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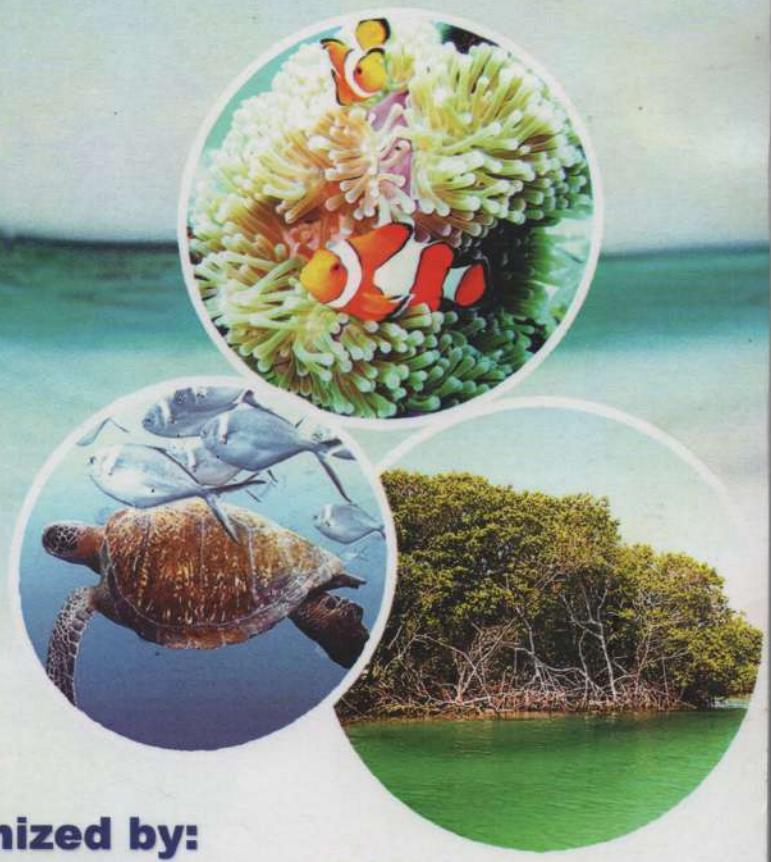

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PROCEEDINGS
INTERNATIONAL SEMINAR

From Ocean for Food Security, Energy, and Sustainable Resources and Environment

at Airlangga University
Surabaya, 18 November 2009

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PREFACE

In the name of Allaah the Most Gracious and Merciful. We would like to express our deep gratitude to our [illegible] finish Proceedings of International Seminar. This proceedings was set of articles or papers that has [illegible] at International Seminar on *From Ocean for Food Security, Energy, and Sustainable Resources* and Environment. This seminar is organized by cooperation between Fisheries and Marine Faculty, Airlangga [illegible], Surabaya and Research Center for Marine and Fisheries Socio Economics, Agency for Marine and [illegible] Research, Ministry of Marine Affairs and Fisheries, Jakarta, and Agrotechnology and Food Science [illegible], Universiti Malaysia Terengganu, Malaysia. The seminar is attended by researchers, lecturers, students of [illegible], master and doctoral degrees, and also by government official. The papers cover broad topics [illegible] production technology, product value improvement, resources and environment biophysics, alternative [illegible] and environment biophysics, and socio-economic.

We would like to express our sincere thanks to Rector and Vice Rector of Airlangga University, Vice [illegible] and Dean of Agrotechnology and Food Science Faculty of Universiti Malaysia Terengganu, Head of [illegible] Center for Marine and Fisheries Socio Economics, Dean of Fisheries and Marine Faculty, Airlangga [illegible], keynote speakers: Prof. Dr. Gunawan Sumodiningrat from Gadjah Mada University, Prof. Dr. Sakri [illegible] from Universiti Malaysia Terengganu, and Prof. Hassan Hj. Mohd Daud, DVM., Ph.D. from Universiti Putra [illegible], moderators, presenters, participants, and colleaque for supporting and kind help in the seminar. We [illegible] to thank to all sponsorships: Vice President of PT. CP Prima, Director of PT. Sufie Bahari Lines, Head of [illegible] and Marine Office, Regency of Tuban, Head of Fisheries and Marine Office, Regency of Pasuruan, [illegible] Manager of PT. Sanbe Farma, Director of PT. Petrokimia Gresik, Director of CV. Antika, Coordinator of [illegible] Fish Pond, Fisheries and Marine Faculty, Airlangga University, and Director of PT. SIER for good [illegible] and partnership in the seminar. Finally, we would like to express our sincere thanks to the Steering [illegible] and Organizing Committee either staff and students from Faculty of Fisheries and Marine, University [illegible] or staff from Research Center for Marine and Fisheries Socio Economics, Agency for Marine and [illegible] Research, Ministry of Marine Affairs and Fisheries, Reviewer: Prof. Ir. Sukoso, M.Sc., Ph.D from Fisheries [illegible] Science Faculty, Brawijaya University, Ir. Murwantoko, M.Sc., Ph.D. and Ir. Triyanto, M.Si., Ph.D. from [illegible] of Fisheries, Agriculture Faculty, Gadjag Mada University, Ir. Agung Sudaryanto, M.Sc., Ph.D. from [illegible] and Marine Science Faculty, Diponegoro University, Mohammad Yunus, DVM., M.Kes., Ph.D. from [illegible] of Parasithology, Veterinary Medicine Faculty, Airlangga University, Ir. H. M. Pujoyuwono, M.Sc. from [illegible] Center for Marine and Fisheries Socio Economics, Agency for Marine and Fisheries Research, Ministry of [illegible] Affairs and Fisheries, and Prof. Sayed Mohd Zain Hasan, Ph.D. from Agrotechnology and Food Science [illegible], Universiti Malaysia Terengganu.

