

Lateral Flow Devices

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Introduction

Commercially available, pathogen-specific, lateral flow device (LFD) tests can test colonies for American foulbrood (AFB) and European foulbrood (EFB) disease. These kits are currently available for purchase at bee supply stores. The tests work well as a hive-side confirmation of diagnosis based on visual signs. As false negative results are possible, these kits work well in conjunction with other diagnostic tests.

SUPPLIES NEEDED

Commercially available lateral flow device for AFB or for EFB

(Make sure that the cells you are sampling from show visible signs of the foulbrood disease for the lateral flow device that you are using. i.e., AFB signs should be tested with an AFB lateral flow device and EFB signs should be tested with an EFB lateral flow device.)

Brood frame exhibiting visible signs of AFB or EFB

Choosing the Right Cells

Choose cells that exhibit visual signs of either EFB or AFB.

If AFB is suspected, chose a sample from the following: 1) brood cells with cappings that appear dark in color, sunken, or perforated, 2) open brood cells containing caramel-colored brood that appears melted, or 3) open cells containing dark, brittle scale (Figure 1).



Figure 1: Brood cells exhibiting signs of AFB, including sunken, perforated cappings, caramel-colored brood that appears melted, and dark scales. Photo by Brandi Stanford, UF/IFAS Honey Bee Research and Extension Laboratory.

If EFB is suspected, choose a sample that shows early signs of infection (Figure 2). Look for open brood cells containing larvae that are malpositioned – either twisted like a corkscrew or end to end, appearing like a blob. The larva can be slightly yellowed or appear melted but should not be dried down or darkened. If a much older or dried down sample is used, a false negative result is more likely as the disease-causing *Melissococcus plutonius* may be replaced by secondary bacteria that will not show up on the test.

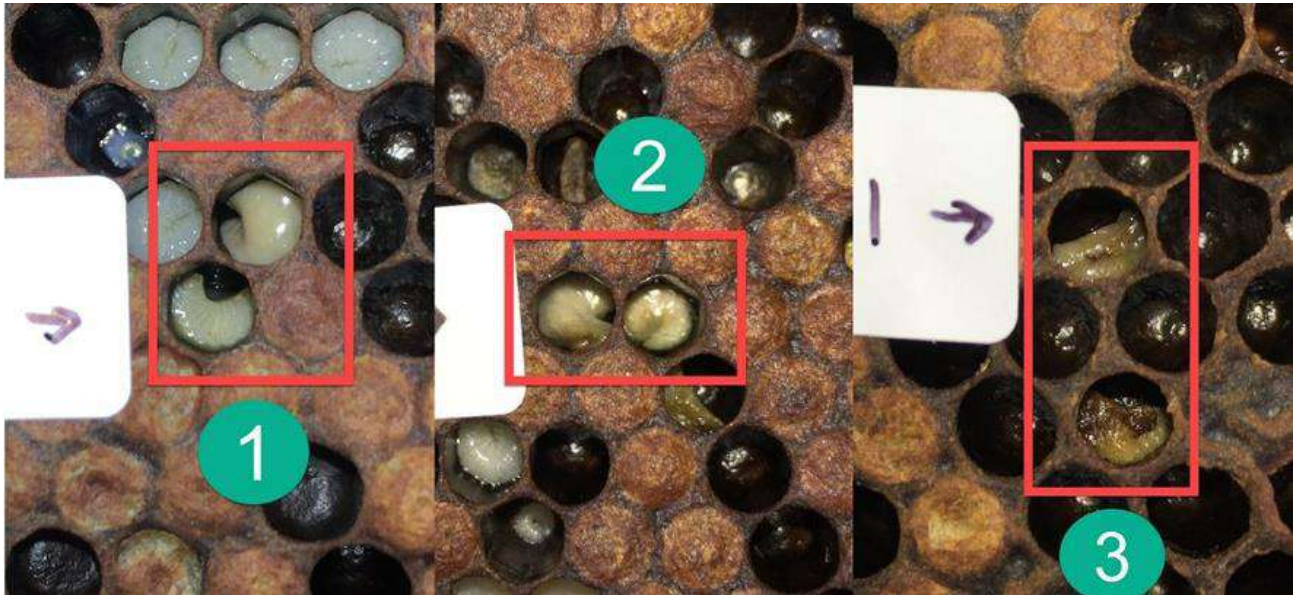


Figure 2: These images show the visual progression of larvae with EFB. The larvae on the left (1) are in an earlier stage of EFB and are great cells to sample for this test. The larvae on the right (3) are in a very late stage of EFB. At this point, secondary bacteria likely have started to take over, which can cause a false negative result. The larvae in the middle (2) are decent options for this test, although may sometimes provide a false negative result. Photos by Michigan State University.

