PRV Team Developing Comprehensive Surveillance Plan

Written by Eric Bush, National Surveillance Unit

The pig is the only natural host for pseudorabies virus (PRV), a contagious herpesvirus causing reproductive problems such as abortions, stillbirths, mummies, and infertility. Pigs that survive PRV develop a permanent latent infection. However, death loss due to PRV, especially in suckling pigs, can be extremely high. While uncommon, PRV infection is lethal in cattle, sheep, goats, raccoons, rats, cats, and dogs in contact with infected pigs.

The State-Federal-Industry PRV eradication program culminated with the declaration by the PRV Control Board at the 2004 United States Animal Health Association (USAHA) meeting that all States had achieved Stage V—PRV-Free status. In light of this monumental achievement, the USAHA recognized the need for the U.S. Department of Agriculture's Animal and Plant Health Inspection Service-Veterinary Services (VS) to develop a complete plan for PRV surveillance. As a result, VS' Centers for Epidemiology and Animal Health's (CEAH) National Surveillance Unit (NSU) formed a PRV surveillance team to develop this plan. This article reflects discussions to date by the PRV surveillance team. The specific surveillance implementation details have not yet been determined. The final plan will likely differ somewhat as the developmental process progresses.

The objectives of PRV surveillance that will be covered in this comprehensive plan include the following:

- Objective I: Surveillance for rapid detection of PRV in U.S. commercial swine.
- Objective II: Monitor the risk of introduction of PRV into U.S. commercial swine.
- Objective III: Surveillance of international PRV status.
- Objective IV: Surveillance to assess progress in PRV educational campaigns.
- Objective V: Surveillance to document freedom of PRV in U.S. commercial swine.

Objective I is to conduct surveillance for rapid detection of PRV in U.S. commercial swine. PRV is a newcomer to the list of foreign animal diseases and has a very peculiar feature: it is foreign to a specific segment of the swine population, i.e., commercial swine production, and concurrently present in feral swine and transitional herds.

During spring 2005, CEAH's trade risk team conducted an "Assessment of the Risk on a State-by-State Basis for Re-exposure of Commercial Production Swine Herds to PRV in the United States." Dr. Tom Kasari led this pathways risk assessment and presented his findings to the NSU in June.

The two primary means by which PRV may reappear in U.S. commercial swine are reactivation in an old sow or reintroduction by exposure to feral swine. The cases in which reactivation is a clinical event (recrudescence) will be identified through laboratory-based surveillance. Selection criteria for eligible laboratory submissions will include high mortality in pigs, central nervous system symptoms in suckling pigs, abortions, and those with stillbirths-mummies-embryonic-death-infertility (SMEDI) syndrome. The most efficient surveillance mechanism to detect reactivation without overt clinical symptoms will be random testing for PRV exposure of cull sows at slaughter.

Reintroduction of PRV into commercial swine would most likely occur by either direct exposure to free-roaming feral hogs or by indirect exposure to hogs from wild-boar hunting clubs. Most feral swine are found in the southern-most States, which also have mostly small-scale farms. In these States, the surveillance population will be defined by those swine moving through livestock markets and monitored via market-based surveillance for PRV exposure. In all other States that have relatively few counties with feral swine, the surveillance population will be defined by all outdoor farms in these counties. Surveillance will be conducted via routine on-farm testing and in response to passively reported "direct-exposure" events between feral swine and commercial swine. The case definition for a direct-exposure event is physical contact (feral swine that have gained access to swine facilities/pens) or fence-line contact (feral swine observed along the fence).

Objective II is to monitor the risk of introduction of PRV into U.S. commercial swine. Clearly, the greatest risk of introducing PRV into commercial swine comes from direct or indirect exposure to feral pigs. Since PRV remains endemic in feral swine, it is important to monitor the distribution of the feral swine population. Feral swine moving into new areas increases the risk of introducing PRV into commercial swine. The risk is also elevated if the PRV prevalence in feral swine increases. Another aspect to be monitored is the size of the population at risk of exposure, i.e. outdoor production sites. These risks impact the likelihood of successful transmission of PRV from feral swine to commercial swine via direct exposure events.

Related to objective II is the surveillance of PRV status of other countries (objective III). The PRV status of neighboring countries and trading partners is particularly important and should be summarized on a regular basis.

Objective IV is to conduct surveillance to assess progress in PRV educational campaigns. Education is needed on several fronts, such as encouraging State Agriculture Departments to incorporate a standardized definition of "at-risk" herds. A swine production site located in an area known to have feral swine and with some portion of production outdoors is an at-risk herd. A second educational need is for a PRV awareness campaign directed at producers and practitioners to aid in passive reporting of suspicious PRV cases akin to other foreign animal diseases. Related to this, but more to do with prevention than detection, is the need to educate producers about the risks associated with feral swine, biosecurity measures that prevent disease transmission from feral swine, and the need to report direct-exposure events.

A final, potential objective V in a comprehensive surveillance plan for PRV would be surveillance to document freedom of PRV in U.S. commercial swine. The PRV planning team believes at this time that if the suite of surveillance programs for objective I is fully implemented, no additional surveillance will be necessary to document disease freedom.

Please contact Eric Bush at Eric.J.Bush@aphis.usda.gov or (970) 494-7260 for more information on PRV surveillance.