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Circle hooks, 'J' hooks and drop-back time: a hook performance study of the south Florida recreational live-bait fishery for sailfish, *Istiophorus platypterus*

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Abstract This study evaluates the performance of two types of non-offset circle hooks (traditional and non-traditional) and a similar-sized 'J' hook commonly used in the south Florida recreational live-bait fishery for Atlantic sailfish, *Istiophorus platypterus* (Shaw). A total of 766 sailfish were caught off south Florida (Jupiter to Key West, FL, USA) to assess hook performance and drop-back time, which is the interval between the fish's initial strike and exertion of pressure by the fisher to engage the hook. Four drop-back intervals were examined (0–5, 6–10, 11–15 and >15 s), and hook performance was assessed in terms of proportions of successful catch, undesirable hook locations, bleeding events and undesirable release condition associated with physical hook damage and trauma. In terms of hook performance, the traditionally-shaped circle hook had the greatest conservation benefit for survival after release. In addition, this was the only hook type tested that performed well during each drop-back interval for all performance metrics. Conversely, 'J' hooks resulted in higher proportions of undesirable hook locations (as much as twofold), bleeding and fish released in undesirable condition, particularly during long drop-back intervals. Non-traditional circle hooks had performance results intermediate to the other hook types, but also had the worst performance relative to undesirable release condition during the first two drop-back intervals. Choice of hook type and drop-back interval can significantly change hook wounding, and different models of non-offset circle hooks should not be assumed to perform equivalently.

KEYWORDS: catch and release, drop-back time, hook performance.

Introduction

The Atlantic sailfish, *Istiophorus platypterus* (Shaw), has been described as one of the most sought-after offshore recreational species in the state of Florida (Ellis 1957; Jolley 1974, 1975). Although this characterisation may not necessarily pertain to the present-day fishery, the popularity and economic importance of pursuing this species remains high, as evidenced by increased fisher participation in south Florida billfish tournaments (National Marine Fisheries Service, Southeast Fisheries Science Center, unpublished data; Fig. 1a). The abundance and availability of sailfish off the southeast coast of Florida, USA, south of St Lucie County to Key West, have been attributed to the narrow continental shelf in this region and the close proximity of the Gulf Stream (Nelson & Farber 1998). The fishery targeting sailfish has evolved over time, with a trend toward live-bait fishing and the development of a strong catch-and-release ethic (Jolley 1975; Fig. 1b). Recently, the fishery has adopted kite fishing methods using live bait (Jolley 1975), which typically involve 'dropping-back' baits during strikes. Specifically, drop-back time is defined

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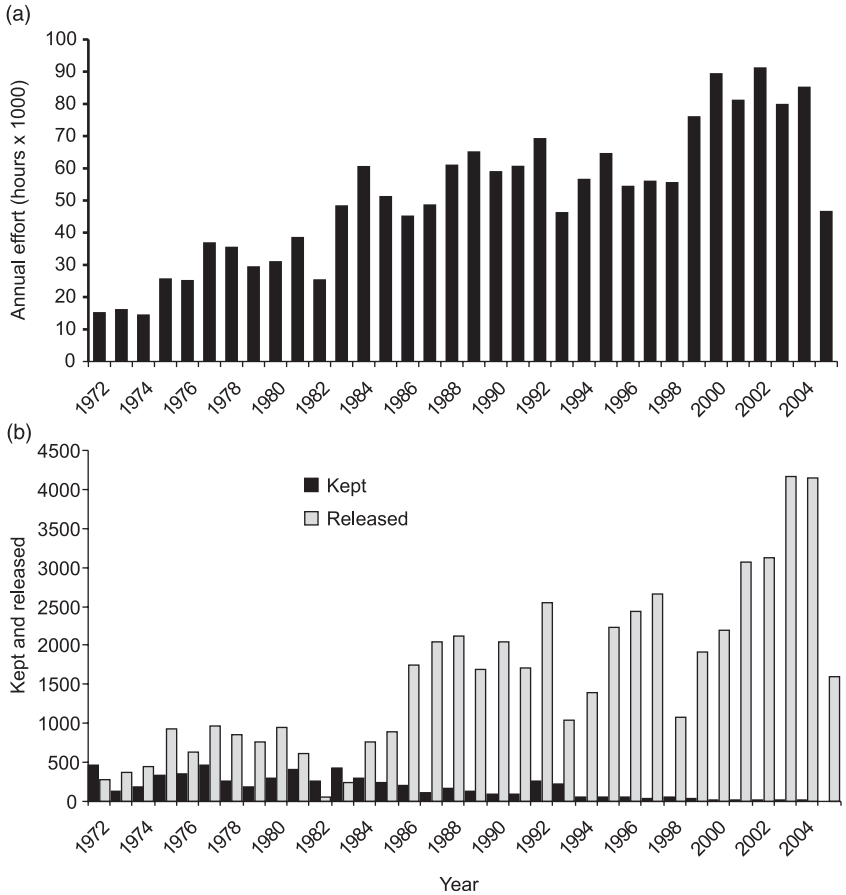

