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SODIUM CHLORIDE TOLERANCE OF GRASS CARP, *Ctenopharyngodon idella* Val. 1844 FINGERLINGS,

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ABSTRACT

Nine concentrations (1.5, 3, 5, 7, 8, 9, 10, 15, 17‰) of NaCl have been used to test the salinity tolerance of grass carp fingerlings *Ctenopharyngodon idella*. It has been found that salinity 9‰ was lethal to the fingerlings, (Lt_{50} 48h), while all the fingerlings survived in salinity 8‰ during the experimental period (168h.). the present study showed that fingerlings can survive in salinity as higher as 8‰.

INTRODUCTION

Acknowledge of the tolerance limits of fishes to salt water is very importance in management of fish ponds, which grass carp *Ctenopharyngodon idella* is one of these fish.

Cross (1969) mentioned that grass carp may migrate from one river system to another through estuaries. Acclimation on high salinities can be done using gradual transfer (Cross, 1970).

Maceina and Shierman (1979) investigated grass carp tolerance to salinities by direct transfer of fish to higher salinities after acclimation at lower salinities. Chervinski (1977) studies salinity tolerance by transferring grass carp directly from fresh water to various sea water concentrations and also from lower acclimation salinity to a higher salinity and Al-Hamed (1971) studied salinity tolerance on the hatchability of eggs, and the survival of young common carp, *Cyprinus carpio*. Also the salinity tolerance in grass carp was tested by Al-Seyab (1996).

The study was directed to test the tolerance of grass carp fingerlings in different salinities.

MATERIALS AND METHODS

The fingerlings of grass carp *C.idella* (average weight 2.12gm ± 0.12) were brought from the Marine Science Centre Fish Farm to the laboratory using plastic containers (30 L). Acclimation on laboratory condition was done using 40 L plastic container contain tap water for one week.

Nine NaCl concentrations were prepared (1.5, 3, 5, 7, 8, 9, 10, 15, 17‰) by dissolving a known weight of NaCl in 10 L tap water. Four fish were put in each test concentration with three replicates. Control (0.76‰) by using tap water was also run simultaneously.

Water temperature was measured by Mercury thermometer, pH was determined by pH meter (PYE unicam model 292 MK2), Ammonia was determined by phenate method (Solorzano, 1969) total alkalinity and total hardness were determined depending on Lind (1979). Median Lethal time (Lt_{50}) and Lethal concentration were recorded during the experiment.

RESULTS AND DISCUSSION

Table (1) clarify the properties of experiment media which refer to safety levels for fish (Boyd,1979). The total hardness values ranged from 2298.33-4001.66mg/L, total alkalinity was 131.66-220mg/L, ammonia was 0.2414-0.6832mg/L.

The lethal level of total ammonia for fresh water fishes are around 2.5mg/L (Lovell,1989). The salinity 9‰ was lethal to all fish during 72 hour, (Table 2), as Lt_{50} for same concentration was 48 hour, and the fish showed abnormal movement prior to death, this may be due to osmoregulatory stress (Ahmed, 1996).

Survival time of fish declined in salinity 10‰, when Lt_{50} was 20 hour and all fish perished during 24 hours. All fish died in salinity 15‰ during 3 hours, while all fish died during the first hour in salinity 17‰, Table (2).

Salinity tolerance differs with fish species, and their ability to osmoregulate. Allen and Avault (1969), and Hollander and Avault (1975) found the salinity tolerances to differ among fry, fingerling, and yearling stages of fishes. The larvae of Australian grayling, *Protoroctes maraena* survived in salinities ranging from 0.1 to 30% (Bacher and O'Brien,1989)

At 10 ppt, *Carassius auratus* began to die after 24 hours (Jasim,1988). Kilambi and Zdinak (1980) found that grass carp could be killed at 11‰ salinity.

Zimmerman and Berg (1934) also observed that salinity 12‰ killed *Cyprinus carpio*. Wakabayashi and Imaoka (1968) reported that gold fish were killed by unrenewed solutions having initial concentration of 6-7‰ salinity. The present study annotate that the fingerling were less tolerant to high salinities comparing with the adult stage; where the adult can survive in 15‰ (Al-Seyab,1996).

Table (1) Some chemical properties of the experimented media.

		NaCl concentration (P.P.t)									
		Control 0.76‰	1.5	3	5	7	8	9	10	15	17
pH	Mean	7.1	7.2	7.1	7.3	7.2	7.2	7.2	7.1	7.3	7
	SD	±0.00	±0.057	±0.057	±0.1	±0.115	±0.115	±0.152	±0.115	±0.00	±0.00
Total hardness mg/L	Mean	2298.33	2486.66	2597.6	2805	2803	2901.66	3006.6	3003.33	3197.33	4001.66
	SD	±0.00	±32.14	±6.806	±4.582	±3.603	±7.637	±11.547	±3.055	±0.00	±0.00
Total Alkalinity mg/L	Mean	174	213.33	215.33	141	131.66	141.33	179	191	202.33	220
	SD	±0.00	±1.52	±0.577	±3.605	±2.886	±1.154	±3.605	±3.605	±0.00	±0.00
Ammonia mg/L	Mean	0.3012	0.3266	0.2412	0.3132	0.2611	0.4310	0.4155	0.5072	0.6833	0.6242
	SD	±0.00	±0.004	±0.0001	±0.00015	±0.0002	±0.00015	±0.0002	±0.0138	±0.00	±0.00

Table (2). Effect of various concentration of sodium chloride on survival% and Lt_{50} *Ctenopharyngodon idella*.

NaCl concentration (p.p.t)	No. of Replication	No. of Fish	Time (h.)	Lt_{50} (h.)	Survival %
0.76 (control)	1	4	168	--	100
1.5	3	4	168	--	100
3	3	4	168	--	100
5	3	4	168	--	100
7	3	4	168	--	100
8	3	4	168	--	100
9	3	4	72	48	0.00
10	3	4	24	20	0.00
15	1	4	3.5	3	0.00
17	1	4	1	--	0.00

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تحمل أصبعيات الكارب العشبي ***Ctenopharyngodon idella*** **Val. 1844. لكلوريد الصوديوم**

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الخلاصة

استخدمت التراكيز الملحية (1.5، 3، 5، 7، 8، 9، 10، 15، 17‰) من كلوريد الصوديوم في اختبار تحمل اصبعيات الكارب العشبي *Ctenopharyngodon idella* ولوحظ أن التركيز القاتل كان 9‰ وكان نصف الزمن المميت 48 ساعة بينما بقيت جميع الاصبعيات عند التركيز 8‰ خلال فترة التجربة (168 ساعة).