

STUDY ON THE SURVIVAL OF TOURNAMENT RELEASED BASS ON ROSS R. BARNETT RESERVOIR, APRIL 1973

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ABSTRACT

The survival of bass (*Micropterus* spp.) caught and released during the Rebel Invitational B.A.S.S. Tournament on Ross R. Barnett Reservoir, Mississippi, April 4-6, 1973 was studied. Two different techniques for handling the bass prior to release were evaluated. A total of 1,863 bass were caught by 159 fishermen during the tournament. Of these, 197 (10.57%) were judged to be dead at the weigh-in. The remaining 1,666 bass were randomly divided into two groups for treatment or non-treatment. A total of 830 bass were injected IP with oxytetracycline and marked prior to release into a 0.8 hectare blocked-off area. The 836 non-treated bass were handled in the same manner except they were not injected or marked prior to release into the study area. A significantly higher number of treated bass (96.99%) survived the 19 day study period than did the non-treated bass (91.63%). It was observed that four interrelated factors play a role in determining survival rate of tournament released bass.

INTRODUCTION

Bass Anglers Sportsman Society (B.A.S.S.) under the auspices of its' President, Mr. Ray Scott, initiated a "Don't Kill Your Catch" program in 1972 in conjunction with the national bass fishing tournaments it sponsors annually (Scott, 1972). Under this program each tournament fishermen is awarded a bonus of one ounce for each bass (*Micropterus* spp.) brought to the weigh-in alive. B.A.S.S. also urges all of their members to release any bass not to be kept for eating or as trophies.

The first such release was conducted on March 9-11, 1972, at the Florida National Invitational Tournament held on Lake Kissimmee. Florida Game and Fresh Water Fish Commission Biologists evaluated the success of this release program by holding a sample of tournament caught bass in cages for 14 days to estimate any delayed mortality due to hooking and related stresses (May, 1972). At B.A.S.S. tournaments held on Lake Keowee, South Carolina, Lake Ouachita, Arkansas, and Lake Eufaula, Oklahoma, no delayed mortality studies were conducted. Bass weighed-in during these tournaments were judged to be alive or dead based on appearance. Those judged to be alive were released immediately back into the lake (Cobb, 1972a; 1972b; Anon., 1972). At the Tennessee National Bass Tournament held on Watts Barr Lake, June 22-24, 1972, a three day delayed mortality study was conducted by the Tennessee Game and Fish Department (Anon., 1972). At the Rebel Invitational Tournament sponsored by B.A.S.S. on August 24-26, 1972, at Ross Barnett Reservoir in Mis-

Mississippi, the release program was evaluated by Mississippi Game and Fish Commission biologists in cooperation with the Mississippi Cooperative Extension Service, Wildlife and Fisheries Department (Barkley, 1972).

Bass fishing tournaments have come under rather severe criticism in recent years from ordinary fishermen and sports writers because they feel that such tournaments can damage the bass population in a Lake. The release program initiated by B.A.S.S. has also come under criticism because of the belief on the part of some writers and sportsmen that the released bass soon die, and therefore, nothing was accomplished by turning the bass back into the lake.

Although a number of hooking mortality studies have been conducted on cold-water species (Marnell and Hunsaker, 1970; Klein 1965; Mason and Hunt, 1965), to our knowledge none had been carried out on warm water species until 1972 (May, 1972; Barkley, 1972). On April 4-6, 1973, B.A.S.S. sponsored the 1973 Rebel Invitational Tournament on Rose Barnett Reservoir, Mississippi, with a release of the catch as part of the tournament. This study was designed to evaluate the survival of the released bass and to evaluate the effects of two different handling techniques on survival.

We gratefully acknowledge the invaluable assistance of Richard Coleman, Bob Warden, and Doug Minchew, all graduate students at Mississippi State University, and the many members of the Mississippi Game and Fish Commission who worked long hours to see this study to completion. We also would like to thank Mr. Ray Scott and members of his staff for their cooperation.

