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A NEW SPECIES OF LACHLANIA FROM NEW MEXICO WITH NOTES ON THE GENUS (EPHEMEROPTERA: OLIGONEURIIDAE)[1]

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ABSTRACT—*Lachlania* **dencyanna** Koss, n. sp., is described from New Mexico, and it is the third species of the genus to be described from North America. *L. dencyanna* can be distinguished from other known *Lachlania* species by wing venation in the adult, and by unique mid-dorsal abdominal tubercles in the nymph. A study of *L. dencyanna* and *L. cacautana* (Needham) wings shows that there is considerable variation in number of crossveins, and their use in taxonomy should be a cautious one. The limits of the genus *Lachlania* are discussed.

The new species of *Lachlania* Hagen described herein has a nymph with a row of median tubercles on the abdominal terga, a feature heretofore undescribed in other species of this genus. The specimens were collected in and near that part of the Gila National Forest north of Silver City, New Mexico, which contains the Gila Cliff Dwelling National Monument. The mayfly fauna of the area is poorly known, and of great interest. Among the species collected were 3 recently described species, namely, adults of *Heptagenia petersi* Allen (1966), originally described from Wyoming and Utah, adults and nymphs of *Leptohyphes apache* Allen (1967), which was described from Arizona, Utah, and New Mexico, and adult females of *Thraulodes brunneus* Koss (1966), which was described from the Gila area. Specimens of the following were also collected: *Baetis bicaudatus* Dodds, *B.* sp. near *ephippiatus* Traver, *B.* sp. near *erebus* Traver, *B.* sp. near *pallidulus* McD., *B.* sp., *Dactylobaetis* sp., *Ephemerella (Serratella) micheneri* Traver, *Heptagenia* sp., *Isonychia intermedia* (Eaton), *Traverella* sp. near *albertana* (McD.), and *Tricorythodes* sp.

Lachlania dencyanna Koss, n. sp.[3]
(Figs. 5–19)

MALE IMAGO.

Size. Length: body 12–15 mm.; forewing 11–13 mm.; caudal filaments 38–43 mm.

Head (fig. 9). Occiput blackish brown; frons translucent gray with a narrow brown stripe extending from each side of nasal carina at median ocellus anteriorly

