



## Exploitation of specialised fisheries resources: The importance of hook size in recreational angling for large common carp (*Cyprinus carpio* L.)

Tobias Rapp<sup>a</sup>, Steven J. Cooke<sup>b</sup>, Robert Arlinghaus<sup>a,c,\*</sup>

<sup>a</sup> Inland Fisheries Management Laboratory, Faculty of Agriculture and Horticulture, Humboldt-University of Berlin, Philippstrasse 13, Haus 7, 10115 Berlin, Germany

<sup>b</sup> Fish Ecology and Conservation Physiology Laboratory, Department of Biology, Carleton University, Ottawa, ON K1S 5B6, Canada

<sup>c</sup> Department of Biology and Ecology of Fishes, Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Müggelseedamm 310, 12587 Berlin, Germany

### ARTICLE INFO

#### Article history:

Received 3 March 2008

Received in revised form 11 June 2008

Accepted 27 June 2008

#### Keywords:

Catch-and-release

Fish welfare

Recreational fisheries

Terminal gear

Hooking location

### ABSTRACT

Little is known about the influence of hook size on fishing success, hooking performance and injury associated with recreational angling for large freshwater fish such as common carp (*Cyprinus carpio* L.). Yet, such information is crucial in the context of the management and conservation of these highly valuable specialised fisheries resources. We compared two different sizes of conventional carp hooks (small, size 6, and large, size 1) baited with corn and found that small hooks caught more and larger carp at similar landing rates. Moreover, small hooks caused less tissue damage compared to large hooks. However, there was no evidence that small hooks reduced incidences of bleeding. For both hook sizes, most carp were hooked in the lower jaw (size 1: 81%; size 6: 64%) and the side of the mouth (size 1: 16%; size 6: 36%), and not a single fish out of 88 fish landed was hooked deeply in vital organs. These results suggest that more widespread use of small size hooks in carp fisheries might be promoted for conservation, fish welfare and angling quality reasons.

© 2008 Elsevier B.V. All rights reserved.

### 1. Introduction

Common carp, *Cyprinus carpio* L., have been widely introduced around the globe to support inland fisheries (Cambray, 2003), and in many European countries they have become a popular target for recreational fisheries (e.g., Czech Republic: Vacha, 1998; Germany: Arlinghaus, 2008; United Kingdom: Hickley and Chare, 2004). Carp angling for rare, exceptionally large trophy fish is becoming popular in continents other than Europe as well (e.g., North America: Cooper, 1987; Farooqi, 2006; Africa: Økland et al., 2003). This kind of recreational fishery also feeds a rapidly developing tourism industry in some countries (e.g. France), and is providing alternative income opportunities for commercially managed water bodies (Arlinghaus and Mehner, 2003).

The consumptive orientation (i.e. the attitude towards catch and harvest aspects of the fishing experience) of carp anglers differs from country to country. In many Eastern European countries carp are often caught for personal consumption (Vacha, 1998). In central Europe and the United Kingdom, highly specialised carp fishing for large carp is often practiced as total catch-and-release

angling (North, 2002; Arlinghaus and Mehner, 2003), often involving voluntary catch-and-release (Arlinghaus, 2007). Due to the low mortality rate of caught-and-released carp (Beukema, 1970; Raat, 1985), which can, in fact, be near zero in many situations (T. Rapp et al., unpublished data), and the longevity of carp (>20 years in the wild; McCrimmon, 1968), catch-and-release can result in multiple recaptures of the same individual over time (Hearn, 2000). Given the exceptional emotional and monetary value attached to large carp by individual anglers and fisheries managers (Arlinghaus and Mehner, 2003), it is imperative that the mandatory and/or voluntary release of carp results in the least possible injury to the fish. This is also advisable from a fish welfare perspective that is becoming an increasingly important aspect in recreational fisheries management and conservation world-wide (Arlinghaus et al., 2007a,b; Cooke and Sneddon, 2007).

If inappropriate terminal tackle is used, the repeated capture of an individual fish can lead to cumulative injuries in the mouth and jaw regions (Meka and Margraf, 2007). Indeed, individual carp that are often recaptured may show severe mouth injuries that are very likely associated with previous recapture events. In angling magazines, carp anglers have thus debated the value of small hooks as a means of reducing injuries (Reetz, 2007), as well as the effectiveness of large hooks in terms of landing rates of hooked carp (Janitzki, 2005). There might be a trade-off in optimal hook size related to minimizing injury while maximizing landing success. Currently, however, no study is available to support these

\* Corresponding author at: Department of Biology and Ecology of Fishes, Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Müggelseedamm 310, 12587 Berlin, Germany. Tel.: +49 30641 81653; fax: +49 30641 81750.

