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# New species of *Allomyia* Banks from the Western United States (Trichoptera: Apataniidae)

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## Abstract

Six new *Allomyia* species from the western United States are described: *Allomyia kondratieffi* sp. nov., *Allomyia leei* sp. nov., *Allomyia meachamensis* sp. nov., *Allomyia sarahae* sp. nov., *Allomyia sheldoni* sp. nov., *Allomyia whatcomensis* sp. nov. The majority of these species were collected from small headwater, high altitude streams on relatively isolated mountain ranges. These species bring the number of known North American *Allomyia* to 18. Additional notes on state/county distribution records, taxonomic problems, species diagnostics and adult emergence periods for the 18 North American species are provided.

**Key words**: Trichoptera, Apataniidae, *Allomyia*, distribution, new species

## Introduction

Continuing collections of western North American (NA) Trichoptera have resulted in the discovery of six new *Allomyia* species. Most NA *Allomyia* species are found in small headwater streams and springs located at higher elevation. They also are generally early season emergers, often when the streams, higher altitude access roads, etc. are still covered with snow in normal and wet years. The adults have short flight periods and seldom fly far from the larval habitats.

Our collections have also indicated that there appears to be a single species (or occasionally two) restricted to the mountain range where a given species is found. An exception is within the Glacier National Park region where six species are now known. Perhaps future collections will expand the known distribution for more species, although the authors suspect that future collections will more likely result in additional isolated species being discovered, rather than greatly expanding the distribution of known species.

The NA *Allomyia* literature is limited. The most recent summary was Ross (1950), who described five species (*acanthis, bifosa, cascadis, gnathos, picoides*) under *Imania* Martynov, and summarized the two species known at the time (*renoa* (Milne, 1935), *tripunctata* (Banks, 1900)). Denning (1953) added *chama*; Schmid (1968) *cidoipes*; Nimmo (1971) *hector*; Wiggins (1973) *scotti* and Nimmo (1977) *thomasi*. Levanidova *et al.* (1995) and Nishimoto and Kuhara (2001) reviewed the eastern Palearctic *Allomyia*, with the inclusion of nine new species from that region.

Banks (1916) defined *Allomyia* to include the single species *Apatania tripunctata* Banks 1900. The "description" of *Allomyia* is contained within the couplets of a key and has not proven accurate as additional species have been added to the genus. Subsequent authors (e.g. Martynov, 1935 (as *Imania*); Nimmo, 1971 (as *Imania*); and Nishimoto & Kuhara, 2001) provide more recent *Allomyia* descriptions. Although *Allomyia* was recognized by Dodds and Hisaw (1925), *Imania* was commonly used until the papers by Higler (1981) and Wiggins (1981), even though Fischer (1967) pointed out the synonymy by Banks (1916). Recently, *Allomyia* was incorrectly synonymized by Koçak and Kemal (2010) under *Sauricesa* Koçak and Kemal (Diptera: Cecidomyiidae). However, O'Hara (2011) corrected the error.

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## Methods

Males are covered in this paper to make these names available, and also to prevent future mis-determinations by discussing diagnostic characters for the new and described species. Studies of the females and larvae of all the NA *Allomyia* species are continuing. The text indicates taxa where the female, or larva, are known to the authors. Abdomens were removed, cleared in KOH and examined/figured with the use of stereo and compound scopes. All material is preserved in ETOH and some has been successfully barcoded. Barcoding was unsuccessful for many specimens/species, suggesting that typical primers may not be appropriate for *Allomyia.*

Abbreviations used include: CAS—California Academy of Sciences, San Francisco, California (CA); CSU—Colorado State University, Fort Collins, Colorado, (CO); INHS—Illinois Natural History Museum, Champaign—Urbana, Illinois; MLBM—Monte L. Bean Museum, Provo, Utah, (UT); NMNH—National Museum of Natural History, Washington, D.C.

## Descriptions

***Allomyia kondratieffi*—sp. nov.** (Fig. 1)

Based on the long basomesal, spinelike styles of the inferior appendages, this species belongs to the *tripunctata* group of Ross (1950). Like *A. chama,* this species has a blunt phallicata apex in lateral view. *Allomyia kondratieffi* can be readily separated from *A. chama* by the thin, spinelike styles of the inferior appendage, while those of *A. chama* are broad and blade-like in lateral view. *Allomyia hector* is also very similar to *A. kondratieffi*. The best characters to distinguish the males are the widely divergent parameres of *A. kondratieffi*, while those of *A. hector* are appressed to the aedeagus. The inferior appendages and styles are more similar to *A. tripunctata* than those of *A. hector*. The authors have associated females of both species, which will be addressed in a subsequent paper; they are quite different morphologically.

**Male**—Length: 10mm head to wing tip. Color: dark brown in ETOH, forewing with pale spot at stigma, cross vein t1, t2, and M just prior to t3; cell between Cu2 and A1+2+3 pale; scattered pale irrorations in subcostal and radial cells. Genitalia (Figs. 1A–F): 9$^{th}$ segment annular, narrow with angular anterior and posterior projections above insertion of inferior appendage. Inferior appendage with 2 segments, basal segment relatively straight and slightly constricted at mid-length in lateral view; apical rami inflated, with dorsal ramus about twice length of ventral ramus; both with dense inner covering of stout, peg-like, black setae. In ventral view both inferior appendages with a long, mesal style originating at base of inferior appendage and extending slightly beyond apex of basal inferior appendage segment. In dorsal view, tenth segment with divided apex acute, directed slightly upward; intermediate appendages large, thumb-like, directed outward. Aedeagus with short, acute parameres directed downward and outward; apex of phallicata blunt in lateral view and roundly divided in dorsal view; the endophallic plates smoothly rounded and directed downward.

**Type material.** Holotype male: U.S.A.: Colorado, San Miguel County, Turkey Creek above water falls, above Upper Alta Lakes, Boris C. Kondratieff and Brian Heinold, 6 July 2012. Paratypes: 4 males, same data as holotype.

**Type deposition.** Given the similarity to *A. chama*, the holotype and four paratypes will be deposited at the CAS where the *A. chama* holotype is deposited.

**Etymology.** This species is named for Boris Kondratieff, a great friend, teacher and collector who has added a tremendous amount of distributional and taxonomic information to the NA caddisfly knowledge base.

**Distribution.** To date, while abundant in the small streams in the type locality area, this species has not been collected elsewhere.

