Geographic Variation Among Pacific Northwest Populations of Longnose Dace, *Rhinichthys cataractae*

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TABLE 1. MEANS AND RANGES (IN PARENTHESES) OF VARIOUS MORPHOLOGICAL CHARACTERS IN PACIFIC NORTHWEST POPULATIONS OF *Rhinichthys cataractae*. The Umpqua River population is *R. evermanni*. Morphometric values are given as fractions of standard length.

	Head Length	Body Depth	Caudal Peduncle Depth	Dorsal Fin Height
Columbia Basin populations				
Grays River (N = 20)	.262 (.250–.281)	.209 (.191–.232)	.114 (.105–.122)	.192 (.173–.220)
Coweeman River (N = 20)	.262 (.249–.275)	.213 (.183–.236)	.111 (.100–.121)	.187 (.167–.200)
Willamette River (N = 24)	.272 (.257–.290)	.208 (.184–.236)	.110 (.099–.122)	.190 (.161–.212)
John Day River (N = 10)	.286 (.261–.298)	.200 (.190–.218)	.117 (.112–.129)	
Palouse River (N = 30)	.273 (.248–.287)	.195 (.179–.217)	.118 (.110–.126)	.190 (.163–.211)
Grande Ronde River (N = 30)	.269 (.233–.282)	.214 (.203–.229)	.119 (.110–.127)	.201 (.185–.219)
Malheur River (N = 23)	.284 (.227–.304)	.210 (.191–.234)	.119 (.111–.132)	
Owyhee River (N = 17)	.272 (.259–.291)	.209 (.195–.228)	.113 (.103–.121)	.213 (.201–.225)
Harney Basin populations				
Silvies River (N = 54)	.290 (.270–.308)	.206 (.184–.227)	.126 (.118–.136)	
Blitzen River (N = 30)	.278 (.261–.294)	.198 (.171–.220)	.117 (.109–.125)	.194 (.178–.216)
Coastal populations				
Chehalis River (N = 18)	.267 (.258–.286)	.199 (.186–.210)	.093 (.084–.105)	.202 (.184–.214)
Umpqua River (N = 25)	.282 (.246–.315)	.197 (.175–.239)	.091 (.084–.103)	.215 (.182–.241)
Coos River (N = 72)	.247 (.230–.270)	.181 (.167–.204)	.105 (.095–.118)	.160 (.125–.189)

	Anal Fin Height	Pectoral Fin Length	Pelvic Fin Length	Falcation Index
Columbia Basin populations				
Grays River	.181 (.160–.195)	.197 (.179–.214)	.154 (.143–.167)	1.70 (1.56–1.96)
Coweeman River	.183 (.164–.204)	.200 (.183–.226)	.156 (.137–.172)	1.65 (1.48–1.89)
Willamette River	.190 (.161–.212)	.204 (.178–.236)	.162 (.141–.202)	1.71 (1.39–2.10)
John Day River		.213 (.193–.244)	.161 (.144–.178)	
Palouse River	.190 (.174–.209)	.203 (.177–.230)	.157 (.143–.170)	1.61 (1.34–1.98)
Grande Ronde River	.197 (.176–.217)	.213 (.185–.245)	.165 (.155–.181)	1.75 (1.51–1.94)
Malheur River		.214 (.185–.239)	.164 (.141–.181)	
Owyhee River	.198 (.185–.217)	.210 (.194–.240)	.156 (.140–.175)	1.68 (1.52–1.85)
Harney Basin populations				
Silvies River		.238 (.196–.271)	.172 (.133–.189)	
Blitzen River	.183 (.165–.205)	.211 (.183–.241)	.150 (.135–.163)	1.65 (1.51–1.87)
Coastal populations				
Chehalis River	.198 (.187–.216)	.219 (.207–.235)	.164 (.151–.181)	1.77 (1.48–2.01)
Umpqua River	.205 (.174–.228)	.205 (.181–.237)	.166 (.148–.188)	1.73 (1.46–1.91)
Coos River	.154 (.115–.176)	.176 (.150–.202)	.142 (.107–.168)	1.43 (1.30–1.59)

	Dorsal Fin Rays	Pectoral Fin Rays	Lateral Line Scales	Scales Above Lateral Line	Caudal Peduncle Circumference Scales
Columbia Basin populations					
Grays River	8.00	15.25 (15–16)	63.80 (60–69)	13.05 (12–14)	28.84 (28–29)
Coweeman River	8.00	14.85 (14–16)	63.30 (59–67)	12.55 (11–13)	27.75 (27–28)
Willamette River	8.00	15.25 (14–17)	64.29 (60–70)	13.00 (12–14)	28.08 (27–29)
John Day River	7.90 (7–8)	13.70 (13–14)	59.40 (55–65)	13.70 (13–14)	27.20 (26–28)
Palouse River	8.00	14.80 (14–16)	67.83 (63–73)	14.17 (13–15)	29.73 (29–30)
Grande Ronde River	8.00	15.30 (15–16)	64.90 (59–70)	13.27 (12–14)	28.70 (28–29)
Malheur River	8.00	14.04 (13–15)	64.79 (60–70)	14.04 (13–15)	28.22 (27–30)

