

Phyllogomphoides nayaritensis (West Mexican Leaf-tail) in Southwestern New Mexico, a New Dragonfly Species for the United States

Dennis Paulson, Seattle, Washington <dennispaulson@comcast.net>

Following the protocol of the DSA Check-list Committee to require published records, I am putting on record here a new odonate species for the United States.

On 19 August 2014, Tony Godfrey photographed a male gomphid in Rotary Park, Truth or Consequences, Sierra County, New Mexico. He submitted the record soon thereafter to OdonataCentral <<http://www.odonatacentral.org/>> as OC# 427318. After some discussion and consultation with Doug Danforth and me, it was agreed that the dragonfly was *Phyllogomphoides nayaritensis*, West Mexican Leaf-tail. This was the first and so far the only record of the species in the United States.

This species is locally common on streams and rivers in western Mexico, from northern Sonora (about 160 miles south of the U.S.-Mexico border) and western Chihuahua (Bailowitz et al., 2015) south to Nayarit (Belle, 1987). So far it is known only from these three states in Mexico, but it presumably occurs also in Sinaloa and Durango. Subsequent efforts to find this or another individual of the species at the same location have not been successful, and it was likely a vagrant individual, one of many Mexican dragonflies that probably cross the border every summer in dispersal flights. Let's have no wall!


P. nayaritensis can be easily distinguished from the two *Phyllogomphoides* leaf-tails known from the U.S., both of



Phyllogomphoides nayaritensis (West Mexican Leaf-tail), Rotary Park, Truth or Consequences, New Mexico, 19 August 2014. Photo by Tony Godfrey.

which have been recorded in southern New Mexico but appear to be very scarce there, by its narrower thoracic stripes and mostly black abdomen tip.

References

- Bailowitz, R., D. Danforth, and S. Upson. 2015. A Field Guide to the Damselflies and Dragonflies of Arizona and Sonora. Nova Granada Publications, Tucson.
- Belle, J. 1987. *Phyllogomphoides nayaritensis*, eine neue Libellenart aus Mexico (Odonata: Gomphidae). Entomologische Zeitschrift mit Insekten börse 97 (1/2): 11–13. 

The Ozark Emerald (*Somatochlora ozarkensis*): Status, Distribution, and Ecological Notes from Oklahoma

Brenda D. Smith-Patten and Michael A. Patten, Oklahoma Biological Survey, Oklahoma Natural Heritage Inventory, University of Oklahoma, Norman, Oklahoma <argia@ou.edu>

The Ozark Emerald (*Somatochlora ozarkensis*) is a regional endemic that occurs in four U.S. states: Arkansas, Kansas, Missouri, and Oklahoma (Fig. 1). Our preliminary data indicates that it has been recorded in 15 counties in Arkansas, seven in Kansas, nine in Missouri, and nine in Oklahoma (10, if Comanche Co. records are truly *S. ozarkensis*, see below), from where the species was described to science by Ralph Durham Bird. The type specimens came from “along Cunneotubby Creek, two and one-half miles northwest of Wilburton, Latimer County, Oklahoma, July 14, 1931, Wilton Fisher, Collector” (Bird, 1933: 5). E. M.

(Edmund Murton) Walker commented that it was “a species related to *provocans* and approaching in some degree *hineana* and *tenebrosa*” (Bird, 1933: 1).

This species is considered to be a globally and nationally at-risk species (ranked as “vulnerable” by NatureServe, <<http://explorer.natureserve.org/>>; and Near Threatened by the IUCN, <<http://www.iucnredlist.org/details/20345/0>>). In Arkansas, Kansas, and Oklahoma it is considered an S1 “critically imperiled” species (NatureServe; Patten and Smith-Patten, 2013), and in Missouri

it currently has a conservation ranking of S2S3 (imperiled/vulnerable), although in recent years, despite species-specific surveys, the species has been reported but a few times in Missouri, indicating that the conservation rank may need to be upgraded.

