A New Species of Spintherophyta Dejean, 1836 (Coleoptera: Chrysomelidae: Eumolpinae) from the California Channel Islands, USA

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A New Species of *Spintherophyta* Dejean, 1836 (Coleoptera: Chrysomelidae: Eumolpinae) from the California Channel Islands, USA

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Abstract

Spintherophyta punctum Gilbert and Clark, **new species**, is described from Santa Rosa Island, an island of the Channel Islands in California, USA. Adults have been associated with willow (*Salix* L., Salicaceae). Illustrations of the adult, including the aedeagus, are provided. A diagnostic key is provided to facilitate identification of species of *Spintherophyta* from the USA.

Key Words: leaf beetles, taxonomy, Nearctic

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Introduction

The genus *Spintherophyta* Dejean, 1836 is widespread throughout Central and South America (Seeno and Wilcox 1982), and approximately 100 species are described (Schultz 1976). The number of species reported from Mexico varies. Flowers (1996) listed 16 species, Ordóñez Reséndiz (2014) listed 18 and Wilcox (1975, 1983) listed 21. Only four species are recorded from the United States (Riley *et al.* 2003). Schultz (1976) reviewed the genus *Spintherophyta* for America north of Mexico. His work included two new species, *Spintherophyta arizonensis* Schultz, 1976 and *Spintherophyta exigua* Schultz, 1976. He also formalized two new combinations, *Spintherophyta globosa* (Olivier, 1808) (transferred from *Chrysodina* Baly, 1864) and *Spintherophyta violaceipennis* (Horn, 1892) (transferred from *Colaspoides* Laporte, 1833). These were stated to be new combinations, although the species were included in *Spintherophyta* a year earlier in the informal publication of Wilcox (1975). Herein, we describe a new species from the Channel Islands, off the coast of southern California.

Materials and Methods

The specimens of the new species described in this paper, all adults collected in 1941, were housed in the Natural History Museum of Los Angeles County until they were found in the museum collection by the senior author. Seven of the 18 specimens were pinned and labeled, and the other eleven were in a small, round pillbox with the data written on the lid (Fig. 4). These were removed from the box and pinned and labeled. Although the lid of the box indicated twelve specimens, there were only eleven in the container.

Specimens of the new species were examined using a Nikon stereomicroscope. They were compared to material in the senior author's collection (determined by the senior author as the four species previously known from the United States) and with the descriptions of these species given by Schultz (1976). They were also compared with online photographs and original descriptions of species from Latin America. Multifocal photographs were taken with a Leica MC-170 HD digital camera attached to a Leica MC 165C stereomicroscope, combined with the image stacking software Leica

Application Suite version 4.10.0. Images were retouched using Adobe Photoshop CC 2019™ software, and plates were made using Adobe InDesign 2020™.

Although external morphological characters alone are sufficient to enable recognition of the new species, genitalia were also examined. Genitalia preparations were photographed with a Tescan Vega 3xm Scanning Electron Microscope that was set to high vacuum. The specimens were coated with gold/palladium prior to imaging, using a Cressington 108 Auto sputter coater with a Cressington MTM 20 Thickness controller. For comparative purposes, the aedeagus of a similar species of *Spintherophyta* was photographed, using an MTI 3CCD camera attached to an Olympus SZX12 stereomicroscope, combined with Olympus cellSens software.

The following collection codens are used throughout the text: Arthur J. Gilbert personal collection, Clovis, CA, USA (AJGC); Academy of Natural Sciences, Drexel University, Philadelphia, PA, USA (ANSP); Hasbrouck Insect Collection, Arizona State University, Tempe, AZ, USA (ASUHIC); The Natural History Museum, London, United Kingdom (BMNH); Monte L. Bean Life Science Museum, Brigham Young University, Provo, UT, USA (BYUC); California Academy of Sciences, San Francisco, CA, USA (CASC); California State Collection of Arthropods, California Department of Food and Agriculture, Sacramento, CA, USA (CSCA); Natural History Museum of Los Angeles County, Los Angeles, CA, USA (LACM); Essig Museum of Entomology, University of California, Berkeley, CA, USA (EMEC); Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA (MCZ); Santa Barbara Museum of Natural History, Santa Barbara, CA, USA (SBMN); Texas A&M University, College Station, TX, USA (TAMU); University of Arizona, Tucson, AZ, USA (UAIC); R. M. Bohart Museum of Entomology, University of California, Davis, CA, USA (UCDC); Entomology Research Museum, Department of Entomology, University of California, Riverside, CA, USA (UCRC); United States Museum of Natural History, Washington, DC, USA (USNM). In recording data in the Specimens Examined section, the text from the labels of the holotype was copied verbatim (a single slash [/] indicates a new line on a label).