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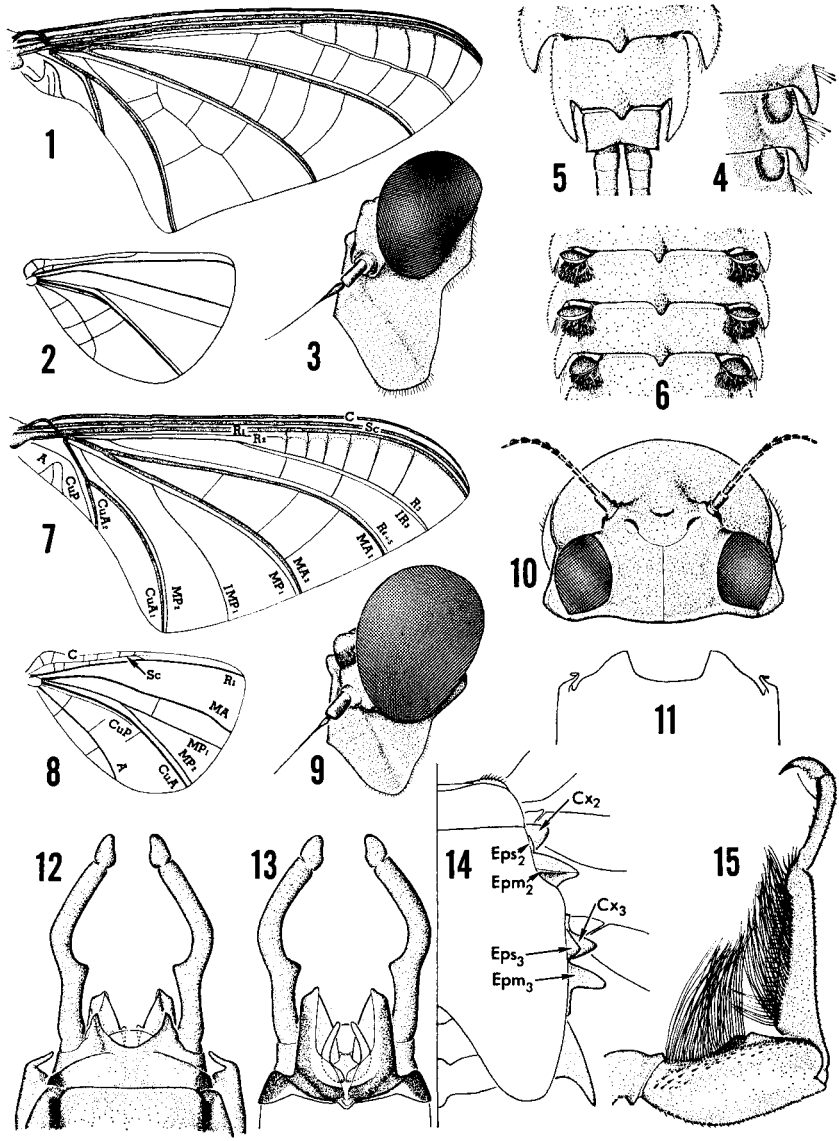
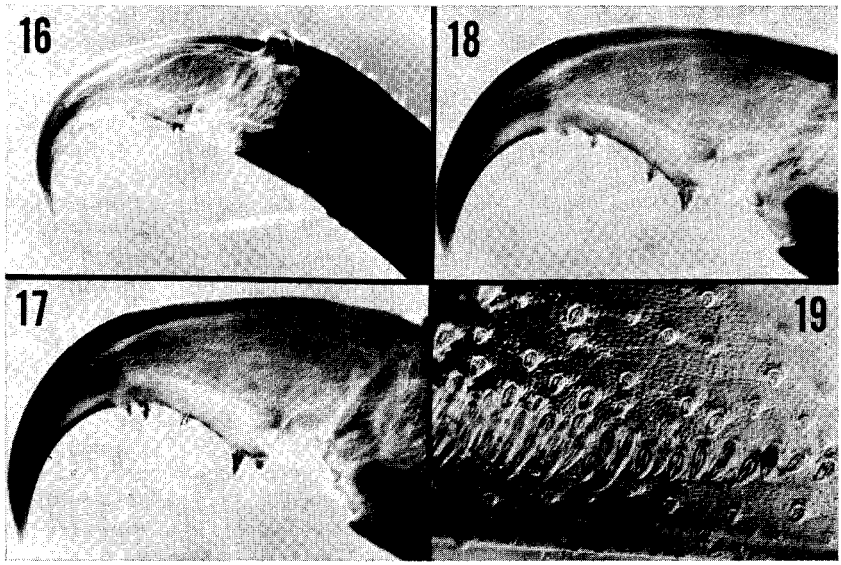
[3] I take great pleasure in naming this species after my wife, Dency Anne, who has not only aided me on my various collecting excursions, but has unselfishly given of herself in assisting me with some of the timetaking tasks of research.



Figs. 1–3, *Lachlania cacautana* (Need.), adult male paratype: 1, right forewing; 2, right hindwing; 3, lateral view of head. Fig. 4, *L. powelli* Edmunds, gills on segments 5 and 6. Figs. 5–15, *L. dencyanna,* n. sp., paratypes: 5–6, nymphal terga; 5, segments 8–10; 6, segments 4–6, with gill covers raised; 7–8, male right wings; 7, forewing; 8, hindwing; 9, lateral view of adult male head; 10, dorsal view of nymphal head; 11, ventral view of adult female subanal plate; 12–13, adult male genitalia; 12, ventral view; 13, dorsal view; 14, dorsal view of right half of nymphal thorax; 15, anterior view of right nymphal foreleg. Cx = Coxa, Epm = Epimeron, Eps = Episternum.



