THE EVIDENCE OF VIRUS-LIKE PARTICLES IN CRABS (Scylla sp.) ISOLATED FROM INSIDE AND OUTSIDE POND SHRIMP INFECTED WITH WHITE SPOT DISEASE

BUKTI DARI PARTICHEL MIRIP VIRUS PADA KEPITING (Scylla sp.) YANG DIISOLASI DARI DALAM DAN LUAR SOLAM UDANG YANG TERINFEKSI DENGAN PENYAKIT WHITE SPOT

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ABSTRACT

The crabs (Scylla sp.) were investigated for the contamination of Whitespot Baculovirus (WSBV) due to they lived inside and outside pond when the disease outbreak. The 6 samples of crabs, all of them were contaminated by WSBV with the founding of virus-like particles in hyperchromed nuclei and cytoplasm. The size of virus-like particles is 65 ± 10 nm in diameter and 145 ± 10 nm in length. We suggest that crabs has a big role in the transmitting the disease in pond an acting as a host for some crustacean virus.

Key words: Crabs, Scylla sp., Whitespot Baculovirus

ABSTRAK

Kepiting Scylla sp. telah diteliti untuk mengetahui adanya infeksi Whitespot Baculovirus (WSBV) karena keping tersebut hidup didalam dan di luar kolam saat terjadinya serangan WSBV. Sebanyak 6 sampel dari keping, semuanya terinfeksi oleh WSBV dengan ditemukannya partikel mirip virus di hyperchromed nuclae dan istiplasma. Ukurannya partikel mirip virus tersebut adalah diameter 65 ± 10 nm dan panjang 145 ± 10 nm. Dinyatakan bahwa kepingan mempunyai peranan yang besar didalam penyebaran WSBV di tambak dan berperan sebagai host dalam virus crustacea.

Kata kunci: Kepiting, Scylla sp., Whitespot Baculovirus
INTRODUCTION

Recently, many diseases infect fishes and shrimps in shrimp industry. Most of the diseases were caused by viruses. The polluted water made shrimp sensitive to the disease causing outbreak with high mortality. It was thought that the disease spread by vertical transmission from broodstock to their offspring through the ovary, fertilized egg and hatched larvae and horizontal transmission between fish where the principal routes of infection are skin abrasions, gill and gut. Recently, the Whitespot Baculovirus (WSBV) was also found in later infection in freshly caught wild shrimps and crabs (Liu and Kou, 1998). The targeted tissue of WSBV infection originate from both ectoderm and mesoderm. It was very difficult to eliminate crabs live inside and outside pond, some of them stay acts a carrier or host of WSBV in ponds.

The economical loss of Indonesian shrimp industries due to some diseases from 1989 to 1992 was 248 million USD or 62 million USD per year (Anemim, 1996). Whitespot Baculovirus is a virus of double stranded DNA with the size 80 - 270 nm, that infects many species of shrimp cultured in Asia, Penaeus exoletus, P. serratus, P. merguiensis, P. monodon, P. penicillatus, P. semisulcatus (Lightner and Redman, 1991).

Whitespot Baculovirus was reported infect shrimp in many countries like China (HHBV/ baculoviral hypodermal and hematopoetic necrosis), Japan, China, Korea (RVB: Pod-shaped nuclear virus of P. japonicus), Thailand (SEMBV/systemic ectodermal and mesodermal baculovirus), Indonesia, Taiwan, Vietnam, Malaysia, India, Texas (WSBV/white spot baculovirus) (Lightner, 1996). The virus was reported in Thailand in 1992 and spread rapidly to Asia and Indo-Pacific regions, because this region is intraregional stocks transportation. The virus was found in European shrimp P. setiferus in 1995 that imported from Texas.

The study analysis, a virus infection founded in crabs which lived in ponds when the WSBV outbreak occurred. We suggest that crabs were playing a role as a host.

