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Source: The Journal of the Lepidopterists' Society, 64(2) : 103-107

Published By: The Lepidopterists' Society

URL: https://doi.org/10.18473/lepi.v64i2.a6

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Journal of the Lepidopterists' Society
64(2), 2010, 103–107

TWO NEW SPECIES OF *PHANETA* STEPHENS FROM WESTERN UNITED STATES (TORTRICIDAE)

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ABSTRACT. *Phaneta viridis* and *Phaneta hodgesi*, new species, are described based largely on material in the United States Museum of Natural History collected by R. W. Hodges. *Phaneta pastigiata* (Heinrich), which has similarities with *P. hodgesi*, is reviewed. Adults and genitalia of the three species are illustrated.

Additional key words: Olethreutinae, Eucosmini, *pastigiata*

The purpose of this paper is to propose names for two new species of *Phaneta* Stephens based on series of specimens found amongst unsorted material at the United States Museum of Natural History (USNM). The first, described below as *Phaneta viridis*, is known only from collections made by R. W. Hodges in 1961 at three locations in Coconino Co., Arizona. The second, *Phaneta hodgesi*, has been recorded from four western states, but most of the type series was collected by R. W. Hodges in 1982 near Great Sand Dunes National Monument in south central Colorado. The generic assignment for these taxa is based on a general conformity in genitalic structure with other members of the *Phaneta-Eucosma* lineage and a lack of a costal fold on the male forewing. The use of the latter character to distinguish between Nearctic *Phaneta* and *Eucosma* Hübner dates back to Heinrich (1923) and Obraztsov (1952).

Phaneta viridis is a distinctive species that is unlikely to be confused with any other Nearctic *Phaneta*; *P. hodgesi* is similar to *Phaneta pastigiata* (Heinrich) in forewing appearance and genitalia, and a review of *P. pastigiata* is included for comparison.

MATERIALS AND METHODS

We examined ninety-nine adult specimens (78 ♂, 21 ♀), together with 25 associated genitalia preparations. The study material resides in the following institutional and private collections: Canadian National Collection, Ottawa (CNC); Essig Museum of Entomology, UC, Berkeley (EME); USNM, Washington, D.C.; and Donald J. Wright (DJW). Forewing length (FWL), defined as the distance from base to apex including fringe, and aspect ratio (AR), defined as FWL divided by medial forewing width, are used as indicators of specimen size and forewing geometry, respectively. The first is reported to the nearest one-tenth of a millimeter, the second as the average of such values calculated for a small number of specimens. Measurements were made with a stereomicroscope equipped with an ocular micrometer. The number of observations supporting a particular statistic is indicated by n. Illustrations were edited in Adobe Photoshop CS. Morphological nomenclature follows Gilligan *et al.* (2008).

SPECIES ACCOUNTS

Phaneta viridis Wright & Gilligan, new species

(Figs. 1, 2, 7, 10, 11)

Diagnosis. This moth is one of two North American species of Phaneta with a greenish forewing color. The other, *Phaneta olivaceana* (Riley) (see e.g. Gilligan *et al.* 2008: 101), is an eastern species that differs from *P. viridis* in both maculation and genitalia. The forewing markings in *P. olivaceana* usually include a dark longitudinal streak from base to apex, whereas those in *P. viridis* are transverse. Males of *P. viridis* have a distinctly shorter and broader valval neck and a much larger cucullus (Fig. 7 vs. Gilligan *et al*. 2008: 214). The lamella postvaginalis narrows posteriorly in *P. viridis* (Fig. 11) but is rectangular in *P. olivaceana* (Gilligan *et al*. 2008: 266).

