

THE SHRIMP INDUSTRY AND MARINE FISH FARMING IN BRAZIL

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FEDERAL DO CEARÁ

Workshop on Aquaculture in Brazil
Trondheim, Norway
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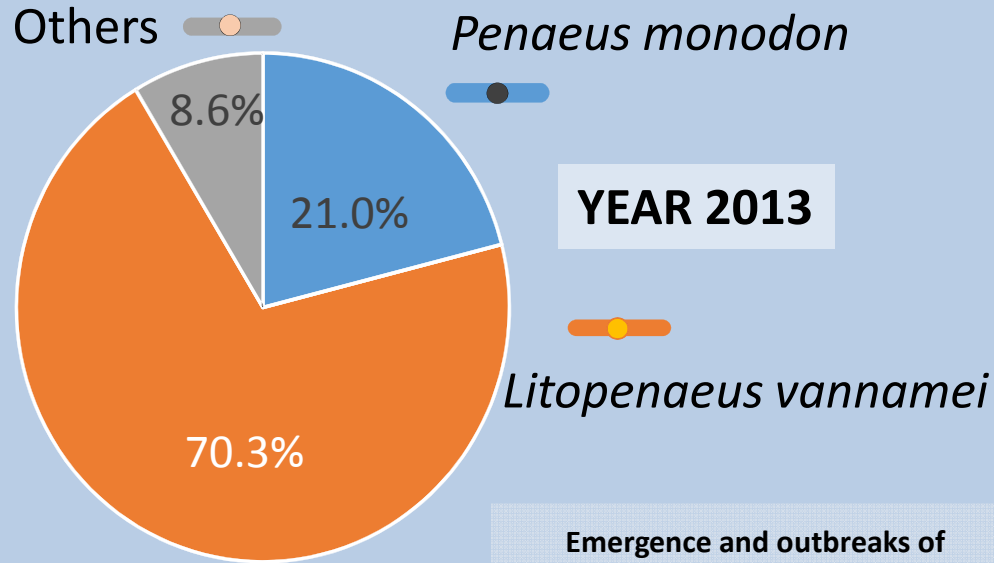
Promotion:



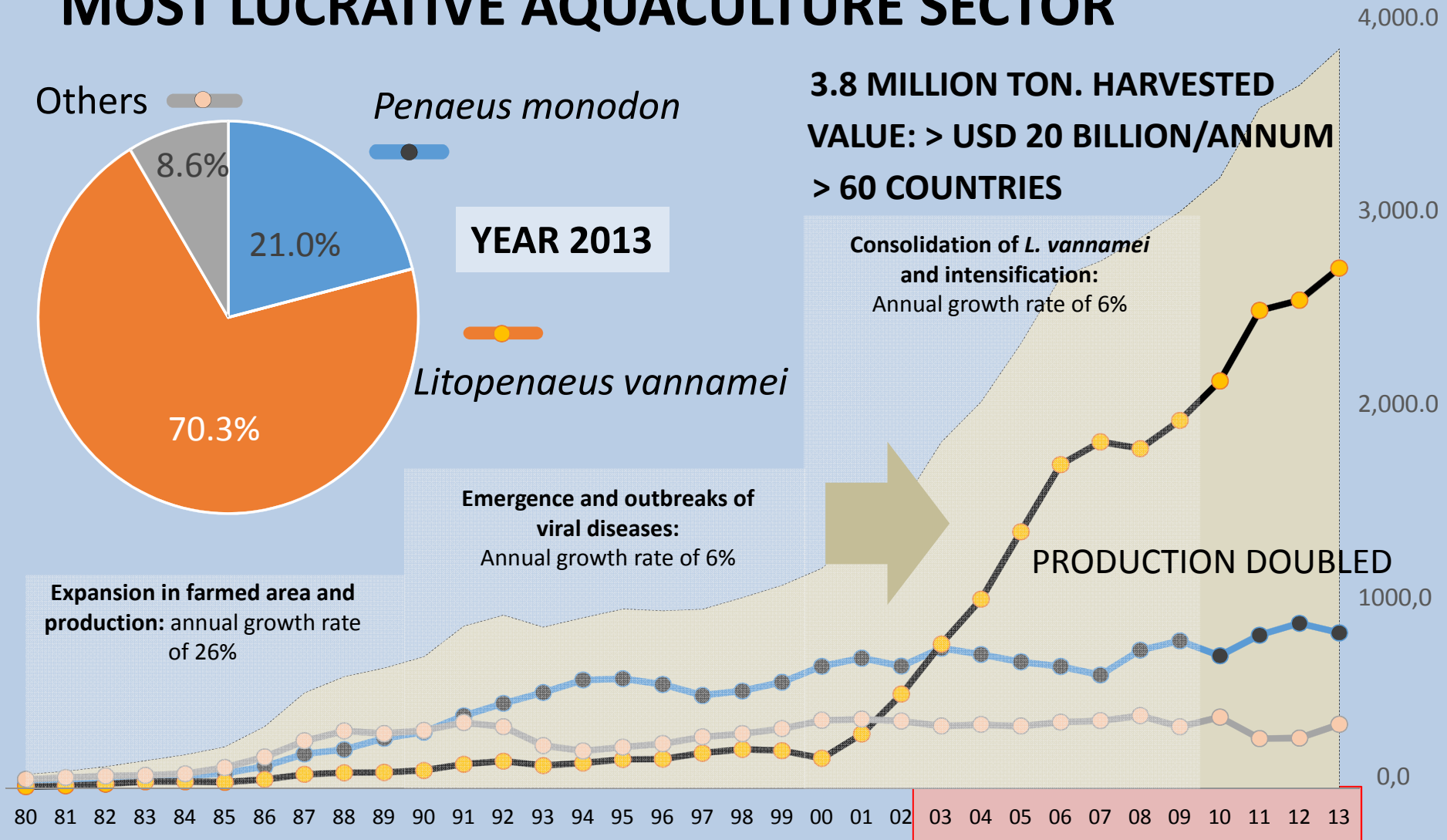
NTNU – Trondheim
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Science and Technology



