Training in ancestral communities for cage culture of tilapia (oreochromissp. and oreochromisniloticus).

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Formación en comunidades ancestrales para el cultivo en jaulas de la tilapia (oreochromissp. y oreochromisniloticus)

Formação em comunidades ancestrais para a cultura da tilápia em jaulas (oreochromissp. e oreochromisniloticus)

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Abstract: The San Vicente dam is located in the upper basin of the Javita River in the northwest of the Province of Santa Elena. It is a 25 m high earthen dam that dams about 40 Hm3 that will be distributed through channels to carry the vital liquid by gravity, favoring the communities located in various sectors such as: Colonche, San Marcos, Bellavista, Manantial de Guangala, Manantial de Colonche, Jambelí, Palmar, Bambil Desecho, Rio Seco, Aguadita and Cerezal, it is established that 26,000 hectares would benefit in the province of Santa Elena (CEDEGÉ, 1984). The Undersecretary of Aquaculture, together with representatives of the Ministry of the Littoral, Environment and the inhabitants of the different communities of the Province of Santa Elena, witnessed the planting of 120,000 of the 500,000 tilapia fingerlings donated by the company MODERCORP that were planted in the San Vicente de Colonche dam. (SA, 2008). Since they were planted, the tilapia have grown and reproduced without any control, generating a high population density, reducing the space for these organisms to move in the body of water, and as a result, their sizes have decreased, affecting the availability of the resource in larger sizes that satisfy local consumers. The few job opportunities in the rural communities have led them to dedicate themselves to other activities that the area offers them, and fishing in the dam as a complement to their daily sustenance, without predicting or preventing the risks that these activities represent.

Keywords: Spring, aquaculture, density, tilapia, aquaculture.

Resumen: La presa San Vicente está ubicada en la cuenca alta del río Javita en el noroeste de la provincia de Santa Elena. Es una presa de tierra de 25 m de altura que retiene unos 40 Hm3 que serán distribuidos a través de canales para conducir el vital líquido por gravedad, favoreciendo a las comunidades ubicadas en varios sectores como: Colonche, San Marcos, Bellavista, Manantial de Guangala, Manantial de Colonche, Jambelí, Palmar, Bambil Desecho, Río Seco, Aguadita y Cerezal, se establece que serían 26.000 hectáreas las que se beneficiarían en la provincia de Santa Elena (CEDEGÉ, 1984). La Subsecretaría de Acuicultura, junto con los representantes del Ministerio del Litoral, Medio Ambiente y los habitantes de las diferentes comunas de la Provincia de Santa Elena, presenciaron

la siembra de 120.000 de los 500.000 alevines de tilapia donados por la empresa MODERCORP que .ueron sembrados en la represa de San Vicente de Colonche. (SA, 2008). Las tilapias han crecido y se han reproducido sin ningún tipo de control desde su siembra, generando una alta densidad poblacional, reduciendo el espacio para el traslado de estos organismos en el cuerpo de agua. Como consecuencia, las tallas han disminuido, afectando la disponibilidad del recurso en tamaños mayores que satisfagan a los consumidores locales. Las escasas oportunidades de trabajo en las comunidades rurales hacen que se dediquen a otras actividades que les ofrece la zona, tomando la pesca en la presa como un complemento a su sustento diario, sin prever ni prevenir los riesgos que representan. Las primeras capturas de tilapia no han cesado ni han previsto su sostenibilidad.

Palabras clave: Primavera, acuicultura, densidad, tilapia.

INTRODUCTION

Due to the lack of experience in the management of tilapia in the dam, there has not been an adequate management plan, and among these populations, individuals with various types of genetic deformities caused by the crossing of fish with first-degree relatives have been noted.

