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Dr. Chadag Mohan is the research and development program manager for the Network of Aquaculture Centres in Asia-Pacific and coordinates its Aquatic Animal Health Program.

He holds a doctorate in aquatic animal pathology from the University of Stirling's Institute of Aquaculture and is a fish pathology professor at the College of Fisheries in Mangalore, India, where he is also involved with aquaculture research.

He is also chairman of the Fish Health Section of the Asian Fisheries Society.

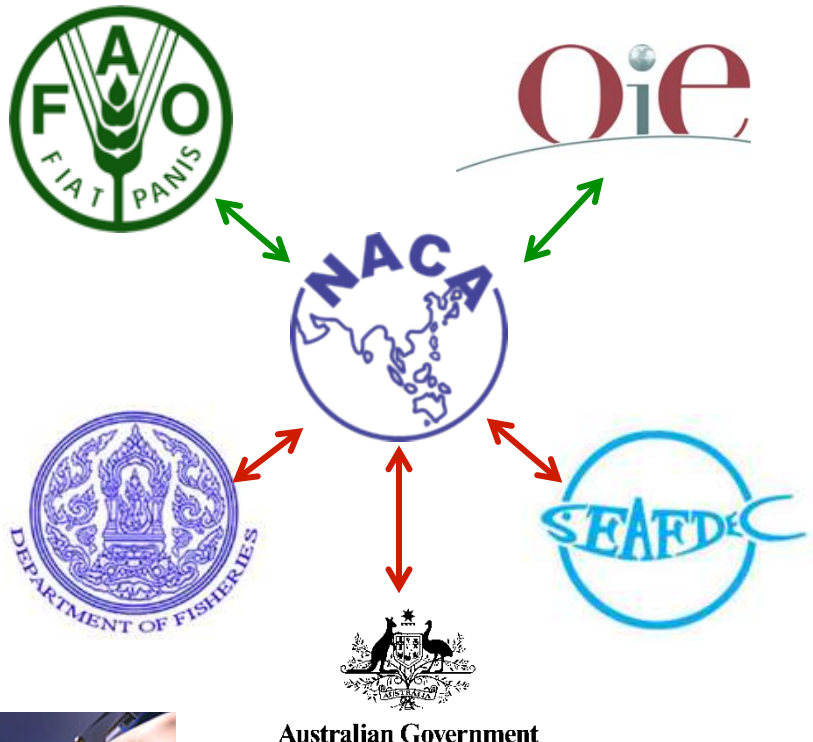
# Biosecurity Recommendations To manage EMS/AHPNS In Shrimp

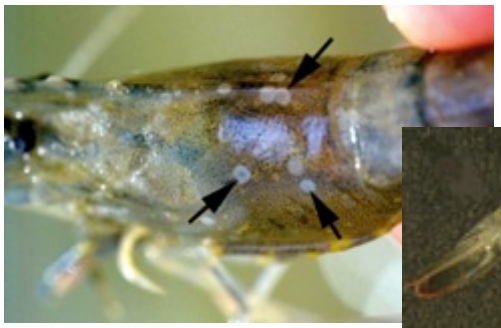
CV Mohan and Eduardo Leano
NACA, Bangkok

# Regional Aquatic Animal Health Program

Improve regional cooperation to reduce risks of aquatic animal disease impacting on livelihoods of aquaculture farmers, national economies, trade and human health.

Works closely with international, regional and national organizations:



Australian Government
Department of Agriculture, Fisheries and Forestry

# NACA's Response to EMS/AHPNS

- Alerting NACA Regional Advisory Group, OIE and FAO to the emerging threat of EMS in Mekong Delta of Vietnam in April 2011
- Formal NACA circular to CA's of all member governments
- Development and dissemination of AHPNS Disease advisory
- Convening of Asia Pacific emergency regional consultation (9-10 August 2012), Bangkok with support from DAFF, Australia
    - 17 global shrimp experts
    - 40 national delegates representing CA and lead research institutions
    - 10 regional/international institutions
    - 8 private sector representatives
- Technical report preparation and wider dissemination
- Development and dissemination of AHPNS Disease Card

