

MALE AND FEMALE GENITALIA OF *PHOEBIS EDITHA*
(BUTLER): HOW THEY DIFFER FROM HISPANIOLAN
P. SENNAE (LINNAEUS) (PIERIDAE)

JOHN G. COUTSIS

4 Glykonos Street, Athens 10675, Greece

ABSTRACT. Male and female genitalia of the Hispaniolan endemic *Phoebis editha* are figured, described, and compared with those of superficially similar *P. sennae* from Hispaniola. Results are based on 14 male and 2 female *P. editha*, and 17 male and 2 female *P. sennae*. Males of *P. editha* differed from those of *P. sennae* in at least six ways, including narrower sacculus, and longer ampullary process. Females of *P. editha* differed from those of *P. sennae* in at least five ways, including more heavily sclerotized apophyses anteriores, and shorter, wider 8th tergum. These differences, together with the facts of sympatry, synchronism, and different larval foodplants, suggest that the taxa are specifically distinct and not forms of the same species.

Phoebis editha, endemic to Hispaniola, was originally described as a distinct species (Butler 1870). Due to superficial similarity between the males of *P. editha* and *P. sennae*, the taxonomic status of the former has been in doubt. Most recently, D'Abrera (1981) suggested *P. editha* may represent a rare form of *P. sennae*. The female of *P. editha* at times has been considered a dry season form of *P. sennae*, or even of *P. philea* (Johansson). This latter view is reported, but not endorsed, by Riley (1975).

Recently, I stated reasons why *P. editha* should be considered specifically distinct from *P. sennae*, the most important of which were sympatry, synchronism, different larval foodplants, and different male genitalia (Coutsis 1983). Due to unavailability of material at the time, I was unable to illustrate the genital differences.

It is now possible for me to describe and figure male and female genitalia of *P. editha* because I have been able to borrow two male and two female specimens. For comparison, genitalia of two male and two female Hispaniolan *P. sennae* are also figured. The findings agree with those derived from a study of 12 male *P. editha* and 15 male *P. sennae*, which I carried out between 1952 and 1958 while doing field work in Hispaniola.

The drawings were done using a Wild M5 stereomicroscope with drawing tube. The appendages were studied and drawn while they were immersed in 80% ethyl alcohol, free from pressure due to slide mounting, and thus free from distortion.

The genital terminology used is based on Tuxen (1970) and Higgins (1975).

