

## Species Account – *Gila elegans*

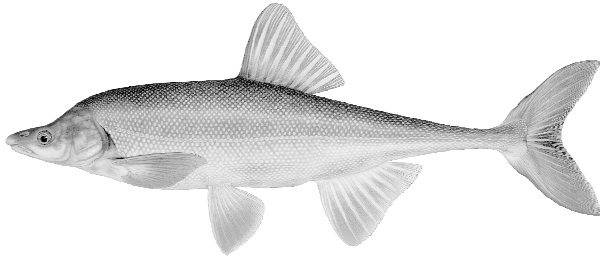


Fig. 47. *Gila elegans* adult (© Joseph R. Tomelleri).

**Adult description:** Up to 50 cm TL. Head small, strongly depressed anteriorly, concave over and behind eyes, and arching posteriorly, in larger specimens to a moderately high nuchal hump. Body very streamlined, elongate, and somewhat compressed, narrowing to an extremely slender and long caudal peduncle with least depth 15-20% of head length (HL). Mouth terminal to subterminal, slightly oblique. Eyes small, about 14% of HL. Fins large; dorsal origin well behind pelvics; caudal deeply forked. Scales small, coverage often incomplete or deeply embedded dorsally, ventrally and on caudal peduncle. Gray to olivaceous on dorsal surface, silver laterally, white ventrally. Breeding males orange-red ventrolaterally with small tubercles on anterior body; less pronounced in females. (Also, Table 22.)

**Reproduction:** Non-guarding, open-substrate lithophils. Spawn May to early July at water temperatures of 17-21° in eddies or pools over gravel shelf, cobble, or boulders. Water-hardened eggs demersal, adhesive, and 2.0-2.4 mm in diameter.

**Young:** At 20-21°C, hatch in 4-7 d and swim up 2-3 d later. Young mostly found in near-shore, low-velocity habitats (e.g., backwaters) over silt, sand, or gravel. In laboratory, preferred 24°C.

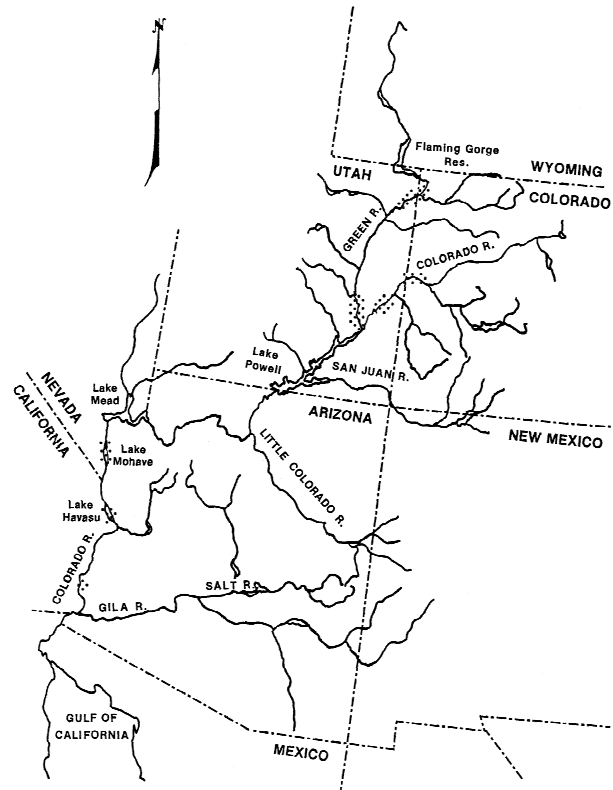


Fig. 48. Recent distribution of *Gila elegans* in the Colorado River Basin. (includes stocked reaches.)

**Table 22.** Selected juvenile and adult meristics for *Gila elegans*. (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	10(11)	(9) <u>10</u> -11	Dorsal-fin rays - R	–	–
Anal-fin rays - P	<u>10</u> -11	(9) <u>10</u> -11	Anal-fin rays - R	–	–
Caudal-fin rays - P	(17)18- <u>19</u> (20)	(18)19	Caudal-fin rays - RD	–	–
Pectoral-fin rays	14- <u>16</u> -17	16	Caudal-fin rays - RV	–	–
Pelvic-fin rays	(8)9	<u>9</u> -10	Lateral scales	–	75-88-99-110
Vertebrae	49- <u>50</u> -51	(46-)48- <u>49</u> -51	Pharyngeal teeth	–	2,5/4,2

\*From Muth (1990).

