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REVIEW OF THE GENUS *HEMERODROMIA* MEIGEN (DIPTERA: EMPIDIDAE; HEMERODROMIINAE) OF AMERICA NORTH OF MEXICO

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Abstract.—The genus *Hemerodromia* is reviewed for America north of Mexico. A general diagnosis and a modified description are presented for the genus and each of the 13 previously described species. Nine **new species** are described from America north of Mexico: ***Hemerodromia burdicki, H. chelata, H. flexiformis, H. glabella, H. ligata, H. loba, H. reclinata, H. sinclairi,*** and ***H. subchelata.*** Designation of **neotypes** are made for *Hemerodromia empiformis* (Say) and *H. superstitiosa* Say. Designation of **lectotypes** are made for the following: *H. captus* Coquillett; *H. coleophora* Melander; *H. haruspex* Melander; *H. jugulator* Melander; *H. melanosoma* Melander; *H. stellaris* Melander; *H. vates* Melander; and, *H. vittata* Loew. *Hemerodromia haruspex* Melander 1947 is shown to be a **new synonym** of *H. melanosoma* Melander 1947, *H. rogatoris* Coquillett 1895 a **new synonym** of *H. superstitiosa* Say 1824, and *H. vittata* Loew 1862 a **new synonym** of *H. superstitiosa* Say 1824. Previously known only from the Palearctic Region, *H. oratoria* (Fallén) was found to be widely distributed in North America. Separate keys to male and female adults, illustrations of male terminalia, and known distributions are provided.

Key Words. Diptera, Empididae, Hemerodromiinae, *Hemerodromia,* dance flies

Adult flies of the genus *Hemerodromia* Meigen (Empididae, Hemerodromiinae), like those of other genera in the subfamily, are very small (ca. 2–4 mm), elongate, and possess raptorial forelegs. Their wings lack an anal lobe. Nearctic genera of Hemerodromiinae have been reviewed by Melander (1902, 1928, 1947), MacDonald (1988, 1989, 1993, 1994), and MacDonald and Turner (1993). Species fitting the present concept of *Hemerodromia* are found in North America (Melander 1947), Europe (Chvala and Wagner 1989), China (Yang and Yang 1990), India and Indonesia (Melander 1928), Nepal (Smith 1965), South Africa (Smith 1969), and South America (Collin 1933, Smith 1967).

Larvae and pupae of *Hemerodromia* species are aquatic (Smith 1969), and larvae are reported to prey on black fly larvae (Peterson 1960). Labels accompanying adults of Nearctic *Hemerodromia* suggest that they commonly are swept from riparian vegetation and also taken in Malaise traps. Harper (1980) collected males and females of several species in emergence traps placed over streams in Quebec, Canada.

The present study is limited to *Hemerodromia* species of America north of Mexico. Included are a general diagnosis and a modified description for the genus and each of the 13 previously described species, descriptions of nine new species, separate keys to male and female adults, and known distributions.

Materials and Methods

The present study was facilitated by the existence of large number of Nearctic specimens added to collections since Melander's (1947) revision. The following institutions loaned the material upon which this work is based: American Museum of Natural History, New York (AMNH); California Academy of Sciences, San Francisco (CAS); Canadian National Collection, Agriculture Canada, Ottawa (CNC); Cornell University, Ithaca (CU); Clemson University, South Carolina (CUSC); Florida State Collection of Arthropods, Gainesville (FSCA); James Entomological Collection, Washington State University (WSU); Illinois Natural History Survey (INHS); Los Angeles County Museum (LACM); Museum of Comparative Zoology, Harvard University (MCZ); Purdue University Entomological Research Collection (PERC); Snow Museum, University of Kansas, Lawrence (UKL); National Museum of Natural History, Smithsonian Institution, Washington D. C. (USNM); University of California, Riverside (UCR); University of Minnesota, St. Paul (UMSP); Universite de Montreal (UMC); University of New Hampshire (UNH); and, Utah State University, Logan (USU). Specimens also came from the author's collection (MAC) and a series from Hawaii sent by D. E. Hardy.

The methods employed in this study were reported in a review of the genus *Chelipoda* Macquart (MacDonald 1993), including details of specimen preparation as presented by Cumming (1992). Terminology pertaining to vestiture is based on McAlpine (1981), but interpretation of male terminalia follows Cumming and Sinclair (1990).

Genus *Hemerodromia* Meigen

Hemerodromia Meigen 1822: 61. Type species: *Tachydromia oratoria* Fallén 1816 (des. Rondani 1856: 148).

Microdromia Bigot 1857: 557, 563 (as *Microdromya,* later regarded as erroneous). Type species: *Tachydromia oratoria* Fallén 1816 (des. Coquillett 1902: 1).

Diagnosis.—Adults of the genus *Hemerodromia* are distinguished from those of other genera of Hemerodromiinae in the Nearctic Region primarily by reduced venation, including the following: anal cell lacking; crossveins h and bm-cu lacking; and, cells bm and dm confluent and ending in the basal third of wing.

Description.—*Hemerodromia* species treated in this paper agree in general with the generic description of Collin (1961), with the following additions and modifications. Body length exclusive of antennae and including terminalia 2.0 to 4.0 mm. Fore femur and fore tibia with 2 median rows of 14–20 black setulae ventrally; those of fore femur flanked by row of 5–8 light brown bristles; those of fore tibia weaker, more sharply pointed, and lacking flanking bristles. Fore tibia with strong apical bristle. Prominent vestiture lacking on mid and hind leg. Male terminalia including hypandrium, pair of epandrial lobes of differing shape and vestiture, pair of cerci of differing shape and vestiture; phallus of differing shape and vestiture. Female "ovipositor" of differing degrees of development, formed from cerci and abdominal segments 8 and 9.

Informal species groups.—Most Nearctic species treated here are placed in four informal species groups, the *H. empiformis* (Say) group, the *H. captus* Coquillett group, the *H. melanosoma* Melander group, and the *H. superstitiosa* Say group. No phylogenetic analysis has demonstrated the monophyly of these groups, but their use herein facilitates presentations of species' diagnoses and descriptions.

Males of the *H. empiformis* group are characterized by distinctive epandrial lobes. Each is slender and straight basally, and then abruptly enlarged at or slightly beyond the apical third. A row of about five to eight (one species possesses only two) strong setulae exist along the medial surface of

each epandrial lobe about midway and an another series of strong setulae exists along the inner, dorsal surface. Differences in the general shape of the cerci, especially the apex, distinguish member species. Females possess a well-developed ovipositor. The group includes eight species in America north of Mexico, *H. brevifrons* Melander, *H. coleophora* Melander, *H. empiformis, H. sufflexa* Melander, and four new species described below.

Males of the *H. superstitiosa* group share a prominent basoventral process on each fore femur, which bears an apical spine (Fig. 7). Immediately distal to this process is an indentation for reception of an apical bristle of a corresponding fore tibia. Females possess a well-developed ovipositor. The group includes *H. oratoria* (Fallén), *H. superstitiosa,* and a new species described below. The degree of development of the basoventral process of the fore femur varies among males of *H. oratoria,* being most strongly developed on specimens from northwestern North America. This structure is weakly developed or lacking on females of *H. oratoria.*

Males of the *H. captus* group possess cerci that are deeply excavated apically, resulting in a very long dorsal and a correspondingly long ventral fork. Females possess a well-developed ovipositor, but it is relatively shorter than that on females of the *H. empiformis* group. The *H. captus* group treated here includes *H. captus, H. fibrina* Landry and Harper, and two new species described below.

Adults of the *H. melanosoma* group are very small and nearly concolorous reddish black to black. Male terminalia include cerci and epandrial lobes that are relatively very slender. The degree of development of the female ovipositor varies among included species. The group as treated here includes *H. chillcotti* Harper, *H. melanosoma,* and one new species described below; *H. jugulator* Melander also appears to belong to this group.

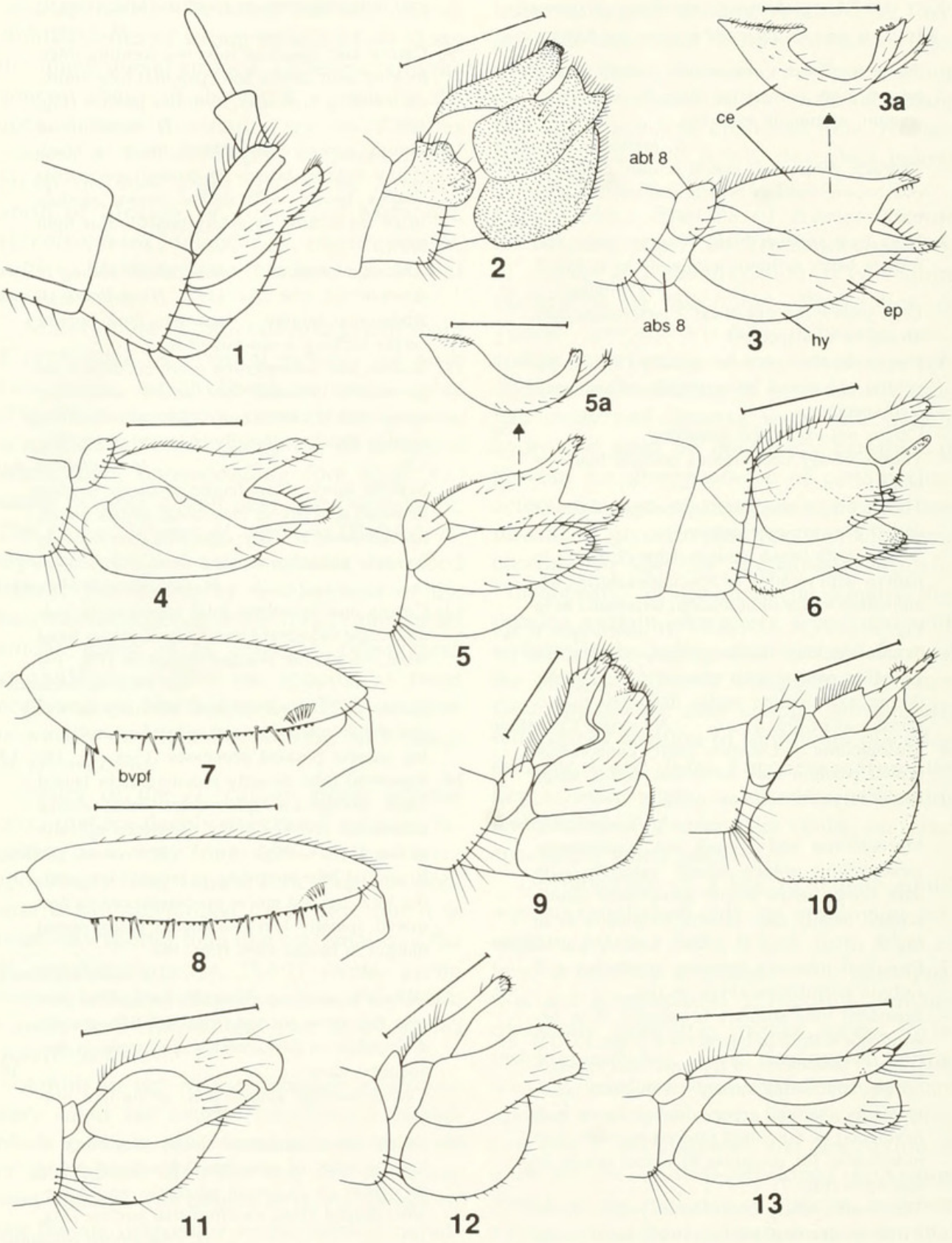
Three species are not placed in any of the informal species groups. Adults of *H. stellaris* Melander and *H. vates* Melander most resemble those of the *H. empiformis* group in size and coloration, but male terminalia lack the distinctive epandrial lobe. *Hemerodromia sinclairi,* newly described below, is distinct from all other species.

Remarks.—Species of *Hemerodromia* are founded largely on terminalia characters of males and identification may require maceration of specimens. Preparation of "good" specimens is difficult because macerating with lactic acid may not always produce enough clearing of pigment to facilitate study and clearing with 10% sodium hydroxide must be done very carefully to prevent the disappearance of certain characters. Storage of adequately cleared terminalia in glycerin may result in additional clearing so that the preparation virtually "disappears" in the microvial. Finally, discerning certain characters associated with terminalia, including vestiture and form of the phallus, often is complicated because their appearance may change substantially with minor rotation of terminalia placed in on microscope slides. For these reasons, the key to male adults is based on coloration and attributes of terminalia visible on intact specimens when possible.

