The European or giant hornet is an introduced species first reported in the United States in 1840. They are commonly encountered across most of Eastern North America, including Pennsylvania.

Classification
Common name: European hornet
Scientific name: Vespa crabro Linnaeus, 1758
Order: Hymenoptera (bees, wasps, and related insects)
Family: Vespidae (yellowjackets, hornets, and paper wasps)

Distribution
European hornets (Figure 1) are native to Europe and Asia (Figure 2). They were introduced from central Europe into North America and first detected in the 1840s. European hornets have since become widespread and well established in the eastern United States, including all of Pennsylvania (Figure 3). They have continued to spread westward and were first reported from Arkansas in 1999. A European hornet worker collected in Guatemala was reported in 2010 but the species is not believed to be established there.
**Description**

European hornet workers can be up to an inch (25 mm) long while queens are slightly larger and can reach 1.3 inches (35 mm). They are amongst the largest wasps in the areas they occur. The head is red and yellow, the thorax is red and brown, while the abdomen is brown anteriorly and mostly yellow posteriorly with brown tear-drops.

**Look-alike species**

European hornets are the species most commonly mistaken for **Asian giant hornets** in eastern North America. However, Asian giant hornets do not occur in eastern North America and have only been found in Washington State and adjacent British Columbia (Figure 3). The two species can also be distinguished by a number of features including the color and position of the eyes (Figure 4, Table 1).

<table>
<thead>
<tr>
<th>European hornet</th>
<th>Asian giant hornet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smaller gap between the rear of the eye and the rear of the head</td>
<td>Larger gap between the rear of the eye and the rear of the head</td>
</tr>
<tr>
<td>Red-brown and yellow</td>
<td>Entirely yellow</td>
</tr>
<tr>
<td>Black and reddish-brown</td>
<td>Mostly black with a yellow spot between the wings</td>
</tr>
</tbody>
</table>

| Abdomen | Black anteriorly and yellow posteriorly with rows of black teardrops | Banded yellow, black, and brown |

Table 1. Characters used to distinguish European hornets from Asian giant hornets.

**Eastern cicada killers** (Figure 5) can be distinguished from European hornets based on coloration and behavior. The abdomens of cicada are mostly black with yellow markings while European hornet abdomens are mostly yellow with brown markings. European hornets construct paper nests in aerial locations, while cicada killers nest in the ground. Cicada killers are solitary, so only each female digs her own nest, but may nest communally, with many nests in a small area that has the right soil substrate.

**Life history**

European hornets build paper nests like other yellowjackets and hornets. However, unlike bald-faced hornets, which build the large, exposed paper nests in trees, and yellowjackets, which typically build paper nests in the ground, the nests of European hornets are found in protected aerial areas, such as a hollow in a large, standing tree and sometimes in the wall voids of houses (Figure 6). Because they usually nest in hollow trees, European hornets are most commonly found in forests and adjacent areas. However, they can also be found in parks and suburban areas with sufficient trees or other suitable nesting habitats. Subterranean nests have also been occasionally reported.
European hornet nests are often large because the hornets themselves are large, but most nests only contain 1,500–3,000 cells. Nest size peaks in mid-September, when most nests contain 200–400 workers although large nests may have up to 1,000 workers. For comparison, eastern yellowjacket (Vespula maculifrons) nests can contain >10,000 cells and 3,000-5,000 individuals at peak size.

Like other social wasps, European hornets make annual nests. This means the nest and workers die out in the fall and the only individuals that survive are fertilized queens that make construct nests the following year. Because overwintered queens construct new nests each year, having a nest in a specific tree or other area doesn’t necessarily mean a nest will be built there in the following years.

Fertilized queens overwinter in protected places, such as under the bark of fallen trees or in the wall voids of buildings. When they get into buildings and wake up in the spring, they sometimes come indoors accidentally rather than going outside, so can end up in the attic and living areas.

European hornets are predatory for most of the year and hunt other insects, including grasshoppers, various flies, and yellowjackets (Figure 7). They sometimes attack honey bees, although this behavior appears to be more common in Europe than in North America. European hornets incorporate sugar and carbohydrates into their diet, particularly in the fall. This sometimes brings them into conflict with people when they are attracted to fallen fruit such as apples and pears or strip the bark of certain bushes (particularly lilac) to feed on plant sap (Figure 8). When hornets strip the bark from bushes they can kill affected twigs and branches.

European hornets are also the only nocturnal wasp in Pennsylvania and are sometimes attracted to porch lights at night.
Medical importance

Despite their large size, the sting from a European hornet is only about as painful as a honey bee sting. Unlike honey bees, European hornets have smooth stingers and can sting multiple times. Unless a person is allergic to bee and wasp stings or received multiple stings, European hornet stings should resolve on their own in one to a few hours without complications. If adverse reactions begin after a sting, seek immediate medical attention.

Control

Because European hornets construct annual nests, the simplest method of control is to wait until the first hard frost or two kills off nearby nest(s). Picking up fallen fruit and turning off porch lights at night in the fall can help reduce their numbers until cold kills them.

Bushes can be protected from European hornets by killing individual hornets using wasp and hornet spray – because nests are relatively small with only a few hundred individuals, killing enough hornets can reduce the damage to acceptable levels – or covering the affected bush(es) in mesh netting until the hornets die off. There are no pesticides that can be applied to the affected bushes themselves to kill the hornets.

If more direct control of the hornets is needed, the nest will need to be found and destroyed. This can be difficult with European hornets because they are often hidden inside hollow trees and other voids and can be up to 30' high. So even if the nest is located you may be unable to safely eliminate it. If you do find the nest and can access it, spraying it with wasp and hornet spray at night may be enough to eliminate the hornets. If you decide to treat a nest yourself, make sure to wear long sleeves and pants with pants tucked into long socks in order to reduce the chance of being stung.

If a nest is found in the wall void of a house, do not cover the outside entrance. If the hornets can’t exit the nest, they may chew through interior wall coverings in an attempt to escape and enter indoor living spaces.

When overwintering hornets are found in the home in the winter and spring, the most immediate control is to capture and release (e.g., with a glass and piece of paper or cardboard) or kill the hornets. The best long-term solution is to prevent overwintering hornets to enter the building by sealing cracks in the siding and around windows, pipes, etc that allow them to enter the wall void in the first place.

Warning. Pesticides are poisonous. Read and follow directions and safety precautions on labels. Handle carefully and store in original labeled containers out of the reach of children, pets, and livestock. Dispose of empty containers right away, in a safe manner and place. Do not contaminate forage, streams, or ponds.

References


extension.psu.edu

Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

Where trade names appear, no discrimination is intended, and no endorsement by Penn State Extension is implied.

This publication is available in alternative media on request.

Penn State is an equal opportunity, affirmative action employer, and is committed to providing employment opportunities to all qualified applicants without regard to race, color, religion, age, sex, sexual orientation, gender identity, national origin, disability, or protected veteran status.

© The Pennsylvania State University 2022
Code: ART-4035