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A NEW SPECIES OF *EUPHYES* SCUDDER FROM WESTERN MEXICO (HESPERIIDAE: HESPERIINAE)

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ABSTRACT. A new species of *Euphyes* Scudder 1872 is described from seven males and four females from the western Mexican states of Oaxaca, Guerrero, Michoacán and Nayarit. It has been found in tropical deciduous forest and thorn forest from 100–680 m elevation.

RESUMEN. Se describe una especie nueva de *Euphyes* Scudder 1872 a partir de siete machos y cuatro hembras provenientes de los estados occidentales Mexicanos de Oaxaca, Guerrero, Michoacán y Nayarit. Se encuentra esta especie en bosque tropical subperennifolia y caducifolia, entre 100–680 msnm.

Additional key words: biogeography, butterflies, skippers, systematics, taxonomy.

The Mexican fauna of skipper butterflies (Hesperiidae) is slowly becoming better known. Fieldwork by John Kemner in Mexico between 1988 and 1995 clearly demonstrated what potential remains for the study of the Hesperiidae in that country. During those years in the field, Kemner collected specimens of over 15 species of skippers that proved to be new to science, almost entirely in Oaxaca. Four of these species have been named to honor Kemner and his persistent collecting efforts (see Freeman 1990; Steinhauser 1991, 1996; Burns 1992). The new species of *Euphyes* Scudder 1872 described below is yet another example of a new species taken by Kemner in Oaxaca, and has since been found to occur as far north in western Mexico as Nayarit.

While the fauna of Papilionoidea in the Sierra de Juarez, Oaxaca and Sierra de Atoyac, Guerrero is now surprisingly well known (see Luis et al. 1991 and Vargas et al. 1991), the Hesperiidae were not included in those studies. Recent studies in Jalisco and Colima states have included the Hesperiidae (see Vargas et al. 1996 and Warren et al. 1998). The first known collected specimen of this new *Euphyes* species was collected by Armando Luis Martínez (Museo de Zoología [MZFC], Universidad Nacional Autonóma de México, Mexico City) in Guerrero in 1985, but was not discovered among papered material at the MZFC by ADW until 1997. Hugh Avery Freeman (Garland, Texas) was the first to recognize this *Euphyes* species as being undescribed, based on two males collected by John Kemner in Oaxaca in 1989. Freeman subsequently forwarded specimens to SRS for eventual description. It has subsequently been taken in the Balsas depression in Michoacán on several occasions (at two localities) by Lamberto González Cota and Maximo Martínez (Uruapan, Michoacán), and recently as far north as southern Nayarit. All localities where this new species has been found are composed of seasonally dry tropical deciduous forest, or thorn forest at Rancho Nuevo, Michoacán. Additionally, permanent small streams or rivers flow through these habitats (except perhaps at Candelaria, with which we are not familiar).

