

# A NEW SPECIES OF *ATRYTONOPSIS* FROM JALISCO, MEXICO (LEPIDOPTERA, HESPERIIDAE, HESPERIINAE, HESPERIINI)

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**Abstract** - A new species of *Atrytonopsis* is described from southwestern Jalisco, Mexico. Based on wing phenotype and morphology of the male genitalia, the new species appears closest to *A. cestus*, a taxon known from southern Arizona, United States, to central Sonora, Mexico. Notes on the circumstances behind the collection and discovery of this new species are provided, as well as a detailed comparison of the new species to other *Atrytonopsis* taxa.

**Key words:** Distribution, endemism, genitalia, insect collection, skipper butterfly

Mexico is home to an extraordinarily rich fauna of HesperIIDae, commonly known as skipper butterflies, with over 740 species recorded from the country to date (Warren in prep.). Many skipper genera are highly diverse in Mexico, and various genera are rich in endemic species, especially among monocot-feeding Heteropterinae and HesperIinae, or grass skippers. The most noteworthy of these are *Dalla* Mabille, 1904, *Piruna* Evans, 1955, and *Paratrytone* Godman, 1900, although when genera whose distributions also extend into the southwestern United States are considered, *Megathymus* Scudder, 1872, *Agathymus* H. Freeman, 1959, *Amblyscirtes* Scudder, 1872, and *Atrytonopsis* Godman, 1900 are additional examples (Warren 2000, in prep.).

*Atrytonopsis* is comprised of about thirteen described species, all but three of which are confined to Mexico and the southwestern United States (Arizona, Utah, Colorado, New Mexico, W Oklahoma and W Texas; see Mielke 2005, Brock and Kaufmann 2006, Pelham 2008, Warren 2009, in prep., Warren *et al.* 2011). While there has been no recent comprehensive revision of the genus, detailed discussions of relationships among species and species groups were provided by Burns (1982, 1983) and Warren (2009), the latter author naming a new species from western Mexico. Below, another new species of *Atrytonopsis* is described from western Mexico, collected by Anna T. and Edward J. Austin in 1967, but apparently not recognized as an undescribed species until late in 2009 (see discussion).

## *Atrytonopsis austinorum* A. Warren, sp. nov.

(Figs. 1a,b, 2a-g)

**Description.** Male (Fig. 1a,b)- forewing length = 14.4 mm, forewing apex somewhat pointed, termen evenly convex (though straight between CuA2 and 1A+2A), no stigma or brand; hindwing nearly evenly convex, slightly produced at end of Rs and slightly lobed at tornus. Dorsal forewing brown, very sparse overscaling of short, flat, golden-brown scales, distributed mainly in basal half of costa, cell CuA2 and cell 1A+2A; a few pale golden-brown setiform scales in base of cell CuA2 and more extensively in cell 1A+2A. Opaque whitish macules as follows: subapical in mid-R3-R4 and near bases of R4-R5 and R5-M1, more or less quadrate, forming a nearly straight line perpendicular to costa, mostly overlapping

except distal end of macule in R5-M1 extends distad of other apical macules, and basal margin of macule in R3-R4 offset distad with respect to basal margin of other apical macules; postmedial in basal half of M3-CuA1, larger, roughly quadrate (distal edge slightly concave, produced somewhat distad along M3); in basal half of CuA1-CuA2, under origin of CuA1 (vein junction just proximad of center of macule), largest, roughly square but produced distad along CuA2; mid-CuA2-1A+2A, semi-opaque, small, nearly round; finally, roughly hourglass-shaped opaque macule spanning width of discal cell at proximal section of distal third of cell, mostly overlapping macule in CuA1-CuA2. Small spot of yellowish scales in lower half of CuA2-1A+2A, just proximad of mid-cell. Wing fringe brown proximad, beige distad, subtly darkened at vein ends, overall palest in CuA2-1A+2A.

