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NOCTUID MOTHS OF THE SCOPULEPES GROUP
OF HEMEROPLANIS HÜBNER

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Three distinct species of the American genus *Hemeroplanis* Hübner (family Noctuidae) have been confused in the literature and in collections for more than 50 years, the specimens being identified as *Hemeroplanis scopulepes* (Haworth) or as one or another of its synonyms. Specific differences exist, however, in the legs and genitalia of the males and in the maculation of the wings of the females. These differences are discussed and illustrated in this paper.

The three species—*H. scopulepes* (Haworth) (= *H. pyralis* Hübner, the only originally included species, and therefore the type of the genus), *H. aurora* (Walker), and *H. zayasi*, new species—are treated herein as the *scopulepes* group. The males of the species of this group have the tibiae of the hindlegs modified—each is decurved toward the apex and bears prominent dorsal hair tufts—while in the other species presently placed in the genus, the hindlegs are not so modified. In addition, in males of the *scopulepes* group (except males of the *geometralis* form of *scopulepes*) the coloration of the forewing basad of the postmedial line is some shade of yellow,² whereas in the other

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² The author has seen specimens indicating that at least in some specimens this color may be some olivaceous shade, which fades after the specimens are killed.

species of *Hemeroplanis* the coloration of that portion of the forewing (or at least the median area of the wing) is some shade of brown or gray. Characters for group separation of the females, if existent, have not been recognized. Some of the females of the *scopulepes* group are colored as in the males, and may therefore be separated from females of other species of *Hemeroplanis*, but other females of this group are not so distinctly colored.

Nothing is known of the immature stages or the larval food plants of either the *scopulepes* group or the other species presently placed in *Hemeroplanis*.

A total of 127 specimens were available for study. Most were from the collections of the U.S. National Museum, but 25 specimens from the British Museum (Natural History) were sent by D. S. Fletcher, 1 specimen of *aurora* was loaned by J. G. Franclemont from the collection of the Department of Entomology, Cornell University, and 2 specimens were received from the private collection of Fernando de Zayas Muños of Havana, Cuba. Most of the line drawings were prepared by Arthur Cushman of the Entomology Research Division. The illustration of the genitalia of the type of *aurora* is presented through the courtesy of Mr. Fletcher. The adults illustrated on plate 1 were photographed by J. R. Foy, Photographic Service Section, Photograph Division, Office of Information, U.S. Department of Agriculture.

Key to the Species of the *scopulepes* Group

MALES

1. Middle tibia longer than basal segment of tarsus (fig. 3); a tuft of hairs present on lower surface of forewing in cell between bases of Cu_1 and Cu_2 .

scopulepes

Middle tibia modified, distinctly shorter than basal segment of tarsus (figs. 1 and 2); lower surface of forewing lacking tuft of hairs as above . . . 2

2. Inner (posterior) spur of middle tibia very long, as long as basal segment of tarsus (fig. 2); basal segment of tarsus not distinctly enlarged (fig. 2); apex of femur of hindleg not bearing a dark tuft of scales (fig. 2); uncus of genitalia short, stout, somewhat sickle shaped in lateral view (fig. 5c) **aurora**

Inner (posterior) spur of middle tibia shorter, about one-half as long as basal segment of tarsus (fig. 1); basal segment of tarsus enlarged, approximately as broad as tibia (fig. 1); apex of femur of hindleg with a dark tuft of scales (fig. 1); uncus of genitalia more elongate, nearly straight, but slightly cygnate apically (fig. 4c) **zayasi**

FEMALES³

1. Pale median line of postmedial band of upper surface of forewing bordered basally by a brown line or linear series of dark brown spots (plate 1, fig. 5); terminal black points usually present on upper surface of both the forewing and the hindwing (plate 1, fig. 5); lower surface of hindwing usually with three distinct transverse, serrate lines (plate 1, fig. 6).

scopulepes

Pale median line of postmedial band of upper surface of forewing usually not bordered basally by a brown line or linear series of dark brown spots (plate 1, figs. 2 and 8); dark terminal line or points of hindwing usually extremely vague or absent (plate 1, figs. 2 and 8); lower surface of hindwings usually with but two distinct transverse lines, the outer line (subterminal) vague or absent (plate 1, fig. 3) 2