ALMOST 4 MILLION MT OF SHRIMP IN 2013: MOST LUCRATIVE AQUACULTURE SECTOR



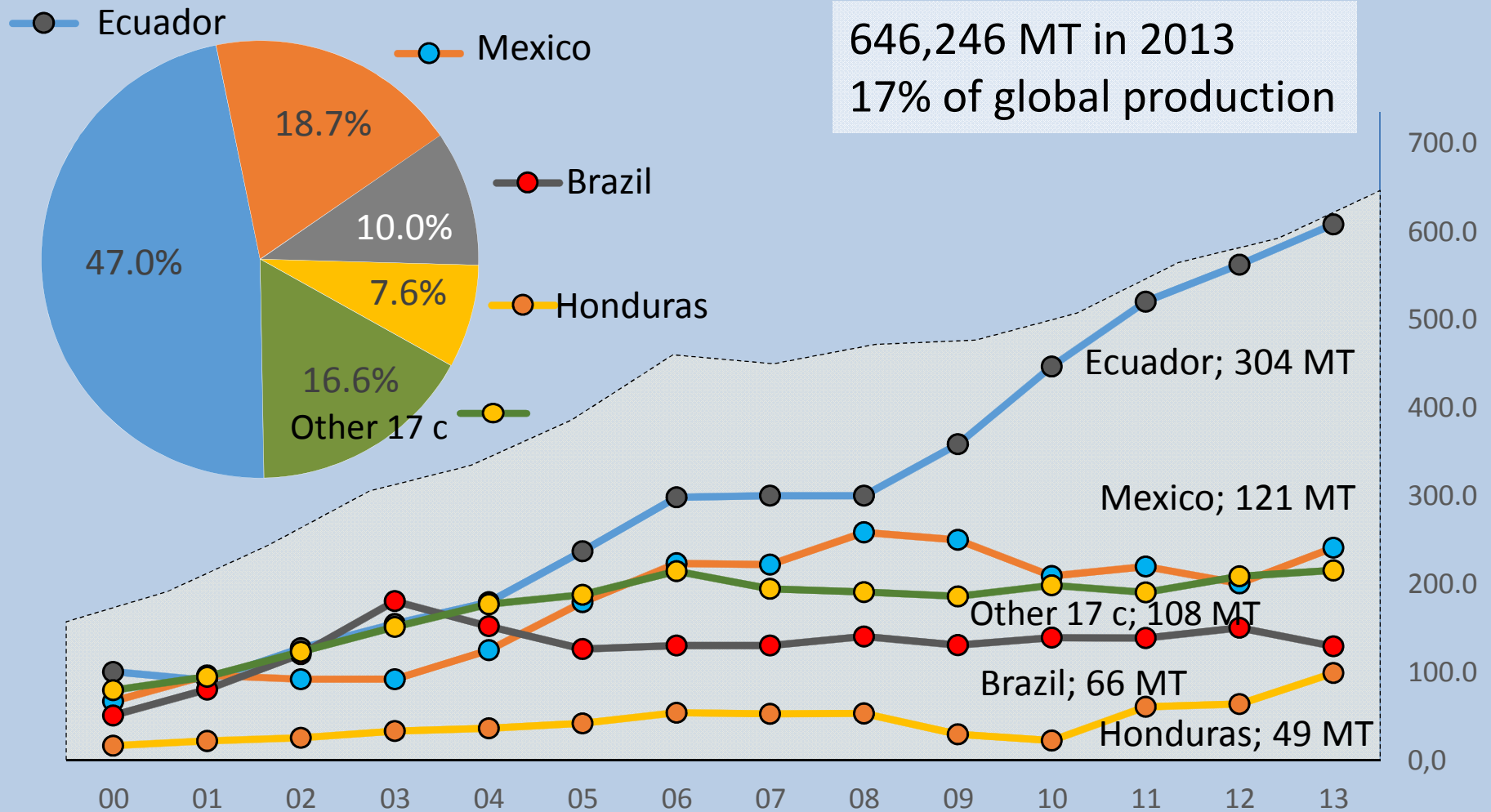
3.8 MILLION TON. HARVESTED
VALUE: > USD 20 BILLION/ANNUM
> 60 COUNTRIES



Source: FAO, Department of Fisheries and Aquaculture. On line query.

