splendens (Pictet) in Galicia, northwestern Spain (Anisoptera: Corduliidae). Odonatologica 28: 333–342.
DuBois, R.B. and D.M. Pratt. 1994. History of the fishes of the Bois Brule River system, Wisconsin, with emphasis on the salmonids and their management. Transactions of the Wisconsin Academy of Sciences, Arts and Letters 82: 33–71.
Johnson, C. 1962. A note on synchronized emergence in *Gomphus vastus* Walsh (Odonata: Gomphidae). The Canadian Entomologist 95: 69.
Oertli, B. 2008. The use of dragonflies in the assessment and monitoring of aquatic habitats (Chapter 7). *In*: Cordoba-Aguilar, A., editor. Dragonflies and Damselflies: Model organisms for ecological and evolutionary research. New York: Oxford University Press Inc. p. 79–95.
Orr, R. 2006. Volunteers collect dragonfly cast skins for surveys along Potomac River. *In*: Natural Resource Year In Review (p. 6): 2005. A Portrait of the Year in Natural Resource Stewardship and Science in the National Park System. National Park Service, US Department of the Interior, Denver, Colorado.
Tonczyk, G. 2007. Horizontal and vertical parameters of *Ophiogomphus cecilia* (Fourcroy, 1785) (Odonata: Gomphidae) emergence in small lowland river. Odonatrix 3(1): 23–25.

The Oklahoma Odonata Project: Progress and Trends

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As the 2014 odonate season comes to a close, we have completed the sixth year of statewide surveys designed to plug gaps in our knowledge about the status, distribution, and ecology of Odonata across the state of Oklahoma. We launched this project, which was funded by the Oklahoma Biological Survey and Oklahoma Department of Wildlife Conservation, in 2009. In recent years our efforts have resulted in a number of publications (e.g., see recent issues of Argia; Patten and Smith-Patten, 2013a), including the first review of odonate species of conservation concern for any American state (Patten and Smith-Patten, 2013b). Herein we report progress and highlight major findings as well as trends we have noted.

County Lists

We initiated the project by compiling records taken from field notes, archived photographs, publications (e.g., Bird, 1932; Bick and Bick, 1957; Donnelly, 2004a, b, c; Abbott, 2005), and museum specimens. Our initial pass through these sources provided us with a starting point of species lists for each of Oklahoma's 77 counties. Our results disheartened us when we learned that fewer than ten species had been recorded in some counties and there were dozens that had 30 or fewer (Fig. 1, upper). We reasoned that species richness must reach at least 40 in every county, so we devised a color-coded map to guide our sporadic survey efforts from 2009 through 2011 (our efforts were far more systematic from 2012 through 2014).

We continued to compile literature, field note, photographic, and specimen records. We obtained specimen records from more than twenty museums, a half a dozen of which we visited personally to inventory ~8,000 specimens. Over the years we have gathered >38,000 records, accounting for roughly 17,000 specimens and hundreds of thousands of individual odonates in the state (our own field notes account for >133,000 individual odonates!). All of these records are georeferenced, and a third of them come from the Dust Bowl era (1930s) and earlier (dating back to 1877) and thus offer a glimpse into the state's odonates decades earlier. And little by little we pieced together the basis for literature records. During this process, we were deflated sometimes, such as when we had to remove a species from the state list (see below), or when we visited the University of Michigan's Museum of Zoology to discover that misattribution of a series of specimens meant we had to remove a half-dozen species from Custer, a county already wanting, only to add them to the neighboring Caddo, a county that already enjoyed a large species total. On the bright side, we were heartened on occasion when we discovered new state records that had gone unidentified or had been misidentified (Table 1; Smith-Patten and Patten, 2012, 2013b).

As the 2012 field season drew to a close, we had closed in on 40 species in every county—we were just one county short (Fig. 1, center)—so we recalibrated the threshold to 50 species as it became clear to us, on the basis of our field work and data compilation, that 50 species was attainable and reasonable in every county. We operated with a 50-species threshold as a target in 2013 and 2014. As the 2014 field season closed, only 13 of the 77 counties remained below the threshold, with no county below 45 species (Fig. 1, lower). All told, since 2009 we have added 1752 species across the 77 counties!

