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# LIVING



From left, an eastern yellowjackets feeding on honey spread on an aspen leaf; feeding on a rotting banana; and falling prey to an ambush bug while feeding on goldenrod nectar. Drew Monkman, special to The Examiner

# Armed and dangerous

*To satisfy their sweet tooth, wasps will raid family picnics, backyard barbecues and schoolyards full of juice-drinking children*

As pleasant as a late summer picnic might be, there always seems to be a handful of unwanted guests. Like corn-on-the-cob, ripe tomatoes and blueberry pie, hornets and yellowjackets are often part of any late summer outside meal. They would be little more than an annoyance if it wasn't for the fact that they can deliver a painful sting.

Hornets and yellowjackets are members of a family of insects known as the Vespidae which, in turn, is part of the much larger order Hymenoptera, or bees, wasps and ants. Most of the Vespidae are social wasps that nest in colonies. The wasps in this family can be recognized by the way they hold their wings when at rest. Rather than holding them over the body like in other wasp families, Vespidae hold them slightly out to each side. The terms "hornet" and "yellowjacket" are loosely used for many types of Vespids that build paper nests and have black and yellow (or white) markings on the abdomen.

Like honey bees, Vespidae wasps live in "societies of heavily armed females," as Tim Tiner and Doug Bennett describe them in their book *Wild City*. To understand how these societies are structured, we need to go back to last fall.

Having mated and carrying a year's supply of sperm, young queen wasps spend the winter hibernating alone in crevices. When spring arrives, each queen begins the process of starting a new colony by gathering wood fibre to masticate into a pulp for nesting material. Depending on the species, the nest will be located in an underground cavity or aboveground, attached to plants or buildings.

The queen starts the nest by constructing several hexagonal, egg-carton-like cells suspended from a short stalk and enveloped with a "paper" covering. She then proceeds to lay an egg in each cell. A week or so later, the eggs hatch and the busy queen must then feed the larvae small pieces of protein-



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Drew Monkman

rich food such as bits of caterpillar or carrion. After about 12 days, the outer skin of the worm-like larvae hardens into a tough casing. The developing wasp is now called a pupa and will undergo a radical change in form. Some insects such as moths construct a covering inside of which they pupate. This is called a cocoon. Note that pupae do not eat.

After another 12 days, an adult wasp emerges from each of the pupal cases. All of these individuals are sterile females called workers. They immediately begin to work for the queen, enlarging the nest, gathering food and taking care of the new

young. In an amazing exchange of material called trophallaxis, the larvae in return secrete a sugar material relished by the workers. All of their hard work is not entirely altruistic! The queen, all the while, continues to lay eggs.

In late summer, however, something unique happens. The queen begins to lay unfertilized eggs that will either develop into males or into new queens. These individuals will go on to mate, but only the newly-fertilized females have the ability to overwinter. The rest of the colony dies — including the hardworking queen — with the first hard frosts of fall.

As Bennet and Tiner describe, not only are these females very social, but they are also armed and dangerous, especially if they perceive a threat to the colony. Because they are sterile, they do not use their ovipositor as an egg-laying tube. Rather, it has been modified into a stinger. It is able to pierce the skin and inject a small amount of venom into the victim. In the case of honey bees, there are barbs on the stinger that cause it to break off while being pulled out. This leads to the death of the bee. Bumblebees and wasps, however, do not have barbs on their stingers and can therefore deliver multiple stings over the course of their lives.

Large, black-and white Vespids called

bald-faced hornets are among our more common species. They have a mostly black body with yellowish-white markings on the side and face. Hornets draw particular attention because of their habit of building globular nests in trees. Just like the paper this article is printed on, the paper nests of bald-faced hornets are made from wood pulp. All summer long, colonies of these insects chew the fibre of trees and boards. They turn the fibre into a saliva-soaked pulp that dries into the fine, grey paper walls of the nests. The nest starts out small, but grows in progressive layers over the course of the summer. A large colony can harbour up to 600 individual hornets by September. They are a species that needs to be treated with respect.

After the first few weeks of frost, it is safe to open an old hornet nest to see the intricate design and various levels of tiers. There are usually some cells with eggs or developing larvae that are now dead. Other cells may be capped with paper and contain dead pupae. No wasps, including the new queens, overwinter in the nest, although some other insects may do so.

Anyone who tries to have a picnic in August or September will almost certainly be visited by yellowjackets. They, too, are Vespidae and are easily identified by the black and yellow bands or other markings on the abdomen. One of our most common species in urban areas is the German yellowjacket. Introduced from Europe, this wasp became common in Ontario in the mid-1970s and can be quite aggressive. It can be identified by the black, arrow-shaped marks down the middle of the abdomen and the paired black spots on the sides.

Most yellowjackets nest in the ground, often in cavities they excavate themselves. Some, however, set up colonies in the cracks of walls and eaves of houses. There is also a species known as the aerial yellowjacket that builds globular nests, similar to those of bald-faced hornets, in trees.

In dry, hot summers when food is abundant, yellowjacket colonies can expand

rapidly. Some will have as many as 4,000 to 5,000 workers and a nest of 10,000 to 15,000 cells at summer's end.

Usually by late August, egg-laying ceases in yellowjacket and hornet colonies and there are fewer larvae to feed. Consequently, the workers are no longer receiving sugar from the larvae in exchange for protein. They therefore start to abandon the nest to satisfy their all-consuming sweet tooth on their own. The sugar they seek is the fuel for their own energy requirements. Some of their favourite sources of sugar include flower nectar (especially goldenrod), ripe fruit and aphid honeydew (usually gleaned from tree leaves). However, as we know all too well, wasps will also raid family picnics, backyard barbecues and schoolyards full of juice-drinking children — anywhere sweet liquids can be found. They are particularly a problem around open garbage pails.

Like all living creatures, wasps play an important ecological role. First of all, many species are important pollinators. The so-called pollen wasps have actually substituted pollen for insect prey and, like bees, feed it to their larvae. You can easily find wasps feeding on the pollen and nectar of goldenrod flowers right now. In the feeding process, the wasps are inadvertently transferring pollen from one flower to another. Most Vespidae wasps, however, prey on insects and other arthropods. They therefore help to control the numbers of many pest species.

If you take some time this summer to look closely at these creatures, remember that not all wasp-like insects are actually wasps. Hover flies, for example, have evolved to look remarkably like bees and wasps in order to warn birds and other animals to stay away. The bright black and yellow colouration is an early-warning system that a painful sting may be awaiting the predator.

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