

EFFECT OF INITIAL BIOMASS ON CHANNEL CATFISH YIELD AND WATER QUALITY IN A BIOFLOC TECHNOLOGY PRODUCTION SYSTEM

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Channel Catfish in BFT System

- **Channel catfish in an outdoor BFT system**
 - **Grown to market size**
 - **16-21 cm (25-63 g) fingerlings stocked**
 - **0.4 – 1.9 kg/m³ (6-12 fish/m²)**
 - **Grown to large fingerlings (stockers)**
 - **18 cm (48 g) fingerlings stocked**
 - **1.8 – 2.3 kg/m³ (26-44 fish/m²)**
- **Determine the effect of initial fish biomass of large stocker catfish on production characteristics and water quality in a BFT production system.**

Experimental Units

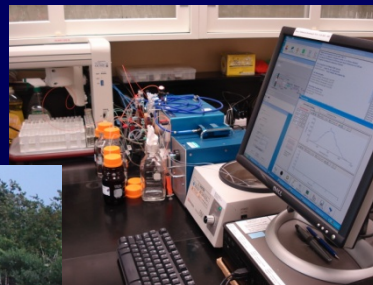


- 9 HDPE-lined (18.6 m², 15.5 m³) tanks
- 1.865 kW (2 hp) regenerative blower per 3 tanks
- Well water seeded with plankton & fertilized
- Dried molasses
- NaHCO₃ added as needed to raise pH
- Maintained 100 mg/L Cl⁻
- No water exchange, but evaporative losses replaced
- Settling chamber (130 L) to manage solids (TSS and settleable)

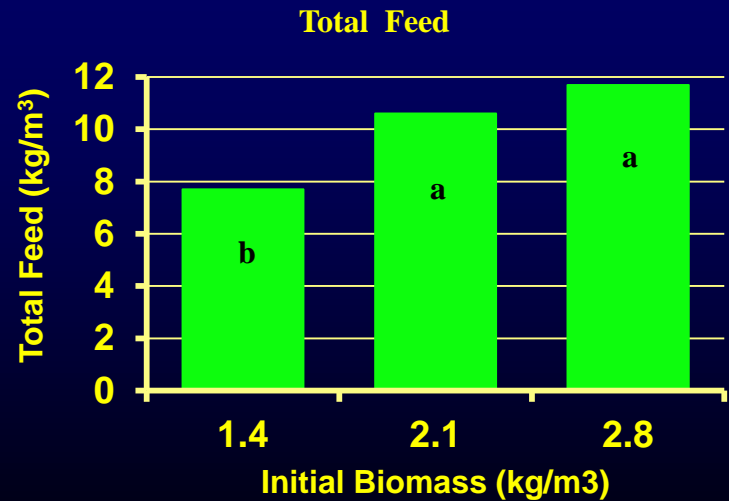
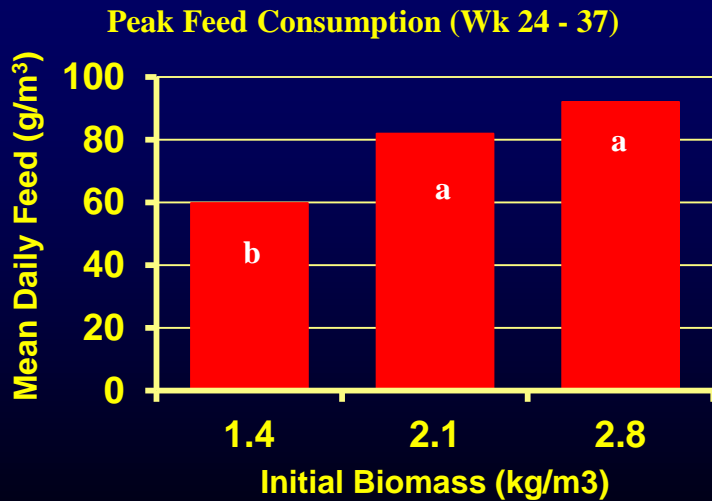
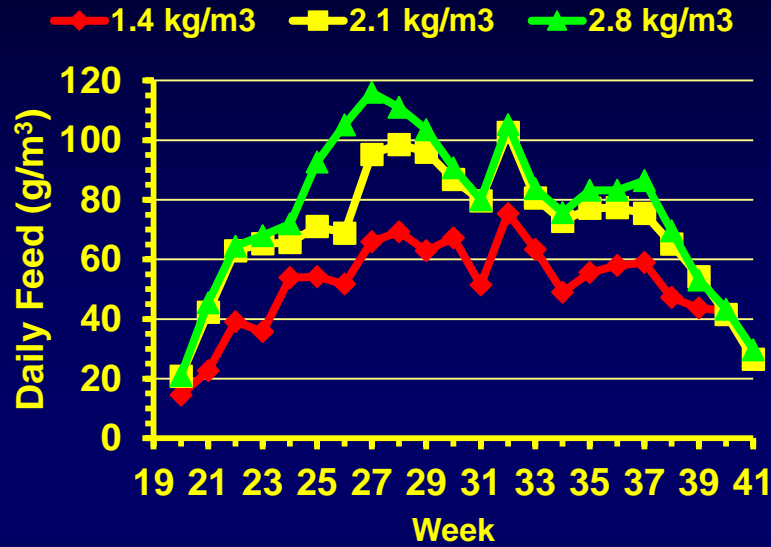


