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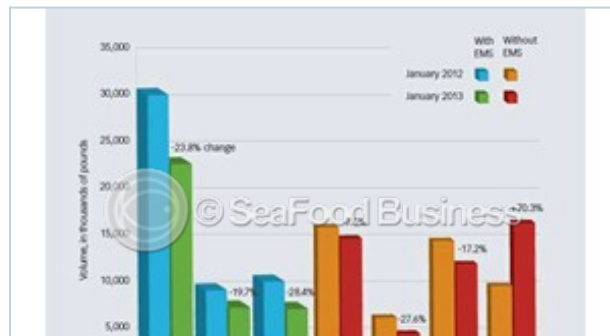
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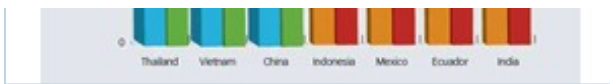
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By Steve Coomes
June 01, 2013

Following three years of exhaustive efforts, an international team of researchers announced in April they'd found the cause of a disease that, since 2009, has killed billions of shrimp raised on farms in Southeast Asia.

Yet while the news was welcome, Donald Lightner, Ph.D., widely credited with finding the cause of the outbreak, says only half the problem is solved. As of



June, no means of stopping the spread of the disease, commonly called “early mortality syndrome,” or simply EMS, had been discovered, implying supplies of tiger and Pacific white shrimp shipped from Southeast Asia

will remain tight for the remainder of 2013. That leaves shrimp buyers searching the globe for replacement product.

“It was nice to have it figured out, but as to what the agent is and its cause, there’s work left to do,” says Lightner, a professor in veterinary science and microbiology at the University of Arizona in Tucson.

The disease, known as “acute hepatopancreatic necrosis syndrome” (AHPNS), kills juvenile shrimp by destroying their hepatopancreas (an organ crucial to digestion) in as little as one month after transference to ponds. The disease first appeared in China in 2009 and has since migrated south to Vietnam, Thailand and Malaysia, costing producers billions of dollars in losses.

According to Lightner, the primary pathogen is a *Vibrio parahaemolyticus* bacterium infected with a phage. Many vibrio strains exist in the world without harming humans or their food supply, but the addition of a bacteriophage (a virus) can render a strain lethal.

“Cholera in humans works the same way in that there are lots of strains around, but they’re not pathogenic until infected with a phage,” he says. Once a shrimp contracts the disease, death can occur in as little as 72 hours. “With the phage, it produces toxins that kill the shrimp by destroying the hepatopancreas.”

In their broad search for what may trigger the disease, scientists have considered but ruled out high-saline ponds, tainted brood stock, contamination from fertilizer runoff and inbreeding.

“Inbreeding has absolutely nothing to do with it since wild monodon get it, too,” says Lightner, referring to tiger prawns. “Breeding companies put a lot of effort into making sure their stocks aren’t inbred, so we don’t see that as a problem.”

Tim Flegel, Ph.D., a professor in the biotechnology department at Mahidol University in Bangkok, says scientists also don’t know how AHPNS has spread from one nation to the next, but they believe high stocking densities in shrimp ponds accelerates its spread.

“Farms are totally unnatural compared to the wild, where shrimp populations are at much lower densities,” Flegel says. “If a shrimp gets weak from disease, it’s eaten by a squid, for example. But in farms, if a disease gets going in there, it goes like fire.”

Stephen Newman, Ph.D., president at [AqualnTech](#) in Lynnwood, Wash., agrees with Flegel, saying shrimp in most aquatic farms are under high stress due to crowding, compromising their immune systems and leaving them prone to infection.

Newman says conditions under which the shrimp have become infected “aren’t readily explained by what Lightner identified as the cause. Historically these (outbreaks) are bacterial and it probably is a vibrio species. But they don’t

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historically have a phage.”

Newman also believes shrimp farming in Third World countries especially needs to be better managed to limit the spread of such catastrophic diseases.

“First World countries understand better than Third World countries that there is a science to aquaculture,” Newman says. “What’s happening in the vast majority of farms in Vietnam, for example, is unsustainable. They’re very poorly run.

“Countries like Ecuador have produced animals at particularly low stocking densities and without the problems you’re seeing in other countries.”

On the supply side

AHPNS-free farms in Indonesia, India and Latin America expect normal production this year, but industry watchers predict steep shortfalls in Southeast Asian farms.

Based on information gathered from sources overseas, Bryan Rosenberg, president and CEO of El Segundo, Calif.-based [Chicken of the Sea Frozen Foods](#), expects total Southeast Asian production could drop as much as 40 percent.

“And that’s based off the past two years’ declines,” says Rosenberg. “So, say Thailand is projecting — best case scenario — maybe 300,000 metric tons (MT) of product for this year, that’s against 480,000 MT last year and 600,000 MT the year before that. That means this year’s best-case scenario is about half of what it was two years ago. And that’s the *optimistic* view right now.”

