Summary of Project Experiment Results
Florida Pompano *Trachinotus carolinus*

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Sea Grant Florida

HARBOR BRANCH
FLORIDA ATLANTIC UNIVERSITY
Ocean Science for a Better World®

Wild Distribution (Florida Pompano)

- Warm water species
- Found in coastal waters along western Atlantic and Gulf of Mexico
  - shallow water
  - near bays and estuaries
  - depths about 230 feet (70 m)
- Highest abundance along east and west coasts of Florida

www.aquamaps.org

Commercial Value

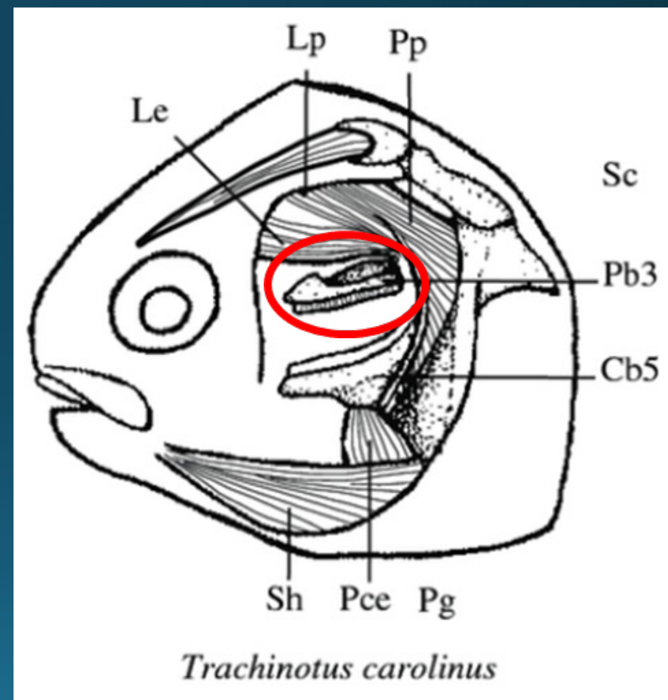
- Prized catch for sport fishers
- Limited seasonal commercial fishery
- Regarded as one of the finest marine food fish (Gilbert 1986; Weirich and Riley 2007)
  - Retailed up to $60.00 per Kg in 2014
  - Typically, between $20.00 and $31.11 per Kg (FAO 2016-2017)
- Good aquaculture species- handles stress well, wide range of salinity, will eat pelleted food, will breed in captivity, tolerance of high densities

Pelican Seafood Company (Fort Piece, FL)
March 25, 2021
$63.92 per Kg
$28.99 per lb.

Jaw Morphology

- Categorized as molluscivorous
  - >70% hard-shelled gastropods and bivalves
- Well developed pharyngeal plates used for grinding prey (Bellinger and Avault, 1971)
- Pharyngeal plates are fused with modified gill arches (branchial musculature allows movement)
- In Aquaculture:
  - Fracturing of a standard extruded pellet
  - Increases the amount of feed waste
- Pompano waste measured up to ~12.9 to 18.4% of the feed offered

(Wills and Baptiste, unpublished data)



(Grubich, 2003)

Non-Perishable Shelf-Stable Semi-Moist Pellet

- Pellets Forms used:
  - Experiments 2 and 3 ➔ extruded slow-sinking Pellet
  - Experiment 4 ➔ extruded floating Pellet
- Conventional fish feeds are:
  - Dried to less than 10% moisture
  - Hard texture
  - Durable and Water stable
- New alternative process uses the same cooking extruder apparatus as used for standard expanded pellets but now equipped with a tempering unit
- This process holds the feed ingredient particles together by covalent protein bonding instead of a carbohydrate gel (Barrow et al. 2015)
- Developed by Rick Barrows (USDA), licensed to Zeigler Bros. Inc.
- It can be formulated with varying moisture levels, up to 50% moisture
- This new type of pellet does not shatter when crushed like conventional expanded pellet feeds

Four Experiments Conducted to Examine Pellet Form and use of Synbiotics Throughout Production Cycle

- Experiment 1 ➔ Survey of Probiotics, prebiotics and symbiotics and their effect on Pompano juveniles
- Experiment 2 ➔ Test of prototype soft pellet and symbiotic on production size Pompano
- Experiment 3 ➔ Test whether there is a difference using large (8mm) feed later in production versus staying on smaller (6mm) pellet
- Experiment 4➔ Synthesis study
  - Examine effect of symbiotic in feeds applied at different stages in production cycle from larvae through harvest
  - Test the revised soft pellet vs. standard pellet during final growout (100 g-market)

Experiment 1 ➔ Pro-, Pre-, Syn- Biotic Survey

- To be presented in a later talk by Susan Laramore

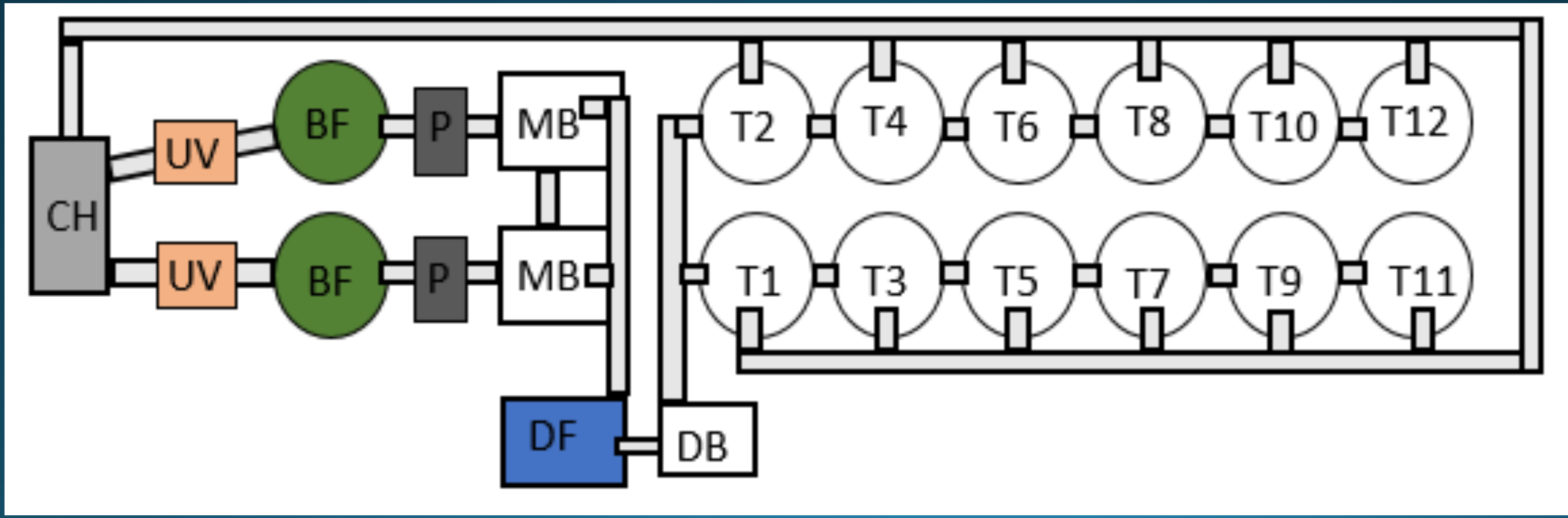
Experiment 2 ➔Prototype Soft Pellet

Objectives:

1. Examine if the uptake efficiency of Florida Pompano is affected by using a prototype soft pellet
2. Increase nutrient availability, health status, and survival of Florida Pompano using the immunostimulant β-Glucan (to be Presented in a later talk today)
3. Use results and observations of the "user experience" to refine the soft pellet form-factor

Experimental Design

- Juvenile Pompano (~ 1 g) were obtained from Proaquatix, LLC (Vero Beach)
  - Reared from 1 to 250 g (half a pound) on an off-the-shelf commercial slow-sink feed
- 35 Pompano (~ 250 g) were stocked into each tank (12 total)
- 90-Day Study



Treatments


- 12 tanks (each treatment performed in triplicate)

- Four treatments included:
  1. Semi-moist soft extruded pellet with β-Glucan
  2. Semi-moist soft extruded pellet
  3. Hard extruded pellet with β-Glucan
  4. Hard extruded pellet

- Manufactured by Zeigler Bros. Inc. (Gardners, PA)

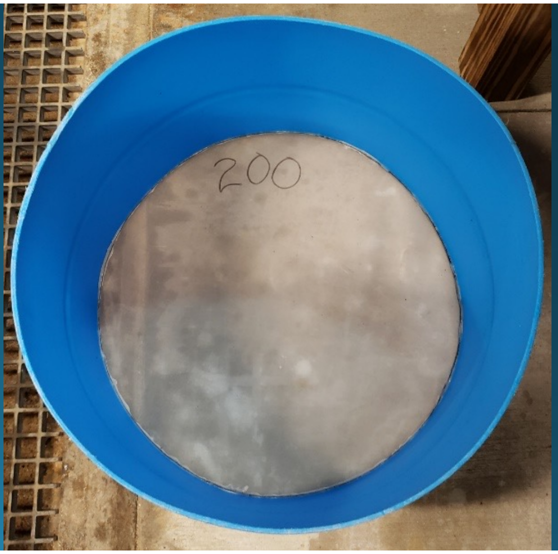
Sample Collection

- 3% body weight feed ration
  - Split into 4 equal feedings a day

- Sample collection 3 times for each tank
  - 9 collections per treatment in total

- Sample collections at the first and last feedings of the day
  - Fractured Pellets Waste (FPW)
  - Whole Pellets Waste (WPW) – uneaten feed

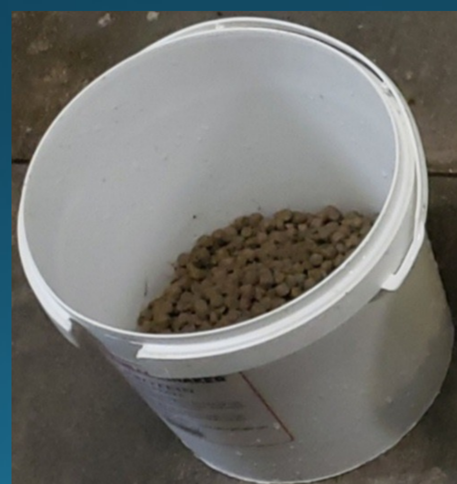
- FPW and WPW - large sieve (200 μm)



Drying Samples

Dry weights were obtained by drying samples in a drying oven for 72 hours @ 60°C:

- Feed sample
- Fractured Pellets Waste (FPW)
- Whole Pellets Waste (WPW)



Fish samples

- Proximate analysis: Crude Protein, Moisture, Crude Fat, Crude Fiber and Ash
- Measurements: total & fork length (cm), weight (g), and mouth gape (mm) and associate production metrics➔ Growth, Survival, FCR, Final Weight
- Intestinal tissue sample for subsequent enzyme analysis (protease, amylase, alkaline phosphatase, lipase, and total protein to determine specific activity)
- Hematological & immunological parameters

