

Contribution to the knowledge of the early stages of *Proserpinus vega* (DYAR, 1903) (Lepidoptera, Sphingidae)

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Abstract: *Proserpinus vega* (DYAR, 1903) is the least known member of the genus. Adults have been collected in the United States (Arizona, New Mexico and Texas) and several states in Mexico. Until now, the species' biology and life history details have remained unknown and unpublished. Here we report on two *P. vega* larvae collected in 2014 in Southeast Arizona on the host plant, *Gaura hexandra* (ORTEGA 1797, Onagraceae); both larvae were reared to pupation. Descriptions of the penultimate and ultimate larval instars and pupa are included, together with host plant and habitat notes.

Key words: Lepidoptera, Sphingidae, *Proserpinus*, Mexico, Arizona, USA, early stages, biology.

Beitrag zur Kenntnis der Jugendstadien von *Proserpinus vega* (DYAR, 1903) (Lepidoptera, Sphingidae)

Zusammenfassung: *Proserpinus vega* (DYAR, 1903) ist wohl die am schlechtesten bekannte Art der Gattung. Imagines wurden bisher gefangen in den Vereinigten Staaten (Arizona, New Mexico und Texas) sowie in einigen mexikanischen Bundesstaaten. Bisher waren Details zur Biologie und Präimaginalmorphologie unbekannt und unpubliziert. Wir berichten über 2 Raupen von *P. vega*, die 2014 im Südosten Arizonas auf der Futterpflanze *Gaura hexandra* (ORTEGA 1797, Onagraceae) gefunden und erfolgreich bis zur Puppe durchgezogen wurden. Das vorletzte und letzte Raupenstadium sowie die Puppe werden abgebildet und beschrieben, dazu einige Hinweise zu Futterpflanze und Habitat.

Introduction: The discovery

Two larvae of *Proserpinus vega* (DYAR, 1903) were collected in mid-August 2014 by the second author. The exact location of the study site will not be disclosed until further studies have been completed.

The first larva was found feeding on the host plant, *Gaura hexandra* ORTEGA 1797 (Onagraceae), during the late afternoon of August 14th. Judging by the size of the larva and its head capsule, the larva appeared to have recently molted into the penultimate instar. The host plant was almost completely hidden by the strong growth of native grasses and finding the larva required searching through the tall grass on hands and knees.

The second larva was found during the late morning of August 17th next to a group of *Gaura hexandra* plants. The large larva was sitting on an adjacent composite plant and judging from its size, it was in late ultimate instar.

Gaura hexandra is a small, clump-forming onagraceous annual – the past year's seeds germinate and grow quickly with the beginning of the annual monsoon rains

in early July. Host plants were found mostly in small groups of 4–8, with the central plant the largest, surrounded by smaller examples. Finding the host plants was difficult, as there are several other herbaceous species that look quite similar.

The larva of another sphingid, *Hyles lineata* (FABRICIUS, 1775), was also found on the *Gaura*. They were unusual in that their coloration was always dark and with maculation not seen before by the authors. These *H. lineata* larvae were very common, so that searching for *Proserpinus* larvae by looking for frass or eaten stems could easily be misleading.

Abbreviations used

CJHL Collection Jean HAXAIRE, Laplume, France.

CSMO Collection Sphingidae Museum, Orlov, Czech Republic.

FLMNH Florida Museum of Natural History, Gainesville, USA.

USNM United States National Museum, Washington D.C., USA.

Chronology of publications, taxons and localities

Proserpinus vega was described by DYAR (1903) from a single specimen collected by SCHWARZ and BARBER at Las Vegas Hot Springs, New Mexico, on 18. VIII. 1901, under the combination *Lepisesia vega*. The original description is one of the shorter we have seen: "Forewing as *terlooii*, with an additional dark green band at base, hindwings as *juanita*, expanse 54 mm." We have examined this specimen, a male deposited in the collection of USNM. It is in quite good condition (Fig. 1), despite the absence of the right antenna and dissected abdomen.

Almost immediately, HOLLAND (1903: 73), in his famous "Moth Book", transferred the species to the genus *Pogocolon* BOISDUVAL, [1875]. He stated that *P. vega* "occurs in our region. It is much darker in color than the two former species (*gaurae* [SMITH, 1797] and *juanita* [STRECKER, 1877]), which it otherwise somewhat closely resembles." This description is completely incorrect, but at that time only the type was known and had been described but a few months before HOLLAND's publication.

