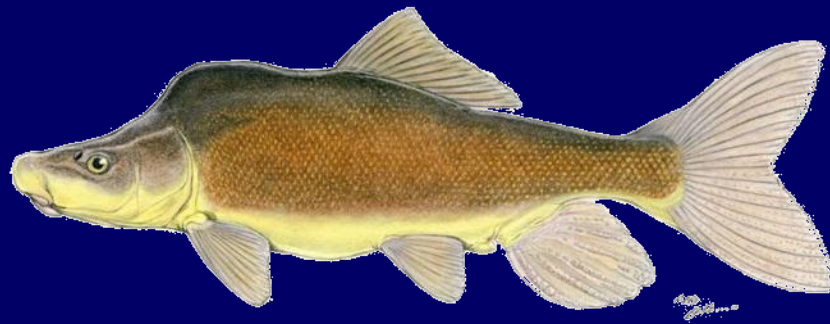


Growth of Razorback Sucker at Bubbling Ponds Hatchery, AZ



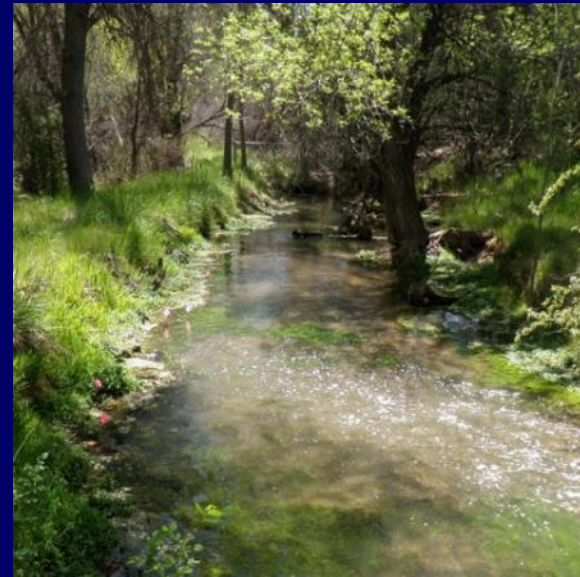
David Ward
Arizona Game and Fish Department
Research Branch

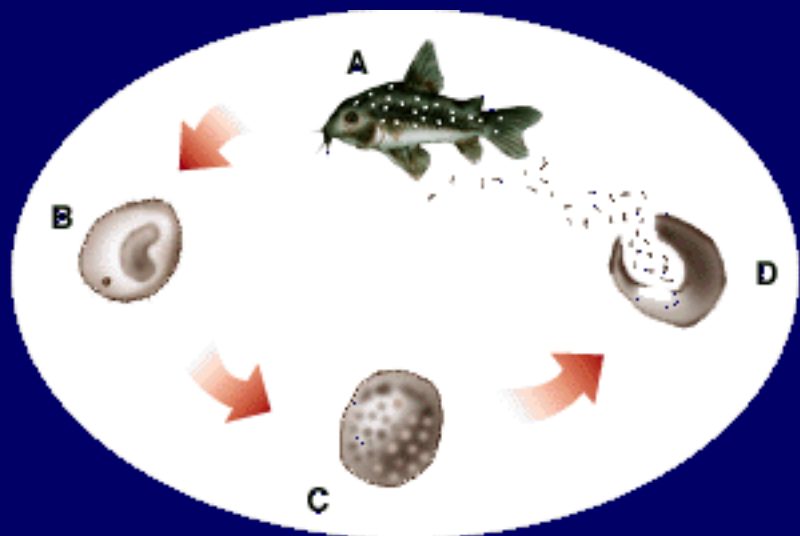
3 Growth Experiments in 2010

- Effects of *ichthyophthirius multifiliis* (Ich)
- Growth rates of fish tagged at 300 + mm
- Effects of sorting practices on growth



Effects of Ich on Growth







Page springsnail



Small (1 -8 mm) freshwater snail of the family Hydrobiidae, endemic to several small springs Near Oak Creek Canyon in Arizona

Snail Methods

- **Thirty snails in each of 12, 10-gallon aquaria with aeration**
- **treated with CFT Legumine Rotenone concentrations of 0, 2, 4 and 12 ppm.**
- **Two consecutive 12-hour treatments with 12 hours of fresh water between treatments.**
- **Snails held for 3 weeks post treatment in fresh water to evaluate delayed mortality**