Dorsal hindwing same ground color as forewing; prominent overscaling of pale golden-brown setiform scales in 1A+2A-3A, extending almost to termen, CuA2-1A+2A, CuA1-CuA2 and discal cell (basal half). Whitish, opaque, mostly overlapping macules as follows: bottom half of Rs-M1 distal of mid-cell, very small point overlapping proximal base of following macule; mid-M1-M2, larger, roughly rectangular, produced distad from others in series along M1, continuous (not separated by brown scaling along M2) with following macule; basal third of M2-M3, roughly rectangular, produced distad along M2; mid-M3-CuA1, roughly rectangular, completely overlapped by macule in M2-M3; mid-CuA1-CuA2, rectangular, offset slightly proximad from proximal edges of macules in M2-M3, M3-CuA1 and distal edge of macule in M2-M3; finally, slender, white, semi-opaque macule spanning discal cell, just proximad of cell end. Wing fringe brown proximad, beige distad, subtly darkened at vein ends.

Ventral forewing pale brown with short, flat, ochreous scales along costa to R3, a few ochreous setiform scales in base of discal cell; opaque macules repeated from dorsal surface; distal border of whitish macule in CuA2-1A+2A blurred by yellowish overscaling, which extends distad in cell nearly to margin; prominent overscaling of short, flat, lilac-colored scales concentrated along termen from apex to CuA2 and between M1 and M3 proximad of termen to distal edges of macules in R5-M1 and M3-CuA1; fringes as on dorsal surface.

Ventral hindwing appearing rusty brown with lilac highlighting, opaque and semi-opaque macules repeated from