DRAUDT (1931: 886) simply repeated DYAR's description and admitted that he did not know the moth, but nonetheless transferred the species to the genus *Arctonotus* BOISDUVAL, 1853.

MOOSER (1940: 451) mentioned *P. vega* from the Federal District (D.F.), Mexico. He also provided anecdotal information about the larva having been described by DAMPF in an unspecified publication and reared "sobre una hierba" (*sic*). To the best of our knowledge, no such

publication exists. One specimen, a perfect male of the moth, was illustrated by MOOSER (1940: plate 72, fig. 3).

HOFFMANN (1942: 230) just mentioned “Valle de México” for the species in his “Catalogo”.

HODGES (1971: 141) finally transferred the species to the genus *Proserpinus* HÜBNER, [1819] and published a complete description of *P. vega*. He pointed out that the supposed description of the larva mentioned by MOOSER has probably never been published. He gave some indication of the distribution of the moth: the Davis Mountains of Southwest Texas in mid-August and Las Vegas Hot Springs, New Mexico, in mid-August (HODGES 1971). We have seen the two mentioned specimens; the second is, of course, DYAR’s holotype.

TUTTLE (2007: 192) provided additional locations, mostly from Arizona in Yavapai and Apache counties, as well as a new location in Gran Quivera, Torrance County, New Mexico. At that last locality, Don BOWMAN is reported to have found an ultimate instar larva on *Oenothera hookeri* (Onagraceae), which was illustrated by TUTTLE (2007: plate 22).

Most recently, TURRENT CARRILES & IBARRA VELAZQUEZ (2014) recorded three specimens of *P. vega* collected in August 1997 by Alfredo GONZALES in Tlalnepantla, State of Mexico. The municipality of Tlalnepantla is divided by the northern salient of the Distrito Federal (D.F.), so this new locality is very close to the area identified by MOOSER.

All known adults have been collected from mid-July to mid-August. We concur with Jim TUTTLE that the flight period seems to be very short, but we are uncertain if *P. vega* is a univoltine species. Where collecting times have been recorded, females have only been caught during a 30-minute window at sunset, and are not known to have been taken either before or after this brief period.

Habitat

The larvae were found in desert grasslands at the base of one of the “Sky Island” mountain ranges in southeast Arizona. These mountain ranges form the northernmost extensions of the Sierra Madre Occidental in Mexico, with several such features arising from the desert floor throughout southeast Arizona.

These wet-dry foothill grasslands are higher altitude habitats, roughly 1300–1500 m in elevation, which transition into adjacent savannah lower down and dry oak forests higher up in the mountains. Most of the year they are dry, with no living herbaceous annuals or perennials present. The annual monsoon rains moving north from Sonora, Mexico, in the first weeks of July initiate the growth of the grasses and perennials, and germination of annual seeds. By late September, these have all have flowered and seeded, and begun to die back. The grasslands then remain dry until the next year’s rains.

Description of the penultimate instar larva

T = Thoracic segments (1–3);

A = Abdominal segments (1–10).

Length: 35 mm.

Overall, the larva is cylindrical, stout, with a reduced caudal horn. Head capsule ground color pale orange, with black patches on frons; clypeus, labrum and mandibles also pale orange. Ground color of thorax and abdomen white with black patches and lines. T1 orange dorsally and laterally. Each segment from T2 to A9 inclusive with 1–4 distinct transverse creases, many highlighted with black, giving a slightly raised effect; this black highlighting irregularly developed across segments. T2 to A9 also with two subdorsal hemi-ovoid black patches that are partially fused along midline, anterior ventral corners continuous with black highlighting of a crease. Spiracles black. Lateral teardrop-shaped black patches on T2–T3 and A1–A9 surrounding spiracles. Dorsal and lateral black markings with a secondary, smaller internal black area with a noticeably rough texture that is visible only on close examination. Venter mostly black, reaching onto prolegs, True legs and prolegs pale orange, latter pale brown at base. Small black setae on prolegs; planta and crochets pale orange. Caudal horn black, short and stout, with a rugose texture; base pale orange, with black T-shaped markings posteriorly. Anal shield orange, with a triangular black patch. Remainder of A10 orange with irregular black sublateral patches at base.

Description of the ultimate instar larva

Length: 79 mm.

