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THE IDENTITY AND DISTRIBUTION OF *EFFERIA PLENA* (HINE) AND *E. NEMORALIS* (HINE) (DIPTERA: ASILIDAE)

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Abstract.—*Efferia plena* (Hine) and *E. nemoralis* (Hine) from the eastern and south-central United States are redescribed and illustrated. These members of the *Efferia staminea* species group are similar in appearance, and specimens of *E. plena* often have been misidentified as *E. nemoralis*. Several characters for reliable identification of males are offered. The distributions of the species are mapped. A lectotype is designated from the syntype series of *Erax nemoralis* Hine.

Key Words: Diptera, robber fly, Asilidae, *Efferia*, *Erax*, *Pogoniefferia*, *Pogonioefferia*, Nearctic

Efferia, with about 110 species recognized in the United States (Poole 1996) and more than 110 species in the more southern reaches of the Americas (Martin and Papavero 1970), is one of the largest genera of Asilidae in the New World. Coquillett (1893) erected the genus to receive a small group of North American species previously referred to the old Palearctic genus *Erax* Scopoli, while leaving other North American species in that Old World genus. He subsequently (Coquillett 1910) designated *E. candida* Coquillett as type species of his new North American genus.

Assignment of Western Hemisphere robber flies to *Erax* began with Macquart (1838) and continued for a long period. He assigned 29 species, most of them American, to the genus. Williston (1891) listed 74 species from South America. In his *Erax* revision, Hine (1919) recognized 76 valid North American species of *Erax* sensu Macquart, and he placed them in eight informal species groups, based largely on wing characteristics.

American species were assigned to *Erax* until Martin (1961) showed that Macquart should have erected a new genus for the American species. He recognized that *Efferia* is the first generic name available for the North and South American species. Hull (1962), apparently unaware of Martin's (1961) work, stated that the New World species only superficially resemble the Old World *Erax* species and proposed the new genus *Nerax* to receive the majority of American species, while reserving *Efferia* for the species included in Hine's *Erax anomalus* group — the species in which the recurrent branch of vein R_4 joins R_{2+3} rather than ending blindly in cell r_{2+3}. Martin (1965) soon synomymized *Nerax* under *Efferia*. In his revision of the North American species, Wilcox (1966) followed Martin's (1961, 1965) interpretation of the genus *Efferia* and Hine's (1919) species group classifica-

tion. He described 30 new species and recognized a total of 100 species in North America north of Mexico.

Artigas and Papavero (1997) divided *Efferia*. They continued to recognize the genera *Diplosynapsis* Enderlein and *Porasilus* Curran, removed *Nerax* from synonymy, reserved *Efferia* for *anomola*-group species, and described the five new genera *Albibarbefferia*, *Aridefferia*, *Carinefferia*, *Pogoniefferia*, and *Tuberculefferia* to receive other species. (Artigas and Papavero (1997) used the spelling *Pogoniefferia* most frequently, but they apparently misspelled it as *Pogonioefferia* in one instance; the former spelling is here selected as correct.) These genera are nearly identical to Hine's (1919) species groups, based on superficial differences in setation and wing venation that can vary among individuals of the same species. Although the latest catalog of robber fly genera recognizes all of the Artigas and Papavero genera (Geller-Grimm 2003), it is perhaps better to treat them as synonyms of *Efferia* until in depth phylogenetic analysis provides additional data upon which to base a conclusion.

New species of *Efferia* are still being recognized and described in western North America (Bullington and Lavigne 1984; Forbes 1987, 1988), but it is rare to find new species in the East. While surveying the robber flies of the south-central United States, it became evident that trays of *Efferia nemoralis* (Hine) at the University of Arkansas Arthropod Museum and other collections actually contained two species. Differences in coloration of the vestiture of the mystax and legs initially suggested the presence of two species. A specimen with a mystax that is interpreted as being "yellow or yellowish" keys to *E. nemoralis*, and a specimen with a mystax that is interpreted as being white keys to *E. monki* (Bromley) in Wilcox's (1966) seminal monograph on North American *Efferia*. On closer examination, it was found that males of the two species differ in the color pattern of the third abdominal tergite and in the form of the gonocoxite and the apex of the epandrium.

Hine (1911) described *Erax nemoralis* from several specimens, both male and female, collected at New Roads, Pointe Coupée Parish, Lousiana, on July 15, 1905. Bromley (1951) described *Erax monki* from a male holotype collected at Donna, Hidalgo County, Texas, on October 1, 1933. He distinguished it from *E. nemoralis* by its smaller size, more slender build, hyaline wings, white mystax and beard, darker legs, and more rounded male genitalia. Wilcox (1966) did not study specimens of *E. monki* before publishing his work on North American *Efferia*. He merely quoted Bromley's description, and did the best he could in constructing the keys. Bromley (1951) indicated that the holotype was in the American Museum of Natural History, but thorough searches of that museum, the National Museum of Natural History, the California Academy of Sciences, the Texas A&M University Insect Collection, and several other museums and collections have failed to produce any type specimens of *E. monki*. A syntype series of *E. nemoralis* and the holotype of *E. plana* were located in the Charles A. Triplehorn Insect Collection, Ohio State University. I now regard *E. monki* as a *species inquirenda*, of doubtful identity and needing further investigation. The holotype and some other specimens were collected in the Gulf Coastal region late in the season, suggesting that it might be junior a synonym of *E. nemoralis*.

Study of the genitalia of the *E. plena* holotype and *E. nemoralis* lectotype, designated herein, has led me to the conclusion that specimens of *E. plena* have often been misidentified as *E. nemoralis* and placed in trays with properly identified *E. nemoralis*. For this

reason, *E. plena* was recorded from only Kansas and Oklahoma by Martin and Wilcox (1965) in their catalog of North American robber flies, and its widespread occurrence in Arkansas was not recognized (Scarbrough 1972, Whitcomb and Bell 1964). Hine (1916) described *Erax plenus* from a male holotype collected in Douglas County, Kansas. No date was given. That specimen and several others studied by Hine have a light colored abdominal tergite 7. One specimen from Onaga, Pottawatomie County, Kansas has a dark colored tergite 7, but Hine (1916) dismissed this condition as intraspecific variation. However, Wilcox (1966) admitted to no variation, and he identified only specimens with a "silvery pollinose" segment 7 as *Efferia plena*. Most specimens of *E. plena* that I have seen have a dark-colored tergite 7, and they are identified as *E. nemoralis* when using Wilcox's (1966) key.