Snail Results

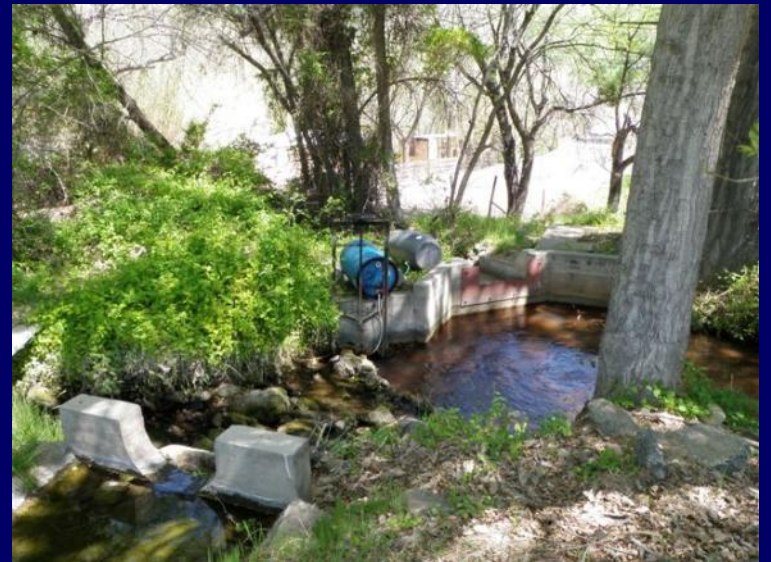
Tank #	Treatment	# of Live Snails
1	Control	24
2	Control	21
3	Control	29
4	2 ppm	17
5	2 ppm	24
6	2 ppm	18
7	4 ppm	13
8	4 ppm	19
9	4 ppm	22
10	12 ppm	0
11	12 ppm	0
12	12 ppm	0



Recommended dosages of rotenone to remove fish typically range from 2- 4 ppm, indicating that rotenone could be used to eradicate mosquitofish without harming the endemic Page springsnail population.