Since Schultz (1976) mentioned California specimens of *S. arizonensis*, and since we suspected that these might be misidentified specimens of the new species, we contacted many of the collections from which he reported borrowing material, including the ANSP, ASUHIC, CASC, EMEC, MCZ, UAIC, UCDC and UCRC. The specimens were eventually located at the MCZ and are further discussed in the Comments section below.

Taxonomy

Generic Diagnosis of *Spintherophyta*. In this genus, the head in repose is in the hypognathous position, with the rear of the mouthparts covered by the raised anterior margin of the prosternum. The procoxal cavities are closed. The tibiae lack a preapical tooth, and the tarsal claws are appendiculate. Males have the first tarsomere on the pro- and mesotarsi enlarged. In all the species occurring in the United States, the dorsum is entirely dark, without pale markings on the pronotum or elytra. With the exception of the very similar genus *Metaparia* Crotch, 1873, these characters will separate *Spintherophyta* from all other United States genera of Eumolpinae. Moreover, the mandibles are similar in both sexes of *Spintherophyta*, at most very slightly larger in the male; the mandibles in male *Metaparia* are always distinctly enlarged compared to the female (Flowers 1996).

Spintherophyta punctum Gilbert and Clark, new species

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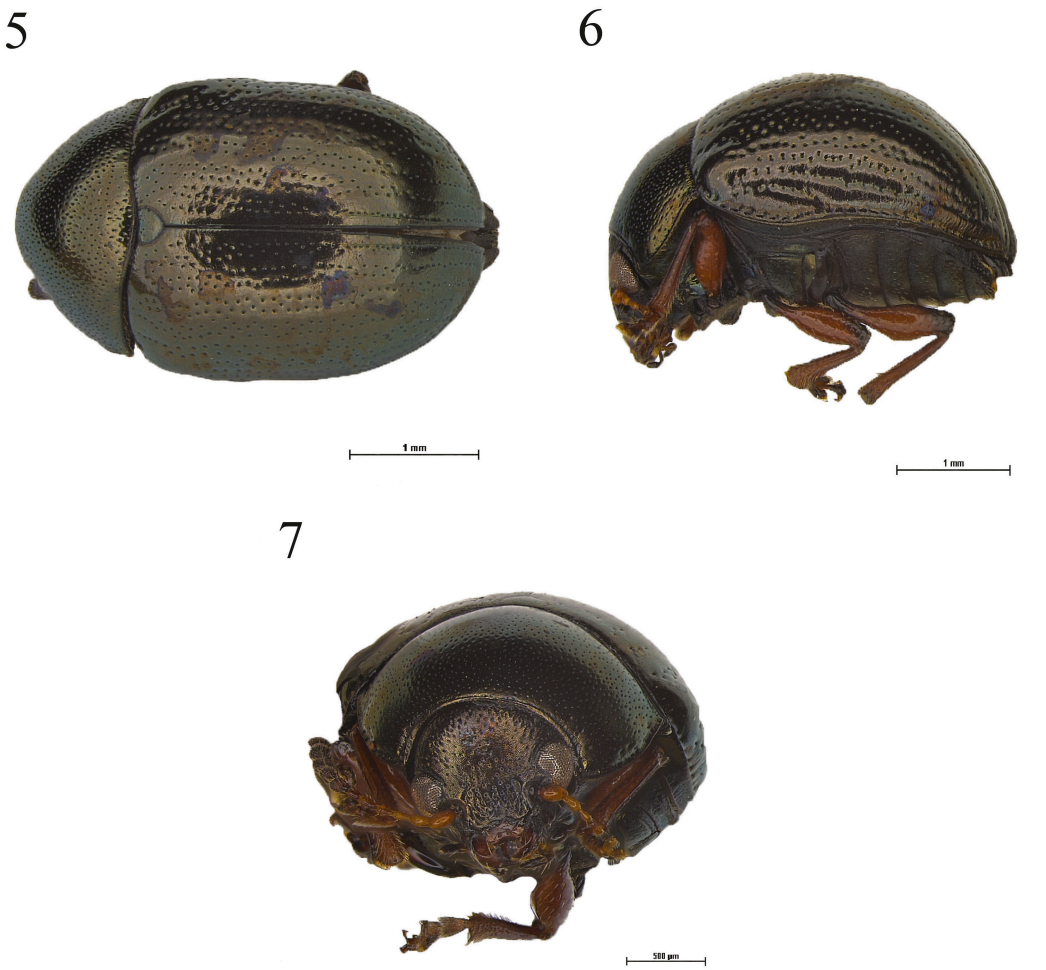
(Figs. 1–3, 8–9)