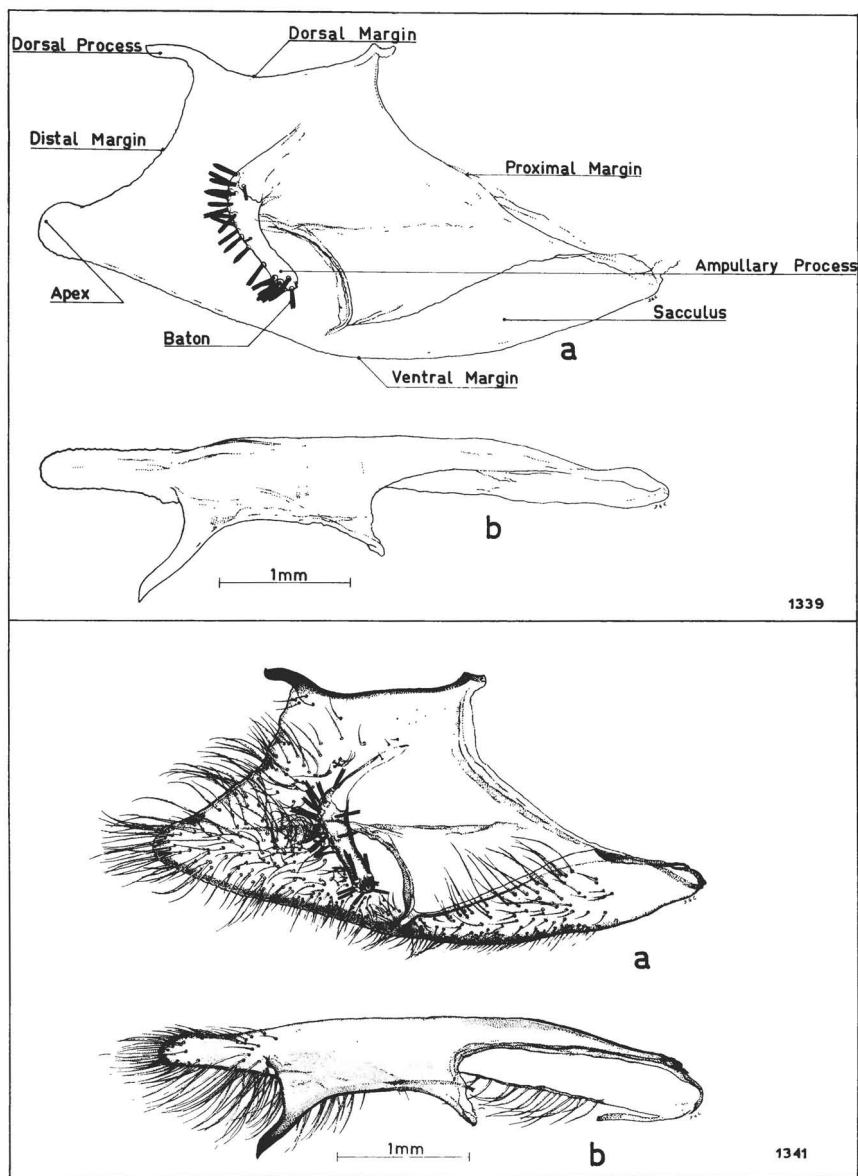


FIG. 1. Male *Phoebe editha* from Port-au-Prince, Haiti. (a) Lateral view of interior face of left valva; (b) Dorsal view of left valva. Top: Line drawing, prep. 1339, coll. 9 July 1955. Bottom: Shade drawing, prep. 1341, coll. 13 July 1955.

