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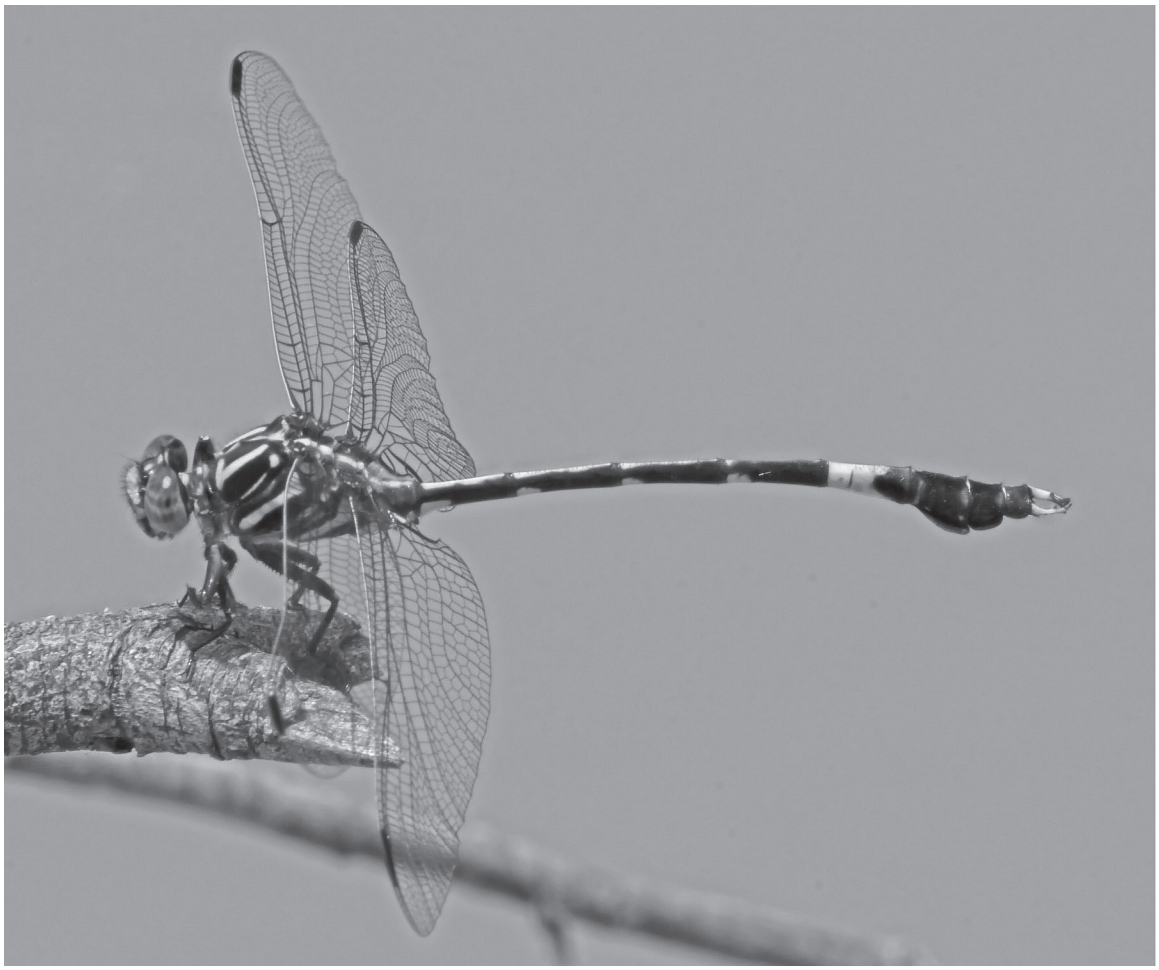

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The Dragonfly Society Of The Americas

Business address: c/o John Abbott, Section of Integrative Biology, C0930, University of Texas, Austin TX, USA 78712

Journals Published By The Society

Argia, the quarterly news journal of the DSA, is devoted to non-technical papers and news items relating to nearly every aspect of the study of Odonata and the people who are interested in them. The editor especially welcomes reports of studies in progress, news of forthcoming meetings, commentaries on species, habitat conservation, noteworthy occurrences, personal news items, accounts of meetings and collecting trips, and reviews of technical and non-technical publications. Membership in DSA includes a subscription to Argia.

Bulletin Of American Odonatology is devoted to studies of Odonata of the New World. This journal considers a wide range of topics for publication, including faunal synopses, behavioral studies, ecological studies, etc. The BAO publishes taxonomic studies but will not consider the publication of new names at any taxonomic level.

Membership in the Dragonfly Society of the Americas

Membership in the DSA is open to any person in any country and includes a subscription to Argia. Dues for individuals in the US, Canada, or Latin America are $20 US for regular membership and $25 US for institutions or contributing membership, payable annually on or before 1 March of membership year. Dues for members in the Old World are $30 US. The Bulletin Of American Odonatology is available by a separate subscription at $20 US for North Americans and $25 US for non-North Americans and institutions. Membership dues and BAO subscription fees should be mailed to Jerrell Daigle, 2067 Little River Lane, Tallahassee, FL, USA 32311

Argia and BAO Submission Guidelines

Digital submissions of all materials (via e-mail or CD) are much preferred to hardcopy. All articles and notes should be submitted in Word or Rich Text Format, without any figures or tables embedded. Only minimal formatting to facilitate review is needed. Photographs should be submitted as TIFF (preferred) or JPEG files with a minimum of 300 ppi at the intended print size. Charts, graphs, diagrams, and other vector graphics are best submitted in Illustrator format or EPS. If this is not possible, submit as PNG or TIFF at a minimum of 600 ppi at the intended print size. Charts and graphs may also be submitted in Excel documents. Tables may be submitted as Word or Excel documents. For more information see the entire guidelines at the end of this issue or visit <http://www.odonatacentral.org/index.php/PageAction.get/name/DSASubmissionGuidelines>. Argia submissions should be sent to John Abbott, Section of Integrative Biology, C0930, University of Texas, Austin TX, USA 78712, <jcabbott@mail.utexas.edu>; BAO submissions should be sent to Ken Tennessen, P.O. Box 585, Wautoma, WI, USA 54982, <ktennessen@centurytel.net>.

Front cover: *Phyllogomphoides nayaritensis*, Río Bavispe at Huasabas, Sonora, Mexico, 26 July 2005. This large clubtail is surprisingly common in the eastern Sonoran drainages of the Sierra Madre. Photo by Doug Danforth.

A Preliminary Checklist of the Odonata of Sonora, Mexico

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Abstract

Little detailed information is available on the Odonata of Sonora, which is located in northwestern Mexico. A recent paper (Paulson & González-Soriano, 2006) listed 46 species for the state. We have documented 122 species based on seven years of field work, including two undescribed species (an *Argia* and an *Erpetogomphus*). Species accounts include locality data, flight period and distribution map by municipio (= county). An overview of Sonora's regional biocommunities is provided, including maps of major watersheds and municipio boundaries.

Resumen

Existe poca información disponible sobre los Odonata de Sonora, el estado situado más al noroeste de México. En una reciente publicación, Paulson y González dan a conocer una lista de 46 especies registradas para Sonora. Nosotros hemos documentado 122 especies basados en un esfuerzo de siete años de trabajo de campo. El listado incluye dos especies no descritas pertenecientes a los géneros *Argia* y *Erpetogomphus*. El listado de especies incluye periodos de vuelo, datos de la localidad y un mapa de distribución por municipio. Se presenta además un panorama general de la comunidades biológicas regionales de Sonora, incluyendo mapas de las principales cuencas hidrológicas y de los límites municipales.

Introduction

The odonate fauna of Mexico is incompletely known. Detailed knowledge for some regions dates back to the nineteenth century while other regions remain largely unexplored. Even for species long known to exist in Mexico, the geographic ranges and flight periods are incomplete, and knowledge of variation in diagnostic characters, behavior and habitat is sketchy. During the 1990s, several publications addressed basic distribution questions (González-Soriano 1993, González-Soriano & Novelo-Gutiérrez 1996). Paulson and González-Soriano (2006) compiled and maintained an Odonata of Mexico list by state on the Internet, including their own records, records obtained from other researchers, and records derived from the literature. The most recent information for Mexico in general was presented by González-Soriano and Novelo-Gutiérrez (2007). Together, these efforts offered an overview of the available knowledge of Mexican odonate distribution. However, the northwestern state of Sonora still remained largely unexplored regarding the Odonata. Sonora's sheer size, its ruggedness and especially its remoteness have long combined to hamper biologists in systematic research efforts. Fortunately, new roads have made the Sierra Madre's western slope far more accessible, and the freeway from Nogales through Los Mochis, Sinaloa, has made the lowlands and medium elevations of Sonora more reachable.

For the last four years, Enrique González-Soriano has conducted a study of the insects associated with the Tropical Deciduous Forest which extends as far north as Sonora's San Javier Municipio. At the same time, we have made frequent trips into Sonora. The known diversity of other insect groups indicated a wealth of Odonata could be expected. Initially our fieldwork was biased toward the Sierra Madre and associated foothills. We began targeting localities in the coastal lowlands during the 2004 season, especially the northwest desert areas that remained largely unvisited. Much remains to be done. Many species fly year round in Sonora, although genuine winter records for most species are still lacking. More "off-season" fieldwork is needed to address this. A small number of species require more consideration because they are new to science and as yet undescribed. The taxonomic rank of certain populations remains unclear, and females of some species are undescribed.

We present here the detailed results of this cooperative effort. Sonora's biogeographical zones are discussed so that references to rivers and topography may be placed in context. The 46 species listed for Sonora by Paulson and González-Soriano (2006) are preceded by an asterisk (*) in the species accounts. Our fieldwork, begun in 2001, has increased the current state list to 122 species, a number that is certain to rise. Accounts for the 122 species we found in Sonora contain the following data:

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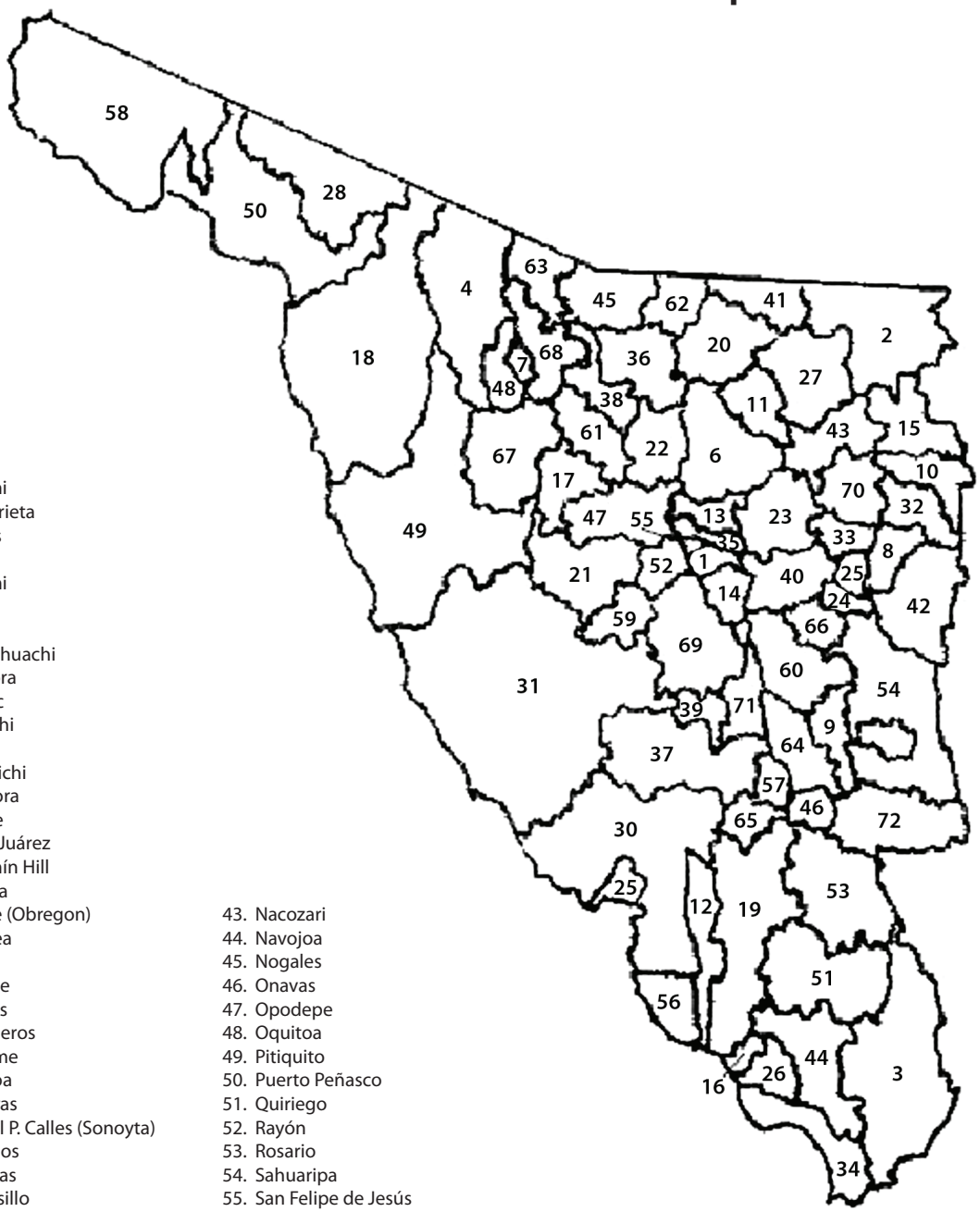
Sonora Municipios



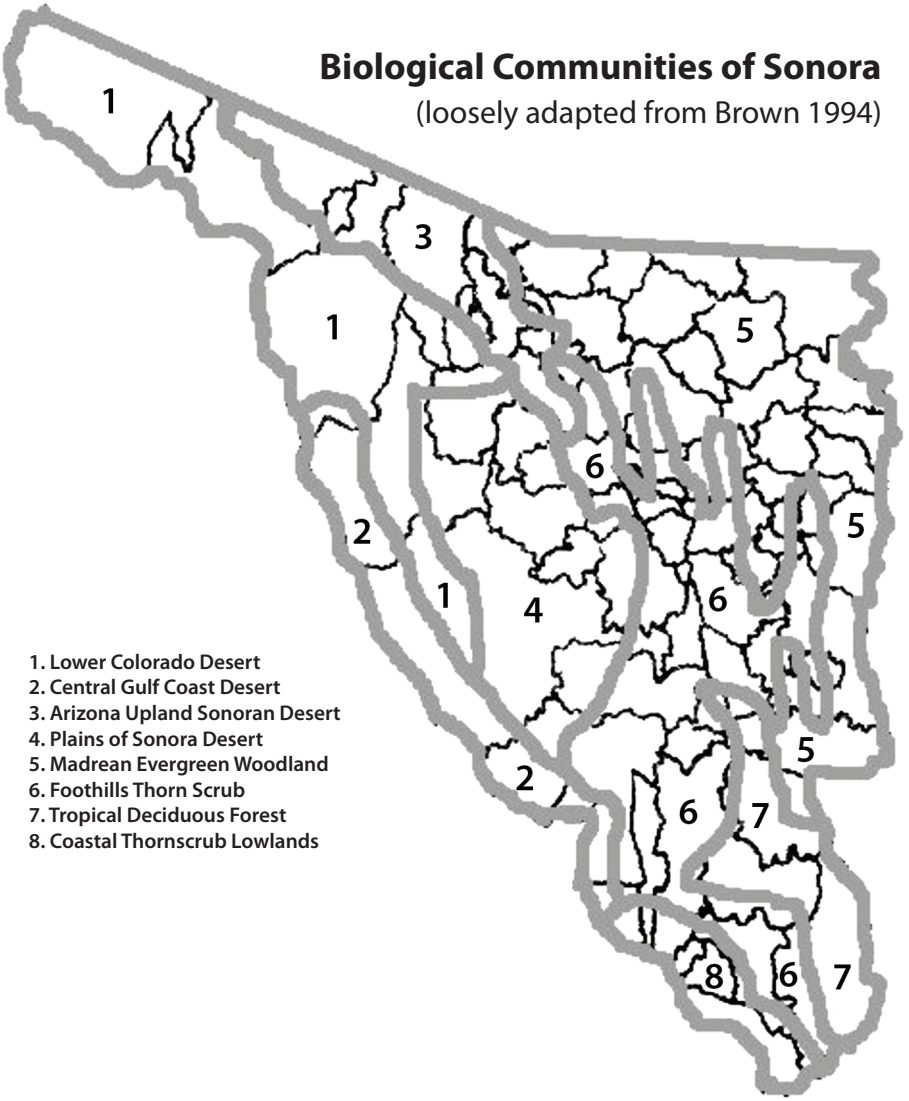
1. Aconchi
2. Agua Prieta
3. Alamos
4. Altar
5. Arivechi
6. Arizpe
7. Atil
8. Bacadéhuachi
9. Bacanora
10. Bacerac
11. Bacoachi
12. Bácum
13. Banámichi
14. Baviácora
15. Bavispe
16. Benito Juárez
17. Benjamín Hill
18. Caborca
19. Cajeme (Obregon)
20. Cananea
21. Carbó
22. Cucurpe
23. Cumpas
24. Divisaderos
25. Empalme
26. Etchojoa
27. Fronteras
28. General P. Calles (Sonoyta)
29. Granados
30. Guaymas
31. Hermosillo
32. Huachineras
33. Huásabas
34. Huatabampo
35. Huépac
36. Imuris
37. La Colorada
38. Magdalena
39. Mazatán
40. Moctezuma
41. Naco
42. Nácori Chico
43. Nacozari
44. Navojoa
45. Nogales
46. Onavas
47. Opodepe
48. Oquitoa
49. Pitiquito
50. Puerto Peñasco
51. Quiriego
52. Rayón
53. Rosario
54. Sahuaripa
55. San Felipe de Jesús
56. San Ignacio Río Muerto
57. San Javier
58. S. Luis Río Colorado
59. S. Miguel de Horcacitas
60. S. Pedro de la Cueva
61. Santa Ana
62. Santa Cruz
63. Sáric
64. Soyopa
65. Suaqui Grande
66. Tepache
67. Trincheras
68. Tubutama
69. Ures
70. Villa Hidalgo
71. Villa Pesquiera
72. Yécora

1) One or more localities of record for most species. We do not include localities for species which are widespread and abundant (such as *Orthemis ferruginea*) or for species found on private property near the owners' dwelling (such as *Macrothemis ultima*) or for species which are as yet undescribed. Where available, GPS coordinates are also provided.

2) Location records by major drainages and by the political/administrative divisions known as municipios (abbreviated as "Mp"). Typically, municipios are smaller than the counties of western North America and thus give a somewhat higher resolution to the accompanying range maps.

3) Comments regarding habitat and behavior.

4) Flight period charts in which letters above the line denote the months of the year, while dashes below the line represent early (from the beginning of the month through the tenth), middle (from the eleventh through the twentieth) and late (from the twenty-first through the end of the month) occurrences within each month. Continuous presence is indicated by a string of dashes. Sightings from any two periods separated by a single ten day period with no occurrences are treated as representing an assumed continuous presence. Longer gaps between occurrences are represented as such. Flight charts reflect our own records for the most part. Further fieldwork is needed to more accurately depict flight periods.



A short appendix follows the species accounts, containing a list of additional species we feel are likely to occur in Sonora. The bibliography contains references not cited in the text but that readers may find useful in dealing with the odonate fauna of Sonora.

General Overview of Sonoran Biogeography

Sonora is a biologically diverse state that contains relatively few naturally occurring aquatic habitats; fully half of the state is made up of various subdivisions of the Sonoran Desert Community. However, in the east and south, aquatic habitats are more plentiful (for details on Sonoran ecosystems, see Brown 1994). Our map of Sonoran watersheds ("cuencas") is adapted from maps and other information developed and presented on the Internet (INEGI 2005).

The Lower Colorado subdivision of the Sonoran Desert covers the northwest corner of Sonora and receives an annual rainfall amount of approximately 10 cm. North of the Gulf of California, it is characterized by sandy plains and dunes and low volcanic desert mountains. Aquatic habitats are limited to marshlands bordering the banks of the Colorado River and to occasional mountain tinajas (pools retained in scoured depressions in the bedrock). East of the Gulf of California, the Lower Colorado subdivision narrows as it extends south to the area around Puerto Lobos. Natural tinaja habitat is supplemented to some extent in this area by ranch ponds and irrigation ditches and the currently

intermittent flow of the lower Concepción, Asunción and Magdalena River system.

The Central Gulf Coast subdivision begins at Puerto Lobos and continues south to a point west of Ciudad Obregón. This narrow strip of desert benefits significantly from the lower temperatures, higher humidity, and the somewhat increased precipitation derived from its proximity to the Gulf. The area is characterized by the huge stem succulents cardon cactus (*Pachycereus pringlei*) and giant boojum tree (*Fouquieria columnaris*) which is not found naturally elsewhere on the Sonora mainland.

The Arizona Upland Sonoran Desert subdivision occupies the north central area of Sonora. It extends south from the Arizona border and swings east to include the towns of Magdalena and Santa Ana. This desert is the stronghold of the saguaro cactus (*Carnegiea gigantea*). Its 20 to 30 cm of annual precipitation is much greater than in the western subdivisions. Aquatic habitats include the Río Sonoyta and Río Altar in the upper Río Concepción drainage. These systems originate in the higher elevations of Sonora and Arizona and comprise large reservoirs and sandy/gravely rivers as well as stock ponds.

The Plains of Sonora Desert subdivision occupies the center of Sonora. It has many plants in common with the Arizona Upland Sonoran Desert, but plants of a tropical nature, such as tree morning-glory (*Ipomea arborescens*), palo jito (*Forchammeria watsoni*) and tree ocotillo (*Fouquieria macdougalii*), occur here. Annual rainfall amount (25 to 38 cm) is at the upper limit for a desert. Despite the increased precipitation, none of its rivers are perennial.

Much of eastern Sonora is dominated by the Sierra Madre Occidental, mountains exceeding 2600 m in elevation. In the northern part of Sonora is a patchwork of isolated mountain ranges that share many species of woody plants with the Sierra Madre; thus, these mountain habitats and those of the Sierra Madre proper are collectively known as Madrean Evergreen Woodland. This community extends from just west of Nogales east to the Chihuahua border and then continues southward. At lower elevations, it is an open woodland comprising stands of oak and juniper. Higher up, it consists of many varieties of oaks and pines. To the south, aquatic habitats abound and include boggy seeps, mountain streams, and boulder-strewn rivers. These woodlands receive up to 50 cm of precipitation in the north to double that in the south, and they contain the headwaters of most of Sonora's major drainages, including the Ríos Sonora, Mátape, Yaqui, and Mayo.

Occupying the southern tip of Sonora and extending in finger-like projections along the western foothills of the Sierra Madre as far north as the towns of Cucurpe, Arizpe, and Nacozari are the semitropical communities of Foothills Thornscrub and the more diverse Tropical Deciduous Forest.

