

# RE-INTRODUCTION OF A SHRIMP NURSERY PHASE

## – BACK TO THE FUTURE?

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# HISTORY OF SHRIMP NURSERIES

- Used in both Latin America and South East Asia during the 1980's and 1990's.
- After introduction of *P. vannamei* in SEA the practice was stopped and farms moved to direct stocking from hatchery to grow-out.



# HISTORY OF SHRIMP NURSERIES

Shrimp nurseries was traditionally used to speed up growth of the shrimp before stocking to grow-out.

This is still the reason for nurseries in Latin America and in some Asian countries.

However the recent emerging trend of reintroduction of shrimp nurseries in South East Asia is because of diseases in early stages of shrimp growth.

**ROBOST SHRIMP VS. FAST GROWTH SHRIMP**

# SHRIMP AND DISEASES

New and newly emerged diseases in Asia:

Enterocytozoon hepatopenaei (EHP)

- EHP infects the tubules in the shrimp hepatopancreas and damages the organ's ability to gain nutrition from feed.

- EHP seriously limits growth, but does not cause mortality.

- EHP is microsporidia, which is a parasitic fungus. The spores is a problem!

# SHRIMP AND DISEASES

Disease in shrimp farming continue to be of concern for farmers and industry!

New and newly emerged diseases in Asia:

Acute hepatopancreatic necrosis disease (EMS/AHPND)

- Kills shrimp within first 30 DOC
- Vibrio sp related **(Use of antimicrobials!)**

**White feces syndrome,  
- to be continued!**



# SHRIMP AND DISEASES

The usual suspects still cause concern and loss:

White spot disease (WSD)

Yellow head disease (YHD)

Infectious myonecrosis (IMN)

(Thitamadee et al. 2015)

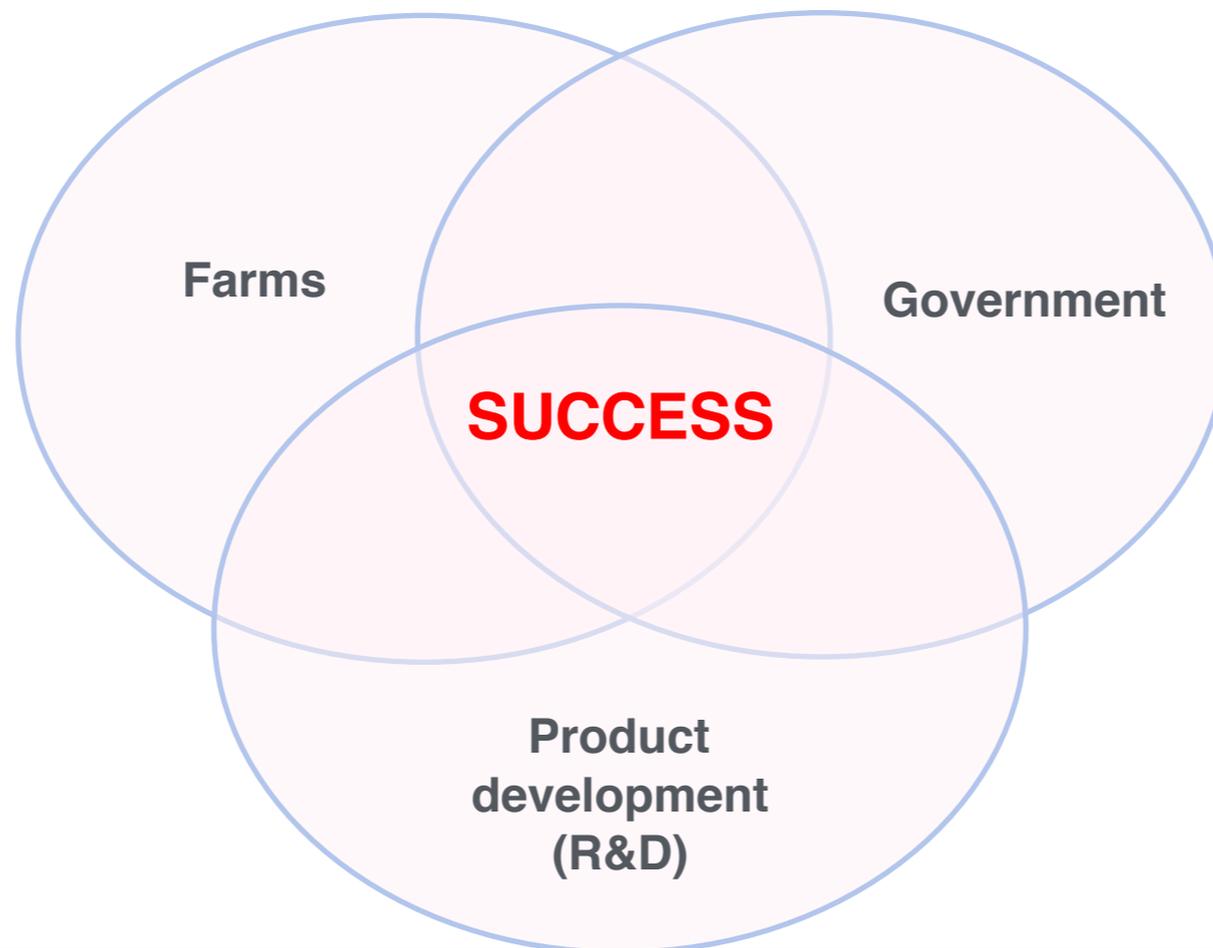
**Sorry!!!, but diseases are here to stay, and we, the industry have to manage production to minimize these diseases!!**