Development of a key to female adults was accomplished only by employing coloration, relative body length from front of head (excluding antennae) to tip of ovipositor, and geographical distribution; females of certain sympatric species appear to be indistinguishable. Two descriptive terms, weakly developed and well developed, are applied to ovipositors in the discussion below and in the diagnosis and description of each species. A well-developed ovipositor, found on the majority of species, involves elongation and sclerotization of abdominal segments eight and nine; it is shiny and usually about twice as long as its diameter. A weakly developed ovipositor, found on two species, involves little elongation and almost no sclerotization of abdominal segments eight and nine.

KEY TO MALE ADULTS OF *HEMERODROMIA* MEIGEN OF AMERICA NORTH OF MEXICO

1. Thoracic pleura concolorous yellow to yellowish gold, contrasting strongly with black scutum; terminalia as in Fig. 1 . . . . . *H. jugulator* Melander
– Thoracic pleura and lateral scutum concolorous brown, reddish brown, reddish black or black 2
2. Legs light reddish black (except coxae and femora bases yellow); terminalia as in Fig. 2 . . . . . *H. sinclairi*, n. sp.
– Legs yellow (except distal 2 tarsomeres dark brown on two species) 3
3. Cercus deeply excavated apically (Figs. 3–6), ventral and dorsal lobes visible on unmacerated specimens 4
– Cercus not excavated apically 7
4. Thorax nearly concolorous reddish black or black 5
– Thorax brown or golden brown with areas of darker brown pigmentation 6
5. Scutum with broad median stripe changing in pattern with rotation of specimens during examination under illumination; terminalia as in Fig. 3 . . . . . *H. subchelata*, n. sp.
– Scutum lacking median stripe, dorsum not changing pattern with rotation of specimens during examination under illumination; terminalia as in Fig. 4 . . . . . *H. captus* Coquillett
6. Mesopleuron and scutum nearly concolorous brown (scutum may have thin darker stripe medially); terminalia as in Fig. 5 . . . . . *H. chelata*, n. sp.
– Mesopleuron and scutum not concolorous; mesopleuron golden brown ventrally with dark brown stripe below notopleural suture; scutum mostly dark brown; terminalia as in Fig. 6 . . . . . *H. fibrina* Landry and Harper
7. Epandrial lobe not abruptly broadened apically in lateral view (Figs. 9–16) 8
– Epandrial lobe abruptly broadened at or beyond apical third in lateral view (Figs. 17–24) 15
8. Distal 2 tarsomeres of mid and hind leg dark brown, contrasting strongly with basal tarsomeres; basoventral process on fore femur well developed as a pointed projection, with deep indentation for reception of apical bristle of fore tibia (Fig. 7) 9
– Tarsomeres nearly concolorous yellow, distal 2 not contrasting strongly with basal tarsomeres; basoventral process on fore femur not developed (except on some specimens of *H. oratoria*), with weakly developed indentation on fore femur for reception of apical bristle of fore tibia (Fig. 8) 10
9. Cercus and epandrial lobe forming interlocking unit, with ventral process of cercus fitting into dorsal groove on epandrial lobe (Fig. 9) . . . . . *H. ligata*, n.sp.
– Cercus and epandrial lobe not forming interlocking unit; cercus and epandrial lobe entire, each ending in slender, in-turned process (Fig. 10) . . . . . *H. superstitiosa* Say
10. Thorax concolorous reddish black or black (shiny reddish brown on teneral specimens) 11
– Thorax brown with darker brown median stripe on scutum or nearly concolorous light brown 13
11. Abdominal tergum 7 yellow; cercus ending in down-turned, lobe (Fig. 11) . . *H. chillcotti* Harper
– Abdominal tergum 7 brown to dark brown; cercus lacking down-turned lobe 12
12. Scutum and mesopleuron pruinose, except for prominent denuded spot above mesocoxa; apical half of cercus narrowed; epandrial lobe weakly concave dorsally in lateral view (Fig. 12) . . . . . *H. glabella* n. sp.
– Scutum shiny; mesopleuron pruinose, lacking denuded spot above mesocoxa; cercus entire, not narrowed apically; epandrial lobe strongly concave dorsally in lateral view (Fig. 13) . . . . . *H. melanosoma* Melander
13. Cercus and epandrial lobe subequal in size and shape in lateral view; apex of cercus lined with 5–6 minute pointed processes (Fig. 14) . . . . . *H. stellaris* Melander
– Cercus and epandrial lobe differing in size and shape in lateral view; apex of cercus lacking minute pointed processes (Figs. 15, 16) 14
14. Epandrial lobe broadly rectangular in lateral view, except for apicoventral lobe; cercus broadened and shallowly excavated apically in lateral view (Fig. 15) . . *H. oratoria* (Fallén)
– Epandrial lobe strap-like in lateral view, ending in 2, twisted apical processes; cercus narrowed apically and convoluted along dorsal margin in lateral view (Fig. 16) . . . . . *H. vates* Melander
15. Cercus bearing apicodorsal, prong-like process that turns inward (Figs. 17, 18), usually discernible on unmacerated specimens in dorsolateral view 16
– Cercus lacking apicodorsal, prong-like process 17
16. Apical setae on cercus long, projecting at least to apex of epandrial lobe; distal prong on cercus ca. ¼ length of cercus and somewhat jagged along ventromedial surface (Fig. 17) . . . . . *H. coleophora* Melander
– Distal setae on cercus short, not projecting to apex of epandrial lobe; distal prong on cercus ca. ⅓ length of cercus and smooth along ventromedian surface (Fig. 18) . . . . *H. loba*, n. sp.
17. Cercus more or less quadrate in lateral view, apical margin nearly straight (Fig. 19) . . . . . *H. sufflexa* Melander



Figs. 1–13. *Hemerodromia* spp. 1–6, 9–13, male terminalia. 7–8, male fore femur. 1, *H. jugulator.* 2, *H. sinclairi.* 3, 3a, *H. subchelata.* 4, *H. captus.* 5, 5a, *H. chelata.* 6, *H. fibrina.* 7, *H. superstitiosa.* 8, *H. empiformis.* 9, *H. ligata.* 10, *H. superstitiosa.* 11, *H. chillcotti.* 12, *H. glabella.* 13, *H. melanosoma.* Abbreviations: abs 8 = abdominal sternum eight; abt 8 = abdominal tergum eight; bvpf = basoventral process of fore femur; ce = cercus; ep = epandrial lobe; hy = hypandrium. Scale bars = 0.25 mm, except 0.5 for Figs. 7–8. Phallus omitted, except for Fig. 1. Figures of all terminalia except Fig. 1 based on macerated specimens. Fig. 1 based on intact male holotype.

– Cercus more or less triangular or rectangular in lateral view, apical margin broadly pointed 18
18. Cercus broadly triangular in lateral view (Figs. 20–22) 19
– Cercus more or less rectangular over basal ½ in lateral view (Figs. 23, 24) 21
19. Body length ca. 2.3 mm; epandrial lobe with 2 setulae on medial surface (Fig. 20) (visible only on macerated terminalia) . . . . . *H. brevifrons* Melander
– Body length 2.8–4.0 mm; epandrial lobe with row of 5–8 setulae on medial surface (visible only on macerated terminalia 20
20. Epandrial lobe with pointed, anterodorsal projection (Fig. 21) . . . . . *H. reclinata,* n. sp.
– Epandrial lobe lacking anterodorsal projection (Fig. 22) . . . . . *H. empiformis* Say
21. Cercus ending in short apicodorsal process, less than $\frac{1}{10}$ length of cercus (Fig. 23) (clearly visible on macerated terminalia) . . . . . *H. burdicki,* n sp.
– Cercus ending in long apicodorsal process, about $\frac{1}{5}$ length of cercus (Fig. 24) (clearly visible on macerated terminalia) . . . . . *H. flexiformis,* n. sp.

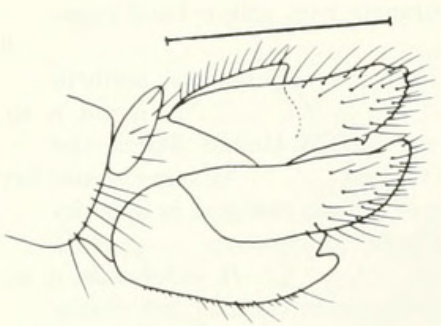
Key to Female Adults of *Hemerodromia* Meigen of America North of Mexico

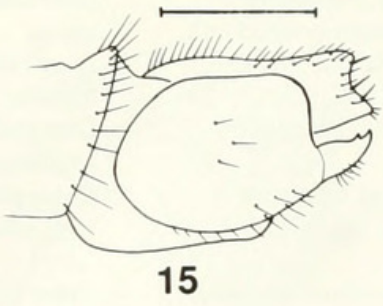
1. Scutum concolorous black or shiny reddish brown to reddish black 2
– Scutum brown with darker median stripe or concolorous brown 7
2. Legs pale reddish black; body length including ovipositor 3.5–4.2 mm . . *H. sinclairi,* n. sp.
– Legs yellow; body length including ovipositor 2.4–2.8 mm 3
3. Thoracic pleura yellowish gold, contrasting strongly with black scutum . . . . . *H. jugulator* Melander
– Thoracic pleura and scutum concolorous black or shiny reddish brown to reddish black 4
4. Mesopleuron with denuded spot above mesocoxa . . . . . *H. glabella,* n. sp.
– Mesopleuron lacking denuded spot above mesocoxa 5
5. Scutum and thoracic pleura heavily pollinose . . . . . *H. captus* Coquillett
– Scutum shiny, contrasting strongly with pollinose thoracic pleura 6
6. Abdominal tergum 7 yellow, contrasting with brown abdominal tergum 6 . . . . . *H. chillcotti* Harper
– Abdominal tergum 7 and abdominal tergum 6 concolorous brown . . *H. melanosoma* Melander
7. Distal 2 tarsomeres dark brown, contrasting strongly with yellow basal tarsomeres 8
– Distal 2 tarsomeres light brown or yellow, not contrasting strongly with yellow basal tarsomeres 9
8. Distributed in southern Texas and northern Mexico . . . . . *H. ligata,* n. sp.
– Distributed in eastern United States and southeastern Canada . . . . . *H. superstitiosa* Say
9. Color pattern of scutum changing in intensity with rotation under illumination . . . . . *H. subchelata,* n. sp.
– Color pattern of scutum constant, not changing in intensity with rotation under illumination 10
10. Mesopleuron golden brown with dark brown stripe below notopleural suture . . . . . *H. fibrina* Landry and Harper
– Mesopleuron concolorous light brown to brown, lacking darker stripe below notopleural suture 11
11. Distributed east of the Mississippi River . . 12
– Distributed west of the Mississippi River . . . 13
12. Body length including ovipositor 2.6–2.8 mm . . . . . *H. oratoria* (Fallén); *H. vates* Melander
– Body length including ovipositor 3.2–3.5 mm . . . . . *H. empiformis* Say; *H. sufflexa* Melander
13. Body length including ovipositor 2.8–3.4 mm . . . . . *H. burdicki,* n. sp., *H. chelata,* n. sp., *H. coleophora* Melander, *H. flexiformis,* n. sp., *H. loba,* n. sp., *H. reclinata,* n. sp., *H. sufflexa* Melander
– Body length including ovipositor 2.4–2.8 mm 14
14. Scutum concolorous brown, occasionally with thin, darker stripe along median . . . . . *H. oratoria* (Fallén)
– Scutum brown laterally with broad, darker stripe along median 15
15. Scutal stripe gradually broadening over apical ⅓; distributed in southern Texas . . . . . *H. stellaris* Melander
– Scutal stripe thin anteriorly, then abruptly broadened and uniform in width over posterior $\frac{4}{5}$; distributed from eastern California south into northern Mexico and southwestern Texas . . . . . *H. brevifrons* Melander

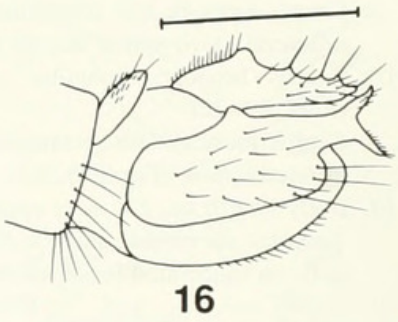
Hemerodromia brevifrons Melander (Figs. 20, 29)

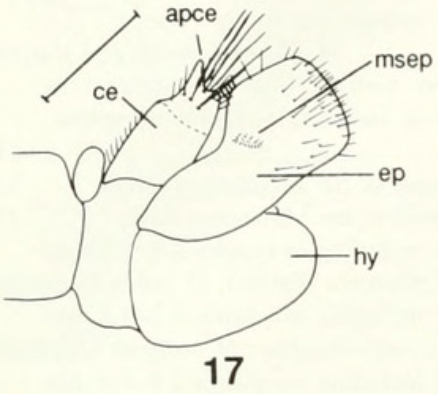
Hemerodromia empiformis var. *brevifrons* Melander 1947: 248.

