shapingaquaculturetogether

# *Semi-biofloc production in Indonesia*

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# Outline of presentation

1. Introduction
2. Farm description
3. Farm trials
   3.1 Protocol
   3.2 Data
4. Conclusions

# Introduction

- Switch from method relying on high water exchange to those with reduced or even zero water exchange

- Options include:
    - recirculation of water from reservoir to ponds, to settling pond and back to pond or discharged.
    - biofloc technology system, or intensive heterotrophic culture system
    - semi-biofloc system, with a gentle switch from autotrophic to mixotrophic

# Introduction

- Hybrid System operated in many Indonesian farms
- Careful balance between autotrophic and heterotrophic organisms.
- Biofloc made of green algae (mostly Chlorella) and bacteria (mostly Bacillus), together with detritus, protozoa, etc.
- Contrary to the classic biofloc system, the balance between phytoplankton and bacteria is of the order of 30-40% autotroph and 60-70% heterotrophs.
- With the development of the biofloc, the pond water colour can be described as light brown cream.

# The Farm

- Aquaculture Experience
- located in Kabupaten Lamongan, East Java
- 40 ponds, of an average size of 3,000 $m^2$
- Ponds fully lined with HDPE.

# Protocol

1. Set-up of biosecurity measures, i.e. crab protection and bird nets.
2. Disinfection of the water (Sanocare PUR 1.2ppm)
3. Water preparation with regular applications over 2 weeks:
- dolomite (10ppm, 8X)
- sodium nitrate and silicate (Sanolife Nutrilake 3ppm, 6X)
- calcium carbonate and magnesium carbonate
- Bacillus probiotics (Sanolife PRO-W 100g/ha, daily)

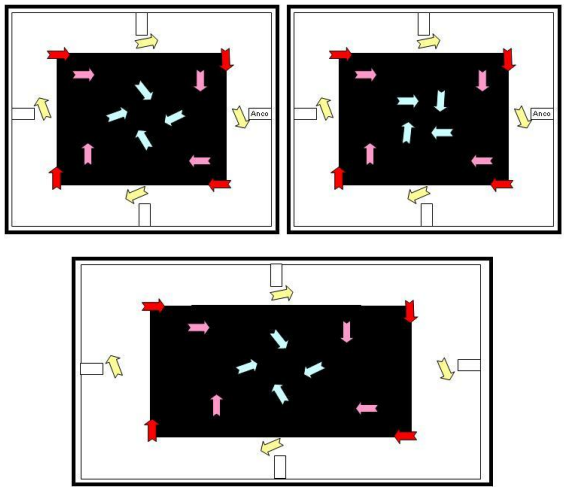
The combination of small particles and Sanolife PRO-W are “floc starters”.

# Protocol

1. Stocking with PL10 animals
2. Control of the environment in order to maintain a balance between algae and bacteria:
- Frequent addition of a natural source of nitrate (Sanolife Nutrilake 5ppm)
- Frequent addition selected Bacillus (Sanolife PRO-W 1ppm)
- Molasses added 2-3 times per week at 10-15Kg/ha
- Mineral additives coated on feed

# Protocol - aeration

Positioning of paddlewheels for:
- oxygenation (above 4 ppm)
- water circulation
- mixing (no stratification)
- sludge collection in the central area of the pond