# SHRIMP AND DISEASES

- Sharp rise in EU **rejections and detentions** (with similar trends from Japan and USFDA data) due to antimicrobial residues in shrimp products from countries with EMS/AHPND outbreaks.
- Can be many reasons for this increase, but there is a clear association between the occurrence of EMS/AHPND and the sharp increase of rejections and detentions

# SHRIMP AND DISEASES

How can the industry work together to adapt management practices and develop products (feed additives, genetics and feed) that **Cares for Growth** and direct the aquaculture industry in a economically sustainable direction?



# SHRIMP NURSERY AT THE FARM

Plastic or fiber tanks (semi-covered)



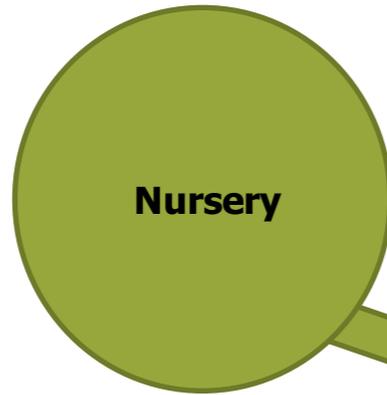
Concrete (semi-covered)



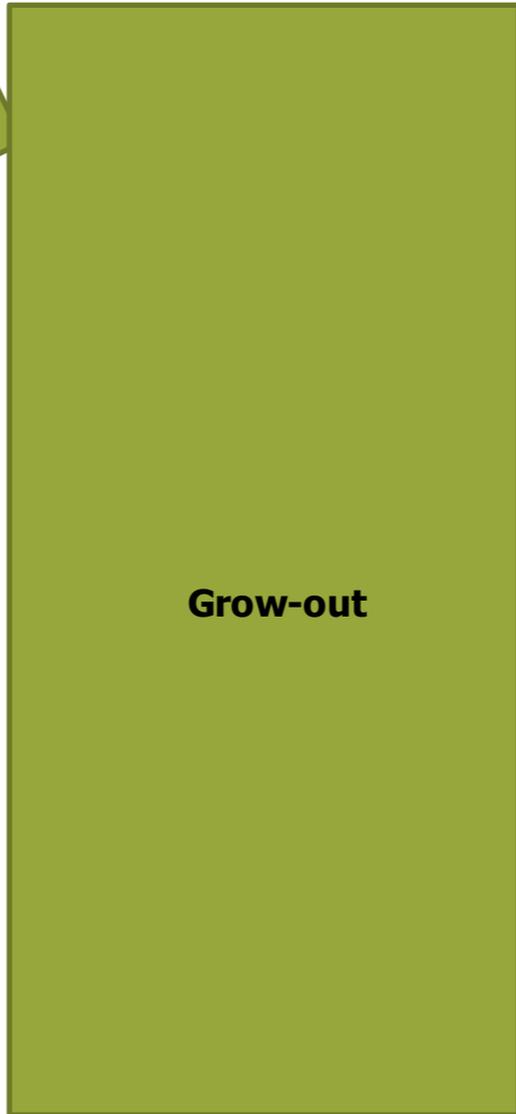
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# SHRIMP NURSERY AT THE FARM

