2-2010

Making Lemonade from Lemons: Using Pelagic Longline Gear Behavior TDR Data for Insights into Post-Hooking Behavior of Fishes

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differences are consistent with those of other species pairs separated near the time of the
isthmian rise including the blackblotch pompano *Trachinotus kennedyi* (Pacific) and Atlantic
permit *Trachinotus falcatus*, which we found to differ by six transitions and two transversions.
Methodological problems have prevented analysis using the CO1 gene, and we are working to
resolve these. The preliminary genetic data suggest that the Atlantic and Pacific forms of *O.
saurus* may be separate species.

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Comparing trophic linkages inferred from visual and molecular analysis of stomach contents for a Caribbean reef fish
Fish stomachs are routinely examined as part of diet studies designed to establish trophic links
with habitat. Despite the utility of such studies, intrinsic limitations can confound reliable
identification of consumed prey. Examples include differential rates of digestion, whereby prey
with no hard parts (e.g. exoskeleton) is digested more rapidly, and physical structures such as
pharyngeal teeth which can macerate prey items beyond recognition. As a result, certain prey
items can be rendered unidentifiable and subsequently underrepresented or not represented at
all in diet summaries. The present study, analyzed the stomach contents of French grunt
(*Haemulon flavolineatum*), a reef fish which possesses pharyngeal teeth and forage on soft-
bodied prey items including polychaete and sipunculid worms. We collected 99 grunt from St
John, US Virgin Islands over two sampling events (June 2008 and May 2009): 51 of which
contained stomach contents that have been visually analyzed. Sampled fish ranged in size
from 57-188 mm (\(\bar{x}=119.4\) mm, SD=4.02) and were collected from multiple habitat types
including seagrass beds and coral reefs. Numerically, sipunculid worms, decapods, polychaete
worms, and unidentifiable prey were most abundant. As a supplemental approach to visual
analysis, we used the polymerase chain reaction (PCR) to amplify fragments of the cytochrome
c oxidase 1 (CO1) gene or “barcoding” region of mitochondrial DNA from prey tissue recovered
from stomachs. Sequences generated from PCR products were then compared to established
databases (GenBank & BOLD) of known individuals to establish taxonomic identification
potentially to the species level. Thus far, DNA extracted from 99 distinct prey items produced
26 DNA “barcode” sequences of which two specimens have sequence similarity of 99% to
known species, with the remainder of specimens ranging from 75-92% similarity
(\(\bar{x}=81.9\%\), SD=5.66%). The utility of a barcoding approach to diet items to increase taxonomic
resolution of diet studies will be discussed.

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Making lemonade from lemons: using pelagic longline gear behavior TDR data for
insights into post-hooking behavior of fishes
Determining the actual fishing depths of pelagic longline gear has long been a goal of fisheries
science, largely for the standardization of fishing effort through the use of habitat-oriented
modeling. Early efforts to record these depths used large temperature-depth recorders (TDRs)
along the mainline, but more recent work with improved (smaller) technology has resulted in
the deployment of hundreds of microTDRs on the gangions themselves to determine actual
hook depths. The use of baited hooks on these gangions resulted in the occasional catch of a
fish on a gangion equipped with a microTDR. These records are therefore useless from a gear
behavior modeling perspective and have been previously disregarded. The collection of several hundred new and old microTDR records of caught pelagic fishes now allows some insight into actual post-hooking fish behavior. A total of 490 records were examined from microTDR research by the senior author between 2003 and 2009, spanning 17 teleost and 13 elasmobranch species. Extracted data included time, temperature, and depth at hooking and death, and these were then matched with individual fish data, such as length. Analyses show a broad range of survival time on the hook, even within species. Hook location (internal versus external) and individual fish size were variable effects to the length of post-hooking survival. Post-hooking behavior patterns were consistent for some species (e.g., manta ray Manta sp.), but not others (e.g., swordfish Xiphias gladius). Not surprisingly, the two most commonly used estimators of hook depths consistently overestimated the hooking depths for most species, suggesting that subsequent population analyses based on these estimated depths are suspect. These data indicate that the present hook depth predictor equations do not provide sufficient information to extrapolate individual species’ habitat utilization and, by extension, any rationale for their use in pelagic longline fishing gear standardization efforts.

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Spatial and temporal changes in the fish communities from a mangrove-dominated creek system near Karachi, Pakistan
During February 1999 to December 2001, a survey to monitor the distribution and abundance of fishes in the Korangi-Phitti Creek system (24°45’ N, 67°20’ E) near Karachi, Pakistan was undertaken. Fish were collected from 123 stations where a combination of monofilament gill nets of 8.9 cm, 5.7 cm, and 3.8 cm stretch mesh sizes were used. The objectives of the study were 1) to compare the fish communities between creeks of varying structure (width) and 2) to examine how the fish communities changed in these creeks temporally (season). The physical condition of the study area was found to have significant seasonal (monsoon) patterns related more to temperature than rainfall and salinity. A total of 17,023 fish representing 86 species were collected during the study period. Sardinella gibbosa and Nematalosa nasus were the most abundant taxa collected accounting for over 50% of the total catch during the study. The community sampled in large creeks (shipping channels) was very different in composition than the community in small creeks in this system. The deeper wide creeks were characterized by schooling pelagic species (e.g., S. gibbosa, and N. nasus), while the smaller creeks were characterized by the additional presence of mullets (Valamugil cunnesius, Mugil cephalus and Liza carinata), and scats (Scatophagus argus).

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Gear catchability estimation from mark-recapture and depletion sampling in coastal rivers
The estimation of gear catchability and associated variance is critical to accurately assess trends in species abundance over time from catch data. In fisheries monitoring, catchability estimates are often used to relate relative abundance indices to absolute abundance estimates (e.g., catch-per-unit-effort trends may be used to estimate population status and predict total