Report: Biosecurity Queensland Briefing Friday 22nd July 2010 to HBMALG

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On Friday afternoon 22nd July 2011 HBMALG members were addressed by Chief Executive Officer Science Leader, Dr Linfa Wang from the Australian Animal Health Laboratory AAHL.

Dr Wang is recognised as the world's leading scientific authority on Hendra Virus and has been working together with Dr Hume Fields, Principal Veterinary Epidemiologist with Queensland Centre for Emerging Infectious Diseases, on researching Hendra Virus and its transmission for over 15 years.

His presentation gave HBMALG members an insight into the virus itself and the most up to date findings of research.

There have only been a very small number of cases to research, a total less than 60 horses world wide. A lot of data has been gathered but much more data is needed to fully understand how the spillovers from bat to horse occur. There are many variables involved and also the randomness of the spillovers needs to be taken into account.

Understanding Hendra Virus itself:

- Genetically Hendra Virus is a very stable virus as opposed to viruses like the human flu which change regularly
- Hendra looks to be a very old or ancient virus within the bat population. i.e.: It is NOT a new virus
- There are a large number of similar viruses present in bats around the world.
- It's natural host is bats and as such it does not kill them (the intention of viruses in general is not to kill the natural host but to multiply and live on within them)
- When transmitted to another host, ie: horses, it is highly virulent, which means it kills the new host very quickly. It is one of the most virulent viruses discovered to date.
- The virus is VERY unstable in the environment. It is a fragile virus unlike Equine Influenza
- It is spread by droplet transmission. Direct contact is necessary.
- It does NOT spread by aerosol transmission as opposed to viruses like Equine Influenza and human flu.
- The virus has little chance of living in a decomposing animal
- All in all it is not very transmissible.
- Hendra virus has recently been found in 30%-60% of urine samples collected from bats, however this does not mean that all bats carry the virus in levels high enough to cause a spillover from one species to another such as bat to horse
- A low percentage of bats may have very high levels of the virus in their system to enable them to excrete enough of the virus to cause a spillover between species: ie. one individual bat may have massive levels of the virus and the ability to excrete high levels. This may help to explain the randomness of spillover events.

Focus of current research:

- The scientists at AAHL are looking for potential biomarkers (a substance used as an indicator of a biological state – such as a hormone) in flying foxes in order to develop strategies to be better able to predict potential Hendra Virus "spikes" that may flag the potential risk of spillover events.
- More study of the dynamics of the bat populations: ie. Are family and colony dynamics changing? What is happening to their habitat? What changing stresses occur in their colonies and season to season? Are numbers growing or are they just more visible to us because they are moving into more settled areas than in the past? And if so, why?
- Distribution of Black Flying Foxes.
- Study of bat urine from individual species of bats to identify levels of virus within each species of bat, ie: is it possible that one species naturally carries higher percentages of Hendra Virus than others? If so, this may explain in part why certain areas have more spillovers due to the specific bat species present.

Why now?

Bearing in mind the fact that this virus has been present in bats for a very long time, perhaps since ancient times, why are we only seeing outbreaks in relatively recent times? (ie. since Hendra Virus was first discovered after the Vic Rail outbreak)

There are two main changes that have occurred over past decades and centuries that scientists identify as impacting on changes to virus transmissions around the globe:

1. **Human activities** in the environment such as:

- Landscaping changes
- Farming changes
- Urbanisation

Dr Wang used the SARS virus as an example. Just 30 years ago the area where the SARS virus broke out was a fishing village. Now it is an area supporting millions of people. Farming culture has changed and the whole landscape of the environment is now urbanized.

2. **Advances of Technology**

- Have enabled the virus to be detected
- There is a rapid increase in new technology

Continual upgrading of technology has enabled discovery of viruses such as SARS. Just 10 years ago the technology did not exist and the virus could not have been isolated and discovered. Technology for research into Hendra Virus is continually advancing.

Developing new technology to enable further research into discovering the facts about transmission between bat / horse and horse / human is ongoing.

Where to from here?