Analysis

- Two-way ANOVA with a Post-Hoc Tukey HSD test
- Subsequent enzyme analysis, hematological and immunological parameters

Feed Conversion Ratio

$$FCR = \left[\frac{weight\ of\ food\ offered}{weight\ of\ fish\ produced}\right] \quad \textbf{(eq. 1)}$$

$$IGR\ (g) = (ln Wt_t - ln Wt_o) \div t \quad \textbf{(eq. 2)}$$

Specific Growth Rate

$$SGR\ (G) = g \times 100 \quad \textbf{(eq. 3)}$$

$$AGR\ (h) = e^g - 1 \quad \textbf{(eq. 4)}$$

$$ADG = \left[\frac{(initial\ weight - final\ weight)}{number\ of\ days\ experiment\ lasted}\right] \quad \textbf{(eq. 5)}$$

Percent Survival

$$S\% = [(\frac{fish\ mortality}{initial\ number\ of\ fish}) \times 100] \quad \textbf{(eq. 6)}$$

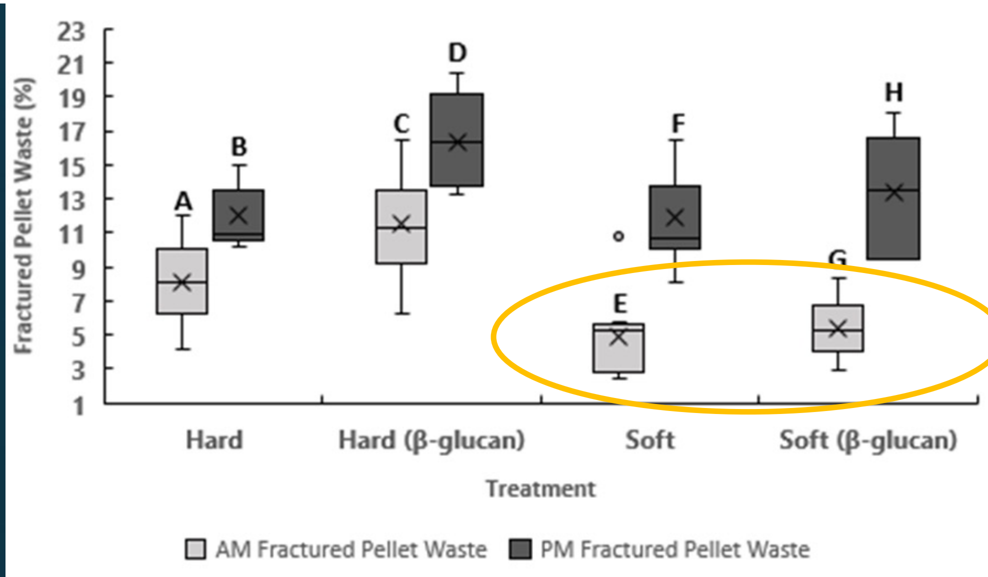
$$FW\% = [(\frac{feed\ wasted}{feed\ offered}) \times 100] \quad \textbf{(eq. 7)}$$

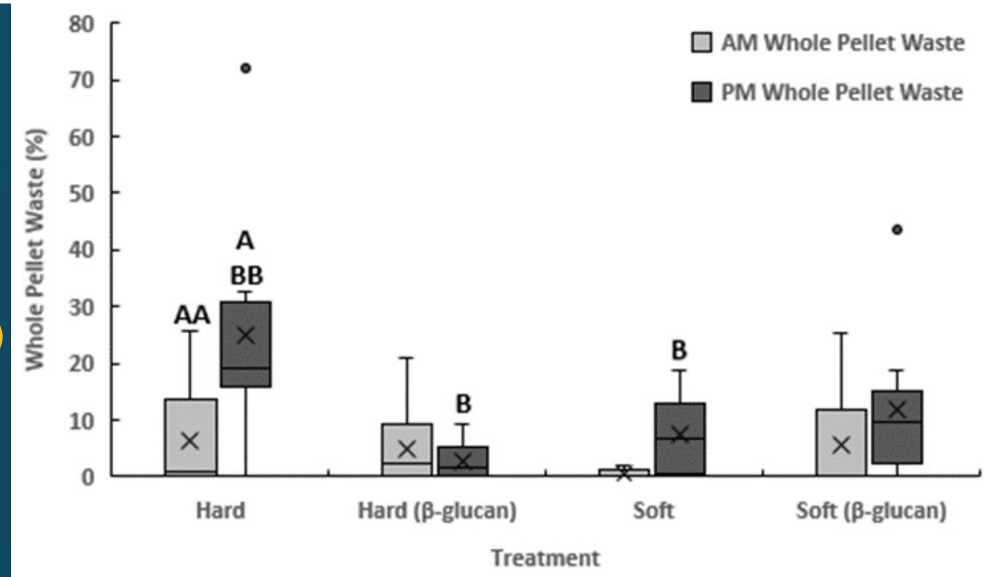
PER = weight gain / crude protein intake from the feed (dry weight) **(eq. 8)**

$$PPV = [((weight_{(final)} \times protein_{(final)}) - (weight_{(initial)} \times protein_{(initial)})) / (weight_{(feed\ intake)} \times protein_{(feed)})] \times 100 \quad \textbf{(eq. 9)}$$

$$ER\ \% = [((weight_{(final)} \times energy_{(final)}) - (weight_{(initial)} \times energy_{(initial)})) / (weight_{(feed\ intake)} \times engery_{(feed)})] \times 100 \quad \textbf{(eq. 10)}$$

Experiment 2: Results





• FPW Average	Hard	Hard β-glucan	Soft	Soft β-glucan
• AM (First Feeding) =	8.09%	11.49%	4.87%	5.41%
• PM (Last Feeding) =	12.01%	16.36%	11.88%	13.40%

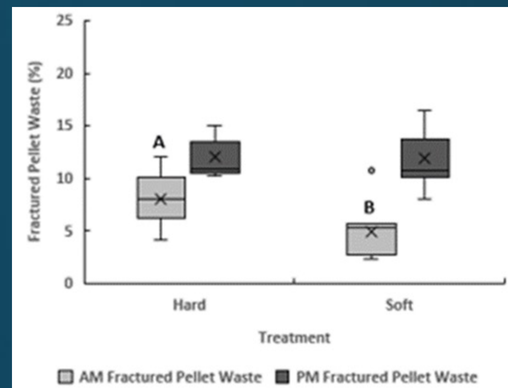
• WPW Average	Hard	Hard β-glucan	Soft	Soft β-glucan
• AM (First Feeding) =	6.22%	5.03%	0.51%	5.46%
• PM (Last Feeding) =	24.82%	2.73%	7.32%	11.86%

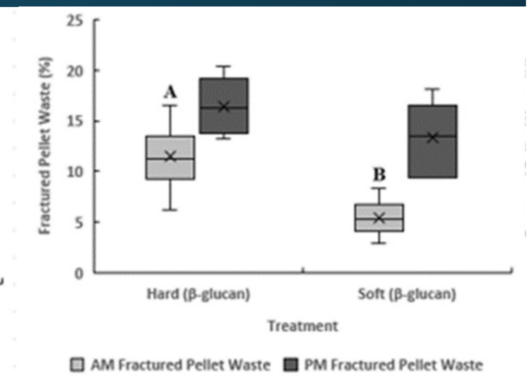
Fish Sample Results

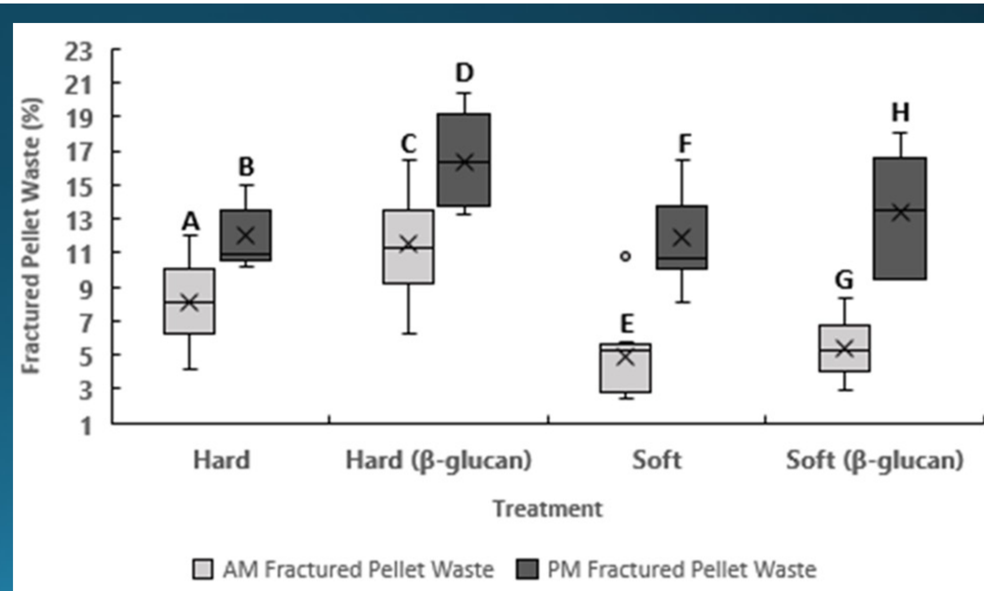
	Parameter																			
	IW (g)		FW (g)		WG (g)		ADG (g)		IGR		SGR		AGR		FCR		FCR (corrected)		SR (%)	
Treatment	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Hard Pellet	247.1	11.6	372.8	17.3	125.7	5.7	1.4	0.1	0.0046	0.0000	0.4569	0.0005	0.0046	0.0000	6.36^{A}	0.02	0.67^{A}	0.24	100.0	0.0
Hard Pellet (β-glucan)	249.6	7.2	371.6	5.7	122.0	3.3	1.4	0.0	0.0044	0.0002	0.4424	0.0186	0.0044	0.0002	6.85^{C}	0.02	1.97^{AB}	1.04	99.0	1.6
Soft Pellet	263.0	14.2	407.3	32.7	144.3	19.1	1.6	0.2	0.0048	0.0003	0.4847	0.0327	0.0049	0.0003	6.63^{B}	0.03	3.37^{B}	0.68	97.1	2.9
Soft Pellet (β-glucan)	260.6	16.1	389.5	11.3	128.9	5.0	1.4	0.1	0.0045	0.0004	0.4475	0.0377	0.0045	0.0004	6.83^{C}	0.09	1.90^{AB}	1.31	98.1	3.3
ANOVA Omnibus p=	0.386		0.165		0.120		0.120		0.286		0.286		0.286		0.000		0.042		0.495	

Experiment 2 - Discussion

- Soft pellet ➔ less A.M. FPW generated compared to the hard pellet
- But, in P.M. FPW for both hard and soft pellet treatments were not different
- Last feeding of the day generated more FPW than first feeding of the day
- A.M. FPW samples were taken at the first feeding of the day after the Pompano had gone all night with no feed. This could be why less FPW is shown in the A.M. collections.







