



2016 HATCHERY UPDATE

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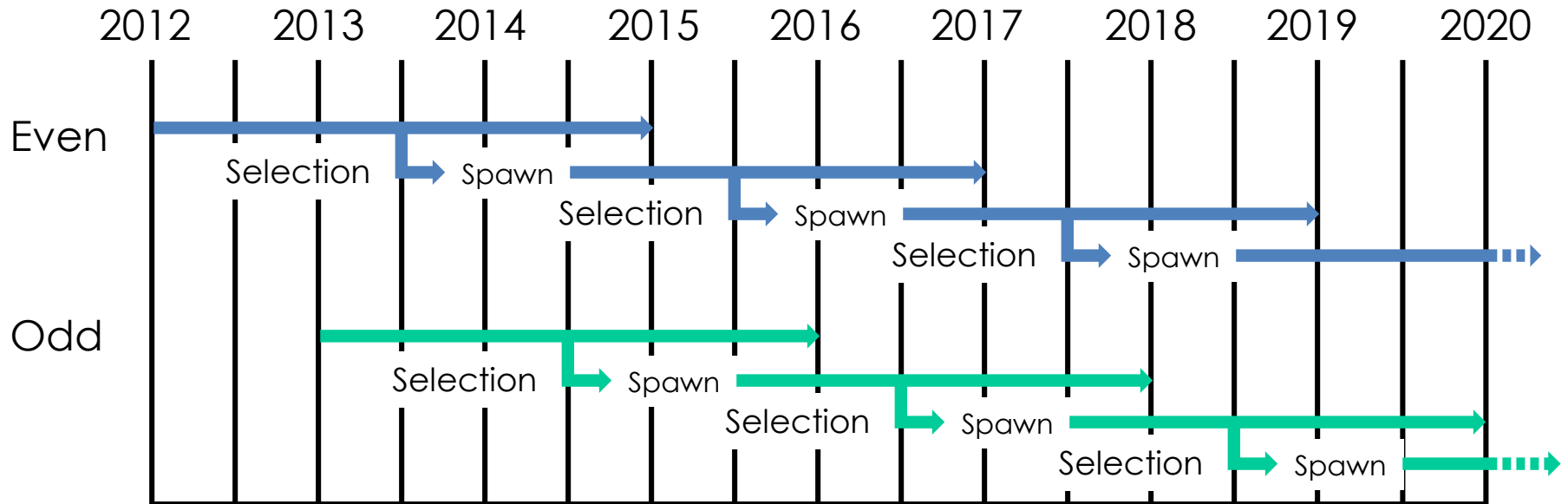


2016 HATCHERY UPDATE

- BREEDING PROGRAM
 - PLAN
 - PROGRESS
 - EXPANSION
- TRIPLOIDY
- OTHER SPECIES OF INTEREST

BREEDING PLAN (IN THEORY)

- IMPLEMENTING A 2-YEAR GENERATION TIME
- BROODSTOCK SELECTION AT 18 MONTHS (SIZE, SHAPE, OTHER TRAITS?)
- SPAWN AT ~24 MONTHS
- “EXTRA” BROODSTOCK CARRIED TO 36 MONTHS



BREEDING PROGRAM

➤ EVEN YEAR LINES

- ORIGINALLY CRAB HOLE, STUMP SOUND, HEWLETTS CREEK, LOCKWOOD FOLLY
- 2016 PLAN: ELIMINATE LOCKWOOD FOLLY, REPLACE WITH CEDAR ISLAND

➤ ODD YEAR LINES

- ORIGINALLY WHITE OAK, DEEP BAY, CEDAR ISLAND, ST. JAMES
- CHALLENGING 2015 SEASON RESULTED IN HERRING SHOAL, OCRACOKE AND MIDDLE MARSH REPLACING WHITE OAK, DEEP BAY AND CEDAR ISLAND



BREEDING PLAN (IN ACTION)

- CRAB HOLE
 - 2012
 - SPAWNS POOLED
 - CARRIED 10,000 SEED ON 5 FARMS
 - TOP ~200 CONDITIONED FOR 2014 PRODUCTION CYCLE
 - 2014
 - CH4-29 BROODSTOCK 84.01 ± 1.29 MM SHELL HEIGHT (SELECTION DIFFERENTIAL 3 MM)
 - CARRIED ON 2 FARMS
 - TOP ~400 SELECTED FOR 2016 PRODUCTION CYCLE
 - CH5-20 BROODSTOCK 80.07 ± 1.05 MM SHELL HEIGHT (SELECTION DIFFERENTIAL 10 MM)
 - CARRIED ON 3 FARMS
 - TOP ~400 SELECTED FOR 2016 PRODUCTION CYCLE

YEAR	SPAWN	CROSSES	LARVAE SET	SEED YIELD	SEED CARRIED	SURVIVE TO SELECTION	% MARKET SIZED
2012	5-23	25	3000000	495000	10000	2376	7
2012	5-25	8	487000	63000			
2014	4-29	39	187000	3500	3500	1426	39
2014	5-20	41	27000	3900	3900	2170	25

BREEDING PLAN (IN ACTION)

