

FIELD NOTES ON PUFFISH HABITATS

IN

DEATH VALLEY, ASH MEADOWS,

&

SOUTHERN AMARGOSA RIVER BASIN

5/31-6/4/83

PART I

by

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From the newsletter of the Michigan Killifish Association, Feb. '84. In connection with a 1983 meeting of the AKA, several killie enthusiasts, including NANFA members Martin, Northfield, MI, and John Brill, Livingston, NJ, toured the area described here. The article will be concluded in a subsequent AC.

Devil's Hole, Ash Meadows

Cyprinodon diabolis

May 31, 1983 - 10:24 A.M.

1. The site has been clearly marked by the Park Service. The cave entrance is enclosed within a cyclone and barbed wire fence, and a wooden ladder has been suspended in the hole leading to the pool. Park Ranger Wayne Westphal led our tour down to the pool.
2. The site consists of a narrow limestone cave on the side of a mountain. The roof of the cave has collapsed, exposing an underwater, rock-strewn shelf, approximately 12 to 14 feet in length to sunlight. The sunlight supports a limited growth of hair algae and mulm which provides a food source for the Cyp. diabolis population. The water depth on the shelf appears to vary from one inch at shoreline to approximately two feet at its outer-most edge. There does not appear to be any water movement on the shelf.
3. Fish populations: Late Summer
Maximum - 450 fish
Minimum - 219 fish
4. Monthly fish population counts are performed by three park rangers using SCUBA gear and diving into the hole.

The technique used for counting the fish population:

- A. Three divers descend to 80 feet.
- B. The first diver starts ascending, counting the fish and concludes with the fish on the shelf.
- C. The second diver watches the counting diver as a safety backup.
- D. The third diver watches the other two divers.

Note: Two non-ranger divers have drowned while diving in the hole. Their bodies were never found.

5. Two refugia have been established for Cyp. diabolis:

- A. Behind Hoover Dam near Las Vegas, Nevada
- B. Amargosa Station refugium near Devil's Hole on Rooker Road.

The Park Service will not transport individuals from either refugium population back to Devil's Hole because these individuals have grown larger in size than those from the Devil's Hole population.

6. Environmental parameters at Devil's Hole:

Water temperature - a constant 92 Deg. F.
Air temperature - approximately 80 Deg. F.
(at time of present visit)
Specific gravity - approximately 1.000
Elevation - approximately 2000 feet above sea level

- 7. The fish population will leave the shelf when the sunlight directly strikes it because the water becomes too warm.
- 8. An artificial light and wooden shelf are no longer used but remain in disrepair along side the hole. These are from an early attempt to extend the length of the natural shelf and save the fish population during a previous period of heavy crop irrigation in Ash Meadows. At that time, the water level dropped to within two or three feet of the outer-most edge of the natural shelf. A wooden platform was constructed and lowered into the water beyond the natural shelf. A florescent light was suspended over the wooden platform in an attempt to grow algae and attract the fish population to it. This experiment was not very successful.
- 9. The water level in the pool is currently at an all-time high. This is due to an above average spring rainfall and a reduction of crop irrigation in Ash Meadows.
- 10. The fish population is currently expanding in numbers without any obvious explanation. One recent theory for this increase is based on bat guano falling onto the ledge. They feel it has increased the over-all biological richness of the shelf environment.
- 11. We were allowed to capture one pair of Cyp. diabolis for photographing. Dale Weber captured the female and John Brill captured the male. After photographing the pair, they were returned to the pool. Total time in the photographing tank was approximately 15 minutes.

Amargosa Station Refugium, Ash Meadows

Cyprinodon diabolis

May 31, 1983 - Early Afternoon

- 1. The refugium is located on Rooker Road, within sight of Devil's Hole. It has not been marked with a sign by the Park Service but is enclosed within a cyclone fence.
- 2. It was established two years ago and is currently maintained by the Park Service.
- 3. The refugium consists of a rectangular concrete tank, approximately 15 feet long with a ten foot deep well at one end. There are two overhead wooden sheets of plywood at either end of the tank providing shade. I assume this has been an attempt to simulate the same conditions as on the breeding shelf in Devil's Hole. This plywood provides shade over the well area and the far end leaving the center of the tank exposed to the sun. Wooden framed wire covers were bolted across the top of the tank.
- 4. A starter population of Cyp. diabolis was taken from Devil's Hole and introduced into the refugium. The population has currently stabilized at approximately 35 individuals.
- 5. We were allowed to unbolt the covers to observe the tank. Almost the entire surface of tank was covered with a heavy layer of floating algae. We had to push it back with our hands to observe the fish.
- 6. Water temperature - approximately 94 Deg. F.

