

Synopsis of the Lampyridae (Coleoptera: Elateroidea) of Jalisco, Mexico

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Abstract

A synopsis of the Lampyridae family occurring in the state of Jalisco, Mexico is provided. Here we summarize the firefly diversity from Jalisco with currently 40 known species in the following eleven genera: *Ankonophallus* (1 sp.), *Aspisoma* (2 spp.), *Aspisomoides* (1 sp.), *Bicellonycha* (4 spp.), *Cratomorphus* (1 sp.), *Photinus* (20 spp.), *Photuris* (2 spp.), *Pleotomus* (2 spp.), *Psilocladus* (1 sp.), *Pyropyga* (5 spp.) and *Tenaspis* (1 sp.).

Key words: Fireflies, checklist, distribution records

Introduction

Commonly known as fireflies, lightning bugs, or glowworms, Lampyridae is a family of elateroid beetles. Adult lampyrids have a soft, weak, sclerotized body, with an elongate, oval, generally flattened form, from 7 to 43 mm in length, with black, brown, red, yellow, or pink coloration. Their head is, mostly, completely or partially covered by the pronotum, eyes in a lateral position, well-developed in nocturnal taxa like *Photinus* and reduced in diurnal species like the ones from the *Pyropyga* genus. (Gutiérrez-Carranza *et al.* 2023) Antennae vary from filiform to serrate, flabellate, or biflabellate (Branham 2010). There are currently 159 genera and 2,635 firefly species (Keller 2024) described all over the world, except for Antarctica and New Zealand. They are found in temperate and tropical climates but can also be found in drier zones in marshes or in wet, wooded areas where their larvae have abundant sources of food (Zaragoza-Caballero *et al.* 2023). Although fireflies are known for being light emitting, and while this is true for most adults, not all of them are. All known larvae emit a weak glow used as a defense mechanism or for prey attraction and capture, but they don't always keep producing light in their adult stage, these non-bioluminescent fireflies are known to have daytime habits (Branham & Wenzel 2003). However, the understanding of immature stages is still in process.

In Mexico, fireflies have been acknowledged since pre-Hispanic times by different communities such as the Popolucas, Zoques, Hñähñu, Mayan, Nahuas, Eudeve people, and many more (Zaragoza-Caballero *et al.* 2016). Currently, there are 301 firefly species in Mexico included in 26 genera (Zaragoza-Caballero 2024) making it the 2nd most firefly diverse country: Brazil being the first place with 358 species in 32 genera (Gutiérrez-Carranza & Zaragoza-Caballero 2024). Both countries sum up to 25% of the whole world's firefly diversity (Zaragoza-Caballero *et al.* 2023).

Most of the species described are distributed in the central and southern zones of the country due primarily to the fact that most field work was done in those areas. The northern and western states haven't been explored much yet, which could be a result of the hypothesis that, given the North's drier weather and lower water availability, species richness is reduced. (Gelviz-Gelvez y Pavón-Hernández 2013). However, high diversity and endemism has been documented in these areas and the total species present in the North–West region represent 42% of the total Mexican species (Zaragoza-Caballero *et al.* 2023).

Although many papers like the ones from Zaragoza-Caballero *et al.* (2020, 2021, 2023, 2024) as well as Perez-Hernández *et al.* (2022) have been published in recent years, there is still a strong need for field work and investigations when it comes to firefly species in Mexico's North–West zone. In the state of Jalisco, according to Perez-Hernández *et al.* (2022) there was an increase in the number of species known, going from 29 to 40, but one of them is not distributed in Jalisco, a fact that will be clarified further. These are included in eleven genera: *Ankonophallus* (1 sp.), *Aspisoma* (2 spp.), *Aspisomoides* (1 sp.), *Bicellonycha* (4 spp.), *Cratomorphus* (1 sp.), *Photinus* (20 spp.), *Photuris* (2 spp.), *Pleotomus* (2 spp.), *Psilocladus* (1 sp.), *Pyropyga* (5 spp.) and *Tenaspis* (1 sp.). The current investigation provides a synopsis of all the known species in Jalisco and their localities to update the state of knowledge of these beetles in the state and serve as a base for future investigations.