- STUMP SOUND
 - 2012
 - SPAWNS POOLED
 - CARRIED 10,000 SEED ON 5 FARMS
 - TOP ~200 CONDITIONED FOR 2014 PRODUCTION CYCLE
 - 2014
 - SS5-6 BROODSTOCK 85.61 ± 1.07 MM SHELL HEIGHT (SELECTION DIFFERENTIAL 7 MM)
 - CARRIED ON 2 FARMS
 - TOP ~200 SELECTED FOR 2016 PRODUCTION CYCLE
 - SS5-27 BROODSTOCK 88.80 ± 1.05 MM SHELL HEIGHT (SELECTION DIFFERENTIAL 10 MM)
 - CARRIED ON 2 FARMS
 - TOP ~200 SELECTED FOR 2016 PRODUCTION CYCLE

YEAR	SPAWN	CROSSES	LARVAE SET	SEED YIELD	SEED CARRIED	SURVIVE TO SELECTION	% MARKET SIZED
2012	5-30	28	153000	30000	10000	1955	11
2012	6-3	5	26000	2000			
2014	5-6	41	29000	4872	4872	1465	30
2014	5-27	32	180000	3228	3228	1055	33

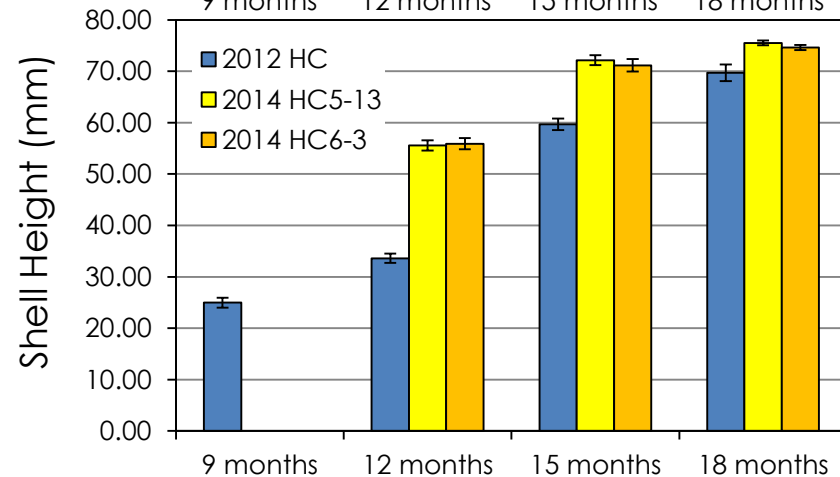
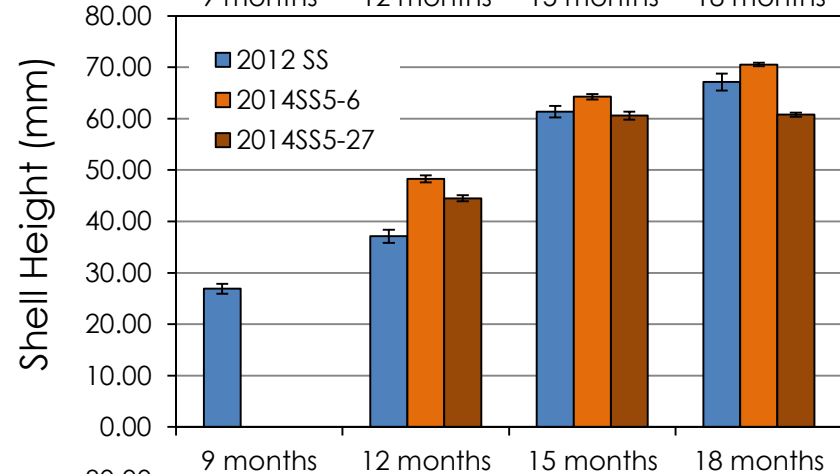
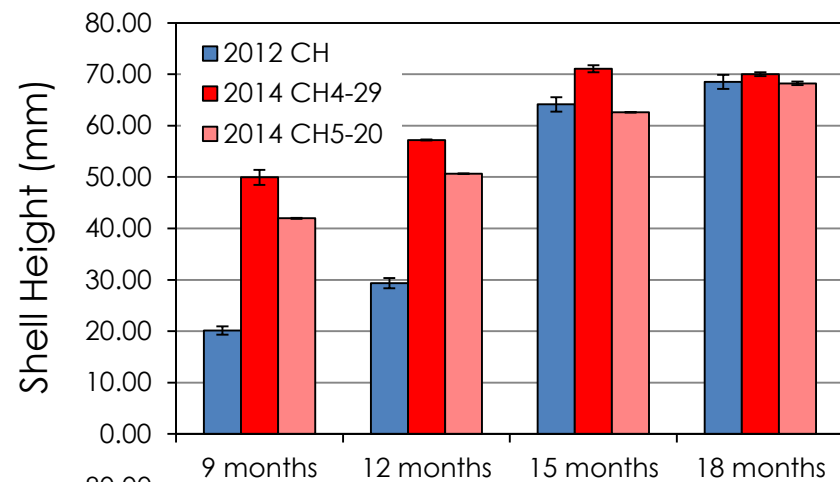
BREEDING PLAN (IN ACTION)

