

Fishery Resource Grant Final Report Statement

Project Title: Alternative Bait Holding Devices in the VA conch pot fishery

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Abstract

Two different types of bait holding devices were tested in the Virginia conch pot fishery. Bait envelopes (modified bait bags as currently used in the fishery) and bait cups filled with one quarter female horseshoe crab were tested within commercial trap lines. Catch totals per treatment traps were compared to catch from traps using bait bags baited with one half female horseshoe crab. Three hundred and twelve envelopes and 311 cups were tested against 553 and 536 bait bags, respectively. No significant difference ($P > .05$) in catch between bait bags and envelopes was observed. Average catch was reduced using bait cups, providing for significant ($P < .05$) differences statistically between bait bags and bait cups. Potential bait longevity as a result of small gastropod scavenging was observed with use of envelopes due to the small mesh size employed. Neither envelopes nor cups provided noticeable difference in bait longevity as the result of sea lice, which freely entered each device and consumed bait.

Project description

The main reason behind the project was twofold, to try to prolong fishing time, and to cut back on bait use. We have a real problem with small snail like creatures as well as sea lice. By cutting bait use in half we could save on bait costs as well as helping with the horseshoe shortage we are currently experiencing. It would also increase fishing time due to the bait lasting longer in the pots that should achieve a better catch ratio.

I employed two types of bait holding devices, bait bag envelopes and bait cups. The bait bag envelopes were made of plastic bait bag material with 4mm holes. The bag was made with a flap that covered the entire bag. This made the bag completely closed up to the smaller animals that eat the bait so quickly. The 4mm holes were large enough to let out enough scent to attract the conchs but small enough to not let in the sea lice and snails. I used a 10mm bait bag with 1/2 female horseshoe as my control. I used 1/4 female with my envelopes as a comparison.

I used two separate rigs of pots to carry out the experiment, one rig had 80 cups and the other had 80 bait envelopes. I spaced the devices out every third pot so it would be a fair test throughout the lines. I chose four different locations to try the devices throughout the testing time. I made four trips with each of the rigs. This allowed for a fair test due to weather changes, locations and areas of more or less conch production.

Results

Five hundred fifty three bait bags and 312 envelopes were tested. Mean average of conch caught by bait bags and bait envelopes were 11.05 and 10.66 respectively. Variability in catch was high in most strings for both devices; however, variation in catch per trap (standard deviation, SD) was less in envelopes (4.19) than in bait bags (5.37). Overall, there was no significant difference ($P > .05$) between bait bags and envelopes observed. A typical line of traps comparing bait bags and bait envelopes is represented in Figure 1.

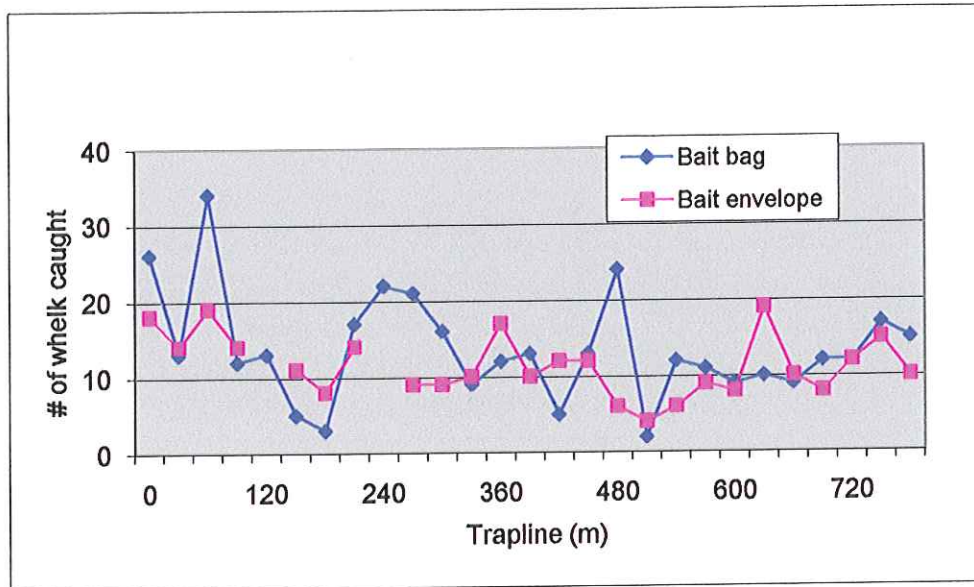


Figure 1 Conch trap line comparing bait bags and bait envelopes.

