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High water temperature affects WSSV management

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Increasing to 33 degrees-C after inoculation prevented WSSV-induced mortality

Several reports have showed that maintaining shrimp infected with White Spot Syndrome Virus (WSSV) at a high water temperature of 33 degrees-C effectively reduces mortality. In a recent study by the authors, a standardized intramuscular inoculation procedure was used to evaluate the effects of high water temperature before and/or after inoculation on the virological and clinical outcome of WSSV infection.

Study setup

Specific pathogen-free Pacific white shrimp (*Penaeus vannamei*) of approximately 14 grams mean body weight were inoculated intramuscularly with a high or low dose of WSSV. Four groups of 10 shrimp for each dose were kept at different temperatures before and after inoculation (Fig. 1).

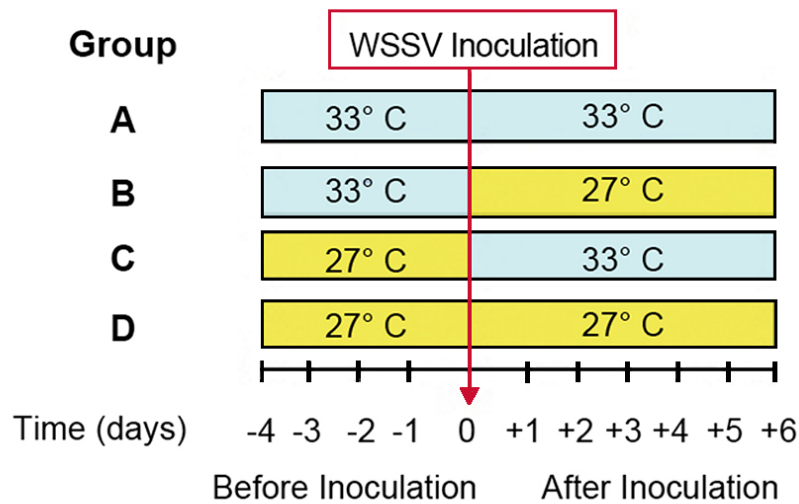


Fig. 1: Temperature control before and after inoculation of shrimp with WSSV.

Group A was kept at 33 degrees-C before and after inoculation. Group B was kept at 33 degrees-C before inoculation with temperature decreased to 27 degrees-C after inoculation. Group C was kept at 27 degrees-C before inoculation, and then temperature was raised to 33 degrees-C. Finally, group D remained at 27 degrees-C for the duration of the experiment. The experiments were repeated three times.

After WSSV inoculation, shrimp were monitored every 12 hours for clinical signs of reduced feeding and lethargy. Dead shrimp and those surviving at the end of the experiments were collected and processed to detect WSSV by indirect immunofluorescence.

Results

As shown in Fig. 2, shrimp in groups A and C given low doses of WSSV had mortalities of 0-10 percent and 0 to 30 percent, respectively, at the end of the experiments. All shrimp in group B died 72 to 96 hours after inoculation, and those in D died within 84 to 144 hours.

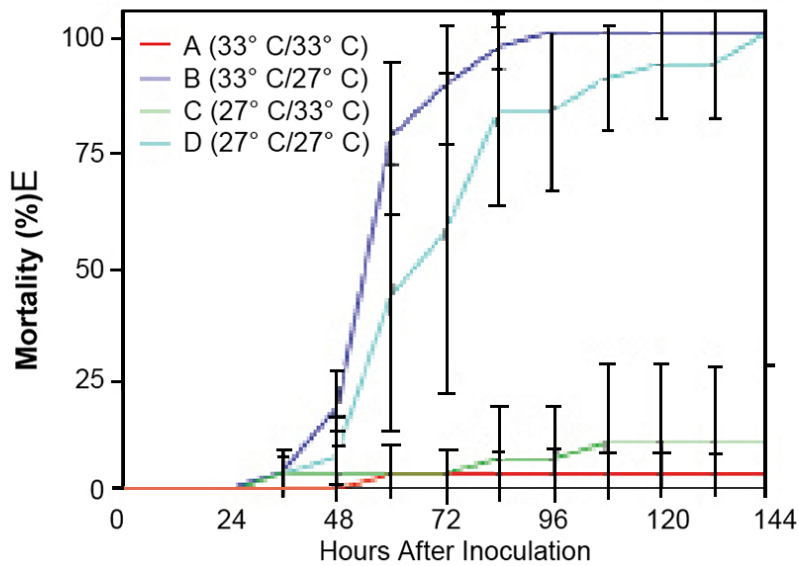


Fig. 2: Mortality in shrimp inoculated with a low dose of WSSV and kept at different temperatures before and/or after inoculation.

With the high dose, groups A and C had mortalities of 0 to 10 percent and 0 to 20 percent, respectively (Fig. 3). All shrimp in groups B and D were dead by 60 hours.

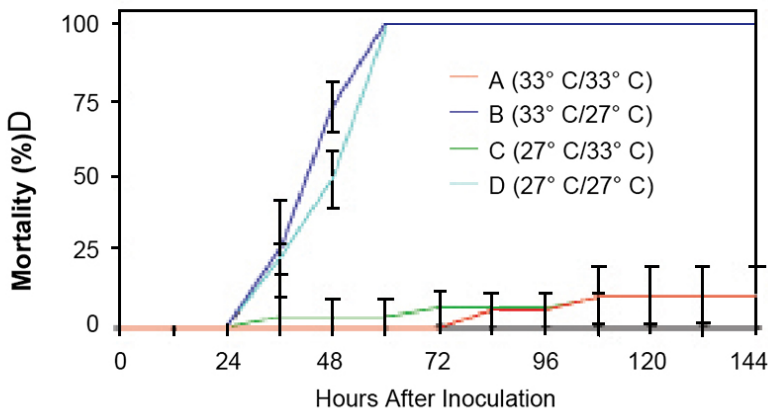


Fig. 3: Mortality in shrimp inoculated with a high dose of WSSV and kept at different temperatures before and/or after inoculation.

All shrimp from groups A and C were found negative for both inoculation doses. All shrimp from groups B and D were WSSV-positive.

Temperature effects

The study results showed that raising water temperature to 33 degrees-C after White Spot inoculation was sufficient to prevent WSSV-induced mortality. Using high water temperature before inoculation had no protective effect. The shrimp kept at 33 degrees C after inoculation were negative to WSSV, which

demonstrated that infection, or at least the replication of the virus, was blocked by the higher water temperature.

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