A REVIEW OF THE SHORE-FLY GENUS AXYSTA HALIDAY (DIPTERA: EPHYDRIDAE) WITH DESCRIPTION OF NEW SPECIES FROM AUSTRALIA, INDIA, AND THAILAND

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ABSTRACT: Axysta austra sp. n. from Australia, A. indica sp. n. from India, and A. nikita sp. n. from Thailand are described. The synonymy of A. americana Clausen with A. nigrifacies (Miyagi) is proposed. The genus Axysta is recorded from the Australasian and Oriental Regions for the first time. Keys to genera in Hyadinini and species of Axysta are provided, as are illustrations of all species.

KEY WORDS: Diptera, Ephydridae, Axysta, new species, Australia, India, Thailand

Specimens of Axysta are uncommon in collections and perhaps in nature, and discovery of specimens and undescribed species from the Australasian and Oriental Regions was wholly unexpected, especially as the genus was generally known to have a north temperate distribution (Clausen 1983, Mathis and Zatwarnicki 1995). Describing and otherwise documenting these species within the context of a species review is the primary purpose of this paper. This review was prompted when collections made by Dr. N. Vikhrev in Thailand were made available to us for study and one of the new species described below was discovered.

To facilitate identification of the genus, which is generally uncommon, we have included keys to the subtribes and genera within Hyadinini. We are reviewing Axysta rather than producing a more comprehensive revision because Clausen’s (1983) thorough revision is largely current and valid for much of the world. His illustrations, which he graciously allowed us to use herein, should be consulted if there are questions about the identification of a species. We are essentially updating Clausen’s revision with the addition of new taxa and new locality information.

The shore-fly genus Axysta Haliday (1839) currently includes seven species (three new species are added in this paper) that are found in both the Old and New Worlds (Mathis and Zatwarnicki 1995). Although the genus is generally widespread and is now known to occur in most biotic regions except the Afro- and Neotropics, the included species have relatively more restricted distributions: A. cesta (Haliday 1833) from Europe, A. nigrifacies Miyagi (1977) from Japan, A. bradleyi Cresson (1930) from the United States, and A. americana Clausen (1983) and A. exter a (Cresson 1924) from the United States and Canada.
Although the literature on *Axysta* is sparse, perhaps reflecting the paucity of specimens in collections, the genus-group name was proposed relatively early in the nomenclatural history of shore flies (Haliday 1839). Clausen (1983) reviewed this history in his revision. Since Clausen’s revision, the genus was reported in a world catalog (Mathis and Zatwarnicki 1995) and in a review of Ilytheinae (Hollmann-Schirrmacher 1998), and some species have been noted in faunistic lists from various countries, as is noted in the synonymical listings for each species. Hollmann-Schirrmacher’s review of the subfamily Ilytheinae mostly presented a revision of *Philygria* Stenhammar and his hypotheses concerning the phylogenetic relationships among the included genera. Hollmann-Schirrmacher (1998) confirmed the monophyly of Ilytheinae by essentially using the same characters that Zatwarnicki (1992) had proposed, but in addition, Hollmann-Schirrmacher suggested that Ilytheinae be divided into just two rather than three tribes. The tribe Ilytheini remained essentially unmodified, but Philygriini was made a junior synonym of Hyadinini, based primarily on conferring greater weight to some characters of the male genitalia. Hollmann-Schirrmacher’s preferred classification is presented in a cladogram that has the genera *Nostima* and *Philygria* as the most derived, monophyletic lineage within Hyadinini and as the sister group of *Axysta*. We concur and adhere to the precedent of Zatwarnicki (1992), Hollmann-Schirrmacher (1998), and Edmiston and Mathis (2005) in recognizing the genera *Nostima* and *Philygria*, formerly in the tribe Philygriini, as being in the subfamily Ilytheinae and tribe Hyadinini.

We know virtually nothing about the immature stages or biology of *Axysta*.

**METHODS**

The descriptive terminology, with the exceptions noted in Mathis (1986) and Mathis and Zatwarnicki (1990a) and below, follows that published in McAlpine (1981). Specimens of *Axysta* are moderately small, and study and illustration of the male genitalia required use of a compound microscope. We have followed the terminology for most structures of the male genitalia that other workers in Ephydridae have used (see references in Mathis 1986; Mathis and Zatwarnicki 1990a, 1990b, Zatwarnicki 1996) except the term aedeagal apodeme has been replaced with the synonymous term phallapodeme.