Since 2014, we have studied Ozark Emerald in Oklahoma through a State Wildlife Grant funded by the Oklahoma Department of Wildlife (ODWC). During this time we have compiled all known records of the species in the state, including from our intensive field surveys conducted throughout the eastern half of Oklahoma. Our research has focused on obtaining a clearer picture of the species' status, distribution, and ecological needs. To date we have compiled 48 confirmed records and four probable records of this elusive species in Oklahoma. These records date from 1931–1934 and 2006–2016. It is interesting to note that despite surveys throughout the region by George H. Bick and Lothar E. Hornuff between 1950 and 1978, the species went unrecorded. During our study, nearly half (44%) of all known records for the species in the state were added to our database ($n = 23$ records, 21 of them confirmed, two probable); $\frac{3}{4}$ (17 of 23) of those records were added by our field surveys.

There are 32 definite and two probable localities in the state where the species has been recorded (Fig. 2); all of the definite records are in a mere nine counties: Adair, Atoka, Cherokee, Latimer, Le Flore, McCurtain, Osage, Pushmataha, and Tulsa. Not all of those localities have been re-surveyed, or if they have, the Ozark Emerald has not been necessarily been recorded there again. For example, the species' type locality, on Cunneo Tubby Creek, 2.5 mi NE of Wilburton, Latimer Co. (Bird 1933), is currently inaccessible (i.e., private land), and we resurveyed the Osage Co. locality (see below) on 11 June 2016 without success. We discuss a couple of other examples of negative resurvey results below.

Our work indicates that the species is rare in Oklahoma, and it appears to be a habitat specialist. It tends to be seen only one or two at a time along creeks, either as single males guarding an ovipositing pool, as mating pairs, or as females ovipositing. On a rare occasion it has been seen at up to eight or nine individuals on a given survey, but only when a lengthy reach (e.g., > 1 km) of a creek was searched. The lower numbers are consistent with sightings in Arkansas and Missouri (George Harp, pers. comm.; Bruce Henry, Missouri Department of Conservation, pers. comm.).

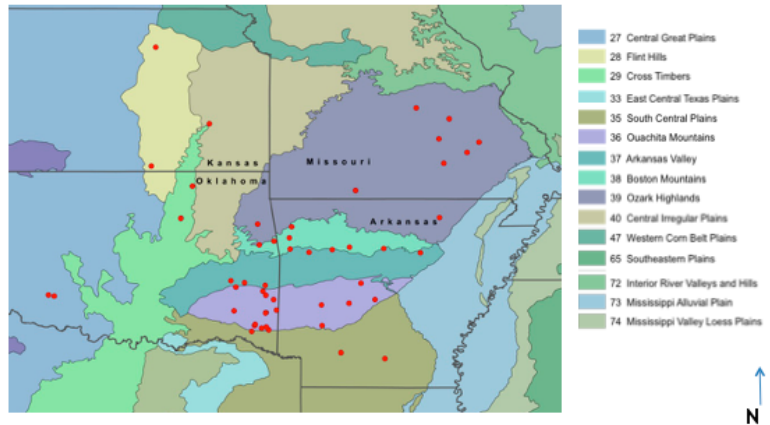


Figure 1. Range of the Ozark Emerald (*Somatochlora ozarkensis*) as indicated by OdonataCentral records. Although all localities of the species are not represented, the map gives an idea of the general known distribution of the species.

In our experience, Ozark Emeralds are seen in larger numbers only when one happens upon a feeding swarm. We have had two occasions where we estimated ≥ 25 emeralds. During these times the emeralds have been in multiple feeding swarms around cleared (often grassy) areas embedded in coniferous or mixed hardwood forest along stretches of dirt or paved roads (1–5 km). Our first large swarm was on 5 July 2014 along Oklahoma Highway 1, the Talimena National Scenic Byway, in Le Flore Co., where we stopped on multiple occasions and managed to capture one male (SP1318) and eight females, and we saw another 25 small emeralds whose species identification could not be confirmed. A second large swarm was also within the Ouachita National Forest (NF), this time in McCurtain Co., along a USFS road 10 km NE of Broken Bow, where the second author (MAP) captured two males and nine females (1 female, SP1726) on 24 July 2015. He estimated there were an additional 14 individuals present, and there were also multiple Clamp-tipped Emeralds (*S. tenebrosa*) and Mocha Emeralds (*S. linearis*). David Arbour reported a swarm of 60 emeralds at Pipe Spring, Ouachita NF, on 29 June 2014 that he thought were all, or at least primarily, Ozark Emeralds, but no individuals were captured for confirmation. We visited this site on 5 July 2014, when we had a mere five individuals, and were able to confirm the species in-hand. Lastly, a modest “swarm,” of about five males (one in hand; MAP) and one ovipositing female, was seen at Robbers Cave Wildlife Management Area (WMA), Latimer Co., 3 July 2016.