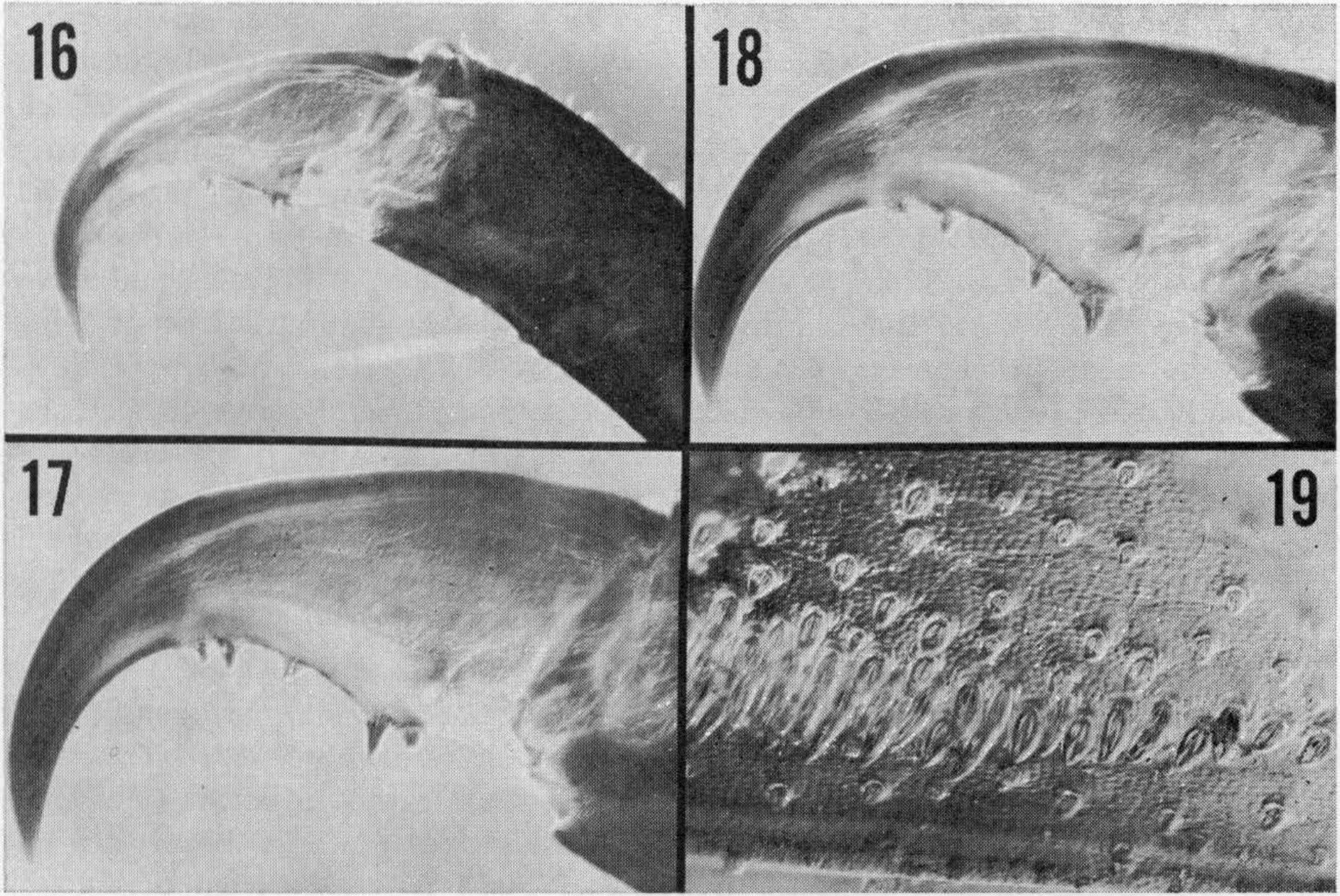
Figs. 16–19, *Lachlania dencyanna*, n. sp., nymphal structures: 16, claw, leg I; 17, claw, leg II; 18, claw, leg III; 19, sternum 3 at left postero-submedian margin. Photographs with a Zeiss Photomicroscope on Kodak Panatomic-X film.

to anterolateral margin of antennal sockets. Antennae black, pedicel with a longitudinal dorsal white stripe. Eyes dull reddish brown.

Thorax. Pronotum light brown with a broad pale V-shaped area occupying anterior two-thirds of mid-region. Mesonotum dark brown, a pair of large submedian pale spots at the anterior margin (often concealed by pronotum); scutum with full-length pale H-shaped mark; scutellum, scutum between anterior arms of "H," and anterolateral margins of scutum dark blackish brown. Metathoracic notum dark brown, similar to lateral regions of mesoscutum. Meso- and metapleura light brown, white in membranous areas. Prosternum white; mesosternum brown; metasternum white, brown on anterior margin.

Legs. All coxae light brown except for white mesal surface; all trochanters and femora sparsely washed with light purple except mesally. Apex of profemora, base and apex of protibia, and segments 1 and 2 of protarsi brown, mostly on anterior surface; remainder of legs and claws white. Tarsal formula 3-4-4; in ventral aspect, ultimate segment of protarsi twice as long as 2 basal segments combined; ultimate segment of meso- and metatarsi subequal to 3 basal segments combined.

