

Insects

Yellowjacket Wasps in Tennessee

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In Tennessee, 11 species of yellowjacket wasps can be found (Table 1). These wasps are often considered beneficial as predators of crop pests; however, in late summer they can be pests due to their stinging behavior. This factsheet summarizes information about yellowjacket identification, biology, behavior and lists options for control when needed.

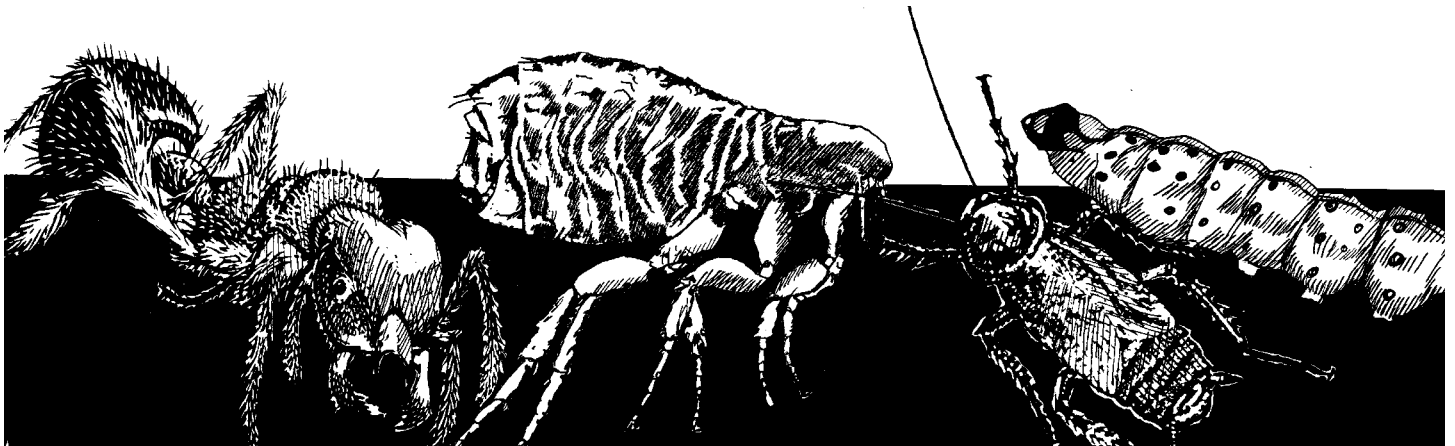
Wasp, hornet and yellowjacket stings can be a serious health threat to animals and humans, especially if a person being stung is allergic to yellowjacket venom. Yellowjackets are often considered the most dangerous stinging insects in the United States. They are more unpredictable than honey bees and will sting readily if the nest is disturbed. Workers foraging away from their nest are seldom aggressive in the spring or early summer, but in late summer they become more aggressive. Nests should be eliminated with great care and in a specific manner. While many people rely on specific methods, such as dousing nests

with gasoline or a garden hose, these remedies are not recommended, and may result in multiple stings.

Yellowjackets scavenge widely for sources of nutrition. Foods such as meats that contain proteins are more commonly collected in the spring and summer to feed developing larvae. During late summer and fall, yellowjacket colonies are near maturity and large numbers of workers forage for food. Sweets support large populations of foraging wasps. They are particularly fond of sweets (e.g., fruit, soft drinks, ice cream, beer), but they will also eat meats, potato salad and just about anything we eat.

Identification

Most people do not need a description of yellowjackets. They have unfortunately witnessed a stinging or have observed them foraging. Table 1 provides information about the species known to occur in Tennessee.



Species in the genus *Dolichovespula*, including the bald-faced hornet, have white and black markings and construct aerial nests. Species in the genus *Vespula* have yellow and black markings and usually nest underground. All *Dolichovespula* and some *Vespula* (*V. consobrina*, *V. vidua*, and *V. squamosa*) collect only live prey, while other *Vespula*, including *V. flavopilosa*, *V. maculifrons* and *V. vulgaris*, often become scavengers. These three scavenger species are more important pests than other species at picnics and outdoor activities where foods, especially sweets, are present.