- HEWLETTS CREEK
 - 2012
 - SINGLE SUCCESSFUL SPAWN
 - CARRIED 10,000 SEED ON 5 FARMS
 - TOP ~200 CONDITIONED FOR 2014 PRODUCTION CYCLE
 - 2014
 - HC5-13 BROODSTOCK 86.06 ± 1.05 MM SHELL HEIGHT (SELECTION DIFFERENTIAL 3 MM)
 - CARRIED ON 1 FARM
 - TOP ~200 SELECTED FOR 2016 PRODUCTION CYCLE
 - HC6-3 BROODSTOCK 87.91 ± 1.00 MM SHELL HEIGHT (SELECTION DIFFERENTIAL 5 MM)
 - CARRIED ON 2 FARMS
 - TOP ~200 SELECTED FOR 2016 PRODUCTION CYCLE

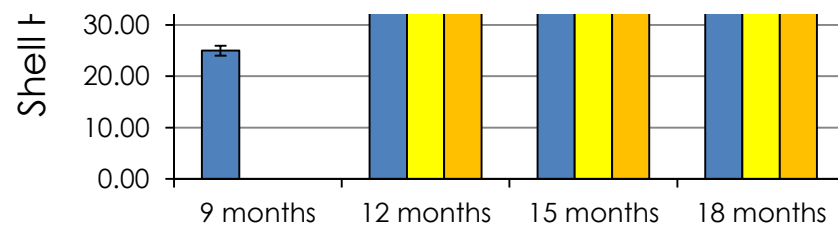
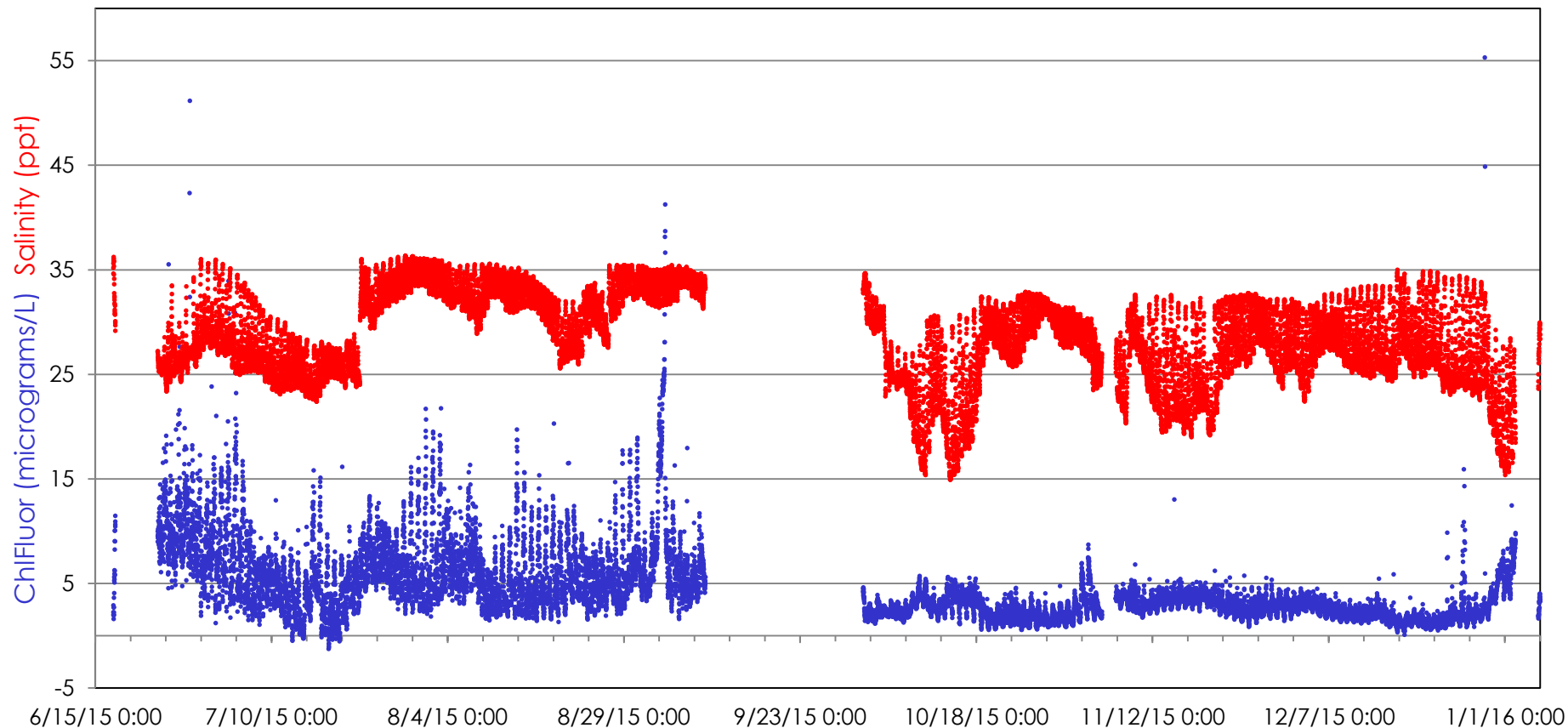
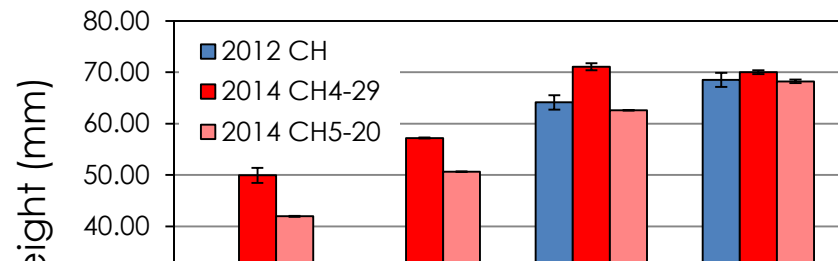
YEAR	SPAWN	CROSSES	LARVAE SET	SEED YIELD	SEED CARRIED	SURVIVE TO SELECTION	% MARKET SIZED
2012	6-6	30	305000	58000	10000	2468	11
2012	6-20	30	0				
2014	5-13	35	323000	2154	2154	542	50
2014	6-3	34	80000	1485	1485	466	29

