

THE GENUS *ATOMOSIA* MACQUART (DIPTERA: ASILIDAE) IN NORTH
AMERICA NORTH OF MEXICO

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Abstract.—*Atomosia arkansensis*, new species, is described from specimens collected in blackland prairie in southern Arkansas, and *Atomosia tibialis* is reported the first time from North America north of Mexico. A new key to Nearctic *Atomosia* species is presented. *Atomosia melanopogon* and *A. mucida* are noted to be sexually dimorphic. In addition to more standard characters, the open or closed condition of cell r_5 and the length of the pedicel and flagellum relative to the length of the scape are used to distinguish similar species. Lectotypes are designated for *Atomosia mucida*, *Atomosia puella*, and *Atomosia sayii*. *Atomosia echemon* is synonymized with *A. puella* (new synonymy), and *A. mucidoides* is synonymized with *A. sayii* (new synonymy).

Key Words: Diptera, Brachycera, robber fly, Asilidae, *Atomosia*, Nearctic

The New World genus *Atomosia* Macquart consists of small, robust robber flies with elongate, slender antennae and a punctulate abdomen. It comprises more than 50 Neotropical species and fewer than 10 Nearctic species (Martin and Papavero 1970, Poole 1996, Scarborough and Perez-Gelabert 2006). Artigas et al. (1991) synonymized the monotypic Neotropical genus *Paratractia* Hull with *Atomosia*. The North American species are notoriously difficult to identify using existing keys. Hermann (1912) authored a key to all species known to him at the time. Unfortunately, he included only four species from North America north of Mexico, and he considered *A. sayii* Johnson and *A. mucida* Osten Sacken to be varieties of *A. rufipes* Macquart. Curran (1930) wrote a key to all species known to him that includes seven species from this region. That key is overly dependent on color characters

for species identification and does not utilize some highly diagnostic morphological characters, such as the relative sizes of the antennomeres and the condition of wing cell r_5 . It is also a confusing key in that some species key out at more than one couplet. Bromley's (1934b, c) key was based in large part on Curran's earlier key. Curran (1935) published a new key that included seven Nearctic species and several Neotropical species. Apparently, neither Curran nor Bromley studied the type specimens.

Little is known about the biology of *Atomosia* species. Some species, like *Atomosia puella* (Wiedemann), are associated with bark of trees and logs, while others, like *Atomosia sayii* Johnson, are found on tips of twigs or resting on leaves (Hull 1962). *Atomosia macquarti* Bellardi has been found preying on the citrus snow scale, *Unaspis citri* (Comstock), in Mexico (Coronado Blanco and

Ruíz Cancino 1999). Bromley (1946) found the seemingly ubiquitous *A. puella* Wiedemann preying on *Drosophila* above the garbage cans on the sunny side of his garage. Scarbrough and Sraver (1979) reported on the predatory behavior of *A. puella* on a farm in Maryland. Species of Diptera, Homoptera, and Hymenoptera were the most important prey items. Over 70% of the diet consisted of nematoceros Diptera; Aphididae, Cicadellidae, and Miridae among the Homoptera; and small Hymenoptera Apocrita. Diptera of all kinds accounted for nearly half of the diet.

MATERIALS AND METHODS

During the course of this study, more than 1,600 specimens were examined from the following collections: American Museum of Natural History, New York City (AMNH); Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts (MCZH); California Academy of Sciences, San Francisco (CASE); California Department of Food and Agriculture, Sacramento (CDFA); Florida State Collection of Arthropods, Gainesville (FSCA); Kansas State University Museum of Entomological and Prairie Arthropod Research, Manhattan (KSUC); The Natural History Museum, London (BMNH); Texas A&M University, College Station (TAMU); National Museum of Natural History, Smithsonian Institution, Washington, D. C. (USNM); University of Arkansas Arthropod Museum, Fayetteville (UAAM).

Specimens of the new species described here were collected into propylene glycol with a Malaise trap at Rick Evans Grandview Prairie, Hempstead County, Arkansas, from 25 May to 22 July 2004. The specimens were transferred to 70% ethanol for long-term storage. Some specimens were later dehydrated by soaking in cellosolve and xylene using the method described by Sabrosky (1966). They were then mounted on pins.

Terminology largely follows that found in the *Manual of Nearctic Diptera* (McAlpine 1981). Body length refers to the distance from the front of the face to the tip of the abdomen and excludes the length of the antennae. Antennomere: scape ratios were calculated by dividing the length of each antennomere by the length of the first antennomere (scape). The numbers are listed in order from antennomere 1 to antennomere 3. Therefore, the ratio 1.0:0.6:3.2 indicates that the pedicel is 0.6 times the length of the scape, and the flagellum is 3.2 times the length of the scape.