In his revision of the genus *Erax*, Hine (1919) separated male *E. plena* from male *E. nemoralis* by the color pattern of abdominal tergites 1–3. The holotype of *E. plena* has the first three abdominal segments dark, mostly with black hair above (Fig. 1). That species is thus distinguished from *E. nemoralis*, which Hine describes as having male abdominal segments 1–2 and a basal triangle of segment 3 dark and largely clothed with black hair, but the apex of 3 is white and covered with long white hair parted in the middle and directed outward (Fig. 4A). Unfortunately, there is a great deal of variation in the color pattern of abdominal tergite 3 of *E. plena* specimens, with many showing a well developed white posterior band and long, white parted hairs (Fig. 2). Even the holotype has some posterolateral white areas and some long, white hairs (Fig. 1)

Efferia plena and *Efferia nemoralis* are members of Hine's (1919) *staminea* group of species. The junction of wing veins R_4 and R_5 is located basad to the level of the basal section of vein M_2 (apex of cell d), and the male abdomen has several silvery pollinose segments with long, parted, white hairs. Within the *staminea* group, they are segregated from many other species by the black femora and white or yellow mystax. Both *Efferia plena* and *Efferia nemoralis* occur widely in Arkansas, where the former species is apparently most abundant in June, and the latter species is most abundant in July and August. *Efferia plena* has a wide distribution from Maryland and North Carolina in the East to Kansas, Oklahoma, and Texas in the Midwest. *Efferia nemoralis* is strictly a south-central species, occurring also in Mississippi, Louisiana, northeastern Texas, and southeastern Oklahoma. The ranges of the two species overlap in Arkansas and Mississippi. Several characters for reliable identification of males are described. No reliable characters have been found separating the females of the two species.

Materials and Methods

Terminology largely follows that found in the *Manual of Nearctic Diptera* (McAlpine 1981, Wood 1981). Antennomere to scape ratios were formulated by dividing the length of each antennomere by the length of the first antennomere (the scape) and then listing the numbers in order.

Specimens from the following collections were studied: Colorado State University, Department of Bioagricultural Sciences and Pest Management, C. P. Gillette Museum of Arthropod Diversity, Ft. Collins (CSUC); Mississippi State University, Mississippi Entomological Museum, Mississippi State (MEMU); National Museum of Natural History, Smithsonian Institution, Washington, D. C. (USNM); Charles A. Triplehorn Insect Collection, Ohio State University, Columbus (OSUC); Oklahoma State

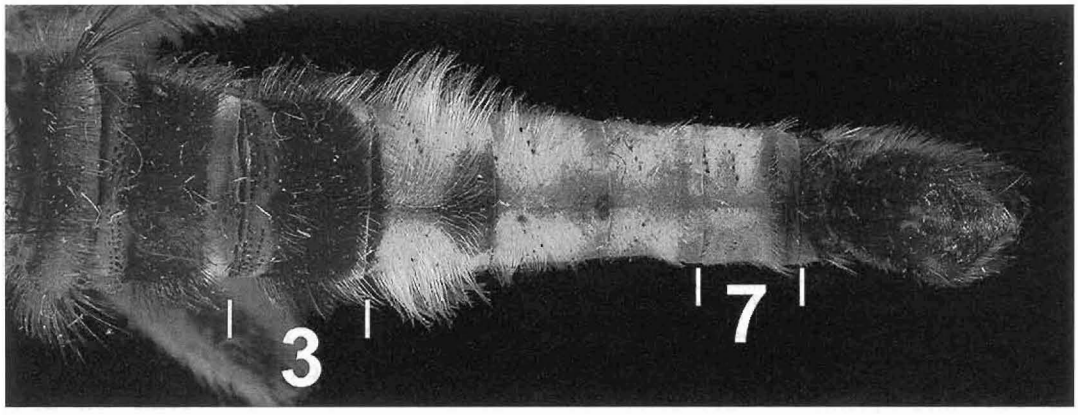

Fig. 1. *Efferia plena*, holotype abdomen, dorsal view showing abdominal tergites 3 and 7.

University, K. C. Emerson Museum, Stillwater (OSEC); Kansas State University, Department of Entomology, Manhattan (KSUC); Texas A & M University Insect Collection, College Station (TAMU); University of Arkansas Arthropod Museum, Fayetteville (UAAM); University of Kansas Natural History Museum, Snow Entomological Collections, Lawrence (SEMC); University of Michigan Museum of Zoology, Insect Division, Ann Arbor (UMMZ); University of Missouri, Department of Entomology, Wilbur R. Enns Entomology Museum, Columbia (UMEE).

Systematics

Key to adult males

Both *E. plena* and *E. nemoralis* key to couplet 9 in Wilcox's (1966) key to males of the *staminea* group. They can be separated as follows:

1. Abdominal tergite 3 mostly shining black or dark brown dorsally and bearing many black setae (Fig. 2A); epandrium with shallow apical notch, as in Fig. 2B; gonocoxite with posteroventral lobe broad basally, tapered to rounded apex; apex not surpassing that of anterodorsal lobe; gonostylus short, not surpassing gonocoxite by distance approximating length of apical gonocoxite lobes (Fig. 2C); aedeagus smoothly rounded basally (Fig. 2-D) . . . . . *Efferia plena* (Hine)

– Abdominal tergite 3 shining dark brown to black dorsally on anterior half, almost devoid of black setae, with broad, posterior, silvery pollinose band V-notched at midline (Fig. 4A); epandrium with deep apical notch, as in Fig. 4B; gonocoxite with posteroventral lobe narrow, more or less parallel-sided; apex surpassing that of anterodorsal lobe; gonostylus long, surpassing gonocoxite by distance approximating length of apical gonocoxite lobes (Fig. 4C); aedeagus sharply hooked and somewhat sigmoid basally (Fig. 4D) . . . . . *Efferia nemoralis* (Hine)

Efferia plena (Hine)
(Figs. 1–3)

Erax plenus Hine 1916: 21; Hine 1919: 148.
Efferia plena: Wilcox 1966: 214.
Pogoniefferia plena: Artigas and Papavero 1997: 73.

Male.—*Body length:* 19.4–28.6 mm (mean ± S.D.: 23.0 ± 1.8; N = 63).

Head: Width 1.5 times eye height. Face golden tomentose, with large gibbosity about as deep as length of scape extending nearly two-thirds of distance from oral margin to antennal bases. Mystax consisting of long pale yellow to deep golden yellow bristles covering entire facial gibbosity, sometimes with 1–4 black bristles in ventolateral corners. Gena brown, thinly golden pollinose. Frons brown, subshining medially, golden pollinose laterally, with 3–5 long

black bristles and patch of many black, shorter, hairlike setae laterally. Vertex, including ocellar tubercle, golden pollinose. Ocellar tubercle bearing 2–4 long, strong, black bristles and several weaker ones. Postcranium white tomentose. Dorsal postocular setae black; lateral postocular setae pale yellow. Lower occiput, postgena, and base of labium with dense vestiture of long, slender, golden plumose hairs. Proboscis black; palpus black, usually with black setae dorsally and apically, golden setae ventrally near base. Antenna, including style, 2.0–2.5 mm long, brown; scape setose dorsally, laterally, and ventrally, with setae usually black dorsally, often golden yellow laterally and ventrally; pedicel setose apically; first flagellomere attenuate; antennomere to scape ratios 1.0–0.5–1.0–1.5.

