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Further Distributional Records for Arkansas Anisoptera

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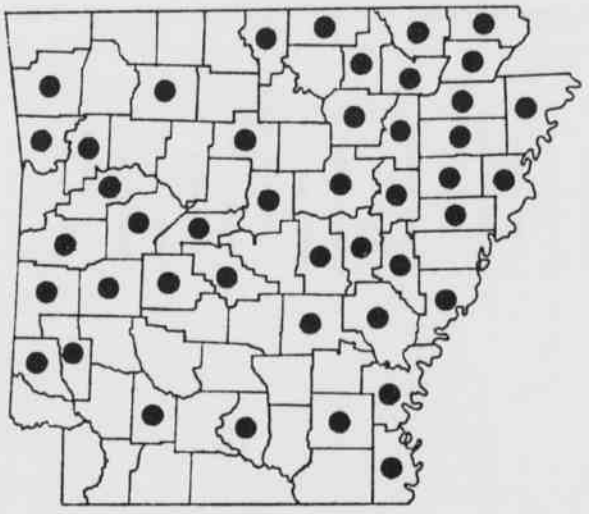

Figure 1. *Hydrometra martini*

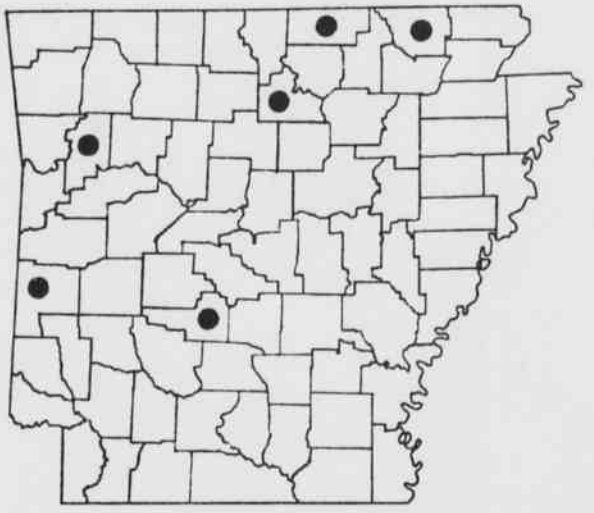

Figure 2. *Hydrometra hungerfordi*

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FURTHER DISTRIBUTIONAL RECORDS FOR ARKANSAS ANISOPTERA

Harp and Rickett (The dragonflies [Anisoptera] of Arkansas, Proc. Ark. Acad. Sci., 31:50-54, 1977) reviewed earlier literature concerning Arkansas Anisoptera and reported 84 species for the state. Dunkle (New records of North American Odonata, Ent. News, 94:136-138, 1983) added one species, and Harp (New and unusual records of Arkansas Anisoptera, United States, Notul. odonatol., 2[2]:26-27, 1983) added six species but deleted two reported by Harp and Rickett (1977), bringing the state list at that time to 89. The purposes of this paper are to make current both the Arkansas Anisoptera species list and the distribution records of each species by county.

The majority of new distributional information reported herein derives from collections by the authors. Supplementing this have been specimens and records transmitted to us by several considerate supporters. Two species are reported for Arkansas for the first time. *Gomphurus modestus* Needham was collected on the Saline R. at U.S. Hwy 70, approximately 4 mi SW Dierks, Howard County, on 20-VI-84. *Brechmorhoga mendax*

General Notes

Table 1. Arkansas Petaluridae, Cordulegastridae and Gomphidae, listed by county.