AMERICAS 17% OF GLOBAL PRODUCTION

BRAZIL 3RD LARGEST WESTERN PRODUCER



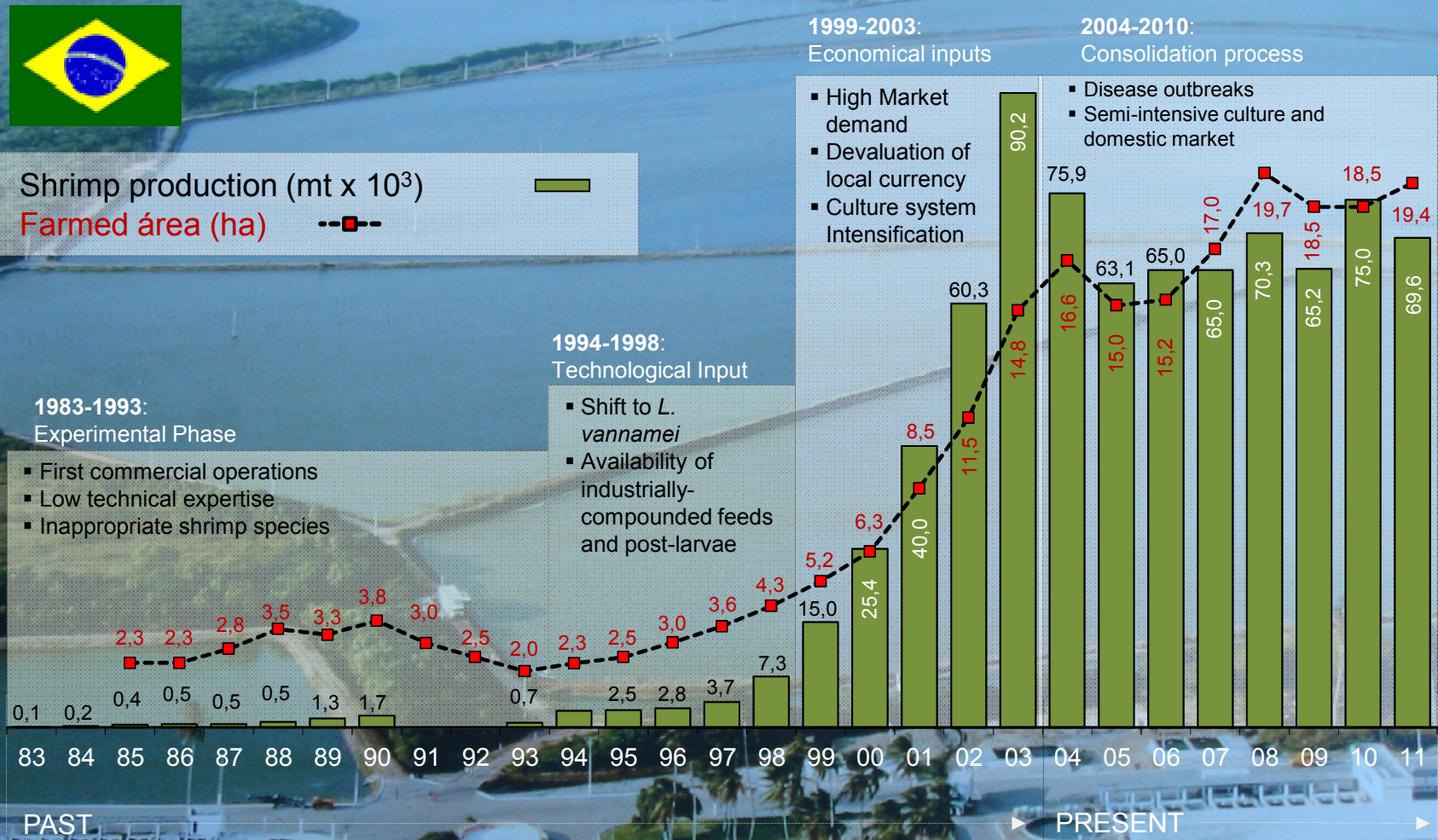
Source: FAO, Department of Fisheries and Aquaculture. On line query.