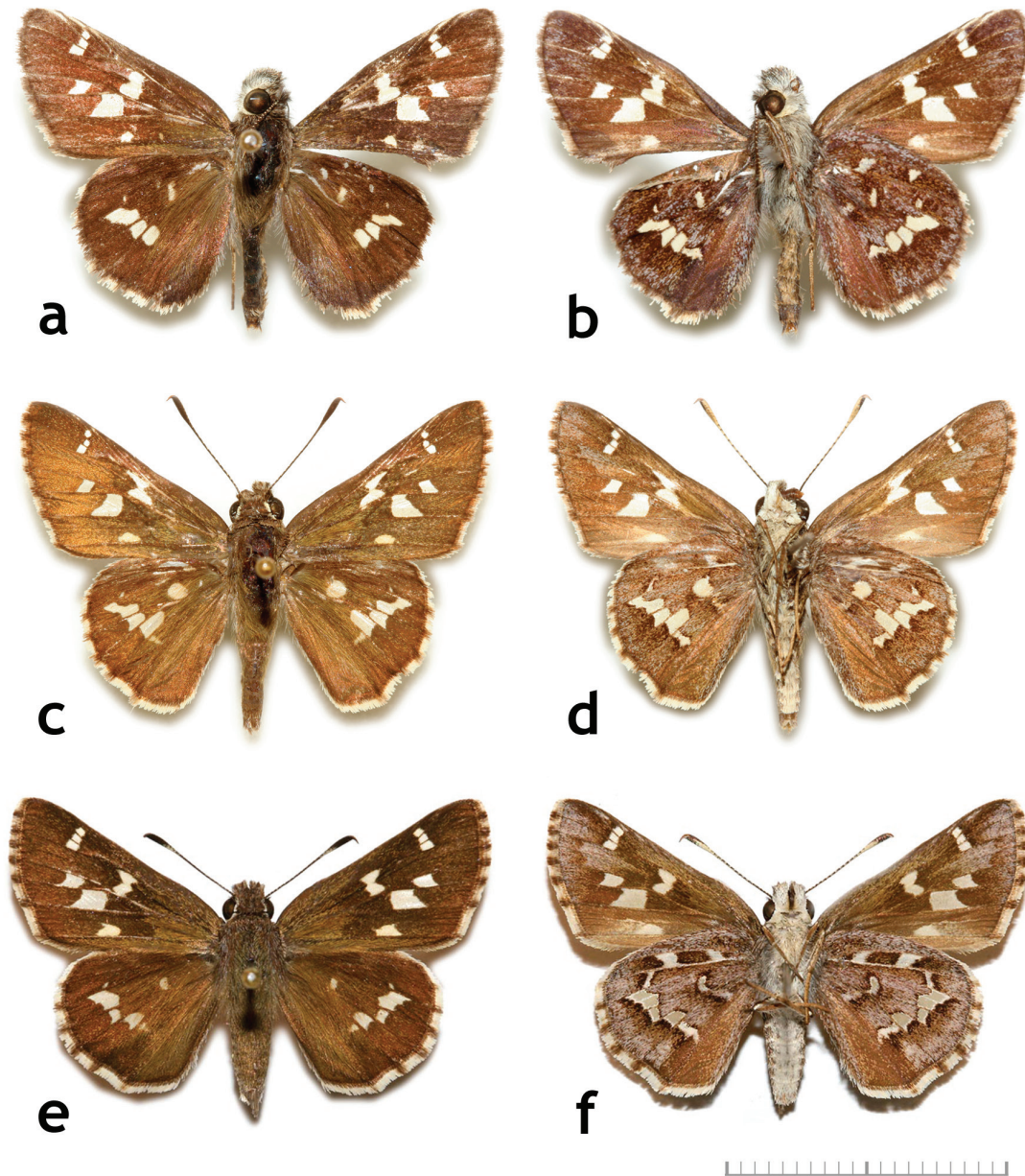


Figure 1. Adults of *Atrytonopsis austinatorum* and *A. cestus*; a) dorsal and b) ventral views of holotype male of *A. austinatorum*, data in text; c) dorsal and d) ventral views of male *A. cestus* from MEXICO: SONORA: Santa Rosa – Yecora Rd., 4.1 – 7.3 mi SE Santa Rosa, 7-VIII-1986, J. P. Brock [MGCL]; e) dorsal and f) ventral views of female *A. cestus* from MEXICO: SONORA: Ruta 16, 20 km E Rio Yaqui (Agua Amarilla), ex larva 7-VIII-1990, emg. 2-IX-1990; host: *Muhlenbergia dumosa*, J. P. Brock. Scale = 20 mm.

dorsal surface; two triangular whitish macules in Sc+R1-Rs, one proximad of mid-cell, the other just distad of mid-cell; two slender whitish macules in CuA2-1A+2A, one post-medial, overlapped entirely by macule in cell CuA1-CuA2, produced somewhat along 1A+2A for a lopsided triangular appearance, the other post-basal, proximad of inner margin of opaque macule in discal cell. Prominent overscaling of short, flat, lilac-colored scales along costa and margin to 1A+2A, proximad of opaque post-median macules, near base of wing (proximad of macule in discal cell), and along inner margin; sparse overscaling of short, flat, ochreous scales over entire wing surface, concentrated somewhat along Rs and distal half of M1; scattered whitish setiform scales at wing base, especially in lower half of discal cell and along inner margin; fringes as on dorsal surface.

Dorsal head brown with brown and whitish setiform scales, whitish above, behind and beneath eye; dorsal labial palpus with mix of brown and whitish setiform scales, grading towards whitish laterally, ventral surface of palpus white with scattered black setiform scales; inner surface gray; third segment brown, correct, barely extending beyond distal scales of second segment. Antennal shaft and club (missing on left antenna) black on dorsum, mostly black on venter with white between segments; nudum dark brown, 9 segments. Dorsal thorax partly rubbed, brown with scattered whitish and beige setiform scales, ventral thorax whitish with scattered dark brown setiform scales, pale gray ventrad, with whitish and dark brown setiform scales along ventral edge of femur; fore-tibia not spined, grayish epiphysis short (0.5 mm), extending to distal