2. Postmedial band of upper surface of hindwing only vaguely indicated (plate 1, fig. 8); fringe of lower surface of wings darker than ground color of wings **aurora**

Postmedial band of upper surface of hindwing distinct (plate 1, fig. 2); fringe of lower surface of wings concolorous with ground color of wings . . . **zayasi**

***Hemeroplanis scopulepes* (Haworth)**

FIGURES 3, 6; PLATE 1, FIGURES 4-6

- Phytometra scopulepes* Haworth, 1810, *Lepidoptera britannica*, pt. 2, p. 260.
- Scopelopus scopulaepes* (Haworth), Stephens, 1829, *A systematic catalogue of British insects*, pt. 2, p. 110; 1829 [1830 ?], *Illustrations of British entomology*, *Haustellata*, vol. 3, p. 124.
- Hemeroplanis scopulaepes* (Haworth), Barnes and McDunnough, 1918, *Contributions to the natural history of the Lepidoptera of North America*, vol. 4, No. 2, p. 122.—McDunnough, 1938, *Check list of the Lepidoptera of Canada and the United States of America*, pt. 1, *Macrolepidoptera*, *Mem. Southern California Acad. Sci.*, vol. 1, p. 127.—Forbes, 1954, *Lepidoptera of New York and neighboring States*, pt. 3, *Memoir 329*, *Cornell University Agric. Exp. Stat.*, p. 378.
- [*Hemeroplanis* ?]⁴ *scopelopes* Seitz [1940-46 ?], *Die Gross-Schmetterlinge der Erde*, vol. 7, pl. 94, row e, 3rd fig. from right side.
- Scopelopus inops* Stephens, 1829 [1830 ?], *Illustrations of British entomology*, *Haustellata*, vol. 3, p. 124.
- Hemeroplanis pyralis* Hübner, 1818, *Zuträge zur Sammlung exotischer Schmeitlinge* [sic], *Erste Hundert*, p. 23, figs. 127-128.
- Heliolithis pyralis* (Hübner), Walker, 1857, *List of the specimens of lepidopterous insects in the collection of the British Museum*, pt. 11, p. 687.
- Pleonectyptera pyralis* (Hübner), Grote, 1872, *Trans. Amer. Ent. Soc.*, vol. 4, p. 23; 1874, *Bull. Buffalo Soc. Nat. Sci.*, vol. 2, p. 44; 1876, *Check list of the Noctuidae of America, north of Mexico*, pt. 2, p. 42 [12]; 1880, *Canadian Ent.*, vol. 12, p. 87.—Smith, 1891, *List of the Lepidoptera of boreal America*, p. 61; 1893, *U.S. Nat. Mus. Bull.* 44, p. 362.—Holland, 1903, *Moth book*, p. 246, pl. 29,

³ The characters given will probably not separate all examples, but they are the best the author can offer at present. The characters utilized in the separation of *aurora* are based on a single female.

⁴ As text is not available for the species illustrated on this plate and since specific names only are given for most of the species, it is presumed that *Hemeroplanis* probably would have been utilized. Plate 94 is one of several that were issued without text during or shortly after World War II. Seitz, the editor, is cited as author, since the individual or individuals responsible for the name *scopelopes* are unknown.

