An overview of tilapia culture in Brazil

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Presentation Summary

- BRIEF HISTORY OF TILAPIA IN BRAZIL
- THE GROWTH OF THE INDUSTRY
- CULTURED SPECIES, STRAINS AND HYBRIDS
- FINGERLING PRODUCTION
- GROW OUT AND PRODUCTION COSTS
- FEE FISHING, PROCESSING AND MARKETING
- POTENTIAL AND CHALLENGES OF THE INDUSTRY

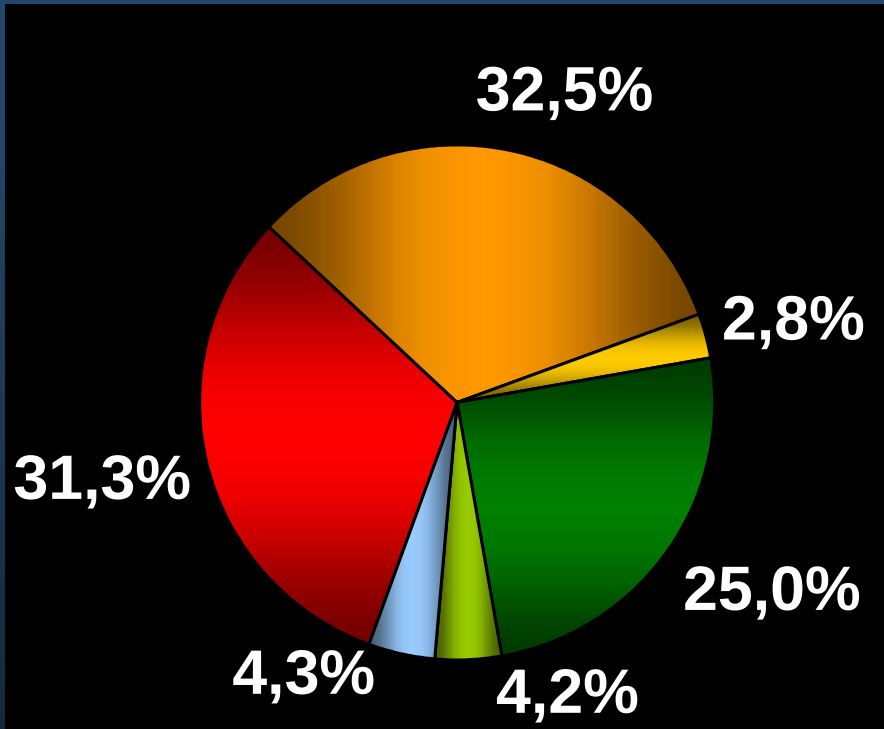
Brief history of tilapia in Brazil

- 50th – Congo Tilapia (*Tilapia rendalli*) WAS introduced in reservoirs to control macrophytes;
- 70th – Nile Tilapia from Ivory Coast introduced in reservoirs of Northeast Brazil for artesanal fishing and family subsistance. The beggining of controled fingerling's production through hybridization with *O. hornurum*.
- 90th – Commercial production, once producers learned how to sex reverse the fish;

History of tilapia in Brazil

- 1996 – Introduction of Chitralada strain;
- 1997 – Production was around 17,000 mt;
- 1999 – Tilapia production was about 30,000 mt;
- 2002 – Production nearly double, up to 57.000 mt;
- Presently – 70,000 to 90.000 mt (unofficial).

Fish culture in Brazil - 2002



TOTAL = 175.000 mt

- Carps - 55.000 mt
- Tilapia - 57.000 mt
- Other exotic fishes - 4.900 mt
- Colossoma sp. - 44.000 mt
- Other native fishes - 7.300 mt
- Miscelaneous - 7.400 mt

Source: IBAMA (2004)

Cultured strains, species and hybrids

- There are more than 70 tilapia species in the world;
- However, only four of them (plus their hybrids and strains) are mainly exploited in aquaculture:

Nile tilapia	*O. niloticus*
Blue tilapia	*O. aureus*
Mozambique tilapia ...	*O. mossambicus*
Tilapia of Zanzibar	*O. hornorum*

Nile tilapia

Chitralada (Thai Tilapia)

Red Koina (O. niloticus x O. mossamicus)

Florida red tilapia
(O. hornorum x O. mossambicus)

Saint Peter Fish (from Israel)

Fingerling production in Brazil

- Lack of statistics on fingerling production. Best estimate: over 250 million sold a year;
- Fry are seined directly from breeding ponds or obtained from artificial egg incubation;
- Swim-up fry are fed a 40-55% CP feed containing MT at 30-60mg/kg for 21 to 28d; lower doses can be used;
- MT is added to feed at the farm. MT costs US$ 3.50 to 5.00/g; feed cost ranges from US$ 0.70 to 0.90/kg;
- Production cost: US$ 7.00 to 13.00 per thousand;
- Sale price: US$ 17.00 to 33.00 per thousand;