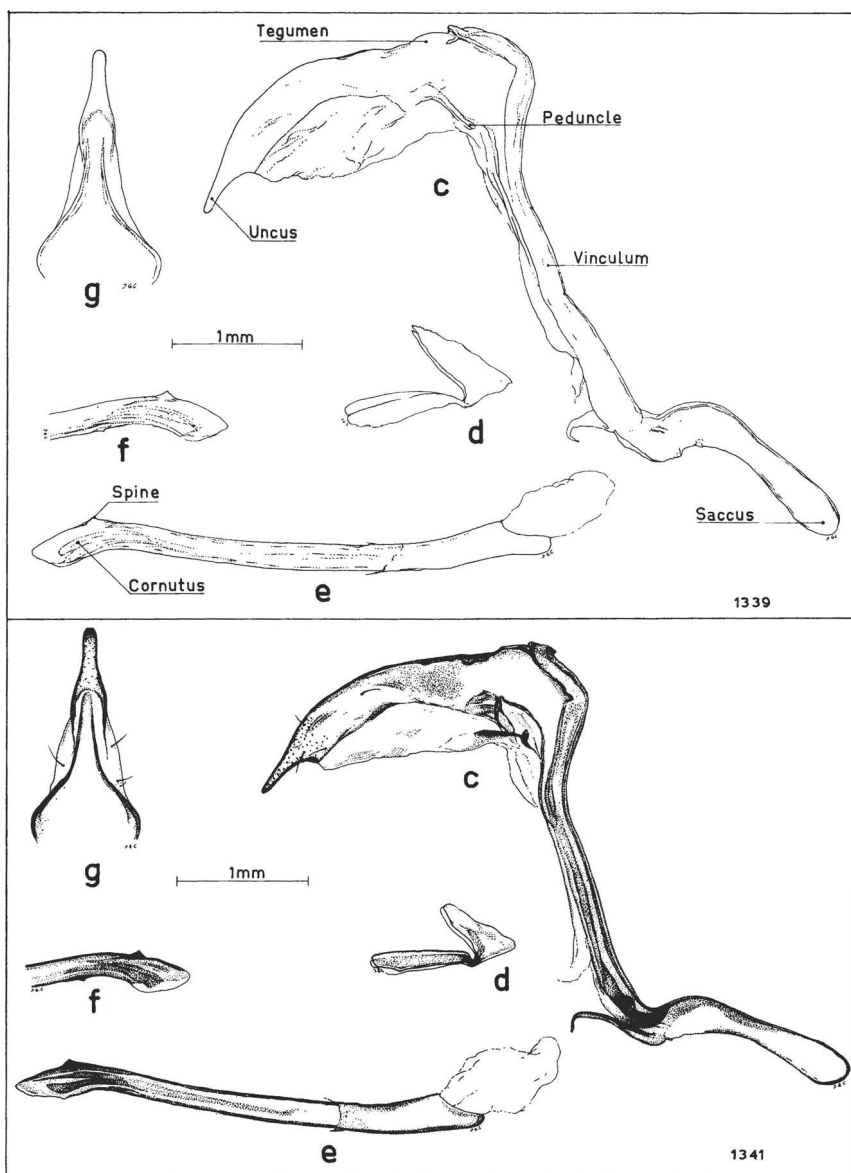


FIG. 2. Male *Phoebe editha* from Port-au-Prince, Haiti. (c) Lateral view of right side of genitalia (valvae, aedeagus, furca removed); (d) Lateral view of right side of furca; (e) Lateral view of right side of aedeagus; (f) Dorsolateral view of left side of distal end of aedeagus; (g) Dorsal view of uncus and tegumen. Top: Line drawing, prep. 1339. Bottom: Shade drawing, prep. 1341.

TABLE 1. Differences between male genitalia of *P. editha* and *P. sennae*.

Species	Dorsal margin of valva	Sacculus	Ampullary process	Apex of valva	Dorsal process of valva	Uncus
<i>P. editha</i>	Shorter than distal margin of valva	Narrower than in <i>P. sennae</i>	Twice as long as in <i>P. sennae</i>	Rounded, simple	Cylindrical, with pointed distal end. One-half as wide as in <i>P. sennae</i>	Distal end bulbous in dorsal view
<i>P. sennae</i>	Longer than distal margin of valva	Wider than in <i>P. editha</i>	One-half as long as in <i>P. editha</i>	Complex, with pointed extension	Flat, tapering to a point. Twice as wide as in <i>P. editha</i>	Distal end not bulbous in dorsal view

TABLE 2. Differences between female genitalia of *P. editha* and *P. sennae*.

Species	Signum	8th tergum	Apophysis anterior of 8th tergum	Ring formed by 8th tergum and lamella antevaginalis	Ventral lobe of papillae anales
<i>P. editha</i>	Distal edge evenly curved	Shorter, but wider than in <i>P. sennae</i>	More heavily sclerotized than in <i>P. sennae</i>	Of greater diameter than in <i>P. sennae</i>	Almost twice as long as in <i>P. sennae</i>
<i>P. sennae</i>	Distal edge unevenly curved and with pointed projection	Longer, but narrower than in <i>P. editha</i>	More lightly sclerotized than in <i>P. editha</i>	Of lesser diameter than in <i>P. editha</i>	Slightly more than half as long as in <i>P. editha</i>