The Santa Elena Peninsula State University as a center of Higher Education through the Department of Community Outreach, the Faculty of Marine Sciences, School of Marine Biology through its teachers, researchers and students have the purpose of developing the project "CULTIVATION OF TILAPIA IN CRABS (*Oreochromissp.* and *Oreochromisniloticus), IN* THE REPRESA SAN VICENTE DE COLONCHE, COMUNA LAS BALSAS, Prov. SANTA ELENA" whose main objective is the transfer of knowledge to four rural communities in the province of Santa Elena, based on the technology of fish farming in controlled environments and the biology of the species under cultivation, making use of the body of water that so far has been used for irrigation purposes in the agricultural sector, but as a complement to the generation of new income, the inhabitants of these localities believe viable fish farming in this dam where tilapia has been developed in the wild for several years.

The inhabitants of the local communities should effectively enjoy the benefits provided by the success achieved by a species such as tilapia, which is a fish of great development, prolific and of great nutritional value for the sustenance of the population. However, at present the resources are not being extracted efficiently, since due to overexploitation the availability of the resource has decreased, which causes great concern to the inhabitants regarding the presence of this resource in the medium and long term.

The project would be carried out with the mission of avoiding possible conflicts that may arise between the communities neighboring the dam that have access to the capture of this resource, relying on the qualified personnel of the UPSE with multidisciplinary participation, whose agenda includes the implementation of training events for the inhabitants of the local community, who would achieve greater knowledge in tilapia production.

The implementation of this project would enhance the direct action of those involved, expanding the knowledge in the characterization of this species, as well as updating the various techniques of management and production of tilapia in cages, to improve the levels of fishing extraction, both in size and body mass of the specimens extracted, which would generate an increase in the economic levels of the inhabitants of the local community.

MATERIALS AND METHODS

The main strategies to be used in this project are aimed at carrying out training courses, workshops and conferences on an ongoing basis, as detailed below:

· Meeting with the leaders of the four communes
· Organization of seminars and workshops
· Project socialization

Field visits will be made to the San Vicente dam to attend meetings with the local inhabitants in order to plan the actions and strategies required by this project, especially with the leaders in the guidelines that obey a suitable methodology for this type of crop.

The studies and analyses to be carried out are: biological study of the microorganisms in the reservoir, analysis of the physical-chemical characteristics of the water body, bathymetry, georeferencing of possible cultivation sites.

- The YSI (multiparameter meter) will measure salinity, pH, dissolved oxygen, temperature, TDS and salinity.
- The points where the cages will be installed are established by means of coordinates.
- Turbidity and depth measurement
- Samples will be collected for laboratory analysis and microscopic identification of phytoplanktonic and zooplanktonic organisms.

Water quality is determined by its physical and chemical properties, among the most important of which are: temperature, oxygen, pH and transparency. These properties affect the productive and reproductive aspects of the fish, so water parameters must be kept within the optimal range for tilapia development.

The design and construction of 6 cages is planned.

For pre-fattening and fattening of tilapia, 4 cages with dimensions of 3x3 m and 1.5 m deep with galvanized and electro-welded steel structure, with poly mesh number 25 (16.3x 18 mm), with 4 hermetically sealed floats of 20 liters capacity, located in the four corners.

For fish farming, 2 cages are considered with dimensions of 1x1 m and 1 m deep, with an electro-welded galvanized steel structure of 2 inches and 2 millimeters thick, with poly-mesh number 10 (4.9 x 6.1 mm), with 4 floats of 20 liters of capacity located in the four corners.

RESULTS

TABLE 1. Number of tilapia to plant

TABLE 1
Number of tilapia to plant

NUMBER OF TILAPIA TO BE PLANTED, FINAL WEIGHT 450 G.						
MODULES	QUANTITY	INITIAL WEIGHT	FINAL WEIGHT	MONTHS	INITIAL BIOMASS	FINAL BIOMASS
		G	g		(kg.)	(kg.)
CAGE # 1 Fry	3000	0,5		1	1,5	
CAGE # 2 Fry	3000	0,5		1	1,5	
CAGE # 3 Fry	3000	0,5		1	1,5	
CAGE # 4 Fry	3000	0,5		1	1,5	
CAGE # 5 Fry	3000	0,5		1	1,5	
CAGE # 6 Pre-fattening	6800					680
CAGE # 7 Pre-fattening	6800					680
CAGE # 8 Fattening	1000		450			450
CAGE # 9 Fattening	1900		450			855
CAGE # 10 Fattening	1900		450			855
CAGE # 11 Fattening	1900		450			855
CAGE # 12 Fattening	1900		450			855
CAGE # 13 Fattening	1900		450			855
CAGE # 14 Fattening	1900		450			855
TOTAL					7,5	5580

