Species Account – *Agosia chrysogaster*

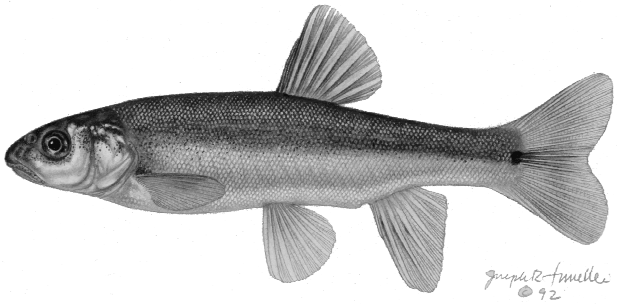

Fig. 40. ***Agosia chrysogaster*** adult (© Joseph R. Tomelleri).

Adult description: Usually <65 mm, rarely greater than 100 mm TL. Body fusiform with a relatively large head and rounded snout. Mouth slightly sub-terminal with a small maxillary barbel. Eye is relatively large. Long coiled gut with black peritoneum. Dorsal fin origin over or nearly over pelvic fin origin. Anal fin elongated in females. Scales small. Body brown or gray above and white below a lateral stripe that terminates in a small caudal spot; caudal-fin pigment darkest along middle rays. Breeding males sometimes weakly yellow on ventral aspects of the head and abdomen. (Also, Table 18.)

Reproduction: Non-guarding open-substrate, or possible nest-guarding, psammophils or lithophils. Spawn December-July, possibly into September, but mostly March- May. In some populations, non-adhesive eggs are deposited in saucer-shaped depressions excavated by males in sand or gravel in shallow, near-shore areas with little or no current. Egg diameter 2.2-2.8 mm, modally 2.5-2.6 mm.

Young: Hatch in 4 d at > 24°C. Larvae present in waters with diel temperatures as low as 7-15.5°C (late March). Late protolarvae and larger individuals subject to downstream transport as evidenced by drift-net captures. Larvae occupy near-shore, low-velocity, areas over sand along channel margins and in backwaters, eddies, and pools. Larvae consume early instars of chironomids, mayflies, other small invertebrates, and detritus.

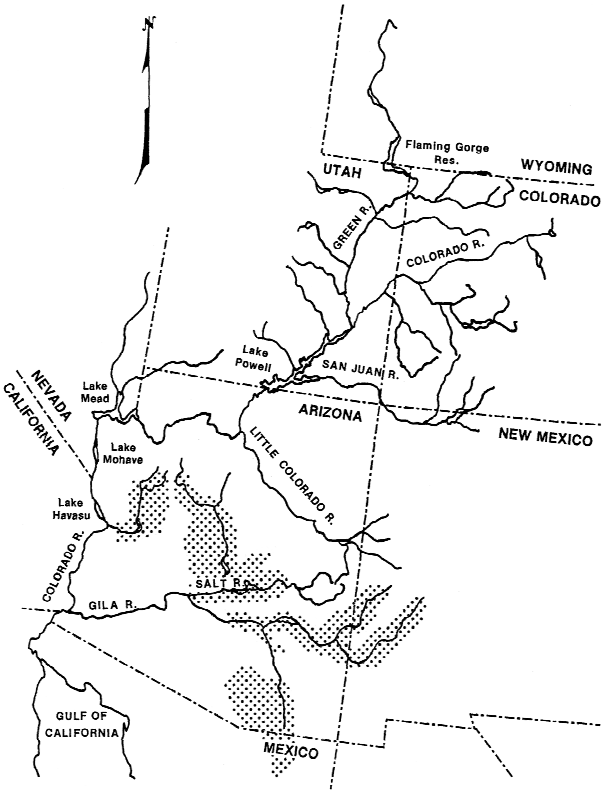

Fig. 41. Recent distribution of ***Agosia chrysogaster*** in the Colorado River Basin.

Table 18. Selected juvenile and adult meristics for *Agosia chrysogaster*. (P = principal rays; R = rudimentary rays; D = dorsal; V = ventral. Scales are lateral series or line when complete. Four added to vertebral count for Weberian complex. Pharyngeal teeth given as left outer row, inner row/right inner row, outer row. Mean or modal values underlined if known and noteworthy; rare values in parentheses.)