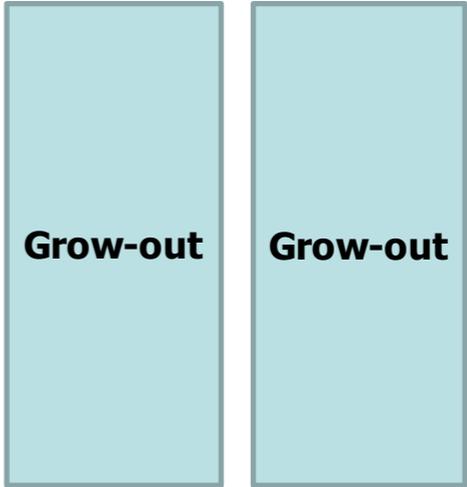
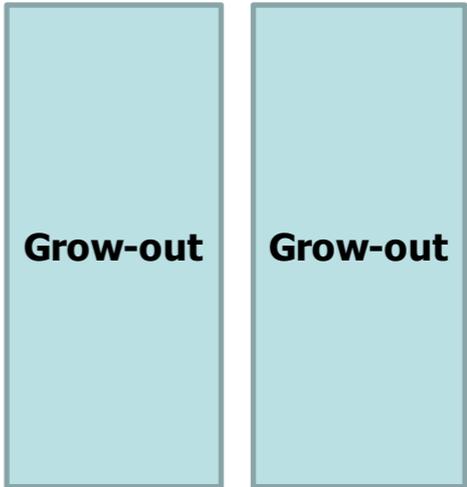
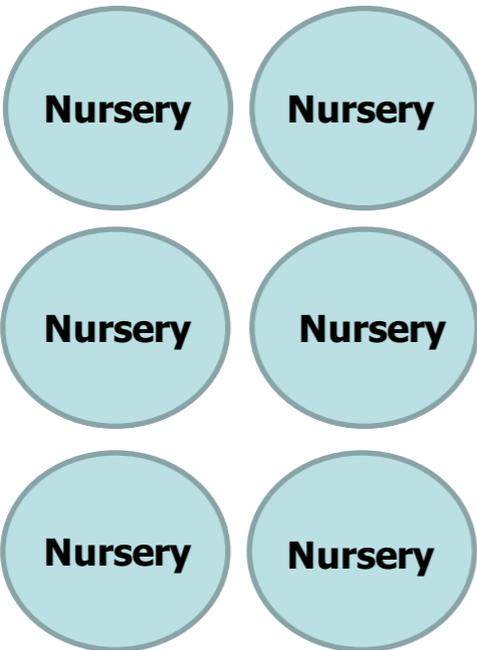


- 21-30 days in nursery
- 30-35 PL/liter
- 70-80% daily water exchange
- Feeding 4-8 times per day with high quality INVE (!) diet and supplements
- Main reason in SEA: To protect against disease in early stage of production





# SHRIMP NURSERY AT THE FARM



## CARE FOR GROWTH

# SHRIMP NURSERY AT THE FARM

In SEA now used to increase bio-security in early stages (up to DOC 30) to avoid shrimp diseases like Acute hepatopancreatic necrosis disease (AHPND) and Enterocytozoon hepatopenaei (EHP)

As a secondary benefit also better growth can be achieved if farmers use high quality feed in both hatchery and nursery stage of production.