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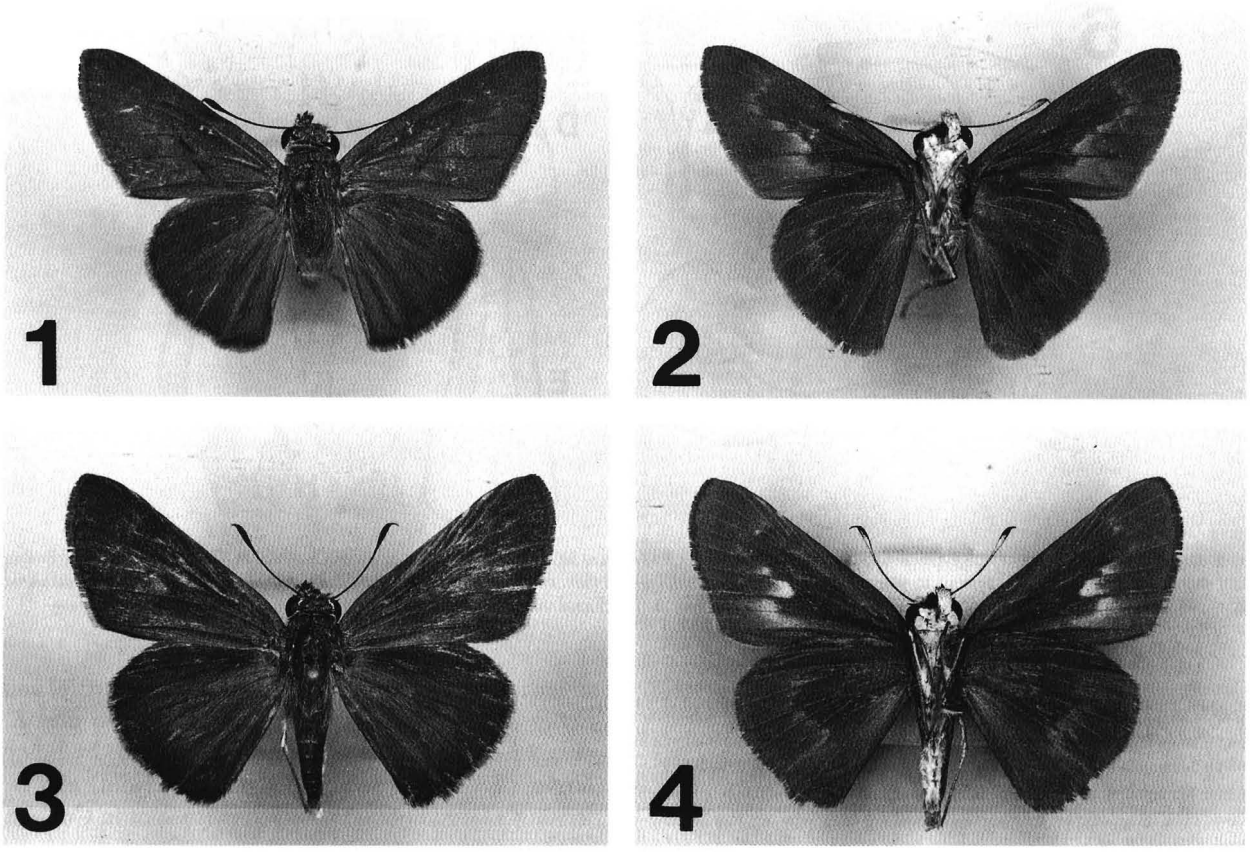
Euphyes canda Steinhauser & A. Warren, new species

Description. Male: Forewing length by width varies from 19.5 × 9.5 mm (holotype) to 17.5 × 9 mm (in two paratypes), averaging 18.43 × 9.29 mm (N = 7). Dorsal surface (Fig. 1): Forewing silky brown with sparse ochreous scales on basal third of Cu2–1A and basal fifth of Cu1–Cu2, proximad of stigma. Faint indications of a discal band of paler spots from M2–M3 to Cu1–Cu2. Narrow tripartite black stigma (Fig. 5) rather prominent and offset slightly at Cu2; the upper section (Cu1–Cu2) distally bordered by an area of upturned scales forming a vague dull gray patch about twice the width of the stigma. Fringes concolorous at apex, becoming slightly paler and grayish at tornus. Hindwing same brown as forewing, unmarked, rather evenly covered with long brown hair-like scales. Fringes slightly paler and grayish. Ventral surface (Fig. 2): Forewing rufous brown, darker in discal cell and basad of poorly defined pale discal band which extends from M2–M3 to 2A, becoming much wider in Cu2–2A but not reaching termen. Pale discal band faintly continued forward at right angle into M1–M2, R5–M1, R4–R5. Fringes concolorous, becoming slightly paler at tornus. Hindwing same rufous brown color as forewing: poorly defined narrow, curved, discal band of pale spots from Rs to 1A; ground color slightly paler distad of discal band, somewhat grayish in 1A–2A and anal cell. Fringe concolorous, becoming paler at tornus. Head brown with admixed whitish scales around eyes and base of antennae, white beneath eyes. Palpi flattened, third segment short, stout, barely protruding above hairs of second; brown above, heavily scaled with white beneath. Antennae about half length of costa, nearly reaching end of Sc; shaft brown above, checkered brown and white beneath.



