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## CHAPTER-25

### REVIEW ON WHITE SPOT SYNDROME VIRUS (WSSV) AND ITS IMPACT ON SHRIMP AQUACULTURE

Chandan Haldar

<sup>1</sup>School of Fisheries, Centurion University of Technology and Management, R.  
Sitapur, India

#### Introduction:

White spot syndrome (WSS) is a viral disease that affects most of the commercially cultivated marine shrimp species all over the world. It was first observed in East Asia in 1992–1993 and spread to most of the shrimp culturing countries. It affects a diverse range of crustacean species including *Fenneropenaeus chinensis*, *F. indicus*, *F. merguensis*, *Penaeus monodon*, *Litopenaeus setiferus*, *L. stylirostris*, and *L. vannamei*. Heavy mortality is observed within a week of infection and survival rates can be from 30% to zero. In many cases the entire cultured stock is wiped out. The total shrimp production of India during 2013-14 was 504834 tonnes). The FAO estimated the

total production of shrimps including both wild and farmed sources for 2015 at about 7.1 million metric tons. In the mid-nineties WSSV caused losses amounting to >6000 million USD in Asia. Between 2006 and 2008, the gross national loss in India due to shrimp diseases was estimated to be 48717 metric t of shrimp valued at Rs. 1022.1 crores, and employment of 2.15 million man days (<http://epubs.icar.org.in/ejournal/index.php/FT/article/view/26607>). India loses 10 to 15 thousand tonnes of shrimp production worth Rs. 300-350 crores annually due to this virus, which causes up to 100% mortality within 7–10 days in commercial shrimp farms.

WSSV is caused by an enveloped double-strand DNA virus called white spot syndrome virus (WSSV), which belongs to the family Nimaviridae and genus Whispovirus. It has an ovoid or ellipsoid to bacilliform shape with a flagella-like appendage at one end. Its genome contains five major proteins named VP28, VP26, VP24, VP19 and VP15. Two of these major proteins (VP28 and VP19) are characterized as envelope proteins. VP28 binds to the surface of shrimp epithelial cells. Such binding is thought to be mediated by a shrimp VP28-binding protein, PmRab7, suggesting that shrimp possess innate immune recognition of WSSV. Identified as a crucial protein VP28 is widely used for diagnosis and control of WSSV.

Sedhuraman *et al.* (2014) conducted a pilot study to investigate the infection of SPF *L. vannamei* with WSSV in coastal areas of Tamil