



- [GOAL Events](#)
- [Advocate Magazine](#)
- [Aquademia Podcast](#)
- [Blog](#)
- [Contact](#)
-
-
-
-
-
- [Log In](#)



- [About](#)
 - [Who We Are](#)
 - [Our History](#)
 - [Our Team](#)
 - [Sustainable Development Goals](#)
 - [Careers](#)
- [Membership](#)
 - [Overview](#)
 - [Our Members](#)
 - [Corporate Membership](#)
- [Resources](#)
- [Certification](#)
 - [Best Aquaculture Practices](#)
 - [Best Seafood Practices](#)

Search...



[Log In](#)

- [About](#)
 - [Who We Are](#)
 - [Our History](#)
 - [Our Team](#)
 - [Sustainable Development Goals](#)
 - [Careers](#)
- [Membership](#)
 - [Overview](#)
 - [Our Members](#)
 - [Corporate Membership](#)
- [Resources](#)
- [Certification](#)
 - [Best Aquaculture Practices](#)
 - [Best Seafood Practices](#)
- [GOAL Events](#)
- [Advocate Magazine](#)
- [Aquademia Podcast](#)
- [Blog](#)
- [Contact](#)



Health & Welfare
Health & Welfare

Breeding shrimp for fast growth and virus resistance



1 December 2000 Jim Wyban, Ph.D.



Future of shrimp farming will be based on disease-resistant, fast-growing and pathogen-free shrimp stocks

When U.S. shrimp farmers had disease problems in the late 1980s, scientists at the Oceanic Institute in Hawaii developed a stock of shrimp that was specific pathogen free (SPF) to assist them. U.S. industry-wide use of SPF postlarvae (PLs) led to a doubling of the industry's production in 1992 and through 1994 (Fig. 1).

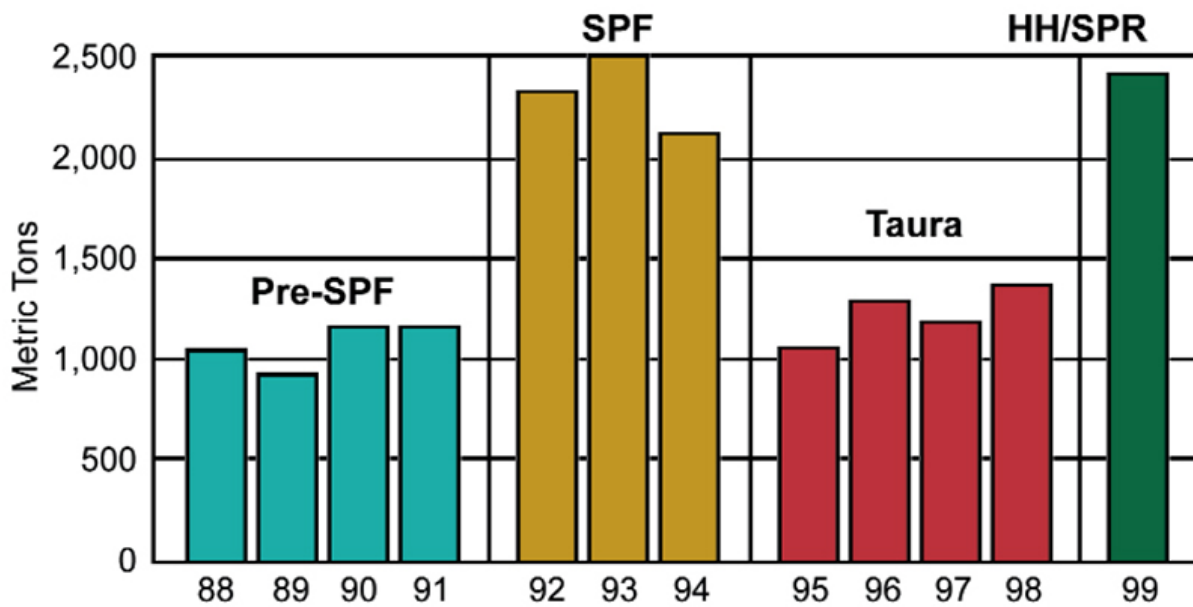


Fig. 1: U.S. shrimp farming production by year. Different color bars indicate distinct eras of production.

