian hornets prefer to attack colonies of European honey bees as they have not evolved any defense mechanisms against the hornets. Thus, the Asian hornet can readily spread in Europe^{1,7}.
Note: On Tsushima Island, beekeepers primarily keep Japanese honey bees, a subspecies of Asian honey bee, which are able to defend against these hornets. However, on mainland Japan, there are more European honey bees⁴.

Factors causing damage

1. Biological Factors

- Asian hornets may cause a decrease in native hornet and wasp species².
- Asian hornets are powerful, generalist predators, thus posing a threat to native wasps and hornets by competition^{5,8}. If their range expands further, they could pose a threat to the beekeeping industry^{1,7}.

2. Social Factors

- The hornets were allegedly transported from exported goods originating from China to South Korea and France. Future goods being exported from the hornet's natural habitat should be carefully monitored and inspected to prevent unintentional queen movement.

Characteristics

Classification

- *Vespa velutina* is a member of the wasp (Vesipidae) family. This species is divided into 14 different subspecies.
- Of these subspecies, only *V. v. Nigrithorax* has become a global pest. This subspecies has become naturalized on Tsushima Island, and introduced to France and Korea.
- There are 7 native species of hornet present in Japan.

Distribution

- The natural distribution of the Asian wasp is from Afghanistan to the West, China to the North, Indonesia to the South, and Taiwan to the East.
- The natural distribution of the subspecies *V. v. Nigrithorax* is Northeastern India, Southern China, and Bhutan. The subspecies is now present in Korea, France, Spain, Portugal, Belgium, and Italy.

Form

- Body length varies depending on the distribution area. In Europe, the queen is typically 25-30 mm, while the worker is 25 mm. In Southeast Asia, the queen is typically 18, the worker 14-17 mm, and the male about 16mm in both areas.
- The body is overall very dark, with a characteristic red-brown mottling on the abdomen. This makes it easy to distinguish from other species.

Ecology

- The queen bee usually overwinters alone in a closed area such as in bushes, shrubs, soil, et cetera. When the colony grows, it typically moves to thigh areas, such as tree tops. (Some Korean cities have reported nests in the walls of condominiums and the like.)
- Like other hornets, it primarily preys on various insects, especially flying insects.
- Colony activity peaks in Autumn.

Other Related Information

- The species has a high rate of dispersal. In Korea, distribution is 10-20 km in one year², and by 100 km per year in Europe⁴.
- In Busan, South Korea, higher populations of hornets tend to be found near urban areas². There is concern that the hornets may pose a risk to people in Kyushu or Honshu. Note: Busan is located at N35° 06', almost the same latitude as Kyoto and Aichi. Average annual temperature is 14.7°C (58.46°F). The rainy season start in June, and from late July-mid August the average maximum daily temperature is 27-29°C (80.6-84.2°F). The weather starts to cool starting in September, and during the winter months of December-February the average temperature is 4.6°C (40.3°F). Data from 1981-2010.

Citations

1. Abrol, D. P. (2006) DEFENSIVE BEHAVIOUR OF *Apis cerana* F. AGAINST PREDATORY WASPS . *Journal of Apicultural Science*, 50(2), 39-46.
2. Choi, M. B., Martin, S. J., & Lee, J. W. (2012) Distribution, spread, and impact of the invasive hornet *Vespa velutina* in South Korea. *Journal of Asia-Pacific Entomology* , 15(3), 473-477.
3. de Haro, L., Labadie, M., Chanseau, P., Cabot, C., Blanc-Brisset, I., & Penouil, F. (2010) Medical consequences of the Asian black hornet (*Vespa velutina*) invasion in Southwestern Franc. *Toxicon*, 55(2), 650-652.
4. 環境省九州地方環境事務所 (2014) 平成 25 年度対馬におけるツマアカスズメバチ侵入状況調査及び防除手法検討業務報告書. 45pp.
5. Nguyen, L. T., Saito, F., Kojima, J. I., & Carpenter, J. M. (2006) Vespidae of Viet Nam (Insecta: Hymenoptera) 2. Taxonomic Notes on Vespinae. *Zoological science*, 23(1), 95-104.
6. Perrard, A., Pickett, K., Villemant, C., Kojima, J. I., & Carpenter, J. (2013) Phylogeny of hornets: a total evidence approach (Hymenoptera, Vespidae, Vespinae, *Vespa*). *Journal of Hymenoptera Research*, 32, 1-15.
7. Tan, K., Radloff, S. E., Li, J. J., Hepburn, H. R., Yang, M. X., Zhang, L. J., & Neumann, P. (2007) Bee-hawking by the wasp, *Vespa velutina*, on the honeybees *Apis cerana* and *A. mellifera*. *Naturwissenschaften*, 94(6), 469-472.
8. Villemant, C., Perrard, A., Rome, Q., Gargominy, O., Haxaire, J., Darrouzet, E., & Rortais, A. (2008) A new enemy of honeybees in Europe: the invasive Asian hornet *Vespa velutina* . *International Congress of Zoology* 26-29 August 2008.

Internet Citations

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