Figure 1. Sailfish fishing effort (a) and number of sailfish kept and released (b) (1971–2005). Annual tournament fishing effort is in hours. Data are from NOAA Fisheries, Southeast Fisheries Center's recreational billfish tournament survey.

as the time between initial strike by the fish and exertion of pressure by the fisher to engage the hook (Jolley 1975).

Recent stock assessment results from the International Commission for the Conservation of Atlantic Tunas (ICCAT) indicated that sailfish are fully exploited in the western Atlantic and possibly over-exploited in the eastern Atlantic (ICCAT 2003). Although ICCAT has adopted binding management recommendations to reduce mortality and rebuild Atlantic blue marlin, *Makaira nigricans* (Lacepède) and white marlin, *Tetrapturus albidus* (Poey), stocks (ICCAT 2004), ICCAT management measures have not been implemented for sailfish. However, the US Atlantic billfish management plan (NMFS 1988) does restrict the possession and commercial sale of all istiophorid billfish caught in the US Atlantic management area and establishes a minimum size for the marlins and sailfish. Several additional billfish management measures are currently being considered as preferred alternatives for the US Atlantic Ocean, including the mandatory use of non-offset circle hooks (NMFS 2005).

The circle hook preferred management alternative is largely based on previous research demonstrating that circle hooks, when using natural bait, improve the survival of released istiophorid billfish (Prince, Ortiz & Venizelos 2002a; Domeier, Dewar & Nasby-Lucas 2003; Horodysky & Graves 2005). Prince *et al.* (2002a) also reported that circle hooks with an offset of $>10°$ (an offset is a lateral deviation of the hook point relative to the main plane of the hook shank and curvature) have a percentage of deep hooking comparable with 'J' hooks, and that this feature diminishes the conservation benefit of circle hooks. Although Horodysky & Graves (2005) and Cramer (2005) speculated that billfish caught on natural baits with longer drop-back intervals (time in seconds between the fish's initial strike and engagement of the hook) are more likely to be deep hooked, data to test this

hypothesis have not been obtained. Therefore, the objective of the present study was to assess the performance of three types of hooks (two models of circle hooks and a comparable size 'J' hook) relative to drop-back time as they are used in the recreational live-bait fishery for sailfish off south Florida, USA. Hook performance was examined in terms of: (1) proportion of successful catches; (2) proportion of fish hooked in an undesirable location; (3) proportion of fish bleeding; and (4) proportion of fish released in undesirable condition (combination of undesirable hook location and bleeding).

Material and methods

The fishery

South Florida's recreational live-bait fishery for sailfish is seasonal, with greatest catches occurring during winter and early spring (Jolley 1974, 1975; Prince *et al.* 2002a). Obtaining sufficient sample numbers is frequently a problem with 'rare-event' species, particularly istiophorids (Prince & Brown 1991). Five charter boat captains, each an expert in targeting sailfish using live bait, voluntarily participated in this study. Working with voluntary captains provided a cost-effective opportunity to obtain a sufficient sample size essential to the success of this project.

The study was conducted from Jupiter to Key West, FL, during the two consecutive fishing seasons (winter through spring) of 2003–2004 and 2004–2005. Most fishing effort was concentrated in the area from West Palm Beach to Miami. The majority of the live-bait presentation methods involved using kites, although slow-trolled baits deployed from outrigger clips were also used when wind speed was too low to use kites. In addition, pitch-baiting techniques (casting live baits) were opportunistically used to target sailfish that occasionally moved between the kite and outrigger baits. Primary baits used in this study ranged from 8.8 to 17.6 cm total length and included such species as bigeye scad, *Selar crumenopthalmus* (Bloch), Atlantic thread herring, *Opisthonema oglinum* (LeSueur), and blue runner, *Caranx crysos* (Mitchill). Occasionally, smaller baits were used, including scaled sardine, *Harengula jaguana* (Poey), and round scad, *Decapterus punctatus* (Cuvier). Conventional bait-casting reels, as well as spinning reels, with 2.1- to 2.4-m rods in the 9.1 to 13.6 kg class were the standard gear used. Most fishing tackle included a line release clip, or wire, to minimise resistance during a strike.