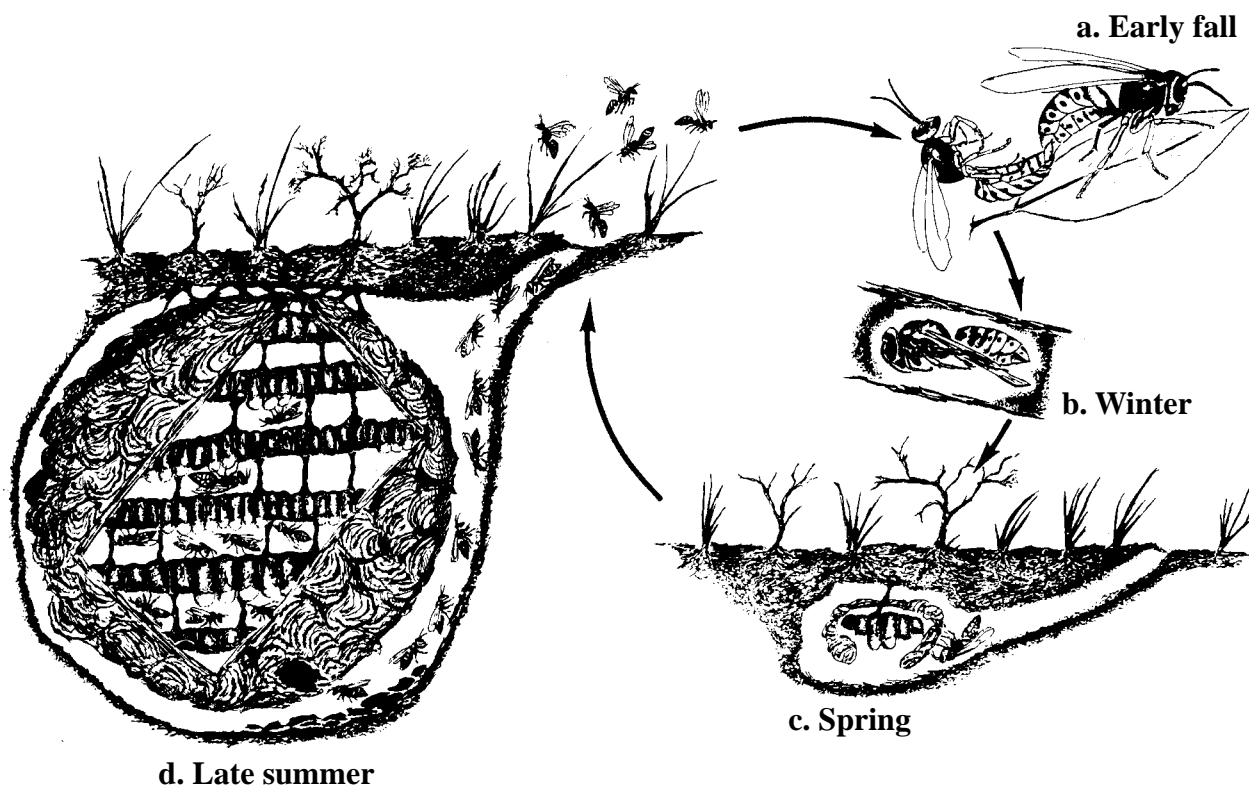
Most literature reports that yellowjackets do not leave stingers behind at the sting site; however, a UT researcher (JAS) found that *V. flavopilosa* did leave stingers behind. A physician treating a victim removed several hundred stingers and assumed they were from honey bees. Examining the stingers and

identifying specimens from the site where stinging occurred indicated that *V. flavopilosa* was responsible.

Biology

Yellowjackets form annual colonies in Tennessee (Fig. 1). Mated queens overwinter under bark and in other sheltered locations. In the spring each queen emerges and constructs a small paper nest where she lays eggs. Larvae, fed by the queen, emerge in about a month as sterile adult females called workers. The newly emerged workers assume all nest activities except egg laying. Thereafter, the colony grows rapidly and contains up to 4000 workers by the end of summer. New males and queens are produced in late summer to early fall. Workers, males and the old queen die and the newly fertilized queens seek sheltered overwintering sites. Abandoned nests are not re-used and soon disintegrate.