Experiment 2 - Discussion

- FCR for the hard and soft pellet treatments were lower than the soft (β-glucan) and hard (β-glucan) pellet treatment groups
- FCR of the hard pellet treatment was also lower then the soft pellet treatment.
- This suggest that treatments with the immunostimulant β-glucan caused higher FCRs than pellet treatments without the immunostimulant
- When FCR was corrected, due to the large amounts of FPW and WPW, the corrected FCR values vary greatly and are much lower than the observed FCR values. Suggesting the Pompano may have been overfed

	Parameter																			
	IW (g)		FW (g)		WG (g)		ADG (g)		IGR		SGR		AGR		FCR		FCR (corrected)		SR (%)	
Treatment	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Hard Pellet	247.1	11.6	372.8	17.3	125.7	5.7	1.4	0.1	0.0046	0.0000	0.4569	0.0005	0.0046	0.0000	6.36^{A}	0.02	0.67^{A}	0.24	100.0	0.0
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Soft Pellet	263.0	14.2	407.3	32.7	144.3	19.1	1.6	0.2	0.0048	0.0003	0.4847	0.0327	0.0049	0.0003	6.63^{B}	0.03	3.37^{B}	0.68	97.1	2.9
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ANOVA Omnibus p=	0.386		0.165		0.120		0.120		0.286		0.286		0.286		0.000		0.042		0.495	

Experiment 3 ➔ Pellet Size during Production

Objective:

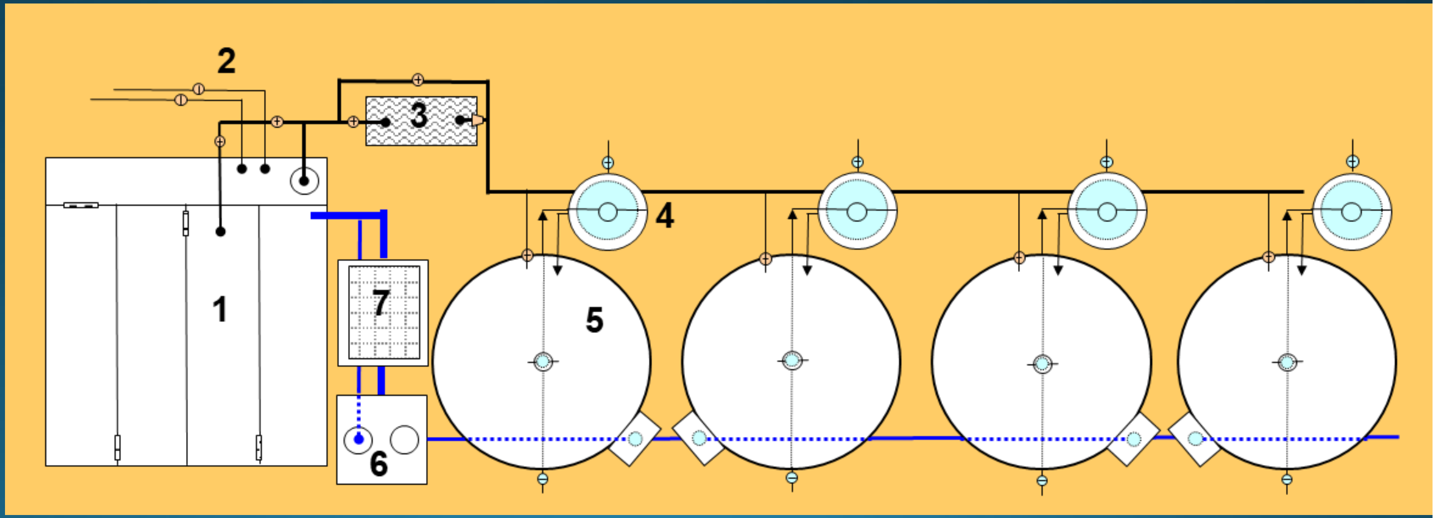
1. Does uptake efficiency of Florida Pompano improve by delaying the timing of increasing pellet sizes during final growout (100 g to harvest)

Specifically:

- Examine if production measures (FCR, Growth, Final Weight) change when using pellets that are smaller than "normally" fed.
- Evaluate if pellet size of an expanded pellet affects the amount of feed wasted.

Experimental Design

- Juvenile Pompano (~ 1 g) were obtained from Proaquatix, LLC (Vero Beach)
- Reared from 1 to 50 g (tenth of a pound) on a commercial extruded feed
- 500 juvenile Pompano (≈ 50 g) were stocked into each tank (8 total)
- Two identical 43 m^3 Recirculating Aquaculture Systems (RAS)
- Each with four 7.8 m^3 tanks
- 2 replicates per system
- Duration 295-Days



Treatments

1. **“Large Pellet”** treatment
   - “typical pellet” size for their body size

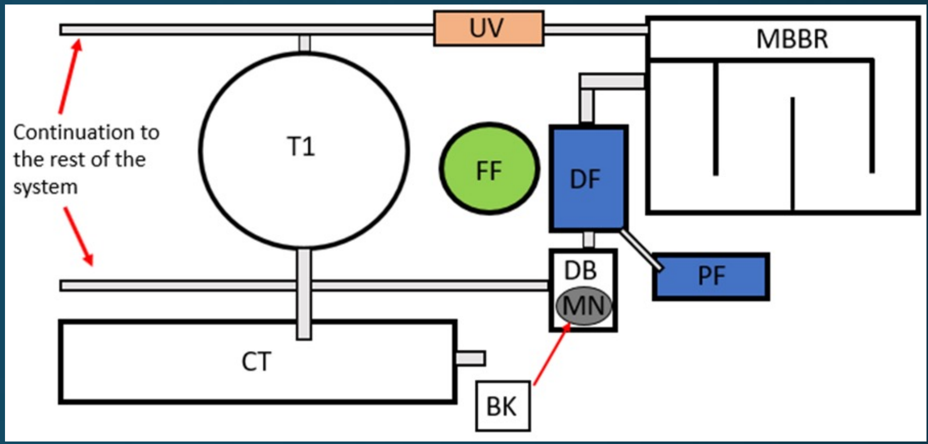
Fish Size (g)	Large Pellet (mm)	Small Pellet (mm)
100-250	3.0	3.0
250-454	6.5	3.0
454-680	8.0	6.5

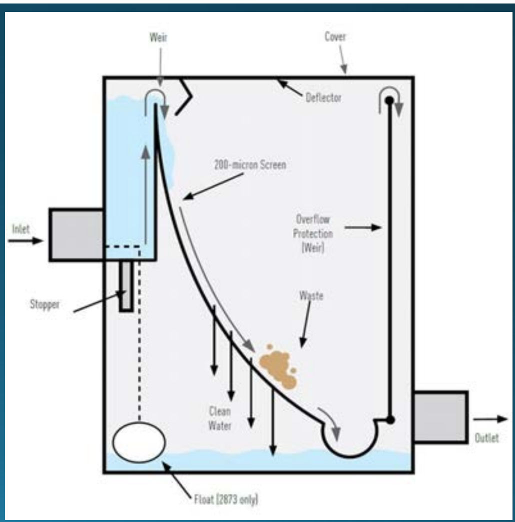
2. **“Small Pellet”** treatment
   - pellet size lagged behind the “Large Pellet” treatment

- Off-the-shelf marine grower slow-sinking expended pellet diet
  - (45% crude protein, 12% lipid), manufactured by Zeigler Bros., Inc. (Gardners, PA).

Sample Collection

- 3% body weight feed ration
  - Broken into 3 equal feedings a day
- For each pellet size change:
  - 3 sample collections were taken
- Sample collections were taken at the first and last feedings of the day
  - Fractured Pellets Waste (FPW)
  - Whole Pellets Waste (WPW) – uneaten feed
- Sample collections:
  - FPW - parabolic filter (200 µm screen)
  - WPW - mesh net





Pentair Aquatic Eco-Systems

Fish samples

- Proximate analysis
  - Crude Protein
  - Moisture
  - Crude Fat
  - Crude Fiber
  - Ash
- Individual Fish Samples
  - total length (cm)
  - fork length (cm)
  - weight (g)
  - mouth gape (mm)
- Dress out percentage

Analysis

- ANOVA with randomized blocks were run with a Post-Hoc Tukey HSD test

Feed Conversion Ratio

Specific Growth Rate

Percent Survival

$$FCR = \left[\frac{weight\ of\ food\ offered}{weight\ of\ fish\ produced}\right] \quad \textbf{(eq. 1)}$$

$$IGR\ (g) = (lnWt_t - lnWt_o) \div t \quad \textbf{(eq. 2)}$$

$$SGR\ (G) = g \times 100 \quad \textbf{(eq. 3)}$$

$$AGR\ (h) = e^g - 1 \quad \textbf{(eq. 4)}$$

$$ADG = \left[\frac{(initial\ weight - final\ weight)}{number\ of\ days\ experiment\ lasted}\right] \quad \textbf{(eq. 5)}$$

$$S\% = \left[\left(\frac{fish\ mortality}{initial\ number\ of\ fish}\right) \times 100\right] \quad \textbf{(eq. 6)}$$

$$FW\% = \left[\left(\frac{feed\ wasted}{feed\ offered}\right) \times 100\right] \quad \textbf{(eq. 7)}$$

$$PER = weight\ gain\ /\ crude\ protein\ intake\ from\ the\ feed\ (dry\ weight) \quad \textbf{(eq. 8)}$$

$$PPV = [((weight_{(final)} \times protein_{(final)}) - (weight_{(initial)} \times protein_{(initial)}))\ /\ (weight_{(feed\ intake)} \times protein_{(feed)})] \times 100 \quad \textbf{(eq. 9)}$$

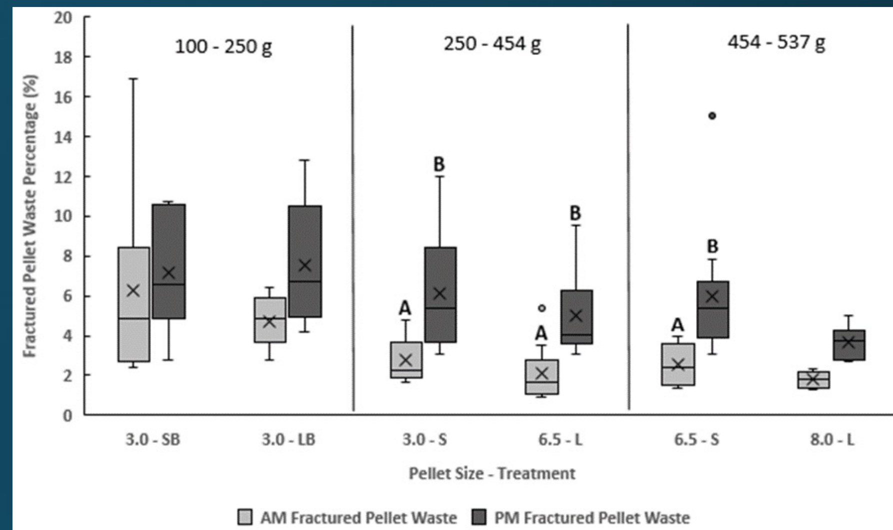
$$ER\ \% = [((weight_{(final)} \times energy_{(final)}) - (weight_{(initial)} \times energy_{(initial)}))\ /\ (weight_{(feed\ intake)} \times engery_{(feed)})] \times 100 \quad \textbf{(eq. 10)}$$