Surabaya, 1 December 2009

Editors

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ABSTRACT

Objectives of this program were to socialize of the catfish hatchery and culture and the induced spawning technology, to improve quality and productivity of efforts and accomplishment availability of food source and protein stocks, to create effort opportunity potential, and to improve society economic by increase household income in food gristle and poorness areas, such as Pacitan Regency, East Java. Method of program that used were discussion, training of the hatchery and culture managements and the induced spawning technology of catfish, technical supervise, monitoring, evaluation and follow up the program continued in future. The result of the program were the induced spawning technology with use ovaprime can improve gonad maturation and spawning of catfish broodstock, the artificial spawning and production times of catfish fry with use induced spawning technology are more fast, efficient and effective than the natural spawning, good response, actively and knowledged of participants on the technology and management of fish culture, good response and responsibility and support of institution related, i.e. Service of Fisheries and Marine Affairs, Pacitan Regency on the program, the induced spawning technology is very must to developed and socialized to fish farmers at other area for development the hatchery and culture of fish, sustainable and continue of follow up and building by relate institution and support of local and province governments on application and socialization of technology and this support to the fish farmers were need, and synergic and continue cooperations between university and partners with local government to other program in the future were need.

Keywords: catfish, induced spawning, development, hatchery, culture

INTRODUCTION

Pacitan (2004) mentioned that there are 29 regencies in East Java as food gristle area, one of them is Pacitan. Food crisis can be assessed from many factors, for example: food availability, access to food production, utilization or food absorbtion and food susceptibility. Food resilience in an area can be seen from food availability, amenity accesses and food consumption, low food availability, poorness, poverty and low nutrition (Anonym, 2009). Food source that can be developed for need nutrition improvement and public consumption besides food as animal protein source (fishery commodity). Pacitan Regency have big enough potency (wide of agriculture pond is around 105.652 m^2) to develop freshwater farm area, to accomplishment food consumption nutrition and to open opportunity of effort job for local society through program of society empowerment.

Catfish, *Clarias gariepinus* is one of quite important commodity of freshwater fishery and have prospect for developed. This fish price is relative cheaper than others and its taste can be accepted by all society (Hernowo and Suyanto, 2004), so at present has been developed up intensive aquaculture (Suyanto, 2005). Catfish easy spawned and cultured, can be to scratch limited farm. Fish spawning can be conducted artificial through hormonal stimulation. Natural spawning of catfish is relative long, however, quality and spawning of catfish can be quickened up through hormonal treatment. Hormonal treatment is conducted to induce final maturation and ovulation (de Graaf and Janssen, 1996). Egg development is influenced by internal and external factors, i.e. environment and feed (Bromage, 1992; Lieberman, 1995; Mittlemark and Kapuscinki, 2000).

Artificial hormonal stimulation to manipulate of fish reproduction can be conduct through some methods. Generally, in broodstock management, hormonal stimulation is used to speed up development level and gonad or gamet maturity and spawning of fish, so its reproduction cycle can be arranged in such a manner outside its reproduction season. Hormonal stimulation very useful later in produce and provide of egg and seed in mass, overflow and continuous and can improve the egg quality produced (Mukti, 2002; Mukti and Rustidja, 2002). Hormonal manipulation is hormone utilization to improve efficiency of fish reproduction and expected can fast egg maturation (gonad), to improve percentage of ovulated-egg and to improve frequency of fish spawn (Stackey, 1986).

Fish culture, especially hatchery is potency and start liked by wide society. Factor of production that very determine in fish culture effort is seed availability. Seed availability is one of determinant of culture effort success (Mukti, 2002; Mukti and Rustidja, 2002). Seed availability are depend the broodstock availability, either male or female. Induced spawning technology uses hormone has been proven fast process of gonad maturity and spawning improvements of some fish species. Broodstock availability that ready spawn and catfish hatchery needs precise technology to that can speed up and increase production and easy adopted and developed at wide society, specially the catfish farmers at rural. In consequence, science and technology applied program through effort development of catfish hatchery and culture use

induced spawning technology are very useful and advantageous if applied and socialized furthermore, specially for area of food gristle and poorness at rural in order to improve society utilization, entered its economy utilization.