Thorax: Cervical sclerites brown, sparsely golden pollinose, covered with long, pale, plumose hairs. Pronotum sparsely golden pollinose, covered with sparse pile of long, slender pale and black hairs; antepronotum with transverse row of about 6–11 black bristles; postpronotal lobe brown, densely golden pollinose, covered with short, black, erect to reclinate setae. Propleuron brown, golden pollinose, with vestiture of long, declinate, plumose white hairs on anterior portion of proepisternum; declinate golden hairs on posterior portion of proepisternum; and reclinate golden to brown hairs on proepimeron. Scutum brown in ground color, covered throughout with vestiture of short or long, black, erect or slightly reclinate setae; postsutural hairs and setae longer than presutural hairs and setae; lateral margin of scutum, in addition to several weaker black setae, with 3–4 strong, black presutural setae and 1–3 strong, black postsutural, supra-alar setae; scutum mostly covered with dense golden pollen except for pair of broad, posterolateral, thinly pollinose or bare patches, each divided by narrow line of pollen along transverse suture, and pair of thinly pollinose, central, brown vittae extending from pronotum to region just posterior to transverse suture, pair separated by narrow line of golden pollen along mid-dorsal line of scutum. Postalar callus densely golden pollinose, covered with short black setae and 3–6 long, strong black bristles. Scutellum convex, brown, golden pollinose, with 6–12 strong, long, erect, black marginal bristles and many short black setae on disc. Mediotergite brown, thinly golden pollinose; anatergite gray pollinose; katatergite gray pollinose, with dense fan of long black and golden bristles. All mesopleural sclerites brown, golden pollinose. Anepisternum with long, fine, golden to dark brown, apically-crinkled hairs along anterior, dorsal and posterior margins; anterior and dorsal hairs erect; posterior hairs reclinate. Anterior basalare brown, thinly pollinose, with long, fine, black, apically-crinkled hairs along anterior margin; posterior brown, thickly golden pollinose. Katepisternum with long, fine, black, apically-crinkled hairs posterodorsally. Anepimeron with few long, fine, black or pale, apically-crinkled hairs posteriodaorsally. Katepimeron and meron lacking setae or hairs. Basal swelling of pleural wing process golden pollinose. Subalar sclerite brown. Metepisternum golden pollinose, covered with several long, fine, black or pale, apically-crinkled hairs and dense crescentic patch of short brown hairs posteroventrally. Metepimeron gray pollinose, with very fine, apically-crinkled, erect golden hairs.

Legs: Coxae brown in ground color, golden pollinose; forecoxa densely covered with long, golden, declinate bristles anteriorly; midcoxa with long, golden, declinate bristles anteroventrally and some stronger golden bristles laterally; hind coxa with fine, long, apically-crinkled, pale hairs anterolaterally and posteriorly, and about 3 long black to

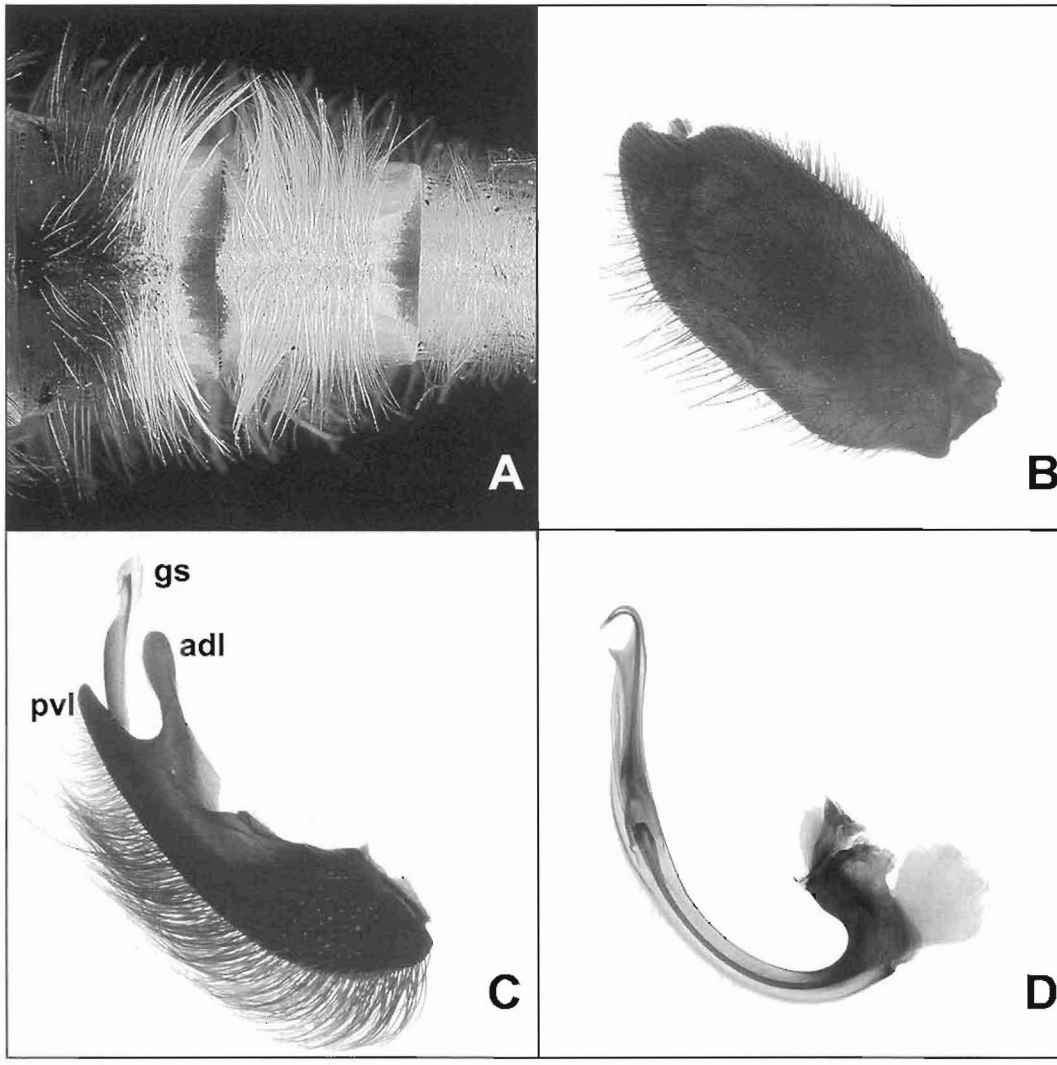

Fig. 2. *Efferia plena*, male. A, Tergites 3–5, left to right (Arkansas: Craighead Co., near Jonesboro). B–D, Male genitalia (Arkansas: Benton Co., Siloam Springs, Chesney Prairie Natural Area). B, Epandrium, right lateral view. C, Gonocoxite and gonostylus, right lateral view. D, Aedeagus, right lateral view. Abbreviations: adl, anterodorsal lobe of gouocoxite; gs, gonostylus; pvl, posteroventral lobe of gonocoxite.