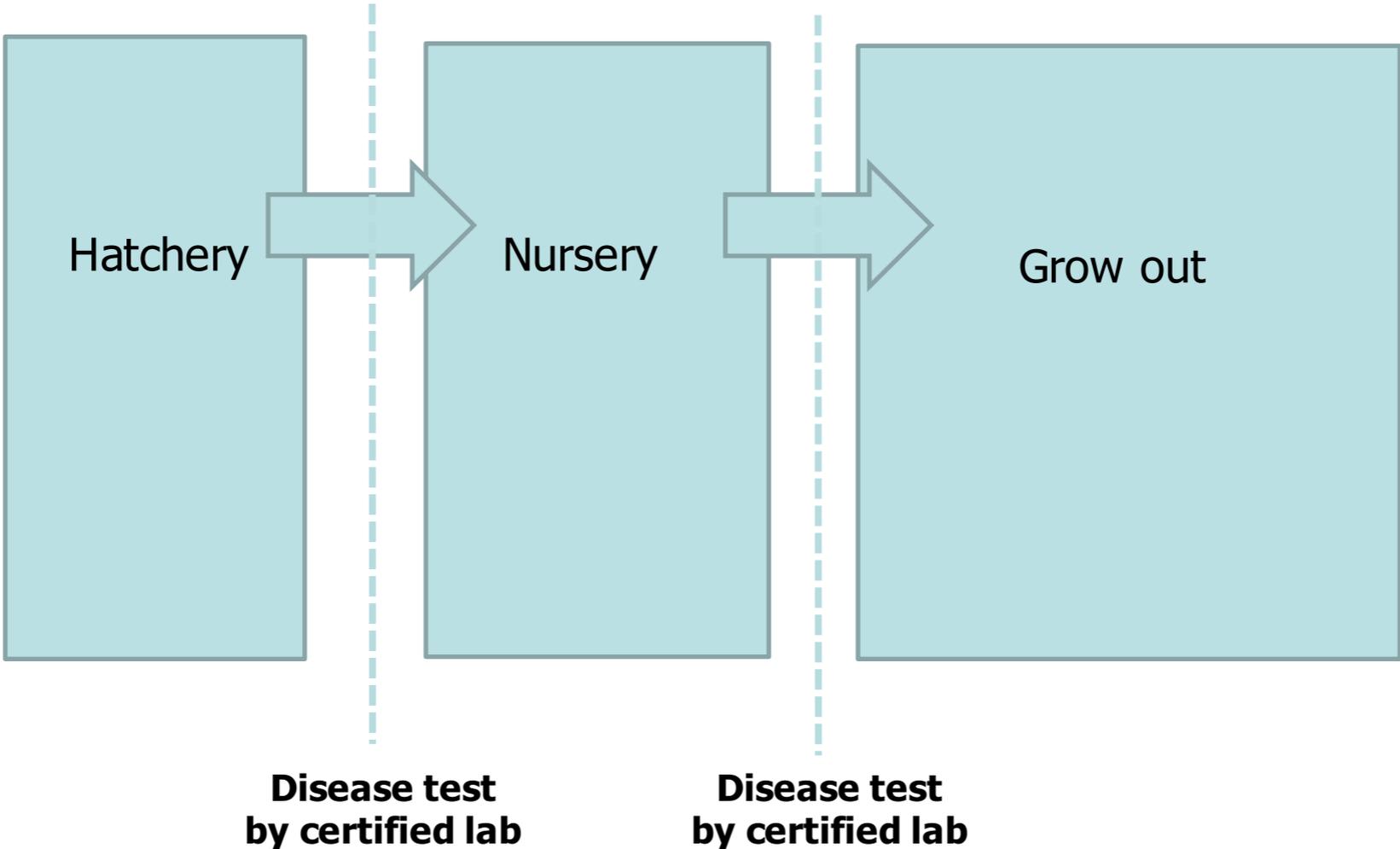
Shrimp from INVE Nursery pond after DOC 25 (M. Poulain, 2016)



Shrimp from control Nursery pond after DOC (M. Poulain, 2016)

# SHRIMP NURSERY AT THE FARM

The nursery option provides one additional “check-point” for farmers to check for diseases.



# SHRIMP NURSERY AT THE FARM

## The “High Quality” Nursery approach:

- High quality diets and feed additives in nurseries should be the norm!
- The use of immune boosters and probiotics to ensure healthy shrimp and healthy environment in the nursery stage is of crucial importance.

# NUTRACEUTICALS AND IMMUNOSTIMULANTS

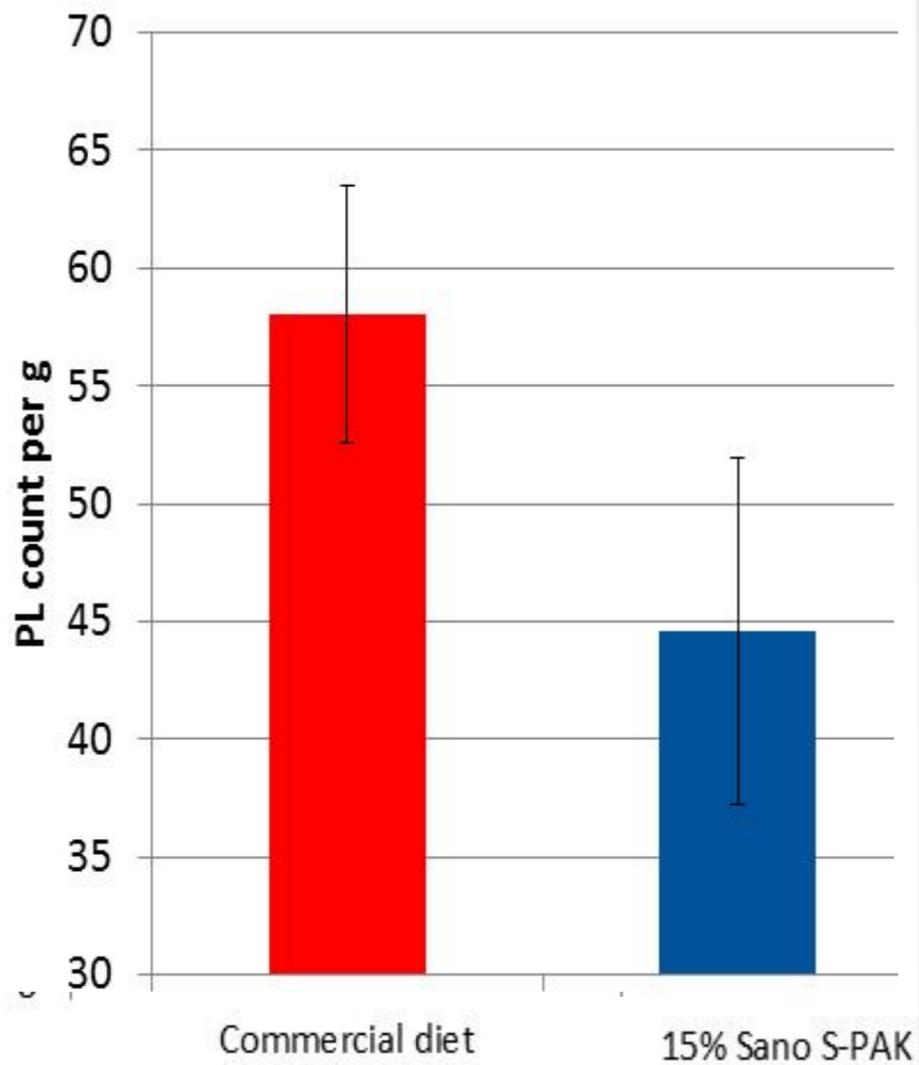
- Use only products which have a proven high attractiveness for shrimp post-larvae, and **juveniles**.
- Elevated doses of nutraceuticals and specific **immunostimulants**.
- High levels of vitamins, lipids, pigments and nucleotides to support the osmoregulation, growth and other vital processes during normal and stressful conditions.