Description. *Head:* Frons yellowish white; vertex pale yellow to yellowish white; labial palpus pale yellow distally, shading to white basally, with gray-brown mark on lateral surface of second segment and with long gray-brown scales concealing third segment; antenna concolorous with head. *Thorax:* Dorsal surface pale yellow; ventral surface and legs yellowish white; tarsi with grayish-brown annulations. *Forewing* (Figs. 1, 2): ♂ FWL 6.0–8.9 mm (mean = 8.1, n = 10), AR = 3.44; ♀ FWL 7.5–8.7 (mean = 8.0 mm, n = 8), AR = 3.29; costal margin weakly convex, apex acute, termen weakly concave; dorsal surface yellowish white with olive-brown markings, including a chevron-shaped subbasal fascia extending from costa to dorsum but often interrupted on CuP, a median fascia consisting of an outwardly

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FIGS. 1–6. **1–2**. *P. viridis*, ♂ holotype, ♀ Coconino Co., Arizona. 3. *P. hodgesi*, ♂ holotype Alamosa Co., Colorado. **4–6.** *P. pastigiata*. **4,** ♂ paratype, Tulare Co., California. **5–6,** ♂, ♂ Alamosa Co., Colorado.

oblique bar at mid-costa, and a broad irregularly shaped band extending from radius to dorsum along proximal margin of ocellus; ocellus edged with white on proximal, posterior, and distal margins; central field of ocellus olive yellow, bordered basally and distally by thin lustrous gray bars, and crossed longitudinally by up to three black dashes; costal strigulae conspicuous from median fascia to apex but weakly defined from base to mid-costa; termen with pale yellowish line from apex to tornus, weakly contrasting with darker fringe scales. Hindwing: Grayish brown, often with lighter fringe. *Male genitalia* (Fig. 7) (n = 6): Uncus a moderately developed, dorsally setose lobe; dorsolateral shoulders of tegumen broadly rounded; socii broad medially, narrowing basally and distally, often with lateral margins irregular; vesica with 15–18 deciduous cornuti; valva with costal margin concave, apex bluntly rounded, distal margin convex and of nearly uniform curvature, anal angle rounded, saccular angle ca. 90°; ventral margin of valval neck with U-shaped emargination; cucullus with densely setose medial surface and with series of moderately stout setae along distal margin from anal angle nearly to apex. *Female genitalia* (Figs. 10, 11) (n = 6): Papillae anales laterally facing and sparsely setose; lamella postvaginalis narrowing posteriorly and flaring laterally at posterolateral corners, with length ca. 2 × medial width, and with central trough shallow and densely microspinulate; lamella antevaginalis weakly sclerotized and ringlike; posterior margin of sternum VII invaginated to full length of sterigma and fused with lateral margins of lamella postvaginalis; lateral margins of sternum VII concave near ostium; ductus bursae with broad sclerotized ring posterior to juncture with ductus seminalis; corpus bursae with two signa, one of moderate size, the other small and pinlike.

Holotype. ♂, Arizona, Coconino Co., Hart Prairie, 10 mi. NNW Flagstaff, 8500 ft., R. W. Hodges, 24 July 1961, USNM.

Paratypes. ARIZONA: same location and collector as holotype, 21 July 1961 (2 ♂), 24 July 1961 (1 ♂), 28 July 1961 (9 ♂, genitalia slides TMG 428, 432; 1 ♀, genitalia slide DJW 2060), 29 July 1961 (9 ♂, genitalia slide DJW 2057), 30 July 1961 (8 ♂, genitalia slide TMG 431), 2 August 1961 (1 ♀, genitalia slide TMG 429); Fort Valley, 7.5 mi NW Flagstaff, 7350 ft., R. W. Hodges, 21 July 1961 (1 ♂, genitalia slide DJW 2058), 25 July 1961 (1 ♂, 1 ♀), 28 July 1961 (1 ♂; 4 ♀, genitalia slide DJW 2187), 29 July 1961 (3 ♂), 30 July 1961 (3 ♂), 2 August 1961 (2 ♀, genitalia slides DJW 2059, TMG 433), 4 August 1961 (1 ♀), 6 August 1961 (1 ♂), 7 August 1961 (1 ♂, genitalia slide USNM 70142), 9 August 1961 (1 ♀, genitalia slide TMG 430); Hochderffer Hill, 12.5 mi NNW Flagstaff, 8500 ft., R. W. Hodges, 6 August 1961 (1 ♂). Paratypes deposited in the USNM.

Etymology. The specific name is the Latin adjective for green.