COUNTY	SPECIES	*Tachopteryx thoreyi*	*Cordulegaster maculata*	*C. obliqua*	*Arigomphus lentulus*	*A. maxwelli*	*A. submedianus*	*A. villosipes*	*Dromogomphus spinosus*	*D. spoliatus*	*Erpetogomphus designatus*	*Gomphurus externus*	*G. hybridus*	*G. modestus*	*G. ozarkensis*	*G. vastus*	*Gomphus exilis*	*G. graslinellus*	*G. lividus*	*G. oklahomensis*	*G. quadricolor*	*Hagenius brevistylus*	*Hylogomphus apomyius*	*Ophiogomphus westfalli*	*Progomphus obscurus*	*Stylogomphus albistylus*	*Stylurus laurae*	*S. plagiatus*	*S. spiniceps*
Arkansas																												
Ashley																												
Baxter		X																							X			
Benton																X									X			
Boone																												
Bradley									X	X	X					X						X			X			
Calhoun										X	X									X					X			
Carroll																X						X						
Chicot																									X		X	
Clark				X																		X			X	X		
Clay							X		X	X							X											
Cleburne									X						X			X				X						
Cleveland																												
Columbia			X	X					X													X			X			
Conway									X																			
Craighead									X	X		X				X									X			
Crawford															X													
Crittenden						X																						
Cross									X	X															X		X	
Dallas																						X						
Desha																												
Drew				X						X	X					X						X			X			
Faulkner									X	X																		
Franklin				X	X				X	X					X	X		X		X		X						
Fulton				X					X	X					X	X		X	X			X		X		X		
Garland				X					X	X												X				X		
Grant									X													X						
Greene		X	X	X						X						X									X		X	
Hempstead																											X	
Hot Spring										X												X						
Howard										X	X			X		X						X			X	X		
Independence									X	X												X			X			
Izard									X		X				X			X			X	X			X			
Jackson							X			X																		
Jefferson							X			X																	X	
Johnson																						X				X		
Lafayette			X																			X						
Lawrence									X	X	X							X				X			X	X		
Lee										X																		
Lincoln																									X			
Little River											X	X										X					X	
Logan									X									X				X						
Lonoke										X																		
Madison									X						X			X								X		
Marion									X		X				X	X			X			X		X				
Miller				X												X						X			X			
Mississippi					X		X					X						X									X	
Monroe										X																		
Montgomery		X	X	X					X						X			X				X			X	X		
Nevada			X																								X	
Newton																						X						
Ouachita				X																						X		
Perry									X	X																	X	
Phillips							X		X	X																		
Pike				X				X		X					X							X	X		X			
Poinsett					X		X		X	X																		
Polk		X	X	X											X			X				X				X		
Pope									X													X						
Prairie									X																			
Pulaski		X					X															X				X		
Randolph									X	X						X						X				X		X
St. Francis																									X			
Saline			X						X	X						X									X	X	X	
Scott					X				X						X			X				X		X				
Searcy									X													X						
Sebastian					X													X										
Sevier				X						X	X			X	X	X				X		X			X	X		
Sharp		X					X		X	X									X			X		X	X	X		
Stone		X							X									X			X	X	X			X		
Union										X						X						X						
Van Buren									X							X						X						
Washington		X								X					X			X				X		X		X		
White							X		X													X						
Woodruff																												
Yell									X				X		X							X						
Total Co.		8	7	13	5	1	9	1	33	30	9	3	1	2	14	16	1	14	3	3	2	40	2	6	20	20	1	9	1

Table 2. Arkansas Aeshnidae, Macromiidae and Corduliidae, listed by county.