IMPROVEMENT?

- SIGNIFICANT DIFFERENCE @ 1 YEAR
- NOT SO MUCH @ 2 YEAR
 - 2014 LINES SHOW SLOW GROWTH IN LAST HALF OF 2015
 - SALINITY?
 - FOOD?
 - OTHER?



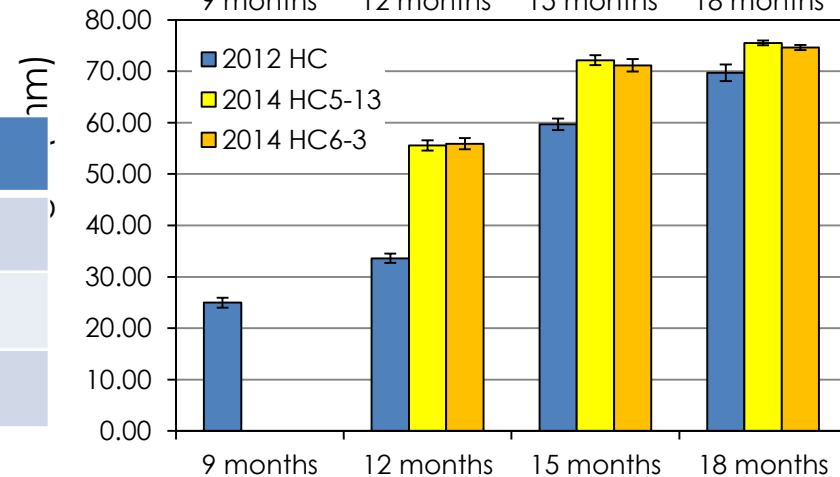
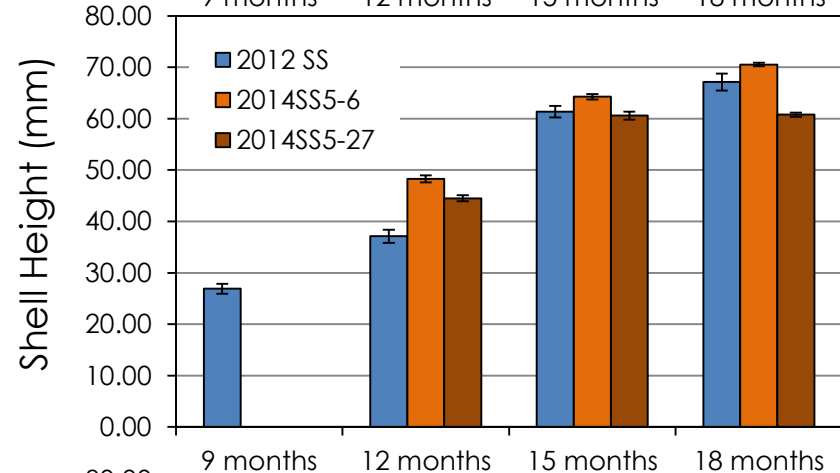
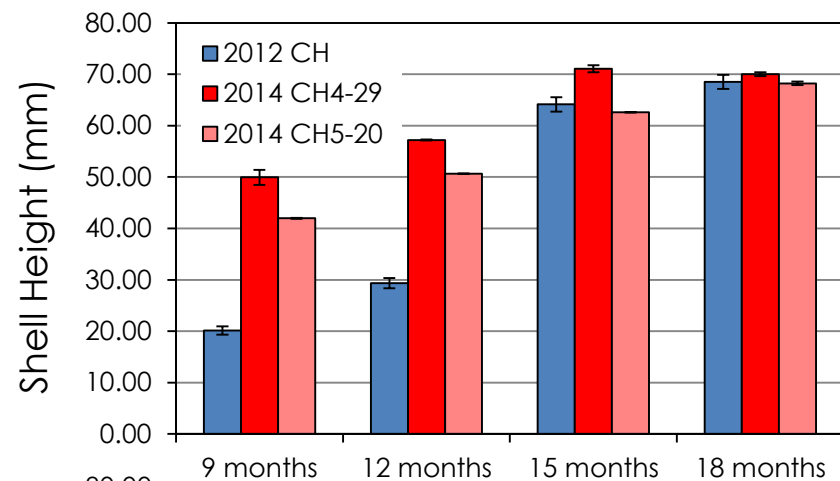
Improvement?



IMPROVEMENT?