Distribution and biology. The type series consists of 53 specimens (42 ♂, 11 ♀) collected at three locations west to southwest of the San Francisco Peaks in Coconino County, Arizona. Capture dates range from 21 July to 9 August, elevations from 7350 to 8500 feet. Hart Prairie, the type locality, is a 245 acre preserve west of Humphreys Peak featuring a mix of prairie vegetation, old growth ponderosa pine, and Bebb willow (*Salix bebbiana* Sarg.). Since 1994 it has been managed by The Nature Conservancy.

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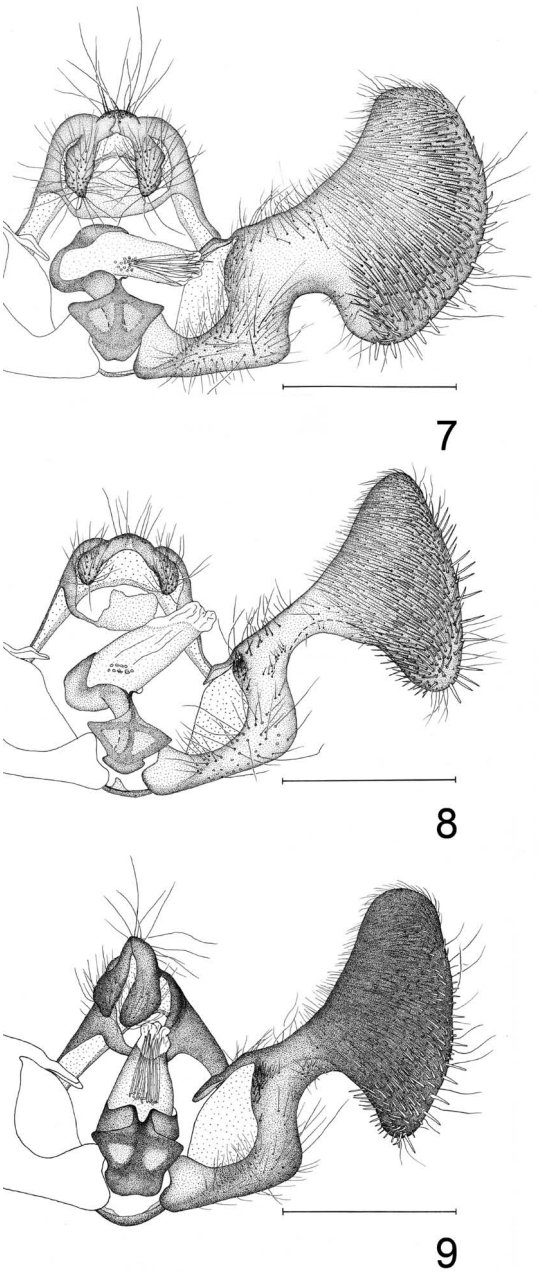
Phaneta pastigiata (Heinrich)
(Figs. 4–6, 8, 12, 13)

Thiodia pastigiata Heinrich 1929:3; McDunnough 1939:45.
Phaneta pastigiata: Powell 1983:34; Brown 2005:495.

Types. Holotype: ♂, California, Tulare Co., Monachee Meadows, 8000 ft., 8–14 July, genitalia slide 72780, USNM. Paratypes: same data as holotype, (7 ♂; 1 ♀, genitalia slide DJW 2174, USNM) [3 specimens (not examined by the authors) were reported from the American Museum of Natural History by Klots (1942). This accounts for 11 of the 12 paratypes mentioned by Heinrich (1929).]

