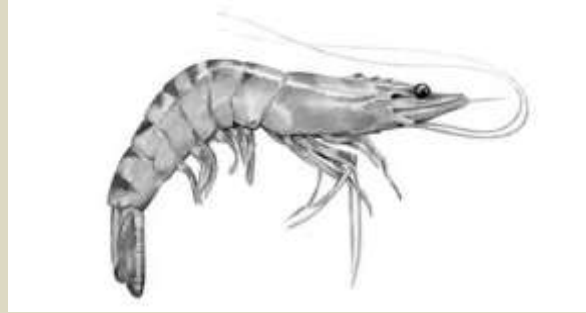


Slide 1

White spot disease



Slide 2

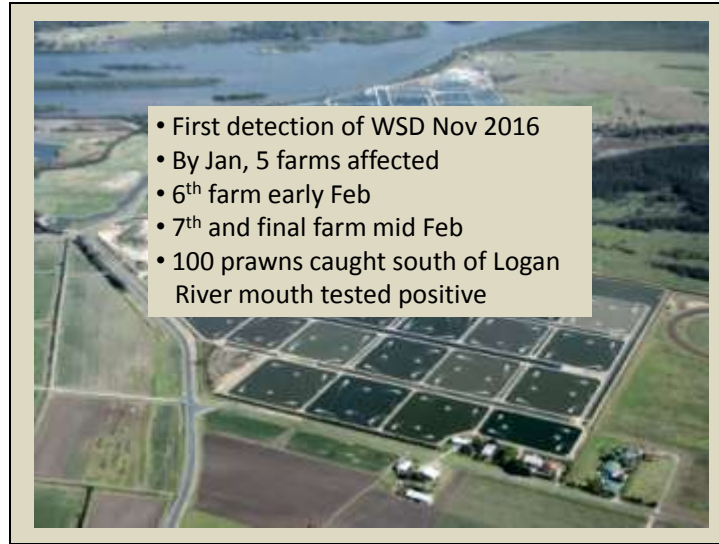


A giant black tiger prawn (*Penaeus monodon*) that is displaying the distinctive white spots of white spot disease (WSD). White spots are especially visible on the carapace and the rostrum. While providing a tentative diagnosis of WSD infection, white spots are not always visible in shrimp with acute phase white spot syndrome, and may develop in the subacute to chronic or recovery phases of the infection

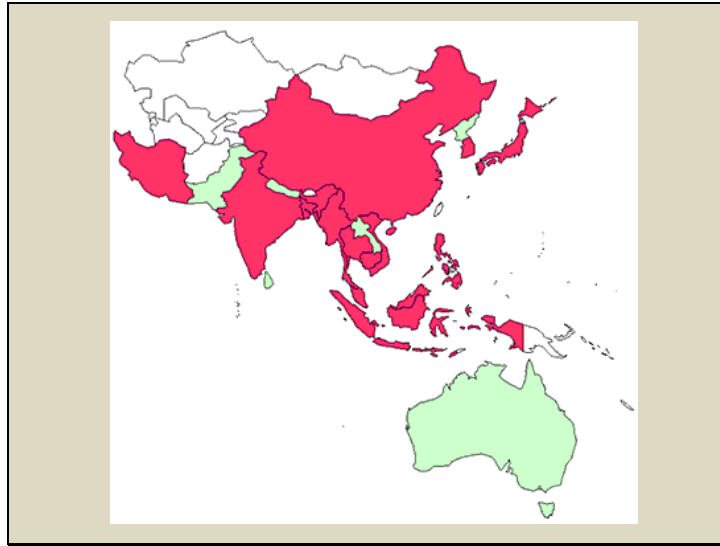
Slide 3



Slide 4

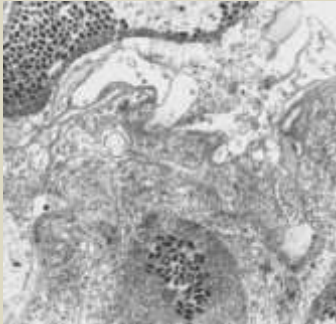


Slide 5



## White spot syndrome virus

- Large, rod-shaped DNA virus
- New genus *Whispovirus* (Family: Nimaviridae)