- SIGNIFICANT DIFFERENCE @ 1 YEAR
- NOT SO MUCH @ 2 YEAR
 - 2014 LINES SHOW SLOW GROWTH IN LAST HALF OF 2015
 - SALINITY?
 - FOOD?
 - OTHER?
- INCREASE IN % MARKET SIZE AT 18 MONTHS

Line	2012	2014
Crab Hole	7	29/35
Stump Sound	11	30/33
Hewletts Creek	11	50/39



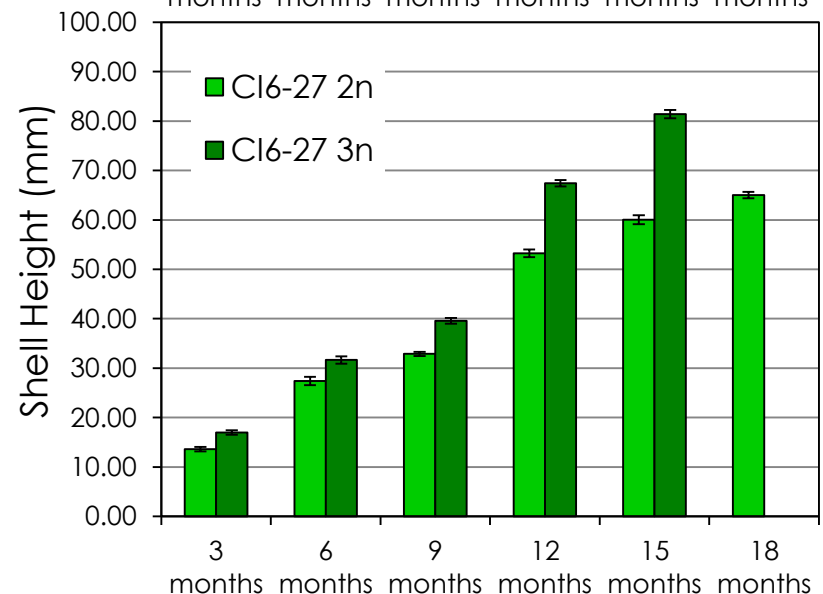
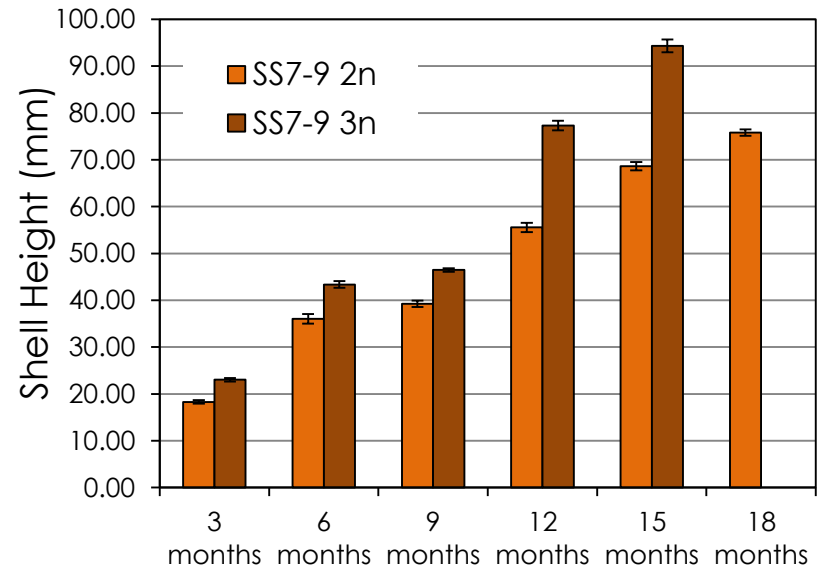
Constraints