Objectives of this program were to socialize the catfish hatchery and culture for society at area of food gristle and poorness, specially at Pacitan Regency, East Java, to socialize the induced spawning technology in efforts the catfish hatchery and culture to speed up production process and improve catfish seed stok for easy and simple culture, furthermore and can be adopted by society, specially at Pacitan Regency, East Java, to improve quality and productivity of catfish hatchery and culture efforts and stock availability accomplishment of food materials and nutrition sources at area of food gristle and poorness, specially at Pacitan Regency, East Java, to create potential effort opportunity (employment) for society at area of food gristle and poorness, as in Pacitan Regency, East Java, and to improve society economic through increase household income from effort of catfish hatchery and culture with simple technology.

Benefits of this program were to develop the programs of apply, construction, and society utilization, specially at area of food gristle and poorness in rural, to develop the programs of food and nutrition stocks availability for society and also main program to improve income of local area through main fish commodity commerce (for relates services and local government), to repair and improve productivity of fish hatchery and culture and increase household income (for society target, specially farmer), to make profitable alternative of job field (for other society), and to concern and continual program in research development and construction of society through programs of society service and science and technology development for lecturers and also students (for institution/university).

MATERIALS AND METHODS

Strategic target of this program are Head of Minosari Fish Farmers and farmer group of other freshwater fish, elite figure, government officer village or district, district Field Education Officer, local Non Government Organization and relates service like Service of Fisheries and Marine Affairs, Pacitan Regency and Service of Fisheries and Marine Affairs, East Java Province. Targets of this program are freshwater farmers, society fisheries units, young man and other public that have big enthusiasm in the fishery field, specially the catfish hatchery and culture efforts.

Place of this program is Nogosari Vi Ngadirojo District, Pacitan Regency, East Province. Program method that used were lo survey and coordination with relates instantio strategic targets, discussion about: a) the c hatchery and culture, b) catfish excellence and in spawning technology, c) need nutrition accomplishment animal food materials stok, d) economic value of the catfish hatchery and c efforts, management training of the hatcher culture and induced spawning technology of c technical supervise of the induced spa technology and the catfish hatchery and c efforts, monitoring and evaluation, and follo program in the future.

RESULTS AND DISCUSSION

Education

First discussion conducted to identify abo general problems of catfish farmers at Ng District, Pacitan Regency, East Java Province discussion result can be obtained input from and identification of some main problems and faced by fish farmer group and also other generally. General problems that faced in fish specially catfish is produce broodstock, stimu broodstock gonad maturity, broodstock spawn that relative long, natural and artificial feed li area, high mortality of seed, seed availability and high price of seed. In other hand, disea water quality management problems to catfish also is constraint by fish farmers (Figure 1).

Education is conducted through discuss communication directly. Participant that attend head and member of Minosari Fish Farmers head and member of fish farmers and also farmers at ten countrysides that exist in N District, Pacitan Regency, local government Field Education Officer at Ngadirojo District, Regency, Head of Fisheries and Marine Affairs Pacitan Regency and Head and Staff of Aqu and Society Service Section, Service of Fishe Marine Affairs, Pacitan Regency, East Java (Figure 2).

Discussion matter covers: broodstock s gonad maturity process of broodstock, gonad stimulation of broodstock, factor that influen maturity level of fish, introduction of fish spawning technology, specially catfish and and materials that applicable to induced spa other hand, discussion matter also about nat types for larva and seed of catfish, availa production of natural feed, nutrition for fish for catfish), and management of water qualit culture as well as environmentally friendly.

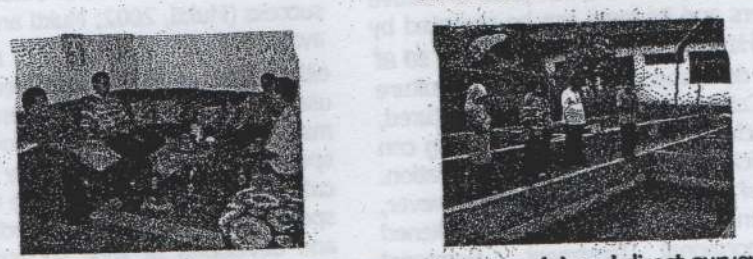
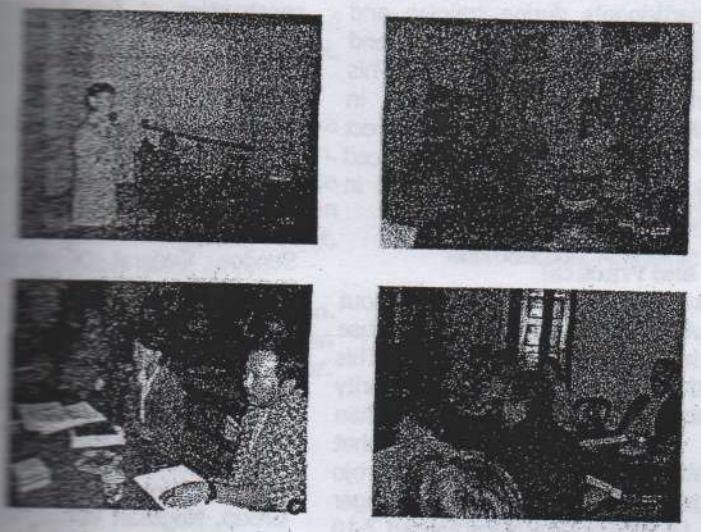