**Table 23.** Size at onset of selected developmental events for *Gila elegans*. (As apparent under low power magnification. P = principal rays; R = rudimentary rays. Scales are lateral series. Rare values in parentheses. From Muth 1990, supplemented with original data.)

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

**References:** Arizona Game and Fish Department 2002, Baird and Girard 1853a & b, Balon 1981, Baxter and Simon 1970, Beckman 1952, Benke and Benson 1983, Bozek et al. 1984, Hammon 1982 & 1985, Holden 1968, Holden and Stalnaker 1970, LaRivers 1962, Marsh 1985, Minckley 1973, Minckley and DeMarais 2000, Miller 1946, Moore 1968, Moyle 1976, Muth 1990, Page and Burr 1991, Rinne 1976, Sigler and Miller 1963, Smith et al. 1979, Valdez and Clemmer 1982, Vanicek and Kramer 1969.

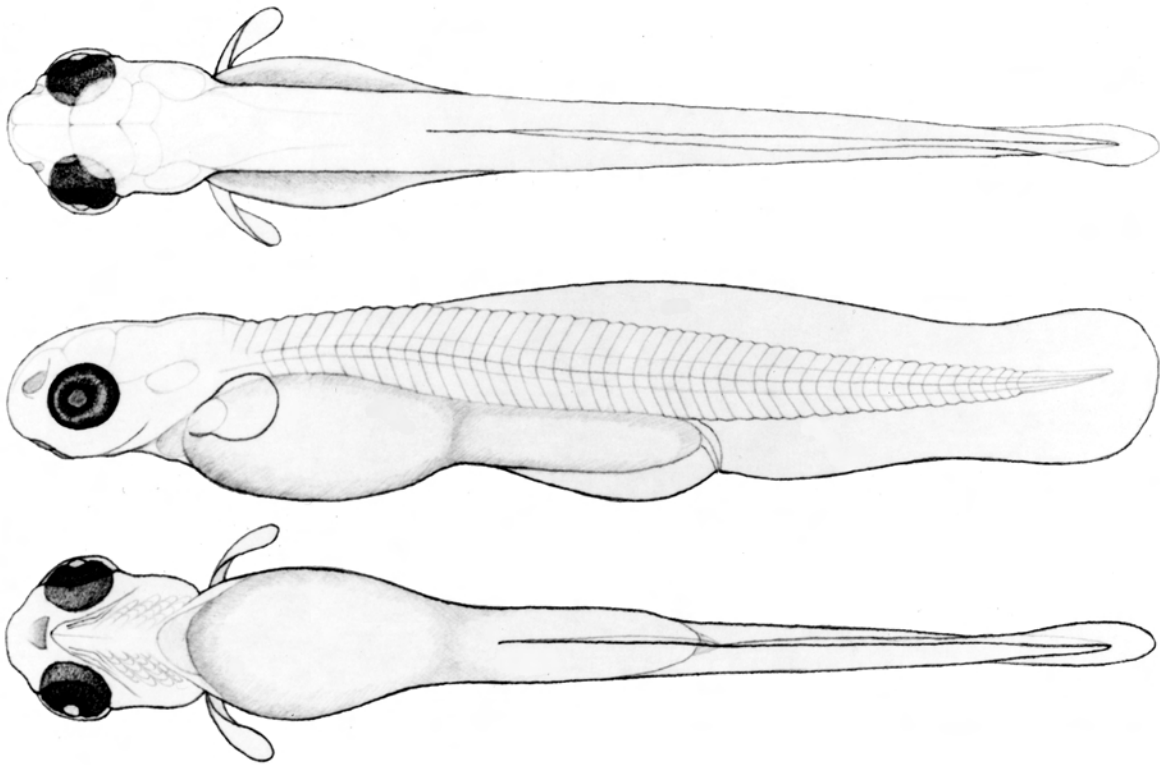
**Table 24.** Size at developmental interval (left) and gut phase (right) transitions for *Gila elegans*. (See Figure 5 for phases of gut folding. Rare values in parentheses. From Muth 1990, supplemented with original data.)