Dissections of male and female genitalia and descriptions were performed using the method of Clausen and Cook (1971) and Grimaldi (1987). Microforces were used to remove abdomens, which were macerated in a hot sodium hydroxide solution. Cleared terminalia were rinsed in distilled water and 70% ethanol and then transferred to glycerin for observation. If necessary for proper orientation, the specimen was transferred from glycerin to glycerine jelly. The glycerin jelly was heated, and the specimen appropriately oriented. After cooling, the embedded specimen in glycerin jelly became immobilized. For long-term storage, abdomens were placed in an attached plastic microivial filled with glycerin and attached to the pin supporting the remainder of the insect from which it was removed.
The species descriptions are composite and not based solely on the respective holotype.

Costal sections: Section I is the straight distance between the humeral cross-vein and the second costal break, just before the merger of vein R1 with the costa; section II is the straight distance between the second costal break and the merger of vein R2+3 with the costa; section III is the straight distance between the merger of veins R2+3 and R4+5.

Specimens examined for this study or where primary types are located are from:
- ANSP Academy of Natural Sciences of Philadelphia, Pennsylvania, USA.
- AMS Australian Museum, Sydney, Australia.
- CAS California Academy of Sciences, San Francisco, USA.
- CSIRO Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.
- CUIC Cornell University, Ithaca, New York, USA.
- EIHU Hokkaido University, Sapporo, Hokkaido, Japan.
- NMI National Museum of Ireland, Dublin, Ireland.
- USNM former United States National Museum, collections in the National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA.
- WSU Maurice T. James Collection, Department of Entomology, Washington State University, Pullman, Washington, USA.
- ZMUM Zoological Museum, Moscow University, Moscow, Russia.

SYSTEMATICS

Subfamily Ilytheinae Cresson

Ilytheinae Cresson 1943: 2 (as Ilytheini). Type genus: *Ilythea* Haliday in Curtis 1837.

Key to Subtribes and Genera of Hyadinini Phillips et al., 1949

1. Posterior notopleural seta inserted near ventral margin and at about same level as anterior seta (subtribe Hyadinina Phillips et al., 1949) .................2
   - Posterior notopleural seta inserted at conspicuously higher level than ante-
     rior seta (subtribe Philygrinina Lizarralde de Grosso 1989) ..................11

2. Vein R2+3 short, costal section II about 1/3 length of III, and with a stump vein. A single, proclinate, fronto-orbital seta ...............*Parydroptera* Collin
   - Vein R2+3 longer, costal section II at least half section III, lacking a stump vein. Usually either a reclinate and procline or a lateroclinate fronto-orbital seta ........................................................................................................3