FIGS. 1–4. Adults of *Euphyes canda*, new species. **1** (dorsal), **2** (ventral), holotype ♂ from MEXICO: Oaxaca: 2 miles north of Candelaria, 1800 ft., 29 Oct 1989, John Kemner. **3** (dorsal), **4** (ventral), paratype ♀ from MEXICO: Guerrero: Mpio. Atoyac: Río Santiago, 680 m, 5 May 1985, Armando Luis-M.

Club stout, dark brown above, checkered brown and white beneath, about one-third of shaft length; apiculus reddish brown, about 1.5 times club width, nudum varies from 7/8 (holotype and three paratypes) to 8/9 (one paratype), averaging 15.6 segments; N = 8. Thorax and abdomen brown above, whitish beneath; legs brown, overscaled white or buff on one side; mid-tibiae with single pair of spurs, hind-tibiae with two pairs, the upper pair shorter. Genitalia (Fig. 6) of general *Euphyes* form (see Shuey 1993). Uncus shallowly bifurcate (Fig. 6D); at distal end, the dorsal half of each arm projects laterally beyond ventral half, the ventral edge of this projection appears as a short dark line (or small lateral posterior suture) in lateral view (Fig. 6A). Gnathos deeply bifurcate, protrudes caudad slightly beyond uncus, distally pointed in ventral view (Fig. 6E). Valvae symmetrical (Fig. 6C); harpe produced dorsad as broad rounded process; sacculus not produced dorsad (Fig. 6B). Saccus moderately long, slender. Penis long; vesica opening dorsad; vesica with eight small, separated, sclerotized teeth as cornuti (Figs. 6F–G). Juxta prominent and well sclerotized (Fig. 6F–H). **Female:** Forewing length by width varies from 19.5 × 10.5 mm to 21 × 11 mm, averaging 20.25 × 10.63 (N = 4). Dorsal (Fig. 3) and ventral surfaces (Fig. 4) as male, but with more rounded wings and lacking stigma. Antennal nudum varies from 7/8 (3 paratypes) to 7/9 (one paratype), averaging 15.25 (N = 4). Genitalia (Fig. 7A–B): Corpus bursae rather elongate, non-erect, rounded at distal end, and constricted at junction with ductus. Ductus bursae elongate, straight, well sclerotized dorsally (and ventrally caudad of the ductus seminalis); of a fairly uniform width the entire length but slightly restricted at caudal end. Ductus bursae without lateral projections or any indication of posterior bending. Lamella antevaginalis sclerotized, poorly developed, bending anteriorly to cover part of ductus. Lamella postvaginalis well sclerotized, forming a V-shaped structure typical for *Euphyes* (see Shuey 1993 for illustrations of other female *Euphyes* genitalia). Papillae annales fairly short, more or less flattened posteriorly (Fig. 7A).

Types. Holotype ♂ (Figs. 1–2): MEXICO: OAXACA: 2 miles north of Candelaria, 1800 ft. elev.; 29 October 1989, leg John Kemner, bearing the following labels: hand printed white label, MEX:

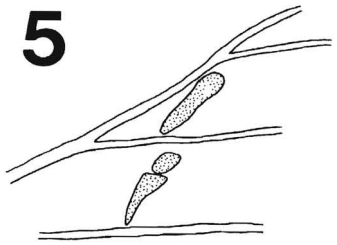


FIG. 5. Forewing stigma (dorsal view) and associated wing veins of holotype ♂ of *Euphyes canda*, new species. Data as in Figs. 1–2.