MATERIALS AND METHODS

The crabs Scylla sp. used in this experiment was collected from farms located in East Java Province. The crabs lived inside and outside pond when outbreak of WSBV occurred. They did not show white spots in the body of crabs and a confirmation was done by light microscope and rapid field test with Giemsa stain. Sample from infected gill was taken individually by sterilized canula.

Preparation of specimen for Transmission Electron Microscopic (TEM) studies was carried out according to Bell and Lightner methods (1988). A piece of gill sample from diseased crabs fixed in 2.5 % cold glutaraldehyde in 0.2 M Sorensen phosphate buffer (pH 7.2) for 1 h. After several rinsing in with the buffer solution, the samples were post fixed in 1 % OsO4 for 1 h. Subsequently the tissue were dehydrated with series of ethanol solutions and embedded in resin. Ultrathin sections were done with ultramicrotome and they were stained in uranyl acetate and lead citrate, and observed with transmission electron microscope.

RESULTS AND DISCUSSIONS

The results of investigation to crabs Scylla sp. which lived inside or outside ponds was summarized in Table 1. The infected crabs did not show any clinical signs normally exhibited by shrimp infected WSBV, the sign we can observed was weak movement. But asymptomatic carrier in the laboratory, may positive to the WSBV. This silent carrier is very difficult to observe due to not exhibited any clinical sign. Whitespot disease of P. penicillatus and Macrobrachium rosenbergii can be observed after removing their carapace, while is crabs such as Scylla serrata the gross sign marked by clouded area in the last two segments of the fifth pereopods (Lo et al., 1996; Peng et al., 1998).

Therefore, under stress full condition, the WSBV is able to cause disease in the crabs. The morphology and the size of virus is presented in Figure 1, two virus were observed in nuclei of infected crabs.

Whitespot Baculovirus is one of the virus to be responsible in collapsed of shrimp industry and hatchery. The shrimp will die between 3-7 days after infection and will cause heavy losses. The virus transmitted may through contaminated crabs or other crustacean organisms living together with shrimp in pond. Madan et al. (1998) have reported that the crabs used in cohabitation experiment died without showing white spot in their bodies. The wild crabs lived inside or outside pond is very difficult to be eliminated. They easily migrate from pond bank to the pond lives together with shrimp. Other host of the virus may also the wild little shrimp accidentally enter inside pond, their number
infectec pond, copepods, pest crabs *H. tridens*, small pest palamomipid shrimp and larvae of ephydridan insect were positive with two step of PCR.

**Table 1. Detection of crabs by TEM lived inside and outside pond when WSBV outbreak. The crab did not show any clinical signs of white spot in whole body, but some of them slowing in their movement.**

<table>
<thead>
<tr>
<th>Species</th>
<th>Date of Sampling</th>
<th>Lived inside/ outside pond</th>
<th>Virus particles WSBV-like virus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scylla sp.</td>
<td>July, 2001</td>
<td>inside</td>
<td>+</td>
</tr>
<tr>
<td>Scylla sp.</td>
<td>July, 2001</td>
<td>outside</td>
<td>+</td>
</tr>
<tr>
<td>Scylla sp.</td>
<td>August, 2001</td>
<td>inside</td>
<td>+</td>
</tr>
<tr>
<td>Scylla sp.</td>
<td>September, 2001</td>
<td>outside</td>
<td>+</td>
</tr>
<tr>
<td>Scylla sp.</td>
<td>September, 2001</td>
<td>inside</td>
<td>+</td>
</tr>
</tbody>
</table>

we found all 6 samples were WSBV positive in both collected from outside and inside ponds when the WSBV occurred. The size of virus particles is 65 ± 10 nm in width and 145 ± 10 nm in length. This virus-like particles were seen in hyperplasia nuclei of crabs gill both inside and outside ponds when the WSBV outbreak. This results though that the virus carried in shore crabs was released into water and infected the healthy shrimp.

**REFERENCES**