- fig. 19.—Dyar, 1902, U.S. Nat. Mus. Bull. 52, p. 207.—Smith, 1907, Trans. Amer. Ent. Soc., vol. 33, p. 368, pl. 9, figs. 1-3; 1909, The insects of New Jersey, p. 472.—Grossbeck, 1917, Bull. Amer. Mus. Nat. Hist., vol. 37, p. 67.—Barnes and McDunnough, 1917, Check list of the Lepidoptera of boreal America, p. 88.
- Hemeroplanis pyraloides* Hübner, 1823, Verzeichniss bekannter Schmettlinge [sic], p. 259.—Druce, 1890, Biologia Centrali-Americana, Insecta, Lepidoptera, Heterocera, vol. 1, pt. 85, p. 412.
- [*Hemeroplanis* ?]⁵ *pyraloides* Hübner, Seitz [1940-46 ?], Die Gross-Schmetterlinge der Erde, vol. 7, pl. 94, row e, last 2 figs. right side.
- Poaphila irrecta* Walker, 1865, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 33, p. 993.
- Apicia denticulata* Walker, 1866, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 35, p. 1544 [new synonymy].
- Coptocnemia floccalis* Zeller, 1872, Verh. Zool.-Bot. Ges. Wien, vol. 22, p. 476, tab. 2, figs. 10a and b.
- Pleonectyptera geometralis* Grote, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 24; 1874, Bull. Buffalo Soc. Nat. Sci., vol. 2, p. 44; 1876, Check list of the Noctuidae of America, north of Mexico, pt. 2, p. 42 [12].—Smith, 1891, List of the Lepidoptera of boreal America, p. 61; 1893, U.S. Nat. Mus. Bull. 44, p. 362.—Dyar, 1902, U.S. Nat. Mus. Bull. 52, p. 207.—Smith, 1907, Trans. Amer. Ent. Soc., vol. 33, p. 370; 1909, The insects of New Jersey, p. 472.—Grossbeck, 1917, Bull. Amer. Mus. Nat. Hist., vol. 37, p. 67.
- Pleonectyptera pyralis* form *geometralis* Grote, Barnes and McDunnough, 1917, Check list of the Lepidoptera of boreal America, p. 88.
- Hemeroplanis scopulaepes* form *geometralis* (Grote), McDunnough, 1938, Check list of the Lepidoptera of Canada and the United States of America, pt. 1, Macrolepidoptera, Mem. Southern California Acad. Sci., vol. 1, p. 127.
- Hemeroplanis scopulaepes* var. *geometralis* (Grote), Forbes, 1954, Lepidoptera of New York and neighboring States, pt. 3, Memoir 329, Cornell University Agric. Exp. Stat., p. 378.

DISCUSSION: This species is extremely variable in maculation, so it is not surprising that the other two species, *H. aurora* (Walker) and *H. zayasi* new species, have been confused with it in collections. Typically the ground color of the basal and median parts of the wings is some shade of yellow while the terminal part is brown, but the ground color of the entire wing may be yellowish or some shade of brown.

The name *geometralis* Grote (= *Poaphila irrecta* Walker) has been applied commonly to those specimens in which the entire upper surfaces of the wings are more or less suffused with some shade of brown. For many years these dark specimens were treated as a distinct species, but more recently they have been considered to be but a form or variety (not geographical) of *scopulepes*. It would appear, judging from the dates on the labels of the specimens under examination, that the dark specimens represent the spring and/or winter (Florida) form. In the neotropical region this form appears to be uncommon, but it does occur occasionally.

⁵ See footnote 4, p. 507.

Many of the specimens from the Antilles have the ground color entirely of some shade of yellow. There is no evidence at present, however, to indicate whether these pale specimens represent another seasonal form. If so, they probably should be named, but for the present I prefer to refer to them as "the pale form." Seitz⁶ applied the name "*pyraloides*" to two figures of the pale form on plate 94, row e of volume 7, *Die Gross-Schmetterlinge der Erde* [1940-46 ?]. *H. pyraloides* Hübner should apply only to the typical form of *scopulepes*.

In addition to the characters indicated in the key, males of *scopulepes* may be recognized by the characteristic male genitalia (fig. 6).

Length of forewing: Male 11 to 16 mm.; female 12 to 16 mm.

TYPE: The present location of the type of *scopulepes* is unknown. It has probably been lost. Haworth described the species from a single specimen, obviously a male, in the collection of W. E. Leach via the Portland Museum. As the material from both the Haworth and Leach collections is now in the British Museum (Natural History), the type of this species should be in that institution, but Fletcher has been unable to locate it in that collection.

TYPE LOCALITY: Haworth listed the type as occurring in England, "Habitat in Anglia rarissime." But he obviously believed that it was not a native species because he states in the description: "Antennae, pedesque desunt in exemplario D. Leach; at in peregrino (forte ex Americae Georgiâ) pedes postici praesingulares, subtus hirsutissimi et exacte scopulaeformes" (Antennae and legs absent in the example of Mr. Leach; but in the exotic (probably from Georgia of America) the very remarkable posterior legs very hairy underneath and precisely scopuliform). Franclemont (1951, *Proc. Ent. Soc. Washington*, vol. 53, No. 2, p. 66) discusses other American species of moths that were described by Haworth and recorded as English species.

