The subfamily Glaphyriinae (Lepidoptera, Pyralidae) is recorded from the Galapagos Islands, Ecuador, for the first time on the basis of two species of Hellula Guenée, 1854: Hellula phidilealis (Walker, 1859) and H. galapagensis Landry sp. n. The new species is described and both species are illustrated. Two illustrated keys based on external characters and genitalia to the Neotropical species of Hellula are provided. Hellula phidilealis was reared on Cleome viscosa L. (Capparidaceae) in the Galapagos. Hellula kempae Munroe is reported from Cuba for the first time.

**Introduction**

The Glaphyriinae comprise about 200 species of small to midsized moths distributed mainly in the New World, with a few species of the genus Hellula Guenée, 1854 in the Old World (Munroe & Solis 1998). Hellula includes ten or eleven putatively valid species (Beccaloni et al. 2003, Munroe 1995, Nuss et al. 2006, and present data). Three Hellula species (H. undalis (Fabricius, 1781), H. phidilealis (Walker, 1859), and H. rogatalis (Hulst, 1886)), are serious pests of Brassicaceae, and the latter two are also known to feed on Amaranthaceae and Portulacaceae (Munroe 1972, Solis & Adamski 1998, Zimmerman 1958).

Two species of Hellula occur in the Galapagos, H. phidilealis and a new species, described below.

This paper is part of a series initiated by the first author (BL) to document the Microlepidoptera of the Galapagos archipelago (e.g., Landry & Giels 1992, Landry 2002, Landry et al. 2006) and the fourth of the series to treat Pyraloidea. We have adopted a concept of family Pyralidae that includes all Pyraloidea taxa (see Landry & Roque-Albelo 2006) although Munroe & Solis (1998) consider that the superfamily consists of two families, the Crambidae and Pyralidae, with the Glaphyriinae included in the Crambidae.

Two keys based on external characters and genitalia are presented here for the five described species that occur or could occur in the Neotropical region (H. galapagensis sp. n., H. kempae Munroe, 1972, H. phidilealis, H. rogatalis, and H. undalis), exclusive...
of *Hellula simplicalis* Herrich-Schäffer, 1871, described on the basis of one specimen from Cuba which could not be found in museums in Berlin, Cuba, or Philadelphia (pers. comm. to BL by W. Mey, Alejandro Barro and V. Becker, and J. Weintraub, respectively). Moreover, following its description, *H. simplicalis* was only recorded in various lists, without additional information (Gundlach 1881, Munroe 1995), although neither Torre y Callejas (1967) nor Alayo & Valdes (1982) mentioned it. The other two described *Hellula* species of the Western Hemisphere (*H. aqualis* Barnes & McDunnough, 1914, and *H. subbasalis* (Dyar, 1923)) occur only in the Nearctic region from the Big Bend region of Texas west to the San Diego region of southern California; they were illustrated with a key to identify them (Munroe 1972). *Hellula kempae* was described from Florida, but it occurs also in Cuba (Cienaga Zapata, near Playa Larga) based on specimens examined by BL and deposited in the USNM. Although *Hellula undalis* is originally an Old World species, described from Italy, it seems probable that it will reach the Western Hemisphere eventually as it has reached the Hawaiian Islands (Zimmerman 1958) and it is a crop pest. *Hellula rogatalis* was described from Texas, U.S.A., but it occurs as well in Mexico (Distrito Federal, V. Becker, pers. comm.) and is likely to spread in the Neotropical region given its pest status on Brassicaceae crops, if it has not done so already.


### Galapagos species

**Hellula phidilealis** (Walker)

Figs 1-3, 11, 17

*Leucochroma* *phidilealis* Walker, 1859: 972.

*Phyratocosma trypheropa* Meyrick, 1936: 323, pl. 13 fig. 9.

**Material examined.** Holotype of *L. phidilealis* (Fig. 1). Male, with labels as follows: “Type” [small, round, ringed green], “Vene-Izuela” [small, round, pale blue], “LEUCOCROMA ? PHIDILEALIS.” [heading of Walker’s published description], “1955 | 283” [square, with numbers separated by horizontal black line], “[male sign] | Pyralidae | Brit. Mus. | Slide No. | 10719” [square, with text in red except from male sign and number]. Deposited in BMNH.