Diagnosis. Among the United States species, *S. punctum* most closely resembles *S. arizonensis*. Using Schultz's (1976) key to the *Spintherophyta* species in America north of Mexico, this new species would be identified as *S. arizonensis*. The two species are of similar size and coloration, and both have the prosternum recurved ventrally. However, the strongly alutaceous surface and dense, coarse punctation of the pronotum (Figs. 1–3), along with the much more coarsely punctate elytra of *S. punctum* (Figs. 1–2), will separate the two species. The aedeagus of *S. punctum* (Figs. 8–9) is similar to that of *S. arizonensis* in lateral perspective but distinctly different in dorsal view (Figs. 10–11). See the Description and Comments sections below for more detailed information.

Description. Holotype Male. Body, in dorsal view, oval, with pronotum nearly as wide as elytra (Fig. 1); length 3.2 mm; width 2.0 mm. Body, in lateral aspect, with dorsal outline convex, with ventral outline flat (Fig. 2). Head and pronotum alutaceous, bright green; elytra shiny bright blue; venter black; femora dark with greenish luster; tibiae mostly dark with greenish luster, except distal end testaceous; tarsi reddish-brown without luster; antennomeres 1–6 testaceous, 7–11 dark-brown, expanded. **Head** alutaceous, glabrous, deeply, coarsely punctate (Fig. 3); vertex with punctures separated by width of puncture; frons coarsely punctured, less densely than vertex, with punctures separated by more than width of puncture; clypeus punctured like vertex, widely, shallowly emarginate;

Figs. 1–4. *Spintherophyta punctum*, **new species**. **1)** Dorsal view; **2)** Lateral view; **3)** Head, frontal view; **4)** Lid of original pillbox containing 11 of the specimens.

frontoclypeal suture obsolete; eyes oblong, nearly twice as long as wide; concave near antennal fossa. Mouthparts enlarged (compared to female), reddish-brown; labrum shallowly concave, with short setae; maxillae and labium with terminal palpomeres attenuate towards apex. **Antennae** extending to middle of elytron; antennomere 1 about twice as long as broad, glabrous; antennomere 2 about equal in length and width, much narrower and shorter than antennomere 1, glabrous; antennomeres 3–6 sparsely pubescent, subequal in length; antennomeres 7–11 densely covered with very short pubescence and with a few longer setae, each antennomere about as long as broad, about twice as broad as each of antennomeres 2–6; antennomere 11 about as broad as 10, but distinctly longer, attenuate towards apex. **Pronotum** about twice as wide as long, nearly as wide posteriad as distance across elytral base, arcuately narrowed to anterolateral corners, with anterolateral edge transitioning smoothly with head; anterior edge with minute, smooth marginal bead; posterior edge not margined; lateral edges with distinct, thin, flattened marginal bead; discal surface distinctly alutaceous, densely and deeply punctate, with punctures larger than those of frons or vertex, but smaller than those of elytra; many punctures contiguous, with some tending to be elongated towards lateral margin. Scutellar shield metallic black with greenish luster, equilaterally triangular; surface glabrous, shining, impunctate. **Elytra** slightly broader at base than posterior portion of prothorax, of uniform width until curving inward towards apex. Humeri prominent. Punctures next to suture large, seriate, separated from each other by distance equal to about half width of puncture; remaining punctures larger, separated by distance less than a quarter width of puncture. Vague costa present along lateral posterior half of each elytron. Interpunctural areas glabrous, shiny. Epipleuron gradually narrowed from

