Genetic selection of Pompano brood fish based on the offspring growth trait

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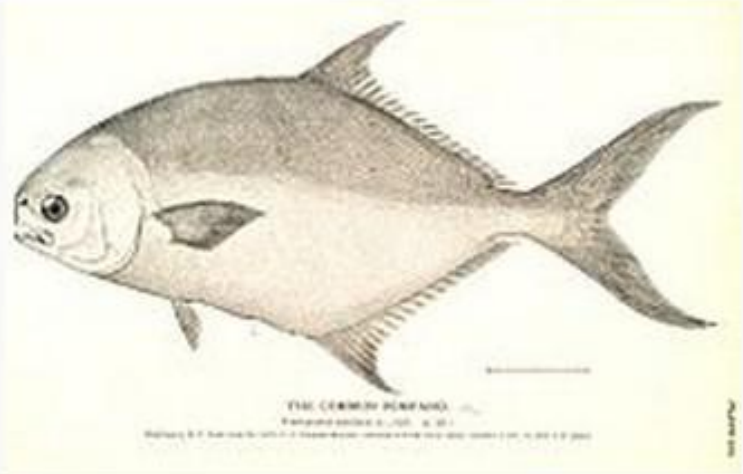
Florida pompano



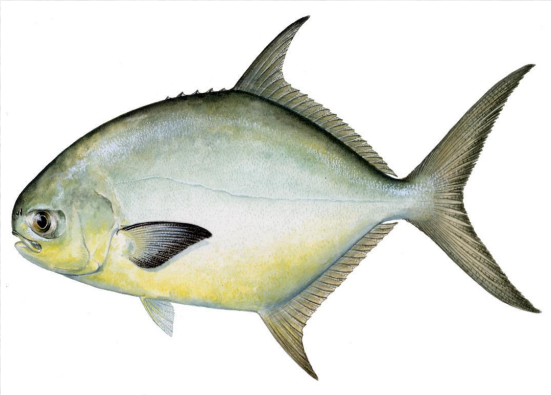
Scientific classification

Kingdom:	Animalia
Phylum:	Chordata
Class:	Actinopterygii
Order:	Perciformes
Family:	Carangidae
Genus:	*Trachinotus*
Species:	***T. carolinus***

- High tolerance of different salinities
- High tolerance of stress
- Readily spawning in captivity
- Relatively fast growth
- Acceptance of pellet diets

Aquaculture industry?

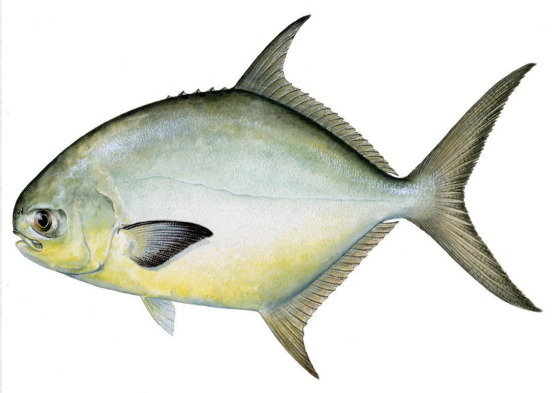
Phenotype = Genetics + Environment



Candidate broodstock
(**16** females and **12** males)

Genotyping

15 polymorphic microsatellite loci



Breeders
(**10** females and **10** males)

Spawning

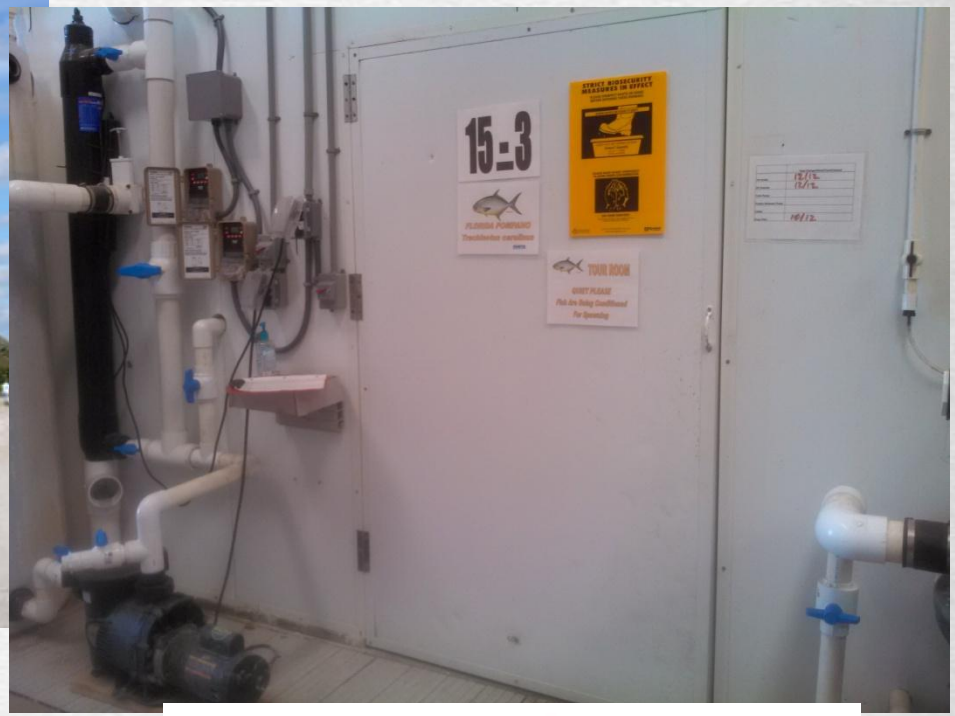
Larvae
(total number: **4686**)

