

# ANOSEMA DISEASE OF THE HONEY BEE

**Cause:** *Nosema apis*, a protozoan.

**Effect:** Nosema disease is widespread and can cause extensive losses of adult bees. It may also be responsible for some supersedure of queens.

**Symptoms:** No symptoms are specifically indicative of Nosema. Inability of bees to fly, excreta on combs or lighting boards, and a pile of dead or dying bees on the ground in front of the hive may be manifestations of Nosema infection, but they may also be caused by other abnormal conditions. The disease may be present without any obvious signs. However, if crawling bees or unusual numbers of dead bees are seen or if a colony fails to build up properly in the spring, Nosema disease should be suspected and your apiary inspector should be contacted for advice and assistance.

**Transmission:** The spores of *Nosema apis* enter the body of the adult bee through the mouth and germinate in the gut. After germination, the active phase of the organism enters the digestive cells that line the midgut where it multiplies rapidly; the contents of these cells are used as its food supply until reproduction ceases and new spores are formed. The cell then ruptures and sheds the new spores into the midgut where they pass down through the small intestine to the rectum. Here they accumulate and are voided in the excreta of the bee. The cycle begins over again when the spores contaminate the food of other bees. Spores will remain viable for many months in dried spots of excreta on brood combs. Near the end of winter, combs are often soiled with excreta from infected workers. Other bees become infected when they pick up the spores in the excreta as they clean the soiled combs during the spring expansion of the brood nest. Thus, the disease within the colony increases rapidly for a time, and a colony may dwindle in the spring because of the premature death of the overwintered bees. Usually, the colony survives and the proportion of infected bees begins to decline rapidly. This decline occurs because the excreta are normally voided away from the hive when regular flights become possible in spring. Since the old bees now die off and are replaced by healthy bees emerging from the brood combs, the disease may not be detectable in the colony by the end of the season. However, enough spores remain on the combs from the previous winter to infect a few bees in the cluster that forms when winter sets in again. These infected bees then form the nucleus for a repetition of the cycle. The disappearance of the infection during the summer seems to indicate that outside agencies such as drinking water, flowers, or vegetation are not important in the spread of the disease. Also, the honey is probably not contaminated to any significant degree, since excreta are not deposited on the honey combs during the honey flow. The spread of Nosema disease occurs chiefly because of the use of contaminated equipment and the robbing of infected hives, through infected package bees, infected queens, and her attendant workers.

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