

**DESCRIPTIONS OF LARVAE OF *ARGIA MUNDA* CALVERT,
A. PLANA CALVERT, *A. TARASCANA* CALVERT AND *A. TONTO*
CALVERT (ZYGOPTERA: COENAGRIONIDAE)**

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The descriptions and figures are based on the Arizona material, reared in 1956 and 1958, and deposited in the Florida State Collection of Arthropods, Gainesville, USA.

INTRODUCTION

While accumulating data for the *Manual of the Zygoptera of North America*, it was realized that larvae of many species in the southwestern United States were unknown. In 1956 and 1958 I spent the summers at the Southwestern Research Station of the American Museum of Natural History near Portal, Cochise County, Arizona in collecting and rearing large numbers of Odonata. The four species described in this paper were among those reared and illustrated. These with other undescribed larvae have been in our keys for many years, and with publication of the *Manual* approaching it is evident that these should be officially described as there will be no larval descriptions of species in our *Manual*, only detailed keys. These four descriptions will be followed by others, hopefully in quick succession.

***ARGIA MUNDA* CALVERT, 1901**

Figure 1

Material examined — ARIZONA, Cochise County, 5 Mi. W of Portal, S.W. Research Station, Cave Creek, 2 reared ♂, 1 reared ♀, 2 larvae, June 1956; — 5 reared ♂, 2 reared ♀, and 1 larva, June 1958.

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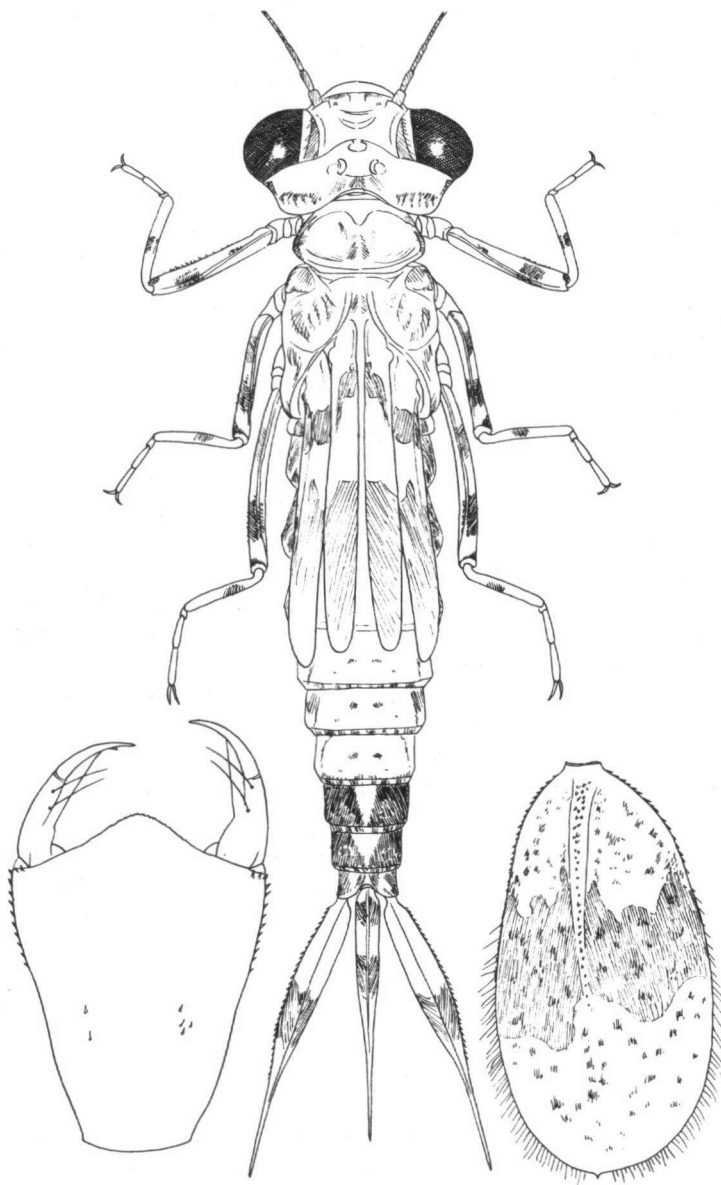


Fig. 1 *Argia munda*: (A) Dorsal view of larva; — (B) Dorsal view of labium; — (C) Lateral view of left lateral caudal gill.