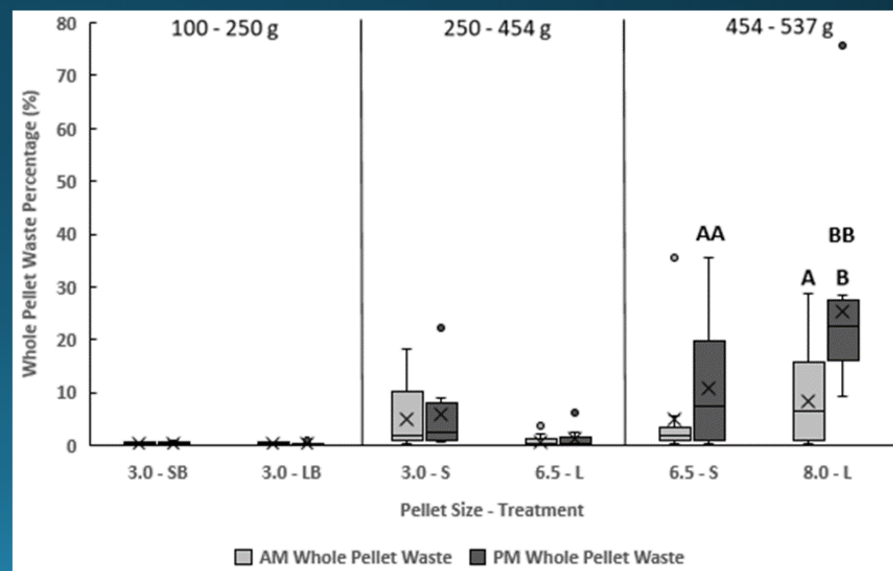
Experiment 3: Results

- FPW Average — Small — Large
  - AM (First Feeding) = 3.88% 3.37%
  - PM (Last Feeding) = 6.19% 5.45%

- WPW Average — Small — Large
  - AM (First Feeding) = 3.94% 2.83%
  - PM (Last Feeding) = 6.24% 8.16%

- All average solids that passed through the parabolic filter (200 um, 150 um, 105 um) were less than 1.0% of the feed ration given AM and PM samples





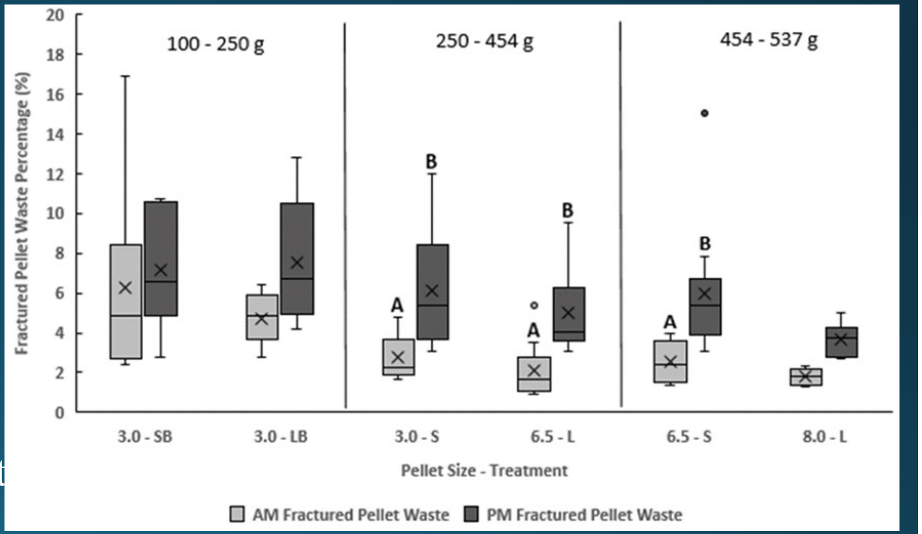
Florida Pompano Samples

	Parameter																			
	IW (g)		FW (g)		WG (g)		ADG (g)		IGR		SGR		AGR		FCR		FCR (corrected)		SR (%)	
Treatment	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Small Pellet	76.4	2.2	506.0	34.1	429.6	34.6	1.5	0.1	0.0064^{A}	0.0003	0.6405^{A}	0.0264	0.0064^{A}	0.0003	4.96^{A}	0.24	3.46	0.35	95.9	2.2
Large Pellet	69.7	1.2	551.0	10.2	481.4	9.6	1.6	0.0	0.0070^{B}	0.0001	0.7011^{B}	0.0062	0.0070^{B}	0.0001	4.44^{B}	0.13	3.12	0.19	97.4	1.1
ANOVA Omnibus p=	0.188		0.094		0.067		0.067		0.018		0.018		0.018		0.031		0.219		0.300	

	Dressout Percetages													
	Fillet (%)		Skin (%)		Pin Bones (%)		Head (%)		Gut (%)		Liver (%)		Carcass (%)	
Treatment	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Small Pellet	41.85	5.96	8.62	1.28	1.69	0.33	22.23	2.99	4.06	1.31	1.14	0.21	20.42	3.72
Large Pellet	43.69	4.49	8.56	1.18	1.66	0.26	21.14	2.59	4.18	1.25	1.24	0.19	19.54	2.78
ANOVA Omnibus p=	0.103		0.597		0.751		0.080		0.340		0.086		0.165	

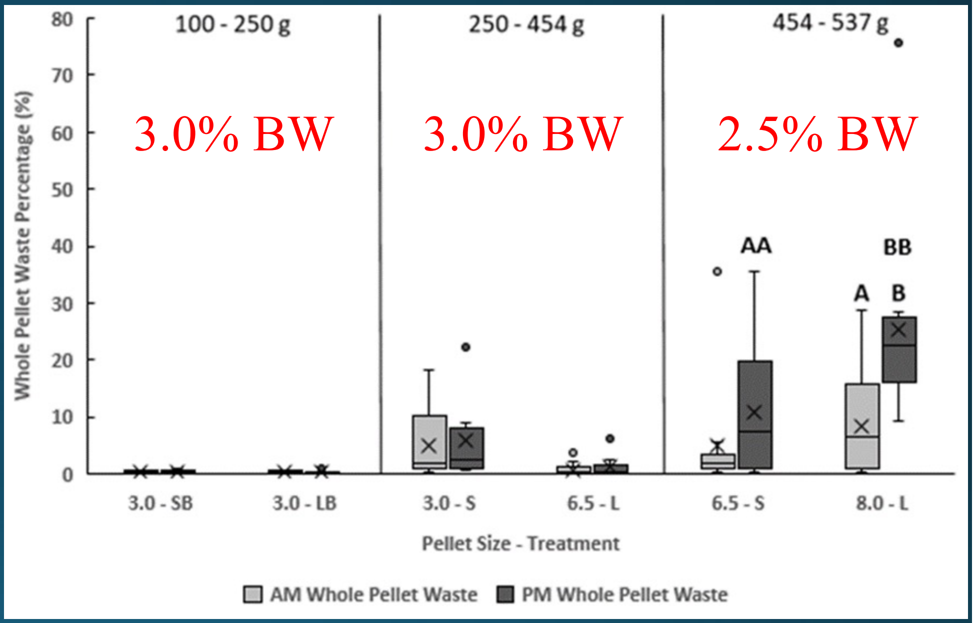
Experiment 3 - Discussion

- Pellet size does not play a role in the amount of FPW
- Again, there were differences between A.M. and P.M. FPW collections
- A.M. FPW samples (first feeding) were taken after the Pompano had gone all night with no feed.
- P.M. FPW samples (last feeding) were taken when 2/3 of the days feed ration had been offered
- In P.M. Pompano may not be as hungry and therefore engage in "sloppy" feeding.
- Note:
  - Riche (2009) showed that Pompano reared within a temperature of 28°C ± 1°C, had a gut passage rate of about 3 hours
  - Pompano were fed every three hours during the day with no feedings overnight, therefore the Pompano should have been ready to eat at every feeding.



Experiment 3 - Discussion

- No differences in WPW from 100 – 454 grams
- Suggesting Pompano can be feed a 3.0% BWD feed ration between 100 – 454 grams
- However, 454 – 537 grams, differences in WPW were observed between and within the small and large pellet treatment groups
- Feed ration was lowered to 2.5% BWD at 454 grams after observing extensive WPW
- However, results suggest the feed ration should have been lowered below 2.5 % BW, as excessive amounts of WPW were still seen



These observations provide for more Accurate Feed Tables

➔ These will be in the Pompano Culture Manual

Experiment 3 - Discussion

- FCR (Feed Conversion Ratio) between the small pellet and large pellet treatments were different
- However, when corrected for amount of FPW and WPW the FCR of the two treatments were not different.
- This result supports that the historically high FCR of Florida Pompano are affected by the FPW generated

	Parameter																			
	IW (g)		FW (g)		WG (g)		ADG (g)		IGR		SGR		AGR		FCR		FCR (corrected)		SR (%)	
Treatment	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Small Pellet	76.4	2.2	506.0	34.1	429.6	34.6	1.5	0.1	0.0064[A]	0.0003	0.6405[A]	0.0264	0.0064[A]	0.0003	4.96[A]	0.24	3.46	0.35	95.9	2.2
Large Pellet	69.7	1.2	551.0	10.2	481.4	9.6	1.6	0.0	0.0070[B]	0.0001	0.7011[B]	0.0062	0.0070[B]	0.0001	4.44[B]	0.13	3.12	0.19	97.4	1.1
ANOVA Omnibus p=	0.188		0.094		0.067		0.067		0.018		0.018		0.018		0.031		0.219		0.300	