SHRIMP FARMING IN BRAZIL



Shrimp production (mt x 10³)

Farmed área (ha)



1983-1993:
Experimental Phase

- First commercial operations
- Low technical expertise
- Inappropriate shrimp species

1994-1998:
Technological Input

- Shift to *L. vannamei*
- Availability of industrially-compounded feeds and post-larvae

1999-2003:
Economic inputs

- High Market demand
- Devaluation of local currency
- Culture system Intensification

2004-2010:
Consolidation process

- Disease outbreaks
- Semi-intensive culture and domestic market

PAST

PRESENT

Source: Nunes *et al.* (2011). Panorama da Aquicultura, 124: 26-36.

LATE 1970'S TO EARLY 1980'S

- Highly carnivorous
- Not tolerant to high salinity waters

Kuruma shrimp,
Marsupenaeus japonicus



MID 1980'S TO MID 1990'S

Slow growth after 7 g, high FCR
Carnivorous

Southern brown shrimp,
Farfantepenaeus subtilis



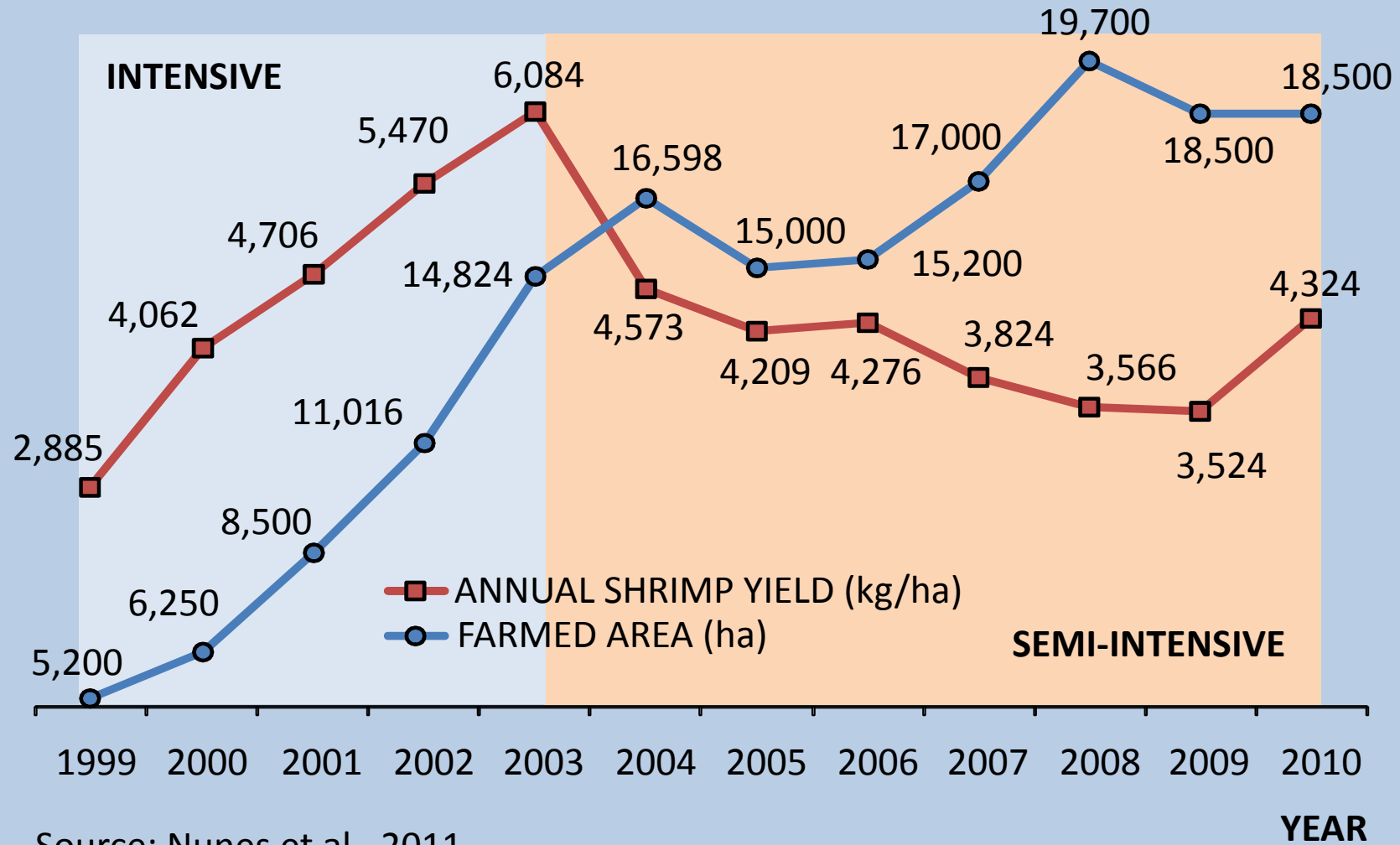
MID 1990'S TO PRESENT

Fast growth rates
Adapted to soybean-based feeds

Pacific whiteleg shrimp,
Litopenaeus vannamei



PRODUCTION EXPANDED THROUGH INTENSIFICATION UNTIL 2003



Source: Nunes et al., 2011

PRODUCTION DOMINATED BY MEDIUM TO LARGE OPERATIONS

An aerial photograph of a large-scale aquaculture farm. The image shows a dense grid of rectangular ponds, each containing water. The water in the ponds varies in color from dark blue to light green, indicating different stages of fish growth or different types of fish. The ponds are separated by narrow, light-colored earthen paths or dikes. In the background, there are some trees and a larger body of water, possibly a river or lake. The overall scene depicts a highly organized and large-scale agricultural operation.

