Summary of Selected Disease Events July – September 2006

I. OIE Listed Diseases

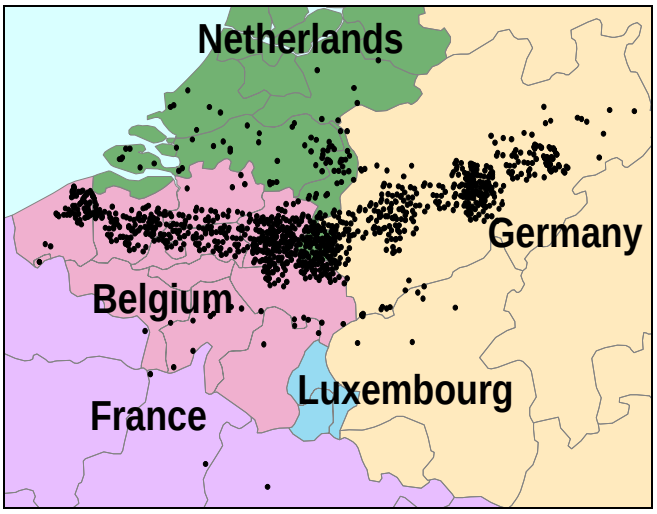
Bluetongue virus, Europe

Bluetongue virus (BTV) was first detected in sheep in the Netherlands on August 14, 2006. Within the next two weeks, BTV was also found in Belgium, Germany and France. By the end of September, the epizootic had spread to more than 400 farms in the four countries. This event represented a northward expansion of over 500 km from where BTV had previously been detected in Europe.

Genetic testing showed the bluetongue virus was serotype 8, previously found only in sub-Saharan Africa, South America, and in the Indian subcontinent. The genetic fingerprint was closest to that of a BTV isolated in Nigeria in 1982, suggesting it originated in Africa. Sheep were most affected in the Netherlands, whereas cattle were more severely affected in the other countries. Clinical signs reported in cattle included lameness, discolored udders and swollen tongues. The involvement of cattle in the outbreak probably reflects both the pathogenicity of the serotype 8 virus, as well as introduction into a naïve and susceptible host population. Cattle living in BTV endemic areas usually are not clinically affected.

Unusually warm weather may have contributed to the BTV epizootic by speeding up propagation of the virus and providing optimum conditions for the *Culicoides* midges which spread the virus by biting ruminant hosts. Laboratory studies in the Netherlands confirmed that *C. dewulfi*, an endemic species of midge, was infected with BTV and two other more common species of midges were potential vectors. This is important because it indicated that bluetongue could become established in Europe. Previous BTV epidemics in southern Europe had been linked to an African midge species. It is not yet known how the virus reached northern Europe.

While bluetongue emergence is a significant event for Europe, the effect on U.S. livestock is probably minimal. North American strains of BTV are endemic in parts of the United States, and imports of ruminants from Europe are restricted because of the presence of BSE. In addition, animals from other BTV-infected countries are quarantined and tested on entry into the United States.



Adapted from Department for Environment, Food and Rural Affairs (DEFRA, United Kingdom)

Multiple studies have confirmed that BTV infection of ruminants is transient, persisting for a few weeks at most. Moreover, seropositive animals are resistant to reinfection with homologous strains of BTV and can be safely moved once the infection has cleared. In contrast, BTV infection of *Culicoides* vectors is persistent. Therefore, increasing attention is focusing on understanding the climatic and ecological factors that determine the range of the insect vectors that persistently harbor and transmit BTV. Scientific studies in the United States, for example, have shown that midges

living in cold climates are dormant or absent during winter months and that bluetongue is not transmitted while adult insects are inactive. As a result, Canada now allows ruminant imports from some northern states during the insect-free season.