Rotenone Treatment, CFT Legumine





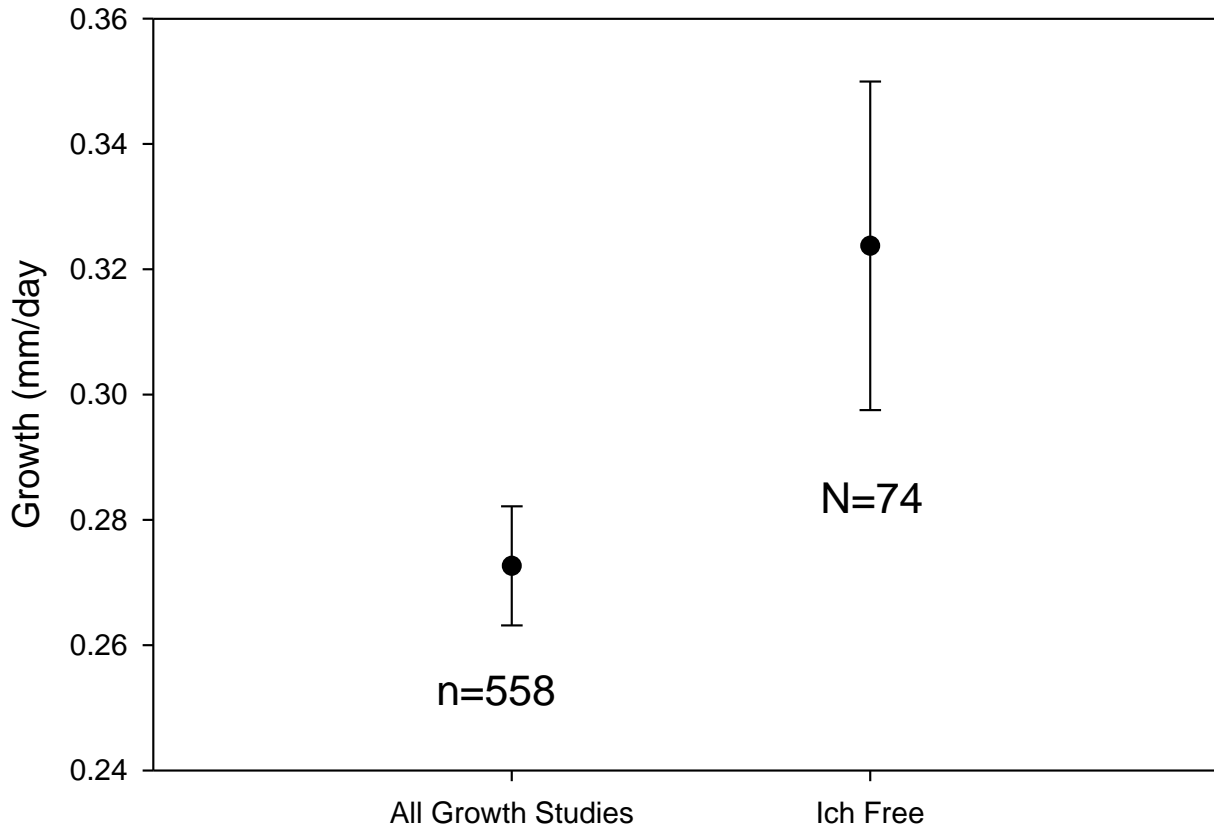


12 mosquitofish caught in the first few days following treatment

20 traps checked daily for 3 weeks caught no additional fish

August 11 – juvenile mosquitofish seen in the pond

0.32 mm/day or 9.6 mm/month



Average growth rate (mm/day) of razorback suckers in pond 8 in the absence of Ich during a 4-month period compared to the average growth rate of razorback suckers at bubbling ponds hatchery from all other studies during the last 4 years. Error bars represent 95% confidence intervals.

Growth rates of fish tagged at 300 + mm

- 210 RZ suckers tagged (pond 3 upper)
- Size at Tagging mean = 285 mm, range = 205 – 396 mm
- In pond for 257 days (May – Jan 2010)