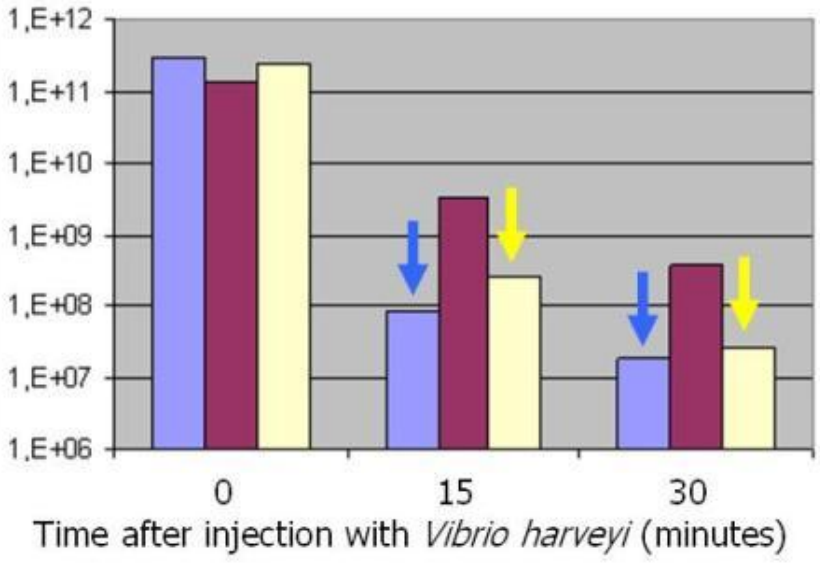
# Protocol - floc

- Floc created with a combination of Sanolife PRO-W, dolomite and calcium carbonate/magnesium carbonate
-Target is 2-3ml/L (Imhoff cones, <2 hours). Much smaller than standard biofloc (15ml/L).
- Limited water exchange
- Regular siphoning to (1) remove the excess organic matter from the central area; and (2) evaluate shrimp molt and mortalities

# Protocol - siphoning

# Protocol – other actions

- Frequent stimulation of the shrimp immune (Sano TOP S)
- Improvement of the feed conversion rate through the coating with Bacillus probiotics (Sanolife PRO-2).




Clearance of *Vibrio* from haemolymph of shrimp from **control** and 2 probiotic treatments (**treat 1** and **treat 2**). Probiotics are commercial Bacillus strains.

Test carried out at SBBU, Bangkok, Thailand.