[http://panchu.tripod.com/shrimp/disease/wssv\\_overview.htm](http://panchu.tripod.com/shrimp/disease/wssv_overview.htm)

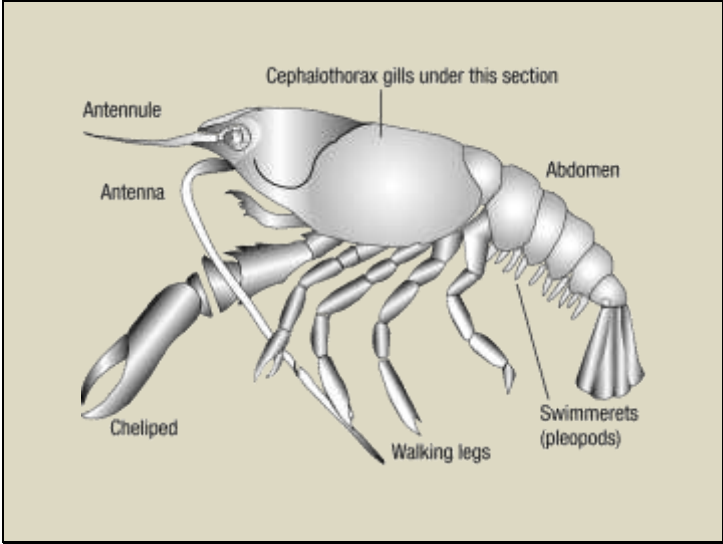
## Clinical disease

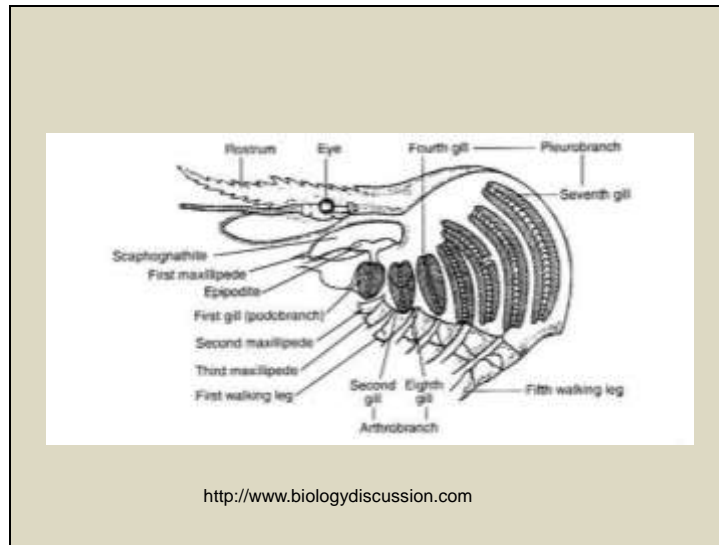
- Lethargy, cessation of feeding, moribund near top of pond, increased mortality
- Loose shell
- Darkened (red or pink) body surface and appendages
- Heavy surface and gill fouling by external parasites
- 0.5-2.0mm calcium deposits in shell – appear at end of acute phase, but can be absent

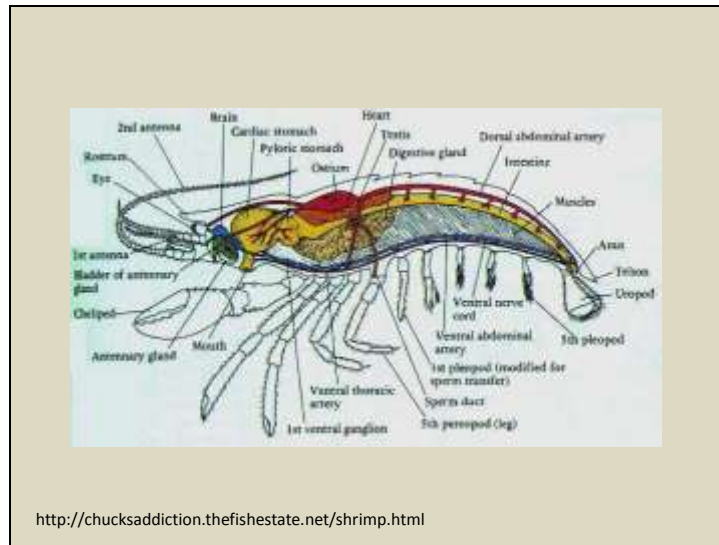
## Diagnosis

- OIE: RT-PCR + one other positive test
  - Histopathology
  - Immunohistochemistry
  - Amplicon sequencing
- Difficult to satisfy if no clinical signs/carriers