3. Costa extended to at most slightly beyond vein R4+5. Tergite 4 at least 3X length of tergite 5 ..............................................................*Axysta* Haliday
- Costa extended to vein M. Tergite 4 at most twice length of tergite 5........4
4. Vein $R_{2+3}$ long; costal section II nearly 3X length of III. Face flat or weak-
ly carinate, not medially prominent. Flagellomere 1 rounded at apex above
......................................................................................................................5
- Vein $R_{2+3}$ short; costal section II less than twice length of III. Face with low
conical median prominence. Flagellomere 1 usually angulate at apex above
......................................................................................................................8
5. Both medial and lateral vertical setae well developed; fronto-orbital setae
usually moderately well to well developed, laterocline (Holarctic)..........
......................................................................................................................$Pelina$ Haliday
- Only medial vertical seta present, lateral seta lacking; lacking well-devel-
oped fronto-orbital setae (Neotropical) (genus $Pelinoides$ Cresson)........6
6. Femora and palpus yellow to yellowish red; arista with dorsal rays, length
of rays subequal to basal aristal width; eye height about twice genal height
......................................................................................................................the $pallipes$ group
- Femora and palpus black or dark colored; arista mostly bare, if short hairs
present, these shorter than basal aristal width; eye height only slightly longer
than genal height, sometimes smaller ..........................................................7
7. Tergite 4 bare, shiny, enlarged, length subequal to combined length of 2nd
and 3rd tergites...............................................................the $cyclocerus$ group
- Tergite 4 microtomentose, appearing dull, at most subshiny, tergite length
only slightly longer than 3rd......................................................the $sulcatus$ group
8. Wing brown with about 14 distinct white spots..........$Pseudohyadina$ Clausen
- Wing unmarked or with at most faint spots or clouds at apex of vein $R_1$ and
on crossveins ...........................................................................................9
9. Tergite 4 from 1.3-2X length of tergite 5, both conspicuously punctate.
Medial vertical seta present, lateral vertical seta absent. Lateral margins of
scutellum not densely microtomentose, not appearing velvety .................
..................................................................................$Lytogaster$ Becker
- Tergite 4 subequal in length to tergite 5, neither conspicuously punctate.
Usually both medial and lateral vertical setae present, if lateral absent then
lateral margins of scutellum densely microtomentose, appearing velvety....
...........................................................................................10
10. Dorsocentral seta 1. Lacking well-developed, fronto-orbital setae........
......................................................................................................................$Hyadina$ Haliday
- Dorsocentral setae 2. One, well-developed, laterocline, fronto-orbital seta
......................................................................................................................$Parahyadina$ Tonnoir and Malloch
11. Lateral vertical seta lacking; fronto-orbital setae lacking...$Garifuna$ Mathis
- Both medial and lateral vertical setae usually present; fronto-orbital seta
present, sometimes reduced.................................................................12
12. Arista bare or minutely haired; 2 rows of facial setae. Presutural or sutural
dorsocentral seta present...............................................................$Philygria$ Stenhammar
- Arista short- to long-haired; 1 row of facial setae. Presutural or sutural dor-
socentral seta lacking...............................................................$Nostima$ Coquillett
Genus *Axysta* Haliday


**Diagnosis.** *Axysta* is distinguished from other genera of the tribe Hyadinini by the following combination of characters: Small to moderately small shore flies, body length, 1.40-2.25 mm; mostly shiny black, setation generally weakly developed. **Head:** Fronto-orbital setae present or absent, if present, lateroclinate; ocellar setae well developed; medial vertical seta well developed, lateral seta absent; arista mostly bare, if short hairs present, these shorter than basal aristal width. Face in lateral view almost straight to rather convex, anterior oral margin just ventrad or slightly anterior to antennal bases; facial protuberance (carina) small, usually polished, extended slightly beyond anterior oral margin; face black with dense silvery or grayish to sometimes golden microtomentum; oral margin without setae; genal height subequal to height of basal flagellomere; maxillary palpus yellow or black. **Thorax:** Setation generally reduced; 1 dorsocentral seta. Lateral margins of scutellum not densely microtomentose, not appearing velvety; katepisternum densely microtomentose, usually whitish to gray. Wing generally hyaline or very faintly infumate, lacking a maculation pattern; costa extended at most to slightly beyond vein R$_4+5$; vein R$_2+3$ moderately long, costal section II at least half section III, lacking a stump vein. Femora black (species in north temperate) or yellow (*A. indica*, forefemur of *A. nikita*). **Abdomen:** Generally shiny; tergite 4 at least 3X length of tergite 5. Male terminalia: Epandrium narrowed dorsally, a thin band only; aedeagus and phallopodeme unfused; subependrial plate complete; gonite slender, elongate, almost straight to conspicuously curved, apex acutely and narrowly pointed.

**Key to Species of *Axysta***

1. Legs, including tarsi, yellow, except darkened mid- and hindfemoral apices (India) ............................................................................................................. *A. indica* sp.n.
   - Legs at least partially black .............................................................................2
2. Basal flagellomere entirely black; arista black; 1 large fronto-orbital seta ...........3
   - Basal flagellomere black dorsally, yellowish basoventrally; lacking a fronto- orbital seta ....................................................................................................................5
3. Abdomen rough dorsally with fine punctures and yellow setae but lacking conspicuous pits, not dorsoventrally flattened, lateral margins of tergites

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rounded; 1 fronto-orbital seta and 2-4 setulae (northern Nearctic Region).....

