Case Definition

Deformed Wing Virus (DWV)
(Monitored)

December 2023

1. **Disease Information**
   - **1.1 General Disease and Pathogen Information:** The Deformed wing virus (DWV) is a viral species (*Iflavirius aladeformis*) that commonly infects European honey bees (*Apis mellifera* L.) and is widely distributed across the world, except for Australia. However, recent findings have revealed that DWV has expanded its host range to include various flower-visiting insects such as other bees, wasps, beetles, ants, and hoverflies, indicating a broader impact of DWV on pollinators. DWV causes covert as well as overt infections in honey bees and can be transmitted vertically and horizontally between bees in a colony. The combination of DWV and the parasitic mite *Varroa destructor* has been identified as a significant factor contributing to the global decline in honey bee populations. Within the DWV species complex, there are three main variants known as DWV-1, DWV-B, and DWV-C. The discovery of DWV-C in the United Kingdom in 2016 marked the identification of a distinct variant, different from the previously characterized types A and B, as determined by nucleotide sequence analysis. Notably, collapsing honey bee colonies in the UK exhibited high titers of DWV-C. However, the extent of prevalence and impact caused by this specific DWV variant remains unknown.
   - **1.2 Clinical Signs:** DWV predominantly persists as a latent infection, often without displaying noticeable disease symptoms. The horizontal transmission via *Varroa* mite vector is believed to be associated with acute symptomatic infection. During acute infections, distinct signs become evident, including twisted and shriveled wings, bloated abdomens, reduced body size, and discoloration.
2. **Laboratory Criteria**
   - **2.1 Agent Isolation and Identification:** Although the enzyme-linked immunosorbent assay (ELISA) test is an option for laboratory diagnosis, the detection of DWV infection is typically achieved by directly identifying the viral nucleic acid, specifically RNA, using Reverse Transcription-Polymerase Chain Reaction (RT-PCR) assay. The DWV can be detected across various castes and developmental stages of honey bees, including eggs, larvae, pupae, adult workers, drones, and queens.
   - **2.2 Agent Characterization:** DWV replicates extensively within the body of honey bees, spreading to various tissues such as the wings, head, thorax, abdomen, legs, hemolymph, and gut. Additionally, DWV is capable of replicating within *Varroa* mites.
   - **2.3 Serology:** NA.
3. **Case Classification**
   - **3.1 Suspect Case:** honey bees with compatible clinical signs.

3.2 Confirmed Positive Case: a suspect case with a positive ELISA or RT-PCR test.

4. **Reporting Criteria**[1]**:** DWV is a U.S. monitored disease that is reportable monthly under the APHIS National List of Reportable Animal Diseases (NLRAD).

[1] DWV is not a WOAH listed disease.