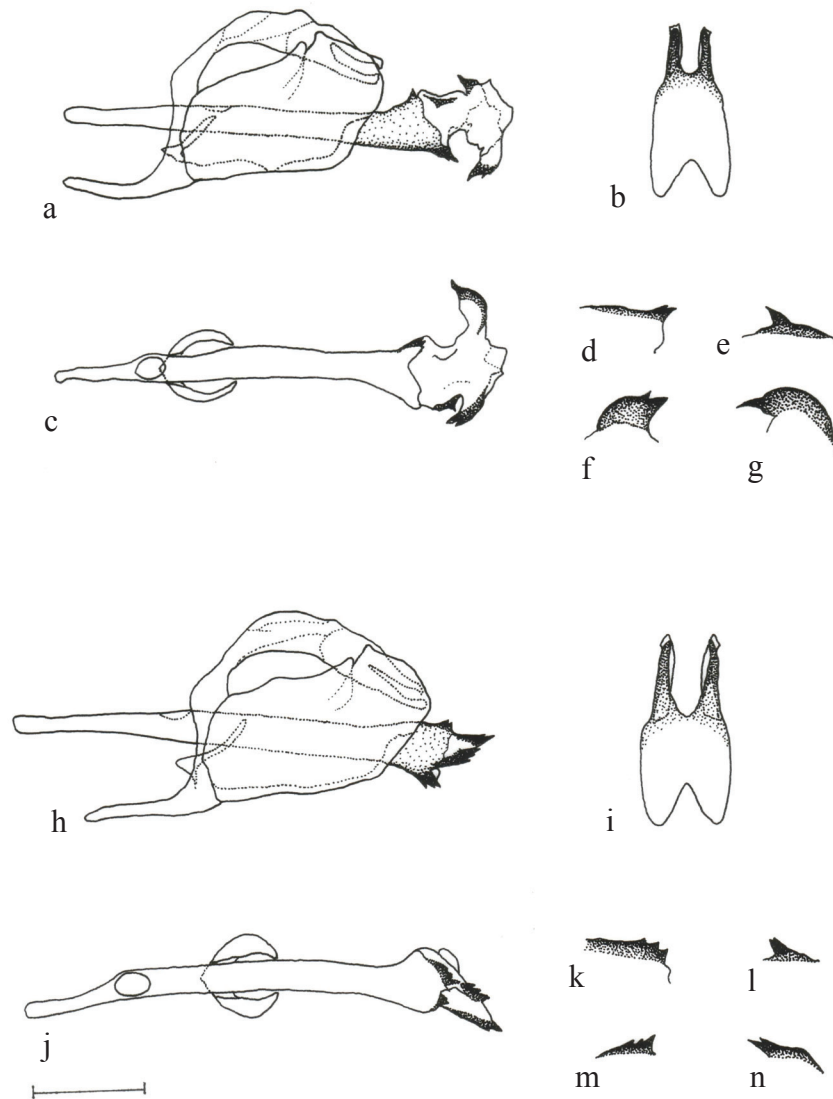


Figure 2. Male genitalia of *Atrytonopsis austinatorum* holotype (a-g), genitalia vial #11-03, Andrew D. Warren, complete data in text, and *A. cestus* (h-n), genitalia vial #11-02, Andrew D. Warren, from USA, ARIZONA: Pima Co., Sta. Catalina Mts., Sabino Canyon, 9-V-1981, J. P. Brock [MGCL]; a, h) Left lateral view of left valva, aedeagus (vesica extended in a), uncus, gnathos, tegumen, saccus, and juxta; b, i) dorsal view of tegumen, uncus and gnathos; c, j) dorsal view of aedeagus (vesica extended in a); d, k) right lobe of distal end of aedeagus; e, l) smallest cornutus; f, m) larger cornutus; g, n) largest cornutus. Scale = 1.0 mm.

end of tibia; mid-tibia unspined, pair of spurs distad, outer spurs about 4/5 length of inner; hind-tibia unspined, two pairs of spurs, in each pair, outer spurs about 2/3 length of inner; tarsus with three longitudinal rows of short spines. Dorsal abdomen dark brown, with long beige setiform scales cephalad (especially segments 1-4); ventral abdomen stained, appears whitish with scattered brownish setiform scales, especially caudad.

Male genitalia (Fig. 2a-g). Uncus in lateral view (Fig. 2a) narrow, slightly convex, somewhat pointed caudad and slightly downturned at caudal end; in dorsal view (Fig. 2b) fairly broad cephalad, divided, two narrow, parallel prongs caudad, the space between them about two times the width of a prong, prongs evenly rounded at distal end; gnathos barely longer than uncus, formed by two divided, essentially parallel prongs spaced as