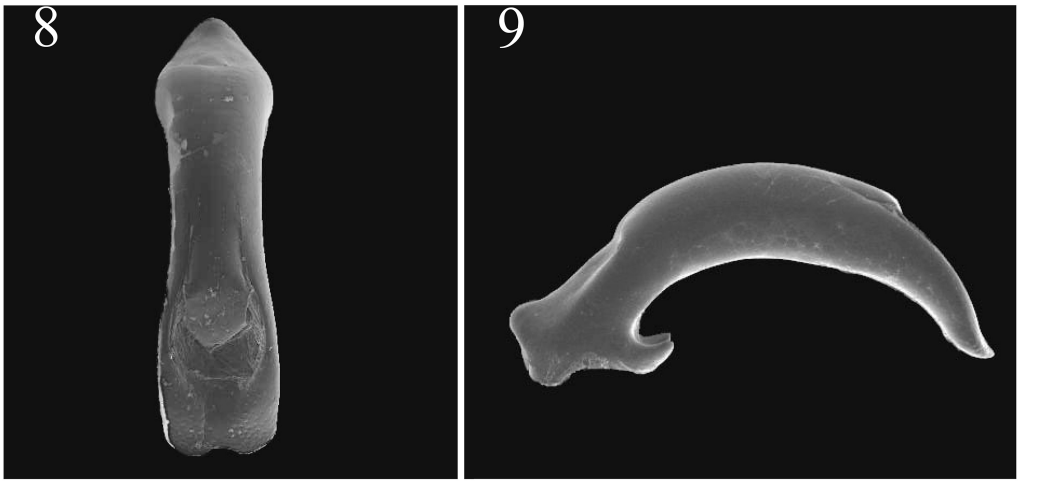


Figs. 5–7. *Spintherophyta arizonensis*. **5)** Dorsal view; **6)** Lateral view; **7)** Head, frontal view.

base to apex. **Ventral** areas black, not metallic, glabrous, entirely impunctate, except prosternum. Prosternum coarsely punctate, as wide as a coxa medially, slightly expanded posteriad of coxae, with apical, ventrally projecting lip; front coxal cavities closed. Abdominal ventrites each with one or two long, centrally located setae. **Legs** with profemur black with greenish luster, except reddish-brown basally. Procoxae pubescent. Tibiae black with greenish luster, except apical tip testaceous. Tarsi reddish-brown; first tarsomere expanded on pro- and mesotarsi, tarsal claws appendiculate. **Aedeagus**, in dorsal view, broad in basal fourth, narrowed in middle third, broad near distal fourth, with apical fifth gradually narrowed to bluntly pointed tip (Fig. 8). In lateral view, aedeagus evenly curved along entire length, except towards base; distal portion gradually narrowed to acute apex (Fig. 9).

Variation. The color varies from blue to greenish and black. A few specimens appear bicolored, with the elytra blackish or purplish, with the pronotum having a purplish tint. In females, the basal tarsomeres are narrower than in males. The female mandibles are slightly smaller than the male (but not nearly as sexually dimorphic as in the similar genus *Metaparia*). The female fifth ventrite has a slightly ventrally curved tip, whereas the fifth ventrite in the male is flat. Male beetles (n = 8) measure 2.8–3.4 mm in length; females (n = 10) measure 2.8–3.5 mm in length.