Character	Observed	Literature	Character	Observed	Literature
Dorsal-fin rays - P	(7)8(9)	8 [(8)9(-11)*]	Dorsal-fin rays - R	2-3	–
Anal-fin rays - P	7	6-7 [(7)8(9)*]	Anal-fin rays - R	2-3	–
Caudal-fin rays - P	19(20)	19(20)	Caudal-fin rays - RD	9-11(12)	–
Pectoral-fin rays	(14)15-17(-19)	(6?-)16-17(18)	Caudal-fin rays - RV	8-10(11)	–
Pelvic-fin rays	8-9	7-8-9	Lateral scales	(77)81-93	(60-)70-73-90-95
Vertebrae	38 (N =3)	–	Pharyngeal teeth	–	0,4/4,0

*Counts from Hendrickson (1987) and Sublette, et al. (1990) that appear one too high, perhaps including longest rudimentary ray.

Table 19. Size at onset of selected developmental events for *Agosia chrysogaster*. (As apparent under low power magnification. P = principal rays; R = rudimentary rays. Scales are lateral series. Rare values in parentheses.)

Event or structure	Onset or formation mm SL	mm TL	Fin rays or scales	First formed mm SL	mm TL	Last formed mm SL	mm TL
Hatched	5(6)	5-6	Dorsal - P	(8)9(10)	(9)10(11)	(10)11-12	12-14
Eyes pigmented	5(6)	5-6	Anal - P	9-10	10-11	11-12	(12)13-14
Yolk assimilated	(6)7	7(8)	Caudal - P	7	7(8)	9	(9)10
Finfold absorbed	(15)16(17)	(18)19-20	Caudal - R	9	10(11)	(14)15(16)	(17)18(19)
Pectoral-fin buds	*	*	Pectoral	(9)10	11-12	14(15)	17(18)
Pelvic-fin buds	(9)10	10-11	Pelvic	12(13)	14(15)	14-15	17-18
* before hatching			Scales	22-25(-31)	27-30(-38)	(23-)25(-31)	(28)29-30(-38)

References: Arizona Game and Fish Department 2002, Bestgen unpublished data, Bestgen et al. 1987b, Girard 1856, Hendrickson 1987, Minckley 1973, Minckley and Barber 1971, Moore 1968, Page and Burr 1991, Sublette et al. 1990, Winn and Miller 1954.

Table 20. Size at developmental interval (left) and gut phase (right) transitions for *Agosia chrysogaster*. (See Figure 5 for phases of gut folding. Rare values in parentheses.)

Transition to	mm SL	mm TL	Transition to	mm SL	mm TL
Flexion mesolarva	7	7(8)	2 - 90° bend	10-11	12
Postflexion mesolarva	9	(9)10	3 - Full loop	14	17
Metalarva	11-12	(12)13-14	4 - Partial crossover	(15)16-19(20)	(17-)19-23(24)
Juvenile	(15)16(17)	(18)19-20	5 - Full crossover	(19-)24-25	(23-)29-30

Table 21. Summary of morphometrics and myomere counts by developmental phase for *Agosia chrysogaster*. (See Figure 4 for abbreviations and methods of measurement and counting. Protolarvae with unpigmented eyes excluded. SD value of 0 actually between 0.0 and 0.5.)