Bait longevity was achieved with use of envelopes in areas where small gastropods were prevalent. The envelopes successfully prevented these scavengers from entering due to both the small mesh size (Figure 1) and the sealing (folding closure) configuration of the device. Larger mesh and non-sealing configuration of bait bags allowed for these scavengers enter bait bags and consume bait (Figure 3). In areas where sea lice were observed, bait longevity between bags and envelopes was comparable, both did not keep lice from getting to bait. Though envelopes prevented bait loss due to gastropods, they did not prevent bait loss due to sea lice. The lice were too small in size, and were able to enter even the 1/32" mesh of envelopes.



Figure 2 small gastropods unable to enter bait envelopes



Figure 3 Small gastropods have entered bait bag and are consuming bait.

Five hundred thirty six bait bags and 311 bait cups were tested. Mean average of conch caught by bait bags and bait cups were 11.90 and 7.62, respectively. Variability in catch was high in most strings for both devices variation in catch per trap (standard deviation, SD) similar for both devices; bags 4.8, and cup, 3.7. Overall, average catch per trap was reduced using bait cups, with a significant difference ($P < .05$) observed between bait bags and bait cups. A typical line of traps comparing bait bags and bait cups is represented in Figure 4.

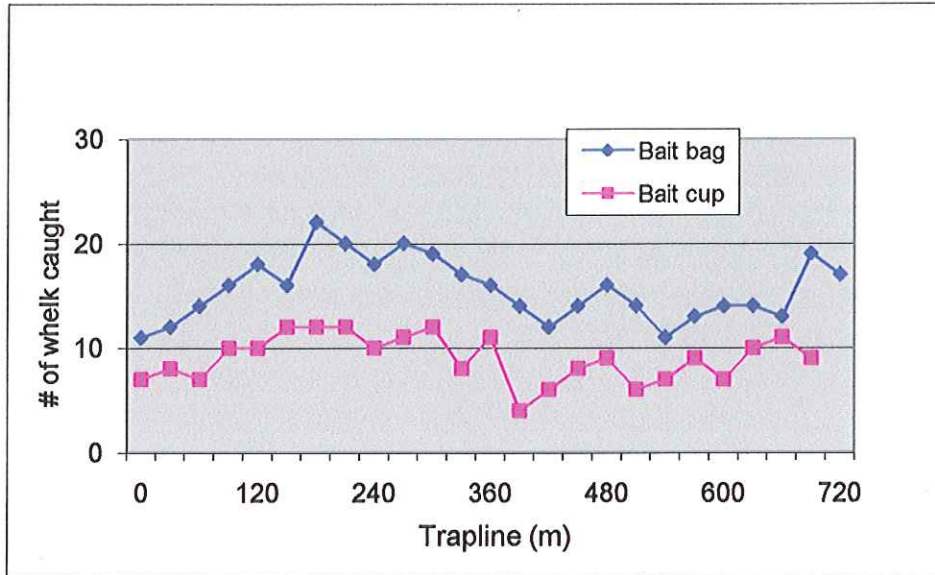


Figure 4 Conch trap line comparing bait bags to bait cups.

Bait longevity was not observed to be different between bait bags and bait cups.

Conclusions/Discussion/Recommendation

After carrying out the eight trips with the two different devices it was concluded that the bait cups with various size holes did not seem to be a feasible alternative to the control device. The diameter of the holes seemed to have no affect on the catch. The devices seemed to keep out most of the smaller sea creatures but didn't produce enough conchs to be a viable replacement for the original bait bags

The bait bag envelopes however were much more promising as a replacement. The complete closure of the envelope and the small size of it seemed to keep out most of the smaller creatures as well as providing an almost equal catch with the control bag. Some of the experimental envelopes actually out caught the control in areas of a high density of the small snails and sea lice. Areas where the bait loss was not an issue the envelopes seemed to be almost equal to the control. With these results I will continue using and modifying these envelopes to try and make them even more productive

This project produced better than expected results on the use of bait envelopes by cutting bait use in half. I shared my ideas and devices with some of my fellow fisherman and they too have since tried the envelopes with the same success rate. With continued modifications on the size of the envelopes as well as amount of bait in each one this could well be a way for the industry to cut bait use significantly, therefore hopefully sustaining the resource for years to come. I will certainly be deploying more of these envelopes in the future.