E-mail address: [arlinghaus@igb-berlin.de](mailto:arlinghaus@igb-berlin.de) (R. Arlinghaus).



**Fig. 1.** Illustrations of the hook sizes used in the present study (plot A), the rig used in this study (plot B) and the hair baited with corn (plot C): (a) boilie stopper, (b) hair, (c) hook, (d) leader, (e) swivel, (f) clip, (g) lead sinker, (h) rubber, (i) braided line with a lead core, (j) swivel, (k) braided main line, and (l) corn.

anecdotal claims, which hampers development of scientifically defensible recommendations regarding optimal hook sizes in specialised carp angling. Hence, a field study was completed to determine if there are differences in injuries (i.e., tissue damage and bleeding), capture characteristics and landing probabilities between two popular hook sizes while targeting large carp with specialised carp angling gear designed to mimic real world situations.

## 2. Methods

The study was conducted on 30 individual fishing days randomly chosen between 11 August and 3 October 2007 at Dow's Lake (N45°23'46.14", W75°42'03.09") and the Rideau Canal (N45°23'23.81", W75°42'05.58") in Ottawa, Ontario, Canada. During this time period, the water temperature ranged from 18.3 to 24.3 °C (average  $\pm$  S.E.: 20.8  $\pm$  0.35). All carp fishing was conducted from shore using bottom fishing techniques as it is common for specialised carp angling (Arlinghaus and Mehner, 2003). One type of commercially available carp hook in two sizes was used (Gamakatsu G-Carp Super Hook; sizes 1 and 6; Fig. 1A). These hook sizes represented a common gear choice in specialised carp angling (Steffens and Arlinghaus, 2008). The bait was not directly attached to the hook, but to a short piece of line, which constituted an extension of the leader (Sufix Camo Skin 11.3 kg, Fig. 1B). This so-called "hair" had a length of 2 cm (measured from the bend of the hook) and the leader had a total length of 15 cm. This method is known among carp anglers as the "hair rig" and is assumed to facilitate quick hooking after the bait is sucked as the hook remains uncovered by bait (Fig. 1B, Steffens and Arlinghaus, 2008). For bait, 3 kernels of maize (corn) were used on the hair. They were threaded onto the hair using a crochet hook and fixed on the hair with a small piece of plastic, called a boilie stopper (Fig. 1C).

The leader was directly tied to a swivel (Fig. 1B). A plastic clip was fixed on the swivel, by pushing the swivel into the clip. A lead sinker (weight of 84 g) was attached to the plastic clip and fixed with a flexible cone-shaped rubber tube. The other parts of the terminal rig consisted of a 50 cm long braided line with a lead core to avoid losing large carp that became snagged in dead woody debris or other structure during the fight. This setup (Fig. 1B) resembled the standard rig and terminal gear used in contemporary angling for large carp that, based on anecdotal evidence, is supposed to improve hooking efficiency and facilitates shallow hooking to minimize injury and increase fish welfare (Arlinghaus, 2007; Steffens and Arlinghaus, 2008). Similar methods contributed to a dramatically reduced depth of hooking in other species (Beckwith and Rand, 2005). The terminal rig was connected to an 18.1 kg test braided mainline via a second swivel (Fig. 1B). On each fishing day, two carp rods (test curve: 1.25 kg, length: 3.60 m) were used at the same fishing site near shore within a macrophyte-free patch. The different hook sizes were randomly allocated to one of the carp rods resulting in the two hooks sizes being offered simultaneously on the fishing spot. The distance between the (rods) hooks was only few meters and the location (either right or left) was determined randomly.

To control for angler skill, all carp were captured by the same experienced angler. All fish were landed with a knotless landing net. After landing, the location of the hook penetration (upper jaw, lower jaw, left corner of the mouth and right corner of the mouth), the absolute hooking depth, the presence or absence of tissue damage and the presence or absence of bleeding were recorded. The absence of tissue damage was defined as lack of additional damage except for the penetration of the hook, which is considered an unavoidable damage in any type of recreational angling. Additional tissue damage consisted of lacerations in the soft mouth tissue as a result of hook movement in the carp mouth. Lacerations

Download English Version:

<https://daneshyari.com/en/article/4544078>

Download Persian Version:

<https://daneshyari.com/article/4544078>

[Daneshyari.com](https://daneshyari.com)