

The key to protecting honey bee colonies from harmful diseases, parasites, and other pests is the ability to identify problems early. This brochure is a quick reference to common honey bee maladies. For a more detailed treatment of this subject, including descriptions of symptoms and approved treatments and control measures, refer to *Honey Bee Parasites, Pests, Predators, and Diseases*, available from the address on the back of this brochure.

## Normal Honey Bee Development

### Queen honey bee

A healthy honey bee colony has three distinct types of individuals: queen, worker, and drone. The queen is an especially important individual in the colony, as she is the only actively reproductive female and generally lays all the eggs.



### Healthy C-shaped larvae

It is important to be able to identify healthy brood stages. Healthy worker, queen, and drone larvae are pearly white in color with a glistening appearance. They are curled in a "C" shape on the bottom of the cell and continue to grow during the larval period, eventually filling their cell.



A healthy worker brood pattern is easy to recognize: brood cappings are medium brown in color, convex, and without punctures. Healthy capped worker brood normally appears as a solid pattern of cells with only a few uncapped cells; these may contain eggs, uncapped larvae, nectar, or pollen.



## Honey Bee Parasites, Pests, and Predators

### Varroa mite (*Varroa destructor*)

The varroa mite is considered by many to be the most serious malady of honey bees. It now occurs nearly worldwide. This external parasite feeds on the hemolymph (blood) of adult bees, larvae, and pupae.



### Honey bee tracheal mite (*Acarapis woodi*)

A second mite that infests honey bees is the honey bee tracheal mite. This internal parasitic mite lives within the tracheae, or breathing tubes, inside the thorax of adult honey bees. Tracheal mites also may be found in air sacs in the thorax, abdomen, and head. The mites pierce the breathing tube walls with their mouth parts and feed on the hemolymph, or blood, of the bees.



### Small hive beetle (*Aethina tumida*)

The small hive beetle, North America's newest beekeeping pest, was first identified in Florida in the spring of 1998. This pest originated in Africa. The adult beetle is small (about one-third the size of a bee), black or brown, and covered with fine hair. The larvae are small, cream-colored grubs without prolegs.



### Bee louse (*Braula coeca*)

*Braula coeca*, commonly known as the bee louse, actually is a wingless fly. The adults are small (slightly smaller than the head of a straight pin), and reddish-brown in color. Although several adult flies may live on a queen, usually only one will be found on a worker. These pests apparently do little harm.



### Larval greater wax moth (*Galleria mellonella*)

Larvae of the greater wax moth cause considerable damage to beeswax combs left unattended by bees. Beeswax combs in weak or dead colonies and those placed in storage are subject to attack. Wax moths pose a continuous threat except when temperatures drop below 40°F.



### Spiders, earwigs, and cockroaches

Beehives provide shelter to a number of large and small arthropods such as spiders, earwigs, and cockroaches. These are not harmful to the bees or hive equipment and do not require control.

### Ants

Ants usually are not serious pests in honey bee colonies. Occasionally, however, certain species may enter colonies to search for food or establish nesting sites. Ants typically are found between the inner and outer covers of the hive and in pollen traps. Although ants seldom disturb the bees, they can be a nuisance to the beekeeper.



### Mice

Mice are a serious pest of stored combs and may inhabit active honey bee colonies during the fall and winter months. These rodents chew combs and frames to make room for building their nests. Mice urinate on combs and frames, making bees reluctant to use the combs or clean out these nests in the spring.



### Skunks

In some locations, skunks are a serious threat to successful beekeeping since they hamper the development of strong colonies. Being insectivorous (insect eating), skunks will raid bee yards nightly, scratch on hive entrances, and consume large numbers of bees. Although such attacks are most common in the spring, they also can occur throughout the summer and fall.

### Bears

Bears are a serious threat to beekeeping operations, since they do a great deal of damage to hives and equipment. They normally visit apiaries at night, smashing the hives to eat brood and honey. Once bears locate an apiary, they return again and again, and it becomes exceedingly difficult to control their marauding behavior.

## MAAREC/Penn State Extension Materials

### Publications

*Fundamentals of Beekeeping*. 1984. Basic beginning beekeeping text. Updated in 2000. \$5.00.

*Honey Bee Parasites, Pests, Predators, and Diseases*. NEW 84-page, full-color book describing honey bee maladies and their control. \$9.00.

Order from: Penn State College of Agricultural Sciences Publication Distribution Center, 112 Ag Administration Bldg., University Park, PA 16802. Phone: (814) 865-6713.

### Videos

*Why Honey Bees?* 1993. A 30-minute video for the public on the importance of honey bees. \$35.00.

*Varroa Mites: Life Cycle, Detection, and Control*. NEW 13-minute video. \$25.00.

Order from: Penn State College of Agricultural Sciences Information and Communication Technologies, 119 Ag Administration Bldg., University Park, PA 16802. Phone: (814) 865-6309.

### Slide Sets

*Honey Bee Diseases*. 1998. Set of 53 slides and script. \$60.00.

*Honey Bee Parasites, Pests, and Predators*. 1998. Slide set of 74 slides and script. \$60.00

Order from: The Penn State Department of Entomology, 501 ASI Building, University Park, PA 16802. Phone: (814) 865-1895.