SPF in Ecuador

In a large commercial trial of SPF shrimp in Ecuador in 1993, more than 250 million SPF PLs produced from Hawaii-raised SPF broodstock were stocked in commercial ponds throughout Ecuador. The results were disastrous. The SPF shrimp were highly sensitive to Taura Syndrome Virus (TSV). SPF alone was not the answer.

Breeding for taura resistance

By 1995, TSV reached Texas in the United States, and the industry's production dropped to half of the 1994 production (Fig. 1). Again, SPF stocks were highly susceptible to TSV.

High Health Aquaculture, Inc., a company formed in 1993 to commercialize Oceanic Institutes's SPF research, set out to develop stocks that were both SPF and specific pathogen resistant (SPR) for TSV. In 1999, High Health's first SPR stocks were used in Texas, and the state's production reached its highest level since before TSV (Fig. 1).

In the spring of 2000, High Health completed its fourth round of selection for TSV resistance in *Litopenaeus vannamei*. One select *L. vannamei* group (G4 in Fig. 2) averaged 92 percent survival compared to 31 percent survival for the non-select group. One of the select groups achieved 100 percent survival in the TSV challenge.

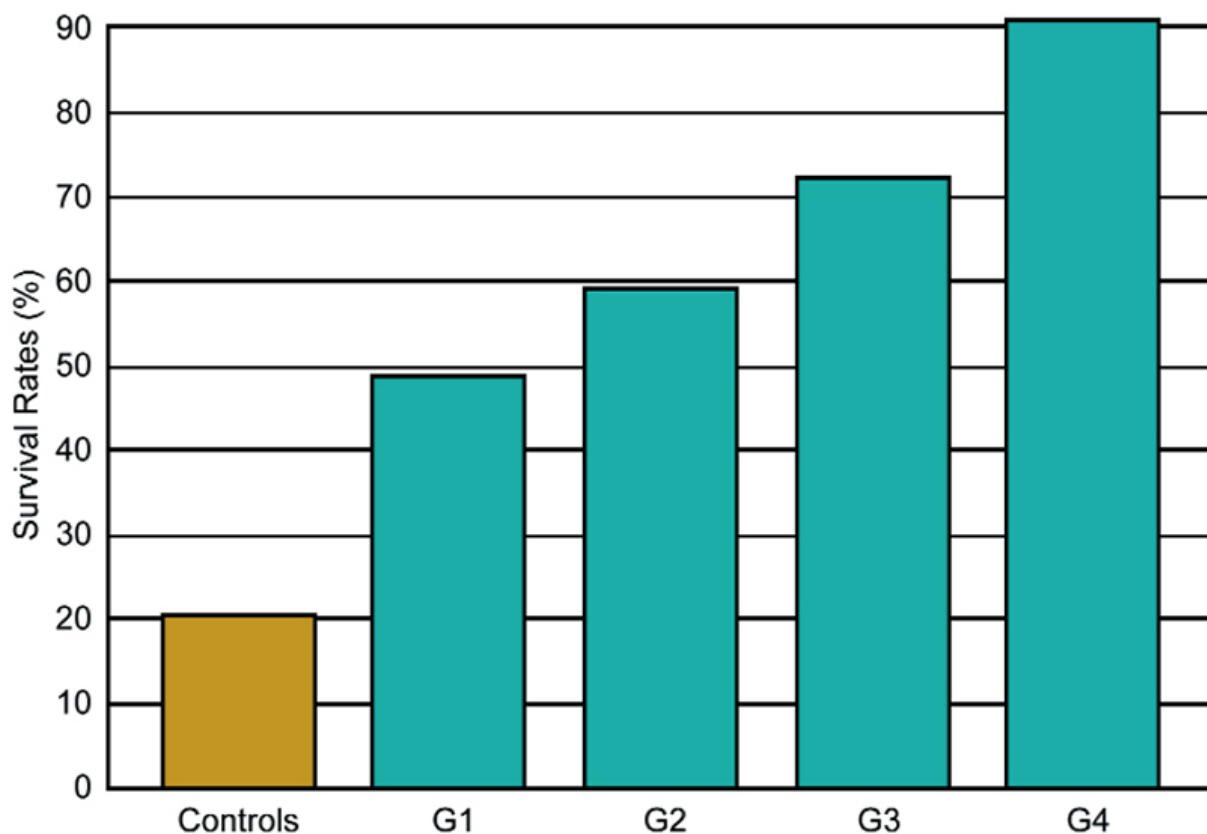


Fig. 2: Mean TSV-challenge survivals by generation for selected groups (green bars) and non-selected controls (gold bar).