Fig. 1 — Life cycle of the yellowjacket: mating in early fall (a), fertilized queen in protected location in winter (b), queen starting nest in spring (c), and nest at peak production (d). (J. Krispyn in Akre et al. 1981)



Yellowjacket nests are often located underground in old rodent burrows or beneath rocks or landscape timbers. Yellowjackets also build nests in walls, attics, crawlspaces and behind the siding of buildings.

Control

Here are some options to control yellowjackets:

1. Sanitation — The best way to reduce the threat of foraging yellowjackets is to minimize attractive food sources. People eating outdoors should keep food and beverages covered until ready to be consumed. Promptly clean up spills and leftovers. Equip trash cans with tight-fitting, self-closing lids. Trash cans and dumpsters should be located away from serving tables, doors and other high-traffic areas. Trash cans should be equipped with a plastic liner and emptied and cleaned frequently. This strategy is especially useful for parks and other outdoor recreation areas. Apples and other fruits fallen from trees should be raked and discarded.

2. Avoidance — Combined with sanitation, avoidance is the best advice in most situations. Yellowjackets foraging away from their nests are seldom aggressive and usually will not sting unless provoked. People should resist the temptation to “swat” at the wasps; most stings occur when foragers are slapped or trapped against skin. Be extremely careful when drinking from beverage cans into which a foraging yellowjacket may have crawled. Swelling resulting from a wasp sting inside the mouth can be life-threatening. Avoidance may also be the best advice if a yellowjacket, hornet or bumble bee nest is located in a tree or other out-of-the-way location. Yellowjacket colonies die off on their own in late autumn with the onset of cold weather, usually after the second hard frost.

3. Repellents — Standard mosquito repellents will not deter yellowjacket foraging or reduce the chances of being stung. A dilute solution of ammonia and water (approximately 6 oz. of ammonia per gallon of water), sprayed in and around trash cans and sponged onto outdoor eating tables will help to mask food odors and minimize attraction to these areas. Use household ammonia, not bleach.

4. Traps — While only of marginal benefit, yellowjacket traps can catch impressive numbers of wasps when properly baited and positioned. Business establishments such as outdoor cafes may find such traps worthwhile when used in conjunction with sanitation and other approaches. Fruit juice or jelly has been an effective attractant. Traps should be placed at the outer perimeter of the area you wish to protect.

5. Insecticides — Elimination of yellowjackets is best accomplished by locating and destroying the nests. However, with foraging yellowjackets this is often impractical, because nests may be located several hundred yards away. Inspect the area around homes for nests. Do this during the daytime, when yellowjackets are entering and exiting the nest opening. If the nest entrance can be located, the colony often can be eliminated by applying an aerosol-type wasp and hornet spray into the nest opening. Nest sites typically are located underground in an abandoned rodent burrow, beneath rocks or landscape timbers, or in a stone wall or wall of a building.

Insecticide dust formulations, such as Ficam[®](bendiocarb) or Drione[®](pyrethrins and silica gel), are especially effective provided a hand duster or similar application device is used to dispense several puffs of the dust into the nest opening. A dry, empty, liquid detergent bottle filled no more than halfway with dust and shaken before dispensing works

fairly well in lieu of a commercial duster. A few pebbles or marbles added to the bottom of the bottle prevent the dust from caking. Sevin® (carbaryl) also kills wasps, but be sure the area to be treated is listed on the pesticide label.

Treatment should be performed at night when temperatures have decreased, and when most of the yellowjackets are in the nest and less active.

Yellowjackets are extremely defensive when the nest is disturbed. Mark the nest opening during the daytime, so you will know where to direct your treatment after dark. If there is more than one opening, all but one must be sealed. Approach the nest slowly and do not shine the beam of your flashlight directly into the nest entrance as this may stimulate the wasps; instead, cast the beam to the side to illuminate the nest indirectly. Placing red cellophane or acetate over the flashlight lens will make the light less stimulative to the wasps. If possible, place the light on the ground rather than in your hand. Apply the insecticide to the nest opening and then seal this last opening.