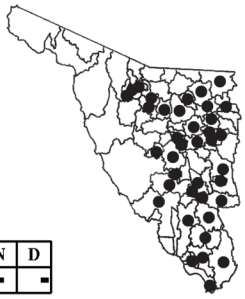
The two differ mainly in the height and density of their plant life. The Foothills Thornscrub occupies the lower elevations of the Sierra Madre down to the coastal plain. These drought deciduous forests stand leafless for much of the year until the summer monsoon season turns them into emerald jungle-like forests. Many types of palms and wild figs commonly grow on the banks and walls of arroyos and canyons. These exotic, semitropical forests contain many small streams lined with Montezuma bald-cypress (*Taxodium distichum*) and spider-lilies (*Hymenocallis sonorensis*) that flow into the Río Mayo and Río Fuerte.

Lastly, the Coastal Thornscrub community occurs in the flat coastal plain extending from Obregón south to the border with Sinaloa. Most of the native habitat has been cleared for vast farmlands. There are many permanent irrigation canals in addition to ponds and marshes created from irrigation overflow. These wetlands are full of water-lilies (*Nymphaea* sp.), cattails (*Typha* sp.), and *Sagittaria*. They are largely independent on the major watersheds and drain, if at all, directly to the Gulf of California.

Species Accounts

Zygoptera

Calopterygidae



****Hetaerina americana*** (Fabricius). Inhabits a wide variety of habitats from sea level to 1600 m; present at most localities we visited. Males frequently confront each other in a peculiar, bobbing display flight.

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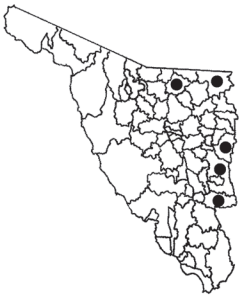

****Hetaerina vulnerata*** Hagen in Selys. Nácori Chico Mp.: Rancho El Macho on Nácori Chico-Mesa Tres Ríos Rd.; 29° 47.21′ N, 108° 47.47′ W; alt. 1980 m. Sahuaripa Mp.: Los Aguajitos crossing 26.5 km N of Yécora on Yécora-Mulatos Rd., Sonora; 28° 35.11′ N, 108° 55.03′ W; alt. 1487 m. Less common and less a generalist than *H. americana*. Occurs at higher elevations (usually 1200+ m) and in more densely wooded canyons of the Madrean Evergreen Woodland. It has been found only in the higher tributaries of the Río Sonora (Cananea Mp.) and Río Yaqui (Agua Prieta, Nácori Chico, Sahuaripa and Yécora Mps.) drainages; recorded in most Mexican states, though not Baja California.

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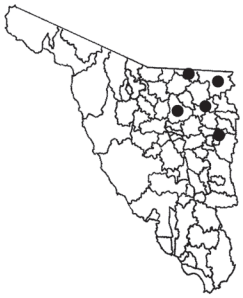
Lestidae



Archilestes californica McLachlan. Nacozari Mp.: Río Nacozari at km #66, Hwy. 12; 30° 18.23′ N, 109° 41.32′ W; alt. 1018 m. Uncommon along small, partly shaded rivers, spring-fed streams, ponds, and cienegas of the Río Sonora and Río Yaqui drainages in Sonora's northeast corner (Agua Prieta, Arizpe, Bacadéhuachi and Nacozari Mps.). Although *A. grandis* and *A. californica* are often found together, sometimes even on the same bush, the latter tends to be more exacting in habitat requirements favoring calmer, more lushly vegetated conditions. Baja California Sur is the only Mexican state with prior records, although we have found this species in neighboring Chihuahua (Behrstock et al. 2007).

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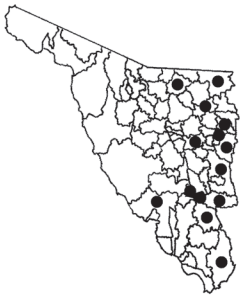

Archilestes grandis (Rambur). Guaymas Mp.: Nacapule Canyon, 4 km N of San Carlos; 28° 00.93′ N, 111° 03.04′ W; alt. 140 m. Found commonly at medium elevation sites throughout most of eastern Sonora in the drainages of the Ríos Sonora, Yaqui, Mayo, and Fuerte. In the lowlands of the Central Gulf Coast Subdivision, it is often present in Nacapule Canyon near San Carlos (Guaymas Mp.). Prior records from most Mexican states.

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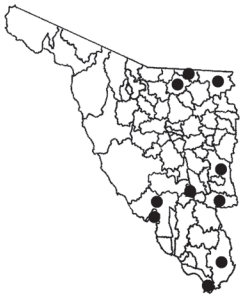

Lestes alacer Hagen. Huatabampo Mp.: irrigation ditch, Rd. 180, km #12, NE of Agiabampo; 26° 22.91′ N 109° 07.47′ W; alt. 16 m. Sahuaripa Mp.: Hwy. 12, large roadside ponds 18 km S of turn-off to Guisamopa; 28° 33.41′ N, 109° 09.21′ W; alt. 1036 m. Common in the northern Mps. of Cananea, Naco, and Agua Prieta, south through the higher elevation Mps. of Yécora and Sahuaripa and down to near sea level in flooded agricultural fields in the

Guaymas, Empalme, and Huatabampo Mps. Usually occurs in marshes and along the grassy borders of ponds.

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****Lestes sigma*** Calvert. Hermosillo Mp.: La Pintada, 1 km E of km #204 on Hwy. 15; 28° 35.31′ N, 110° 57.89′ W; alt. 265 m. Huatabampo Mp.: irrigation ditch, Rd. 180, km #12, NE of Agiabampo; 26° 22.91′ N, 109° 07.47′ W; alt. 16 m. Occurs mainly in the coastal lowlands of the Bácum, Empalme, Guaymas, Huatabampo, and Navojoa Mps.; sometimes common in wetlands formed by agricultural runoff and summer rains, habitat shared with *L. alacer*. Outside the coastal lowlands, *L. sigma* has been found flying with *L. alacer* near one stock pond at 265 m in the Plains of Sonora subdivision (Hermosillo Mp.) and up to 400 m in Tropical Deciduous Forest (Alamos Mp.).

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Platystictidae

Palaemnema domina Calvert. Agua Prieta Mp.: Rancho Los Ojos, Cajon Bonito, Hwy. 2, 45 km E of Agua Prieta. The few existing records for this species are widely scattered: Chiapas, Morelos, Nayarit, as well as southern Arizona and, recently, Chihuahua. It may occur locally in much of eastern Sonora, although our only records are from the Agua Prieta and Yécora Mps. *Palaemnema domina* probably escapes notice because it is sedentary for much of the day, becoming active during overcast, or crepuscular conditions. It frequents medium elevation woodland streams with undercut banks where it spends most of the day within the exposed root balls of streamside trees such as sycamores. During daylight, it may be found on the wing after and even during rainstorms.

J	F	M	A	M	J	J	A	S	O	N	D
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Protoneuridae

****Neoneura amelia*** Calvert. Navojoa Mp.: Río Mayo dam at Tesia, downstream from Presa Mocuzari; 27° 10.42′ N, 109° 21.51′ W. Navojoa Mp.: canal at km #147, Hwy. 15, 8 km S of Navojoa; 26° 59.59′ N, 109° 25.77′ W; alt. 55 m. One previous Sonoran record (from 1965) of this tropical species, from the lower Río Yaqui north of Esperanza in the Cajeme (Obregon) Mp., a locality severely altered during the last several decades by the diversion of water for agricultural purposes. The next northernmost record for *N. amelia* was from Nayarit, 800 km to the southeast. We found it in early October 2005, at sites about 25 km apart (a large earthen canal south of Navojoa, and a site on the Río Yaqui just below the Tesia diversion dam east of Navojoa, both in Navojoa Mp). In 2006 and 2007, adults were present at the Tesia site, while the Navojoa canal site was dry.

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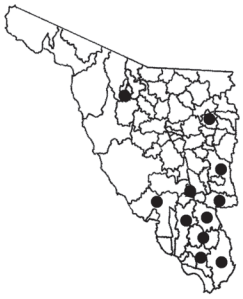

****Protoneura cara*** Calvert. Guaymas Mp.: Nacapule Canyon, 4 km N of San Carlos; 28° 00.93′ N, 111° 03.04′ W; alt. 140 m. Oquitoa Mp.: crossing of Río Altar, 2 km E of Oquitoa; 30° 45.38′ N, 111° 42.71′ W; alt. 484 m. Local in much of Sonora, from humid palm-canyons in coastal mountains near San Carlos (Guaymas Mp.) to medium elevations in the drainages of the Ríos Yaqui, Mayo, and Fuerte. Recorded 100 km (Río Bavispe, Villa Hidalgo Mp., Río Yaqui drainage) and 80 km (Río Altar, Oquitoa Mp., Río Concepción drainage) S of Arizona. Frequents sluggish pools and backwaters bordered with extensive overhanging brush and undercut root balls. Occurs on both the Gulf and Pacific slopes of Mexico.

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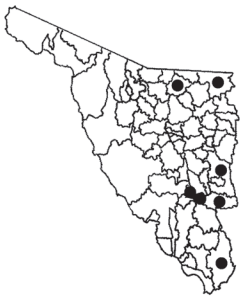
Coenagrionidae



Apanisagrion lais (Brauer in Selys). Sahuaripa Mp.: Los Aguajitos crossing, 26 km N of Yécora on Yécora-Mulatos Rd; 28° 35.11′ N, 108° 55.03′ W; alt. 1487 m. Yécora Mp.: Hwy. 16, km #262, "la Barranca"; 28° 22.37′ N, 109° 02.85′ W; alt. 1631 m. Extremely local in Sonora probably due to specialized habitat requirements; it is found almost exclusively in the emergent grasses and other herbaceous vegetation associated with shaded springs, over-

grown cienegas and streams or seeps with pools and sluggish flow. Records are from medium elevations in a part of the Cananea Mp. draining ultimately to the Río Colorado, from the Agua Prieta, Onavas, Sahuaripa, San Javier, and Yécora Mps., all in the Río Yaqui drainage, and from several sites in the Alamos Mp. draining to the Río Mayo. Occurs widely in Mexico (Westfall & May 1996).

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Argia anceps Garrison. Alamos Mp.: a "sabinal" on R. Cuchujaqui about 30 km E of Alamos; 27° 02.86′ N, 108° 43.95′ W; alt. 393 m. Sahuaripa Mp.: extended spillway of Presa Cajon de Onapa; 28° 42.49′ N, 109° 07.86′ W; alt. 604 m. Yécora Mp.: Hwy. 16 crossing of La Canada El Pillado Grande, km #214, Tepoca; 28° 26.31′ N, 109° 15.51′ W; alt 585 m. Occurs widely in southeastern Sonora's Río Yaqui, Río Mayo, and Río Fuerte drainages. In the fall, it is common at medium elevation sites on rocky, sunlit shelves along several rivers in the Yécora and Sahuaripa Mps. Also seen in the Onavas, San Javier, and Alamos Mps. flying with *A. pima*, *A. tarascana*, and *A. oculata* along small streams in pine-oak woodland, at spring-fed seeps, in steep palm canyons and in mature stands of Montezuma bald-cypress (*Taxodium distichum*). *Argia anceps* differs at a glance from the above mentioned species by its narrow, unforked humeral stripe and the reduced presence of black markings. These records extend the known northern range limit of *A. anceps* well beyond its prior limit in Sinaloa.

J	F	M	A	M	J	J	A	S	O	N	D
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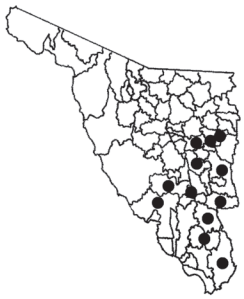

Argia carlcooki Daigle. Guaymas Mp.: Río San Marcial at Punta de Agua; 28° 25.76′ N, 110° 24.95′ W; alt. 209 m. Sahuaripa Mp.: spillway of Presa Cajon de Onapa; 28° 42.49′ N, 109° 07.86′ W; alt. 604 m. Occurs in significant numbers at many sites in eastern Sonora, all in localities of spring-fed streams in the Río Yaqui, Río Mayo, and Río Fuerte drainages. Also found in the La Colorada Mp. on the Río Mátape, a much more open river. These Sonora sightings and a recent record from Arizona suggest that *A. carlcooki* is to be expected in proper habitat along the length of Mexico's western slope. Previous records extended only as far north as the state of Jalisco.

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Argia cuprea (Hagen). Recorded only from Yécora Mp., in successive seasons (2004, 2005); several individuals, including tandem pairs, were found with *A. oenea* over a small, rocky stream on private property in mixed pine-oak woodland. These records constitute a major range extension, since *A. cuprea* had not been known to occur northwest of the states of Nayarit and Nuevo León, a distance of approximately 800 km.

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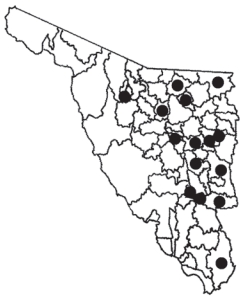

Argia extranea (Hagen). Onavas Mp.: palm-canyon on Hwy. 16, km #197; 28° 28.83′ N, 109° 21.41′ W; alt. 964 m. Oquitoa Mp.: crossing of Río Altar, 2 km E of Oquitoa; 30° 45.38′ N, 111° 42.71′ W; alt. 484 m. Relatively common in eastern Sonora and at least as far west as the Oquitoa Mp. Color characters in the field may lead to confusion, however, since some local populations are a lustrous blue similar to *A. carlcooki*, while others exhibit a purplish cast much like that of the Arizona/Sonora populations of *A. plana*. Along shaded canyon seeps and cypress-lined streams, *A. extranea* often flies with *A. carlcooki* and *A. oculata*. In the western parts of its range it is somewhat more tolerant of arid, open conditions.

J	F	M	A	M	J	J	A	S	O	N	D
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Argia fumipennis violacea (Burmeister). Cananea Mp.: San Raphael Cr. and reservoir, 25 km NE of Cananea. Populations continuous with those of Arizona are encountered occasionally in the Cananea, Naco, and Agua Prieta Mps. along the international border. Known elsewhere in Mexico from Durango, Nuevo León, and San Luis Potosí. Usually found on rocks breaking the surface of gently flowing, canopied streams or in the brush bordering these streams. The abdominal apical area is bicolored: seg. 8 is violet, segs. 9 and 10 blue. A small but noticeable white spot is usually present immediately anterior to the interpleural suture, and the forked humeral stripe normally shows a thin, reddish outline.

J	F	M	A	M	J	J	A	S	O	N	D
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Argia funcki (Selys). Sahuaripa Mp.: spillway of Presa Cajon de Onapa; 28° 42.49′ N, 109° 07.86′ W; alt. 604 m. Yécora Mp.: Arroyo Tepoca, km #215, Hwy. 16; 28° 25.82′ N, 109° 15.45′ W; alt. 560 m. Previously known from a primarily black form found in southern Mexico. Recently, however, a strikingly red form of the species was observed by Sid Dunkle, Rosser Garrison, Dennis Paulson, Enrique González-Soriano, Rodolfo Novelo-Gutiérrez and others, at least as far north as Nayarit. Sid Dunkle was kind enough to inform us of two older Sonora records (1986, 1987) originating with Boris Kondratieff and Richard Baumann from the Río Maycoba (Yécora Mp.). During the last five seasons, this red form was found in several Sonoran localities from 560 m to 1524 m within the Yécora, Sahuaripa, and Alamos Mps., and in numbers suggesting large resident populations. Males and females alike were found perching on rocks a few inches above the waterline. Other individuals, as discussed by Paulson (2002) for Nayarit, may be found perching up to 8 m above the water on boulders or cliff faces. Found along major rivers and small mountain streams.

J	F	M	A	M	J	J	A	S	O	N	D
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Argia harknessi Calvert. Guaymas Mp.: Río San Marcial at Punta de Agua; 28° 25.76′ N, 110° 24.95′ W; alt. 208 m. Navojoa Mp.: canal at Hwy. 15, km #147, 8 km S of Navojoa; 26° 59.59′ N, 109° 25.77′ W; alt. 53 m. Sahuaripa Mp.: spillway of Presa Cajon de Onapa; 28° 42.49′ N, 109° 07.86′ W; alt. 604 m. Villa Hidalgo Mp.: Río Bavispe 5 km NE of Villa Hidalgo; 30° 11.96′ N, 109° 18.53′ W, alt. 720 m. Previously known only from Nayarit and south, but locally quite common in Sonora. In rocky streams and rivers of the Sahuaripa, Yécora, and Alamos Mps., large numbers are present at elevations up to 700 m. On warm days, they typically perch on rocks only inches above the waterline, while on cooler, windier or overcast days they will abandon the rocks and move up into streamside brush such as smartweed (*Polygonum*). In such conditions, their normally electric blue luster darkens to a matte purplish blue. A supposition of northward range extension was prompted by the observation of several individuals in late July 2005, at 700 m along the Río Bavispe (Río Yaqui drainage) within 130 km of the Arizona border (Villa Hidalgo and Huásabas Mps.). Range extension was confirmed in early June 2007 by the appearance of *A. harknessi* at 1067 m elevation along the San Francisco River in SE Arizona's Greenlee County. This species shows wide latitude in its habitat choices. In September 2005, some were present as low as 53 m perching in brush with *Neoneura amelia* along the calm margins of a large canal in the Navojoa Mp., while a year later, an individual was observed perching in a thick mat of water-hyacinth along the Río San Marcial in Guaymas Mp.

J	F	M	A	M	J	J	A	S	O	N	D
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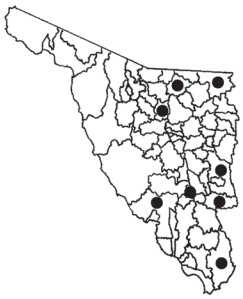
Argia hinei Kennedy. Guaymas Mp.: Nacapule Canyon, 4 km N of San Carlos; 28° 00.93′ N, 111° 03.04′ W; alt. 140 m. Sahuaripa Mp.: Los Aguajitos crossing, 26 km N of Yécora on Yécora-Mulatos Rd; 28° 35.11′ N, 108° 55.03′ W; alt. 1487 m. Observed in multiple localities in the Agua Prieta Mp. and west along the Arroyo Santo Domingo in the Cucurpe Mp. Farther south in Sonora, its numbers diminish although it has been observed near sea level in the Guaymas Mp., at medium elevations in the Alamos Mp. and up to almost 1600 m in the Yécora Mp. Though not previously reported from Sonora, its occurrence is not surprising given prior records from Baja California Norte, Coahuila, Sinaloa and, more recently, Chihuahua.



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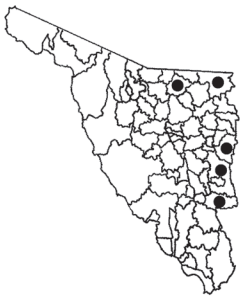
Argia lacrimans (Hagen). Nácori Chico Mp.: Rancho El Macho on Nácori Chico-Mesa Tres Ríos Rd.; 29° 47.21′ N, 108° 47.47′ W; alt. 1980 m. Sahuaripa Mp.: Los Aguajitos crossing, 26 km N of Yécora on Yécora-Mulatos Rd.; 28° 35.11′ N, 108° 55.03′ W; alt. 1487 m. Found above 1300 m among the stepped pools of small mountain streams in the Agua Prieta, Cananea, Nácori Chico, Sahuaripa, and Yécora Mps., all in the Río Yaqui drainage. In the Sahuaripa and Yécora locations, they occur with *A. pima*, an association not yet noticed in more northern locations. The humeral stripe helps to distinguish these two very similar species. In *A. lacrimans*, the stripe is usually forked, the upper fork being the more robust; when unforked or incipient, it is the lower which is "missing". In *A. pima* the lower fork is always present and is always the more robust; rarely the upper fork is missing. Prior records for *A. lacrimans* extend the length of Mexico's uplands from Chihuahua south to the state of Morelos.



J	F	M	A	M	J	J	A	S	O	N	D
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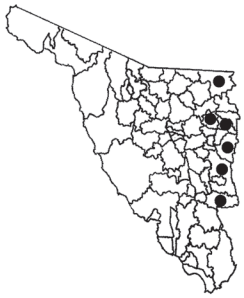
Argia lugens (Hagen). Huachineras Mp.: small rocky drainage along Huachineras-Mesa Tres Ríos Rd.; 30° 06.53′ N, 108° 53.88′ W; alt. 2218 m. Yécora Mp.: Río Moro at bridge on Santa Rosa Rd.; 28° 26.72′ N, 109° 06.56′ W; alt. 1394 m. Range and habitat overlap with those of *A. funcki* in the Sahuaripa and Yécora Mps. The only other populations so far observed are in the Agua Prieta, Huachineras, and Nácori Chico Mps. Its preferred habitat is that of medium elevation rocky flats and boulder-strewn rivers, although it ranges up to at least 2200 m in small drainages of the Sierra Madre's western slope (Huachineras and Sahuaripa Mps.). Recorded in much of Mexico south to Oaxaca.



J	F	M	A	M	J	J	A	S	O	N	D
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Argia moesta (Hagen). Rosario Mp.: Río Chico, 19 km NW of Movas; 28° 16.71′ N, 109° 29.37′ W; alt. 184 m. Occasional individuals were found in the Río Bavispe (Huásabas Mp.) and Río Yaqui (Soyopa Mp.). In late June 2005, large numbers were found along the Río Yaqui at Onavas (Onavas Mp.) and the Río Chico (Rosario Mp.). Known also from several Mexican states south and east of Sonora.

J	F	M	A	M	J	J	A	S	O	N	D
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Argia munda Calvert. Found in Arizona in May and June along small streams draining the Huachuca and Chiricahua Mountains near the international border. However, with the onset of the summer rains, it becomes less common. Despite records from Mexico's Sierra Madre in states farther east and south (Chihuahua, Durango, and San Luis Potosí), there were no records from Sonora until late June 2005, when a lone male was found on a tree branch at an elevation of 1500 m along a small mountain creek in Yécora Mp.

J	F	M	A	M	J	J	A	S	O	N	D
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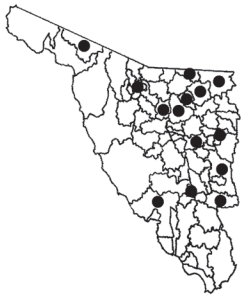
Argia nahuana Calvert. Fronteras Mp.: inflow to Presa Cuquiarachic; 30° 52.39′ N, 109° 42.64′ W; alt. 1227 m. General Calles Mp.: large pond N of Quitobac; 31° 31.02′ N, 112° 45.42′ W; alt. 424 m. Quite common in the northeast, especially adjacent to southeastern Arizona, but seen less often at low elevation in true Foothills Thornscrub. Medium elevation localities as far south as Yécora Mp. harbor small numbers of this species. Though previously unreported from Sonora, it is known from most of the northern and central Mexican states.