	Protolarvae (N=17)			Flexion mesolarvae (N=15)			Postflexion mesolarvae (N=24)			Metalarvae (N=29)			Juveniles (N=39)		
	$\bar{x}$	±SD	Range	$\bar{x}$	±SD	Range	$\bar{x}$	±SD	Range	$\bar{x}$	±SD	Range	$\bar{x}$	±SD	Range
SL, mm	6	0	6 - 7	8	1	7 - 9	10	1	9 - 12	14	1	11 - 17	24	7	15 - 42
TL, mm	7	0	6 - 7	8	1	7 - 10	12	1	10 - 14	16	2	12 - 20	29	9	18 - 50
Lengths %SL															
AS to AE	2	0	2 - 3	3	0	2 - 3	4	1	3 - 5	5	1	4 - 6	6	1	4 - 8
PE	10	1	9 - 12	11	1	10 - 12	12	1	10 - 13	13	1	12 - 14	14	1	11 - 15
OP1	19	1	18 - 20	21	1	19 - 22	24	1	20 - 26	26	1	24 - 27	26	1	23 - 28
OP2							49	1[b]	48 - 52	52	2	48 - 54	52	1	50 - 54
PY	57	7[a]	43 - 64												
OPAF	29	2	25 - 32	30	2	25 - 33	34	2	31 - 39	43	4[g]	36 - 54			
ODF	40	3	31 - 44	42	2	37 - 47	45	2	39 - 49						
OD							51	1[c]	50 - 53	51	1	49 - 54	51	1	49 - 53
ID							64	1[a]	62 - 65	65	1	63 - 67	65	1	63 - 66
PV	66	1	64 - 68	68	1	66 - 70	71	1	69 - 74	69	1	68 - 71	69	1	67 - 71
OA							69	1[d]	68 - 71	68	1	67 - 70	68	1	66 - 70
IA							77	1[a]	76 - 79	78	1	76 - 80	77	1	76 - 79
AFC							111	1[e]	109 - 114	113	1	111 - 115	113	1	111 - 115
PC	106	1	105 - 107	107	1	105 - 109	113	2	110 - 115	118	2	115 - 121	120	1	118 - 124
Y	29	18	0 - 50												
P1	12	1	10 - 14	14	1	12 - 16	15	2	13 - 21	16	1	14 - 18	18	1[h]	16 - 21
P2							5	2[b]	2 - 7	9	2	5 - 13	15	2	11 - 24
D							16	2[b]	12 - 18	21	2	15 - 24	22	1	20 - 27
A							12	1[f]	10 - 13	15	1	12 - 17	18	2	15 - 22
Depths %SL															
at BPE	14	1	12 - 15	14	1	13 - 16	17	1	15 - 18	18	1	17 - 20	18	1	16 - 20
OP1	15	1	14 - 18	16	1	15 - 17	19	1	16 - 21	22	1	20 - 25	23	1	21 - 25
OD	11	1	10 - 14	12	1	11 - 13	14	1	12 - 16	20	2	15 - 25	22	1	18 - 25
BPV	9	1	7 - 10	8	1	7 - 9	10	1	8 - 11	12	1	11 - 14	14	1	12 - 17
AMPM	4	0	4 - 5	5	0	4 - 5	7	1	5 - 8	9	1	8 - 10	10	1	9 - 11
Max. yolk	5	4	0 - 13												
Widths %SL															
at BPE	14	1	13 - 15	15	1	13 - 17	17	1	14 - 19	18	1	16 - 19	17	1	15 - 19
OP1	10	1	9 - 11	11	1	10 - 12	14	1	12 - 16	17	1	15 - 20	18	1	15 - 20
OD	6	1	5 - 7	6	0	6 - 7	9	1	7 - 11	13	2	9 - 17	15	1	12 - 20
BPV	5	0	4 - 6	5	0	4 - 5	6	1	5 - 8	8	1	7 - 9	10	1	8 - 14
AMPM	3	0	2 - 3	3	0	2 - 3	4	1	3 - 5	5	0	4 - 5	5	1	4 - 6
Max. yolk	7	4	0 - 12												
Myomeres															
to PY	22	4[a]	14 - 25												
OPAF	8	1	5 - 10	8	1	5 - 10	8	1	6 - 10	12	2	9 - 17			
OP2							16	1[b]	15 - 17	17	1	15 - 18	17	1[g]	16 - 18
ODF	13	2	9 - 15	13	1	11 - 14	13	1	11 - 15						
OD							17	1[a]	16 - 18	17	1	16 - 18	16	1[g]	15 - 17
PV	26	1	24 - 27	26	1	26 - 27	27	1	26 - 28	26	1	25 - 27	26	1[g]	24 - 27
Total	38	1	36 - 39	37	1	37 - 39	38	1	37 - 39	38	1	37 - 39	37	1[i]	37 - 38
After PV	12	1	11 - 14	11	1	10 - 12	11	1	10 - 12	12	1	11 - 13	12	1[j]	11 - 13

[a]N = 15. [b]N = 17. [c]N = 22. [d]N = 18. [e]N = 23. [f]N = 13. [g]N =2 8. [h]N = 38. [i]N = 27. [j]N = 30.