Another aspect of our data compilation has been an effort to identify what sort of documentation supported each spe-

cies in each county, the goal being to ensure that extant specimens or archived photographs supported every county record. In a majority of instances we have located specimens that support a county occurrence, and for a majority of records for which we have not located a specimen an identifiable photograph is archived at OdonataCentral. There are now a mere 3.2%—146 county records of 4611 summed across all counties—of records supported solely by a literature reference. Similarly, a mere 3.3% (150 of 4611) of all county records are sight records. Hence, 93.6% of the 4611 county records are supported by specimens or identifiable photographs. We moreover determined that all but twelve of the 168 species (i.e., 92.9%) recorded in the state are supported by extant specimens (Table 2).

The State List

It was generally accepted that at the end of 2008 Oklahoma's list of Odonata stood at 136 species (Abbott 2005). One of these species, the Spotted Spreadwing (*Lestes congener*), had long been attributed to the state, but the male specimen on which Bick (1991) had based the claim actually is a Plateau Spreadwing (*L. alacer*; Patten and Smith-Patten 2013a). To counter this slight loss in richness, we discovered three species in museum collections that had not been published (Table 1; Smith-Patten and Patten, 2012, 2013). There were also two species that had yet to be reported. A Western Forktail (*Ischnura perparva*) was collected in 2003 at Ft. Sill by Boris C. Kondratieff and his colleagues but was not published until three years later (Zuellig *et al.*, 2006; OC 381755). The only Oklahoma record of Lance-tipped Darner (*Aeshna constricta*) was photographed in 2004 but was not identified until 2011 (OC 334055). So in reality, 140 species had been recorded in the state when Donnelly (2004a, b, c) and Abbott (2005) published their works, although four of those species were in hiding.

Since 2005, 28 additional species have been found in Oklahoma, bringing the state list to 168 species, a total tied with Massachusetts for the eleventh highest state list in the country. All but a handful of these additional species have been found repeatedly (Table 1), although three—Western Forktail, Leonora's Dancer, (*Argia leonorae*), and Banner Clubtail (*Gomphus apomyius*)—have been recorded but twice each and may yet prove to be vagrants to the state. Breeding activity (tandem pairs or females ovipositing) has been documented for two other species, Duckweed Firetail (*Telebasis byersi*) and Bayou Clubtail (*Arigomphus maxwelli*), that have been recorded only twice each.

Overlooked Species and Colonizations

Among recent additions to the state list, four species have small but established breeding populations in the

