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## INDUCE BREEDING OF THE GRASS CARP, *Ctenopharingodon idella* (CUVIER AND VALENCIENNES) IN TEZONTEPEC, HIDALGO\*

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NOTA CIENTIFICA

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This paper was partially presented at the I Simposio de la Asociacion Latinoamericana de Acuacultura, Maracay, Venezuela

### ABSTRACT

In the Centro Acuícola de Tezontepec, Hidalgo from July to September of 1977 an artificial spawning was carried out on the grass carp, *Ctenopharingodon idella* using dry hypophysis of *Cyprinus carpio* to induce it. The first dose was 2 mg of dry hypophysis per fish, the second best dose was of 1.5 mg of dry hypophysis per kg of fish. The best artificial spawning was under dry fertility conditions and the surviving of fry was over 90%. The relationship between fecundity with length and weight of the fish was also shown.

### RESUMEN

En el Centro Acuícola de Tezontepec, Hidalgo, de Julio a septiembre de 1977 se efectuó el desove artificial de la carpa *Ctenopharingodon idella* mediante hipófisis seca de *Cyprinus carpio* como inductor. La primera dosis fue de 2 mg de hipófisis seca de pez, y la mejor segunda dosis fue de 1.5 mg de hipófisis seca por kg. de pez. El mejor desove artificial se consiguió bajo condiciones de fertilidad seca y la sobrevivencia de larvas fue de más de 90%. También se muestra la relación entre la fecundidad con la longitud y el peso de los peces.

### INTRODUCTION

*Ctenopharingodon idella* is an extraordinary herbage regulator fish. It is widely known in the world, in Elba (Camejo et al, 1980), Rumania (Giurca, 1980), Mexico (Rosas, 1975). It come from the Amur River between Chine and the Soviet Union (Huet, 1973).

This is a very usefull fish but unfortunately. this species does not usually breed in captivity. In recent years the investigation has been dealing with dominating its artificial spawning by using also the technique of gonadotrophic hormones produced by the hypophysis glands (Konradt, 1976).

Thus, the aims of this study were to induce this species to spawning under normal, humid, and dry fertility conditions using dry hypophysis of *Cyprinus carpio*, and also to know the best surviving spawning conditions.

### MATERIALS AND METHODS

This methods was applied in the Centro Acuicola de Tezontepec, Hidalgo from July to September of 1977 when most of the fish are ripe although, the spawning period is between April to June or September (Rosas, 1976, Cortes and Arredondo, 1976). Here the water comes from a spring at about 24 °c.

Males and females were separated according to the degree of maturity, an Ohaus scale 0-10 kg range and an ictiometre were used to weight and measure the female fish which have the most mature sexual conditions.

Dehydrate hypophysis of *Cyprinus carpio* by mean of acetone baths were used to dosefy the fish. A precision scale was used to weight this hypophysis, and something to homogenize it, in order to prepare the solution. As a dissolvent, 2 ml of physiological serum with 2 ml of oixitin (Lab. Cutter 1 ml = 10 oixitoxis units of back pituitory extract) per kg of the female fish, was used. The injection was applied in the pectoral fin lobe.

The first dose was 2 mg of dry hypophysis per fish. The second, varied from 0.5 to 3.0 mg of dry hypophysis per kg of fish. It was just administered to the female fish, it was not necessary the induce breeding for males.

After about 8 hrs. from the application of the second dose a sexual courtship starts incited by the hormone induction, which finalized with ova and sperm expulsion

carring out the fertility in the water reservoir. This is under normal fertility conditions. Another way under humid conditions which is as follows: once the sexual courtship started a female and male were caught and stripped by hand to obtain the sexual products which were place in a container with water. The third way was under dry conditions, the couple were also handstripped to obtain the sexual products in a dry container, and were mixed with a bird feather.

A vase of 10 ml was filled up with eggs and counted, this was the base to calculate the number of eggs in millilitre per fish.

In order to incubate the eggs a Zoug incubated of 16 litres was used with a 1.6 to 2.0 l/minute of water flow.

## RESULTS

The first dose was used to induce the maturity of gonads, the second for spawning.

Table 1 shows that from 27 inductions for spawning 21 were positive These lasted 8 to 10 hrs after the second dose.

It seems that 1.5 mg of dry hipophysis per kg of fish was the second dose and the best to induce spawning. Also at the final period of the natural spawning 2.0 - 3.0 mg of dry hipophysis per kg of fish was a better dose for spawning than of 1.5 mg of dry hipophysis per kg of fish.

Dry and humid fertility conditions, respectively, were better with a 82 - 93% surviving, than in natural conditions with 80% surviving. In dry conditions it was by the spermatozoa much easier to fertilize the ova in humid or natural conditions, possibly, because the closeness of the products.

