High water temperature affects WSSV management

1 February 2006 Victoria Alday-Sanz, Ph.D. C.M. Escobedo-Bonilla M. M. Rahman M. Corteel J.J. Dantas-Lima M.B. Pensaert H.J. Nauwynck M. Wille P. Sorgeloos

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).

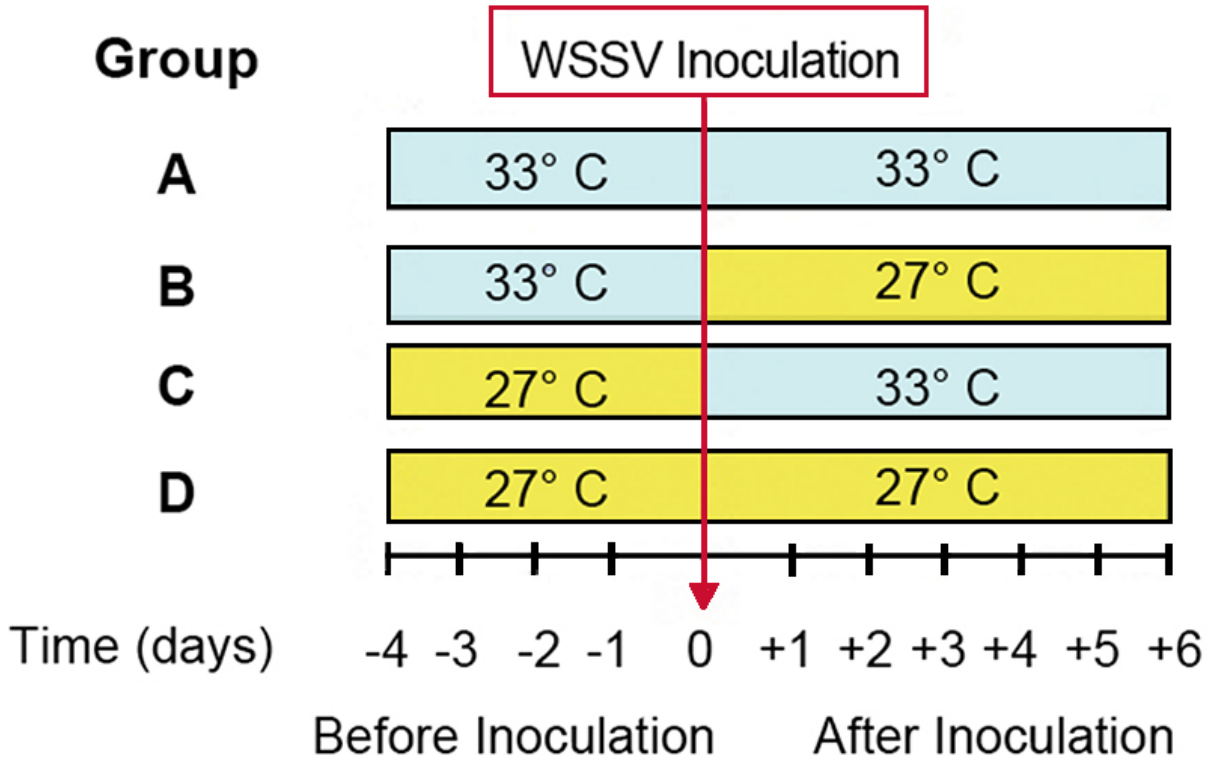


Fig. 1: Temperature control before and after inoculation of shrimp with WSSV.

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.