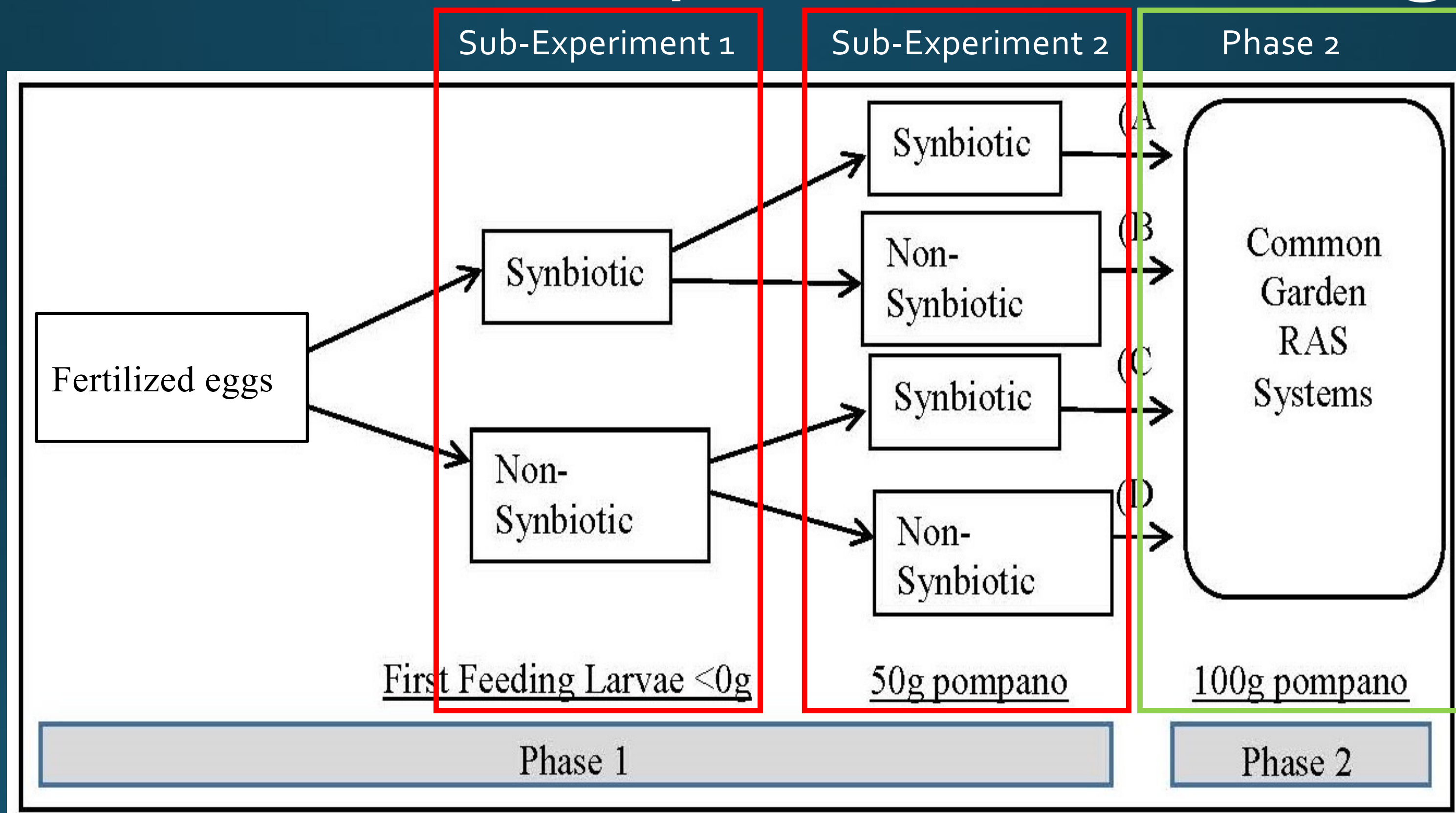
Experiment 4 → Synthesis Study

Study encompassed and entire production cycle from egg to harvest

Objectives

- Evaluate effectiveness of synbiotics applied during different periods of the production cycle
  - Production effects
  - Health and physiological effects (later presentation)
- Evaluate effects of revised soft pellet versus hard pellet
  - With and without synbiotic

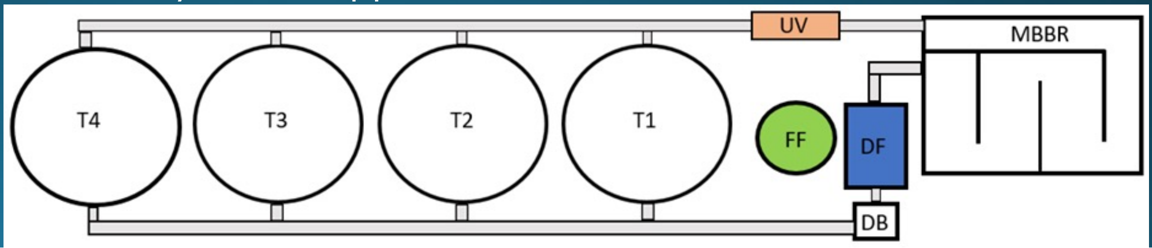
Experiment 4 – Experimental Design



Experiment 4 – Experimental Design

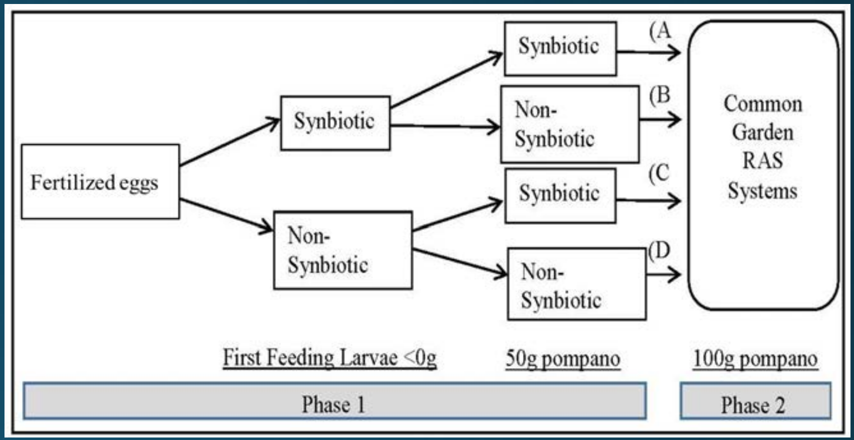
Phase 2

- Two by Two factorial design
  - Effects tested:
    - ➔ Pellet Form (Soft-Floating vs Hard-Floating)
      - ➔redesigned soft pellet to an expanded floating pellet based on Experiment 2 and 3 results
    - ➔ Synbiotic application
      - Therefore, four treatments (Soft Synbiotis, Soft non-Synbiotic, Hard Synbiotic, Hard non-symbiotic)
      - Replicated 3 times in three identical research production-scale systems.
      - Each treatment was randomly assigned to one of four tanks in each system. (i.e., Blocked on System)
    - ➔ Interaction between Pellet Form and Synbiotic Application



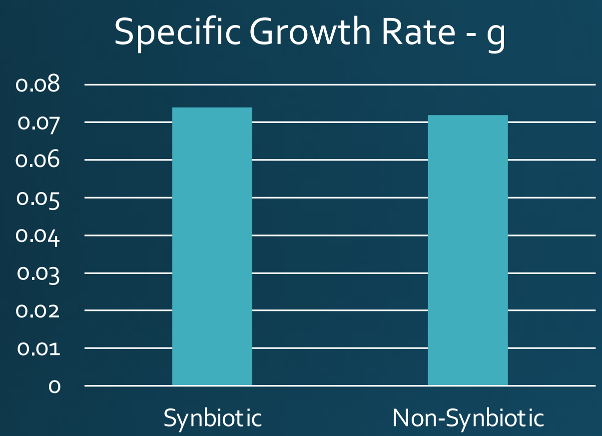
Experiment 4 – Experimental Design

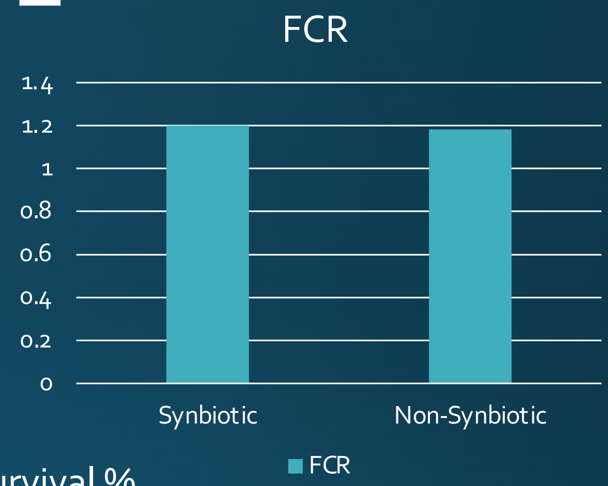
- Synbiotic longitudinal analysis:
  - Add Phase 1 symbiotic history effects
    - Synbiotic treatment groups
      - Phase 1 groups (a, b, c, d)
      - Fish in each group tagged uniquely
    - Pellet Form (Soft vs. Hard)
    - Synbiotic treatment during Phase 2 (symbiotic vs. non-symbiotic)
    - Interaction effects

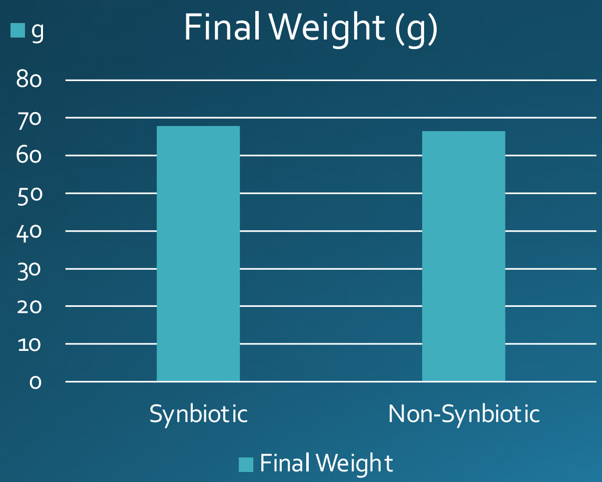


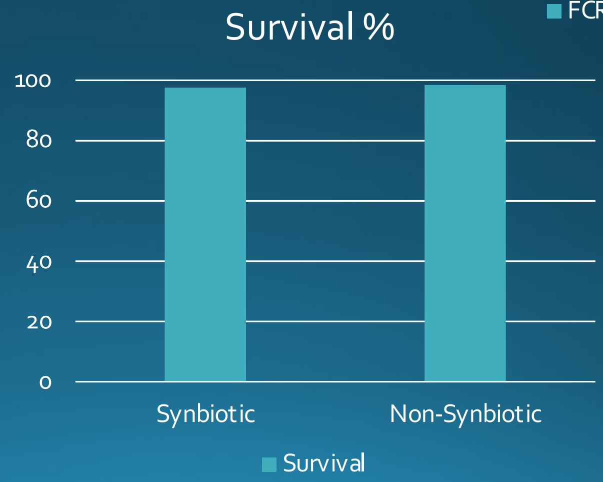
- Production variables only in this talk
  - Survival, Final Weight, SGR, FCR, Dress-out %s (Head-on gutted, Skinned Fillet, Fillet with skin)