Atomosia Macquart

Atomosia Macquart 1838: 73. Type species: *Atomosia annulipes* Macquart 1838, by subsequent designation of Diponchel *in d'Orbigny* (2: 309–310 [November 1841]).

Description.—Small, dark colored, shining species, 5–12 mm long. Body usually rather bare, often with punctate mesonotum and abdomen. Scape 1–2 times length of pedicel; flagellum 1.5–2.0 times length of scape and pedicel combined. Flagellum apically blunt, lacking stylus, with short bristle arising at or beyond middle of dorsal surface. Lateral margins of frons curved, converging at vertex. Proboscis short, robust, somewhat laterally flattened, not projecting beyond face. Palpus small, 2-segmented. Scutum shining, with scarce or abundant, short, appressed, bristly pile. Scutellum with 1–2 pairs of stout or long and thin marginal setae. Anatergite with bristly pile. Postmetacoxal region extensively sclerotized, with posterodorsal margin V-shaped. Femora stout, with long, weak setae. Hind femur usually with pair of long ventromedial setae near base and with long, stout seta laterally at apical third. Tibiae with 2 rows of long setae. Claws slender, acuminate, strongly bent apically; pulvilli and empodium well developed.

Wings unmarked, transparent or nearly so; vein R₂₊₃ joining vein R₁ proximal to end of R₁, with cell r₁ thus closed, separated from wing margin; vein R₄ strongly arched basally, with apex ending at or anterior to wing apex; vein R₅ ending far posterior to wing apex; cross-vein m-cu present, cell r₅ broadly open to closed and petiolate; apex of cell bm closed by 3 veins; anal cell closed. Abdomen robust, wide, punctulate, with tergite 6 forming large, rounded cup concealing tergites 7–8 and genitalia.

Remarks.—Specimens are readily recognized by their small size; curved frons converging at vertex; blunt, 3-segmented antenna; dark, punctulate scutum and abdomen; heavily sclerotized postmetacoxal bridge; and closed, petiolate cell r₁.

Most taxonomic works list *Atomosia insicuralis* Macquart 1838, (= *Atomosia puella* (Wiedemann)) as the type species of the genus, as designated by Coquillett (1910). Evenhuis and Thompson (1990) discovered the earlier designation of *Atomosia annulipes* as type species by Duponchel in d'Orbigny (1841). Martin and Papavero (1970) placed *A. annulipes* in the genus *Aphestia* Schiner. Because acceptance of Duponchel's type designation would change the current generic concepts of *Atomosia* and *Aphestia*, Evenhuis and Thompson (1990) suggested that application to the International Commission on Zoological Nomenclature to suppress this designation may be warranted.

KEY TO *Atomosia* SPECIES FROM NORTH AMERICA NORTH OF MEXICO

1. Scape shining yellow; antennomeres largely yellow, but flagellum brown on outer side; male with ground color hidden, especially on thorax, by long, dense, appressed silvery setae; female with setae pale golden, shorter, more scattered; legs, including coxae, pale yellowish except for black fifth tarsomere; gonocoxite as in Fig. 4b *Atomosia mucida* Osten Sacken
- Antenna otherwise; antennomeres dark brown or yellowish brown; scutal setae more scattered; coxae dark brown or black; legs otherwise, yellow or black or some combination of both 2
2. Antennal length about 0.7–0.8 times head width; fore femur and tibia wholly pale yellow or partly yellow; hind tibia wholly pale yellow or darkened only apically; small or large species, 6–10 mm long 3
- Antennal length about 0.5–0.6 times head width; all femora and tibiae either wholly black or some combination of black and yellow; small species, 6–8 mm long 5
3. Flagellum length about 3.2 times scape length; femora mostly black with base and apex yellow; tibiae yellow or reddish yellow with darkened apices; tarsi with apical 3–4 tarsomeres black; gonocoxite as in Fig. 1b *Atomosia arkansensis* Barnes, new species
- Flagellum length about 2.3–2.4 times scape length; femora and tibiae all or mostly yellow; tarsi with only fifth tarsomere dark 4
4. Cell r₅ closed or nearly closed at wing margin; postalar callus black or sometimes dark reddish brown; all tibiae wholly yellow; small species, 6–8 mm long; gonocoxite as in Fig. 7b *Atomosia sayii* Johnson
- Cell r₅ somewhat narrowed apically, but broadly open at wing margin; postalar callus partly or wholly yellowish red; hind tibia distinctly darkened apically; larger species, 8–10 mm long; gonocoxite as in Fig. 6b *Atomosia rufipes* Macquart
5. Antennal length about 0.6 times head width; setae of ocellar tubercle pale; fore and mid femora darkened on dorsal surface; hind femur with broad, dark ring on the apical half; all tibiae dark above, yellow below; scutellum with 2 pairs of long, fine marginal setae; gonocoxite as in Fig. 2b *Atomosia glabrata* (Say)
- Antennal length about 0.5–0.55 times head width; setae of ocellar tubercle white or black; all femora almost wholly brownish black; tibiae usually black or dark brown; scutellum with 2 pairs of short, stout marginal setae 6
6. Ocellar tubercle with 2 long, stout, white setae only, lacking shorter setae; cell r₅ narrowed apically, open at wing margin; hind tibia and tarsus covered with dense vestiture of white setae, especially well developed in male; gonocoxite as in Fig. 8b *Atomosia tibialis* Macquart
- Ocellar tubercle with 2 black setae and sometimes with shorter setae; cell r₅ open or closed at or before wing margin; hind tibia and tarsus with normal vestiture 7