With the limited data available from past outbreaks (less than 60 individual horses and 2 dozen properties worldwide), it is apparent there is no easy fix answer at this stage of research.

An effective vaccine for horses has been developed under laboratory conditions and will be ready for field tests to occur by early 2012. The longevity of the vaccine in the system still needs to be determined which could see commercial availability some months later.

It should also be mentioned that although the vaccine works well and will provide protection from Hendra Virus to vaccinated horses, no vaccine is ever the "be all and end all" of managing a disease.

In the meantime what can we do?

Unfortunately the unpleasant reality we now need to come to grips with is that:

"The world has changed forever".

Hendra Virus and the impacts and issues that arise from it are not just going to go away. It is here and impacting on all horse owners, and we must learn to deal with it as calmly and effectively as possible.

Nobody likes this fact, but as we have seen over the past two months, Hendra Virus outbreaks have been on the rise and are not confined to tropical areas or Queensland any longer.

While we wait for scientific answers as to why this is so, for further research to keep ourselves and our horses safer, and for the vaccine to become available, we can bear in mind that we are fortunate to have the most knowledgeable experts and facilities available worldwide at AAHL.

The experts tell us that given what we already know about the disease, and more importantly what we still need to learn, the best that can be done for the moment is:

- To learn how to forecast potential outbreaks
- To use Risk Management to minimize the chance of exposure between bats and horses on a day to day basis

In the laboratory and in the field the scientific experts are endeavoring to identify factors that may lead to early detection of potential outbreaks to better enable early warnings, and also how to achieve better responses to actual outbreaks.

On our properties we as horse owners can implement good Biosecurity Practices and Risk Management strategies in order to minimise risks to our horses and ourselves.

Risk Management

It has been determined from evidence discovered at the most recent June-July 2011 cluster of outbreaks that all cases occurred in paddocked horses with access to trees with either fruit or blossoms that are attractive food sources to bats.

This is very valuable information.

As spillovers of Hendra Virus from bats to horses must occur via droplet transmission, and bearing in mind that the virus is very fragile and does not live long in the environment, planning to reduce the potential for bat activity around our horses is a good first step.

- **Identify** trees that may be a potential food source on your property. Some examples of the trees and vegetation where Hendra virus in horses has occurred this year include - a range of fig trees (including the Moreton Bay fig tree), melaleucas (including paperbarks), eucalypts and wattles and passion fruit vines. Other trees known to attract flying foxes include flowering or fruiting trees with soft fruits and stone fruits (e.g. mangoes, pawpaw), palms, lilypillies and grevilleas.
- **Observe** your trees for budding blossoms and fruits or learn when this is seasonally likely to occur.
- **Isolate** horses completely from any area where bats may roost during the day, and also from the "drip zone" which is the area directly under and nearby the branches where bats feed. Resultant excrement on the ground and leaves or partially eaten fruit and chewed up spats from the bats may be ingested by horses seeking shelter under trees. This area has been found to be a place where the virus can live longer in a cool moist environment than out in the elements of sun, wind etc.

Restrict horses from access under and around these trees during fruiting or blossoming. Methods may include:

- Removing horses from paddocks where flowering/fruiting trees are attracting flying foxes. They should be returned only after the trees have stopped flowering/fruiting and the flying foxes have gone.
- If it is not possible to remove horses from paddocks, try to temporarily remove your horses during times of peak flying fox activity (usually at dusk and during the night)
- Fence off access to trees that attract flying foxes (temporary or permanent fencing).
- Safely clean up and dispose of any debris underneath the trees before returning horses.
- Remove all feed and water containers from under trees
- Feed horses under shelter and place water containers under shelter.

Other general good Biosecurity Practices include:

- Washing hands after handling horses
- Observing horses daily for signs of ill health
- Use basic PPE : P2 respirator, gloves, and goggles and cover open wounds when treating sick horses
- If horses are suspected of Hendra Virus, do not approach the horse, call the Vet immediately.

Many valuable fact sheets and updates are available on the DPI website: www.dpi.qld.gov.au