Specimens Examined. Holotype (male, LACM): "Calif., Santa Rosa Is. / Santa Barbara Co. / Becher's Bay / March 31, 1941 / on leaves of willow." Paratypes: Calif., Santa Rosa Is., Santa Barbara Co., Becher's Bay, March 31, 1941, on leaves of willow (2 males, 1 female, AJGC; 1



Figs. 8–9. *Spintherophyta punctum*, **new species**, aedeagus. **8)** Dorsal view; **9)** Lateral view.

female, BYUC; 1 male, 1 female, CASC; 1 female, CSCA; 2 females, LACM; 1 female, TAMU); Sta. Rosa I., Santa Barbara Co., Calif., 6-IV-1941, J von Bloeker (1 male, 1 female, AJGC; 1 female, BYUC; 1 female, CSCA; 2 females, LACM; 1 female, TAMU).

Etymology. The species epithet "*punctum*" is from Latin and means puncture. It refers to the heavily, coarsely punctured elytra and pronotum. No other Mexican or United States species are as coarsely and heavily punctured on the pronotum as *S. punctum*. Since the epithet is a noun in apposition, it is not necessary that it have gender agreement with the genus.

Plant Association. Eleven of the 18 specimens were collected on leaves of willow (*Salix* L., Salicaceae). One of the Arizona/California species, *S. violaceipennis*, has also been reported from willow (Clark *et al.* 2004).

Comments. The original description of one Mexican species, *Spintherophyta hoegei* (Jacoby, 1881), is close enough to *S. punctum* to lead to misidentification. Similarities include elytral punctures that are heavy and dense, but not seriate (Jacoby 1881). However, examination of a syntype of *S. hoegei* (BMNH) proves that the two species are quite different. Unlike the new species, *S. hoegei* does not have alutaceous microsculpture on the head and pronotum; the pronotal punctures are not coarse or dense, but are instead separated by more than the width of the punctures, with no indication of elongated punctures along the lateral margins; the legs are reddish (mostly dark in *S. punctum*); and all antennomeres are reddish, as opposed to *S. punctum* where the basal six antennomeres are testaceous and the distal five are reddish brown.

Spintherophyta punctum is similar to *S. arizonensis*. However, when comparing the two species, three striking features immediately stand out. First, the punctation and microsculpture are different. The pronotum of *S. arizonensis* is shining in most specimens (of 30 specimens observed, a few had a slightly alutaceous appearance, but the pronotum was still shiny), and the pronotal punctures are dense and separated, rarely contiguous (Figs. 5, 7). The elytra of *S. arizonensis* are heavily punctate with large punctures, many of which are contiguous (Figs. 5–6). In contrast, the pronotum of *S. punctum* is strongly alutaceous and very heavily and coarsely punctured (Figs. 2–3), and the elytra are much more coarsely punctured (Figs. 1–2). The above-mentioned coarse punctation and alutaceous surfaces are not only diagnostic in comparison to *S. arizonensis*, but they are also lacking in the other three *Spintherophyta* species previously known from the United States. Second, the color is different. Without magnification, specimens of *S. arizonensis* appear black, while *S. punctum* appears greenish to blue. Under magnification, some specimens of *S. arizonensis* have a greenish or purplish tint, with the pronotum and elytra of different shades. Under magnification, most specimens of *S. punctum* remain primarily green or blue, but a couple were nearly black. Third, the genitalia are different. Although Schultz (1976) did not feel that the aedeagus was "exceptionally diagnostic", his line drawings appear distinctly different from *S. punctum* for three of the four species. The aedeagus of *S. punctum* (Figs. 8–9) compared to *S. arizonensis* (Figs. 10–11) in lateral profile is thicker throughout its length and more uniformly arched.

Figs. 10–11. *Spintherophyta arizonensis*, aedeagus. **10)** Dorsal view; **11)** Lateral view.