for uncus, narrow in lateral view, slightly convex, distal end somewhat produced dorsad, prongs in dorsal view slightly broader than those of uncus, somewhat squared off at caudal end, slightly but evenly curved outward, mostly overlapped by prongs of uncus, except central part of inner margins and caudal ends; tegumen fairly broad cephalad, divided into two lobes separated by a deep notch (Fig. 2b), narrowing caudad to junction with uncus; combined ventral arm of tegumen and dorsal arm of saccus essentially straight, cephalic arm of saccus fairly long, 2/3 length of valva, narrow and slightly convex in lateral view, narrow in dorsal view, somewhat pointed at cephalic end; valvae (Fig. 2a) symmetrical, length about two times width, costa convex to ampulla; ampulla short, length about 1.3 times width, angled slightly dorsad, caudal end

evenly rounded; harpe pointed dorsad, evenly rounded caudad, cephalic end slightly overlapping caudal edge of ampulla; juxta-tranquilla prominent, narrow, pointed dorso-caudad in lateral view with ventral edge strongly bent caudad, broad in ventral view; aedeagus (Fig. 2a, c) long, about 1.6 times length valva, straight in lateral view, straight but right side slightly swollen in dorsal view (Fig. 2c), cylindrical, narrowed slightly cephalad with rounded end, broader caudad, terminal end divided in dorsal view, left lobe produced but rounded at caudal end, right lobe produced into two very small spines (Fig. 2d); vesica of highly irregular shape, with three small, sclerotized cornuti as follows: smallest (Fig. 2e), single thorn on slightly sclerotized base, cephalad to following two; larger (Fig. 2f), double spine on a curved, sclerotized base; last (Fig. 2g), similar to preceding, but with single spine on a curved, sclerotized base.

**Specimens examined.** Holotype male with the following labels: white, handprinted in pencil: / Mex: Jalisco / Mex Rt 80 / km 1050 / 20 Aug 1967 /; white, printed: / G. T. Austin colln. / MGCL Accession / # 2004-5 /; white, printed and handprinted: / Genitalia Vial / # 11-03 / Andrew D. Warren /; red, printed: / HOLOTYPE / *Atrytonopsis austinorum* / A. Warren /. The holotype is deposited at the McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville (MGCL).

**Type locality.** MEXICO: JALISCO: Mex. Rte. 80, Km. 1050. While the exact location of km. 1050 on Mexican Highway 80 has not been determined, the site is apparently between Autlán de Navarro and the junction with Mexican Hwy. 200 near the Pacific Coast; that is to say, between the north end of the Sierra de Manantlán and the Pacific Coast. Vegetation in this area ranges from cloud forest at higher elevations (ca. 1400m), to deciduous semi-evergreen forest at lower elevations, with a pronounced dry season between December and May or June. The butterfly fauna of the Sierra de Manantlán region and coastal western Jalisco was studied in detail by Llorente *et al.* (1996), Vargas *et al.* (1996, 1999), Warren *et al.* (1996) and Warren and Llorente (1999).

According to data on labels from other specimens from the G. T. Austin collection, accessioned into the MGCL collection in 2004, the following butterflies were also collected at km. 1050 on August 20, 1967, by the Austins: *Parides erithalion trichopus* (Rothschild & Jordan, 1906), *Eurema m. mexicana* (Boisduval, 1836), *E. दौरα sidonia* (R. Felder, 1869), *Pyrisitia proterpia* (Fabricius, 1775), *Pteronymia rufocincta* (Salvin, 1869), *Euptoieta hegesia meridiania* Stichel, 1938, *Marpesia chiron* (Fabricius, 1775), *Anartia fatima colima* Lamas, 1995, *A. jatrophae luteipicta* (Fruhstorfer, 1907), *Anthanassa ardys* (Hewitson, 1864), *Euptychia fetna* Butler, 1870, *Hermeuptychia hermes* (Fabricius, 1775), *Pindis squamistriga* R. Felder, 1869, *Urbanus d. dorantes* (Stoll, 1790), *Amblyscirtes patriciae* (E. Bell, 1950) and *A. novimaculatus* A. Warren, 1998. Given this composition of taxa, the site was probably well below 800m, perhaps as low as 200-300m or so, although this would be by far the lowest known elevation for *A. novimaculatus* (see Warren 1998).