Aside from the record above, 2015 was not the best year for the species, or at least the best year for us finding the species. We encountered Ozark Emeralds only one other time, on 29 June, when we found a lone female ovipositing on Fourche Maline Creek, Robbers Cave Wildlife Management Area (WMA). On 2 July, while on a general survey with ODWC staff at Cookson WMA, Cherokee Co.,

BS-P saw a lone female emerald ovipositing on Hasting's Hollow Creek. That female appeared to have an ovipositor like that of an Ozark Emerald, but because the individual could not be captured the record was treated as probable rather than confirmed. She was particularly cautious because the record would have been the first in the state for the Ozark Highlands. There was one other record for the year: while on a tour with David Arbour on 10 August, Steven Easley photographed a single male (OC435326) at "The Narrows" on the Mountain Fork River (9 km S of Smithville), McCurtain Co.; there also may have been a mating pair, but the photo was inconclusive.

We were unable to refind Ozark Emeralds on Crooked Branch Creek in Well Hollow, Ouachita NF, Le Flore Co., where we had it on 5 July 2014 (1 female, SP1317) or on Breadtown Creek at Atoka WMA, Atoka Co., where we had found two males and three females (including one ovipositing) on 13 July 2013 (1 female, SP802) prior to the initiation of this survey. Floods scoured the latter creek heavily in spring 2015, which may account for the species' disappearance. It may also be that the larvae have yet to mature. Still, we did not find the species at either location in 2016.

In 2015 we received an older report of the species, when on behalf of his young daughter, Mark Ferguson, formerly of Oklahoma but now a Natural Heritage Inventory biologist in Vermont, submitted photographs of a male Ozark Emerald (OC435703) they had captured on 2 August 2006 at Torpedo Switch, Osage Co. We consider this record to be third for the county. For many years we had in the Oklahoma Odonata Project database an unconfirmed record of the species from Osage Co. (Donnelly, 2004; OC247853), so we had considered the record dubious. However, we recently tracked the record down to five

male specimens deposited at the Illinois State Museum (ISM 9831-9834 collected on 5 July 1999 and ISM 14035 collected on 3 July 2000).

With flooding greatly reduced relative to the previous year, 2016 proved markedly better for detection of the Ozark Emerald. We added nine new records and five new localities for the species. The season began with a remarkable record for Tulsa Co., where on 5 June Bill Carrell found the species at Keystone Dam in the Cross Timbers Ecoregion (1 male adult, OC445702, and 1 female teneral, OC445701) on 5 June. Although not the first record for the ecoregion (see the Osage Co. record, above), it was not expected at the site where it was found. It thus provided further evidence that the species has a population outside of its expected range on the Ozark Highlands and Ouachita Mountains. Carrell had the species again at that locale on 14 August, when he saw one male and photographed an ovipositing female (OC453133), yet when BS-P surveyed the site on 12 June (with Carrell) and 18 August, she did not find any individuals.

On 19 June and 10 July 2016, MAP surveyed portions of Honobia WMA, Pushmataha Co. (at 8 km SW of Nashoba and 6 km E of Finley, respectively), where he saw three males (OC447526, 1 as SP1981) on the first trip and 1 tandem pair on the next. He encountered the species again on 3 July in Latimer Co. (5 males [1 in hand], and 1 female ovipositing on Fourche Maline Creek at Robbers Cave WMA) and McCurtain Co. (1 female ovipositing on Cooper Creek 9 km ENE of Broken Bow).

