

# Wasps of New York State and Some Relatives

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**T**O the victim, there is only one kind of wasp—the kind that stung him. But actually, there are several thousand species of wasps in New York State.

Many wasps are rare and only a few are social [among themselves—Ed.]. The social wasps belong to the family Vespidae and most of these belong to the genus *Vespula*. There are eleven species of *Vespula* in New York State. Of all the wasps, the white-faced hornet or bald-faced hornet, with the scientific name of *Vespula maculata*, is most common. It is also one of the larger species and usually builds its nest ten to thirty feet above the ground.

The white-faced hornet is black with white markings. It is widely distributed throughout the United States and Canada and is found in all states and provinces with the exception of Arizona, Hawaii and Alaska.

Not all social wasps of this group have aerial nests. A few species nest underground or just on top of the ground. However, all the species in this group have similar characteristics and each colony develops in much the same way each year. A colony is started early in the spring by a single, fertilized queen. The queens mate in the fall and hibernate under loose bark, in decaying logs, and on rare occasions, in the ground.

When the queen emerges in the spring she begins to construct her nest according to the habits of her species. She first collects rotten or rotting wood and constructs a paper nest. This nest contains only a few cells and in each she lays a single egg. The food for the developing wasp larvae are other insects which are collected and transported to the nest by the queen. The first wasps which emerge from this nest and, in fact, those which emerge as late as July, are females but sterile and are referred to as "workers." These are the wasps which make the nest larger and gather the food for the colony during the rest of the season. As soon as she has enough workers, the queen wasp becomes nothing more than an egg-laying machine.

Sometime in August the queen wasp begins to lay unfertilized eggs and these develop into males. About the same time it is presumed that the larvae in the nest are fed more lavishly than those were

fed earlier in the season. These better fed larvae become the queens which will start nests the following year; they emerge in late August, September and October, mate and go into hibernation. The males die in the fall. The queens hibernate as individuals and the original nest is abandoned, never to be used again.

A successful nest produces 2,000, 3,000 or perhaps 4,000 queens in the course of one year. Yet over the years, the numbers of these insects do not increase. It is thus obvious that there are tremendous problems from parasites and predators and that an extremely small percentage of the nests which are started in the spring develop into full-sized nests such as are pictured here.

The largest wasp nest which has been taken to date was a ground-nesting species and contained approximately 5,000 specimens, but it was estimated that during the course of the season it had produced about 20,000.

## Food

Unlike honey bees, social wasps do not store food. Whereas wasp larvae develop on solid food (other insects), the adult wasps feed on liquid substances. The main food for an adult wasp is nectar collected from the many species of flowering plants throughout the season. Social wasps are quite frequently found in fly traps which have been baited with molasses or other sweet materials. Fruit juices are very attractive to wasps, as are open jars of jam and jelly. Several species of wasps have been found attempting to steal honey from bee hives.

Adult wasps have also been observed collecting hamburger, ham, and many other kinds of raw and cooked meats. These bits of meat are carried back to the nest and fed to the larvae. Wasps are pests at picnics, especially in August when their numbers are at their greatest.

It is not known if there is some form of communication within the wasp colony or not. The fact that wasps will gather rapidly at a picnic table in the summer is indicative that there may very well be some kind of communication and that information about a food source, once located, is passed on to other wasps in the nest.

## Nest-Building Materials

Wasps of the genus *Vespula* use wood fibers and a salivary secretion to make the paper for both the cells and the outer cover of the nest. These fibers may be collected from weathered wood on the sides of houses and barns or from trees which have fallen in the forest. None of the wasps in the genus *Vespula* use live wood to make their nest. The large black and yellow imported European hornet, *Vespa crabro* uses live lilac bark in the construction of its nest. *Vespa crabro* is found throughout New England and New York State and west to Ohio but is not too common. It likes to nest in the attics of barns, garages and houses where it is well protected from the elements. One of the favorite foods of *Vespa crabro* are apples which have fallen to the ground and are rotting in the fall.

## The Nest Structure

Nests of the genus *Vespula* are similar whether in, on, or above ground. *Vespula maculata* is seldom found less than ten feet above the ground or higher than thirty feet. It also builds the largest nests.