First of the two syntypes of *P. trypheropa* (Fig. 2). Female, with labels as follows: “Timotes (Venez.) | 6.7.1934 | Farenholtz E. 6687” [rectangular], “Phyratocosma | trypheropa Meyr. | teste Meyr. [with four subsequent undecipherable letters]” [rectangular, bordered black, with last line separated from first two by horizontal black line]. Deposited in UMB.

Second of the two syntypes of *P. trypheropa* (Fig. 3). Female, with labels as follows: “Para- | type” [round, ringed yellow], “Timotes | Venezuela | F . .7.34”, “Meyrick Coll. | B.M. 1838-290.” [upside down], “trypheropa Meyr.”, “PHYRATOCOSMA Meyr.”, “Phyratocosma | tryphe-ropa | 1/1 Meyrick | E. Meyrick det. | in Meyrick Coll.”, “B.M. Pyralidae | Genitalia Slide | [female sign] No. | 21119”. Deposited in BMNH.

10 males (2 dissected) and 15 females (3 dissected) collected at light or reared in the Galapagos Islands. Deposited in CDRS and MHNG.

**Diagnosis**

With a wingspan of 13.0 to 18.0 mm (n=31) *Hellula phidilealis* is one of the large species of the genus. Its forewing (Figs 1-3) has contrasting white transverse lines and a dark brown reniform spot suffused with shining blue scales on an olive background. Its hindwing is basally semi-transparent with a distinctly darker apex and often a visible subapical line, especially in the cubital sector. The male genitalia (Fig. 11) have relatively narrow valvae adorned ventrilocally with thin, symmetrical spines, and the dorsal setose section of the valva is relatively wide in being about ¾ the width of the ventral hairy section. In female genitalia (Fig. 17) the corpus bursae has the spined narrower distal section distally as wide as its base, with the ductus seminis al apicolateral. The species can be separated from the other Neotropical species of *Hellula* by the characters used in the keys below. One specimen of *H. phidilealis* from Cuba (slide BL 1628, USNM) had three cornuti on its vesica instead of the usual two.

**Distribution and natural history**

This species is widely distributed from the south of the U.S.A. into Central and South America; it is a pest of Amaranthaceae and Brassicaceae (Munroe 1972). It is rather common on the Galapagos Islands, where it has been collected on Baltra, Floreana, Isabela, San Cristobal, Santa Cruz, and Santiago at elevations between sea level to 329 m (on Floreana) in January until May, September, November, and December. We have also examined seven specimens...
reared by LR from fruits of Cleome viscosa L. (Capparidaceae) on Baltra, Santa Cruz, and Santiago. This is an introduced weed of the arid lowlands of Baltra, Floreana, Pinta, Santa Cruz, Santiago, and Seymour Norte (McMullen 1999).

Notes on types
The holotype of H. phidilealis (Fig. 1) is a male of 15 mm in wingspan. Its genitalia are damaged, especially in having the ventroapical spines lost on the left valva and half broken on the right one. Phyratocosma trypheropa was described from two females. One syntype in the Bremen Museum (Fig. 2) is without abdomen and measures 18 mm in wingspan. The other syntype, in the BMNH, has lost the left pair of wings and is dissected. The remaining forewing is 9.0 mm long.

Hellula galapagensis Landry, sp. n.
Figs 4, 5, 12, 13, 18
Type material. Holotype: ♂ with the following labels. 1- “ECU[ADOR], GALAPAGOS | Santiago, Cerro Inn | 28.iii.1992 | M[ercury]V[apour] L[amp], leg[it]. B[ernard]. Landry”;
2- “HOLO-TYPE | Hellula | galapagensis | B. Landry”. Deposited in MHNG. Paratypes: 5 ♂, 8 ♀ from Ecuador, Galapagos Islands; collected at the Mercury Vapour Lamp by B. Landry except one, as indicated. Floreana. 1♂ (dissected, slide MHNG 3181), Punta Cormoran, 21.iv.1992. Isabela. 4♀, Puerto Villamil, 2.iii.1989. Santiago. 2♂ (one dissected, Slide LR 004), 1♀ (dissected, slide MHNG 3211), same data as Holotype. Seymour Norte. 1♂ (dissected, slide LR 005), 3♀ (one dissected, slide BL 1621), Arid Zone, 23.i.1989. Unknown locality. 1♂ (dissected, slide BL 1637), No. 43 [T. De Vries]. Deposited in CDRS, CNC, and MHNG.
One specimen from Isabela (2 km W Puerto Villamil, 5.iii.1989, B. Landry, slide BL 1602, CNC) is excluded from the type series because its vesica bears three cornuti roughly equal in size and shape, and it has the foregoing markings better contrasted (Figs 5, 13).