J	F	M	A	M	J	J	A	S	O	N	D
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Argia oculata Hagen in Selys. Guaymas Mp.: Nacapule Canyon, 4 km N of San Carlos; 28° 00.93′ N, 111° 03.04′ W; alt. 140 m. Onavas Mp.: Palm Canyon on Hwy. 16, km #197; 28° 28.83′ N, 109° 21.40′ W; alt. 964 m. This taxon is in need of clarification since more than one species may be grouped under this name (Garrison, pers. comm.). For now, Sonoran individuals are being tentatively attributed to a population found earlier in the state of Nuevo Leon and known as *A. oculata* "minimum blue" (see Westfall & May 1996, p. 263). Even among the Sonoran populations there are differences. Larger, bluer individuals, some showing small dorsolateral spots on abdominal seg. 8 and 9, occur in the flat stretches of rivers traversing Montezuma bald-cypress ("sabino") forests in the Alamos Mp. Smaller, and/or more purplish individuals without the dorsolateral spots are found in steep, palm canyons, as in the Guaymas and Onavas Mps. The species has also been seen along small, heavily canopied, mountain streams in pine-oak woodland in Yécora Mp. Nearest Mexican states with records for *A. oculata* are Nayarit and Nuevo Leon, both at least 800 km to the southeast.

J	F	M	A	M	J	J	A	S	O	N	D
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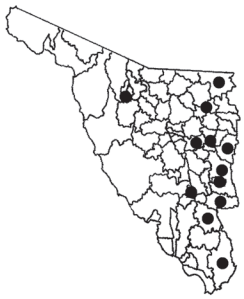
Argia oenea Hagen in Selys. Nacozari Mp.: Río Nacozari, Hwy. 12 at km #66; 30° 18.23′ N, 109° 41.32′ W; alt. 1018 m. Oquitoa Mp.: dirt road crossing of Río Altar and upstream, 2 km E of Oquitoa; 30° 45.38′ N, 111° 42.71′ W; alt. 484 m. Found commonly at medium elevations in the Río Yaqui drainage up to at least 1600 m with an additional sighting well to the west along the Río Altar in the Oquitoa Mp. Females and tandem pairs are often seen on



brush, but lone males perch almost exclusively on rocks or gravel bars in shallow streams. Occurs in much of Mexico.

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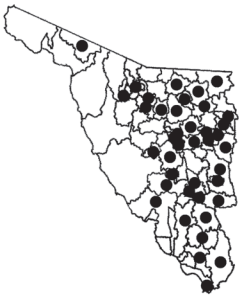

Argia pallens Calvert. Guaymas Mp.: R. San Marcial at Punta de Agua; 28° 25.76′ N, 110° 24.95′ W; alt. 209 m. Huachineras Mp.: El Alamo tank, 1 km N of microwave tower on Huachineras-Mesa Tres Ríos Rd.; 30° 06.36′ N, 108° 55.56′ W; alt. 1569 m. Sonora's most widespread *Argia*; *A. pallens* occurs from near sea level to over 1300 m and from the Agua Prieta Mp. in the northeast across to the General Calles (Sonoyta) Mp. in the west and the length of the state to the Huatabampo Mp. in the far south. Typical habitats include smaller perennial streams cutting through open rocky areas, but it also perches in full sun on rocks or on the sandy, muddy or gravel edges of larger rivers. Additionally, *A. pallens* is one of the few *Argia* often found at pond edges. Despite its presence in Arizona, New Mexico, and west Texas, it was previously unreported in Mexico from north of Nayarit (Paulson 2002).

J	F	M	A	M	J	J	A	S	O	N	D
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****Argia pima*** Garrison. Sahuaripa Mp.: Los Aguajitos crossing, 26 km N of Yécora on Yécora-Mulatos Rd.; 28° 35.11′ N, 108° 55.03′ W; alt. 1487 m. As yet unrecorded from the rest of Sonora, *A. pima* has been found in a cluster of localities above 1300 m in Yécora and Sahuaripa Mps., each a small, shaded mountain stream; at most localities, *A. lacrimans* was also present (see that species for a discussion of humeral stripe differences as an aid in identification.). The visible, comma shaped mark in the ventrolateral posterior corner seg. 2 will also help to differentiate *A. pima* from *A. lacrimans* and *A. tarascana*. *Argia anceps* has a similar mark but is easily distinguished by other means.

J	F	M	A	M	J	J	A	S	O	N	D
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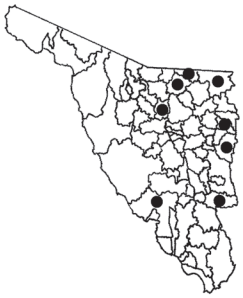
Argia plana Calvert. Guaymas Mp.: Nacapule Canyon, 4 km N of San Carlos; 28° 00.93′ N, 111° 03.04′ W; alt. 140 m. Huachineras Mp.: small, rocky drainage along Huachineras-Mesa Tres Ríos Rd.; 30° 06.53′ N, 108° 53.88′ W; alt. 2218 m. Occurs in the drainages of the Ríos Sonora (Cananea Mp.), Yaqui (Agua Prieta, Huachineras, and Nácori Chico Mps.), Colorado (Naco Mp.) and Concepción (Cucurpe Mp.). In northern Sonora, it is a generalist, perching on nodding brush or grasses, on rocks in shaded, lesser streams or in flatter, more open habitat. Farther south, it is more particular in its habitat choices, being found in dense palm- and fig-lined canyons (Guaymas Mp.), among shaded ferns and mosses at seeps in vertical rock surfaces and along small, stepped mountain streams (Yécora and Huachineras Mps.).



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****Argia pulla*** Hagen in Selys. Onavas Mp.: Río Yaqui, immediately W of Onavas; 28° 27.83′ N, 109° 32.00′ W; alt. 158 m. Unlike most of its congeners, it occurs commonly at ponds as well as along running water; often co-occurs with *Enallagma novaehispaniae*, *E. semicirculare*, and *E. praevarum* and even behaves similarly, perching among grasses and shrub tips overhanging the calm pools and backwaters of nearby streams. Although present up to 600 m in the Yécora and Sahuaripa Mps., it is most common along irrigation ditches and at agricultural ponds in the coastal lowlands. Localities in the Sahuaripa and La Colorada Mps. represent the northern limits of its known range in Mexico.

J	F	M	A	M	J	J	A	S	O	N	D
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Argia sabino Garrison. San Javier Mp.: Lo de Campo, Hwy. 16; 28° 32.36′ N, 109° 44.62′ W; alt. 492 m. Yécora Mp.: "Vado Rana" crossing 8 km N of Yécora on Yécora-Mulatos Rd.; 28° 26.35′ N, 108° 55.51′ W; alt. 1542 m. In southern Arizona, *A. sabino* occurs on small mountain streams with tinajas (deep plunge pools with steep and polished sides). Even when these streams cease flowing, the tinajas retain their water along with several individuals of *A. sabino*. This species has thus far been recorded from comparable conditions in three Sonoran localities in the San Javier and Yécora Mps. In his original description of *A. sabino*, Garrison (1994) mentioned it might be conspecific with *A. tarascana*, although he considered it unlikely. The two species are sympatric at localities in the Yécora Mp., but *A. sabino* is normally distinguished by a dumbbell-shaped black mark passing through the median ocellus. It is known

elsewhere in Mexico only from Jalisco state, 1000 km to the southeast.

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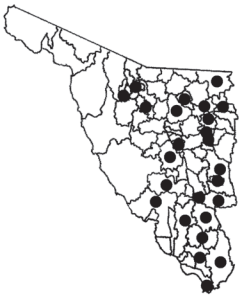

****Argia sedula*** (Hagen). Found from near sea level along irrigation ditches in the Huatabampo Mp. to over 1300 m in the Yécora Mp., *A. sedula* is at home near almost any flowing water other than steep, mountain streams. Like *A. pulla* and *A. translata*, it is even encountered occasionally in coastal ponds (Guaymas Mp.). It occurs in most of the northern Mexican states.

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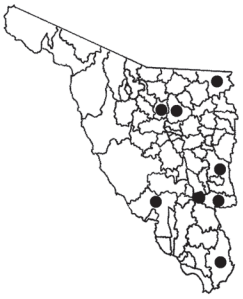

Argia tarascana Calvert. Guaymas Mp.: Nacapule Canyon, 4 km N of San Carlos; 28° 00.93′ N, 111° 03.04′ W; alt. 140 m. Sahuaripa Mp.: spillway of Presa Cajon de Onapa; 28° 42.49′ N, 109° 07.86′ W; alt. 604 m. Yécora Mp.: "Vado Rana" crossing 8 km N of Yécora on Yécora-Mulatos Rd.; 28° 26.35′ N, 108° 55.51′ W; alt. 1542 m. Occurs in multiple medium elevation localities in the Río Yaqui drainage from the Agua Prieta Mp., near the Arizona border, south to the Rosario Mp. It also occurs in the drainages of the Ríos Concepción (Cucurpe Mp.), Sonora (Arizpe Mp.) and Fuerte (Alamos Mp.). Along larger rivers (e.g. the Río Sahuaripa) it is more often found perching on low vegetation overhanging calm, partially canopied backwaters or sloughs. An apparently disjunct, low-elevation population inhabits Nacapule Canyon, a steep, palm canyon a mere 2 km from the coast near San Carlos (Guaymas Mp.). Though now well known from central Arizona, *A. tarascana* was previously recorded in Mexico only from as far north as Durango.

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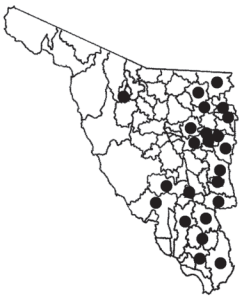

Argia tezpi Calvert. Nacozari Mp.: Río Nacozari, Hwy. 12 at km #66; 30° 18.23′ N, 109° 41.32′ W; alt. 1018 m. Widespread in Sonora, ranging from 210 m to over 1300 m, from the Río Altar (Oquitoa Mp.) in the west to the Río Maycoba in the east and from the Agua Prieta Mp. in the north to the Alamos Mp. in the south. Though present on steep mountain streams, it occurs more often along the rocky flats or gravel bars of larger rivers such as the Ríos Bavispe (Huásabas Mp.) or Bacadéhuachi (Bacadéhuachi Mp.). In some localities, individuals display very little fidelity either to perches or to perch types moving randomly from rock to rock or from rock to shrub tip to emergent vegetation, with no apparent preference. Westfall and May (1996) cite prior presence in Sonora as well as along much of Mexico's western slope and in Mexico's southern states.

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****Argia tonto*** Calvert. Nácori Chico Mp.: Rancho El Macho on Nácori Chico-Mesa Tres Ríos Rd.; 29° 47.21′ N, 108° 47.47′ W; alt. 1980 m. Sahuaripa Mp.: Los Aguajitos crossing, 26 km N of Yécora on Yécora-Mulatos Rd.; 28° 35.11′ N, 108° 55.03′ W; alt. 1487 m. Though relatively common at canopied, mountain streams in nearby southern Arizona, *A. tonto* has been recorded only a few times in Sonora. We have seen a specimen in the University of Arizona Collection with incomplete data, merely "Frijolito Canyon." This locality might be in the Ajo Mountains in northeastern Sonora (Bacoachi Mp.), but we regard the record as uncertain. During the summer of 2005, a few individuals were observed in a shady stand of Mexican cypress (*Cupressus lusitanica*) along Los Aguajitos, a small, rocky stream in the Sahuaripa Mp. Later, others were found along the Río El Macho west of Mesa Tres Ríos (Nácori Chico Mp.) and in another Mexican cypress stand 6 km east of the town of Kipor (Yécora Mp.). Also known from nearby Chihuahua and south to Morelos.

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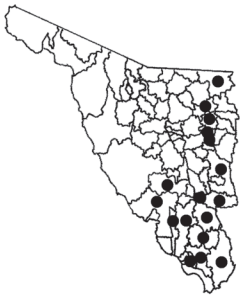

Argia translata Hagen. Etchojoa Mp.: Tres Cruces, 1 km S of Sahuaral; 26° 55.02′ N, 109° 39.73′ W; alt. 16 m. Villa Hidalgo Mp.: Río Bavispe, 17 km N of Villa Hidalgo; 30° 15.91′ N, 109° 21.60′ W; alt. 700 m. One to several individuals often seen flying with larger numbers of *A. tezpi*. However, their habitat requirements are less specialized. Sometimes present immediately adjacent to deep, flowing waters as in spillways, while *A. tezpi* typically avoids such habitat in favor of rocky flats. In the lowlands of the Guaymas or Cajeme Mps., they occur in major agricultural canals and, rarely, even in ponds choked with water hyacinth. These are Mexico's westernmost records for *A.*

translata; most records are from the southern half of Sonora. Records exist for many of Mexico's mainland states.

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Argia* cf. *ulmeca Calvert. Yécora Mp.: Hwy. 16 crossing of Río Maycoba, km #307; 28° 22.45′ N, 108° 45.49′ W; alt. 1201 m. The attribution to *A. ulmeca* is tentative. Several localities in the eastern half of the Yécora Mp. harbor individuals suggestive of *A. ulmeca*. However, the Sonoran population differs from typical *A. ulmeca* in being larger, showing strong flavescence in the wings, having five antenodal cells in the fore wing and showing obscure dorsolateral spots on abdominal seg. 8 and 9. They tend to perch at 4 m, or higher, in trees when first becoming active, then to descend gradually, finally perching on low-lying rocks in the later morning. Paulson (2002) has mentioned a comparable population found in Nayarit. Additional study may show that these constitute a species separate from typical *A. ulmeca*.

J	F	M	A	M	J	J	A	S	O	N	D
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***Argia* sp. nov**. This new species has been found in several localities in the eastern part of the Yécora Mp., from late June through September, always between 1300 and 1600 m, and always in pine-oak woodland with small, lushly canopied streams with stepped pools. Maturing males develop patches of variably intense golden sheen on the cranial and humeral areas and later are quite easily spotted thanks to a broad, metallic, golden stripe on each side of the thoracic dorsal carina. This sheen becomes less pronounced in the post-breeding period. Also, abdominal seg. 8 is black, while seg. 9 and 10 are blue. Females are often found in the woodland understory at some distance from the streams.

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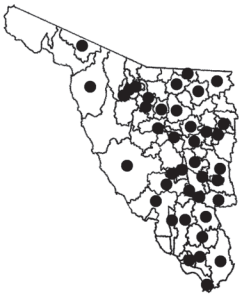

****Enallagma civile*** (Hagen). Found the length and breadth of Sonora, often in large numbers, and, indeed, throughout most of Mexico. It almost always occurs in lentic conditions from small ponds to the still margins of larger lakes, taking isolated perches over the water, or, especially when windy, on vegetation at some distance from the shoreline. When observed along rivers, it is usually at the calmer edges and backwaters. It occurs from near sea level to at least 1570 m (Huachineras Mp.).

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Enallagma eiseni Calvert. General Calles Mp.: wall marking international border along Hwy. 2, km #19, .5 km W of El Papalote; 31° 56.51′ N, 113° 01.26′ W; alt. 323 m. This species was encountered by Wulf and Eva Kappes in the 1990s (pers. comm.) about 50 m north of the international border at Quitobaquito Spring in Organ Pipe National Monument, Pima Co., Arizona. In mid-October 2006, we found about two dozen individuals near the same spring. A few individuals were seen on bulrushes at the perimeter of the spring-fed pond, but the large majority were perched in sunlit brush, mainly saltbush (*Atriplex*), at varying distances from the pond including two individuals approximately four meters into Sonora. These are the first records for mainland Mexico.

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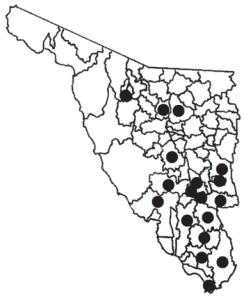

****Enallagma novaehispaniae*** Calvert. Quite widespread in Sonora, although it has yet to be recorded from the tier of municipios along the international border. Where it co-occurs with *E. civile*, *E. novaehispaniae* is almost always greatly outnumbered. It normally occurs along the calm margins of brush-lined streams, although females may be found at some distance from water. The purplish color of *E. novaehispaniae* approaches that of *E. semicirculare* though with a faint sheen of turquoise, especially in younger individuals.

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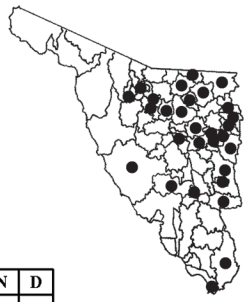

****Enallagma praevarum*** (Hagen). Widespread in northern two-thirds of Sonora with exception of a few records in southern-most extremity (Alamos and Huatabampo Mp.). It ranges from sea level to over 1600 m and is often found with Sonora's other *Enallagma* species. It differs

J	F	M	A	M	J	J	A	S	O	N	D
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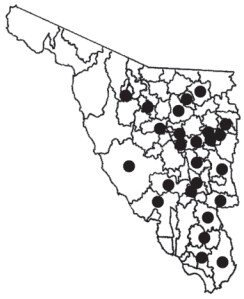
from them, however, in often being associated with rapidly flowing water. It occurs in most Mexican states.



****Enallagma semicirculare*** Selys. Less common in Sonora than the preceding three species, *E. semicirculare* is nonetheless quite widespread up to at least 1570 m (Huachineras Mp.). Small numbers of them may be expected in pond or stream habitats in all drainages. In the field, its normal slightly purplish cast (some Sonoran individuals are blue) helps to distinguish *E. semicirculare* from *E. civile* and *E. praevarum*. Separating it at a glance from the very similar *E. novaehispaniae* is sometimes difficult.

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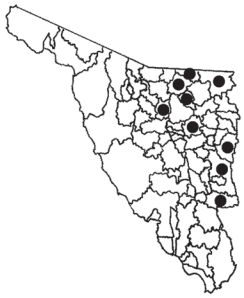

Hesperagrion heterodoxum (Selys). Sahuaripa Mp.: Los Aguajitos crossing, 26 km N of Yécora on Yécora-Mulatos Rd.; 28° 35.11′ N, 108° 55.03′ W; alt. 1487 m. Widespread but local from 1000 m to 1600 m, from the Cucurpe Mp. east and from the international border south through the Yécora Mp. It prefers conditions of dappled sunlight and seeks out quiet waters supporting dense emergent growth of herbaceous plants.

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Ischnura barberi Currie. Guaymas Mp.: Tular Lagoon, 4 km W of Guaymas; 27° 56.03′ N, 110° 56.61′ W; alt. 3 m. To date, there are six records of *I. barberi* from Sonora, all from conditions considerably less than pristine. One is from the city (and Mp.) of San Luis Río Colorado, another from a flatland flooded with irrigation run-off behind Kino Nuevo (Hermosillo Mp.) and the last four from heavily impacted marshes near causeways or dumps in the Guaymas Mp. There are no prior Mexican records for this species.

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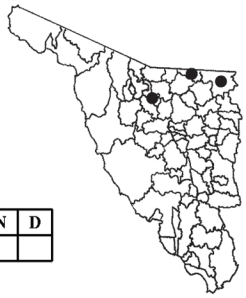
****Ischnura cervula*** Selys. Agua Prieta Mp: Rancho Los Ojos: Cajon Bonito, Hwy. 2, 45 km E Agua Prieta. A more northern species recorded only from municipios near the international border (Naco, Agua Prieta, and Magdalena de Kino). It is found mainly in the low herbaceous growth of marshes, in stands of cattails, or at the borders of sluggish streams from 800 m to 1400 m.



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Ischnura damula Calvert. Cananea Mp.: lake and woodland stream below Ajos-Bavispe Reserva Biologica, about 40 km E of Cananea. In early July 2003, about six individuals were seen at 1400 m in a colony of horsetail (*Equisetum*) bordering a small but lush, perennial stream in the Río Yaqui drainage (Agua Prieta Mp.). In late August 2005, a significant population, including immatures, was found in mixed aquatic vegetation bordering a mature reservoir at 1800 m in the mountains east of Cananea (Cananea Mp.). Along with a more recent sighting in Chihuahua, these are Mexico's only records.

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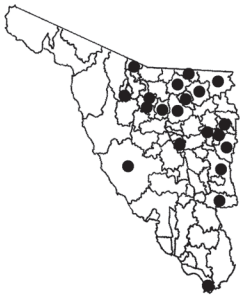
****Ischnura demorsa*** (Hagen). Rather common at medium to high elevation in much of Sonora's northeastern half. Still, it has been found in the coastal lowlands of Hermosillo Mp. and at Sonora's southern extremity in the Juan de la Barrera locality of Huatabampo Mp. Though most easily found at streams, *I. demorsa* occurs at ponds and lakes. They seem not to require strictly herbaceous growth, but occur also in sparser, shrubby plant communities and will leave shoreline cover and venture out over more open water.



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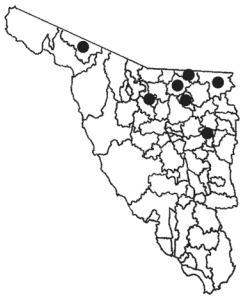
****Ischnura denticollis*** (Burmeister). Cananea Mp.: lake and woodland stream below Ajos-Bavispe Reserva Biologica, about 40 km E Cananea. General Calles Mp.: large pond and drainage below dam, near Quitobac; 31° 31.02′ N, 112° 45.42′ W; alt. 424 m. Widespread in Mexico, though not frequently encountered in Sonora, *I.*



denticollis is usually present in small numbers in sedges or spike-rushes (*Eleocharis*) bordering marshes, small streams and larger rivers. Most records are from the northeast part of the state.

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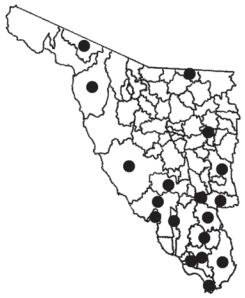

Ischnura hastata (Say). Guaymas Mp.: slough beside Hwy. 15, km #66; 27° 45.64′ N, 110° 24.58′ W; alt. 4 m. Yécora Mp.: Puente la Ventana 2 km E of Yécora, Hwy. 16; 28° 22.60′ N, 108° 53.87′ W; alt. 1578 m. Found locally in much of Sonora from Caborca Mp. in the west to the Chihuahua border, and from Naco Mp. south to Huatabampo Mp. Nearly all-inclusive in its altitudinal distribution, ranging from sea level to 1600 m. Most common in emergent herbaceous vegetation bordering small streams, agricultural channels and open, even ephemeral ponds. Also occurs in ponds covered with water-hyacinth (*Eichhornia*), in saline habitat such as pickleweed (*Salicornia*) wetlands (Huatabampo Mp.) and in mangrove-lined estuaries (Guaymas Mp.). Present in various habitats throughout most of Mexico's states.

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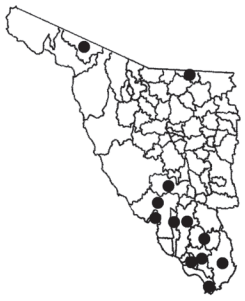

Ischnura ramburii (Selys). Etchojoa Mp.: Tres Cruces, 1 km S of Sahuaral; 26° 55.02′ N, 109° 39.73′ W; alt. 16 m. Large numbers of *I. ramburii* were found from Guaymas to Huatabampo Mp. in low-lying areas immediately inland from the coast of southern Sonora. Frequents shallow ponds and irrigation ditches fringed with emergent grasses and spider-lilies (*Hymenocallis*). At times, they will greatly outnumber all other odonates present. Smaller numbers of *I. ramburii* occur inland through La Colorada and even Naco Mp. Though widespread in Mexico, *I. ramburii* is infrequently reported from the northern tier of states.