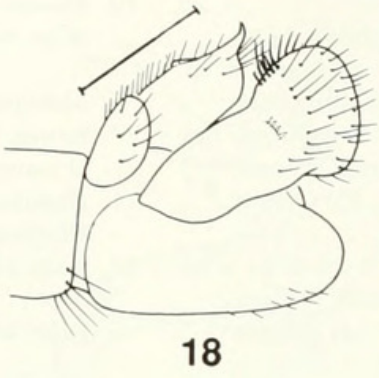
Diagnosis.—This species belongs to the *H. empiformis* group. Existence of only two setulae on the inner surface of each epandrial lobe past its midpoint is diagnostic for males of *H. brevifrons,* but they are discernible only on macerated terminalia. Adults are smaller in size compared to

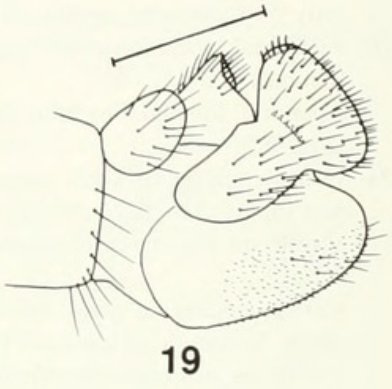


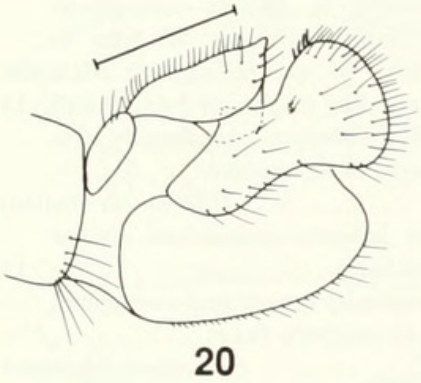


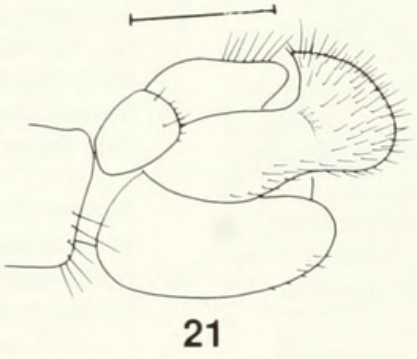


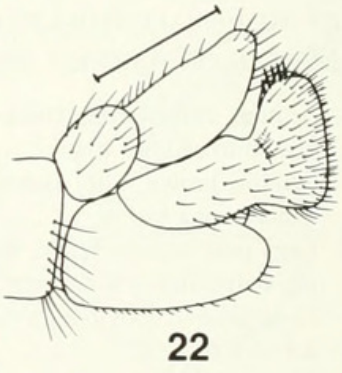


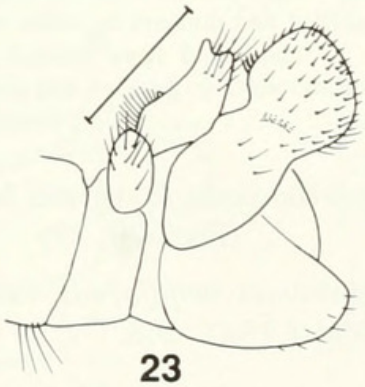


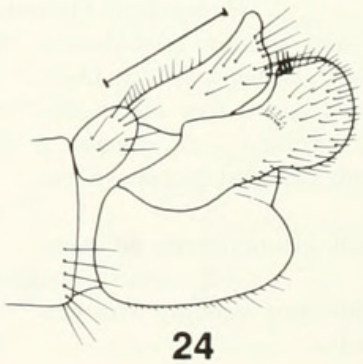












Figs. 14–24. *Hemerodromia* spp., male terminalia. 14, *H. stellaris*. 15, *H. oratoria*. 16, *H. vates*. 17, *H. coleophora*. 18, *H. loba*. 19, *H. sufflexa*. 20, *H. brevifrons*. 21, *H. reclinata*. 22, *H. empiformis*. 23, *H. burdicki*. 24, *H. flexiformis*. Abbreviations: apce = apicodorsal process of cercus; ce = cercus; ep = epandrial lobe; hy = hypandrium; msep = medial setulae of epandrium lobe. Scale bars = 0.25 mm. Figures based on macerated specimens.

those of most species in the *H. empiformis* group, resembling those of *H. stellaris* and *H. vates* in size and coloration. Males of these three small, brownish species are distinguished by their terminalia, but females appear to be inseparable.

Description.—Length including terminalia of male ca. 2.3 mm, of female 2.4–2.5 mm. General body color brown. *Head*: black; antenna yellow. *Thorax*: pruinose; scutum golden brown with dark brown median stripe; scutellum brown laterally, dark brown in center; postnotum dark brown; pleura golden brown. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: terga 1 and 7 yellow, remainder brown, sterna light brown. Male terminalia (Fig. 20) dark brown; cercus smoothly triangular in lateral view; epandrial lobe abruptly expanded over apical ⅓, two setulae on inner surface near midpoint. Female similar to male; ovipositor well developed.

Type material examined.—Holotype ♂, labeled "San Diego Co/Desert Edge/Cal. Apr 14 '15/M C VanDuzee" (USNM). The specimen is damaged, but the macerated terminalia are intact and preserved in glycerin in a microvial attached to the specimen pin. The type locality in San Diego county could not be established.

Other specimens examined.—MEXICO. Chihuahua: 1 ♂, Camargo, May (CNC). UNITED STATES. California: 17 ♂, 19 ♀, Riverside Co., 1000 Palms and Willis Palms Oasis, Feb–Apr; 1 ♂, Victorville, May (CNC); 3 ♂, 1 ♀, 1000 Palms, Mar (LACM); 10 ♂, 9 ♀, Mono Co., Fish Slough, Jul (UCR). Texas: 7 ♂, 7 ♀, Big Bend Nat. Prk., May (CNC).

Distribution.—Males are known from eastern and southeastern California, Big Bend National Park, Texas, and northern Mexico (Fig. 29).

Remarks.—Distinctive male terminalia support treatment as a separate species in the *H. empiformis* group. Variation exists in the coloration of males possessing identical terminalia, with the central scutum, lower aspects of thoracic pleura, and the central area of the fore coxa ranging from partially brown to completely black on some specimens in concurrently collected series.

Hemerodromia burdicki MacDonald, new species

(Figs. 23, 30)

Diagnosis.—This species belongs to the *H. empiformis* group. Males of *H. burdicki* closely resemble those of *H. flexiformis*, newly described below, with separation of most specimens dependent on macerated terminalia. The cercus on males of *H. burdicki* possesses a very short apicodorsal process. In contrast, the cercus on males of *H. flexiformis* possesses a much longer apicodorsal process.

Description.—*Male:* Length including terminalia ca. 2.8 mm. General body color brown. *Head*: black; antenna yellow. *Thorax*: pruinose; scutum and scutellum golden brown with dark brown median stripe; humeral area, scutellum and postnotum dark brown; pleura brown. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: terga 1 and 7 yellow, remainder brown, sterna light brown. *Terminalia* (Fig. 23): dark brown; cercus elongate in lateral view, ending in a blunt process ca. ⅕ or less the length of cercus; epandrial lobe abruptly expanded over apical ⅓, with row of 4–6 setulae on inner surface past midpoint.

Female: Similar to male, except length including terminalia ca. 3.3 mm; ovipositor well developed.

Type material.—HOLOTYPE ♂, labeled "USA: UT; WAYNE CO./CAPITOL REEF NAT. P.; PLEASANT CREEK/AUGUST 2–7, 1993/J. F. MACDONALD" (USNM). The specimen is in excellent condition and some of the diagnostic features of terminalia are visible without maceration. The type locality is in Capitol Reef National Park in south-central Utah. Allotype, same data as holotype (USNM). Paratypes. UNITED STATES. Arizona: 14 ♂, 25 ♀, Cochise Co., SW Research Sta., W. Portal, May–Jul (UCR, USNM); 1 ♂, Nogales, Jun; 13 ♂, 2 ♀ (1 pair in copula) Patagonia,

Jun (USNM). California: 12 ♂, 25 ♀, Fresno Co., Tollhouse, Sep; 7 ♂, 7 ♀, Tulare Co., Three Rivers, Jul–Aug; 1 ♂, Tulare Co., Farmersville, Jul (CNC, MAC); 2 ♂, 1 ♀, Sierra Nat. For., El Portal, Apr (CNC); 8 ♂, 4 ♀, Stanislaus Co., Frank Raines Prk., Sep (CAS); 3 ♂, Riverside Co., Cottonwood Cyn., Jul (UCR). Idaho: 1 ♂, Franklin, Jul (USU). Utah: 30 ♂, 23 ♀, Wayne Co., Capitol Reef Nat. Prk., Aug (MAC, USNM, USU); 4 ♂, 28 ♀, Washington Co., Beaver Dam Wash, Jun–Jul; 1 ♂, Templeton, Jun (USU); 55 ♂, 56 ♀, Washington Co., Leeds Cyn., Jul–Sep. (USU).

Distribution.—Males of this species are known from southeastern Arizona, central and southern California, southern Utah and southeastern Idaho (Fig. 30).

Etymology.—This species is named after Donald Burdick, my undergraduate mentor, to whom I owe my interest in insects and who facilitated my early career in entomology.

Remarks.—Males and females of this species have been collected in Malaise traps and aspirated from leaves of trees associated with permanent streams in Capitol Reef National Park in early August, and large series were collected in Malaise traps set by W. Hanson (Utah State University) in riparian zones in southwestern Utah from July into September.

Hemerodromia captus Coquillett
(Figs. 4, 25)

Hemerodromia captus Coquillett 1895: 391.

Diagnosis.—Adults of *H. captus* are characterized by their uniformly blackish body coloration together with dense pruinescence, resulting in a matte thorax. The latter attribute helps to distinguish *H. captus* from *H. chillcotti* and *H. melanosoma,* the adults of which have a denuded scutum. Adults of *H. captus* lack the denuded, shiny spot on the mesopleuron that exists on those of *H. glabella,* newly described below.

Description.—Length including terminalia of male ca. 2.4 mm, of female ca. 2.7 mm. General body color concolorous dark reddish black or black. *Head*: black; antenna yellow. *Thorax*: densely pruinose; scutum, scutellum, postnotum and pleura dark reddish black or black. Legs yellow, contrasting with thoracic pleura. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: tergum 7 yellow, terga 1–6 brown; sterna yellowish. Male terminalia (Fig. 4): brownish black; cercus slender, deeply excavated apically, ventral fork more slender than dorsal fork. Female similar to male; ovipositor well developed.

Type material examined.—Lectotype female, here designated, labeled "4327/ Demster/N.Y." (USNM; type no. 3151). The label is difficult to read, with one word being either "Demster" or perhaps "Demester"; if the former, the locality is New York, Oswego County, about 50 kilometers north of the city of Syracuse. The specimen is in excellent condition. A lectotype is designated because it is not possible to identify a specific specimen as "type" from the publication alone.