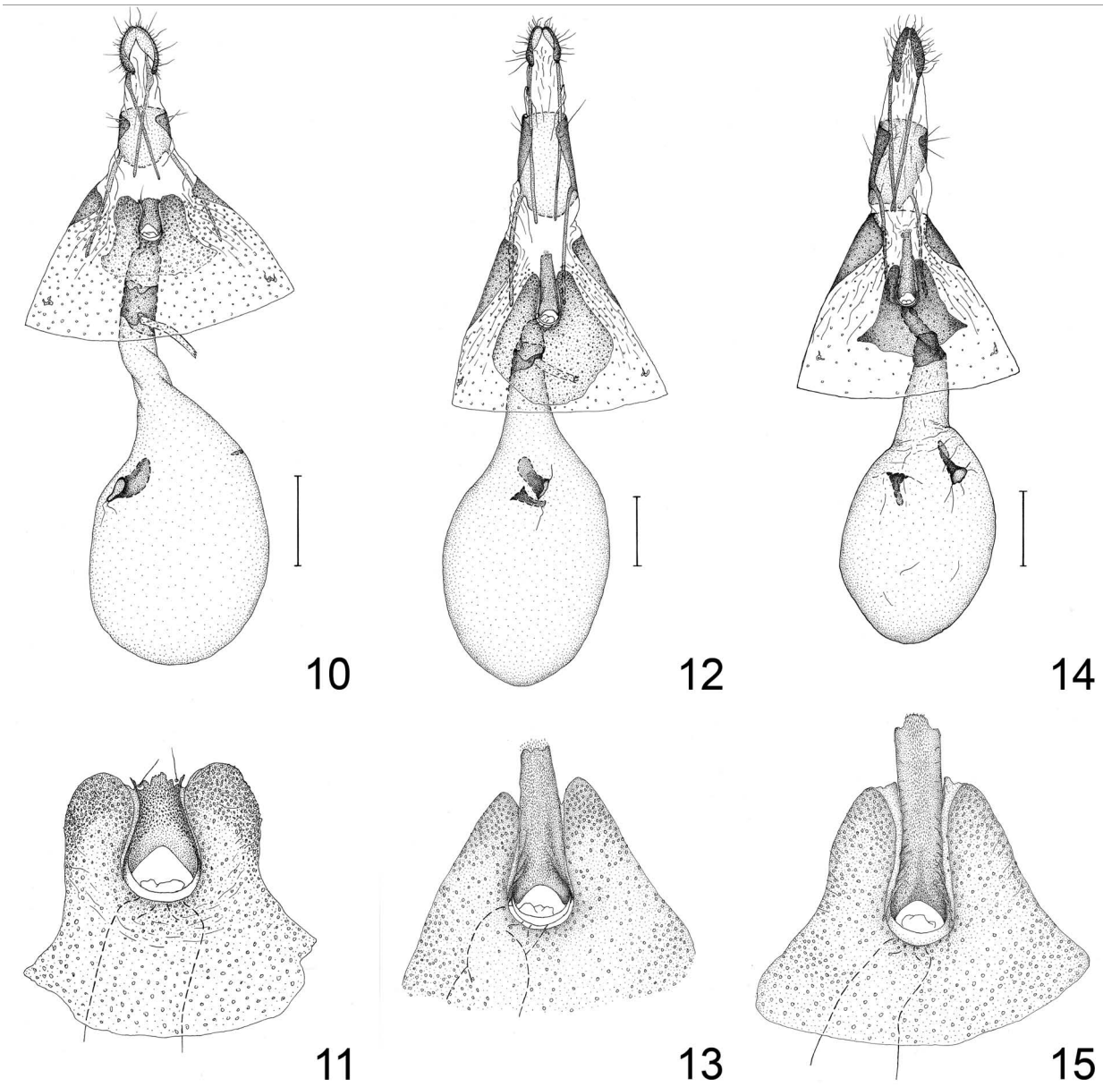
Descriptive notes. *Phaneta pastigiata* is a medium-sized grayish-brown species with no prominent forewing markings (Figs. 4–6). The median fascia is faintly indicated by a grayish-brown mark at mid-costa, and a subbasal fascia is sometimes suggested by a dark shade emanating from the dorsum (Fig. 6). The weakly defined ocellus is marked proximally by a patch of white to faun scaling and distally by an inconspicuous lustrous gray bar. The central field of the ocellus consists of white-tipped grayish-brown scales and is edged distally by black scales that tend to coalesce into three dots. The most prominent forewing feature is a white streak along the termen from tornus to apex, which is followed distally by white fringe scales with blackish-gray subapical cross-markings, the latter aligning to form two thin black lines parallel to the termen. Forewing statistics: ♂ FWL 6.7–9.8 mm (mean = 8.3, n = 11), AR = 3.39; ♀ FWL 7.0–8.6 mm (mean = 7.9, n = 5), AR = 3.47.

