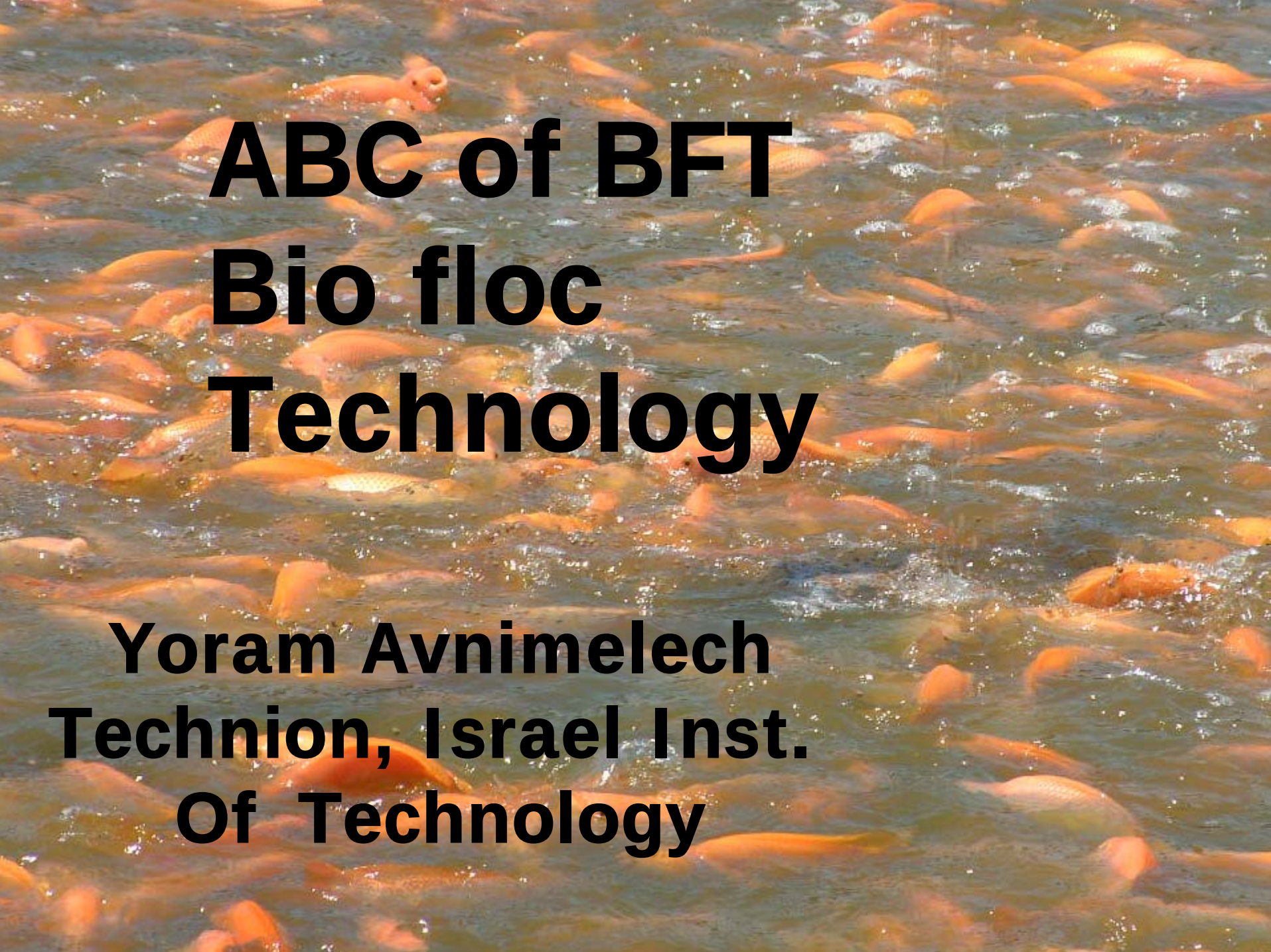

ABC of BFT Bio floc Technology

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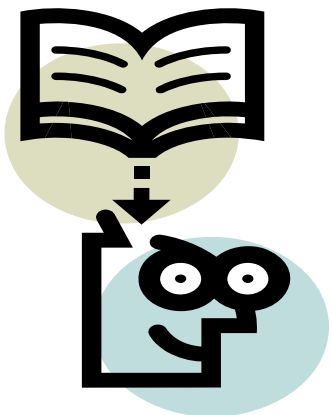
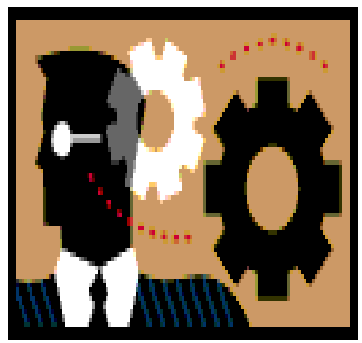
The concept of biofloc technology
had evolved at about the same time (Mid 90's),
independently by Steve Hopkins et al.
in Waddle Mariculture Ctr, SC
and by Avnimelech and coworkers in Israel.
In essence, the microbial processes
within these ponds serve
as the pond water quality treatment
system
(built in biofilter) and microbial protein
serves as a feed additive.

