

Department of  
Fisheries and Wildlife



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Dear Bob,

Enclosed are the data on Nevada trout received from Dale Lockard. I'm not sure the gene frequencies based on small sample sizes mean too much; those for MDH are okay.

The thesis contains some interesting stock comparisons for steelhead and coho. We plan to submit the meristic chapter to Copria (you've already seen these data). We would appreciate your critical comments on this section if you have time. We plan to submit it essentially "as is."

Regards,

Carl





UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE

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OREGON COOPERATIVE FISHERY RESEARCH UNIT  
104 Nash Hall, Oregon State University  
Corvallis OR 97331

18 May 1978

Mr. Dale V. Lockard  
Nevada Department of Fish  
and Game  
1100 Valley Road  
P. O. Box 10678  
Reno NV 89510

Dear Dale:

I think we've finally put together everything on the trout that you sent. It took us longer than we expected as it was rather a scramble finding all of the pieces.

Jack's technician, who did the electrophoresis, left about when Jack did and took the original data books, so we had to compile these data from disorganized copies. We never were able to locate the electrophoretic data for sample EL 6. Also missing were the vertebral counts for the second set of samples that you sent; we couldn't find the x-ray plates either. Since these are important characters, we ~~ax~~ x-rayed the fish again and made new counts. I had a person trained last year in making meristic counts, but when she left, we found that she hadn't been as meticulous as we thought, so I'm not sure how accurate the gill raker or scale count data are. We went back over her specimens and recounted basibranchial teeth since these are important characters for cutthroat. By-the-way, we either never received or could not locate sample EL 5.

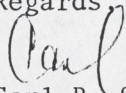
The one sample that really sticks out from the rest is EL 4; this is in electrophoretic patterns, higher vertebral numbers, and lack of basibranchial teeth. Scale counts and gill rakers also appear different; the latter appearing too low, however.

Bob Behnke thinks that trout from Chino Creek are redband, and our data support this contention. The other samples are all cutthroat trout. I've sent a copy of the data to Bob, and he may be able to classify the cutthroats as to race.



The fish from sample WP-1 are distinct in having more basibranchials, different gene frequency for liver MDH, and slightly more vertebrae. Bob believes these to be Utah cutthroat.

Regards,



Carl B. Schreck, Leader  
Oregon Cooperative Fishery  
Research Unit



jj

cc: R. Behnke



## NEVADA CUTHROAT

## Isozymes

Sample Code	Sample Size(N)	LDH	TO	EST	G6PDH common=35	PGM	PHI	AGP	GP	ME	WM MDH	LIV MDH	IDH	Notes:
EL-1 Gance Cr.	40	BB	BB N=20	AA N=13 others unclear or no activity	v1=1 v2=3 N=39	AA	3-2-1	BB	common	AA N=20	B'B'	*	*	Notes: - EL-5 not considered since N=3. missing. EL-6 samples missing common for A
EL-2 North Fk. Humbolt R.	40	BB	BB	AA N=30	common	AA	3-2-1	BB	common	AA	B'B'	*	*	All isozymes are fixed at given phenotype unless otherwise indicated.
EL-3 Frazier Cr.	29	BB	BB	AA	common=27 v1=1 v2=1	AA	3-2-1	BB	common	AA	B'B'	*	*	* refer to p. 2
EL-4 Chino Cr.	40	*	BB N=20	not clear	common=31 unknown variant=1	AA	3-2-1	BB	common=31 heterozygote =1	AA N=20	B'B'	AA	*	
EL-7 South Fk. Little Humbolt R.	40	BB	BB	AA	common=27 v1=5 v2=8	AA	3-2-1	BB	common	AA	B'B'	A'A'		variable but bands not distinct
EL-8 Big Goose Cr.	37	BB	No Activity	AA	common=30 v1=2 v2=5	No Activity	3-2-1	BB	common	Not Clear	*	AA (one band)	Not clear	
WP-1 Goshute Cr.	40	BB	BB	AA	common=31 v1=1	AA	3-2-1	BB	common	AA	*	AA	A''A''	
Shoshone Cr.	36	BB	BB	AA	common=15 v1=3; v2=10 ?=8	AA	Not Clear	BB	common	AA(?)	B'B'	*	?	
Tierney Cr.	40	*	No Results	AA	common=28 v1=4; v2=3 ?=5	AA		No Variance	common	No variance	B'B'	2 bands		



EL-1

NEV. CUTT.

Liv MDH	obs.	exp.	freq.
A'A'	39	38.97	0.975
AA'	1	0.947	0.025
AA	0	0.006	0.0

IDH	obs.	exp.	freq.
AA	4	6.12	0.222
AA''	13	8.73	0.722
A''A''	1	3.13	0.055

$A = 0.987$   
 $A' = 0.012$   
 $N = 40$   
 $\chi^2 = 0.008$

$A = 0.583$   
 $A'' = 0.416$   
 $N = 18$   
 $\chi^2 = 4.27$

EL-2

Liv MDH	obs.	exp.	freq.
A'A'	39	39.05	0.975
A'A	1	1.028	0.025
AA	0	0.006	0.0

IDH	obs.	exp.	freq.
AA	26	22.5	0.65
AA''	8	15.0	0.20
A''A''	6	2.5	0.15

$A' = 0.988$   
 $A = 0.013$   
 $N = 40$   
 $\chi^2 = 0.007$

$A = 0.75$   
 $A'' = 0.25$   
 $N = 40$   
 $\chi^2 = 8.71$

EL-3

Liv MDH	obs.	exp.	freq.
A'A'	28	28.02	0.966
A'A	1	0.969	0.034
AA	0	0.008	0.0

IDH	obs.	exp.	freq.
A'A''	0	0.162	0.0
AA	19	18.87	0.678
AA''	7	7.40	0.25
A''A''	1	0.726	0.036
AA'	1	0.828	0.036
A'A'	0	0.009	0.0