Figure 1. Discussion between team and fish farmer group as partner (a) and direct survey to field abo and culture ponds of catfish, *C. gariepinus* (b)



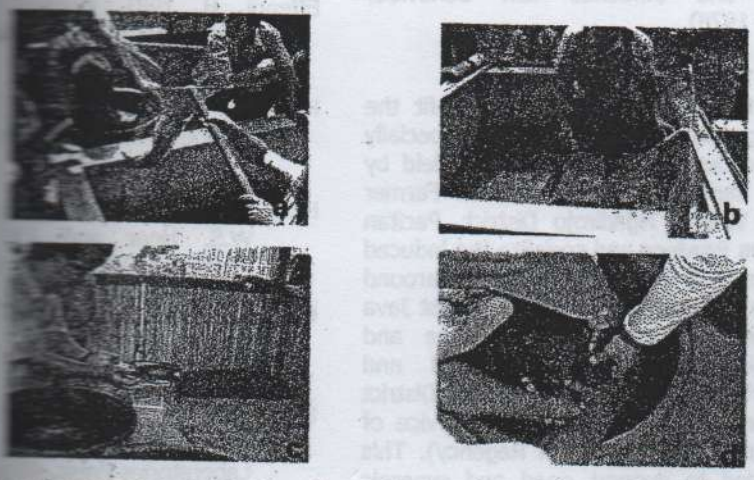
team (a), input and comments by Head of Fisheries and Marine Affairs Service, Pacitan Regency (b), input and comments by Head of Fish Farmers Group as partner (c), and discussion of matter (d)

matter during education not only matter above, specially related However, during discussion also related to constraint in other culture of other matter which during the time often faced around Ngadirojo District, Pacitan Province.

Demonstration

is conducted at meeting room of Fish Farmer Group, Nogosari Village, Ngadirojo District, Pacitan Regency, East Java Province (Figure 3), whereas practical or demonstration is conducted at field pond (hatchery pond of catfish) property member of Minosari Fish Farmer Group, Nogosari Village, Ngadirojo District, Pacitan Regency, East Java Province (Figure 4). Some materials and equipments for training and demonstration that used are materials and equipments that relative easy and cheap obtained by society, specially fish farmers in rural (Figure 4).

about training matter by program team (a), discussion about training matter (c), and place of training (d)



of practical and selection of catfish, *C. gariepinus* broodstock (a), preparation practical of catfish hatchery and culture ponds (b), demonstration measurement of catfish broodstock by participant (c), and practical induced spawning of catfish broodstock by participant (d)

Response of participants during training and direct field demonstration showed very positive and show very big knowledge of participants. This condition are shown with active its participant in discussion during education and training and direct field demonstration about application of induced spawning technology and culture of natural feed in field (Figures 3 and 4).

Result of Training and Practical

Training result, especially demonstration about induced spawning of catfish, *C. gariepinus* that use ovaprime synthetic hormone shows good result. This condition is proved through process of gonad maturity and spawning of catfish broodstock that quickly than natural spawning of catfish. In general that experienced by catfish farmers around Ngadirojo District, Pacitan Regency, East Java Province is longer spawning of catfish, i.e usually take place around 7-10 d since paired. Not to mention failure that experienced under done consequence and has not yet ready to spawn of catfish broodstock paired. Richter and Rustidja (1985) suggested that in general, fish conducts reproduction activity in temporal and most spawn in seasonal, include catfish was that spawn rainy season. Rustidja (2004) state, success spawning is very determined by some factors. Fish spawn habit is determined by age, sex maturity level, seasonal and spawning place.

Result of induced spawning of catfish broodstock that use ovaprime synthetic hormone was indicated that catfish broodstock conduct spawn less than 24 h since injection. de Graaf and Janssen (1996) explain, fish spawning can be conducted artificial through hormonal stimulation. Natural spawn of catfish is relative long, however, maturity and spawning of catfish can be quickly through hormone treatment. Hormone treatment is conducted to induce final maturation and egg ovulation. Effendi (1981) mentioned that one of hormone function is morphogenesis or forming arrangement and maturation of gonad and secondary sex characteristics. Hoar (1978) stated that most fish species, sex character forming is dependent to sex steroid hormones. Steroid hormone is hormone that can influence reproduction, stimulate growth, difference sex, and influence fish behaviour (Donaldson *et al.*, 1978).