MATERIALS AND METHODS

Fishermen were required by tournament officials to have live wells equipped with aeration devices; some also had recirculation systems. Bass caught during tournament hours were held in aerated live wells in the respective tournament boat and brought to the weigh-in site for weighing. At weigh-in fishermen were provided with plastic bags, partially filled with water and containing acriflavine, to place their catch in for transport to the scales. At a checking table, bass were removed from the bag, the number of live and dead fish recorded by tournament officials, then placed back into the bag and taken to the scale for weighing. One corner of the bag was cut to permit all excess water to drain. The bass were then weighed while still in the bag. After weighing, the bag containing the individual's catch was taken to a 500 gallon holding tank belonging to B.A.S.S. and emptied directly into the tank. From this point project personnel alone handled the fish.

Live bass were dipped from the holding tank, and handed to personnel on an adjacent Game and Fish distribution truck where they were held prior to delivery to the release site. The initial bass each day was randomly selected either for treatment or non-treatment, and thereafter every other bass was either treated or not treated. Bass randomly selected for treatment were injected intraperitoneally with 20 mg oxytetracycline per pound of body weight and had the dorsal portion of the caudal fin clipped for identification. Non-treated bass were not fin clipped and were immediately removed from the dip net and placed in one of the four holding compartments on the truck.

Two Game and Fish distribution trucks were used in the study so there would be a minimum of delay in transporting the bass to the release site.

Those bass in the B.A.S.S. holding tank judged to be dead, by either lack of opercular motion or by observed extensive damage, were removed from the tank for examination as to sex and gonadal condition.

The release site was located 3.4 km (2.1 mi.) N.W. of the weigh-in station. The release site was the No. 2 ring levee of the Pearl River Waterfowl Refuge, located along Highway 43. The release site, encompassing 0.82 ha (2.04 ac.), was enclosed by a 201.2m (660 ft.) small mesh fish population study block net. Float

line of the net was raised approximately 1 meter above the water surface. The release site was the same that was used in the August, 1972 study, except that the area was enlarged by 0.16 ha (0.4ac). The release site was bisected by a 121.9m (400 ft.) bridge on Highway 43. Maximum water depth was 3 meters with an average depth of 1.6 meters. Both surface and bottom temperature and D.O. were measured twice daily, at approximately 9 A.M. and 4 P.M. Depth of sampling station was 1.6 meters. A YSI Model 54 oxygen meter was used to record temperature and D.O.

The release site was checked at least twice daily to pick up any moribund or dead bass. All dead and moribund bass were measured, weighed and recorded as to whether marked or unmarked. If the bass had not been dead for more than 1 — 2 hours as indicated by gill condition, they were preserved on ice for necropsy. Standard methods were used to examine the fish to determine cause of death. The bottom of the release site area was checked by a scuba diver on 19 April 1973 to see if any dead or moribund fish could be found. The area checked was on the N. E. side of the Highway 43 bridge. The diver checked the bottom along transect lines from the bridge to the opposite bank.

RESULTS

A total of 1,863 bass were caught by 159 fishermen during the three day tournament, April 4-6, 1973, on Ross Barnett Reservoir. Of these bass, 197 (10.57%) were judged to be dead after being weighed and placed in the B.A.S.S. holding tank for observation for a few minutes. The remaining 1,666 bass (89.43%) were randomly divided into two groups for treatment or non-treatment (Table 1)

A total of 830 bass were injected with 20 mg of oxytetracycline per pound of body weight and 836 bass were not treated. Some of the bass, both treated and untreated, were judged to be in extremely poor physical condition as evidenced by hemorrhages in fins and on the body, loss of scales and injuries in and around the mouth.

During the study, water temperatures in the release site ranged from 12.0°C to 22.0°C at the surface and from 11.9°C to 20.5°C at 1.6 meters. Dissolved oxygen readings varied from 7.4 ppm to 9.1 ppm at the surface and from 7.3 ppm to 9.1 ppm at 1.6 meters (Table 2).

Dead bass were first recovered from the release site on day 4 post release (Figure 1). However, the first treated bass that died was not recovered until day 10. The number of bass that died gradually increased daily until day 12 post release and then declined. Of the 95 bass that died and were collected during the 19 day study period, 67 or 70.53% died between day 10 and day 15 post release.

Of the 830 treated bass, 805 (96.99%) survived the study period, and of the 836 untreated bass, 766 (91.63%) survived (Table 3). There was a significant difference in the survival of treated and untreated bass released (χ^2 d.f. = 21.28, 0.001 level).