Forewings (fig. 7). Iridescent blue in live and dried specimens; iridescent green in specimens preserved in alcohol. Veins pale in basal third of wing, becoming pale brown apically; junction of costal brace and R_1, base of R, and the pleural wing recess brown. Crossveins in R_1–R_3 interspace white to pale brown; IMP_1 and all crossveins behind R_3 white. In each wing, total number of crossveins 6–14, usually 9–14. Four to 8 crossveins in R_1–R_3 interspace, most commonly 6. IR_3–$R_{4 \text{ and } 5}$ interspace with 1–4 crossveins, usually 2 or 3. MA interspace usually with



Figs. 16–19, *Lachlania dencyanna,* n. sp., nymphal structures: 16, claw, leg I; 17, claw, leg II; 18, claw, leg III; 19, sternum 3 at left postero-submedian margin. Photographs with a Zeiss Photomicroscope on Kodak Panatomic-X film.

2 crossveins, less often with 3, occasionally 1 or 4. Of 32 specimens examined, 12 possessed a crossvein within MP_1–IMP_1 fork, or a short spurious vein external to the fork, on at least one wing. No crossveins between MP_1 or IMP_1 and MP_2, and none posterior to MP_2. Branching and/or partially developed crossveins occurred in one or both forewings in the R_1–R_3 and/or MA interspaces in 15 out of 32 specimens; a branched crossvein was observed in the IR_3–$R_{4\text{ and }5}$ interspace only once.

Hindwings (fig. 8). Color of membrane as in forewings; all veins and crossveins pale; pleural wing recess brown. Subcosta absent in apical half of wing. Usually no crossveins between R_1 and MA, but rarely 1 crossvein present. MA–MP_1 interspace usually with 1 crossvein, less often with 2, rarely none or 3. Crossveins lacking between MP_1 and MP_2. Cu-A interspace usually with 2 crossveins, less often with 1, occasionally 3; frequently if more than 1 crossvein is present, the additional ones are partial, attached either to Cu or A. One to 4 crossveins attach A to hind margin of wing, most commonly 2, less often 1 or 3, rarely none or 4. Partial crossveins observed only in Cu-A interspace.

Abdomen. Terga 1–7 light yellowish brown to light rusty in color; terga 8–9 golden yellow to red-brown; wide hyaline intersegmental membrane conspicuous between segments 1–7, usually not visible between segments 7–10. Sclerotized bar at lateral margins of terga usually appearing dark brown in dorsal view only; bar faintly visible in lateral view, and only darkened at posterior border of segments 2–9 or not at all. Posterior margins of terga 2–9 vary from completely blackened to not blackened. Anterior margin of terga 9 and 10 dark brown, sclerotized (usually concealed by posterior margin of preceding segment). Tergum 10 red-brown with a dark brown sclerotized "V" with point directed anteriorly; white membrane between arms of "V." Sterna 1–8 white to pale gray; 9th sternum brown along its anterior margin and surrounding a dark, sublateral, sclerotized groove extending the full length of the segment (fig. 12).

Genitalia (figs. 12–13). Subgenital plate heavily sclerotized laterally, with ventral end of sclerotized area adjacent to and articulating with the apex of the sclerotized groove of the ninth sternite. Medially, subgenital plate with a lightly sclerotized "Y" with stem extending the length of subgenital plate and the arms extending semi-freely between forceps arms; basal half of "Y" arms connected to each other by a membrane, and complete outer lateral margin of arms with a membrane extending to the base of each respective forceps arm. Penes heavily sclerotized dorso- and ventrolaterally, each lobe with a sclerotized basal lateral extension reaching to and articulating with the lateral sclerite of the subgenital plate. Penes elongate, more or less rectangular; mesally with a recess containing a curved titillator. Apex broadly three-cornered, the dorsomesal one longest.

Caudal Filaments. Basal segment sclerotized except on mesal surface; remainder of filaments white and pilose.

FEMALE IMAGO.

Size. Length: body 11–17 mm.; forewing 13–15 mm.; caudal filaments 8–11 mm.

Head. Occiput blackish brown on anterior two-thirds, light brown on posterior third; frons, antennae and eyes as in male.

Thorax. Pronotum light to dark brown; midline white, pale "V" restricted to anterior third of segment. Meso- and metanota, pleura and sterna as in male.