Diagnosis
This is a small species with a wingspan of 11.5 to 13.0 mm (n=14). Its forewing has very poorly contrasted transverse lines and pale reniform spot over a pale ochre-olive background. Its hindwing is usually uniformly white and opaque, rarely with a light shade of brown, usually without a subapical line, and a clearly darkened apex was not observed. The male genitalia have the valvae almost forming a perfect square, i.e. they are broad compared to their length, with the ventral margin apically adorned with spines that are asymmetrical, i.e. the spine of the right valva is at least half the length of the spine of the left valva. The female genitalia have the ductus bursae ribbon-like and the corpus bursae divided into a thickly sclerotized, heavily spined, and ridged distal half that becomes distally narrower, and a membranous proximal half. In the Galapagos, this species can be separated easily from H. phidilealis by its smaller size (11.5-13 mm wingspan compared to 13-18 mm) and other characters mentioned in the keys below.

Description
Male (n=6) (Figs 4, 5, 12, 13). Head pale ochre-olive as transverse band in middle of fronto-clypeus, between and in front of scapes, directed laterally, and on occiput, directed mediadorsally, and as small patch on eye margin near middle of eye, white elsewhere, including proboscis and maxillary palpi. Scape white; pedicel and first flagellomere pale ochre-olive; subsequent flagellomeres ringed with basal narrower row of shorter scales pale ochre-olive and distal wider row of longer scales white, but pattern fading toward last flagellomeres. Labial palpi white with pale ochre-olive laterally as large patches subapically on first palpomere and in middle of second, and more diffuse on most of third. Thorax with three transverse bands of pale ochre-olive at base, middle and apex, with narrower white bands in between and sometimes apex. Foreleg coxa white; femur mostly pale ochre-olive with white on ventral edge; tibia white with bands of pale ochre-olive submedially and subapically; tarsomere I white with pale ochre-olive in middle; tarsomeres II-IV pale ochre-olive at bases, middle and apex. Foreleg coxa white; femur very pale ochre-olive with white on dorsal edge; tibia white with wide oblique bands of pale ochre-olive submedially and subapically; tarsomere I white with pale ochre-olive in middle; tarsomeres II-IV pale ochre-olive at bases, white at apex; tarsomere V pale ochre-olive. Midleg coxa white; femur very pale ochre-olive with white on dorsal edge; tibia white with wide oblique bands of pale ochre-olive submedially and subapically; tarsomeres as in foreleg. Hindleg coxa and femur as in midleg; tibia mostly white, with pale ochre-olive subapically; tarsomere I mostly white; tarsomeres II-III as in foreleg; tarsomeres IV-V pale ochre-olive. Forewing length 5.3-5.6 mm (Holotype 5.3 mm). Forewing pale ochre-olive with white markings as spot basally on dorsal margin, basal line from 1/10 costa to 1/5 dorsal margin, submedial line from 1/5 costa, slightly produced toward apex medially, and connected to 1/2 dorsal margin, spot on costa just before 1/2, subcostal spot at 3/5, subapical line from 3/4 costa, produced apically in median sector, curving backward below reniform spot, ending on dorsal margin at 3/4, diffuse spot near apex, and as small spots subterminally between veins; with oblique dark brown reniform spot wider near midline,
sometimes with greyish brown spot on postmedian line at R5, and with small greyish brown spots terminally between veins; fringe pale ochre-olive. Hindwing white, opaque, rarely with light shade of brown, slight indication of postmedian line, and terminal spots; fringe white. Abdomen's first tergite mostly white, often with light pale ochre-oive scales; following tergites pale ochre-oive (paler than forewing) with white row at apices of tergites III-VII; ventrally light pale ochre-oive and white in faint pattern of longitudinal bands. Descalled tergite VIII medially with Y-shaped support structure with median branch pointing apically and ending at about ⅔ of length. Sternite VIII medially with more thickly sclerotized longitudinal band enlarging from middle to reach pleura.