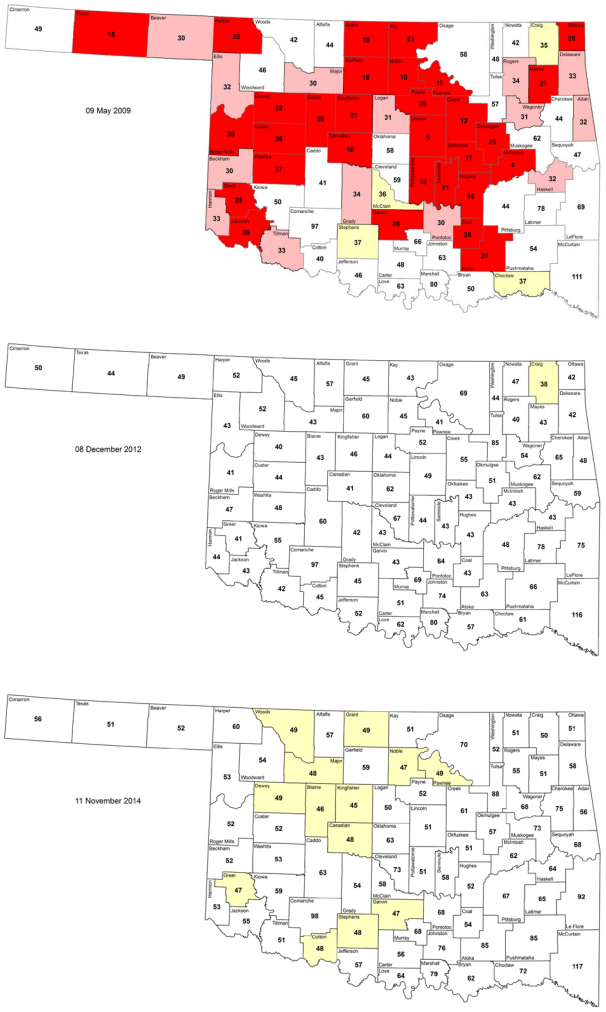

Figure 1. Oklahoma odonate species richness by county: when the statewide project began (top); at the end of the mid-way point (center); and at the end of the 6th year (bottom). In the top two maps, color codes are: red <30 species; pink 30-34 species; pale yellow 35-39 species; white ≥40 species. In the bottom map, color codes are: red <40 species; pink 40-44 species; pale yellow 45-49 species; white ≥50 species.

state and probably were overlooked previously: Atlantic Bluet (*Enallagma doubledayi*; Patten and Smith-Patten, 2012), Sphagnum Sprite (*Nehalennia gracilis*; Smith-Patten and Tucker, 2014), Ashy Clubtail (*G. lividus*), and Selys's Sundragon (*Helocordulia selysii*). Another species, Marl Pennant (*Macrodiplax balteata*), occurs regularly but appears to have colonized in the past six years given that it now has been recorded in 19 counties in western Oklahoma, with breeding activity (ovipositing, tandem pairs) observed in several counties (Comanche, Jackson, and Ellis). Two other species, Amber-winged Spreadwing (*Lestes eurinus*) and Bleached Skimmer (*Libellula composita*), may be in the process of colonizing the state. The single female spreadwing collected in Pushmataha County in 2013 was thought to be a vagrant (Patten and Smith-Patten, 2013a, b; SP 688),

but 2014 saw multiple records in northeastern Cherokee County, including five in one day in mid-June (OC 423037) and multiple females there in early July (OC 424308). Likewise, the single male Bleached Skimmer photographed in Texas County in 2011 (OC 331112) was thought to be a vagrant, but less than a year later four males and a female, including a tandem pair, were discovered in Beckham County (OC 375611; SP 276), and in 2013 three males and a female, with another tandem pair, were photographed in Ellis County (OC 401522 and 401523) one day after a remarkable 18 males were counted at the site of the original record in Texas County (SP 796).

Regal Darner (*Coryphaeschna ingens*), Two-striped Forceptail (*Aphylla williamsoni*), Cocoa Clubtail (*G. hybridus*), and perhaps Twin-spotted Spiketail (*Cordulegaster maculata*) occur regularly or nearly so in spring or summer in McCurtain County (the darner recently was recorded in Atoka, too; OC 424926), but it is not clear to what extent these species breed in the state. Likewise, Western Pondhawk (*Erythemis collocata*) has been well documented at least three times in western Cimarron County (Smith-Patten and Patten, 2013b) at the tip of the panhandle, and it may breed there on occasion. Two other species, Hyacinth Glider (*Miathyria marcella*) and Striped Saddlebags (*Tramea calverti*), have been recorded multiple times in autumn, but records likely refer to post-breeding movement north of normal breeding areas. Similarly, the single record of White-faced Meadowhawk (*Sympetrum obtrusum*; Smith-Patten and Patten, 2013a) and the multiple records of Saffron-winged Meadowhawk (*S. costiferum*; Table 1) appear to have wandered post-breeding south of their ranges during periods of strong northerly winds. Their occurrences coincide with small invasions that the Cherry-faced Meadowhawk (*S. internum*) stages at irregular intervals (Smith-Patten and Patten, 2013a). The sole Striped Meadowhawk (*S. pallipes*) also may have been a wind-borne vagrant, but the species may be a more regular visitor. Although known currently from a single record, we suspect the Seaside Dragonlet (*Erythrodiplax berenice*) will be shown to be a resident in salt marshes of the southwestern-most part of the state. Likewise, Black Setwing (*Dythemis nigrescens*; Smith-Patten 2014) may occur regularly in southwestern Oklahoma.