Head capsule orange, now slightly bilobed, with subdorsal black spots, and a thin black line from midline to base. Integument now very smooth, reflective; looking almost enameled. Sublateral area and venter now white with irregular black markings. Black-based transverse creases are darker than in penultimate instar. Creases now dorsally shaded with orange on T3 and A1, changing to light pink from A2–A8. Caudal horn anteriorly is pale orange, extending to half way up; posterior black from top to base.

Pupation

Both larvae fed for several days prior to pupation. The larger ultimate instar larva fed for five days, becoming prepupal on August 23rd, with the final molt occurring on August 29th, producing a female pupa. The penultimate instar larva molted into ultimate instar on August 20nd, and completed ultimate instar feeding on September 2nd, with the final molt into a male pupa on September 9th.

Male pupa — early emergence

To our surprise, the male pupa developed immediately and emerged on October 5th at approximately 1:30 am,

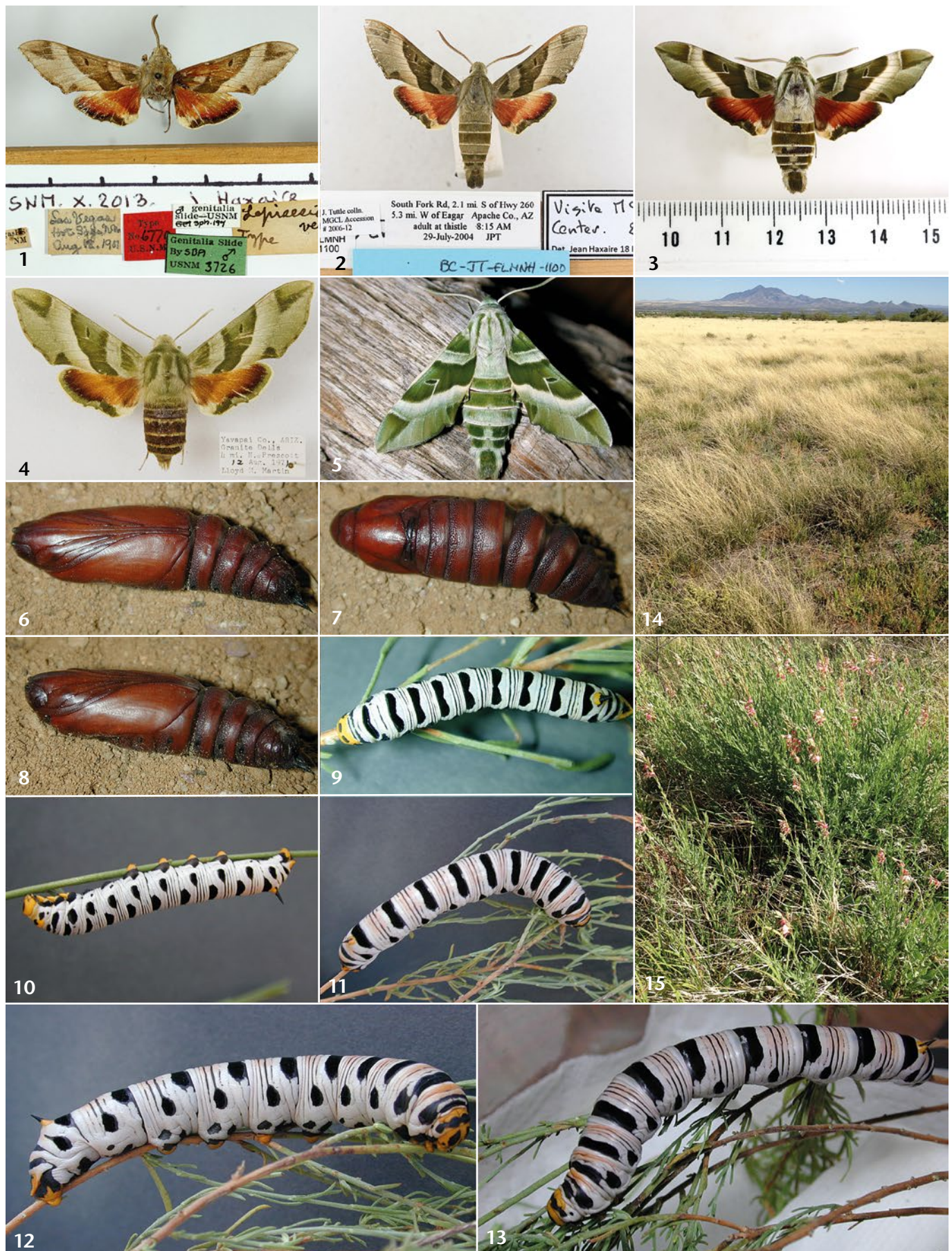


Fig. 1: holotype, ♂, USNM, Washington (JH). Fig. 2: adult ♂, AZ, leg. Jim TUTTLE, FLMNH (JH). Fig. 3: ♂, AZ, reared by MDV, CJHL (JH). Fig. 4: ♀, AZ, CSMO (JH). — Set specimens (Figs. 1–4) at approximately natural size. — Fig. 5: ♂ just after emergence, AZ, (MDV). Fig. 6: ♀ pupa, AZ, ventral view (MDV). Fig. 7: ♀ pupa, AZ, dorsal view (MDV). Fig. 8: ♀ pupa, AZ, lateral view (MDV). Fig. 9: larva, penultimate instar, AZ, dorsal view (MDV). Fig. 10: larva, penultimate instar, AZ, lateral view (MDV). Fig. 11: larva, ultimate instar, AZ, dorsal view (MDV). Fig. 12: larva, ultimate instar, AZ, lateral view (MDV). Fig. 13: larva, ultimate instar, AZ, slightly darker form, dorso-lateral view (MDV). Fig. 14: typical habitat, Cochise County, AZ (MDV). Fig. 15: Harlequinbush, *Gaura hexandra* (ORTEGA, 1797), Onagraceae, AZ (MDV). — Photos taken by: (JH) = J. HAXAIRE; (MDV) = M. D. VAN BUSKIRK.

and as a result we were unable to prepare a description. The reasons for this unexpected emergence are unknown but may be related to the artificial rearing conditions. The living male is illustrated in Fig. 5.

Description of the female pupa

Length: 43 mm.