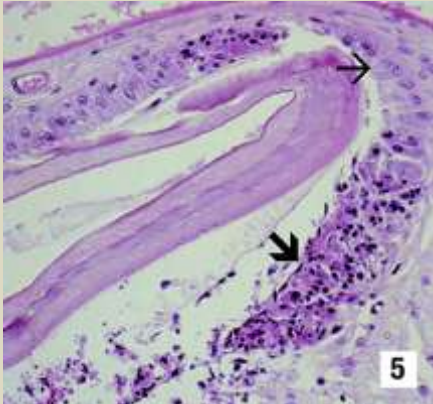
<http://chucksaddiction.thefishestate.net/shrimp.html>

Slide 12



**The carapace from a juvenile black tiger prawn with WSD. Calcareous deposits on the underside of the shell account for the white spots. Photo: P Saibaba, SKBR College, Amalapuram, India**

“Normal” stomach



<http://library.enaca.org/Health/FieldGuide/html/fore.htm>

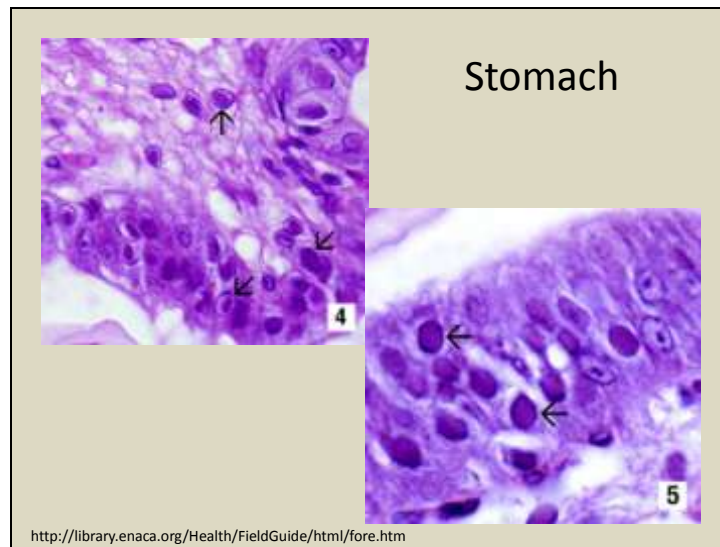


Figure 4. Photomicrograph (900x) of a histological section from the stomach of a juvenile black tiger prawn infected with WSD. Prominent intranuclear inclusion bodies are abundant in the **cuticular** epithelium and subcuticular connective tissue of the organ (arrows). Cells in different phases of infection by WSD display intranuclear inclusion bodies. The early phase inclusion bodies that predominate in this section are centronuclear, eosinophilic, and separated from the nuclear membrane and marginated chromatin by an artifactual halo (resembling infectious hypodermal and haematopoietic necrosis inclusion bodies).

Figure 5. Histological section (1300x) of the stomach of a juvenile Chinese white shrimp (*P. chinensis*) with an advanced WSD infection. Fully developed WSD intranuclear inclusion bodies (arrows) are more basophilic, appear granular in texture, and nearly fill the affected hypertrophied nucleus. Occlusion bodies are not present .

(stomach is chitin lined)

## Carapace

Dystrophic  
calcification?



