

CEI Impact Worksheet White Spot Disease Louisiana, USA May 16, 2007

Summary:

White spot disease (WSD) has been confirmed in freshwater farmed crawfish (also known as crayfish) in Louisiana, United States of America (U.S.). This is the first occurrence of WSD in Louisiana and the source of the outbreak is undetermined. Louisiana is the nation's largest producer of crawfish with farmed and wild-caught crawfish production totaling 95% of the total U.S. harvest. While there is no export market for Louisiana-produced crawfish, other crustacean exports from this state were valued at \$7 million in 2005. This represented 1.3% of the value of all U.S. crustacean exports for that year. The U.S. produced approximately 324.8 thousand metric tons of crustacean products from wild fisheries and aquaculture sources in 2005, representing 3.26% of world production. WSD is an OIE-notifiable disease.

Current Outbreak and Status of White Spot Disease in the United States

On May 8, 2007, the National Veterinary Services Laboratories (NVSL) confirmed the presence of white spot syndrome virus (WSSV) in samples of freshwater farmed crawfish (*Procambarus clarkii*) from St. Martin Parish, Louisiana (see Figure 1). The source of the virus was undetermined, but crawfish broodstock is regularly collected from wild populations of unknown health status. Declining crawfish productivity and large numbers of birds around the farm ponds were observed prior to the outbreak. Farmed crawfish are at the end of their current production cycle and all ponds in the region will be emptied of crawfish and remain so until October 2007. Surveillance of wild populations of crawfish within the region is ongoing.

The first documented occurrences of this disease in U.S. commercial facilities were in Texas and South Carolina in 1995. WSSV also has been found in wild shrimp and crabs offshore in the Gulf of Mexico and near shore in Texas, Mississippi, Georgia and South Carolina. WSD was last reported to OIE for an outbreak in Hawaii in April 2004.

Sources: OIE Weekly Disease Information Report; Impact Worksheet on White Spot Disease, United States, April 23, 2004, USDA APHIS VS CEAH Center for Emerging Issues
http://www.aphis.usda.gov/vs/ceah/cei/taf/iw_2004_files/domestic/wsd_us_0404_files/wsd_us_0404.htm

Figure 1. Location of WSD Outbreak



Distribution, Pathogenesis and Epidemiology of White Spot Disease

White spot disease is caused by a double-stranded DNA virus of the genus *Whispovirus* in the family *Nimaviridae*. Although mainly a disease of penaeid shrimps, WSSV has a wide host range, potentially affecting many species of shrimps, prawns, crawfish, lobsters and crabs in marine and freshwater environments. WSSV was first reported in Taiwan and mainland China during 1991–1992, and subsequently was found in many Asian

countries including Japan, Indonesia, Republic of Korea, Malaysia, Thailand, Vietnam, the Philippines and India. Since 1999, WSSV also has been reported in several Central and South American countries, including Nicaragua, Guatemala, Honduras, Costa Rica, Panama, Mexico, Colombia, Ecuador and Peru. WSSV is not known to infect humans and eating infected shrimp is not considered to be a human health risk.

WSD can be highly lethal to farmed shrimp populations with mortality reaching 100% in some cases. Clinical signs include loosening of the cuticle, spotting of the carapace from abnormal deposits of calcium salts (hence the name 'white spot disease'), and reddish discoloration due to expansion of cuticular chromatophores. Acutely infected shrimp become lethargic, swimming slowly near the surface and reducing their food consumption. Eventually they sink to the bottom and die. Because there are no effective treatments for WSD, management practices must focus on prevention.

There are numerous potential pathways for WSSV to be transmitted between wild and farmed crustaceans, and therefore numerous opportunities to interrupt the spread of disease. In shrimp farms, the virus is transmitted horizontally through water and feed, whereas in hatcheries it may be transmitted vertically from infected females to their offspring. WSSV may be imported into aquaculture facilities with collections of wild broodstock or through contact with contaminated transport

containers. Viral outbreaks in aquaculture facilities can, in turn, spread to wild crustaceans through untreated pond effluent, flooding, or escape of farmed species. Packing plants that process imported shrimp may discharge WSSV-contaminated effluents into estuaries, increasing risk of virus transmission to wild populations. Gulls and other birds may pick up the virus from contaminated landfills and move it on their bodies or through excretions into shrimp ponds. Heat-treating liquid effluent and solid waste material before disposal will kill the virus and prevent transmission from these sources.

