Slow growth syndrome in *Penaeus monodon*-an emerging problem

Information Sheet Prepared for NACA
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Background

During 2002, slow growth of farmed *P. monodon* was reported throughout shrimp growing areas of Thailand and figures indicated that annual production volume was down by approximately 36 %. The cause of the slow growth in Thai *P. monodon* has not been determined but recent trails indicate that a filtrable infectious agent is involved. Bacteria-free filtrates from slow growing *P. monodon* have been shown by Dr. Boonsirm Withyachumnarnkul to cause slow growth in experimental shrimp. In addition, extracts from the experimentally infected shrimp have a similar effect on new groups of experimentally injected *P. monodon* but no visible effect on experimentally injected *P. vannamei* (B. Withyachumnarnkul, unpublished).

A new type of yellow head virus (YHV) has been found in these shrimp, but preliminary tests (unpublished) suggest that it is not correlated with the problem. Since the slow growth problem occurred following the large scale importations of Pacific white shrimp (*Penaeus vannamei* also called *Litopenaeus vannamei*) from the Americas and from China/Taiwan, it is possible that the syndrome may be due to introduction of an exotic virus.

In late 2002, lymphoid organ vacuolisation virus (LOVV)-like viral particles were detected in several captured *P. monodon* broodstock from Thailand (DV Lightner, personal communication). Prior to the importation of *P. vannamei*, LOVV was only known in the Americas. During the interval of initial *P. vannamei* importation into Thailand, many Thai hatchery operators produced postlarvae (PL) for both *P. vannamei* and *P. monodon* in the same facility, sometimes holding broodstock in common tanks. This would have provided an ideal opportunity for pathogen transfer between the species. The practice is now discouraged, and most major Thai producers of *P. vannamei* PL do so in dedicated facilities.

Etiology

Our survey has shown that known pathogens are unlikely to be the cause of slow growth syndrome in *P. monodon* (Chayaburakul et al. Dis Aquat Org, in press). Ultracentrifuge bands of tissue homogenates show 2 previously unreported viral-like particles and extracts of these bands give products by RT-PCR but not by PCR, suggesting involvement of RNA viruses

Working Case Definition:

As the etiology is still uncertain, there is no clear case definition for this syndrome. The following features can be used as a working case definition for surveillance and epidemiological purposes to collate more information about this syndrome in the region.

The suspected population must have a coefficient of variation (CV = Standard deviation/Mean) of more than 35% by weight and absence of hepatopancreatic parvovirus (HPV) or of other severe hepatopancreatic infections by known agents while also complying to any 3 out of the 5 following gross signs:

- Unusually dark color
- Average daily weight gain of less than 0.1 g/day at 4 months
- Unusually bright yellow markings
- Bamboo segments
- Brittle antennae

Recommendations

As of now there is no tested management approach to tackle this problem. However, it is well known that viruses can move between species. Pathogens like-WSSV, YHV, IHHNV and MOV may jump from *P. monodon* to *P. vannamei* while pathogens like LOVV, TSV, BP and Reo-like virus may jump from *P. vannamei* to *P. monodon*. Implementing the following recommendations might help to reduce the impact of slow growth syndrome.

- In countries where *P. vannamei* has already been introduced, *P. vannamei* and *P. monodon* should be reared separately, particularly at the hatchery phase.
- National authorities should increase surveillance for slow growth syndrome in *P. monodon*.
- Countries considering introduction of *P. vannamei* or any other crustacean should follow the full ICES protocol with the addition of co-habitation tests employing important, endemic crustacean species. This will reduce the risk of importing exotic viral pathogens that may damage local aquaculture or fisheries.