Protocol

- **Channel catfish (*Ictalurus punctatus*)**
 - **Initial biomass: 1.4, 2.1, 2.8 kg/m³ (5.4, 8.1, 10.8 fish/m²)**
 - **217 g/fish (30.5 cm/fish)**
 - **154-d duration**
- **32% protein floating feed**
- **Weekly water quality analyses**
 - **TAN, NO₂-N, NO₃-N, SRP, TSS, TVSS, Settleable Solids, Total Alkalinity, pH, Chlorophyll *a***
- **MIB & GSM analyses**
- **DO & water temperature**
 - **Data logger**



Feed Loading



Mean Nitrogen Concentrations

LS Means \pm SE

	NH₄-N	NO₂-N	NO₃-N
Initial Biomass		(mg/L)	
1.4 kg/m³	0.18^a	0.87^b	53.67^a
2.1 kg/m³	0.17^a	1.39^a	70.09^{ab}
2.8 kg/m³	0.27^a	1.12^{ab}	84.07^b
SE	0.07	0.12	6.53
P - Value	0.602	0.049	0.045

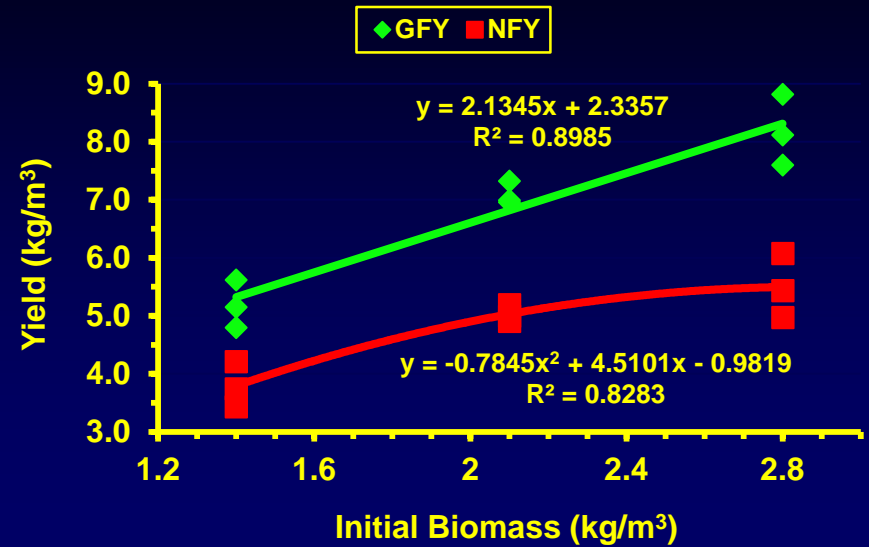
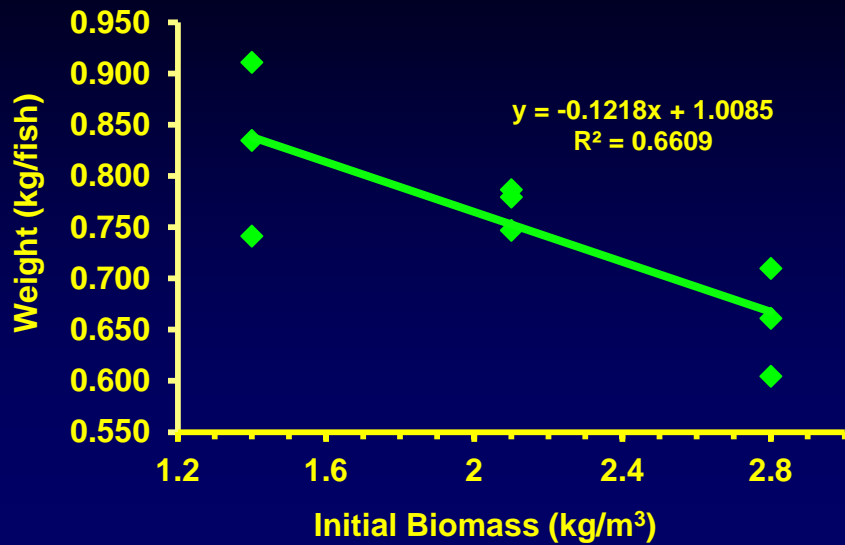
ab means within column followed by same letter do not differ significantly, $P > 0.05$.