This light tan larva, along with those of *tonio* and *tarascana*, has lateral gills without stout setae much beyond $1/2$ their length on either dorsal or ventral margins. Unlike the other three species described here, *munda* has abdominal segments 1-7 very pale, almost unmarked, and contrasting sharply with the dark 8 and 9, the latter two segments each with a pale median triangle with apex pointed posteriorly.

Length (including gills) 17.5-18.0 mm; abdomen (without gills) 8.5-9.0; hind femur 3.5; hindwing pads 5.0; lateral caudal gills 4.0-4.7.

Head almost twice as wide as long, hind corners protruding posteriorly; length behind compound eyes about equal to length of eyes; margins without noticeable setae. Antennae uniform in color and about equal in length to maximum head length; first and second segments thicker than remaining ones, first one thickest. Relative lengths of antennal segments about as 6:14:20:14:10:12, without distinct seventh segment. Prementum of labium 2.5 mm long and 1.9 mm wide at its widest point near base of labial palps, extending posteriorly a little beyond bases of procoxae, its basal width $1/2$ its apical width. Front margin of prementum strongly convex and minutely denticulate, the lateral margins with about ten stout setae each side in about distal $2/5$, no premental raptorial setae, only a few small scattered setae in two groups toward base. Each palpal lobe with two long raptorial setae and ending in two pointed hooks, the lateral one shorter than the mesal one and about $1/2$ as long as the movable hook which is a little shorter than the palp to base of movable hook.

Thorax obscurely patterned, with a few darker streaks as shown in illustration. Wing pads extending to middle of abdominal segment 5, with a conspicuous white band across them in basal $2/5$, apexes darker. Legs with hind femora extending to apex of abdominal segment 4, femora with two dark rings, the tibiae with one.

Abdomen with segments 1-7 pale, contrasting sharply with dark segments 8 and 9; 5-7 with a darker spot each side of midline; 8 and 9 each with middorsal light triangle with apex directed posteriorly; 10 mostly pale; lateral caudal gills about as long as segments 6-10, a bit inflated in basal $2/3$ in dorsal view, broad in lateral view, with width a little more than $1/2$ the length, blunt at apex, usually light in color with a distinct transverse dark band near middle, the marginal setae very short and extending to about $7/9$ length of gill on ventral margin, on dorsal margin to scarcely $1/2$ length, but disappearing among the very thin, almost transparent hairs which cover remainder of margin; lateral carina of lateral gill with sharp setae extending from base to $1/2$ or more of gill length; median gill with small setae on dorsal margin to about $7/13$ length of gill, on ventral margin to about $5/13$ of length of gill, lateral keel on each side extending to about $9/11$ length of gill and with sharp setae the entire length, shape and margins much the same as in lateral gills, but a little shorter than lateral gills, its width only about $1/2$ its length. Ovipositor with about $1/4$ its length extending beyond end of segment 10.

ARGIA PLANA CALVERT, 1901

Figure 2

Material examined — ARIZONA, Cochise Co., 5 Mi. W of Portal, S.W. Research Station, Cave Creek, 18 reared ♂, 9 reared ♀, 59 larvae, June 1956; — 26 larvae, June 1958; — NEW MEXICO, Gila Hot Springs, 1 reared ♂, April 1962; — KANSAS, Wyandotte Co., Wyandotte St. Lake, 3 larvae, 2 June 1976, collected by P. Liechti; — TEXAS, Brewster Co., Cattail Falls, 2 larvae, April 1974, collected by Carol Bane; — OKLAHOMA, Marshall Co., Willis, 3 reared ♂, 2 reared ♀, June, July and August 1955, collected by George H. Bick; — Murray Co., Platt National Park, Travertine Creek, 10 larvae, 25 July 1969, collected by R.E. McKinley.