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Neoerythromma gladiolatum Williamson & Williamson. Guaymas Mp.: Presa Punta de Agua spillway; 28° 25.82′ N, 110° 23.89′ W; alt. 245 m. Known previously on Mexico's Pacific slope only from as far north as Sinaloa, *N. gladiolatum* was recently discovered in Sonora. Initially (mid-September 2006), males, females and mated pairs were observed in close association with free-floating mats of vegetation in the large, pond-like spillway beneath Punta de Agua dam (Guaymas Mp.). At times, they perched also on very low-lying vegetation right at the water line. In late October 2006, further populations were found in mats of water hyacinth in the "Canal Bajo" along Sonora Rd. 128 in Cajeme (Obregón) Mp. and perched on herbaceous stems barely protruding from the water's surface in the pond-like conditions of the Mocuzari Reservoir spillway (Alamos Mp.).

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Telebasis griffinii (Martin). Bacum Mp.: canal and nearby back-water of old Río Yaqui bed, 1 km W of Bacum; 27° 34.00′ N, 110° 05.21′ W; alt. 35 m. Navojoa Mp.: large slough adjacent to Río Mayo W of Hwy. 15 bridge; Navojoa; 27° 06.16′ N, 109° 26.93′ W; alt. 72 m. Abundant at a pond choked with water hyacinth (*Eichhornia*) in the Río Mayo riverbed; smaller numbers of *T. salva* were present. This site is at the northern entrance to the city of Navojoa (Navojoa Mp.). At a similarly mucky and water hyacinth-covered slough of the old Río Yaqui riverbed 1 km west of Bácum (Bácum Mp.), the relative abundance for the two species is reversed. For *T. griffinii*, the Bácum location is the northernmost in Mexico. Dennis Paulson recorded it from a pond covered with water-lettuce (*Pistia*) near the coast of Nayarit in September 2001; he mentioned finding it also in San Luis Potosí in eastern Mexico.

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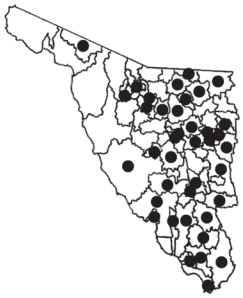
****Telebasis salva*** (Hagen). Common in most of Sonora where it inhabits marshes and sunlit margins of streams and ponds. In most localities its daily appearance occurs later than that of other species. Populations of *T. salva* thrive from sea level (Guaymas and Huatabampo Mps.) up to at least 1800 m (Cananea Mp.).



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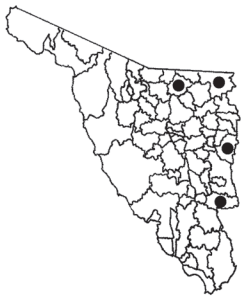
Anisoptera

Aeshnidae



Aeshna persephone Donnelly. Nácori Chico Mps.: Rancho El Macho on Nácori Chico-Mesa Tres Ríos Rd.; 29° 47.21′ N, 108° 47.47′ W; alt. 1980 m. Found from medium to high elevations in Cananea, Agua Prieta, and Nácori Chico Mp. and at multiple sites in Yécora Mp. Though never common, it occurs in a variety of riparian habitats from small mountain streams to significant rivers such as the Río Maycoba. Males at times rise to treetop height but are most often seen flying low, closely following the indentations of the shoreline. It is also known from Nayarit and Chihuahua.

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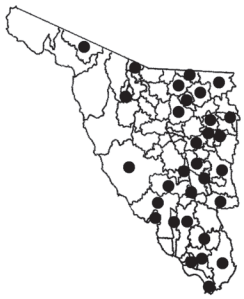

****Anax junius*** (Drury). The most widely distributed aeshnid in Mexico; it has been recorded in at least sixteen states. Not surprisingly, it has been observed in most habitats and most municipios we have visited. Though common at well vegetated, low elevation ponds and lakes, *A. junius* also occurs over flowing water and at mountain ponds.

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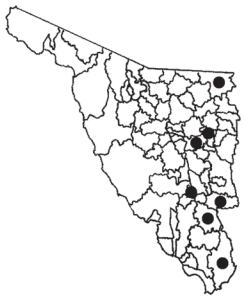

Anax walsinghami McLachlan. Guaymas Mp.: Nacapule Canyon, 4 km N of San Carlos; 28° 00.93′ N, 111° 03.04′ W; alt. 140 m. Yécora Mp.: "Vado Rana," 8 km N of Yécora on Yécora-Mulatos Rd.; 28° 26.35′ N, 108° 55.51′ W; alt. 1542 m. Most records are from eastern Sonora at medium to upper elevation in the drainages of the Ríos Yaqui, Mayo, and Fuerte, with one low elevation sighting from Nacapule Canyon in Guaymas Mp. Rivers, such as the Ríos Bavispe and Maycoba, as well as smaller streams, are its usual habitat, although agricultural fields and ponds are also visited. In flight, its enormous size and clearly drooped abdomen permit easy identification. In a few mountain stream localities north of Yécora, several individuals were seen simultaneously; most often, they are observed singly.

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Gynacantha nervosa Rambur. Alamos Mp.: Arroyo Cuchujaqui, 12 km SE of Alamos; 26° 56.53′ N, 108° 53.02′ W; alt. 255 m. A single Sonoran record for *G. nervosa*. Normally crepuscular in habit, one was startled from a late morning perch in a densely tangled fig canyon tributary to the Arroyo Cuchujaqui (Alamos Mp.) at an elevation of 270 m in the Río Fuerte drainage. It has been recorded from Sinaloa on the western slope and from as far north as San Luis Potosí on the eastern slope; most Mexican records are from farther south.

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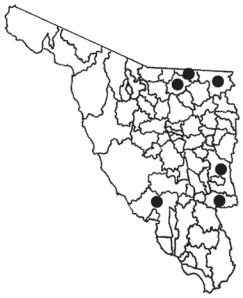

Remartinia luteipennis (Burmeister). Guaymas Mp.: Nacapule Canyon, 4 km N of San Carlos; 28° 00.93′ N, 111° 03.04′ W; alt. 140 m. Yecora Mp.: Yecora River stretch adjacent to town of Yecora; 28° 23.22′ N, 108° 55.26′ W; alt. 1553 m. Easily spotted when present, although its occurrence is very local. May be found along rivers or at the edges of ponds or cienegas, but tends to remain in habitat offering thick stands of vegetation such as cattails, willows, or seep-willow (*Baccharis*). There are records from the upper Colorado drainage (Naco Mp.) and several localities of the Yaqui drainage from Agua Prieta Mp. to Yécora Mp. It has also been seen at 140 m in Nacapule Canyon a mere 3 km from the coast in Guaymas Mp.

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Rhionaeschna dugesi (Calvert). Yecora Mp.: Yecora River stretch adjacent to town of Yecora; 28° 23.22′ N, 108° 55.26′ W; alt. 1553 m; sight record only. Sonora's only record for *R. dugesi* dates from early June 2003 and is based on a female observed at length and from close up while it was at evening roost in a stand of seep-willow (*Baccharis*) along the Río Yécora at the town of Yécora (Yécora Mp.). This species shows a marked preference for sheltered, riparian habi-

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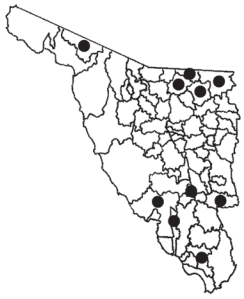
tat and tends to fly close to the surface of the water. Scattered records from at least as far south as the state of Oaxaca.



****Rhionaeschna multicolor*** (Hagen). Found at ponds and small lakes from the international border (General Calles, Agua Prieta, and Naco Mps.) south to Guaymas and San Javier Mp. and along open stretches of the Río Yécora (Yécora Mp.). *Rhionaeschna multicolor* is more a generalist than its congener, *R. dugesi*, and may turn up in a wider variety of habitats, and throughout a greater altitudinal range. There are records from much of Mexico.

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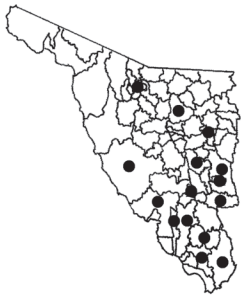

Rhionaeschna psilus (Calvert). Bácum Mp.: back-water of old R. Yaqui, 1 km W of Bácum; 27° 34.00′ N, 110° 05.21′ W; alt. 35 m. Yécora Mp.: Río Yécora at town of Yécora; 28° 23.22′ N, 108° 55.26′ W; alt. 1553 m. Seen occasionally at low to medium elevations in much of Sonora. Records come from the drainages of the Ríos Concepción (Tubutama Mp.), Sonora (Arizpe Mp.), Yaqui (Agua Prieta, Arivechi, Bácum, Huásabas, San Javier, San Pedro de la Cueva, and Yécora Mps.), Mayo (Alamos Mp.), and Fuerte (Alamos Mp.). Quite unobtrusive by nature, they will normally seek out secluded, wooded pools or sloughs in or adjacent to flowing streams. However, along the larger, more open Río Yécora, a female was found taking shelter from gusty afternoon winds by perching low in a *Baccharis* thicket; males were observed at this same location basking in early morning sun. In the Mesa Grande area (also Yécora Mp.), a pair was observed in copula on a manzanita branch along an arid ridge. Multiple individuals have been seen in close proximity to each other at pools along braided streams flowing through Montezuma bald-cypress forests (Alamos Mp.). Exuviae found (fide Dennis Paulson) in Nacapule Canyon (Guaymas Mp.) confirm breeding at close to sea level.

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Gomphidae

Aphylla protracta (Hagen). Huásabas Mp.: Puente Huásabas, Hwy. 21 crossing of Río Bavispe and nearby points downstream; 29° 55.40′ N, 109° 17.63′ W; alt. 549 m. Huatabampo Mp.: lakes 1 km N of Juan de la Barrera (Hwy. 180); 26° 24.21′ N, 109° 07.45′ W; alt. 25 m. Poorly known in Sonora but probably not uncommon. Known sites disclose little in the way of altitudinal preference. Several have been found perching on branch tips and cattails at agricultural ponds and along canals only a few m above sea level (Bácum, Guaymas, Huatabampo, and Navojoa Mps.), others in streamside brush from 500 m to 1400 m (Huásabas, Sahuaripa, San Javier, and Yécora Mps.). Needham et al. (2000) listed *A. protracta* from Sonora and Chihuahua, as well as other Mexican states.

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****Erpetogomphus bothrops*** Garrison. Alamos Mp.: Arroyo Cuchujaqui, 12 km SE of Alamos; 26° 56.53′ N, 108° 53.02′ W; alt. 255 m. Navojoa Mp.: canal crossing at Hwy. 15, km #147, near Airport Rd., 8 km S of Navojoa; 26° 59.59′ N, 109° 25.77′ W; alt. 55 m. Yécora Mp.: Río Moro at Santa Rosa Rd. bridge, N of Hwy. 16; 28° 26.72′ N, 109° 06.56′ W; alt. 1394 m. There is significant variation among populations in lowland Sonora. Specimens from below 350 m in Cajeme, Navojoa, and Alamos Mp. most resemble those from Nayarit and other Pacific Coast localities. This phenotype exhibits an unstriped lateral thoracic area and strongly bidentate epiproct tips. However, a second phenotype occurs at considerably higher elevational preferences (from 500 m to at least 1394 m on the Río Moro, Yécora Mp.); it has a heavily striped thorax and significant differences in the secondary genitalia. Furthermore, the epiproct tips are either squared off, clearly rounded or spatulate, unlike the bidentate tips of the lowland form. In all these phenotypes, breeding males usually show turquoise dorsally blending into lateral areas of apple green. The cerci are strongly decurved and possess a black terminal denticle. Our northernmost record is from within 150 km of the Arizona border, on the Río Bavispe (Huásabas Mp., Río Yaqui drainage), where at least a dozen were present in July and August 2005. On the Río Sahuaripa, (Sahuaripa Mp., Río Yaqui drainage), individuals perched with the more numerous *E. elaps* on rocks only inches above flowing water. Elsewhere in Mexico, *E. bothrops* is known from Sinaloa in the west and as far north as Tamaulipas in the east.

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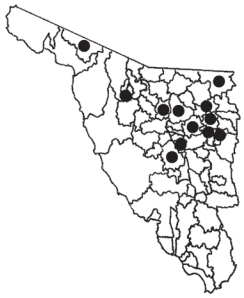
****Erpetogomphus compositus*** Hagen. Huásabas Mp.: Puente Huásabas, Hwy. 21 crossing of Río Bavispe and nearby points

downstream; 29° 55.40′ N, 109° 17.63′ W; alt. 549 m. Rather easily found along the gravel bars of northern Sonora's larger perennial rivers. It may be encountered from General Calles (Sonoyta) Mp. in the west to Agua Prieta Mp. in the east, and south to Ures and Bacadéhuachi Mps. Most sightings are from the drainages of the Ríos Concepción, Sonora, and Yaqui. Although *E. compositus* ranges southward into Baja California Sur, the only prior records for mainland Mexico are from the northern half of Sonora.



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Erpetogomphus crotalinus (Hagen) in Selys. This species does not appear in Paulson's and González-Soriano's list. However, there is an old record originating with Boris Kondratieff (passed on to us by Sid Dunkle) from a "small river W of Yécora on Rt. 16, 23 Aug 1986, . . . 1 male." We have spent considerable time in this area without yet encountering *E. crotalinus*, although it was expected given that it occurs in good numbers in nearby western Chihuahua.

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Erpetogomphus elaps Selys. Alamos Mp.: a "sabinal" on R. Cuchujaqui some 30 km E of Alamos; 27° 02.86′ N, 108° 43.95′ W; alt. 393 m. Sahuaripa Mp.: extended spillway of Cajon de Onapa Reservoir; 28° 42.49′ N, 109° 07.86′ W; alt. 604 m. Found in Sahuaripa and San Javier Mps. and at many different localities in Yécora Mp., all in the Río Yaqui drainage, and in Alamos Mp. in the Río Fuerte drainage. At many of these sites, it occurs in high numbers. This cluster of records is new for Sonora and extends the species' known range northward by some 800 km. The few females observed were on high branch tips. The far more numerous males patrolled gravel bars in the open areas of small streams or perched on rocks or overhanging branch tips. Often, *E. elaps* occurred with smaller numbers of *E. bothrops* and *E. lampropeltis natrix*. Among males, the dorsal areas of the abdomen show distinct, even gaudy, areas of turquoise contrasting with the overall apple-green color. Later in the flight season, these areas fade and the green becomes a dull, matte olive. The male's cerci differ from those of *E. bothrops* in being almost straight and in carrying no denticle on their rounded apices.

J	F	M	A	M	J	J	A	S	O	N	D
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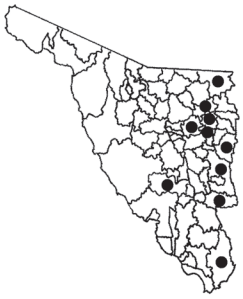
****Erpetogomphus lampropeltis natrix*** Kennedy. Huásabas Mp.: Puente Huásabas; Hwy. 21 crossing of Río Bavispe and nearby points downstream; 29° 55.40′ N, 109° 17.63′ W; alt. 549 m. Most Sonora records are clustered on various secondary rivers of the Río Yaqui drainage (Cumpas, Villa Hidalgo, Huásabas, Nácori Chico, Sahuaripa, and Yécora Mps.), although there are additional records from the Ríos Mátape (La Colorada Mp.) and Taymuco (Alamos Mp.). In some localities, such as the Cajon de Onapa spillway (Sahuaripa Mp.), *E. lampropeltis natrix* occurred in association with large concentrations of other species of its genus (e.g. *E. bothrops*, *E. compositus*, *E. elaps*). Less than fully mature individuals of both sexes have been found displaying a reddish ochre coloration on the dorsolateral areas of the abdomen. Known elevations for this species range from 350 m to 1400 m.



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***Erpetogomphus* sp. nov**. This new taxon shows a combination of apple-green and turquoise blue which obviously allies it with both *E. bothrops* and *E. elaps*. It differs in the isolation of the turquoise marks in the postfrontal and antehumeral areas, in the heavier presence of black in the abdomen including the club and by differences in the abdominal appendages. The species is known from two small, rocky streams in pine-oak woodland and from a tiny stream through a stand of Mexican cypress (*Cupressus lusitanica*), all in Yécora Mp.

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Phyllocycla elongata Belle. Navojoa Mp.: canal at km 147, Hwy. 15, 8 k S of Navojoa; 26° 59.59′ N, 109° 25.77′ W; alt. 55 m. Navojoa Mp.: Río Mayo dam at Tesia downstream from Presa Mocuzari; 27° 10.42′ N, 109° 21.51′ W. The two locations are about twenty km apart. The first record, 1 October

2005, involved several individuals, males and females alike, roosting in the late afternoon well above a large earthen-sided canal. *Aphylla protracta* was also present. The second record involved a lone male encountered on the Río Mayo below the Tesia diversion dam 12 km northeast of Navojoa. *Phyllocycla* and *Aphylla* are reliably distinguished by the posterolateral margins of abdominal seg. 10, gently rounded in the former, acutely produced in the latter. In *P. elongata*, the ventrolateral flange on seg. 9 is strongly angled downward in the basal area and is diagnostic of the species.

J	F	M	A	M	J	J	A	S	O	N	D
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Phyllogomphoides nayaritensis Belle. Villa Hidalgo Mp.: Río Bavispe, 17 km N of Villa Hidalgo; 30° 15.91′ N, 109° 21.60′ W; alt. 700 m. Yécora Mp.: Arroyo Tepoca at Hwy. 16, km #215; Tepoca; 28° 25.82′ N, 109° 15.45′ W; alt. 560 m. Identification of our specimens as *P. nayaritensis* is provisional, pending comparison with the holotype in Germany. The decumbent basal spine on the cercus identifies them as belonging to the "*P. pacificus* group." However, the morphology of the secondary genitalia, consistent in the Sonoran males, departs to some degree from the characteristics of the same structures in the holotype of *P. nayaritensis* shown by Belle (1987). *Phyllogomphoides nayaritensis* is known from a single specimen taken decades ago in Nayarit, as its name would suggest. If our specimens are this species, it occurs widely in much of eastern Sonora. Behrstock et al. (2007) reported it in neighboring Chihuahua. It emerges with the onset of mid-summer rains and has been observed at several localities in Sahuaripa and Yécora Mp. in the Río Yaqui drainage and from the Arroyo Mentidero and Río Cuchujaqui (both Alamos Mp.) in the Río Fuerte drainage. In July and August 2005 dozens of individuals were present along the Río Bavispe in Granados, Huásabas and Villa Hidalgo Mp. (Río Yaqui drainage), within 120 km of the international border. Its known elevational range in Sonora is from 350 m to 1400 m. Both males and females perch near riffles on rocks or branches just above water level along midsize, rocky rivers often with strong flow.

J	F	M	A	M	J	J	A	S	O	N	D
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Progomphus belyshevi Belle. Sahuaripa Mp.: Los Aguajitos crossing, 26 km N of Yécora on Yécora-Mulatos Rd.; 28° 35.11′ N, 108° 55.03′ W; alt. 1487 m. Yécora Mp.: Arroyo Tepoca at Hwy. 16, km #215; Tepoca; 28° 25.82′ N, 109° 15.45′ W; alt. 560 m. The only prior records for this poorly known taxon were from the Mexican state of Morelos. Sonora's first records were from two mid-size rivers in the eastern part of the Yécora Mp. In June of 2005, *P. belyshevi* was observed in several additional localities north to Sahuaripa Mp. Fully mature adult males were found coincident with the initial stages of the summer rains but disappeared as the rains increased to full intensity. At several Sonoran sites, *P. borealis* often flies with *P. belyshevi*, and no apparent gradations between the two have been observed. The Sonoran flight period of *P. borealis* extends from mid-March through mid-November, while that of *P. belyshevi* is apparently reduced to June and July.

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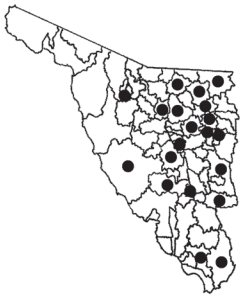

****Progomphus borealis*** McLachlan. Sahuaripa Mp.: Los Aguajitos crossing, 26 km N of Yécora on Yécora-Mulatos Rd.; 28° 35.11′ N, 108° 55.03′ W; alt. 1487 m. Yécora Mp.: Arroyo Tepoca at Hwy. 16, km #215; Tepoca; 28° 25.82′ N, 109° 15.45′ W; alt. 560 m. Commonly encountered along concrete-lined irrigation ditches and along sunlit gravel bars of perennial streams and larger rivers in the drainages of the Ríos Concepción, Sonora, Mátape, and Yaqui. Although there are two records from extreme southern Sonora (Navojoa and Alamos Mps.), most *P. borealis* records are from the northern two thirds of Sonora, including Yécora Mp. where it flies with *P. belyshevi* (see entry above).

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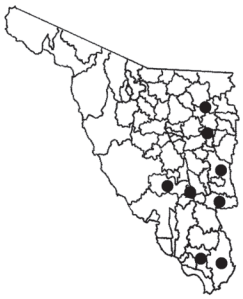

Progomphus clendoni Calvert. Nacozari Mp.: Río Nacozari at km #66, Hwy. 12; 30° 18.23′ N, 109° 41.32′ W; alt. 1018 m. From 350 m in the Río Mátape drainage (La Colorada Mp.) to over 1400 m in the Río Yaqui drainage (Yécora Mp.). *P. clendoni* has also been found within 120 km of the international border along the Río Nacozari (Nacozari Mp., Río Yaqui drainage) in the north to the Arroyo Cuchujaqui (Alamos Mp., Río Fuerte drainage) in the south. In most of these localities, it inhabits open stretches of perennial streams where it perches on isolated weed tips, on rocks in riffles or directly on gravel bars. It was previously known only from as far north as Nayarit and Tamaulipas.

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Cordulegastridae

****Cordulegaster diadema*** Selys. Yecora Mp.: Hwy. 16, km #261, "la Barranca". Relatively common in Arizona and known from Durango and from a few Mexican states farther south; appears to be elusive in Sonora, even in seemingly proper habitat. The only records are from medium to high elevation streams and seeps in Yécora Mp. with one older occurrence noted from the Ajo Mountains in the north (Bacoachi Mp.).

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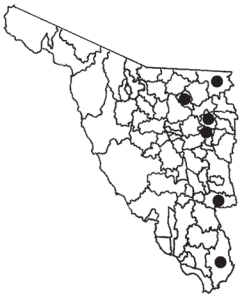
Macromiidae



Macromia magnifica McLachlan. Villa Hidalgo Mp.: Río Bavispe 17 km N of Villa Hidalgo; 30° 15.91′ N, 109° 21.60′ W; alt. 700 m. Probably present in small numbers at medium elevations the length of eastern Sonora. *M. magnifica* has been found in the Río Yaqui drainage (several municipios), the Río Fuerte drainage (Alamos Mp.) and the Río Sonora drainage (Bacoachi Mp.). Usually found patrolling the edges of mid-size rivers, the open areas of flood plains or even adjacent roads. During the midday hours and with the approach of evening, it retreats to roosts in shrubby areas. Also known from nearby Chihuahua.