Some points to think about

- What did we learn on that system in the last 25 years? Where are we going in developing better utilizing this approach?





New Concept

- We deal with a system and not with individual components (fish as an isolated entity, etc.).
- Fish, bacteria, algae, other plankton, water and soil: Effecting each other and affected by all other.
- We are beginning to control the system, not just its individual components.

Controlling Nitrogen

- We are quite advanced in this aspect:
- By controlling C/N ratio of the system (feed as a major factor. Using low C/N feed, adding Carbonaceous substrates), we can control nitrogen pretty well.

Recycling feed

- Feed, especially proteins, is recycled: Feed residues (N) are assimilated by bacteria that are then consumed by fish.
- Reliable evaluation by using ^{15}N tagging.
- Tilapia utilize up to 50% of needs, shrimp up to ~ 30%.
- Not all fish.

Raising yields, saving expenses

- Experience from commercial scale systems show that production rises and expenses lowered by ~ 20%.
- The major cut of cost is feed expenses.

Control of biota

- Limited control by now:
- Reasonable control of floc formation by inoculation, control of organic load (adding mollases, raising stocking rate…).
- Some empirical results of disease outbreak prevention.

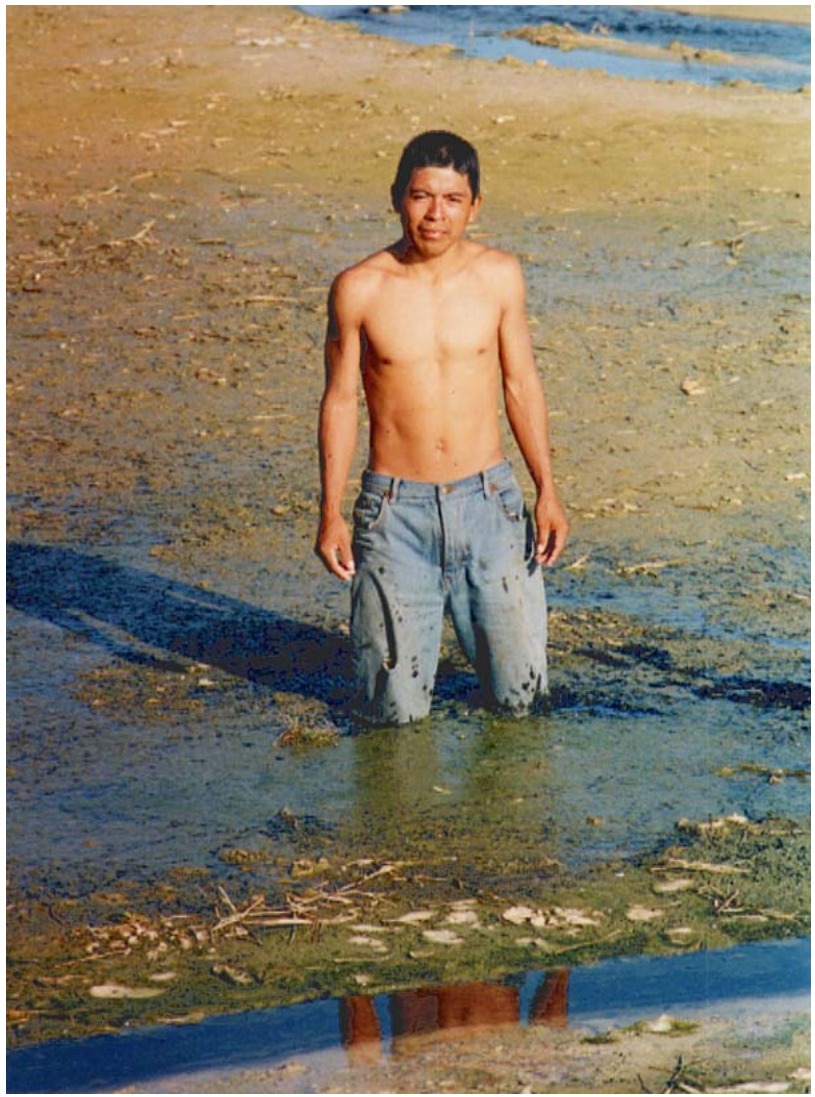
Environmental friendly systems

- Minimal (down to zero) emission of water from ponds to environment.
- Sludge is still a problem!!
- Lowering the need for fish meal and oils
- Better utilization of water and soil resources as compared to extensive ponds.

