

A NEW SPECIES OF *HEMILEUCA* FROM THE SOUTHWESTERN UNITED STATES (SATURNIIDAE)

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ABSTRACT. *Hemileuca griffini* Tuskes which occurs in southern Utah and northern Arizona was collected for the first time in 1974. The adult moth is a black and white day flying saturniid which is active during September and October. The larval hostplant is black brush, *Coleogyne ramosissima*. This species has a unique taxonomic position in that both the adult and larva exhibit morphological characters which are intermediate to the *Pseudohazis* and *Hemileuca* groups, thus, a continuum of characters exists between these two previously separated genera.

The genus *Hemileuca* consists of 23 described species, 16 of which have partial or complete distributional patterns north of Mexico. The moths within this genus are large to moderate in size, and exhibit a great deal of hostplant and habitat diversity. Adults are characterized by having the labial palpi fused to each other forming a small unsegmented bilobed structure; also, the male has bipectinate antennae. Members of *Coloradia*, the genus most closely related to *Hemileuca*, have labial palpi which are separate, and males have antennae which are quadripectinate.

The last *Hemileuca* described as a distinct species was *chinatiensis* (Tinkham), in 1943. The significance of *H. chinatiensis* as a species with genitalic characters intermediate between *Pseudohazis* and *Hemileuca* was overlooked by Tinkham; not until Ferguson (1971) was its taxonomic position made clear. Michener (1962) combined the genera *Pseudohazis* and *Hemileuca* on the basis of their morphological similarity, but made no mention of *chinatiensis*. Although Michener included four subgenera within *Hemileuca* Ferguson chose to abandon the subgeneric names and to consider them as species groups.

It is the purpose of this paper to describe a new species of *Hemileuca* collected for the first time in 1974, and to present additional morphological evidence to support the merger of *Hemileuca* and *Pseudohazis*. The new species of *Hemileuca* described in this paper is named after Mr. Bruce Griffin, who collected the first specimens.

***Hemileuca griffini* Tuskes, new species**

Holotype: Male (Figs. 1a,b). **HEAD:** Eyes dark brown. Frontal and vertex hairs rust red, clypeal hairs dark brown to rust red. Antennae, bipectinate, 0.67 cm long; shaft orange ventrally, dark brown dorsally, pectiniform processes black and finely plumose. **THORAX:** Dorsally clothed with black hairs; long white hairs mixed with tufts of rust red hairs at base of secondaries. Collar, white with rust

red hairs anteriorly and posteriorly. Legs, clothed with black hairs; anterior portion of pro- and metathoracic legs with long rust red hairs. ABDOMEN: Abdominal segments I-VI lustrous black, posterior margin of pleura I-VI lightly fringed with white hairs. Terga I-VI black and sparsely clothed with red hairs. Terga VII and VIII rust red. FOREWINGS: 2.54 cm long, wings approximately 60% white and 40% black. Veins black. Marginal area black, submarginal area white, but traversed by black veins; postmedial line black and continuous. Distal portion of discal cell with black band extending from postmedial line to costa. Coastal area black. Area between costa and subcostal area adjacent to discal cell white. Antemedial line black and extending from costa, curving out at base of discal cell and continuing transversely to hind margin. Basal patch tear-shaped, black and free standing. Basal portion below basal patch clothed with long black and white hairs to hind margin of wing. Ventral surface similar to dorsal. HINDWINGS: 1.87 cm long and approximately 50% white and 50% black. Marginal and submarginal areas similar to those of primaries. Postmedial line diverging in area of the discal cell, forming a circular area with a white center just distal to the discal cell. Basal area black, clothed with long black and white hairs extending almost to the postmedial line along the interior margin of wing. MALE GENITALIA: (Fig. 5) Uncus trilobed, dorsal and anterior portion covered with bristles; wide at base, narrowing at apex. Lateral process of transtilla narrow, and not extending past apex of uncus. Transtilla fused, but with shallow groove at apex of medial process. Valves prominent and distinctly winged, apex slightly rounded and not pinnacle-shaped; upper half of ventral margin heavily setose. Four-eight setae $\frac{3}{4}$ as long or longer than juxta, located basolaterally. Entire genitalic structure lightly sclerotized.