J	F	M	A	M	J	J	A	S	O	N	D
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Libellulidae

Brachymesia furcata (Hagen). Sahuaripa Mp.: spillway of Presa Cajon de Onapa; 28° 42.49′ N, 109° 07.86′ W; alt. 604 m. Uncommon in Sonora, known so far from only a few sites in Sahuaripa, Guaymas, Yécora, Cajeme (Obregon), Alamos, and Huatabampo Mps., mostly in ponds or sloughs near rivers. Normally, males of *B. furcata* are found perching on isolated weed tips at or near the perimeter of such areas. In windy conditions, both sexes perch on the downwind side of trees and tall shrubs well removed from water. Additional fieldwork will likely show this species to be more common in Sonora, especially in the northwest across the border from Yuma, Arizona, where it is found in significant numbers. The closest previously documented Mexican populations are in Sinaloa and Tamaulipas.

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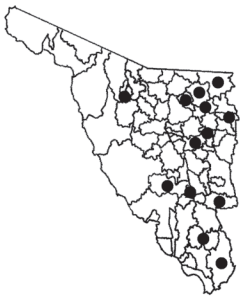

****Brechmorhoga mendax*** (Hagen). Nacozari Mp.: Río Nacozari along Hwy. 12 at km #66, 30° 18.23′ N, 109° 41.32′ W; alt. 1018 m. Although there are records of *B. mendax* from most of the major drainages, its occurrence is spotty in Sonora where it is, in part, replaced by *B. pertinax* and *B. praecox*. Where the three appear together in Yécora Mp., *B. mendax* usually occupies longer, wider, more open stretches of somewhat larger watercourses.

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****Brechmorhoga pertinax*** (Hagen). Huachineras Mp.: small, unnamed rocky drainage along the Huachineras-Mesa Tres Ríos Rd.; 30° 06.53′ N, 108° 53.88′ W; alt. 2218 m. Nácori Chico Mp.: Río El Macho, 2 km SW of Mesa Tres Ríos; 29° 47.71′ N, 108° 43.42′ W; alt. 1600 m. Yécora Mp.: Arroyo Tepoca at Hwy. 16, km #215; Tepoca; 28° 25.82′ N, 109° 15.45′ W; alt. 560 m. The range of this species is puzzling; there are records for ten different localities in Sonora, most from Yécora Mp., the exceptions being from the Sierra Huachineras (Huachineras and Nácori Chico Mps.) and from the Río Taymuco (Alamos Mp.). Since there are records of *B. pertinax* from the Grand Canyon area of northwestern Arizona, from the Chiricahua Mountains of southeastern Arizona, and from Chihuahua, we expect that additional fieldwork will show this species to occur more widely along the Sierra Madre's western slope. When at rest, *B. pertinax* perches dangling vertically from branch tips as do other *Brechmorhoga*. It differs from its congeners, however, through the concentration of pruinescence in the outer half of the wings. This condition lends a perceptible flashing quality to its flight.

J	F	M	A	M	J	J	A	S	O	N	D
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Brechmorhoga praecox (Hagen). Yécora Mp.: Arroyo Tepoca at Hwy. 16, km #215; Tepoca; 28° 25.82′ N, 109° 15.45′

W; alt. 560 m. Recorded from San Javier, Sahuaripa, Soyopa, Yécora, and Alamos Mp., all in the southeastern quarter of Sonora. During daylight hours, *B. praecox* tends to frequent narrow, partially overgrown pools in, or immediately adjacent to small or mid-size streams. In the late afternoon and early evening, individuals often participate in mixed species feeding swarms over bottomland pastures. Needham et al. (2000) list *B. praecox* from Sonora and Tamaulipas south through Mexico.

J	F	M	A	M	J	J	A	S	O	N	D
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Brechmorhoga tepeaca Calvert. Several individuals of this species have been encountered in September of two successive years (2004, 2005) on private property freely mingling with individuals of *Erpetogomphus* sp. nov. and *Macrothemis ultima* along the pools of a heavily canopied, stepped mountain stream in pine-oak woodland in Yécora Mp. It resembles *B. pertinax* which has not, so far, been found in this location and *B. praecox* which has. Prior states of record for this species include Tamaulipas some 1500 km to the southeast.

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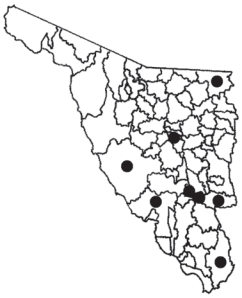
Dythemis maya Calvert. Guaymas Mp.: Nacapule Canyon, 4 km N of San Carlos; 28° 00.93′ N, 111° 03.04′ W; alt. 140 m. Onavas Mp: "Palm Canyon" on Hwy. 16, km #197; 28° 28.83′ N, 109° 21.40′ W; alt. 964 m. Widespread in the Río Yaqui, Río Sonora, and Río Fuerte drainages but uncommon and infrequently seen. December records from Yécora Mp. and even January records from Aconchi Mp. in the Río Sonora drainage, farther north and west, suggest a year-round flight period. In all these localities, it assumes a characteristic "flaps down" posture on exposed perches in small, usually steep, tributary canyons near larger, more open watercourses. The Alamos Mp. records involved several individuals at pools of a darkly shaded, braided stream through a Mexican bald-cypress (*Taxodium distichum*) forest in the Río Fuerte drainage.



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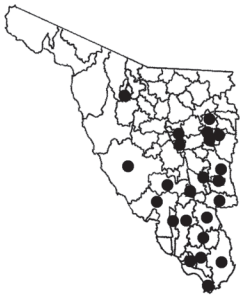
****Dythemis nigrescens*** Calvert. The most common and widespread member of its genus in Sonora. Occurs, at least sporadically, in almost every Sonoran drainage and especially in the Coastal Thornscrub, Foothills Thornscrub, and Tropical Deciduous Forest. It is found from sea level (Navojoa and Huatabampo Mps.) to over 1300 m (Yécora Mp.), as far west as Oquitoa Mp. and as far north as southern Arizona. It is equally common at ponds and rivers.



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Dythemis sterilis Hagen. Alamos Mp.: Arroyo Cuchujaqui, 12 km SE of Alamos; 26° 56.53′ N, 108° 53.02′ W; alt. 255 m. Navojoa Mp.: canal at Hwy. 15, km #147, 8 km S of Navojoa; 26° 59.59′ N, 109° 25.77′ W; alt. 53 m. First record for this normally more southern species was a male observed in late October 2004 at an elevation of 275 m in a narrow, densely tangled, fig-canyon tributary to the Arroyo Cuchujaqui (Alamos Mp.) in the Río Fuerte drainage. It occupied a sunlit perch surrounded by heavy shade not far from the river. Since then, additional individuals have turned up, some at higher elevations farther east in the same drainage, and one at lower elevation (55 m) south of Navojoa. There are prior records from Nayarit and Sinaloa.

J	F	M	A	M	J	J	A	S	O	N	D
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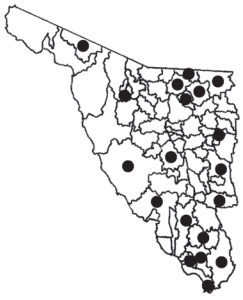
Erythemis collocata (Hagen). Guaymas Mp.: Tular Lagoon, 4 km W of Guaymas; 27° 56.03′ N, 110° 56.61′ W; alt. 3 m. Oquitoa Mp.: crossing of Río Altar, 2 km E of Oquitoa; 30° 45.38′ N, 111° 42.71′ W; alt. 484 m. Found equally on open ponds or rivers, from sea level to nearly 1600 m. Has been encountered in the drainages of the Río Yaqui (Agua Prieta, Sahuaripa, and Yécora Mps.), the Río Sonora (Bacoachi, Cananea, and Ures Mps.), the Río Colorado (Naco Mp.) and the Río Fuerte (Alamos Mp.) and at many locations in the coastal lowlands.



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Erythemis plebeja (Burmeister). Guaymas Mp.: "El Esterito", a long, wide canyon emptying to the old San Carlos harbor;

27° 57.58′ N, 111° 03.81′ W; alt. 3 m. Sahuaripa Mp.: spillway of Presa Cajon de Onapa; 28° 42.49′ N, 109° 07.86′ W; alt. 604 m. Several Sonoran records for this species have come from spillways at dams on major rivers: at 650 m at the Presa Cajon de Onapa (Sahuaripa Mp.), at the diversion dam at Tesia on the lower Río Mayo (Navojoa Mp.) and at the Presa Mocuzari on the Río Mayo (Alamos Mp). Subsequently, in early October 2005, two additional individuals were recorded at pools along the Río Guirocoba (Alamos Mp., Río Fuerte drainage) and two more along the "Canal Bajo" in the Cajeme (Obregon) Mp. In September 2007, it was recorded from "El Esterito" at an elevation of 3 m just outside San Carlos (Guaymas Mp.). On the Pacific slope, it was previously known from as far north as Nayarit and Sinaloa, although there are records for most of the rest of mainland Mexico and, recently, even from Pima County, Arizona.

J	F	M	A	M	J	J	A	S	O	N	D
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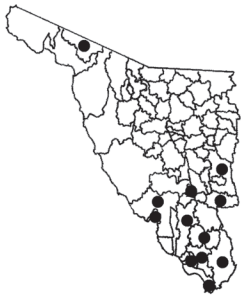
****Erythemis vesiculosa*** (Fabricius). Guaymas Mp.: Río San Marcial at Punta de Agua; 28° 25.76′ N, 110° 24.95′ W; alt. 208 m. Sahuaripa Mp.: spillway of Presa Cajon de Onapa; 28° 42.49′ N, 109° 07.86′ W; alt. 604 m. Never present in large numbers, *E. vesiculosa* occurs somewhat predictably from sea level to 1000 m. Observed on multiple occasions in Guaymas and Huatabampo Mps. near coastal agricultural ponds and irrigation ditches as well as at ranch ponds and small rivers at medium elevations in Sahuaripa, Yécora, and Alamos Mps. In 2006, the frequency of sightings for *E. vesiculosa* spiked dramatically upward with multiple individuals present on repeated occasions in areas where only occasional lone individuals had been observed previously.



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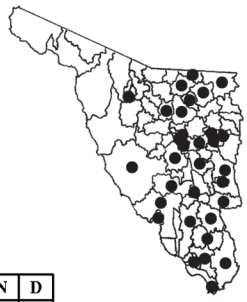
****Erythrodiplax basifusca*** (Calvert). Along the western slope of the Sierra Madre from Arizona south through Sonora and into Sinaloa, *E. basifusca* occurs regularly at ponds, streams, and rivers. It perches near the water's edge, often deep within herbaceous growth.



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Erythrodiplax berenice (Drury). Guaymas Mp.: San Carlos causeway marsh, both sides of road; 27° 57.92′ N, 111° 01.07′ W; alt. 3 m. The only Sonoran record for *E. berenice* is of a female found perching on low brush near the margin of a small, polluted pond next to the Guaymas–San Carlos causeway (Guaymas Mp.) The pond was about 200 m from the Gulf of California shoreline at an elevation of approximately 3 m. Females are distinguished by their huge subgenital plate. Given prior records from the two Baja California states and from Sinaloa, the mangrove stands and the brackish areas along the immediate coast probably harbor at least small numbers of this species.

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****Erythrodiplax funerea*** (Hagen). Huatabampo Mp.: lakes 1 km N of Juan de la Barrera (Hwy. 180); 26° 24.21′ N, 109° 07.45′ W; alt. 25 m. Yécora Mp.: Arroyo Tepoca at Hwy. 16, km #215; Tepoca; 28° 25.82′ N, 109° 15.45′ W; alt. 560 m. In the southern third of Sonora, *E. funerea* occurs from sea level to 600 m, in a variety of open habitats. These include streams and irrigation ditches with pastures nearby (Yécora Mp.), larger rivers (Alamos, Cajeme, and Navojoa Mps.) and flooded coastal lowlands (Guaymas and Huatabampo Mps.). Drainages include the Ríos Yaqui, Mayo and Fuerte.

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****Libellula comanche*** Calvert. Agua Prieta Mp.: Rancho Los Ojos: El Diablo, Hwy. 2, 45 km E of Agua Prieta. Though previously listed for Sonora, *L. comanche* is only rarely encountered. Our sole record is from a pool in a small, woodland stream close to the international border in the Río Yaqui drainage (Agua Prieta Mp.). Also recorded from Chihuahua.

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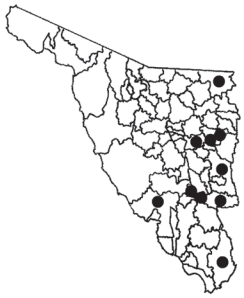
****Libellula croceipennis*** Selys. Alamos Mp.: a "sabinal" on the Río Cuchujaqui, 30 km E of Alamos; 27° 02.86′ N, 108° 43.95′ W; alt. 393 m. Granados Mp.: several spots along

track following west bank of Río Bavispe, Granados; 29° 51.79′ N, 109° 18.02′ W; alt. 541 m. Guaymas Mp.: Miramar estuary and Tular Lagoon, NW of Guaymas; 27° 56.03′ N, 110° 56.61′ W; alt. 3 m. Occurs at medium elevations in much of Sonora's Río Yaqui and Río Fuerte drainages. It is found in sluggish, smaller streams with a closed canopy or the shaded backwaters of larger rivers such as the Arroyo Cuchujaqui (Alamos Mp.). Females are often first spotted "splash ovipositing" at the water's edge. The species has also been observed in Nacapule Canyon, a steep palm canyon very near the coast just north of San Carlos (Guaymas Mp.). One male was found basking in morning sunlight in the Tular Lagoon tidal marsh at an elevation of 2 m (Guaymas Mp.), a distinctly atypical habitat.



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Libellula luctuosa Burmeister. Oquitoa Mp.: crossing of Río Altar, 2 km E Oquitoa. 30° 45.38′ N, 111° 42.71′ W; alt. 484 m. Despite abundance and coast-to-coast distribution in the southern US, *L. luctuosa* is virtually absent from Mexico. It has been recorded previously only from the state of Chihuahua, and there, only in the extreme northwest. Not surprisingly, it also occurs in adjacent Sonora. Has been seen over large, open stock ponds near the international border in the drainages of the Río Colorado (Naco and Cananea Mps.) and Río Yaqui (Agua Prieta Mp.) and along the Río Altar (Oquitoa Mp.) in the Río Concepción drainage.

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Libellula nodisticta Hagen. Naco Mp.: Villa Verde, 4 km W of Ejido Cuauhtemoc. The known range of this species remains strangely discontinuous. It is seen with some frequency at medium elevations in south-central Arizona, whereas in Mexico it is known from Durango, Jalisco, and intermittently from states farther south. However, there were no records from Sonora until 2002 when one was found perched on a small snag along a 20 m open stretch of otherwise impenetrable marsh vegetation at a cienega in Naco Mp. A second sighting occurred the next year in exactly the same spot. These remain Sonora's only records.

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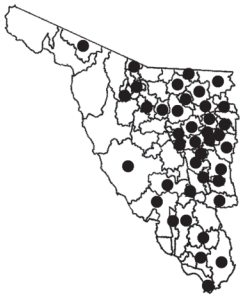
****Libellula saturata*** Uhler. While abundant in Arizona, this species diminishes in numbers in northern Sonora to the level of being merely common, especially in the Río Concepción, Río Sonora, and Río Yaqui drainages. In southern Sonora, its numbers decrease further, although it is still found in the Río Fuerte drainage. It occurs from the flooded fields of the coastal lowlands (Guaymas Mp.) to 1570 m at ponds in Huachineras Mp.



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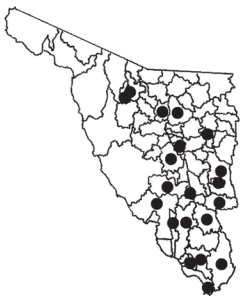
Macrothemis inacuta Calvert. Nacozari Mp.: Río Nacozari, Hwy. 12 at km #66; 30° 18.23′ N, 109° 41.32′ W; alt. 1018 m. Easily found in Sonora, it favors open areas at low to medium elevations, along rivers, streams, canals and even roads. At a given location, they hang up, dangling unseen in the lower branches of trees during the heat of the day only to reappear in significant numbers during the early evening in large, mixed feeding swarms. They occur as far north as Maricopa County, Arizona.



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Macrothemis pseudimitans Calvert. Alamos Mp.: Arroyo Cuchujaqui, 12 km SE of Alamos; 26° 56.53′ N, 108° 53.02′ W; alt. 255 m. Locally quite common in Sonora, especially in Alamos Mp. (Ríos Fuerte and Mayo drainages) and at lower elevations in Yécora Mp. (Río Yaqui drainage). We also report one recent (mid-September 2007) record from SE Arizona's San Bernardino NWR, .5 km N of the international border. During the day it usually patrols over streams in short beats punctuated by moments of rest on rocks just above the water's surface. Some individuals, especially females, forage over stands of brush away from streambeds. The species is frequently seen in evening feeding swarms over nearby pastures. Prior records for the mainland's western slope are limited to the state of Nayarit.

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Macrothemis ultima González. Initially discovered in Jalisco (see E. González-Soriano 1992) and with larvae subsequently reported from Michoacan (R. Novelo-Gutiérrez 2006), this poorly known species is also encountered on private property in pine-oak woodland near the border of Yécora Mp. with Chihuahua. They behave like miniature *Brechmorhoga* patrolling in short beats low over the pools of small, canopied, mountain streams. When not flying, they will often perch flat on nodding leaves (behavior which is distinctly not *Brechmorhoga*-like). This species almost certainly occurs more widely on Mexico's central plateau and along the upper reaches of the western slope.

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****Miathyria marcella*** (Selys). Bácum Mp.: back-water of old R. Yaqui, 1 km W of Bácum; 27° 34.00′ N, 110° 05.21′ W; alt. 35 m. Guaymas Mp.: Río San Marcial at entrance to Punta de Agua; 28° 25.76′ N, 110° 24.95′ W; alt. 209 m. Navojoa Mp.: large pond adjacent to Río Mayo, W of Hwy. 15 bridge; Navojoa; 27° 06.16′ N, 109° 26.93′ W; alt. 72 m. Primarily a coastal lowland species in southern Sonora, *Miathyria marcella* is most commonly seen in feeding swarms about 4–8 m in the air near ponds or sloughs choked with water-hyacinth (*Eichhornia*) as at the western entrance to Punta de Agua (Guaymas Mp.) or along the Río Mayo (Navojoa Mp.). Individuals occasionally appear singly over ponds or along streams where this plant is not in evidence as, for example, in the Arroyo Alamos (Alamos Mp.). Males engage in an interesting variation on hover guarding. They will at times descend into the thick growth of water-hyacinth; moments later, they will re-emerge abruptly into the air, then repeat the process. A previously invisible female will likely be found ovipositing among the rootlets at that spot.

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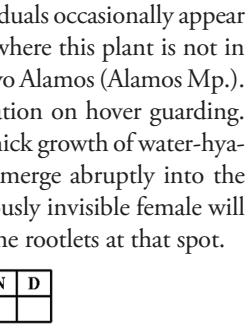
Micrathyria aequalis (Hagen). Guaymas Mp.: "El Esterito," a long, wide canyon emptying to the old San Carlos harbor; 27° 57.58′ N, 111° 03.81′ W; alt. 3 m. Huásabas Mp.: Puente Huásabas; Hwy. 21 crossing of Río Bavispe and nearby points downstream; 29° 55.40′ N, 109° 17.63′ W; alt. 549 m. Though quite common in Sonora's southern half, this diminutive, pruinose species occurs along the Río Bavispe (Huásabas Mp.) in the Río Yaqui drainage. It is regularly encountered at ponds and along streams and rivers from sea level to 600 m. Males are typically very active, sallying from perches protruding from the water near the overgrown banks of calm pools and small sloughs apart from the main river channels. *M. aequalis* was previously known northward only to Sinaloa on the western slope.



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Micrathyria didyma (Selys in Sagra). Bácum Mp.: backwater of old R. Yaqui, 1 km W of Bácum; 27° 34.00′ N, 110° 05.21′ W; alt. 35 m. Our five Sonoran records for *M. didyma* (including one pair in copula) are consistent with suggestions by Paulson (pers. comm.) and by Dunkle (2000) that this species seeks or requires shaded habitat. Four of the records are from secondary sloughs choked with water-hyacinth adjacent to major river beds (Ríos Mayo and Yaqui) in Sonora's Coastal Lowlands (Bácum and Navojoa Mps.). The fifth was from a shaded perch along the Arroyo Cuchujaqui (Alamos Mp.) These are apparently the northernmost records ever for this species, although it has been recorded in Mexico from Sinaloa and Tamaulipas.

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Micrathyria hagenii Kirby. Guaymas Mp.: wetlands 2 km NE of Casas Blancas; 27° 37.10′ N, 110° 18.47′ W; alt. 9 m. Uncommon in southern Sonora. It has been found in the coastal lowlands at one agricultural pond southwest of Vicam (Guaymas Mp.) and at another pond near Juan de la Barrera (Huatabampo Mp.) as well in the Río Fuerte drainage at ponds near the Arroyo Cuchujaqui (Alamos Mp.). Nayarit and Sinaloa were previously considered the northern limit of its range on the Pacific slope. There are several recent mid- to late September 2005 records from Pima County in southern Arizona.

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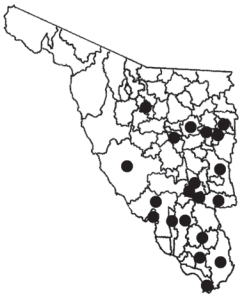
****Orthemis discolor*** (Burmeister). Huachineras Mp.: El Alamo tank, 1 km N of microwave tower on Huachineras-Mesa Tres Ríos Rd.; 30° 06.36′ N, 108° 55.56′ W; alt. 1569 m. Huatabampo Mp.: lakes 1 km N of Juan de la Barrera (Hwy.

180); 26° 24.21′ N, 109° 07.45′ W; alt. 25 m. Previous records for *O. discolor* on Mexico's Pacific slope extended no farther north than Nayarit. In early January 2001, a few individuals were found near a complex of hot springs draining to the Río Sonora (Aconchi Mp.). Subsequent observations farther northwest (Santa Ana Mp.) and northeast (at 1570 m in the Huachineras Mp.) suggest that *O. discolor* ranges quite widely in Sonora. It occurs at multiple sites in the Río Yaqui drainage (Huásabas, Onavas, San Javier, Sahuaripa, and Yécora Mp.). It is also quite common in some coastal locations (Guaymas Mp.) and throughout southern Sonora, particularly in the Río Fuerte drainage. Given that it flies year round, its prior absence is puzzling. Superficial similarity to its sibling species, *O. ferruginea*, may be part of the explanation when the two fly together. An additional factor may be habitat choice. In contrast to *O. ferruginea* which prefers open conditions with long sightlines, *O. discolor* is more tolerant of, and may disappear into canopied, even constricted, habitat with minimal flows.



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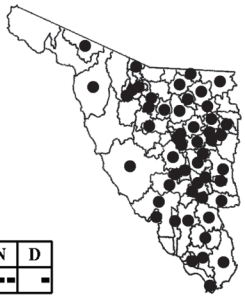
****Orthemis ferruginea*** (Fabricius). Occurs in almost every municipio we have visited from sea level to at least 1600 m. It is to be expected in almost every habitat with the exception of small, heavily canopied mountain streams and seeps.