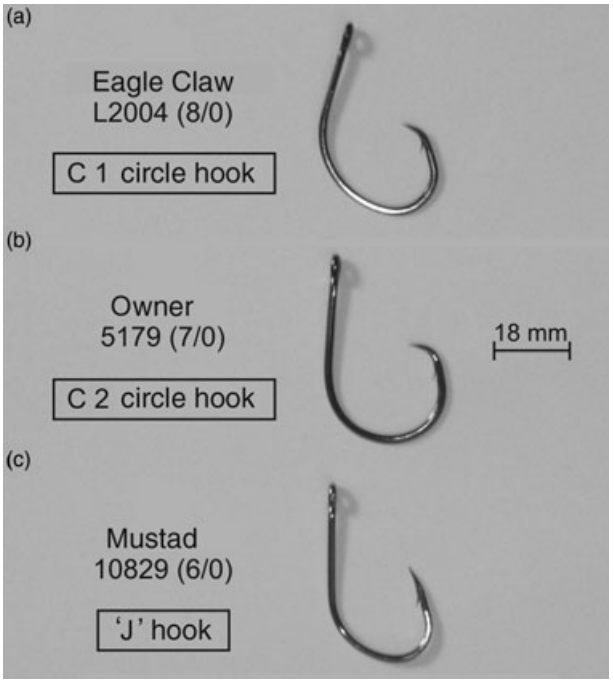

Figure 2. Hooks evaluated in this study: (a) C1 circle hook, Eagle Claw model L2004 (size 8/0, non-offset); (b) C2 circle hook, Owner model 5179 (size 7/0, non-offset); and (c) 'J' hook, Mustad model 10829BLN (size 6/0, $< 5°$ offset).

Terminal gear and drop-back interval

For practical purposes, we selected hook types from those that were either currently used or were planned to be used in the south Florida fishery for Atlantic sailfish. Two hook models conformed to the circle hook definition of Prince *et al.* (2002a), both having a point angled perpendicular to the main hook shank. Circle hooks were the Eagle Claw[1] model L2004 (size 8/0, non-offset) and the Owner[1] model 5179 (size 7/0, non-offset, Fig. 2a, b). The Eagle Claw L2004 was designated as C1 and the Owner 5179 as C2. The 'J' hook was a Mustad[1] model 10829BLN (size 6/0); this hook had a minor offset of less than 5° (Fig. 2c). The C1 had a traditionally shaped shaft (i.e. rounded circularity); C2 was non-traditional in shape with a straight shank (i.e. shank lacks circularity), a smaller point and a wider hook gap (~18 mm) relative to C1 (Fig. 2a,b). Although manufacturer-assigned sizes differed by model, all hooks had comparable overall dimensions suitable for the various small- and medium-sized live-bait presentations (i.e. kite fishing, flat

[1]The mention of commercial products or entities does not imply endorsement by the National Marine Fisheries Service, International Game Fish Association, or the authors.

lining, pitch baiting) used to target sailfish. At the start of the study in 2003, the C1 and 'J' hooks models were widely used in the fishery, while the C2 had been recently introduced by the manufacturer for sailfish tournament applications.

Drop-back techniques are often used in different fishing applications using natural dead or live bait to allow the fish to consume the bait without feeling tension on the line (Jolley 1975). This method increases the ability of fishermen to hook sailfish and helped popularise the south Florida fishery during the 1920s (Jolley 1975). To accomplish drop-back after a strike, fishers use various means to allow line to come off the reel spool without the fish detecting tension from the line or hook. This can be achieved manually by decreasing the reel's drag (clutch). Alternatively, drop-back can be accomplished by placing the rod in a holder with the reel at a very light drag setting or by using a line clip that releases when a strike occurs.

Drop-back time categories were based on suggestions from participating captains for time intervals likely encountered in this fishery. The duration of drop-back appeared to vary based, in part, on the type of live-bait presentation (i.e. kite, outrigger-deployed bait and pitch bait), as well as the fishing location (West Palm Beach to Miami, FL). For example, West Palm Beach captains fish with kites almost exclusively and use long drop-back times (15–30 s), but shorter drop-back times are more common in the Miami area. Four drop-back intervals were examined: (1) 0–5 s; (2) 6–10 s; (3) 11–15 s; and (4) >15 s. The captains determined drop-back time using either an interval count or stopwatch.

