

Comparing catch rates between single- and double-hook tackle off the coast of South Carolina

Purpose

The SAFMC is considering means to reduce the discard rate for snapper grouper species as an action in Amendment 35: Snapper Grouper Release Mortality Reduction and Red Snapper Catch Levels, in order to increase the level of acceptable biological catch for red snapper from the last stock assessment projections. One of the mechanisms being investigated is the requirement of using single hook tackle (as opposed to double hook) to reduce encounter rates and catch per unit effort. A pilot project is being conducted by Council staff off the coast of South Carolina comparing catch rates between single hook and double hook rigs. FWC also has single-hook/double-hook data that will be investigated to determine how these datasets can be used together to characterize efficiency differences between single and double-hook rigs.

Methods:

Fishing was standardized using the same circle hook size for all drops (5/0 Mustad circle hook). Fishers were paired up with another angler with similar fishing experience (self-identified). One person in each pair used a single hook chicken rig and one fished with a double hook chicken rig. The anglers changed which one was fishing with the single hook or double hook rig every two to three stops (total of 21 stops). Each group selected their bait type for the stop. They changed their bait among stops selecting between Boston mackerel, squid, cut bait, or random selection. Information was collected on fisher, rig type, bait, depth, time gear in water, time gear out of water, and species caught. Information was also collected on size, release treatment, fish condition, kept or released, and hook location. Fishing was conducted off South Carolina fishing from a research vessel. Depth ranged from 70 to 90 feet.

Statistical model:

- Logistic regression generalized linear model
- Best full model: Catch ~ Angler group + Rig Type + Bait Type + Time fished
- Reduced model: Catch ~ Angler Group + Rig Type

Preliminary Results:

- Majority of the catch was Vermilion snapper (55%) (**Table 1**)
- More species were caught on double hook rigs (11 vs 8).
- Most species had higher catches on double hook rigs (8 with more, 2 the same, and 1 less).
- Significant difference in catch probability between Rig Type (one-hook vs. two-hook tackle).
 - o Wald test (Chi-squared test): $X^2 = 15.4$, $df = 1$, $P (> X^2) = 8.9e-05$
- Reduction in probability of catch of **14.4%** using single hook tackle (**Figure 1**)
 - o This analyzes presence/absence.
 - o Two fish were caught on 26 out of 709 drops.

Table 1. Summary of species caught by single and double hook tackle

Species	Single Hook	Double Hook
Almaco Jack	0	2
Bank Sea Bass	1	1
Black Sea Bass	34	43
Graysby	1	1
Inshore Lizardfish	0	3
Red Snapper	2	1
Sand Perch	6	16
Spottail Pinfish	2	5
Tomtate	20	25
Vermilion snapper	83	120
Whitebone Porgy	0	1
TOTAL	149	218

Figure 1. Probability of catch by angler group and rig type (one-hook vs. two-hook tackle) based on the reduced logistic regression model.

