New Distributional Records for the Red River Burrowing Crayfish, *Procambarus curdi* and Osage Burrowing Crayfish, *Procambarus liberorum* (Decapoda: Cambaridae), in Arkansas and Oklahoma

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New county or locality records are reported for the Red River burrowing crayfish, *Procambarus* (*Girardiella*) *curdi* and Osage burrowing crayfish, *Procambarus* (*Girardiella*) *liberorum* (Decapoda: Cambaridae), in Arkansas and Oklahoma. These burrowing crayfish were recently collected from a site in McCurtain County, Oklahoma, where they were common following heavy rains. In Oklahoma, the Red River burrowing crayfish is considered imperiled or vulnerable (S2/S3) while the Osage burrowing crayfish is not yet ranked and under review (SNR/SU) by The Nature Conservancy; both crayfish in Arkansas are considered apparently secure (S4) by The Nature Conservancy. Additional new localities are reported herein (including one from Texas for *P. curdi*) as well as a summary of historical collection locales of *P. curdi* and *P. liberorum* in Arkansas and Oklahoma.

INTRODUCTION

Taylor et al. (2004) and Jones et al. (2005) reported 28 species of crayfish from Oklahoma. Since that time, Robison and McAllister (2006) documented the Osage burrowing crayfish, *Procambarus* (*Girardiella*) *liberorum* Fitzpatrick in Oklahoma for the first time, bringing the total to 29 species. In Arkansas, however, *P. liberorum* has a more extensive range where it inhabits the uplands of the Boston Mountains, Ouachita Mountains, and Arkansas River Valley physiographic regions extending eastward to Lonoke County (Crandall et al. 2009). In Oklahoma, *P. liberorum* is not yet ranked and under review (SNR/SU) but considered apparently secure (S4) in Arkansas by The Nature Conservancy (NatureServe 2010). On the most recent IUCN Red List of Threatened Species (IUCN 2011), both *P. curdi* and *P. liberorum* are listed as least concern (LC).

There are currently at least 55 species/subspecies of crayfish in Arkansas (Taylor et al. 2007), with several other undescribed forms yet to be described (see Crandall et al. 2009). Renewed interest in the study of crayfish in Arkansas and/or Oklahoma has led to additional reports on other species, including the Bayou Bodcau crayfish (*Bouchardina robisoni*), western painted crayfish (*Orconectes palmeri longimanus*), redspotted stream crayfish (*Orconectes acares*), Mena crayfish (*Orconectes menae*), Kiamichi crayfish (*Orconectes saxatilis*), and Ouachita Mountain crayfish (*Procambarus tenuis*) (Jones and Bergey 2007; Robison and McAllister 2008, 2010; Robison et al. 2009;

Johnson 2010; McAllister and Robison 2010).

Except for the initial report by Reimer (1975) of the Red River burrowing crayfish, *Procambarus* (*Girardiella*) *curdi*, in one Arkansas county and four counties of Oklahoma, nothing else has been published on the distribution of *P. curdi* in Oklahoma, a span of some 35+ years. However, Hobbs and Robison (1988) provided some additional localities for *P. curdi* in two counties of Arkansas. This crayfish was originally described from Brazos County, Texas, and most of its range includes the Navasota and Trinity river watersheds of that state (Reimer 1975; Hobbs 1989; Johnson and Johnson 2008). The species is considered by The Nature Conservancy (NatureServe 2010) as imperiled or vulnerable (S2/S3) in Oklahoma but apparently secure (S4) in Arkansas. Interestingly, *P. curdi* is not shown on the Oklahoma Biological Survey Crayfish of Oklahoma poster by C. Lukhaup (http://www.crustalo.de) and a footnote reads "all species of Oklahoma crayfish are represented with the exception of the uncommon *Procambarus curdi* (Red River burrowing crayfish)." Herein we provide additional records of *P. curdi* and *P. liberorum* in Arkansas and Oklahoma.

MATERIALS AND METHODS

Between April 2011 and February 2012 collections of burrowing crayfish were made by C. T. McAllister on the campus of Eastern Oklahoma State College–Idabel (EOSC), located at the junction of US 70 and US 259 in McCurtain County, Oklahoma (33.92164°N, 94.774504°W). Crayfish were collected by hand at night during heavy thunderstorms either at the entrance of their burrows (Fig. 1) or as they crawled overland on lawns or with aquatic dipnet from ditches (Fig. 2) and temporary runoff pools. Select specimens were placed in 95% ethanol and shipped to C. A. Taylor for specific identification and deposition of vouchers in the Illinois Natural History Survey Crustacean Collection, University of Illinois at Urbana-Champaign (INHS).