Hook-performance metrics

Four hook-performance metrics were evaluated: (1) proportion of successful catches; (2) proportion of undesirable hook locations; (3) proportion of positive bleeding events; and (4) the proportion of fish released in an undesirable condition. A successful catch was determined when a sailfish was hooked and brought close enough to the vessel for a crew member to touch the leader (i.e. last 10–15 feet of line). Hook location was assigned to one of five categories based on past experience with this fishery (Prince *et al.* 2002a), as well as consultation with participating captains: (1) corner of the mouth (or jaw hinge, Fig. 3a); (2) upper or lower jaw (or bill, Fig. 3b); (3) buccal cavity (Fig. 3c); (4) gill arch complex (Fig. 3d); and (5) oesophagus (Fig. 3e) or stomach (Fig. 3f). Hook locations 1 and 2 were considered desirable and the remainder were considered undesirable with respect to survival of released fish (Prince *et al.* 2002a; Skomal, Chase & Prince 2002). If fish blood was observed during any part of the fight, the catch was considered a positive bleeding event. Designation of undesirable release condition was based on records where fish had undesirable hook locations (locations 3, 4 or 5 listed above), positive bleeding events, or both. The use of undesirable hook locations in combination with positive bleeding events to define undesirable release condition was based on previous studies that found these metrics were either indicative of conditions that could (or did) lead to post-release mortality (Prince *et al.* 2002a; Domeier *et al.* 2003; Horodysky & Graves 2005; Kerstetter & Graves 2006) or were predicted to result in post-release mortality (Skomal *et al.* 2002). Therefore, by definition, undesirable release condition encompasses the most deleterious hook-induced injuries. As such, this variable is a more comprehensive performance metric for evaluating factors that may reduce survival than hook location or bleeding metrics by themselves.

Statistical analysis

The chi-squared goodness-of-fit procedure (Steel & Torrie 1960) was used to test the null hypothesis that the proportions of successful catches, undesirable hook locations, positive bleeding events and undesirable release conditions were equivalent for each hook type and drop-back interval. Statistical significance was declared at $P < 0.05$.

Results

Successful catches

Catch success differences among the three hook types and the four drop-back intervals were, with a few exceptions, relatively small and inconsistent for all three hook types (Fig. 4). The greatest difference was observed for the longest drop-back interval (>15 s), when catch success was significantly greater for the C2 hook compared with the C1 hook. In addition, the C2 hook had significantly lower catch rate than the 'J' hook in the first drop-back interval. For C1, the proportion of catch among the four drop-back intervals ranged from 0.61 to 0.70 (SD = 0.04), C2 ranged from 0.60 to 0.94 (SD = 0.16) and 'J' ranged from 0.75 to 0.87 (SD = 0.05).

Undesirable hook locations

Although not consistently supported by statistical differences, the general trend for proportion of undesirable