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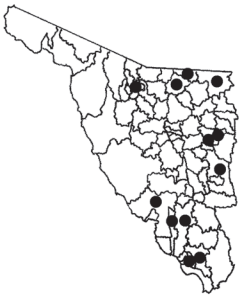
****Pachydiplax longipennis*** (Burmeister). Bacum Mp.: canal and nearby backwater of old Río Yaqui bed, 1 km W of Bacum; 27° 34.00′ N, 110° 05.21′ W; alt. 35 m. Navojoa Mp.: large pond adjacent to Río Mayo W of Hwy. 15 bridge; Navojoa; 27° 06.16′ N, 109°26.93′ W; alt. 72 m. Though easily found along the international border, *P. longipennis* is less commonly observed farther south. Our few records for this area extend from near sea level in Cajeme (Obregon), Etchojoa, and Guaymas Mps. to around 850 m in Bacadéhuachi Mp. Normally seen among cattails or brush bordering ponds or sloughs.



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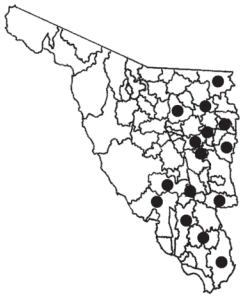
****Paltothemis lineatipes*** Karsch. Guaymas Mp.: Nacapule Canyon, just outside San Carlos Bay; 28° 00.93′ N, 111° 03.04′ W; alt. 140 m. Nacori Chico Mp.: Rancho El Macho on Nacori Chico–Mesa Tres Ríos Rd.; 29° 47.21′ N, 108° 47.47′ W; alt. 1980 m. Sahuaripa Mp.: Hwy. 12, detour road cut 16 km NW of Río Yaqui; 29° 16.70′ N, 109° 20.56′ W; alt. 488 m. Most commonly encountered along open, usually rocky, streams and rivers or even roadbeds, although it may occasionally turn up in other habitats. It is not limited by elevation, occurring from near sea level to roughly 1600 m.



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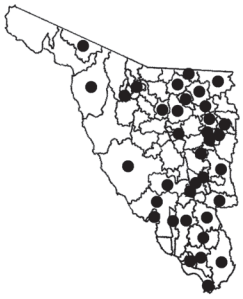
****Pantala flavescens*** (Fabricius). Intermittently common at lower and medium elevations in much of Sonora and is often found in the open appreciable distance from bodies of water. As a "rainpool glider" *P. flavescens* specializes in depositing its eggs in temporary pools and is one of the few odonates sometimes observed flying in the rain in Sonora.



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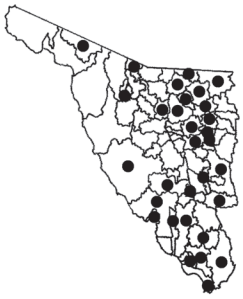
****Pantala hymenaea*** (Say). Less common than the preceding species, *P. hymenaea* also appears in much of Sonora. It is highly eruptive, absent for extensive periods, then suddenly present in large numbers, often in advance of impending storm systems. Most records are from the lowlands near the coast and from sea level to 1300 m. in the drainages of the Ríos Sonora, Yaqui, and Fuerte.



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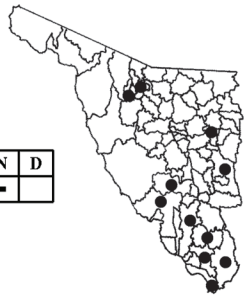
****Perithemis domitia*** (Drury). Guaymas Mp.: Miramar estuary and Tular Lagoon, NW of Guaymas; 27° 56.03′ N, 110° 56.61′ W; alt. 3 m. Sahuaripa Mp.: extended spillway of Cajon de Onapa Reservoir; 28° 42.49′ N, 109° 07.86′ W; alt. 604 m. Ranges in elevation from sea level to 950 m. *Perithemis domitia* is rather secretive in habit, occurring most often at tiny, shaded pools and clearings along small, densely overgrown streams, leaving the larger, more open pools to its

more dominant congener *P. intensa*. Though uncommon, it is found in most of Sonora's major drainages.



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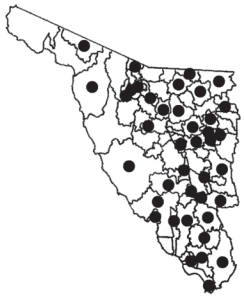
****Perithemis intensa*** Kirby. Found commonly at the margins of ponds, irrigation ditches, streams and larger rivers in all the principal drainages of Sonora. It tends to favor open areas and to relegate the frequently sympatric, but more timorous *P. domitia* to the isolation of small, overgrown pools.



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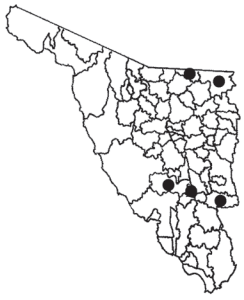
Perithemis tenera (Say). San Javier Mp.: Hwy. 16, "Long Lake" at km #147; 28° 33.33′ N, 109° 42.28′ W; alt. 571 m. Given its occurrence in southeastern Arizona, it is not surprising that *P. tenera* occurs as well in the border municipios of Naco and Agua Prieta. More surprising, however, are more southern records from the Río Mátape at San Jose de Pimas (La Colorada Mp.), a large pond in the San Javier Mp. and from the Yécora sewage ponds (Yécora Mp.). There are scattered records from Mexican states farther south and east.



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Plathemis lydia (Drury). Guaymas Mp.: wetlands 2 km NE of Casas Blancas; 27° 37.10′ N, 110° 18.47′ W; alt. 9 m. Normally a more northern species, *P. lydia* has nonetheless been seen in the Río Colorado drainage (Naco Mp.), the Río Yaqui drainage (Villa Hidalgo Mp.), and once at an agricultural pond near the coast southwest of Vicam (Guaymas Mp.) well to the south. This is another species present from coast to coast in the US but virtually absent in Mexico, despite an abundance of apparently suitable habitat in abundance. The only other Mexican state of record is Nuevo León.

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****Plathemis subornata*** Hagen. Fronteras Mp.: spring-fed inflow to Presa Cuquiarachic, 15 km W of Fronteras; 30° 52.39′ N, 109° 42.64′ W; alt. 1227 m. The only records for this species are from Naco Mp. in the Río Colorado drainage immediately adjacent to the international border and from Fronteras Mp. in the Río Yaqui drainage. In Arizona, and presumably in Sonora, either *P. lydia* or *P. subornata* will predominate to the virtual exclusion of the other, their relative success deriving from years of ample rainfall or years of drought, respectively.

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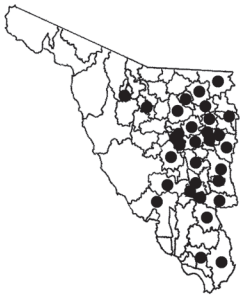
****Pseudoleon superbus*** (Hagen). Though not yet observed in the coastal lowlands, *P. superbus* is found quite easily from 300 m to 1600 m along the gravel bars and rocky riverbeds of all Sonoran drainages. This is another species commonly encountered along roads or trails at some distance from water.



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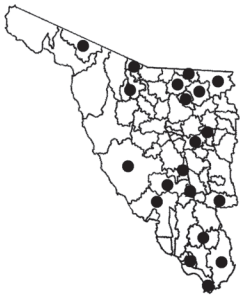
****Sympetrum corruptum*** (Hagen). The most likely "generalist" of Sonoran dragonflies, *S. corruptum* occurs in every major drainage and from sea level to at least 1900 m. It flies nearly year round and is found in most any habitat, including the margins of small ponds and large lakes, pastures, marshes, streams and rivers.



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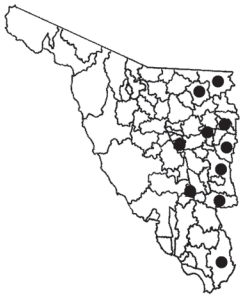
		▬	▬	▬	▬	▬	▬	▬	▬	▬	▬

Sympetrum illotum (Hagen). Alamos Mp.: Arroyo El Mentidero, 14 km S of Alamos; 26° 55.15′ N, 108° 55.09′ W; alt. 237 m. Nácori Chico Mp.: Rancho El Macho on Nácori Chico–Mesa Tres Ríos Rd.; 29° 47.21′ N, 108° 47.47′ W; alt. 1980 m. Occurs in small numbers at medium elevations (up to at least 1570 m in Huachineras Mp.) in the drainages of the Ríos Sonora, Yaqui, and Fuerte. Sonora's milder climate permits winter flight with November and December records from Huásabas and Yécora Mps.



and a January record from Baviácora Mp. Usually found on isolated perches 1 m or so above the water. Observed in most Mexican states south to Chiapas.

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Sympetrum signiferum Cannings & Garrison. Yecora Mp.: Hwy. 16, km #299, open meadow on both sides of road. Flies in late summer and fall. Though found commonly nearby in SE Arizona, *Sympetrum signiferum* has been recorded so far only twice in Sonora, in small, grassy or boggy meadows between stands of oak woodland above 1300 m in the Río Yaqui drainage (Yécora Mp.). Individuals used isolated weed tips as perches. Due to its rather late flight period and narrowed habitat requirements, *S. signiferum* seems rarer than it probably is.

J	F	M	A	M	J	J	A	S	O	N	D
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Tauriphila australis (Hagen). Guaymas Mp.: Río San Marcial at entrance to Punta de Agua; 28° 25.76′ N, 110° 24.95′ W; alt. 209 m. Navojoa Mp.: large pond adjacent to Río Mayo W of Hwy. 15 bridge; Navojoa; 27° 06.16′ N, 109° 26.93′ W; alt. 72 m. In late August 2006, individuals of *T. australis* were observed participating in feeding swarms flying at roughly 4–6 m over a slough choked with water-hyacinth adjacent to the bed of the Río Mayo near the northern entrance to the town of Navojoa (Navojoa Mp.). Also present were far greater numbers of *Miathyria marcella* and a very few *Tauriphila azteca*. Some two weeks later, again over thick patches of water-hyacinth, smaller associations of *T. australis* and *M. marcella* were found downstream from the Punta de Agua dam near the town of the same name (Guaymas Mp.). In this instance, the flight was at roughly 2–3 m. One male was seen "dangle perching" from streamside shrubs, as might a *Brechmorhoga*, for example. Prior Pacific slope records for *T. australis* extend northward only as far as Nayarit.

J	F	M	A	M	J	J	A	S	O	N	D
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Tauriphila azteca Calvert. Navojoa Mp.: large pond adjacent to Río Mayo W of Hwy. 15 bridge; Navojoa; 27° 06.16′ N, 109° 26.93′ W; alt. 72 m. A very few individuals of this species were observed at the northern entrance to the city of Navojoa (Navojoa Mp.) in late August 2006. They were part of mixed feeding swarms with *T. australis* and *Miathyria marcella* over a Río Mayo slough infested with water-hyacinth (*Eichhornia*) and remained in constant motion 4–6 m above the water and were never seen to perch. Prior Pacific slope records extend north only to Nayarit.

J	F	M	A	M	J	J	A	S	O	N	D
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Tramea calverti (Muttkowski). Guaymas Mp.: Miramar estuary and Tular Lagoon, NW of Guaymas; 27° 56.03′ N, 110° 56.61′ W; alt. 3 m. Despite its reputation as a dispersive species that periodically enters the southern and eastern US, there are only a few Sonoran records for *Tramea calverti*. Two occurred one day apart in late July 2004, in the aftermath of a major storm pushing in from the south; one was found perched near a large pond in the Sahuaripa Mp., the other in a brushy area below the Cuquiarachic dam west of Fronteras (Fronteras Mp.). Most other records are from varying lentic conditions in the coastal lowlands (e.g. a mangrove lagoon, a water-hyacinth pond and an open, impounded lake in Guaymas, Navojoa and Huatabampo Mps., respectively). Its previously known range includes much of Mexico.

J	F	M	A	M	J	J	A	S	O	N	D
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Tramea insularis Hagen. Alamos Mp.: spillway below Mocuzari Reservoir, NW of Alamos. During the fall of 2005, small numbers of *T. insularis* turned up in southern Arizona, perhaps as a result of winds associated with major hurricanes in the Gulf of Mexico. In late October of 2006 a lone male was found with others of the genus, including *T. calverti*, hawking over a pond-like area in the spillway below the Mocúzari Reservoir (Alamos Mp).

J	F	M	A	M	J	J	A	S	O	N	D
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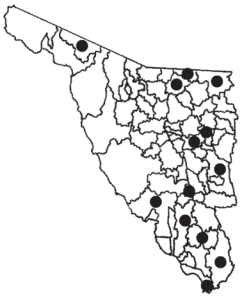
Tramea lacerata Hagen. Guaymas Mp.: Miramar estuary and Tular Lagoon, NW of Guaymas; 27° 56.03′ N, 110° 56.61′ W; alt. 3 m. Huasabas Mp.: Puente Huasabas; Hwy. 21 crossing of Río Bavispe and nearby points downstream; 29° 55.40′ N, 109° 17.63′ W; alt. 549 m. Less common in Sonora than its congener, *T. onusta*. Still, it is found widely, if intermittently, in the eastern half of Sonora. Most records are from Cana-

nea, Agua Prieta, and Naco Mps., although it has also been seen as far south as Juan de la Barrera in the coastal lowlands close to Sonora's southern extreme (Huatabampo Mp.). Agricultural ponds and open stretches along streams and rivers are its usual habitats. Most prior Mexican records are from well south on the Gulf slope.



J	F	M	A	M	J	J	A	S	O	N	D
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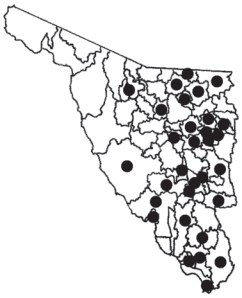
****Tramea onusta*** (Hagen). Guaymas Mp.: "El Esterito", a long, wide canyon emptying to the old San Carlos harbor; 27° 57.58′ N, 111° 03.81′ W; alt. 3 m. Villa Hidalgo Mp.: Río Bavispe 5 km NE of Villa Hidalgo; 30° 11.96′ N, 109° 18.53′ W; alt. 680 m. Aside from canopied mountain streams, most Sonoran habitats, including even roads and highways, yield individuals of *T. onusta*. Females especially are found away from water, either in flight or perched on branch tips. Sunny, open space with long, unbroken sight lines seems the most important habitat prerequisite for this species. It occurs in every major drainage, in the coastal lowlands, and is most abundant at agricultural ponds.



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Species Reasonably Expected to Occur in Sonora

The following list includes species with some likelihood of being recorded from Sonora in the future. Most of these are included because they occur in Arizona just north of the international border, an area that has benefited in recent years from significant fieldwork. Sonora also shares borders with Chihuahua along the Mexican plateau and Sinaloa in the subtropical lowlands, states from which strays of previously unreported species may wander.

Argia agrioides Calvert. One record from Arizona's San Bernardino National Wildlife Refuge (NWR) adjacent to the international border.

A. alberta Kennedy. Has occurred in SE Arizona at the San Bernardino NWR and is occasional elsewhere in Cochise County. The first Mexican record was recently taken in Chihuahua only a short distance from northeastern Sonora.

A. immunda (Hagen). Occurs at spring fed cienegas and streams adjacent to the international border in Arizona's Cochise and Santa Cruz Counties, as well as in Chihuahua.

Enallagma basidens Calvert. Found in significant numbers in Arizona at mature ponds close to the international border; also recorded from Chihuahua and several Mexican states to the east.

E. carunculatum Morse. Recorded from Baja California Norte and from near the international border at the San Bernardino NWR.

Anax amazili (Burmeister). One tentative sight record by two separate observers at Tepoca (Yécora Mp.).

Coryphaeschna adnexa (Hagen). Often associated with dense surface vegetation (e.g., water-hyacinth) and lentic conditions such as those which occur west of Bácum and at Navojoa where such southern species as *Telebasis griffinii*, *Miathyria marcella*, *Micrathyria hagenii*, and *M. didyma* are found.

Oplonaeschna armata (Hagen). Occurs reliably in summer along mountain streams in SE Arizona and in several Mexican states; this is arguably the most likely of all the expected species.

Rhionaeschna jalapensis (Williamson). Has been found at a pond close-by in western Chihuahua. High elevation ponds in adjacent Sonora should therefore be checked for this species.

Erpetogomphus heterodon Garrison. Resident in adjacent Chihuahua, it probably occurs in eastern Sonora as well.

Stylurus intricatus (Hagen) in Selys. Both *S. intricatus* and *S. plagiatus* occur in the Colorado River drainage near Yuma and may reasonably be expected farther south in Sonoran portions of that river.

S. plagiatus (Selys). See entry for *S. intricatus*.

Brachymesia herbida (Gundlach). One individual was photographed, but not netted, in October 2007 along the spillway below the Macuzari Reservoir (Alamos Mp.), and was almost certainly this species.

Dythemis fugax Hagen. Resident at several spring fed ponds in southeast Arizona.

Dythemis velox Hagen. Prior records from the Mexican states of Chihuahua, Durango, Nuevo Leon, and Tamaulipas, as well as records from Arizona's Gila and Graham Counties, suggest the likelihood of this species occurring in Sonora as well.

Libellula pulchella Drury. In September 2005, several individuals were present in quite arid conditions at a small ranch pond in Arizona's Cochise County near the international border. Two sight records, as well, from the San Carlos area ("el Esterito") in the Guaymas Mp.

Macrodiplax balteata (Hagen). Occurs in the Yuma area and is expected to occur in the NW corner of Sonora.

Macrothemis hemichlora (Burmeister). Considered a possibility due to prior records from Tamaulipas and Nayarit.

Tholymis citrina Hagen. A lone record from the Gila River in SE Arizona near the New Mexico border suggests that this species is at least remotely possible from Sonora.

Acknowledgments

We offer our sincere thanks to several people whose help is greatly appreciated. In particular, Dennis Paulson has encouraged this undertaking and has assisted us by sharing his own ideas and recent records. Rosser Garrison's suggestions regarding problematic identifications have been frequent and helpful in the extreme. Our gratitude and appreciation go especially to the Computing for Science and Education Institute, located in Bisbee, Arizona, for providing equipment and consulting services for scientific publications. Additional thanks go to Sid Dunkle, William Radke, Carl Olson, Amy Loughner, Ann Johnson, Joe and Valer Austin, Juan Caicedo, Tim Manolis, and Ryan Sawby.

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BAO Manuscript Acceptance

At present, there is a shortage of manuscripts for the Bulletin. We hereby solicit future papers for publication. In the past, most papers published in BAO were of considerable length. The DSA editorial staff has adopted a slight change in policy and will now accept short communications for publication. Scientific notes of one to a few pages in length will also be considered for inclusion. All manuscripts, regardless of length, are sent to at least two reviewers. Please see the Submission Guidelines near the end of this issue or <www.odonatacentral.com/dsa1/submission_guidelines.htm> for instructions.

A List of the Odonata of Chihuahua State, Mexico, Including New State Records and the First Mexican Record of *Argia alberta* Kennedy, 1918

Robert A, Behrstock[1], Doug Danforth[2], Sandy Upson[3]

Abstract

Twenty-one sites were visited in northwestern Chihuahua from 17 June to 30 September 2005. Based upon these visits, we present 35 records of Odonata (15 Zygoptera and 20 Anisoptera) that have not been reported or confirmed for Chihuahua. The total number of species known from the state is increased to 80. Just over one-half of the new records exhibit broad distributions, living from sea level to moderate altitudes. The remainder inhabit higher elevations. *Argia alberta* Kennedy, 1918, is reported for the first time from Mexico.

Resumen

Se visitaron 21 sitios del noroeste de Chihuahua entre el 17 junio y el 30 septiembre de 2005. Con base en estas visitas, presentamos 35 nuevos registros de Odonata (15 Zygoptera y 20 Anisoptera) que no estaban reportados o confirmados previamente para Chihuahua. Con ello, el total de especies para el estado incrementa hasta 80 especies. 52.5% de las especies encontradas son de amplia distribución que viven entre el nivel del mar y altitudes moderadas. 47.5% son especies que se encuentran en altitudes más elevadas. Se incluye aquí el primero registro de *Argia alberta* Kennedy, 1918, para México.

Introduction

Paulson (1982) observed: "Unfortunately, the Odonata fauna of the northern part of the Mexican Plateau is very poorly known, and a number of species of the mountains of southern Arizona have not been taken in Mexico, although they are doubtless widespread there." The remedy he suggested: "Further serious collecting should be done in certain areas (for example, the Northern Mexican Plateau…)." Later, González-Soriano and Novelo-Gutiérrez (1996) stated that practically no details existed concerning the distribution of Odonata in Mexico, although some works contained partial information on some species. Their 1996 paper presented state lists for 325 species of Mexican Odonata; however 16 states—fully half of the Mexican total—were poorly known and they considered these lists preliminary. Subsequent to Paulson's 1982 statements, knowledge of the highland odonate fauna has improved along both sides of the US–Mexico border, but the picture remains incomplete.

Recent investigations have documented Arizona records of more southerly species such as *Argia lacrimans* (Hagen, 1861) (Sierra Madre Dancer), *Palaemnema domina* Calvert, 1903 (Desert Shadowdamsel), *Rhionaeschna psilus* (Calvert, 1947) (Turquoise-tipped Darner), *Dythemis maya* Calvert, 1906 (Mayan Setwing), and *Argia carlcooki* Daigle, 1995 (Yaqui Dancer) (Cole 1997, Behrstock 1998, Hoekstra & Garrison 1999, Danforth 2000, and Behrstock et al. 2004). Other Mexican species whose US distributions are becoming better understood include: *Argia tarascana* Calvert, 1902 (Tarascan Dancer), *A. tezpi* Calvert, 1902 (Tezpi Dancer), *Enallagma semicirculare* Selys, 1876 (Claw-tipped Bluet), and *Sympetrum signiferum* Cannings & Garrison, 1991 (Spot-winged Meadowhawk). The number of Odonata known from Sonora has been greatly increased by Upson et al. (2007); this work has clarified the distributions of numerous lowland and highland taxa. This increased activity along the border is reflected in recent manuals; new US distributional records, as well as maps that facilitate faunal comparisons between the southern US and northern Mexico are presented by Abbott (2005). Additionally, Needham et al. (2000) and Westfall and May (2006) accord increased coverage to dragonflies and damselflies that occur in northern Mexico.

Located just across the US border is Chihuahua—the largest state in Mexico. Covering 245,609 km² (94,830 mi²), it is a bit smaller than Arizona, situated just to the northwest. Its northern–northeastern boundary, which extends from extreme southwest New Mexico to the Big Bend Region of west Texas, is 937 km (582 mi) long, and comprises 29% of the US–Mexican border. In Mexico, Chihuahua is surrounded (east to west) by the states of Coahuila, Durango,

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Sinaloa and Sonora. Elevations are moderate to high (c. 808–3,030 m). The westernmost portion of the state is comprised of the rugged Sierra Madre Occidental. To the east, the lower Sierra gives way to grasslands that have been heavily impacted by agriculture. East of these grasslands and at somewhat lower elevations are calcareous plains clothed in grasses, shrubs, and succulents that characterize the Chihuahuan Desert. Although some native desert vegetation remains, sizable tracts have been converted for ranching and farming. The Sierra Madre Occidental has been heavily modified by logging and human settlement; nonetheless, these mountains still retain large tracts of forest.