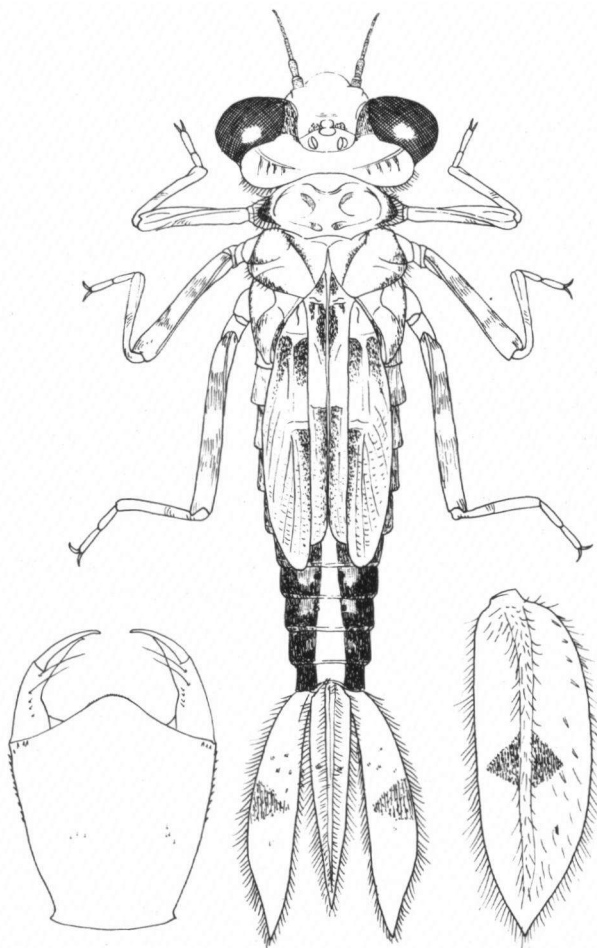


Fig. 2. *Argia plana*: (A) Dorsal view of larva; (B) Dorsal view of labium; — (C) Lateral view of left lateral caudal gill.

This short, stocky larva has short legs and is quite different from the other three species described in this paper. Its caudal gills have a few marginal sharp setae, but long thinner hairs for almost the entire length of the dorsal and ventral margins. The gills are much thickened and very hairy, in cross-section appearing quite triquetral. In this respect it belongs to a group containing *immunda* (Hagen), *extranea* (Hagen), and *vivida* Hagen in Selys. In the field the larvae are nervous, at the edge of the stream, almost crawling out of the water on vegetation long before ready to emerge. In the laboratory when placed in paper cups with a strip of screen for emergence, many such cups in an aquarium covered with cheesecloth, the larvae would leave the cups and wander around between the cups when they were not ready to transform to adults. It would be of interest to observe them at the stream at night to see if they come out of water. Terrestrial larvae are said to have thickened, hairy gills.

Length (including gills) 13.0-15.0 mm; abdomen (without gills) 6.0-7.2; hind femur 2.3-2.7; hindwing pads 3.5-4.4; lateral caudal gills 3.0-3.7.

Head about twice as wide as long, hind corners rather prominent with many short setae; medial margin of compound eyes quite straight. Antennae uniform in color and much shorter than head length; first and second segments thickest. Relative lengths of antennal segments about as 6:10:12:7:5:4:1. Prementum of labium 1.9 mm long and 1.8 mm wide at its widest point near base of labial palps, extending posteriorly to base of mesocoxae, its basal width about 5/8 its apical width. Front margin of prementum strongly convex and minutely denticulate, the lateral margins with about 10-14 setae each side in about distal 2/5, about 3 prominent setae at base of each palpal lobe, no prominent raptorial setae, only a few small scattered setae in two groups toward base. Each palpal lobe with 2 long raptorial setae, followed in line by about 3 smaller ones, some of these smaller ones occasionally large so there may be 3 or 4 long setae; each palpal lobe ends in 2 pointed hooks, the lateral one shorter than the mesal one, about 2.3 times as long as the movable hook, which is a little shorter than the palp to base of movable hook.