Water Quality

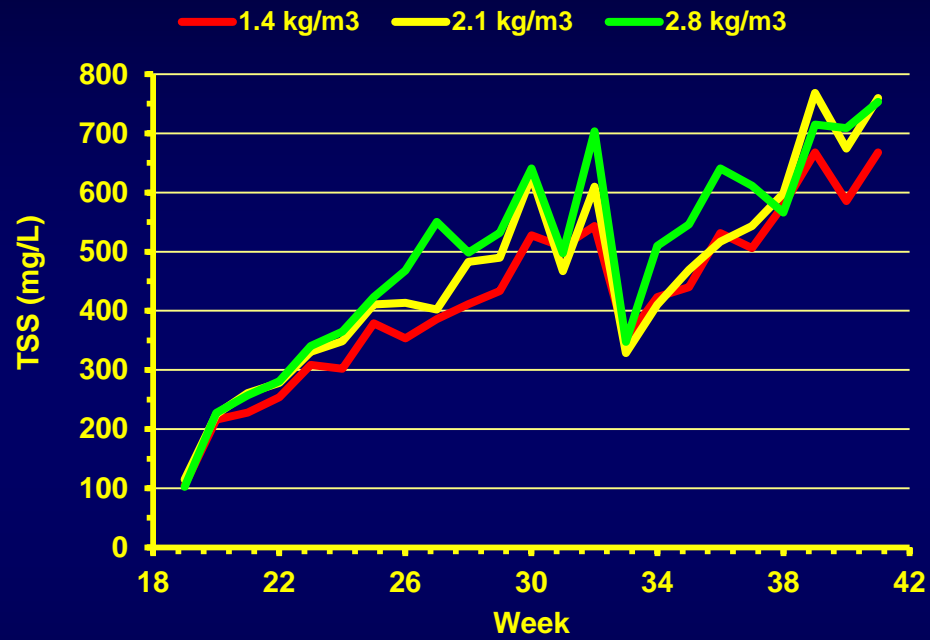
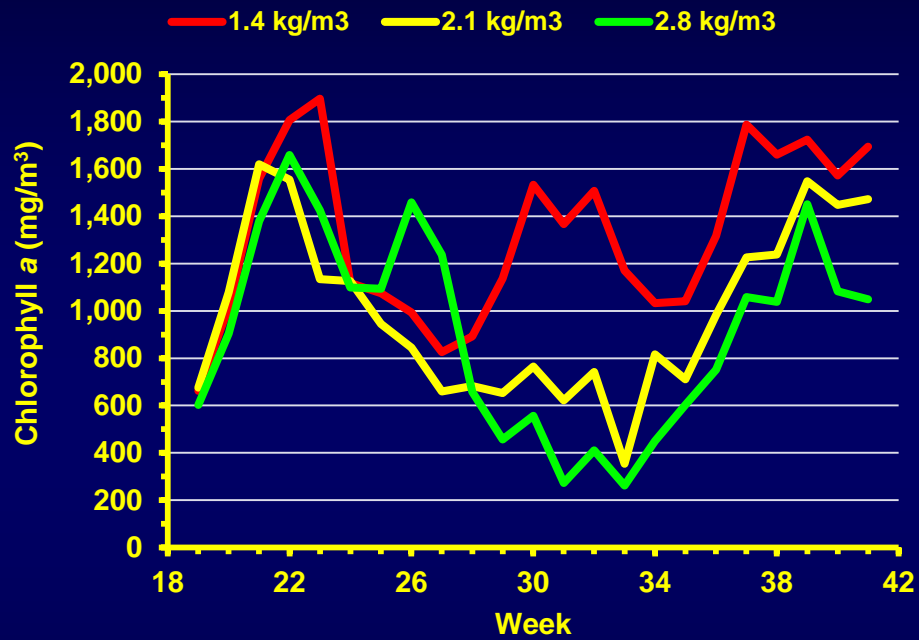
LS Means \pm SE