We also searched four of the larger online museum databases for previously unpublished records of these burrowing crayfish from Arkansas and Oklahoma, including the Carnegie Museum of Natural History Crayfish Database (CMNH 2011), INHS Database (INHS 2011), the North Carolina State Museum of Natural Sciences Crustacean Collection, Raleigh (NCSM 2011), and the Smithsonian National Museum of Natural History (USNM 2011) Invertebrate Zoology Collection in Washington, D.C. All previous literature dealing with *P. curdi* and *P. liberorum* was reviewed and distributional information was utilized and included herein when deemed reliable.

RESULTS AND DISCUSSION

Sixteen adult (including Form I and II males, females) and many juvenile and subadult *P. curdi* and 45 (including Form I and II males, females, juveniles, and young) *P. liberorum* were collected. All juvenile and subadult *P. curdi* were taken with dipnets from ditches (Fig. 2) while all other crayfish (juvenile and adult *P. liberorum* and adult *P. curdi*) were collected from burrow entrances (Fig. 1), temporary pools and/or while crawling overland. Johnson and Johnson (2008) reported that *P. curdi* preferred ditches and low areas, often far from permanent water where individuals spend most of their time below ground when temporary water disappears. However, during daytime, juveniles are found in temporary water while adults emerge mostly at night. Although severe drought conditions and extremely high air temperatures were evident from May through July 2011 in southeastern Oklahoma, burrows inhabited by these local crayfishes were active to semi–active into the first week of July as evidenced by the building of new chimneys throughout that time period. However, new chimneys ceased to be built over the next three months until they reappeared again in early November 2011 when unseasonably

Figures 1 and 2. 1. Front (south–facing view) of EOSC–Idabel campus showing crayfish burrows on lawn (arrows); inset (individual burrow). 2. Temporary ditch on west side of campus showing habitat of juvenile and subadult *P. curdi*. Photos by C. T. McAllister, February 2012.

warm temperatures with moderate to heavy precipitation returned. Crayfish (both juveniles, subadults, and adults) continued to be collected from outside their burrows (*P. liberorum*) or in temporary ditches (*P. curdi*) on the EOSC campus on various dates from early November 2011 until late January 2012.

Interestingly, four adult female *P. liberorum* with young attached to their pleopods were collected at the entrance to their burrows on 8 (n = 1) and 15 November 2011 (n = 3). It was raining heavily on the latter date and the air temperature ranged from 18–24°C. Young ranged in size from 7–10 mm and numbered ca. 63/adult. This is the first time, to our knowledge, that this reproductive observation has been reported for *P. liberorum*.

Procambarus curdi was originally described by Reimer (1975) and reported from Little River County (Arkansas), Bryan, Choctaw, and McCurtain counties (Oklahoma), and Brazos and Grimes counties (Texas). In addition, crayfish initially reported by Creaser and Ortenburger (1933, p. 42) as *Cambarus simulans* (=*Procambarus simulans simulans*) from an unspecified locality in Kiowa County, Oklahoma, was determined by Reimer (1975) to be synonymous with *P. curdi*. However, Kiowa County is far out of the contiguous range of *P. curdi* (i.e., more than 280 km west). We consider this record questionable in the absence of genuine voucher specimens accompanied by verified locality data and do not include it on Fig. 3.

Therefore, outside of Texas, the distributional range of *P. curdi* includes three counties (Little River, Howard, Miller) in Arkansas and three counties (Bryan, Choctaw, McCurtain) in Oklahoma (Fig. 3; Appendix). We report herein a new locality in McCurtain County (Oklahoma) and new county record (Howard County, Arkansas) for *P. curdi* (Fig. 3; Appendix).

It was not our purpose herein to address the range of *P. curdi per se* in Texas. However, it should be noted that from our literature review and search of specimens of *P. curdi* in museum collections, Crandall et al. (2009) utilized two specimens of *P. curdi* in DNA analyses from Black Cypress Bayou (Red River drainage), Marion County, Texas (32.7941°N, 94.3249°W) that represent a new county record and, most importantly, just outside of the current range of *P. curdi* in that state (Ziser 2010; D. Johnson, pers. comm.). Interestingly, unlike its range in Arkansas and Oklahoma, the range of *P. curdi* is extensive in Texas and the species

is now known from 427 sites in 40 counties of the eastern part of the state (D. Johnson, pers. comm.).