Allotype: Female (Figs. 2a,b). HEAD: Eyes dark brown. Entire head covered with rust red scales. Antennae, bipectinate, 0.70 cm long; shaft orange both dorsally and ventrally pectiniform processes orange to dark brown, and not finely plumose. THORAX: Dorsally clothed with black hairs, long white hairs at base of primaries and secondaries. Long, large tufts of orange hairs at base of secondaries. Orange hairs scattered on posterior portion of thorax. Collar rust red. Legs, similar to those of male, but with more red present on femur of metathoracic leg than on holotype. ABDOMEN: Abdominal segments I-VII lustrous black with terga I-VII lightly fringed with rust red hairs. Terga of segment VIII rust red. Pleura I-VIII lustrous black. FOREWINGS: 2.83 cm long. Similar to those of male, but with the following exceptions: Marginal area more heavily marked with black scales. Black margin continuous around entire wing. HINDWINGS: 2.04 cm long. Similar to those of male but margins more heavily marked with black scales.

PARATYPE VARIATION. The length of the forewing in the 20 males examined averaged 2.54 cm, and ranged from 2.31 to 3.14 cm. The markings on the forewings exhibited little variation, except for the black basal patch. In some individuals the basal patch is slightly more prominent than that of the specimen illustrated (Fig. 1), but in 15 of the 21 paratypes examined it was less developed or almost absent. Although the pattern is uniform, the intensity of the scales differ. The wings of what are assumed to be older specimens are cream colored, rather than white, and often partially transparent. The hindwings show more variation than the forewings. Paratypes from Mexican Hat and Bitter Springs Rd. appears similar, but two males from Pierce Ferry Rd. are much darker. The forewings of 16 females examined averaged 2.75 cm, and ranged from 2.67 to 3.13 cm in length. As in the males the

forewings showed relatively little variation, but the hindwing differed markedly. In most individuals the hindwings were approximately 50% black and 50% white, while in others they were about 80% black.

Types: HOLOTYPE: ♂ ca. 6 mi. S.W. of Mexican Hat, San Juan Co., Utah. Elev. 4800'. Sept. 2, 1974. Bruce Griffin, Collector. ALLOTYPE: ♀ ca. 0.5 mi. E. of Jct. 89A and 89 on Hwy 89, near Bitter Springs. Coconino Co., Arizona. Elev. 5200'. Collected as 3rd instar larva by B. Griffin and Ken Hansen on *Coleogyne ramosissima*, May 3, 1975, and reared to maturity on *Cercocarpa betuloides* by Paul Tuskes, emerged Oct. 12, 1976. PARATYPES: Utah: 3 ♂♂, same data as holotype, 4 ♂♂ and 3 ♀♀ same locality as type, Sept. 8, 1976, Kilian Roever; 8 ♂♂ and 4 ♀♀, Rt. 163, 7 mi. S.W. of Mexican Hat, San Juan Co., Sept. 8, 1974, K. Roever. Arizona: 3 ♂♂ and 5 ♀♀ same data as allotype; 2 ♂♂ and 3 ♀♀, Pierce Ferry Rd., 32 mi. N.E. Rt. 83, Mohave Co., K. Roever; 2 ♀♀, Rt. 160, 42 mi. E.N.E. of Keyenta, Navajo Co., Sept. 8, 1974, K. Roever.

The types were deposited at the Los Angeles County Museum of Natural History. Paratypes were deposited at the following institutions: American Museum of Natural History, Los Angeles County Museum of Natural History, Dept. of Entomology, University of California, Davis, and the United States National Museum.