A few days later, BS-P documented the first record of the Ozark Emerald in the Oklahoma Ozarks. She encountered nine individuals (6 males, 3 in hand [2 males, SP1998-1999], 3 females, 2 in hand [1 female, SP2000], OC448780) on Hasting's Hollow Creek in Cookson WMA, Cherokee Co., on 6 July. The next day she saw three individuals (2 males, 1 female; female photographed as OC448782, Fig. 3) on Eagle Pass Hollow Creek, Ozark Plateau WMA, Adair Co. The species was not seen at Ozark Plateau WMA when BS-P revisited the site on 16 August.

The 2016 season ended with two additional records for the Ozark region. The first came on 24 September, when Jon Ivy submitted a photo of a single male at The Nature Conservancy's J. T. Nickel Preserve, at Bathtub Rocks (OC456397). This record extended the known flight season for the species by more than a

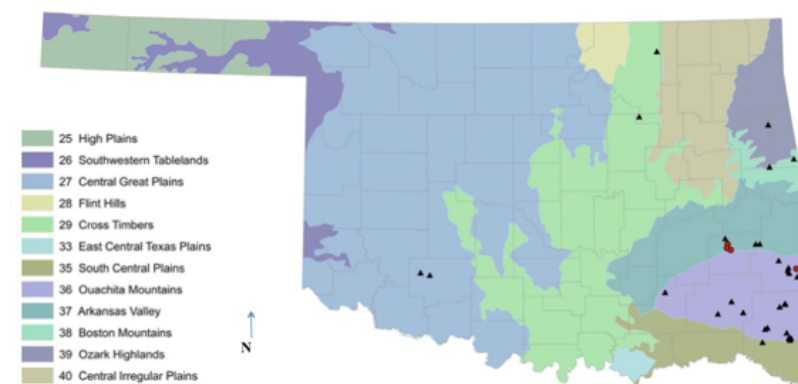


Figure 2. Known locations for Ozark Emerald (*Somatochlora ozarkensis*) in Oklahoma. Historical localities (1931-1934) are red circles; more recent records (2006-2016) are black triangles. The species was not reported between 1934 and 2006. Comanche County records are likely Ozark Emerald but they lack voucher specimens, and the photos cannot without a doubt be attributed to *S. ozarkensis*.

month and a half. Not to be outdone, Cliff Ivy submitted a photo of a single female at the same spot a week later, on 2 October (OC456581). This last record, along with a 2008 record for 28 May (13 km WNW of Hochatown, Cedar Creek, 2 males, both teneral, OC282324), provide the extremes of the known flight season for the Ozark Emerald.

Also in 2016 we received a batch of 2011 and 2012 Ozark Emerald records that had not been reported to us previously. The majority of the records were from McCurtain Co. and are John C. Abbott Collection (JCAC) specimens (6 males, 4 females: 8.5 km SSW of Smithville, Ouachita NF, USFS Rd 28000, 2–3 July 2011). On that same trip, Greg W. Lasley photographed a male and female (iNaturalist 220655, 9 km E of Bethel, 4 km W of Mountain Fork River). The following year on 4 June, Troy Hibbitts reported one individual at the same location of the JCAC specimens, and the next day he photographed a male on the Talimena Highway, 9 km NNW of Big Cedar, Ouachita NF, Le Flore Co. (OC457345). Lastly, on 5 June 2012, Diana and Terry Hibbitts photographed a male in Le Flore Co., 8 km W of Page, Le Flore Co. (iNaturalist 1393295).

Ozark Emeralds have been found within the ecoregions of the Cross Timbers, Ozark Highlands, Boston Mountains, Arkansas Valley, Ouachita Mountains, and South Central Plains (USEPA 2013). There are also two records reported from the Central Great Plains ecoregion. These records are likely Ozark Emeralds, but they lack voucher specimens, and the photographs cannot without a doubt be attributed to *S. ozarkensis* (both by Victor W. Fazio III, in Comanche Co.: OC3134021, 1 male, Fort Sill Military Reserve, West Range, Ketch Canyon, 20 June 2009 and OC328764, 1 male, Wichita Mountains Wildlife Refuge, French Lake, 17 June 2011); i.e., the Texas Emerald (*S. margarita*) or perhaps other emerald species cannot be excluded with certainty.