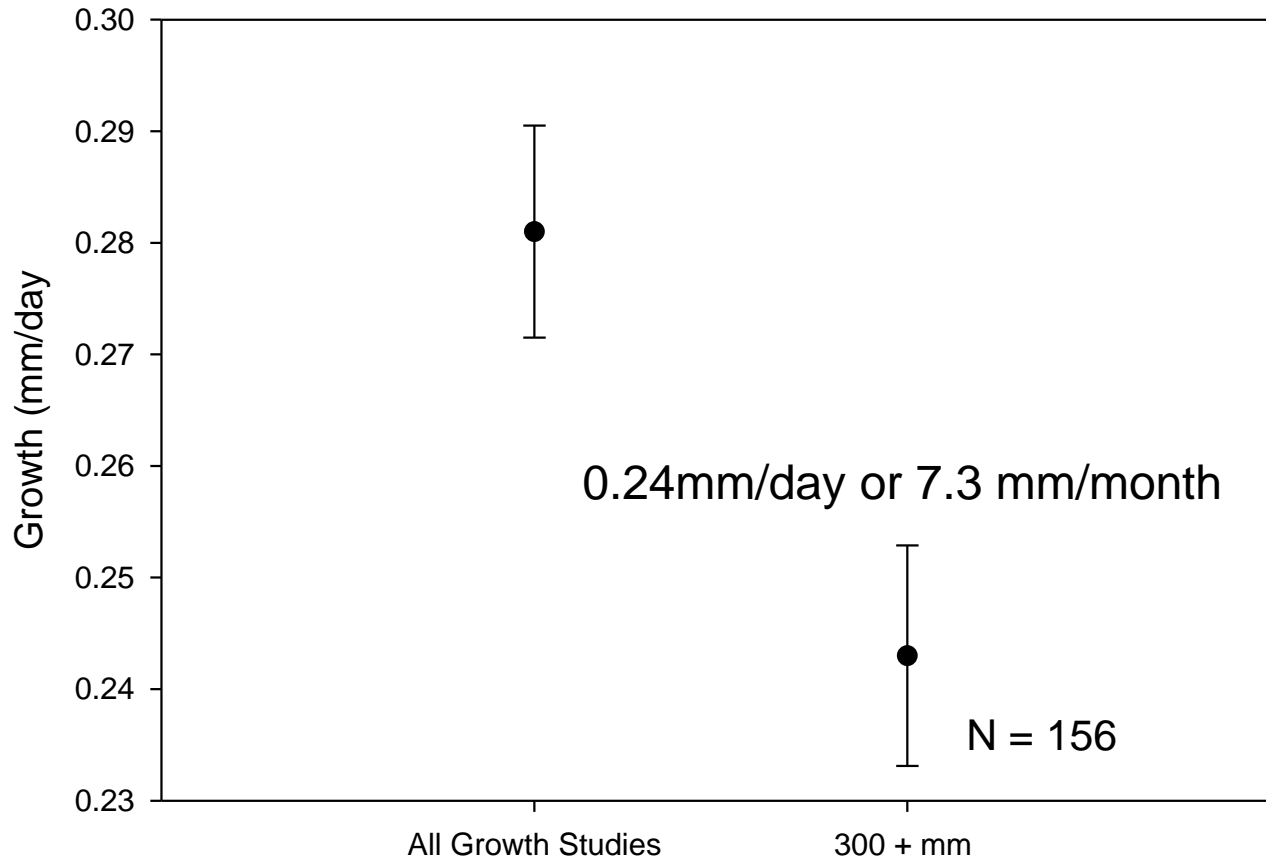
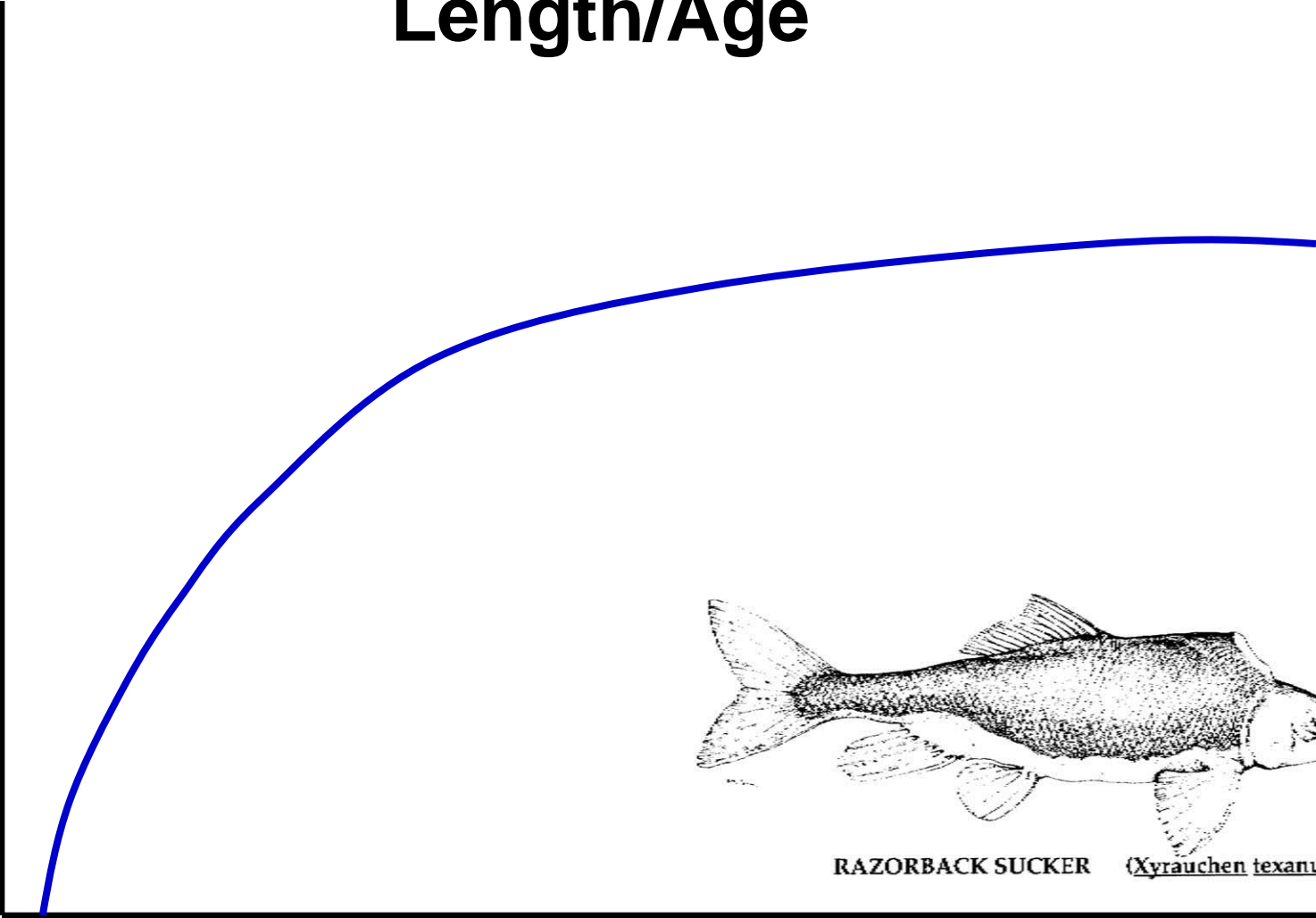


Figure 2. Average growth rate (mm/day) of adult razorback suckers (tagged at 300 + mm TL) in pond 3 compared to the average growth rate of razorback suckers at Bubbling Ponds Hatchery during the last 4 years. Error bars represent 95% confidence intervals.