- Abdomen with conspicuous pits, each bearing a long, yellow seta, moderately dorsoventrally flattened with lateral margins of tergites sharply creased; 1 fronto-orbital seta .................................................................A. extera (Cresson)

4. Midfacial carina completely silvery microtomentose (Europe).........................4

- Midfacial carina bare or with sparse microtomentum (northern Nearctic Region, eastern Palearctic Region) .........................A. cesta Haliday

5. Midfacial carina with sparse, silvery microtomentum. Scutellum without apical papillae (southeastern United States)..........................A. nigrifacies (Miyagi)

- Midfacial carina shiny black. Apical scutellar setae arising from conspicuous apical papillae (Australia, Thailand) ..............................................................6

6. Basal flagellomere elongate, narrowly rounded apically; palpus yellow, forefemur yellow (Thailand) .........................................................A. nikita sp. n.

- Basal flagellomere round; palpus black, forefemur black (Australia)............

Axysta austra Krivosheina and Mathis, new species
Figs. 1-7

Diagnosis.—This species is distinguished from congeners by the following combination of characters: palpus black, basal flagellomere round, legs generally black with yellowish tarsi, and presence of apical, scutellar papillae.

Description. Male body length 1.75 mm, wing length 1.85 mm. Head: shiny black with silvery microtomentum except as noted; orbital setae absent; frons shiny black with ocellar triangle and anterior narrow band silvery microtomentum, face convex on ventral half, silvery microtomentum except shiny black carina; occiput silvery microtomentum as 2 stripes divided with narrow black area, parafacial setulae in 2 rows: lateral row of 8 setulae thin, short, curved dorsally and outwardly; medial row of 3 setulae more well developed, convergent. Clypeus with silvery microtomentum; palpus black. Antennal scape and pedicel black, basal flagellomere round, 1.2X as long as wide, yellow, darkened dorsoapically; arista black. Thorax: Shiny black, smooth, with rather dense coppery microtomentum; scutum shiny black with coppery microtomentum; with 2 indistinct stripes; anepisternum completely silvery microtomentum; anepimeron shiny black; katepisternum silvery microtomentum, as anepisternum. Anepisternal setae not developed. Scutellum black, transversely rugose dorsally with rather sparse coppery microtomentum; posterior margin rather truncate and blunt apically, with 2 apical papillae. Wing hyaline, faintly brownish; costa extended slightly beyond vein R4+5; costal section II 0.86X costal section III; halter dirty-white, knob darkened. Legs with all femora and tibiae black, all tarsi yellow with apical tarsomeres darkened. Abdomen: Shiny black, sparsely coppery microtomentum, with conspicuous pits, each bearing a long yellow seta. Sternite 5 of
1. Male abdomen, terminal segments, ventral view. 2. Female abdomen, ventral view.
3. Aedeagus and phallapodeme, lateral view. 4. Gonites and hypandrium, lateral view.
5. Internal male terminalia, lateral view. 6. Hypandrium, ventral view. 7. Epandrium and cercus, lateral view.
male (Fig. 1) divided medially in 2 symmetrical parts, each more or less as isosceles triangular with rounded angles, posteromedial side longest, also with very small, circular sclerite at anterior margin; sternite 4 wider than long, posterior margin shallowly emarginate. Male terminalia (Figs. 1, 3-5, 7): Epandrium in lateral view (Fig. 7) as a narrow strap dorsally, ventral half becoming much wider, posterior margin shallowly convexly arched, ventral width greater than width of cercus in lateral view; cercus narrowly oval in lateral view; sclerotized portion of aedeagus in lateral view (Figs. 3, 5) generally narrow, angulate, L-shaped, widest at angle, otherwise arms narrow, basal arm longer than apical arm; phallopodeme in lateral view (Figs. 3, 5) elongate and narrow, pointed apically, base shallowly concave, ventral side even, nearly straight, dorsal side irregular; gonite in lateral view triangular, acutely pointed and shallowly curved apically; hypantrum in ventral view (Fig. 6) subrectangular, with anterolateral angles rounded and posterolateral angles narrowly produced, in lateral view (Figs. 4, 5) elongate, widest medially as obtuse angle. Female abdomen as in Fig. 2.