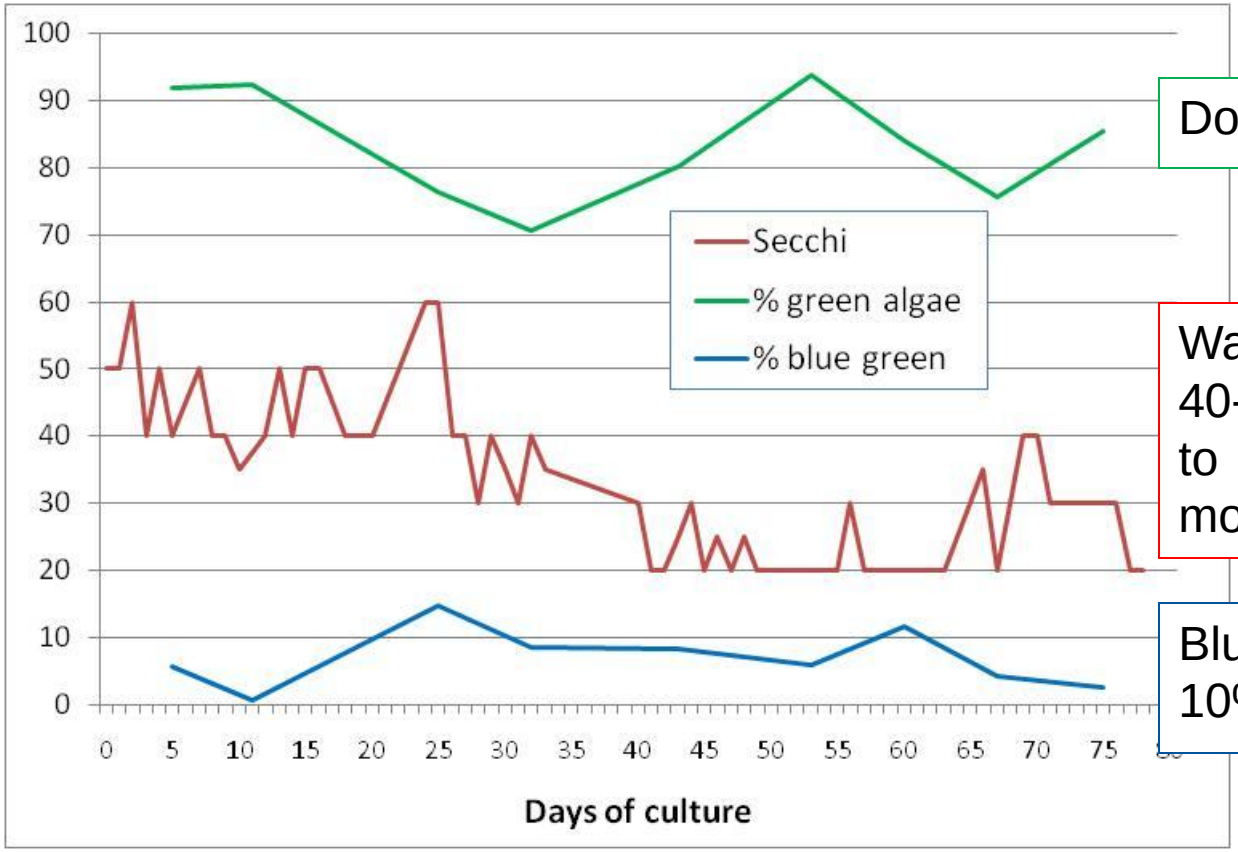
# Results – autumn 2012

| Pond | Size ($m^2$) | Density ($PL/m^2$) | Days of Culture | Size (pcs/kg) | Yield (kg) | FCR | Productivity (Mt/ha) |
|---|---|---|---|---|---|---|---|
| A | 2,800 | 80 | 88 | 48 | 4,110 | 1.32 | 14.7 |
| B | 2,900 | 65 | 86 | 52 | 3,979 | 1.21 | 13.77 |
| C | 2,900 | 72 | 87 | 50 | 3,935 | 1.28 | 13.6 |
| D | 2,800 | 72 | 86 | 51 | 3,741 | 1.26 | 13.4 |
| E | 2,300 | 78 | 87 | 48 | 3,172 | 1.32 | 13.8 |
| **Average** | **2,740** | **73** | **87** | **50** | **3,788** | **1.28** | **13.8** |
| A | 3,300 | 113 | 104 | 46 | 7,527 | 1.38 | 22.8 |
| B | 3,000 | 133 | 82 | 62 | 6,273 | 1.53 | 20.9 |
| C | 2,900 | 137 | 83 | 62 | 5,794 | 1.69 | 20.0 |
| D | 3,000 | 119 | 97 | 47 | 6,423 | 1.36 | 21.4 |
| E | 3,200 | 120 | 96 | 46 | 5,360 | 1.53 | 16.7 |
| F | 3,000 | 119 | 96 | 48 | 5,760 | 1.44 | 19.2 |
| **Average** | **3,067** | **124** | **93** | **52** | **6,188** | **1.49** | **20.2** |

# Results – January 2013

| Pond | Size (m2) | Density ($PL/m^2$) | Days of Culture | Size pcs/kg | Yield (kg) | FCR | Productivity (MT/ha) |
|---|---|---|---|---|---|---|---|
| A | 2,800 | 107 | 96 | 45 | 6,011 | 1.30 | 21.5 |
| B | 2,900 | 105 | 94 | 53 | 5,783 | 1.28 | 20.0 |
| C | 2,800 | 107 | 89 | 51 | 5,504 | 1.33 | 20.0 |
| **Average** | **2,833** | **106** | **93** | **50** | **5,766** | **1.30** | **20.3** |

# Results – Phytoplankton




Dominated by green algae

Water transparency from 40-60 cm in the first weeks to 20-30cm in the last 2 months of the crop

Blue-green algae below 10% most of the time.

# Conclusion

- Successful production using semi-biofloc or mixotrophic system
- Management of the system based on the frequent application of the right nutrients for the algae and the right probiotics

# Thank you