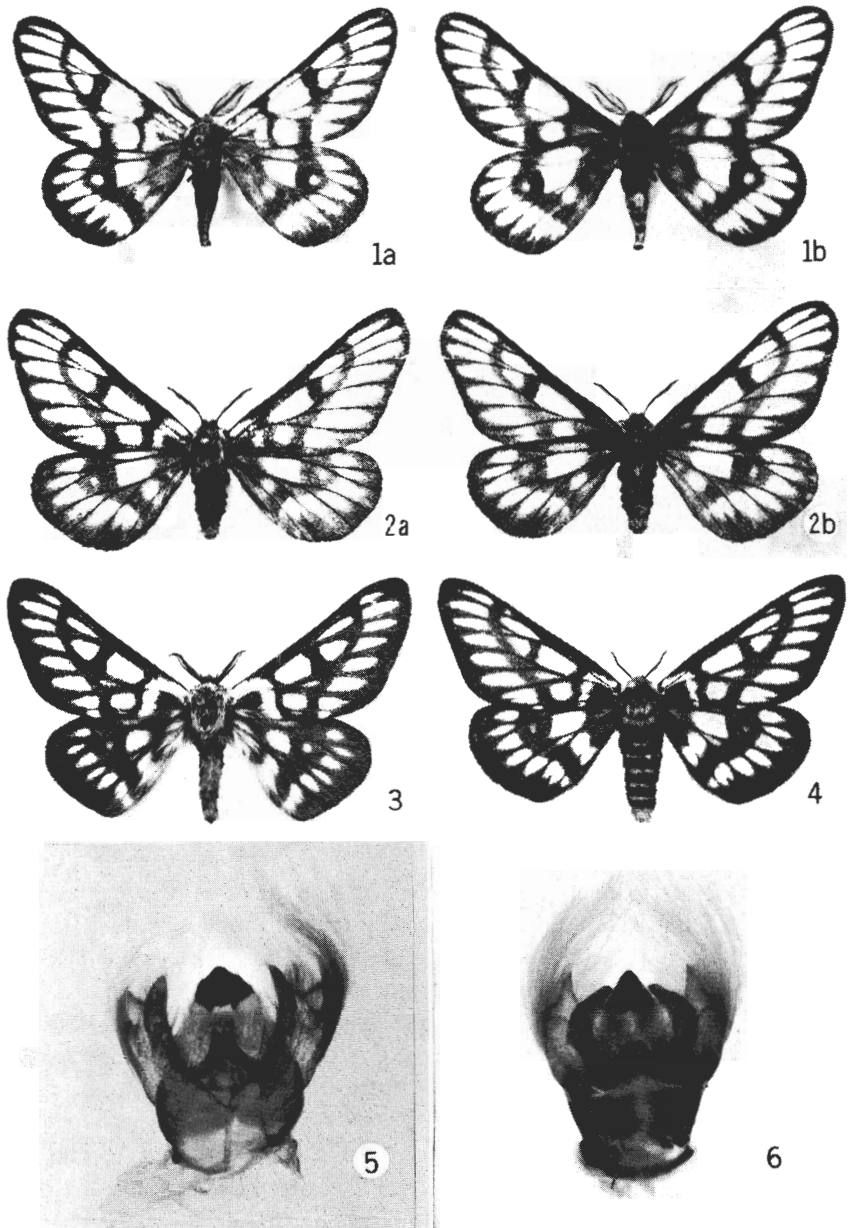
Larval Description—Last Instar

Head: Shiny black with numerous white setae, diameter, 4–5 mm. Clypeus black. **Body:** Length 45–55 mm, width, 7–8 mm. Ventral surface gray to light brown with an orange cast. Sublateral scoli black; lateral scoli black with slight yellow cast at tips, dorsal scoli of rosette type, yellow with black center. Body with three distinct lateral cream to white bands. Band I from prothoracic segment to caudal segment, passing through sublateral scoli. Band II broken by intersegmental area and located slightly ventral to lateral scoli. Band III lightly pigmented broken band, but still obvious, located midway between dorsal and lateral scoli. Segmental area with cream to white colored paniculum, especially common on lateral areas. Secondary setae white. True legs black. Prolegs gray to black. Spiracles orange. Ground color black.

Characteristics of *H. griffini* in relation to other *Hemileuca*

The trilobed uncus of *griffini* (Fig. 5) is typical of the *Pseudohazis* group. The only *Hemileuca* to have a trilobed uncus outside of the *Pseudohazis* group is *H. electra* Wright. The uncus of *electra* is typically bilobed, but apparently some aberrant males have trilobed unci (Ferguson, 1971). The transtilla of *griffini* is shallowly grooved at the apex of the medial process, and this characteristic appears to be intermediate between the two subgenera. Fused transtilla are common to all *Hemileuca* with the exception of *diana* and *grotei*. Both of these species have bilobed transtilla which are rounded and short compared to the long thin bilobed structure of *Pseudohazis*. The valves of *griffini* are prominent and distinctly winged, showing much greater development than the typical rounded valves of *Pseudohazis* but they are not as large as those of most *Hemileuca*.