Crandall et al. (2009) recently determined that the formerly rare and Arkansas endemic species, *Procambarus ferrugineus* Hobbs and Robison, which was described from 10 specimens (USNM 218841–21842) from two localities in Lonoke County, Arkansas (Hobbs and Robison 1988), was actually *P. liberorum*. Therefore, those localities reported for *P. ferrugineus* and *P. liberorum* by Crandall et al. (2009), and/or those deposited in the USNM and not part of the range of *P. liberorum* documented by Robison and McAllister (2006, fig. 1), should now be included in the overall range of *P. liberorum* (Fig. 3). The species appears to have originated in the White River headwaters of the Ozark Mountains, migrated southward through the Arkansas River drainage onto the north flank of the Ouachita Mountains, then proceeded eastward through the Arkansas River Valley as far east as Lonoke County in the Gulf Coastal Plain province (Crandall et al. 2009). The seven new distributional (county) records in Arkansas include: Conway, Crawford, Faulkner, Johnson, Montgomery, Perry, and Pulaski counties (Fig. 3; see Appendix). Thus, the overall range of *P. liberorum* in Arkansas now includes 17 counties, namely Benton, Conway, Crawford, Faulkner, Franklin, Johnson, Logan, Lonoke, Madison, Montgomery, Perry, Pope, Pulaski, Scott, Sebastian, Washington, and Yell (Fig. 3). In Arkansas, the species is ranked secure (S4) by The Nature Conservancy within its somewhat limited range as the species apparently faces few threats (NatureServe 2010).

In Oklahoma, *P. liberorum* was previously known from only two counties, LeFlore and Rogers (Robison and McAllister 2006). We now can add McCurtain County to the range of this crayfish in the state (Fig. 3). The Nature Conservancy has yet to rank *P. liberorum* in Oklahoma and that ranking (SNR) is currently under review (NatureServe 2010). Additional collecting, particularly during and after extensive spring rainfall in surrounding counties should be done in an attempt to locate additional populations and perhaps a more extensive range of *P. liberorum* in eastern Oklahoma.

ACKNOWLEDGMENTS

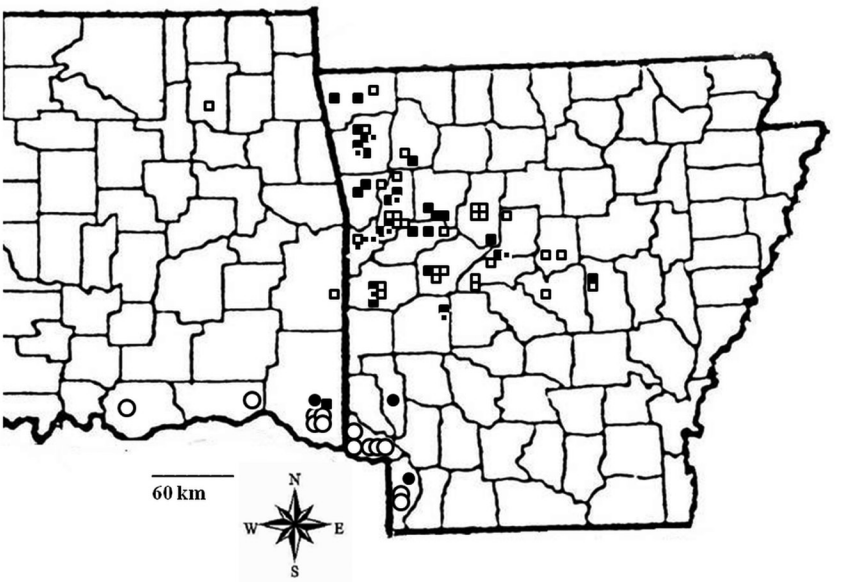

Figure 3. Distribution of *Procambarus curdi* and *Procambarus liberorum* in Arkansas and Oklahoma. Historic records of *P. curdi* (open dots); new records of *P. curdi* (solid dots). Historic records of *P. liberorum* (open squares); new records of *P. liberorum* (solid squares). Some symbols for *P. liberorum* in Arkansas may represent more than one locality.

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APPENDIX. Collecting localities of 169 specimens of *Procambarus curdi* and 538 specimens of *Procambarus liberorum* from Arkansas and Oklahoma (when available: locality, latitude/longitude in decimal degrees or township, range, and section, date of collection, museum accession number, number of specimens, citation).