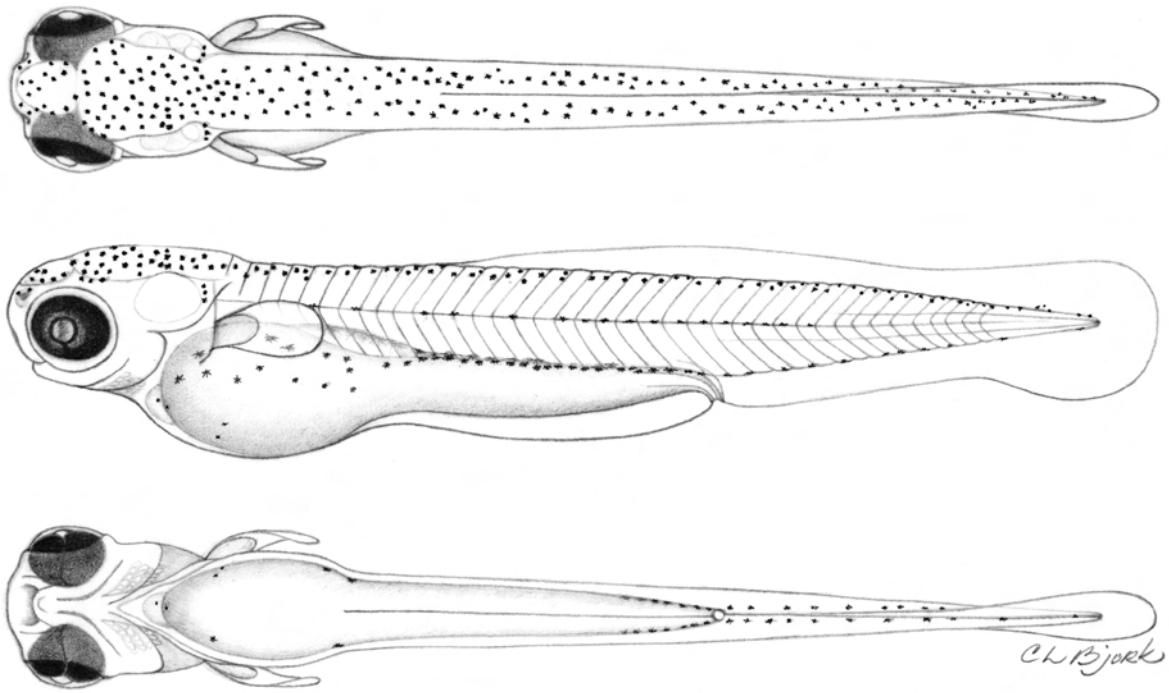

Fig. 42. ***Agosia chrysogaster*** protolarva, 6.0 mm SL, 6.3 mm TL. (Collected in 1984 from the Gila River near Cliff, New Mexico.)