Thorax almost unmarked except for a darker comma shaped mark each side of midline on pronotum, and darker laterally projecting "epaulets", which bear many sharp, prominent spines. Wing pads extending to about the base of abdominal segment 7 or slightly farther with telescoping, living specimens showing some light and dark markings near base. Legs with hind femora not extending as far posteriorly as wing pads, only about to abdominal segment 6, femora with dark rings which almost disappear in specimens preserved for a long time in alcohol.

Abdomen darker brown than thorax, with pale dorsal stripe contrasting sharply with darker sides, increasing in width posteriorly until on segment 10 to about 1/3 as wide as dorsum; often with obscure slightly pale areas each side of the prominent middorsal stripe; many short hairs scattered over surface; lateral

caudal gills about as long as segment 3 or 4-10; gills much thickened and very hairy, lateral ones in dorsal view much inflated and convex on lateral surface, more straight on medial surface, in cross section appearing quite triquetral, the medial surface concave, the width about $9/22$ of their length; median gill convex on both lateral surfaces, about $1/2$ as wide as long; all gills with strong setae or long thinner hairs for almost entire length of dorsal and ventral margins, and prominent lateral keels which extend almost full length of gills; usually variable dark markings each side of gills especially near middle and toward base; surfaces of lateral gills often with stout setae encroaching on lateral surfaces along entire length. Ovipositor extending only a little past end of segment 10.

ARGIA TARASCANA CALVERT, 1901

Figure 3

Material examined — ARIZONA, Cochise Co., 15 Mi. E of Douglas, San Bernardino Ranch, larvae collected 3-5 July 1958, emerged 4-16 July 1958, 16 reared ♂, 8 reared ♀, 38 larvae, all but one in last instar.

This larva, like *munda* and *tonto*, does not have gills with strong marginal setae for $3/4$ or more of their length on either dorsal or ventral margins. The gills have irregular black blotches, and are $3/4$ to fully as long as the abdomen, which has a wide middorsal pale stripe for its full length. The larvae were collected in small streams flowing from artesian wells.

Length (including gills) 18.3-19.0 mm; abdomen (without gills) 6.3-7.0; hind femur 4.1-4.2; hindwing pads 4.4-5.0; lateral caudal gills 6.6-7.0.

Head about $1\frac{1}{2}$ times as wide as long, hind corners protruding posteriorly, margins with numerous short, stout setae (not shown in illustration). Antennae about equal in length to maximum head length; first and second segments thicker than remaining ones, first one thickest. Relative lengths of antennal segments about as 6:12:15:14:8:4:2. Prementum of labium 2.8 mm long and 2.3 mm wide at its widest point near base of labial palps, extending posteriorly to about halfway between procoxae and mesocoxae, its basal width about $2/5$ its apical width. Front margin of prementum slightly convex, minutely denticulate (not shown in illustration), the lateral margins with about 10-13 stout setae each side in about distal $1/2$ or less, no premental raptorial setae, only a few small scattered setae in two groups toward base. Each palpal lobe with three long raptorial setae and ending in two pointed hooks, the lateral one shorter than medial one, which is about $1/2$ as long as the movable hook which is a little longer than the palp to base of movable hook.

Thorax mostly light tan, the pronotum with a noticeable darker spot each side of midline and obscure darker areas laterally. Wing pads extending to base or near apex of abdominal segment 6, depending upon degree of telescoping, with obscure darker markings toward midline. Legs with hind femora extending to