The number of eggs and fry varied from 30,000 to 449,000 eggs and 25,000 to 378,000 fry, respectively, which correspond to the length of fish between 47 - 95 cm long and weighing between 1.8 - 9.8 kg.

Figure 1 shows the relationships between the number of eggs with length, and weight of the fish under the normal, humid and dry conditions. These give the following functional regression equations:

$$F = 1.45889 \times 10^{-7} L^{5.4156} \quad n = 21 \quad r = 0.70$$

$$F = 103.2829 W^{-8.368.28} \quad n = 21 \quad r = 0.44$$

Where F: fecundity (number of eggs in miles)

L: length (cm)      n: number of data pairs

W: weight (kg)      r: correlation coefficient

These equations are the mathematical models between fecundity with length and weight of the fish, which determine the potential for a given length and weight of the eggs expected.

As it is shown in figure 1, there were more eggs for the length and weight of the fish under dry conditions than the other conditions which means that the best artificial spawning was under the dry conditions.

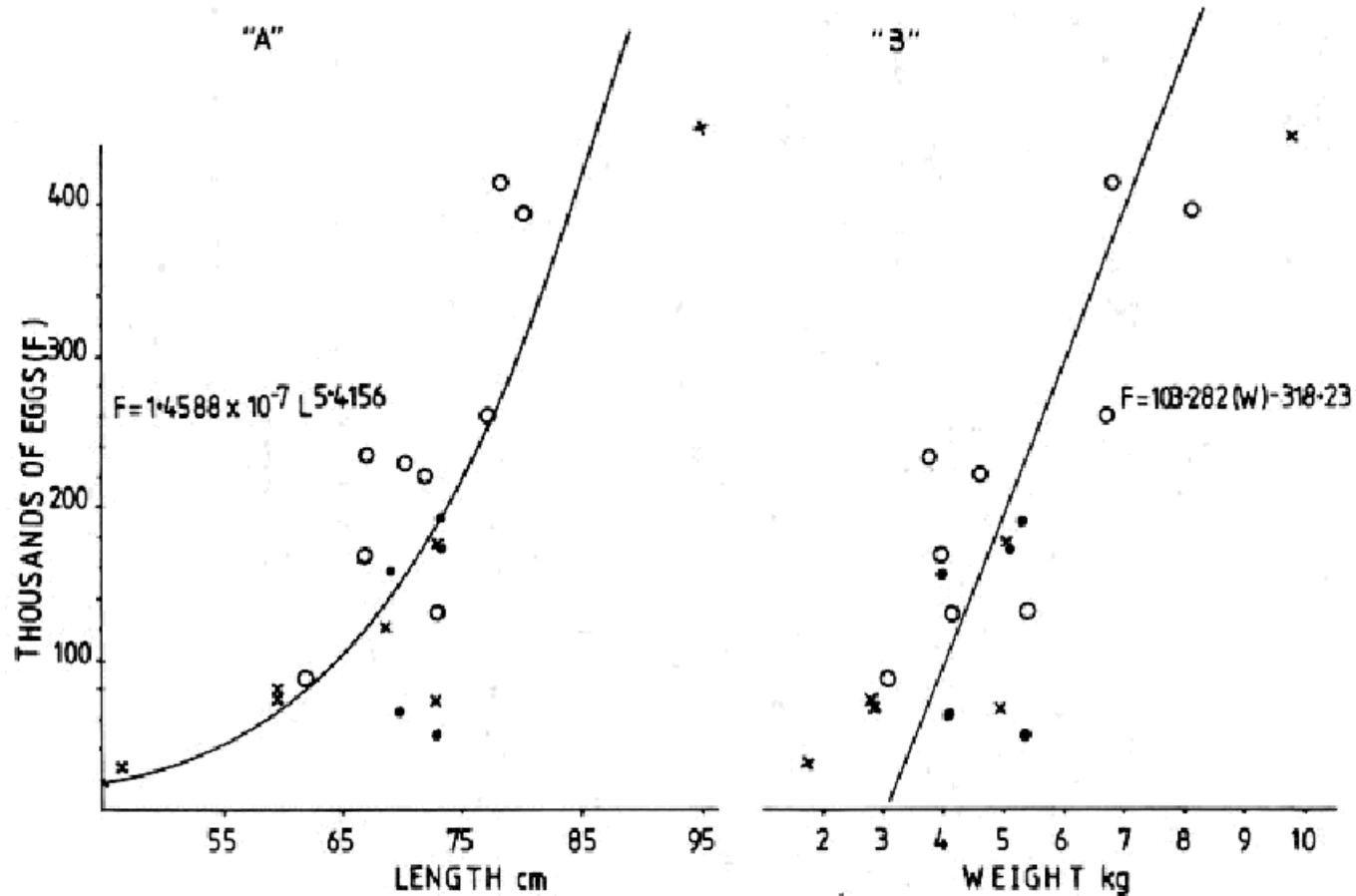


TABLE 1

Experimental conditions after injecting the 2nd dose of hypophysis per kg (H/kg) of the fish, *Ctenopharingodon idella*