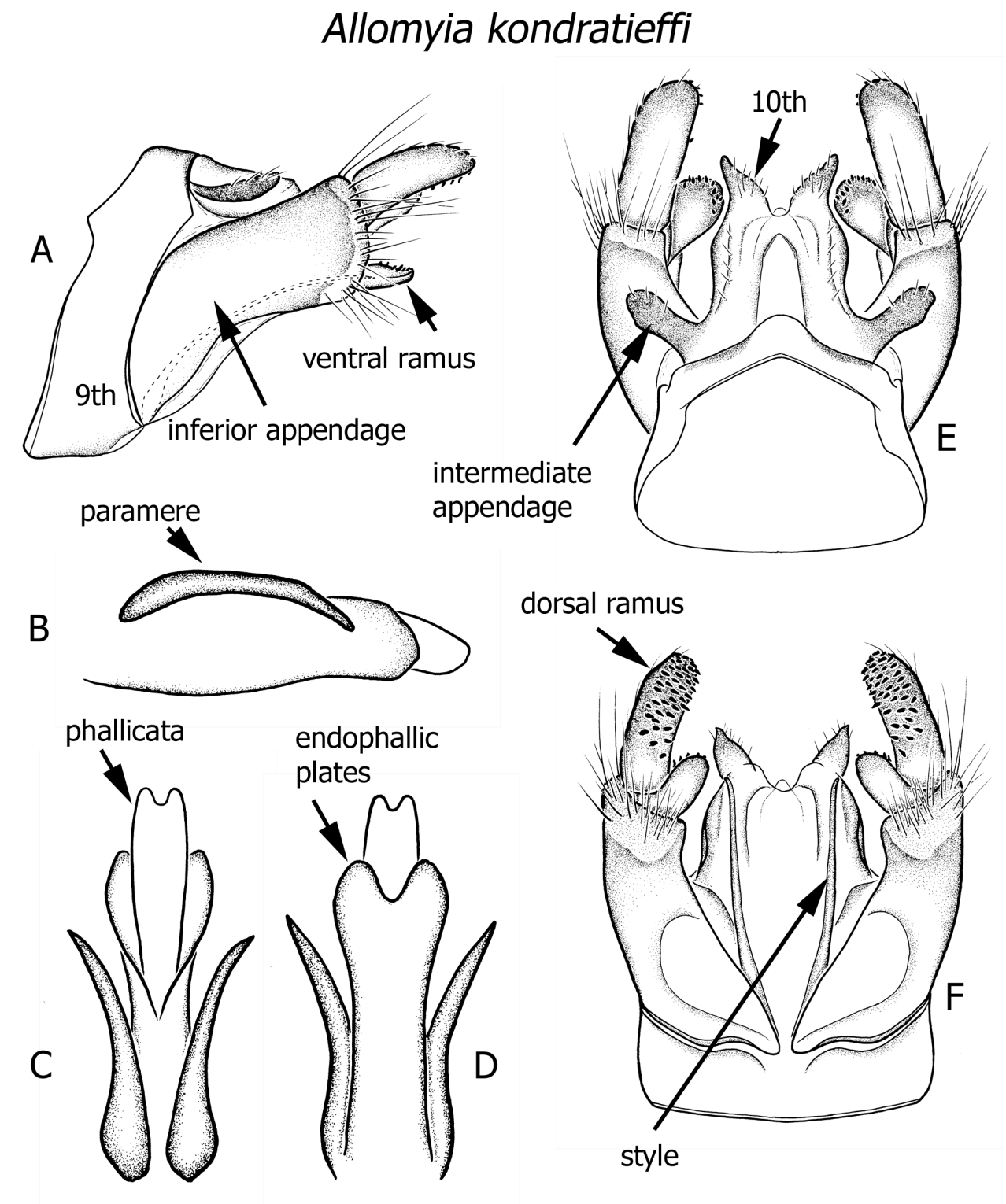


**FIGURE 1.** *Allomyia kondratieffi* sp. nov. Male (A–F): A—genitalia, left lateral; B—aedeagus, lateral; C—aedeagus, dorsal; D—aedeagus, ventral; E—genitalia, dorsal, F—genitalia, ventral.