pale bristles posterolaterally. Femora dark brown to black, subshining. Forefemur lacking stout bristles, with many long, black hairlike setae dorsally, anteriorly, and ventroapically, and with many long, golden, hairlike setae posteriorly and ventrally near base, these ventral setae much longer than others. Midfemur similar to forefemur, but with anteroventral and posteroventral rows of 4–5 stout, black bristles and 2–3 stout, black bristles on basal half of anterior face. Hind femur with many short golden setae anterodorsally on basal three-fourths; many long, dark, apically-crinkled, hairlike setae posteroventrally; ventral row of 7–9 stout black bristles; and anterior row of 2–3 stout black bristles. Tibiae reddish brown, darkened at apices. Foretibia with many long, golden,

apically-crinkled, hairlike setae posteroventrally; dense brush of short, fine, golden hairs anteroventrally; rows of stout, black bristles anterodorsally and posterodorsally; and circle of several stout, black bristles at apex. Midtibia with many long, golden, apically-crinkled, hairlike setae ventrally; row of 4–6 stout black bristles posterodorsally; and circle of several stout, black bristles at apex. Hind tibia with many long, golden, apically-crinkled, hairlike setae ventrally; dense elongate patch of short golden setae posterodorsally; and stout black bristles as follows: 1 anterodorsally and 1 posterodorsally near base, 1–2 anterodorsally at about midlength, 1 anteriorly at about apical fourth, 2 anteroventrally along apical third, and 5 circling apex except posterodorsally. Tarsi uniformly brown; length of first tarsomere about 1.0–1.3 times length of second and third combined. All claws black with brown base. All pulvilli pale yellow.

Wing: 11.6–18.0 mm long (mean ± S.D.: 14.5 ± 1.4; N = 63). Very lightly infuscated, nearly hyaline; sometimes more heavily infuscated in subcostal cell. Halter with stem yellow, knob often darker.

Abdomen: Tergites dark brown to black in ground color. Tergite 1 brown in ground color; covered with grayish brown pollen and fine black setae throughout; with 5–8 stout black bristles and several long, pale, apically-crinkled hairlike setae posterolaterally. Tergite 2 mostly shining dark brown to black, with broad lateral and narrow posterior grayish brown pollinose band; covered dorsally with many long, black, hairlike setae; with narrow lateral band of long, pale, hairlike setae. Tergite 3 (Fig. 2A) mostly shining dark brown to black, usually with broad lateral grayish brown pollinose band and narrow posterior silvery pollinose band; covered mostly with black setae; with posterior and lateral bands of white, apically-crinkled, hairlike setae; posterior band narrow, with setae parted at midline, falling over sides of tergite. Tergite 4 (Fig. 2A) almost entirely silvery pollinose; devoid of black; covered with many long, white, apically-crinkled, hairlike setae parted at midline and falling over sides of tergite. Tergites 5 (Fig. 2A) and 6 almost entirely silvery pollinose; devoid of black setae and covered with many short, fine, white setae parted at midline and falling over sides of tergite. Tergite 7 (Fig. 1) sometimes silvery pollinose, but usually largely shining brown except for silvery to grayish brown pollinose anterior V-shaped area and narrow lateral band; covered with many short, fine, recumbent, posteriorly directed, black setae. Sternites 1–3 grayish brown pollinose, except for narrow, silvery pollinose posterior marginal band on sternite 3. Sternites 4–7 silvery pollinose. Sternites 1–4 covered with many long, white, apically-crinkled, hairlike setae; sternites 5–7 with shorter, white, hairlike setae. Sternite 8 shining brown, with narrow posterior band of long, slender, black bristles directed posteriorly.

Epandrium with shallow apical notch, as in Fig. 2B. Gonocoxite with posteroventral lobe broad basally, tapered to rounded apex; apex not surpassing that of anterodorsal lobe. Gonostylus short, not surpassing gonocoxite by distance approximating length of apical gonocoxite lobes (Fig. 2C). Aedeagus smoothly rounded basally (Fig. 2D).

Type Material.—The holotype male is in the Charles A. Triplehorn Insect Collection at Ohio State University. It is labeled "Douglas Co., Kan. 900 ft., F. H. Snow./TYPE [red label]/Erax plenus Hine [handwritten, with black border]." The specimen is 27.4 mm long, and its wings are 15.5 mm long. Tergite and sternite 7 are silvery pollinose. A paratype male in the same collection is labeled "Osborne Co, Kan. 1557 ft., F. X. Williams, Aug. 3, 1912 [date handwritten]/PARATYPE

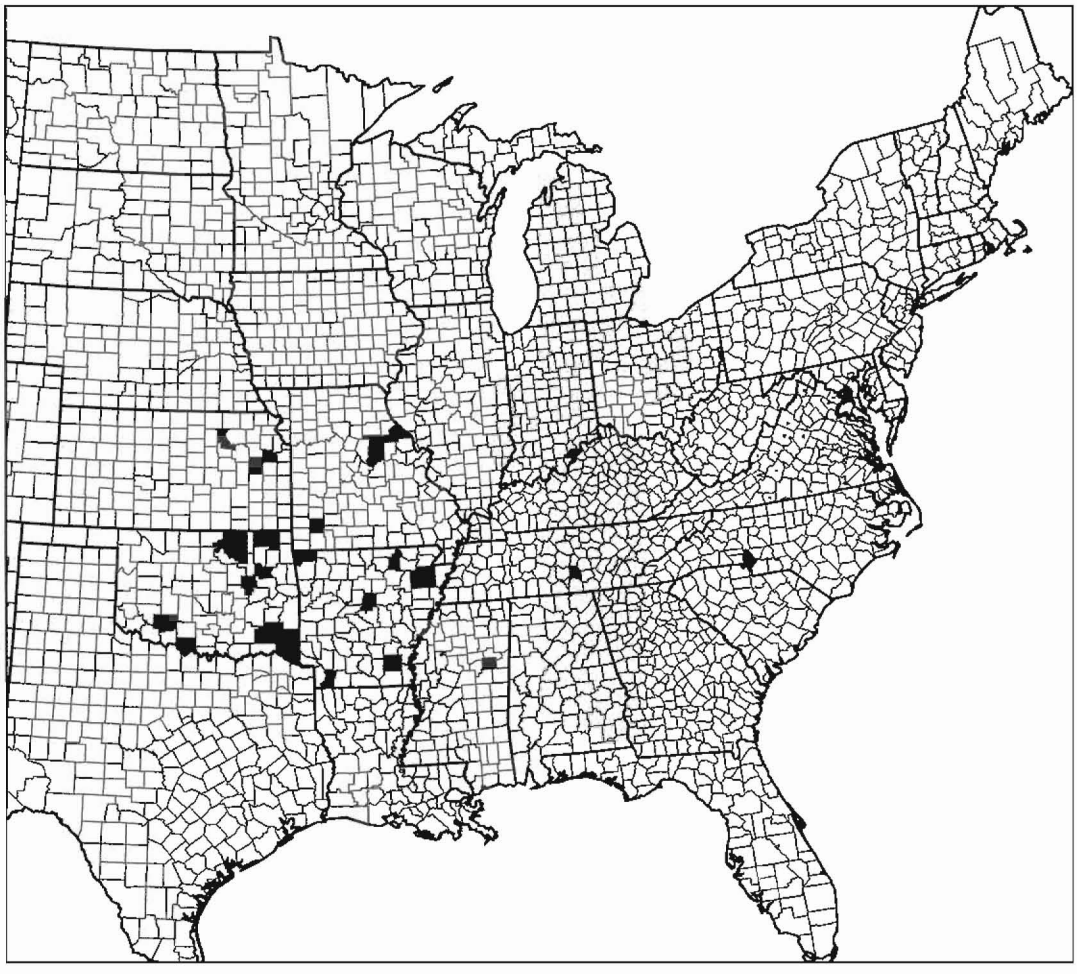

Fig. 3. Distribution of *Efferia plena* by county.