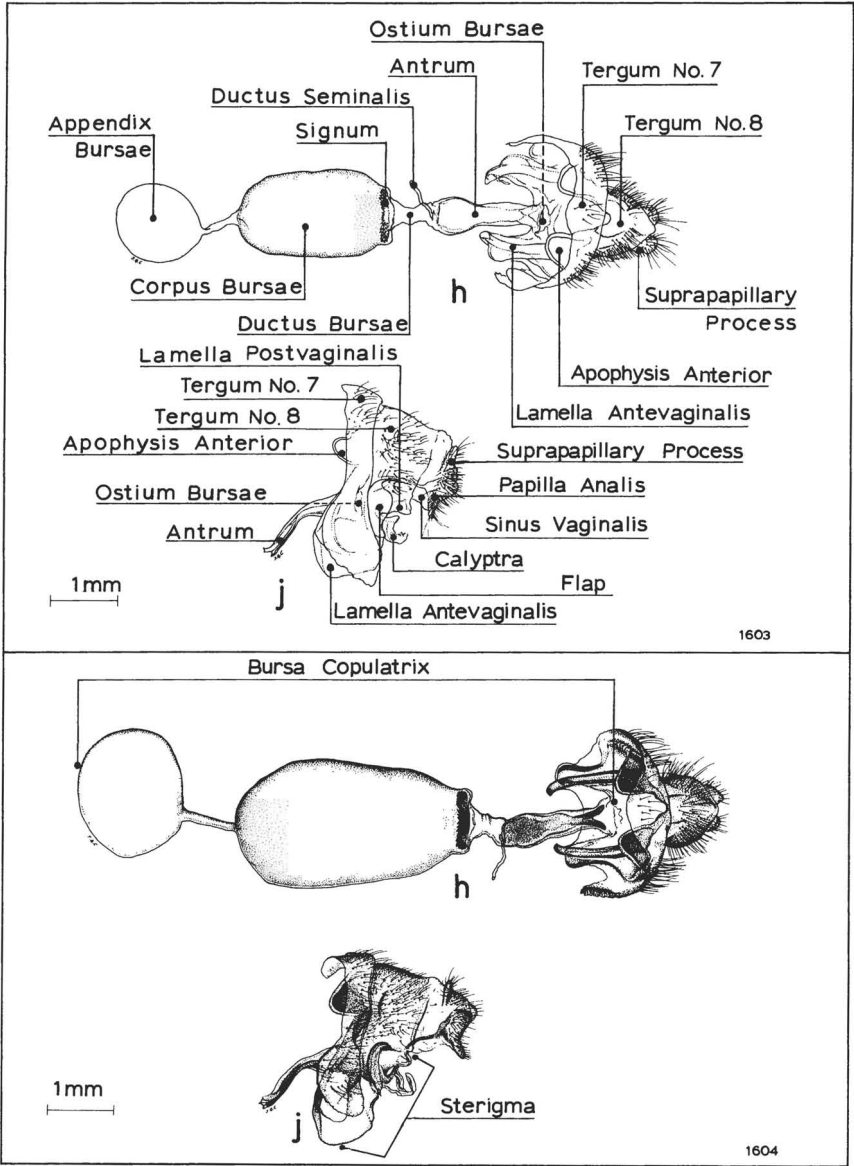


FIG. 3. Female *Phoebe edita* from Port-au-Prince, Haiti. (h) Dorsal view of genitalia; (i) Lateral view of left side of genitalia (corpus bursae, ductus bursae, appendix bursae omitted). Top: Line drawing, prep. 1603, coll. 27 July 1955. Bottom: Shade drawing, prep. 1604, coll. 2 July 1954.