Lastly, the sole record of a Ouachita Spiketail (*Cordulegaster talaria*; Heck, 2011) hints at the possibility of an undiscovered breeding population in Oklahoma at this locality of this recently described species (Tennessen, 2004), and the same may hold for the sole Allegheny River Cruiser (*Macromia alleghaniensis*) documented in the state (OC 376227) given the small population known from adjacent western Arkansas (Harp and Harp, 1996).

Declines and Disappearances

As we noted in our assessment of species of special concern for Oklahoma (Patten and Smith-Patten, 2013b), various species known from the state were collected formerly in large numbers but now are scarce and seldom found. Key examples include Smoky Rubyspot (*Hetaerina titia*) and Mexican Forktail (*Ischnura demorsa*), each of which has been recorded only a few times in the past five years or more. Other species, such as Plateau Spreadwing (*Lestes alacer*), remain fairly numerous but appear to have declined given the current status relative to prior collection records. One species, the Little Blue Dragonlet (*Erythrodiplax minuscula*), was recorded sporadically in the state from the early 1930s to late 1960s, was "refound" in the southeastern corner of the state in the late 2000s, and yet has not been recorded anywhere in the state in the past four years. Likewise, Rainbow Bluet (*Enallagma antennatum*) was recorded routinely in Cimarron and Alfalfa Counties but went unrecorded from the mid-1970s until 2013, when two individuals were discovered (SP 587, 594). This lotic species, just like the rubyspot and forktail mentioned above, may vanish from the state as streams in western Oklahoma desiccate with a combination of drought and draining of aquifers to irrigate crops.

Hybridization

Hybrid zones are well known on the Great Plains, particularly among vertebrates (Moore, 1977; Rising, 1983) and along the eastern edge of the Rocky Mountains (Swenson and Howard, 2005). Three hybrid zone and contact zone "hotspots" have been identified in Oklahoma: one in the western panhandle, one southwest of the Wichita Mountains in the southwestern corner of the state, and one at the western edge of the Ouachita Mountains in the southeastern quadrant (Swenson and Howard, 2005). These three zones occur where key biotic provinces meet, i.e., respectively, the Navahonian and Kansan, Kansan and Texan, and Texan and Austroriparian (*sensu* Abbott and Stewart, 1998). Moreover, as Moore (1977) noted, "The occurrence of the [Great Plains hybrid] zones appears to correlate with a change in climatic conditions, viz., precipitation. It is also possible that this region represents an interface between distinct floristic assemblages, i.e., an ecotone."

Oklahoma is thus a biogeographic crossroads, where faunas from eastern North America, western North America, and subtropical northern Mexico (and south Texas) converge. This convergence yields high species richness, which is wonderful, but also has led to our routine discovery of apparent hybrids and other anomalies. Some hybrids, such as a couple of potential Eastern × Western Pondhawks (*Erythemis simplicicollis* × *E. collocata*; SP 745, 746) in the

Table 1. Odonata species added to the Oklahoma state list 2003-2014. Records marked with an asterisk remain the sole ones for that species. "Historical records" are specimens that languished in museum collections that had not been identified or published.