Other specimens examined.—CANADA. Ontario: 2 ♂, 2 ♀, Brockville, Aug; 1 ♀, Orillia, Aug; 4 ♀, Ottawa, Jun–Jul; 2 ♀, St. Lawrence I. Prk., Aug (CNC); 26 ♂, 12 ♀, Orillia, Jul (USNM). Quebec: 1 ♂, Gatineau Prk., Jul (CNC). UNITED STATES. Connecticut: 7 ♂, 5 ♀, Waubamich, Jul (USNM). Indiana: 2 ♂, Lafayette, Jul (USNM). Maine: 1 ♂, 2 ♀, Kennebec Co., Wayne, Aug (MAC). Maryland: 4 ♂, 8 ♀, Washington D. C. area, May–Sep (USNM). Michigan: 3 ♂, 3 ♀, Beulah, Jul; 1 ♀, Brevport, Aug; 1 ♂, Cheboygan Co., Jul; 1 male, Monroe Co., May (USNM); 13 ♀, Emmett Co., Jul (UKL). New York: 2 ♀, Demester; 2 ♂, 1 ♀, Oswego, Jul–Aug (USNM); 1 ♂, Oswego, Jul (INHS). Virginia: 3 ♂, 1 ♀, Great Falls, Jun–July (USNM).

Distribution.—This species is known from the Great Lakes region east to the mid-Atlantic seaboard and New England (Fig. 25).

Fig. 25. Distribution of *Hemerodromia captus, H. chelata, H. fibrina, H. subchelata.*

Remarks.—Males of *H. captus* possess terminalia that resemble those of *H. bifurcata* Collin, described from Bikin in extreme eastern Russia. However, the shape of the cercus appears to be distinct, based solely on the figure in Collin 1941 since the type was not examined. The two species also appear to differ in coloration, with the

thorax of *H. captus* being reddish black to black while that of *H. bifurcata* is described as "yellowish."

Hemerodromia chelata MacDonald, new species

(Figs. 5, 25)

Diagnosis.—This species belongs to the *H. captus* group. Terminalia of males of *H. chelata* closely resemble those of *H. subchelata,* newly described below, but maceration reveals the absence of a basomedial process on the cercus of males of *H. chelata* that is present on males of *H. subchelata.* Males and females of these two species differ in thoracic coloration, with those of *H. chelata* having a nearly concolorous golden brown thorax and those of *H. subchelata* a reddish black scutum with a black median stripe that changes in intensity as specimens are rotated during examination under illumination.

Description.—*Male:* Length including terminalia ca. 2.8 mm. *Head*: black; antenna yellow. *Thorax*: pruinose; scutum golden brown, usually with brown median stripe ranging from thin to broad; humeral area paler than surrounding scutum; pleura, scutellum and lateral aspects of scutum golden brown. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: terga grayish brown, darker than background thoracic coloration, except tergum 1 yellowish brown and tergum 7 nearly yellow; sterna yellowish brown. *Terminalia* (Fig. 5): brownish black; cercus deeply excavated apically into 2 forks of nearly equal size, with apex of dorsal fork smooth; basomedial process lacking on cercus.

Female: Similar to male, except length including terminalia 2.8–3.0 mm; ovipositor well developed.

Type material.—HOLOTYPE ♂, labeled "UTAH Garfield Co/Capitol Reef NP/Sulfur Creek/26–28 Jun 1978/Lindahl Mal. tr." (USNM). The specimen, which was collected in a Malaise trap, is in good condition; most of the diagnostic features of terminalia are visible without maceration. The type locality is Capitol Reef National Park in southcentral Utah, but the county of record probably is Wayne County, not Garfield County (Two Sulphur Creeks are named in the area, but only one occurs in the National Park and it is in Wayne County.) Allotype, same data as holotype, except date was 28 Jul (USNM). Paratypes. UNITED STATES. Utah: 10 ♂, 8 ♀, same collecting site as holotype, Jun–Aug (USU, USNM); 5 ♂, Washington Co., Beaver Dam Wash, Jun–Sep; 2 ♂, Washington Co., Leeds, Apr (USU).

Distribution.—This species is known only from the type series from Capitol Reef National Park in southcentral Utah and several specimens from extreme southwestern Utah (Fig. 25).

Etymology.—The specific epithet is from the Latin word "chela," in reference to the deeply excavated cercus of this species, which resembles the claw-like anterior appendage of a decapod crustacean.

Remarks.—Males of *H. chelata* resemble those of Palearctic *H. raptoria* Meigen, based solely on a figure in Vallaint (1981: 388. Fig. 10) since the type was not examined. The former lack peg-like setulae on the epandrial lobe and also lack a basal process on the inner surface of the cercus that is present on males of *H. raptoria.*

Variation in coloration exists among males of *H. chelata* based on a small series of males collected near Leeds, Utah, all of which share terminalia that are identical to the holotype and macerated paratype males. One male in the series resembles males in the type series, but five other males have varying degrees of black pigmentation involving the foreleg and the scutum. For example, the fore coxae are black on four males, the fore femora are black on three males, and the scutum is grayish black on four males while being yellowish brown laterally and grayish black dorsally on the remaining male.

Hemerodromia chillcotti Harper

(Figs. 11, 27)

Hemerodromia chillcotti Harper 1974: 295.

Diagnosis.—This species belongs to the *H. melanosoma* group. Terminalia of males, with a down-turned process apically on each cercus, are distinct from those of *H. glabella* and *H. melanosoma*. Females of *H. chillcotti* have a long ovipositor and thus are readily distinguished from those of *H. melanosoma* on which the ovipositor is very weakly developed. Both species lack the distinct shiny spot on the mesopleuron immediately above the mesocoxa that is diagnostic for *H. glabella*.

Description.—Length including terminalia of male ca. 2.3 mm, of female ca. 2.5 mm. General body color reddish black to black. *Head*: black; antenna yellow. *Thorax*: lightly pruinose on shiny background, scutellum more pruinose; scutum reddish black to black; pleura, scutum, scutellum and postnotum reddish black to black. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: terga 1 and 7 yellow, remainder brown; sterna yellowish. Male terminalia (Fig. 11): dark brown; cercus slender, with down-turned, rounded lobe apically in lateral view; epandrial lobe strongly narrowed and in-turned apically. Female similar to male; ovipositor well developed.

Type material.—Holotype ♂ (not examined), deposited in the Collection entomologique Ouellet-Robert, Universite de Montreal (UMC). The type locality is St-Hippolyte de Kilkenny, comte de Terrebonne, north of Montreal, Quebec. Paratypes. CANADA. Quebec: 6 ♂, 12 ♀, same locality as holotype, Jun–Aug (CNC, UMC); 1 ♂, 1 ♀, Wakefield, Jul (CNC). UNITED STATES. North Carolina: 1 ♂, Wayah Bald, Jul (CNC).

Other specimens examined.—CANADA. Quebec: 1 ♀, Lac Phillippe, Jul; 3 ♂, Old Chelsea, Jul (CNC). UNITED STATES. Alabama: 9 ♂, 7 ♀, Conecuh Co., Apr (CNC). Connecticut: 1 ♂, 2 ♀, Redding, Jul (USNM). Florida: 2 ♂, Liberty Co., Apr (CNC). Georgia: 6 ♂, 10 ♀, Athens, Apr–Jun (MAC); 1 ♀, Rabun Co., Jul (CNC). Maryland: 1 ♂, Cabin John, Jul (USNM). Massachusetts: 1 ♂, 1 ♀, Petersham, Jul (USNM). New Hampshire: 1 ♂, White Mts., Stinson Lk., Jul (USNM). New York: 1 ♂, Lk. Placid, Jul (CNC). North Carolina: 1 ♀, Cherokee, Jul (CNC); 2 ♂, Graham Co., Robbinsville, Jun (USC). Pennsylvania: 18 ♂, 9 ♀, Fulton Co., Jul (CAS). South Carolina: 1 ♀, Black Falls, Jul (USNM); 1 ♂, Senaca, Aug (CNC). Tennessee: 1 ♀, Gatlingburg, Aug–Sep (INHS); 1 ♀, Van Buren Co., Jun (CNC). Virginia: 1 ♀, Alexandria, Jun (USNM).

Distribution.—This is an eastern species, found from southeastern Canada and New England south into southern Alabama and northwestern Florida (Fig. 27).

Remarks.—Adults have been collected at lights at night, and I have collected specimens in Malaise traps set across a small stream under dense hardwood canopy near Athens, Georgia.

Hemerodromia coleophora Melander (Figs. 17, 29)

Hemerodromia empiformis coleophora Melander 1928: 256.

Hemerodromia coleophora Melander 1965: 470.

Diagnosis.—This species belongs to the *H. empiformis* group. It is one of two species whose males have a prong-like, apical process on the cercus. Males of *H. coleophora* are distinct from those of *H. loba*, newly described below, but maceration of terminalia of specimens may be required to reveal the features. The apical setae of the cercus of *H. coleophora*, which extend at least to the apex of the corresponding epandrial lobe, are longer and the terminal prong of the cercus is shorter and slightly jagged along the ventromedial surface. Corresponding features of the cercus of *H. loba* include shorter apical setae, which do not extend to the apex of the epandrial lobe, and a longer terminal prong that is entirely smooth.

Description.—Length including terminalia of male ca. 3.0 mm, of female ca. 3.0

Fig. 26. Distribution of *Hemerodromia ligata, H. oratoria, H. superstitiosa.*

mm. General body color brown. *Head*: black; antenna yellow. *Thorax*: pruinose; scutum and scutellum brown with dark brown median stripe; humeral area, scutellum and postnotum dark brown; pleura brown. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: terga 1 and 7 yellow, remainder brown; sterna lighter brown. Terminalia (Fig. 17): brownish black; cercus with prong-like apical process, ca. ¼ the length of remainder of cercus and slightly jagged along ventromedial margin; lateral setae of cercus extending at least to apex of epandrial lobe; epandrial lobe abruptly expanded over apical ¼, with row of 4–6 setulae on inner surface near midpoint. Female similar to male; ovipositor well developed.

Type material examined.—Lectotype ♂, here designated, labeled "Yellowst Park/4 Aug 1918/A. L. Melander" (USNM). The specimen is in excellent condition and most of the diagnostic features of terminalia are visible without maceration. The lectotype locality is in Yellowstone National Park of northwestern Wyoming. Paralectotypes. Washington: 1 ♂, 2 ♀, Central Ferry, Aug; 3 ♂, Mt. Rainier, Summerland, Aug (USNM). Wyoming: 12 ♂, 14 ♀, Yellowstone Nat. Prk., Aug (USNM).

Other specimens examined.—UNITED STATES. Arizona: 1 ♂, Santa Cruz Co., 8 mi SE Patagonia, Jun (WSU). California: 2 ♂, 4 ♀, Los Angeles Co., Angeles Nat. For., Windy Sprs., Jun (CAS); 1 ♂, Los Angeles Co., Big Tujunga Cyn., July (LACM). Montana: 1 ♂, Great Falls, Jul (USNM); 1 ♂, 1 ♀, Lewis & Clark Co., Missouri R., Aug (CAS). New Mexico: 6 ♂, 3 ♀, Catron Co., 5 mi E. Glenwood, Jun; 6 ♂, 4 ♀, Taos Co., Rio Grande R., Jul (USNM). Oregon: 5 ♂, 3 ♀, Deschutes R. nr. Redmond, Jul (WSU, USNM); 1 ♂, Wheeler Co., 2 mi W. Spray, Jun (WSU). Utah: 1 ♂, Garfield Co., Capitol Reef Nat. Prk., Aug (USU). Washington: 2 ♂, Kittitas Co., 8 mi S. Ellensburg, Jul (CAS); 1 ♂, Benton Co., W. Richland, Jun; 2 ♂, Whitman Co., 8 mi SW Pullman, Jun (WSU). Wyoming: 1 ♂, 1 ♀, Yellowstone Nat. Pk., Riverside, Aug (CNC).

Distribution.—This species is widely distributed in the western United States (Fig. 29).

Hemerodromia empiformis (Say)
(Figs. 8, 22, 30)

Ochthera empiformis Say 1823: 99.
Hemerodromia empiformis (Say): Melander 1902: 236.