The majority of the dead bass picked up in the release site were too decomposed for necropsy. However, two moribund bass were picked up and cause of death was determined to be a systemic bacterial infection (*Aeromonas liquefaciens*). During the 1972 study, 36 dead or moribund bass were examined. Stress due to handling and/or hook damage was responsible for the death of 16,

Chondrococcus columnaris infection killed 2 (5.6%), a mixed infection of *Aeromonas liquefaciens*, *Chondrococcus columnaris* and/or an unidentified myxobacteria killed 14 (38.9%), and stress plus an infection of *Aeromonas liquefaciens* killed 4 bass (11.1%).

Because of the slight possibility that a significant number of either moribund or dead bass could have been on the bottom of the release site, thus escaping detection, a Game and Fish Commission Scuba diver was assigned the task of searching the bottom of the release site. On day 15 post release (April 19), the diver checked the bottom on either side of 15 transect lines that extended from the back of the N.E. side of the release site to the Highway 43 bridge. No dead or moribund bass were found.

DISCUSSION

Of the total number of bass (1,863) caught during the 1973 Rebel Invitational Bass Tournament, 1,571 (84.33%) survived after being held for 19 days in the blocked-off release site for observation. This was a higher survival rate than had been experienced during the 1972 Rebel Invitational Bass Tournament held on August 24-26, when only 256 (24.43%) of a total 1,048 bass caught were still living 10 days following the end of the tournament.

During the 1972 study, no special precautions were taken to enhance the survival of the caught and released bass, except that all bass were kept for a short period in a large holding tank containing acriflavine. Although all tournament fishermen were required to have a functioning aeration device for their live wells at both tournaments, it was evident that the bass brought to the weigh-in site in 1972 were in much worse condition than those in 1973. This difference in the condition of the bass could be attributed to differences in water temperature (1972 average surface water temperature was 27.1°C compared to 15.3°C for 1973). However, another factor that must be taken into account is the fact that there had been a change in live well design to permit an automatic maintenance and exchange of the water volume present. During the 1972 tournament, many fishermen filled the live wells, plugged them to prevent draining while the boat was moving and turned on the aeration device. Thus there had to be a build-up of harmful metabolic products in the live well during the tournament hours.

It is believed, but not proven, that stress of handling and of being overcrowded in live wells was a major factor in the losses in both the 1972 and 1973 Rebel Invitational Bass Tournaments. The fact that "stress" can lower the resistance of fishes to infectious diseases is well documented (Bullock, 1964; Snieszko, 1962; Snieszko, 1957; Wedemeyer, 1970). It has also been shown that lactic acidosis as a result of hyperactivity induced by handling can cause death in fish (Caillouet, 1967; Caillouet, 1968).

At the 1972 Rebel Invitational, 422 (40.3%) of 1,048 bass brought to the weigh-in site were either dead or judged to be in such poor condition that they could not survive if released. Whereas, at the 1973 Rebel Invitational, only 197 (10.6%) of 1,863 bass brought to the weigh-in site were dead or in too poor of condition for release. It is believed that two factors contributed to the higher percentage of the bass caught in the 1973 tournament being brought to the weigh-in in good condition: first, lower water temperature and second, better live well systems in the tournament boats.

Prophylactic injections of antibiotics is a standard fish cultural practice to increase survival of brood fish after they have been handled in the spring. (Snieszko and Bullock, 1968).

During the 1972 study, procedures used for handling and release of the tournament caught bass were essentially those recommended by tournament officials, i. e., no special precautions were taken to enhance survival of the released bass although all bass released were handled as gently as possible. During the 1973 study, one-half of the bass released were chosen at random and treated with oxytetracycline to see if this would increase the survival rate. Of the 830 bass treated and released 805 (96.99%) survived the 19 day study period, whereas 766 (91.63%) of the 836 non-treated bass survived.

The significant difference in the survival rate of the treated versus untreated bass indicates that prophylactic treatments would insure a significantly higher survival rate of tournament caught and released bass. Initial mortalities of released bass are probably due almost entirely to stress and/or hooking damage. However, later mortalities were due to bacterial infections. Use of antibiotic injections provides protection against bacterial infections for the fish until their own defensive mechanisms can come into play. The pathogenic organisms found to be responsible for mortalities of released bass were *Aeromonas liquefaciens*, *Chondrococcus columnaris* and unidentified myxobacteria. These organisms are ubiquitous and are non-obligate pathogens of fish.