Sources: ProMED; Department for Environment, Food and Rural Affairs (DEFRA, United Kingdom); the Bluetongue Triangle, USDA Agricultural Research Service

A summary of bluetongue in the Mediterranean basin is available online at: http://www.aphis.usda.gov/vs/ceah/cei/taf/emergingdiseasenotice_files/bluetongue_medbasin_ednotice_sep_04_files/bluetongue_med_basin_jan_05_update.htm

Equine viral arteritis, United States

On 26 June 2006, the OIE Reference Laboratory for Equine Viral Arteritis at the University of Kentucky's Gluck Equine Research Center confirmed an outbreak of equine viral arteritis (EVA) infection involving fetal losses and respiratory disease among mares on a quarter horse breeding farm in New Mexico. Eighteen states and two Canadian provinces received shipments of exposed horses or semen from the infected farm since early May when the infection was believed to have started. EVA positive animals were identified in nine states, including New Mexico. Vaccines were imported from Canada to help stem shortages.

The diagnosis of EVA was based on the widespread prevalence of high antibody levels to the virus in mares and stallions, as well as virus isolation from the semen of two stallions. The laboratory reported the outbreak to the New Mexico Livestock Board, which took steps to limit the spread of the disease, including quarantines. The last reported case of EVA in New Mexico was reported in mid-July.

EVA was first reported in the United States in Kentucky in 1984. The disease is restricted to equids and is characterized by a variety of conditions including fever, depression, edema, conjunctivitis, nasal discharge, and abortion. Standardbreds are most susceptible. Mortality in adult animals is rare, but economic impacts can be significant including deaths of young foals, abortions in 10-50% of susceptible mares, and reduced demand for infected breeding stallions. EVA virus can be spread through semen from infected stallions, infected respiratory secretions, or indirectly through shared equipment or tack.

Sources: ProMED; New Mexico Livestock Board; TheHorse.com; U.S. Animal Health Association 2006 Annual Conference

Spring viremia of carp, Canada

On 27 September 2006, Canada reported to OIE an outbreak of spring viremia of carp (SVC). The outbreak occurred in freshwater common carp (*Cyprinus carpio*) in an open production system in Hamilton, Ontario. The population was spawning at time of sampling and showed no signs of disease. SVC virus was detected in 18 of 30 pooled samples.

The fish were tested in late June before shipment to another country. Authorities cancelled the shipment. The Canadian SVC virus isolate was classified as genotype group I, similar to Asian and U.S. isolates. SVC has never before been reported in Canada.

Source: OIE Disease Information Reports

Vesicular stomatitis, United States

On 17 August 2006, the National Veterinary Services Laboratories confirmed vesicular stomatitis (VS) in a 10-year-old horse in Natrona County, near Casper, Wyoming. This

was the first confirmed case of VS in the United States in 2006. There were 29 clinically normal horses and 25 clinically normal cattle on the premises. A veterinary practitioner observed oral lesions on the horse during a routine physical examination on August 14th and notified APHIS, Veterinary Services.

There was no history of recent movement of the horse from the premises, but the owners did report many *Culicoides* midges and other biting flies in the vicinity. The affected property was quarantined and the horse was isolated to minimize contact with other susceptible animals. Insect control was also stepped up. During August and September 2006, a total of nine premises with VS-infected livestock were identified in Wyoming: six in Natrona County and three in adjacent Converse County. One of the premises had infected cattle, while the others had infected horses. Through the end of September, Wyoming was the only state with VS outbreaks during 2006.

Phylogenetic sequencing of the 2006 isolate showed it was closely related to viruses isolated from livestock in Montana and Wyoming in 2005. It is therefore likely that the 2006 virus originated from an overwintering virus from the 2005 VS epizootic in that region. In 2005, nine states reported VS outbreaks affecting livestock on 445 premises, mostly in Wyoming, Utah and Colorado.

Source: OIE Disease Information Reports

II. Other Significant Disease Events

Anthrax, Canadian prairie provinces and Minnesota, United States

In early July 2006, the Canadian Food Inspection Agency (CFIA) reported an outbreak of anthrax that began in the Melfort area northeast of Saskatoon, Saskatchewan. Some 50-55 cattle died in 4 days within an area of 10-15 km. The outbreak spread quickly, and by mid-September, 153 farms in 45 rural municipalities were quarantined. The outbreak killed 800 animals (493 cattle, 254 bison, 29 sheep, 13 white-tail deer, 6 horses, 3 swine, 2 goats), making it the worst anthrax outbreak on record in the Canadian prairies since CFIA began keeping records in the 1950's.