**Stronger animals, with faster growth  
and improved survival**

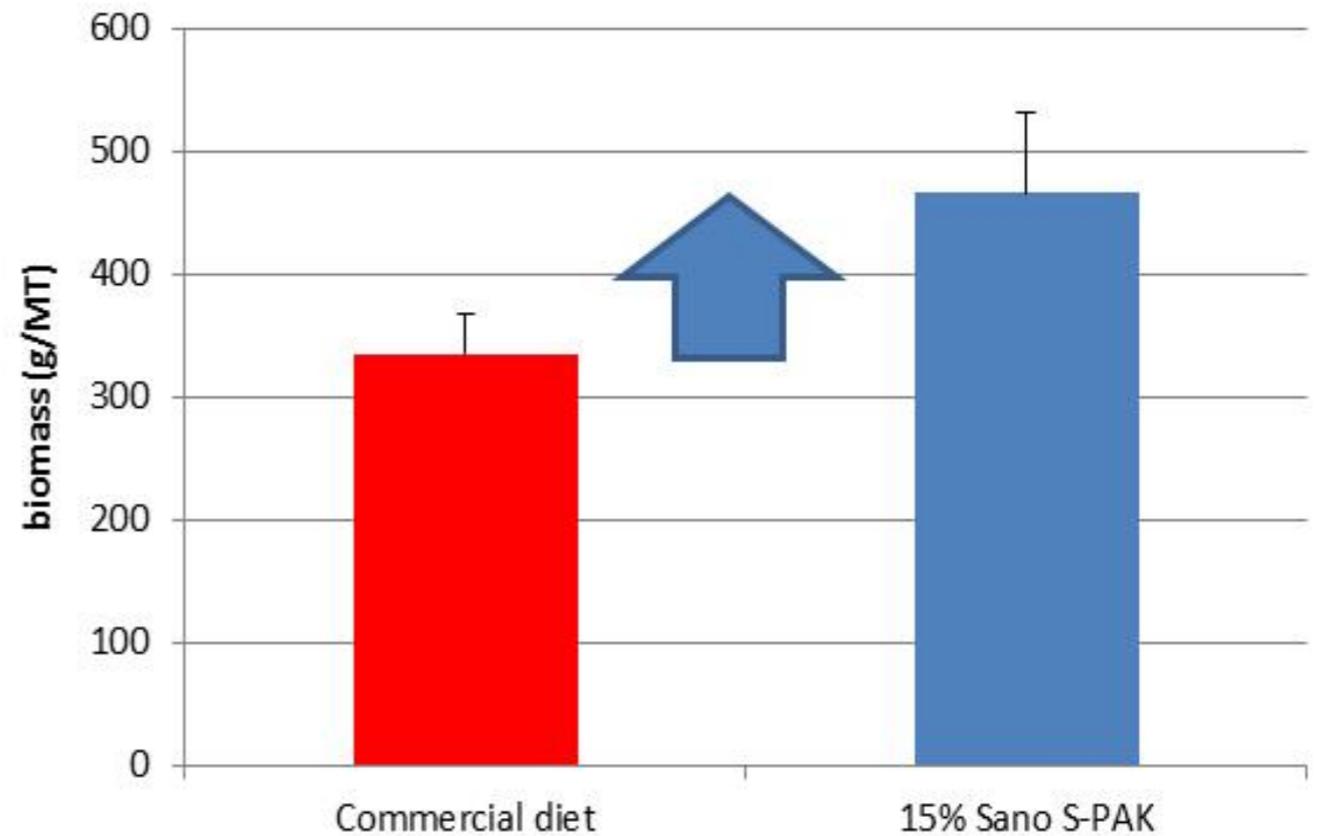


# USE OF HIGH QUALITY PRODUCTS EQUALS FAST GROWTH

15% replacement of “quality feed” in PL15-PL27 period



15% replacement of “quality feed” in PL15-PL27 period



# HIGH QUALITY PROBIOTICS

If you are running a closed nursery system with no/low water exchange, INVE recommend to use probiotic to improve the bacterial flora in nursery water and the gut of the shrimp.

Probiotics for **water management** should be applied to improve bacterial flora in water and pond/tank environment.

Probiotics for **shrimp gut health** should be applied to shrimp feed (at feed mill or as top dressing at the nursery).