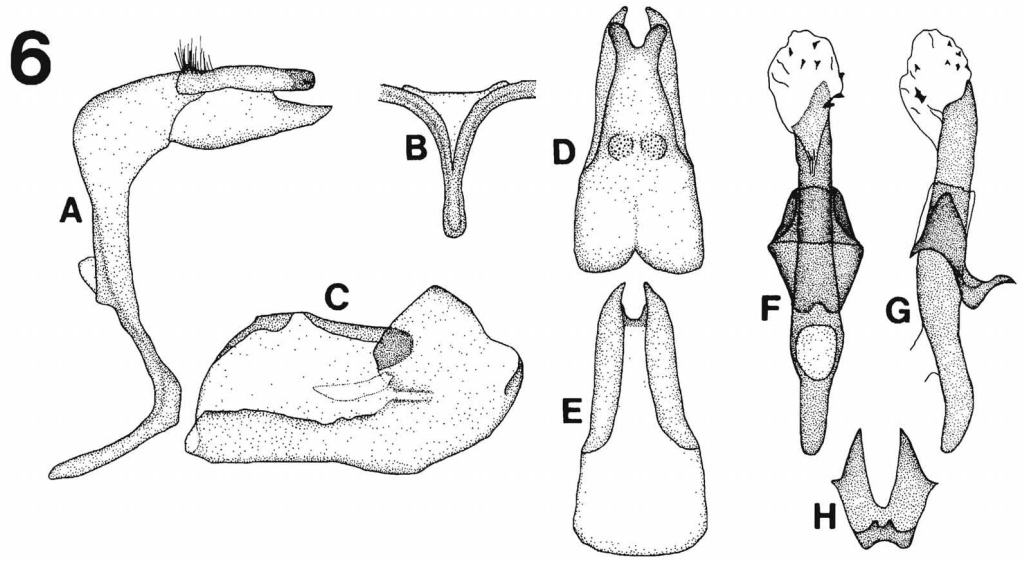


FIG. 6. Male genitalia of holotype of *Euphyes canda*, new species (data as in Figs. 1–2), genitalia vial SRS-3798. **A,** Uncus, gnathos, tegumen, and saccus in ventral view. **B,** Saccus in ventral view. **C,** Right valve, medial view of inner surface. **D,** Uncus, tegumen and gnathos in dorsal view; **E,** same, in ventral view. **F,** Penis, juxta and everted vesica with cornutus, dorsal view; **G,** same, in left lateral view. **H,** Juxta in ventral view.

Oaxaca - 2 mi. N. Candelaria—29 Oct. 1989 John Kemner—El. 1800′; hand printed red label, Holotype—*Euphyes canda* ♂ - S. R. Steinhauser & A. D. Warren; printed and hand printed white label, Allyn Museum Acc. 1990–12; printed and hand printed white label, Allyn Museum Photo No. 930818A,20. Paratypes N = 10 (6 ♂, 4 ♀): same data as holotype (1 ♂); GUERRERO: Mpio. Atoyac: Río Santiago, 680 m, 5 May 1985, Armando Luis-M. (1 ♀, Figs. 3–4); MICHOACAN: Mpio. Arteaga: Rancho Nuevo, ± 600 m, 2 Mar 1997 Lamberto González-Cota [LGC] (1 ♂); same locality and collector, 8 Mar 1997 (1♂); same locality and collector, 10 Nov 1996 (1 ♀); Mpio. Arteaga: El Higueral, 650 m, 28 Jun 1996, LGC (1 ♂, 1 ♀); same locality and collector, 25 May 1997 (1 ♂); same locality and collector, 5 Sept 1996 (1 ♀); NAYARIT: Mpio. San Blas: Mecatan, Ojo de Agua, 100 m, 22 Jun 2000, Tom W. Ortenburger (1 ♂). The holotype and one ♀ paratype are deposited in the Allyn Museum of Entomology; two ♂ and two ♀ paratypes will be deposited in the MZFC (Mexico City); one ♂ in the collection of LGC (Uruapan, Michoacán); and the remainder, temporarily, in the collection of ADW.

Etymology. The name *canda* is a meaningless combination of letters suggested by the type locality, Candelaria.