Transition to	mm SL	mm TL	Transition to	mm SL	mm TL
Flexion mesolarva	(7)8	8-9	2 - 90° bend	(11)12-15	13-16
Postflexion mesolarva	(8)9	(9-)11	3 - Full loop	(19)20-22	24-27
Metalarva	11(12)	13	4 - Partial crossover	not applicable	
Juvenile	22(23)	28(29)	5 - Full	not applicable	

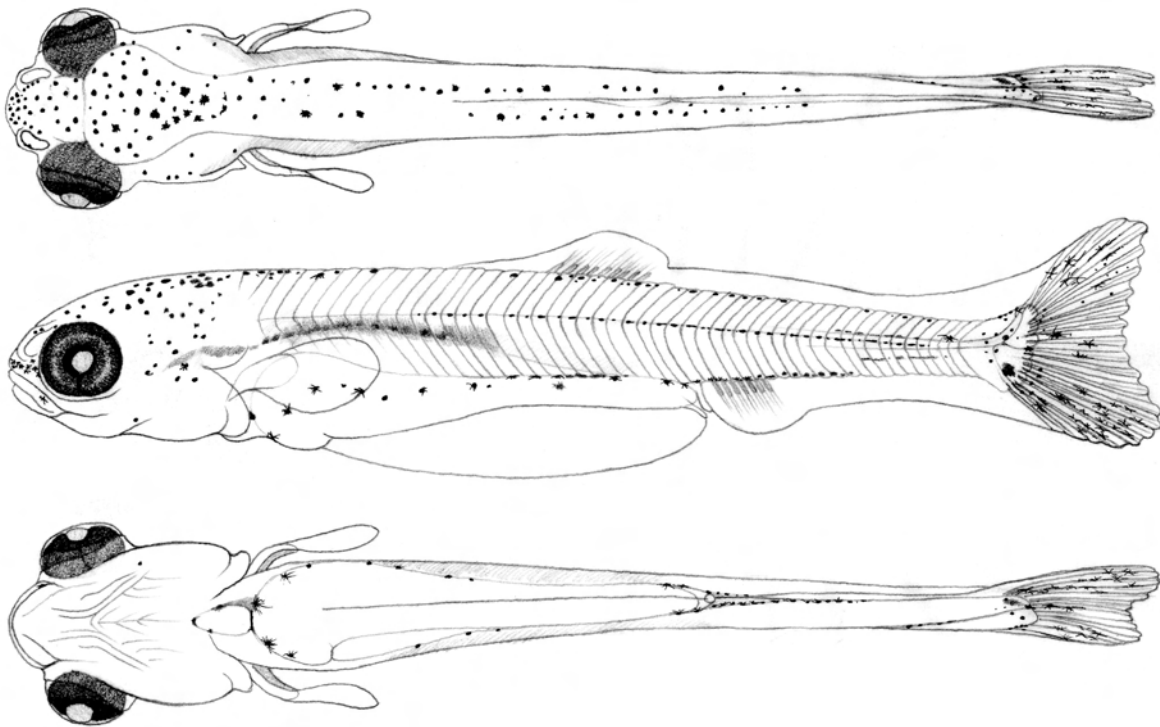
**Table 25.** Summary of morphometrics and myomere counts by developmental phase for *Gila elegans*. (See Figure 4 for abbreviations and methods of measurement and counting. Protolarvae with unpigmented eyes excluded. SD value of 0 actually between 0.0 and 0.5. From Muth 1990, except as noted.)