**Note:** For probiotics, **always calculate your cost** based on CFU count in the product and not based on the actual volume of the product!

# PROTOCOLS FOR NURSERIES

## NURSERY WITH HIGH QUALITY PRODUCTS

- Total bacterial count: 1.64E +05
- Bacterial count: Yellow/Green Ratio 7.98

## NURSERY WITH CONVENTIONAL FEED

- Total bacterial count: 3.61E+05 (2x)
- Bacterial count: Yellow/Green Ratio 8.88

## DIRECT STOCKING

- Total bacterial count: 2.18E +05 (2X)
- Bacterial count: Yellow/Green Ratio 3.34

# COST (YES!) AND BENEFIT (YES!)

Trial from Vietnam looking at cost and benefit between high quality protocol and control (business as usual!)

- Water treatment
- Feeding
- Electricity/power
- Labor cost



# COST (YES!) AND BENEFIT (YES!)

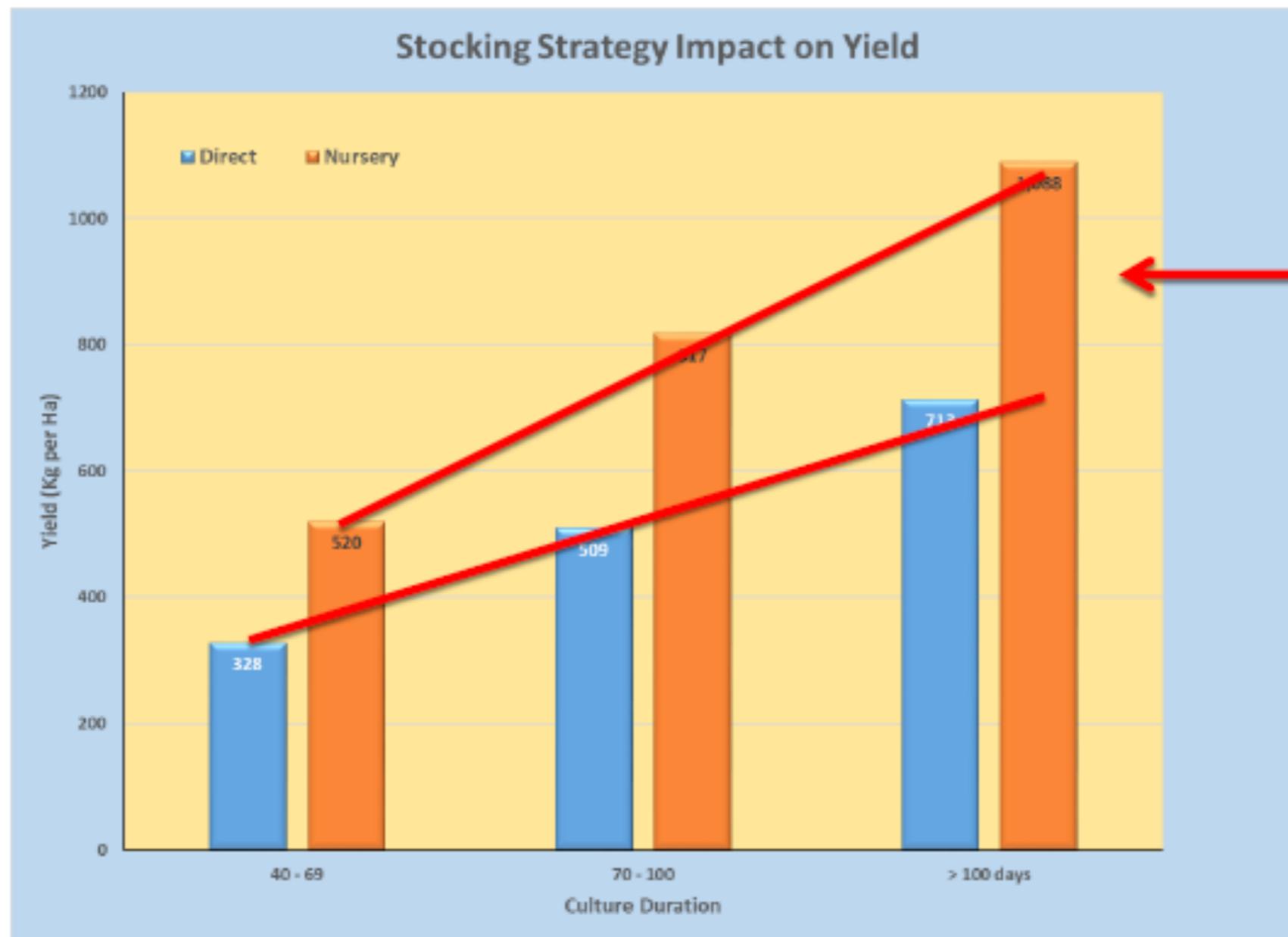
Trial from Vietnam looking at cost and benefit between high quality protocol and control (business as usual!)