Material and methods

Most of the information obtained in this work came from Zaragoza-Caballero *et al.* (2023), given that this publication has the most recent data as to new species discovered in Jalisco. However, the paper from Zaragoza-Caballero *et al.* (2020) was also important for starting with the current investigation. With the information of these papers as a starting point, distribution data was obtained from several other works such as: (Zaragoza-Caballero 1989, 1993, 1995, 2002, 2004, 2005, 2007, 2009, 2015; Zaragoza-Caballero & Navarrete-Heredia 2014; Zaragoza-Caballero & Gutiérrez-Carranza 2018; Zaragoza-Caballero *et al.* 2016, 2020, 2021, 2023, 2024) Pérez-Hernández *et al.* (2022) as well as information from the “Portal de Datos Abiertos de la Universidad Nacional Autónoma de México” (cited in the text as DA portal) and collection data for specimens of the “Colección Nacional de Insectos de la Universidad Nacional Autónoma de México” (CNIN: IBUNAM). The curator in charge of this collection is Dr. Alejandro Zaldívar Riverón.

Results

The Lampyridae family has currently 40 species in 11 genera described in the state of Jalisco, Mexico. With localities such as: Chapala, Ajijic (3 spp.); Tonaya, Amacuatitlan (9 spp.); Chamela, Arroyo Chamela (2 spp.); El Limón, Arroyo Los Yesos (10 spp.); La Huerta, Arroyo Ropixtes (1 sp.); Autlán de Navarro, Ahuacapan (2 spp.); Cabo Corrientes, El Tuito (4 spp.); Casimiro Castillo, El Pacotal (1 sp.); Chamela (5 spp.); Chapala (2 spp.); El Grullo (1 sp.); El Limón, San Buenaventura (12 spp.); El Salto (2 spp.); La Huerta, Estación de Biología Chamela (16 spp.); Guadalajara (2 spp.); Jalisco without specific locality (1 sp.); La Huerta, Careyes (3 spp.); La Huerta, La Manzanilla (2 spp.); Cihuatlán, Melaque (2 spp.); Hostotipaquillo, Plan de Barrancas (1 sp.); Puerto Vallarta, Estero el Salado (2 spp.); La Huerta, Río Cuitzmala (2 spp.); San Juan de Los Lagos (2 spp.); Sierra de Manantlán, Las Joyas (1 sp.); Tala, Ahuisculco (1 sp.); Tapalpa (4 spp.); Tecolotlán, Los Guayabos (1 sp.); Tolimán (1 sp.); Zapopan (1 sp.); Carr. Barra Navidad-Pto. Vallarta (2 spp.); 4.7 km NE San Buenaventura (2 spp.); 10 mi W Villa Corona (1 sp.); 6.6 km SO, San Buenaventura (2 spp.); 8 mi. SW San Juan de los Lagos (1 sp.) and San Buenaventura, 720m (1 sp.).

The 40 species described in the state of Jalisco are listed below.

Checklist of Lampyrids from Jalisco, Mexico

Lampyrinae Rafinesque, 1815

Cratomorphini Olivier, 1911

Aspisoma Laporte, 1833

Aspisoma aegrota (Gorham, 1880)

Aspidosoma aegrotum Gorham, 1880

MEXICO: Jalisco, San Buenaventura. Pueblo. Altitude: 720 m; Arroyo Los Yesos 6.6 km SO Sn Buenaventura. Altitude: 900 m; El Limón (Labels from the CNIN: IBUNAM, Mexico City)

Aspisoma aelianum (Gorham, 1884)

Aspidosoma aelianum Gorham, 1884

MEXICO: Jalisco, Chamela; Carr. Barra Navidad-Pto. Vallarta km 84 Río San Nicolás (labels from the CNIN: IBUNAM, Mexico City)

Aspisomoides Zaragoza-Caballero, 1995

Aspisomoides bilineatum (Gorham, 1880) (Fig. 1)