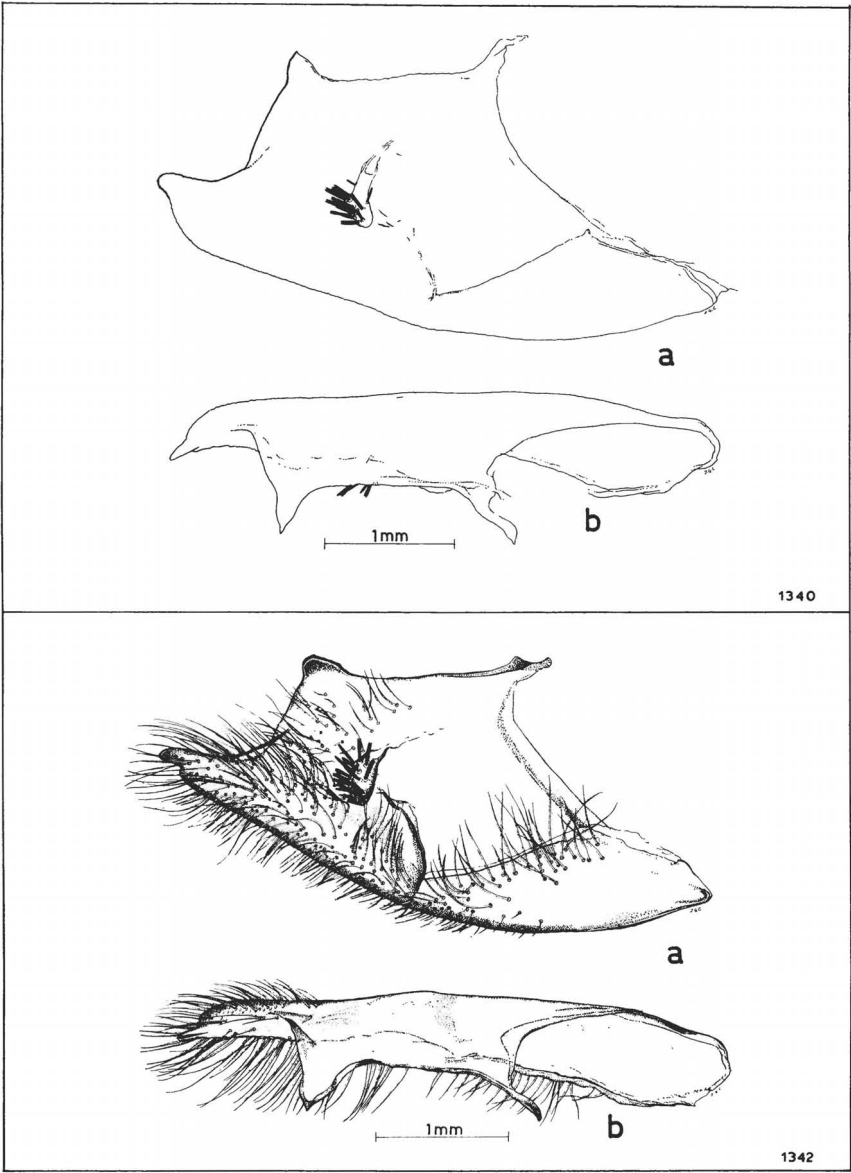


FIG. 4. Male *Phoebeis sennae* from Haiti. (a) Lateral view of interior face of left valva; (b) Dorsal view of left valva. Top: Line drawing, prep. 1340, coll. Gros Morne, 2 July 1954. Bottom: Shade drawing, prep. 1342, coll. Port-au-Prince, 13 July 1955.