The genitalia and adult phenotype of *griffini* show the greatest



Figs. 1-6. 1, Dorsal (1a) and ventral (1b) view of male *H. griffini* (Holotype). 2, Dorsal (2a) and ventral (2b) view of female *H. griffini* (Allotype). 3, Dorsal view of male *H. chinatiensis*. 4, Dorsal view of female *H. chinatiensis*. 5, Male genitalia of *H. griffini* (Holotype). 6, Male genitalia of *H. chinatiensis*.

similarity to those of *chinatiensis* (Figs. 3, 4 & 6). In *griffini*, the medial process of the transtilla is frequently less sclerotized and not as stout as that of *chinatiensis*. In addition, the medial process appears narrower at the tip, with a slightly deeper groove than that found in *chinatiensis*. The apices of the valves are variable: most are rounded, while others have a more prominent constriction similar to, but less developed than, those of *chinatiensis*.

Adult *griffini* are 25% smaller than those of *chinatiensis*. Phenotypically *griffini* males (Figs. 1a,b) can be distinguished from those of *chinatiensis* (Fig. 3) in several ways: The basal black patch on the forewing of *griffini* is usually free standing or almost absent, while in *chinatiensis* the patch continues uninterrupted to the hind margin of the wing. On the dorsal surface of *chinatiensis* the area between the costa and radius adjacent to the discal cell is black while in *griffini* there is a white patch between the costa and radius adjacent to the discal cell. The veins proximal to the post medial line in *griffini* are narrow and usually black; the veins of *chinatiensis* are also black, but the scaling diffuses out from the veins giving them the appearance of being 3 to 4 times wider than those of *griffini*. The black margin of the forewings of *chinatiensis* is from $\frac{1}{2}$ to $1\frac{1}{2}$ times wider than that of *griffini*. In general, the wings of *griffini* are approximately 40% black and 60% white while in *chinatiensis* they are about 60% black and 40% white. The dorsal portion of the abdomen of *griffini* may be covered with long rust red and/or black hairs. Thus, the abdomen may vary from black to light orange, with prominent rust red fringe around the anterior portion of each tergum. The last two segments are covered with long red hairs which form a tuft. The abdominal terga of *chinatiensis* are a uniform rust red in color. These are but a few of the characters which may be used to separate *griffini* males from those of *chinatiensis*.

Although the males of *griffini* and *chinatiensis* are very distinct, the females are similar, with only a few obvious differences. The red abdominal banding, prominent in *chinatiensis* females (Fig. 4), is less developed or absent in *griffini* (Fig. 2). In *griffini* the red hairs are mixed with black hairs and spread randomly over the entire terga but become more abundant near the pleura, giving a diffused red appearance to the lateral surface, or the abdomen may be completely black except for the presence of short red hairs at the tip of the abdomen. At present *griffini* and *chinatiensis* are thought to be allopatric, with the closest population of *chinatiensis* occurring 350 to 400 miles to the southeast, in western Texas.

Examination of last instar *griffini* larvae indicated that they are similar

in most respects to *Hemileuca*. That is, secondary setae frequently, but not always, arise from a pinaculum which is either white or cream colored. Of 36 larvae examined, 31 had white pinacula, the remainder were colored, giving them an appearance similar to that of *Pseudohazis*. Thus, although most individuals appear similar to larvae of *chinatiensis*, some individuals appear similar to *H. hera* (Harris). After examination of the larvae of 16 of the 17 species of *Hemileuca* occurring north of Mexico, this character has been found to be variable only in the larvae of *griffini*.

The two genera, *Hemileuca* Walker, 1855 and *Pseudohazis* Grote & Robinson, 1866 were joined by Michener in 1952. Michener based his decision on external morphological characters. Ferguson (1971) showed the intermediate characteristics of *chinatiensis* in which the genitalia are similar to *Hemileuca* but the adult phenotype is that of *Pseudohazis*. With the discovery and description of *griffini*, a second species with intermediate adult and larval characters has been found. The genitalia of *griffini* are more similar to genitalia of males of the *Pseudohazis* group than those of *chinatiensis*. In addition, the larvae of *griffini* exhibit morphological characters common to both species groups. Thus, a continuum of adult and larval characters exists between the two previously separated genera, *Hemileuca* and *Pseudohazis*.

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