Legs. Coxae similar to male in coloration, remainder of legs white, either plain or mottled with light purple or brown; legs beyond coxae shriveled and twisted.

Forewings. Coloration as in male. In each wing, total number of crossveins 5–14, usually 8–13. Three to 7 crossveins in R_1–R_3 interspace, most commonly 5. IR_3–$R_{4\text{ and }5}$ interspace with 1–4 crossveins, usually 2 or 3. MA interspace with none to 4 crossveins, usually 2, less often 3, rarely 4, 1, or none. Of 22 specimens examined, 5 possessed a crossvein within MP_1–IMP_1 fork, or a short spurious vein external to fork, on at least one wing. No crossveins between MP_1 or IMP_1 and MP_2 and none posterior to MP_2. Branching and/or partially developed crossveins occurred in one or both wings in the R_1–R_3 and/or MA interspaces in 11 out of 22 specimens; no partial or branched crossveins in IR_3–$R_{4\text{ and }5}$ interspace.

Hindwings. Coloration, Sc, MA–MP_1 interspace, and MP_1–MP_2 interspace as in male. Crossveins not observed in R_1–MA interspace. Cu-A interspace with none to 3 crossveins, usually 1, less often 2. One to 4 crossveins attach A to hind margin of wing, 2 and 3 being equally frequent, 1 and 4 less frequent. Partial crossveins observed in all 3 areas.

Abdomen. Tergum 1 gray, terga 2–9 yellowish brown to red-brown; intersegmental membrane usually as in male; posterior margins of terga usually not darkened. Lateral sclerotized bar usually more conspicuous than in male, extending anteriorly and dorsally next to anterior margin on segments 2–9; bar broken at midline on segments 2–7, and with irregular, submedian, posterior swellings which increase in size from segment 2 to 9. Terga 2–9 also with short submedian sclerotized patches located slightly to the posterior on each segment; patches gradually decrease in size from segment 4 to 9. Tergum 10 dark blackish brown except for median apical white V-shaped membranous area; basal half of tergum sclerotized. Sterna 1–7 pale; posterior margin of sternum 7 with each lateral third sclerotized; median third of segments 8–9 pale, lateral thirds light brown. Subanal plate broadly and deeply excavated (fig. 11).

Caudal Filaments. Basal segment as in male; remainder of filaments black, white distally; a shallow groove on mesal surface.

MATURE NYMPH.

Size. Length: body 15–17 mm.; caudal filaments 10–12 mm.

Form (figs. 5, 6, 10, 14–19). General coloration ranging through whitish, dull green, red-brown and blackish brown; posterolateral projections pale. Frons broadly rounded (fig. 10). Claws dark red apically with 3–6 denticles (figs. 16–18). Lateral projections of mes- and metepimeron well developed, clearly visible in dorsal view (fig. 14). Posterolateral projections of abdomen with hairs apicomesally and spines laterally (figs. 5–6). Posterolateral projections of segment 9 elongate, in dorsal view mesal edge at least half as long as segment 10 is wide. Posterior margin of metathorax and tergum 1 with a pair of low submedian tubercles; posterior margin of abdominal terga 2–9 with a distinct single median tubercle; all tubercles densely covered with short spines (figs. 5–6). A dense row of short spines near posterior margin of sterna 1–8, extending halfway to lateral margins of sterna 2–4; on successive posterior sterna the row progressively shorter and more interrupted at midline; other spines randomly scattered across remainder of each sternum (fig. 19).

Types. Holotype: male imago, East Fork of Gila River at junction with Gila River, 40 miles north of Silver City, state highway 527, Grant Co., New Mexico, 10/IX/1967, R. W. Koss and D. W. Argyle, in collection of University of Utah, Salt Lake City. Allotype: female imago,

same data and deposition as holotype. Paratopotypes: 36 male imagoes, 27 female imagoes, 2 nymphs, same data as holotype; 221 nymphs, 15–19/VII/1967, R. W. Koss, D. T. Koss, and M. Tucker, other data as holotype. Of these, 15 males, 9 females, 48 nymphs in alcohol, and 1 male, 1 female on pins deposited in University of Utah collection; 9 males, 6 females, 45 nymphs in alcohol, and 1 male, 1 female on pins in R. W. Koss collection; 2 males, 2 females, and 10 nymphs deposited in each of the following collections: California Academy of Sciences, San Francisco; Canadian National Collection, Ottawa; Institute Royal des Sciences Naturelles, Brussels; J. R. Traver, University of Massachusetts, Amherst; and United States National Museum, Washington. Also 20 nymphs in each of the following collections: British Museum (Natural History), London; California State College, Los Angeles; Florida A & M University, Tallahassee; and University of Florida, Gainesville. Paratype: 1 nymph, tributary to Gila River, 1 mi. so. of Cliff, Grant Co., New Mexico, 14/VII/1967, R. W. Koss, D. T. Koss, and M. Tucker, in University of Utah collection.