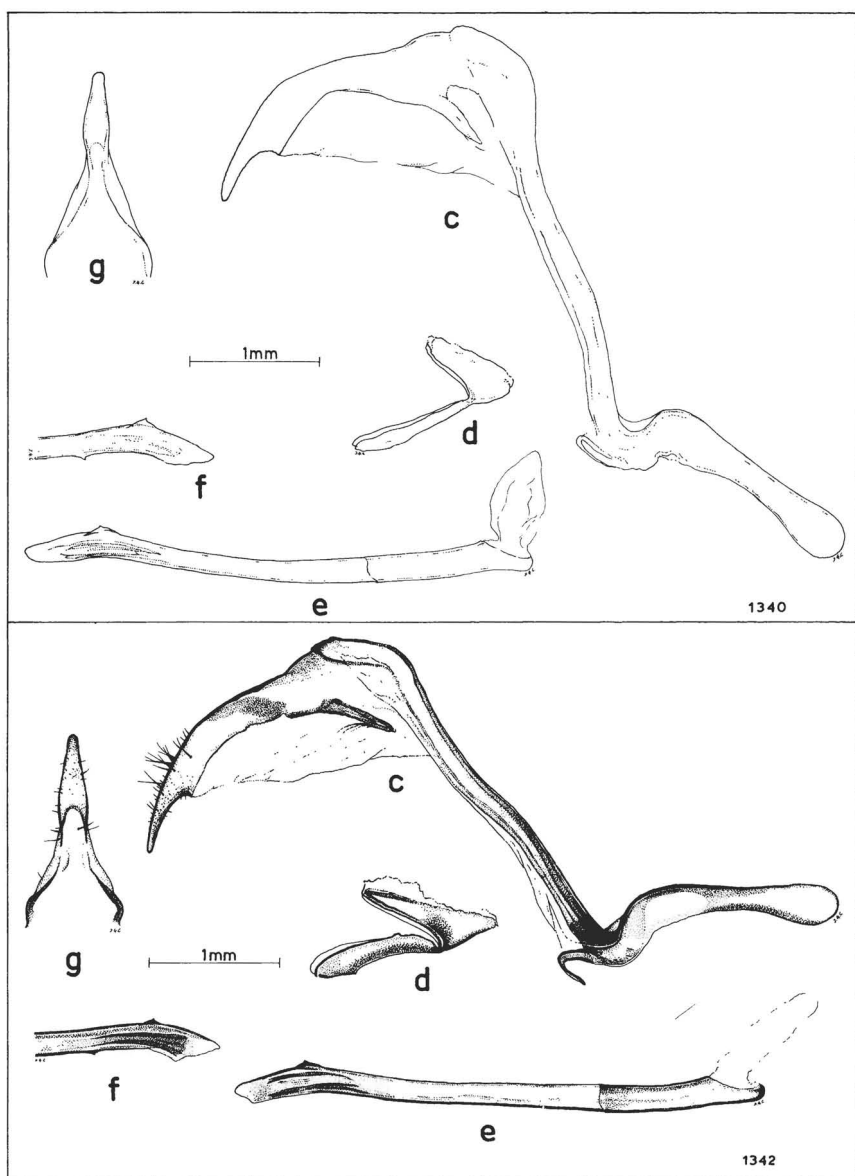


FIG. 5. Male *Phoebeis sennae* from Haiti. (c) Lateral view of right side of male genitalia (valvae, aedeagus, furca removed); (d) Lateral view of right side of furca; (e) Lateral view of right side of aedeagus; (f) Dorsolateral view of left side of distal end of aedeagus; (g) Dorsal view of uncus and tegumen. Top: Line drawing, prep. 1340. Bottom: Shade drawing, prep. 1342.