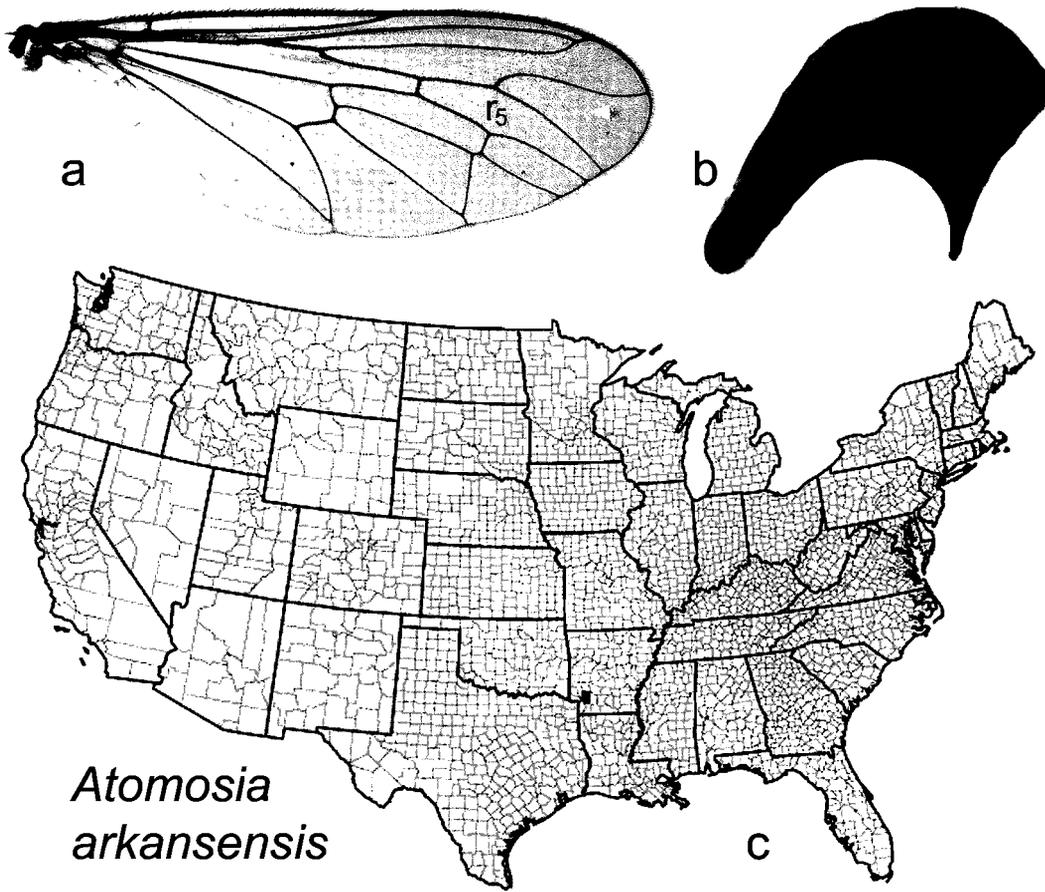


Fig. 1. *Atomosia arkansensis*. a, Right wing, dorsal view, showing cell r_5 . b, Right gonocoxite, ventrolateral view. c, United States distribution by county.

