

A different form of dumping: The need for a precautionary approach for yet another new species for shrimp farming in Asia

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Dumping, in aquaculture terms, occurs when exporters flood a market with a low priced cultured commodity, at a price which is either below the price in its home market or is below its cost of production. Cases in point are the well publicized (and sorely contested) 'anti-dumping' cases against exports of tra (*Pangasianodon hypophthalmus*) and basa (*Pangasius boccourti*) and the export of shrimp from Asian and Latin American countries into US markets. In general, with regard to this form of dumping, which is essentially a trade and fair pricing issue, producing countries have a forum to turn to settle disputes which is the WTO - at least when they are members of the WTO.

What is pointed out in this article is not in respect of commodities as mentioned earlier but a new form of "dumping" which could occur with widespread introduction of new species. The term "dumping" is justified because the commercial transactions associated with such introductions in the region often do not take account of the potential environmental and biodiversity costs, and therefore an environmental subsidy is being provided by the host nation for the environmental impacts that may result.

The senior author recently attended the Indonesian aquaculture meeting, Indo Aqua 2007, Bali, Indonesia, and was surprised and perturbed by the promotion of *Penaeus stylirostris* as a new species for aquaculture in the region, as means of counteracting the emerging problems with *Penaeus vannamei*. Mention of this new species is also appearing in some trade magazines. The controversies are well known with regard to the introduction into certain countries of *P. vannamei*, a species that is alien to Asia, as a means of reviving the shrimp aquaculture sector that was based on the indigenous *P. monodon* which unfortunately succumbed to various disease problems. Even to date, in spite of the very high production of *P. vannamei* and the economic returns thereof, certain countries in the region

such as India and Vietnam (in the southern region) have endeavored to revive the culture of *P. monodon* through the adoption of improved farming practices, and resisted the introduction of *P. vannamei*. The positive impacts of the former and the benefits it has brought to small scale shrimp farmers in such countries (Briggs *et al.*, 2004) are well documented, although farmers of both *P. vannamei* and *P. monodon* are facing considerable problems due to downward price pressures associated with large volume *P. vannamei* production. All this is essentially history and whether *P. vannamei* impacts on biodiversity in Asia is yet to be seen and or proven, although there is evidence that the species is present in the wild and the long-term impacts can not be predicted at this stage (Senan *et al.*, 2007).

It is a trend in the shrimp sector to produce specific pathogen-free (SPF) broodstock and post larvae. Such developments have primarily taken place in the West through years of enduring and carefully managed scientific research, and such stocks, including exotic species such as *P. vannamei*, have been introduced to many Asian countries. In theory, post larvae produced under strict biosecure conditions using true SPF broodstock have a higher probability of leading to a successful crop. However, this has not happened in many countries. Use of local pond-raised brood stock as 'SPF' stocks and their subsequent proliferation has led to several problems, including poor growth and increased occurrence disease outbreaks.

For obvious reasons, introductions of the so-called true SPF broodstock has also not always happened and is evident by the fact that in many *P. vannamei* culturing countries of the region, Taura syndrome caused by Taura syndrome virus (TSV), has been officially documented. In recent years, another exotic viral disease caused by infectious myonecrosis virus (IMNV) has also been reported from

The shrimp farming sector in the Asia-Pacific region is one of the most lucrative of all aquaculture sectors. The sector went through a difficult period when over intensification, environmental degradation and other factors led to the emergence and establishment of many viral diseases in *Penaeus monodon*, the backbone of production in the past. To keep the sector alive, some nations introduced the exotic *P. vannamei*, and the use of specific pathogen-free (SPF) broodstock was seen as a means of combating these disease problems. However, many of the viral diseases that had affected *P. monodon* were also found to affect *P. vannamei*, and to rub salt into the wounds, new viral diseases that were never present in the region have also begun to appear. Despite this experience, there is now advocacy towards introduction of yet another exotic species, *P. stylirostris*, for which SPF broodstock have been developed. Again introductions seem to be poised to occur without any consideration of the long term effects on biodiversity, disease risk or other potential environmental impacts. This article calls for a precautionary approach and proper analysis of risks before, rather than after, the potentially damaging widespread new shrimp introductions.

the region (NACA/FAO 2006). These disease problems only confirm, yet again, that introductions, especially of exotic species for aquaculture, always carry a risk of also introducing exotic pathogens, in addition to possible impacts on biodiversity in the long term (Flegel, 2006). The region which had to cope with WSSV for a long time has now to deal with two more dangerous exotic viruses, which have the potential to inflict long term damage on the shrimp industry. The cryptic nature of

crustacean viruses and their ability to cause multiple infections raises important issues to be addressed when considering the trans-boundary movement of crustaceans, including SPF/ SPR stocks.

The Regional Aquatic Animal Health Advisory Group of NACA has repeatedly expressed concern about TSV in Asia, especially because the pathogen is spreading and changing genetically. This could conceivably lead to changes in virulence, not only in *P. vannamei* but also in the susceptibility of local crustacean species. The high number of variants of TSV represents a threat of unknown proportions to native species. IMNV, which was known to occur only in Brazil (first reported in Brazil in 2002), has now been reported from the region in June 2006 (NACA/FAO 2006).

If one examines the reasons for introductions, it becomes obvious that many national governments, producers and related aquaculture businesses, when faced with the prospect of continuously losing crops of *P. monodon* due to disease problems (e.g., white spot disease, monodon slow growth syndrome), naturally decided to try alternative species, but unfortunately without giving due considerations to the potential long term impacts of such introductions. In the race to produce large volumes of shrimp for a hungry market, the precautionary approach and risk management measures (e.g., import risk analysis, biosecurity measures) were not given a priority. Added to this, the availability of SPF broodstock provided a strong justification for many governments and shrimp producers to advocate introduction of non-native *P. vannamei*. On the production side, this species has done very well in the region. This cannot be denied - but the disease impacts are only beginning to emerge.

