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ARTIFICIAL PROPAGATION AND FINGERLINGS PRODUCTION OF *Barbus sharpeyi* (GÜNTHER, 1874) IN BASRAH DURING THE SPRING OF 2006

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ABSTRACT

In this study we present the efforts of propagation of Bunnei in the Marine Science Center freshwater fish hatchery during of spring of 2006. The brooders weights ranged between 1.5-2.5 kg for females, and about 1 kg for male. The total dosage of pituitary gland was 4 mg/kg presented in two injections. The first was 10% of total dosage. The rest and second injection had given after 12 hours. Eggs 1350g in total weights were obtained after 12 hours from second injection. The males were injected with the first injection of 2mg/kg of PG extract. The fertilization rate reached 85%. The washing process was modified, it was for 20 min. only. The fertilized eggs were incubated in Zoug jars with a rate of 75-100 g/jar. High hatching percent (95%) were obtained with water temperatures of 24-25°C. The hatching occurred after 72-76 hours. We obtained 750,000 larvae, incubated in the primary rearing incubators(tanks) over four days. They were fed with mixed eggs yolk. Then they were distributed to a closed system, an open system and outdoor ponds. The pesticide Actelic was used (1ppm) for the elimination of big zooplankton in the outdoor ponds before the release of the larvae. The feeding and growth were measured. It was found that Bunnei grow faster in outdoor earthen ponds

INTRODUCTION

After drying of the Iraqi marshlands, Bunnei (*Barbus sharpeyi*) stocks, and other species, showed a very great reduction, both in quantity and quality. It was found that the best way to restore the fish stocks in marshes through artificial propagation of important local fishes. *B. sharpeyi* was the most affected species by the drying crime (8).

Some studies had been carried on the propagation of Bunnei. Unfortunately most of them were unpublished reports. These reports and data were utilized in this study to view the history of the work on this species. In Iraq the first study was performd during 1982 and 1985 (2,3). Followed by the study of the propagation of marshes and reverine Bunnei (5). The published article (4) gave some important data on induced spawning and the embryonic development. The most recent study (1) was done in Basrah governorate for the first time. In Iran some important work had been done(7,9) in Khuzestan province were Bunnei comprise important commercial species. The main purpose of all these studies was the enhancement of Bunnei stocks in the inland waters, especially the marshes. All the mentioned studies had used an induced spawning technique similar to that for common carp, and obtained good results. They used different pituitary gland (PG) dosage, but the most accepted dosage for PG is 0.3 mg/kg fish for the first dosage and 3.0 mg/kg fish for the second dosage.

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The main object of this study is to improve the artificial spawning technique of Bunnei in Basrah and to enhance fish stocks in the southern Iraqi marshes.

MATERIALS AND METHODS

According to the previous experience in collecting Bunnei brooders from AL-Huwaizha marsh, we found that it is better to change the site of collection from Al Dessam marsh in Basrah to Um Al Naaj marsh in Al Amarah province (Fig 1). This new site was better as a source for Bunnei brooders. The area of Um Al Naaj marsh was found to be a spawning area for Bunnei; since it has a large shallow area covered with aquatic plants suitable for the spawning of Bunnei, which is a phytophill spawner. Um Al Naaj marsh was not dried during the drying crime of the marshes (2000-2003), therefor it contains the most important components of the marsh ecosystem. There are different types and densities of aquatic plants such as *Phragmites, Typha, Ceratophyllum, Vallisneris, Potamogeton, and Scripus.* Many kinds of important fish were found in this area, such as *Barbus xanthopterus, Barbus sharpeyi, Barbus leuteus, Barbus grypus, Aspius vorax* and some other less important species.