Partial fry collection from breeding ponds

Partial fry collection from breeding ponds

Harvest basin for total fry collection

Harvest basin for total fry collection

Happas for breeding and fry or egg collection

Eggs in a female's mouth

Egg incubation

Egg incubation


PLASÚTIL

3.2mm mesh for grading fry collected in ponds

Estimating the number of fry

8 to 13mm fry – beggining of hormonal treatment

Sex reversal in throughs

Sex reversal in happas placed in ponds

Sex reversal in happas placed in ponds

Sex reversal in happas placed in ponds

Sex reversal in lined tanks

Sex reversal free in the ponds

Sex reversal free in the ponds

Female gonad

Male gonad

Grow-out

- In Brazil, tilapia grow-out is mostly performed in ponds or in cages;
- Fertilized ponds (chicken or pig manure, chemical fertilizers or a combination of those) yield tilapia up to 300g at a low cost (less than US$ 0.30/kg);
- Intensive ponds with tilapia fed complete feeds yields tilapia over 500g at a cost of U$ 0.55 to 0.65/kg;
- Tilapia at small volume / high density cages have a higher production cost (US$ 0.70 to 0.90/kg);
- Average feed prices: US$ 0.23 to 0.43/kg

Fertilized ponds and supplemental feed

Ponds with aeration and water exchange

Ponds with aeration

Grow-out

	Feed (%CP)	Yield (mt/ha)	Final SD (fish/m2)	FCR
Fertilization and supplemental feed	22-28	3 to 6	1.2 to 2.0	0.5-0.8
Intensive (no aeration neither water exchange)	28-32	6 to 8	1.2 to 1.5	1.0-1.3
Intensive (aeration and no water exchange)	28-32	10 to 12	2.0 to 2.5	1.2-1.5
Intensive (aeration plus water exchange)	32	15 to 60	3.0 to 12.0	1.4-1.8
Low volume/high density cage (6 to 14m3)	32-40	120 to 250	250 to 450	0.8-1.8