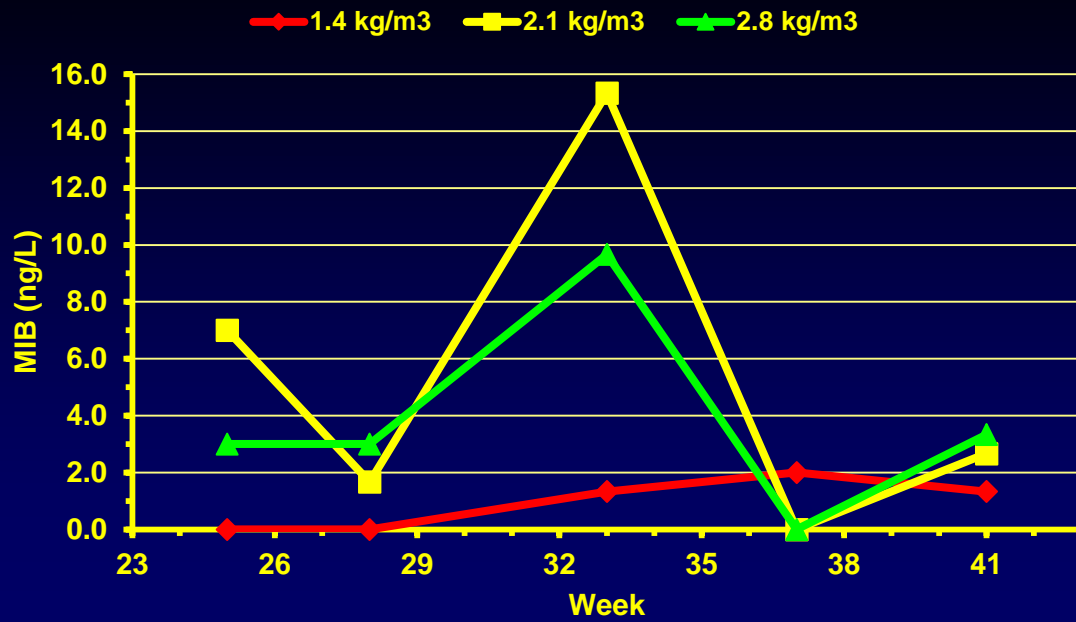
Initial Biomass	PO ₄ -P (mg/L)	Total Alkalinity (mg/L CaCO ₃)	Chlorophyll <i>a</i> (mg/m ³)	Settleable Solids (mL/L)	TSS (mg/L)	TVSS (mg/L)
1.4 kg/m ³	14.6 ^b	122.7 ^a	1,321 ^a	32.9 ^a	422.1 ^a	354.6 ^a
2.1 kg/m ³	18.4 ^a	114.6 ^a	995 ^b	38.5 ^a	457.9 ^a	378.0 ^a
2.8 kg/m ³	20.6 ^a	121.2 ^a	911 ^b	41.0 ^a	490.7 ^a	410.4 ^a
SE	0.8	3.5	71	3.1	20.6	18.4
<i>P</i> - Value	0.005	0.295	0.015	0.240	0.141	0.179

ab: means within column within study followed by same letter do not differ significantly, $P > 0.05$.