- 7. Ocellar tubercle with 2 long, black setae only; face white tomentose; mystax white or yellow; palpus white setose; oral margin tomentose; cell r_5 usually open; gonocoxite as in Fig. 5b *Atomosia puella* (Wiedemann)
- Ocellar tubercle with 2 long, black setae and several shorter dark or pale setae; male with face black tomentose except for bare, shining black oral margin; female with face white tomentose; male with mystax black; female with mystax white; palpus black setose; cell r_5 usually petiolate, closed before wing margin; gonocoxite as in Fig. 3b
 *Atomosia melanopogon* Hermann

***Atomosia arkansensis* Barnes, new species**
 (Fig. 1)

Description.—Male body, excluding antennae, 5.4–6.3 mm long (mean = 5.9 mm); female 5.4–6.6 mm long (mean

= 6.1 mm); shining black in ground color except for some legs segments.

Head: Width 1.4 times eye height. Face white tomentose. Frons and postcranium thinly white tomentose. Vertex and ocellar tubercle bare, shining black. Face with mystax of long white setae, mostly on lower fourth; upper face with some long setae and many shorter white setae reaching to antennal bases. Frons laterally with long, thin, black setae. Ocellar triangle tuberculate, with 2 long, black setae; lacking shorter hairlike setae. Postocular setae long, pale yellowish white. Postgena and stipes with dense vestiture of long, white setae. Proboscis black, somewhat laterally compressed, about 2.5 times as long as deep; deepest

near base, tapered to rounded apex. Palpi short, bearing long, pale, hair-like setae. Average antennal length 0.77 times head width; scape shining dark brown to black in ground color, white tomentose, with black lateral setae along entire length; pedicel dull brown, with irregular row of black setae laterally; flagellum dull, darker brown, with medial, light brown spot one third distance from apex; antennomere:scape ratios 1.0:0.6:3.2.

Thorax: Cervical sclerites black in ground color, thinly white tomentose, with dense vestiture of long, slender, white setae. Antepronotum thinly white tomentose, with row of long, slender, yellow setae; postpronotum densely white tomentose; postpronotal lobe mostly shining black, with narrow, white tomentose perimeter, covered with short, slender, golden, reclinate hairlike setae. Propleuron thickly white pollinose, with vestiture of long, declinate, white setae on proepisternum and anterior portion of proepimeron. Prosternum densely white tomentose, lacking setae. Scutum shining black throughout, including postalar callus, with vestiture of short, golden, reclinate, hairlike setae; lateral margin, in addition to several weaker setae, with 1 golden notopleural seta, 1 golden supra-alar seta, and 1 strong and one weaker golden postalar seta on mostly bare, shining, black postalar callus. Scutellum shining black throughout, with reclinate, golden discal scutellar hairlike setae similar to those on scutum and 2 pairs of long, thin, golden apical scutellar setae; anterolateral apical setae much weaker than posteromedian apical setae, often difficult to see. Mediotergite, anatergite, and katatergite white tomentose; anatergite with many short, stout, white setae; katatergite with fan of long, slender, white setae. Most mesopleural sclerites at least partly white tomentose, but tomentum lacking on disc of anepisternum, katapisternum, and anepimeron. Anepisternum covered

with short, reclinate, golden, hairlike setae, with single long golden seta posteriorly. Anterior basalare, posterior basalare, and basal swelling of pleural wing process densely white tomentose; subalar sclerite black. Metepisternum and metepimeron white tomentose; metepisternum anteriorly with some fine, pale declinate setae.

Legs with all coxae black in ground color, covered with white tomentum, with many long, slender, white setae, especially on anterior surface. All trochanters yellowish brown with darkened apex, bearing many long, slender, white setae. Fore and mid femora mostly shining black, with very narrow yellow band at base and slightly wider yellow band at apex; with many slender, white setae anteroventrally. Hind femur with basal third and apical fourth yellow or yellowish brown; remainder shining black; with many slender, white setae posteroventrally; with long, stout, white seta anteroventrally one third distance from apex. Tibiae variable in color, usually yellowish brown, sometimes darker, somewhat darkened at apex, covered with short, pale setae; fore tibia with anteroventral and posteroventral rows of long, slender, pale setae; mid tibia with dense ventral patch of short, pale setae on apical fourth to third and anterior, posterior, and posteroventral rows of long, pale setae; hind tibia with dense ventral patch of short, pale setae extending from near base to apex, anteroventral row of long, pale setae, and single stout, pale anterior setae about one third distance from apex. Basal tarsomeres yellowish brown at base, darker apically; remaining tarsomeres dark brown to black. Claws yellowish brown at extreme base, otherwise black; pulvilli yellowish white.

Wing 4.1–4.4 mm long in male (mean = 4.3 mm); 4.4–5.1 mm long in female (mean = 4.7 mm). Membrane hyaline or very lightly infuscated. Cell r_5 broadly