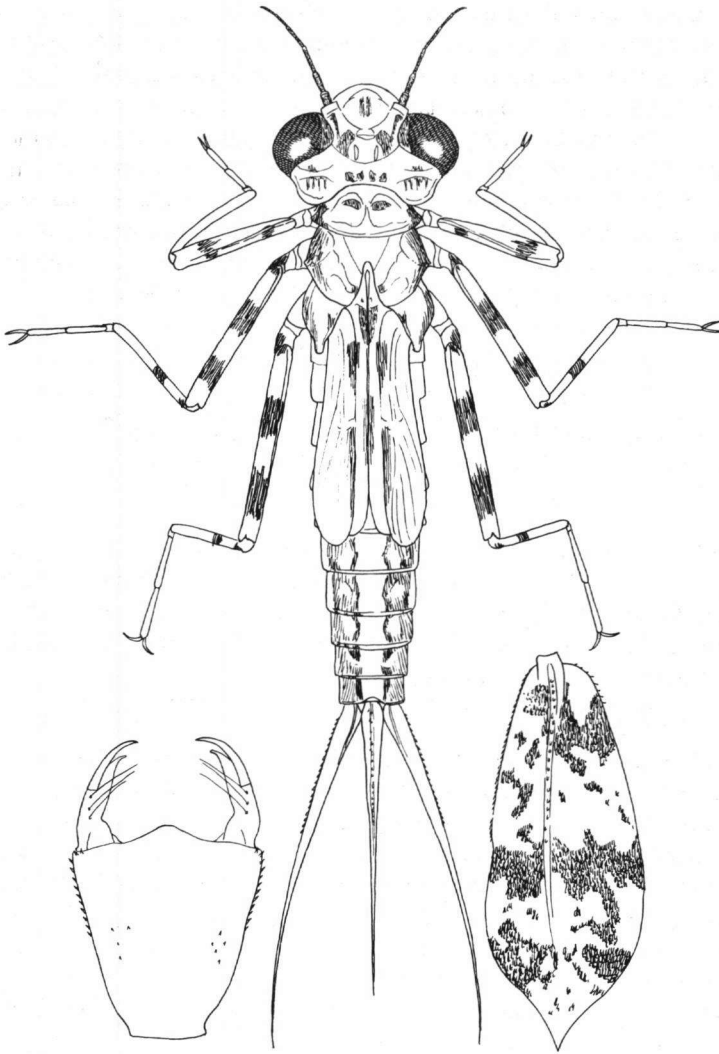


Fig. 3. *Argia tarascana*: (A) Dorsal view of larva; — (B) Dorsal view of labium; — (C) Lateral view of left lateral caudal gill.

ends of wing pads or a little beyond; meso- and metathoracic femora with small basal dark ring and two wider more distal rings, the intervening space about equal to width of ring, the tibiae with one ring. Profemora with numerous short stout spines (not shown in illustration).

Abdomen with a sharply defined wide middorsal light stripe full length of

abdomen and about $1/3$ width of each segment. Lateral caudal gills very long, about $3/4$ to fully as long as abdomen and not inflated at base, with width about $3/8$ their length, tapering at apex to a pointed tip, with sharply defined but irregular black blotches, some small, others larger; the marginal setae small, on ventral margin extending to a little less than $1/2$ length of gill, where there is a slight indentation of the margin, on dorsal margin hardly noticeable, extending to no more than $1/8$ length of gill, remainder of margin without hairs; lateral carina of lateral gill with sharp setae for about $1/2$ length of gill; median gill with small setae on dorsal margin to about $1/2$ length of gill, where a slight indentation occurs, as on ventral margin of lateral gill, only five or six minute setae near base of ventral margin, lateral keel on each side to about $1/2$ length of gill but with only a few scattered small setae near base; shape and markings much as in lateral gills, but its length a little shorter than lateral gills, its width about $7/12$ its length. Ovipositor with about $1/4$ its length extending beyond end of segment 10.

ARGIA TONTO CALVERT, 1902

Figure 4

Material examined — ARIZONA, Cochise Co., 5 Mi. W of Portal, S.W. Research Station, Cave Creek, 10 reared ♂, 4 reared ♀, 9 larvae, June 1956, 2 reared ♀ July 1958; — Coconino Co., Oak Creek Canyon, 1 larva, 16 August 1956.

This tan colored larva is distinctive in having dark caudal gills that are strongly inflated in basal $3/5$, the lateral gills with almost no strong setae on the dorsal margin, on ventral margin extending to only about $1/3$ gill length.

Length (including gills) 19.0-25.0 mm; abdomen (without gills) 7.5-10.5; hind femur 4.7-5.0; hindwing pads 5.0-6.0; lateral caudal gills 5.7-6.1.