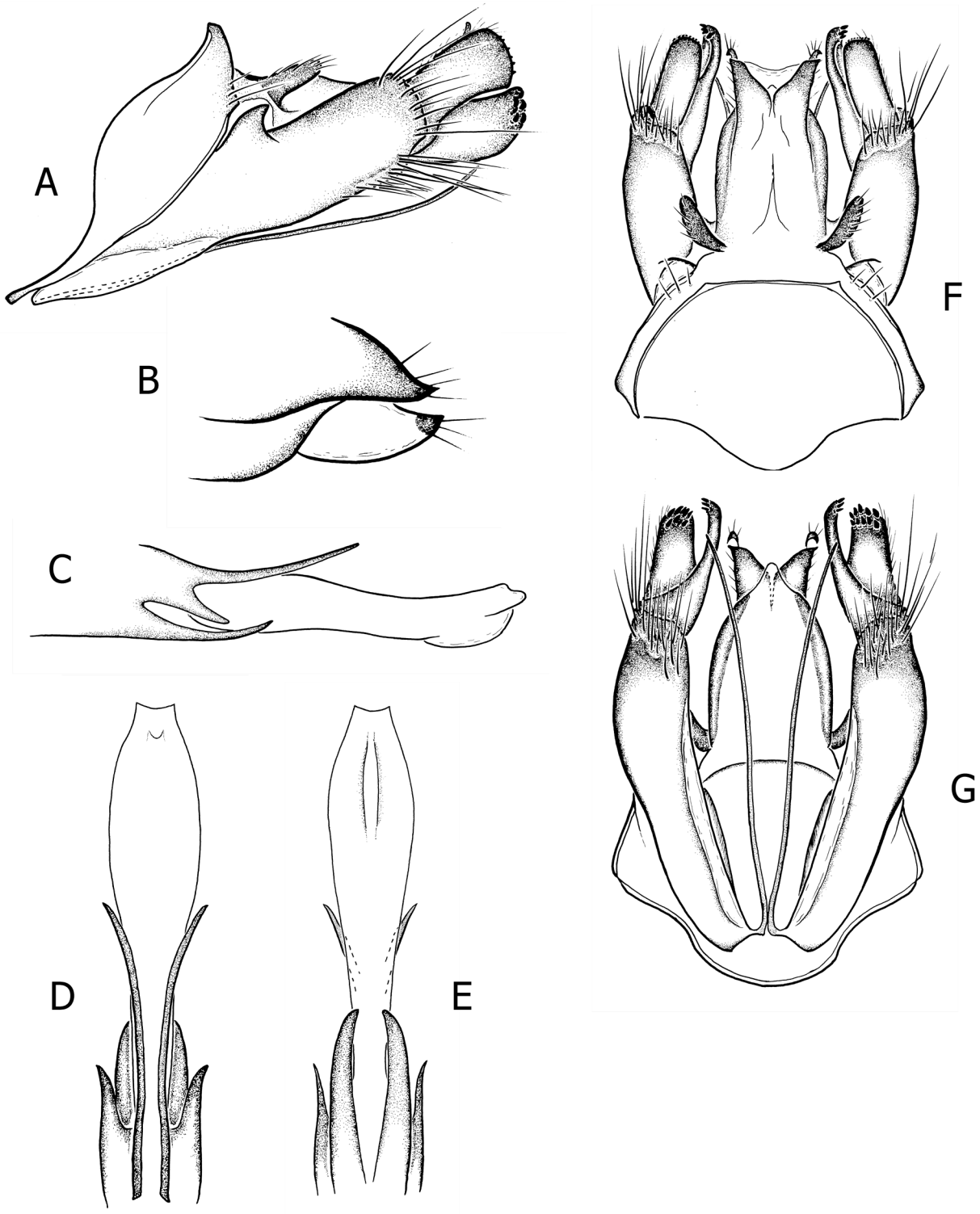


**FIGURE 2.** *Allomyia leei* sp. nov. Male (A–G): A—genitalia, left lateral; B—apex of 10th, ventrolateral; C—aedeagus, lateral; D—aedeagus, dorsal; E—aedeagus, ventral, F—genitalia, dorsal, G—genitalia, ventral.

***Allomyia leei*—sp. nov.** (Fig. 2)

This species is unique among the NA *Allomyia*, with the lower apical ramus of the inferior appendage located ventromesally and very thin in ventral view, appearing twisted, and with the apical peg-like setae facing outward in lateral view. The ninth segment is also very narrow and placed diagonally in lateral view. These characters are similar to the Eastern Palearctic region species (Levanidova *et al.*1995, Nishimoto & Kuhara 2001), rather than other NA species. The aedeagus is also unique, with what appears to be three pairs of parameres, one of the pairs originating ventrally.

**Male**—Length: 8 mm head to wing tip. Color: dark brown in ETOH; forewing with pale area at stigma, cross vein t1, t2, and M just prior to t3; cell between Cu2 and A1+2+3 pale. Abdomen with an extensile organ originating mesally between the 4th and 5th sternites, appearing identical to that of *A. bifosa* (see Schmid 1968, 680 Fig. 16). Genitalia (Figs. 2A–G): 9th segment annular, both dorsal and ventral margins constricted in lateral view and dorsal margin located much further distad than ventral. Inferior appendage 2 segmented, basal segment nearly straight and parallel-sided in lateral view; apical segment composed of two rami, broad in lateral view and narrow in dorsal view; dorsal and ventral rami about equal in length; both with dense inner covering of stout, peg-like, black setae apically; ventral ramus twisted mesally, so peg-like setae are directed outward and narrow lateral surface directed in a dorsal-ventral direction. In ventral view both inferior appendages with a long, mesal style originating at base of inferior appendage and extending nearly to apex of inferior appendage. In dorsal view, tenth segment with acute, divided apex, directed slightly upward; beneath the dorsal apices there is a small, digitate lobe, which is membranous at its base, but sclerotized and setose at its apex, making the apices of the 10th appear bifid in lateral view; these ventral lobes extend beyond the dorsal lobes. Intermediate appendages thumb-like, directed outward. Aedeagus with what appear as three pairs of acute parameres, the dorsal being the longest and thinnest, the medial the shortest, and the ventral the most robust; the apex of phallus inflated prior to the apex in dorsal view; directed slightly dorsad at apex.

**Type material.** Holotype male: U.S.A.: Washington, Clallam County, small stream at Switchback Trailhead, along Hurricane Ridge Road, tributary to Morse Creek, Jon Lee and R. Lee, 29 May 2014. Paratypes: 4 males, same data as holotype.

**Type deposition.** Given its similarity to the eastern Palearctic *Allomyia,* the holotype and four paratypes will be deposited at the NMNH.

**Etymology.** This species is named for Jonathon Lee, an excellent field biologist, taxonomist and friend, whose collections continue to add rare material from poorly collected western US habitats.

**Distribution.** To date, while abundant in the small stream at the type locality, this species has not been collected elsewhere.

***Allomyia meachamensis*—sp. nov.** (Fig. 3)

This is a large species and may be the simplest form in the *tripunctata* group. It is distinguished from *A. tripunctata* by its short, stout mesal styles at the base of the inferior appendages. The mesal setae of *A. gnathos* are also fairly short, but the aedeagal parameres of *A. gnathos* are longer, with thick, upturned apices in lateral view.

**Male**—Length: 14mm head to wing tip. Color: dark brown in ETOH, forewing with pale spot at stigma, cross vein t2, and M just prior to t3; cell between Cu2 and A1+2+3 pale; scattered, pale, very small irrorations in subcostal and radial cells. Genitalia (Figs. 3A–F): 9th segment annular, sigmoid, short and subequal in width in lateral view. Inferior appendage with 2 segments, basal segment relatively straight and slightly constricted at mid-length in lateral view; apical rami inflated, with dorsal ramus about twice length of ventral ramus; both with dense inner covering of stout, peg-like, black setae, starting about midlength. In ventral view, both inferior appendages with a short, strongly tapered, mesal style, originating at base of inferior appendage; styles shorter than width of inferior appendages. In dorsal view, tenth segment with acute, deeply divided apex, directed slightly upward; intermediate appendages large, thumb-like, directed outward. Aedeagus with short, acute parameres, directed downward and strongly outward; phallicata, in lateral view, tapered to acute ventral apex, and divided mesally into acute apices in both dorsal and ventral views; the endophallic plates long, smoothly rounded, narrow and directed downward in lateral view.

**Type material.** Holotype male: U.S.A.: Oregon, Umatilla County, Meacham Creek at Meacham, A. Krupka & R.L. Newell, 13 April 2014.

