

**PHYSIOLOGICAL EFFECTS OF LIVE-RELEASE ANGLING  
TOURNAMENTS**

Bruce L Tufts

Department of Biology, Queen's University, Kingston, Ontario, Canada, K7L  
3N6, Phone (613) 533-6134, FAX (613) 533-6617, e-mail  
tuftsb@biology.queensu.ca

James D. Kieffer

Department of Biology, University of New Brunswick, PO Box 5050, Saint  
John, New Brunswick, Canada E2L 4L5

Cory D. Suski, Shaun S. Killen, Michael B. Morrissey, Susan G. Lund  
Department of Biology, Queen's University, Kingston, Ontario, Canada K7L  
3N6

**EXTENDED ABSTRACT ONLY – DO NOT CITE**

In recent years, the practice of “catch and release” angling has been an important tool for the management and conservation of recreational fish species. One area where “catch and release” has played an extremely important role is in competitive fishing. In recent years, most high profile competitive fishing events (ie tournaments) in North America have adopted a “live-release” format. In response to the growing popularity of live release tournaments for largemouth bass, numerous studies have attempted to monitor survival following these events. To date, however, most research concerning survival at tournaments has focussed on the correlation of environmental variables with mortality. These studies have produced some valuable information, but many important issues in this area have yet to be resolved because of the limitations of the approaches that are traditionally used in this area (ie main focus on monitoring immediate and/or delayed mortality).

We are now involved in a large-scale project to examine the physiological impacts of live-release tournaments on three important recreational species: largemouth bass, smallmouth bass and walleye. This project has several objectives. First, we are determining the physiological status of these species following a number of tournaments in order to gain insight into the nature of

their physiological disturbance following these events. In addition, we are conducting experimental tournament simulations with these species in which we sample fish after the different stages of a tournament (eg angling, livewell confinement, weigh-in). These tournament simulation experiments will provide important information about the relative contribution of different tournament practices towards the overall physiological disturbance. Finally, we are also conducting many experiments that examine other significant tournament issues and explore ways to reduce the physiological disturbance in fish during live-release tournaments. Taken together, the results of these studies will be used to minimize the biological impact of live-release tournaments on these important recreational species.

This presentation will mainly focus on the physiological changes that occur in largemouth bass during live release angling tournaments. During the summer of 2000, several live release bass tournaments in Ontario were visited to obtain tissue and blood samples from fish following weigh-in procedures, and a number of physiological parameters were compared in tournament-caught bass and resting control bass. Analyses showed that the plasma cortisol concentrations of tournament-caught fish were much greater than control individuals. Interestingly, however, the plasma cortisol concentrations in a group of control bass sampled after being held for several days in our aquatic facility were considerably higher than those in bass sampled immediately after angling in the wild. These results indicate that plasma cortisol levels in largemouth bass are very responsive to any type of disturbance. Plasma osmolarity was elevated in bass following tournaments and there was no evidence of significant ion losses that are known to occur following severe chronic stresses. The mRNA levels for an inducible heat shock protein (hsp 70) were not changed in tournament fish and differences in creatine phosphokinase levels between tournament-caught bass and control bass were not significantly different. These results seem to indicate that tournament fish do not normally experience significant cell or tissue damage.

Muscle variables were also very different between tournament and control bass. The muscle energy reserves, phosphocreatine, ATP and glycogen in tournament bass were reduced by 92%, 60% and 75%, respectively, relative to those in control bass. Lactate concentrations in the muscle and blood of tournament bass were also significantly elevated. The results for muscle energy reserves and lactate are very similar to those following exhaustive exercise and explain why largemouth bass are often very lethargic following live-release tournaments.

Taken together, these results suggest that, following a live-release angling tournament, largemouth bass have experienced a large decline in muscle energy reserves, an accumulation of lactate, and changes in osmotic balance, but have probably not experienced significant cell or tissue damage. These events also cause an increase in traditional indicators of stress such as plasma cortisol and glucose levels. Although there is a relatively large physiological disturbance in largemouth bass after tournaments, these physiological changes are normally reversible and we observed very little mortality in largemouth bass after tournaments. Indeed, largemouth bass that were transported to the laboratory after tournaments almost always survived.