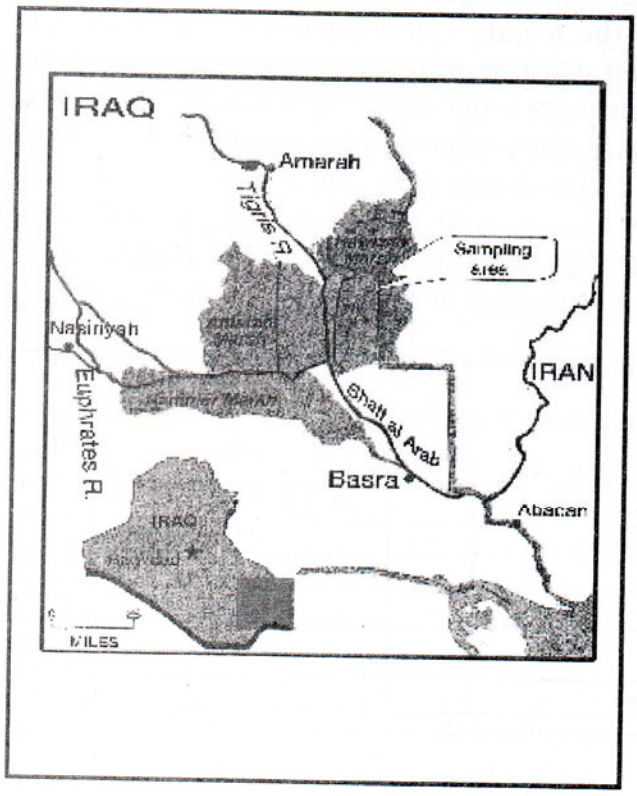

Fig 1: The collection sites in Al Huwaizah marsh

Study activities were arranged according to a monthly time table, started by the collection of brooders during February 2006, and ended in August of the same year (Table1). Shore seine net was used for fishing. The fishermen were supplied with cages for keeping Bunnei brooder until their transportation. The cage dimensions were 1.5 x 1.5 m, constructed from a steel frame covered by net with mesh size 1.5 x 1.5 mm. The transportation was conducted during the early morning, using a truck with one ton tank supplied with oxygen bottles. No more than 15 fish were transport each time, low mortality occurred during the transportation process. During the period of 6/2/2006-7/3/2006 about 50 fish were stocked in the earthen rearing ponds. When the brooders reached the

hatchery they were treated with malachite green bath (0.1ppm) or 10g/L NaCl before releasing to the earthen ponds for recovery and conditioning. The brooders were kept without feeding for two days, and then fed on soya beans and fish meal. The good brooders were selected and transferred on 14 March from rearing ponds and kept (sex separated) in the brooders tank inside the hatchery. The brooders were supplied with a continuous water supply. The water depth was 0.6 m and the temperature was 23° C. The artificial propagation was conducted after 14 hours of acclimation, We use the protocol which had developed by the Marine Science Center Hatchery (1) with some important modifications during this season. Carp pituitary gland (CPG) extract was used for induced spawning. In this study greater hormone dosage were used than the dosage used in previous studies. The total dosage used in this study was 4 mg/kg body weight for females, The Carp pituitary gland extract (CPG) injection was given after 12 hours of keeping the brooders in the brooders tank inside the hatchery. This dosage was divided into two parts: 10% of this dosage was given as the first preparatory injection, while the remaining (90%) of the total dosage was given as a second final injection, 12 hours after the first injection. During this season the males were injected with a dose of 2mg/kg body weight of CPG at the same time of the female's first injection. The dried CPG was prepared for injections by using distilled water only, with amount of 2ml for each fish. The distilled water must have the same temperature as the brooders rearing tank water. All the fishes were injected intramuscularly. The dry method were used for fertilization. Glass zoug's jars (20L) were used for hatching the fertilized eggs. The larvae were reared in two rearing periods in different production systems. All these steps will explained in detail in order to selectthe best protocol for the production of Bunnei fingerlings by induced spawning.

Table 1: Bunnei production activities time table used in Marine Science Center hatchery

MONTH / ACTIVITY	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.
BROODSTOCK COLLECTION	-	*****	*****	*****	-	-	-	-
ARTIFICIAL BREEDING	-	-	*****	*****	-	-	-	-
LARVAL NURSING	-	-	*****	*****	*****	-	-	-
REARING POST LARVEA	-	-	-	*****	*****	-	-	-
FRY REARING	-	-	-	*****	*****	*****	-	-
Fingerlings production	-	-	-	-	-	*****	*****	*****

***the shaded area means the time of the activity.

RESULTS AND DISCUSSION.

Brooders collecting and rearing

Many criteria were used to select the suitable brooders for artificial breeding such as weight, length, shape of the cloacac, body depth, belly, as well as normal shape, bright color and absence of external disease and parasites. It wasn't possible to detect any secondary sexual character for sex differentiation. This could be done only by depending on the morphology. The body of the male is more cylindrical with a smaller belly, less body depth and elongated cloacae. During this season of production no sign of fungal infection was observed on the brooders. This may due that fishermen in Um Al Naaj marsh used the shore seine net and cast net. While during the previous study (1) the brooders died due

to severe fungal infections caused by physical injuries resulted by gill net in Al-Dessam marsh to collect the brooders. On the other hand it was found that the smaller fish were more tolerant to handling and transportation. The study of maturation indicated that the fishes were either in ripe or running maturity stage (Table2). The brooders (10 female and 20 male in two patches) were kept in brooders tank for 12 h for acclimation, with sex separated before hormone administration.