M. Afsharnasab *et al.* 2009. Iran. Asian J Anim  
Vet Adv 4: 297-305.



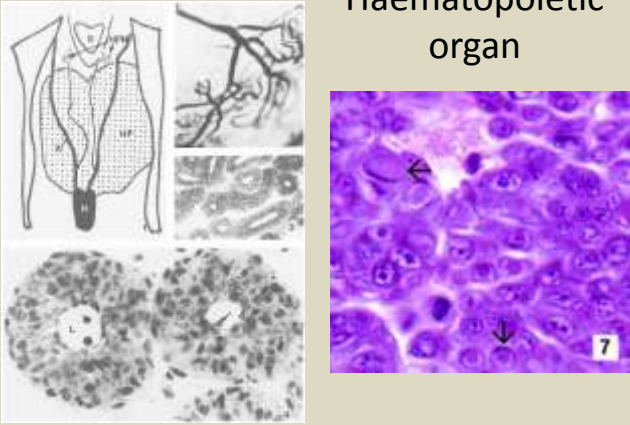
Wu *et al.* 2008. Histopathological Alterations in Gills of White Shrimp, *Litopenaeus vannamei* (Boone) After Acute Exposure to Cadmium and Zinc. *Bull Environ Contam Tox* 82:90-95.

Figure 7. Section of the gills from a juvenile Chinese white shrimp with WSD (900x). Nearly one-quarter of the cells present are infected, as indicated by the presence of developing and fully developed intranuclear inclusion bodies of WSD (arrows)

Source: DV Lightner



### Haematopoietic organ

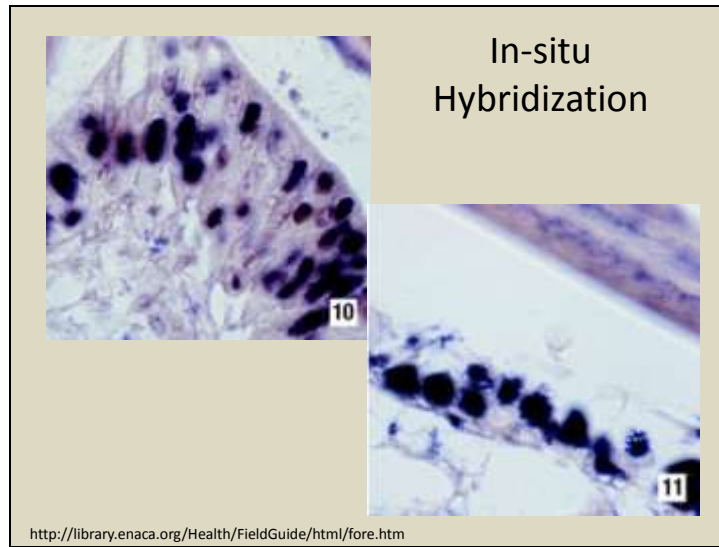


The composite image illustrates the structure and histology of a haematopoietic organ. It includes:

- A schematic diagram of the organ's location within the body cavity.
- A branching tree diagram representing the organ's vascular or ductal network.
- Two circular histological sections showing the internal cellular architecture.
- A large, detailed histological section stained with hematoxylin and eosin (H&E), showing numerous cells with prominent nuclei. Two black arrows point to specific cells, and a small box with the number '7' is visible in the lower right corner of this section.

<http://library.enaca.org/Health/FieldGuide/html/fore.htm>

Slide 18



Stomach and cuticular epithelium of the carapace.

Slide 19



Aquatic Animal Diseases  
Significant to Asia-Pacific  
Identification Field Guide



**Australian Government**  
**Department of Agriculture,  
Fisheries and Forestry**



**NACA**

<http://library.enaca.org/Health/FieldGuide/html/fore.htm>

Network of Aquaculture Centres in Asia-Pacific

## References

- Afsharnasab *et al.* 2009. Gross Sign, Histopathology and Polymerase Chain Reaction Observations of White Spot Syndrome Virus in Shrimp Specific Pathogen Free *Litopenaeus vannamei* in Iran. *Asian J Anim Vet Adv* 4: 297-305.
- Aquatic Animal Diseases Significant to Asia–Pacific Identification Field Guide.  
<http://library.enaca.org/Health/FieldGuide/histopage/wsd.htm>  
Accessed Feb 24 2017
- Wu *et al.* 2008. Histopathological Alterations in Gills of White Shrimp, *Litopenaeus vannamei* (Boone) After Acute Exposure to Cadmium and Zinc. *Bull Environ Contam Tox* 82:90-95.