Each cell in the comb is six-sided, as are honey bee cells. The largest comb in the nest is found in the middle so that the general shape of the nest is that of a sphere. There are several layers of paper around the nest. The paper on the top of the nest contains much more salivary secretion and is firmer and gives good protection against water. The several layers of paper around the nest form dead air spaces which make good insulation and protect the colony against extremes of temperature.

All paper-nesting wasps have a single nest entrance. This makes it possible for a person to capture aerial nests easily. At night one needs only to rapidly plug the nest hole with a wad of cotton and the nest can be cut down and removed. It takes the disturbed wasps several minutes to tear a hole in another part of the nest and to make a new entrance. Sometimes, when nests are taken for study, it is best to place a little chloroform or ether on the tip of the cotton plug which is inserted into the hole. This temporarily anesthetizes the wasps and



Unusual view of exposed cones  
of the Honey Bee

keeps them quiet until a stronger killing agent can be applied. One good method of capturing a nest is to place a cotton plug in the entrance hole, cut the nest from the tree or bush in which it is found and to put the whole nest into a large tin can in which it can be transported.

#### Enemies

Social wasps have many enemies. Skunks enjoy eating adult wasps and after they have killed all these in a nest, they consume the larvae. Hunters in the fall notice that the bottoms have been removed and the contents eaten from all those nests which are close to the ground. Skunks also eat honey bees. Skunks have been trapped while eating stinging insects and stings have been found on their tongues, in their throat and even in their stomachs. Stings do not seem to deter them in their search for food.

A few of the social wasps are parasitic on other social wasps. The queens of the parasitic species usually emerge late in the season and after the nest which they are to parasitize has been well established. The parasitic queen moves into an established nest rapidly and kills the queen. The workers do not rally to the defense of their queen under these circumstances although they are usually aggressive towards invaders. Once the old queen is dead the new queen lays her own eggs and the workers in the nest raise larvae of another species, apparently unaware of what is occurring. This is most striking when one finds a nest containing both black and white, and yellow and white wasps; this is obviously a parasitized nest.

Perhaps man is the greatest enemy of nest building wasps. Stories are told of live nests with the entrance hole plugged which have been thrown at an enemy for defense and no doubt some of these stories are true. Certainly most people would run if a wasp nest were thrown in their direction. Aerial nests are a target for stones and I have taken nests six and

ten feet in the air containing stones one and two inches in diameter.

#### Polistes

Not all wasps enclose their nest in a paper envelope. Common wasps which build nests consisting of a single, exposed comb are members of the genus *Polistes*. There are several species. The nests are used for one year only and are found hanging under eaves and in sheds and attics.

The nests are made of paper and the comb looks a little like honey comb. It is grey in color and is made of wood fiber. *Polistes* nests do not contain as many individuals as do *Vespula* nests. As in the case of *Vespula* there is a single queen which starts the nest. The first offspring to appear are workers while true queens and males appear late in the season.

All female wasps have stings and for this reason they are feared. This is unfortunate for their social life is complicated and interesting. They are an industrious animal, they prey on other insects and except for being a nuisance at picnics should be considered as a beneficial species.

#### Notes on Specimens Shown

The painting (see centerspread) shows an interesting collection of wasps, together with a few bees, ants and sawflies which have a connection in one way or another with our main subject. All are members of the insect classification designated *Hymenoptera*. The comments below are keyed to the specimens shown on the painting in consecutive order, the first comment referring to the specimen in the top left of the painting, and the succeeding comments taking up each specimen from left to right row by row down the painting.

#### A Gall Wasp

*Odontocynips nebulosa* Kieffer

Gall wasps are numerous insects.

Most are small and their identification is difficult. Quite frequently the gall they form can be used to identify the species. *Odontocynips nebulosa* forms a gall on the oak, *Quercus stellata*. It is common in the southeastern United States; related genera are found in New York State.

#### An Evaniid

*Prosevania punctata* (Brulle)

This wasp is a native of the Mediterranean region. It was introduced into the United States and is now found from New York to Georgia and west to Ohio. The wasp is especially common in cities. It is parasitic upon the egg capsules of several species of cockroaches found in homes and stores.

#### The Allegheny Mound Ant

*Formica exsectoides* Forel

All ants are social, living in colonies usually in the ground. This species, which is common in New York State, builds a mound which may be as high as four feet. This ant feeds on other insects and also honeydew when it is available. The Allegheny mound ant swarms in much the way that honey bees do. Usually new nests are constructed but on occasion the new nest may join the old, the two mounds being side by side.