Homeowners should seek a pest control professional, particularly when access to the nest is difficult. Wasp, hornet and yellowjacket stings can be life-threatening to persons who are allergic to the venom. People who experience extensive swelling, hives, dizziness, difficulty breathing or swallowing, wheezing or similar symptoms of allergic reaction should seek medical attention immediately. Itching, pain and localized swelling can be reduced with antihistamines and an ice pack.

Acknowledgment: The information in this fact sheet was adapted from material previously published by the authors referenced below. We extend sincere thanks to those authors.

References:

- Akre, R., A. Greene, J. MacDonald, P. Landolt, and H. Davis. 1981. The Yellowjackets of America North of Mexico.
- Potter, M. 1998. The Yellowjackets Are Coming, Kentucky Pest News, University of Kentucky, 8/31/98.
- Potter, M. and M. Beaver. 1996. Wasps, Hornets, and Yellowjackets. In Public Health Pest Control, University of Kentucky.



Pat Parkman

A yellowjacket queen will start the colony in the early spring.



John Skinner

The fall mated queen is the only member of the colony that survives the winter.



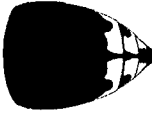


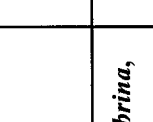
Precautionary Statement

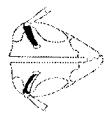





To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store, or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

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Table 1. Tennessee yellowjackets and hornets.

Species and distribution in TN	Gaster and other images	Identifying characters of workers	Typical (and maximum) # of workers, cells and combs	Nest description and location	Feeding behavior and other biology	Pest status and other information
<i>Vespa crabro</i> , European hornet East and Middle TN		>20 mm; first abdominal segment reddish-brown; yellow markings; wings brownish and eyes red.	200-400 (1000) workers; 1500 - 3000 cells in 6-9 combs	Brown carton nest constructed in hollow trees, roofs, attics, wall cavities, bee hives; subterranean nests may be found.	Active at night, attracted to light, tap on windows.	A very defensive species. Can girdle trees for sap and fibers. See Extension factsheet SP 290A for more information. Only true hornet in TN.
<i>Dolichovespula arctica</i> East TN		No worker caste, use workers of host species mentioned below	Variable	Obligate social parasite of <i>D. arenaria</i> and <i>D. norvegicoidea</i> . Males of host often produced in great numbers when parasite queen killed.		
<i>Dolichovespula arenaria</i> , aerial yellowjacket East and Middle TN		Broad space between compound eyes and base of mandibles; yellow genal band continuous; yellow of terga I and II deeply notched	200-700 workers; 39-4359 cells in 1 - 6 combs; multiple brood cells	Nests often constructed in vegetation (few cm - tree tops) and on man-made structures - houses, sheds, garages; subterranean nests may be found.	Do not scavenge protein, so not usually picnic pest; decline in Aug., few endure through Sept.	Common; May buzz heads for long distances in woods; can spray venom from sting; large colonies formidable; control warranted if nest near people.
<i>Dolichovespula maculata</i> , baldfaced "hornet" all TN		>15 mm; gaster mostly black; white markings on last 3 terga	100-400, 636; about 2000 (3500) cells in 3 - 4 combs	Nests (>35 cm diameter and >60 cm long) usually in exposed locations: vegetation up to 20 m, rock overhangs, electric power poles, houses, sheds, etc.	May scavenge protein, but mostly feed on live prey (flies, yellowjackets, etc)	Common; not as defensive as <i>Vespula</i> ; should be regarded as a beneficial insect unless colony near people.
<i>Dolichovespula norvegicoidea</i> East TN		Broad space between compound eyes and base of mandibles; yellow genal band widely interrupted; yellow of terga I and II not deeply notched	23 - 50 workers, 230 cells in 2 combs	Only a few nests recorded; 10 - 15 cm off ground in vegetation.	Not much known about this species.	Not very common; East TN is southern most portion of eastern range
<i>Vespula consobrina</i> , blackjacket East TN		Area under compound eyes touching or nearly touching base of mandibles; black with white markings; white band on tergum I interrupted	Small; <100 workers; 490 - 1437 cells in 2 - 4 combs (1 worker comb and 1-3 reproductive combs)	Nests usually subterranean rodent burrows in forests, but may be in logs or rock cavities or walls of houses.	Forage for live prey, including spiders and insects. Workers will defend food source from other yellowjackets.	Colonies declining and producing reproductives by Sept. in North Carolina. Responsible for numerous stinging episodes to loggers in western NC.