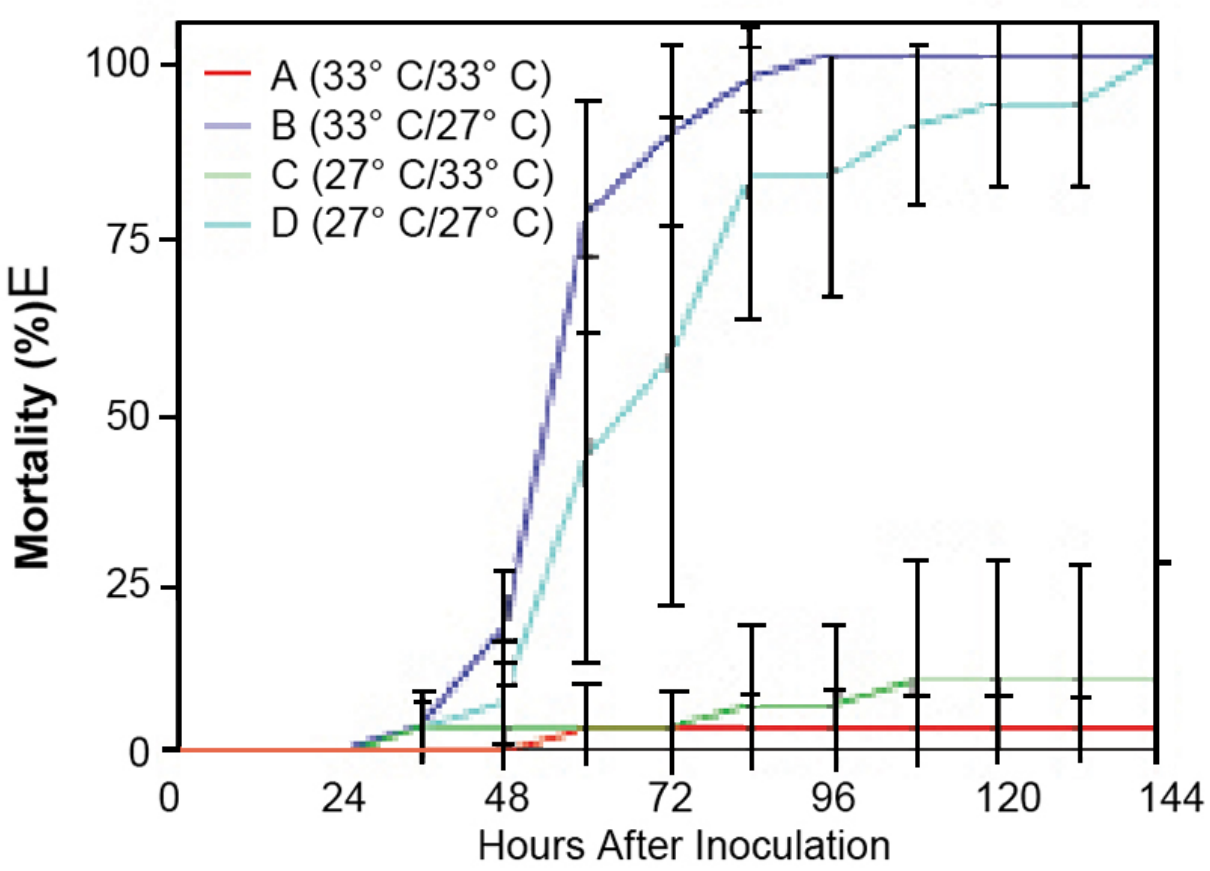


Fig. 2: Mortality in shrimp inoculated with a low dose of WSSV and kept at different temperatures before and/or after inoculation.

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.

