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Health &  
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## Opinion: OIE, the World Organization for Animal Health, needs seafood industry's input

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### Major aquaculture and fishery industries should collaborate to properly address trade interests as OIE delegates



Prof. Tim Flegel argues that the world's major aquaculture and fishery industries should collaborate to ensure that the Chief Veterinary Officers (CVOs) of their respective countries properly address aquaculture and fishery trade interests. Photo by Darryl Jory.

I must declare at the outset that the following discussion about shrimp and fish viruses is of no health concern to humans. In fact, the seafood safety regulations related to human health are controlled by the Food and Agriculture Organization of the United Nations and World Health Organization (FAO/WHO) **Codex Alimentarius Commission** (<http://www.fao.org/fao-who-codexalimentarius/en/>). I am concerned only with the spread of diseases that can result in significant negative economic consequences to industries involved in the capture or culture of fish, shrimp and other aquatic animals, which are the concern of the World Organization for Animal Health (**OIE** (<https://www.oie.int/en/home/>)).

By way of introduction, I started work as a shrimp pathologist around 1987 just when the shrimp aquaculture industry in Thailand was beginning to boom. I gained a great boost in knowledge by attending the first shrimp pathology course given by Dr. Donald V. Lightner and his group at the University of Arizona in the summer of 1989, and I continued my valued association with Don until his retirement. I owe him a great deal for his collaboration, help and advice over

the years, and I was greatly saddened by his **recent passing**. ([https://www.aquaculturealliance.org/advocate/donald-lightner-influential-figure-in-shrimp-aquaculture-remembered/?hstc=236403678.f2f3baced43626f5c360609020196a5a.1680706602655.1680706602655.1680706602655.1&\\_hssc=236403678.1.1680706602655&\\_hsfr](https://www.aquaculturealliance.org/advocate/donald-lightner-influential-figure-in-shrimp-aquaculture-remembered/?hstc=236403678.f2f3baced43626f5c360609020196a5a.1680706602655.1680706602655.1680706602655.1&_hssc=236403678.1.1680706602655&_hsfr))

In the early 1990s, Thai farmers were hit by their first-ever wave of massive shrimp mortalities that they called Yellow Head Disease (YHD). It took us several years to determine that YHD was caused by a previously unknown RNA virus. It was named Yellow Head Virus (YHV) and eventually given the scientific name Okavirus. That disaster was followed in 1995 by an even worse one from White Spot Disease (WSD). It was caused by a new DNA virus named White Spot Syndrome Virus (WSSV) that was later given the scientific name Whispovirus.

It was around this time that I became familiar with the World Organization for Animal Health headquartered in Paris. At that time, it was called the Office International des Epizooties, or OIE, and it still uses that acronym. Through Dr. Lightner, I joined some meetings of the Fish Disease Commission [now called the Aquatic Animals Health Standards Commission or the Aquatic Animals Commission (AAC)] to help write chapters on YHV and WSSV for the OIE Manual of Diagnostic Tests for Aquatic Animals. I was enthusiastic to join in this effort because I passionately felt that there was a serious threat of spreading shrimp diseases (and particularly viral diseases) via the transboundary movement of living shrimp for aquaculture.

However, from 2005 onwards, I became progressively more discouraged as restrictive OIE recommendations for viral diseases of shrimp and fish focused not on movements of living shrimp and fish for aquaculture, but increasingly on fish and shrimp products traded on the international seafood market. By fish and shrimp products I am specifically referring to fresh, eviscerated whole fish or peeled, deveined shrimp (chilled or frozen) or similar products prepared and packaged for direct retail sale for human consumption.

**"Assessment of transmission risk in cooked, WSSV-infected shrimp"** ([https://www.aquaculturealliance.org/advocate/assessment-of-transmission-risk-in-cooked-wssv-infected-shrimp/?hstc=236403678.f2f3baced43626f5c360609020196a5a.1680706602655.1680706602655.1680706602655.1&\\_hssc=236403678.1.1680706602655&\\_hsfr](https://www.aquaculturealliance.org/advocate/assessment-of-transmission-risk-in-cooked-wssv-infected-shrimp/?hstc=236403678.f2f3baced43626f5c360609020196a5a.1680706602655.1680706602655.1680706602655.1&_hssc=236403678.1.1680706602655&_hsfr))

At OIE, I met Dr. Barry J. Hill, then President of the OIE Aquatic Animal Health Standards Commission. He reminded everyone that the implementation of a "zero risk" trade policy for transmission of aquatic animal diseases via traded products is unacceptable. The SPS Agreement of the **World Trade Organization** ([https://www.wto.org/english/tratop\\_e/sps\\_e/spsagr\\_e.htm](https://www.wto.org/english/tratop_e/sps_e/spsagr_e.htm)), requires countries to establish such measures "...on the basis of an appropriate assessment of the actual risks involved..." Zero risk, almost by definition, requires no assessment, appropriate or otherwise.