English Name	Scientific Name	Date	County	Observers
Historical Records				
Leonora's Dancer†	*Argia leonorae*	9 Jul. 1932	Comanche	R. D. Bird
Brimstone Clubtail*	*Stylurus intricatus*	~25 Aug. 1932	Harper	A. E. Pritchard
Western Pondhawk	*Erythemis collocata*	5 Aug. 1970	Cimarron	L. E. Hornuff
Contemporary Records				
Western Forktail	*Ischnura perparva*	20 Sept. 2003	Comanche	B. C. Kondratieff
Lance-tipped Darner*	*Aeshna constricta*	18 Oct. 2004	Tulsa	B. Carrell
Bayou Clubtail	*Arigomphus maxwelli*	25 Apr. 2005	McCurtain	D. Arbour
Two-striped Forceptail	*Aphylla williamsoni*	28 Aug. 2005	McCurtain	D. Arbour
Evening Skimmer*	*Tholymis citrina*	20 Apr. 2006	McCurtain	D. Arbour
Striped Saddlebags	*Tramea calverti*	19 Aug. 2006	Tulsa	J. Fisher & B. Carrell
Cocoa Clubtail	*Gomphus hybridus*	4 Apr. 2007	McCurtain	B. A. Heck
Hyacinth Glider	*Miathyria marcella*	10 Oct. 2007	McCurtain	D. Arbour
Cardinal Meadowhawk*	*Sympetrum illotum*	30 Oct. 2007	Comanche	V. W. Fazio III
Selys's Sundragon	*Helocordulia selysii*	21 Mar. 2008	McCurtain	B. A. Heck
Regal Darner	*Coryphaeschna ingens*	7 Jul. 2008	McCurtain	D. Arbour & B. Heck
Filigree Skimmer*	*Pseudoleon superbus*	30 Sept. 2008	Jefferson	V. W. Fazio III
Marl Pennant	*Macrodiplax balteata*	12 Jul. 2009	Comanche	V. W. Fazio III
Twin-spotted Spiketail	*Cordulegaster maculata*	20 Apr. 2010	McCurtain	B. A. Heck
Ashy Clubtail	*Gomphus lividus*	7 May 2010	McCurtain	B. A. Heck
Banner Clubtail	*Gomphus apomyius*	15 May 2010	McCurtain	B. A. Heck
Duckweed Firetail	*Telebasis byersi*	14 Jun. 2010	McCurtain	D. A. Arbour
Ouachita Spiketail	*Cordulegaster talaria*	18 Apr. 2011	McCurtain	B. & G. Heck
Bleached Skimmer	*Libellula composita*	5 Aug. 2011	Texas	V. W. Fazio III
Allegheny River Cruiser	*Macromia alleghaniensis*	20 Jun. 2012	McCurtain	B. A. Heck
Atlantic Bluet	*Enallagma doubledayi*	2 Sept. 2012	Atoka	MAP & BS-P
White-faced Meadowhawk*	*Sympetrum obtrusum*	22 Sept. 2012	Kingfisher	MAP & BS-P
Saffron-winged Meadowhawk‡	*Sympetrum costiferum*	11 Oct. 2012	Grant	J. R. Heinen
Sweetflag Spreadwing*	*Lestes forcipatus*	9 Jun. 2013	LeFlore	MAP & BS-P
Amber-winged Spreadwing	*Lestes eurinus*	10 Jun. 2013	Pushmataha	MAP & BS-P
Black Setwing*	*Dythemis nigrescens*	9 May 2014	Jackson	BS-P
Sphagnum Sprite	*Nehalennia gracilis*	3 Jun. 2014	Atoka	BS-P & J. Tucker
Seaside Dragonlet*	*Erythrodiplax berenice*	3 Aug. 2014	Jackson	MAP & BS-P
Striped Meadowhawk*	*Sympetrum pallipes*	9 Sept. 2014	Cimarron	B. Carrell
Plateau Dragonlet*	*Erythrodiplax basifusca*	21 Oct. 2014	Harmon	MAP & BS-P

†A ♂ photographed and examined in hand by T. Kompier, 28 July 2011, Kiowa Co. (OC 333094) was thought to be the 1st state record, but three years later we discovered this ♂ in the Sam Nobel Museum at Univ. of Oklahoma.
‡We thought four ♂ observed in Kay Co. on 15 Oct. 2014, two of which were collected and one photographed (OC 427449) were the 1st state record; a few days later we determined Heinen had photographed the species in Grant (OC 382090) and Kay Co. (OC 382107) in 2012 and collected two ♂ and one ♀, identified as *S. vicinum*.

western tip of the panhandle, have not surprised us (see Smith-Patten and Patten 2013b), and perhaps the same can be said of the ♂ Twelve-spotted × Widow Skimmer (*Libellula pulchella* × *L. luctuosa*; SP 1016) hybrid we collected in Canadian County in the central part of the state in September 2013. A possible Cherry-faced × White-faced Meadowhawk (*Sympetrum internum* × *S. obtrusum*; SP 430) is not surprising as Donnelly (1997) discussed such a cross, although it was remarkable given that it made its way to Oklahoma, where *S. obtrusum* has been documented definitely just once and *S. internum* occurs irregularly (Smith-Patten and Patten, 2013a).