TABLE 1. (CONTINUED)

	Dorsal Fin Rays	Pectoral Fin Rays	Lateral Line Scales	Scales Above Lateral Line	Caudal Peduncle Circumference Scales
Owyhee River	7.94 (7–8)	14.65 (14–16)	60.41 (55–72)	13.47 (13–14)	28.71 (28–30)
Harney Basin populations					
Silvies River	8.00	13.80 (13–15)	58.52 (53–65)	13.41 (13–14)	27.33 (25–28)
Blitzen River	8.00	14.57 (14–15)	66.87 (62–73)	13.67 (13–14)	28.90 (28–30)
Coastal populations					
Chehalis River	8.00	14.94 (14–15)	57.61 (55–61)	12.39 (12–13)	25.61 (25–26)
Umpqua River	9.00	15.32 (15–16)	58.96 (57–61)	13.28 (13–14)	26.96 (26–28)
Coos River	7.97 (7–8)	14.00 (13–15)	65.94 (60–70)	14.24 (14–15)	30.22 (29–31)

sumed to be ancestral to the Coos R. population, it must have originated from the Willamette River, which flows northward into the Columbia. During the late Cenozoic the Umpqua R. was a Willamette tributary, but was captured during the Pleistocene by the headwaters of a coastal stream (Baldwin, 1959), diverting its flow to the west. Five species of Columbia R. cyprinids were isolated in the Umpqua R. at this time, including the ancestor of *R. evermanni*. Longnose dace may therefore have reached Coos R. by two possible routes: 1) directly from the ancient Willamette, by means of a geographically and chronologically distinct stream capture, or 2) indirectly from the Umpqua, either along the coast or by direct transfer to the Coos R. If the second alternative is true, the *cataractae*-like ancestor probably entered the Coos R. system very soon after it was isolated in the Umpqua, for morphological evidence suggests that these two populations have diverged in opposite directions from the original morphotype.

Because the longnose dace has such a wide range and rather specialized habitat requirements, there have probably been many oppor-

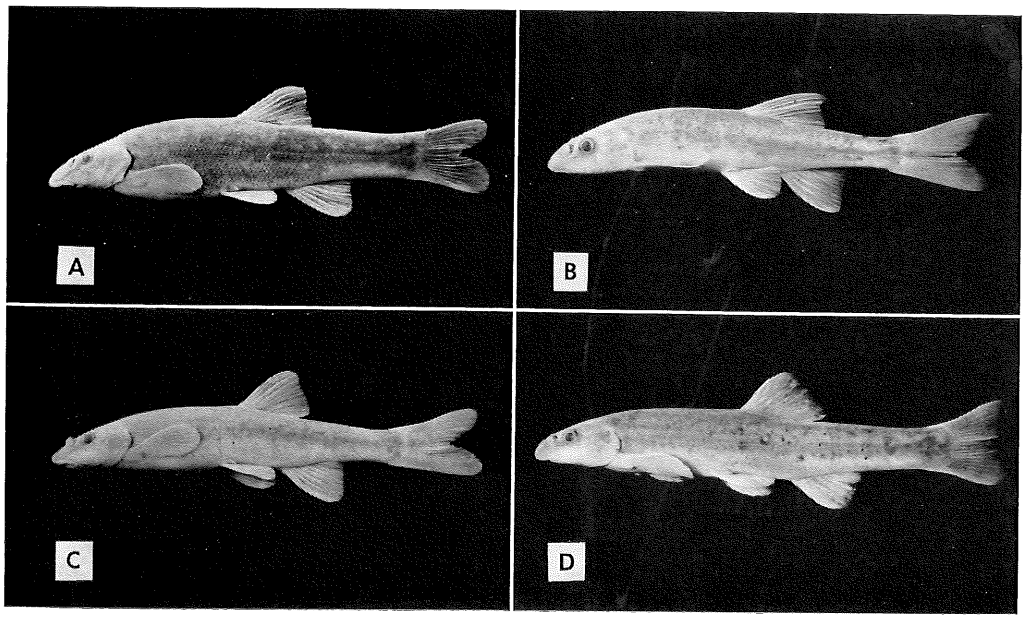

Fig. 2. A) *Rhinichthys cataractae*, 75.0 mm SL, from Willamette R. B) *R. cataractae*, 63.7 mm SL, from Chehalis R. C) *R. evermanni* (OS 4572), 60.4 mm SL, from Umpqua R. D) *R. cataractae* (OS 4555), 80.6 mm SL, from Coos R.

tunities for morphological and behavioral differentiation. There is general agreement that the taxonomic status of various populations is uncertain (McPhail and Lindsey, 1970; Scott and Crossman, 1973). The Columbia Basin samples we examined showed relatively little variation, and in most characteristics agreed with published data from Canadian and eastern U.S. populations. The exceptional features of Coos R., Chehalis R. and Umpqua R. populations certainly deserve further investigation and possible revision in taxonomic status, but we believe that it would be premature to undertake taxonomic revision at the present time without a more complete analysis of geographic variation over the entire North American range.

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