

From Dr. Jerry Bromenshenk, Bee Alert Technology, Missoula, MT

I've been deliberately staying out of the IAPV discussions, but given some recent statements on some honey bee discussions groups, I see a need to clarify some points. The authors of the Science paper published their preliminary results and presented their conclusions. Unfortunately, we question the association with IAPV and disagree with comments implying a link to Australian imports. Any talk of banning imports from Australia seems premature.

As noted by Erik Stokstad, who wrote an overview article that was published in the same issue of Science, our data (Bee Alert, BVS, working with the ARMY ECBC laboratory in Aberdeen, MD) does not implicate any one virus as being associated with CCD, not even as a biomarker.

We have looked at bee samples from across the county. In these samples, we have detected more than a dozen different viruses with as many as 4-6 new, heretofore unclassified and unnamed viruses.

In every bee operation, we see combinations of viruses, usually 2-3. But, we have not found a common virus or assemblage of viruses among and across CCD operations, regardless of the origin of the bees (i.e., U.S., Australian, intermixed).

We have looked at some Australian imports, and we did find viruses, but again, the data does not support a link with CCD colonies. In one Australian sample, we found yet another unknown virus, maybe even two, but these did not show up in any CCD colonies.

If CCD is associated with a virus, we would expect to see the same virus showing up in a consistent manner and to see a pattern to emerge, as projected for IAPV by the Science article. However, as stated, our data does not corroborate this finding.

To sort all of this out is going to take a better sampling strategy and more samples than the limited sampling being done (by all parties combined). We have been advocating that many samples from many beekeepers and from many different areas need to be screened for a common connection. We have proposed to USDA a national survey and screening program.

Although the Army has provided methods development and initial IVDS screening, the Army does not have unlimited resources and can not continue to provide this as a free service to every beekeeper (as implied by a previous post to Bee-L). They have indicated a willingness to continue to assist, especially with respect to the issue of risk from imported bees and emergent cases of CCD. But large scale sampling and analysis, in a production mode, is beyond their capability and is not part of their mission.

We (Bee Alert and BVS) have proposed placing a priority on obtaining samples from Australia, taken according to a rigorous sampling scheme, and sent directly to the Army lab for screening. That step needs to be done before any decisions are made regarding restricting bee imports from Australia.

We (Bee Alert and BVS) have also recommended that funds be made available to purchase 1-3 IVDS instruments that could be used to screen bees from CCD colonies, from nutrition experiments, entering the country, etc. for viruses. Initially, screening would be provided to beekeepers as a free service in exchange for samples and survey data from the beekeepers themselves.

In 12-24 months, assuming that this approach proves out to be useful to bee management, we recommend that virus screening be provided as a fee-based service, much like a veterinarian provides lab services for disease diagnosis. In that way, it would no longer depend on public funds.

Finally, mention has been made in this post and others of IVDS (Integrated Virus Detection System). IVDS was developed by the Army for inexpensive and rapid screening of viruses. It is a unique, new technology. It does not name viruses, like PCR, but it separates them out by physical size, and it provides the titer or concentration of each virus in a sample.

Sample processing consists of blending bees in sterile water, centrifuging and filtering, and then introducing the sample into a column using an electro-spray system. A laser sizes and counts all virus sized particles in each sample. Instrument time is less than 5 minutes. From start to finish, a sample can be prepped and analyzed in about 2 hours.

IVDS can separate viruses by a 4 nm difference. The viruses we have detected range from 20 nm to 39 nm in size. Some of the bee virus literature reads that all the bee viruses are 30 nm in size, an out-dated concept based on IVDS technology.

Finally, although IVDS does not identify specific viruses, IVDS can be used in conjunction with sequencing and proteomic GC/MS data to put a name on each virus detected by its size. Of course, if a detected virus is unknown, that will take additional work. But if it has been characterized (sequenced), we can look for it with IVDS.

So, IVDS provides a way of looking at all viruses, regardless of whether they've ever been seen before, and does so at a fraction of the cost and time of more traditional approaches such as sequencing. In addition, the instruments and sample processing equipment are small enough that they could be put into a van and driven to where ever they might be most needed (e.g., CCD outbreak, backup to a research project such as evaluating diets, meet imported bees at the dock, screen queens and bees for breeders, etc.

Our proposal that the initial screening would be provided to beekeepers as a free service in exchange for samples and survey data from the beekeepers themselves, is dependent on obtaining external funding to acquire an instrument for large scale testing, whether from USDA, from beekeepers, from growers, from foundations, or even public interest groups. We have located an under-used instrument and are attempting to arrange for a loan or rental so that we can get it out to MT and put to work for the bee industry.

If this is the direction that the beekeepers want to go, we can immediately start providing services through Bee Alert and BVS using the IVDS technology, but we will need to charge for the services.

Our services will provide a screening for all viruses in the samples and will be coordinated with the national effort, when and if it ever happens. We think that virus screening is needed and overdue, but if we wait for federal funding, we may very well be waiting along time. Give us your feedback and suggestions. We'd like to get started. Perhaps its time for a new research arrangement – one in which the bee industry plays a more direct role in research.

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