Risk Assessment of Triploid Oysters on the West Coast of Florida

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Introduction

Historic on-bottom oyster production:

- Historic culture methods involved oysters being grown extensively on planted shell with less labor costs
- These production practices result in increased fouling on shell of oysters, increased mortality, and less control to the farmer during grow-out

Off-bottom oyster culture:

- Emerging practice
- Oysters float in the water column using boxed floats and are flipped to expose to sun and air for fouling control
- Requires more labor during grow-out
- May have higher returns due to reduced fouling and increased production control
- Both diploid (2N) oysters and triploid (3N) oysters
- Triploid oysters have three chromosomes which restrict reproduction and may enhance growth

Objectives

1. Create an accurate financial spreadsheet that can be utilized by industry in the region
2. Assess costs and sales data from triploid oysters compared to diploid oysters
3. Determine the financial relationship between environmental, production, and consumption risk forecasts with production costs and revenues

Figure 1: Floating bags flipped upward for air drying; the bags sit on two square floats that keep the bags above the water to dry. When unflipped, the bags and oysters are submerged below the water column.

Fouling Control and Maintenance

Date	Method (for example, flipping, air drying, spraying)	# of Bags		Est. Time
		3N	2N	
8/11/2016	Examined bags but saw little to no fouling; a small amount of sea grass was on top of the bags and we picked it off by hand; did not flip bags	4	4	7 min 41 secs
8/17/2016	Two of the bags were flipped when we arrived but we believe it happened the night before. There was seagrass on the bags and some algae on the bags too that we needed to SCRUB off. We also flipped each bag.	4	4	1 hr 19 min 27 sec
8/22/2016	We flipped the bags to dry for aprox. 1 hour. Afther the hour we scrubbed the bags with brushes to get some of the dry algae off	4	4	1 hr 25 min 28 sec
8/29/2016	In anticipation of tropical storm, removed all 8 bags and brought to Clam Shack to hold. Did volume and bag height. Pictures. Will measure samples.	4	4	1 hr
9/21/2016	Arrived at lease and flipped the bags from the boat. Rusty and Carter flipped two bags while we went down the line at 8:30 AM	8	8	12 min
9/21/2016	Flipped bags back into the water, checked for water in the floats (1 bag had both floats filled with water), scraped of the barnacles from the buoys that are holding the longlines	8	8	40 min
9/28/2016	Arrived at least and flipped the bags for air dry: I was the only one in the water	8	8	9 min

Figure 2: Sample Logbook Page; This page represents fouling control where farmers are asked to enter the date, how the bags/oysters were cleaned, which ploidy and number of bags they worked on, and an estimated time working on the bags/oysters

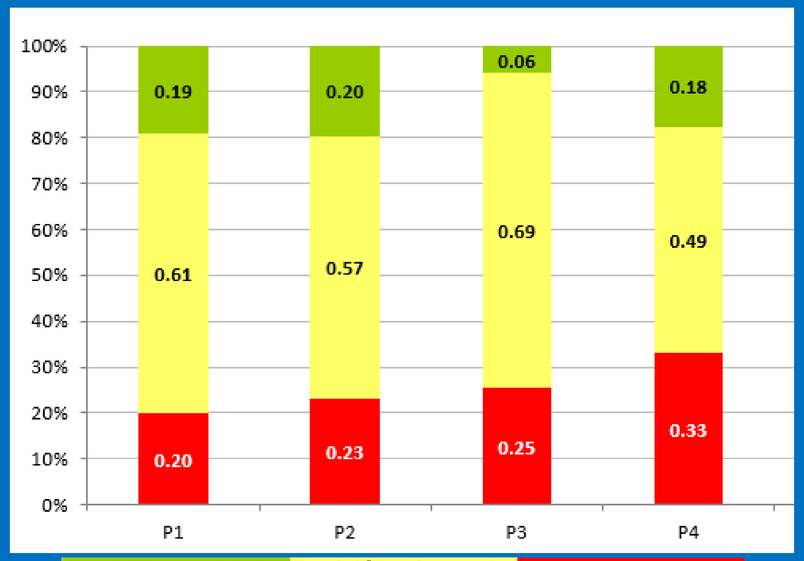

Figure 3: Stoplight chart showing probabilities of "Favorable," "Cautionary," and "Unfavorable" outcomes based on four different scenarios. Upper limits and lower limits can be adjusted based on farmer's preference.

Methods

Data Collection:

- Distributed logbooks to 10 farmers throughout the west coast of Florida
- Logbooks have specific pages and line items for farmers to record hours worked doing various activities on the farm to collect labor data
- Interview oyster famers on capital data and production methods throughout grow out

Simulation

- Use Simetar, utilizing Stochastic modeling, to predict environmental, production, and market risk associated with oyster farms along the west coast of Florida

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Simulations

Simulate a wide variety of scenarios including changes in:

- Environmental conditions
- Labor and capital costs
- Consumer demand

Run in Simetar (Excel Add-On)

- Utilizes Stochastic modeling
- Over 500 iterations run on a single variable based on its probability distribution to determine the expected value, minimum value, and maximum value
- Determine which scenarios provide the highest probability of reaching the optimum levels of key output variables (KOV)

Test for significant factors involved in oyster production

Figure 4: Our lease setup; lines 1 through 4 (furthest away) have boxed floats and are flipped upward for drying. The 5th line (closest in picture) has bullet floats which only have to be flipped once to dry fouling while allowing oysters to be submerged