**Male genitalia** (n=4) (Fig. 12). Uncus elongate, separated into two ± tubular sections: distal section ⅔ length of basal section, bare, less thickly sclerotized, with laterobasal, rounded, laterally projected flanges, with apex laterally compressed, triangular, and slightly downcurved; basal section more thickly sclerotized longitudinally as narrow bar medioventrally, with ± circular hole at base of bar, with anteriorly directed setation lateroventrally, dorsally rounded. Tuba analis lightly sclerotized along ventral margin and lateroapically. Pseudognathos plate-like, naked, short, simple, slightly downcurved, with lateral margins slightly projected dorsally, with lateroventral bases closest to ventral margin of tegumen above phallus, with apex broadly rounded and reaching slightly beyond margin of tegumen. Tegumen arms very narrow, slightly convex, narrowly connected dorsally, with few long and curved setae along ventral margins toward apex. Juxta ring-like, very narrow, thickly sclerotized except for short, dorsoverntrally flattened section dorsally, above phallus. Valva almost forming perfect square, divided into three well-sclerotized and setose sections separated by membranous, naked bands of medium width (about ⅓ width of dorsal section): dorsal section narrow, about ⅔ width of ventral section at widest point; median section small, triangular, apical; ventral section wide, with widest point closer to base than to apical margin of valva, dorsally forming wide, pointed angle, apex wide along tornal margin of valva; each valva ventroapically adorned with long, slightly down-curved spine on left valva and shorter (ca. ⅓ length), upturned or straight spine on right valva. Vinculum narrow, with short arms appearing two-branched because of more thickly sclerotized margins articulating dorsally with tegumen and ventrally with dorsal margin of valva; saccus short, wide, upturned, with straight margin. Phallus tubular, long, about 40% longer than valval ventral margin, basal third slightly larger and bent sideways in relation to distal ⅗; vesica with two cornuti, one with wider base than other.

**Female** (n=8). Colour and pattern as in male. Forewing length: 4.8-5.3 mm. Frenulum with two acantheae.

**Female genitalia** (n=2) (Fig. 18). Papillae anales narrow, width/length about 17%, straight, with dense, mostly short setation especially along apical margin, with 6-7 longer setae along apical margin of narrow and straight basal sclerotized line, latter not reaching dorsal apex of papilla. Posterior apophyses narrow, straight, slightly enlarged at ¼, reaching just beyond basal margin of segment VIII. Segment VIII well sclerotized, slightly less than half as long as wide, about ⅓ length of preceding segment, rectangular but with dorsal margin slightly longer than ventral margin and with basal margin concave, with sparse setation of medium length mostly along apical and ventral margins. Anterior apophyses straight, narrow except for slight enlargement at ¼, about 30% longer than posterior apophyses, reaching into segment VII for about ⅗ of its length. Ostium bursae median in membrane just beyond more densely scaled apical margin of sternite VII. Ductus bursae long, S-shaped, with dorsal and ventral sclerotized bands, with ventral band shorter and narrower, not reaching ostium or corpus bursae. Corpus bursae pear-shaped, with narrower distal section beyond dorsal connection with ductus bursae; divided into longer, strongly-sclerotized, ridged, and spined distal section and slightly wider, un sclerotized, and unsclerotized proximal section; distal section with larger series of 8-10 spines on right side laterally, distally narrowing and ending in wide ductus seminalis curved backward, dorsal wall without spine on most of right side, ventral wall without spines on right side close to membranous section.

**Etymology**
The specific epithet is derived from the name of the area of occurrence, the Galapagos archipelago.

**Life history**
Unknown except that the moths are attracted to light and that the specimens were mostly collected at sea level, but also higher, although the precise elevations of these higher localities were not noted.

**Notes**
This species readily could be identified as new given our good knowledge of the previously described species (Capps 1953, Munroe 1972, Zimmerman 1958) except for the species described from Cuba as *Hellula simplicialis* Herrich-Schäffer, of which the
Figs 17–19. Female genitalia of *Hellula* species (a, whole genitalia; b, corpus bursae). – 17, *H. phidilealis*, Galapagos, Santa Cruz (slide MHNG 3045, MHNG); 18, *H. galapagensis*, paratype (slide BL 1621, CNC); 19, *H. kempae*, allotype (slide BL 1633, CNC).
holotype could not be found as mentioned above in the introduction. This taxon was briefly described as “$\frac{3}{4}$ larger than undalis, forewing uniformly rust-gold, hindwing paler.” *Hellula undalis* being already one of the large species (we have seen wingspans between 15 and 18 mm), *H. simplicalis* clearly appears to be different from the small *H. kempae* (13-14 mm wingspan) and the smaller *H. galapagensis*.