#### The Imported Pine Sawfly

*Diprion similis* (Hartig)

The larvae of this introduced sawfly feed on pine needles. It is a pest in nurseries and in young plantings where the larvae are said to defoliate many of the young trees, which they seem to prefer. The female sawfly lays her eggs, an average of eight, on the pine needles. The insect overwinters in the pupal stage and adults emerge in May and June. The adults live for only three to twelve days, just long enough to mate and lay eggs. The insect is found in the eastern United States, being introduced accidentally from Europe.

#### A Braconid

*Apanteles congregatus* (Say)

This parasitic wasp is found throughout North and South America and is recorded as a parasite on at least a dozen other insect species. As is the case with many parasitic insects, this parasite also has a parasite. The wasp which is parasitic on this species is a chalcid. The eggs of *Apanteles congregatus* are oval shaped and colorless. The female lays several eggs, especially if the host is large. These are placed in the host's body, usually within a few seconds, by the female's sharp ovipositor. One author found 377 mature larvae on a large tobacco hornworm which was their host. The insect passes the winter in its cocoon in the soil.

# WASPS OF NEW AND SOME

(Vertical line to right of insect)



*Odontocynips nebulosa* Kieffer  
A GALL WASP



*Prosevania punctata* (Brulle)  
AN EVANIID



*Formica exsectoides* Forel  
THE ALLEGHENY MOUND ANT



*Pelecinus polyturator* (Drury)  
A PELECINE WASP



*Chrysis nitidula* Fabricius  
A CUCKOO WASP



*Vespa maculata* (Linne)  
THE WHITE FACED HORNET



*Eumenes fraternus* Say  
A POTTER WASP



*Sphecus speciosus* (Drury)  
THE CICADA KILLER



*Dasymutilla occidentalis* Linne  
THE COW-KILLER ANT



*Tiphia inornata* Say  
A TIPHINE WASP



*Vespa crabro* Christ  
THE IMPORTED EUROPEAN HORNET



*Agapostemon radiatus* (Say)  
A GREEN BEE



*Campsomeris quadrinotata* (Fabricius)  
A SCOLIID

*Wayne Trimmer*



*Sceliphron caementarium* (Drury)  
A MUD-DAUBER



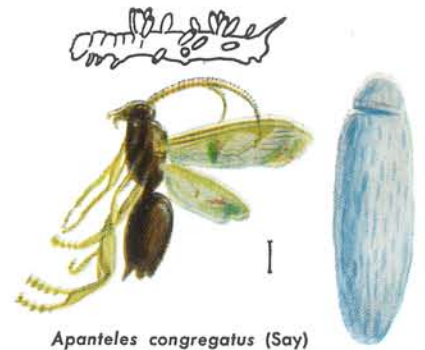
*Bembix spinolae* Lefebvrie  
A DIGGER WASP

# YORK STATE RELATIVES

(indicates actual body length)



*Diprion similis* (Hartig)  
THE IMPORTED PINE SAWFLY



*Apanteles congregatus* (Say)  
A BRACONID



*Xylocopa virginica* Linne  
THE CARPENTER BEE



*Bombus terricola* Kirby  
A BUMBLE BEE



*Itopectis conquisitor* (Say)  
AN ICHNEUMONID



*Megarhyssa macrurus* (Linne)  
AN ICHNEUMONID



*Thyreodon atricolor* (Olivier)  
AN ICHNEUMONID



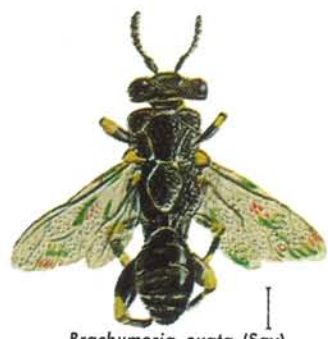
*Psyllaephagus triocephalus* (Howard)  
AN ENCYRTID



*Tremex columba* (Linne)  
THE PIGEON HORN-TAIL, A SAWFLY



*Pseudotorymus lazellus* (Ashmead)  
A TORYMID



*Brachymeria ovata* (Say)  
A CHALCID



*Perilampus ruficornis* (Fabricius)  
A PERILAMPID



*Ooencyrtus kuwanai* (Howard)  
A TANAOSTIGMATID WASP

### **A Pelecine Wasp** *Pelecinus polyturator* (Drury)

The female of this wasp species has an unusually long, cylindrical abdomen; the male is more like other wasp species. The female lays her egg singly on June beetle grubs. June beetle grubs feed on grass and other roots and are common throughout the country. The females of this pelecine wasp are common in New York State in August and September; they are frequently confused with the ichneumonids. This wasp is found throughout the eastern United States west to Minnesota and south to Argentina.