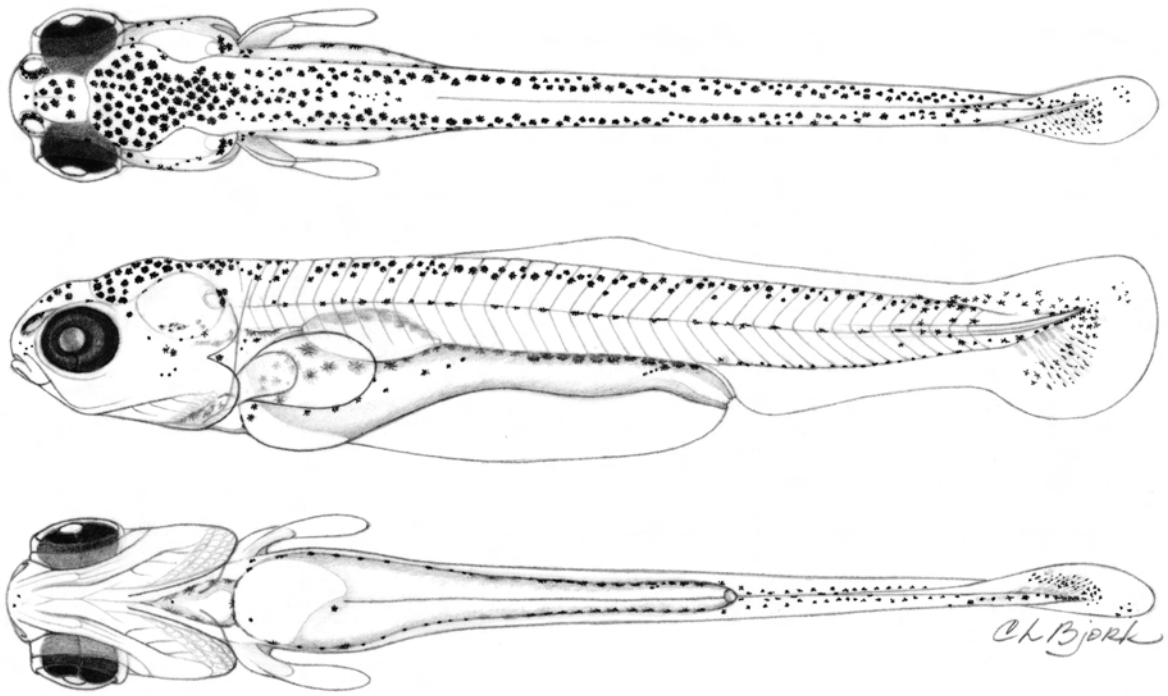

Fig. 43. ***Agosia chrysogaster*** flexion mesolarva, recently transformed, 7.6 mm SL, 8.2 mm TL. (Collected in 1984 from the Gila River near Cliff, New Mexico.)