|                      | WATER TREATMENT | FEEDING        | POWER          | LABOR          | TOTAL          |
|----------------------|-----------------|----------------|----------------|----------------|----------------|
| <b>TSF (Control)</b> | 26,155,000 VND  | 25,891,000 VND | 15,116,000 VND | 12,000,000 VND | 79,162,000 VND |
| <b>INVE</b>          | 14,958,000 VND  | 40,550,000 VND | 6,231,000 VND  | 6,000,000 VND  | 67,739,000 VND |
| <b>INVE vs TSF</b>   | - 43%           | + 36%          | - 59%          | - 50%          | - 14%          |

Combination of high quality products and good management practice can save the farmer **14%** in overall cost already right after the nursery cycle is ended!

# COST (YES!) AND BENEFIT (YES!)

Does the use of high quality and careful management at hatchery and nursery level carry through until harvest??



**BENEFIT**

D. Fegan 2016 Mexico

# PROTOCOL FOR NURSERIES

## “TRADITIONAL” NURSERY PROTOCOL

- 5 PL/L in stocking density
- Normal diet (as would have been used in initial grow-out stages)
- Higher total bacteria counts
- Low vibrio count compared to direct grow out stocking from hatchery

## HIGH QUALITY PRODUCT NURSERY PROTOCOL

- 30-35 PL/L in stocking density
- Possibility to use only high quality INVE products or combine with your own feed.
- Low bacteria count
- Higher survival and better growth in grow-out
- Low vibrio count compared to direct grow out stocking from hatchery

# EXAMPLE FROM THAILAND

## Shrimp nursery details

|                          |  |
|--------------------------|--|
| Tank volume:             | 100 m <sup>3</sup>   |
| Stocking:                | 500,000 PL12 (5/L)   |
| Harvest weight:          | 1.5 gram   |
| Survival in control:     | 50%  |
| <b>Survival in INVE:</b> | <b>80%</b> (added high quality diet (15% of total feed and probiotic)) |
| Water exchange control:  | 100% each day  |
| Water exchange INVE:     | 50% each day   |
| Cost of PL control:      | 50 satang/PL   |
| Cost of PL INVE:         | 30 satang/PL <b>(40% cheaper!)</b>                                     |