Results- Phase1 Sub-exp 1

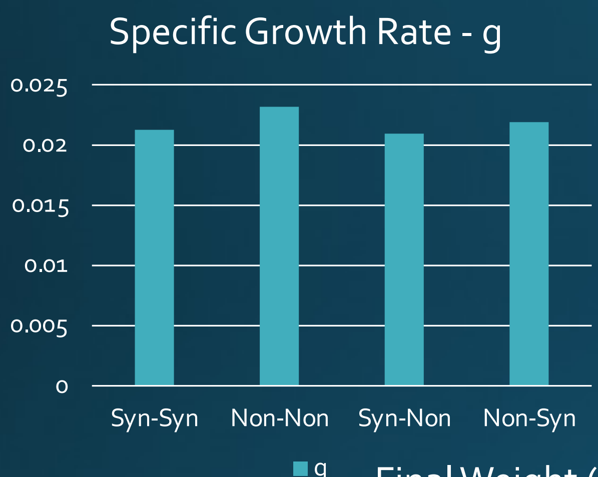


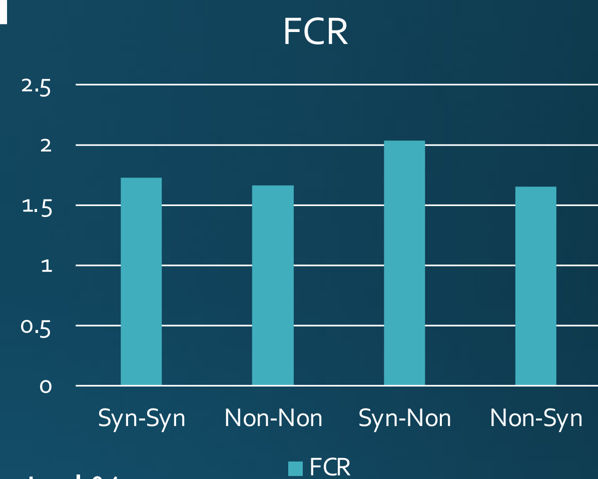


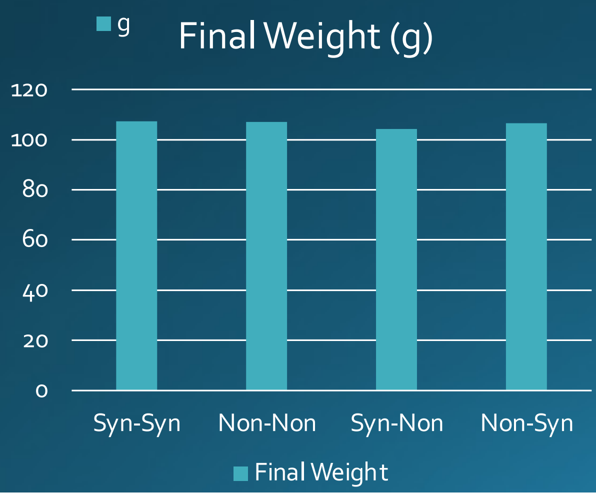


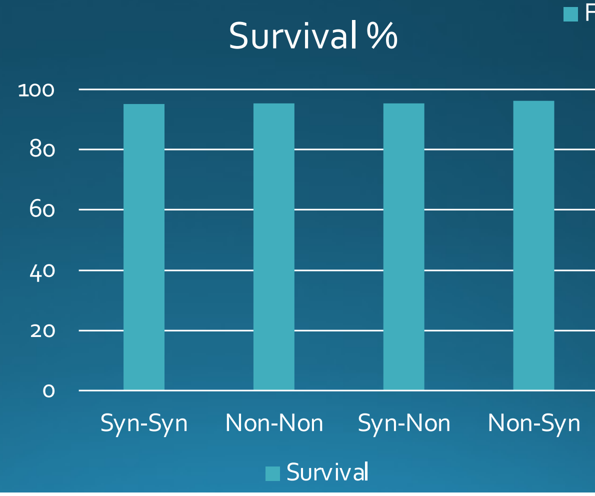


Results- Phase1 Sub-exp 2

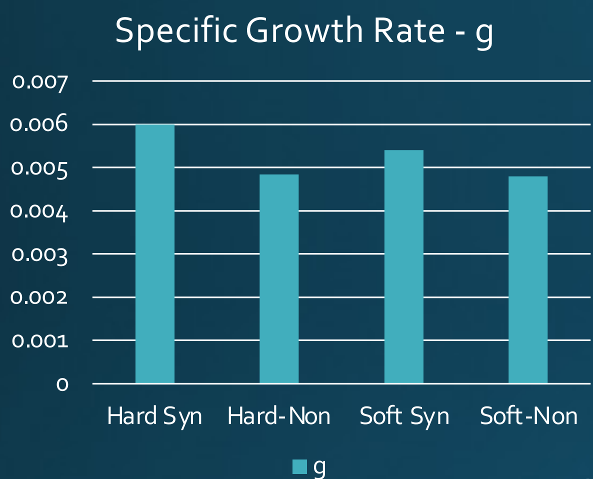


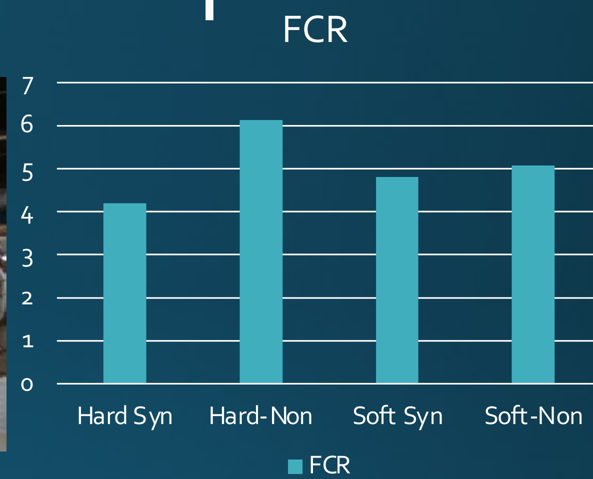


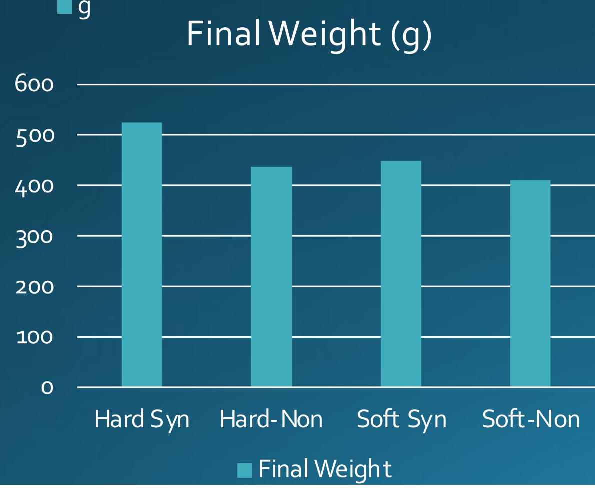


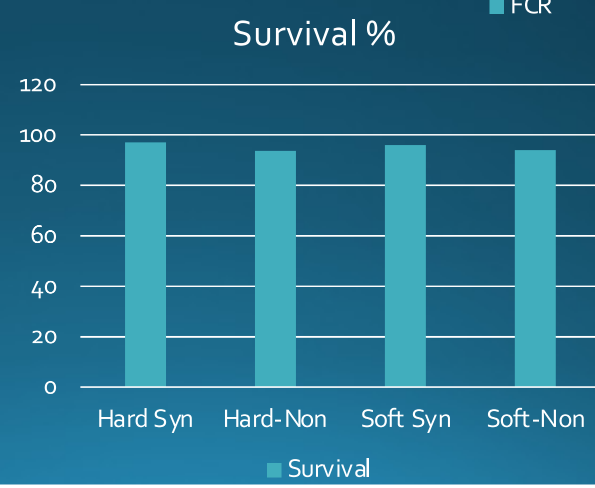


Results- Phase 2 → Factorial Experiment

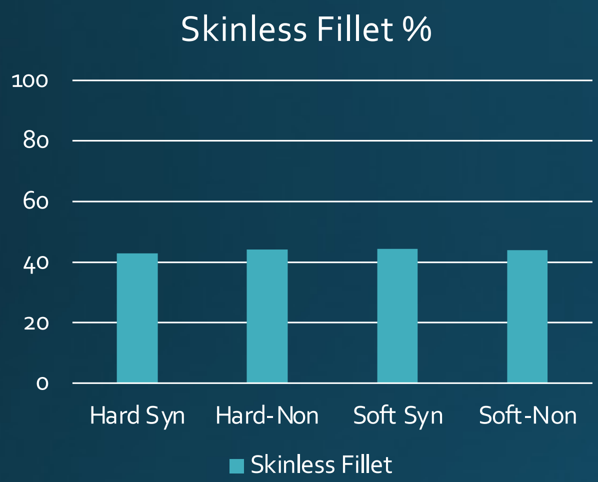


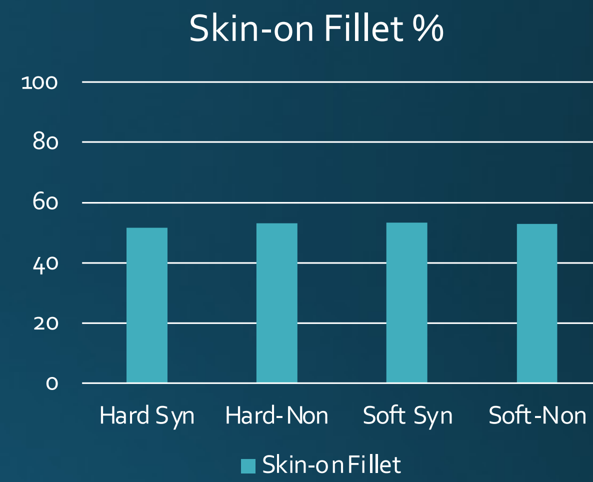


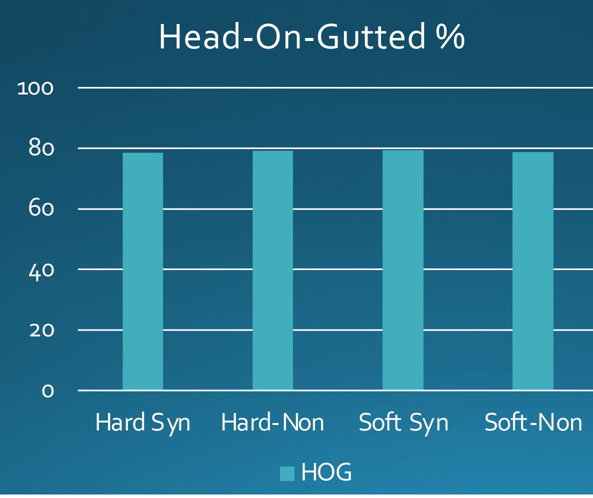




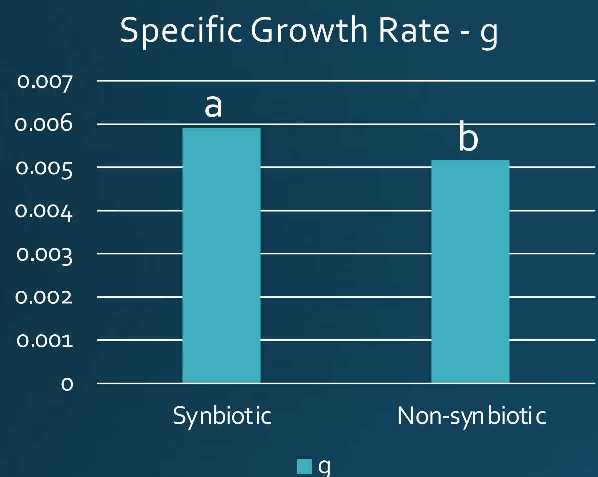
Results- Phase 2 ➔ Dress-out _ Factorial