Type material.–The holotype male is labeled “AUSTRALIA. QLD: The Boulders (W. of Babinda; 17°20.5'S, 145°52.2'E; 70m) 23 Sep 2002, D&W Mathis/HOLOTYPE % Axysta austra Krivosheina & Mathis AM [red].” The holotype is double mounted (minuten in a block of plastic), is in excellent condition, and is deposited in the AMS. One male paratype (USNM) bears the same locality label data as the holotype (abdomen removed, dissected, parts in an attached microvial). Other paratypes are as follows: Australia. New South Wales: Narrabeen Lake, Sydney (33°42.7'S, 151°17.1'E), 18 Sep 1960, Z. Liepa (1♀; CSIRO). Queensland: Ravenshoe (8 km W; 17°38.5'S, 145°24.2'E; 780 m), 6 Nov 1962, E. S. Ross and D. O. Cavagnaro (1♀; CAS).

Distribution.–Australasian: Australia (New South Wales, Queensland).

Etymology.–The species epithet, austra, is of Latin derivation and means southern, in reference to the distribution of this species in the southern hemisphere.

Axysta bradleyi Cresson
Figs. 8-15

Hyadina bradleyi.–Sturtevant and Wheeler 1954: 211 [generic combination].

Diagnosis.–This species is distinguished from congeners by the following combination of characters: Head: Basal flagellomere elongate, narrowly rounded apically, black dorsally, yellowish basoventrally; arista white to yellowish; fronto-orbital seta lacking. Midfacial carina with sparse, silvery microtomentum. Thorax: Scutellum without apical papillae. Anepisternum and anepimeron shiny,
mostly to entirely bare of microtomentum. Abdomen: Tergites with conspicuous pits, moderately dorsoventrally flattened with lateral margins of tergites creased, sharply angulate. Male terminalia (Figs. 8, 11-15): Ventral portion of epandrium robustly developed, as high as wide, height equal or greater than width of cerci; aedeagus in lateral view deeply bilobed, both dorsal and ventral portions elongate and acutely pointed, dorsal portion much thinner; phallopodeme narrowly triangular; hypandrium shorter than length of cerci. Female abdomen as in Figs. 9-10.

Distribution.—Nearctic: United States (Georgia, Florida, New Jersey, Ohio, South Carolina, Tennessee, Virginia).

Axysta cesta (Haliday)

Figs. 16-23

Ephydra cesta Haliday 1833: 177 [Great Britain. Northern Ireland. Down: Holywood (54°38.5’N, 5°49.8’W); LT ♂ (designated by Clausen 1983: 71), NMI].


Hyadina cesta.—Sturtevant and Wheeler 1954: 211 [generic combination, review, Nearctic].


Hydrina viridula Robineau-Desvoidy 1830: 795 [not given (? France); ST (sex ?), MNHN (apparently destroyed)].—Schiner 1863: 255 [synonymy].

Ephydra (Axysta) viridula.—Haliday 1839: 406 [generic combination, Ireland].


Diagnosis.—This species is distinguished from congeners by the following combination of characters: Head: Basal flagellomere short, only slightly longer than high, bluntly rounded apically, entirely black; arista black; 1 laterocline
fronto-orbital seta. Midfacial carina mostly sparsely or moderately densely, silvery microtomentum. Thorax: Scutellum without apical papillae. Anepisternum sparsely to moderately densely microtomentose, less so posterodorsally; anepimeron largely shiny, at most very sparsely microtomentose anteriorly to almost entirely bare of microtomentum posteriorly. Abdomen: Tergites with conspicuous pits, moderately dorsoventrally flattened with lateral margins of tergites creased, sharply angulate; sternite 5 as a parallelogram, posterior margin broadly but shallowly V-shaped. Male terminalia (Figs. 16, 19-23): Ventral portion of epandrium robustly developed, as high as wide; aedeagus in lateral view relatively large, deeply curved, multilobed, layered, with lateral slits and broad, dentate apex; phallopodeme elongate, conspicuously arched in lateral view; hypandrium elongate and narrow, forming a tubular sheath around length of aedeagus. Female abdomen as in Figs. 17-18.

