
Effects of Nutrition on Virus Diversity and Titters

Project No.: 09-POLL9-Wick

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Objectives:

- Determine the viral diversity and titer change over time from adding nutrition to the bee diet.
- Evaluate the nutrition levels needed to affect these changes.
- Determine which viruses are most affected by nutritional changes.
- Determine the timing intervals for adding nutrition that will have the highest impact on viral loads.

Interpretive Summary:

Nutritional quality has shown to be a beneficial factor in honey bee health. This project will build on the studies of nutrition supplements that have shown to stimulate population growth, queen quality, and reducing the impact of *Varroa* mites. The ability to detect viruses in bees and to observe the change in diversity and titer of each virus over time has been demonstrated by BVS using the Integrated Virus Detection System (IVDS) recently. Applying this ability to evaluate the nutritional affects on virus diversity and virus concentrations in bee colonies gives us a direct correlation to nutrition on bee viral loads. Knowing the affect of nutrition on viruses will help us to develop strategies

for controlling viral loads in honeybees. IVDS uses size measurements as identification of individual viruses and has demonstrated multiple virus detection in a single sample as well as the concentration of each virus. This will be applied in here to monitor the change in viral loads over time in relation to adding nutrition to the bee diet.

Many of the viruses detected in bees do not show active infection as seen by some symptomatic evidence as noted by the work of L. Bailey but do show up in the IVDS screening and is used as a measurement of how well the bees are fighting off infection. Bee viruses are opportunistic by nature and will increase in the bees as the bee health declines for any of various reasons.

The following chart (**Figure 1**) represents some of the initial test samples compared to the control sample with only the initial and second data sets represented and only from one apiary. The correlations to other variable factors will we added into the analysis of the entire study, but this demonstrates the viability of the Integrated Virus Detection System (IVDS) to be able to track changes in viral diversity and in the intensity of each detection.

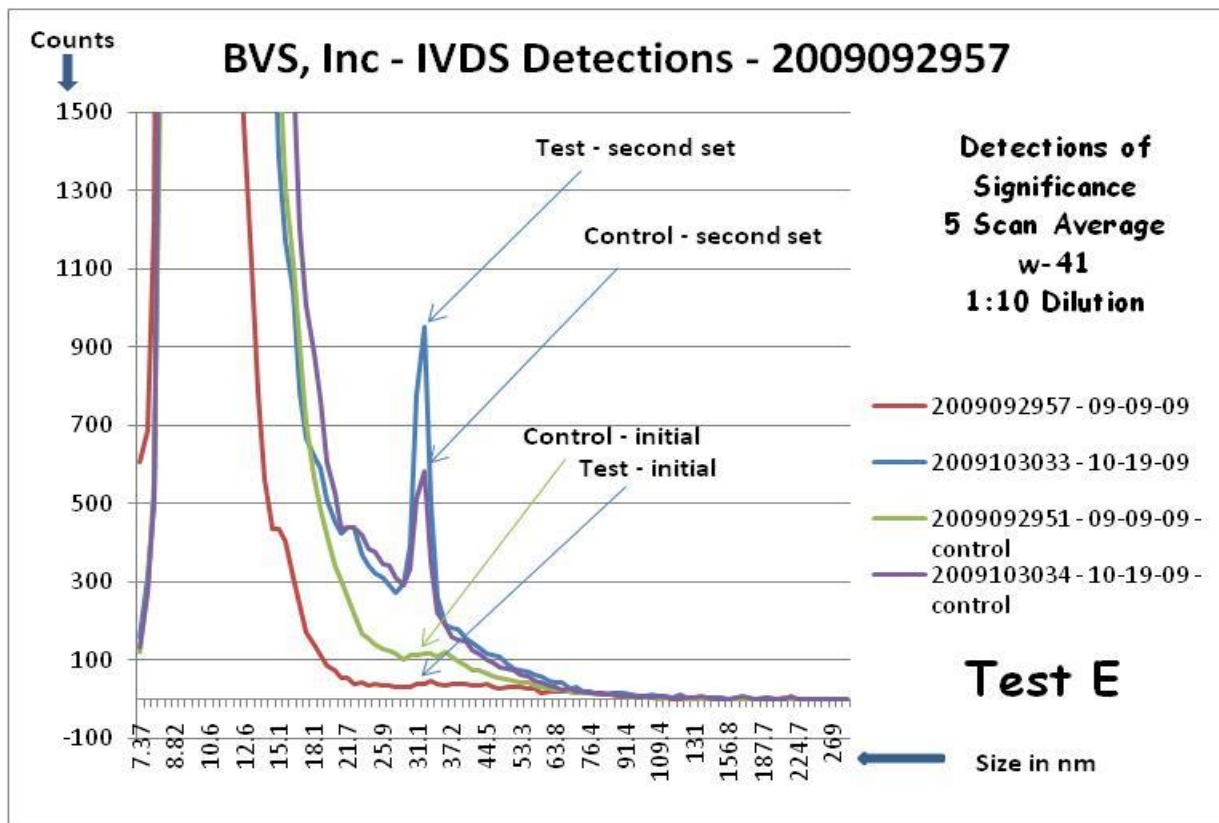


Figure 1: IVDS Detections

The usefulness of monitoring viral loads on a regular basis can provide beekeepers with a tool for relative effectiveness of treatments and of time of treatments, including nutritional supplements. This data added to similar work with essential oils can give a better picture of bee health and management strategies.