$A' = 0.983$   
 $A = 0.017$   
 $N = 29$   
 $\chi^2 = 0.009$

$A = 0.821$   
 $A' = 0.018$   
 $A'' = 0.161$   
 $N = 28$   
 $\chi^2 = 0.333$

EL-4

L DH	obs.	exp.	freq.
BB	14	13.78	0.350
B'B	19	19.39	0.475
B'B'	7	6.82	0.175

IDH	obs.	exp.	freq.
AA	2	2.75	0.05
AA'	6	4.62	0.15
A'A'	0	2.03	0.0
AA'''	11	10.73	0.275
A'A'''	12	9.22	0.300
A'''A'''	9	10.49	0.225

$B = 0.587$   
 $B' = 0.413$   
 $N = 40$   
 $\chi^2 = 0.014$

$A = 0.262$   
 $A' = 0.225$   
 $A''' = 0.512$   
 $N = 40$   
 $\chi^2 = 3.70$

EL-8

WM-MDH	obs.	exp.	freq.
B'B'	36	35.97	0.923
B'B	1	1.02	0.027
BB	0	0.01	0.0

$B' = 0.986$   
 $B = 0.014$   
 $N = 37$   
 $\chi^2 = 0.01$

(over)



WP-1

Shoshone Cr.

2a

WM-MDH	obs.	exp.	freq.
B'B'	31	30.63	0.775
B'B''	8	8.75	0.200
B''B''	1	0.625	0.025

$$B' = 0.875$$

$$B'' = 0.125$$

$$N = 40$$

$$\chi^2 = 0.29$$

Lw-MDH	obs.	exp.	freq.
AA(?)	8	13.44	0.222
A''A	28	17.11	0.778
A''A''	0	5.45	0.0

$$A = 0.611$$

$$A'' = 0.389$$

$$N = 36$$

$$\chi^2 = 14.58$$

Tierney Cr.

LDH	obs.	exp.	freq.
BB	38	36.1	0.95
BB'	0	3.8	0.0
B'B'	2	0.1	0.05

$$B = 0.95$$

$$B' = 0.05$$

$$N = 40$$

$$\chi^2 = 40.0$$



## NEVADA CUTTHROAT

Notes: EL-5 (Mahala Cr.) samples missing.

Sample Code	Std. Leng. (cm)	Vertebrae	Character			Analysis					Basibranchials (all on midline except where noted)
			1 <sup>st</sup> arch gill rakers (up)	1 <sup>st</sup> arch gill rakers (lower)	1 <sup>st</sup> arch gill rakers (total)	Pelvic Fin rays	Scales above lateral line?	Lat. series scales (2 rows above lateral line)	Pyloric caeca		
EL-1	$\bar{x}$ : 11.54 R: 8.4-14.2 N: 7	61.57 61-62 7	8.28 7-9 7	11.43 9-13 7	19.71 16-22 7	9.14 9-10 7	30.57 27-34 7	149.43 132-160 7	40.28 30-47 7	5.0 2-8 5	
EL-2	$\bar{x}$ : 11.17 R: 8.4-17.0 N: 6	60.67 60-62 6	8.33 8-9 6	10.33 9-13 6	18.67 17-21 6	9.00 — 6	33.00 31-35 6	157.5 151-166 6	45.67 40-49 6	1.67 0-3 6 all are right	
EL-3	$\bar{x}$ : 15.83 R: 15.6-16.1 N: 3	61.6 61-62 5	8.33 6-10 3	10.00 — 3	18.33 16-20 3	9.33 9-10 3	27.67 25-32 3	144.00 128-154 3	37.67 35-42 3	4.5 2-8 6	
EL-4	$\bar{x}$ : 12.1 R: 11.8-12.5 N: 3	63.83 62-65 6	7.67 7-8 3	9.67 9-10 3	17.33 16-18 3	9.33 9-10 3	26.33 24-29 3	163.67 148-173 3	27.67 24-29 3	0.0 — 6	
EL-6 Hanks Cr.	$\bar{x}$ : R: N: 5	61.40 60-62 5								6.33 4-9 6	
EL-7	$\bar{x}$ : R: N: 6	60.83 60-61 6								5.14 3-8 7	
EL-8	$\bar{x}$ : R: N: 7	61.43 61-62 7								9.86 0-20 7	
WP-1	$\bar{x}$ : 14.3 R: 13.5-14.8 N: 3	62.5 62-64 6	7.67 7-8 3	12.33 12-13 3	20.00 19-21 3	9.33 9-10 3	33.67 32-35 3	142.33 120-167 3	36.33 30-43 3	23.6- 20-27 5	
Shoshone Cr.	$\bar{x}$ : R: N: 7	61.71 61-62 7							one w/ (2 right 3 left 3 mid	5.71 2-9 7	
Tierney Cr.	$\bar{x}$ : R: N: 7	61.00 60-62 7							one w/ (1 right 4 mid	2.71 0-5 7	