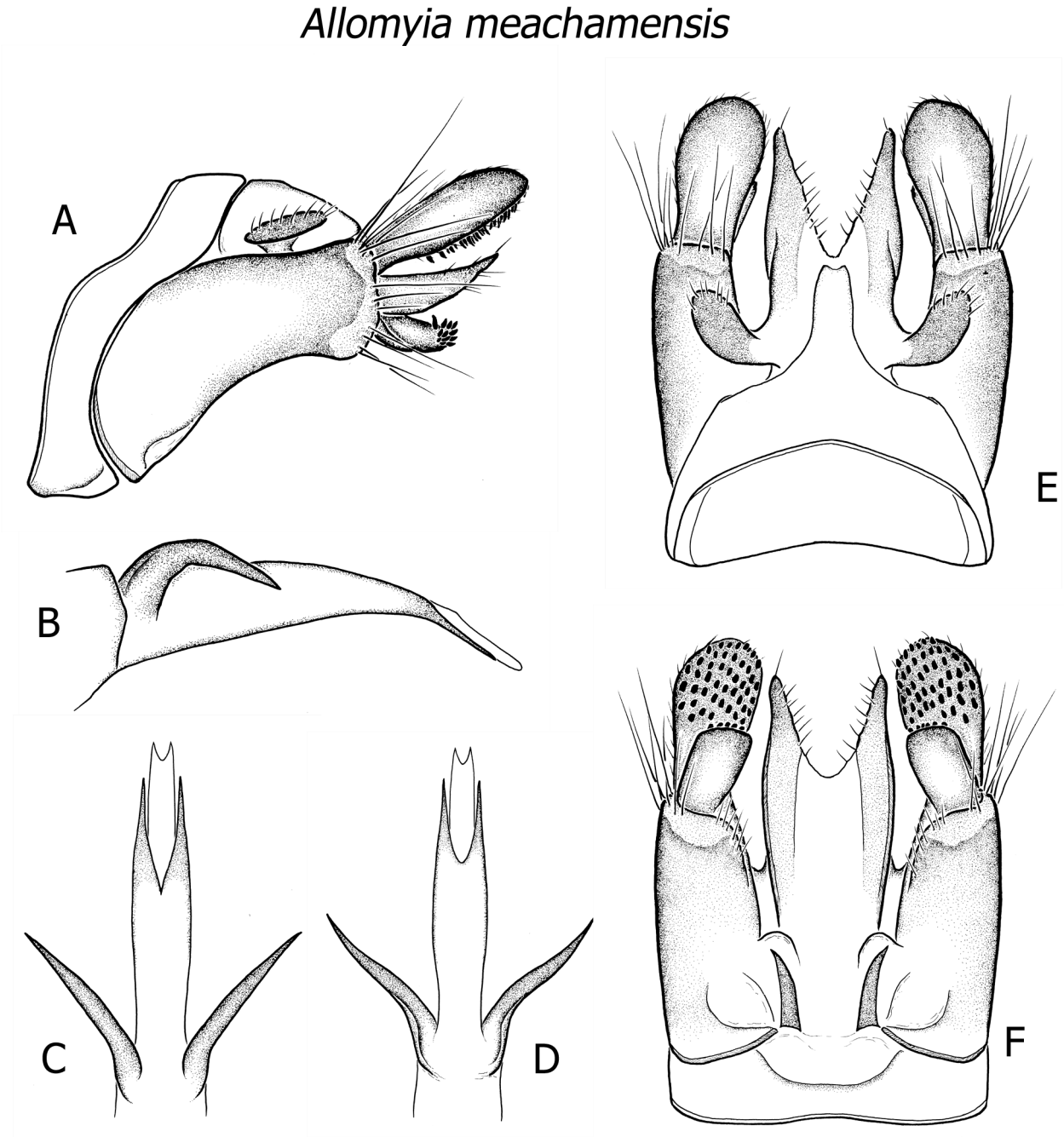


**FIGURE 3.** *Allomyia meachamensis* sp. nov. Male (A–F): A—genitalia, left lateral; B—aedeagus, lateral; C—aedeagus, dorsal; D—aedeagus, ventral; E—genitalia, dorsal, F—genitalia, ventral.

**Type deposition.** The holotype male will be deposited at the INHS, where many *Allomyia* type specimens are located.

**Etymology.** This species is named for the Meacham Creek locality. Meacham was named for Harvey J. and Alfred B. Meacham, who operated Meacham Station, a stage station, in the 1860s and 1870s along the Oregon Trail. (Wikipedia: last accessed July 13, 2015)

**Distribution.** To date, this species is known only from the holotype male. While the type locality has been collected several additional times, no further adults, or *Allomyia* larvae, have been collected.

***Allomyia sarahae*—sp. nov.** (Fig. 4)

This is another species of the *tripunctata* group, of simple form. It is distinguished from *tripunctata* by its relatively short, broad 10th segment, with a short mesal division of the apex in the dorsal view. The 10th segments of both *A. tripunctata* and *A. meachamensis* are deeply cleft mesally.