2 <sup>nd</sup> dose (H/kg)	Fecundity	Spawning Time (hrs)	Number Eggs	(miles) Fry	Surviving (%)	Females		Day/Month
						Length (cm)	weight (kg)	
1.5	normal	8.10	194	155	80	73	5.3	14/7
0.5	Normal	—	—	—	—	77	6.7	29/7
2.0	Normal	—	—	—	—	73	4.7	31/7
2.5	Normal	—	—	—	—	74	5.2	3/8
1.5	Normal	10.20	173	139	80	73	5.1	10/8
1.5	Normal	10.20	157	126	80	69	4.0	10/8
2.0	Normal	8.15	49	39	80	73	5.4	13/8
1.5	Normal	—	—	—	—	73	5.1	17/8
1.5	Normal	9.30	63	50	80	70	4.1	18/8
1.5	Normal	—	—	—	—	75	5.5	19/8
1.5	Normal	—	—	—	—	69	4.1	20/8
1.0	Humid	19.15	69	58	83	73	5.0	13/8

1.5	Humid	8.30	449	374	83	95	9.8	14/8
2.0	Humid	8.10	74	62	83	60	2.9	24/8
2.0	Humid	8.40	121	101	83	69	4.2	24/8
2.0	Humid	10.00	177	145	82	73	5.1	24/8
2.0	Humid	10.00	68	56	83	60	2.9	28/8
2.0	Humid	10.00	30	25	83	47	1.8	28/8
1.5	Dry	8.00	234	213	91	67	3.8	8/7
1.5	Dry	8.00	230	209	91	70	4.2	8/7
1.5	Dry	8.15	416	378	91	78	6.8	13/7
1.5	Dry	9.05	396	360	91	80	8.1	22/7
1.5	Dry	8.00	222	202	91	72	4.6	26/7
0.5	Dry	8.00	261	237	91	77	6.7	26/7
3.0	Dry	9.00	132	120	91	73	5.4	1/9
3.0	Dry	9.00	169	153	91	67	4.0	1/9
3.0	Dry	9.00	87	79	91	62	3.1	1/9

## DISCUSSION

In Arkansas (Torrán *et al.*, 1982) the grass carp has been raised for nearly 20 years. Eggs are obtained from females fish by hand-stripped after hormone injection.

Rosas (1975) used a fresh hypophysis of *Cyprinus carpio* which should have been obtained dry before it was applied to a receiver (female fish) of about the same weight with a dose 1:1. The spawning occurred between 6 and 24 hrs and got only three thousands fry of *Ctenopharingodon idella*.

Rio *et al.* (1975) suggested to apply a fraction dose, which the first dose would have matured the ova, and the second dose would have induce the spawn, However, in Mexico there had not been any related experiences before.

Rosas (1976) mentioned that in May 1971 and June 1972 in Tezontepec, Hgo., an artificial spawning of the grass carp had been done using hypophysis extract injections which did not succeed until June 1972 obtaining 300,000 fry. The results in this paper in the same place, 3'281,000 fry were obtained from 21 female fish.

Juarez and Palomo (1980) also in Tezontepec applied 900-1100 ui/kg gonadotropin corionic + E vitamin (HGC-LH) injections to a group of 19 grass carp to induce them to spawning, 64.4% to 86.5% eggs survived while compared with the results of this paper 3'771,000 eggs were obtained from which 3'281,000 hatched meaning that 87% survived.

Kuoril *et al.* (1983) found that in order to reach ovulation in females grass carp, *Ctenopharingodon idella*, LH-RH was administered 200 u/kg in a simple injection. Fertility eggs as well as hatched fry underwent normal development. However, during the course of incubation the eggs and fry immediately after hatching displayed a high mortality. The results of this paper shows a mortality of about 10% (Table 1).

Bezdenzhny and Prokhorchik (1984) administered gonadotropin hormone to induce the maturity of the oocyte of the eel (*Anguilla anguilla*). A total of 3 hatches of viable eggs were obtained. This increased the reproductive capacity of the species.

Thus, the results obtained here are the quantity of hormone solution to be injected and the use of the method of dry fertility conditions were considered adequate in order to get a successful spawning, and the percentage reached of fry surviving confirm this. Also, the relationships between fecundity with length and weight showed a high potential production of eggs by the grass carp.

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