He has good reason to worry, according to Flegel. Uncertain their shrimping efforts won’t be for naught, many farmers, especially in Thailand, did not stock or even fill ponds this past February, the common start date for the first of two crops produced annually. Some online message-board users estimate as few as 20 percent of Thai farmers stocked their ponds, though sources interviewed could not verify that figure.

“Production will be down, though I’m not sure by how much,” says Flegel. “The farmers are reluctant to do anything since they’re not sure they’ll have a harvest.”

Flegel says Thai farmers sitting out this season commonly operate multiple businesses and have chosen to redirect their interests and investments to those enterprises until a cure for AHPNS is found.

“They’re a pretty savvy group that’s been at this for 27 years,” he says. “Thailand’s very well organized, and there’s a lot of very good communication between its department of fisheries, academics, frozen storage and feed producers who meet regularly to solve problems in the industry.”

With tight supplies and strong international demand already pushing up prices, Travis Larkin, president of [Seafood Exchange](#) in Raleigh, N.C., says his restaurant and supermarket customers are digging into frozen reserves and waiting to see if prices decline before replenishing supplies.

“Some are working off old inventory and pretending it’s OK, but anyone who’s run through their safety stock will have to pay the market price to replace that or forego getting it,” says Larkin, who buys all of his shrimp from South American providers. His costs are up 25 percent over last year. “Prices have gone up so quickly, a lot of people are paralyzed right now, trying not to buy.”

Maria Marano, president of Marina International in Saddle River, N.J., says her customers are acting similarly.

“It’s been rough since December, when prices started going up,” says Marano, who buys shrimp mostly from Ecuador, a nation whose shrimp exports more than doubled from 213 million pounds in 2005 to 450 million pounds 2010. “If my customers purchased shrimp at \$3 per pound before, and now I’m buying it at \$3.20, they are

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only going to buy what they need.”

While depending heavily on Southeast Asian producers, Rosenberg buys shrimp from suppliers around the world to ensure he’s got ample amounts of product for customers. Yet he expects prices will eventually go so high that some customer segments may curtail their shrimp purchases or avoid it altogether.

“Some items that cost us \$5 a pound last year are being quoted at \$9 right now, and this is just the beginning,” Rosenberg says. “If high prices result in less demand and more product, then at least a new balance is struck.”

Processing plants are adding to the problem, Rosenberg says, by bidding up prices in an effort to get raw product and keep workers busy. Such limited resources will really affect companies whose shrimp specs leave no room for replacement, says Dave Bennett, national sales director at CenSea, a wholesale buyer in Northbrook, Ill.

“Retail chains that deal exclusively in private-label sales are going to have a rough year,” Bennett says. “A supermarket chain that carries a couple of different importers’ brands, they’ll have it easier since they can use different types. We can help them with a load of this or that through opportunistic buys. Private-label guys can’t do that.”

Bennett is anticipating India will top its record aquaculture crop of 2011-2012, when it produced 250,000 MT, well beyond the 155,000 MT harvested in the 2009-2010 season. Rosenberg is hoping China and Vietnam have better output than last year, when China’s (marine and freshwater) harvest topped 1.2 million MT [down from more than 1.3 million MT at its peak in 2009], and Vietnam harvested 500,000 MT, its all-time record. Crops from both countries are due in June.

“Right now we’re getting new information that Chinese supply is looking good, but that’s not validated,” Rosenberg says. “But even if supply looks good there, China has such strong domestic demand for shrimp that it doesn’t mean product will be available for us.”

Lightner says in addition to negative reports coming from Thailand, he’s heard Vietnam isn’t faring well so far.

“We do keep getting different numbers all the time, but from what we’re hearing, Vietnam may be getting hit quite hard [with EMS] this time,” Lightner says.

Searching for a solution

Until the AHPNS conundrum is finally solved, farmers are conducting field experiments such as setting up trials in which shrimp are fed nutritious crustaceans like copepods to aid digestion. The result thus far is a mortality rate of 50 percent rather than the total kill common in AHPNS-infected ponds.

Both Lightner and Newman have heard stories of success with shrimp ponds that are co-cultivated with multiple species, such as sea bass and tilapia.

“If you stock [the shrimp] in cages in a pond where they don’t forage on the bottom, and you throw in tilapia, which does forage on the bottom, you see a reduction in mortality,” Newman says. “Still, the evidence is largely anecdotal. There are a lot of questions remaining to be resolved as to why co-cultivation seems to be effective.”

Even if scientists found a solution soon to stop the spread of AHPNS, several sources say it will take at least a year for the industry to return to prior production levels.

“There are no quick fixes here,” Newman says. “It will be starting all over for some. But hopefully the industry will learn something from this and improve. It can’t keep having these outbreaks.”

Contributing Editor Steve Coomes lives in Louisville, Ky.



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