In response to the developing problems with *P. vannamei* culture, there is now emerging commercial advocacy for wider introductions of *P. stylirostris*, another exotic species to the region, apparently because of the existence of strains resistant to IHNV and TSV. This species is already present in Asia, to a small extent and has been tried on an experimental scale in some countries, but again our understanding of pathogens and the potential impacts on biodiversity are still an insufficient basis for large scale introductions for farming.

Another issue that governments and business must consider in their decision-making is the risk of developing total dependency as SPF stock need to be introduced on a regular basis to meet the seed demands of the industry (SPF lines must be maintained in a biosecure environment to retain their status) and to avoid in-breeding and consequent loss of production performance. This may not be the best approach for the shrimp sector, if it has to survive in the competitive world. The same approach is even emerging for SPF *P. monodon* that are being introduced into Vietnam and elsewhere. Although the development of SPF *P. monodon* broodstock is to be applauded, the technology should be developed and widely adopted within the region to promote self reliance and the availability of local supplies. The solution perhaps lies in a consolidated approach in the region; the private sector and governments of the shrimp producing nations should invest more substantially in development of SPF broodstock of *P. monodon* and other local species, rather than developing a reliance on SPF stock from outside of the region. Such programs are currently under development in several countries.

So, just as *P. monodon* faced viral disease problems, the same is beginning to happen with *P. vannamei*. What is the solution? Should the solution be to (a) revive the culture of *P. monodon*, (b) try to live with *P. vannamei* and do the needful to avoid potential environment impacts and emerging disease problems and/or (c) introduce a new species alien to the region as advocated by the proponents of SPF broodstock of species such as *P. stylirostris*; in common parlance to keep on changing the pillow to get rid of the headache!!!

Obviously, the advocacy for large scale introduction of SPF *P. stylirostris* is almost totally commercially driven without obvious concern for the risks associated with long term environmental integrity and biodiversity (apart from its non-suitability for culture in Asia on the grounds of performance and the like). It is hoped that governments in the region pay careful attention to the need for proper risk analysis and biosecurity measures, and will not be content with a patchwork solution to a problem. Some questions which stakeholders must consider:

- Did the introduction of stocks of the alien species *P. vannamei* (both SPF and non-SPF) provide any long term solutions to the disease problems, or did it in fact make the situation worse by introducing additional pathogens to trouble farmers?
- Will the introduction of another exotic species to the region do any good?
- Has the long term impact of *P. vannamei* on local biodiversity been properly assessed and understood?
- What prevents us from reviving the native *P. monodon* industry?

We reiterate the position that patchwork and short term reactive solutions to problems are not the answer. We are dealing with intricate biological systems. We are duty-bound to future generations to preserve biodiversity in our ecosystems as it is the foundation of life on earth and at the heart of a healthy planet. Let us not heed to short term commercial gains (and consider who the real beneficiaries will be) and be misled by various new claims about *P. stylirostris*. It is regrettable that, although the commercial advantages of the introduction of SFP shrimp are well advertised (e.g., Wyban, 2007), the emergence of new diseases in the region associated with the introduction, and or long-term potential impacts on biodiversity are rarely or never addressed. Indeed, Briggs *et al.* (2004) pointed out the lack of caution by the private sector as opposed to the position of Asian governments.

This article has attempted to be forthright. We fear that some Asian nations will again be drawn into widespread introduction of yet another species of shrimp, with no concerns on long term impacts. NACA's interest as an inter-governmental organization is the long term sustainability of the aquaculture sector in the Asia-Pacific region, and the millions of small scale farmers who make a livelihood from aqua farming and who have been productive enough to provide over 40 percent of the food fish consumed globally at present. Let us ensure a careful and rigorous, science-based analysis and appropriate management measures put in place, before we see yet another new species, introduced and spread, leading to unforeseen future problems for the sector and the region's biodiversity.

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Sustainable livelihoods of pangus farming in rural Bangladesh

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Development of aquaculture has generated considerable employment opportunities in Bangladesh through the production and marketing of fish and associated activities. Around 400,000 ha of freshwater ponds/ditches and more than 900,000 households are involved in aquaculture (ADB, 2005). Conditions are highly favorable for the rapid expansion of aquaculture as the quantity of seed produced has risen rapidly in recent years (Muir, 2003). Bangladesh is considered one of the most suitable countries in the world for small-scale freshwater rural aquaculture, because of its favorable resources and agro-climatic conditions. Over the last three decades, there has been a steady increase in inland freshwater aquaculture production. In Bangladesh, total fish production was estimated at 2.2 million tons in 2005 of which 882,091 tons (40%) were from inland freshwater aquaculture, 859,269 tons (39%) from inland capture fisheries, and 474,597 tons (21%) from marine fisheries (DOF, 2006). The main production systems for freshwater aquaculture in Bangladesh are extensive and semi-intensive pond polyculture of carps which accounts for 80% of the total freshwater aquaculture production (ADB, 2005; Ahmed, 2005). The remaining 20% are mainly from pangus, tilapia, small indigenous species (SIS) of fish and rice-fish farming (Muir, 2003). A current



focus is on promoting pangus farming for food supply, increase income, and employment opportunity – all of these are important parameters of sustainable livelihoods.

Sutchi catfish, *Pangasianodon hypophthalmus* is an indigenous fish species of Thailand, living in the Mekong River (Roberts and Vidthayanon, 1991). The origin of pangus was from the Mekong River of Vietnam to the Chao Phraya