Photo: Queiroz Galvão Alimento Ltda.
Date: 12/05/2003

Pendências, Rio Grande do Norte

SEMI-INTENSIVE METHODS PREVAIL



Large ponds between 5 to 10 ha
Yields between 2 to 3 MT/crop
Short crops, less than 90 days

Photo: Mauricio Albano
Date: 30/09/2008

Acaraú, Ceará

EXPANSION INTO INLAND AREAS

LOW SALINITY SHRIMP FARMING

Abandoned tilapia farms or in salted soil
Oligohaline waters, with 0.5 – 0.6 g/L salinity

Jaguaruana, Ceará

Photo: Jeroen Vontilburg.



COMMERCIAL SHRIMP HATCHERIES

1. 18 operational hatcheries in Brazil
2. Production of 1.5 billion PLs/month
3. High demand driven by production of small-size shrimp at farm level
4. USD 2.6/million PL
5. 60% of production dominated by three large players
6. 100% or partly owned by entrepreneur groups with farming areas of not less than 500 ha



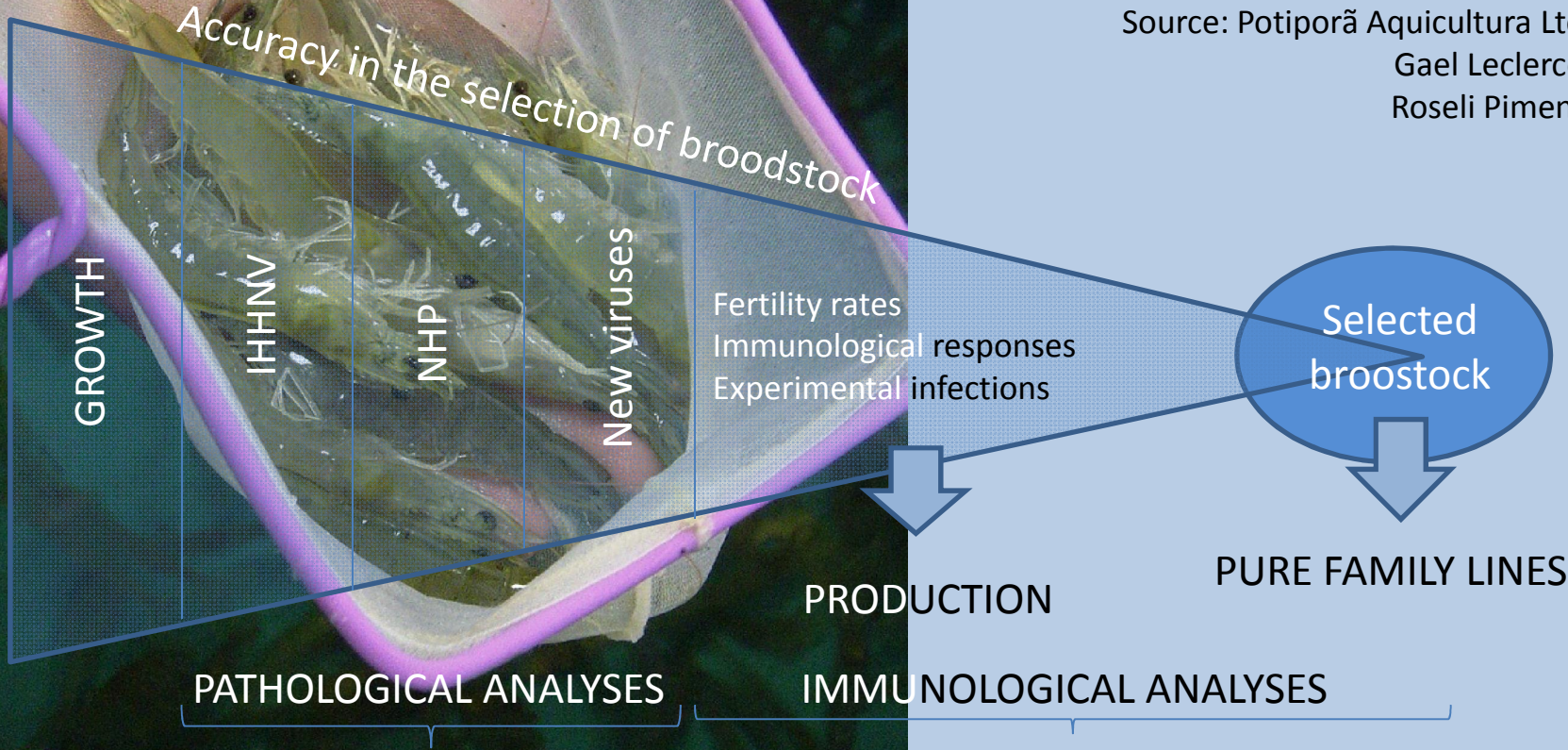
SPR SHRIMP (Specific Pathogen Resistant)