As an example, "zero risk" applied to air travel would mean there would be no air travel. He explained that, as stated in the SPS Agreement, trade restrictions are only justified if it has been determined by scientific methods that the risk of disease transmission via an imagined pathway is unacceptable. Since he was a fish specialist, I asked him whether, to his knowledge, any fish virus had ever been translocated via fresh, whole eviscerated fish (chilled or frozen) that were prepared and packaged for direct retail sale for human consumption. He replied with a categorical "No."

As an example, he described one incident in which whole fish had been exported to the United Kingdom for processing and repackaging by a local importer before distribution to supermarkets. A disease outbreak did occur, but it was due to waste that had been improperly discharged from the processing facility, contaminating a nearby stream and causing disease in wild fish. It did not arise from the processed fish sent to the supermarket.

After that, regulations were implemented – not to stop the importation of fish for processing, but to ensure that processors could handle the imported fish processing wastes safely before they would be allowed to operate. At no time were restrictions applied to fish products directly imported from the same source country or to fish products from local processing plants that handled their wastes safely. Obviously, everyone realized that some of the supermarket products would contain a viable virus, but they were confident from past experience that no translocations would occur via that pathway, and none did.

Indeed, in an article entitled "Dilemmas of disease control policies" in the Bulletin of the European Association of Fish Pathologists in 1991 [Bull Eur Assoc Fish Pathol 11:3-7], it was stated by P. De Kinkelin and R.P. Hedrick that, "In the final analysis, the task of governmental authorities is not to secure for farmers a 100 percent no-risk situation. The position of governmental regulations must be to define the level of unacceptable risk. There will always be some degree of risk that will be left for the farmer to carry. For these reasons, control authorities have chosen to select major pathogens, even though this is not perfect and there will be many failures. And in the end, control policies must work hand in hand with the industry, because if the industry cannot trade, there will be no aquaculture industry for which health authorities must devise such disease control policies."

Later, in the same paper the authors wrote, "Considering the current possibilities for policies to control the movement of aquatic animal pathogens around the world, it is evident that the most reliable means of preventing their spread depends on the principle that the only safe fish is a dead fish or, even better, an eviscerated fish. With this principle there are no dilemmas."

This was the background experience that fueled my opposition to the increasingly restrictive nature of OIE recommendations after 2004. Specifically, in the first seven editions of the OIE Aquatic Animal Health Code (AAHC) from 1995 to 2004 (10 years), fish and shrimp products were recommended as safe for trade regardless of the status of the exporting country for the presence or absence of listed viral pathogens. Only the movement of living animals was of concern. This position was based on 104 years of previous experience (i.e., since knowledge of the existence of bacterial and viral pathogens) indicating that trade in shrimp and fish products had never resulted in geographical translocation of viral diseases. Cases of translocation by living animals imported for aquaculture, on the other hand, were well known.

***The majority of the CVO representative members were (and still are) veterinarians who have been trained to deal with terrestrial animal diseases and perhaps have little or no knowledge or interest in aquatic animals.***

During this historical period, new and newly emerging shrimp and fish pathogens were recognized by researchers who quickly and freely notified the world of their discoveries. Thus, containment measures could be rapidly implemented to prevent negative effects on production and trade. Then, beginning with the eighth AAHC edition in 2005, the recommendations for fish and shrimp began to be qualified by conditional warnings of potential danger from viral pathogens that might be present in traded products. In the current OIE recommendations, only cooked products are now considered safe for some viruses. These changes were not backed up by any new substantiated incidents of viral translocation via these traded products. In subsequent editions of the AAHC similar restrictive changes were made for shrimp products that were formerly considered to be safe.

These increasingly restrictive changes in the AAHC coincided with increasing use of highly sensitive polymerase chain reaction [PCR, a widely used method to rapidly make millions to billions of complete or partial copies of a specific DNA sample, allowing scientists to take a very small sample of DNA and amplify it (or a part of it) to a large enough amount to study in detail] technology to detect shrimp and fish pathogens]. I participated in the development of such techniques for shrimp so they could be used to screen for the absence of dangerous viruses before the translocation of living shrimp for use in aquaculture. Thus, I was disappointed and strongly opposed when these PCR techniques were applied to fish and shrimp products.

I was concerned for two reasons. First, as exemplified by the incident described by Barry Hill above, it was already known and accepted that some imported fish products approved for direct retail sale would contain viable pathogens but that they posed no significant disease transmission risk. Thus, PCR testing of the products (if it had been available at that time) would have been superfluous and would have constituted a needless expense. Second, PCR tests give positive results for both dead and living pathogens and cannot be used to confirm that viable pathogens are present.

This inappropriate application of PCR technology was likely stimulated by laboratory experiments in which viable viruses had been successfully isolated from fish and shrimp products. These experiments involved homogenization of fish or shrimp tissues followed by centrifugation to concentrate any viruses that might be present. The preparations were then injected into fish or shrimp and shown to cause disease in the laboratory. None of these publications provided any epidemiological evidence to support the contention that fish and shrimp products presented any significant risk for viral transmission to cultivated or wild fish or shrimp.