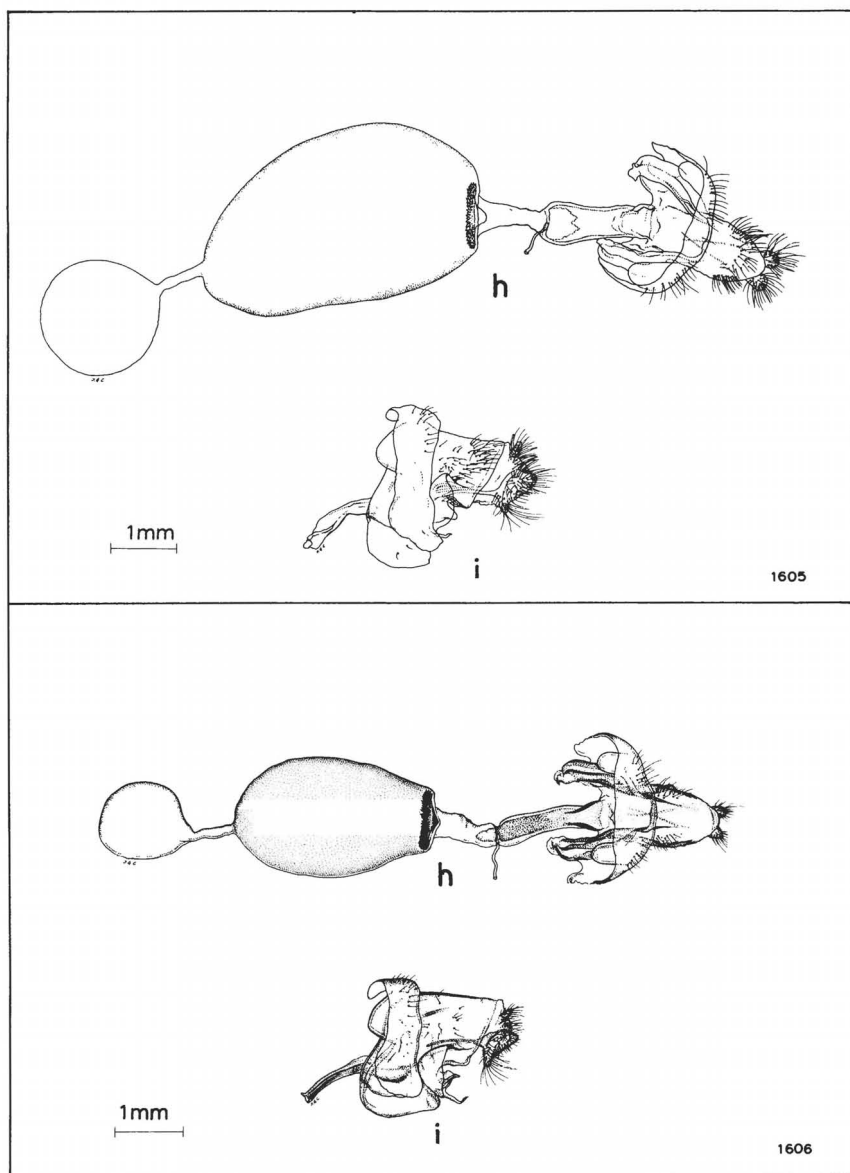


FIG. 6. Female *Phoebe sennae* from Haiti. (h) Dorsal view of genitalia; (i) Lateral view of left side of genitalia (corpus bursae, ductus bursae, appendix bursae omitted). Top: Line drawing, prep. 1605, coll. Gros Morne, 4 July 1954. Bottom: Shade drawing, prep. 1606, coll. Port-au-Prince, 13 July 1955.

DESCRIPTION OF *PHOEBIS EDITHA* GENITALIA

Male genitalia (Figs. 1 & 2). Valva flat; dorsal, proximal and distal margins concave; ventral margin convex; dorsal margin shorter than distal margin; distal margin about $\frac{1}{2}$ length of ventral margin. Saccus well defined, greatest width about $\frac{1}{4}$ total length. Ampullary process cylindrical, sclerotized, gently curved toward proximal margin of valva, possessing a rounded apex, and covered with heavily sclerotized, stiff, cylindrical batons with bifurcate distal ends; overall length of ampullary process about $\frac{2}{3}$ that of dorsal margin of valva. Apex of valva rounded; junction between dorsal and distal margins of valva possessing a cylindrical, inward directed, heavily sclerotized dorsal process, about $\frac{1}{2}$ length of dorsal margin of valva, with pointed distal end.

Uncus fused with tegumen, without visible suture, possessing no definable proximal edge; distal part of uncus in lateral view tapering to a rounded point; uncus in dorsal view $1\frac{1}{2}$ times as wide as in lateral view, possessing blunt and imperceptibly bulbous apex.

Tegumen forming shallow dome; peduncles poorly defined. Vinculum in lateral view about same length as combined length of tegumen and uncus.