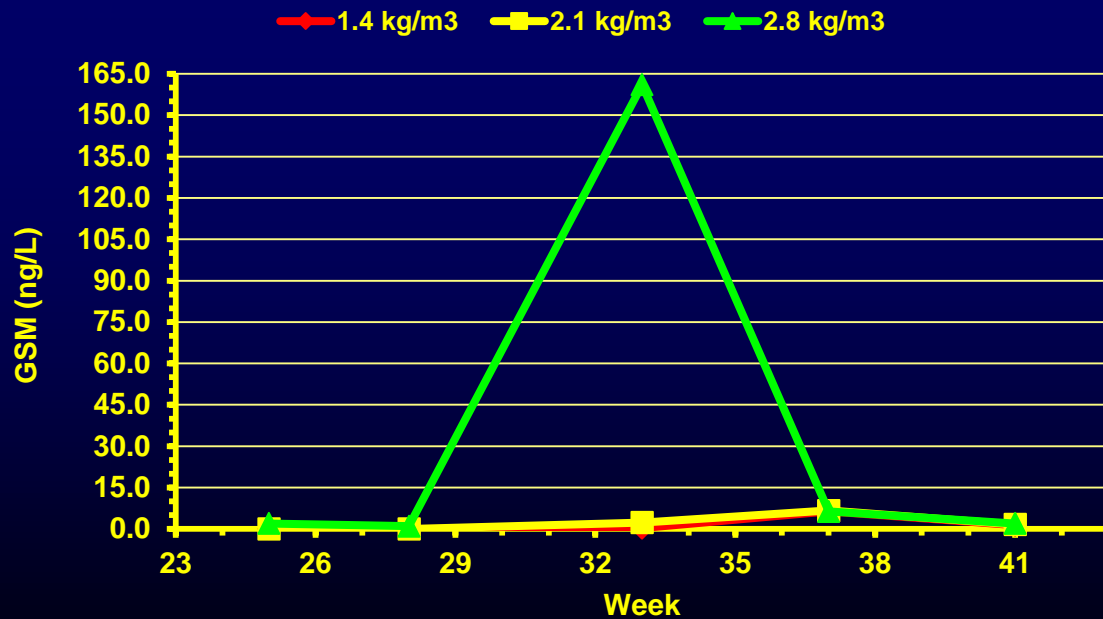


Initial Biomass	Survival (%)	FCR
1.4 kg/m ³	97.3	1.5
2.1 kg/m ³	96.7	1.5
2.8 kg/m ³	97.7	1.4
SE	0.8	0.05
P - Value	0.658	0.615