	Protolarvae (N=37)			Flexion mesolarvae (N=20)			Postflexion mesolarvae (N=4)			Metalarvae (N=34)			Juveniles (N=52)		
	$\bar{x}$	$\pm$ SD	Range	$\bar{x}$	$\pm$ SD	Range	$\bar{x}$	$\pm$ SD	Range	$\bar{x}$	$\pm$ SD	Range	$\bar{x}$	$\pm$ SD	Range
SL, mm	7	0	7 - 8	9	1	8 - 9	10	1	9 - 11	16	3	11 - 22	31	6	22 - 44
TL, mm	8	0	7 - 9	9	1	9 - 11	12	1	11 - 13	19	4	13 - 28	39	8	28 - 54
<u>Lengths %SL</u>															
AS to AE	3	0	2 - 3	3	0	2 - 4		<sup>c</sup>	3 - 4	4	1	3 - 6	5	0	5 - 6
PE	9	1	7 - 10	9	1	8 - 10	11	0	11 - 11	12	1	11 - 14	12	1	11 - 13
OP1	18	1	16 - 21	21	1	19 - 24	22	0	22 - 24	25	1	23 - 28	24	1	22 - 26
OP2								<sup>c</sup>	44 - 46	47	1	44 - 49	45	1	44 - 47
PY		<sup>f</sup>	63		<sup>e</sup>	50 - 52			29 - 31			31 - 55			
OPAF			28 - 38			29 - 32			29 - 31			31 - 55			
ODF			39 - 42			42 - 45			43 - 46		<sup>c</sup>	46 - 48			
OD							51	<sup>1d</sup>	50 - 53	52	2	50 - 57	51	1	49 - 54
ID									50 - 53	65	2	62 - 69	65	1	62 - 66
PV	65	2	62 - 70	67	2	63 - 70	67	1	66 - 69	65	2	62 - 70	63	1	60 - 65
OA							67	<sup>1d</sup>	65 - 68	65	2	63 - 69	64	1	62 - 67
IA									65 - 68	77	2	75 - 82	76	1	74 - 78
AFC					<sup>b</sup>	105 - 111	110	<sup>1b</sup>	110 - 111	111	<sup>2b</sup>	110 - 113	112	<sup>1b</sup>	111 - 114
PC			104 - 107	110	<sup>3b</sup>	105 - 115	114	0	114 - 114	123	<sup>2d</sup>	116 - 126	125	1	123 - 128
Y		<sup>f</sup>	47		<sup>e</sup>	0 - 26									
P1			4 - 12			12 - 13			12 - 13	14	1	12 - 15	17	1	15 - 19
P2								<sup>c</sup>	2 - 3	10	4	5 - 16	16	1	15 - 18
D										19	2	15 - 23	22	1	20 - 24
A										17	2	14 - 20	21	2	17 - 23
<u>Depths %SL</u>															
at BPE	12	1	10 - 13	13	1	12 - 14	14	0	14 - 14	16	1	15 - 17	16	1	15 - 17
OP1	12	<sup>1b</sup>	10 - 14	14	<sup>1b</sup>	12 - 17	14	<sup>1b</sup>	12 - 17	20	<sup>2b</sup>	16 - 24	22	<sup>1b</sup>	20 - 24
OD	12	<sup>1b</sup>	9 - 15	11	<sup>1b</sup>	8 - 14	11	<sup>1b</sup>	8 - 14	19	<sup>4b</sup>	9 - 24	23	<sup>1b</sup>	20 - 26
BPV	8	<sup>1b</sup>	6 - 9	8	<sup>1b</sup>	6 - 9	8	<sup>1b</sup>	6 - 9	14	<sup>2b</sup>	9 - 18	13	<sup>1b</sup>	11 - 15
AMPM	4	<sup>0d</sup>	3 - 4	4	1	3 - 5	5	0	5 - 6	7	0	6 - 7	6	0	6 - 7
Max. yolk		<sup>f</sup>	12		<sup>e</sup>	0 - 4									
<u>Widths %SL</u>															
at BPE	12	1	11 - 14	13	1	11 - 14	13	1	13 - 14	15	1	14 - 16	15	1	14 - 16
OP1	9	<sup>1b</sup>	8 - 11	10	<sup>2b</sup>	7 - 11	10	<sup>2b</sup>	7 - 11	16	<sup>1b</sup>	14 - 18	18	<sup>1b</sup>	16 - 21
OD	6	<sup>1b</sup>	5 - 8	5	<sup>1b</sup>	4 - 7	5	<sup>1b</sup>	4 - 7	12	<sup>3b</sup>	7 - 18	17	<sup>2b</sup>	15 - 21
BPV	5	<sup>1b</sup>	4 - 7	5	<sup>1b</sup>	4 - 6	5	<sup>1b</sup>	4 - 6	10	<sup>2b</sup>	6 - 13	13	<sup>1b</sup>	11 - 15
AMPM	3	0	2 - 3	2	0	2 - 3	3	1	2 - 3	3	0	2 - 4	4	0	3 - 4
Max. yolk		<sup>f</sup>	14		<sup>e</sup>	0 - 8									
<u>Myomeres; Vertebrae for Juveniles</u>															
to PY		<sup>f</sup>	30												
OPAF		<sup>f</sup>	17												
OP2							17 <sup>a</sup>	<sup>c</sup>	17 - 17	17 <sup>a</sup>		16 - 18	16 <sup>a</sup>		15 - 17
ODF		<sup>f</sup>	13												
OD							20	<sup>1b</sup>	19 - 21	20 <sup>a</sup>		19 - 22	20 <sup>a</sup>		19 - 20
PV	30 <sup>a</sup>	<sup>f</sup>	29 - 32	30 <sup>a</sup>		30 - 32	30 <sup>a</sup>		30 - 30	30 <sup>a</sup>		29 - 32	28 <sup>a</sup>		27 - 29
Total	51 <sup>a</sup>		49 - 51	51 <sup>a</sup>		50 - 52	51 <sup>a</sup>		50 - 51	50 <sup>a</sup>		49 - 52	50 <sup>a</sup>		49 - 51
After PV	21 <sup>a</sup>	<sup>f</sup>	19 - 21	21 <sup>a</sup>		19 - 21	21 <sup>a</sup>		20 - 21	20 <sup>a</sup>		19 - 21	22 <sup>a</sup>		21 - 23