Concurrently, northeast Manitoba experienced increased numbers of anthrax cases affecting cattle, bison, horses and donkeys in eight rural municipalities. An outbreak of anthrax was also reported in free-ranging wood bison in the Slave River Lowlands (SRL) of the Northwest Territories. Anthrax is endemic in bison in this region, with six documented outbreaks between 1963 and 2001.

Livestock vaccine was initially in short supply during the anthrax outbreak, but more than 400,000 doses were eventually shipped from Canadian and U.S. sources. Two human cases of cutaneous anthrax were reported, one in a farmer who performed a necropsy of a sick animal and another in a veterinarian who had tested infected cattle. Carcasses were buried or incinerated to minimize environmental contamination with anthrax spores.

In June and July 2006, Minnesota experienced its worst outbreak of livestock anthrax in 87 years. As of July 20th, the disease had reportedly killed 68 livestock on 23 farms in northwest Minnesota. Before 2000, most anthrax cases occurred in southwestern Minnesota, whereas since 2001, anthrax cases have occurred mainly in the northwest part of the state. Minnesota's worst anthrax outbreak took place in 1919 when 42 sites were infected. Most of the livestock deaths during the current outbreak were in cattle, but a few bison and horses also died.

Over the years, the northern prairie states and provinces have experienced regular but sporadic outbreaks of anthrax in livestock. Anthrax is a naturally occurring disease caused by the bacterium *Bacillus anthracis*. All warm-blooded animals are susceptible to anthrax, but cattle, horses, sheep, and goats are most commonly affected. Anthrax spores can live in the soil for decades. Animal health authorities speculated that the 2006 epizootic may have resulted from unusually heavy spring rains and flooding that eroded soils and brought anthrax spores to the surface where they could be ingested by livestock and wildlife. In addition

to eroding old cattle graves, heavy rains could have increased horse fly numbers that helped spread the disease when they fed on infected carcasses. Animals may also have acquired anthrax by grazing on exposed sites after standing water evaporated in hot, dry weather.

Sources: ProMED; Minnesota Board of Animal Health

Chikungunya fever, multiple countries

Chikungunya fever is caused by an alphavirus indigenous to tropical Africa and Asia. The disease was first recognized in epidemic form in East Africa during 1952-1953. The word "chikungunya" is thought to derive from local dialect describing the contorted posture of patients afflicted with the severe joint pain associated with this disease. Chikungunya virus is transmitted to humans by the bite of infected mosquitoes, mainly of the genus *Aedes*. Chikungunya fever epidemics are sustained by human-mosquito-human transmission, similar to the epidemic cycle of dengue and urban yellow fever. In Africa, the disease is enzootic in both humans and non-human primates and is sustained by a primate-mosquito-primate cycle. Researchers are currently investigating the possibility of other animal reservoirs of chikungunya virus.

Large outbreaks of chikungunya fever have occurred recently on several islands in the Indian Ocean and in India. On Isle Reunion, for example, health authorities estimated 266,000 cases of chikungunya fever (out of 760,000 inhabitants) between March 2005 and September 2006. More than 270 life-threatening chikungunya cases were reported, mostly in patients older than 65 years. Although the disease has a relatively high morbidity rate, fatalities appear to be rare.

Recently, chikungunya fever cases also have been reported in travelers returning from known outbreak areas to Europe, Canada, the Caribbean, and South America. During 2005 and 2006, the Centers for Disease Control and Prevention (CDC) diagnosed 12 cases of chikungunya fever in travelers arriving in the United States from areas known to be epidemic or endemic for chikungunya fever.

Source: ProMED

Chlamydiosis in farmed saltwater crocodiles, Australia

Outbreaks of disease causing high mortality of farmed saltwater crocodiles on two premises in the Darwin region of North Australia have been thoroughly investigated at the Berrimah Veterinary Laboratories. More than 3,000 juvenile crocodiles (2-5 months old) died during June through August 2006. Fatally affected animals consistently had inflamed pharynxes and conjunctiva with fibrinous exudate often causing death by laryngeal obstruction.