Saccus about $\frac{2}{3}$ as long as combined length of tegumen and uncus, bent downward, with rounded distal end.

Furca composed of two dorsal and two ventral processes, latter about $\frac{1}{2}$ as wide and $1\frac{1}{2}$ times as long as former.

Aedeagus about $1\frac{1}{2}$ times as long as combined length of tegumen and uncus, bent upward along basal $\frac{3}{4}$, downward along distal $\frac{1}{4}$, possessing a single dorsal, flat spine near distal end, and a single ventrolateral flat spine basad of dorsal spine on left side, resulting in an asymmetrical arrangement; vesica with two oblong, sclerotized cornuti near distal end of aedeagus.

Female genitalia (Fig. 3). Corpus bursae membranous, diaphanous, oblong, flask-shaped and expansible (thus of varying size); surface of membrane possessing numerous minute excrescences in the form of dots; a single oblong signum present near junction with ductus bursae; signum perpendicular to longitudinal axis of corpus bursae; dorsal and proximal part of signum possessing numerous spines.

Appendix bursae likewise diaphanous and membranous, devoid of excrescences, spherical in shape; connected to corpus bursae by a diaphanous tube.

Ductus bursae tubular, diaphanous; antrum sclerotized and about three times as long as ductus bursae; ductus seminalis arising dorsally from junction between ductus bursae and antrum.

Lamella antevaginalis massive, sclerotized, shaped like a locomotive "cow catcher"; laterally fused with 8th tergum, forming with it a complete, uninterrupted ring with no visible suture; lamella postvaginalis with a movable protuberance, the calyptra, composed of lightly sclerotized and intricately folded membranes, blocking ostium bursae; ostium bursae laterally flanked by two free-standing membranous flaps.

Apophyses anteriores of 8th tergum sclerotized; papillae anales bilobed; ventral lobe about half as wide as dorsal, but equal in length to it; dorsum of membranous area between 8th tergum and papillae anales with rounded, lightly sclerotized suprapapillary processes.

DIFFERENCES BETWEEN GENITALIA OF
PHOEBIS EDITHA AND *PHOEBIS SENNAE*

Male genitalia (Figs. 1, 2, 4, 5). The differences are summarized in Table 1.

Female genitalia (Figs. 3, 6). The differences are summarized in Table 2.

The structural differences between *P. editha* and *P. sennae*, together with the fact that these butterflies are sympatric, synchronous, and have different larval foodplants, show that these taxa are specifically

distinct, and not, as some authors have suggested, forms of the same species.

ACKNOWLEDGMENT

I thank C. L. Remington for allowing me to borrow and dissect the genitalia described and figured here.

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GENERAL NOTE

SMALL-NICOLAY COLLECTION TO SMITHSONIAN

The National Museum of Natural History (Smithsonian Institution) is receiving the G. B. Small, Jr.-Col. S. S. Nicolay Collection of New World Butterflies. The scientific value of the collection is inestimable. It contains more than 3,800 species including about 450 undescribed taxa. Its representation and identification of New World HesperIIDae, Lycaenidae, and Riodinidae are now better than that in most museums. Coverage of Panama is approximately 98% complete, making its butterfly fauna better known than that of any other continental neotropical country. Geographically variable species, particularly from Panama, are represented by long series from many localities. Because so much neotropical forest has been destroyed, many of these specimens represent a unique record of the original fauna. Besides Panama, the collection is rich in material from Brazil, Costa Rica, Ecuador, Peru, and the United States.

The Small-Nicolay Collection contains 98,500 specimens, of which more than 42,500 are spread. There are 237 paratypes.

Lepidopterists who expect to be in the Washington, D.C., area may visit the Smithsonian and examine the collection by prearrangement.

ROBERT K. ROBBINS AND J. F. GATES CLARKE, *Department of Entomology, MRC NHB 127, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560.*