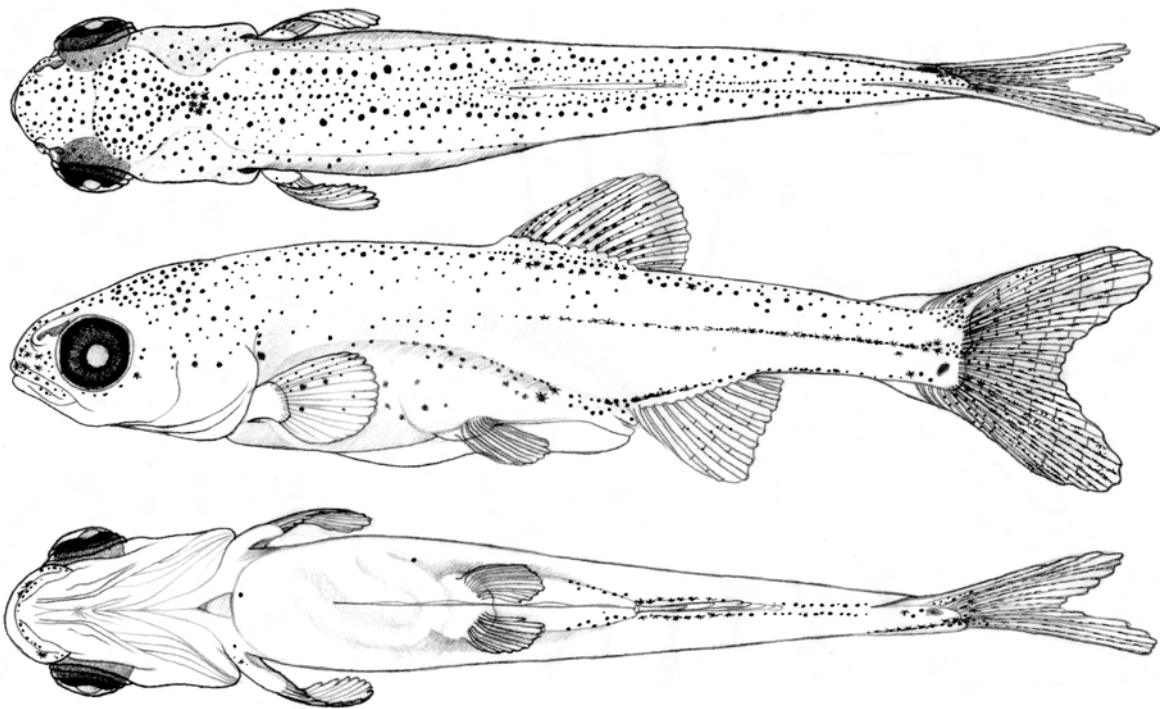
<sup>a</sup>Mode rather than mean. <sup>b</sup>Study data not reported in Muth (1990), depths and widths for mesolarvae not divided and given here for both flexion and postflexion mesolarvae. <sup>c</sup>N = 2. <sup>d</sup>Range extended with study data not reported in Muth (1990). <sup>e</sup>Original data, N = 4. <sup>f</sup>Measurement or count from Fig. 49, or range extended by such.