SYNONYMICAL NOTES: *Hemeroplanis pyralis* Hübner, 1818: Type locality "Georgien in Florida." The excellent illustrations (figs. 127-128) leave no doubt as to the proper application of this name. Barnes and McDunnough (1918) were the first to place the name in the synonymy of *scopulepes* and I concur in that placement. The present location of the type of *pyralis* is unknown. It may be in the Naturhistorisches Museum, Vienna, Austria.

Hemeroplanis pyraloides Hübner, 1823: Hübner proposed this name as a substitute for *pyralis* without explanation. The type is therefore ipso facto the type of *pyralis*.

Scopelopus inops Stephens, 1829: Proposed as a replacement name for *scopulaepes* without explanation. The type is ipso facto the type of *scopulepes*.

⁶ See footnote 4, p. 507.

Poaphila irrecta Walker, 1865: Walker did not know the source or original locality of the specimen that he described under this name. Fletcher has examined the type in the British Museum (Natural History) and states in correspondence that it is a brown female of the form named *geometralis* by Grote. Therefore, if the brown form is to be recognized by the application of a form name, *irrecta* Walker would have priority. Smith (1893) treated this name as a synonym of *pyralis* Hübner.

Apicia denticulata Walker, 1866: Type locality "Georgia." Fletcher has also examined the type of this species, likewise in the British Museum (Natural History) and has informed me that it is also a female of the brown form. I therefore place this name in the synonymy of *scopulepes*.

Coptocnemia floccalis Zeller, 1872: Type locality "Texas." Described from a single male stated to be in the "Cambridger Museum" (Museum of Comparative Zoology at Harvard College, Cambridge, Mass.). It is clear from the original description and illustrations that his name is a synonym of *scopulepes*, and it was treated by Smith (1891) as a synonym of *H. pyralis* Hübner.

Pleonectyptera geometralis Grote, 1872: Described from a single female from Central Alabama in June. Grote compared it with specimens of *H. pyralis* Hübner taken at the same locality in July and stated that *geometralis* was "reddish fawn" to the postmedial lines. The type is in the collection of the Philadelphia Academy of Sciences.

MISSPELLING: Stephens (1829) inserted an "a" after the "l" and thus made the name "scopulaepes" and has been followed in this action by all subsequent writers. He did not discuss the change, but in any event I follow the original spelling, "scopulepes." On plate 94 of Seitz (1940-46?) the specific name is spelled "scopelopes." Since the text referable to this plate has not been published, the name, if an original proposal, has no status.

DISTRIBUTION: This species is known to occur from North Carolina (Raleigh) and Arkansas (Carroll County), through Central America, the Caribbean, and South America, to Argentina (Misiones), but it has not been reported from Puerto Rico. It was not present in a large collection of Noctuidae from that island recently studied by the author. The apparent absence of the species in Puerto Rico suggests that the species reached Cuba, Jamaica, and Hispaniola from the north and the Lesser Antilles from the south.

Hemeroplanis aurora (Walker)