Over four generations of selection, the mean survival of select groups increased an average of 15 percent per generation (Fig. 2). These data demonstrate that breeding shrimp for virus resistance is feasible and that rapid progress is possible with a carefully designed program.

Breeding for fast growth

Dramatic improvements in shrimp growth rates also have been achieved. Outstanding growth rates to harvest sizes of 22 to 25 grams were commonplace in Texas in 1999 and 2000. Rapid growth of High Health animals in eastern Mexico in 2000 resulted in two crops produced there for the first time.

Breeding for WSSV resistance

Encouraged by success in breeding for TSV-resistance, High Health initiated efforts in 2000 to breed for resistance to White Spot Syndrome Virus. Inbred and out-crossed families of SPF/SPR *L. vannamei* were separately challenged with both TSV and WSSV. In the WSSV challenge, genetic variation was surprisingly similar to earlier efforts with TSV. TSV and WSSV challenge survivals were not correlated, but several groups had significant survivals in both challenges.

Zero-exchange, bio-secure systems

Recent successes using zero-exchange, bio-secure grow-out systems have reemphasized the importance of stocking disease-free PLs (McIntosh 2000). The only certain method for producing these is by using high-health broodstock in a biosecure hatchery. As use of bio-secure systems expands, so will the demand for disease-free shrimp.

Conclusion

Recent successes have proven that breeding shrimp for fast growth and virus resistance is both feasible and highly effective. The future of shrimp farming will be based on domesticated shrimp stocks that are disease-resistant, fast-growing and pathogen-free. This trend will make shrimp farming more environmentally responsible by limiting its reliance and impact on wild stocks, and eliminating global transport of pathogen-contaminated PLs and broodstock.

(Editor's Note: This article was originally published in the December 2000 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](#)

Author

-  Jim Wyban, Ph.D.

Jim Wyban, Ph.D.

High Health Aquaculture, Inc.
Hawaii, USA
www.hihealthshrimp.com

[116,101,110,46,101,116,103,64,110,97,98,121,119]

Share

- [✉ Share via Email](#)
- [🐦 Share on Twitter](#)
- [f Share on Facebook](#)
- [in Share on LinkedIn](#)

Tagged With

[Jim Wyban](#) [Breeding shrimp virus resistance](#)

Related Posts

Health & Welfare

[Blue alternative: High Health introduces SPF blue shrimp to Thailand](#)

Blue shrimp are very similar to Pacific white shrimp, and can be raised under similar conditions. Blues grow faster and tolerate lower water temperatures.

Health & Welfare

[Born in Hawaii, SPF broodstock shrimp industry faces globalization](#)

The next step for shrimp breeding will be developing animals that aren't just disease-free, but increasingly resistant to multiple pathogens. The industry is globalizing, with suppliers setting up shop overseas. But its birthplace will always be Hawaii.

Health & Welfare

[Domestication of Pacific white shrimp revolutionizes aquaculture](#)

The development of specific pathogen-free Pacific white shrimp and breeding led to rapid adoption of the domesticated shrimp throughout the Western Hemisphere and Asia.

Health & Welfare

[TSV challenges advance selective breeding in Pacific white shrimp](#)

Results of ongoing studies demonstrate that selective breeding for both resistance to Taura Syndrome Virus (TSV) and fast growth in shrimp is achievable.

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.

[Learn More](#)

Search Responsible Seafood Advocate

Search 

Advertising Opportunities

[2022 Media & Events Kit](#)

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](#)
- [Uncategorized](#) [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

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

- 
- 
- 
- 
- 

Copyright © 2024 Global Seafood Alliance
All rights reserved.

[Privacy](#)

[Terms of Use](#)

[Glossary](#)