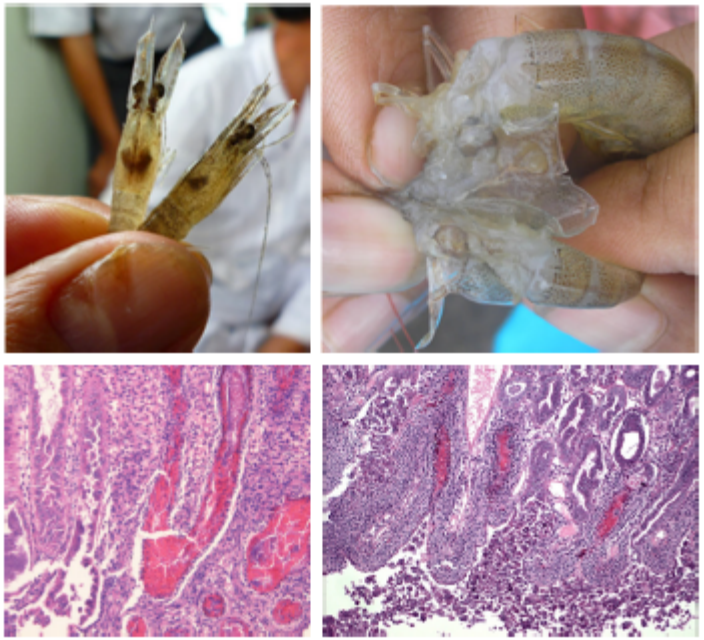
Global Outlook for Aquaculture Leadership BANGKOK 2012 TM

Australian Government
Department of Agriculture, Fisheries and Forestry

NACA

# Final Report

## Asia Pacific Emergency Regional Consultation on the Emerging Shrimp Disease: Early Mortality Syndrome (EMS) / Acute Hepatopancreatic Necrosis Syndrome (AHPNS)



Network of Aquaculture Centres in Asia-Pacific
Bangkok, Thailand
9-10 August 2012

Global Outlook for Aquaculture Leadership
BANGKOK 2012 TM

# Diseases of Crustaceans – Acute Hepatopancreatic Necrosis Syndrome (AHPNS)

## Signs of Disease

In the absence of identified biotic or abiotic cause(s) of the syndrome, the following disease signs can be used for presumptive (pond level) and confirmative (animal level) diagnosis of the disease.

### Disease signs at pond level

- Often pale to white hepatopancreas (HP) due to pigment loss in the connective tissue capsule.
- Significant atrophy (shrinkage) of HP.
- Often soft shells and guts with discontinuous contents or no content.
- Black spots or streaks sometimes visible within the HP.
- HP does not squash easily between thumb & finger.
- Onset of clinical signs and mortality starting as early as 10 days post stocking.
- Moribund shrimp sink to bottom.

### Disease signs at animal level by histopathology

- Acute progressive degeneration of the HP accompanied initially by a decrease of R, B and F-cells followed last by a marked reduction of mitotic activity in E-cells.
- Progress of lesion development is proximal-to-distal with dysfunction of R, B, F, and lastly E-cells, with affected HP tubule mucosal cells presenting prominent karyomegaly (enlarged nuclei), and rounding and sloughing into the HP tubule lumens.

**Juvenile *Penaeus vannamei* from Vietnam: left with AHPNS; right appears normal.**
Source: D Lightner

**Pale atrophied hepatopancreas of juvenile *Penaeus vannamei*, indicative of AHPNS.**
Source: D Lightner

**Pale atrophied hepatopancreas of juvenile *Penaeus monodon* from Vietnam with AHPNS.**
Source: D Lightner

# Biosecurity at pond/farm level

- Avoiding high risk practices (live feeds; co-cultivation, unregulated movement)
- Implementing pathogen exclusion practices (SPF broodstock, water treatment e.g., filtration, disinfection)
- Reduce stress in production practices
- Employ disease containment practices (good sanitation, bird netting)
- Implement BMPs (stocking larger sizes, probiotics, bioflocs)

# Biosecurity at national Level

- Build capacity for early detection and diagnosis (histology)
- Restrict movements of non-SPF seed and broodstock
- Measures to contain spread to non-affected countries:
  - Conduct import risk analysis
  - Exercise caution if importing from affected countries
  - increase surveillance and study suspected AHPNS-like outbreaks thoroughly
  - develop contingency plans with agreed roles and responsibilities for a rapid response
  - Establish task force to enhance international cooperation

# Thank You!