Monitoring and Technical Supervise

Monitoring is conducted relate to benefit the induced spawning technology of catfish, especially training result and demonstration directly in field by participants (fish farmers) at Minosari Fish Farmer Group, Nogosari Village, Ngadirojo District, Pacitan Regency, East Java Province and socialize the induced spawning technology in other fish farmer at around location Ngadirojo District, Pacitan Regency, East Java Province. Technical supervise about science and technology applied program is continued and constructed by Field Education Officers of District Fisheries and Marine and relate services (Service of Fisheries and Marine Affairs, Pacitan Regency). This condition is needed to support good and synergic cooperation program between fish farmers and Field Education Officers or relate services as well as role and function from relate services, i.e. education and construction at fish farmers. Society are exp share in active to get the technology and manage information such as good and advantageou continuity program and quality and prod improvement of fish culture can be quick reache

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ANALYSIS OF VOLUME AND ERYTROCYTE CELL NUMBER OF TETRAPLOIDIZATION-TREATED NILE (*Oreochromis niloticus*)

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ABSTRACT

The aim of this research was to analyze the volume and erythrocyte cell number of tetraploidization-treated nile. Tetraploidization treatment of nile were use heat shock 40, 41, and 42°C on eggs in 80, 85, and 90 min after fertilization during 2.5 min. Volume of erythrocyte cell was significantly difference ($p<0.05$) in each treatment. The highest volume of erytrocyte cell was appeared at temperatures 42°C in 90 min after fertilization, i.e. 24.66 ± 0.01 µm³. Number of erytrocyte cell was not significantly difference ($p>0.05$) in each treatment. The smallest number was appeared at temperatures 42°C in 90 min after fertilization, i.e. $2.17x10^6$ ± 0.0004 cells/mL. Therefore, the highest volume of erytrocyte cell was significantly difference ($p<0.05$) in each treatment with the biggest at heat shock 42°C in 90 min after fertilization, i.e. 1.42 µm³.

Keywords: volume, erythrocyte cell, tetraploidization, nile, heat shock

INTRODUCTION

Current interest in polyploidy induction is almost entirely due to its potential application in fish farming, namely the production of triploid and tetraploid fish (Wolf, 1983). Induced triploidy is used to produce reliable or completely sterile fish. Triploidy can be induced in fish by inhibiting the second meiotic division and extrusion of the second polar body by shocking eggs shortly after fertilization (Churrout, 1983). Triploid fish can also be produced by crossing tetraploid with diploid breeders (Rougeot *et al.*, 2003). Polyploidy can be induced by application of shocks during different phases of the cell cycle leading first polar. Heat shocks are effective at inducing polyploidy in fish including zebrafish and tilapia, and relatively simple (Herbst, 2002).

Polyploid organisms have an increased DNA content, nuclear size, number of chromosomes and cellular size compared to diploid. Poidy level can be determined by several methods that allow for the comparison of these characteristics between polyploid and diploid. The variable of erythrocyte size of diploid and tetraploid is frequently used as an index to demonstrate ploidy level (Gao *et al.*, 2007). However, by virtue of having an extra chromosome set, polyploidy causes an increase in cell size with significant reduction in cell numbers in variety of cell types including erythrocytes (Cal *et al.*, 2005). The aim of this research was to analyze the volume and erythrocyte cell number of tetraploidization-treated nile.

MATERIALS AND METHODS

Broodstock Management

Reproductively mature nile (*O. niloticus*) was reared in Freshwater Aquaculture Development Centre of Umbulan, Pasuruan. Breeders were held in 100 m³ tanks. Temperature was 28-30°C and breeders had given food 10-15% of weight.

Fertilization, Heat Shocks and Incubation

After mature each breeder was stripping for collected semen and egg. Semen was collected by stripping mature males and kept on syringe. Thus, egg was collected by stripping mature females and put it into bacthes for mixing with semen. Mixing between semen and egg just during 1 min, after that prepairing for heat shocks were 80, 85, and 90 min after fertilization (a.f.). Before shock treatment, egg has been counted, i.e. 150 cells to each treatment. Heat shocks were apllied by immersing eggs into styrofoam as water bath maintained at the experimental temperature (40, 41, and 42°C) during 2.5 min. After shock treatment, eggs were transferred into hatchery, with water temperature range 27-29°C. Hatching rate assessed on embryos at 4 d a.f.. The fry fed three times a day with *Artemia* spp. until a week. After one week fry fed *Tubifex* spp. three times a day until two weeks before fry were transferred into net cage 40x60 m². The fry was reared in net cage until 90 d a.f. and fed three times a day with commercial fish food. Water temperatures were daily measured and dissolved oxygen and pH was measured three times every week.