We have not yet analyzed our habitat assessment data, but we can offer qualitative impressions of where we have encountered the species nonetheless. We have found it in deciduous or mixed deciduous-evergreen woodlands at rocky streams, usually those with much bedrock exposure but sometimes also with sand or fine to pebbly gravel. Stream beds tend to be narrow, only 5–8 m wide. During much of the species' flight season the water in these streams flows at least slightly, but towards the end of the season many streams dry, leaving only scattered pools. Stream water is always clear and usually shallow (approx. 2 cm to <1 m). Males tend to guard small pools or riffles in the stream, waiting for females to arrive. When a female arrives she is more or less immediately captured to mate.

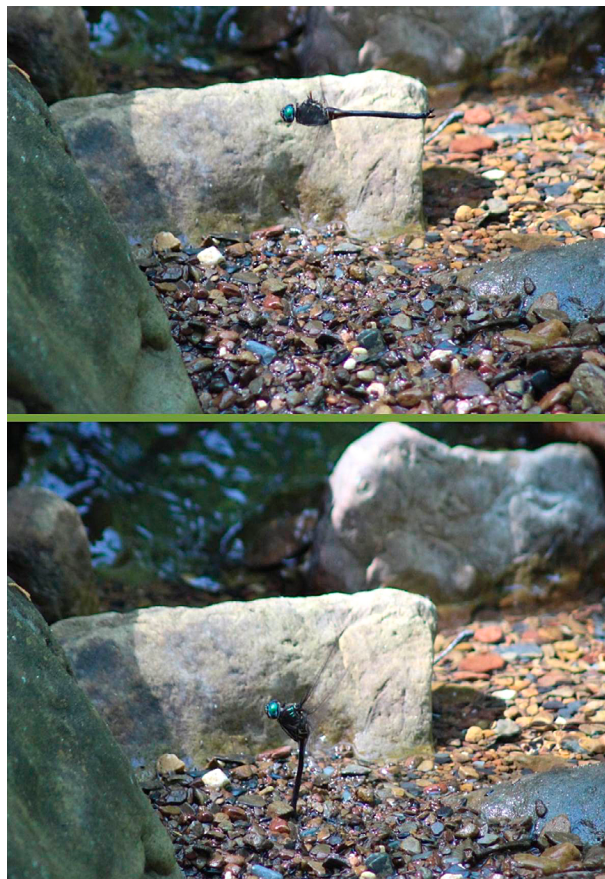


Figure 3. Female Ozark Emerald (*Somatochlora ozarkensis*) ovipositing along Eagle Pass Hollow Creek, Ozark Plateau WMA, Adair Co., Oklahoma, 7 July 2016. Photos by Brenda D. Smith-Patten.

Females have been observed ovipositing most often in trickles of water that flow over gravel or sand, but we have also seen ovipositing in what appear to be non-flowing portions of streams.

We hope to continue habitat assessments during the field season of 2017. Ideally we will also be able to conduct assessments in Arkansas and Missouri. A full report of those assessments will be forthcoming along with a range-wide overview of the Ozark Emerald.