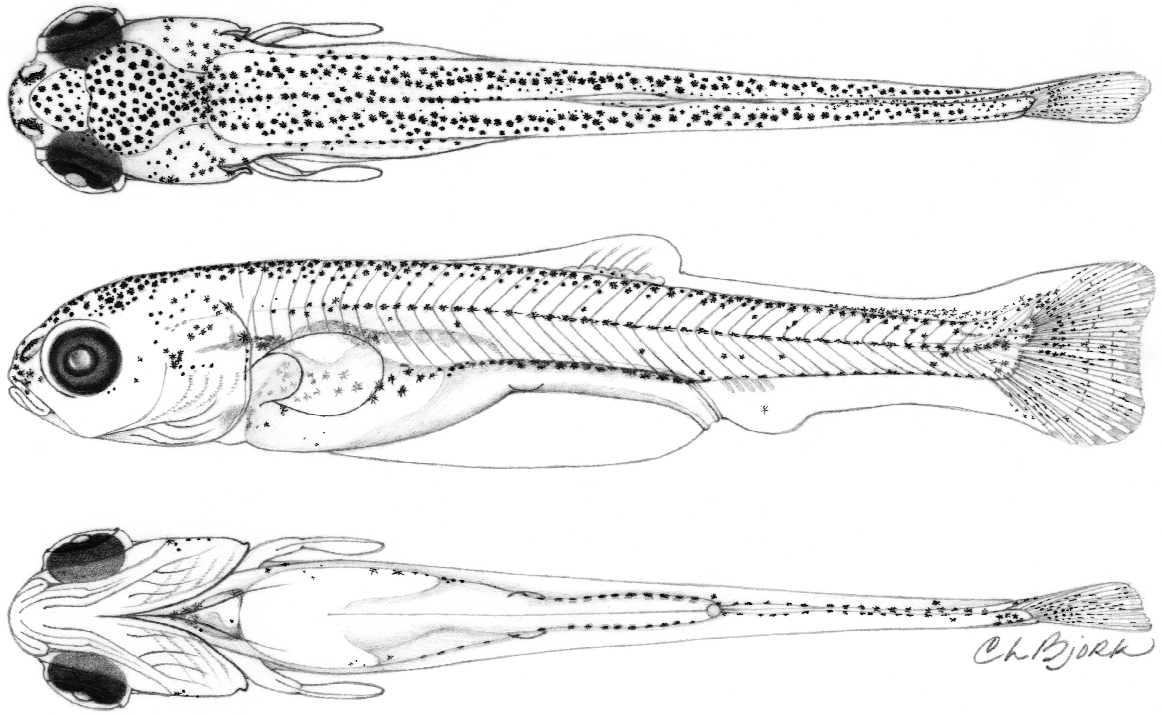

Fig. 44. ***Agosia chrysogaster*** postflexion mesolarva, 10.0 mm SL, 11.2 mm TL. (Collected in 1984 from the Gila River near Cliff, New Mexico.)

Fig. 45. ***Agosia chrysogaster*** metalarva, 13.6 mm SL, 16.3 mm TL. (Collected in 1984 from the Gila River near Cliff, New Mexico.)

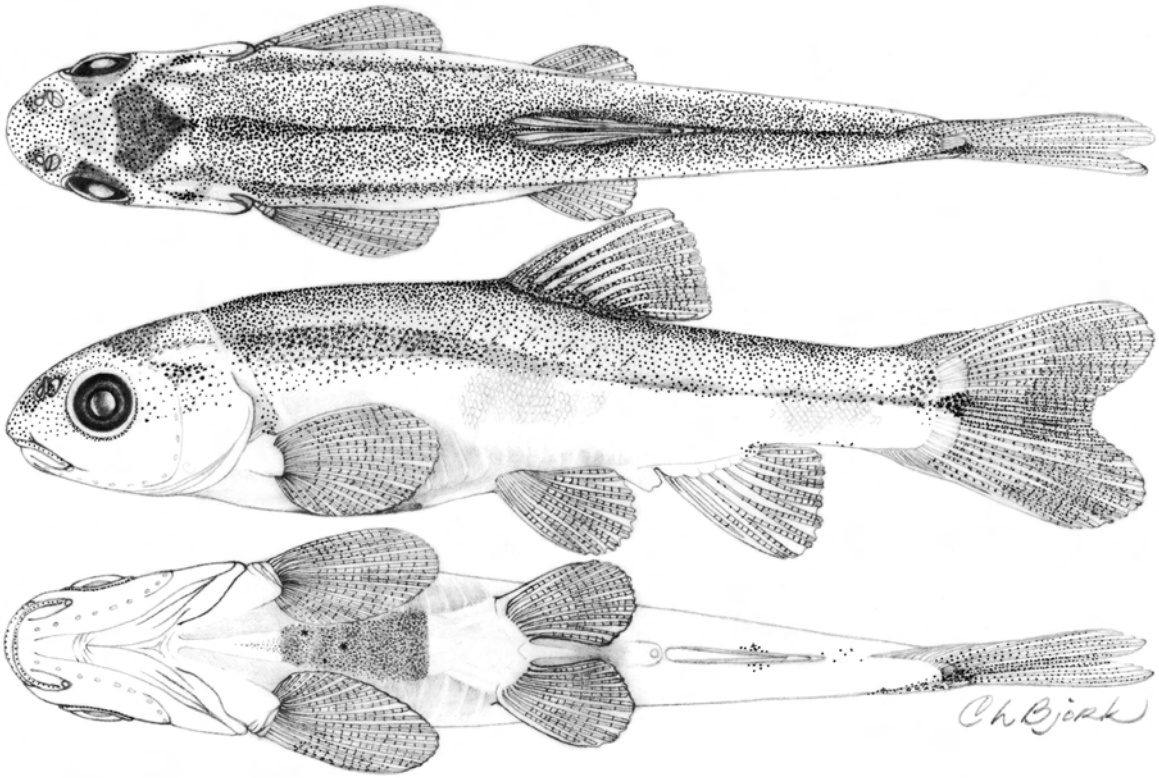

Fig. 46. ***Agosia chrysogaster*** juvenile, 31.7 mm SL, 38.1 mm TL. (Collected in 1984 from the Gila River near Cliff, New Mexico.)