Other hybrids have shocked us, foremost among them a ♂ river cruiser (*Macromia*) that is an apparent Swift × Bronzed (*M. illinoiensis georgina* × *M. annulata*) in Ellis County in the northwestern portion of the state in July 2013 (SP 785). This record stuns us on two fronts: it marks the first known hybrid between the two species, and it was found in an area outside the range of either species; indeed, *M. annulata* is unknown from Oklahoma. Equally shocking is that we have collected a potential Comanche × Great Blue Skimmer (*L. comanche* × *L. vibrans*; SP 1036) hybrid in Harper County in the northwestern corner of the state, an area well within the range of *L. comanche* but well outside that of *L. vibrans*.

Zygopterans, too, have provided a challenge, not least the various ♂ Eastern Forktail (*Ischnura verticalis*) specimens we have collected that have paired spots on the thorax akin to a Plains Forktail (*I. damula*). Is this a sign of gene flow? What do we make of the Familar Bluet (*Enallagma civile*; SP 1466) from Jackson County in October 2014 that has typical *E. civile* cerci but displays a pattern of extensive black on the dorsal surface of the abdomen that matches exactly the pattern on various ♂ Tule Bluets (*E. carunculatum*) we have collected in Oklahoma and elsewhere? Is this individual a hybrid between these two species? And what can we say of the handful of ♂ dancer (*Argia*) specimens we have collected in the central portion of the state, from Kay

Table 2. Odonata species on Oklahoma's state list that are not supported by an extant specimen.

English Name	Scientific Name	Date	County	Source
Historical Records				
Chalky Spreadwing†	*Lestes sigma*	22 Jul. 1968	Marshall	Bick (1978)
Cinnamon Shadowdragon‡	*Neurocordulia virginiensis*	17 Jun. 1934	McCurtain	Byers (1937)
Recent Records				
Lance-tipped Darner	*Aeshna constricta*	18 Oct. 2004	Tulsa	OC 334055
Cardinal Meadowhawk	*Sympetrum illotum*	30 oct. 2007	Comanche	OC 263515
Filigree Skimmer	*Pseudoleon superbus*	30 Sept. 2008	Jefferson	OC 284013, 284120
Twin-spotted Spiketail	*Cordulegaster maculata*	20 Apr. 2010	McCurtain	OC 318493, 327593, 374173, 374178
Banner Clubtail	*Gomphus apomyius*	15 May 2010	McCurtain	OC 318873, 327591
Ouachita Spiketail	*Cordulegaster talaria*	18 Apr. 2011	McCurtain	Heck (2011); OC 327732
Allegheny River Cruiser	*Macrimia alleghaniensis*	20 Jun. 2012	McCurtain	OC 376227
Black Setwing	*Dythemis nigrescens*	9 May 2014	Jackson	Smith-Patten (2014); OC 422099
Striped Meadowhawk	*Sympetrum pallipes*	9 Sept. 2014	Cimarron	OC 426895
Plateau Dragonlet	*Erythrodiplax basifusca*	21 Oct. 2014	Harmon	OC 427500

† Bick collected this ♂ but the identification was confirmed by the venerable Leonora K. Gloyd, then with Univ. of Michigan. We have been unable to find the specimen at the IORI in Gainesville Florida, where most of Bick's collection was donated, or at the Univ. of Michigan Museum of Zoology. ‡Byers (1937) reported in a footnote a ♀ collected by J. Standcavish in SE Oklahoma. The identification was determined by W.T. Davis (see Davis, 1937) who published the species' type description. We have been unable to locate the specimen, which may have remained in A.E. Pritchard's collection, only some of which we have been able to track.