Chihuahua's climate is extreme, characterized by early frosts, cold and often snowy winters, hot summers, and frequent droughts. Erratic summer rains and occasional winter rains refresh its often widely separated aquatic habitats. These include seasonally marshy wetlands, springs, streams and rivers, natural and impounded lakes, and irrigation canals. Precipitation falling on the western flank of the Sierra Madre Occidental may run into rivers such as the Yaqui and Mayo that flow through Sonora to the Gulf of California. East of the Sierra, the Río Conchos, one of the main tributaries of the Río Grande, lies entirely within Chihuahua. Its watershed is basically the eastern slope of the Sierra Madre Occidental plus the Chihuahuan Desert. The Río Conchos flows — via seven impoundments, for approximately 800 km, eventually meeting the Río Grande just west of Big Bend National Park, at Ojinaga, Mexico/Presidio, Texas. Much of the plateau's flowing water does not reach the Río Conchos; it is captured for irrigation or disappears into basins — often mineralized and referred to as salinas, in the state's interior.

The state has scarcely been investigated by odonatologists who are more likely to spend their limited field time further south. As has been the case with lepidopterists, the higher and drier regions of the Central Plateau have been largely neglected by odonatologists seeking high diversity (i.e., tropical) sites (Andrew Warren pers. comm.). Widespread odonates have remained unrecorded; and certain species that may be locally common such as *Ischnura ramburii* (Selys, 1850) (Rambur's Forktail) have not been reported in Chihuahua for nearly 100 years.

Figure 1. Road map of Chihuahua State, Mexico. Thick gray lines represent areas visited by the authors during 2005.

Methods

During 13 days between 17 June and 30 September 2005, 21 sites in northwest Chihuahua were surveyed for Odonata (Table 1). These were located along both sides of the Continental Divide in the Sierra Madre Occidental, and on the plains further east. The area containing these sites is depicted on Figure 1. Aquatic habitats were examined to generate records that might compliment studies in adjacent Sonora. GPS coordinates were obtained for all but three sites using a Garmin eTrex (no endorsement implied); its elevational readings are somewhat approximate. Locations of sites K, Q, and S were located on the Internet with Google Earth; however, the coordinates for K and Q remain approximate. All times are expressed in local (Mountain) time. Distances are road km, not straight line. Investigators' initials are indicated at the end of each site description: Robert A. Behrstock (RAB), Hank Brodkin (HB), Doug Danforth (DD), Kim Davis (KD), Dennis R. Paulson (DRP), Chris Roll (CR), Netta Smith (NS), Mike Stangeland (MS), and Sandy A. Upson (SAU). Voucher specimens are deposited in the Colección Nacional de Insectos (CNIN), UNAM, Mexico.

Updated List of Chihuahuan Odonata

González-Soriano and Novelo-Gutiérrez (1996), and Paulson and González-Soriano (June 2005) summarized the Odonata of Mexico by state and were our primary sources for the species known

from Chihuahua and surrounding Mexican states. Each treatment contains species not cited in the other, and we have communicated with the authors in an attempt to minimize omissions in the list below. Their combined lists include 39 species known from Chihuahua: 21 Zygoptera and 18 Anisoptera. Literature and specimen records (Needham et al. 2000, Westfall & May 1996, Bill Mauffray pers. comm., S. W. Dunkle pers. comm.) account for an additional two Zygoptera and three Anisoptera. Enrique González-Soriano (pers. comm.) informs us that several species listed for Chihuahua (González-Soriano & Novelo-Gutiérrez 1996) were in error, including: *Argia oculata* Hagen in Selys, 1865, *A. pipila* Calvert, 1907, *Brechmorhoga praecox* (Hagen, 1861), and *Tramea abdominalis* (Rambur, 1842) (Vermilion Saddlebags), and are not included in our totals. We have been unable to confirm Chihuahuan specimens for *Aphylla protracta*, listed in Needham et al. (2000), and deem this record as unsubstantiated. Thus, we consider the state list to have included 45 species as of 17 June 2005.

In the list below, citations and, if available, field data are provided for certain species not listed in one or the other of our primary sources. New Chihuahuan records are preceded by a plus (+). Comments for certain species are inserted next. Site designations follow and may be broken up to reflect varying abundance or behavior between sites. Wherever collected, voucher specimens are indicated with an asterisk (*). In order to maximize the data available to future studies, all species' occurrences are indicated for all sites listed. Important records provided by colleagues are credited in the species accounts. A species' presence in surrounding states is indicated with the following abbreviations: Arizona (AZ), New Mexico (NM), Texas (TX), Coahuila (CL), Durango (DU), Sinaloa (SI), and Sonora (SO). Sonoran occurrences

Table 1. Sites in Chihuahua State, Mexico visited by the authors 17 June to 30 September 2005.

Site	Date/Time	Location	Observers
A	17 Jun 2005 1115–1200 hrs	Mex Hwy 10, c. 17.7 km N of Nuevo Casas Grandes; diked irrigation pond and grassy margin of adjacent, narrow channel with clear, running water. 30° 35.36′ N, 107° 59.43′ W; elev. 1,415 m.	RAB
B	17–18 Jun 2005 three visits during morning, mid-day and late afternoon	Río Palanganas, Juan Mata Ortiz (c. 27 road km S of Nuevo Casas Grandes), clear, shallow, dry season main channel with mostly cobble substrate, much algae in shallows, a few riffles and mud bars; fringing willows and other streamside vegetation present where not grazed. 30° 10.98′ N, 108° 01.16′ W; elev. 1,537 m.	RAB
B-2	15 Jul 2005 1545–1710 hrs	Same as site B but river examined somewhat further downstream where partly intermittent, wider, and less shaded.	RAB, DD, SAU
B-3	9 Sep 2005 1510–1620 hrs	Same as site B but river flooded over normal channel. All marginal or emergent vegetation under water and odonates forced out to open flats or shrubs above river's bank.	RAB, DD, DRP, NS
C	19 Jun 2005 0945–1045 hrs	Mex Hwy 10, c. 16.9 km N of Nuevo Casas Grandes (immediately S of site A); large, partly shaded, diked irrigation pond, weedy banks, little emergent vegetation. 30° 34.36′ N, 107° 59.26′ W; elev. 1,417 m.	RAB
C-2	15 Jul 2005 1330–1405 hrs	Same as site C.	RAB, DD, SAU
D	19 Jun 2005 1140–1246 hrs	Mex Hwy 2, c. 14.2 km NW of Janos. Bridge at Río La Palotada, here a clear, narrow stream with both cobble and soft bottoms, some small riffles (these covered with water during third and fourth visits), deeper stretches with abundant submerged and floating vegetation, some emergents where not grazed. Portions of stream partly shaded by mesquite or willows. 30° 56.83′ N, 108° 19.70′ W; elev. 1,354 m.	RAB
D-2	15 Jul 2005 1055–1235 hrs	Same as site D.	RAB, DD, SAU
D-3	9 Sep 2005 1645–1810 hrs	Same as site D.	RAB, DD, DRP, NS
D-4	30 Sep 2005 1015–1320 hrs	Same as site D but emergent and marginal vegetation more lush. Also examined were several adjacent stock ponds varying from limited emergent and floating vegetation to tall stands of emergents. Banks flat to fairly steep and mostly grazed.	RAB, HB, KD, MS
E	15 Jul 2005 0950–1045 hrs	South side of Mex Hwy 2, 21.7 km NW of Janos. Large, sunny farm pond margined variously with grasses, mud, or mesquite thickets. 31° 00.43′ N, 108° 22.48′ W; elev. approx. 1,382 m.	RAB, DD, SAU

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F	15 July 2005 1443–1535 hrs	Río Piedras Verdes bridge at Colonia Juárez village, approx. 22 km SW of Nuevo Casas Grandes. Habitats included both narrow, shallow stretches and, where dammed by the bridge foundation, wider and deeper pools. Large willows shaded much of shore. 30° 18.00′ N, 108° 04.51′ W; elev. c. 1,554 m.	RAB, DD, SAU
G	5 Jul 2005 1800–1830 hrs	Laguna Fierro, approx. 5 km E of Nuevo Casas Grandes. Mineralized lake. 30° 23.84′ N, 107° 51.37′ W; elev. c. 1,450 m.	RAB, DD, SAU
H	5 Sep 2005 1226–1335 hrs	Mex Hwy 16, approx. 1.6 road km E of Sonora–Chihuahua border. Shallow, mostly sunny stream with soft bottom, boulders, and exposed rocky shelves. Some fringing vegetation — mostly in short side channels. 28° 26.00′ N, 108° 29.90′ W; elev. 1,587 m.	RAB, DD, DRP, CR, NS, SAU
I	6 Sep 2005 1200–1300 hrs	Mex Hwy 16. Shallow stream in open meadow. Much of river flowing over exposed rock. Some gravel in pools. Little emergent vegetation. 28° 25.12′ N, 108° 21.88′ W; elev. 1,783 m.	RAB, DD, DRP, CR, NS, SAU
J	6 Sep 2005 1415–1445 hrs	Mex Hwy 16 at Basaseáchic town. Channel below rock wall dam, muddy stream edge and wet field dominated by dense knotweed (*Polygonum*). 28° 12.64′ N, 108° 12.72′ W; elev. 2,008 m.	RAB, DD, DRP, CR, NS, SAU
K	6 Sep 2005 1640–1730 hrs	A tributary of the Río Tomochic, c. 52 km E of the village of Basaseáchic. Farm pond adjacent to Mex Hwy 16 and a bridge across the river. Approximately 28° 20.71′ N, 107° 39.55′ W; elev. c. 2,030 m.	RAB, DD, DRP, CR, NS, SAU
L	7 Sep 2005 1010–1024 hrs	Approx. 16 km NNW of Madera, shallow, narrow rushing stream in pinewoods. 29° 19.48′ N, 108° 10.15′ W; elev. 2,277 m.	RAB, DD, DRP, CR, NS, SAU
L-2	8 Sep 2005 1540–1620 hrs	Same as site L.	RAB, DD, DRP, CR, NS, SAU
M	7 Sep 2005 1330–1510 hrs	Chihuahua Hwy 37, approx. 14.8 km N of Temosachic zócalo (town square). Sandy bottom stream with gravel and mud bars, shallow to about 1.5 m deep. Also, large, shallow, grassy edged pond with established aquatic vegetation. 29° 04.16′ N, 107° 51.83′ W; elev. 1,930 m.	RAB, DD, DRP, CR, NS, SAU
N	7 Sep 2005 1530–1600 hrs	Chihuahua Hwy 37, approx. 1 km S of Temosachic zócalo. Stream crossing at El Ojo turnoff. Mostly shallow, somewhat muddy edged stream that had very recently experienced high runoff, as evidenced by flattened marginal grasses and some caved in banks 28° 56.65′ N, 107° 48.59′ W; elev. 1,878 m.	RAB, DD, DRP, CR, NS, SAU
O	7 Sep 2005 approx. 1630–1730 hrs	Chihuahua Hwy 37 at km 91 marker, approx. 11.7 km N of Temosachic zócalo. Small stream that was open and sunny east of the highway, but with dense stands of *Baccharis* scrub and willows (*Salix*) to the west. 29° 03′ N, 107° 50′ W; elev. 1,930 m.	RAB, DD, DRP, CR, NS, SAU
P	8 Sep 2005 1000–1022 hrs	Small farm pond with well-established aquatic vegetation. Pine woodland, north side of dirt road west of Madera and not far east of Puente Huápoca. 29° 12.44′ N, 108° 17.90′ W; elev. 1,984 m.	RAB, DD, DRP, CR, NS, SAU
Q	8 Sep 2005 1200–1228 hrs	Sierra Tarahumara, Balneario Agua Caliente de Huápoca, Río Papigochi at the base of Huápoca Canyon, c. 48 km W of Madera. River in flood above its channel and chocolate brown, so access limited to upper banks only. Also visited were the river close by at small suspension bridge and narrow stream just uphill from the Balneario. Approximately 29° 10.73′ N, 108° 18.24′ W; elev. 1,400 m.	RAB, DD, DRP, CR, NS, SAU
R	8 Sep 2005 1630–1724 hrs	Approx. 15.5 km NNW of Madera; NW of site L and a bit higher. Sunny, grassy-weedy opening in pine woods with scattered branches on ground and several large boulders. Stream nearby. 29° 19.79′ N, 108° 11.15′ W; elev. 2,355 m.	RAB, DD, DRP, NS
S	9 Sep 2005 1225–1325 hrs	Río Santa Maria at Mex Hwy 10, S side of town of Buenaventura. Slow stream lined variously with willows, *Baccharis*, and grasses; substrate included, mud and gravel bars and slower, deeper stretches. 29° 50.55′ N, 107° 28.52′ W; elev. 1,545 m.	RAB, DD, DRP, NS
T	30 Sep 2005 1508–1547 hrs	N side of Mex Hwy 2, approx. 44 km NW of Janos, small pond with fringe of low vegetation. 31° 11.38′ N, 108° 31.09′ W; elev. 1,390 m.	RAB, HB, KD, MS
U	30 Sep 2005 1600–1640 hrs	N side of Mex Hwy 2, approx. 50 km NW of Janos. Small grassy-edged pond with willows and several small cottonwoods, almost no emergent vegetation. 31° 12.27′ N. 108° 32.06′ W; elev. 1,400 m.	RAB, HB, KD, MS

are based, in part, on the authors' notes. Distributional data from the US are extracted from Abbott (2005), and/or Donnelly (2004).

Zygoptera

Hetaerina americana (Fabricius, 1798), American Rubyspot: B, D, D-2, D-4, F, M, O, Q, where often numerous on streamside vegetation; S, abundant at streamside vegetation. Typically, *H. americana* was more numerous than *H. vulnerata*, occurred at lower elevations, and tended to be found in more open habitats. AZ, NM, TX, CL, DU, SI, SO.

+***Hetaerina vulnerata*** Hagen in Selys, 1853, Canyon Rubyspot: H, I, several males on rocks and streamside vegetation; *J, about ten seen at channel edge; L-2, one or two at stream edge. AZ, NM, TX, DU, SI, SO.

+***Archilestes californica*** McLachlan, 1895, California Spreadwing: *C, five individuals seen perched on stems overhanging pond; D-2, one or two at stream edge; *D-4, perhaps eight males perched on fringing vegetation at stream edge and on overhanging branches. We have not encountered *A. californica* alongside *A. grandis* in Chihuahua; they are occasionally sympatric nearby in Sonora. These are the easternmost Mexican records of *A. californica*. AZ, SO.

Archilestes grandis (Rambur, 1842), Great Spreadwing: B, one female roosting in a streamside willow thicket; H, common on streamside vegetation; I, a few at streamside, AZ, NM, TX, DU, SI, SO.

+***Lestes alacer*** Hagen, 1861, Plateau Spreadwing: C-2, several present in weedy growth at pond edge; D-3, two males seen at stream edge; *E, common at grassy pond edge; J, hundreds of dull orange tenerals flushed from vegetation; M, several tenerals at pond margin; *P, 10 or more adults in vegetation near pond margin; abdominal lengths of males varied by as much as 6 mm; T, 500+ tenerals flushed from pond-side vegetation, most in weedy growth near but not at water's edge; U, one adult male and at least 30 tenerals in vegetation surrounding pond. AZ, NM, TX, CL, DU, SO.

Palaemnema domina Calvert, 1903, Desert Shadowdamsel: On 28 June 1987, one male of this species was collected by Boris Kondratieff at Riito, 16.1 km E of Yepachic on Mex Hwy 16. The specimen is in the collection of Sidney W. Dunkle (pers. comm.). AZ, SO.

+***Apanisagrion lais*** (Brauer in Selys, 1876), Black-and-white Damsel: *H, one teneral female and one male found in streamside grasses; Q, at least two in small stream near Río Papigochi. AZ, SI, SO.

+***Argia alberta*** Kennedy, 1918, Paiute Dancer: *D, one male collected from streamside vegetation. This species occurs in both freshwater and mineralized aquatic habitats. It is characteristic of the Great Basin but ranges widely in the western US from eastern California and Oregon to W Texas, central Oklahoma, Kansas and Iowa (Donnelly 2004, Abbott 2005). *Argia alberta* occurs nearby in Arizona, New Mexico and west Texas. This is the first documented record for Mexico. AZ, NM, TX.

+***A. anceps*** Garrison, 1996: *M, two males at river edge; *Q, two males at river edge. Unlike most other populations of this species, individuals from these sites exhibited clear wings. SI, SO.

+***A. extranea*** (Hagen, 1861), Spine-tipped Dancer: *Q, one just above the Río Papigochi in a narrow canyon with a small stream. AZ, SI, SO.

+***A. fumipennis*** (Burmeister, 1839), Variable Dancer: *D, D-2, *D-4, common at streamside, perched on the ground, floating vegetation, rocks, and low shrubs; *M, two–three on ground near water's edge; N, O, several on stream bank; S, one male on bank near stream. AZ, NM, TX, DU, SO.

A. funcki (Selys, 1854): This large, cherry-red species inhabits rocky mountain streams that it often shares with *A. lugens*. Although males of these two species are strikingly different, the females, both of which exhibit at least two color morphs, are confusingly similar. The species has been known from Chihuahua since one male and one female were taken on 28 Jun 1987 by Boris Kondratieff at Riito, 16.1 km E of Yepachic on Mex Hwy 16 (Sidney W. Dunkle pers. comm.) Subsequent records include 6 Aug 2005 at Puente Huápoca, c. 38 km W of Madera where photographed by Rich Hoyer; and *Q, perhaps 10, mostly males, on boulders at river edge. Site Q appears to be just several km SE of Hoyer's sighting and photo. SO.

+***A. hinei*** Kennedy, 1918, Lavender Dancer: *H, ten on rocks and streamside vegetation; I, fairly common streamside; Q, small numbers at river edge. AZ. NM, TX, CL, SI, SO.

A. immunda (Hagen, 1861), Kiowa Dancer: This species is included in the Chihuahuan fauna on the basis of two males and one female from southeastern Chihuahua in the collection of Dennis R. Paulson. They were collected by him 30 August 1967 on the Río San Pedro at Meoqui, elevation 1,189 m. AZ, NM, TX.

A. lacrimans (Hagen, 1861), Sierra Madre Dancer: H, one male perched on a rock in or just adjacent to stream (Netta Smith photo). This species occurs nearby in Sonora. AZ, DU, SI, SO.

A. lugens (Hagen, 1861), Sooty Dancer: During June 1987, Boris Kondratieff and R. Baumann took *lugens* at several sites including: Water Canyon 4.02 km W of Pacheco; Río Tomachic, Hwy 16 at Tomachic, and Arroyo Fresa, 4.82 km above its junction with the Río Piedras Verdes. B, 10 or more seen perched on large cobbles surrounded by flowing water, less commonly on the ground, one on a tree trunk; B-3, male and blue morph female observed on mud-gravel flats near river; *F, fairly common on boulders in stream; *G, one male present (uncharacteristically) at edge of large, shallow, mineralized lake; H, I, several on boulders in stream; N, one male on bank several m above stream; Q, several present on boulders in river; S, about five at stream bank or on rocks in stream. AZ, NM, TX, DU, SO.

A. moesta (Hagen, 1861), Powdered Dancer: G, one blue female perched at edge of large, shallow, mineralized lake. Although this species is often common at streams, it was not encountered elsewhere, and our only record was (atypically) at a lake edge. AZ, NM, TX, SO.

A. munda Calvert, 1902, Apache Dancer: On 22 Jun 1987, Boris Kondratieff and R. Baumann collected this species at three sites in Chihuahua: Arroyo Fresa, 4.8 km above junction with Río Piedras Verdes (1 male and 1 female); a tributary of the Río Gavilan (1 male); Water Canyon, 4 km W of Pacheco (1 female). The specimens, the first for Chihuahua, are in the collections of the International Odonata Research Institute and Sidney W. Dunkle (B. Mauffray and S. Dunkle pers. comm.) AZ, NM, TX, DU, SO.

A. nahuana Calvert, 1902, Aztec Dancer: B, D, D-2, D-4, F, common to abundant on floating and streamside vegetation, often the most abundant *Argia* present; M, a few at stream margin; S, common, 50+ at water's edge. AZ, NM, TX, DU, SO.

A. oenea Hagen in Selys, 1865, Fiery-eyed Dancer: I, two or three on rocks in stream. This species occurs widely from SE Arizona to Tamaulipas, and is easily found in NE Sonora. Although it may be more common elsewhere in Chihuahua, it was rare in the areas we sampled. TX, SO.

+***A. pallens*** Calvert, 1902 Amethyst Dancer: *B, several perched on mud bordering narrow, low water (dry season) stream channel. This species is common to abundant on streams in Arizona and Sonora and occurs as well in S New Mexico and west Texas. Its near absence in Chihuahua was surprising. AZ, NM, TX, SO.

+***A. pima*** Garrison, 1994, Pima Dancer: I, a male that flew up from stream edge was observed at close range (about 20 cm) by Upson, who noted the size, overall abdominal color and pattern and the distinctive humeral stripe. This species is known from several nearby sites in Sonora, including Maycoba, just west of the Chihuahuan–Sonoran border. AZ, SO.

A. plana Calvert, 1902, Springwater Dancer: (cited in Westfall & May 2000) (Arroyo Toro, Toro Basin, 23 June 1987. One male collected by Boris Kondratieff, Det. S.W. Dunkle.) Specimen is in the Florida State Collection of Arthropods (Bill Mauffray pers. comm.) The second state record was a female photographed by Mark Pretti, 22 Aug 2005, approx. 5 km SW of Madera, at an elev. of approx. 2,133 m; H, 20+ on rocks in stream and along bank; L, two or three on rocks in stream and on adjacent bank. One of the most numerous damselflies on plateau and mountain streams from the Texas Hill Country to S Arizona, *A. plana* was surprisingly sparse in NW Chihuahua. AZ, NM, TX, DU, SI, SO.

A. sedula (Hagen, 1861), Blue-ringed Dancer: B, D, D-2, D-4, F, usually common at streamside; often perched on the ground; Q, one or two present at river edge; S, three on stream bank. AZ, NM, TX, CL, DU, SO.

+***A. tarascana*** Calvert, 1902, Tarascan Dancer: *H, at least five including a tandem pair in streamside grasses; Q, at least one present in small stream near river. This species is locally common nearby in Sonora. AZ, DU, SO.

+***A. tezpi*** Calvert, 1902, Tezpi Dancer: D-2, F, Upson and Danforth observed single males on boulders in streams. With close-focusing binoculars, the black eyes and abdomen and the burgundy metallic sheen on the dorsum of the thorax were noted, differentiating this species from the similarly appearing *A. lugens* and *A. translata*. This species is common just a short distance westward in Sonora. AZ, NM, SI, SO.

A. tonto Calvert, 1902, Tonto Dancer: L, L-2, several on rocks in rushing stream. This large, dusty purple species is common to abundant in S New Mexico and SE Arizona, where it inhabits streams surrounded by pine-, or pine-oak woodlands. We found it at only one high elevation site. AZ, NM, DU, SO.

A. translata Hagen in Selys, 1865, Dusky Dancer: B, one perched on shaded branches overhanging pool; Q, several on boulders at river edge; S, eight along vegetated stream bank. AZ, NM, TX, DU, SI, SO.