Aspidosoma bilineatum Gorham, 1880

MEXICO: Jalisco, La Huerta. 19.5°–105.05°. Altitude: 150 m; Río Cuitzmala. 19.36111°–104.99417°. Altitude: 1 m; El Limón. San Buenaventura. 19.79194°–104.05889°; Arroyo “Los Yesos” 6.6 km. SW, San Buenaventura. 19.76583°–104.05222°; Tonaya. Amacuatitlan, cited as: “Amacahuititlan” 4.7 km NE Sn. Buenaventura; San Buenaventura Loc. 1.; Chamela

Cratomorphus Motschulsky, 1853

Cratomorphus limai Zaragoza-Caballero, Domínguez-León & González-Ramírez, 2021 in Zaragoza-Caballero *et al.* 2021

MEXICO: Jalisco, Casimiro Castillo. El Pacotal. Altitude: 600 m

Lamprocerini Olivier, 1907

Tenaspis LeConte, 1881

Tenaspis chamelensis Zaragoza-Caballero, López-Pérez y Rodríguez-Mirón, 2021 in Zaragoza-Caballero *et al.* 2021

MEXICO: Jalisco, La Huerta. Estación de Biología Chamela

Photinini LeConte, 1881

Ankonophallus Zaragoza-Caballero & Navarrete-Heredia, 2014

Ankonophallus pilosus Zaragoza-Caballero & Navarrete-Heredia, 2014

MÉXICO: Jalisco, Puerto Vallarta, Estero el Salado NTPcalamar. 20°40'28.97"N 105°13'58.02"W. Altitude: 4 m

Photinus Laporte, 1833

Photinus acutiformis Zaragoza-Caballero & Cifuentes-Ruiz, 2023 in Zaragoza-Caballero *et al.* 2023

MEXICO: Jalisco, Tonaya. Amacuatitlan, cited as: “Amacahuatitlán”

Photinus aliciae Zaragoza-Caballero, 2005

MEXICO: Jalisco, La Huerta. Estación de Biología Chamela, Cuenca 1; UNAM. 19.5°–105.05°. Altitude: 150 m; La Manzanilla. 19° 48' 42" N 104° 01' 88" W. Altitude: 12 m; El Limón. San Buenaventura. 19.79194°–104.05889°; Arroyo Los Yesos 6.6 km SO San Buenaventura; Cuenca 1

Photinus anisodrilus Zaragoza-Caballero, 2007

Photinus (Paraphotinus) anisodrilus Zaragoza-Caballero, 2007

Paraphotinus anisodrilus (Zaragoza-Caballero, 2007)

MEXICO: Jalisco, El Limón. San Buenaventura. 19.79194°–104.05889°; Arroyo Los Yesos, Jalisco. 19° 43' 066" N 104° 03' 535" W. Altitude: 900 m; Tonaya. Amacuatitlan cited as: “Amacuahutitlán”, Jalisco. 19° 48' 426" N 104° 01' 882" W. Altitude: 900 m

Photinus ater Gorham, 1881

MEXICO: Jalisco, Chapala. (Zaragoza-Caballero 1995)

Photinus bucaro Zaragoza-Caballero, 2005

MEXICO: Jalisco, La Huerta. Estación de Biología Chamela UNAM. 19.5°–105.05°. Altitude: 150

m; La Manzanilla. 19.29889°–104.86806°. Altitude 150 m; La Huerta. Rio Cuitzmala. 19.36111°–104.99417°. Altitude 1 m; Chamela

Photinus chamelensis Zaragoza-Caballero, 2005

MEXICO: Jalisco, La Huerta. Estación de Biología Chamela, Cuenca 1; 17 mi. SSW, Guadalajara; 11 km N; Estación de Biología “Chamela” UNAM. 19.5°–105.05°. Altitude 150 m; Arroyo Ropixtes, carr. Barra de Navidad-Pto. Vallarta km 55; Chamela. 19.5°–105.05°. Altitude 150 m; Estación de Biología Chamela, UNAM. 19.5°–105.05°. Altitude 150 m; Careyes. 19.44444°–105.02333°. Altitude 20 m; Estación Biología Chamela 9, Cuenca 1

Photinus chipirietetsi Zaragoza-Caballero & Vega-Badillo, 2023 in Zaragoza-Caballero et al. 2023

