

**Bismarck Brown
as a Marking Technique
for *Cyprinodon
macularius* desert pupfish**

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BACKGROUND

- ◉ *Cyprinodon macularius* desert pupfish is listed as an endangered species. In 1993 US Fish and Wildlife recovery plan stated that desert pupfish “populations would be established in natural or quasi-natural Refugia...suitable for long-term maintenance of desert pupfish.” (Service, 1993).

BACKGROUND CONT.

- Traditional population estimates are done every 1-2 years to monitor populations
 - Bill Williams River NWF
 - Cibola NWF
 - Imperial NWF
- Anal fin clips have been used for marking
- Populations are determined from a mark/recapture events.



PROBLEM WITH FIN CLIPS

- ⦿ is hard to see
- ⦿ time consuming
- ⦿ can't be performed on individual less than 20mm



TYPES OF MARKS

- ◉ Elastomer tags
- ◉ Spray marking with fluorescent pigments
- ◉ Fin clip



WHAT IS BISMARCK BROWN?

- ◉ It is used in histology for staining tissues
- ◉ It can be used with live cells



BISMARCK BROWN AS A MARKING TECHNIQUE

- ◉ Deacon also found that "Bismarck Brown Y is applicable for use on *Cyprinodon nevadensis* and could be used in shortterm (2-3 day) mark and recapture studies" (Deacon, 1973). Given the success of Bismarck Brown with *Cyprinodon nevadensis* it is likely that *Cyprinodon macularius macularius* desert pupfish will show similar results.

HYPOTHESIS

- ◉ Desert pupfish can be stained using Bismarck Brown
- ◉ Stain will not cause mortality
- ◉ Stain will be visible for at least one day



THE EXPERIMENT

	Control				
	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5
Number of Fish (N=)	6	6	6	6	6
Bismark Brown Y Used (g)	0.5	0.25	0.5	0.25	-
water Used (L)	15L	10L	15L	10L	15L
Concentration: Bismark brown y (g) / water (L)	1:30,000	1:40,000	1:30,000	1:40,000	-
True Dye concentration with 50% active dye (g/L)	1:60,000	1:80,000	1:60,000	1:80,000	-
Exposure time (H)	1	1	2	2	2



RESULTS

MORTALITY

- No mortality occurred for fish in treatment tank
 - No statistical difference between treatment groups
- 2 mortalities were reported for the control tank



RESULTS

LENGTH (TL)

- No significant difference was show in length
 - No difference between individual with in the same treatment group.
- Desert pupfish were stained in a size range of 17mm-31mm

RESULTS

VISUAL

- The stain was only visible for 1 day.
- 1:30,000 g/L for 2 hours is the best visual results



Desert pupfish unstained



Desert Pupfish 12 hours after
being stained with Bismarck
Brown

FUTURE PLANS

- Use bismark brown at 1:30,000 g/L for 2 hours as the new marking technique in future population estimates.
- The first estimate will occur in Oct 2012 at three pupfish refuge facilities.