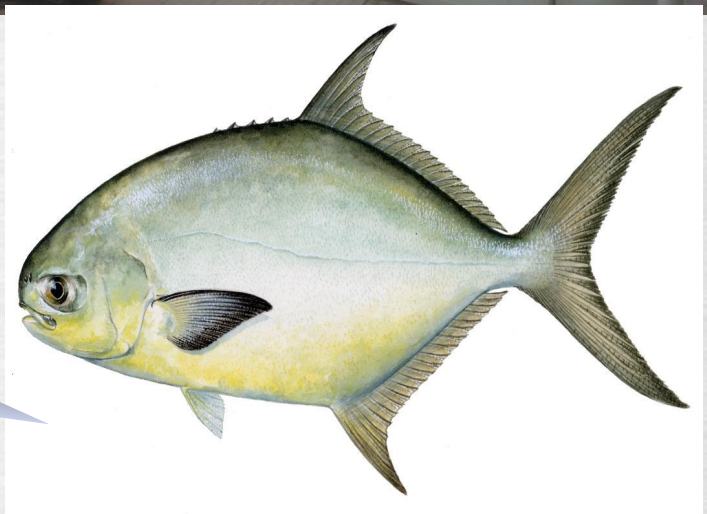
Grading

Genotyping

9 loci

Fast-growing: 515
Slow-growing: 485





Florida pompano
(*Trachinotus carolinus*)

Microsatellite markers

Locus	Repeat motif	No. of alleles	Size range of alleles
TFl01	$(GT)_{17}$	7	241-263
TFl05	$(CA)_{13}$	14	147-225
TFl07	$(CT)_6CC(CT)_8/(CT)_9$	11	170-208
TFl15	$(GT)_{10}$	17	133-221
TFl26	$(CA)_7/(CA)_{10}$	3	224-228
TFl30	$(GT)_{21}$	5	134-142
TFl39	$(CT)_4(AC)_{12}/(TC)_3/(CT)_6$	7	210-238
TFl43	$(CA)_9$	8	163-181
TFl51	$(GT)_{19}$	5	201-209
TFl56	$(CT)_{10}(TC)_{31}$	13	112-148
TFl62	$(AC)_{34}$	13	157-195
TFl64	$(GCA)_{28}$	17	122-191
TFl65	$(CA)_{12}$	3	136-148
TFl66	$(CA)_{10}$	8	187-205
TFl70	$(CA)_{16}$	5	110-122

Breeders

Samples		Sample Source	Weight (g)	Length (cm)	Gonad Development
Male	M-2	F1	500	28.6	Flowing
	M-3	F1	785	32.1	No Sample
	M-4	F1	925	33.7	Flowing
	M-5	F1	675	30.3	No Sample
	M-6	F1	995	30.5	Flowing
	M-7	F1	665	31.5	Mild
	M-8	F1	635	31.9	No Sample
	M-9	Wild	1645	41.8	Flowing
	M-10	Wild	1135	37.3	Flowing
	M-12	Wild	955	32.9	Flowing
Female	F-1	F1	1555	37.5	SGe, SGl, & SGfg
	F-2	F1	1080	34.7	SGl and SGfg
	F-3	F1	1585	38.5	Few ring, SGe, & SGl; Most SGfg
	F-9	F1	1300	36.5	Few ring, SGe, & SGl; Most SGfg
	F-10	F1	1135	33.4	SGfg
	F-12	Wild	2730	46.4	SGfg
	F-13	Wild	1820	41.9	SGfg
	F-14	Wild	2440	45.5	SGfg
	F-15	Wild	1465	37.8	SGl and SGfg
	F-16	Wild	1710	40.3	SGl and SGfg

Larvae

Offspring	Body length	Body height	Body weight	Number
Fast-growing	>47 mm	>20 mm	>2.9 g	515
Slow-growing	<35 mm	<15 mm	<1.1 g	485

Microsatellite markers

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TFl70	$(CA)_{16}$	5	110-122

Female breeders

Female	Initial Time	Sample Source	Weight (g)	Length (cm)		Gonad Development	Offspring No.	Contribution (%)
F-1	2012	F1	1555	37.5	6	SGe, SGl, & SGfg	19	1.9
F-2	2012	F1	1080	34.7	10	SGl and SGfg	0	0
F-3	2012	F1	1585	38.5	5	Few ring, SGe, & SGl; Most SGfg	0	0
F-9	2012	F1	1300	36.5	8	Few ring, SGe, & SGl; Most SGfg	112	11.2
F-10	2012	F1	1135	33.4	9	SGfg	3	0.3
F-12	2009	Wild	2730	46.4	1	SGfg	594	59.4
F-13	2009	Wild	1820	41.9	3	SGfg	252	25.2
F-14	2013	Wild	2440	45.5	2	SGfg	0	0
F-15	2013	Wild	1465	37.8	7	SGl and SGfg	0	0
F-16	2013	Wild	1710	40.3	4	SGl and SGfg	20	2.0