COUNTY / SPECIES	*Aeshna constricta*	*A. interrupta*	*A. umbrosa*	*Anax junius*	*A. longipes*	*Basiaeschna janata*	*Boyeria vinosa*	*Coryphaeschna ingens*	*Epicaeschna heros*	*Gomphaeschna furcillata*	*Nasiaeschna pentacantha*	*Didymops transversa*	*Macromia georgina*	*M. illinoiensis*	*M. pacifica*	*M. taeniolata*	*Epitheca cynosura*	*E. princeps*	*E. williamsoni*	*Helocordulia uhleri*	*Neurocordulia molesta*	*N. virginiensis*	*N. xanthosoma*	*Somatochlora filosa*	*S. linearis*	*S. ozarkensis*	*S. tenebrosa*
Arkansas							X				X					X	X	X									
Ashley							X		X				X				X								X		
Baxter																		X									
Benton				X														X									
Boone				X														X									
Bradley			X				X		X		X						X										
Calhoun				X		X	X		X		X						X	X									
Carroll						X																					
Chicot				X													X	X									
Clark				X			X		X		X									X		X					
Clay				X		X	X				X		X			X	X	X									
Cleburne				X			X					X						X					X				
Cleveland											X						X	X									
Columbia				X		X	X		X		X					X											
Conway				X							X			X													
Craighead				X			X		X							X	X	X						X	X		
Crawford				X		X																					
Crittenden				X													X	X									
Cross				X			X				X			X			X	X									
Dallas							X										X	X									
Desha				X																							
Drew				X			X	X	X		X		X	X			X	X							X		
Faulkner																							X				
Franklin				X													X	X					X		X	X	
Fulton				X		X	X					X					X	X							X		
Garland			X	X		X												X					X				X
Grant				X			X								X	X	X										
Greene				X		X	X			X		X					X		X						X		X
Hempstead									X			X	X				X	X									
Hot Spring				X		X																					
Howard						X												X									
Independence			X	X		X	X					X	X				X								X		
Izard				X	X	X	X																X		X		
Jackson				X			X		X		X					X	X	X									
Jefferson				X					X		X							X									
Johnson				X									X														
Lafayette				X		X					X						X										
Lawrence				X		X	X		X		X					X	X	X			X		X				
Lee									X							X											
Lincoln										X	X						X										
Little River									X								X	X									
Logan						X	X				X				X			X									
Lonoke				X							X						X	X									
Madison												X					X										
Marion		X		X		X	X							X	X			X									
Miller				X			X		X		X	X						X			X				X		
Mississippi				X							X					X	X	X									
Monroe				X													X										
Montgomery			X			X	X		X			X	X					X		X		X	X		X		
Nevada						X	X		X		X							X									
Newton				X	X												X										
Ouachita							X										X	X									
Perry				X							X		X														
Phillips				X							X							X									
Pike						X						X					X	X							X		
Poinsett				X			X		X		X					X	X	X									
Polk				X		X	X								X		X						X				
Pope				X											X												
Prairie				X					X		X						X	X									
Pulaski	X			X			X		X		X			X			X										
Randolph				X		X	X					X	X		X		X	X									
St. Francis							X																				
Saline				X	X	X	X		X		X	X		X	X			X									X
Scott																							X				
Searcy				X																							
Sebastian				X		X					X																
Sevier						X	X				X	X	X		X		X						X				
Sharp				X		X	X						X	X			X										
Stone				X		X	X		X											X							
Union				X							X					X	X										
Van Buren						X	X					X					X								X	X	
Washington		X		X	X	X	X		X		X	X		X	X		X									X	
White				X		X						X	X					X									
Woodruff				X					X		X					X		X							X		
Yell				X		X					X	X									X						
Total	1	2	4	52	4	30	36	1	23	2	32	16	12	8	9	12	40	38	1	3	3	2	10	1	12	4	3

General Notes

Table 3. Arkansas Libellulidae, listed by county.