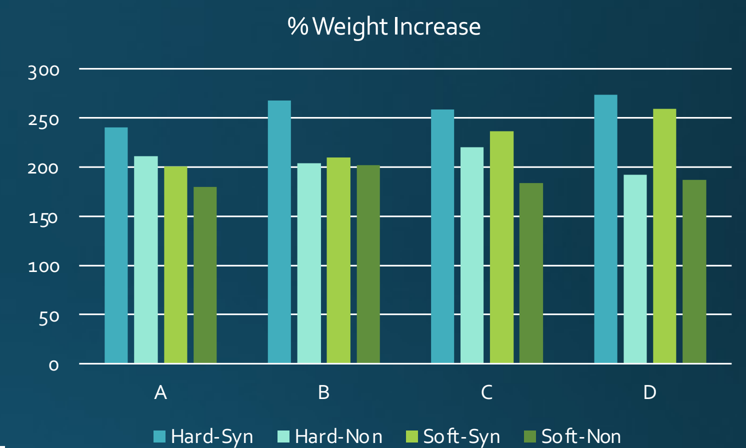


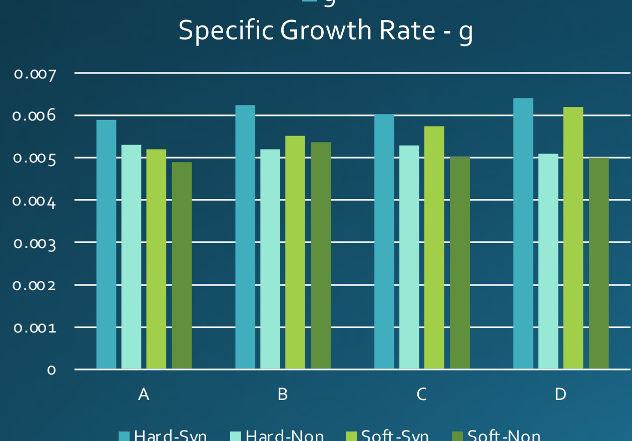


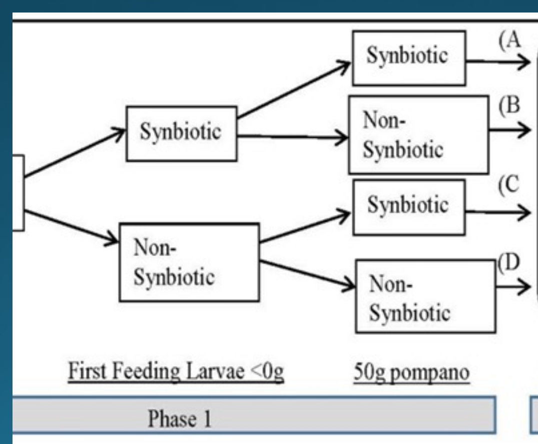


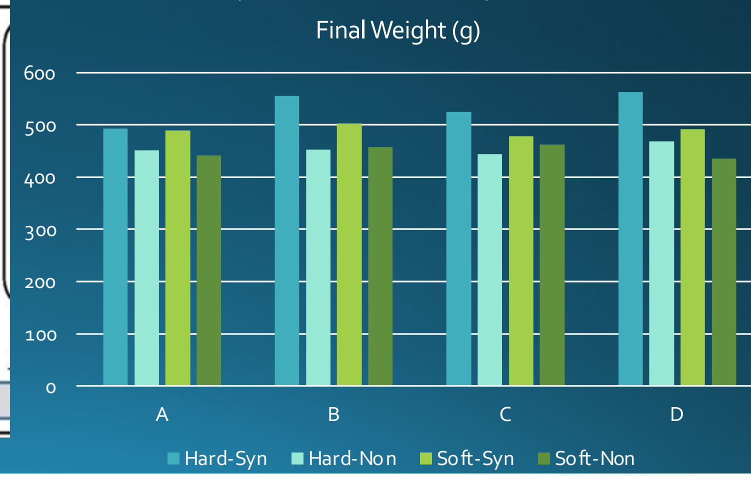
Results- Phase 2 → Longitudinal Analysis











Conclusions

- These study represents the first time FPW was collected and how much Florida Pompano generate
- Florida Pompano do fracture pellets during consumption and these studies provide an understanding how FPW is generated and it how it attributes to high FCR
- Pellet size has no effect on FPW, however, soft pellets reduce the amount of FPW
- No difference detected between Hard pellet and Revised Soft Pellet in performance (Exp. 4)
- Addition of synbiotic during grow-out imparts some benefit in growth (Exp. 4)
- No significant effects detected due to larval or juvenile history of synbiotic application at final harvest (Exp. 4)

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- Jack Lee
- Jonathon Banakos

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- **Proaquatix**
- **Rick Barrows**

Aquaculture Managers:

- Richard Baptiste
- Chris Robinson

Aquaculture Technicians:

- Zachary Niles
- Richard Mulroy
- Erik Perna
- Thomas Cole
- Madison Wheeler
- Molly Wightman
- Anthony Cianciotto
- Alex Dodge

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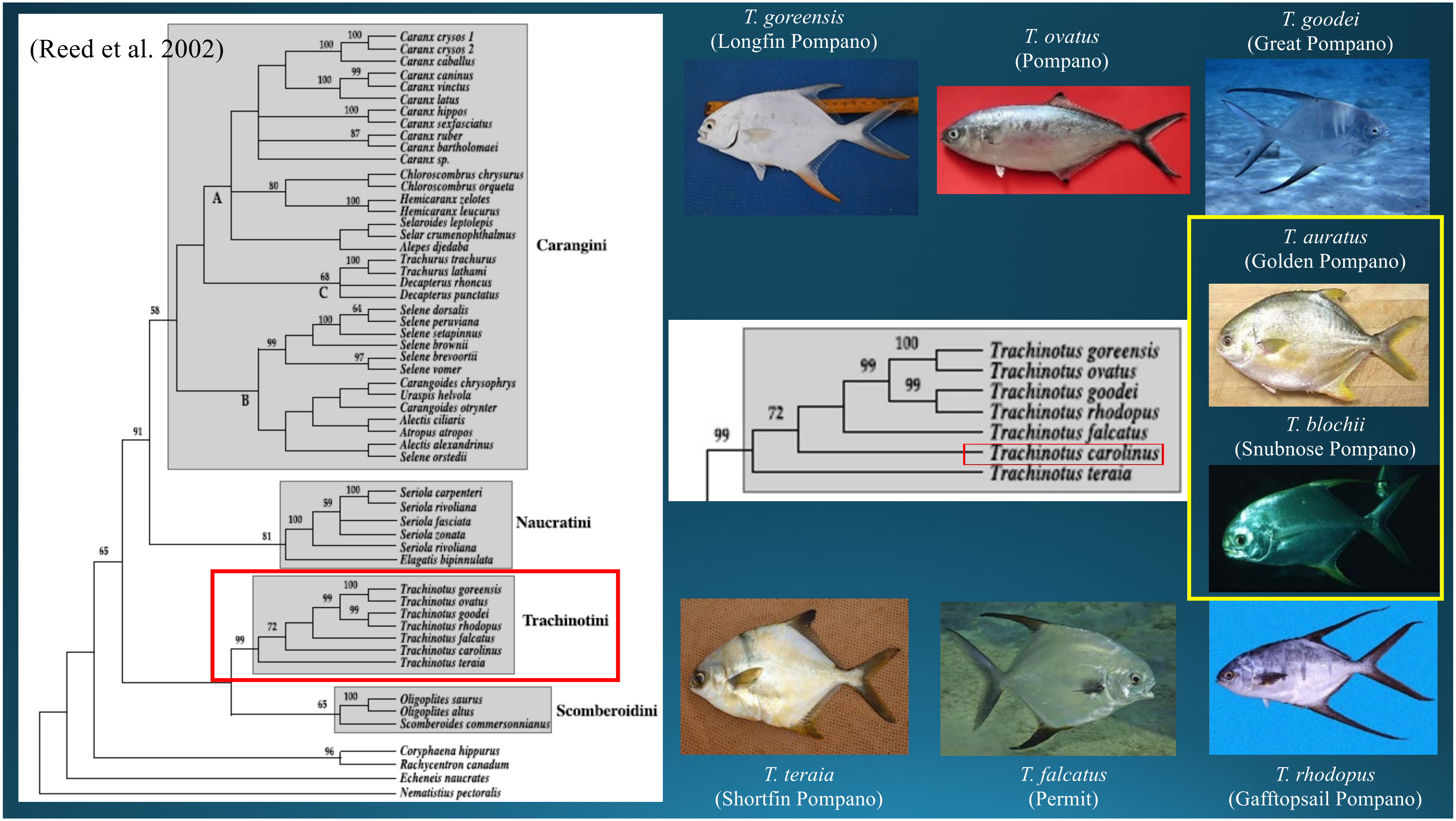
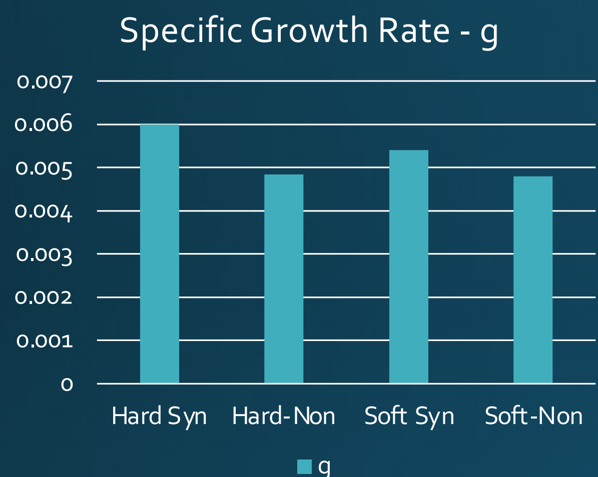
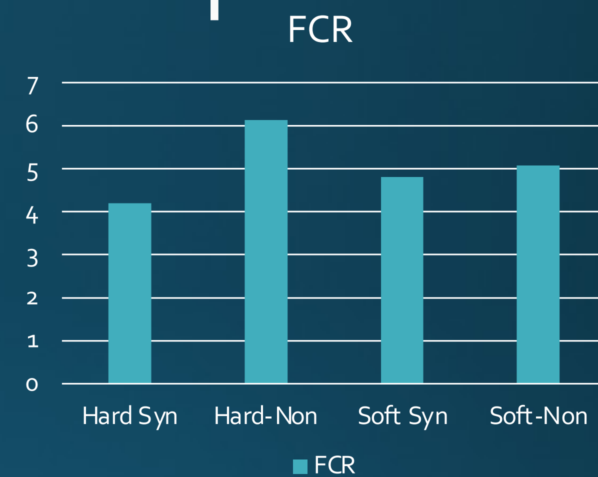
CULTURE MANUAL
FOR THE
FLORIDA POMPANO
Trachinotus carolinus (Linnaeus, 1766)
Day 0: Neurula
Day 8: Feed Transition
3.0±0.1 mm
Day 12: Feeding on Artemia
Day 20: Post Flexion
Pump 1
Pump 2
Pump 3
Pompano

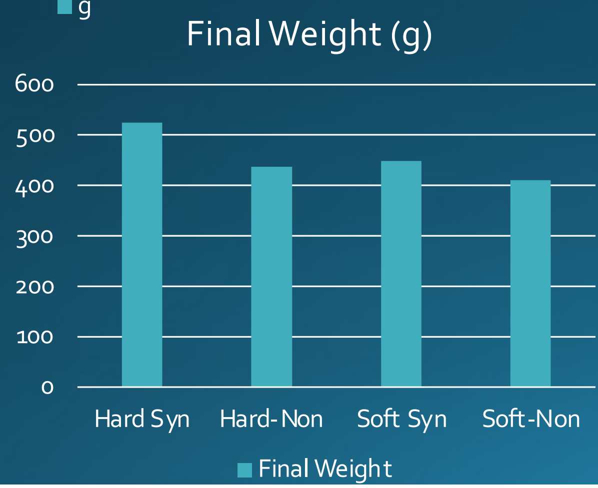
Questions?