Distribution.—Palearctic: Austria, Belgium, Czech Republic, Finland, France, Germany, Great Britain, Hungary, Ireland, Italy, Kazakhstan, Netherlands, Norway, Poland, Russia (European Territory, Far East, Jakutia [Sakha], and southern Primorye), Sweden, Switzerland.

Axysta extera (Cresson)
Figs. 24-31

Lytogaster extera Cresson 1924: 162 [United States. New Jersey. Mercer: Trenton (40°13.2'N, 74°45.8'W); HT ♀, ANSP (6315)].


Microlytogaster extera.—Clausen 1983: 74-75 [generic combination, revision].

Diagnosis.—This species is distinguished from congeners by the following combination of characters: Head: Basal flagellomere short, only slightly longer than high, bluntly rounded apically, entirely black; arista black; 1 lateroclinate fronto-orbital seta. Midfacial carina with sparse, silvery microtomentum, appearing subshiny. Thorax: Scutellum without apical papillae. Anepisternum and anepimeron shiny, mostly to entirely bare of microtomentum. Abdomen: Abdomen rough dorsally with fine punctures and yellow setae, but lacking conspicuous pits, not dorsoventrally flattened, lateral margins of tergites rounded. Male terminalia (Figs. 24, 27-31): Ventral portion of epandrium (ventrad of cerci) in lateral view relatively short vertically, but horizontally elongate, height less than width of cerci, forming right angle with anterior, dorsal extension; aedeagus in lateral view as a single, elongate, thin, shallowly curved, acutely pointed process; phallopodeme moderately narrowly triangular; hypandrium greatly reduced, length only slightly greater than greatest width. Female abdomen as in Figs. 25-26.

Distribution.—Nearctic: Canada (Ontario, Quebec), United States (Alaska, Colorado, Connecticut, Iowa, Massachusetts, Michigan, Minnesota, Montana, Nebraska, New Jersey, North Dakota, Ohio, Wisconsin).
Axysta indica Krivosheina and Mathis, new species  
Figs. 32-37

Diagnosis.—This species is distinguished from congeners by the following combination of characters: occipital spots silvery, contrasted with coppery ocellar triangle, katepisternum silvery, contrasted with coppery surface of thorax, legs yellow, and apical scutellar papillae lacking.

Description. Male body length 1.35 mm, wing length 1.35 mm. Head: Shiny black, coppery microtomentum except as noted; orbital setae absent; frons shiny black with ocellar triangle and anterior narrow band coppery microtomentum; upper occiput with 2 central silvery spots, brightly differing from coppery coloration of frons; face convex on ventral half, densely silvery microtomentum except shiny black parafacials; carina silvery microtomentum; parafacial setae in 2 rows: lateral row of 5 thin, short setulae curved dorsally and outwardly; medial row of 3 setulae more well developed, convergent. Clypeus silvery microtomentum; palpus yellow. Antennal scape and pedicel yellow, basal flagellomere and arista missing. Thorax: Shiny black, smooth, with rather dense coppery microtomentum, no stripes; scutum shiny black, coppery microtomentum; anepisternum coppery microtomentum; aneepimeron shiny black with sparse microtomentum; katepisternum densely silvery microtomentum, distinctly contrasted with other thoracic surfaces. Aneepisternal setae not developed. Scutellum black, transversely rugose dorsally with rather sparse coppery microtomentum; posterior margin rather truncate and blunt apically, lacking apical papillae. Legs including tarsi yellow except mid- and hindfemoral apices darkened. Wing hyaline, faintly brownish; costa extends slightly beyond vein R4+5; costal section II 0.83X costal section III; stem of haltere yellow, knob black. Abdomen: Shiny black, sparsely coppery microtomentum, with conspicuous pits, each bearing yellow seta. Sternite 5 of male (Fig. 32) undivided, wider than long, posterior margin emarginate, very shallowly and broadly V-shaped; sternite 4 with posterior margin very shallowly concave. Male terminalia (Figs. 33-37): Epandrium in lateral view (Fig. 37) as a narrow strap dorsally, ventral half becoming much wider, posterior margin shallowly concave, ventral width greater than width of cercus in lateral view; cercus in lateral view narrowly elliptical; sclerotized portion of aedeagus in lateral view (Figs. 33, 35) with base subquadrat, basoposterior angle somewhat produced, basoanterior and apiocoanterior angles nearly right angles, apical 2/3 of aedeagus very narrowly produced, parallel sided, elongate, aedeagus also with striated apical extension, 4X longer than wide, apex deeply and sharply dentate; phalloapodeme in lateral (Figs. 33, 35) elongate, both apices narrowly produced, medial keel narrowly extended, angularly truncate; gonite in lateral view triangular, wide basally, ventral extension becoming narrowed with apex conspicuously curved and acutely pointed; hypandrium in ventral view (Fig. 36) subrectangular, with anterior margin rounded and posterolateral angles narrowly produced and slightly recurved, in lateral view (Figs. 34-35) elongate, widest posteriorly, narrowed toward anterior margin.
Figs. 32-37. *Axysta indica* sp. n. (India. Assam: Digboi (9.7 km NW)). 32. Male abdomen, terminal segments, ventral view. 33. Aedeagus and phallapodeme, lateral view. 34. Gonites and hypandrium, lateral view. 35. Internal male terminalia, lateral view. 36. Hypandrium, ventral view. 37. Epandrium and cercus, lateral view.
Type material.—The holotype male is labeled “INDIA, Assam, 6 mi NW Digboi, III-30-1944 D.E. Hardy/HOLOTYPE ♂ *Axysta indica* Krivosheina & Mathis USNM [red].” The holotype is double mounted (glued to paper triangle), is in good condition (end of abdomen removed, dissected, and in an attached microvial; basal flagellomere and arista missing), and is deposited in the USNM.