### **A Cuckoo Wasp** *Chrysis nitidula* Fabricius

Cuckoo wasps are bright metallic green and are frequently confused with the green bees (family Halictidae). Cuckoo wasps prey on other wasps and bees. The wasps in this group have the undersides of the abdomen concave and when captured or attacked by other wasps they usually roll themselves into a ball. There is at least one record of a cuckoo wasp being caught by another wasp in the act of parasitizing its offspring. The cuckoo wasp rolled itself into a ball and the offended wasp being unable to sting it, chewed off its wings and carried the cuckoo out of the nest. The cuckoo wasp survived, crawled back into the nest and laid its egg while the parent was away. *Chrysis nitidula* is parasitic on one of the vespine wasps. It is found throughout northeastern United States, west to Ohio and south to North Carolina.

### **The White-Faced Hornet** *Vespa maculata* (Linne)

This wasp builds a nest which may contain several thousand specimens at the end of the season. A single fertilized queen starts the nest. She constructs a comb containing about 10 cells and at the same time surrounds the comb with several layers of paper. The comb and paper are made of dead wood collected by the queen, masticated and worked into place. The first wasps raised in the spring are workers and are incapable of mating. These expand the nest and do the work in the colony for the remainder of the season, including the feeding of the larvae which become queens and drones in the fall. This species always builds an aerial nest usually 10 to 25 feet from the ground.

### **A Potter Wasp** *Eumenes fraternus* Say

These wasps are sometimes called the jug-builders because their nests of mud



*White caps are cocoons of larvae*

resemble jugs or pots. The famous French naturalist, Fabre, studied species in this genus in Europe by constructing a window in the side of the nest. The nest is mass provisioned (a term used when the nest is completely filled with food prior to the hatching of the larvae). Wasps in this group provision their nest with caterpillars. *Eumenes fraternus* is found throughout the eastern United States and eastern Canada and west to Minnesota, Kansas and Texas. Like many wasps these are considered beneficial insects since they feed on insects harmful to plants.

### **The Carpenter Bee** *Xylocopa virginica* Linne

This insect is not a wasp but a bee and is known as the carpenter bee because of its habit of nesting in wood and boring holes which are about one-half inch in diameter. The favorite nesting site is the south side of an unpainted house or barn or any place where large beams are exposed. The males of this species have a white mark in the center of their face while the females are all black. The carpenter bee is common from New York to Florida and west to Kansas and Texas. Bees provision their nests with nectar and pollen, not with other insects as do most wasps.

### **A Bumble Bee** *Bombus terricola* Kirby

This is a bumble bee and one of 12 species found in New York State. This species is widely distributed throughout the United States and Canada. Fertilized bumble bee queens overwinter in the ground or a hollow log as individuals. In the spring they start the nest which may contain several hundred individuals by fall. Bumble bees have a dense covering of fine hair over their entire body. Few insects are found north of the Arctic Circle but several bumble bee species flourish there. Their shaggy coat of hair gives them good insulation against the cold.

### **An Ichneumonid** *Itoplectis conquisitor* (Say)

This is one of the best known ichneumonids. Many persons have written on its biology and it has nearly 100 host insects. The ichneumonid wasp deposits its eggs in the larvae or pupa with its sharp ovipositor. The larvae which hatches then consumes its host. *Itoplectis conquisitor* is found all along the Atlantic Coast and west to the Rocky Mountains.

### **Another Ichneumonid** *Megarhyssa macrurus* (Linne)

This is a well known ichneumonid. The female is equipped with a long ovipositor which it uses to insert its eggs in the burrows of the sawfly, also illustrated on this page, *Tremex columba*. The ichneumonid larvae completely consumes its host. A good place to collect females of this species is while they are laying eggs on a diseased or dying elm. At that time the ovipositor may be inserted an inch or more into the trunk of the tree. This parasite is nearly as widespread as its host in this country.