Male genitalia (Fig. 8) (n = 5): Uncus a convex, dorsally setose bulge; dorsolateral shoulders of tegumen broadly rounded; socii short and sparsely setose; vesica with 10–20 deciduous cornuti; valva with dorsal margin concave, apex rounded, distal margin weakly convex to nearly straight, anal angle rounded, neck narrow (width less than one-third that of valva at saccular corner) with variably developed flange on ventromedial margin and with moderately scooped-out emargination of ventrolateral margin (indicated by dashed line in Fig. 8), saccular angle ca. 90°; cucullus with medial surface densely setose and with series of long stout setae along distal margin from anal angle nearly to apex. *Female genitalia* (Figs. 12, 13) (n = 3): Papillae anales laterally facing, weakly sclerotized, and sparsely setose; apophyses posteriores long, length ca. 1.5 × length of apophyses anteriores; lamella postvaginalis elongate, length ca. 3 × medial width, with central trough densely microspinulate; posterior margin of sternum VII invaginated to ca. three-fourths length of sterigma, fused with lateral margins of lamella postvaginalis, but separated from ringlike lamella antevaginalis by thin strip of membrane; ductus bursae with sclerotized ring posterior to juncture with ductus seminalis; corpus bursae with two signa of nearly equal size.



FIGS. 7–9. Male genitalia. **7,** *P. viridis*, slide DJW 2058. **8,** *P. pastigiata*, slide DJW 2111. 9, *P. hodgesi*, slide DJW 1121. Scale bar = 0.5 mm.

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FIGS. 10–15. Female genitalia. **10–11,** *P. viridis*, slides DJW 2187, 2060. **12–13,** *P. pastigiata*, slide DJW 2174. **14–15,** *P. hodgesi*, slides DJW 1933, 1842. Scale bar = 0.5 mm.

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Distribution and biology. Twenty-four specimens (19 ♂, 5 ♀) were examined from the following states and counties: CALIFORNIA: Mono, San Bernardino, Tulare; COLORADO: Alamosa; NEVADA: Lander. Adults were captured between 1 June and 19 July at elevations from 7300 to 8200 feet.

Phaneta hodgesi Wright & Gilligan, new species
(Figs. 3, 9, 14, 15)

Diagnosis. This species is similar in appearance to *P. pastigiata* (Figs. 4–6), but the forewing is shorter (mean FWL ≈ 7.2 mm vs. 8.2 mm), less elongate (AR ≈ 3.22 vs. 3.41), and has a prominent orange-brown mark at mid-dorsum that is not present in *P. pastigiata*. The two species have similar genitalia, but in *P. hodgesi* the uncus is more strongly produced, the ventrolateral margin of the valval neck is not scooped out, the lamella postvaginalis is more elongate, and the anterolateral corners of sternum VII are more sharply acute.