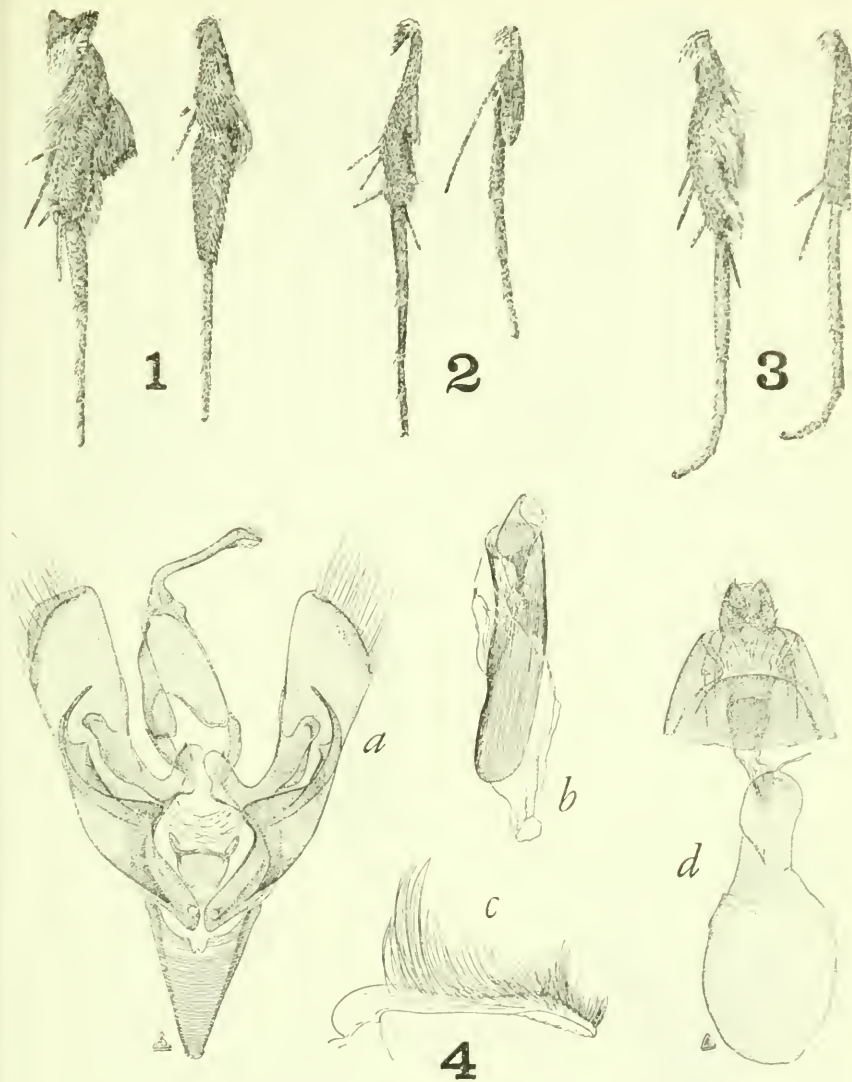
FIGURES 2, 5; PLATE 1, FIGURES 7-8

Thermesia aurora Walker, 1865, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 33, p. 1039.