Type locality.—India. Assam: Digboi (9.7 km NW; 27°22.7′N, 95°37′E).

Distribution.—Oriental: India (Assam).

Etymology.—The species epithet, *indica*, has reference to the country where the holotype was collected and is a noun in apposition.

*Axysta nigrifacies* (Miyagi)  
Figs. 38-45

*Hyadina nigrifacies* Miyagi 1977: 80 [Japan. Hokkaido: Sapporo (43°03.7′N, 141°21.3′E); HT ♀, EIHU].—Cogan 1984: 159 [Palearctic catalog].  

Diagnosis.—This species is distinguished from congeners by the following combination of characters:  
**Head:** Basal flagellomere short, only slightly longer than high, bluntly rounded apically, entirely black; arista black; 1 lateroclinate, fronto-orbital seta. Midfacial carina variable from completely bare to sparsely or moderately densely, silvery microtomentose.  
**Thorax:** Scutellum without apical papillae. Anepisternum sparsely to moderately densely microtomentose, less so posterodorsally; anepimeron largely shiny, at most very sparsely microtomentose anteriorly to almost entirely bare of microtomentum posteriorly.  
**Abdomen:** Tergites with conspicuous pits, moderately dorsoventrally flattened with lateral margins of tergites creased, sharply angulate. Male terminalia (Figs. 38, 41-45): Ventral portion of epandrium robustly developed, as high as wide; aedeagus in lateral view deeply bilobed, both dorsal and ventral portions elongate and acutely pointed, dorsal portion longer and thinner than more robust ventral portion; phallapodeme moderately narrowly triangular; hypandrium elongate, length subequal to length of cerci. Female abdomen as in Figs. 39-40.


Remarks.—This species was initially described in the genus *Hyadina* (Miyagi 1977) and was later transferred to *Axysta* (Zatwarnicki 1991, Mathis and Zatwarnicki 1995), which we reconfirm here. The conspecificity of *A. nigrifacies* with *A. americana* was determined from direct comparison of the female holotype and
paratype of *A. nigrifacies*, kindly loaned to us by I. Miyagi, with specimens of *A. americana*. This is the first example of a Holarctic species in *Axysta*.

**Axysta nikita** Krivosheina and Mathis, new species

Figs. 46-52

Diagnosis.—This species is distinguished from congeners, especially *A. bradleyi*, by the following combination of characters: arista black, pleura partially shiny, tibiae yellow, and presence of apical papillae on scutellum.