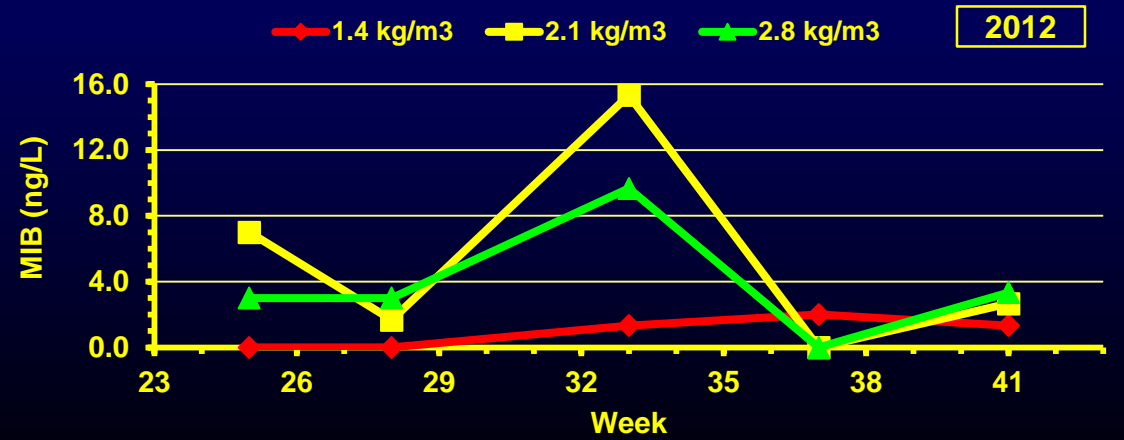
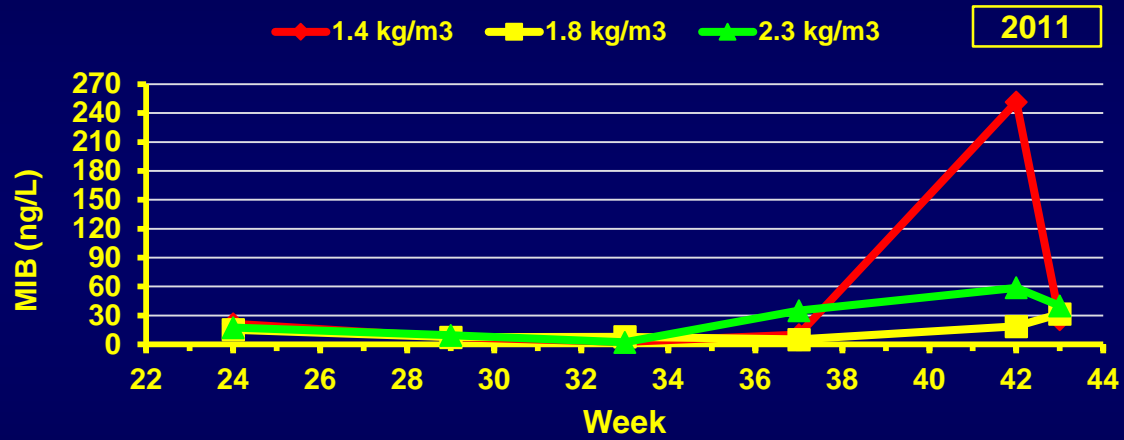
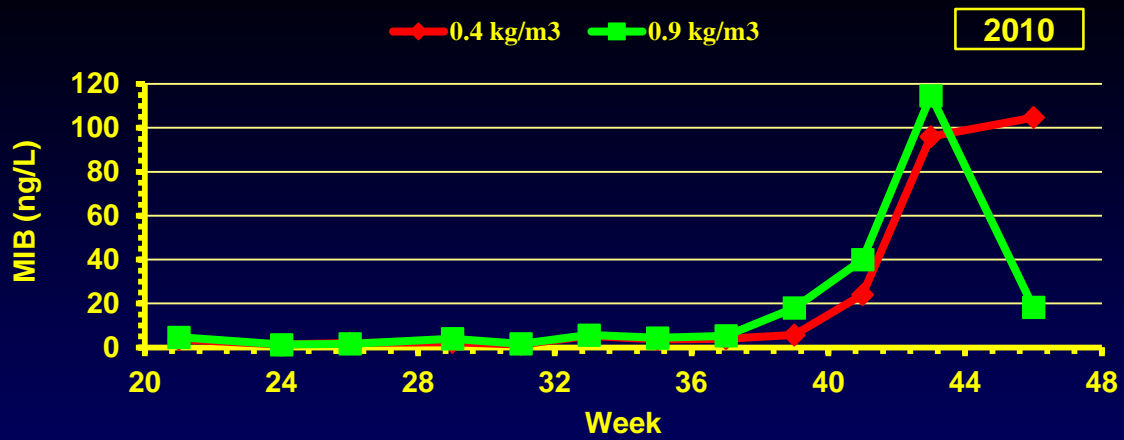