SPECIES	*Brachymesia gravida*	*Brechmorhoga mendax*	*Celithemis elisa*	*C. eponina*	*C. fasciata*	*C. verna*	*Dythemis velox*	*Erythemis simplicicollis*	*Erythrodiplax connata minuscula*	*E. umbrata*	*Ladona deplanata*	*Libellula auripennis*	*L. axilena*	*L. cyanea*	*L. flavida*	*L. incesta*	*L. luctuosa*	*L. needhami*	*L. pulchella*	*L. quadrimaculata*	*L. semifasciata*	*L. vibrans*	*Miathyria marcella*	*Micrathyria hagenii*	*Orthemis ferruginea*	*Pachydiplax longipennis*	*Pantala flavescens*	*P. hymenaea*	*Perithemis tenera*	*Plathemis lydia*	*Sympetrum ambiguum*	*S. corruptum*	*S. vicinum*	*Tramea carolina*	*T. lacerata*	*T. onusta*	Total Species
Arkansas	X							X								X						X				X	X							X		13
Ashley				X				X						X		X	X					X				X	X	X	X	X	X			X		18
Baxter								X			X			X			X									X				X			X			10
Benton								X									X									X				X				X		9
Boone			X	X				X						X			X									X	X	X	X	X			X	X		14
Bradley				X				X			X			X		X						X				X			X		X				X	21
Calhoun					X			X				X				X						X				X			X						X	19
Carroll								X									X									X			X	X				X		9
Chicot								X									X					X				X	X		X	X				X		13
Clark		X					X	X									X					X					X	X		X	X			X		20
Clay				X				X						X		X	X					X				X	X	X	X	X			X	X		25
Cleburne								X									X		X											X						13
Cleveland								X								X						X								X	X					8
Columbia								X	X		X			X		X						X				X	X			X	X					21
Conway			X		X			X						X	X	X	X		X							X			X	X	X			X		17
Craighead			X	X				X	X	X	X		X	X		X	X		X		X	X	X			X	X	X	X	X	X	X	X	X	X	37
Crawford			X					X																						X	X	X				8
Crittenden								X														X				X				X	X			X		10
Cross								X		X						X	X					X			X	X	X	X	X	X				X		22
Dallas								X								X														X	X	X				9
Desha								X														X								X	X					8
Drew			X	X				X			X	X				X	X					X				X	X			X	X	X		X		31
Faulkner					X		X	X						X		X	X					X	X			X	X	X	X	X	X			X	X	18
Franklin			X	X				X						X		X	X		X		X			X	X	X			X	X	X			X	X	31
Fulton			X	X			X	X	X					X	X	X	X								X	X	X			X	X		X	X	X	35
Garland			X	X	X		X	X							X	X	X		X			X			X	X	X	X	X	X			X		28
Grant								X								X						X				X	X			X						13
Greene			X	X				X	X	X	X			X	X	X	X		X		X	X				X	X	X	X	X	X			X		37
Hempstead			X	X				X								X										X	X			X		X		X		16
Hot Spring					X			X								X			X			X				X	X			X	X			X		14
Howard							X	X						X		X	X					X				X					X					17
Independence							X	X								X										X	X	X	X	X	X			X		22
Izard			X		X			X						X	X	X	X		X			X				X	X	X	X	X			X	X	X	31
Jackson								X						X		X	X					X				X	X	X	X	X				X	X	22
Jefferson				X				X								X	X					X				X	X	X	X	X				X	X	18
Johnson								X						X												X			X	X	X					10
Lafayette								X	X		X					X						X				X	X			X				X		16
Lawrence								X						X		X	X		X			X				X	X		X	X			X	X		32
Lee								X						X		X	X					X				X	X	X	X	X				X	X	15
Lincoln								X			X			X		X						X				X		X	X	X				X		13
Little River	X		X	X				X																		X	X		X	X		X		X	X	18
Logan			X					X							X	X	X					X				X	X		X		X			X		20
Lonoke					X		X	X								X	X		X			X				X	X	X	X	X				X	X	20
Madison								X						X			X									X	X		X	X						13
Marion			X	X				X						X			X		X							X	X		X	X		X		X		28
Miller								X								X	X					X				X	X		X	X						19
Mississippi				X				X								X	X					X				X	X	X	X	X				X		20
Monroe								X								X						X				X	X	X	X	X				X	X	13
Montgomery			X	X	X	X	X	X	X					X		X	X					X				X			X	X				X		35
Nevada								X			X			X		X						X				X				X						15
Newton				X				X						X		X	X									X				X	X			X		14
Ouachita				X				X*						X		X						X				X	X			X						12
Perry								X									X					X				X	X	X	X	X						14
Phillips								X						X		X	X		X			X				X	X	X	X	X				X		18
Pike								X								X	X									X				X						18
Poinsett			X	X	X			X						X		X	X					X				X	X	X	X	X	X			X		26
Polk			X	X				X						X		X	X					X				X				X				X		24
Pope				X				X								X	X		X					X		X	X			X			X	X		16
Prairie				X				X						X		X			X			X				X	X			X				X	X	18
Pulaski	X		X					X						X		X	X					X				X	X	X	X	X	X	X	X	X	X	28
Randolph				X	X		X	X			X			X		X	X		X			X				X	X	X	X	X	X	X	X	X	X	35
St. Francis								X								X	X									X	X	X	X	X				X		12
Saline			X		X		X	X	X			X			X	X	X				X	X				X	X	X		X		X		X	X	37
Scott			X					X						X		X	X									X				X				X		15
Searcy				X				X								X	X		X							X	X	X	X	X		X	X	X		16
Sebastian								X					X	X			X									X			X								11
Sevier								X	X				X							X						X				X							24
Sharp			X				X	X								X	X					X				X	X		X	X	X						26
Stone								X									X									X	X	X		X			X	X		20
Union								X								X										X			X						X	12
Van Buren			X					X			X			X		X	X										X		X	X						19
Washington			X	X			X	X						X	X		X		X			X				X	X	X	X	X		X	X	X	X	37
White								X								X	X					X				X	X		X					X		17
Woodruff				X				X						X		X	X		X							X	X	X	X	X			X	X		20
Yell			X	X	X			X			X					X	X		X							X	X	X	X	X	X				X		24
Total Co.	3	1	24	27	13	1	11	75	9	5	13	3	1	37	9	56	51	1	19	1	5	46	2	1	3	66	51	35	65	68	24	8	15	14	52	14	