Description. *Head*: Frons and vertex white; labial palpus white with very pale grayish-brown scaling on lateral surface of second segment; antenna white. *Thorax*: Dorsal surface white, sometimes with pale orange-brown tint; ventral surface white; legs white to whitish gray, with grayish-brown tarsal annulations. *Forewing* (Fig. 3): ♂ FWL 6.0–8.1 mm (mean = 7.3, n = 17), AR = 3.27; ♀ FWL 6.5–7.2 mm (mean = 6.9, n = 5), AR = 3.13; costal margin weakly convex, apex acute, termen straight; dorsal surface white to pale gray, with orange-brown markings as follows: a subbasal fascia extending from dorsum to discal cell but not expressed anterior to radius, a series of thin dashes on the costa separating strigulae, and an apical spot; ocellus bordered proximally and distally by barely discernable silvery-white transverse bars; central field of ocellus white to very pale orange brown, marked with two or three black dots; termen with conspicuous white band from apex to tornus; fringe consisting of two intermeshed rows of white scales: the shorter scales with black preapical marks that align to form a thin black line from apex to tornus, the longer scales with similar markings from apex to M1 and with pale orange-brown apical shading from M1 to tornus. *Hindwing*: Pale grayish brown with lighter fringe. *Male genitalia* (Fig. 9) (n = 3): Uncus a rounded dorsally setose lobe; dorsolateral shoulders of tegumen weakly developed; socii broad medially, narrowing toward apex; vesica with 11–17 deciduous cornuti; valva with costal margin concave, apex rounded, distal margin convex and of nearly uniform curvature, anal angle narrowly rounded, ventral margin deeply emarginated, neck narrow (width a little more than one-third that of valva at saccular corner) with weakly developed ridge from edge of basal excavation to ventral margin at base of cucullus, saccular angle ca. 90°; cucullus with medial surface densely setose and with series of moderately stout setae evenly distributed along distal margin from anal angle nearly to apex. *Female genitalia* (Figs. 14, 15) (n = 2): Papillae anales weakly sclerotized, laterally facing, and sparsely setose; apophyses posteriores long (length ca. 1.5 × length of apophyses anteriores); lamella postvaginalis long and semirectangular, length nearly 4 × medial width, with densely microspinulate central trough; posterior margin of sternum VII invaginated to ca. three-fourths length of sterigma and fused with lateral margins of lamella postvaginalis; ductus bursae with sclerotized ring posterior to juncture with ductus seminalis; corpus bursae with two signa of nearly equal size.

Holotype. ♂, Colorado, Alamosa Co., Zapata Ranch, 7900 ft., R. W. Hodges, 26 June 1982, genitalia slide DJW 1837, USNM.

Paratypes. ARIZONA: Coconino Co., Walnut Canyon, 6 1/3 mi. EESE Flagstaff, 6500 ft., J. G. Franclemont, 10 July 1965 (1 ♀); Coconino Co., Little Spring, N. W. slope S. F. [San Francisco] Mtns., 8300 ft., J. A. Powell & F. A. Sperling, 15 July 1995 (1 ♂). COLORADO: same data as holotype (2 ♂, genitalia slide DJW 1836; 2 ♀, genitalia slide DJW 1842); Alamosa Co., Zapata Ranch, 8200 ft., R. W. Hodges, 23 June 1982 (1 ♂); Alamosa Co., Great Sand Dunes, Mosca Creek, 8200 ft., R. W. Hodges, 16 June 1982 (1 ♂); Alamosa Co., Sand Dunes Staff Quarters, 8200 ft., R. W. Hodges, 22 June 1982 (1 ♂), 25 June 1982 (3 ♂), 27 June 1982 (1 ♂). NEVADA: Elko Co., Angel Lake Road above Wells, 7000 ft., D. C. Ferguson, 15 July 1971 (1 ♀, genitalia slide DJW 1933). WYOMING: Albany Co., T15N R73W Sec 1, 2217 Sky View Lane, 7480 ft., J. S. Nordin, 11 July 2004 (1 ♂), 15 July 2004 (1 ♂, genitalia slide DJW 1121). Paratype depositories: EME, USNM, DJW.

Etymology. This species is named in honor of Ronald W. Hodges.

Distribution and biology. Twenty-two specimens (17 ♂, 5 ♀) were examined from Arizona, Colorado, Nevada and Wyoming, all collected between mid-June and mid-July at elevations between 7000 and 8300 feet.

Remarks. The CNC has three males collected on 20 May 1955 by J. E. H. Martin at Apple Valley, California that are similar in size and appearance to *P. hodgesi* but lack the orange-brown mark on the forewing. They also differ from *P. hodgesi* in subtle details of the genitalia. These specimens probably represent another unnamed species, but additional material is needed, particularly females, for a thorough evaluation.

ACKNOWLEDGEMENTS

We thank J. W. Brown, J.-F. Landry, and J. A. Powell for the loan of specimens under their care and John S. Nordin for providing specimens of *P. hodgesi* from southeastern Wyoming. Two anonymous reviewers gave helpful comments on the manuscript.

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Received for publication 1 March 2009; revised and accepted 2 October 2009.

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