Table 2: Characteristics of maturity stages for Bunnei brooders

	Testes	Gonads
Ripe	Firm, flattened, yellowish white, two third of body cavity	Two third of body cavity, firm, orange, lobed, ova transparent, thin membrane
Running	Firm, flattened, white, two third body cavity, milt run from vent on slight pressure	Filing body cavity, orange, ova large transparent run from vent on slight pressure

Hormone dosage

The modification in the dose of the female and timing of injection in male resulted good quantity and quality of sex products. It was also found that increasing the hormone dosage to 4mg/kg showed best results. The dosage in previous work was 3-3.5 mg/kg body k (5, 4, 1, 9, 7). The differences in injection response of the high dosage could be due to the collection environment of the brooders. Farga, and Chabbaq (5) found that the dosage of reverine Bunnei was greater than that of marsh brooders.

Obtaining sex products and fertilization

All the injected brooders resulted good quality sex products (eggs and milt) by hand striping. The females gave a flow of greenish grey eggs with gentle press on the abdomen. The total eggs obtained was 1650 g from10 females, with 18.5 kg total weight(i.e. 89.2 g/kg).The sex products were mixed without water by the aid of a feather for 5 seconds. Then 20 ml of fertilizing solution (the same composition of the washing solution) was added to the mixture and mixed with a feather for another 5-8 minutes. The fertilized ova were washed with washing solution (200g NaCl+300g Urea+50liter water from brooders tanks). The washing was conducted in two stages, each for 10 minute with washing solution. Then the fertilized ova were washed with tannin solution (8g.tannic acid/10 liter water) for 17 seconds in two stages. Between each stage the eggs were washed with water only. This washing procedure gave greater hatching rate than that in the previous studies (1). In this season we increase the Urea concentration, and decreased the time of washing with tannin solution, because Bunnei eggs have lower sticky ability than common carp.

Fertilized eggs, incubation and hatching

The fertilization rate reached 85% which was within the range of common carp(6), fertilized ova were incubated in zoug's jars. The incubation density was 75-100g for each jar. Water flow rate(about 600L/min) was suitable to ensure ova circulated to ensure sufficient oxygen supply. The incubation period extended from 72-76 hours, at 24-25°C. The hatching was started after 72 hours and reached 95% at 76 hours(mass hatching). The hatching rate was very high, and was higher than other reported in previous studies (1, 3, 4).

First larval rearing period

The hatching larvae were transported to rearing tanks (The larvae obtained from two incubation jars were stocked in one rearing tank of 0.75 m^3) till complete absorption of yolk sac which last for 3-3.5 days. The larvae were fed with egg yolk. At the age of 7-10 days the post-larvae were transferred to indoor rearing systems and outdoor earthen ponds. The behavior of the early stage larvae differs from that of common carp. It was attached to the bottom of the rearing tank, longer than common carp larvae. After 3-4 days they started to swim near the bottom. About 750,000 post larvae had been produced during this spawning season. Indoor water systems had been used for rearing post larvae. The first was an open water system, which contains 20 tanks (260-300 L each), the second was a recirculated water system which contains ten tanks (1000 L each), with a rearing density of 100 larvae / L.

Live food was used for feeding the post-larvae. This food was produced in the Marine Science Laboratory (Dept. of Marine Invertebrate). The live food includes rotifers (*Brachionus* sp.) and *Artemia* (*Artemia* sp.). The Artemia *napualii* were added to the feeding regime during the second week. The next step in the feeding regime of the larvae depends mainly on *Artemia napualii.* The post larvae were fed twice daily. During the first rearing period, the growth of the post larvae showed a good weight increment in different culture systems. The earthen ponds showed the highest growth. The survival rates of the post larvae in the indoor systems were calculated to be 60-80%. The post larvae stocked in the earthen ponds showed the highest length and weight increase. This could be related to the food availability in the well fertilized and predator free situation in the larval rearing ponds. The first larval rearing period was lasted till the fry stage (table3).