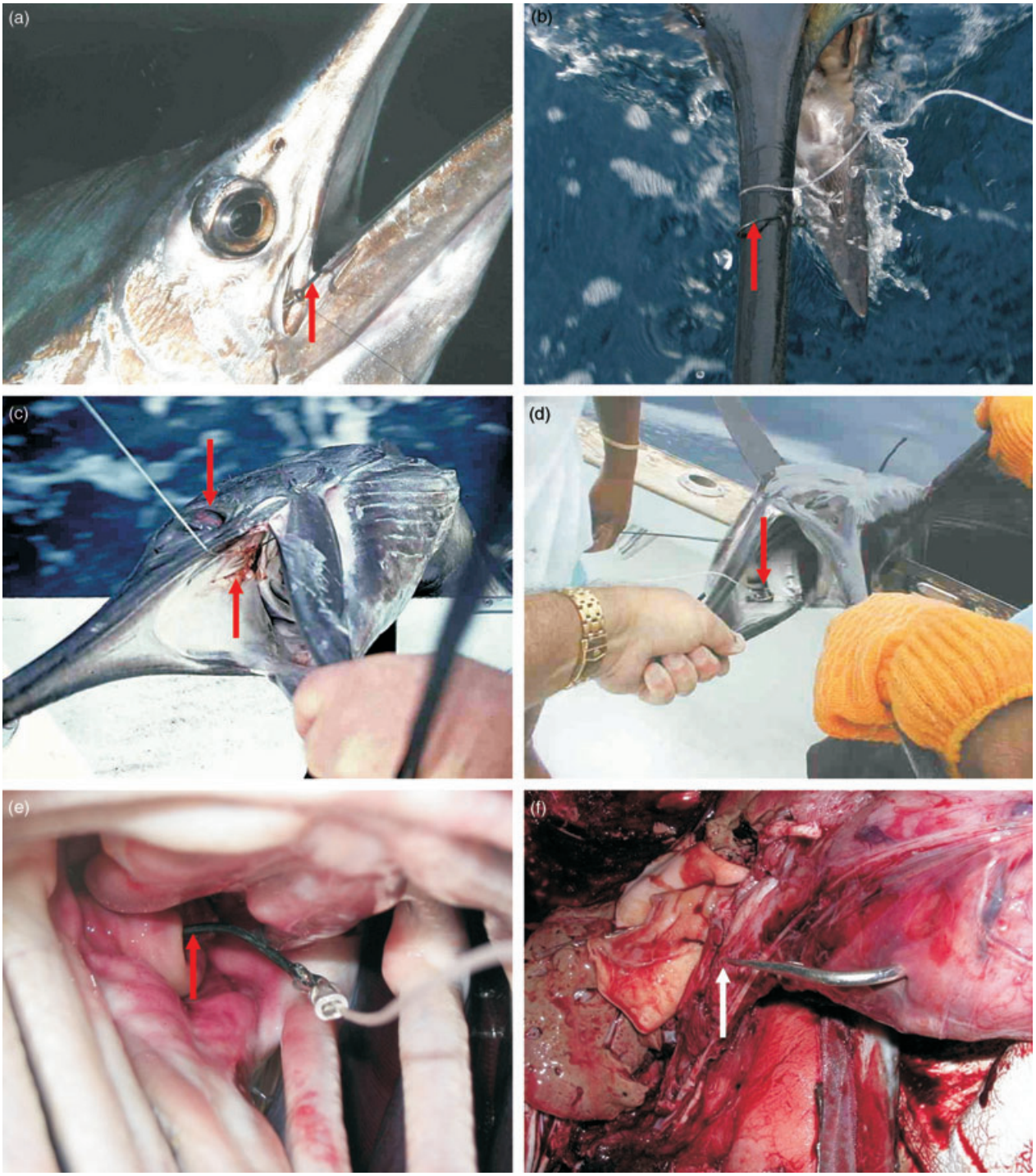

Figure 3. Six common hooking locations (indicated by arrows) encountered in this study: (a) corner of the mouth (or jaw hinge); (b) upper or lower jaw (or bill); (c) buccal cavity; (d) gill arch complex; (e) oesophagus; and (f) stomach. Locations (a) and (b) were considered desirable relative to survival after release and locations (c), (d), (e) and (f) were considered undesirable (see text). The upper palate laceration shown in (c) also resulted in haemorrhaging of the eye (shown by the top arrow) due to hook penetration through the rear upper palate. Locations (e) (top of oesophagus) and (f) (stomach) were categorised into one location (i.e. stomach).

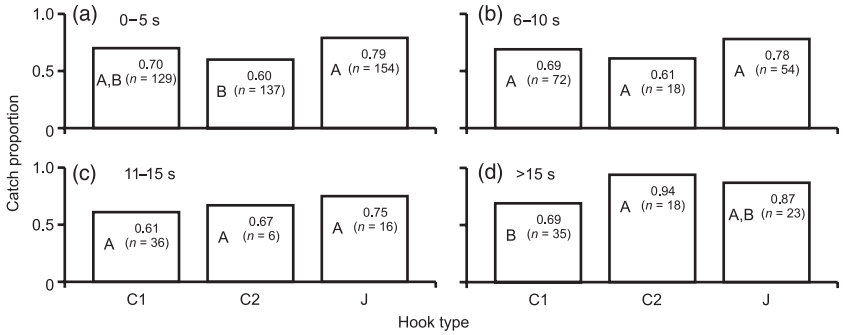

Figure 4. Catch success for the three hook types (C1 Eagle Claw circle hook, C2 Owner circle hook and Mustad 'J' hook, J) and four drop-back intervals (a–d) in the south Florida recreational live-bait sailfish fishery. Different letters within each drop-back interval indicate significant differences (chi-squared goodness-of-fit, $P < 0.05$) between hook types.

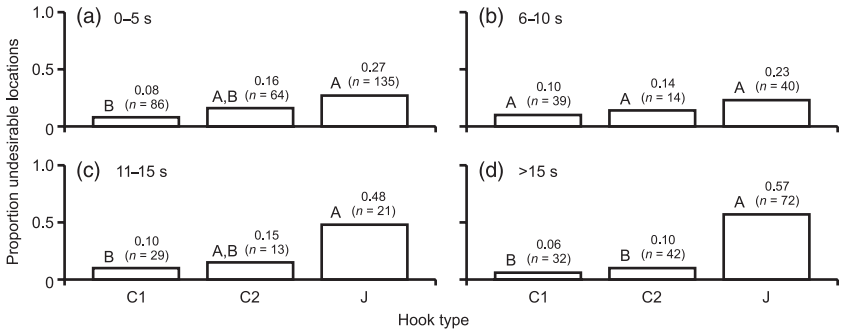

Figure 5. Proportion of undesirable hook locations (locations c, d and e, see Fig. 3) for the three hooks types (C1 Eagle Claw circle hook, C2 Owner circle hook and Mustad 'J' hook, J) and four drop-back intervals [0–5 s (a), 6–10 s (b), 11–15 s (c) and >15 s (d)] in the south Florida recreational live-bait fishery for sailfish. Different letters within each drop-back interval indicate significant differences ($P < 0.05$) between treatments (hook types). Unequal sample sizes between and among hook types and drop-back intervals are a consequence of the voluntary survey of participating captains who, on occasion, did not respond to all survey questions.