[red label]. It also has a silvery pollinose tergite and sternite 7.

Other specimens examined.—ARKANSAS. Benton Co.: Chesney Prairie Natural Area, near Siloam Springs, 7–12 June 2004, J. K. Barnes (1 ♂, UAAM); 12–18 June 2004, J. K. Barnes (3 ♂, UAAM). Boone Co.: Baker Prairie Natural Area, 2 July 2003, M. D. Warriner (1 ♂, UAAM). Craighead Co.: Bono Bog, 22 May 2003, N. Lavers (1 ♂, UAAM); Hatchie Coon, on mud in overflow area, 1 August 2004, N. Lavers (1 ♂, UAAM); Hatchie Coon, 1 August 2004, N. Lavers (2 ♂, UAAM); Hatchie Coon Wildlife Management Area, tall grass and forbs, 15 July 2004, N. Lavers (1 ♂, UAAM); Jonesboro, 5 June 1964, A. G. Scarbrough (1 ♂, UAAM), 28 June 1964, A. G. Scarbrough (1 ♂, UAAM), 31 May 2004, N. Lavers (1 ♂, UAAM); near Jonesboro, 16 June 1971, A. G. Scarbrough (2 ♂, UAAM). Drew Co.: Seven Devils Wildlife Management Area, understory trail, above swamp, 23 August 2004, H. Raney (1 ♂, UAAM). Faulkner Co.: Bell Slough Wildlife Management Area, 26 May 2003, H. Raney (1 ♂, UAAM); Camp Robinson Wildlife Management Area, 1 June 2003, H. Raney (1 ♂, UAAM). Franklin Co.: Cherokee Prairie Natural Area, 19 May

2003, M. D. Warriner (1 ♂, UAAM). Lafayette Co.: Lafayette Wildlife Management Area, roadcut along fields, 15 August 2004, H. Raney (1 ♂, UAAM). Poinsett Co.: Lake Hogue, 27 June 2004, N. Lavers (1 ♂, UAAM). Sharp Co.: Strawberry River Preserve, in open field near river, 22 May 2004, H. Raney (1 ♂, UAAM).

INDIANA. Clark Co.: State Forest, 13 June 1933, Montgomery (1 ♂, UMMZ).

KANSAS. Clay Co. (1 ♂, OSUC). Douglas Co.: 5 mi. NE of Lawrence, 18 June 1971, V. P. Gapud (1 ♂, SEMC). Osage Co.: 12 June 1923, H. Darby (1 ♂, UAAM), 14 June 1923, H. Darby (1 ♂, UAAM), 16 June 1923, R. H. Beamer (1 ♂, UAAM). Riley Co.: 5 June 1955, W. W. Gibson (1 ♂, KSUC). Pottawatomie Co.: Onaga, 20 Augnst 1901 (1 ♂, OSUC).

MARYLAND. Prince George's Co.: College Park, 9 June 1935, C. T. Greene (1 ♂, USNM).

MISSISSIPPI. Oktibbeha Co.: 3 June 1989, T. L. Schiefer (3 ♂, MEMU); 3 mi. W of Adaton, 20 June 1996, T. L. Schiefer (1 ♂, MEMU), 12 June 1998, T. L. Schiefer (1 ♂, MEMU); 6 mi. SW of Starkville, 6–7 July 1984, R. L. & B. B. Brown (1 ♂, MEMU); Agricultural College, 16 May 1921, W. F. Turman (1 ♂, MEMU); John Starr Memorial Forest, 14 June 1995, D. M. Pollock (1 ♂, MEMU); Longview, 8 June 1919, F. Oswalt (1 ♂, MEMU); State College, 1 May 1940, C. M. Wells (1 ♂, MEMU).

MISSOURI. Audrain Co.: Mexico, 1 August 1993, T. Woods (1 ♂, UMEE). Callaway Co.: Tucker Prairie, 19–20 June 1968 (2 ♂, UMEE), 2–6 July 1968 (5 ♂, UMEE), 8 July 1968 (2 ♂, UMEE), 12 July 1968 (3 ♂, UMEE), 14 July 1968 (1 ♂, UMEE), 18 July 1968 (1 ♂, UMEE). Lawrence Co.: Mt. Vernon, 16 June 1954, W. R. Enns (2 ♂, UMEE). Pike Co.: New Hartford, 24 June 1938, W. S. Craig (1 ♂, USNM).

NORTH CAROLINA. Mecklenburg Co.: Charlotte, 5 June 1927 (5 ♂, USNM).

OKLAHOMA. Comanche Co.: Fort Sill, East Range, Parks Hill, 12 June 2003, J. Owens, J. Schmidt (1 ♂, CSUC); Fort Sill, East Range, nr Hoyle Bridge, pinned with presumed prey: *Colias philodice* Godart, clouded sulphur butterfly, 12 June 2003, J. Owens, J. Schmidt (1 ♂, CSUC). Craig Co.: Bluejacket, 17 June 1931 (1 ♂, OSEC); Centralia, 26 June 1931 (1 ♂, OSEC). Jefferson Co.: Waurika Lake, 13 July 1983, H. C. Reed & J. Nelson (2 ♂, OSEC). McCurtain Co.: Idabel, 9 June 1931, (1 ♂, OSEC). Nowata Co.: Nowata, 28 June 1935, C. A. Sooter (1 ♂, OSEC). Okmulgee Co.: Bryant, 11 June 1934, C. A. Sooter (1 ♂, USNM), 13 June 1934, C. A. Sooter (2 ♂, USNM); Henryetta, 7 June 1934, C. A. Sooter (1 ♂, USNM), 15 June 1934, C. A. Sooter (1 ♂, USNM). Osage Co.: Pawhuska, 3 June 1934, A. E. Pritchard (1 ♂, USNM). Pushmataha Co.: Tuskahoma, 23 May 1928, R. H. Beamer (1 ♂, UAAM).

TENNESSEE. Coffee Co.: Manchester, 20 June 1941, W. S. Craig (1 ♂, UMEE).