If the proof of the pudding is the eating:

- There are many BFT ponds and farms all over.

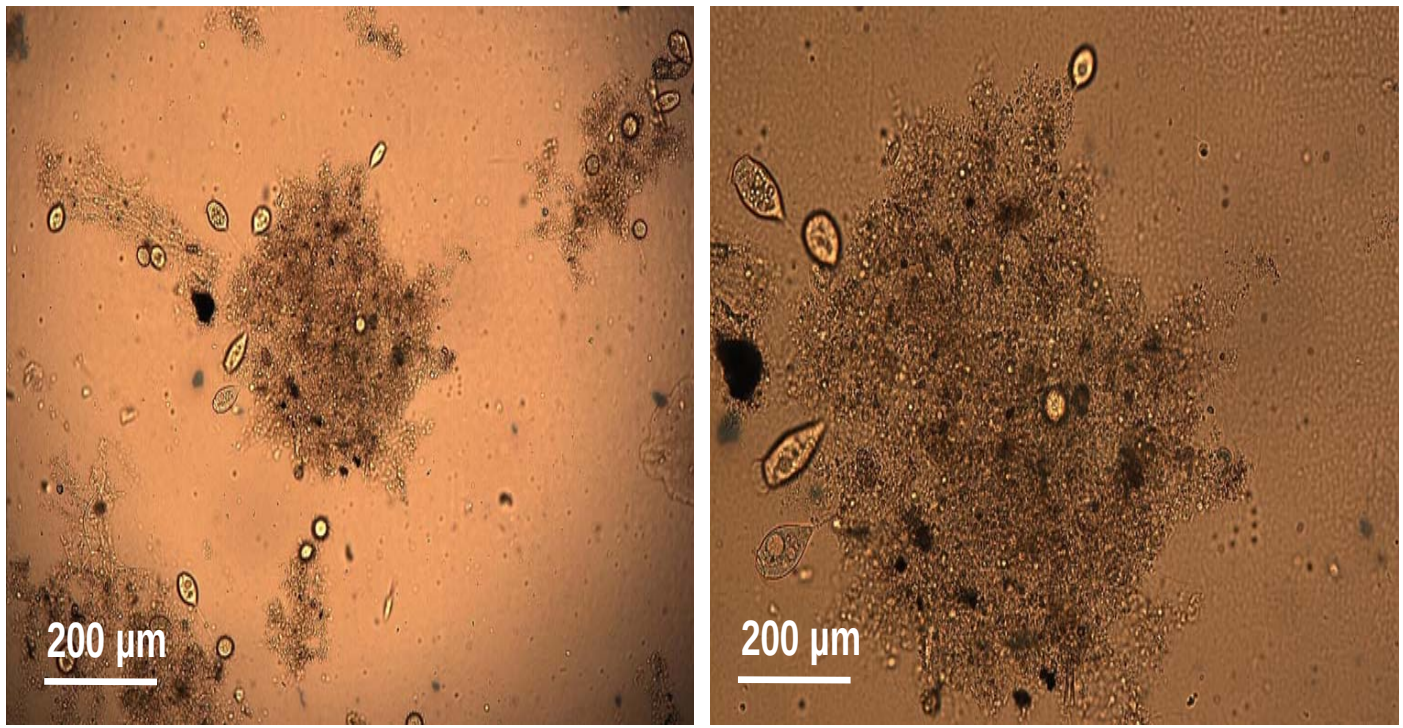
We still have to develop!!



Better define flocs

Different organisms, age, composition etc.

Optical micrographs of bioflocs



Better Feeding

- It was shown that flocs have an added value for fish (shrimp) nutrition over fabricated feed (e.g. Kuhn et al.). Only a few important compounds identified.
- Research in Gent demonstrated that we can affect the levels of probiotic compounds in bioflocs.
- Research indicated that we can affect bioflocs composition
- **YET , all of these ideas are still in early research level**

Engineering

- We need better and ready to use pond design.
- We badly need better aerators.

Dissemination of information

- Very important!!!
- Exchange of information among farmers (a win-win game).
- Two ways communication research – Practice.
- Dedicated meetings, sessions, internet

BFT working group

- Started, in an AES special session in WAS meeting, Las Vegas 2006. Has (had) an active web page (http.flocs.aesweb.org). Pushed more research.
- An Asian BFT group established, hopefully will be active.
- Special BFT sessions in every annual WAS meeting.
- We need training seminars
- **What about WAS 2010 San Diego???**

Thanks, but…. A short commercial