### **The Cicada Killer** *Sphecius speciosus* (Drury)

Most wasps use their sting and its venom to immobilize (but not to kill) the insects they collect to feed their young. This large wasp collects only cicadas. The prey is placed in specially prepared chambers in the ground and a single egg is laid on the cicada by the wasp. Some cells contain a single cicada and the eggs laid on these develop into males, other cells contain two cicadas and the eggs laid on these develop into the larger female wasps. The wasp egg hatches after several days and the young larva has a large supply of fresh meat on which to feed. Feeding is completed in the fall and the winter is spent in the pupal stage. There is only one generation per year. This wasp is common throughout all but the more western parts of the country.

### **The Cow-Killer Ant** *Dasymutilla occidentalis* Linne

This wasp belongs to the velvet ants, so-called, because most are covered with bright hairs and superficially they look much like ants. Velvet ants are most frequently red but many have yellow bands, while others have black areas. These wasps are more common in the Southern States than they are in the North. The females are wingless and will be seen moving rapidly over the ground; the males are fully winged.

The females have a fierce sting. The cow-killer ant obtained its name because it was thought to be dangerous to livestock; this is not so. *Dasymutilla occidentalis* is the largest of the velvet ants in the eastern United States. It is found from New York to Florida and west to Missouri and Texas. This velvet ant is a parasite of the bumble bee, *Bombus fraternus*, and its larvae may also be found in other bumble bee nests.

#### A Tiphine Wasp *Tiphia inornata* Say

This shiny black wasp is a parasite on the grubs of the June beetles. As is the case with many wasps, the male is smaller and less striking than the female. It has been found in Pennsylvania and Ohio and may very well be present in parts of New York State.

#### The Imported European Hornet *Vespa crabro* Christ

The favorite nesting sites of this social wasp are barns, sheds and even houses. Nests, which in the fall may contain over a 1,000 specimens, are frequently found between studding and in attics. The adults collect a variety of insects which they feed to their young; they themselves feed on nectar and in the fall will be seen sucking the juice from ripe fruit. The wasps were inadvertently introduced into the United States and the date is not known exactly. They were first found in New York State in 1840. The species has been very successful here and is now found in Massachusetts and New York and south to Virginia. Despite its size and long stinger most observers say it is not an especially aggressive wasp as far as people are concerned.



Nest of *Vespa maculata*

#### Another Ichneumonid *Thyreodon atricolor* (Olivier)

This ichneumonid is parasitic on at least two species of sphinx moths. The adult appears in June and is found throughout July and August. It is a common species and is present in nearly every insect collection. The eggs are laid in the host larva and the insect passes the winter as a pupa in the soil. Like most ichneumonids, this is a beneficial species. The parasite has at least one parasite itself; this form of parasitism is termed hyperparasitism. The species is found throughout the New England States, west to Kansas and south to Washington, D. C.



Nest below cut open, showing comb.  
Arrow points at nest entrance

#### An Encyrtid *Psyllaephagus triocephalus* (Howard)

This wasp is parasitic on a gall-forming insect first found on a persimmon tree in Washington D. C. The parasite and its host are nearly the same size and only one parasite is found in a single host. The wasp is found in Maryland, North Carolina, New York and Ohio but its range is probably greater.

#### The Pigeon Horn-Tail Sawfly *Tremex columba* (Linne)

All ants, bees, wasps and sawflies belong to the order Hymenoptera. The more primitive half of this order are the sawflies. In this group the abdomen is broadly jointed to the thorax. The rest of the order Hymenoptera has a

petiolate abdomen or waist. *Tremex columba* lays its eggs in the trunks of diseased or dying trees. The larvae bore tunnels in the trunk and if present in large numbers speed up the disintegration of the wood. Weakened elms and sugar maples are especially susceptible to attack in New York State. This native sawfly is found over all of the North American continent.

#### A Green Bee *Agapostemon radiatus* (Say)

This is a bee. The female of this species is all green while the male has a banded abdomen as illustrated. Bees and wasps are closely related and have many similar habits. Wasps feed other insects to their young but they themselves feed on nectar and pollen. Bees use pollen and nectar as larvae and adults.