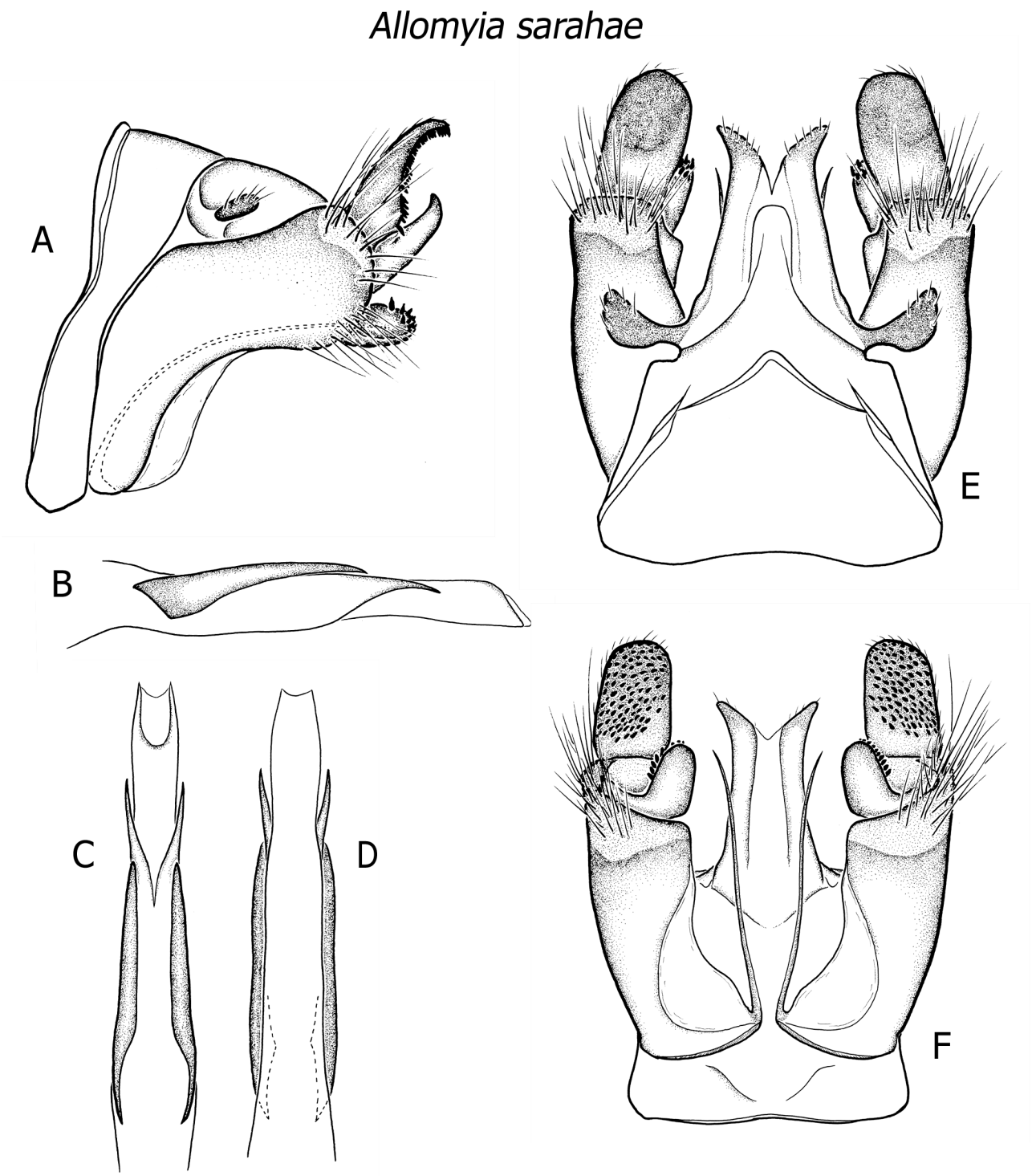


**FIGURE 4.** *Allomyia sarahae* sp. nov. Male (A–F): A—genitalia, left lateral; B—aedeagus, lateral; C—aedeagus, dorsal; D—aedeagus, ventral; E—genitalia, dorsal, F—genitalia, ventral.

**Male**—Length: 10 mm head to wing tip. Color: dark brown in ETOH, forewing with pale spot before stigma; pale spots at cross vein t2, and M just prior to t3; cell between Cu2 and A1+2+3 pale. Genitalia (Figs. 4A–F): 9th segment annular, slightly sigmoid, shorter ventrally than dorsally in lateral view. Inferior appendage with 2 segments, basal segment slightly sigmoid, with only a slight constriction near mid-length in lateral view; dorsal ramus about twice length of ventral ramus; dorsal ramus distinctly concave/flattened towards apex in lateral view, with dark peg-like setae covering much of the ventral surface; ventral ramus slightly twisted mesally, with numerous peg-like setae. In ventral view, both inferior appendages with a long, thin mesal styles originating at base of inferior appendage; styles nearly reaching apex of ventral ramus of inferior appendages. In dorsal view, tenth segment with short, acute, mesal cleft apically; apices of 10th segment directed slightly upward and outward. Intermediate appendages large, bulbous at apex and narrowed at base; directed outward. Aedeagus with long, acute parameres, directed distad at apex; apex of phallicata, in dorsal view, deeply divided mesally to form acute apices, each apex appearing as tapered dorsal spine in lateral view; endophallic plates indistinct, slightly tapered downward in lateral view.

**Type material.** Holotype male: U.S.A.: Utah, Utah County, malaise trap, trap set 27 June–11 July, 2007, stream entering South Fork of American Fork River below Scout Falls, 40.41829° N, 111.64149°W, altitude 2453 meters, Sarah Walker. Paratypes: 3 males, same data as holotype.

**Type deposition.** The holotype male and three paratypes will be deposited at the NMNH.

**Etymology.** This species is named in memory of Sarah Walker Judson, a young friend of the senior author. It was easy to admire her capability, dedication and pleasant demeanor. She had an excellent taxonomic eye, along with the organizational and database skills necessary for any taxonomist. She is missed.

**Distribution.** *Allomyia sarahae* was known only from the type locality area until the recent collection of several pupae at Great Basin National Park, White Pine County, Nevada, about 170 miles SW of the Scout Falls type locality.

***Allomyia sheldoni*—sp. nov.** (Fig. 5)

This species is a member of the *tripunctata* group. The very short, narrow ventromesal basal styles, with a large mesal projection distad of the mesal style in ventral view, distinguish *A. sheldoni* from the rest of the NA *Allomyia*. The male also has very large, swollen glands on the fifth sternum, with the pore located more laterally on the segment than is typical.

**Male**—Length: 9 mm head to wing tip. Color: light brown in ETOH (specimen may be slightly teneral, as forewing has few visible pale areas at cross vein t2, and M just prior to t3). Genitalia (Figs. 5A–F): 9th segment annular, slightly sigmoid, shorter ventrally than dorsally in lateral view. Inferior appendage with 2 segments, basal segment sigmoid, with distinct constriction near mid-length in lateral view; dorsal ramus about three times length of ventral ramus; dorsal ramus relatively narrow in dorsal view, with dark peg-like setae covering most of the ventral surface; ventral ramus slightly twisted mesally, with numerous peg-like setae. In ventral view, both inferior appendages with short, thin mesal styles originating at base of inferior appendage; distad of the short style the inferior has a broad projection directed distomesally. In dorsal view, tenth segment weakly sclerotized mesally, with apicolateral projections, appearing as separate clubbed projections, each with small, acute apicolateral spine, directed outward. Intermediate appendages long, narrow; in dorsal view, directed distally. Aedeagus with long, acute parameres, directed downward in lateral view; in dorsal/ventral views the parameres are parallel sided, with broad to rounded apices; apex of phallicata blunt, with a small ventral point at apex; divided mesally to form concave margin in dorsal view, cleft in ventral view.

**Type material.** Holotype male: U.S.A.: Nevada, Elko County, spring, Soldier Creek, 8850' altitude, Ruby Mountains, Andrew L. Sheldon, 8 July 1999.

**Type deposition.** The holotype male will be deposited at the NMNH.

**Etymology.** This species is named in memory of Andy Sheldon, who passed away during the editorial process for this paper. His long term hikes through the mountain ranges of the Great Basin added much knowledge to the aquatic insects of this isolated area.

**Distribution.** This species is known only from the type specimen, collected from a spring in the upper Soldier Creek basin, an area accessible only via a long, steep trail.