- System limitations
- Staffing limitations



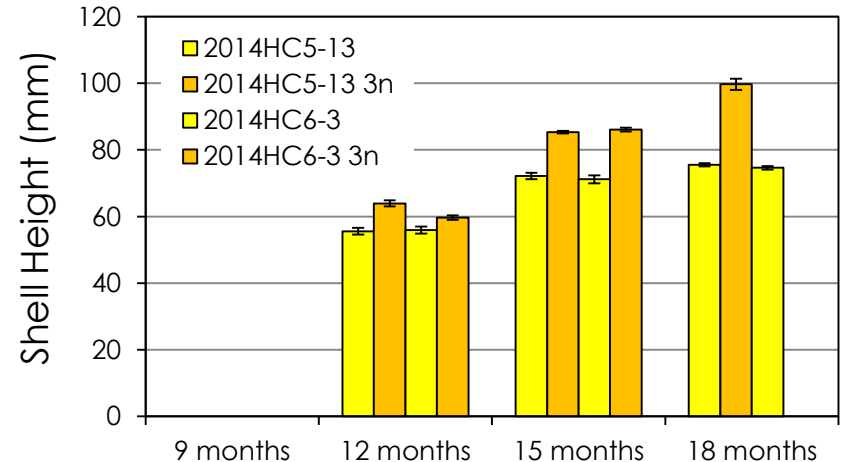
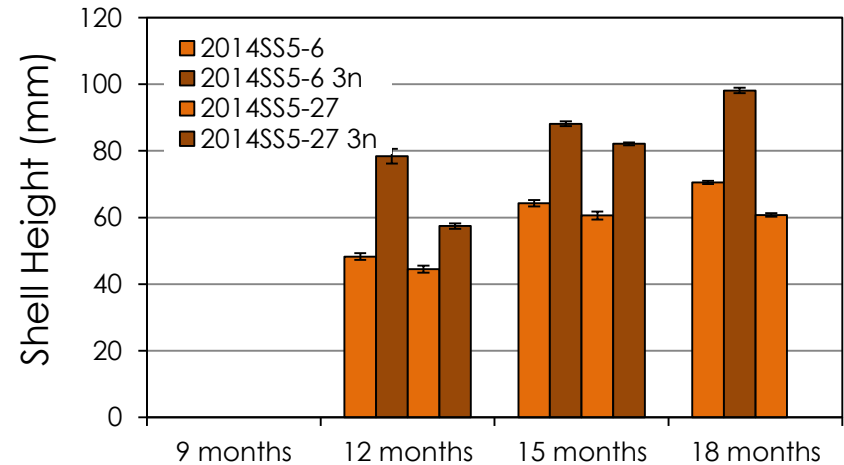
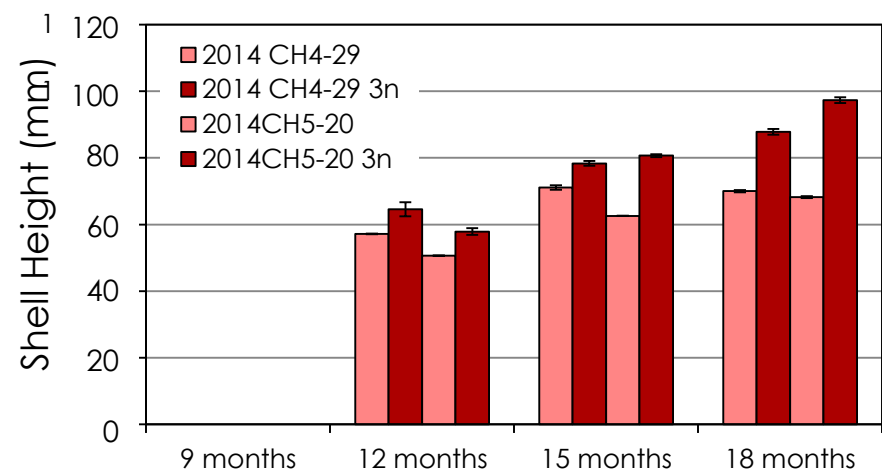
TRIPLOID OYSTER EVALUATION

- LICENSING AGREEMENT WITH VIMS FOR PRODUCTION OF NATURAL TRIPLOIDS
 - TETRAPLOID (4N) MALES CROSSED WITH DIPLOID FEMALES
 - WILD STUMP SOUND
 - “BEST” OF 2011 CEDAR ISLAND
- SUBSTANTIAL GROWTH AND SURVIVAL ADVANTAGE



TRIPLOID OYSTER EVALUATION

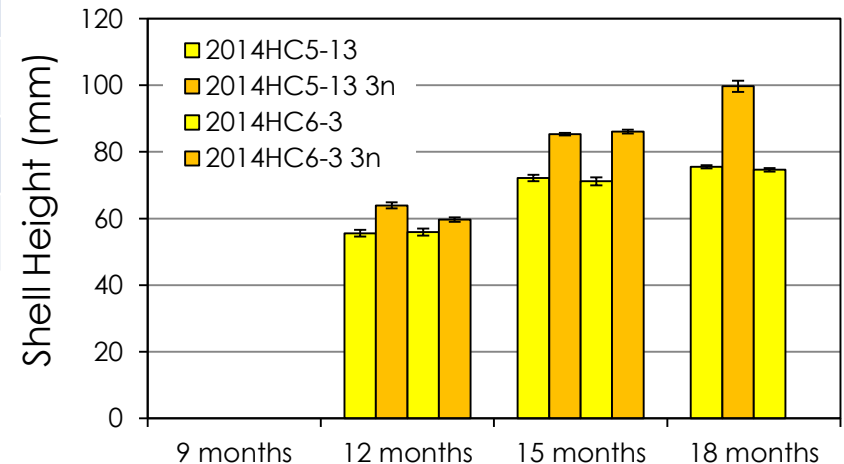
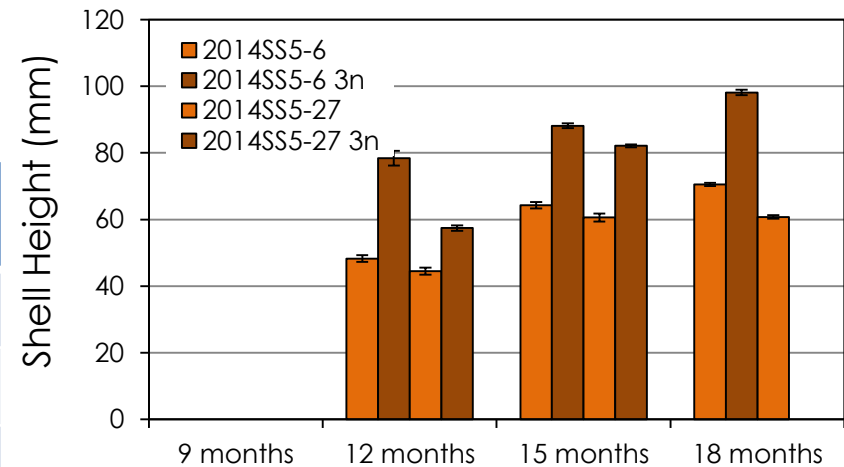
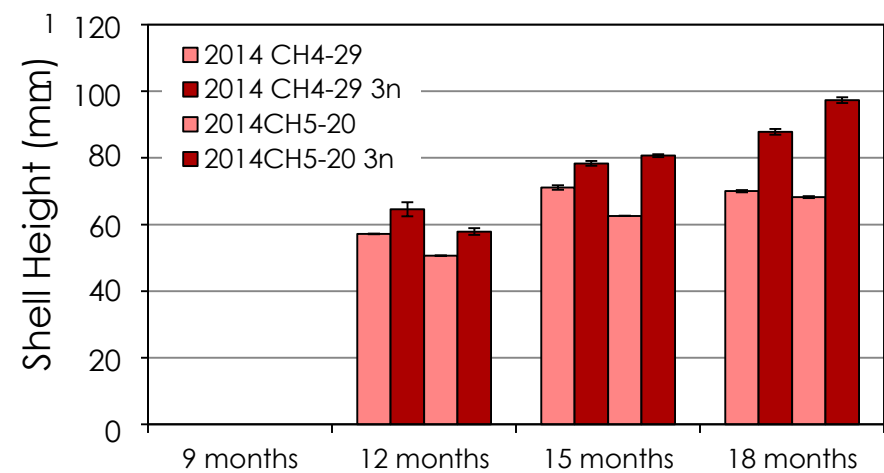
- TRIPLOID LINES ESTABLISHED FOR ALL 6 2014 SPAWNS
- GROW OUT AT SRH
 - TRIPLOIDS >> DIPLOIDS BY ~20MM AT 18 MONTHS
 - NO SUBSTANTIAL DIFFERENCE IN SURVIVAL
 - ALL 3N WERE 64-83% MARKET SIZED AT 15 MONTHS
- HOW DID THEY DO ELSE WHERE?