Key to Adults of US Species of *Spintherophyta*
(modified from Schultz 1976)

1. Pronotum and elytra of same color, or only slightly different in color from each other 2
1′. Pronotum metallic blue, elytra metallic red or violet with bronze luster; Arizona, California and Mexico ..... ***S. violaceipennis*** **(Horn)**
2. Pronotum strongly alutaceous, densely punctate ..... ***S. punctum*** **Gilbert and Clark, new species**
2′. Pronotum shining or only vaguely punctate 3
3. Anterior margin of prosternum recurved ventrally; Arizona, California and New Mexico ..... ***S. arizonensis*** **Schultz**
3′. Anterior edge of prosternum level with rest of prosternum, without anterior lip; US east of Rocky Mountains 4
4. Color shining green; shape elongate oval; New Mexico and Texas ..... ***S. exigua*** **Schultz**
4′. Color shining brown to black; shape globular; Colorado, New Mexico, South Dakota and eastward (Riley *et al.* 2003) ..... ***S. globosa*** **(Olivier)**

Discussion

Santa Rosa Island is one of the Channel Islands off the coast of southern California. In 1980, portions of five of the eight islands that compose the Channel Islands, including all of Santa Rosa Island, became Channel Islands National Park.

In 1980, a single specimen of a Brazilian species, *Spintherophyta igneicollis* (Baly, 1864), was reportedly captured in a flight trap in Florida (Flowers 1990). Although this report was probably in error (Flowers *et al.* 1994), it calls attention to the possibility of accidental introduction of species of this genus. Understanding that Santa Rosa Island had historically been utilized for ranching, recreational and military uses (Caterino *et al.* 2015), we considered the possibility that *S. punctum* may be an introduced species. Although *Spintherophyta* occurs throughout Central and South America, we investigated most carefully the possibility of beetles from Mexico. No *Spintherophyta* are recorded from Baja California or Baja California Sur, the coastal Mexican states immediately south of California (Andrews and Gilbert 2005). Concerning the species from other parts of Mexico, photographs of eleven of them are viewable on the Museum of Comparative Zoology website (MCZ 2019). They are clearly not the same as *S. punctum*. Reviewing the original descriptions of all the other Mexican species (Bechyné 1950; Jacoby 1881, 1890; Lefèvre 1877, 1887), it became obvious that most of them were also not *S. punctum*. They are either of a different color, or they are lightly to moderately punctate and shining. However, the original description of one species, *S. hoegei*, was similar to the Santa Rosa Island material. In this case, a syntype of *S. hoegei* was borrowed from the BMNH. The specimen was not dissected, but, as indicated in the Comments section above, the external morphology

is sufficient to distinguish the species from *S. punctum*. It is entirely plausible that *S. punctum* is endemic to the Channel Islands, as apparent endemics in other beetle families have been reported previously. Caterino and Chandler (2010) described a new species of Staphylinidae from Santa Catalina Island. More recently, Rifkind (2019) described two new species of Cleridae from the Channel Islands, one inhabiting Santa Rosa Island.

Some species of chrysomelids that are abundant in Arizona can occasionally be collected in the desert regions of California, but only after substantial rainfall. For example, *Blepharida rhois* (Forster, 1771), *Phaedon purpureus* (Linell, 1898), *Zygogramma tortuosa* (Rogers, 1856) and *Syphrea flavicollis* (Jacoby, 1884) have been collected in the desert areas of southern California after summer rains. Collecting in these desert regions is problematic because, unless the collector lives in the desert or has someone who can provide specific up-to-date information on where, when and how much rain has fallen, it is very unlikely that a trip to the desert would be fruitful. This may be the reason that so few specimens of *Spintherophyta* have been collected in California. In 50 years of collecting beetles, neither of us has collected any at all.

Even so, Schultz (1976) recorded two common Arizona species of *Spintherophyta*, *S. arizonensis* and *S. violaceipennis*, from California, although reporting only a few specimens (six and five, respectively). He did not provide detailed information regarding localities within the state (specimens were reported only as "Cal") or the collections in which the specimens are deposited. Suspecting that the *S. arizonensis* specimens might possibly be misidentified examples of *S. punctum* or were possibly from coastal areas of the state where there might be some association with the Channel Islands, we contacted the curators at various museums (*i.e.*, collections that were acknowledged in Schultz's publication), attempting to relocate the specimens. For details, see the Materials and Methods section above. We successfully found five of the specimens at the MCZ. They were indeed labeled only as "Cal" and thus provided no further insight into the possibility of a relationship with the Channel Islands specimens. We reexamined them and found that they were not the new species. Rather, they had been correctly identified as *S. arizonensis*. They were most likely collected in the desert areas of southern California, rather than near the Channel Islands.

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