Those who promote rejection of PCR-positive shrimp and fish products are obliged to provide new, scientifically sound epidemiological evidence that such products constitute an unacceptable risk for disease transmission. Instead, imagined risks based on limited, unrealistic laboratory studies have been used as justification without a full risk assessment to consider the epidemiological pathways involved. Rejecting shrimp and fish products based on PCR testing fails to consider that millions of tons of fish and shrimp products had been traded safely before and after the relevant viruses were discovered and prior to the widespread use of PCR technology.

Until today, no viral translocation incidents have been proven to occur via these products. I challenge readers who disagree with my position to provide published, peer-reviewed publications that have proven the translocation of a virus from fish or shrimp products to cultivated or wild fish or shrimp. Please do not cite laboratory studies that employ injection of viral extracts accompanied by pure speculation regarding translocation risks. Please also exclude publications that contain speculations based only on personal perceptions and unsupported by sound epidemiological research data.

Despite the lack of any translocation incidents or sound epidemiological studies indicating significant risks associated with fish and shrimp products, what has followed from the laboratory PCR research is that many countries now use increasingly sensitive PCR methods to screen imported products that were formerly considered safe without testing. Imported products positive for OIE-listed pathogens by PCR have been and still are being rejected or subjected to treatments that decrease their value. The resulting negative impact on seafood trade is substantial and, in my opinion, unnecessary and unjustified. Some countries use this approach even when a pathogen is present and uncontrolled in their own country, although doing so contravenes the regulations they agreed to as members of the WTO.

These practices of trade restriction have led to a high level of paranoia in producing countries. As a result, there is now a strong political incentive to ignore OIE-WTO responsibilities in reporting new and newly emerging diseases for fear of knee-jerk implementation of import bans, PCR screening and rejection of their fish and shrimp products. Some countries have even enacted legislation to criminalize scientists (fines and imprisonment) who report or even test for new and emerging diseases in their country without government permission. In such an atmosphere of fear and intimidation, the most critical interval for potential containment of newly emerging viruses is obliterated, and the unintentional spread of viruses via living shrimp and fish is promoted.

The way to solve this dangerous situation is to go back to the former OIE position that fish and shrimp products are unequivocally safe for trade, regardless of the status of the exporting country for a particular viral pathogen. By mutual agreement, this would stop PCR testing of these products and there would be no paranoia regarding notification of new and emerging pathogens. This does not mean that importing countries cannot invoke appropriate measures to protect their animal health, but they should ensure that trade is not disrupted on the basis of a test result that alone has no epidemiological relevance to disease transmission.

I believe that the seafood industry – including fishermen, fish farmers, processors, exporters and associated importers – must join hands to restore rational, international seafood trade. Aquaculture feed producers should also participate because PCR has been used to regulate feeds and feed ingredients containing materials from aquatic sources (e.g., fishmeal). I believe that the wild-capture fishing industries should also be involved because the viruses that pose a threat to aquaculture often occur in wild fish and shrimp and could be present and detectable by PCR in fish and shrimp products.

The way for the industry to help restore rational trade is to take an active role with the OIE. The OIE operates through decisions made by its member countries at its annual General Session meetings. Resulting recommendations are backed by the World Trade Organization. Each OIE member country is represented by a country delegate who is their Chief Veterinary Officer (CVO). The CVO is the only channel for member countries to interact with OIE, whether by voting at the General Session, by submitting requests or by proposing changes to the animal health codes.

In my opinion, a major weakness of OIE is that it originated in 1924 as an international organization of veterinarians for the control of terrestrial animal diseases only. It was not until 1960 that the Fish Disease Commission (FDC, now called the Aquatic Animals Commission or AAC) was formed to assist OIE member countries in adapting and applying the OIE principles from terrestrial animal disease control to fish (and eventually shrimp and other aquatic animals). The first Aquatic Animal Health Code (AAHC) was not published until 1995. The majority of the CVO representative members were (and still are) veterinarians who have been trained to deal with terrestrial animal diseases and perhaps have little or no knowledge or interest in aquatic animals. Such members tend to defer to the experts of the FDC/ACC and support their recommendations. It is true that the FDC/ACC records its activities and sends out its draft recommendations to member countries for comments and suggestions before they are submitted to the OIE General Session for approval by voters. However, the fisheries and aquaculture industries are generally unaware of this prior-review process or may not be involved in it.

I believe the time has come for the world's major aquaculture and fishery industries to come together to ensure that the CVOs of their respective countries properly address aquaculture and fishery trade interests as OIE delegates. Major aquaculture and fishery-producing countries could cooperate to protect their interests in fair trade by block voting of their CVOs at OIE general sessions. Through their CVOs, they would also be able to call for re-assessment and possible amendment of the current AAHC recommendations on the safety of seafood products and aquaculture feeds.

In the same way that the Global Aquaculture Alliance was able to set up a system of standards now operating as Best Aquaculture Practices (BAP), it should be possible to set up a system for internationally recognized safety certification for seafood products and aquaculture feeds with respect to pathogen-translocation risks.

I hope that this article will stimulate a constructive discussion that will lead to an active role for the seafood industry in developing OIE policies and recommendations.

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## Author

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