Diagnosis. Adults of *L. dencyanna* differ most obviously from the other 2 North American species of *Lachlania* (*L. powelli* Edmunds (1951), described from Utah, and *L. saskatchewanensis* Ide (1941), described from Saskatchewan) by the number of crossveins in the front wing.[4] *L. saskatchewanensis*, known only from the 1 female type specimen, has 1 crossvein each in the R_1–R_3, IR_3–$R_{4\text{ and }5}$ and MA interspaces—a total of 3 crossveins in each forewing; *L. powelli* usually has 1 crossvein in each of the above interspaces, but occasionally (25% or less) 2 crossveins can be found in the R_1–R_3 or MA interspace—thus a total of 5 possible, although 3 is most common. *L. dencyanna*, however, always has 3 or more crossveins, most often 5 or 6 in the R_1–R_3 interspace, and usually has 2 or 3 crossveins in both the IR_3–$R_{4\text{ and }5}$ and MA interspaces—a total of 5–14 possible crossveins in each forewing, 8–14 being most common.

On the males, the femur-tibia joints of the meso- and metathoracic legs are pale in *L. dencyanna*, brown in *L. powelli*; and the sublateral abdominal sclerotized bars are poorly developed and visible dorsally in *L. dencyanna*, but well-developed and visible both laterally and dorsally in *L. powelli*. The male genitalia is also distinctive for each species.

[4] *Lachlania powelli* may be a synonym of *L. saskatchewanensis*, but a series of adult and nymphal specimens of the latter will be necessary before the status of *L. powelli* is determined. The biology discussions in this paper and in Edmunds (1951) should be adequate to aid collecting of adults as well as nymphs. Canadian entomologists should attempt to collect *Lachlania* whenever they are collecting in or near warm water rivers, especially in Saskatchewan. *L. saskatchewanensis* is known from a single female collected in September from the saline Stoney Lake near Humboldt, Saskatchewan. It seems more likely that the nymphs occur in the Saskatchewan River or one of its warmer tributaries.

L. dencyanna differs from *L. cacautana* (Needham, 1932), *L. garciai* (Navas, 1912) and *L. pallipes* (Eaton, 1883) by its lack of crossveins between IMP_1 and MP_2 (figs. 1, 7). *L. abnormis* Hagen (1868) and *L. lucida* Eaton (1883), like *L. powelli* and *L. saskatchewanensis,* have a single crossvein in each of the first three interspaces of the forewing, and this feature alone will suffice to distinguish them from *L. dencyanna.* The wings of *L. radai* (Navas, 1926) have a copper iridescence as opposed to a blue (dry specimen) or green (in alcohol) iridescence in *L. dencyanna* wings. According to Navas' illustration, the wings of *L. radai* and *L. dencyanna* are similar in number and position of crossveins; however, Ulmer's (1943) illustration indicates that *L. radai* may have more crossveins in the second interspace than has *L. dencyanna.* The wing cross-venation of *L. fusca* (Navas, 1924) is similar to *L. dencyanna,* but the species is so poorly known as to make further comparisons worthless.

The presence of the middorsal abdominal tubercles is unique to *L. dencyanna* nymphs, and will readily distinguish them from all other known nymphs of *Lachlania.* However, the junior author has seen 1 specimen with similar middorsal tubercles from "Peru" (no other data). The well-developed posterolateral projections of abdominal segment 9 also serve to separate *L. dencyanna* from other known *Lachlania* nymphs. The well-developed lateral projections of the thorax, the presence of lateral spines instead of hairs on the posterolateral abdominal projections, and the high density of short ventral abdominal spines distinguishes *L. dencyanna* from *L. powelli* (fig. 4); the condition of these characters in other described *Lachlania* nymphs is not known.

Biology

The East Fork of the Gila River at its junction with the Gila River is a warm, turbid and rapid stream, mostly 6 inches to 2 feet in depth, and 6–10 feet in width. The stream is unshaded for most of the day.