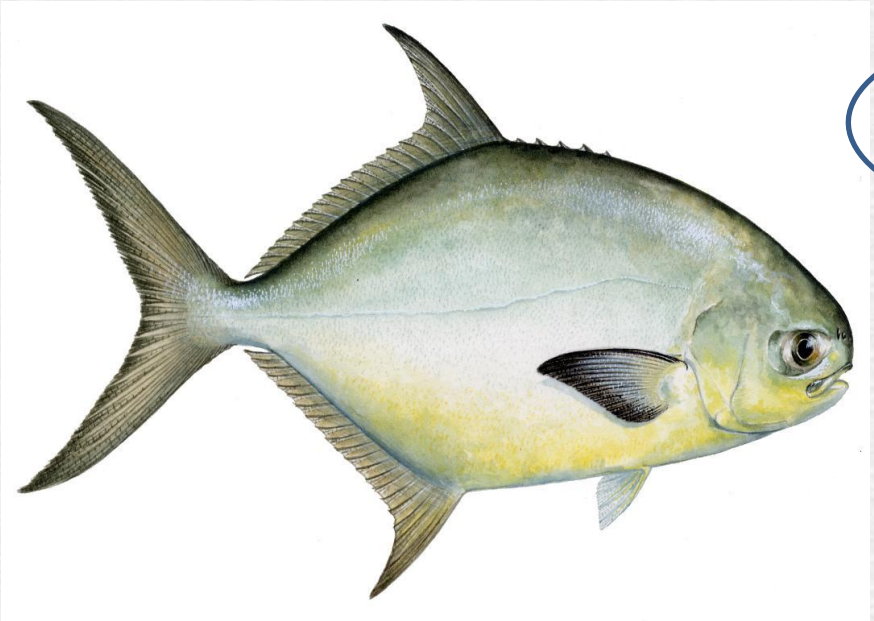
Female	Body length	Body weight	Offspring			Fast-growing Contribution
			Fast-growing	Slow-growing	Total	
F-12 ★	46.4	2730	337	257	594	56.73%
F-13 ★	41.9	1820	141	111	252	55.95%
F-9	36.5	1300	29	83	112	25.89%
F-16	40.3	1710	5	15	20	25.00%
F-1	37.5	1555	2	17	19	10.53%
F-10	33.4	1135	1	2	3	33.33%

Male breeders

Samples	Initial Time	Sample Source	Weight (g)	Length (cm)		Gonad Development	Offspring No.	Contribution (%)
M-2	2012	F1	500	28.6	10	Flowing	0	0
M-3	2012	F1	785	32.1	6	No Sample	0	0
M-4	2012	F1	925	33.7	5	Flowing	5	0.5
M-5	2012	F1	675	30.3	7	No Sample	0	0
M-6	2012	F1	995	30.5	3	Flowing	4	0.4
M-7	2012	F1	665	31.5	8	Mild	0	0
M-8	2012	F1	635	31.9	9	No Sample	0	0
M-9	2009	Wild	1645	41.8	1	Flowing	738	73.8
M-10	2009	Wild	1135	37.3	2	Flowing	209	20.9
M-12	2013	Wild	955	32.9	4	Flowing	44	4.4

Male	Body length	Body weight	Offspring			Fast-growing Contribution
			Fast-growing	Slow-growing	Total	
M-9 ★	41.8	1645	453	285	738	61.38%
M-10	37.3	1135	59	150	209	28.23%
M-12	32.9	955	3	41	44	6.82%
M-4	33.7	925	0	5	5	0.00%
M-6	35	995	0	4	4	0.00%

Female	Male	Offspring			Fast-growing Contribution
		Fast-growing	Slow-growing	Total	
F-1	**M-9** ★	1	6	7	14.29%
F-1	**M-10**	0	1	1	0.00%
F-1	**M-12**	1	10	11	9.09%
F-9	**M-6**	0	3	3	0.00%
F-9	**M-9** ★	27	44	71	38.03%
F-9	**M-10**	0	7	7	0.00%
F-9	**M-12**	2	29	31	6.45%
F-10	**M-6**	0	1	1	0.00%
F-10	**M-10**	1	0	1	100.00%
F-10	**M-12**	0	1	1	0.00%
F-12 ★	**M-9** ★	281	122	403	69.73%
F-12 ★	**M-10**	56	135	191	29.32%
F-13 ★	**M-9** ★	141	111	252	55.95%
F-16	**M-4**	0	5	5	0.00%
F-16	**M-9** ★	3	2	5	60.00%
F-16	**M-10**	2	7	9	22.22%
F-16	**M-12**	0	1	1	0.00%



What's next?

1. Result Verification…
2. Broodstock enlarge…
3. Breeder selection…

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Thank you