**Key to the Neotropical species of* Hellula* based on external characters**

1. Forewing ground colour brown, with or without ochre scales; forewing darker reniform spot usually contrasting, rather wide (6-8 scales wide), appearing surrounded by row of white scales, sometimes overlaid with white scales that are not distinctly lustrous; large species (wingspan 15-19 mm); hindwing light brown to brown .......................... 2

   - Forewing ground colour mostly olive, pale ochre-olive, or ochre; forewing reniform spot contrasting or not, central element narrow (2-5 scales wide), sometimes appearing crossed by white lines, sometimes with paler, lustrous scales in central element; small to large species (11.5-18.0 mm); hindwing usually white, at least basally .......................... 3

2. Forewing light brown, usually with some ochre scaling; hindwing light brown, without distinct pattern elements (Fig. 10) .......................... *H. undalis*

   - Forewing brown to rather dark brown, without ochre scaling; hindwing light brown to brown, sometimes with post median line (Figs 8, 9) .......................... *H. rogatalis*

3. Forewing ground colour olive, with contrasting white lines and spots, with dark brown reniform spot overlaid with shining pale blue scales in narrow central element; wingspan 14-18 mm; hindwing usually white at base, appearing semi-transparent, distinctly darker toward apex, often with visible subterminal line (Figs 1-3) .......................... *H. phidilealis*

   - Forewing ground colour pale ochre-olive or ochre, with pattern elements contrasted or not; reniform spot distinct or very pale, with or without shining scales; wingspan 11.5-14.0 mm; hindwing not appearing hyaline or with markedly darker apex, with or without subterminal line .......................... 4

4. Forewing ground colour pale ochre-olive, with pattern elements indistinct; reniform spot very pale brown, without shining scales; hindwing usually completely white, rarely overlaid with light brown and with faint

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indication of subterminal line or terminal spots (Figs 4, 5) .......... \(H.\) galapagensis

- Forewing ground colour ochre, with distinct pattern elements; reniform spot distinct, with few shining scales; hindwing light ochre-brown, usually with greyish brown subterminal line, and with greyish brown terminal spots (Figs 6, 7) .......... \(H.\) kempae

Note. A dissection may be the only reliable way to separate these two species.

**Key to the Neotropical species of *Hellula* based on genitalia**

1. Males ..................................... 2
   - Females .................................. 6

2. Valva without ventroapical spine  .......... 3
   - Valva with ventroapical spine (Figs 11-14) .... 4

3. Valva with dorsoapical spine (Fig. 16) ....
   - Valva without dorsoapical, or any other spine (Fig. 15) .......... \(H.\) undalis

4. Ventroapical spines of valvae asymmetrical, the right one at least half the length of the left one (Figs 12, 13) .......... \(H.\) galapagensis
   - Ventroapical spines of valvae symmetrical, equal in length although sometimes slightly variable in shape .......... 5

5. Valva with dorsal setose section about ¾ width of ventral hairy section (Fig. 11); unmelanized and naked bands between setose sections of valva narrow (about 1/6 width of dorsal setose section) .......... \(H.\) phidilealis
   - Valva with dorsal setose section narrower, less than ¼ width of ventral setose section (Fig. 14); membranous and naked bands between setose sections of valva wide (about ¼ width of dorsal setose section) .......... \(H.\) kempae

6. Ductus bursae short, less than ¼ length of corpus bursae, without sclerotized band in ventral wall until ostium; corpus bursae formed by principal sac harbouring large and thickly sclerotized tongue-like signum, smaller circular sac apically, and lateral sac from base .......... 7
   - Ductus bursae long, longer than corpus bursae, with ventral wall sclerotized until ostium; corpus bursae ± pear-shaped, with distal half thickly sclerotized, ridged, and spined .......... 8

7. Ductus bursae with Y-shaped sclerotized band in ventral wall; corpus bursae with lateral sac larger than principal sac; signum of principal sac as on Fig. 20 .......... \(H.\) phidilealis
   - Ductus bursae with sclerotized band in ventral wall apically blunt, not Y-shaped; corpus bursae with lateral sac smaller than principal sac; signum of principal sac as on Fig. 21 .......... \(H.\) undalis

8. Corpus bursae with spined narrower distal section distally as wide as its base; with ductus seminalis apicolateral (Fig. 17) ........ \(H.\) rogatalis
   - Corpus bursae with spined narrower distal section narrowing toward apex; with ductus seminalis apical (Figs 18, 19) .......... \(H.\) galapagensis and \(H.\) kempae

We have not been able to find reliable female genitalia characters to separate these two species.

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**References**


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