STRATEGIES OF INDIVIDUAL SELECTION OF SHRIMP BROODSTOCK ADOPTED BY A COMMERCIAL HATCHERY IN NE BRAZIL

Prevention against diseases

Genetic improvement

Source: Potiporã Aquicultura Ltda.
Gael Leclercq e
Roseli Pimentel



HATCHERY PRODUCED POST-LARVAE

21-day old post-larvae at arrival to the farm



TWO-STAGE PRODUCTION CYCLE



Starts with PL10-PL12
Ends with 50-100 mg/PL
<15 days of rearing

Starts with PL10-PL12
Ends with >200 mg/PL
< 35 days of culture

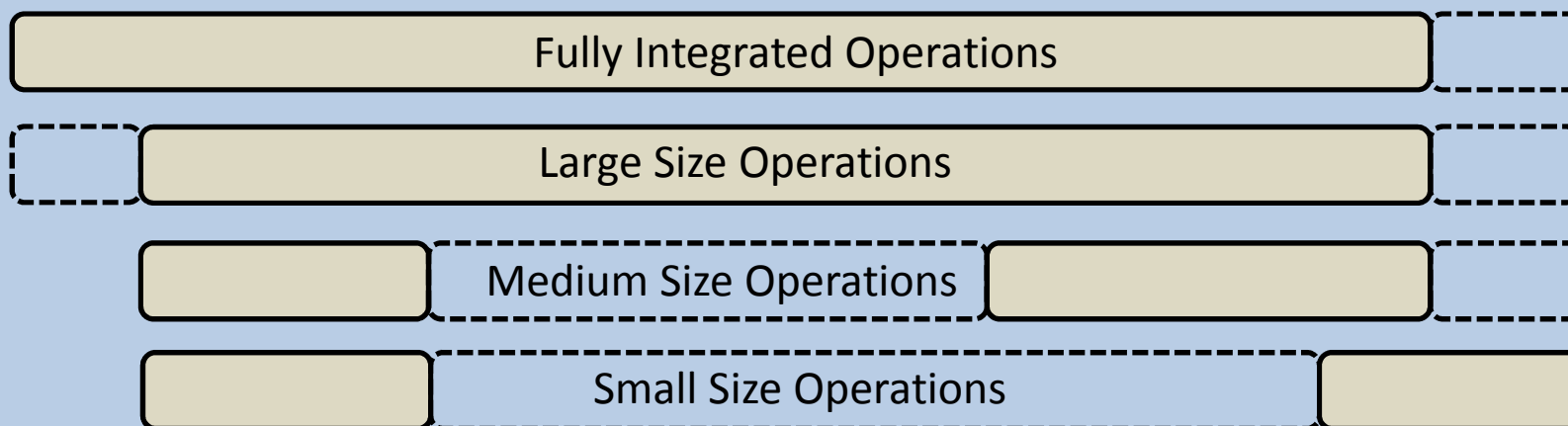
NURSERY TANKS

FEED MANUFACTURING



1. Feed is pelleted and locally produced
2. Seven companies involved in the shrimp feed business
3. About 100 thousand MT a year

SHRIMP TRADING IN BRAZIL



SHRIMP HARVEST AND TRADING

Fresh shrimp (head-on, shell-on)



SHRIMP PROCESSING FACILITIES

Processed shrimp (peeled and cooked)
Ready-to-eat dishes



+45 YEARS OF R&D WITH MARINE FISH



Bahia Pesca, IP-SP, UFSC, FURG,
LABOMAR, UFRPE

00s - present

UFSC, FURG, Bahia Pesca

90s - 00s

Cobia, snook, snappers and
groupers

UFAL, UFPE, UFSC, IPqM

70s - 80s

Flounder and snook

Flounder: *Paralichthys orbignyanus*

Fat snook: *Centropomus parallelus*

Common snook: *Centropomus undecimalis*

Mutton snapper: *Lutjanus analis*

Lane snapper: *Lutjanus synagris*

Cobia, *Rachycentrum canadum*

Grouper, *Epinephelus marinus*

Mullet

Mugil brasiliensis

Mugil curema

Mugil liza

BAHIA PESCA – SANTO AMARO, BA



Getonilson e Gerônimo

Fotos: Bahia Pesca

AQUALIDER MARICULTURA – RECIFE, PE



Fotos: Aqualider Maricultura, Manuel Tavares
Recife, Pernambuco

CAMANOR - CANGUARETAMA, RN



UFSC/LAPMAR, FLORIANOPOLIS, SC



Laboratório de Piscicultura Marinha (LAPMAR)
Departamento de Aquicultura da Universidade
Federal de Santa Catarina (UFSC)
Coordenação: Prof. Dr. Vinicius Ronzani Cerqueira