Color reddish brown with darker abdominal segments. Two prominent tubercles on head adjacent to inner edge of eye shields. Proboscis with rough striations opposite the eye shields. Abdominal segments slightly convex, rough-textured apically. Cremaster black, triangular; broad basally and flattened dorso-ventrally, very slightly bifid at tip.

At the time of writing, the female pupa remains in diapause.

Conclusions

While this article contains heretofore unknown data on the life history of *P. vega*, there is still considerable fieldwork and research required during the coming seasons. Completion of the entire life history, mating and other adult behavior, additional host plant data, and further aspects of species biology need to be recorded and published.

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References

- DRAUDT, M. (1931): 14. Familie: Sphingidae. — Pp. 839–900, pls. 90–98F in: SEITZ, A. (ed., 1913–1940), Die Gross-Schmetterlinge der Erde, vol. 6, Die Amerikanischen Spinner und Schwärmer. — Stuttgart (A. Kernen), VIII + viii + 1452 pp., pls. 1–168 (i.e., more than 168 pls.).
- DYAR, H. G. (1903): New North American Lepidoptera with notes on larvae. — Proceedings of the Entomological Society of Washington, Washington D.C., 5: 290–298.
- HODGES, R. W. (1971): Sphingoidea. — In: HODGES, R. W., The moths of America North of Mexico including Greenland. — London (E.W. Classey, R.B.D. Publ.), 158 pp., 14 col. pls.
- HOFFMANN, C. C. (1942): Catalogo sistematico y zoogeografico de los Lepidopteros Mexicanos, tercera parte, Sphingoidea y Saturnioidea. — Anales del Instituto de Biología, Universidad Nacional Autónoma de México (Serie Zoología), Ciudad México, 13: 213–256.
- HOLLAND, W. J. (1903): The moth book [first ed.]. — New York: (Doubleday, Page & Co.), 479 pp.
- MOOSER, O. (1940): Enumeración de los Esfíngidos Mexicanos (Insecta Lepidoptera), con notas sobre su morfología y su distribución en la República. — Anales de la Escuela Nacional de Ciencias Biológicas, Ciudad México, 1: 407–495.
- TURRENT CARRILES, A., & IBARRA VELAZQUEZ, A. (2014): Reporte de un esfingido poco conocido *Proserpinus vega* (DYAR, 1903). (Insecta, Lepidoptera, Sphingoidea). — Revista de la Sociedad Mexicana de Lepidopterología, Nueva Serie, Ciudad México, 2: 4–5.
- TUTTLE, J. P. (2007): The hawk moths of North America. — Washington D.C. (The Wedge Entomological Research Foundation), xviii + 253 pp., 23 pls.

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