### Computer Program

*Bee Aware: A Management Tool for the Diagnosis and Control of Honey Bee Diseases, Parasites, Pests, and Predators*. A CD-ROM for Windows. \$50.00.

Order from: The Penn State Department of Entomology, 501 ASI Building, University Park, PA 16802. Phone: (814) 865-1895.

### Correspondence Course

Beginning Beekeeping, AG 5126. Noncredit course. 1996. Cost \$39.00 plus \$77.60 for materials.

Contact: Penn State Dept. of Distance Education, Independent Learning, 207 Mitchell Bldg., University Park, PA 16802. Phone: (800) 252-3592.

## Brood Diseases

### American foulbrood (*Paenibacillus larvae* = *Bacillus larvae*)

American foulbrood (AFB) is an infectious brood disease caused by a spore-forming bacterium. It is the most widespread and destructive of the brood diseases, afflicting queen, drone, and worker larvae alike. Adult bees, however, are not affected by AFB. This disease occurs in two forms: vegetative (rod-shaped bacterial cells) and spores. The spore stage is unique to this type of bacteria, as it may persist for 40 years or more.



### European foulbrood (*Melissococcus pluton*)

European foulbrood (EFB) is a bacterial brood disease. It is considered a stress disease and is most prevalent in spring and early summer. It is less serious than AFB, and colonies can recover from infections. EFB does not form spores, but often overwinters on combs. It gains entry into the larva in contaminated brood food and multiplies rapidly within the gut of the larva.



### Chalkbrood (*Ascophaera apis*)

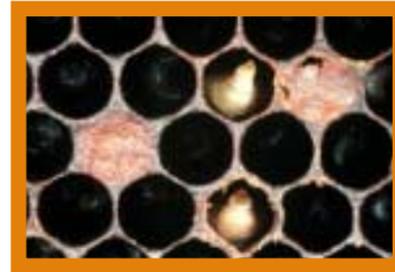
Chalkbrood, a fungal brood disease of honey bees, is caused by a spore-forming fungus. Worker, drone, and queen larvae are susceptible. Spores of the fungus are ingested with the larval food. The spores germinate in the hind gut of the bee larva, but mycelial (vegetative) growth is arrested until the



larva is sealed in its cell. When larvae are about 6 or 7 days old and sealed in their cells, the mycelia break through the gut wall and invade the larval tissues until the entire larva is overcome. This process generally takes from 2 to 3 days.

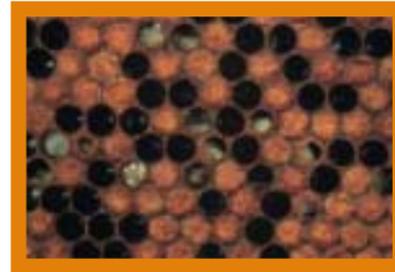
### Sacbrood

Sacbrood, a disease caused by a virus, usually does not result in severe losses. It is most common during the first half of the brood-rearing season. It often goes unnoticed, since it affects usually only a small percentage of the brood. Adult bees typically detect and remove infected larvae quickly. Often, if sacbrood is widespread enough for the beekeeper to observe the symptoms, the disease may be so severe that the adult worker population is reduced.



### Bee parasitic mite syndrome (BPMS)

This situation most likely is associated with varroa mites, viruses, or a combination of both. Affected larvae die in the late larval or prepupal stage, stretched out in their cells often with their heads slightly raised. In the early stage of infection, they are white but dull rather than glistening, and they look deflated. This is one of a complex of symptoms that has been given the name "Bee Parasitic Mite Syndrome" or BPMS.



## Adult Diseases

### Paralysis

Paralysis is a symptom of adult honey bees and usually is associated with viruses. Two different viruses, chronic bee paralysis virus (CPV) and acute bee paralysis virus (APV), have been isolated from paralytic bees. Other suspected causes of paralysis include: pollen and nectar from plants such as buttercup, rhododendron, laurel, and some species of basswood; pollen deficiencies during brood rearing in the early spring; and consumption of fermented stored pollen.



### Nosema (*Nosema apis*)

Nosema disease is caused by a spore-forming protozoan that invades the digestive tracts of honey bee workers, queens, and drones. Nosema spores are ingested with food or water by the adult bee. The spores germinate and multiply within the lining of the bee's midgut. Millions of spores are shed into the digestive tract and are eliminated in the feces.



### Deformed wings

Adult bees with deformed wings and bodies are common in honey bee colonies with varroa mite infestations. These deformities most likely are caused by varroa mites feeding on the bees as they develop, a virus (deformed wing virus), or perhaps a combination of both.



### For additional information,

visit the MAAREC Web site at <http://MAAREC.cas.psu.edu> or contact MAAREC, 501 ASI Building, University Park, PA 16802. Phone (814) 865-1895.

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- Rutgers University, New Brunswick, New Jersey
- USDA/ARS, Bee Research Lab, Beltsville, Maryland
- University of Delaware, Newark, Delaware
- University of Maryland, College Park, Maryland
- West Virginia University, Morgantown, West Virginia

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## A Quick Reference Guide to

# Honey Bee

## Parasites, Pests, Predators, and Diseases

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### MAAREC

The Mid-Atlantic Apicultural Research and Extension Consortium: Delaware, Maryland, New Jersey, Pennsylvania, West Virginia, and the USDA cooperating.