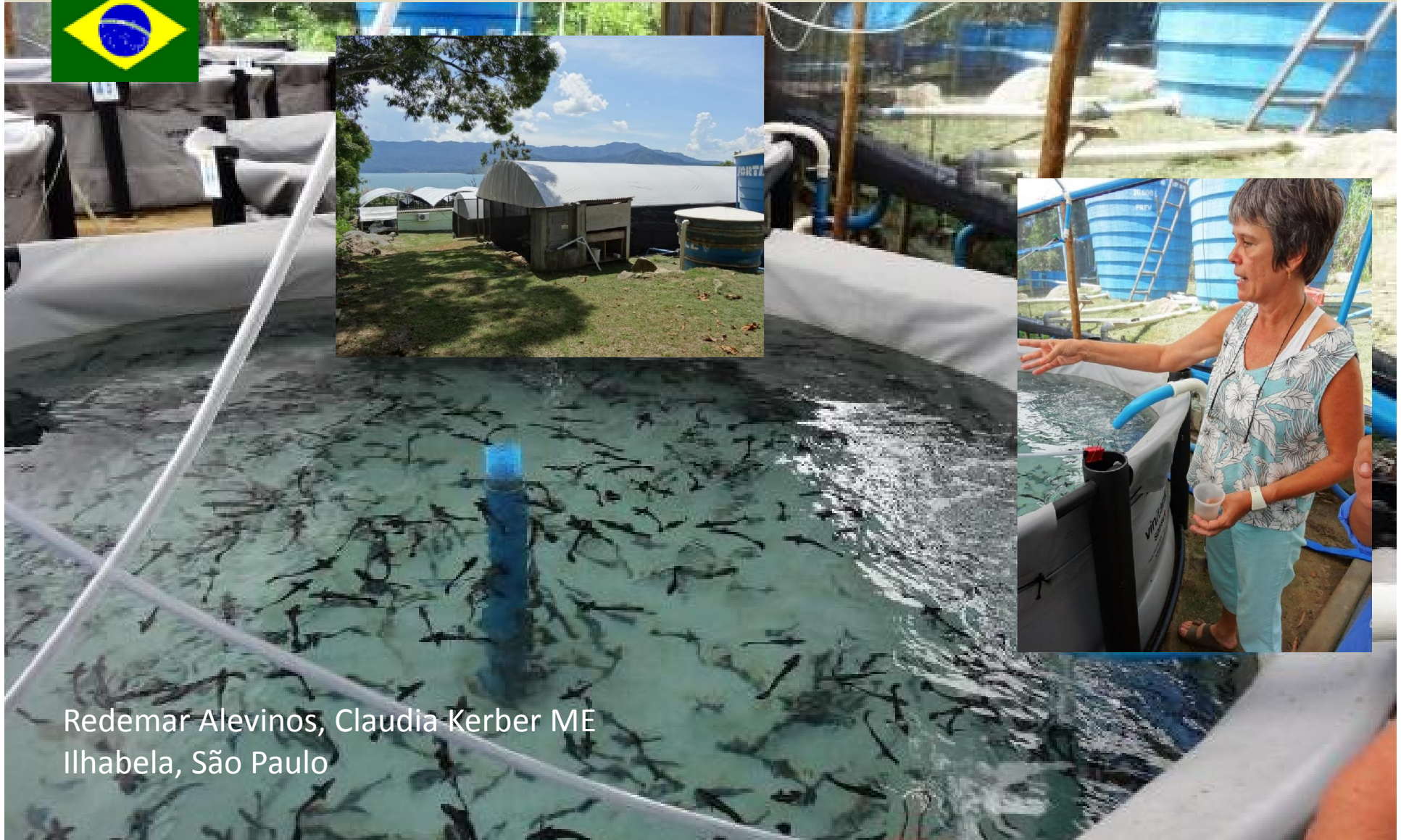
Foto: 24/10/2012

UFC/LABOMAR/CEAC – EUSÉBIO, CE



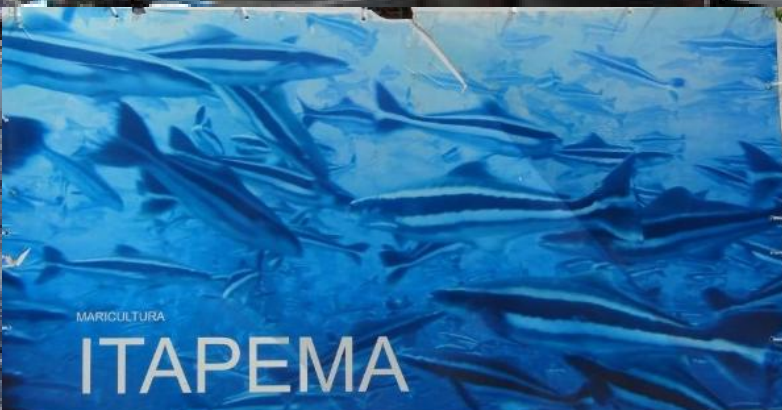
Yellowtail snapper, *Lutjanus chrysurus*