Species and distribution in TN	Gaster and other images	Identifying characters of workers	Typical (and maximum) # of workers, cells and combs	Nest description and location	Feeding behavior and other biology	Pest status and other information
<i>Vespula vidua</i> East TN		Area under compound eyes touching or nearly touching base of mandibles; first antennal segment yellow ventrally	One colony had 385 workers; 2,447 cells; one worker comb and 1-3 reproductive combs	Nests in disturbed areas (yards, pastures, as well as forests); most nests subterranean, but also in logs and artificial structures.	Pests around picnic tables as capturing insects or attracted to odors. Not usually pests unless nest is nearby.	Not a stinging hazard unless located near human activity.
<i>Vespula squamosa</i> , southern yellowjacket all TN		Orange queen; workers with area under compound eyes touching or nearly touching base of mandibles; two yellow stripes on scutum (thorax)	500 - 4000 workers; 2,500 - 10,000 cells; new cells grey, <i>V. maculifrons</i> cells smaller and tan	Nests mostly in disturbed areas (yards, parks, roadsides); sometimes in pine or mixed forests, rarely in hardwoods. Most nests subterranean, but aerial or structural nests found especially when associated with <i>V. maculifrons</i> .	Workers scavenge protein and are nuisances at picnics. Queen usurps <i>V. maculifrons</i> nest often.	Important pest because nests found in urban and recreational areas. Disturbances of these large nests usually results in multiple stings.
<i>Vespula flavopilosa</i> , hybrid yellowjacket East TN		Area under compound eyes touching or nearly touching mandible base; medial black mark on tergum I "V"- shaped	500 - 1000; 2000-5000 cells (20% queen cells); colonies smaller than <i>maculifrons</i>	Subterranean nests of tan, fragile carton. Nests established along roadsides and in yards and several have been found in structures.	Scavengers; may leave stingers behind at sting site; stingers confused with honey bee stingers.	Life cycle completed by early October (1 mo. earlier than <i>V. maculifrons</i>) in western NC. Not as common as <i>V. maculifrons</i> . Pest at picnics.
<i>Vespula germanica</i> German yellowjacket		Area under compound eyes touching or nearly touching base of mandibles; medial black mark on tergum I diamond- shaped	In U.S., one nest had 11,540 cells	In U.S., almost all nests have been in structures with a majority between walls.	Scavenge proteins and attracted to sweets, wide variety of arthropod prey.	Significant pest problem where found. Colonies in Mid-Atlantic may be active into December. Problem to beekeepers also.
<i>Vespula maculifrons</i> , eastern yellowjacket all TN		Area under compound eyes touching or nearly touching base of mandibles; medial black mark on tergum I anchor- shaped	Large colony 3000 - 5000 at peak, 10,000 - 15,000 cells of which 30% are queen cells	These tan-brown fragile nests usually found in subterranean locations in yards, roadsides, urban areas and especially in creek banks of hardwood forests. Also found in rotten stumps, walls of structures and vehicles.	Prey upon insects, scavenges.	In GA, reproductive found in late September and continues into December. Competes for primary pest status with <i>V. squamosa</i> .
<i>Vespula vulgaris</i> , common yellowjacket East and Middle TN		Area under compound eyes touching or nearly touching mandible base; yellow genal band interrupted with black, sometimes only slightly	Data from Western U.S.: 3,000 +; 2,100 cells, 210 reproductive	Predominately subterranean nests in rotted logs, leaf litter and soil. Colonies occasionally found in walls; nest envelope and comb constructed of decayed wood fragments and are red to tan- brown and very brittle.	Feed on a variety of immature insect prey and scavenge any protein or sugar source.	Important nuisance pest at picnics.



Pat Parkman

Yellowjackets can strip bark from trees to make their nests.

SP341M-500-6/00(Rev) E12-2015-00-044-00

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