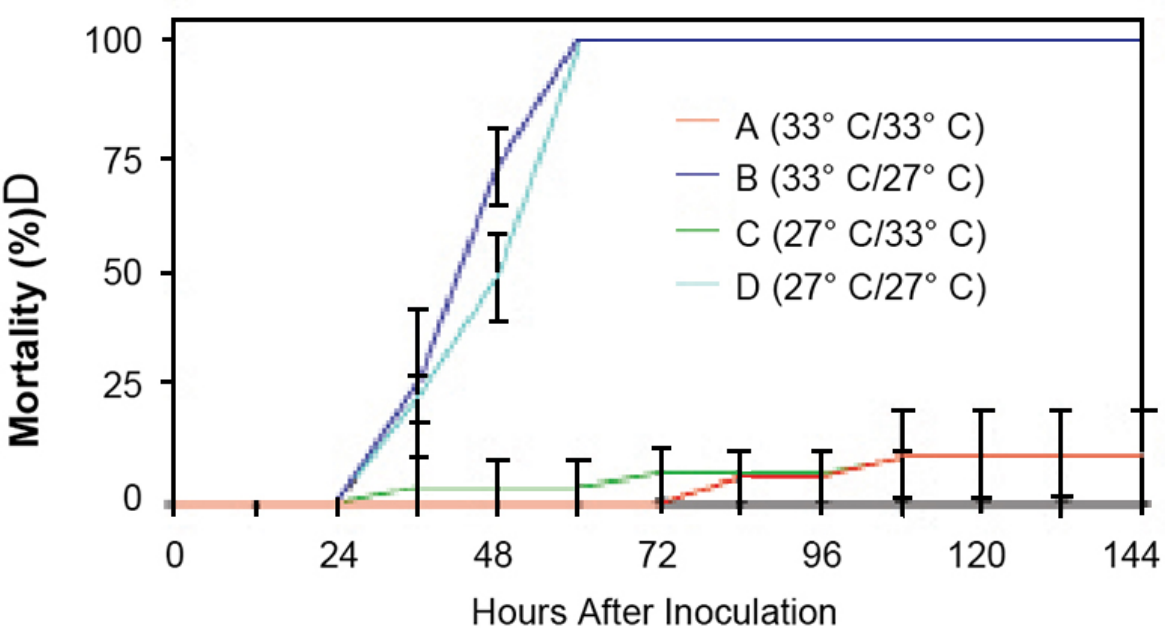


Fig. 3: Mortality in shrimp inoculated with a high dose of WSSV and kept at different temperatures before and/or after inoculation.

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.

(Editor's Note: This article was originally published in the February 2006 print edition of the Global Aquaculture Advocate.*)*

Now that you've finished reading the article ...

… we hope you'll consider supporting our mission to document the evolution of the global aquaculture industry and share our vast network of contributors' expansive knowledge every week.

By becoming a Global Seafood Alliance member, you're ensuring that all of the pre-competitive work we do through member benefits, resources and events can continue. Individual membership costs just $50 a year.

Not a GSA member? Join us.

Support GSA and Become a Member

Authors

- Victoria Alday-Sanz, Ph.D.

  Victoria Alday-Sanz, Ph.D.

  Aquatic Animal Health Consultant
  Otterstraat 70
  9200 Dendermonde, Belgium

  [109,111,99,46,111,111,104,97,121,64,121,97,100,108,97,95,97,105,114,111,116,99,105,118]

- C.M. Escobedo-Bonilla

  C.M. Escobedo-Bonilla

  Laboratory of Virology
  Ghent University
  Merelbeke, Belgium

- M. M. Rahman

  M. M. Rahman

  Laboratory of Virology
  Ghent University
  Merelbeke, Belgium

- M. Corteel

  M. Corteel

  Laboratory of Virology
  Ghent University
  Merelbeke, Belgium

- J.J. Dantas-Lima

  J.J. Dantas-Lima

  Laboratory of Virology
  Ghent University
  Merelbeke, Belgium

- M.B. Pensaert

  M.B. Pensaert

  Laboratory of Virology
  Ghent University
  Merelbeke, Belgium

- H.J. Nauwynck

  H.J. Nauwynck

  Laboratory of Virology
  Ghent University
  Merelbeke, Belgium

- M. Wille

  M. Wille

  Laboratory of Aquaculture and Artemia Reference Center
  Ghent University
  Ghent, Belgium

- P. Sorgeloos

  P. Sorgeloos

  Laboratory of Aquaculture and Artemia Reference Center
  Ghent University
  Ghent, Belgium

Share

- Share via Email
- Share on Twitter
- Share on Facebook
- Share on LinkedIn

Tagged With

M. Corteel J.J. Dantas-Lima M.B. Pensaert H.J. Nauwynck M. Wille P. Sorgeloos WSSV C. M. Escobedo-Bonilla Victoria Alday-Sanz

Related Posts

Health & Welfare

Alphavirus replicon particles potential method for WSSV vaccination of white shrimp

A study demonstrated that VP19 and VP28 white spot syndrome virus envelope proteins expressed by replicon particles provided protection against mortality due to WSSV in shrimp.