# ENSURE YOUR SHRIMP NURSERY PROTOCOL IS TAILOR MADE TO YOUR FARM CONDITIONS!

|  <b>Nursery protocol</b> |               |           |              |            |                |            |                |                              |  |           |           |           |                |                |
|--|---------------|-----------|--------------|------------|----------------|------------|----------------|------------------------------|--|-----------|-----------|-----------|----------------|----------------|
| Calculations   |               |           |              |            |                |            | Actual feeding |                              |  |           |           |           |                |                |
| g:   | 100,000       |           | PL           | 30         |                | ton water  | 35 PL/L        |                              |  |           |           |           |                | Std. Feed (kg) |
| PL   | Weight (g/pc) | Feed rate | Feeding (kg) | Survival % | Act. feed (kg) | S-PAK size | S-PAK (g)      | FRIPPAK size                 | FRIPPAK (g)  | TOP-S (g) | PRO-2 (g) | PUR (ppm) | Std. Feed (kg) |                |
| 12   | 0.01          | 30 %      | 0.30         | 100        | 0.30           | 2/5        | 150            | 400                          | 150  |           |           | 30        |                |                |
| 13   | 0.02          | 28 %      | 0.56         | 95         | 0.53           | 2/5        | 180            | 400                          | 180  |           |           | 30        |                |                |
| 14   | 0.04          | 26 %      | 1.04         | 95         | 0.99           | 2/5        | 200            | 400                          | 200  |           |           | 30        |                |                |
| 15   | 0.06          | 24 %      | 1.44         | 95         | 1.37           | 2/5        | 275            | 500                          | 275  |           |           | 30        |                |                |
| 16   | 0.09          | 22 %      | 1.98         | 95         | 1.88           | 2/5        | 375            | 500                          | 375  |           |           | 30        |                |                |
| 17   | 0.11          | 20 %      | 2.20         | 95         | 2.09           | 5/8        | 420            | 500                          | 420  |           |           | 30        |                |                |
| 18   | 0.13          | 19 %      | 2.47         | 95         | 2.35           | 5/8        | 470            | 500                          | 470  |           |           | 30        |                |                |
| 19   | 0.14          | 18 %      | 2.52         | 95         | 2.39           | 5/8        | 479            | 500                          | 479  |           |           | 30        |                |                |
| 20   | 0.16          | 16 %      | 2.56         | 95         | 2.43           | 5/8        | 486            | switch to<br><b>Std.Feed</b> |  |           |           | 30        | 1.95           |                |
| 21   | 0.18          | 15 %      | 2.70         | 95         | 2.57           | 5/8        | 513            |                              |  |           |           | 30        | 2.05           |                |
| 22   | 0.20          | 15 %      | 2.90         | 90         | 2.61           | 5/8        | 522            |                              |  |           |           | 30        | 2.09           |                |
| 23   | 0.25          | 14 %      | 3.50         | 90         | 3.15           | 8/12       | 630            |                              |  |           |           | 30        | 2.52           |                |
| 24   | 0.30          | 14 %      | 4.05         | 90         | 3.65           | 8/12       | 720            |                              |  |           | 30        | 2.90      |                |                |

# CONCLUDING REMARKS

Even if no nursery is to be build, the “nursery approach” to take extra good care of growing your shrimp in the first critical 30-40 days after stocking should be applied:

## **Nursery approach**

High quality diet

Boost immune system of shrimp with imunostimulants to ensure a robust shrimp that grows well.

Pay special attention to water quality!

# CONCLUDING REMARKS

Farmers in Thailand (Southern provinces) are using the shrimp nursery with success.

The government in Vietnam is starting to promote nurseries in shrimp farming to increase production both in small and large scale shrimp farms.

Using high quality and concentrated products in your nursery protocol farmers will enable nurseries to stock 30-35 PL/L instead of the normal 5 PL/L following other protocols.

# CONCLUDING REMARKS

Vibrio counts in nurseries are less than in ponds with direct stocking.

After transfer from nursery to grow-out, it is important to provide shrimp with high input of immunostimulants and probiotics to maintain the benefit achieved in the nursery. Be careful when transferring the shrimp!

A few percent improved harvest will more than recover the initial extra cost for using nurseries. Remember that today many farmers does not make it past DOC30!!

# CONCLUDING REMARKS

- Industry should focus on supporting farmers with solutions that are sustainable and have a holistic, long term approach to the sector!
- High quality diets and feed additives should be the new norm!
- **A healthy pond environment ensures a healthy shrimp, a healthy consumer and a happy farmer!!**

# FINAL WORD GOES TO TILAPIA!!

**Tilapia project with Temasek Polytechnic and INVE Aquaculture**

**Tilapia trial with probiotics and immune boosters for tilapia**

**Start in October 2016**



# FINAL WORD GOES TO TILAPIA!!

## Objective:

Evaluation of the efficacy of the three INVE products (PRO-W, PRO-F and TOP-S) on health and growth performance of Tilapia under controlled in-house conditions at Temasek Polytechnic

Evaluation of the efficacy of the three products on health and growth performance of Tilapia under marine water conditions at Lubritrade Ocean (Ubin) Pte Ltd as part of the farm contingency programme in times of plankton blooms

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**THANK YOU**