**Etymology.** *Atrytonopsis austinorum* is named in memory of the late Lepidopterists of the Austin family, including Anna T. Austin and Edward J. Austin, the collectors of the holotype, and their son George T. Austin, a prolific skipper systematist, colleague, and close friend of the author.

**Distribution and phenology.** This species is currently known only from southwestern Jalisco, Mexico. The single known specimen was collected in August. Until the larval foodplant is known, it will be impossible to speculate on the overall distribution of *A. austinorum*. However, *A. austinorum* should be sought at least in Colima, as well as in similar habitats in Nayarit, Sinaloa, Michoacán, Guerrero and Oaxaca. The southernmost known record for *A. cestus* (W. H. Edwards, 1884), which appears to be *A. austinorum*'s closest relative (as detailed below), is from along Hwy. 16 in east-central Sonora (J. P. Brock, pers. comm. 2011), although its larval foodplant, *Muhlenbergia dumosa* Scriben. ex Vasey., occurs at least as far south as Colima (SEINet 2011).

**Diagnosis and discussion.** In overall wing morphology, *A. austinorum* (Figs. 1a-b) is closest to *A. cestus* (Figs. 1c-f), the single known male of the former appearing almost identical to some females (Fig. 1e-f) of the latter. Spot size is rather variable in *A. cestus* (35 males and 4 females examined in MGCL), although in general, compared to *A. cestus* males, forewing opaque spots are more rounded in *A. austinorum*, especially in the discal cell; in addition, the ground color of *A. austinorum* is darker above and below and the forewing shape is considerably more rounded at the apex than in *A. cestus*. In *A. cestus* males (and most females), the distal edge of the opaque macule in the forewing discal cell rarely overlaps the proximal edge of the macule in CuA1-CuA2, whereas the macules clearly overlap on *A. austinorum*. Finally, all males examined of *A. cestus* have a relatively prominent, long, slender forewing stigma spanning from the base of vein CuA1 to 1A+2A, in three parts, of which there is no trace on *A. austinorum*.

Compared to other species of *Atrytonopsis*, *A. austinorum* differs from most in the presence of a prominent opaque macule in the hindwing discal cell, a feature shared with *A. cestus*, although *A. pittacus* (W. H. Edwards, 1882), *A. edwardsii* W. Barnes & McDunnough, 1916 and *A. ovinia* (Hewitson, 1866) usually have a very small semi-opaque spot in the hindwing discal cell. Unlike *A. cestus*, *A. austinorum* lacks a forewing stigma, as do *A. lunus* (W. H. Edwards, 1884), *A. zweifeli* H. Freeman, 1969, *A. frappenda* (Dyar, 1920), many individuals of *A. deva* (W. H. Edwards, 1877), as well as very rare individuals of *A. pittacus* (see Burns 1982). The ventral hindwing spot pattern of *A. austinorum* is also very similar to some individuals of *A. python* (W. H. Edwards, 1882), although none of the hindwing spots on *A. python* are truly opaque (contra Warren 2009), and males of *A. python* have a forewing stigma. The ventral patterns of *A. pittacus*, *A. edwardsii* and *A. ovinia* are less likely to be confused with *A. austinorum*, with their smaller, white or semi-opaque spots against a more uniform background, and males of all three of those species almost always have a forewing stigma. In *Atrytonopsis*, the small, yellowish dorsal forewing spot in CuA2-1A+2A is found only

on *A. austinorum*. Images of pinned specimens of all described *Atrytonopsis* species are provided by Warren *et al.* (2011).

The male genitalia of *A. austinorum* (Fig. 2a-g) are of the typical *Atrytonopsis* form, as discussed and illustrated by Burns (1982, 1983) and Warren (2009). Compared to other *Atrytonopsis* species (pers. obs.), the genitalia of *A. austinorum* are most similar to those of *A. cestus* (Fig. 2h-n). Similarities include the general shape of the uncus, gnathos, valva, saccus, juxta and aedeagus, including the spined right lobe of the end of the aedeagus, and three sclerotized cornuti. However, the genitalia of *A. austinorum* differ from those of *A. cestus* in many details, including the narrower gap between the slightly shorter arms of the uncus and gnathos (in dorsal view; Figs. 2b vs. 2i), the less bulbous, somewhat narrower tegumen (Figs. 2b vs. 2i), slightly shorter and broader valva (in lateral view; Figs. 1a, h), and the slightly smaller juxta (Figs. 2a, h). The right lobe of the distal end of the aedeagus supports two spines in *A. austinorum* (Fig. 2d) but three in *A. cestus* (Fig. 2k). The smallest, single-spined cornutus in *A. austinorum* (Fig. 2e) supports two short spines in *A. cestus* (Fig. 2l); the larger, double-spined cornutus in *A. austinorum* (Fig. 2f) has three short spines in *A. cestus* (Fig. 2m); and the final, single-spined cornutus in *A. austinorum* (Fig. 2g) has two short spines in *A. cestus* (Fig. 2n).