MEXICO: Jalisco, El Grullo. Urban zone. Altitude: 870 m

Photinus fridakhaloae Zaragoza-Caballero & González-Ramírez, 2023 in Zaragoza-Caballero et al. 2023

MEXICO: Jalisco, Sierra de Manantlán. Las Joyas. Altitude: 1,870 m

Photinus geovanni Zaragoza-Caballero, 2015

MEXICO: Jalisco, El Limón. San Buenaventura. 119°47'61" N 104°03'32" W. Altitude: 720 m

Photinus guillermodeltoroi Zaragoza-Caballero & Rodríguez-Mirón, 2023 in Zaragoza-Caballero et al. 2023

MEXICO: Jalisco, Tapalpa

Photinus hendrichsi Zaragoza-Caballero & Cifuentes-Ruiz, 2020 in Zaragoza-Caballero et al. 2020

MEXICO: Jalisco, Chapala. Ajijic

Photinus javierfigueroai Zaragoza-Caballero & Rodríguez-Mirón, 2023 in Zaragoza-Caballero et al. 2023

MEXICO: Jalisco, Tapalpa

Photinus kleriocar Zaragoza-Caballero, 2005 (Fig. 2)

MEXICO: Jalisco, La Huerta. Estación de Biología “Chamela” UNAM. 19.5°–105.05°. Altitude: 150 m; El Limón. San Buenaventura. 19.79194°–104.05889°; Arroyo Los Yesos. 19.75°–104.05°; Tonaya. Amacuatitlan, cited as: “Amacahuititlan”, 4.7 km. NE San Buenaventura. 19.79306°–104.055°; La Huerta. Careyes. 19.44444°–105.02333°. Altitude: 20 m; 4.7 km NE San Buenaventura. 19.8°–104.017°. Altitude: 900 m; 10 mi W Villa Corona. Altitude: 1250 m

Photinus mazuritae Zaragoza-Caballero & González-Ramírez, 2023 in Zaragoza-Caballero et al. 2023

MEXICO: Jalisco, La Huerta. Est. Biol. Chamela

Photinus pyralis (Linnaeus, 1758) (Fig. 3)

Cantharis pyralis Linnaeus, 1758

MEXICO: Jalisco, Cihuatlán. Melaque 11 km N Jalisco; 8 mi. SW San Juan de los Lagos. Altitude: 0 m; La Huerta. Estación de Biología Chamela UNAM. 19.5°–105.05°. Altitude: 150 m; Cuenca 1; Cuenca 4; Cam. Ant. Sur; Ahuacapan. 19.667°–104.322°; Cuenca 4; El Limón. Arroyo Los Yesos 6.6 km SW, San Buenaventura. 19.76583°–104.05222°; San Buenaventura. 19.79194°–104.05889°; San Buenaventura. Altitude: 720 m; San Buenaventura. Loc. 1; Tonaya. Amacuatitlan, cited as: “Amacahuatitlan”. 19.79194°–104.05889°; 4.7 km NE, San Buenaventura. 19.79306°–104.055°; 6.6 km SO, San Buenaventura. 19.75167°–104.06528°; Autlán de Navarro. Ahuacapan. 19.66667°–104.33306°; Chamela. Arroyo Chamela. 19.5°–105.05°. Altitude: 150 m

Photinus silveirai Zaragoza-Caballero & González-Ramírez, 2023 in Zaragoza-Caballero et al. 2023

MEXICO: Jalisco, Tapalpa

Photinus tilae Gutiérrez-Carranza & Zaragoza-Caballero, 2023 in Gutiérrez-Carranza et al. 2023*

MEXICO: Jalisco, La Huerta. Estación de Biología Chamela IBUNAM, Eje Central Camino Antiguo Sur. 19°29'56.90" N 105°02'31.61" W; Camino Antiguo Norte. 19°30'0.72" N 105°02'41.39" W

*Specimens of this species are previously erroneously cited as *Photinus furcatus*

Taxonomic notes: A correction for the species *Photinus tilae*, identified previously as *Photinus furcatus* was made, given that, the work from Gutiérrez-Carranza *et al.* (2023) stated that all specimens deposited in the CNIN: IBUNAM determined as *P. furcatus* from the state of Jalisco are really *P. tilae*.