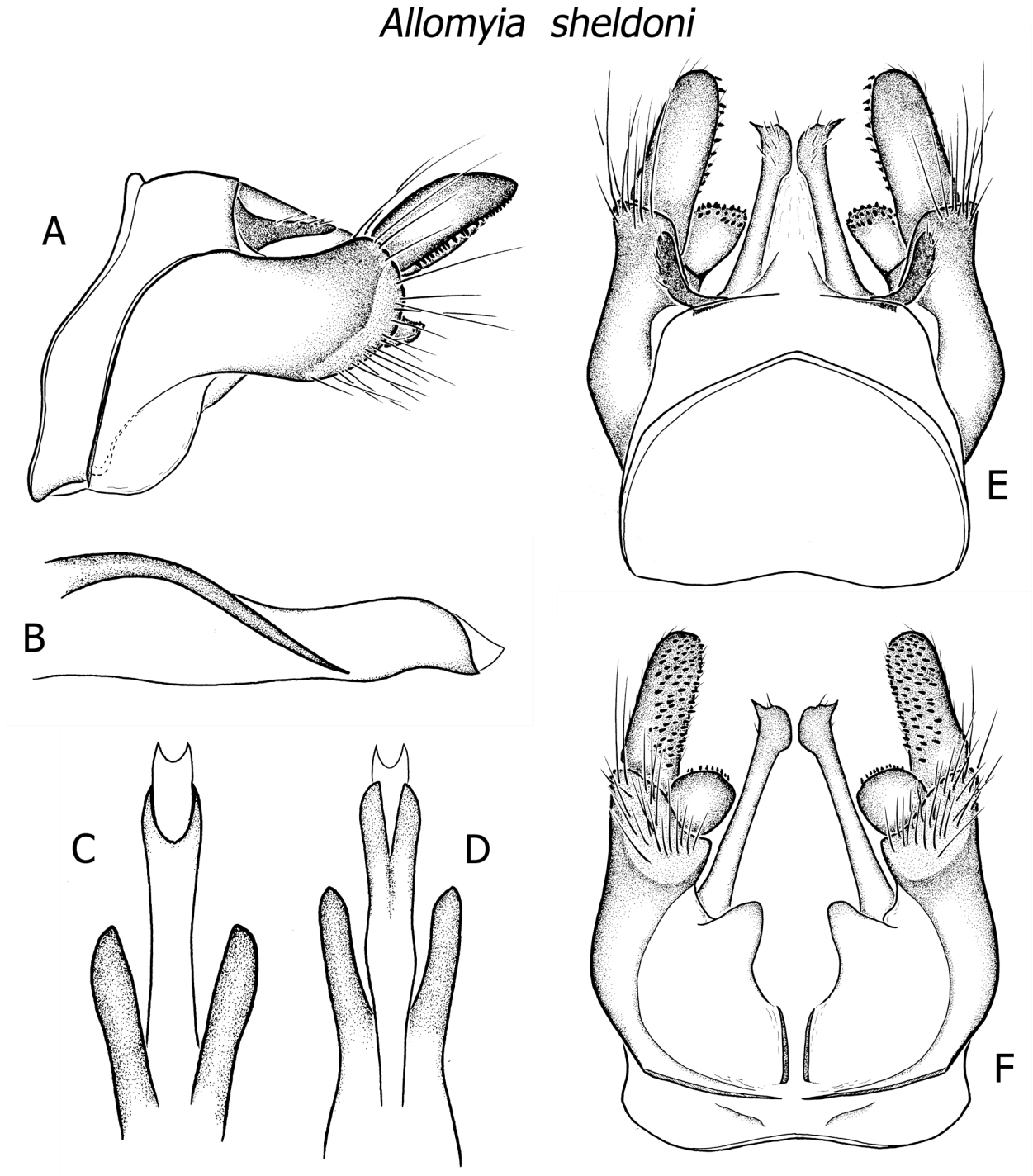


**FIGURE 5.** *Allomyia sheldoni* sp. nov. Male (A–F): A—genitalia, left lateral; B—aedeagus, lateral; C—aedeagus, dorsal; D—aedeagus, ventral; E—genitalia, dorsal, F—genitalia, ventral.

***Allomyia whatcomensis*—sp. nov.** (Fig. 6)

This is another species that appears to be more closely related to the Palearctic species than those of NA and it is not clear which group of Ross (1950) it may belong to. Both the mesal styles and spurs of the inferior appendages, and the division of the 10th segment into two pairs of apical processes, are unique within NA *Allomyia*.

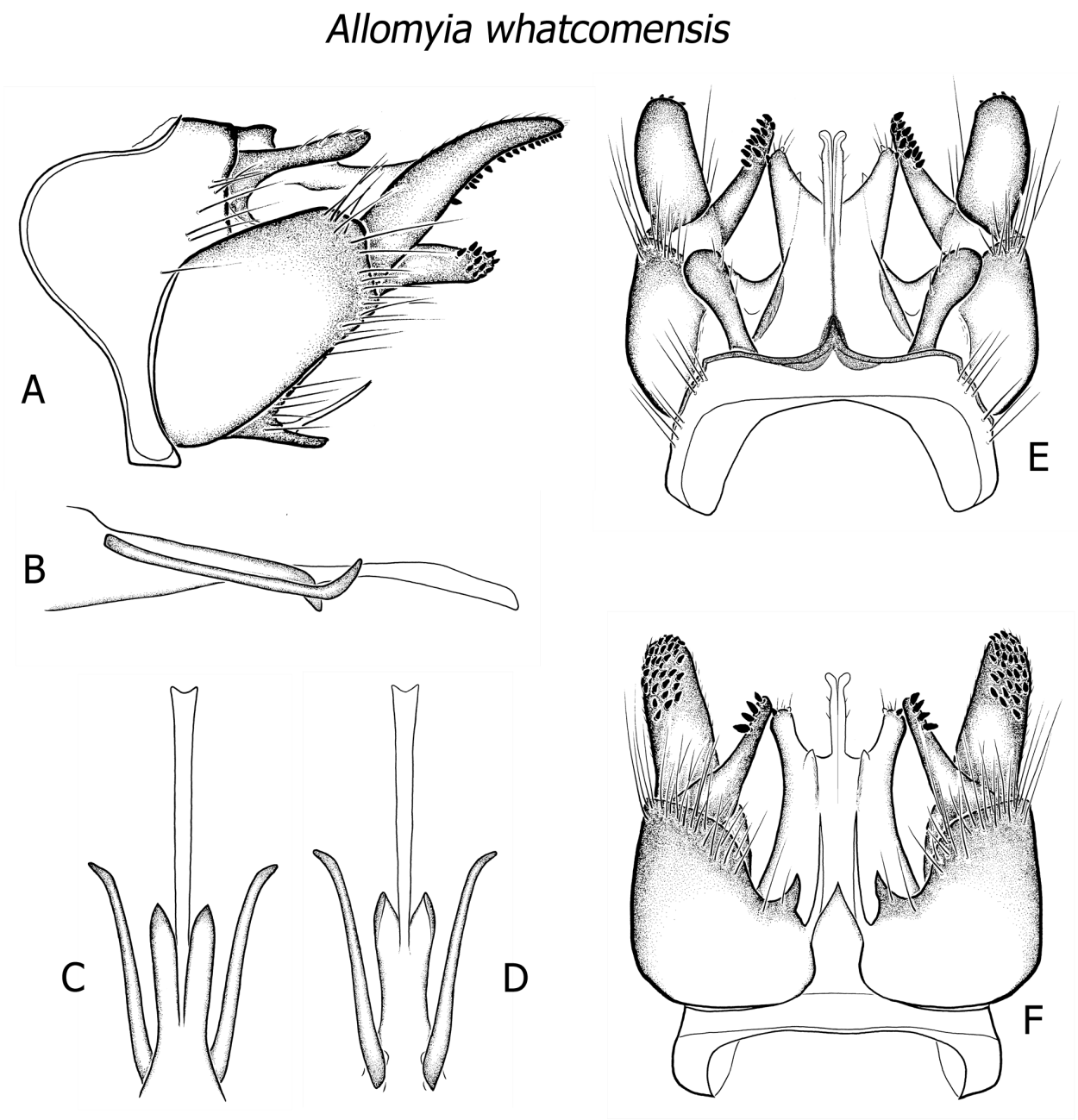


**FIGURE 6.** *Allomyia whatcomensis* sp. nov. Male (A–F): A—genitalia, left lateral; B—aedeagus, lateral; C—aedeagus, dorsal; D—aedeagus, ventral; E—genitalia, dorsal, F—genitalia, ventral.