County south to Garvin County, that largely match the Springwater Dancer (*A. plana*) in terms of their cerci but have thick black antehumeral stripes, sometimes forked and sometimes not, reminiscent of the antehumeral stripes on the Blue-ringed Dancer (*A. sedula*) or Kiowa Dancer (*A. immunda*)? Is this anomalous pattern an indication of gene flow? If so, which species have hybridized? And why have we located such individuals only in the center of the state, on the western fringe of the crosstimbers belt?

These questions and many like them will ensure that the Oklahoma project moves forward in earnest. Clearly, much remains to be discovered.

Abbreviations: OC = Odonata Central <http://www.odonatacentral.org/>; SP = Smith-Patten/Patten collection (housed at the Oklahoma Biological Survey).

Acknowledgments

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Literature Cited

Abbott, J.C. 2005. Dragonflies and damselflies of Texas and the south-central United States. Princeton University Press, Princeton, New Jersey.

Abbott, J.C., and K.W. Stewart. 1998. Odonata of the south central Nearctic region, including northeastern Mexico. Entomological News 109: 201–212.

Bick, G.H. 1978. New state records of United States Odonata. Notulae Odonatologicae 1: 17–19.

Bick, G.H. 1991. Oklahoma revisited: Unpublished records. Argia 3(1):1–4.

Bick, G.H. and J.C. Bick. 1957. The Odonata of Oklahoma. Southwestern Naturalist 2: 1–18.

Bird, R.D. 1932. Dragonflies of Oklahoma. Pub. University of Oklahoma Biological Survey 4: 50–57.

Byers, C.F. 1937. A review of the dragonflies of the genera *Neurocordulia* and *Platycordulia*. Miscellaneous Publications of the Museum of Zoology, University of Michigan 36: 1–36.

Davis, W.T. 1937. Second record of the dragonfly *Neurocordulia virginiensis*. Journal of the New York Entomological Society 45: 250.

Donnelly, T.W. 1997. The hunt of red *Sympetrum*. Argia 9(3): 17–18.

Donnelly, T.W. 2004a. Distribution of North American Odonata. Part I: Aeshnidae, Petaluridae, Gomphidae, Cordulegastridae. Bulletin of American Odonatology 7: 61–90.

Donnelly, T.W. 2004b. Distribution of North American Odonata. Part II: Marcomiidae, Corduliidae, Libellulidae. Bulletin of American Odonatology 8: 1–32.

Donnelly, T.W. 2004c. Distribution of North American Odonata. Part III: Calopterygidae, Lestidae, Coenagrionidae, Protoneuridae, Platystictidae. Bulletin of American Odonatology 8: 33–99.

Harp, G. . and P.A. Harp. 1996. Previously unpublished Odonata records for Arkansas, Kentucky, and Texas. Notulae Odonatologicae 4: 127–130.

Moore, W.S. 1977. An evaluation of narrow hybrid zones in vertebrates. Quarterly Review of Biology 52: 263–277.

Patten, M.A. and B.D. Smith-Patten. 2012. First record of the Atlantic Bluet (*Enallagma doubledayi*) for Oklahoma. Argia 24(4): 16–17.

Patten, M.A. and B.D. Smith-Patten. 2013a. Two new species, *Lestes eurinus* Say and *L. forcipatus* Rambur, for Oklahoma, with comments on other vagrant *Lestes* recorded in the state (Zygoptera: Lestidae). Notulae Odonatologicae 8: 29–32.

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

Rising, J.D. 1983. The Great Plains hybrid zones. Current Ornithology 1: 131–157.

Smith-Patten, B.D. 2014. First record of Black Setwing (*Dythemis nigrescens*) for Oklahoma. Argia 26(2): 13–14.

Smith-Patten, B.D. and M.A. Patten. 2012. *Stylurus intricatus*, a new old record for Oklahoma. Argia 24(3): 10–11.

Smith-Patten, B.D., and M.A. Patten. 2013a. First record of the White-faced Meadowhawk (*Sympetrum obtrusum*) for Oklahoma, and a review of the status of the Cherry-faced Meadowhawk (*S. internum*) in the state. Argia 25(2): 12–13.

