Genetic Monitoring and Control of Recruitment in Bonytail Rearing Ponds

Background

- The SNARRC broodstock is spawned for production purposes on an annual basis:
  - larvae and fingerlings are shipped to several Regional facilities for grow-out
  - stocking size for bonytail requires a multiyear grow-out period
  - precocious individuals often spawn during the second summer of rearing

Background

- Precocious spawning results in several issues:
  - genetic diversity may be decreased in production fish
    - Produced by few parental pairs
  - feed and growth rates cannot be tailored to the needs of the production cycle
  - biomass accumulation can lead to oxygen depletions and deteriorated water quality conditions
    - Ponds have been lost in the past

Purpose

- Use microsatellite markers to assess genetic diversity of individuals naturally spawned (recruitment) in grow-out ponds
  - provide recommendations on the disposition of those fish
    - Genetically diverse: good for augmentation
- Explore the use of small piscivorous fish as a means of biological control to reduce natural recruitment
  - Colorado pikeminnow (approx. 50 mm)

Methods

- 2010-2012
  - Fin clip subsample of young of the year during harvest (September-December)
    - Achii Hanyo, Uvalde NFH, SNARRC
- Genotype at 20 microsatellite loci
  - 8 identical to F_1 genotypes (ca. 2002)
    - Results presented in this talk
  - Added 12 more loci in 2011
    - Increase resolution for relatedness analyses
    - Additional loci not presented in this talk

Methods

- For comparison to study ponds:
  - SNARRC broodstock
    - 2000-2002 year class (F_2)
  - Willow Beach NFH
    - 1981 year class (F_1)

Progress and Results

- To date 1,230 young of the year fin clips have been collected
  - 200 Uvalde NFH (4 ponds; 2010)
  - 400 Achii Hanyo NFRF (4 ponds; 2010)
  - 300 Achii Hanyo NFRF (3 ponds; 2012)
  - 330 SNARRC (4 ponds; 2012)
- Adults were not sampled either prior to stocking pond or post harvest

Progress and Results

Pop	N	N_A	H_O	H_E	F_{IS}
Uvalde 13	41	6.875	0.653	0.650	0.002
Uvalde 14	42	7.250	0.652	0.643	-0.035
Uvalde 23	41	7.125	0.733	0.706	-0.054
Uvalde 24	42	7.500	0.684	0.664	-0.034
Achii 01	82	8.875	0.737	0.772	0.043
Achii 02	79	8.500	0.704	0.750	0.049
Achii 03	82	9.000	0.722	0.764	0.047
Achii C	77	8.500	0.689	0.739	0.053
SNARRC F_2	622	10.250	0.745	0.760	0.014
WBNFH F_1	277	9.750	0.733	0.711	-0.038

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Comparison of 8 loci only

Progress and Results

	Number of Alleles Per Locus									
Locus	Uvalde 13	Uvalde 14	Uvalde 23	Uvalde 24	Achii 01	Achii 02	Achii 03	Achii C	SNARRC F_2	WBNFH F_1
1	7	9	8	10	10	9	12	9	10	12
2	9	11	11	11	12	12	11	12	15	15
3	10	9	10	10	14	14	16	16	18	14
4	4	4	4	4	4	4	5	4	5	6
5	8	6	6	7	11	10	11	8	15	13
6	7	7	6	6	8	7	7	7	7	6
7	5	6	6	6	6	6	5	6	6	5
8	5	6	6	6	6	6	5	6	6	7

2013 Work

- Continue genotyping young of the year
  - Achii Hanyo, SNARRC (2012 collections)
- Spring 2013 (all tenth acre ponds)
  - 3 with 250 (125 M:125 F) BTC w/o CPM
  - 3 with 250 BTC 0.5 lb CPM / 50 lb BTC
  - 3 with 250 BTC 1.0 lb CPM / 50 lb BTC
- Genotype all adults going into ponds
- Examine recruitment densities

Thank You

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