Imported frozen shrimp used as bait for coastal or freshwater fishing is another hazard to wild crustaceans. Discarded bait can be picked up by wild shrimp, crabs or crawfish, spreading WSSV into those populations. Ballast water exchange, e.g., in the Panama Canal, could also be a significant pathway for virus transmission to wild stocks.

Sources: *International Database on Aquatic Animal Diseases* <http://www.collabcen.net/toWeb/qa2.asp>; *Impact Worksheet on White Spot Disease, United States, April 23, 2004, USDA APHIS VS CEAH Center for Emerging Issues* http://www.aphis.usda.gov/vs/ceah/cei/taf/iw_2004_files/domestic/wsd_us_0404_files/wsd_us_0404.htm; *White Spot Viral Disease in Penaeid Shrimp – A Review. A.P. Sangamaheswaran and M.J.P. Jeyaseelan.* www.worldfishcenter.org/naga/Naga24-3&4/pdf/aquabyte%203.pdf

Table 1: Crawfish and crustacean production, U.S. total and Louisiana, 1998 and 2005

	Aquaculture Production				Commercial Landings	
	1998 ¹		2005 ¹		2005 ²	
	Crawfish	Total crustacean	Crawfish	Total crustacean	Crawfish	Total crustacean
Value (\$1,000)						
U.S. total	NA	36,318	21,148	53,381	8,462	1,264,878
Louisiana	9,129	9,129	20,388	NA	NA	NA
Quantity (1,000 lbs)						
U.S. total	NA	NA	35,933	NA	15,246	665,794
Louisiana	NA	NA	35,360	NA	NA	NA

NA = Data not available

Sources: ¹USDA, NASS, 1998 and 2005 Census of Aquaculture; ²NOAA, National Marine Fisheries Service, 2005;

Crawfish and Other Crustacean Industries in the United States

Louisiana's farmed crawfish production and wild crawfish catch comprises about 95% of the total

U.S. crawfish harvest (Table 1). In recent years, approximately 80% of the annual Louisiana crawfish crop is from aquaculture production facilities. Most of the Louisiana-harvested crawfish is sold to the food industry; however, a small amount is sold as recreational fish bait.

According to USDA's National Agricultural Statistics Service (NASS), 2005 Census of Aquaculture data, Louisiana had 605 crawfish aquaculture production facilities that produced 35,360 thousand pounds (Table 1).¹ At the parish level, St. Martin Parish had 16 facilities that produced about 530,000 pounds of crawfish and ranked 5th in Louisiana in both the number of producers and quantity of production in 2002. Between 1998 and 2005, the value of Louisiana crawfish sales rose from \$9.1 million to \$20.4 million, an increase of 124%. In 2005, Louisiana accounted for 93% of the crawfish producing facilities in the U.S. and 96% of the national crawfish sales value. In 2005, the value of Louisiana-farmed crawfish comprised about 38% of the total U.S. value of all farmed crustaceans.

Sources: Southern Regional Aquaculture Center, 'Crawfish Aquaculture – Marketing', Oct 2005; USDA, NASS, 2002 Census of Aquaculture, Louisiana Parish data; Louisiana State University Agricultural Center, 1978-2004: Louisiana Summary of Agriculture and Natural Resources.

United States' Share of the International Market for Crawfish and Other Crustaceans

The U.S. produced approximately 716 million pounds of crustacean products from wild fisheries and aquaculture sources in 2005. U.S. crustacean production in 2005 represented 3.26% of world production.

In 2005 the U.S. exported over 49 million kilograms of crustaceans valued at \$537 million. These exports included lobster, crab, shrimp, prawn, and other crustaceans. There is no export market for Louisiana-produced crawfish; crawfish consumption is generally limited to Louisiana and surrounding areas. However, Louisiana does export other crustacean products. In 2005, these exports were valued at about \$7 million, representing 1.3% of the value of all crustacean products that the U.S. exported that year. By weight, total U.S. crustacean exports in 2005 amounted to 49.3 million kilograms.

Sources: United Nations, FAO – Fishstat data; World Trade Atlas, U.S. Edition; World Trade Atlas, State Export Edition

CEI's plans for follow up:

CEI will continue to monitor the situation but has no plans at this time to issue additional reports. If you would like additional information or would like to comment on this worksheet, you may reply to this message, or contact the Center for Emerging Issues: Tracking, Analysis and Forecasting (TAF) Team at (970) 494-7000 or cei/aphis/usda@aphis.usda.gov.

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¹ Other sources indicate that Louisiana crawfish production is higher than the NASS estimates and this may be due in part to the NASS collection methodology which limits data collection to facilities with annual sales greater than \$1,000.