Diagnosis.—Adults closely resemble those of *H. sufflexa* and maceration of male terminalia is necessary to identify most specimens. Males of *H. empiformis* are distinguished by the shape of the cercus, which is smoothly triangular in a posterodorsal plane in lateral view. The cercus on males of *H. sufflexa* is not smoothly triangular in a posterodorsal plane, instead, it is more or less quadrate with the posterior margin nearly straight in lateral view.

Description.—Length including terminalia of male 3.0–3.5 mm, of female 3.3–3.7 mm. General body color brown. *Head*: black; antenna yellow. *Thorax*: pruinose; scutum and pleura golden brown, scutum usually with darker median stripe. Fore femur lacking prominent basoventral process (Fig. 8). *Abdomen*: tergum 7 yellow, terga 1–6 brown; sterna paler. Male terminalia (Fig. 22): dark brown; cercus smoothly triangular in a posterodorsal plane in lateral view; epandrial lobe abruptly expanded at apical ⅓, with row of 4–6 setulae on inner surface past midpoint. Female similar to male; ovipositor well developed.

Type material.—Neotype ♂ of *H. empiformis*, here designated, labeled "IN: WHITE CO./TIPPE. RIVER/5 MI E. BROOKSTON/JULY 5, 1988/J. F. MACDONALD" (USNM). The specimen is in excellent condition and most of the diagnostic features of terminalia are visible without maceration. A neotype is necessary because it is not possible to characterize *H. empiformis* on the basis of Say's description alone.

Specimens examined.—CANADA. Ontario: 1 ♂, Algonguin Prk., Jun (USNM); 2 ♂, 2 ♀, Grand Bend, Jul; 1 ♂, Marmora, Jul (CNC); 1 ♂, Milton I., Aug (CNC); 2 ♂, 2 ♀, Ottawa, Jul (CAS, CNC); 1 ♂, Ridgeway, Jul (CAS); 1 ♂, Rainy Lk., Jun; 1 ♂, Simcoe, Jun; 1 ♂, St. Lawrence Is. Nat. Prk., Aug (CNC). Quebec: 1 ♂, 2 ♀, Berthierville, Jul (FSCA). UNITED STATES. Alabama: 1 ♂, 1 ♀, Jefferson Co., Apr (MAC). Georgia: 3 ♂, 2 ♀, Athens, Jun (MAC). Indiana: 7 ♂, 8 ♀, White Co., 5 mi E. Brookston, Jul; 4 ♂, 9 ♀, W. Lafayette, Jun–Sep (MAC; PERC). Maine: 1 ♂, Orono, Aug (USNM). Maryland: 1 ♂, Plummer, May (USNM). Minnesota: 1 ♂, Houston Co., Jun; 2 ♂, Olmstad Co., Sep; 3 ♂, 1 ♀, Pine Co., May (UMSP). New York: 1 ♂, 1 ♀, Chautaugua Lk., Jun (CAS); 1 ♂, Ithaca, Aug (CU). Virginia: 1 ♂, 3 ♀, May (CAS). Wisconsin: 1 ♂, 3 ♀, Polk Co., Jul (LAC).

Distribution.—Males of this species are widely distributed in the eastern United States and southeastern Canada (Fig. 30).

Remarks.—Described on the basis of a female by Say (1823), *H. empiformis* is one of two species of the *H. empiformis* group found in eastern North America. The other species is *H. sufflexa,* which was described on the basis of male terminalia as a variety of *H. empiformis* by Melander (1947) and was listed, without explanation, as *H. sufflexa* by Melander (1965). Since females of these two species are indistinguishable, Say's description of *H. empiformis* could apply equally to *H. sufflexa.* However, the concepts of these two species presented and supported with figures of male terminalia in Melander (1947) are adopted here.

I have aspirated male and female adults of *H. empiformis,* together with those of *H. superstitiosa,* from the undersides of heavily shaded leaves overhanging a very small, spring-fed stream that runs into the Tippecanoe River northeast of Lafayette, Indiana. Two females of *H. empiformis* were observed with prey impaled on their mouthparts and subsquently aspirated; prey were determined to be immature leafhoppers (Cicadellidae).

Hemerodromia fibrina Landry and Harper
(Figs. 6, 25)

Hemerodromia fibrina Landry and Harper 1985: 1384.

Diagnosis.—This species belongs to the *H. captus* group. Among North American species, adults possess distinctive pigmentation patterns on the thorax, described below. Terminalia of males include a deeply excavated cercus with prominent vestiture, including rows of black, peg-like setulae on the lower fork.

Description.—Length including terminalia of male ca. 3.0 mm, of female ca. 3.0 mm. General body color brown, with areas of darker pigmentation on thorax. *Head*: black; antenna yellow. *Thorax*: pruinose; scutum mostly dark brown; humeral area and scutellum golden brown to brown; pleura golden brown, except dark brown below notopleural suture; postnotum dark brown. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: male terga reddish brown, sterna light reddish brown. Male terminalia (Fig. 6): reddish brown; cercus deeply excavated apically, lower fork lined by black, peg-like setulae; epandrial lobe nearly rectangular. Female coloration similar to male, except abdominal terga 1 and 7 light reddish brown; ovipositor well developed.

Type material.—Holotype ♂ (not examined), deposited in the Collection entomologique Ouellet-Robert, Université de Montreal UMC). The type locality is Lac Helene on the Rivière du Castor drainage (53°25′N, 77°30′W), south of La Grande-Riviere inland from the eastern shore of James Bay, Quebec, Canada.

Specimens examined.—CANADA. Quebec: 1 ♂, 2 ♀, July (MAC); Northwest Territories: 1 ♂, Norman Wells, Hodgeson Lk., Jul; 1 ♂, 2 ♀, Wholdaia Lk., Jul (CNC). UNITED STATES. Alaska: 1 ♂, Nenana, Jun (USNM).

Distribution.—This species is known from central Alaska east to west-central Quebec (Fig. 25).

Remarks.—Adults of *H. fibrina* resemble those of Palearctic *H. raptoria* Meigen, but terminalia of males of the former (Fig. 6) differ from those of the latter, based on figure 303 in Collin (1961). The most prominent difference is in the structure and vestiture of the cercus and epandrial lobe. Labels on some specimens of *H. fibrina* revealed their collection along edges of peat bogs, and Landry and Harper (1985) found this species to be one of the few lacustrine Hemerodromiinae during their study.

Hemerodromia flexiformis MacDonald, new species

(Figs. 24, 30)

Diagnosis.—This species belongs to the *H. empiformis* group. Adults closely resemble those of *H. burdicki,* newly described above, and maceration of male terminalia may be necessary to distinguish them. The cercus on males of *H. flexiformis* possesses a much longer apical process that is smoothly rounded at its apex. The cercus on males of *H. burdicki* processes a very short apical process that is more pointed at its apex.

Description.—*Male:* Length including terminalia ca. 2.8 mm. General body color brown. *Head*: black; antenna yellow. *Thorax*: pruinose; scutum and scutellum golden brown, usually with darker median stripe; humeral area, scutellum and postnotum dark brown; pleura golden brown. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: terga 1 and 7 yellow, remainder brown, sterna lighter brown. *Terminalia* (Fig. 24): brownish black; cercus rectangular basally in lateral view, sharply narrowed and in-turned apically; epandrial lobe abruptly expanded over apical ⅓, with row of 4–6 setulae on inner surface past midway.

Female: Similar to male; body length including terminalia ca. 3.3 mm; ovipositor well developed.

Type material.—HOLOTYPE ♂, labeled "WASHINGTON: Steptoe/Cyn., 10 mi. SW/Colton, Whitman Co./900 ft., 29-VII-1976/W. J. Turner" (USNM). The specimen is in excellent condition and most of the diagnostic features of terminalia are visible without maceration. The type locality is in southeastern Washington State. Allotype, same data as holotype (USNM). Paratypes. UNITED STATES. California: 2 ♂, Tulare Co., Farmersville, Jul–Aug; 3 ♂, Tulare Co., Three Rivers, Jun (MAC). Oregon: 1 ♂, 2 ♀, Deschutes Co., Cline Falls St. Prk., Jul; 1 ♂, Umatilla Co., 27 km E. Ukiah, Jul (CAS). Washington: 1 ♂, Kittitas Co., Yakima R., 8 mi S. Ellensburg, Jul (CAS); 7 ♂, 1 ♀, Asotin Co., Asotin Crk., 6 mi W. Asotin, Aug; Whitman Co., 32 ♂, 17 ♀, Steptoe Cyn., 10 mi SW Colton, Jul; 2 ♂, 8 mi SW Pullman, Aug; 1 ♂, Big Almota Cyn., Jul (USNM, WSU).

Distribution.—Males of this species are known from central California, central Oregon and southeastern Washington (Fig. 30).

Etymology.—The specific epithet is an arbitrary combination of letters incorporating "flexa" and "formis," Latin for shape or figure, alluding to the structural similarity between the new species and *H. sufflexa.*

Hemerodromia glabella MacDonald, new species

(Figs. 12, 27)

Diagnosis.—This species belongs to the *H. melanosoma* group. The shiny, denuded spot on the mesopleuron just above the mesocoxa distinguishes this species from *H. chillcotti* and *H. melanosoma,* the other two Nearctic species with relatively small and shiny reddish black to black adults.

Description.—*Male:* Length including terminalia ca. 2.2 mm. General body coloration reddish black. *Head*: black; antenna yellow. *Thorax*: slightly pruinose on shiny background; scutum, scutellum, postnotum and pleura reddish black to black; mesopleuron with denuded spot just above mesocoxa. Fore femur lacking prominent ba-

Fig. 27. Distribution of *Hemerodromia chillcotti, H. glabella, H. melanosoma.*

soventral process (see Fig. 8). *Abdomen*: terga dark brown, sterna lighter brown. *Terminalia* (Fig. 12): reddish black; cercus straight, apical half narrowed; epandrial lobe straight, broadening apically.

Female: Similar to male, except length including terminalia 2.3–2.7 mm; ovipositor well developed.

Type material.—HOLOTYPE ♂, labeled "ARIZONA Gila Co/Jones Water C. G./30 Jul 1885/W. J. Hanson" (USNM). The specimen is in excellent condition and some of the diagnostic features of terminalia are visible without maceration. The type locality is in Gila County, about 30 kilometers northeast of Globe, Arizona. Allotype, same collecting data as holotype (USNM). Paratypes. UNITED STATES. Arizona: 5 ♂, 10 ♀, Southwest Research Station, Cochise Co., May–Sep (UCR, CAS, USNM); 7 ♂, 5 ♀, same collecting data as holotype (USU). California: 1 ♂, Andreas Cyn., Oct (USNM); 1 ♂, Blythe, May (CNC). New Mexico: 1 ♂, Catron Co., 5 mi E. Glenwood, Jun (USNM); 1 ♂, Dona Ana Co., 17 mi NE Las Cruces, May (UCR); 1 ♂, 1 ♀, Pinos Altos, Cherry Crk., Jun (USNM).

Distribution.—This is a southwestern species, known from southeastern California east into south-central New Mexico (Fig. 27).

Etymology.—The specific epithet is from the Latin word "glabella," for hairless or bald, in reference to the small, denuded spot on the mesopleuron just above the mesocoxa.

Remarks.—Males of *H. glabella* closely resemble those of Neotropical *H. extispex* Melander (type examined), but the latter possess a patch of long setae distally on the hypandrium that is lacking on males of *H. glabella.*

Hemerodromia jugulator Melander
(Figs. 1, 28)

Hemerodromia jugulator Melander 1928: 256.

Diagnosis.—Adults of this species are characterized by concolorous yellowish to yellowish gold thoracic pleura that contrast strongly with the shiny black scutum.

Description.—Length including terminalia of male ca. 2.8 mm, of female ca. 3.0 mm. *Head*: black; antenna yellow. *Thorax*: slightly pruinose with shiny background; scutum reddish black to black; pleura and humeral area yellowish to yellowish gold. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: terga 1 and 7 yellow, remainder dark brown; sterna yellowish. Male terminalia (Fig. 1): dark brown; cercus and epandrial lobe straight, slender; phallus strongly developed and projecting dorsally beyond cercus; exposed phallus and cercus subequal in length. Female similar to male; ovipositor well developed.