Description.—Wing length: 1.75 mm, body length 1.5 mm. Head: Shiny black with silvery microtomentum except as noted; frons shiny black with ocellar triangle and narrow, anterior margin of frons silvery microtomentose. Scape black, pedicel yellow dorsally darkened, flagellomere 1 yellow with narrow dorsal portion black; flagellomere 1 elongated, 2 times as long as wide; arista black. Face convex in the lower half, with silvery microtomentum except shiny black carina; clypeus with silvery microtomentum, palpus yellow. Head setation reduced: fronto-orbital setae absent; 1 ocellar seta; 1 medial vertical seta, lateral vertical seta lacking; parafacial setae in 2 rows, 4-5 curved dorsally and outwardly curved thinner and shorter outer setae and 3 convergent stronger inners. Thorax: Shiny black, smooth, with rather dense silvery and coppery microtomentum, no stripes; scutum shiny black on the anterior third with coppery microtomentum on rest of surface. Aneipisternum with sparse, silvery microtomentum except the ventral half; anepimeron partially shiny black; katepisternum with silvery microtomentum same as on aneipisternum. Aneipisternal setae not developed. Scutellum shiny black, transversely rugose dorsally with rather sparse coppery microtomentum; rather truncate and blunt apically; with 2 apical papillae at base of strong apical setae, lateral setae much weaker and shorter. Wing hyaline to faintly brownish; costa extended slightly beyond vein R$_{4+5}$; costal section II 0.65X section III; halter dirty-white. Forefemur yellow, mid and hind femora black except apices, all tibiae yellow, hindtibia with indistinct dark medial band, all tarsi yellow with apical 2 foretarsomeresh darkened and 1 apical mid- and hindtarsomeresh darkened. Abdomen: Shiny black, with sparse coppery microtomentum, with conspicuous pits, each bearing a long yellow seta. Sternite 5 of male (Fig. 46) divided medially in 2 symmetrical parts, each rectangular with angles rounded; sternite 4 about as long as wide, posterior margin emarginate medially, lateral margins arched. Male terminalia (Figs. 46, 48-52): Epandrium in lateral view (Fig. 52) as a narrow strap dorsally, ventral half becoming much wider, ventral half subquadrate with posteroventral angle rounded, posterior margin slightly slanted dorsally, otherwise nearly flat, ventral width greater than width of cercus in lateral view; cercus in lateral view narrowly oval; sclerotized portion of aedeagus in lateral view (Figs. 48, 50) moderately wide on basal 1/3-1/2 apical 1/2-2/3 very narrow, elongate, abruptly curved subapically, apex acutely pointed; phallapodeme in lateral view (Figs. 48, 50) moderately elongate, more narrowly produced toward attachment with aedeagal base, keel produced to a point, trian-
gular; gonite in lateral view (Figs. 49, 50) narrow, elongate, sickle-shaped, conspicuously curved on apical half, apex acutely pointed; triangular, acutely pointed and shallowly curved apically; hypandrium in ventral view (Fig. 51) narrowly Y-shaped, arms of Y thickly developed, truncate apically, anterior extension narrow, truncate apically, in lateral view (Figs. 49-50) generally elongate and narrow, relatively wide basally, anterior portion narrowly developed.

Type material.–The holotype male is labeled “THAILAND: Chantaburi prov., Pong Nam Ron, 20.XII.2008, leg. N. Vikhrev/HOLOTYPE ♂ Axysta nikita Krivosheina & Mathis ZMUM [red].” The holotype is intact, glued to a pin, genitalia extracted so that the aedeagus and gonites are visible laterally, is in good condition, and is deposited in ZMUM. Paratypes (6♂, 1♀; ZMUM; 1♂; USNM) with same locality label as the holotype, 20-21.XII.2008 (3 paratype males and 1 female with end of abdomen cut and dissected, parts in glycerol in plastic container under the fly), leg. N. Vikhrev.

Type locality.–Thailand. Chantaburi: Pong Nam Ron (12°53’N, 102°26.6’E).

Distribution.–Oriental: Thailand (Chantaburi).

Etymology.–The species epithet, nikita, is named to honor its collector, Dr. Nikita Vikhrev (Zoological Museum, Moscow University).

Natural history.–The specimens were collected from a regularly watered grass-plot in front of buildings.

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LITERATURE CITED