Using the Lateral Flow Device

Follow the directions included with the lateral flow device you are using, available at Vita Bee Health (<https://www.vita-europe.com/beehealth/>).

Interpreting the Results

If the lateral flow device worked properly, after about 30 seconds a blue control line will appear on the device under the letter C. If this line does not appear, the test should be discarded, and a diagnosis should not be made. If the control line does appear, wait another 1-3 minutes and observe if a second line appears on the device under the letter T. Note that this line may be very clear or extremely faint. Checking results under a bright light source may be helpful. Any presence of a second line indicates a positive diagnosis. If a second line does not appear, that indicates a negative diagnosis for your sample, but not necessarily for the whole colony (Figure 3).

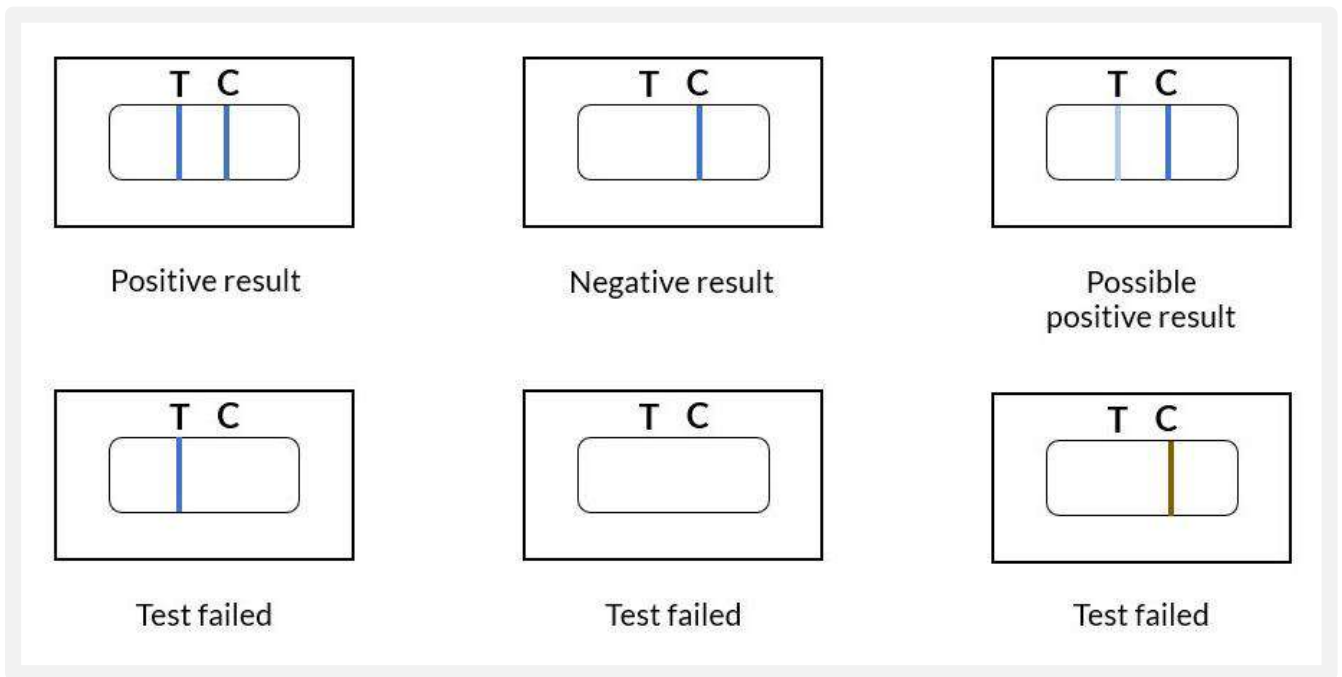


Figure 3: Possible results of the lateral flow device test according to the manufacturer, Vita Bee Health (<https://www.vita-europe.com/beehealth/>). Two blue lines (C&T) indicate a positive result, test performed OK. One blue line (C only) indicates a negative result, test performed OK. Faint blue T line and a strong C line indicate a possible positive, test performed OK. One blue line (T only) indicates the test has failed. No lines present indicate the test has failed. Brown C or T lines indicate the test has failed. Figure by Michigan State University.

Common Errors to Avoid

- Using an expired device. Note the expiration date on the test package.
- Using the incorrect kit for the pathogen. The kits are pathogen specific, and the correct kit must be used.
- Using too much material in the test. Using too much sample may clog the device.
- Selecting a larva that is too far decayed for an EFB test. When possible, chose a larva that shows early signs of disease.



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