Type material examined.—Lectotype ♂, here designated, labeled "Cld. Sp. Harb./L. I. July" (USNM). The specimen is in excellent condition and the terminalia are not macerated. The type locality is New York, Suffolk County, Cold Spring Harbor, on the north shore of Long Island. Paralectotypes. New York: 3 ♀, Cold Spr. Harbor, Jul (USNM).

Other specimens examined.—UNITED STATES. Georgia: 1 ♀, Athens, Jun (MAC). New York: 1 ♀, Cold Spr. Harbor, July (AMNH). North Carolina: 1 ♀, Pisgah Nat. For., Looking Glass Prk., Jul (CNC). Washington D.C.: 1 ♀, Jun (USNM).

Distribution.—This species is known from Long Island, New York and south into Georgia (Fig. 28).

Remarks.—The female I collected near Athens, Georgia, was taken in a Malaise trap set across a small stream under a dense hardwood canopy.

Hemerodromia ligata **MacDonald, new species**
(Figs. 9, 26)

Diagnosis.—This species belongs to the *H. superstitiosa* group. Terminalia of males, which have a ventral process on each cercus that fits into a dorsal groove on the corre-

Fig. 28. Distribution of *Hemerodromia jugulator, H. sinclairi, H. stellaris, H. vates.*

sponding epandrial lobe, are distinct from those of *H. superstitiosa.* Darkened distal tarsomeres on mid and hind legs distinguish adults of both sexes from those of *H. oratoria.*

Description.—*Male*: Length including terminalia 3.2–3.4 mm. General body color brown. *Head*: black; antenna yellow. *Thorax*: pruinose; scutum golden brown with dark brown median stripe; scutellum brown, lighter brown laterally; postnotum dark brown; pleura golden brown. *Legs*: fore femur basally bearing prominent ventral process ending in 1 or 2 strong, black setulae, with associated indentation on ventral surface for reception of apical bristle of fore tibia (see Fig. 7); distal 2 tarsomeres on mid and hind leg brown to dark brown. *Abdomen*: tergum 1 light brown, tergum 7 yellow, remainder dark brown. *Terminalia* (Fig. 9): dark brown; cercus with ventral process fitting into dorsal indentation of epandrial lobe.

Female: Similar to male except abdominal tergum 1 light brown, remainder brown; length including terminalia 3.5–3.7 mm; ovipositor well developed.

Type material.—HOLOTYPE ♂, labeled "Devil's River/Del Rio, TEXAS/April 28 1959/J. F. McAlpine" (CNC, holotype number 21335). The specimen is in excellent condition and most of the diagnostic features of terminalia are visible without maceration. The type locality is Val Verde County, near the town of Del Rio in southwestern Texas. Allotype, same collecting data as holotype (CNC). Paratypes. UNITED STATES. Texas: 2 ♂, 4 ♀, same data as holotype; 1 ♂, 1 ♀, Big Bend Nat. Prk., Oak Spr., May; 1 ♂, 1 ♀, Kerrville, Apr (CNC); 2 ♂, 3 ♀, Devil's River, Apr–May (USNM).

Distribution.—This species is known only from southwestern and southcentral Texas (Fig. 26).

Etymology.—The specific epithet is from the Latin word "ligatus," for tie or fasten, in reference to the cercus and corresponding epandrial lobe that fit together to form an interlocking unit.

Hemerodromia loba MacDonald, new species

(Figs. 18, 29)

Diagnosis.—This species belongs to the *H. empiformis* group. Males resemble those of *H. coleophora,* but are characterized by their longer and entirely smooth, prong-like apical process on the cercus which usually is evident on unmacerated specimens. The corresponding structure on *H. coleophora* is shorter (ca. ¼ length of cercus compared to ca. ⅓ for males of *H. loba*) and more difficult to discern on unmacerated specimens.

Description.—*Male:* Length including terminalia 3.0–3.4 mm. General body color brown. *Head*: black; antenna yellow. *Thorax*: pruinose; scutum and scutellum brown with darker median stripe; humeral area and postnotum dark brown; pleura brown with darker brown areas above meso-and metacoxa. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: terga 1 and 7 yellow, remainder brown; sterna light brown. *Terminalia* (Fig. 18): brownish black; cercus with prong-like apical process, ca. ⅓ length of remainder of cercus, which is entirely smooth; epandrial lobe abruptly expanded over apical ¼, with row of 4–6 setulae on inner surface past midpoint.

Female: Similar to male, except length including terminalia 3.2–3.5 mm; ovipositor well developed.

Type material.—HOLOTYPE ♂, labeled "Truckee, CALIF./6000′ Tahoe Co./14. vii. 1961/B. H. Poole" (CNC, holotype no. 21336). The specimen is in excellent condition and most of the diagnostic features of terminalia are visible without maceration. The type locality cannot be established from the holotype label since there is no "Tahoe County"; however, based on elevation data on the label, the specimen probably was collected near the town of Truckee, northwest of Lake Tahoe in extreme

eastern California. Allotype, same collecting data as holotype (CNC). Paratypes. UNITED STATES. California: 2 ♂, 4 ♀, same collecting data as holotype (CNC). Nevada: 4 ♂, 4 ♀, Pershing Co., Rye Patch Dam, Jul (CAS). Washington: 1 ♂, Kittitas Co., 8 mi S. Ellensburg, Jul (CAS); 1 ♂, 1 ♀, Spokane, Aug (USNM).

Distribution.—Males of this species are known only from east-central California and adjacent Nevada, and the eastern half of Washington (Fig. 29).

Etymology.—The specific epithet is from the Latin word "lobus," for elongated projection or protuberance, in reference to the prominent lobe that arises from the dorsal surface near the apex of each cercus.

Hemerodromia melanosoma Melander
(Figs. 13, 27)

Hemerodromia melanosoma Melander 1947: 250.

Hemerodromia haruspex Melander 1947: 249. **New synonymy.**

Diagnosis.—Adults are distinguished from those of other members of the *H. melanosoma* group by their nearly denuded scutum that contrasts strongly with the pruinose thoracic pleura.

Description.—Length including terminalia of male 2.2–2.4 mm, of female ca. 2.3 mm. General body color reddish black or black. *Head*: black; antenna yellow. *Thorax*: background shiny; scutum denuded, contrasting strongly with more pruinose pleura; scutum, scutellum, postnotum and pleura reddish black to black (tan or brown on teneral specimens). Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: tergum 1 yellow, terga 2–7 brown; sterna yellowish. Male terminalia (Fig. 13): reddish black; cercus strap-like in lateral view; epandrial lobe slender and concave dorsally. Female similar to male; ovipositor weakly developed.

Type material examined.—Lectotype ♂ of *H. melanosoma*, here designated, labeled "Petawawa CAN/4 July '1938/A. L. Melander" (USNM). The specimen is in excellent condition and most of the diagnostic features of terminalia are visible without maceration. The type locality is ca. 150 km west-northwest of Ottawa, along the Ottawa River. Lectotype ♂ of *H. haruspex*, here designated, labeled "Orlando Fla/26 Apr. '30/A. L. Melander" (USNM). The specimen is in very good condition and most of the diagnostic features of terminalia are visible without maceration.

Other specimens examined.—CANADA. Newfoundland: 1 ♀, Indian R., Jul (USNM). Nova Scotia: 4 ♂, 6 ♀, Shelbourne, Aug (CNC). Ontario: 1 ♂, Algonquin Prk., Jun (CNC); 5 ♀, Petawawa, Jul (USNM). Quebec: 8 ♂, 4 ♀, Old Chelsea, Jul; 2 ♀, Parc de Mauricie, Aug; 8 ♂, 24 ♀, Wakefield, Jun–Jul (CNC). UNITED STATES. Connecticut: 2 ♀, Redding, Jul–Aug; 1 ♂, Terryville, Jun; 1 ♂, 1 ♀, Waubamich, Jun (USNM). Florida: 1 ♂, Gulf Hammock, Apr (CNC); 5 ♀, Orlando, Apr; 1 ♀, Sebring, Apr (USNM). Georgia: 1 ♀, Athens, Jun (MAC); 1 ♂, Rabun Bald, Jul (CNC); 2 ♂, 1 ♀, Rabun Co., May–Jun (CNC). Maine: 1 ♀, Kennebec Co., Wayne, Aug (MAC); 2 ♂, Old Town, Lk. Pushan, Aug (USNM). Maryland: 1 ♂, 1 ♀, Beltsville, May; 2 ♂, 2 ♀, Cabin John, Jun (USNM). Massachusetts: 1 ♀, E. Falmouth, Jul (USNM). Michigan: 1 ♂, Marquette Co., Big Bay, Jun (MAC); 1 ♂, Missaukee Co., Jun (CNC); 1 ♀, Schoolcraft Co., Aug (USNM). New Hampshire: 5 ♂, 4 ♀, Dixville, Jul (UNH). New York: 3 ♀, Lk. Placid, Jul (CNC); 2 ♂, 2 ♀, Milford Center, Jul (USNM). North Carolina: 1 ♂, 1 ♀, Durham Co., May (USNM). Pennsylvania: 1 ♂, 3 ♀, State College , Jul (CAS). South Carolina: 1 ♂, 1 ♀, Oconee Co., Jun (CNC). Tennessee: 1 ♂, 1 ♀, East Ridge, Chapin Sanctuary, May (CNC). Virginia: 1 ♀, Alexandria, Jun; 1 ♂, Big Mdws., Jun (USNM).

Distribution.—This species is known from the Great Lakes region east to Newfoundland, along the southern Appalachian

Fig. 29. Distribution of *Hemerodromia brevifrons, H. coleophora, H. loba, H. reclinata, H. sufflexa.*

Mountains and south into south-central Florida (Fig. 27).

Remarks.—Melander (1947) distinguished *H. melanosoma* and *H. haruspex* on the basis of thoracic coloration, with adults of *H. haruspex* described as shiny tan to brown and those of *H. melanosoma* described as shiny black. These color descriptions are true of Melander's "type" of *H. melanosoma* and his "type" of *H. haruspex,* but examination of both revealed identical terminalia. In addition, several shiny tan to shiny brownish to shiny black males examined from museum series collected in Maryland, New England and southern Canada have identical terminalia. Based on identical male terminalia, *H. melanosoma* (Melander 1947: 250) and *H. haruspex* (Melander 1947: 249) are considered synonyms. The former available name is retained because it applies to fully sclerotized adults and is better known; the latter rarely has been cited in the literature.

Hemerodromia oratoria (Fallén)
(Figs. 15, 26)

Tachydromia oratoria Fallén 1816: 34.

Diagnosis.—This species appears to belong to the *H. superstitiosa* group, but both the basoventral process and associated indentation for the reception of the fore tibial bristle vary in development among males and are virtually lacking on females. Male terminalia are distinct, as described below, but females are difficult to separate from those of other species that are concolorous golden brown and have a well-developed ovipositor.

Description.—Length including terminalia of male 2.4–3.2 mm, of female 2.4–3.4 mm. General body color of male light reddish brown, of female darker. *Head*: black; antenna yellow. *Thorax*: pruinose; male scutum, scutellum, postnotum and pleura light reddish brown, scutum occasionally with darker median stripe. Male fore femur usually with well-developed basoventral process and associated indentation on ventral surface for reception of apical bristle of fore tibia (see Fig. 7). *Abdomen*: male tergum 7 yellow and tergum 6 mostly yellow, darker laterally on most specimens; remaining terga brown. Male terminalia (Fig. 15): dark brown; cercus nearly rectangular, with broadly excised apex; epandrial lobe rectangular, except for in-turned, apicoventral lobe. Female similar to male except basoventral process of fore femur and associated indentation lacking, scutum usually with broad median stripe, and abdominal terga 1–7 brown; ovipositor well developed.

Type material.—Lectotype ♀ (not examined), deposited in Fallén collection in Stockholm, Sweden. Collin (1961: 719) discusses the circumstances surrounding the correct association of *H. oratoria* males in the collections of Zetterstedt and Lundbeck.