The biology of the nymphs is similar to that described by Edmunds (1951) for *L. powelli,* except that they were not found clinging to rocks. Nymphs were, however, found in great numbers clinging to sticks and other vegetation caught in crevices among the rocks. Nymphs died in standing water when kept overnight in a bucket.

Adults were captured on a September 10 collecting trip, but not in July; and none was obtained from rearing cages kept in the river. During July, most of the nymphs appeared to be 1–2 weeks from emergence, although some did have darkened wing pads indicating emergence was near or already occurring for some individuals. The failure to capture adults in July may have been due to the senior author's original lack of knowledge concerning their very untypical mayfly mating behavior. Much of their behavior is similar to *L. powelli,* but a few interesting particulars were noted.

Adults first appeared around 11:30 A.M., and all activity ceased at approximately 1:30 P.M. with an air temperature of 82°F.

The male flew a distance of 3–5 feet back and forth across the stream, facing upstream at approximately a 45° angle to the direction of the current. They flew 1–2 inches above the water with tails widespread. The males would occasionally dart up- or downstream a distance of 5 feet or more, or fly in 1 or more circles before continuing the back and forth flight pattern. This may have been an escape behavior performed when they noticed the observer's movements.

Males would occasionally alight on the water for 1–2 seconds and then resume the back and forth flight pattern. It was assumed that these were exhausted males which rested by the short stops on the water's surface. One male was observed to land on the water and take off 14 times in 2 minutes before the final drop to the water. He usually floated 5–10 feet before flying up, but on the next to last fall he floated about 35 yards before the last take off and immediate, final fall. This male never mated during the period of observation, nor did he resume the back and forth flight pattern. Males were also observed sitting and clambering about in the grass along the water's edge, and occasionally they would be flushed up when someone walked along the shore. One male was observed to fly into the grass, wait a bit, clamber out and fly off. The purpose of this is unknown, but perhaps these males were resting also. These observations differ from those of Edmunds (1951) for *L. powelli* where "at no time were the insects seen to alight or leave the air above the river."

Females fly parallel to the current, either holding their position against the force of the wind, floating downwind (downstream) in the air, or shooting upwind (upstream). Quite frequently they would quickly fly downstream 20 feet or more, and this seemed to be an escape reaction following the perception of the observer's movements.

Only 2 matings were observed, and both pairs floated on the water when in tamdem. One of the pairs remained together when captured, and the male was observed to be on top of the female with his head posterior to hers. It is not certain whether this is the normal mating position or not, but it is similar to 1 position noted by Edmunds (1951).

KEY TO THE NORTH AMERICAN SPECIES OF *Lachlania*

ADULTS

1. Forewing with 5 or more crossveins anterior to MA_2; sterna 1–7 white ..... **L. dencyanna**, n. sp.
   Forewing with 3, occasionally 4 or 5, crossveins anterior to MA_2; sterna 1–7 brown 2
2. Anterior margin of mesonotum with a continuous pale, transverse band ..... **L. saskatchewanensis** Ide
   Anterior margin of mesonotum with 2 large submedian pale spots ..... **L. powelli** Edmunds

NYMPHS

1. Abdominal terga 2–9 each with a distinct middorsal tubercle (figs. 5–6); posterolateral projections of abdomen with hairs apicomesally and spines laterally (figs. 5–6) ..... **L. dencyanna**, n. sp.
Abdominal terga 2–9 lacking middorsal tubercles; posterolateral projections of abdomen with hairs apicomesally and hairs plus very short spines laterally (fig. 4) ..... **L. powelli** Edmunds

NOTES ON THE WING VENATION OF THE GENUS **Lachlania**

There have been discrepancies, errors and omissions in the literature concerning which wing veins are present, their degree of development, and their identity (especially in the hindwing). The following notes on *Lachlania* venation are based on studies of *L. cacautana, L. dencyanna, L. powelli, L.* spp. (from South America, mostly Peru) and comparisons with most of the other genera of Oligoneuriidae.