Investigators performed full necropsies on 57 affected crocodiles. Lesions in most animals were confined to the conjunctiva, pharynx and upper esophagus. PCR was positive for Chlamydiaceae on 18/18 specimens. DNA sequence analysis for speciation/strain typing is being performed at the Queensland University of Technology and the University of Melbourne. These tests should determine whether the pathogen is unique to crocodiles or whether it could have come from other animals, such as birds. Viral infection as the cause of disease has not been completely ruled out, and virus isolation attempts are continuing on the affected specimens.

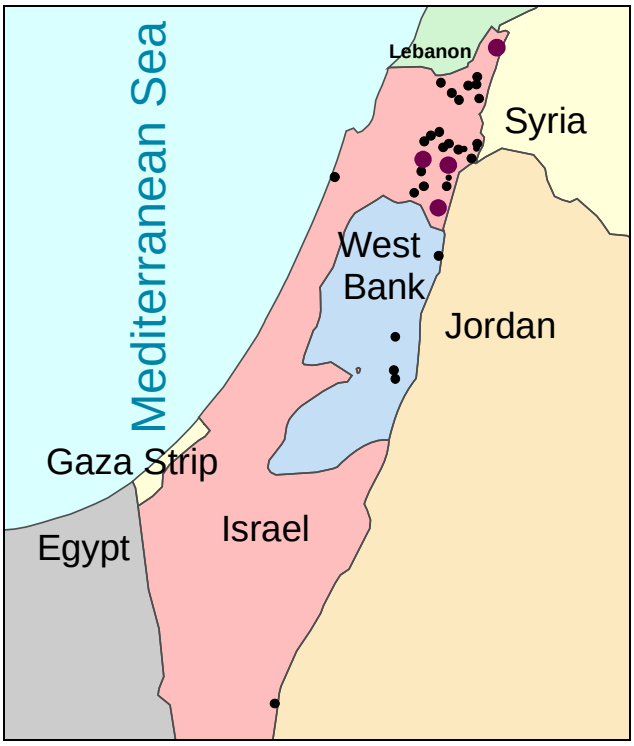
Factors contributing to the high mortality of juvenile crocodiles with Chamydial disease may include the anatomical features of the pharynx and larynx and the inability to cough, making these animals highly susceptible to laryngeal obstruction and asphyxiation. The buildup of mucus in the throat may partly account for the poor clinical response to antibiotic treatment. Injectable antibiotics are poorly tolerated by juvenile crocodiles.

Source: ProMED

Epizootic hemorrhagic disease in cattle, Israel and Morocco

In September 2006, Israel notified the OIE of the emergence of epizootic hemorrhagic disease (EHD). The outbreak was observed in

more than 55 cattle farms (mainly Holstein and some beef cattle) situated along the eastern border of Israel, concentrated along 80 km of the Jordan Rift Valley. Clinical signs were similar to those described for bluetongue or Ibaraki disease in cattle. Morbidity rates were 10-40%, with very low mortality. The affected farms were placed under quarantine and farmers were instructed to spray the cattle and environment with insecticides. No cases were seen in adjacent sheep and goats farms.



Adapted from Israeli Veterinary Services

EHD is caused by an orbivirus that is transmitted by *Culicoides* midges, similar to bluetongue and African horse sickness. EHD usually affects deer, does not appear to infect sheep and rarely causes disease in cattle. EHD had never before been reported in Israel.

The EHD outbreak in Israeli cattle followed a similar event in Morocco. On September 14, 2006, the Moroccan government reported outbreaks of EHD among cattle on 23 farms in six provinces in the northern part of the country. The EHD outbreak started in late July and was confirmed by laboratory testing in September. A follow-up report to OIE on October 2nd reported that the outbreak had expanded to 218 cattle farms. The morbidity rate was 18% (329 cases out of 1,814 susceptible animals) and the mortality rate was 2.2%. Most cases were on small farms with 8 cattle being the largest number of affected animals on a single farm. EHD had never before been reported in Morocco.