In conclusion, it appears that bass caught during tournaments can be released with a reasonable assurance that there will be a high survival rate if certain precautions are taken. Based on this study, the use of oxytetracycline prophylactic treatment will increase the survival of bass released during tournaments. However, it is also apparent from this study and that of Barkley (1972) that other factors can be of even greater importance in determining the survival rate. These factors are water temperature, proper live well design and use, and proper handling techniques by the tournament fishermen and officials.

It is our opinion that water temperature is a critical factor in the survival of released bass based on observations made at this and other tournaments. However, all of the factors mentioned above are interrelated and must be taken into account if these release programs are to be successful.

Further studies are needed to determine the relative importance of those interrelated factors mentioned above.

Table 1. Number of bass caught, treated and released during the Rebel Invitational B.A.S.S. Tournament, April 4-6, 1973, Ross Barnett Reservoir.

Date	Total Catch	Number Dead At Weigh-In	Total Released In Test Site	Number Treated	Number Not Treated
April 4	599	66	533	266	267
April 5	653	82	571	285	286
April 6	611	49	562	279	283
Totals	1,863	197	1,666	830	836

Table 2. Average and range of surface and bottom temperatures and dissolved oxygen within release site during 19 day study period.

	Temperature (°C)		Dissolved Oxygen (ppm)	
	a.m.	p.m.	a.m.	p.m.
Surface				
Range	12.0-18.7	14.0-22.0	7.4-8.9	7.8-9.1
Average	15.2	17.7	8.2	8.6
Bottom (1.6 meters)				
Range	11.9-18.6	13.8-20.5	7.3-8.8	7.6-9.1
Average	14.9	16.6	8.0	8.5

Table 3. Number of treated bass surviving at end of 19 day study period.

	Number Treated	Number Untreated	Total
No. Handled	830	836	1,666
No. Dead	25	70	95
No. Survived	805	766	1,571
Percent Survival	96.99	91.63	94.30

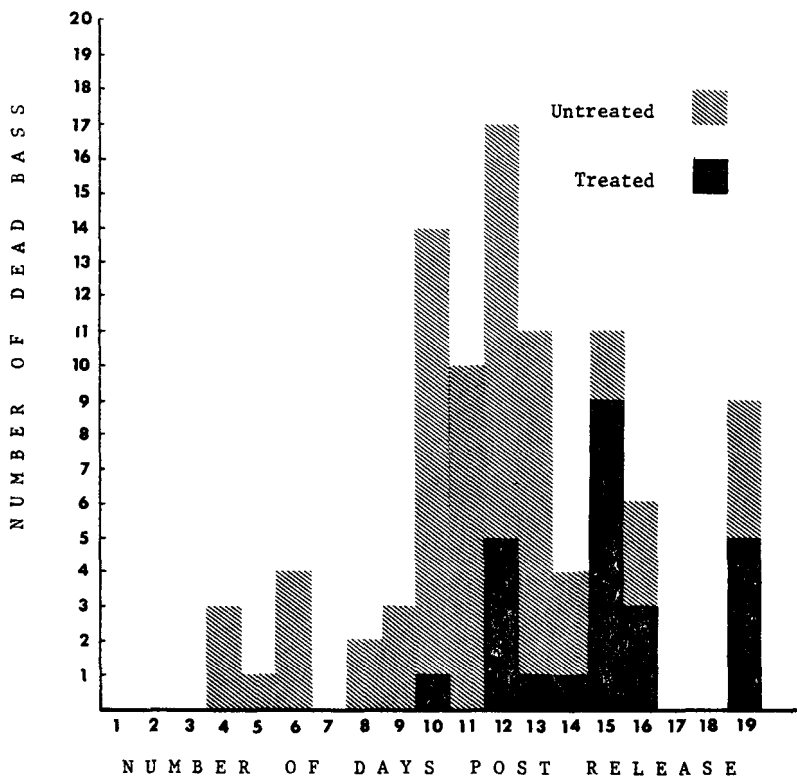


Figure 1. Number of dead bass, treated and untreated, collected daily during the 19 day study period, April 4-23, 1973.

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