Traci E. Holstein
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Farmer to Farmer Aquaculture Niche Volunteers

Aquaculture without Frontiers
Biofloc Workshop and Farmer Training
Tabasco, Mexico
September 4-11, 2010

We departed from Shrimp Improvement Systems in the Florida Keys early on Sept 4 to fly out of Miami International onward to Houston, Mexico City and into Villahermosa, Tabasco that night. We were met by Rafael Martinez Garcia from Universidad Juarez Autonoma de Tabasco (UJAT) and the University of Arizona. UJAT, as the host organization, provided lodging for us at the Cencali Best Western Hotel near the campus. On Sunday Sept 5, we finalized presentations and discussed workshop plans with Rafael and with Dr. Wilfrido Contreras.

Starting on Sept 6 and for four days, Wendell and I met with approximately 20-40 participants in a classroom setting at the UJAT. We had a wide range of people attend, including farmers, hatchery staff, professors, and students. The following pages include a simple outline / agenda of the topics discussed. The attendees were especially interested in system construction, including aeration, and C:N ratios that are required to maintain the proper biofloc. We feel that bioflocs may be appropriate for aquaculture production in regions where high protein diets may be prohibitively expensive, but power for aeration is subsidized and reliable. Bioflocs, a mixture of nitrifying, autotrophic and heterotrophic bacteria along with several kinds of algae, have been shown to be very nutritious for several kinds of filter feeding juvenile fish and crustaceans. As in an activated sludge treatment system, the critical need is to keep the flocs in motion and under aerobic conditions. If water motion ceases and/or if air or oxygen injection cease, the flocs will consume all available oxygen, settle to the bottom of the rearing unit, and become anaerobic. This will quickly starve larger organisms of available dissolved oxygen in the water column.

The four days of workshop covered the biofloc technology in detail along with all of the attendant management that must be implemented to assure survival in the event of power loss. Unfortunately, we were not able to follow our original agenda to visit any tilapia farms or shrimp hatcheries due to the heavy flooding the area had been experiencing. The workshop attendees nevertheless reported that they appreciated the presentations and several were going to attempt to construct small scale biofloc units to evaluate the techniques themselves.

Demonstration of biofloc production

Classroom instruction

Wendell and Traci with bioflocs

Reviewing floc usage with farmers

Awarding certificates to the farmers and extension agents in attendance

Sept 10 was used for reviewing results with the UJAT faculty and to visit a few of the locations in Villahermosa that were not flooded. We returned to Florida on Sept 11 with a minor snafu in Mexico City that caused our suitcases to be lost for a day, but eventually returned to us in the Keys.

Day ONE:

Introduction to Biofloc Technology
- History
- Why floc technology is needed.
- Sustainable aquaculture
- Aquaculture environmental impacts

Microbial Processes
- Algae
- Heterotrophs
- Autotrophic bacteria and nitrification
- Heterotrophic VS autotrophic dominance
- Reaching a steady state

Day TWO:

Nitrogen Issues
- Feeding
- Monitoring water quality
- Management techniques
- BFT as a means to help water quality issues
- C:N ratios for good BFT

Feeding with Bioflocs
- Cost efficiency
- PCR and FCR
- Protein usage
- Nutritive value of floc
- Probiotic effect

Day THREE:

Aeration
- Oxygen demand
- Oxygen facts

- Sludge issues
- Different types of aerators
- Placement of aerators

Pond management and construction
- Starting a pond
- Floc succession
- Commercial nitrifiers
- Probiotics
- Feed
- Daily and weekly monitoring needs
- Construction

Day FOUR:

Disease and biosecurity
- Population issues
- Water exchange
- Probiotic effects
- Biosecurity measures

Sustainable aquaculture
- Future needs regarding aquaculture
- How BFT can help
- Past issues
- Water use
- Feed components
- Sludge disposal

Lista de asistencia al taller de Entrenamiento sobre bioflocs en Acuacultura:

1. Isidro López Ramos
2. Beatriz Adriana Hernández Vera
3. Anahí Cachón Camacho
4. Luis Arturo Dorantes López
5. Salvador Zapata Méndez
6. Mario Alberto Campos De León
7. Haram Fabiola Hernández López
8. María de Jesús Contreras García
9. Estuardo González Arévalo
10. Luis Domínguez Trejo
11. Rafael Angulo Pineda
12. Gabriel Márquez Couturier
13. Luis Felipe Anzaldo
14. Rosa Aurora Pérez Pérez
15. Moisés González Valencia
16. María del Carmen De la Cruz Ábalos
17. José María Pascual Patricio
18. Benjamín Eduardo Medina Sánchez
19. Mónica Alejandra de la Cruz Ábalos
20. Julián Sánchez Álvarez
21. Lucero Vázquez Cruz
22. Ulises Hernández Vidal
23. Sergio Hernández García
24. Luis Manuel Gómez Días Durán
25. José Bernat Rodríguez
26. María Fernanda Cifuentes Alonso
27. Norma Alejandra Pliego Mijares
28. Rosa Aurora Pérez Pérez
29. Cynthia María Castellanos Vidal
30. Alejandro Salvador de la Cruz
31. Aurora Oseguera Cruz
32. Nabor Hernández Hernández
33. Federico Vladimir Aguilar Téllez
34. Raquel Hernández Jiménez
35. Ramón Enríquez García Hernández
36. Lorenzo Gerónimo García
37. Benigno García Hernández
38. Karen Lisbeth Hernández Pérez
39. Francisco Montejo Velázquez
40. Xchel Aurora Pérez Palafox
41. Héctor Daniel Pérez Gómez