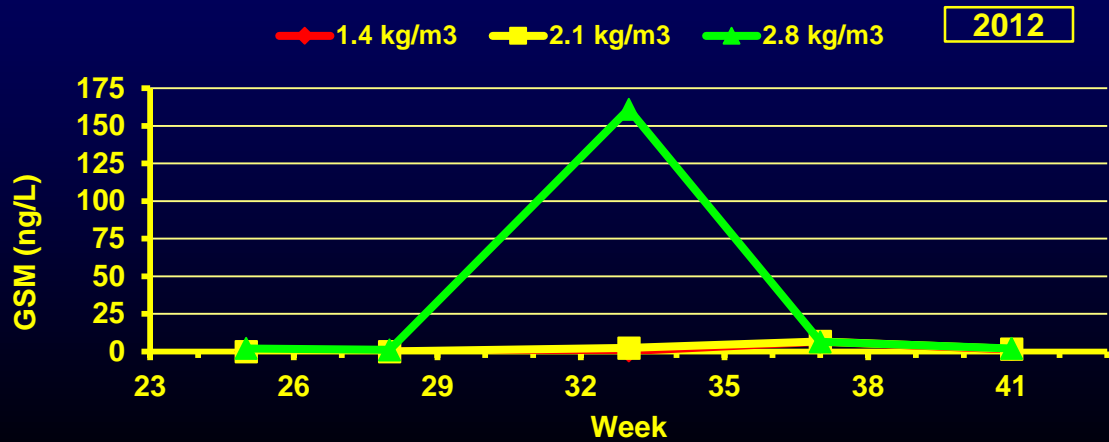
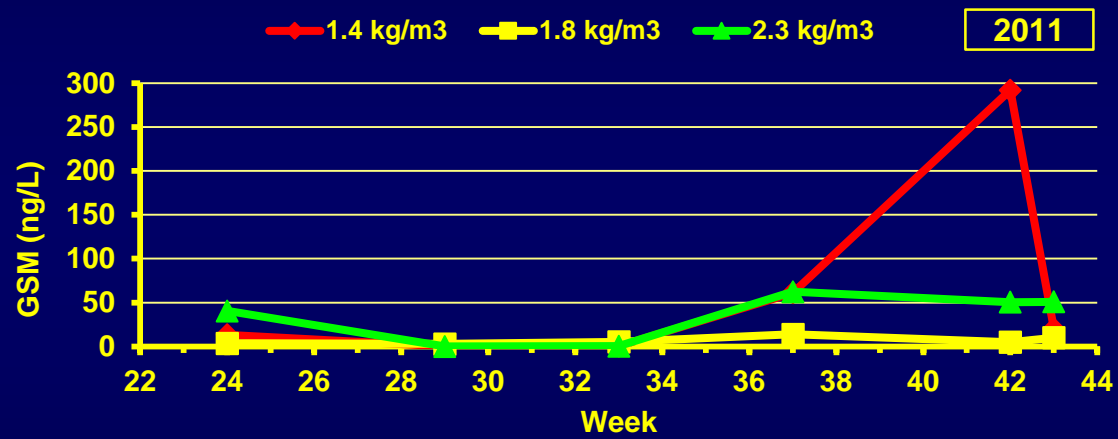
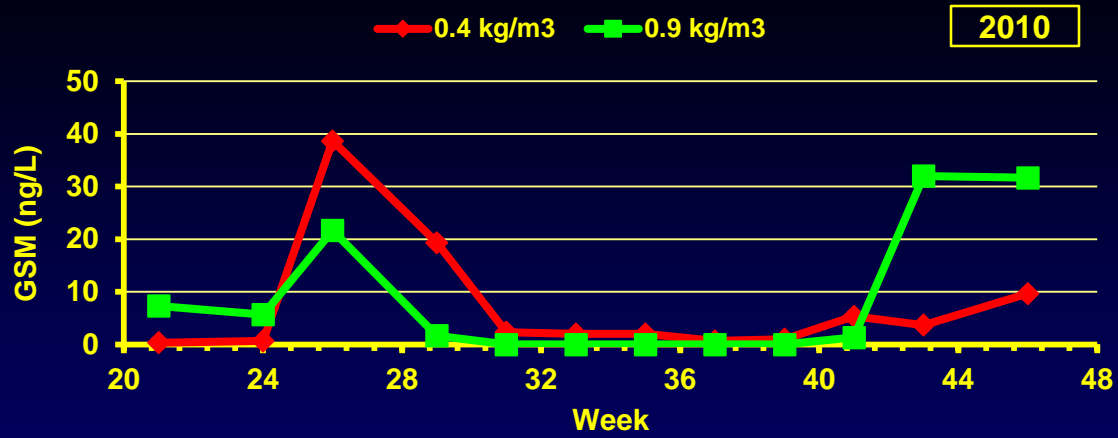