Blood Sampling

Blood samples were taken from the caudal vessels using a 1 mL disposal plastic syringe fitted with a 23 gauge-needle. The blood smears were fixed in 95% methanol for three minutes, left to air dry and stained with 20% Giemsa solution for 15 min. The length and width of cells and nuclei were measured with 25 cells each per slide smears. The cells and nuclei volume were calculated as follows $V=4/3\ \pi ab^2$, which a is the major and b is minor axes of the cell and nucleus. In particular, erythrocyte counts were performed on diluted blood samples (1:200 dilution NaCl fluid) using a Neubaeur haemocytometer.

Statistical Analysis

The data was expressed as mean ± deviation standard and compared with Analysis of Variance (ANOVA) followed by Least Significant Difference.

RESULTS AND DISCUSSION

Erythrocyte Measurements

Heat shocks treatment has significantly influenced ($p<0.05$) to increased volume cells and measured nuclei in erythrocytes. The increase cell and nuclei sizes were larger than control (no shock) (Table 1). The largest cell volume was increase with shocks 42°C at 90 min a.f., i.e. 24.66 μm^3 (45%), followed 42°C at 85 min a.f. was 24.38 μm^3 (43%), 41°C at 90 min a.f. was 22.51 μm^3 (32%), 42°C at 80 min a.f. was 21.73 μm^3 (28%), 41°C at 85 min a.f. was 20.54 μm^3 (21%), 40°C at 90 min a.f. was 20.40 μm^3 (20%), 40°C at 85 min a.f. was 19.27 μm^3 (13%), 41°C at 80 min a.f. was 17.97 μm^3 (5% at 80 min a.f. was 17.80 (4%), and no shoc 17.00 μm^3 (Figure 1).

The largest nuclei volume was incre shocks 42°C at 90 min a.f., i.e. 1.42 μm^3 (Table 2), followed by 41°C at 90 min a 1.37 μm^3 (83%), 42°C at 85 min a.f. was 1. (75%), 40°C at 90 min a.f. was 1.21 μm^3 (61% at 85 min a.f. was 1.20 μm^3 (60%), 42°C at a.f. was 1.19 μm^3 (59%), 41°C at 80 min a 1.13 μm^3 (51%), 40°C at 85 min a.f. was 1 (48%), 40°C at 80 min a.f. was 1.02 (36%) shocks was 0.75 μm^3 (Figure 2).

Table 1. Erythrocyte cells volume measurements

Temperature shocks treatment	After fertilization		
	80 min	85 min	90 min
Control	17.00 ± 0.27 μm^3	17.00 ± 0.27 μm^3	17.00 ± 0.27
40 °C	17.80 ± 0.07 μm^3	19.27 ± 0.13 μm^3	20.40 ± 0.02
41 °C	17.97 ± 0.10 μm^3	20.54 ± 0.11 μm^3	22.51 ± 0.13
42 °C	21.73 ± 0.14 μm^3	24.38 ± 0.12 μm^3	24.66 ± 0.01

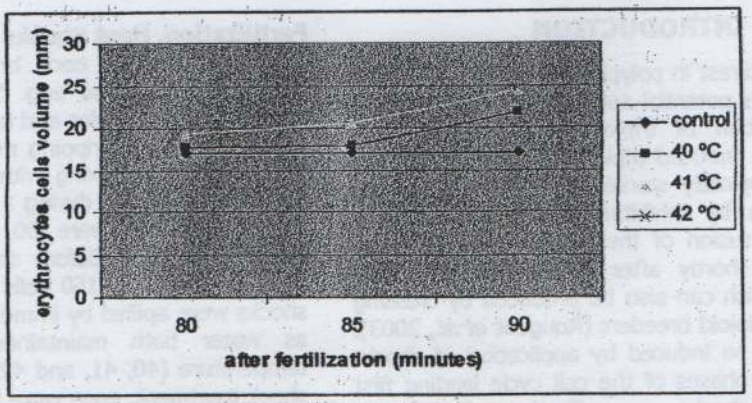

Figure 1. Comparison volume cells erythrocyte each treatment

Table 2. Erythrocytes nuclei volume measurements

Temperature shock treatment	After fertilization		
	80 min	85 min	90 min
Control	0.75 ± 0.03 μm^3	0.75 ± 0.03 μm^3	0.75 ± 0.03
40 °C	1.02 ± 0.03 μm^3	1.11 ± 0.01 μm^3	1.21 ± 0.01
41 °C	1.13 ± 0.01 μm^3	1.20 ± 0.03 μm^3	1.37 ± 0.01
42 °C	1.19 ± 0.04 μm^3	1.31 ± 0.03 μm^3	1.42 ± 0.01