hook locations was higher for 'J' hooks than for either C1 or C2 hooks at all drop-back intervals (Fig. 5). The proportion of undesirable hook locations for the C1 and 'J' hooks were statistically different for all except the 6–10 s drop-back interval. The C2 hook had results intermediate between the other two hook types. The proportion of undesirable hook locations among the four drop-back intervals ranged from 0.06 to 0.10 (SD = 0.02) for C1, 0.10–0.16 (SD = 0.26) for C2 and 0.23–0.57 (SD = 0.16) for 'J'.

Bleeding

The proportion of bleeding fish was significantly less for C1 hooks than for 'J' hooks for each drop-back interval (Fig. 6). The C2 hook type had results intermediate between the other two hook types. The proportion of bleeding among the four drop-back intervals for C1 ranged from 0.05 to 0.10 (SD = 0.02), for C2 0.09–0.13 (SD = 0.02) and for 'J' 0.21–0.55 (SD = 0.16).

Undesirable release condition

For most drop-back intervals, the proportion of fish in undesirable release condition was significantly lower for C1 hooks than for 'J' hooks (Fig. 7). For drop-back times > 10 s, the proportion of fish in undesirable release condition was lower for both C1 and C2 than for 'J' hooks. The C2 hook had the highest proportion of undesirable release condition for drop-back times of < 10 s. The proportion of undesirable release condition among the four drop-back intervals for C1 ranged from 0.39 to 0.47 (SD = 0.04), for C2 0.29–0.71 (SD = 0.20) and for 'J' 0.49–0.79 (SD = 0.14).

Discussion

Goodyear (2002), discussing potential factors affecting estimates of catch-and-release mortality for istiophorid billfish, suggested that post-release mortality rates may vary with different fishing modes; thus, caution is warranted when extrapolating estimates of post-release

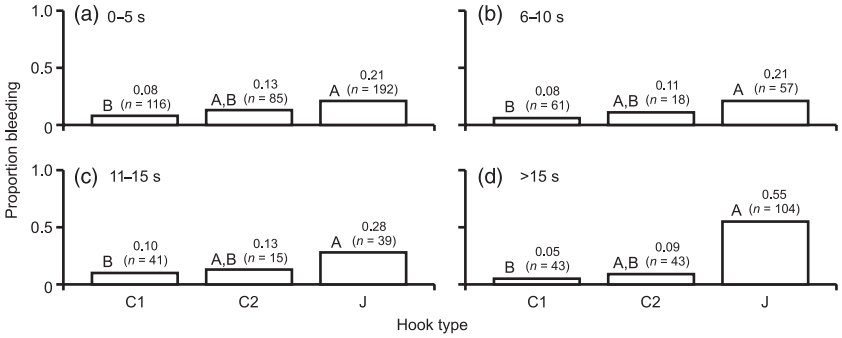

Figure 6. Proportion of bleeding events for the three hook types (C1 Eagle Claw circle hook, C2 Owner circle hook and Mustad 'J' hook, J) and four-drop intervals [0–5 s (a), 6–10 s (b), 11–15 s (c) and >15 s (d)] in the south Florida recreational live-bait fishery for sailfish. Different letters within each drop-back interval indicate significant differences ($P < 0.05$) between treatments (hook types). Unequal sample sizes between and among hook types and drop-back intervals are a consequence of the voluntary survey of participating captains who, on occasion, did not respond to all survey questions.

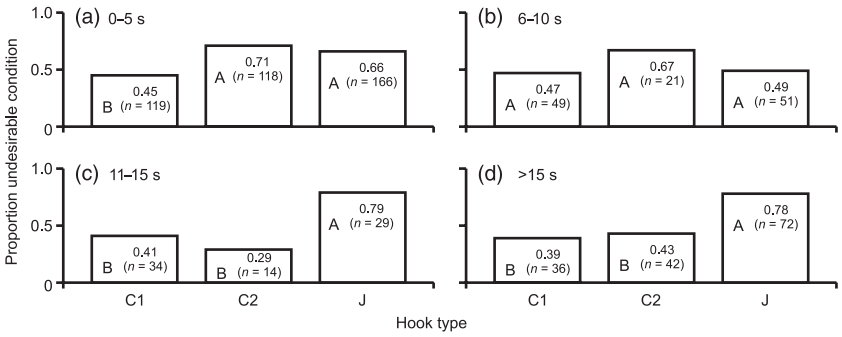

Figure 7. Proportion of undesirable release condition for the three hook types (C1 Eagle Claw circle hook, C2 Owner circle hook and Mustad 'J' hook, J) and four drop-back intervals [0–5 s (a), 6–10 s (b), 11–15 s (c) and >15 s (d)] in the south Florida recreational live-bait fishery for sailfish. Within each drop-back interval, letters (A, B) were used to indicate significant differences ($P < 0.05$) between treatments (hook types). Unequal sample sizes between and among hook types and drop-back intervals are a consequence of the voluntary survey of participating captains who, on occasion, did not respond to all survey questions.