Photinus tucaari Zaragoza-Caballero & Vega-Badillo, 2023 in Zaragoza-Caballero *et al.* 2023

MEXICO: Jalisco, Tolimán. 2km N El Terreno Sierra Manantlán. Altitude: 2,300 m

Photinus wixarika Zaragoza-Caballero & Domínguez-León in Zaragoza-Caballero *et al.* 2023

MEXICO: Jalisco, San Juan de los Lagos. 8 mi

Photinus zuritai Zaragoza-Caballero & Cifuentes-Ruiz, 2023 in Zaragoza-Caballero *et al.* 2023

MEXICO: Jalisco, Tapalpa

Pyropyga Motschulsky, 1853

Pyropyga chemsaki Zaragoza-Caballero, 1993

MEXICO: Jalisco, La Huerta. Estación de Biología Chamela UNAM. 19.56667°–105.08333°.

Altitude: 150 m; El Salto; Cabo Corrientes. El Tuito. 20.31972°–105.32611°. Altitude: 600 m

Pyropyga cordobana Green, 1961

MEXICO: Jalisco, El Limón. San Buenaventura. 19.79194°–104.05889°; Loc. 1

Pyropyga minuta (LeConte, 1852)

Ellychnia minuta LeConte, 1852

MEXICO: Jalisco, El Limón. San Buenaventura T-2. Altitude: 720 m; Arroyo Los Yesos 6.6 km

SO San Buenaventura; Carr. Barra Navidad-Pto. Vallarta km. Sierra del Cuale; El Limón. 19.783°–

104.05°; La Huerta. Estación de Biología “Chamela” UNAM. 19.5°–105.05°. Altitude: 150 m

Pyropyga modesta Green, 1961

MEXICO: Jalisco, Cabo Corrientes. El Tuito. 20.34167°–105.35917°. Altitude: 590 m; El Salto;

La Huerta. Est. Biol. Chamela. (Zaragoza-Caballero 1993); Hostotipaquillo, Plan de Barrancas

Pyropyga nigricans (Say, 1823)

Lampyris nigricans Say, 1823

MEXICO: Jalisco, 2 miles south from Guadalajara; Chapala. Ajijic; Chapala. 6 mi W. 20.29°–

103.18917°; La Huerta. Estación de Biología “Chamela”, UNAM. 19.5°–105.05°. Altitude: 150 m

(Zaragoza-Caballero 1993)

Pleotomini Summers, 1875

Pleotomus Le Conte, 1861

Pleotomus emmiltos Zaragoza-Caballero, 2002

MEXICO: Jalisco, Tonaya. Amacuatitlan, cited as: “Amacahuititlán”, 940 m. 19°48' N 104°02' W,

6-VI-1997; El Limón. Arroyo Los Yesos, 6 km W San Buenaventura, 840 m. 19°45' N 104°02' W;

San Buenaventura, 720 m. 19°47' N 104°03' W, 7-VI-1997

Pleotomus pallens LeConte, 1866

MEXICO: Jalisco, Chamela; Guadalajara; Guadalajara. 8 mi. N, Guadalajara. 20.66667°–

103.33306°; La Huerta. Estación de Biología “Chamela” UNAM. 19.5°–105.05°. Altitude: 150

m

Photurinae Lacordaire, 1857

Bicellonycha Motschulsky, 1853

Bicellonycha amoena amoena (Gorham, 1880) in Keller & Hinson 2023: 6 (Fig. 4)

Photuris amoena Gorham, 1880

MEXICO: Jalisco, El Limón. San Buenaventura. 19.79194°–104.05889°; Arroyo Los Yesos; La Huerta. Careyes. 19.44444°–105.02333°. Altitude: 20 m; Estación de Biología “Chamela” UNAM. 19.5°–105.05°. Altitude: 150 m; Tonaya. Amacuatitlan, cited as: “Amacahuititlan” 4.7 km NE San Buenaventura; Chamela. Arroyo Chamela; Cihuatlán. Melaque. Altitude 0 m

Bicellonycha cyathigera (Gorham, 1881)