TRIPLOID OYSTER EVALUATION

- TRIPLOID LINES ESTABLISHED FOR ALL 6 2014 SPAWNS
- GROW OUT AT SRH

FARM	SHELL HEIGHT 15-18 MONTHS	% MARKET SIZE
"A"	71.9±0.29	36
"B"	79.2±0.47	89
"C"	68.8±0.69	34
"D"	ND	55
"E"	ND	"MANY"
"F"	88.5±0.87	85

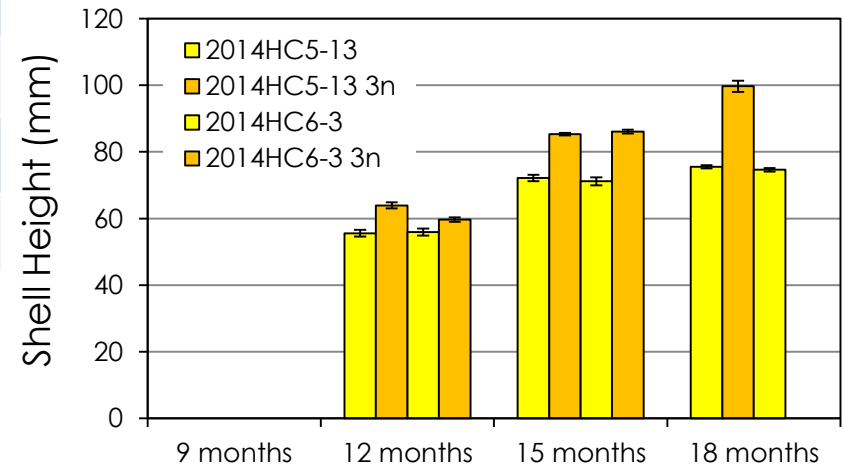
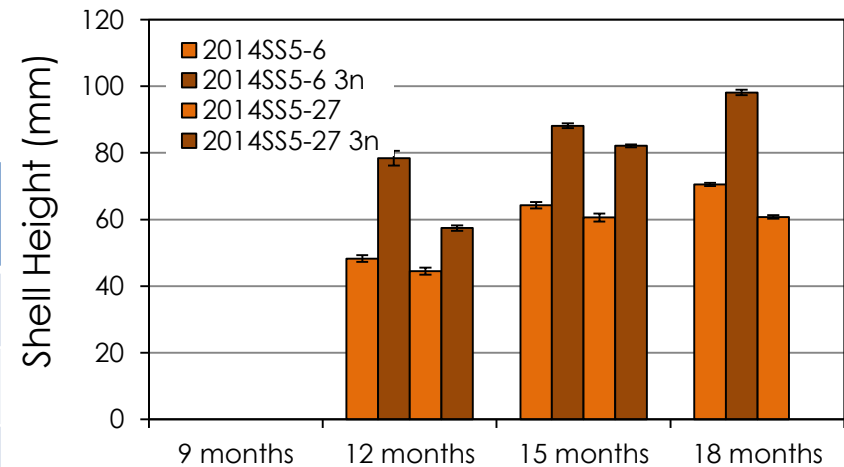
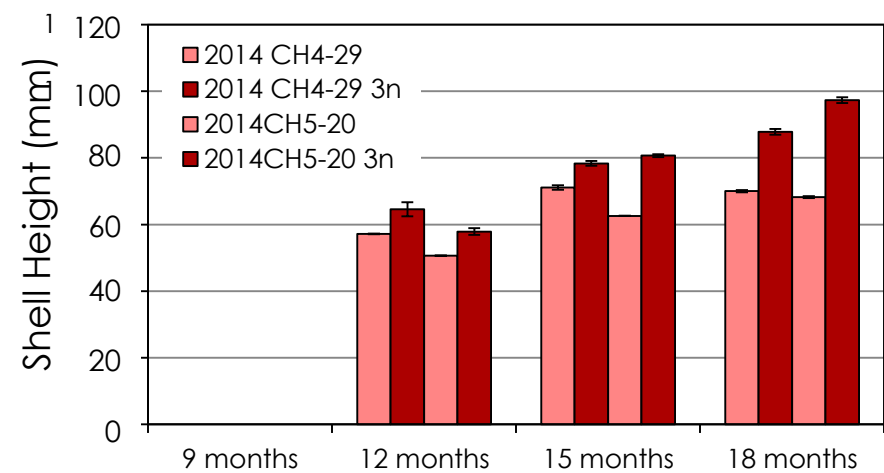