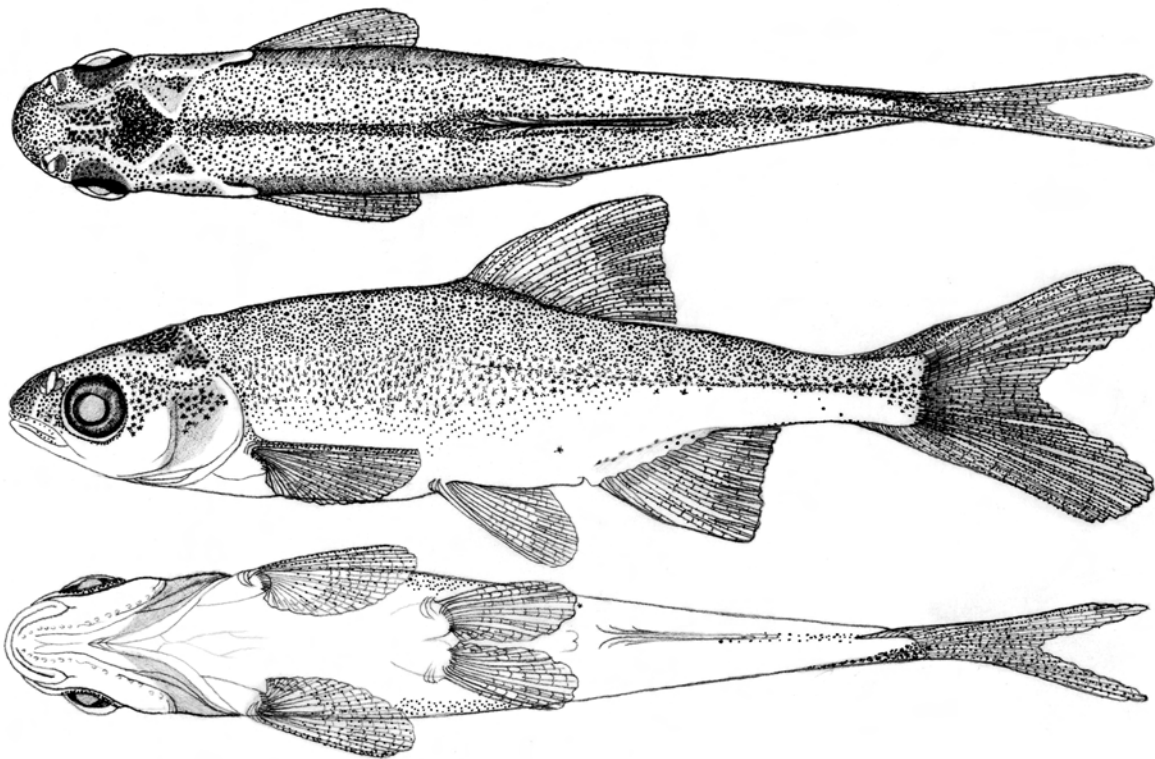
**Fig. 49.** *Gila elegans* protolarva, 7.0 mm SL, 7.5 mm TL. (Cultured in 1981 at Willow Beach National Fish Hatchery, Arizona, with stock from Lake Mohave. From Muth 1990.)



**Fig. 50.** *Gila elegans* postflexion mesolarva, 9.4 mm SL, 10.7 mm TL. (Cultured in 1981 at Willow Beach National Fish Hatchery, Arizona, with stock from Lake Mohave. From Muth 1990.)



**Fig. 51.** *Gila elegans* metalarva, 15.0 mm SL, 18.2 mm TL. (Cultured in 1981 at Willow Beach National Fish Hatchery, Arizona, with stock from Lake Mohave. From Muth 1990.)



**Fig. 52.** *Gila elegans* juvenile, 34.0 mm SL, 42.7 mm TL. (Cultured in 1981 at Willow Beach National Fish Hatchery, Arizona, with stock from Lake Mohave. From Muth 1990.)