Photuris cyathigera Gorham, 1881

MEXICO: Jalisco, El Limón. Arroyo “Los Yesos” 6.6 km SW, San Buenaventura. 19.76583°–104.05222°; Tonaya. Amacuatitlan, cited as: “Amacahuititlan” 4.7 km NE, San Buenaventura. 19.79306°–104.055°; 6.6 km SO San Buenaventura

Bicellonycha gorhami Zaragoza-Caballero, 1989

MEXICO: Jalisco, ex col. M. Pic, dep. Locality not specified (Zaragoza-Caballero 1989)

Bicellonycha limbata Pic, 1924

MEXICO: Jalisco, Cabo Corrientes. El Tuito. 20.31667°–105.36667°. Altitude: 815 m

Photuris (*Photuris*) Dejean, 1833

Photuris (*Photuris*) *lugubris* Gorham, 1881

MEXICO: Jalisco, La Huerta. Estación de Investigación, Experimentación y Difusión Chamela

Photuris (*Photuris*) *sp.**

MEXICO: Jalisco, La Huerta. Estación de Investigación, Experimentación y Difusión Chamela; El Limón. San Buenaventura; Loc. 1; Arroyo Los Yesos 4.7 km NE San Buenaventura; 6.6 km SW, San Buenaventura; Tonaya. Amacuatitlan, cited as: “Amacahuititlan”: Loc. 4; Zapopan. Bosque de Encino. Altitude: 1600 m; Tala. Ahuisculco BTCpert. Altitude: 1350 m; Chapala. Ajijic; Autlán de Navarro. Sierra de Manantlán. Altitude: 1450 m; Tecolotlán. Los Guayabos; Puerto Vallarta. 20.61333°–105.23111°. Altitude: 10 m **Photuris sp.* is listed in the DA portal as *Photuris trilineata* (Say, 1835) with 339 specimens

Taxonomic notes: This species has not been determined yet.

Psilocladinae McDermott, 1964

Psilocladus Blanchard, 1845: 121

Psilocladus aztecus Gutierrez-Carranza, Zaragoza-Caballero & Keller, 2025 in Gutierrez-Carranza *et al.* 2025.

MEXICO: Jalisco, Cabo Corrientes. El Tuito, 14-VII-1993, lights, cols. Morris, Huether & Wappes. [FSCA codes. 00036830-00036832]

The species *Photinus pumesere* was cited for “Sierra de Manantlán, El Terreno, Municipio Manatitlán,” (Zaragoza-Caballero *et al.* 2023), “Minatitlán, misspelled as “Manatitlán”, belongs to Colima, not Jalisco, therefore, currently, there is no evidence for the species being distributed in Jalisco. Finally, some localities listed as “Amacahuititlan”, “Amacahuatitlan” and “Amacahutitlan” were fixed as “Amacuatitlan” according to the “Nomeclátor de Jalisco” (Secretaría de Programación y Presupuesto 1980), as well as others that were misspelled or in the wrong municipality.