TEXAS: Calhoun Co.: Port Lavaca, 12 August 1925 (1 ♂, OSUC).

Distribution (Fig. 3).—Nearctic: United States (Arkansas, Indiana, Kansas, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, Tennessee, Texas). Existing collection records seem to indicate that *E. plena* is relatively rare east of the Mississippi, but abundant in Kansas, Oklahoma, Arkansas, and Missouri. It is tempting to speculate that this is a prairie species that spread eastward with deforestation.

Note.—The mystax and the long ventral hairs of the femora and tibiae usually are golden yellow, although in some specimens they appear to be paler. They are usually distinctly more richly colored than those of *E. nemoralis*.

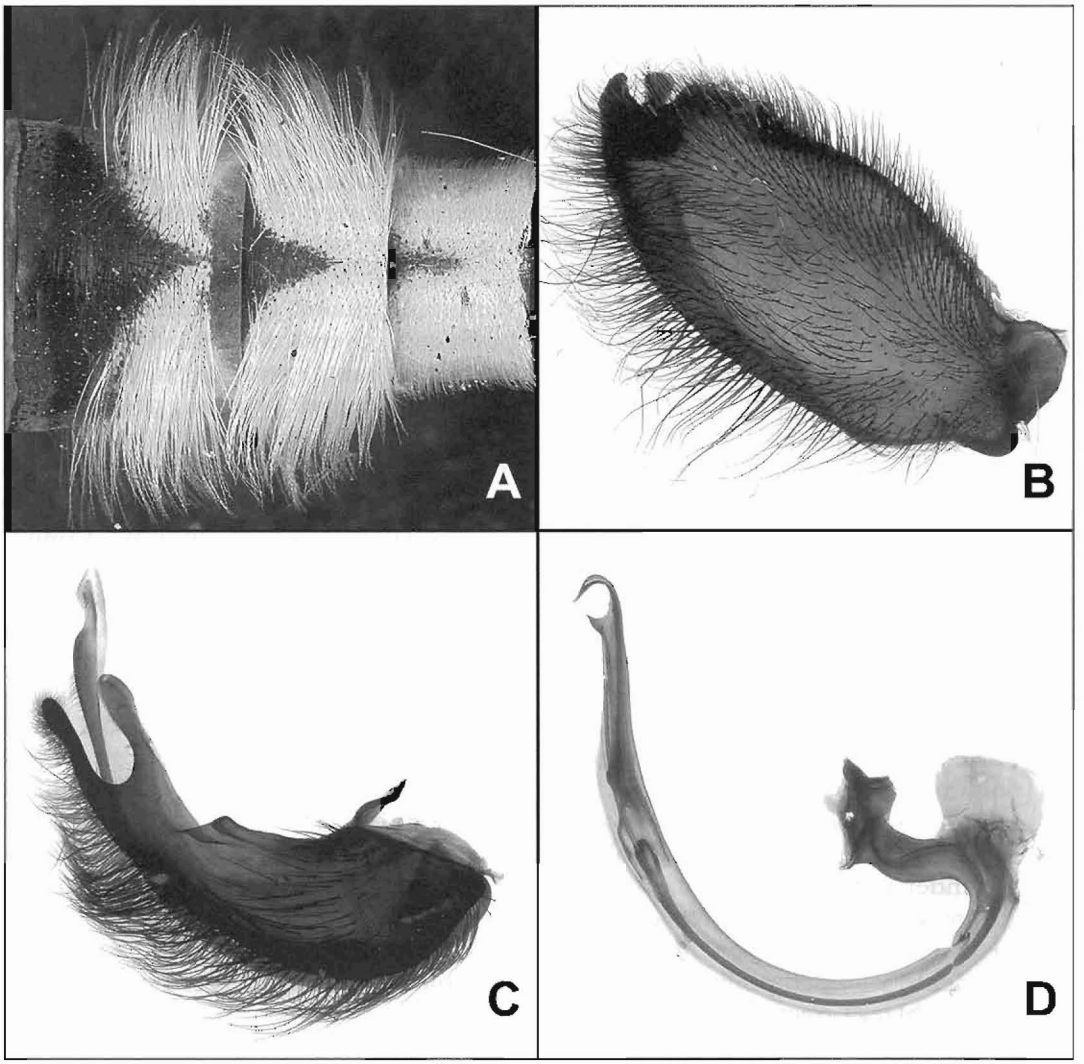

Fig. 4. *Efferia nemoralis*, male. A, Tergites 3–5, left to right, lectotype (Louisiana: Point Coupée Parish, New Roads). B–D, Male genitalia (Arkansas: Hempstead Co. Rick Evans Grandview Prairie). B, Epandrium, right lateral view. C, Gonocoxite and gonostylus, right lateral view. D, Aedeagus, right lateral view.

A specimen from Fort Sill, Comanche Co., Oklahoma is pinned with its presumed prey, an adult clouded sulphur butterfly, *Colias philodice* Godart.

Efferia nemoralis (Hine)
(Figs. 4–5)

Erax nemoralis Hine 1911: 311; Hine 1919: 147.

Efferia nemoralis: Wilcox 1966: 208.

Pogoniefferia nemoralis: Artigas and Papavero 1997: 73.

Male.—*Body length:* 20.5–27.9 mm (mean ± S.D.: 24.2 ± 1.9; N = 49).

Head: Width 1.5 times eye height. Face white tomentose, with large gibbosity about as deep as length of scape extending nearly two-thirds of distance from oral margin to antennal bases. Mystax consisting of long white or slightly yellowed bristles covering entire facial gibbosity, sometimes with 1 or a few black bristles in ventolateral corners. Gena brown, thinly pale pollinose. Frons brown, subshining

medially, golden pollinose laterally, with 3–5 long black bristles and patch of many black, shorter, hairlike setae laterally. Vertex, including ocellar tubercle, golden pollinose. Ocellar tubercle bearing 2–4 long, strong, black bristles and several weaker ones. Postcranium white tomentose along ocular margin, with thin pale pollen elsewhere. Dorsal postocular setae black; lateral postocular setae pale yellow or brown. Lower occiput, postgena, and base of labium with dense vestiture of long, slender, white, plumose hairs. Proboscis black; palpus black, with black setae dorsally and apically, white setae ventrally near base. Antenna, including style, 2.2–2.6 mm long, brown; scape setose dorsally, laterally, and ventrally, the setae usually black dorsally, often white laterally and ventrally; pedicel setose apically; first flagellomere attenuate; antennomere to scape ratios 1.0–0.5–0.9–2.1.