Acknowledgments

Surveys for the Ozark Emerald were provided for by a State Wildlife Grant (F13AF01188, T-73-1) funded through the Oklahoma Department of Wildlife. Additional surveys and the Oklahoma Odonata Project in general were funded and supported by the Oklahoma Biological Survey. We thank John C. Abbott, David Arbour, James W. Arterburn, Bill Carrell, Doug Currie, Jason J. Dombroskie, Jena Donnell, Steven Easley, Zack Falin, Victor W. Fazio III, Brian Ferguson, Mark Ferguson,

Molly Ferguson, John Fisher, Matt Fullerton, George L. Harp, Berlin A. Heck, Bruce Henry, Brad Hubley, Mark Howery, Diana Hibbitts, Terry Hibbitts, Troy Hibbitts, Cliff Ivy, Jon Ivy, Tom Kompier, Boris Kondratieff, Greg W. Lasley, Meredith Mahoney, David Martinez, Paul McKenzie, Mark O'Brien, Dennis Paulson, Herschel Raney, George Sims, Ken Tennessen, Jennifer C. Thomas, and Ken Williams for providing data, helping facilitate research, or both. And a special thanks for David Hille for conducting habitat assessments.

Literature Cited


Bick, G.H. 2003. At-risk Odonata of conterminous United States. *Bulletin of American Odonatology* 7: 41–56.

Bird, R.D. 1933. *Somatochlora ozarkensis*, a new species from Oklahoma (Odonata–Cordulinae). *Occasional Papers of the Museum of Zoology, University of Michigan* 261: 1–7.

Donnelly, T.W. 2004. Distribution of North American Odonata. Part II: Macromiidae, Corduliidae and Libellulidae. *Bulletin of American Odonatology* 8(1): 1–32.

Houston, J. 1970. Notes on the habitat and distribution of the Odonata of Franklin County, Arkansas. *Arkansas Academy of Science Proceedings* 24: 69–73.

Patten, M.A. and B.D. Smith-Patten. 2013. Odonata species of special concern for Oklahoma, USA. *International Journal of Odonatology* 16: 327–350.

USEPA. 2013. United States Environmental Protection Agency, Level III ecoregions of the continental United States: Corvallis, Oregon, U.S. EPA – National Health and Environmental Effects Research Laboratory, map scale 1:7,500,000, <<https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states>>. 

And Now for Something Completely Different...

Nick Donnelly <tdonnelly@binghamton.edu>

Where were you on the day after the election in November? We were flying to Asunción, Paraguay for another southern hemisphere ode adventure. For the first time we were accompanied by two of our three sons, who are marvelous field companions and demon netters of dragonflies.

Why Paraguay? This subtropical country is one of the least-studied for odes in the New World. An Argentine friend, who has several ode projects right across the river from Paraguay, has never been there and his emails suggest that knowledge of Paraguay in bordering countries might be pretty limited.

Our arrival at the airport was a familiar experience: weary passengers in the middle of the night facing equally weary customs officials (the expensive visa was unpleasantly novel), and a long taxi ride down unlit, shabby streets to a barely mid-ranked hotel. We were too tired to really notice that the people were pleasant, and we were pleased that our primitive Spanish seemed to be working unusually well.

We were traveling once again with what Ailsa refers to as the “moth people”, a mainly butterfly/moth bunch, most of whom we knew from previous trips to Panama, Vietnam, and several other countries. The dragonfly people this time comprised half of the group, with a coleopterist and a hemipterist also representing other insect groups.

John Heppner has been organizing these trips for several years, and we now regularly see the world this way, mainly during our northern winter.

Our first collecting place was not far from Asunción, at one of the two Christian evangelical camps where we spent our first week in the country. Very heavy rains just prior to our arrival had filled the streams to hazardous levels and literally dampened our spirits just a bit. The early season odes seem to have been beaten back also, and we spent a week finding somewhat sparse collecting. We did find a new *Gynothemis* species and a *Progomphus* that shouldn't have been there (*P. joergenseni*). All of our group, for different reasons, concluded that November was a little too early for most insects.

Epipleoneura was a new genus for the country. It is a very small, very thin, and very dark protoneturid damselfly. After many trips to the New World tropics I have now developed an eye for these guys. I took it in Panama, Guyana, and Venezuela years ago, and more recently found it in French Guiana and Brazil. The species *E. venezuelensis* is apparently widespread, but I think it is under-reported. In French Guiana a few years ago in the early morning I noticed a common, small plant that grows along clear streams in tropical forest. I noted that one of the attenuate leaves of this plant seemed just a bit longer and a little more attenuate. Try as I did, I simply could not resolve a