Health & Welfare

CENIACUA develops WSSV-resistant shrimp in Colombia

To combat white spot syndrome virus (WSSV) in white shrimp, Corporación Centro de Investigación de la Acuacultura de Colombia (CENIACUA) initiated a selective-breeding program to develop resistance in shrimp.

Health & Welfare

A comprehensive look at the Proficiency Test for farmed shrimp

The University of Arizona Aquaculture Pathology Laboratory has carried out the Proficiency Test (PT) since 2005, with 300-plus diagnostic laboratories participating while improving their capabilities in the diagnosis of several shrimp pathogens.

Responsibility

A look at various intensive shrimp farming systems in Asia

The impact of diseases led some Asian shrimp farming countries to develop biofloc and recirculation aquaculture system (RAS) production technologies. Treating incoming water for culture operations and wastewater treatment are biosecurity measures for disease prevention and control.

About The Advocate

The Responsible Seafood Advocate supports the Global Seafood Alliance's (GSA) mission to advance responsible seafood practices through education, advocacy and third-party assurances.

Categories

Aquafeeds Health & Welfare Health & Welfare From Our Sponsors Innovation & Investment Intelligence Responsibility Fisheries Artículos en Español

Don't Miss an Article

Featured

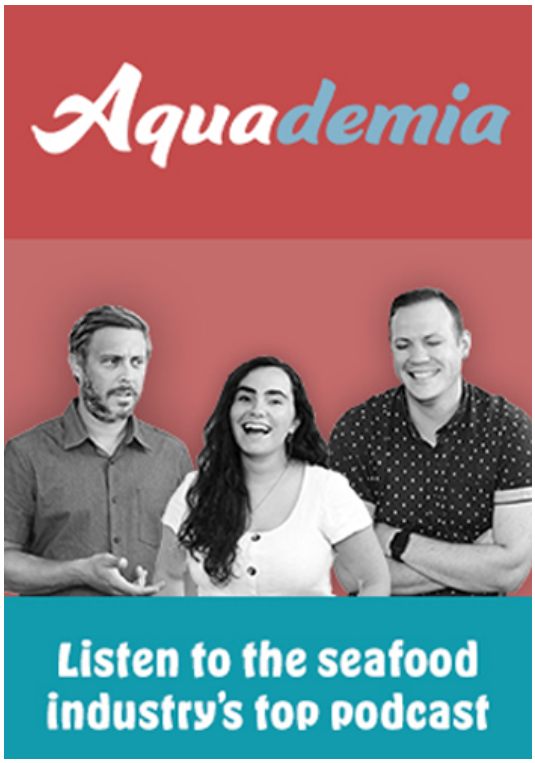
- Health & Welfare An update on vibriosis, the major bacterial disease shrimp farmers face
- Intelligence A seat at the table: Fed By Blue team says aquaculture needs a stronger voice
- Responsibility Quantifying habitat provisioning at macroalgae cultivation locations

Popular Tags

All Tags

Recent

- Fisheries Second Test: Another filler for the fisheries category
- Fisheries Test: This is filler for the fisheries Category
- Aquafeeds Test Article
- Responsibility Study: Climate change will shuffle marine ecosystems in unexpected ways as ocean temperature warms
- Health & Welfare Indian shrimp researchers earn a patent for WSSV diagnostic tool



- About
- Membership
- Resources
- Best Aquaculture Practices (BAP)
- Best Seafood Practices (BSP)
- GOAL Events
- Advocate Magazine
- Aquademia Podcast
- Blog
- Contact

Stay up to date with GSA