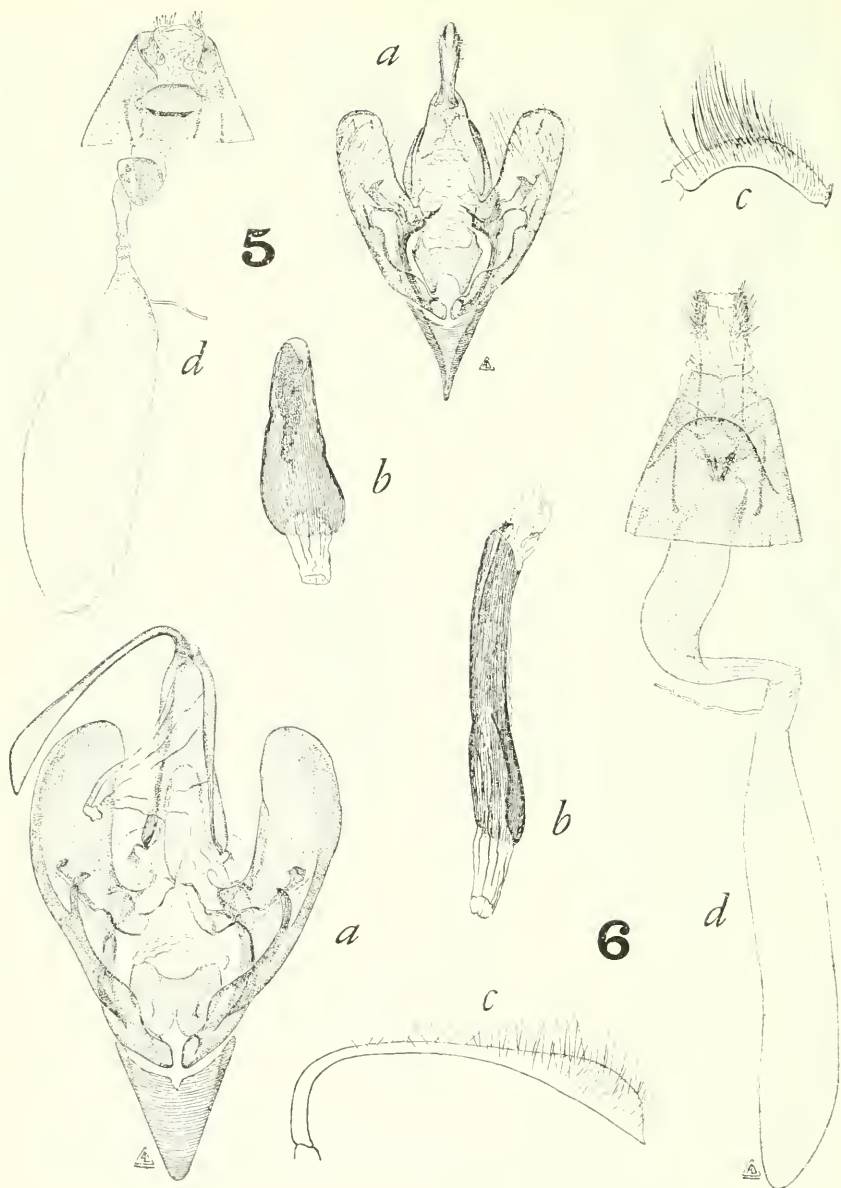


Adults of species of the *scopulepes* group of *Hemeroplanis*: 1 and 3, dorsal and ventral views, holotype male of *zayasi*, Santiago, Cuba; 2, dorsal view, female of *zayasi*, Santiago, Cuba; 4 and 6, dorsal and ventral view, male, of *scopulepes*, Misantla, Mexico; 5, female of *scopulepes*, Matanzas, Cuba; 7 and 8, dorsal view, male and female of *aurora*, "St. Domingo."





FIGURES 1-4.—Hind and middle legs (figs. 1-3) and male and female genitalia (fig. 4):
 1, *Hemeroplanis zayasi*, new species; 2, *H. aurora* (Walker); 3, *H. scopulepes* (Haworth);
 4, *H. zayasi*, new species: a, male genitalia, aedeagus removed; b, aedeagus; c, enlarged
 lateral view of uncus of male; d, female genitalia.



FIGURES 5-6.—Male and female genitalia: 5, *Hemeroplanis aurora* (Walker); 6, *H. scopulepes* (Haworth). a, Male genitalia, aedeagus removed; b, aedeagus; c, lateral view of uncus of male, enlarged; d, female genitalia.

DISCUSSION: *H. aurora* (Walker) superficially resembles *scopulepes*, but the tibia of the middle leg of the males of *aurora* are greatly reduced, and the undersurface of the forewing does not bear a tuft of hair as in *scopulepes*. Males of *zayasi* likewise differ in these two respects from *scopulepes*, but the basal tarsal segment of the middle leg is enlarged (nearly as wide as tibia) in *zayasi* and normal in *aurora*. The inner (posterior) spur of the middle leg is very long and slender (as long as basal tarsal segment) in *aurora* but only about half as long as basal tarsal segment in *zayasi*.

The three specimens of *aurora* that have been studied exhibit some differences in maculation of the wings from *scopulepes* and *zayasi*, but three specimens represent such a small sample that it is not known whether the differences are constant and accordingly characteristic of the species. In the males the dark terminal marking of the forewing is only slightly darker than the median part of the wing; the basal edge of the marking is diffuse and poorly defined. The subterminal series of dark points is well developed, the spots nearest the inner margin largest. The apical part of the hindwing distad of postmedial band is suffused with salmon pink and has a subterminal series of dark points present. The female appears to differ from females of the other two species in that the postmedial band of the hindwing is nearly obsolescent. In both sexes the reniform spot of the forewing is nearly obsolescent, while in the other species, especially *scopulepes*, it is usually well developed.

Length of forewing: Male 12 to 13 mm.; female 13 mm.

The characteristic male and female genitalia are illustrated (fig. 5).

TYPE: In the British Museum (Natural History), London, England.

TYPE LOCALITY: "St. Domingo."

MISIDENTIFICATION: This name was erroneously listed as a synonym of *Hemeroplanis pyraloides* Hübner, one of the synonyms of *H. scopulepes* (Haworth) by Druce (1890, *Biologia Centrali-Americana*, Insecta, Lepidoptera, Heterocera, vol. 1, pt. 85, p. 412).

DISTRIBUTION: Only five specimens of this species are known in collections, and they are all from Hispaniola. In addition to the type, there are three other specimens in the British Museum (Natural History), all with labels identical to those of the type. It has been possible, through the courtesy of Fletcher and the authorities of the British Museum (Natural History), to study a pair of these specimens. The other specimen of *aurora*, a male, is from Pétionville, Haiti, May-June 1930, O. Fulda, and is from the collection of the Department of Entomology, Cornell University, Ithaca, New York.