Anna T. and Edward J. Austin were serious amateur Naturalists who developed a special interest in Lepidoptera in 1952, after constructing a butterfly net for their son George, who was nine years old at the time. Through the mid- and late-1950's, the Austin family accumulated a significant collection of Lepidoptera from Connecticut (their home base at the time), surrounding states, and the eastern coast of the USA south to Florida. In 1960, on a trip to Big Bend, Texas, the Austin family detoured south and spent a single day collecting butterflies at Horsetail Falls in Nuevo León, Mexico. They found this experience so rewarding that they spent most of August, 1962, collecting butterflies in eastern Mexico, along the Gulf Coast as far as Mérida, Yucatán, where they met Eduardo Welling. Details of this trip are preserved in E. J. Austin's correspondence files, in the George T. Austin archives at the MGCL. Edward and Anna made at least one additional trip to Mexico collecting butterflies, in 1967, about which no details have been found in the G. T. Austin archives.

George T. Austin became seriously interested in the systematics of the butterflies of the southwestern United States, Mexico and Central America in the late 1970's, after growing up collecting butterflies on a regular basis with his family as a hobby, and at some point began maintaining his parents' butterfly collection. While he integrated much of his parents' collection with his own material over time, some of the Mexican material his parents collected in 1967 remained incompletely integrated and unidentified. Stored in oversize wooden Schmitt boxes, this material moved from Las Vegas, Nevada to Gainesville, Florida, in 2003, when George relocated to work at the MGCL. Some of this material remained in these boxes until George's passing on June, 30, 2009.

The story behind Anna and Edward's trip to Mexico in 1967 first became known to this author in late 2006, when organizing various skippers among unsorted, recently-accessioned Hesperinae at the MGCL, and encountering a

series of *Amblyscirtes novimaculatus*, labeled from "Mex: Jalisco, Mex Rt 80, km 1050, 20 Aug 1967" in pencil, in George's handwriting, but with no collector's name on the labels. When asked, George stated that his parents collected the specimens, but did not elaborate further. However, Edward and Anna's collection of skippers from Jalisco in 1967 is actually very significant, since they had collected several males and the only known female of *A. novimaculatus*, apparently not far from its subsequently designated type locality in the Sierra de Manantlán, Jalisco (based on males collected in the 1990's; see Warren 1998). They also collected a single male of *Amblyscirtes patriciae* (E. Bell, 1959), which predates other known Mexican specimens (Warren 1996). One more major surprise from km. 1050 would surface three years later.

In October 2009, while organizing George's personal study material, four months after his passing, the author came across a Schmitt box with various *Atrytonopsis*, apparently unreferenced since George's departure from Las Vegas in 2003, including *A. deva*, *A. pittacus*, *A. python*, *A. cestus*, and the unusual male *Atrytonopsis* from Jalisco, km. 1050, Rt. 80. While some of the specimens in this box had been dissected (George was usually quick to dissect the genitalia of interesting specimens), the unusual *Atrytonopsis* had not been dissected, and had no identification label associated with it. Subsequent study has revealed that it undoubtedly represents an undescribed species, apparently most closely related to *A. cestus*. Given that systematic fieldwork in the 1990's in southwestern Jalisco (as cited above) failed to generate additional specimens of this species, it seems best to name this new species now, based on the single individual collected by the Austins, as opposed to waiting for additional material to surface. The overall good condition of the specimen and its completely unique appearance leave no doubt that it represents an undescribed species.

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