**Male**—Length: 8 mm head to wing tip. Color: light brown in ETOH, forewing with pale areas at cross vein t2, M just prior to t3 and arculus. Genitalia (Figs. 6A–F): 9$^{th}$ segment annular, with large, broad anterolateral projection, shorter ventrally than dorsally in lateral view. Inferior appendage with 2 segments, basal segment broad at base, evenly tapering to distal margin apex in lateral view; dorsal ramus long, about two times length of ventral ramus, evenly tapered towards the apex, with dark peg-like setae covering apical half of ventral surface; ventral ramus strongly twisted mesally, with a few, outward directed, strong, peg-like setae at apex. In ventral view, both inferior appendages with short, thin mesal styles originating at base, and additional short spur lateral to spine. In dorsal view, tenth segment weakly sclerotized mesally, with apicolateral projections as well as apicomesal projections; the apicomesal projections appear nearly fused

mesally and are situated dorsal to the apical lateral appendages, as viewed laterally; lateral projections of 10th directed outward, with a couple black peg-like setae at apex, situated ventral to mesal projections in lateral view. Intermediate appendages, in dorsal view, long, narrow at base and club-shaped at apex, directed distally. Aedeagus with long, thin parameres, directed upward at apex in lateral view, in dorsal/ventral views directed outward at apex; apex of phallicata acute and directed downward, deeply divided mesally in dorsal view and with a shallow cleft in ventral view.

**Type material.** Holotype male: U.S.A.: Washington, Whatcom County, at upper pond on Artist Point Road, Highway 542, Dean W. Blinn, 21 August 2008.

**Type deposition.** The holotype male will be deposited at the NMNH.

**Etymology.** This species is named for Whatcom County, a fascinating area in far NW Washington (WA) that contains habitats rising from the wet coastal sea level on the west to over 10,000 feet altitude areas above timber line and then back down to eastern arid, high desert areas.

**Distribution.** This species is known only from the type specimen.

## Additional notes on described species

*Allomyia acanthis* (Ross) 1950, 418–419, fig. 3

*Allomyia acanthis* is a Cascade Range species reported from Oregon (OR) and WA. It is readily distinguished by the bi-lobed upper ramus of the inferior appendage. The lower ramus of the apical segment is small, knob-like and located mesally, difficult to see in lateral view. The wide, blade-like parameres of *A. acanthis* are also distinctive.

It is interesting that the type collection locality of *A. acanthis* (White River, Mt. Rainier, Washington, July 21, 1937, W.E. Ricker) also contained a male of *A. cascadis*. Ross (1950) listed the *A. cascadis* male as a paratype in his description of *A. cascadis*. There is also a female *Allomyia* with the same White River locality, except collected August, 21, 1937. This female was labeled by Ross as *A. cascadis*; however, it is a female of *A. acanthis*. Apparently Ross chose not to provide a description of this female as either *A. acanthis* or *A. cascadis*.

*Allomyia acanthis* has been collected several times in Mt. Rainier National Park, Pierce County, WA (Ruiter *et al.* 2005). The only other published record of this species that we have located is from 20 miles SE of Belknap Springs, Lane County, OR (Anderson 1976). About 20 miles from Belknap Springs is a large area of spring habitat (44.24589° N, 121.84387° W), at the base of Belknap Crater, along the McKenzie Pass Road east of Belknap Springs. Perhaps the collection was made there, as several *Allomyia* larval collections have been made from very cold springs at the base of lava flows. The CAS contains two additional collections of *A. acanthis* from the south slope of Mt. Adams, Yakima County, WA, about 50 miles south of Mt. Rainier. Known emergence dates range from 17 July to 21 September. The authors have associated females.

*Allomyia bifosa* (Ross) 1950, 415–417, fig. 5

*Allomyia bifosa* is a central Rocky Mountain species. The two pairs of dorsal aedeagal parameres readily distinguish this species. Schmid (1968, 680 fig. 16) provided an excellent illustration of the extensile organ, located ventrally between the 4th and 5th segments, and mentioned by Betten (1934).

The type specimen, and several paratypes, are from Banff, Alberta (AB). Ross (1950) also included a specimen from Glacier, British Columbia (BC), and a female from Banff, as paratypes. However, Ross did not describe the *A. bifosa* female. Schmid (1955) provided a description and illustration of the female. Schmid (1968) provided additional records from the Banff area. Nimmo (1971) indicated this species is fairly abundant in southern AB/BC mountains. Newell and Potter (1973) extended *A. bifosa*'s range to northern Montana (MT), and Swegman and Ferrington (1980) extended records to Park County, Wyoming (WY), at high altitudes.

Known emergence dates range from 7 June to 25 September. This emergence period seems very long for a species with such a small range. The authors have associated females and larvae.

*Allomyia cascadis* (Ross) 1950, 415, fig. 6

*Allomyia cascadis* is one of the most widespread western NA species, with records from the cascades of southern OR north to southern BC and AB, and then south along the Rockies into ID and MT. In addition to the genital characters, *A. cascadis* males can be distinguished from the other species by a black, sclerotized, ventral plate between the 4th and 5th segments, where the large eversible gland, found in *A. bifosa* and *A. sheldoni*, is located. There is no evidence of an eversible gland in *A. cascadis*.

Ross (1950) based the description of *A. cascadis* on a male from Stevens Pass, WA. Stevens Pass is located at the boundary between Chelan and King Counties. The paratype male has a label indicating that it is from the L.J. Milne Trichoptera Collection (which was acquired, in part, by the INHS in 1940). Ross (1950) also included an *A. cascadis* paratype male from White River, Mt. Rainier, WA (21 July 1937, W.E. Ricker) in the type series. This is interesting, as the holotype of *Allomyia acanthis* has the same White River collection label as that of the *A. cascadis* paratype. There is also a female labeled by Ross as *A. cascadis* with the same White River locality label. However, that female is *A. acanthis*, not *A. cascadis*. A few additional collections of *A. cascadis* have been made from the Mt. Rainier area (Ruiter *et al.* 2005).

Known emergence dates range from 17 April through 13 August. The authors have associated females and larvae.