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"E"	ND	"MANY"
"F"	88.5±0.87	85



OTHER SPECIES?

- SUN RAY VENUS CLAMS
 - ~200 NC BROODSTOCK
CONDITIONING
 - PREVIOUS EFFORT WITH FLORIDA
BROODSTOCK YIELDED CLAMS
THAT DEMONSTRATED RELATIVELY
POOR GROWTH (<40MM @30
MONTHS) AND SHELL
MALFORMATIONS
 - BAY SCALLOPS
 - HATCHERY PRODUCTION WORKED
OUT (WHEN WE CAN GET
BROODSTOCK)
 - GROW OUT CHALLENGING

THANKS
TO ALL
THOSE THAT
MAKE THIS
POSSIBLE...



SRH STAFF

AMY
FINELLI

NELSON
BULLOCK



**....INCLUDING
STAFF...**



ABIGAIL
LARSEN

**CMS SEAWATER
STAFF**
RON MOORE



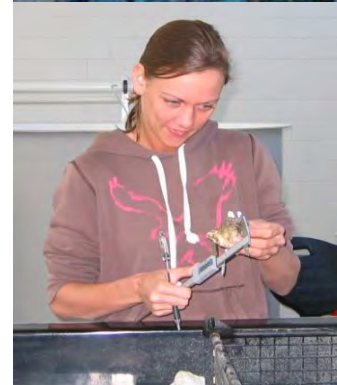
SAM
ROY



...THE SMALL ARMY OF STUDENTS...

(SINCE 2012)

SARA EISLER ERIN GROSS LATICIA WALLACE SAMANTHA WELCH CHRISSY
BADGER DOUG FAIRCLOTH MATT HUNT DAN LINK BRENDAN TURLEY JIM
WHITE DAN HAPPICK JESSICA LOWCHER LAUREN MCCASLIN SHELBY SPADE
CODY MOORMAN KAYLA MCCUTCHEON KYLE JOHNSON BRIAN GRAHAM
JESSICA DWIGHT RICHARD HUSE MICHAEL HAYES MICHAEL SIMMONDS SAM
ROY PAIGE MILLSAP JESSICA NIXON JOHN WORKMAN JOSEPHINE FRITH
NICO QUADAY TAMMY BLEIER JENNY CHIBIRKA LEAH HASELTINE OLIVIA
VANDEN HEUVEL JAMES HARGROVE KEVIN MA AMELIA JOHNSON ASHLEY
CARTER ANNA DICOCO JAMES HILL BEN SCAINCE EMILY ULLMAN CASEY
CHALMERS RICHARD BOLTZ ANDREA YAMMINE JIM PRESCOTT MICHAEL
WIND AVERY DELMAINE ROBIN VARNEY JOHN CARROLL ALAN DILLAWAY
KRISTEN MORRIS ALLY FOURQUEAN JAMIE KNAUB SEAN HARDISON NOAH
HORNADAY JUSTIN KEENY WILLOW PATTON HUNTER SYNAN MEGHAN
DAUGHERTY KORY ENNEKING MEGAN MAGLIONE KRISTINA KELLER



A close-up photograph of a large pile of oyster shells, with a white text box in the center. The shells are piled together, showing their characteristic rough, textured surfaces in shades of brown, tan, and grey. Some shells are slightly open, revealing a glimpse of the interior. The background is a soft, out-of-focus blue, suggesting a body of water. A white rectangular box with a thin blue border is centered over the middle of the image, containing the text "...OUR INDUSTRY PARTNERS...." in a black, serif, all-caps font.

...OUR
INDUSTRY
PARTNERS....



...AND OUR RESOURCE PROVIDERS

NC DIVISION OF MARINE FISHERIES/NC
GENERAL ASSEMBLY

UNCW ACADEMIC AFFAIRS

UNCW CENTER FOR MARINE SCIENCE

UNCW DEPARTMENT OF BIOLOGY AND MARINE
BIOLOGY

NORTH CAROLINA SEA GRANT

NEW HANOVER COUNTY FARM BUREAU