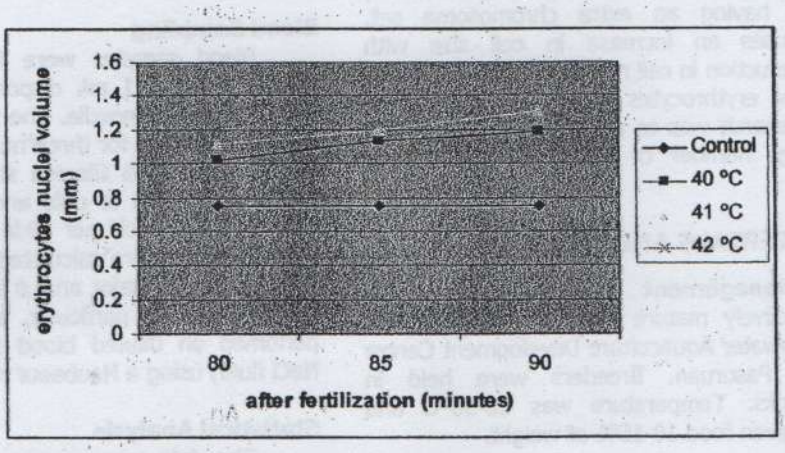

Figure 2. Comparison volume nuclei erythrocytes each treatment

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PRELIMINARY STUDY OF NATURAL HABITAT AND WATER QUALITY AS LIVING GROUND OF SPINY EEL (*Macrognathus aculeatus*) AT BENGAWAN SOLO RIVER BASIN, LAMONGAN

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ABSTRACT

The aim of this research was to know natural habitat and water quality as living ground of spiny eel. This research was done on ten areas at Bengawan Solo River Basin, Lamongan, i.e Cimcim Bridge, Rowo Semandu, Gilir, Babat Barage, Waduk Gondang, Brangsi, Maduran, Deket, Karang Binangun, and Glagah. The survey and explorative methods were used. The natural habitat characteristics of ten areas were a large part of muddy and sandy land and vegetation grown. Water qualities that measured were NO (0.0-10.0 mg/L), NH_3/NH_4 (0-4.0 mg/L), O_2 (0.5-6.0 mg/L), PO_4 (1.0-2.0 mg/L), gH (5.0-21.0°dgh), NO_2 (0.1-0.9 mg/L), pH (6.0-7.0), temperature (29.0-35.0°C), salinity (0-3 °/oo), depth (0.39-1.25 m), and brightness (0.85-46 cm).

Keywords: natural habitat, water quality, spiny eel, Bengawan Solo River Basin

INTRODUCTION

Climate change or global warming in the world and today have caused changes on diversity an ecosystem, include population stock of water organisme (fish species). Damages of environmental, land change and totally disappeared of distribution pattern and reproduction of vary fish species in the original nature were very influence by environmental changes or climate change (global warming), include silih or spiny eel (*Macrognathus aculeatus*). CBD (2007) mentioned that climate change can pressure natural ecosystem, decrease species capacity to adaptation, decrease population number (mortality) and change distribution and reproduction performance pattern of species.

Silih or spiny eel (*M. aculeatus*) are wild fish at river and Indonesian original. This fish was very distribution in areas or island, include province of Sumatra, Kalimantan and Java. In Java Island, spiny eel found at river basin that flow until Province of East Java, include Bengawan Solo River Basin at Lamongan. Spiny eel was recognized at Lamongan since 1980s and still distribution on society, so this fish was priority commodity of fisheries at Lamongan. In the fisherman, price of this fish is very expensive, range USD 8.00 until USD 10.00/kg.

Not clear data and information about population status of spiny eel in nature (river or lake) and reproduction pattern were cause non recognized benefit and advantages of this freshwater fish. Spiny eel can tolerant on salinity range 0-15 ppt and low dissolved oxygen conditions, so fish have potential to culture on freshwater and brackishwater ponds, though traditionally. However, research on population distribution of silih to development effort domestication and culture of their was need.

Many species of genus *Macrognathus* in some area or country are *M. maculatus* (common name of fish in Singapore), *M. aculeatus* (different name at province or district, in Indonesia), *M. perakensis* (in Perak, Malaysia and Singapore) (Kelvin *et al.*, 2000), *M. circumcinctus*, *M. zebrinus*, *M. keithi* (Fishbase. 2003) and *M. siamensis*, *M. aral*, and *M. mekongensis* (at Mekong River, Kambodia) (Rainboth, 1996; Baird *et al.*, 1999). *M. aculeatus* discovered in Sumatera, Java, Kalimantan, and Maluku (O-Fish, 2002). In Kambodia discovered so species *Macrognathus* sp. (Amilhat *et al.*, 2005). Spiny eel as Indonesian original fish was difference with same species in other country. Especially, species name of *M. aculeatus* in Indonesia is silih, whereas same species name in other country is sili.

Yustina (2001) resulted that *M. aculeatus* discovered at Rangau River, Riau, Sumatera Island with common name is black tilan. This species have distributed in Southeast Asia region, include Indonesia and Thailand. In Borneo, this species can live and develop at brackishwater (Anonym, 2006).