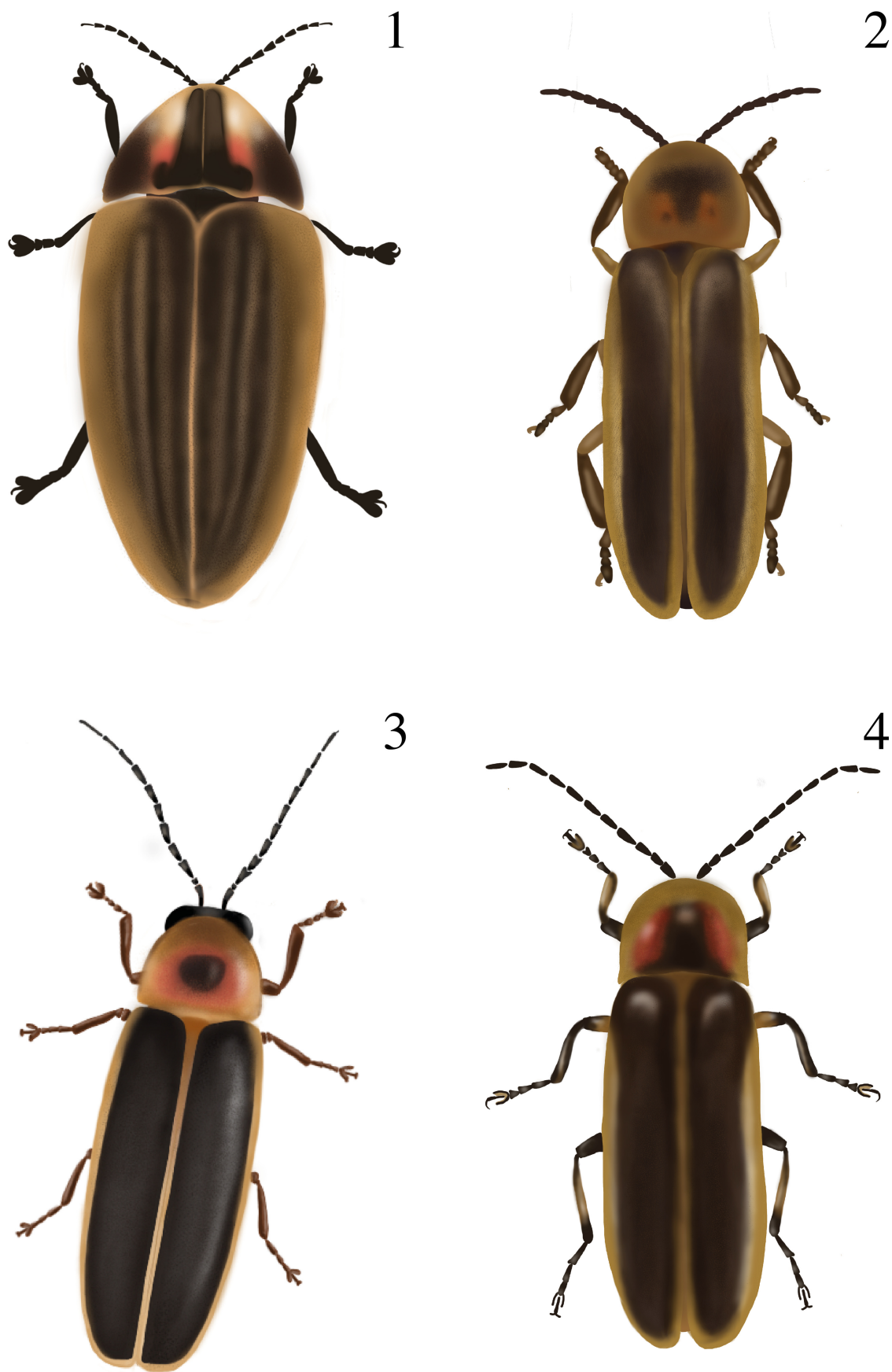


FIGURE 1–4. Dorsal view of adults from the species most frequent in Jalisco. 1. *Aspisomoides bilineatum* (Gorham, 1880). 2. Dorsal view of *Photinus kleriocarum* Zaragoza-Caballero, 2005. 3. Dorsal view of *Photinus pyralis* (Linnaeus, 1758) 4. Dorsal view of *Bicellonycha amoena amoena* (Gorham, 1880) in Keller & Hinson 2023: 6.

Discussion

In recent years, the increase of interest in fireflies has been evident, around the world and especially in Mexico, thanks to the work done by the specialists of Zaragoza's lab it is pleasing to note the vast amount of discoveries on lampyrids in the country in so few years, however, it is a work in progress, which must be kept ongoing, so that research on fireflies in the country becomes easier and more rewarding.

Certain states of the country with drier habitats have not been investigated as thoroughly as states in central and southern Mexico, it is essential to pay due attention to the northwestern part of the country, since authors such as Zaragoza-Caballero *et al.* (2023) have presented the fact that states such as Jalisco present a high endemism and diversity, in addition to localities that have no formal records and could present significant advances concerning the knowledge of fireflies.

This work aims to integrate every description known of Jalisco's fireflies into a single work, making access to it easier and laying the foundation for future research, and just in terms of our own, completing this study has led to the initiation of future projects, where specimens have been collected from various regions of Jalisco, many of which had no prior records, resulting in promising findings. Therefore, it is anticipated that our current knowledge of fireflies in Jalisco will be enlightened.

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