Hagen was collected on the Caddo R. at St Hwy 84, approximately 2½ mi NE Amity, Clark County, on 23-V-84. These additions bring the Arkansas Anisoptera species list to 91.

The increase in our distributional knowledge is placed in perspective by two observations. Harp and Rickett's (1977) paper listed 656 county records, while this paper lists 1451 county records (Tables 1-3). Our most common species, *Erythemis simplicicollis,* was recorded from 32 counties in 1977, but it is now listed for all 75 counties. Distributional data are becoming sufficiently extensive that some analyses for individual species can now be attempted. Nevertheless, much information remains to be collected. Harp and Rickett (1977) predicted the eventual listing of an additional nine anisopteran species, based on lists from contiguous states. Of the nine species added to the state list since then, only two are among those predicted - seven are not.

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DISTRIBUTION AND STATUS OF *ETHEOSTOMA CRAGINI* GILBERT AND *E. MICROPERCA* JORDAN AND GILBERT IN ARKANSAS

Etheostoma cragini, the Arkansas darter, is endemic to the Arkansas River system in Colorado, Kansas, Oklahoma, Missouri, and Arkansas (Cloutman, 1980) and a member of the recently erected subgenus *Ozarka* (Williams and Robison, 1980). Recent distribution and status reviews of Arkansas' ichthyofauna did not include *E. cragini* as a component (Buchanan, 1973, 1974; Robison, 1974). Cloutman (1980) plotted the first known locality for the species in Arkansas but did not discuss the range extension. This locality was discovered in 1979 by Arkansas Highway and Transportation Department personnel during construction of the U.S. Highway 71 Bypass around Fayetteville, Washington County (Buchanan, pers comm; Cloutman, pers comm).

Habitat of the Arkansas darter is most often reported as small spring branches or spring-fed creeks with thick growths of aquatic macrophytes such as *Nasturtium officinale, Ranunculus sp.,* and *Myriophyllum sp.* (Pflieger, 1971, 1975; Cross and Collins, 1975; Williams and Robison, 1980). Captures of Arkansas darters from the Chikaskia River, Kansas and the mainstream Arkansas River indicate this species can exist, at least temporarily, in large stream habitat (Cross, 1967; Matthews and McDaniel, 1981).