Smith-Patten, B.D. and M.A. Patten. 2013b. First records of the Western Pondhawk (*Erythemis collocata*) for Oklahoma. Argia 25(3): 19–21.
Smith-Patten, B.D., and J.A. Tucker. 2014. First Record of the Sphagnum Sprite (*Nehalennia gracilis*) for Oklahoma. Argia 26(4): 26–27.
Swenson, N.G. and D.J. Howard. 2005. Clustering of contact zones, hybrid zones, and phylogeographic breaks in North America. American Naturalist 166: 581–591.
Tennessen, K.J. 2004. *Cordulegaster talaria*, n. sp. (Odonata: Cordulegastridae) from west-central Arkansas. Proceedings of the Entomological Society of Washington 106: 830–839.
Zuellig, R.E., B.C. Kondratieff, J.P. Schmidt, R.S. Durfee, D.E. Ruiter, and I.E. Prather. 2006. An annotated list of aquatic insects of Fort Sill, Oklahoma, excluding Diptera with notes on several new state records. Journal of the Kansas Entomological Society 79: 34–54.

Records Request for Research Project on *Argia* of the Guiana Shield

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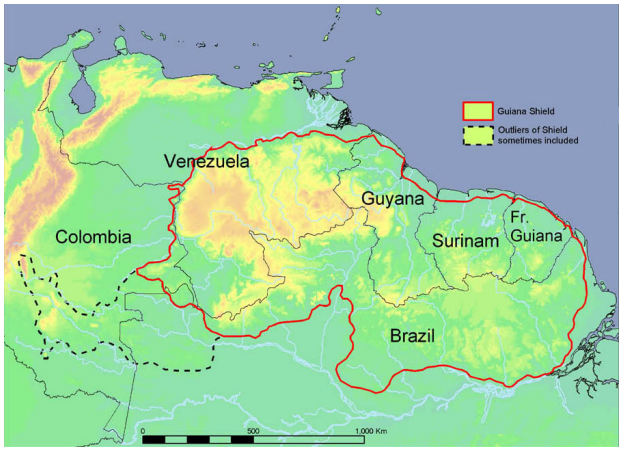
Dr. Natalia von Ellenrieder and I are working on a manuscript entitled "Damselflies of the genus *Argia* of the Guiana Shield (Odonata: Coenagrionidae)". We have documented 19 species, of which 11 are new. The illustrations are mostly down as are locality maps but the text still needs to be written.

The following described species are known from the region: *Argia collata* Selys, *A. euphorbia* Fraser, *A. fumigata* Hagen in Selys, *A. insipida* Hagen in Selys, *A. oculata* Hagen in Selys, *A. pulla* Hagen in Selys, and *A. translata* Hagen in Selys. In describing our new species, we are comparing them with other species not known to occur within the Guyanan Shield and we are also treating some of the extra-limital species in more detail. We are requesting help on the following points:



Map showing the outline of the Guiana Shield..

Argia insipida: This species is known from the Guyanas and Colombia and, curiously, from Costa Rica. We have seen no records from Panama for this species. Does anybody have records of *A. insipida* from Panama or from Nicaragua?

***Argia pipila* Calvert**: This species is similar to *A. insipida* and to the more northerly *A. barretti* and has been recorded as far south as Honduras, although there is an unpublished record supposedly of this species from Nicaragua in the University of Florida collections. This specimen may represent *A. insipida* and needs to be re-examined. Does anybody have records of either species from Nicaragua or San Salvador or Honduras?

***Argia frequentula* Calvert**: We collected specimens from southernmost Costa Rica (Puntarenas Province, Rio km 20, 12 km east of Golfito on ruta 14; sandy stream, 8.6172°, -83.0644°) just northwest of the Panamanian border. Does anybody have records of this species from Panama?

If anyone has any records or information to share, please contact me at <rgarrison@gmail.com>.

Would You Like to See Any New Features in Argia?

If you have ideas for new features for future issues of Argia that could make it an even more interesting, useful, or eye-catching publication, contact the Editor at <celeste@xerces.org>. Several current regular features such as the Advice Column and How I Fell Into the Cluthces of the Odonata stemmed directly from reader suggestions, and we're always looking for good ideas.