Harvest tilapia is a problem in ponds

Harvest basin is the solution

Cage culture

Reservois for hydreletrical plants

Extense estuarine areas

Large rivers

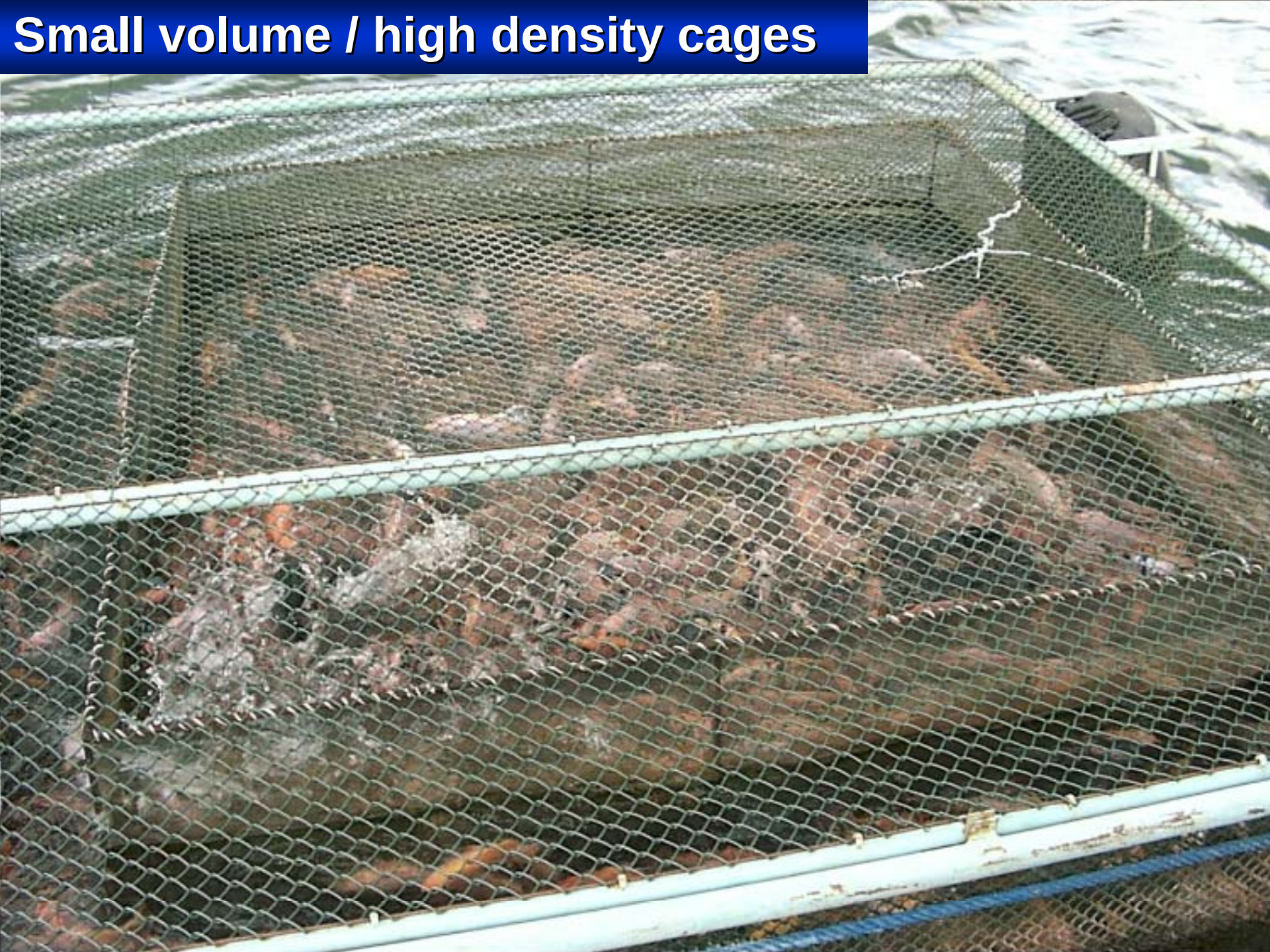
Large rivers

Cage culture in large reservoirs

Cage culture in large reservoirs

Cage culture in large reservoirs

Small volume / high density cages



Handling platarform

Strategies for SVLD cage production of tilapia					
Step	**Days**	**Feed**	**Feeding frequency (times/day)**	**FCR**	**Standing crop (kg/m^3)**
Step 1 (0.5 to 20g)	30-60	40-36%CP Powder to 2mm float	6 to 4	0.6 to 0.8	30 – 60
Step 2 (20 to 100g)	60-90	40-32%CP 3-4mm float	3	0.8 to 1.0	120 – 150
Step 3 (100 to 600g)	100-150	40-32%CP 5-6mm float	3 to 2	1.0 to 1.8	120 – 250

Fee fishing in Brazil

- As tilapia production started to grow in te 90’ths and the markets were not well established, many farmers opened up their ponds for fee-fishing;
- At meadle 90’ths fee fishing became more professional and specialized. Brazil is well known as having the largest fee-fishing business in the world;
- Many species are stocked into fee fishing ponds. Live tilapia is bought at US$ 1.20 to 1.40/kg and sold at US$ 1.80 to 2.00/kg;
- Fee fishing helped to create a better image of tilapia as a sport and food fish.

Fee fishing

Fee fishing

Processing plants

- Besides selling live fish, some producers started to process tilapia and sell fillets at the farm;
- Many producers joint-ventured and set up large and more professional processing plants;
- Retail prices:

Degutted fish	US$ 1.10 to 1.80/kg
Skin less (Black)	US$ 4.00 to 5.50/kg (120g up)
Skin on (Red)	US$ 6.00 to 7.50/kg (120g up)

Small on farm processing plant

Industrial processing plant

Industrial processing plant

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FAZENDA SANTA CECÍLIA DO PONTAL - EUCLIDES DA CUNHA PAULISTA - SP.
ESCRITÓRIO: RUA DR. JOSÉ FOZ, 85 - CEP 19010-040 - PRES. PRUDENTE - SP - FONE/FAX (18) 221-0122
CNPJ/CGC 03.521.650/0001-70 - INSC. EST. 725.002.244.110 - INDÚSTRIA BRASILEIRA

MATÉRIA PRIMA - CARNE DE PEIXE RÓTULO REGISTRADO NO SISP SOB Nº 0818/5245

Tilapia processed products

Tilapia leather products

Tilapia live market in Northeast Brazil

Potential for tilapia culture

- Brazil has 180 million people only consuming 6kg of seafod/capita/yr. Aquaculture may increase it at the same extent as the poultry industry did. In the last 20 years chiken consumption increased from 6 to 25kg/hab/yr as poultry became more available and cheaper. This is an increment of 1kg/capita/yr.
- Brazil has 5.3 million hectares of reservoirs (for hydroeletric power). A sustainable cage culture on 0.1% of this area will add 700.000 mt of fish / year (0.6kg of feed/ha/day);

Potential for tilapia culture

- Brazilian agriculture has been attaining record crops for soybean, corn and other feedstufs. It will continue to support the animal feed industry;
- Aqua feed industry well equipped and specialized;
- Tilapia are presently produced in ponds at very competitive prices for any market;
- Brazil has large extensions of land and plenty of water supply for pond aquaculture in tropical areas.

Potential for tilapia culture

- Shrimp industry in Brazil is facing problems with exporting barriers, decreasing market prices and diseases;
- The technology for intensive tilapia production is available and Brazil is helping other countries to develop tilapia industry;

Challenges for tilapia culture in Brazil

- Scale up the industry (to reduce production costs and add value for processed products);
- Sustainable use of natural resources available to increase production;
- Marketing and advertising efforts to promote tilapia in the country;
- Continuous quality control to deliver a premiu quality tilapia for any market;
- Improving production technology and advances in disease prevention and control.

What else is to come in Brazilian aquaculture?

The Amazonian red giant or The pirarucu (*Arapaima gigas*)

Culture of pirarucu in Amazon River

Piraiba or filhote (*Brachyplatystoma filamentosum*)