*Allomyia chama* (Denning) 1953, 168–169, fig. 3

*Allomyia chama* is known from a few records in a fairly limited area of south-central WY (Albany County) and north-central CO (Larimer County) (Denning 1953, Zuellig *et al.* 2012). We have additional records from Garfield County in northcentral CO. The short, finger-like, apically blunt, aedeagal parameres and broad styles of the inferior appendages distinguish it from *A. kondratieffi* (see discussion above).

The known range of emergence dates is also short, from 27 June through 29 July. This is likely the result of the few available records and limited distribution of the species. The authors have associated females.

*Allomyia cidoipes* (Schmid) 1968, 681, figs. 12–15

The few *Allomyia cidoipes* records range from southern BC (Nimmo & Scudder 1983), Mt. Baker (Schmid 1968) and Mt. Rainier (Ruiter *et al.* 2005) in WA, to Mt. Hood in OR (Anderson 1976). There are also CA *Allomyia* records from Nevada, Placer, Shasta, and Sierra counties; however, it has not been clear which species these may be (Erman 1997, Givens 2014). See discussion under *A. renoa* below.

*Allomyia cidoipes* has a 3-lobed apical segment of the inferior appendage, like *A. picoides*. The species are readily separated from each other on the shape of the medial style of the inferior appendage. The style of *A. cidoipes* is massive and contorted apically, while that of *A. picoides* is blade-like and acute apically in ventral view. The species epithet *cidoipes*, an anagram of the apparent sister species *picoides*, is an enjoyable bit of humor by Schmid.

Emergence dates in BC through northern OR range from 28 March through 1 July. The authors have associated females.

*Allomyia gnathos* (Ross) 1950, 413–415, figs. 2, 7

This is another *Allomyia* species with a small distribution, the Colorado Rockies (Ross 1950, Herrmann *et al.* 1986). There is also a UT record (Baumann & Unzicker 1981); however, the specimens cannot be located (R.W. Baumann personal communication). Although many additional UT collections have been examined over the years, *A. gnathos* has yet to be recovered. The authors do not consider the UT record valid until UT specimens can be located.

The male parameres of *A. gnathos* are quite distinct, with the upward turned, blunt apices, as viewed laterally, being diagnostic amongst known *Allomyia* species.

Known emergence dates occur from 16 June through 20 August. The authors have associated females and larvae.

*Allomyia hector* (Nimmo) 1971, 59–60, figs. 183–187

The *A. hector* male is most similar to *A. kondratieffi* (see discussion above). To date, this species has been reported only from the Banff National Park, AB, type collections. The authors have seen additional collections from Glacier National Park, MT, and a single collection from the Gallatin Range, south of Bozeman, MT.

Known emergence dates range from 20 April through 25 September. This wide emergence range is undoubtedly a result of the long north/south range of this species-over 800 km. The authors have associated females.

*Allomyia picoides* (Ross) 1950, 417–418, figs. 4, 9

The Katmai, Alaska (AK), type series is the only reported record for *A. picoides*. We have seen a few additional *A. picoides* specimens from AK. Some of these AK specimens have additional small spurs located in the concavity between the outer two rami of the inferior appendages. We have males from Lake County, MT with these small spurs further developed so that they look like another smaller ramus. Finally, we have specimens from Modoc County, CA that seem to match the AK *A. picoides* type series. This extremely wide distribution range, without intervening collections, is difficult to explain. Further collections in these areas are continuing.

The few available collections indicate that emergence ranges from 20 April to 12 July. We have associated females.

*Allomyia renoa* (Milne) 1935, 31 no figure

Formally, *A. renoa* was known only from the type series (Ross 1950). That information was recently summarized by Ruiter *et al.* (2014). Female material from a 2015 collection by the senior author from Washoe County, NV, is identical to the *A. renoa* type series specimens, and also to the collections reported by Erman (1997) and Givens (2014). Work on association of this species is continuing, along with a clarification of other associations within the *A. picoides* group, of which *A. renoa* is a member.

The emergence period ranges from 13 May through 30 June. The authors have associated males and larvae.

*Allomyia scotti* (Wiggins) 1973, 17–23, figs. 25–36

To date *A. scotti* is only known from the Mt. Hood, OR, area. Currently USFS studies on the range of this species indicate it is fairly common around Mt. Hood but has not been collected elsewhere.

*Allomyia scotti* is readily separated from the other *Allomyia* by the large, clavate outer rami of the inferior appendage in lateral view.

Based on only a few records, the emergence period ranges from 24 June to 16 July. The female, larva and pupa were described by Wiggins (1973).

*Allomyia thomasi* (Nimmo) 1977, 35–36, figs. 56–58

*Allomyia thomasi* is another species which may be readily distinguished from other *Allomyia* species. The large, mitten-shaped outer ramus of the inferior appendages is diagnostic. Nimmo (1977) suggested this represented a trilobed distal segment of the inferior appendage. The loss of the intermediate appendage is also unique amongst species of *Allomyia.*

The AB type records are the only reported collections for this species. Nimmo and Donald (1976) listed *A. thomasi* from Waterton National Park, and pointed out that *A. thomasi* was a new species with the formal description in press. We have an additional collection from Glacier National Park, MT.

Adult emergence ranges from 12 May through 1 August. The female and larvae remain un-associated.

*Allomyia tripunctata* (Banks) 1900, 472, fig. 4

*Allomyia tripunctata* was described from a Yakatuk, AK specimen (Banks, 1900). Essig (1926) added (without detail) BC and WA to the known distribution. Denning (1948) figured a Glacier, BC specimen, collected 20 July 1901, as *A. tripunctata*, when describing *A. stylata* from Albany County, WY. Ross (1950) synonymized *A. stylata* under *A. tripunctata*, based on a lack of difference between the Denning *A. stylata* type specimen and an *A. tripunctata* specimen from Wellington BC. Ross (1950) also pointed out that Denning's Glacier, BC specimen was actually a representative of *A. bifosa* (Ross 1950).

*Allomyia tripunctata* is a very widespread species, from coastal and interior Alaska, south through AB, BC, CO, MT, SD, WA, and WY. It is likely that some of the southern, isolated populations represent new species, since the females from several of them are quite distinct. However, males are very similar, with the only obvious distinctions being found in the aedeagal structure (e.g. *A. kondratieffi*, *A. sarahae*). Work is continuing on the accumulation of larvae and making female associations.

Adult emergence ranges from 12 May through 16 August. The authors have associated females.

## Discussion

The additional material used in this study indicates that the wing venational characters presented by Ross (1950), as a basis for species groups, are inconsistent. While we have mentioned, where appropriate, the characters Ross (1950) provided for separating species groups, our preliminary examinations of available associated females and larvae do not appear to support Ross's taxonomic groupings. Efforts to associate the females and larvae continue. We hope that the presentation of these new species will encourage others to examine these isolated habitats, and others, for these early emerging species.

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