Enallagma basidens Calvert, 1902, Double-striped Bluet: One male is in the collection of Dennis R. Paulson. It was taken by him 30 Aug 1967 on the Río San Pedro at Meoqui, elevation 1,189 m. AZ, NM, TX, CL.

E. civile (Hagen, 1861), Familiar Bluet: A, B, B-2, C, C-2, D, D-2, D-4, E, F, G, I, P, T, usually perched on pond and stream emergents—generally not as common as *E. praevarum*; G, thousands perched on emergent branches at lakeshore and nearby on leaves of common cocklebur (*Xanthium strumarium*) at edge of large, shallow, mineralized lake. AZ, NM, TX, CL, DU, SI, SO.

E. praevarum (Hagen, 1861), Arroyo Bluet: A, B, B-2, C, C-2, D, D-2, D-4, E, F, H, I, J, K, M, N, O, P, Q, S, streamside and pond edges where usually plentiful—occasionally roosting by the dozens in weedy growth or shrubs near water. AZ, NM, TX, CL, DU, SO.

Hesperagrion heterodoxum (Selys, 1868), Painted Damsel: On 22 Jun 1987, Boris Kondratieff and R. Baumann found *heterodoxum* at a spring 0.20 km from the Río Gavilan, at Las Amarillas, and on 28 Jun 1987 at a small stream on the east rim of Cascada de Basaseáchic Parque Nacional. *B, several perched on grasses or weedy growth at the margin of flowing water, often drifting *Enallagma*-like among stems; H, I, J, L, O, several on streamside vegetation; M, a few at grassy pond margins. AZ, NM, TX, DU, SO

+***Ischnura damula*** Calvert, 1902, Plains Forktail: *A, *C, C-2, *D, uncommon in grasses bordering both flowing water and pond edge. Only recently confirmed for Mexico (authors' notes), *I. damula* has been taken in NE Sonora not far from our Chihuahua sites. AZ, NM, TX, SO.

I. demorsa (Hagen, 1861), Mexican Forktail: A, B, C, C-2, D, D-2, D-4, E, I, J, K, M, O, P, S, T, U, streamside, emergent vegetation and pond edges—often very numerous in weedy or shrubby growth near water. AZ, NM, TX, CL, DU, SI, SO.

I. denticollis (Burmeister, 1839), Black-fronted Forktail: D, D-2, D-4, E, grasses at edge of stream where often common but usually outnumbered by *I. demorsa*; *M, abundant at grassy pond margin; T, U, common at pond edge. AZ, NM, TX, DU, SO.

+***I. hastata*** (Say, 1839), Citrine Forktail: *E, one male and two females observed at a grassy pond edge where greatly outnumbered by *I. demorsa*; U, one male at pond edge. Both of our records of this generally widespread and common species are from ponds in the extreme NW corner of the state. AZ, NM, TX, SI, SO.

I. ramburii (Selys, 1850), Rambur's Forktail: The first and apparently only state record was taken 6–7 Aug 1906, at Guzmán (97 km SW of Juarez, elev. approx. 1,341 m.), where it was collected at a small stream flowing into a lake. This record is from Calvert's own specimens or sightings (Calvert, 1909); *D-4, one adult male only (despite searching through much suitable habitat) at emergent vegetation in narrow stretch of steam. Once sites in the NE portion of the state are examined, this often-abundant species may prove to be more widespread in Chihuahua. AZ, NM, TX, SI, SO.

Telebasis salva (Hagen, 1861), Desert Firetail: B, D, D-2, D-4, I, M, P, vegetation at river or stream edge where often common. Frequently seen ovipositing on floating vegetation; occasionally common in shrubs near water. AZ, NM, TX, DU, SI, SO.

Anisoptera

Aeshna persephone Donnelly, 1961, Persephone's Darner: *H, one teneral female along stream; Q, one individual observed along river. Several individuals were encountered on streams in nearby eastern Sonora. Regarding the final preparation of Dragonflies of North America (Needham et al. 2000), the late Minter Westfall wrote: ". . . Some records which were on my list but with no indication of source I have left in but with a question mark." However, E. González-Soriano (2007 pers. comm.) mentioned he has a male of *A. persephone* from Chihuahua (El Jaguey, near Creel). AZ, NM, SO.

Anax junius (Drury, 1773), Common Green Darner: A, B, B-2, C, C-2, D, D-2, D-4, E, M, P, small numbers often present over ponds and streams. AZ, NM, TX, CL, DU, SI, SO.

+***Anax walsinghami*** McLachlan, 1883, Giant Darner: Q, one male observed as it patrolled river edge. AZ, NM, TX, DU, SO.

Oplonaeschna armata (Hagen, 1861), Riffle Darner: (in Needham et al. 2000). Arroyo Toro, Toro Basin, 1720 m, 23 Jun 1987, 1 male collected by Boris Kondratieff. Specimen in Florida State Collection of Arthropods (Bill Mauffray pers. comm.). AZ, NM, DU.

+***Remartinia luteipennis*** (Burmeister, 1839), Malachite Darner: I, one fly-by seen by Paulson and Behrstock as it patrolled the stream. AZ, SO.

+***Rhionaeschna dugesi*** (Calvert, 1905), Arroyo Darner: *O, three males observed in brushy areas west of highway, two in apparent territorial dispute within 1 m of water's surface. AZ, NM, TX, DU, SO.

+***R. jalapensis*** (Williamson, 1908): *K, at least three males present at a farm pond near a wetland and a large river where sympatric with *R. multicolor*. Previously, the northernmost record of *R. jalapensis* was a male located 28 Aug 1965 at a

small montane pond in Durango, 7.1 km NE of El Salto at c. 2,469 m elevation. There, it was also sympatric with a female *R. multicolor*. (D. Paulson data). DU.

+***R. multicolor*** (Hagen, 1861), Blue-eyed Darner: *D-4, a few over stream, common over adjacent stock ponds; *I, one or two cruising rocky stream; *K, five at pond and adjacent wetland near river; *R, female near stream at clearing in pinewoods (not typical habitat or elevation). AZ, NM, TX, DU, SO.

+***Aphylla protracta*** (Selys, 1859), Narrow-striped Forceptail: (in Needham et al. 2000); D-2, one male perched on shrubs near stream (Doug Danforth photo). We have been unable to verify a previous specimen record that places *A. protracta* in Chihuahua. Thus, we tentatively consider it new for the state. TX, CL, SI, SO.

+***Erpetogomphus compositus*** Hagen in Selys, 1858, White-belted Ringtail: *D-2, several males at narrow portion of stream near riffle. As was the case with several libellulids, we only encountered this species in the extreme NW corner of the state. AZ, NM, TX, SO.

E. crotalinus (Hagen in Selys, 1854), Yellow-legged Ringtail: *D, one or two males on cobbles in riffles at narrow section of stream immediately north of highway; D-2, up to 10 males concentrated in previously mentioned riffle area, perched on rocks, twigs, and stream bank, typically in narrow portions of stream shaded by scattered willows or mesquites, and here sympatric with *E. compositus*; D-4, common, at least 15 males observed along narrow stream channel, several on rocks or bank but most perched on luxurious vegetation lining stream; F, two males on rocks in narrower part of stream; *M, fairly common, perhaps 10 on rocks in stream; N, fairly common, six or more roosting on gravel and mud bars; O, three observed on gravel bars east of highway; *S, one male on gravel-mud bar. Males of this species were the most frequently encountered gomphid, and also the most numerous. Despite finding it during eight site visits (occasionally in moderate numbers), and searching nearby shrubs and open habitat, no females were observed. Most sightings were at open, sunny streams with rocky riffles or bars available for perches. A few individuals perched on stream banks, or in areas more enclosed by marginal shrubbery. During one visit, c. 10 males were observed perched on emergent vegetation fringing a very narrow and largely shaded stream. All encounters occurred between approx. 1,354–1,930 m. Garrison (1994) mentions *E. crotalinus* and *E. heterodon* being sympatric in Chihuahua, a phenomenon we did not observe. AZ, NM, DU, SO.

E. designatus Hagen in Selys, 1858, Eastern Ringtail: Garrison (1994) reports specimens from La Cruz (Rosser W. Garrison collection) and Naica (University of Michigan Museum of Zoology). AZ, NM, TX, CL, DU.

E. heterodon Garrison, 1994, Dashed Ringtail: *B, B-2, cobbles in shallow riffles or banks at river edge, occurring in the open and far from shading vegetation, also at isolated pools in an intermittent river channel. Common; up to eight males perched along <10 m of river edge. One female perched on vegetation at river edge some distance from males (dry season and river low); *B-3, two males observed on mud-gravel flats approx. 10 m distant from river (wet season and river flooded). NM, TX.

E. lampropeltis natrix Williamson & Williamson, 1930, Serpent Ringtail: I, one or two on rocks in stream; Q, one at river edge. AZ, NM, TX, DU, SO.

+***Ophiogomphus* sp.**: On 22 Aug 2005 at approximately 0900 hrs, Mark Pretti photographed a female *Ophiogomphus* perched on a dirt road about 16 km N of Madera. The habitat is montane pinewoods at an elevation of approx. 2,745 m. This individual was relocated two hours later at the same spot. The site is at least 0.5–1 km from any stream. *R, late in the afternoon (1430–1725) 2 or 3 females were located in a roadside clearing in pinewoods. All were first noted in flight, but they landed on bare ground, rocks, or downed pine branches. Just prior to the sighting, four investigators searched the adjacent stream for an hour, but found no evidence of this species. This site is probably no more than 3 km from where Pretti encountered it.

Currently, this species is believed to represent either *Ophiogomphus purepecha* González-Soriano & Villeda-Callejas, 2000, or *O. arizonicus* Kennedy, 1917. *O. purepecha* was described from specimens collected in Michoacán and has not been recorded further north. *O. arizonicus* is found as far south as SE Arizona and SW New Mexico but has not been recorded in Mexico. Females of *O. purepecha* and *O. arizonicus* are very similar. Series of each have not been compared and a suite of characteristics that separates them has not been proposed. Enrique González-Soriano, one of the describers of *O. purepecha*, was kind enough to examine our specimen. When the Chihuahuan specimen was compared with the allotype of *O. purepecha*, two characteristics led him to believe that the two were not conspecific. The vulvar laminae of *O. purepecha* have the free portion of each arm longer and more widely divergent than those of the female from Chihuahua. Additionally, the occipital ridge of *O. purepecha* has a slight undulation but that of the female from Chihuahua is straight. (pers. comm. 13 Jun 2006). This finding suggests a southward range extension of *O. arizonicus*, but this must be supported with additional specimens.

+***Phyllogomphoides* sp.**: This genus has not been recorded in Chihuahua. On 6 Aug 2005, Rich Hoyer photographed

a male *Phyllogomphoides* 38 km west of Madera, at Puente Huápoca, approx. 29° 11.07′ N, 108° 19.75′ W; 1,400 m elev. This individual cannot be identified with certainty but probably represents *P. nayaritensis* Belle, 1987, as that species has been collected at a number of sites not far to the west in Sonora (authors' notes). SO.

Progomphus borealis McLachlan in Selys, 1873, Gray Sanddragon: D, *D-2, single males present each visit, perched along both riffle and slow portion of stream; H, one on stream; *L-2, female on bank of rushing stream. This species exhibits the broadest elevational range of any North American gomphid, occurring from wide rivers near sea level to small streams in high pine forest. At all sites where *P. borealis* was encountered, it was outnumbered by one or more species of *Erpetogomphus*. AZ, NM, TX, DU, SO.

Cordulegaster diadema Selys, 1868, Apache Spiketail: (in Needham et al. 2000). The first state record was a specimen taken at a spring-fed tributary of Arroyo Chuchubat, 24 Jun 1987, by Boris Kondratieff (Sidney W. Dunkle pers. comm.) On 16 Jun 2006, April Baisan obtained photos and video of one individual near the large pool at the base of Basaseáchic waterfall (photos to the authors, D. Paulson and S. Dunkle). AZ, NM, DU, SO.

Macromia magnifica McLachlan in Selys, 1874, Western River Cruiser: The only records we are aware of include a female taken near the Sonora–Chihuahua border at the Río Chuhuichupa on 25 Jun 1987 by Boris Kondratieff and Richard W. Baumann, and a male with the same data collected by Kondratieff on 26 Jun (Sidney W. Dunkle pers. comm.). AZ, DU, SO.

+***Brechmorhoga mendax*** (Hagen, 1861), Pale-faced Club-skimmer: *B-3, one male hanging in *Baccharis* shrubs near river; *M, one of five or more present was netted over a stream; Q, one male observed along river. AZ, NM, TX, SO.

Brechmorhoga pertinax (Hagen, 1861), Masked Club-skimmer: (in Needham et al. 2000). Arroyo Banderas near junction with Chuhuichupa, 26 Jun 1987. One male collected by Boris Kondratieff. Specimen in Florida State Collection of Arthropods (Bill Mauffray pers. comm.). AZ, SO.

+***Dythemis velox*** Hagen, 1861, Swift Setwing: D-4, one male perched on a bare branch over a narrow, partly shaded channel (Kim Davis photo). Although common and widespread in the southern US, *D. velox* has little presence in Mexico, and is mainly known from the northern tier of states. AZ, NM, TX, DU.

Erythemis collocata (Hagen, 1861), Western Pondhawk: A, B, C, D, D-2, D-4, M, small numbers encountered at pond and stream edges. AZ, NM, TX, CL, DU, SO.

Erythrodiplax basifusca (Calvert, 1895), Plateau Dragonlet: D, one male at stream edge; D-4, perhaps 20 males at stream edge and several at adjacent ponds; E, one male flying over pond edge. The similar *E. fusca* (Rambur, 1842) (Red-faced Dragonlet) has been recorded in south-central Texas and could occur in NE Chihuahua. AZ, NM, TX, DU, SI, SO.

Libellula comanche Calvert, 1907, Comanche Skimmer: D, D-2, two-several males at stream edge, often perching on taller emergent vegetation. This species exhibits a limited distribution in Mexico, apparently being restricted to Sonora and Chihuahua. We found it only in the northwestern corner of the state. AZ, NM, TX, SO.

L. luctuosa Burmeister, 1839, Widow Skimmer: D, D-2, several males engaged in territorial chases; C-2, one or two males patrolling pond margin. In Mexico, this species, like *L. comanche*, occurs only in Sonora and Chihuahua. As was the case with *E. compositus* and *L. comanche*, we found *L. luctuosa* only in the extreme northwestern part of the state. These species may be more common further east in northern Chihuahua, as they are numerous in West Texas. AZ, NM, TX, SO.

L. saturata Uhler, 1857, Flame Skimmer: A, B, B-2, C, C-2, D, D-2, D-4, E, F, H, I, K, N, O, Q, usually present and occasionally numerous over ponds and running water. AZ, NM, TX, CL, DU, SO.

+***Micrathyria aequalis*** (Hagen, 1861), Spot-tailed Dasher: D-4, 1–2 males observed in a narrow, partly shaded river channel lined with dense vegetation. We did not encounter it during three earlier visits to this site. TX, SI, SO.

Orthemis ferruginea (Fabricius, 1775), Roseate Skimmer: E, one male cruising pond edge. Although common in the southern US and much of Mexico, this species was encountered at only one site. The similar *O. discolor* (Burmeister, 1839) (Carmine Skimmer) is likely to occur in Chihuahua as well. AZ, NM, TX, CL, DU, SI, SO.

+***Pachydiplax longipennis*** (Burmeister, 1839), Blue Dasher: C, C-2, D, *D-2, common, perched on sticks or shrubs alongside both flowing water and pond edges; D-4, perhaps five at pond and stream edges. AZ, NM, TX, CL, DU, SI, SO.

Paltothemis lineatipes Karsch, 1890, Red Rock Skimmer: H, I, K, Q, small numbers usually present on higher elevation streams—occasionally over roads. AZ, NM, TX, CL, DU, SI, SO.

Pantala flavescens (Fabricius, 1798), Wandering Glider: B-2, C, E, several over pond margin; D-2, F, H, one to several cruising stream. AZ, NM, TX, CL, DU, SI, SO.

P. hymenaea (Say, 1839), Spot-winged Glider: B-2, E, several at pond margin; N, one or two patrolling river; T, one perched in weedy growth at pond edge. AZ, NM, TX, CL, DU, SI, SO.

+***Perithemis intensa*** Kirby, 1889, Mexican Amberwing: C, one male and one female seen at pond edges or perched atop bushes; *C-2, one male on emergent twigs at pond edge. AZ, NM, CL, SI, SO.

+***P. tenera*** (Say, 1839) Eastern Amberwing: *F, wide, slow stretch of stream, approx. five males perched on emergent twigs at shoreline or mid-stream, or on the lower branches of trees overhanging the water. AZ, TX, CL, DU, SO.

Plathemis subornata (Hagen, 1861), Desert Whitetail: D, D-2, D-4, several males in territorial chase along stream. Although this species is widespread in the Southwest, it, like some other libellulids, was only encountered in extreme NW Chihuahua. AZ, NM, TX, SO.

+***Pseudoleon superbus*** (Hagen, 1861), Filigree Skimmer: *B, one female perched on open ground at streamside; D-2, F, several patrolling stream. AZ, NM, TX, DU, SI, SO.

Sympetrum corruptum (Hagen, 1861), Variegated Meadowhawk: C, one male perched on emergent vegetation; D-4, common near stream, a few tenerals present; E, several at pond margin; G, several males on emergent twigs at lake edge; I, 5–10 at stream edge; M, several at pond; O, 4–5 at river edge; P, several at pond edge; R, several flying above or perching in clearing; T, U, common in shrubby growth near pond. AZ, NM, TX, CL, DU, SO.

+***S. illotum*** (Hagen, 1861), Cardinal Meadowhawk: *D-4, one male in broad, open section of stream and sympatric with *S. corruptum*; *H, at least five present over slower stretches of stream; I, one–two over rocky stream; K, several at pond edge; P, several adults at pond edge. AZ, NM, TX, DU, SO.

+***S. signiferum*** Cannings & Garrison, 1991, Spot-winged Meadowhawk: H, one male flying over quiet stretch of stream; *J, hundreds of tenerals flushed from vegetation; M, 10 or more tenerals flushed from weedy growth near pond. Only recently discovered in Sonora, the range and flight dates of this species in both the US and Mexico have yet to be clarified. AZ, DU, SO.

+***Tramea lacerata*** Hagen, 1861, Black Saddlebags: A, C, C-2, D, D-2, up to six seen over ponds and flowing streams; D-4, one male over stream. AZ, NM, TX, SO.

+***Tramea onusta*** Hagen, 1861, Red Saddlebags: C, four seen over pond; C-2, two or three at pond margin. AZ, NM, TX, SI, SO.

Discussion

During 13 days in the field, 15 Zygopterans and 20 Anisopterans previously unrecorded or unconfirmed in Chihuahua were located at 21 sites. These records increase the number of Odonata observed or collected in Chihuahua from 45 to 80 species, including 11 genera new to the state. New records include 25 species supported by specimens, three photographed, and seven observed only.

The latest contributions to Chihuahua's fauna represent a number of geographic regions. Of the newly recorded taxa, five (*Argia alberta*, *Ischnura damula*, *Erpetogomphus compositus*, *Dythemis velox*, and *Perithemis tenera*) are more northerly species that range southward only as far as northern Mexico. Paulson and González-Soriano (2005) do not list *I. damula* for Mexico, but it was recently recorded at two sites in northeast Sonora (authors' data). *Argia fumipennis*, another species widespread in the US, mainly inhabits the northern tier of Mexican states, but has been taken as far south as Hidalgo. Five species (*Ischnura hastata*, *Pachydiplax longipennis*, *Sympetrum illotum*, *Tramea lacerata*, and *T. onusta*) occur widely in the US and Mexico, ranging from moderate elevations down to sea level. Seven species (*Archilestes californica*, *Argia hinei*, *Anax walsinghami*, *Rhionaeschna multicolor*, *Brechmorhoga mendax*, *Perithemis intensa*, and *Pseudoleon superbus*) are characteristic of the southwestern US and western (or more of) Mexico. Identity of the *Ophiogomphus* remains to be clarified, as does its geographic provenance. The *Phyllogomphoides*, if *nayaritensis*, is a species restricted to northwest Mexico. *Sympetrum signiferum* is a northwest Mexican species that ranges very locally into the southwestern US where it is scarce, occurring at only a few Arizona sites just north of the Mexican border. The remaining 14 species, *Hetaerina vulnerata*, *Lestes alacer*, *Apanisagrion lais*, *Argia anceps*, *A. extranea*, *A. oenea*, *A. pallens*, *A. pima*, *A. tarascana*, *Remartinia luteipennis*, *Rhionaeschna dugesi*, *R. jalapensis*, *Aphylla protracta*, and *Micrathyria aequalis*, are of southern origin, reaching their northern limits in Mexico's northern tier of states (two species) or the southernmost US (12 species).

We encountered 19 of the 21 *Argia* now known from Chihuahua, of which nine were new state records. The genus accounts for about 26% of the total state list. Trailing far behind were *Ischnura* and *Erpetogomphus*, each with five species. *Enallagma*, the largest genus of damselflies north of the Mexican border, was represented by only three species but several more might occur within the state.

Of the 80 species now known from Chihuahua, about 42 (52%) exhibit broad elevational ranges, occurring elsewhere at or near sea level. The remaining 38 species (48%) are more characteristic of higher elevations including plateaus, inter-montane valleys, and mountains. The genus *Argia* is prominent among the high elevation species; of the 21 species found in Chihuahua, only six are likely to occur near sea level. Nineteen of the 21 Chihuahuan *Argia* are found in the US, of which eight are largely restricted to the "Sky Islands" isolated mountain ranges immediately adjacent to the Mexican border. Other Mexican species confined to these border ranges, or high plateaus around them, include *Apanisagrion lais*, *Sympetrum signiferum*, and *Remartinia luteipennis*.

The Chihuahuan odonate list may be expected to increase as fieldwork continues. *Ischnura barberi* Currie, 1903, *Brachymesia herbida* (Gundlach, 1889), *Stylurus intricatus* (Selys, 1858), and *Dythemis maya* are known from the vicinity of the Río Grande near Big Bend National Park or at El Paso, Texas, both adjacent to Chihuahua (pers obs. Behrstock). *Brachymesia gravida* (Calvert, 1890) is known from west Texas to Arizona and should appear in Chihuahua. *Amphiagrion abbreviatum* (Selys, 1876), and *Macromia annulata* Hagen, 1861 are found just north of Chihuahua in southern New Mexico, as is *Argia apicalis* (Say, 1839), now known from as far west as Arizona. In neighboring Mexican states, there are numerous potentially occurring species, including: *Argia anceps* Garrison, 1996, *Enallagma novaehispaniae* Calvert, 1907, *Erpetogomphus elaps* Selys, 1858, *Progomphus clendoni* Calvert, 1905, *Dythemis nigrescens* Calvert, 1899, *Libellula croceipennis* Selys, 1869, and *Orthemis discolor* (Burmeister, 1839). These observations also suggest that *Argia funcki*, *Rhionaeschna jalapensis*, and *Phyllogomphoides nayaritensis* may be potential additions to the odonate fauna of the US, and could occur in southeast Arizona, south New Mexico or west Texas.

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