Thorax: Cervical sclerites brown, golden pollinose, covered with long, white, plumose hairs. Pronotum sparsely golden pollinose, covered with sparse pile of long, slender pale and black hairs; anteprono tum with transverse row of about 11–20 black bristles; postpronotal lobe brown, densely golden pollinose, covered with short, black, erect to reclinate setae. Propleuron brown, golden pollinose; with vestiture of long, declinate, plumose white hairs on anterior portion of proepisternum; declinate golden hairs on posterior portion of proepisternum and anterior portion of proepimeron; and reclinate black hairs on posterior portion of proepimeron. Scutum brown in ground color, covered throughout with vestiture of short or long, black, erect or slightly reclinate setae; postsutural hairs and setae longer than presutural hairs and setae; lateral margin of scutum, in addition to several weaker black setae, with 2–4 strong, black presutural setae and 1–3 strong, black postsutural, supraalar setae; scutum mostly covered with dense golden pollen except for pair of broad, posterolateral, thinly pollinose or bare patches, each divided by narrow line of pollen along transverse suture, and pair of thinly pollinose, central, brown vittae extending from pronotum to region just posterior to transverse suture, the pair separated by narrow line of golden pollen along mid-dorsal line of scutum. Postalar callus densely golden pollinose, covered with short black setae and 2–4 long, strong black bristles. Scutellum convex, brown, golden pollinose, with 6–10 strong, long, erect, black marginal bristles and short black setae on disc. Mediotergite brown, thinly pollinose; anatergite gray pollinose; katatergite gray pollinose, with dense fan of long black and pale bristles. All mesopleural sclerites brown, at least partly golden or gray pollinose. Anepisternum with long, fine, golden to dark brown, apically-crinkled hairs along anterior, dorsal and posterior margins; anterior and dorsal hairs erect; posterior hairs reclinate. Anterior basalare brown, thinly pollinose, with long, fine, black, apically-crinkled hairs along anterior margin; posterior basalare yellowish brown, silvery pollinose. Katepisternum with long, fine, black, apically-crinkled hairs posterodorsally. Anepimeron with few long, fine, black or pale, apically-crinkled hairs posteriodorsally. Katepimeron and meron lacking setae or hairs. Basal swelling of pleural wing process silvery pollinose. Subalar sclerite brown. Metepisternum golden pollinose, covered with several long, fine, black or pale, apically-crinkled hairs and dense crescentic patch of short brown hairs posteroventrally. Metepimeron gray pollinose, with very fine, apically-crinkled, erect white to golden hairs.

Legs: Coxae brown in ground color, gray to golden pollinose; forecoxa densely covered with long, white, declinate bristles anteriorly; midcoxa with long, white, declinate bristles anteroventrally

and longer, stronger, white to pale golden bristles laterally; hind coxa with sparse, fine, long, apically-crinkled, white hairs anterolaterally and posteriorly and about 3 long black to pale bristles posterolaterally. Femora dark brown to black, subshining. Forefemur lacking stout bristles, with many long, black hairlike setae dorsally, anteriorly, and ventroapically, and with many long, pale, hairlike setae posteriorly and ventrally near base, these ventral setae much longer than others. Midfemur similar to forefemur, but with anteroventral and posteroventral rows of 4–5 stout, black bristles and 1–2 stout, black bristles on basal half of anterior face. Hind femur with many short yellow setae anterodorsally on basal three-fourths; many long, pale, apically-crinkled, hairlike setae posteroventrally; ventral row of 5–9 stout black bristles; and anterior row of 4–5 stout black bristles. Tibiae yellowish brown, darkened at apices. Foretibia with many long, pale, apically-crinkled, hairlike setae posteroventrally; dense brush of short, fine, golden hairs anteroventrally; rows of stout, black bristles anterodorsally and posterodorsally; and circle of several stout, black bristles at apex. Midtibia with many long, pale, apically-crinkled, hairlike setae ventrally; row of 4–6 stout black bristles posterodorsally; and circle of several stout, black bristles at apex. Hind tibia with many long, pale, apically-crinkled, hairlike setae ventrally; dense, elongate patch of short golden setae posterodorsally; and stout black bristles as follows: 1 anterodorsally and 1 posterodorsally near base, 1 anterodorsally at about midlength, 1 anteriorly at about apical fourth, 2 anteroventrally along apical third, and 5 circling apex except posterodorsally. Tarsi uniformly brown; length of first tarsomere about 1.3–1.4 times length of second and third combined. All claws black with brown base. All pulvilli pale yellow.

Wing: 13.7–18.8 mm long (mean ± S.D.: 15.8 ± 1.0; N = 49). Lightly infuscated; more heavily infuscated in subcostal cell. Halter with stem and knob yellow.

Abdomen: Tergites dark brown to black in ground color. Tergite 1 brown in ground color; covered with grayish brown pollen and fine black setae throughout; with 5–8 stout black bristles and several long, pale, apically-crinkled hairlike setae posterolaterally. Tergite 2 mostly shining dark brown to black, with broad lateral and narrow posterior grayish brown pollinose band; covered dorsally with many long, black, hairlike setae; with narrow lateral band of long, pale, hairlike setae. Tergite 3 (Fig. 4A) shining dark brown to black dorsally on anterior half; with broad silvery pollinose band laterally and along posterior half, V-notched at midline; almost devoid of black setae and bearing many long, white, apically-crinkled, hairlike setae parted at midline and falling over sides of tergite. Tergite 4 (Fig. 4A) mostly silvery pollinose except for anterior, mid-dorsal V-notch; devoid of black setae and covered with many long, white, apically-crinkled, hairlike setae parted at midline and falling over sides of tergite. Tergites 5 (Fig. 4A) and 6 mostly silvery pollinose except for usually brown mid-dorsal line or V-notch; devoid of black setae and covered with many short, fine, white setae parted at midline and falling over sides of tergites. Tergite 7 largely shining brown except for silvery pollinose anterodorsal V-shaped area and narrow lateral band; covered with many short, fine, recumbent, posteriorly directed, black setae. Sternites 1 and 2 brownish gray pollinose, except for narrow, silvery pollinose posterior marginal band on sternite 2. Sternites 3–7 silvery pollinose. Sternites 1–4 covered with many long, white, apically-crinkled, hairlike setae; sternites 5–7 with shorter, white, hairlike setae. Sternite 8 shining brown, with narrow posterior band of