REDEMAR ALEVINOS – ILHABELA, SP



Redemar Alevinos, Claudia Kerber ME
Ilhabela, São Paulo

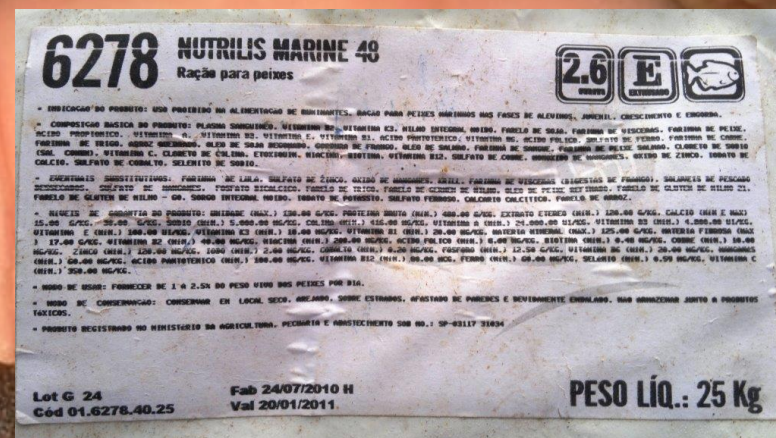
MARICULTURA ITAPEMA – SÃO SEB., SP



Fazenda Marinha

Laboratório de Produção de Alevinos
Parceria com a Prefeitura de São Sebastião

EXTRUDED COMMERCIAL FEEDS



Feeds for cobia grow-out

Ração Nutrilis Marine 48 E 45%
Evalis Nutrição Animal Ltda. (SP)

SNAPPER: ACCEPTABLE GROWTH RATES



GPD = 0,60 g/day

Rustica, voraz

Aceita bem rações a base vegetal

Dificuldade na maturação

JUVENIL DE CIOBA
CULTIVADO NO LABOMAR



FREITAS et al. 2011

GPD	Total WEIGHT GAIN	SURVIVAL	FCR	DENSITY
0.60 g/day (95 days)	57.0 g / 3.2 months	99.6 %	1.85	15 fish/m ³

COBIA: RAPID GROWTH RATES



GPD = 2.5 g/day

- Voracious, docile, easy to handle
- Natural spawning
- Dependent on high quality water
- Vulnerable to parasites and bacteria
- Rapid growth

COBIA JUVENILE FARMED
AT LABOMAR

PINTO & NUNES unplisheed

GPD	Total WEIGHT GAIN	SURVIVAL	FCR	DENSITY
2.5 g/day (70 days)	175 g / 2.3 months	99.3%	2.00	10 fish/m ³
2.5 g/day (84 days)	210 g / 2.8 months	97.6%	1.87	10 fish/m ³

COBIA: *NEARSHORE* CAGES IN SP



Itapema Maricultura



DIFFICULTIES ON *OFFSHORE* CULTURE



FAT SNOOK: SLOW GROWTH



Hardy fish, but shy
Do not come to surface, swim on shoal
Very slow growth

GPD = 0.27 – 0.34 g/day

JUVENILES OF FAT SNOOK
FARMED AT LABOMAR

PINTO 2011

GPD	Total WEIGHT GAIN	SURVIVAL	FCR	DENSITY
0.34 g/day (96 days)	32.6 g / 3.2 months	100%	1.77	10 fish/m ³
0.27 g/day (94 days)	25.4 g / 3.1 months	93.5%	2.55	10 fish/m ³

COMMON SNOOK: GROWTH ??



GPD = 0,8 g/days

Hardy fish, but shy

Do not come to surface, swim on shoal

Susceptible to *Caligus* sp.



JUVENILE OF THE COMMON
SNOOK FARMED AT
LABOMAR

BARRAMUNDI, *Lates calcarifer*

GPD = 3.0 -4.0 g/day



BARRAMUNDI

Source:
<http://www.kekoa.com.au/news/barramundi-giants/>

VS.



COMMON SNOOK

FINAL REMARKS

1. Shrimp farming:

- Gaps on genetics
- Major problems with viral diseases: recirculating intensive farming systems
- Water reuse for inland farming

2. Marine fish farming:

- Identify one single species with potential for pond farming
- Cobia farming limited potential for expansion in lower latitudes
- Lack of expertise in all aspects of marine fish farming