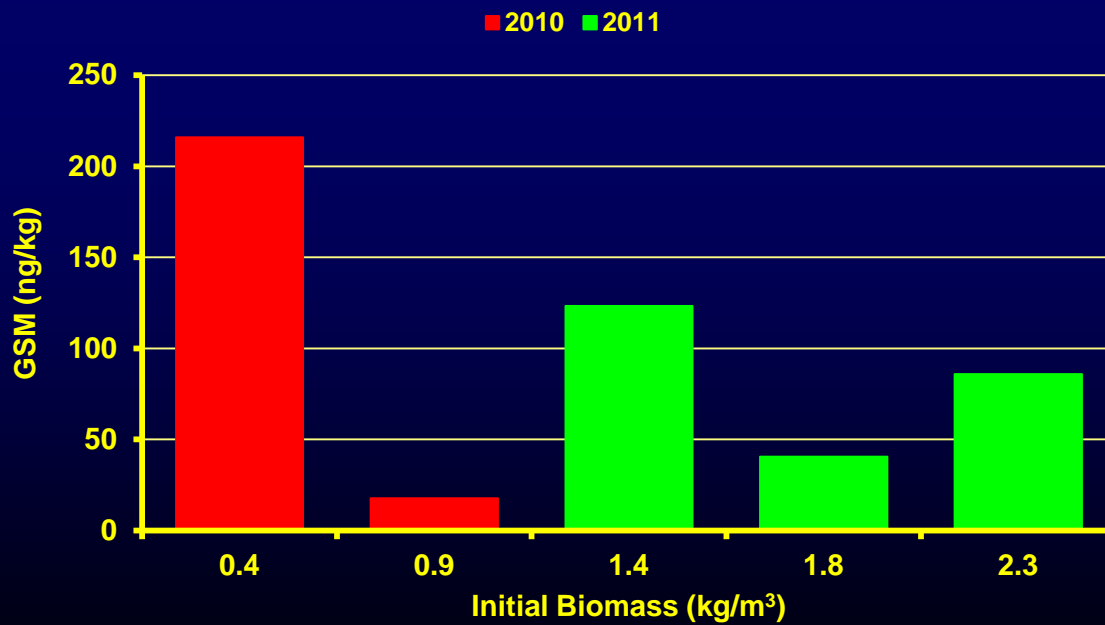
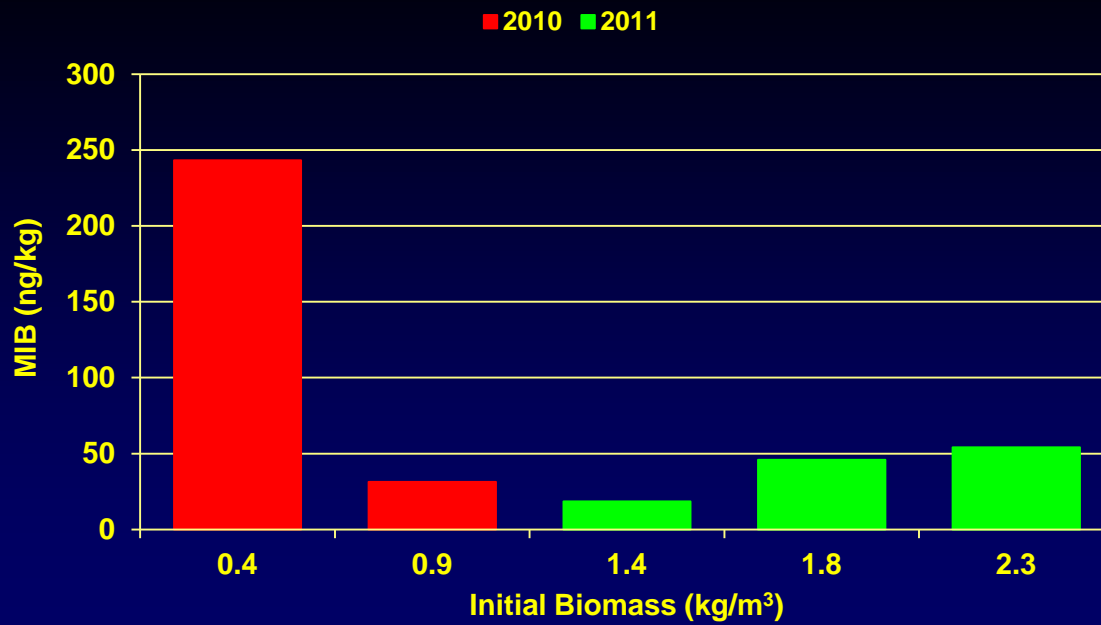
Biomass	MIB (ng/L)
1.4 kg/m ³	1.0 ^a
2.1 kg/m ³	5.0 ^a
2.8 kg/m ³	4.0 ^a
SE	1.2



Biomass	GSM (ng/L)
1.4 kg/m ³	1.7 ^a
2.1 kg/m ³	2.7 ^a
2.8 kg/m ³	34.3 ^a
SE	18.4







Summary

- **Responses to increased stocking biomass**
 - **Linear decrease in mean final weight**
 - **Curvilinear increase in NFY**
 - **3.8 to 5.5 kg/m³**
- **Low concentrations of MIB and GSM in water**
 - **Observed for 3 consecutive seasons**

Acknowledgement

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