survival to different fisheries or stocks from single species, single gear or single fishing-method studies. Within this context, use of dissimilar terminal gear has been considered as a different fishing mode (Prince *et al.* 2002a; Domeier *et al.* 2003; Cooke & Suski 2004; Cooke, Barthel, Suski, Siepker & Philipp 2005; Horodysky & Graves 2005). The goal of this study was to examine whether drop-back time, in addition to different hook types, affects post-release survival. In this regard, although the fate of released fish was not monitored, insight into possible effects were gained by examining performance of different hook types over a range of drop-back intervals. This was particularly relevant given the absence of consideration of drop-back time relative to hook performance in published literature for any catch-and-release fishery (Cooke & Suski 2004; Cooke *et al.* 2005). This approach has relevance for catch-and-release hook studies, because the conclusions of the initial hook performance study on sailfish (Prince *et al.* 2002a) were later confirmed by Horodysky & Graves (2005). The latter study examined post-release fate of white marlin caught on circle and 'J' hooks using electronic tags. The trolled natural-bait fishing technique examined by Horodysky & Graves (2005) for white marlin was essentially the same as the trolled natural-bait fishery examined by Prince *et al.* (2002a) for sailfish (i.e. the same fishing mode as defined by Goodyear 2002). The general conclusion drawn from both studies was that non-offset circle hooks increase post-release survival in dead-bait troll fisheries targeting white marlin and sailfish compared with 'J' hooks.

Catch success

Catch success is perhaps the primary metric that fishers consider when choosing a terminal gear. If this metric

is not sufficiently high, then use of the terminal gear is often resisted or rejected by fishers, despite any conservation benefits that might be realised. In a previous hook performance study of sailfish (Prince *et al.* 2002a), catch proportions did not differ between 'J' and circle hooks and were similar to the catch proportions found in this study. The expert captains involved in this study reported that the level of successful catches they experienced during the study were all 'acceptably high' for most recreational fishers in the south Florida sailfish fishery. This conviction is confirmed by numerous south Florida sailfish tournaments that have, over the last few years, voluntarily mandated use of circle hooks in their events.

Interpretation of the results for the proportion of successful catches among hook types and drop-back intervals should be tempered by the relatively small sample sizes (<20) in some of the treatments, particularly C2 for the second, third and fourth drop-back intervals. Prince *et al.* (2002a) also reported higher catch success in this same fishery for sailfish using severely offset circle hooks (89%), noting that this high catch proportion also resulted in increased deep hooking similar to 'J' hooks. The level of fishing skill among participating captains was considered comparable, as reflected by their performance in competitive billfish tournaments. However, each captain in this study had to deal with a wide range of customer fishing-skill levels that likely contributed to the overall variation observed in this study. Indeed, fisher ability can influence the degree of injury in catch-and-release fisheries (Dunmall, Cooke, Schreer & McKinley 2001).

Undesirable hook locations, bleeding and undesirable release condition

To compare hook performance results to those reported by Prince *et al.* (2002a), hook location categories in the previous study were combined to emulate those here. Results in the previous study most closely resembled the fourth drop-back interval in the present study as follows: 'J' hooks had a proportion of undesirable hook location of 54% in the previous study and 57% in this study, while circle hooks (C1 hook) had an undesirable hook location of 2% in the previous study and 6% in this study. This was also true for bleeding percentages; 57% positive bleeding events for 'J' hooks and 6% for circle hooks in the previous study compared with 55% ('J') and 5% (C1) in this study. The similar findings suggest that the results reported by Prince *et al.* (2002a) may have been affected by longer drop-back times (not monitored), but might also reflect the differences in fishing mode. The previous study was predominately a trolled dead-bait fishery, while the current study used a drift live-bait fishing mode.

Kerstetter & Graves (2006) suggested hook location was likely a more important factor contributing to post-release survival than hook type. Penetration of the stomach, as illustrated in Fig. 3f, is considered one of the greatest threats to survival of all hook locations examined. This situation is particularly acute with a 'J' hook, because the point is fully exposed inside the peritoneal cavity, increasing the likelihood of organ laceration and associated haemorrhaging as the fish swims and fights. Under similar circumstances the circle hook is less likely to cause trauma, because the hook point angle is less exposed to internal organs.