Table3:The average length and weight increment of Bunnei larvae and fry in different rearing system

	Open system		Closed system		Earthen ponds	
	Length (mm)	Weight (mg)	Length (mm)	Weight (mg)	Length (mm)	Weight (mg)
1st day	5.7	2.5	10	7.4	7	6.7
1st week	8.2	6.4	-	-	-	-
2nd week	10.1	23.9	-	-	-	-
3rd week	15.2	56.9	14	13.3	26	68
4th week	17.3	80.2	-	-	34	415.5
5th week	19.2	100.3	-	-	-	-
6th week	20.4	130.7	15	39.0	49	1067
7th week	22.3	171.1	26	143.o	55	1690

Second rearing period:

During this period the fry were reared to fingerlings in earthen ponds and feed with formulated carp artificial food in a ration of 5% body weight. The monthly increase in weight was shown in Fig (2). It was found that Bunnei during this stage of life grown faster in length than in weight, especially during the fifth month.

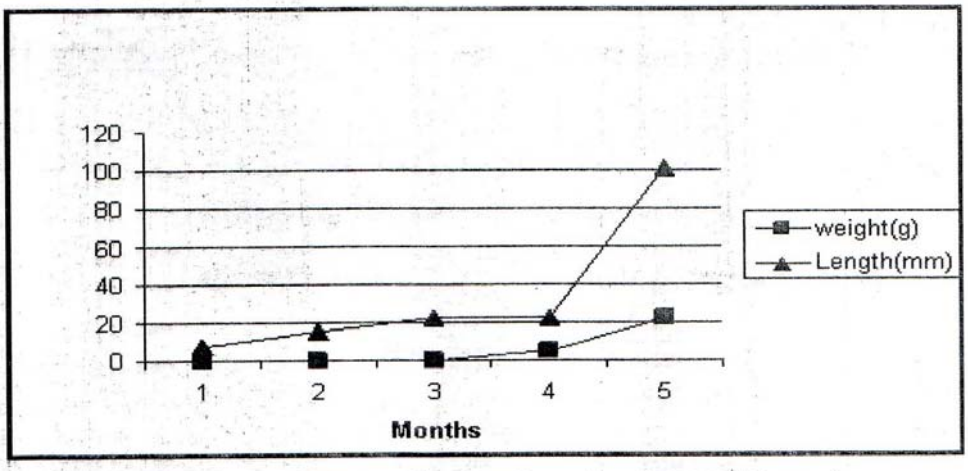

Fig (2) The increase in length and weight of Bunnei during the second rearing period

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التكثير الاصطناعي لأسماك البني (*Barbus sharpeyi*) في محافظة البصرة خلال ربيع 2006

مصطفى احمد المختار جاسم حميد صالح

عامر عبد اللة جابر عبد الحسين حاتم

عدي محمد حسن

الملخص

بينت الدراسة الفعاليات الرئيسة لتكثير البني اصطناعيا في مفقس اسماك مركز علوم البحار في ربيع 2006. استخدمت امهات بمديات أوزان تراوحت بين 1.5–2.5 كغم للإناث. بينما كانت جميع الذكور بوزن كيلوغرام واحد تقريبا. استخدم مستخلص الغدة النخامية لأسماك الكارب الاعتيادي بجرعة كلية مقدارها 4 ملغم/كغم، وعلى حقنتين، الأولى بمقدار 10% من الجرعة الكلية، والكمية المتبقية هي الحقنة الثانية، و أعطيت بعد مرور 12 ساعة من الحقنة الأولى. استحصل البيض بعد 12 ساعة من الحقنة الثانية، وبوزن كلي بلغ 1350 غم. حقنت الذكور بجرعة مستخلص الغدة النخامية وقدرها 2ملغم/كغم مع الجرعة الأولى للإناث. بلغت نسبة الإخصاب 85%. ثم الغسل لمدة 20 دقيقة فقط. حضن البيض الملقح في أقماع الفقس بمعدل 75–100 غم/قمع. بلغت نسبة الفقس 95% في درجات حرارة تراوحت بين 24–25م. تم الفقس بعد 72–76 ساعة. بعد الفقس تم الحصول على 750.000 يرقة، حضنت في الحاضنات الأولية لمدة أربعة أيام. غذيت بمخلوط صفار البيض المسلوق. ثم وزعت الى نظام داخلي مغلق ونظام داخلي مفتوح و البرك الأرضية. استعمل مبيد الاكتيليك بتركيز جزء واحد بالمليون في البرك الأرضية، للقضاء على الهائمات الحيوانية الكبيرة. قيس النمو والتغذي، كما وجد ان البني ينمو أسرع في البرك الطينية.

مركز علوم البحار – جامعة البصرة–البصرة، العراق.

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