MATERIALS AND METHODS

This research used explorative method by survey and field perceived to identification, determination, and study of ecosystem and spiny eel distribution, include live habitat of spiny eel and water qualities at river basin or lake in Lamongan, Province of East Java. This research conducted on ten areas at river basin or lake in Lamongan and Fisheries Education Laboratory, Fisheries and Marine Faculty, Airlangga University. Ten areas at Bengawan Solo River Basin that studied are Cimcim Bridge, Rowo Semandu, Gilir, Babat Barage, Gondang Lake, Brangsi, Maduran, Deket, Karang Binangun, and Glagah. Measurement of Water qualities used water quality kits. Data analysis used descriptive method.

RESULTS AND DISCUSSION

This research was general know that live habitat of spiny eel at Bengawan Solo River Basin, Lamongan have characteristic muddy and sandy of soil and vegetation grown (Table 1), whereas water qualities are like Table 2 (measurement at morning) and on Table 3 (measurement at evening).

Table 1. Data of spiny eel *M. Aculeatus* habitat in ten areas at Bengawan Solo River Basin, Lamongan R

Areas	Habitat
Cimcim Bridge	- soil characteristic: muddy and sand - vegetation grown
Rowo Semandu	- soil characteristic: clay - many vegetation grown, especially grass
Gilir	- soil characteristic: clay and sand - few vegetation grown
Babat Barage	- soil characteristic: muddy - few vegetation grown
Gondang Lake	- soil characteristic: clay and sand - many vegetation grown
Brangsi	- soil characteristic: clay and sand - many stoney - few vegetation grown
Maduran	- soil characteristic: clay and sand - few vegetation grown
Deket	- soil characteristic: sand - many vegetation grown
Karang Binangun	- soil characteristic: clay and sand - many vegetation grown
Glagah	- soil characteristic: clay and sand - many vegetation grown

Table 2. Data of water qualities in ten areas at Bengawan Solo River Basin, Lamongan Regency (meas morning)

Areas	NO_3 mg/L	NH_3/NH_4 mg/L	O_2 mg/L	PO_4 mg/L	gH °dgh	NO_2 mg/L	pH	T °C	Salinity ‰	Depth m
Cimcim Bradge	10	4.0	0.5	1.0	10	0.3	6	32.0	0	1.0
Rowo Semandu	10	0.5	4.0	2.0	11	0.3	6	31.0	0	0.41
Gilir	0	0.0	4.0	1.0	8	0.3	6	31.0	0	1.06
Babat Barage	0	5.0	4.0	1.0	7	0.3	6	32.0	0	0.84
Gondang Lake	10	5.0	4.0	1.0	10	0.3	6	29.0	0	1.25
Brangsi	10	0.5	4.0	2.0	10	0.3	6	29.5	1	0.39
Maduran	10	0.5	4.0	2.0	11	0.9	6	29.0	0	0.85
Deket	0	0.5	6.0	2.0	11	0.0	7	31.0	3	1.0
Karang Binangun	0	1.0	4.0	2.0	21	0.1	8	31.0	2,5	1.0
Glagah	0	0.5	4.0	2.0	14	0.1	8	31.0	3	1.0

Table 3. Data of water qualities in ten areas at Bengawan Solo River Basin, Lamongan Regency (meas evening)

Areas	NO_3 mg/L	NH_3/NH_4 mg/L	O_2 mg/L	PO_4 mg/L	gH °dgh	NO_2 mg/L	pH	T °C	Salinity ‰	Depth m
Cimcim Bradge	0	0.5	4.0	2.0	5	0.3	6	32.0	0	1.0
Rowo Semandu	0	0.5	4.0	1.0	7	0.3	7	33.0	0	0.40
Gilir	0	0.5	6.0	2.0	5	0.3	6	34.0	0	1.0
Babat Barage	0	1.0	4.0	2.0	14	0.3	7	32.0	0	0.42
Gondang Lake	10	1.0	4.0	2.0	11	0.9	6	30.0	0	1.25
Brangsi	0	0.5	4.0	1.0	10	0.3	6	29.0	0	0.39
Maduran	0	0.5	4.0	1.0	9	0.3	6	29.5	0	0.85
Deket	0	0.5	6.0	2.0	20	0.1	7	35.0	0	1.0
Karang Binangun	0	1.0	4.0	2.0	26	0.1	7	33.0	0	0.9
Glagah	0	1.0	6.0	1.0	21	0.1	7	33.0	0	0.9

The live habitat of spiny eel (*M. aculeatus*) at river basin is sand soil and vary grown of natural vegetation. Generally, measure-resulted water qualities are suitable for life of spiny eel (*M. aculeatus*). Shuresh (2006) suggested that spiny eel can tolerant on salinity range 0-15 ppt and low dissolved oxygen conditions, so fish have potential to culture on freshwater and brackishwater ponds, though traditionally. Their habitat was river with deep and slow current and muddy sand. Yustina (2001) suggested that spiny eel *M. aculeatus* have discovere at Rangau River, Riau, Sumatera and loc their fish is black tilan.

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