Although deep-hooking events (in the oesophagus or stomach) are not necessarily fatal (encapsulated hooks have been observed in viscera of recaptured billfish; Prince, Ortiz, Venizelos & Rosenthal 2002b), a high proportion of deep-hooked pelagic fishes have been reported to suffer mortality (Skomal *et al.* 2002; Domeier *et al.* 2003; Horodysky & Graves 2005). Hook damage to the gills (i.e. severing a gill arch) can also result in rapid mortality due to blood loss. Other undesirable hook locations have been found to result in severe debilitation and possible mortality of pelagic fishes, including hook-related perforations of the upper palate in sailfish (Prince *et al.* 2002a) and blue shark, *Prionace glauca* (Linnaeus) (Borucinska, Kohler, Natanson & Skomal 2002). Bleeding, although not necessarily fatal by itself (as can be the case for undesirable hook locations), is also considered a metric that can be a precursor to mortality (Prince *et al.* 2002a; Domeier *et al.* 2003; Horodysky & Graves 2005; Kerstetter & Graves 2006). Given that published reports indicate undesirable hook locations and bleeding events do not necessarily result in mortality, combining these metrics into one index (undesirable release condition) better reflects the most deleterious hook-related traumas than any single metric. As such, undesirable release condition is a useful measure for inferring the likelihood of post-release survival.

The criteria for hook selection and comparison in our study were based on hook geometry, not manufacturer or model number. Thus, the results presented here imply the best of tested geometries for promotion of live release, but not necessarily the best possible geometry. Also, results may vary by wire size and hook gape, so improvements are possible (or expected) even for the designs tested, depending on the targeted species and bait-rigging techniques. The traditionally shaped circle hook (C1) generally had the most

desirable performance characteristics relative to improving post-release survival. In addition, successful catch proportions for the C1 hook were similar to the other hooks for most drop-back intervals; thus, this metric may not be a major deterrent for its widespread use. In fact, over the last few years a number of south Florida sailfish tournaments have required participants to use this circle hook in their events (J. Vernon, personal communication). In addition, the consistency (i.e. variation) in performance of the C1 hook among all drop-back intervals and metrics basically removes drop-back time as an important variable affecting survival, at least over the interval ranges evaluated. This was not the case with the 'J' hook, for which injuries generally increased with longer drop-back intervals (as much as twofold). The C2 hook generally had performance results intermediate with the other hook types. However, the C2 hook was consistently less desirable than the C1 and 'J' hooks for undesirable release condition in the first and second drop-back intervals. These results were consistent with observations of participating captains who reported that the C2 hook tended to engage more often in soft tissue than the C1 hook for the shorter drop-back intervals.

Choice of hook type, in conjunction with long drop-back intervals, can substantially alter the rate of hook wounds. Moreover, different models of circle hooks cannot be expected to perform equally. Because monitoring drop-back times on the ocean would not be considered feasible by law enforcement, just how drop-back results might influence management is not clear. However, regulating hook type may be a more practical approach (Trumble, Kaimmer & Williams 2002; Cramer 2005), and this option (i.e. mandatory use of circle hooks) is currently being considered as a preferred management alternative for the US Atlantic recreational fisheries for istiophorids (NMFS 2005). Circle hooks have also been mandated for the US Atlantic commercial longline fleet (Cramer 2005; Watson, Epperly, Shah & Foster 2005). In other words, these results suggest that significant conservation benefits of live release may accrue by mandating use of traditionally shaped, non-offset circle hooks in fisheries with characteristics similar to those in this study.

This study is in concurrence with Goodyear's (2002) recommendation that different fishing methods need to be treated and assessed separately relative to issues of post-release survival. Specifically, further research is warranted to examine hook performance over a range of drop-back intervals targeting specific species, using different deployment strategies (e.g. live-bait kite fishing, slow-troll with live-bait, live-bait drifting) and bait species and sizes. Testing these factors was beyond the scope of this study and beyond the data set. In addition, a range of drop-back intervals should be incorporated into future hook performance and conservation biology-related research, particularly in catch-and-release fisheries where natural live or dead bait and long drop-back intervals are involved.

In conclusion, findings of this study indicate that drop-back time is an important consideration when assessing hook performance in recreational fishing applications using live or dead natural bait. These results apply only to active-fishing applications for sailfish as passive-fishing applications, such as longline gear, are not relevant in this context. Given the results found here, drop-back time may also have wider relevance as a conservation issue for any active fishery application that uses live or dead natural bait, no matter the target species.

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