The sources and relationship, if any, of the EHD epizootics in Morocco and Israel are unknown. The countries are separated by almost 3,000 km, so the outbreaks may be purely coincidental. Although EHD is not on the list of OIE notifiable diseases, the epizootic fits the criteria for notification as an emerging disease with significant morbidity or mortality. The relatively high morbidity rates in these EHD outbreaks may relate to the lack of immunity in cattle exposed to a new virus.

Source: ProMED: OIE Disease Information Reports

Low pathogenic avian influenza (H5N1), United States

As part of the cooperative federal-state program for avian influenza surveillance in wild birds, there have been several recent findings of low pathogenic avian influenza (LPAI) H5N1 virus in wild waterfowl in the United States. During August and September 2006, LPAI H5N1 viruses were confirmed in mute swans in Michigan, mallards in Maryland and Pennsylvania, and northern pintails in Montana. Low pathogenic strains of avian influenza are common in many waterfowl species, in which they cause little illness. Mild strains include the "North American" H5N1 virus, which differs from the highly pathogenic H5N1 strains circulating in Asia, Europe, Africa and the Middle East. There is no known health risk to hunters from contacting waterfowl with low pathogenic forms of avian influenza.

Sources: USDA News Releases; CIDRAP News; ProMED

Undiagnosed disease of pigs, China

Between June and September, 2006, an unknown swine disease occurred in six neighboring Chinese provinces (Hunan, Jiangxi, Anhui, Jiangsu, Zhejiang and Hubei). The disease reportedly killed more than 1

million pigs, many in villages. The resulting shortage of pigs caused prices to rise substantially. The disease was characterized by sudden onset, high fever, redness of the skin, rapid breathing, and high mortality (40%).

In September, Chinese veterinary authorities provided the OIE with results of diagnostic findings from 582 samples of pigs exhibiting signs of "swine high fever disease". Results showed a mix of infections with classical swine fever (CSF), porcine reproductive and respiratory syndrome (PRRS), and porcine circovirus 2 (PCV2). These three diseases accounted for more than 96% of the samples tested. In addition, 80 samples tested negative for African swine fever. Prevention and control measures were undertaken and the mortality appeared to have stopped in September.

Veterinary authorities reported a similar swine disease in some parts of southern China in the last few years. The disease was found mainly during hot summers (June to September) in areas along the Yangtze River. ProMED's moderator noted that none of the three agents, PRRS, CSF or PCV2, is known for having marked seasonal distributions, yet a summer distribution seems to be one of the most prominent features of the outbreaks.

Sources: OIE Disease Information Reports; ProMED; American Association of Swine Veterinarians

Undiagnosed disease of camels, Ethiopia

In September 2006, Ethiopian authorities reported an outbreak of a new camel disease in the Somali region of Ethiopia. The regional animal health bureau stated that it had provided treatment to more than 178,000 camels in 19 districts during the preceding 10 months. During the late 1990's, camel illness and deaths in Sudan, Ethiopia, Eritrea and Somalia were attributed mainly to camel pox and parapox viruses and to the relatively new "camel respiratory disease syndrome," the etiology of which was unclear. In Kenya, Rift Valley fever (RVF) was regarded as the cause of abortions in camels as well as deaths of neonates and young camels in the late 1990's.

Source: ProMED

Other disease reports

During the current reporting period (July – September 2006), the Center for Emerging Issues prepared Impact Worksheets on Newcastle disease in Brazil and classical swine fever in Croatia. The Center also prepared an Emerging Disease Notice on viral hemorrhagic septicemia affecting fish in the Great Lakes area. These and other reports are available on the internet at:
http://www.aphis.usda.gov/vs/ceah/cei/taf/current_iw.htm

This summary report was prepared by the Center for Emerging Issues, within the Centers for Epidemiology and Animal Health, Veterinary Services, USDA. Comments or questions concerning this report may be addressed to Steven Sweeney at steven.j.sweeney@aphis.usda.gov or 970-494-7267.