Etheostoma microperca, the least darter, is a member of the subgenus *Boleichthys* (Page, 1981) and is widely distributed from the Great Lakes region and Minnesota southward to Missouri, Oklahoma, and Arkansas (Burr, 1980). Buchanan (1973, 1974) and Robison (1974) listed localities for *E. microperca* in the Arkansas River drainage in Benton County and in the Saline River of the Ouachita River system. Burr (1978) reviewed the Saline River specimens and concluded they were actually *E. proeliare,* a closely related member of the subgenus *Boleichthys.*

Burr (1980) and Pflieger (1971, 1975) describe the habitat of *E. microperca* as clear, quiet, heavily vegetated waters such as pools of small sized creeks with permanent flow, pothole lakes, spring pools, and seeps.

To locate additional populations and determine the overall status of both species within Arkansas, we examined over 50 localities in Washington and Benton counties. This two county area, which forms the northwestern corner of the state, has an abundance of limestone springs draining into the Illinois River of the Arkansas River system. Sample sites were located using U.S. Geological Survey 7.5 ' topographic quadrangles. Accessible springs and spring-fed streams were sampled by seining with 1.2 meter × 1.5 meter nets having 4.5 mm mesh. Population estimates were made by determining the amount of suitable habitat and applying the densities observed from a subsample. Specimens were preserved in 10 percent formalin and stored in 45 percent isopropanol. Specimens have been deposited in the vertebrate collections of the Arkansas State University Museum of Zoology (ASUMZ); the Museum of Zoology, Northeast Louisiana University (NLU); and the Westark Community College Zoology collection (WZC).

A summary of new localities found in our survey, date of collection, and disposition of specimens is presented for each species. This is followed by a description of habitat where populations currently exist. Reference is made in this section to materials catalogued at Cornell University (CU) and the University of Michigan (UMMZ).

Five localities are now known for *E. cragini* within Arkansas: 1) Benton County: Healing Spring Run and Little Osage Creek at Arkansas Highway 264 crossing (T18N, R31W, sec. 10). 21 August 1981. 5 specimens (ASUMZ 9340). 2) Benton County: Unnamed spring run tributary to Osage Creek near Logan Community (T18N, R32W, sec. 27). 23 March 1982. 12 specimens (NLU 54208). 3) Benton County: Unnamed spring run tributary to Osage Creek near Logan Community (T18N, R32W, sec. 34). 28 July 1982. 3 specimens (ASUMZ 9396). 4) Washington County: Spring run tributary to Wildcat Creek northeast of White Oak Church and cemetery (T17N, R31W, sec. 17). 20 April 1982. 1 specimen (NLU 54206). 5) Washington County: Unnamed spring run at junction of Arkansas Highway 112 and U.S. Highway 71 Bypass in Fayetteville (T17N, R30W, sec. 33). 19 March 1979. 5 specimens uncatalogued, WZC.

Localities 2 and 3 are considered separate spring run populations even though they exist along a continuous stream channel. During summer and fall, the populations are separated by more than one mile of dry streambed. We believe there is little interchange between the two, and thus, they exist as discrete populations.

The largest known populations of *E. cragini* within Arkansas exist in Healing Spring Run (1), unnamed spring run (2), and the Highway 71 spring run (5). The Healing Spring population is estimated at 500-1000 individuals while the unnamed spring run, and Highway 71 populations probably consist of more than 1000 individuals each. The remaining two populations appear much smaller (less than 100 individuals) due to lack of extensive habitat.

All known *E. cragini* sites in Arkansas have the following physical characteristics: first or second order spring runs; aquatic vegetation; and a substrate of fine gravel, sand, and silt. Numerous larger streams were sampled without yielding Arkansas darters. The closely related *Etheostoma punctulatum,* also of the subgenus *Ozarka,* was found in these second to third order streams. Small, apparently pristine, spring branches with aquatic vegetation but coarser substrate were also examined but no Arkansas darters were found. Spring runs used extensively by livestock also seem unsuitable for *E. cragini.*