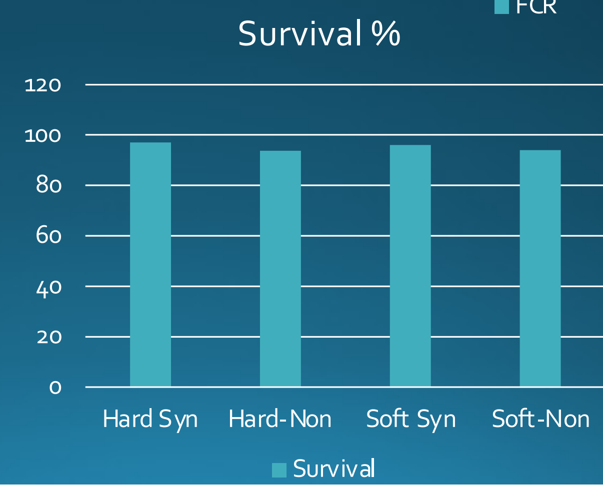

(Reed et al. 2002)
Caranx crysos 1
Caranx crysos 2
Caranx caballus
Caranx caninus
Caranx vinctus
Caranx latus
Caranx hippos
Caranx sexfasciatus
Caranx ruber
Caranx bartholomaei
Caranx sp.
Chloroscombrus chrysurus
Chloroscombrus orqueta
Hemicaranx zelotes
Hemicaranx leucurus
Selaroides leptolepis
Selar crumenophthalmus
Alepes djedaba
Trachurus trachurus
Trachurus lathami
Decapterus rhoncus
Decapterus punctatus
Selene dorsalis
Selene peruviana
Selene setapinnus
Selene brownii
Selene brevoortii
Selene vomer
Carangoides chrysophrys
Uraspis helvola
Carangoides otrynter
Alectis ciliaris
Atropus atropos
Alectis alexandrinus
Selene orstedii
Carangini
A
B
C
Seriola carpenteri
Seriola rivoliana
Seriola fasciata
Seriola zonata
Seriola rivoliana
Elagatis bipinnulata
Naucratini
Trachinotus goreensis
Trachinotus ovatus
Trachinotus goodei
Trachinotus rhodopus
Trachinotus falcatus
Trachinotus carolinus
Trachinotus teraia
Trachinotini
Oligoplites saurus
Oligoplites altus
Scomberoides commersonnianus
Scomberoidini
Coryphaena hippurus
Rachycentron canadum
Echeneis naucrates
Nematistius pectoralis
T. goreensis
(Longfin Pompano)
T. ovatus
(Pompano)
T. goodei
(Great Pompano)
T. auratus
(Golden Pompano)
T. blochii
(Snubnose Pompano)
T. teraia
(Shortfin Pompano)
T. falcatus
(Permit)
T. rhodopus
(Gafftopsail Pompano)

Results- Phase 2 ➔ Factorial Experiment

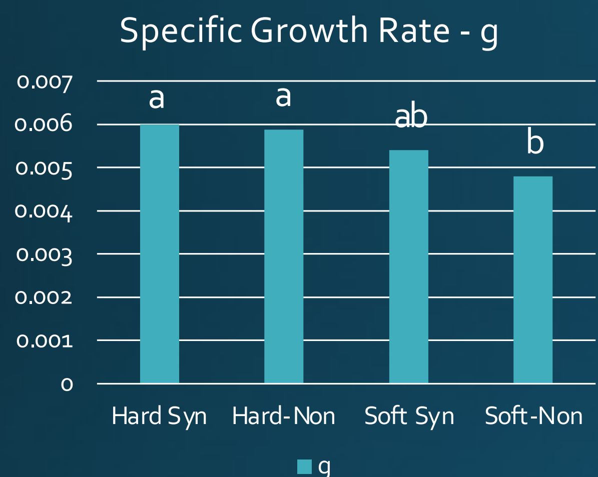


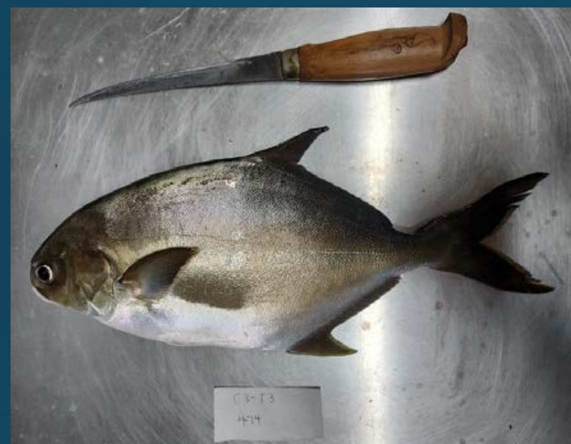


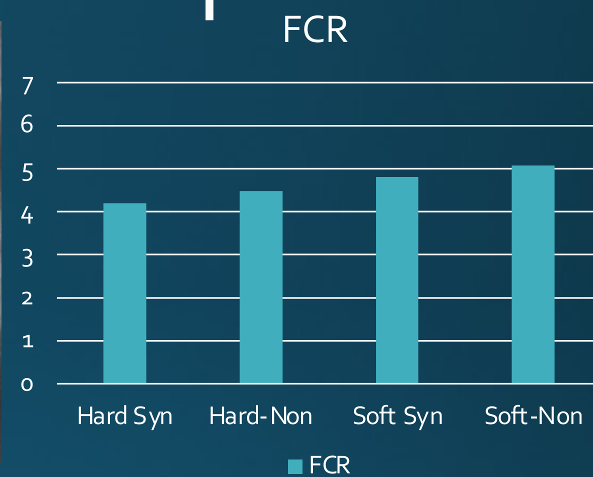


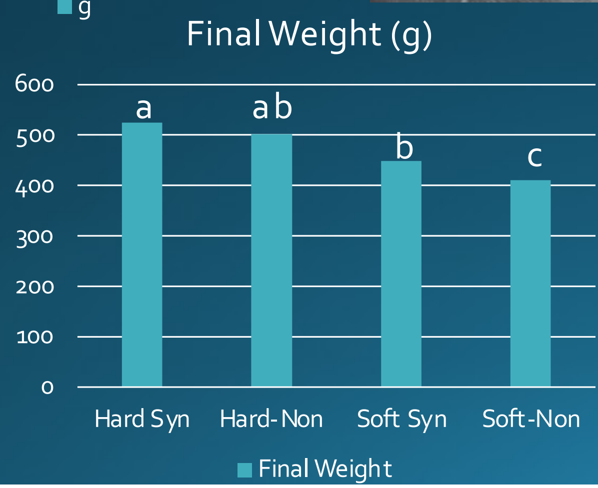


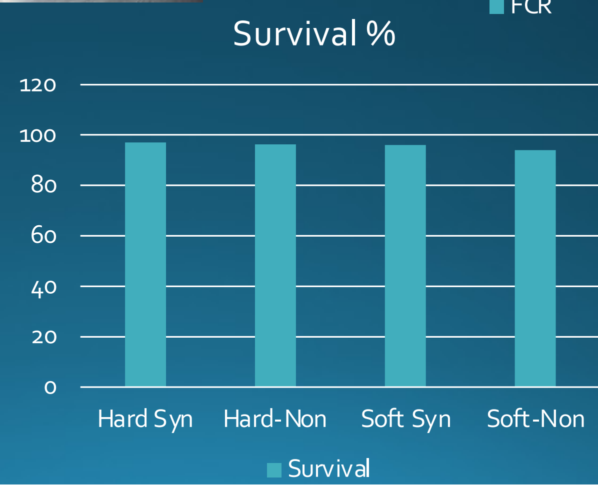
Results- Phase 2 ➔ Factorial Experiment











Florida Pompano (*Trachinotus carolinus*)

- **Kingdom**: *Animalia*
- **Phylum**: *Chordata*
- **Class**: *Actinopterygii*
- **Order**: *Perciformes*
- **Family**: *Carangidae*
- **Genus**: *Trachinotus*

- **Characteristics**:
  - Fusiform
  - Oval shape
  - Elongated towards the posterior end
  - Carangiform locomotion - only the posterior half of the body flexes

Experiment 3 - Discussion

- Small pellet treatment had a lower IGR, SGR and AGR then the large pellet treatment.
- This could be a result of optimal foraging theory (Pyke, 1984).
- Pompano could possibly be expending more energy to consume smaller pellets (as they are in constant search for food), in turn having less energy to put into growth resulting in a slower growth rate than the large pellet treatment
- While the large pellet treatment allows the pompano to obtain more food while expending less energy allowing them to harness that energy into a faster growth rate.
- Although not statistically different, large pellet treatment also had a higher Protein Efficiency Ratio (PER), Protein Productive Value (PPV) and Energy Retention (ER).

	Parameter																			
	IW (g)		FW (g)		WG (g)		ADG (g)		IGR		SGR		AGR		FCR		FCR (corrected)		SR (%)	
Treatment	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Small Pellet	76.4	2.2	506.0	34.1	429.6	34.6	1.5	0.1	0.0064^{A}	0.0003	0.6405^{A}	0.0264	0.0064^{A}	0.0003	4.96^{A}	0.24	3.46	0.35	95.9	2.2
Large Pellet	69.7	1.2	551.0	10.2	481.4	9.6	1.6	0.0	0.0070^{B}	0.0001	0.7011^{B}	0.0062	0.0070^{B}	0.0001	4.44^{B}	0.13	3.12	0.19	97.4	1.1
ANOVA Omnibus p=	0.188		0.094		0.067		0.067		0.018		0.018		0.018		0.031		0.219		0.300	

	Florida Pompano Proximate Analysis Percentages with PER, PPV, and ER															
	Crude Protein (%)		Moisture (%)		Crude Fat (%)		Crude Fiber (%)		Ash (%)		PER		PPV (%)		ER (%)	
Treatment	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Initial	53.78	----	2.92	----	38.06	----	0.18	----	8.88	----	----	----	----	----	----	----
Small Pellet	49.23	7.13	2.41	0.33	41.05	4.67	0.18	0.03	6.70	0.51	8.88	0.61	20.20	2.44	29.82	2.36
Large Pellet	50.18	3.27	1.92	0.06	42.50	1.91	0.17	0.05	6.11	0.30	9.61	1.07	23.31	2.21	31.51	1.31
ANOVA Omnibus p=	0.845		0.058		0.640		0.816		0.155		0.278		0.105		0.260	