Length/Age

TL



RAZORBACK SUCKER (*Xyrauchen texanus*)

Time →

Growth of larger RZ suckers

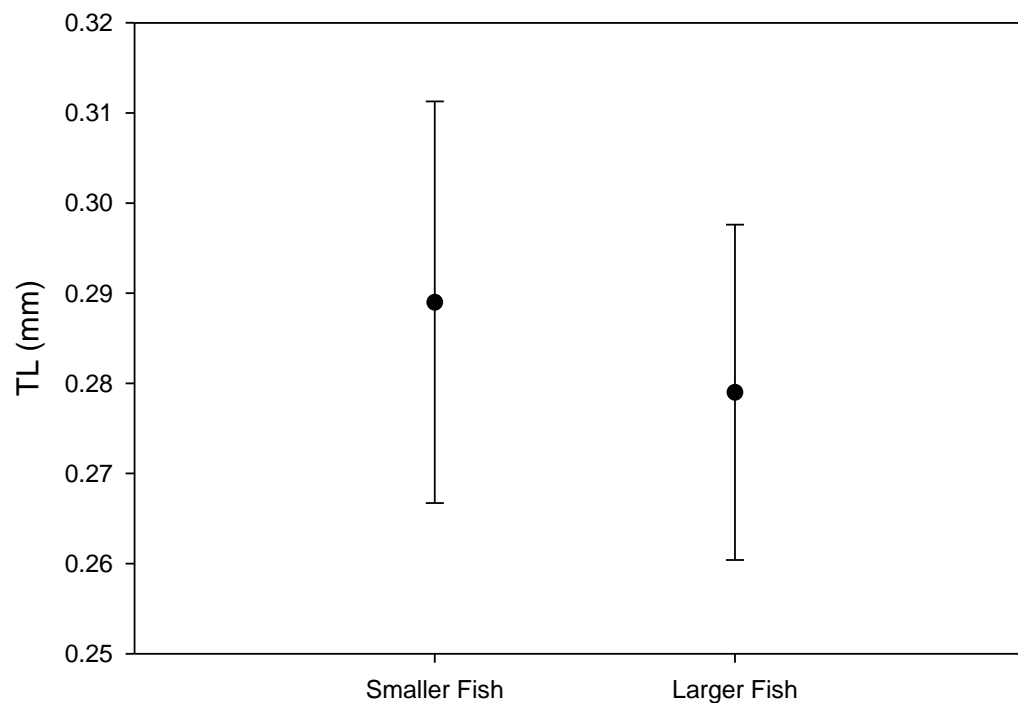
- Average growth rate of larger fish = 0.24 mm/day or 7.3 mm/month
- Average growth rate for all other studies = 0.275 mm/day or 8.25 mm/month
- Reduced growth rate may not really start to be biologically meaningful until fish exceed 450 mm TL

Effects of Sorting on Growth rates

- **Smaller fish sorted into pond 7**
 - Average size 122 mm TL
- **Larger fish sorted into pond 8**
 - Average size 160 mm TL
- **Both ponds harvested after 1 year**



Pond #	Growth rate mm/day	# of fish tagged	# of fish Recovered	Days in pond	Initial TL, mm		Final TL, mm	
					Mean	(Range)	Mean	(Range)
7	0.29	200	120	386	122	(71 – 151)	234	(119 – 372)
8	0.27	200	171	379	160	(115 – 260)	265	(162 – 421)



Effects of Sorting on Growth rates

- No significant differences in growth rate
- Sorting may have helped to offset the original lower growth trajectory of the smaller fish



Conclusions

- Under typical hatchery operations growth of RZ suckers is relatively consistent at Bubbling Ponds Hatchery
(0.2 – 0.3 mm/day or 6 – 9 mm/month)
- Achieving significantly higher growth rates would likely require large changes in rearing practices that may not be practical in order to reach production goals

Acknowledgements

- Bubbling Ponds Staff
 - Frank Agyagos
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