Head length about $5/8$ of width, hind corners not protruding, but bearing numerous sharp setae. Antennae uniform in color, relatively long, about $2/7$ longer than maximum head length; first and second segments thicker than remaining ones, first one thickest. Relative lengths of antennal segments about as 11:19:26:25:13:7:4, with the seventh segment distinct. Prementum of labium at least 3.1 mm long and 2.5 mm wide at its widest point near base of labial palps, extending posteriorly to about halfway between procoxae and mesocoxae. Front margin of prementum strongly convex, minutely denticulate (not shown in illustration), the lateral margins with about 12-13 stout setae each side in about distal $1/2$, no premental raptorial setae, only a few small scattered setae in two groups toward base. Each palpal lobe with two long raptorial setae and ending in two pointed hooks, the lateral one shorter than the mesal one which is about $1/2$ as long as the movable hook which is a little shorter than the palp to base of movable hook.

Thorax with pronotum unmarked except for protruding denticulate lateral margins; meso- and metanota with obscure markings as in illustration. Wing

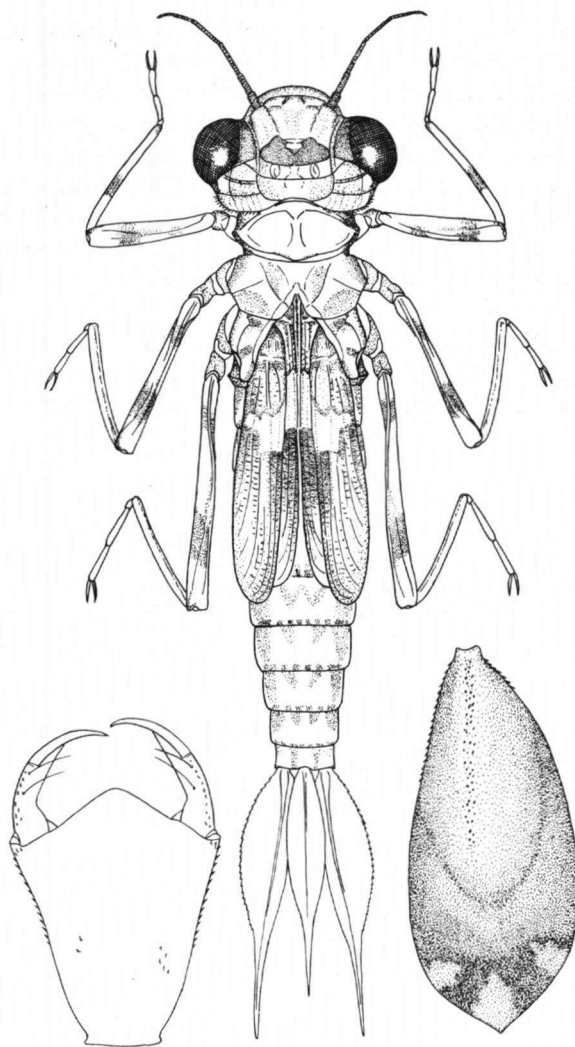


Fig. 4. *Argia tonto*: (A) Dorsal view of larva; (B) Dorsal view of labium; — (C) Lateral view of left lateral caudal gill.

pads extending to middle of abdominal segment 6, in freshly preserved specimens with lighter band near base. Legs with hind femora extending slightly farther posteriorly than wing pads, femora with two widely separated dark rings, the tibiae with one, especially the fore-tibiae.

Abdomen tan, segments 6-10 with a darker basal spot each side of midline,

and a darker lateral streak; lateral caudal gills about as long as segments 3-10, strongly inflated in basal $3/5$ in dorsal view, the widest part of gill in lateral view at about $5/8$ its length, a bit pointed at apex, more in some specimens than shown in illustration, dark in color in last instar larvae, slightly lighter areas near tip, and in earlier instars gill may be lighter with a darker transverse band near middle; marginal setae of gills very short, extending in lateral gills to about $1/3$ length of gill on ventral margin, on dorsal margin to about $1/8$ length, margins devoid of fine hairs; lateral carina of lateral gills with short scattered setae extending from base to about $1/2$ length of gill; median gill with small setae on dorsal margin to a little more than $1/10$ length of gill, less on ventral margin; lateral keel on each side to about $1/5$ length of gill with only a few scattered setae; shape and markings much as in lateral gills, but its length a little less than lateral gills, its width about $1/2$ its length. Ovipositor extending only slightly beyond end of segment 10.

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