Specimens examined.—CANADA. Alberta: 1 ♂, 20 mi W. Calgary, Jul; 1 ♂, 1 ♀, Edmonton, Jun (CNC); 1 ♂, 8 ♀, Slave Lk., Aug (CAS). British Columbia: 1 ♂, Big Beaver Crk., Aug; 1 ♂, 2 ♀, Chase, Aug; 2 ♂, 1 ♀, Moyie Lk., Jul; 14 ♀, Taylor Landing, Aug (CAS); 1 ♂, Robson, Aug (CNC); 4 ♂, Carbonate, Jul (CU, USNM). Newfoundland: 8 ♂, 2 ♀, Jul–Aug (USNM). Northwest Territories: 8 ♂, 9 ♀, Aklavik, Jul–Aug (CAS). Ontario: 1 ♂, Ottawa , Jul (CNC); 9 ♂, 12 ♀, Waubamik, Jun–Jul (USNM). Quebec: 1 ♂, Berthierville, Jul (FSCA). Saskatchewan: 2 ♂, 3 ♀, Saskatoon, Aug (USNM). UNITED STATES. California: 1 ♂, Shasta Co., Boundary Cmpgr., Jul; 2 ♂, 4 ♀, Santa Cruz Co., Felton, Jul (CAS); 3 ♂, 3 ♀, Humboldt Co., Jun (CU); 1 ♂, Butte Co., Madrone Lk., Jul (UCR); 1 ♂, 2 ♀, Humboldt Co., Blue Lk. (USNM). Connecticut: 1 ♂, Canaan, Aug; 5 ♂, 2 ♀, Redding, Jun–Jul; 1 ♀, Storrs, Jun (USNM). Georgia: 3 ♂, 2 ♀, Rabun Co., May (CNC, MAC); 1 ♂, 1 ♀, Clayton, May (USNM). Idaho: 1 ♂, 1 ♀, Horseshoe Bend; 1 ♂, 3 ♀, Priest Lk., Aug (USNM); 3 ♂, 1 ♀, 10 mi E. Lowell, Lochsa R., Jul (WSU). Indiana: 1 ♂, W. Lafayette, May; 1 ♂, Fulton Co., Aug (MAC). Michigan: 3 ♂, Isle Royale,

Aug; 2 ♂, Marquette Co., Aug; 1 ♂, Waxford Co., Jul (USNM). Minnesota: 2 ♂, St. Louis Co., Aug (UMSP). Montana: 1 ♂, Gillame, Jul (AMNH); 1 ♂, 1 ♀, Troy, Aug (USNM). New York: 1 ♂, Long Is., Jul (AMNH); 4 ♂, Rome, Jun (USNM). North Carolina: 1 ♂, Black Mt., N. Frk. Swannanoa R. (USNM). Oregon: 2 ♂, 1 ♀, Jackson Co., Rogue R., Jul; 2 ♂, 1 ♀, Minam, Jul (CAS); 3 ♂, 1 ♀, Corvallis, Jun; 1 ♂, Forest Grove, Jun; 1 ♂, Salem, Jul (USNM). Pennsylvania: 1 ♂, State College, Jun (CAS). South Carolina: 1 ♂, Pickens Co., Apr (CUSC). Virginia: 3 ♂, Alexandria, May–Jun; 1 ♂, Luray, Jun (USNM). Washington: 24 ♂, 22 ♀, Asotin Co., 6 mi W. Asotin, Jun–Jul; 3 ♂, 2 ♀, Jefferson Co., Cottonwood Cmpgr., Jul; 1 ♂, Lewis Co., Rainbow Falls St. Prk., July (WSU); 1 ♂, Entiat, Jul; 11 ♂, 3 ♀, Zilliah, Jun (USNM).

Distribution.—This Holarctic species is widely distributed in the Nearctic Region, occurring in eastern North America and westward across southern Canada to the Pacific Coast and south into central California (Fig. 26).

Remarks.—Examination of males of *H. oratoria* from Europe (deposited in USNM) revealed identical fore leg structure and terminalia between them and males of a taxon that is widely distributed in the Nearctic Region. This Nearctic taxon heretofore has been known as *H. rogatoris* Coquillett, but examination of the holotype male (USNM type no. # 3152) revealed that it is a male of *H. superstitiosa*. This new synonymy is reported below under the treatment of *H. superstitiosa*.

Hemerodromia reclinata MacDonald, new species

(Figs. 21, 29)

Diagnosis.—This species belongs to the *H. empiformis* group. Adults resemble those of *H. empiformis* in size and coloration, but male terminalia are distinct. The main difference involves the structure of the epandrial lobe, which is strongly expanded anteriodorsally on males of *H. reclinata*.

Description.—*Male:* Length including terminalia ca. 2.6 mm. General body color brown. *Head*: black; antenna yellow. *Thorax*: pruinose; scutum and scutellum golden brown with darker median stripe; humeral area dark brown; pleura golden brown. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: terga 1 and 7 yellow, remainder brown; sterna lighter brown. *Terminalia* (Fig. 21): brownish black; cercus broadly triangular in lateral view; epandrial lobe abruptly expanded over apical ¼, with strongly developed anterodorsal projection lined by row of setulae; inner surface of epandrial lobe with 4–6 setulae past midpoint.

Female: Similar to male except length including ovipositor 2.8–3.0 mm; ovipositor well developed.

Type material.—HOLOTYPE ♂: upper label "ARIZONA Oak/CrkCn Sedona/29 June 1953" and lower label "WW Wirth/ collector" (USNM). The intact specimen is in excellent condition and at least some of the diagnostic features of terminalia are discernible without maceration. The type locality is about 30 km south of Flagstaff in central Arizona. Allotype, same data and labels as holotype (USNM). Paratypes. UNITED STATES. Arizona: 1 ♂ (lacking head; macerated terminalia in glycerin microvial attached to pin have become overcleared and are difficult to see), 5 ♀, same collecting data as holotype (USNM).

Distribution.—This species is known only from the type locality (Fig. 29).

Etymology.—The specific epithet comes from the Latin word "reclinis," for leaning back, in reference to the distinctive anterodorsal projection of the expanded portion of the epandrial lobe.

Hemerodromia sinclairi MacDonald, new species

(Figs. 2, 28)

Diagnosis.—Adults of this species are characterized by a unique combination of

Fig. 30. Distribution of *Hemerodromia burdicki, H. empiformis, H. flexiformis.*

features, including relatively large size, greater development of macrotrichiae, grayish black coloration, and gray wings.

Description.—*Male:* Length including terminalia 3.3–3.5 mm. General body color grayish black. *Head*: black, except white hair fringe on gena; antennal scape and pedicel reddish brown, flagellum and stylus dark reddish brown; mouthparts reddish brown; palps whitish. *Macrotrichiae*: black, reclinate, including pair of ocellar bristles and 5 pairs of parafrontal bristles. *Thorax*: densely prinose, matte; concolorous grayish black; scutal pruinescence golden yellow; pruinescence on lower half of mesopleuron whitish. *Macrotrichiae*: black, erect, including several pronotal setae, pair of notopleural bristles, uniserial acrostichal hairs, and 2 rows of scutellar setae including 10–12 dorsally and 6–8 apically. *Legs*: mostly light reddish black; coxae and trochanters yellow; femora yellowish basally, becoming light reddish black distally (darker on lateral surface); tibiae and tarsi light reddish black. Fore femur ventrally with 2 rows of black, bluntly pointed setulae; each row flanked by row of bristles, inner row with 7 black bristles and outer row with 3 black bristles distally and 3–4 light reddish brown setae basally; lacking prominent basoventral process (see Fig. 8). Fore tibia ventrally with 2 rows of black, sharply pointed setulae, each flanked by rows of blackish setae. *Wings*: gray with darker veins; stigma lacking. *Abdomen*: terga grayish black; sterna light gray. *Terminalia* (Fig. 2): nearly black; cercus crescent shaped in lateral view, in-turned aspically; epandrial lobe rectangular basally, narrower and truncate apically in lateral view, apex up-turned and excavated.

Female: Similar to male, except body length including terminalia 3.5–4.2 mm and fore femur ventrally with 6 black bristles in outer row; ovipositor weakly developed.

Type material.—HOLOTYPE ♂, labeled "USA:NM: Grant Co./Gila Nat. For./29. VI. 1991/E. Fork Gila River/BJ Sinclair BS9101" (CNC). The specimen is in excellent condition and the terminalia are not macerated. The type locality is in Grant County, Gila National Forest, north of Silver City, New Mexico. Allotype, same collecting data as holotype (CNC). Paratypes. UNITED STATES. New Mexico: 5 males (2 with macerated terminalia in microvial attached to respective pins); 2 females, same collecting data as holotype (CNC).

Distribution.—This species is known from the type series from southwestern New Mexico (Fig. 28).

Etymology.—This species is named after Brad Sinclair who aspirated the type series off rocks in the east fork of the Gila River, has collected numerous representatives of other species of Hemerodromiinae, and has contributed greatly to our understanding of Diptera larvae and adult terminalia.

Hemerodromia stellaris Melander (Figs. 14, 28)

Hemerodromia stellaris Melander 1947: 251.

Diagnosis.—Terminalia of males of *H. stellaris* are distinct. Each cercus and corresponding epandrial lobe are subequal in shape and size, and there are 5–6 minute pointed processes along the apical margin of the cercus (best seen on macerated terminalia). Lack of an expanded epandrial lobe distinguishes males from those of *H. brevifrons,* but females of these two species appear to be separable only by subtle differences in the development of the median stripe on the scutum. Relatively small size and lack of a basoventral process on the fore femur distinguish adults of *H. stellaris* from those of *H. ligata,* newly described above and which also may be collected in Texas.

Description.—Length including terminalia of male ca. 2.3 mm, of female 2.6–2.8 mm. General body color brown. *Head*: black; antenna yellow. *Thorax*: thinly pruinose; scutum and pleura golden brown, scutum with dark brown median stripe expanding over apical ⅓ to width of similarly

darkened scutellum and postnotum. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: tergum 7 yellow, remainder dark brown. Male terminalia (Fig. 14): dark brown; cercus and epandrial lobe straight and relatively slender, nearly equal in size and shape; apex of cercus lined by 5–6 tiny pointed processes. Female similar to male; ovipositor well developed.

Type material examined.—Lectotype ♂, here designated, labeled "Comal River/24-3-42 Tex/A. L. Melander" (USNM). The specimen is in excellent condition and most of the diagnostic features of terminalia are visible without maceration. The type locality is immediately north-northeast of San Antonio, Texas. Paralectotypes. UNITED STATES. Texas: 6 ♂, 6 ♀, same collecting data as holotype; 1 ♂, Del Rio, May (USNM).

Other specimens examined.—MEXICO. Sonora: 2 ♂, Ciudad Obregon, May (CNC). UNITED STATES. Texas: 15 ♂, 10 ♀, Devil's R. nr. Juno, Jun (USNM).

Distribution.—This species is known from southcentral Texas and northwestern Mexico (Fig. 28).

Remarks.—A series of specimens collected in Hawaii (Oahu Island, Makiki Valley) by D. E. Hardy are identical to specimens in Melander's type series of *H. stellaris* with regard to size, coloration, and all the details of male terminalia. Symmorphy of male terminalia between the Hawaiian specimens and specimens from the continental United States is evidence for conspecificity since convergence in such genitalic details is highly unlikely.

Hemerodromia subchelata MacDonald, new species

(Figs. 3, 25)

Diagnosis.—This species belongs to the *H. captus* group. Terminalia of males closely resemble those of *H. chelata,* newly described above. The distinction involves subtle differences in the shape of the cercus, revealed only upon maceration. The cercus on males of *H. subchelata* has a median lobe basally that is lacking on males of *H. chelata,* and the dorsal fork of the cercus is somewhat lobed apically in contrast to the corresponding area being smooth on males of *H. chelata.* Adults of these two species differ in coloration, as described above under *H. chelata.*

Description.—*Male:* Length including terminalia 2.8–3.0 mm. General body color reddish black. *Head*: black; antenna yellow. *Thorax*: pruinose; scutum mostly reddish black with black median stripe changing intensity with rotation of specimens; humeral area golden brown; scutellum grayish black; pleura reddish black, usually edged with golden brown dorsally. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: terga dark brown, except tergum 7 yellow; sterna yellowish brown. *Terminalia* (Fig. 3): dark brown; cercus with prominent basomedian process, deeply excavated apically into 2 forks of nearly equal size; apex of dorsal fork somewhat lobed.

Female: Similar to male, except length including terminalia 2.8–3.0 mm, median stripe on scutum less developed, and abdominal tergum 7 light yellow; ovipositor well developed.