Table 2. Amount of feed per cage

TABLE 2
Amount of feed per cage

FOOD				
MODULES	INITIAL BIOMASS kg	% OF FEED	Daily Feed Quantity kg	6 Daily Rations Kg Time (8:00; 10:00; 12:00; 14:00; 16:00 and 18:00)
CAGE # 1 Fry	1,5		0,375	0,063
CAGE # 2 Fry	1,5		0,375	0,063
CAGE # 3 Fry	1,5		0,375	0,063
CAGE # 4 Fry	1,5		0,375	0,063
CAGE # 5 Fry	1,5		0,375	0,063
CAGE # 6 Pre-fattening			20,400	3,400
CAGE # 7 Pre-fattening			20,400	3,400
CAGE # 8 Fattening		5	5,000	0,833
CAGE # 9 Fattening		5	9,500	1,583
CAGE # 10 Fattening		5	9,500	1,583
CAGE # 11 Fattening		5	9,500	1,583
CAGE # 12 Fattening		5	9,500	1,583
CAGE # 13 Fattening		5	9,500	1,583
CAGE # 14 Fattening		5	9,500	1,583
TOTAL			104,675	

Water quality is determined by its physical and chemical properties, among the most important of which are: temperature, oxygen, pH and transparency. These properties affect the productive and reproductive aspects of the fish, so the water parameters must be kept within the optimal ranges for tilapia development.

Hydrogen sulfide levels are slightly above the accepted range, and are due to domestic discharges and are not considered toxic if the concentration is less than 10 mg/l, i.e. this does not affect the flora and fauna present in the body of the dam.

The average depth of the water column of the San Vicente Dam averages 5.80 m (15.5 ft).

The planktonic community is a heterogeneous group of microscopic plant and animal organisms that float or swim weakly in the body of water, comprising primary producer organisms, herbivores, carnivores, detritivores and decomposers, consisting of phytoplankton (algae), which form the basis of the food chain and energy of other aquatic communities.

Phytoplankton in inland waters can be found representatives of practically all groups of algae. The dominance of one or another group in certain samples depends on the predominant characteristics of the environment. The groups found are cyanophyceae (*gleocapsa, chroococcus*), chlorophyceae (*closterium, scenedesmus, cosmarium, staurastrum, chlorella, pandorina, phacus*), chrysophyceae (diatom, tabellaria, navicola, pinnularia asterionella) and dinoflagellates; the most abundant and frequent genera are: *Navicula, Pinnularia, Asterionella* and *Tabellariacoscinodiscusciclotella,*. Among the Dinoflagellates, the

most important genera are *Peridinium* and *Ceratium*. Certain flagellates are also found as euglenophytes (*Euglena*, Cryptoglena).

Zooplankton is represented by species from various groups, including rotifers, copepods, cladocerans, and nematodes. It should be noted that insect larvae, fish eggs and larvae were also found among the samples.

In addition to this, a 96-hour bioassay was carried out in the Practice Unit of the Faculty of Marine Sciences as follows:ç

In two basins, 20 liters of water from the San Vicente Dam were placed in 20 red tilapia with an average weight of 25 g. in order to test their resistance, behavior and survival without food and aeration.

CONCLUSIONS

These properties affect the productive and reproductive aspects of the fish, so the water parameters must be kept within the optimal ranges for tilapia development. The results were favorable, obtaining a 100% survival rate, showing resistance in their metabolism and behavior.

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