Diagnosis and discussion. *Euphyes canda* might be confused with several of the dark species of *Arotis* Mabille, 1904, from which it can be distinguished by its more elongate forewing, form of stigma, its longer and more slender penis, and by the "lateral posterior suture" on the uncus. These last three characters were used by Shuey (1987, 1993) to distinguish *Arotis* from *Euphyes*. The *Euphyes* species superficially closest to *E. canda* are *E. leptosema* (Mabille), *E. peneia* (Godman), *E. fumata* Mielke, *E. eberti* Mielke and *E. ampa* Evans. *Euphyes canda* differs superficially from *E. leptosema* in having fainter and less extensive ventral wing markings; from *E. peneia* in being more rufous than ochreous ventrally; from *E. fumata* and *E. eberti* in having a tripartite stigma (rather than bipartite) and being larger (forewing length of *E. fumata* and *E. eberti* is 15–16.5 mm); and from *E. ampa*, by being larger (*E. ampa* forewing length of 17 mm) and by lacking a large double, pale yellowish spot in Cu2–1A of the ventral forewing.

Genitalically, the terminal configuration of the penis of *E. canda* differs from *E. leptosema*, *E. peneia*, *E. fumata* and *E. eberti* in lacking spines. Its overall valva shape is similar to *E. subferruginea* (Hayward) and *E. eberti* but with a simple sacculus instead of the greatly produced and dentate sacculus of *E. eberti* (found also in *E. ampa*). There are other genital differences, but these should suffice to distinguish *E. canda* from others.

We have placed *canda* in the genus *Euphyes* rather than *Arotis*, primarily because of its long slender penis, pointed tips of the gnathos, and its uncus prongs with a small lateral posterior suture, noted as a probable synapomorphy for *Euphyes* by Shuey (1993). At first glance, *E. canda* does not appear to fit well into any of the species groups proposed by Mielke (1972:182–183) and Shuey (1993:271–272). It has the cornutus form similar to the *dion* (W. H. Edwards) and *subferruginea* groups, but not the tawny wing pattern of the former, and has a stigma unlike the latter. The stigma of *E. canda* is similar to that of *E. peneia* and *E. leptosema*, but the valvae are very different, quite elongate in the latter two, shorter and broad in *E. canda*. A future phylogenetic revision of the genus, through direct examination of all taxa and elaboration of Shuey's (1993)

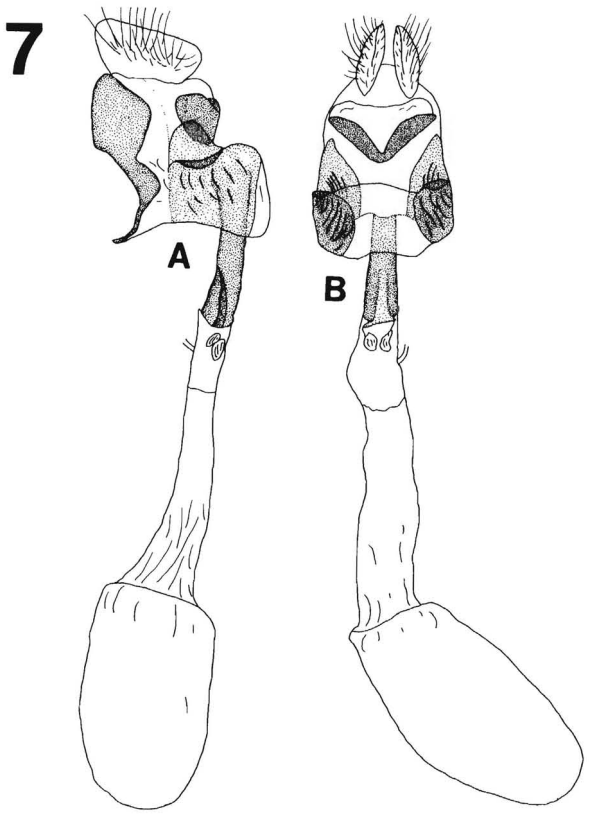


FIG. 7 Female genitalia of *Euphyes canda*, new species, from MEXICO: Michoacán: Mpio. Arteaga: El Higueral, 650m, 28 Jun 1996, Lamberto González-C. ADW genitalia vial # 98-69. **A,** Papillae anales, lamella, ductus bursae (showing end of ductus seminalis), and corpus bursae in left lateral view; **B,** same in ventral view.

data matrix, would hopefully clarify *E. canda's* position, as well as the species-group relationships in the genus.

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