Type material.—HOLOTYPE ♂, labeled "Kerrville, TEX./April 14 (handwritten) 1959/J. F. McAlpine" (CNC, holotype no. 21337). The specimen is in excellent condition and most of the diagnostic features of terminalia are visible without maceration. The type locality is in Kerr County, about 100 kilometers northwest of San Antonio, Texas. Allotype, same collecting data as holotype (CNC). Paratypes. UNITED STATES. Texas: 7 ♂, 12 ♀, same collecting data as holotype (CNC); 3 ♂, Llano Co., Enchanted Rock, Jun (USNM).

Distribution.—This species is known only from southcentral Texas (Fig. 25).

Etymology.—The specific epithet is an arbitrary combination of letters incorporating "sub," Latin for from or somewhat, and "chelata," alluding to the structural similarity between this species and *H. chelata.*

Remarks.—Males of *H. subchelata* resemble those of Palearctic *H. raptoria* Meigen, based solely on Vallaint 1981 (388; Fig. 10) since the type was not examined. However, the former lack peg-like setulae on the epandrial lobe, instead possessing a row of sharp setulae. Unlike males of *H. chelata,* those of *H. subchelata* share with *H. raptoria* the existence of a median basal process on the inner surface of the cercus.

Hemerodromia sufflexa Melander
(Figs. 19, 29)

Hemerodromia empiformis var. *sufflexa* Melander 1947: 248.
Hemerodromia sufflexa: Melander 1965: 470.

Diagnosis.—This species belongs to the *H. empiformis* group. As discussed under *H. empiformis,* males of *H. sufflexa* are distinguished by the shape of the cercus, which is nearly quadrate in lateral view and relatively straight along the apical margin, in contrast to the smoothly triangular cercus on males of *H. empiformis.* Females of the two species are indistinguishable.

Description.—Length including terminalia of male 3.0–3.4 mm. General body color brown. *Head*: black; antenna yellow. *Thorax*: pruinose; scutum and pleura golden brown, scutum with darker median stripe. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: tergum 7 yellow, remainder brown. Male terminalia (Fig. 19): dark brown; cercus nearly quadrate, apical margin nearly straight; epandrial lobe abruptly expanded at apical ⅓, with row of 4–6 setulae on inner surface past midpoint. Female similar to male; ovipositor well developed.

Type material examined.—Holotype ♂, upper label "Chatcolet/Aug '15 Ida/AL Melander" and lower label "type male" (USNM). The specimen is damaged, but the macerated terminalia are in a glycerin microvial attached to a pin. The type locality is in Benewha County, at the southern tip of Coeur d'Alene Lake, north of the town of St. Maries, Idaho. One ♀ with same data as holotype was labeled "type ♀" (USNM). Syntypes. Idaho: 5 ♂, 11 ♀, Chatcolet, Aug; 2 ♂, 2 ♀, Priest Lk., Aug–Sep (USNM). Washington: 1 ♀, Knightmere, Aug (USNM).

Other specimens examined.—CANADA. British Columbia: 1 ♂, Laird R. Hot Sprs., Aug (CNC). Ontario: 1 ♂, Grand Bend, July; 2 ♂, St. Lawrence Is. Nat. Prk., Aug; 3 ♂, Ottawa, Jun–Jul (CNC); 1 ♂, Orillia, Jul (USNM). Quebec: 1 ♂, Lac Phillippe, Jul (CNC). UNITED STATES. Idaho: 38 ♂, 61 ♀, Kootenai Co., 10 m. N. Harrison, Jul–Aug (WSU). Illinois: 1 ♂, Kankakee St. Prk., Jun; 6 ♂, Muncie, May (INHS). Indiana: 1 ♂, Lafayette, Jul (USNM). Nebraska: 2 ♂, 2 ♀, Cherry Co., Valentine, Jun (USNM). New York: 1 ♂, Ithaca, Sep (USNM). Washington: 2 ♂, Stevens Co., 2 mi SE Deer Lk., Jul (WSU); 1 ♂, Oroville, Aug (CNC).

Distribution.—Males of this species have been collected across the northern United States and southern Canada (Fig. 29).

Hemerodromia superstitiosa Say
(Figs. 7, 10, 26)

Hemerodromia superstitiosa Say 1824: 376.
Hemerodromia vittata Loew 1862: 210. **New synonymy.**
Hemerodromia rogatoris Coquillet 1895: 392. **New synonymy.**

Diagnosis.—Distinctive terminalia separate males from those of *H. ligata,* but females of these two species appear to be indistinguishable. Darkened distal tarsomeres on mid and hind legs separate adults of both of these species from those of *H. oratoria.*

Description.—Length including terminalia of male 3.3–3.5 mm, of female 3.4–4.0 mm. General body color brown. *Head*: black; antenna yellow. *Thorax*: pruinose; male scutum and pleura golden brown, occasionally with either 1 or 2 thin stripes medially on scutum; female scutum and pleura golden brown, with broad, dark brown

stripe on scutum medially; scutellum and postnotum of both sexes dark brown. Fore femur (Fig. 7) bearing prominent basoventral process with associated indentation on ventral surface for reception of apical bristle of fore tibia; distal 2 tarsomeres on mid and hind leg brown to dark brown. *Abdomen*: terga 1 and 7 of male yellow, remainder brown; abdominal terga 1 of female yellow, remainder brown. Male terminalia (Fig. 10): dark brown; cercus quadrate basally, ending in narrow process that is in-turned at tip; epandrial lobe oval basally, strongly narrowed apicodorsally, in-turned at tip. Female similar to male, except for coloration as noted above; ovipositor well developed.

Type material.—Neotype ♂ of *H. superstitiosa,* here designated, labeled "Kilbourne/La. 10 v 47/W. W. Wirth" (USNM). The specimen is in excellent condition and most of the diagnostic features of terminalia are visible without maceration. A neotype is designated because it is not possible to identify *H. superstitiosa* on the basis of Say's description alone. Lectotype ♂ of *H. vittata,* here designated: top label "type 1645"; next label "D. C."; next label "Loew coll."; and, bottom label "vittata n." (MCZ). The specimen is in poor condition, with a collapsed head, no wings, no middle legs, and no hind legs, but the macerated terminalia are intact and preserved in a glycerin microvial attached to the specimen pin. The male designated as Coquillett's type (# 3152) of *H. rogatoris* is in excellent condition, with the following labels: top label "N. Carolina"; next label "Morrison"; next label "collection"; and bottom label "CV Riley".

Specimens examined.—CANADA. Nova Scotia: 1 ♂, Truro, Aug (CU). Ontario: 3 ♂, 5 ♀, Ottawa, Jun–Sep. (CNC, USNM); 1 ♀, Petawawa, Jul (USNM). Quebec: 2 ♀, Farnham, Jul; 1 ♂, Old Chelsea, Aug (CNC). UNITED STATES. Connecticut: 1 ♂, 1 ♀, Redding, Jun–Aug (USNM). Florida: 104 ♀, Columbia Co., Sante Fe R., Jan (FSCA); 1 ♂, Crescent City, Jun (USNM). Illinois: 1 ♂, Kempsville, Jun (INHS); 2 ♂, 2 ♀, 15 mi SSW Joliet, Jun (UKL). Indiana: 6 ♂, 3 ♀, W. Lafayette, Jun–Sep (MAC, USNM); 37 ♂, 21 ♀, White Co., 5 mi E. Brookston, Jul (MAC). Kansas: 1 ♀, Manhattan, Jul (USNM). Maryland: 10 ♂, 19 ♀, Wash. D. C. area, Sep (CNC, USNM). Michigan: 1 ♂, Osceola Co., Jun (CNC); 5 ♂, 3 ♀, Brevort, Aug; 1 ♂, E. Lansing, Sep; 1 ♂, Monroe, May (USNM). New York: 1 ♀, Erie Co., 1 ♀, Ithaca, Aug; 1 ♂, 3 ♀, Niagara, Jul (USNM). Ohio: 2 ♂, Maumee, Jul (USNM). Pennsylvania: 2 ♂, Benvenue, Jun (CAS). Tennessee: 1 ♂, Memphis, Jul (USNM). Virginia: 3 ♂, 6 ♀, Great Falls, Jun; 1 ♀, Stubblefield Fall, Jul (USNM); Wisconsin: 1 ♀, Milwaukee Co. (USNM).

Distribution.—This species is distributed in the eastern United States and southeastern Canada (Fig. 26).

Remarks.—This species was described on the basis of a female by Say (1824). The concept of the male of *H. superstitiosa* first appeared with an illustration of terminalia in Melander (1947), and Melander's concept of *H. superstitiosa* is adopted here, although Say's original female description could apply to both *H. empiformis* and *H. sufflexa.*

Loew (1862) described *H. vittata* on the basis of a male, with the first illustration of terminalia appearing in Melander (1947; Figs. 17, 18). Examination of Loew's intact type male (MCZ type no. 1645) revealed initial similarly to Melander's (1947) concept of the male of *H. superstitiosa* in terms of both terminalia and the foreleg. Subsequent maceration of Loew's male type revealed terminalia identical to those of *H. superstitiosa* (sensu Melander 1947), including the missing tip of the right epandrial lobe, which explains the structure shown in figs. 17 and 18 of Melander (1947). Melander apparently examined and illustrated the terminalia of Loew's type, but did not recognize it as being identical to his concept of *H. superstitiosa.* Based on identical male terminalia, *H. vittata* of

Loew (1862) is considered a junior synonym of *H. superstitiosa.*

Coquillett described *H. rogatoris* in 1895, but, as mentioned above under *H. oratoria,* his holotype has terminalia that match exactly those of *H. superstitiosa.* Coquillett (1895) and Melander (1947) had before them males of *H. oratoria,* at least based on their descriptions and figures of terminalia, but the former apparently mislabeled his holotype (USNM type number 3152) and the latter apparently did not examine the specimen.

Labels on specimens in collections report adults of *H. superstitiosa* emerging from streams, on floating vegetation, or in swarms above streams. I have aspirated males and females, together with adults of *H. empiformis,* from the undersides of leaves of small trees overhanging a meter wide, spring-fed stream near Lafayette, Indiana.

Hemerodromia vates Melander
(Figs. 16, 28)

Hemerodromia vates Melander 1947: 252.

Diagnosis.—Males possess distinctive terminalia, including a pair of corkscrew-shaped processes that arise from each epandrial lobe, which are only partially discernible without maceration. Otherwise, males and females are similar to several species of *Hemerodromia* with adults that are relatively small and golden brown.

Description.—Length including terminalia of male ca. 2.4 mm, of female 2.8–3.0 mm. General body color brown. *Head*: black; antenna yellow. *Thorax*: slightly pruinose; scutum and pleura golden brown, scutum with faint to light brown median stripe. Fore femur lacking prominent basoventral process (see Fig. 8). *Abdomen*: tergum 7 yellow, tergum 1 light brown; remainder brown. Male terminalia (Fig. 16): brown; cercus with distal half strongly narrowed, with series of small projections along dorsal margin; epandrial lobe bearing 2 narrow processes apically, each assuming corkscrew appearance in lateral view. Female similar to male; ovipositor well developed.

Type material examined.—Lectotype ♂, here designated, labeled "Kent Conn/16 July '38/A. L. Melander" (USNM). Except for lacking the left wing, the specimen is in good condition and most of the diagnostic features of terminalia are visible without maceration. The type locality is in Litchfield County in extreme west-central Connecticut. Paralectotype. Connecticut: 1 ♂, same collecting data as holotype (USNM).

Other specimens examined.—UNITED STATES. Georgia: 1 ♂, Blackshear, May (CU). Indiana: 1 ♂, Lafayette, Aug (USNM). Louisiana: 1 ♂, Kilbourne, May (USNM). Virginia: 3 ♂, 1 ♀, Great Falls, Jun (USNM).

Distribution.—This species is widely distributed in the eastern United States (Fig. 28).

Remarks.—Males of *H. vates* have terminalia that in part resemble those of *H. acuminata* Collin, described from Bikin in extreme eastern Russia. However, the cercus of males of *H. vates* differs in lacking an apical process, based on figure in Collin (1941) since the type was not examined, and the epandrial lobe is distinct.

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