#### A Scoliid *Campsomeris quadrinotata* (Fabricius)

The biology of this species is not known. The females do not construct well defined burrows and the wasps are thus difficult to observe. It is believed that all the species in the genus use beetle larvae (of the family *Scarabaeidae*) as prey. The beetle larvae live in the soil and are sought out by the female wasps. The wasp stings the larvae, thus immobilizing it, lays its egg and then searches for another host.

#### A Mud-Dauber *Sceliphron caementarium* (Drury)

This thread-waisted wasp (so-called for the great length of the petiole of its waist) is one of the mud-daubers. The females collect the mud, a mouthful at a time and carefully carry it to the nest. It is then molded into place; several cells are constructed in an area covering three or four square inches. The favorite nesting site is under eaves and other protected places around houses and barns. While they are working they have the peculiar habit of flicking their wings, which gives them the appearance of being nervous.

#### A Digger Wasp *Bembix spinolae* Lepeletier

Wasps of this genus are known as digger wasps. They nest somewhat gregariously and once a suitable location has been selected, it is used year after year. *Bembix spinolae* is found throughout the eastern two-thirds of the United States and southern Canada. This species has been more intensively studied than

any other in the genus. A number of different species of flies are used to provision the young. The egg is laid on the first fly which is brought to the underground nest. Unlike most wasps, this species provisions its nest progressively and does not provide one mass of food prior to egg laying. This wasp is found throughout the eastern United States and west to South Dakota, Colorado and Arizona.

#### A Torymid

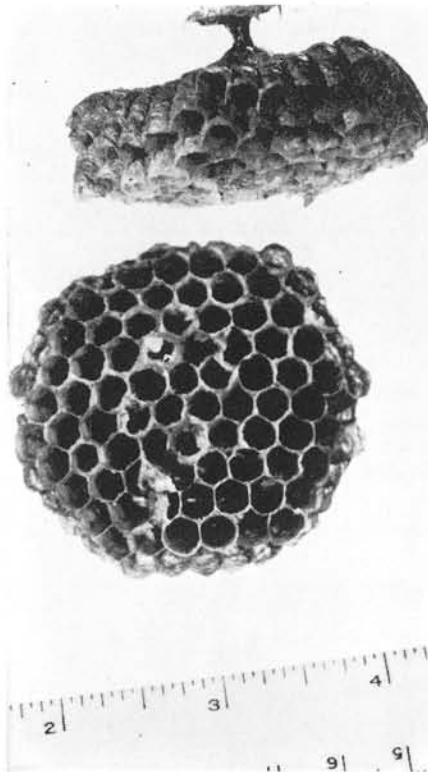
*Pseudotorymus lazulellus* (Ashmead)

This wasp is parasitic on an insect which infests timothy grass and sometimes wheat and rye. Like many insects there are often differences in color and this torymid may be metallic green with blue abdomen, or they may be indigo blue. Specimens have been collected in Ontario, New York, Connecticut and Colorado. No doubt it exists in other states and will be better known as more collections are made.

#### A Chalcid

*Brachymeria ovata* (Say)

This parasitic wasp is found throughout the United States and is parasitic on several species of Lepidoptera (the but-



Nest of the *Polistes* wasp.  
Top view shows supporting column

terflies and moths). Usually the female lays her eggs in pupa at a time when the host insect is helpless to defend itself. Several eggs may be laid in the same insect pupa; while the chalcid larvae attack the live host, they do not appear to attack each other.

#### A Perilampid

*Perilampus ruficornus* (Fabricius)

This little known wasp was probably introduced from Europe. It is now found in New York and New Jersey and has been reared from the moth, *Crambus vulgigagellus*. Presumably the number of eggs laid on a single host depend on the size of the host, but usually several wasps emerge from a single host.

#### A Tanaostigmatid Wasp

*Ooencyrtus kuwanai* (Howard)

This wasp is parasitic on the eggs of the gypsy moth, the insect which is so destructive in our forests in eastern New York and the New England States. The wasp was purposely introduced from Japan in 1909. Millions of wasps were reared in U.S.D.A. laboratories, and were released in the Northeast in an attempt to control the moth. It was found that the wasp parasitized other insect species as well as the gypsy moth.