REMARKS: The specimens illustrated (plate 1, figs. 7-8) are not so dark as the photographs indicate. The ground color is not darker

than most specimens of *scopulepes*, the apparent darker ground color being the result of different lighting and other photographic techniques. Because of space limitations, the underside of the wings of *aurora* have not been figured. In the single female the maculation of the underside is similar to that of *zayasi*, but the maculation of the underside of the hindwings in the males agrees more closely with that of *scopulepes* in regard to the development of the transverse lines.

Hemeroplanis zayasi, new species

FIGURES 1, 4; PLATE 1, FIGURES 1-3

DESCRIPTION: Head with front only slightly exceeding eyes; front narrow, about equal in width to eye. Eyes moderately large, globoid, naked. Ocelli present. Antennae filiform, weakly ciliate ventrally. Labial palpi slightly oblique, nearly porrect, reaching about to middle of front, clothed with small, appressed salmon pink and dull brown, pale-tipped scales.

Vestiture of front and patagia mostly of dull brown, pale-tipped scales, many bifid and hairlike. Vestiture of tegulae and thorax of yellow hairs over pale yellow scales. Abdomen yellow suffused with brown scaling. Large, white, lateral tufts of basal abdominal segment extending ventrad, covering abdominal sternites of basal segments.

Legs of male with femora and tibiae conspicuously tufted (fig. 1), tufts mostly salmon pink except distal tuft of hind femur black. Tibia of middle leg short. Basal tarsal segment enlarged, densely scaled (fig. 1).

Forewing about half again as long as wide (13:8); slightly falcate apically; termen weakly angulate at Cu_1 ; venation of quadrifid type, areole present in forewing. Maculation of wings as illustrated (pl. 1, figs. 1-3). Ground color of wings of male basad of postmedial band pale lemon yellow irrorated with brown, area distad of postmedial band rust brown. Ground color of wings of female variable, orangish-yellow, olivaceous or salmon brown, darker distally. Subterminal spot between Cu_2 and anal vein of forewing of male black; anal spot of hindwing of male salmon; elements of transverse band (when present) reniform and orbicular spots dull brown.

Underside colored about as upperside, except ordinary spots and lines darker brown, and terminal area paler.

Male and female genitalia specifically distinct (fig. 4). Uncus of male genitalia (fig. 4c) shorter and stouter than that of *scopulepes* but longer than that of *aurora*; apex of uncus membranous ventrally. Processes of inner face of valve larger and more heavily sclerotized in *zayasi* than in the other two species (see figs. 4a, 5a, and 6a). The aedeagus of *zayasi* shorter and stouter than that of *scopulepes*, longer

than that of *aurora*, the vesical plate differently shaped in all three species (figs. 4*b*, 5*b*, and 6*b*). Female genitalia with ductus bursae shorter than in *scopulepes* and *aurora* and lacking a noticeable sclerotized area near the ostium (figs. 4*d*, 5*d*, and 6*d*).

Length of forewing: Male 12 to 14 mm.; female 13 to 15 mm.

TYPES. Holotype ♂, Santiago (Santiago de Cuba), Cuba, USNM 64634; 1 ♂ and 2 ♀ paratypes, same place, in USNM. 2 ♀ paratypes, Santiago (Santiago de Cuba), October 1902, W. Schaus; 1 ♂ paratype, Nassau, Bahamas, April 15, 1903, J. L. Bonhote; 2 ♂ paratypes, Mangrove Cay, Andros, Bahamas, January 11, 1902, J. L. Bonhote; 1 ♂ paratype, Bahamas (Nassau ?), April 15, 1903, L. Bonhote; 1 ♀ paratype, same place and collector, September 3, 1902, in the British Museum (Natural History), London, England. 1 ♂ paratype, La Breña, Moa.-Ote., Cuba, June, 1954, Zayas and Alayo; 1 ♀ paratype, Sierra de Cristal, Oriente, Cuba, June 1956, F. de Zayas in the collection of Ing. Fernando de Zayas Muños, Havana, Cuba.

DISTRIBUTION: Presently known only from Cuba and the Bahama Islands.

REMARKS: In addition to the characters presented in the key, the size and color of the subterminal spot between Cu_2 and anal vein in the forewing, the presence of the salmon-colored anal spot of the hindwing, and the more or less uniform ground color of the hindwing enable one to separate males of *zayasi* from males of the other known species of the *scopulepes* group.