



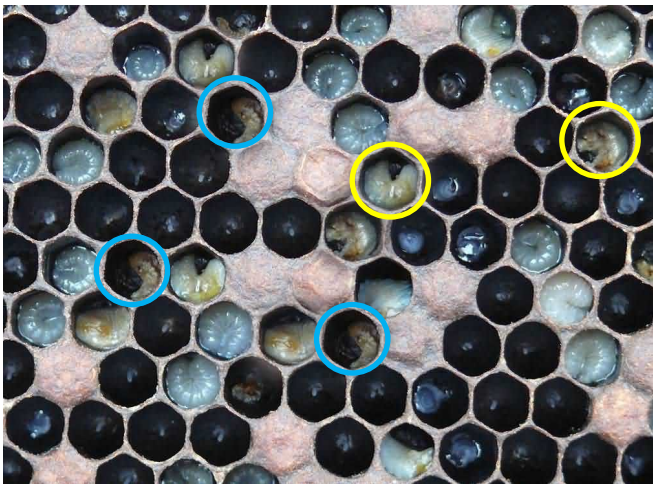
COOPERATIVE EXTENSION

UNIVERSITY OF HAWAII AT MĀNOA
COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES

European Foulbrood (EFB) in Hawaii

Introduction

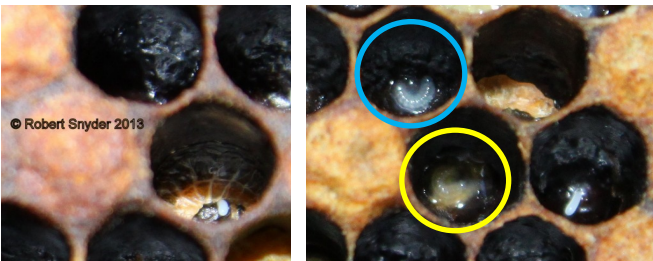
EFB is a bacterial infection of brood, caused by *Melissococcus plutonius*, with a number of other associated organisms contributing to symptoms. The disease is more problematic when the colony is under stress, as healthy colonies can overcome mild to moderate infections. EFB is present worldwide anywhere honey bee colonies are maintained. Though outbreaks in Hawaii are not common, there are no records with regards to incidence and location of outbreaks.



◀ Diseased yellowed larvae (yellow) that have taken on the twisted appearance, in comparison to pearly white healthy larvae. Dead larvae dry out to form scales (blue). Photo by R. Snyder, beeinformed.org

Transmission

EFB is spread when larvae consume the bacteria in contaminated brood food or from infected nurse bees. As the bacteria multiplies in the larva's gut, it competes for food causing death by starvation. Nurse bees reject larvae that demand an abnormal amount of food. The bacteria is transmitted to nurse bees' mouth parts when they attempt to remove the dead or dying larvae. If an infected bee survives to adulthood, the colony may be further infected by bacteria spread through their feces. Weak colonies infected with EFB may be robbed, which spreads disease to neighboring colonies. Swarms and absconding colonies may move bacteria between regions. Beekeepers accidentally spread bacteria by moving contaminated combs or hive components to non-infected hives, or by feeding healthy colonies infected honey or pollen. EFB is highly contagious and may remain viable for several years in honey, wax, and equipment.



◀▲ Egg laid in a cell with a brown scale at the bottom.
▶▲ EFB contaminated royal jelly being fed to first instar larva (yellow). Note the discoloration compared to uninfected royal jelly (blue). Photos by R. Snyder, beeinformed.org

Symptoms

This disease has recently become increasingly common and difficult to treat on the mainland. Infected larvae move in their cells, so when they die may take on a twisted appearance. In some cases, the larva collapses on itself, turns yellowish-brown, and dries to form a loosely attached brown scale that is rubbery in appearance. There may be a sour smell associated with infections, but this varies between infected colonies because it is the result of other microorganisms associated with EFB.



▲ Multiple stages of EFB, likely with a secondary bacterial infection. Photo by R. Snyder, beeinformed.org

Diagnosis

Infected larvae typically do not become ropey. Though experienced beekeepers may identify infection from the smell, positive diagnosis can only be made in a laboratory. Alternatively, a Vita® EFB test kit may be purchased which is just as accurate.



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Prevention

Maintaining strong and healthy colonies is the best way to avoid colony losses associated with EFB, and reducing the incidence of symptomatic colonies, particularly as EFB is a stress-related disease. Beekeeping management practices that avoid spreading EFB to other colonies and areas is another preventative measure. Changing brood nest temperatures can trigger outbreaks, so avoid removing adult bees, giving extra brood to rear, or prematurely adding extra supers especially during the winter months. As a precautionary measure, brood frames should be replaced on a 3-4 year basis. Ensure colonies have young healthy queens and inspect for EFB at least twice, once in the spring and once in the fall.

Treatments

When infections are mild, treatment is not necessary and a strong nectar flow will help reduce colony stress. For a moderate infection, requeening will break the egg laying cycle and allow the nurse bees time to remove diseased larvae and clean brood-rearing cells.

Antibiotic treatment with oxtetracycline may be used for moderate to severe infections, and this product is labeled for prophylactic use. However, over treating with antibiotics can lead to bacterial resistance. This is only available by prescription from a veterinarian. Residues may appear in bee products such as honey so honey supers should be removed before treating.



Interested in learning more? Check out our website: <https://cms.ctahr.hawaii.edu/pollinators>
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Questions? Email Dr. Chrissy Mogren (cmogren@hawaii.edu)