Demoulin (1952) does not include the R_2 vein on his illustration of the forewing of *Oligoneuriella rhenana* (Imhoff), and Edmunds (1951) and Edmunds, Berner and Traver (1958) illustrated the R_2 vein of the forewing of *Lachlania* as branching from the R_3 near the midpoint of the wing. We have observed the R_2 vein to have its origin not at midpoint, but at the base of the wing in *Elassoneuria insulicola* Demoulin, *Homoeoneuria ammophila* (Spieth) ?, *H. dolani* Edmunds, *Lachlania, Oligoneuriella rhenana, Oligoneurisca borysthenica* (Tshernova), and *Spaniophlebia* sp. The R_2 vein is very weak, lies very close to the R_1, and at the point where R_3 curves posteriorly (in *Lachlania*) R_2 fades into the dark thickened region along the posterior margin of R_1 (figs. 1, 7).

In the hindwing of *Lachlania,* the Sc is present for approximately the basal half only; it does not extend to the apex of the wing. The CuP vein of the hindwing lies very close to the CuA vein; it is short, extending to or slightly beyond the MP fork (figs. 2, 8).

The number of crossveins is variable in *L. cacautana* and *L. dencyanna,* but rather constant in *L. powelli.* The degree of variation in numbers of crossveins present in *L. dencyanna* and *L. powelli* has already been discussed in the species description and diagnosis. In *L. cacautana,* only 11 male and 3 female specimens were available, so no sexual differences in number of crossveins could be noted. In the forewing, *L. cacautana* has 3–8 crossveins, usually 6 or 7, in the R_1–R_3 interspace; IR_3–$R_{4\text{ and }5}$ interspace with 4–8 crossveins, usually 5; 3–6 MA crossveins, usually 4 or 5; 1–3 crossveins between MP_1 and IMP_1, usually 2; and 1–4 crossveins between IMP_1 and MP_2, usually 3. In the hindwing of *L. cacautana,* R_1–MA interspace lacks crossveins; MA–MP_1 interspace usually without crossveins, 2 wings with 1 crossvein; MP_1–MP_2 interspace usually lacking crossveins, 3 wings (2 on 1 specimen) with 1 crossvein; 1–3 crossveins between Cu and A, usually

2; and 2–5 crossveins, usually 3, attach A to the hind margin of the wing.

The most important feature noticed in *L. dencyanna* and *L. cacautana* is that in both sexes and in both fore- and hindwings, there is much variation between individuals and between the left and right wings in number and position of normal, forked and partially developed crossveins. In *L. dencyanna*, the condition in one wing was reflected in the other wing in only 7 of 54 specimens.

Because of this variation in number and position of crossveins, the use of these features for species definitions should be a cautious one, and a review of the species described by earlier authors may result in the discovery of synonyms.

Comments on American Oligoneuriid Nymphs

Edmunds (1961) has provided a key to the genera of nymphs of Oligoneuriidae but studies since that time have provided additional data and raised some questions concerning the genera found in the Neotropical region. One type of nymph in South America has a long dome-shaped frons extending anteriorly. This has been referred to by Spieth (1943) as the nymph of *Oligoneuria*, but Demoulin (1955) subsequently assigned the nymph to *Spaniophlebia* on the basis of venational patterns in the nymphal wing pads. Study of many Oligoneuriidae by us shows that there is a general correlation between the size of the extension of the frons in the nymphs and in the adults. The adults of *Spaniophlebia* show only a very small frons. It therefore seems questionable that nymphs with the largest frons known among American Oligoneuriidae are the nymphs of *Spaniophlebia*. The greatest development of the frons in adults known to us occurs in *Lachlania cacautana* Needham (fig. 3). The species *cacautana* was originally described in *Alloydia*. Edmunds & Traver (1954) and Ulmer (1943) have regarded *Alloydia* and *Noya* as being synonyms of *Lachlania*. Perhaps *Alloydia* is a distinct genus, and the nymph is the one described by Spieth (1943) as *Oligoneuria* and by Demoulin (1955) as *Spaniophlebia*. Our material is inadequate to provide an answer. *Alloydia* and *Noya* were both regarded as distinct from *Lachlania* largely on the basis of having more crossveins in the wings. The adults of *Lachlania dencyanna* are similar to *Alloydia* and *Noya* in having numerous crossveins, but the nymphs are, except for the possession of median tubercles on the terga, typical of the nymphs of *Lachlania*, including *Noya pallipes* as described by Ulmer (1920). Clarification of these taxonomic problems awaits the association of nymphs and adults of several more species.

The nymphs with the large frons are not the nymphs of *Oligoneuria anomala* Pictet. The nymphs of *Oligoneuria* are now known to us, and will be described elsewhere.

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