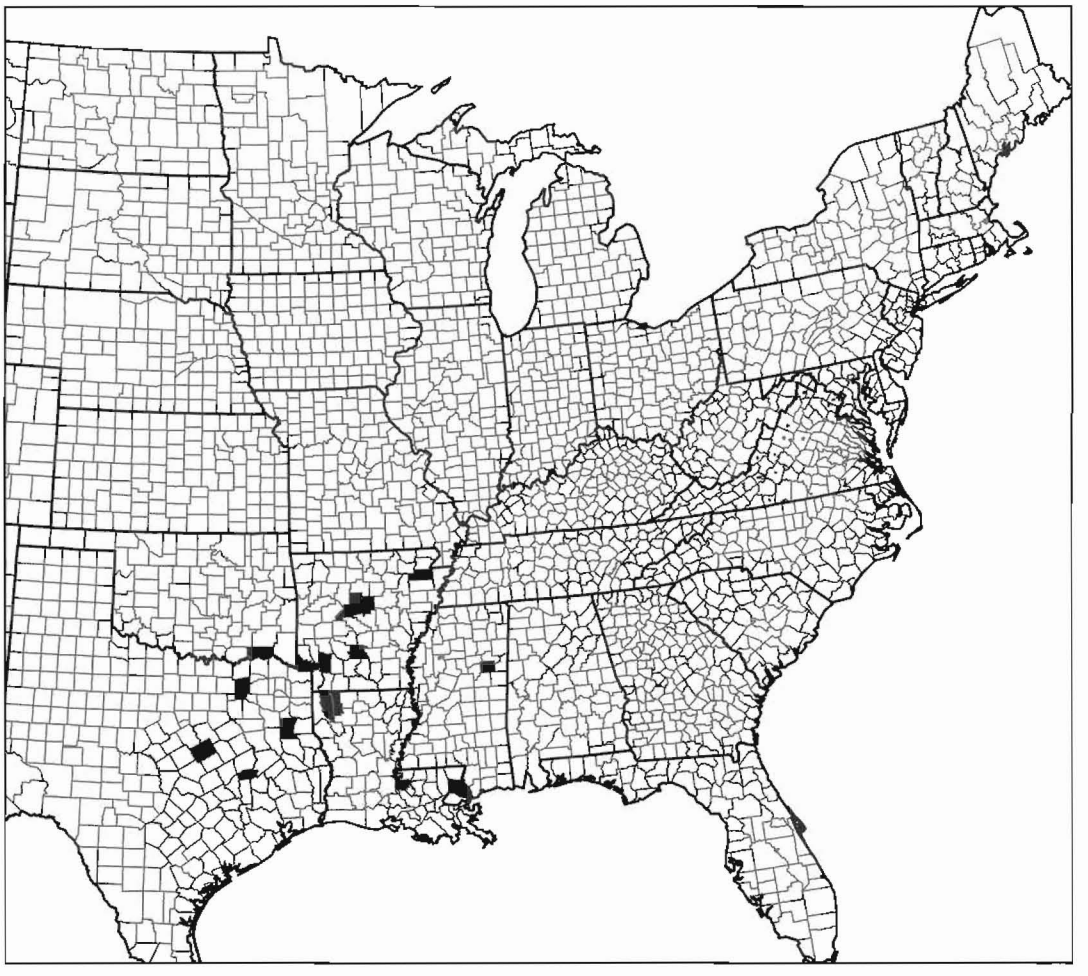

Fig. 5. Distribution of *Efferia nemoralis* by county and parish.

long, slender, black bristles directed posteriorly.

Epandrium with deep apical notch, as in Fig. 4B. Gonocoxite with posteroventral lobe narrow, more or less parallel-sided; apex surpassing that of anterodorsal lobe. Gonostylus long, surpassing gonocoxite by distance approximating length of apical gonocoxite lobes (Fig. 4C). Aedeagus sharply hooked and somewhat sigmoid basally (Fig. 4D).

Type material.—None of the female syntypes were found. One specimen from a syntype series of four males located at the Ohio State University Insect Collection is hereby designated lectotype for clarification and to ensure stabilization in nomenclature. It is labeled "New Roads, La, July 14–18'05/Jas. S Hine, Collector/COTYPE" [red label]/*Erax nemoralis* Hine [handwritten, with black border]/Lectotype Male [red type], Diptera: Asilidae, *Efferia nemoralis* (Hine)/ designated by, J. K. Barnes [red border]." New Roads, Louisiana, is located in Point Coupée Parish. The lectotype abdomen is mounted on a paper point, and the dissected genitalia are in a microvial, both attached to the same pin that holds the main body of the lectotype. Paralectotypes, 3 males, United States: "New Roads, La, July 14–18'05/Jas. S

Hine, Collector/COTYPE [red label]/ Paralectotype Male [red type], Diptera: Asilidae, *Efferia nemoralis* (Hine)/det. J. K. Barnes [red border]." The lectotype and paralectotypes range in length from 24.4 to 25.0 mm; their wings range from 15.1 to 16.5 mm long. The lectotype wing is 16.5 mm long.

Other specimens examined.—ARKANSAS. Conway Co.: Pointe Remove, 27 July 2003, H. Raney (1 ♂, UAAM). Craighead Co.: Hatchie Coon, 18 July 2003, N. Lavers (1 ♂, UAAM), 24 August 2003, N. Lavers (1 ♂, UAAM). Dallas Co.: sweepings, 15 August 1960, P. Deema (1 ♂, UAAM). Faulkner Co.: Camp Robinson, 21 July 2003, B. Baldwin (1 ♂, UAAM); Camp Robinson Wildlife Development Area, 26 July 2003, (1 ♂, UAAM). Hempstead Co.: cotton, 1 July 1959, (1 ♂, UAAM); sweepings, 10 August 1960, P. Deema (1 ♂, UAAM); Rick Evans Grandview Prairie, 400 ft., 25 May–2 June 2004, J. K. Barnes (1 ♂, UAAM), 2–14 June 2004, J. K. Barnes (1 ♂, UAAM), 18 June–2 July 2004, J. K. Barnes (3 ♂, UAAM), 26 August–7 September 2004, J. K. Barnes (1 ♂, UAAM). Little River Co.: weeds, 4 July 1961, (2 ♂, UAAM). Perry Co.: Harris Brake Wildlife Management Area, 19 July 2003, H. Raney (1 ♂, UAAM).

LOUISIANA. Bossier Parish: Barksdale Air Force Base, 3 June 1998, D. M. Pollock (3 ♂, MEMU). St. Tammany Parish: Madisonville, 11 June 1951, P. Beamers (1 ♂, SEMC). Webster Parish: Lake Bistineau State Park, 22 May 1996, M. MacGown (1 ♂, MEMU).

MISSISSIPPI. Oktibbeha Co.: Starkville, 22 June 1982, R. L. Brown (1 ♂, MEMU); State College, July 1948, Simmons (1 ♂, MEMU).

OKLAHOMA. Choctaw Co.: Hugo, 20 June 1934, A. E. Pritchard (1 ♂, USNM).

TEXAS. Hunt Co.: Greenville, 10 June 1935, (2 ♂, TAMU), 13 June 1935, (6 ♂, TAMU; 2 ♂, USNM). Madison Co.: 21 June 1931, Bibby & Tate (1 ♂, TAMU); S. Bromley (1 ♂, USNM). McLennan Co.: Waco, 22 June 1948, P. A. Glick (1 ♂, USNM). Rusk Co.: Tatum, 8 June 1949, D. J. & J. N. Knull (1 ♂, OSUC). Co. unknown: Liberty, 10 June 1934 (8 ♂, TAMU).

Distribution (Fig. 5).—Nearctic: United States (Arkansas, Louisiana, Mississippi, Oklahoma, Texas).

Note.—The mystax and the long ventral hairs of the femora and tibiae are usually straw yellow, although in some specimens they appear to be sordid white. They are usually distinctly paler than in specimens of *E. plena*.

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