The water temperature is not constant. Colder water is periodically pumped into the tank in an attempt to maintain a constant temperature.
- 7. Specimens from this captive population of Cyp. diabolis are now larger in size than those from the Devil's Hole population. The average total length of individuals from the refugium population are approximately one and one half inches, whereas individuals from the Devil's Hole population are approximately one inch long. There are no studies currently underway to determine why this size difference exist.

Salt Creek, Death Valley

Cyprinodon salinus

May 31, 1983 - 3:30 P.M.

1. The park was clearly marked by the Park Service and is located on all the tourist maps of Death Valley. A wooden boardwalk has been built which can be followed throughout the site. The Park Service has also supplied a map at the site showing points of interest as you tour the park.
2. The air temperature was above 115 Deg. F. (off the scale of my thermometer).

Water and specific gravity readings were taken at three points in Salt Creek:

- A. Shallow channel near the approach to the creek (park entrance)
Water depth - one inch or less
Water temperature - 102 DEG. F. (in open water)
Specific gravity - 1.018
 - B. Deeper channels near the approach to the creek (upstream from park entrance)
Water depth - one to two feet
Water temperature - 92 Deg. F. (slight shade from vegetation)
Specific gravity - 1.018
 - C. Several hundred feet upstream (center of park, deeper main channel)
Water depth - two to three feet
Water temperature - 92 Deg. F. (denser shade from vegetation)
Specific gravity - 1.018
3. Hundreds of juvenile Cyp. salinus were schooling in the shallow channels near the approach to the creek. The juveniles appeared to be concentrated in the shallows while the adults stayed in schools in the deeper areas. Throughout the creek, the largest fish concentrations appeared to be centered in the shallower channels near the park entrance, as opposed to the deeper pools further upstream.

4. The water current was sluggish throughout the creek and varied with water depth.
5. Insect life was very heavy in the park area:
 - A. Mosquito larva in backwash areas
 - B. Water Beetles (boatmen) everywhere (largest percentage of insects present)
 - C. Insect larva which appeared to be dragonfly
 - D. Big black biting SOB horseflies (possibly deerflies)

School Spring, Ash Meadows

Cyprinodon nevadensis pectoralis

May 31, 1983 - Late Afternoon

1. The spring has been clearly marked with a sign by the Park Service although they have misspelled the name pectoralis ("pectorlis"). Park Ranger Westphal again acted as our guide.
2. The site has been divided into three areas:
 - A. Three concrete pools are enclosed within a cyclone fence. They are not yet operational.
 - B. Original spring (enclosed within the fence).
 - C. Natural outflow pool. Created from A and B.

All of the following notes relate to the natural outflow pool.

3. Water from the original spring is pumped uphill to the concrete pools. The overflow water from the concrete pools is carried downhill through a PCV pipe to the natural outflow pool. The PCV pipe outlet is barely visible in the outflow pool.
4. The outflow pool has a surface diameter of approximately five feet. The water depth is approximately one to two feet.
5. A heavy growth of aquatic plants (similar to Java moss) covers the pool bottom and reeds surrounding its edges.
6. Water temperature - 89 Deg. F.
Specific gravity - above 1.000.
7. Few adult Cyp. n. pectoralis were observed. The adult males were displaying their typical territorial behavior and were constantly picking at the water plants for food.
8. Fry and juvenile fish of all sizes were feeding at edges of the outflow pool.
9. Invertebrate life observed in and around the outflow pool:
 - A. Dragon flies
 - B. Water beetles
 - C. Snails

Scruggs Springs, Ash Meadows

Cyprinodon nevadensis pectoralis

June 1, 1983 - 6:45 A.M.

1. The springs have not been marked with a sign by the Park Service and appears to be on private property. A trailer house had been setup about 100 yards from the springs. We had to cross over a barbed wire fence to reach them.
2. Since the spring was not marked, we had to use the book "The Natural History Of Native Fishes In The Death Valley System" by Soltz and Naiman to identify its name based on its relationship to other marked springs in the area (School Spring). The identification of this spring is not totally unequivocal.
3. The springs consisted of an uphill white covered pump which moved water into a channel. The channel turned a few times for about 50 feet and flowed in an open marsh area. The marsh was covered with a heavy thicket of tall reeds at its back. Horse hoofprints were all around the edges and in the marsh area.
4. The water depth was no more than three inches in both the channel and marsh areas. The channel consisted of a clay bottom with a fairly swift current over it.
5. Adult and juvenile Cyp. n. pectoralis were observed throughout the channel and marsh areas. The water in the marsh area was cloudy from the horses walking through it so we were not able to closely observe them.
6. Three water temperature and specific gravity readings were taken:
 - A. Upstream by pump:
Water temperature - 86 Deg. F.
Specific gravity - above 1.000
 - B. Mid-channel between pump and beginning of marsh:
Water temperature - 84 Deg. F.
Specific gravity - above 1.000
 - C. In marsh:
Water temperature - 84 Deg. F.
Specific gravity - above 1.000