ARKANSAS (144 specimens of *P. curdi*)

LITTLE RIVER COUNTY (117 specimens)

1. 20.1 km W of Ashdown, no date. (1). (Reimer, 1975).
2. Roadside ditch, 11.3 km N of Miller County line off US 71, 26 Apr. 1976. (1). (Hobbs and Robison 1988).
3. Roadside ditch, 3.1 km W of Ashdown off St. Hwy 32. 27 Apr. 1976 & 10 Apr. 1982. USNM 208541. (27 & 6). (Hobbs and Robison 1988).
4. 6.4 km N of Cross Roads, S of Little River Bridge off St. Hwy 41, 11 Apr. 1982. (31). (Hobbs and Robison 1988).
5. Roadside ditch, 6.9 km S of Ashdown, 11 Apr. 1982. (51). (Hobbs and Robison 1988).

HOWARD COUNTY (4 specimens)

1. Mineral Springs, 1985. USNM 218985. (4).

MILLER COUNTY (23 specimens)

1. 13.7 km SW of Fouke near Sulphur River, 26 Mar. 1982. (17). (Hobbs and Robison 1988).
2. 4.8 km E of Fouke off St. Hwy 134, 28 Mar. 1982. (3). (Hobbs and Robison 1988).
3. Rice field in Garland, no date, USNM 219520. (3).

OKLAHOMA (25 specimens of *P. curdi*)

BRYAN COUNTY (1 specimen)

1. Durant Fish Hatchery at Armstrong, no date. (1). (Reimer 1975).

CHOCTAW COUNTY (1 specimen)

1. 0.6 km W of Swink off US 70, no date. (1). (Reimer 1975).

MCCURTAIN COUNTY (23 specimens + many juveniles and subadults)

1. Hill's Pond, Idabel, 16 Apr. 1940, USNM 91843. (2).
2. Rachel's Pond, Idabel, 16 Apr. 1940, USNM 307287. (1).
3. Small drain N of Idabel High School, no date. (1). (Reimer 1975).
4. Airport pond NE of Idabel, no date. (1). (Reimer 1975).
5. 0.4 km W of Idabel, no date. (1). (Reimer 1975).
6. Railroad pond S of Idabel, no date. (1). (Reimer 1975).
7. Eastern Oklahoma State Campus, Idabel, Intersection of US 70 and US 259 (33.92164°N, 94.774504°W), 20 and 25 Apr. 2011, INHS 11940. (16, many juveniles, subadults).

TEXAS (2 specimens of *P. curdi*)

1. Black Cypress Bayou, Marion County, Texas (32.7941°N, 94.3249°W), unknown date, KC 868–869. (2). (Crandall et al. 2009).

ARKANSAS (482 specimens of *P. liberorum*)

BENTON COUNTY (18 specimens)

1. 206 SW Seventh Street (Yard of Harold May), Bentonville. 12 Mar. 1988. USNM 148353 (TYPE SPECIMEN), 148354 (ALLOTYPE), 148355-148356 (PARATYPES). (4). (Fitzpatrick 1976).
2. Pool in roadside ditch off US 43, 26 May 2005, INHS 10671. (14).

CONWAY COUNTY (8 specimens)

1. Roadside seepage, 5.3 km S of jct. St. Hwy 247 and St. Hwy 154 on St. Hwy 247, 22 May 1991. USNM 260027. (1).
2. Roadside ditch, 1.6 km S of jct. St. Hwy 247 and St. Hwy 154 on St. Hwy 247, 22 May 1992. USNM 260026. (2).
3. Roadside ditch (35.109N, 93.011W), no date, USNM 260006. (1). (formerly *P. ferrugineus*, Crandall et al. 2009).
4. Roadside ditch atop Petit Jean off St. Hwy 154 (35.071°N, 92.979°W), no date. (4). (Crandall et al. 2009).

CRAWFORD COUNTY (19 specimens)

1. Natural Pond, swampy area (35.69403°N, 93.99400°W), 20 May 2005. (9).
2. Hurricane Creek (35.70551N, 94.02766W), 20 May 2005. (8).
3. Tributary of Little Frog Bayou, 5.1 km NNE of Alma off Old Freedom Road, 14 November 2007, INHS 11012. (2).

FAULKNER COUNTY (9 specimens)

1. S of ballfields on Museum Road, Conway (35.10054°N, 92.41853°W), 13 March 2004. (5).
2. Vilonia High School Eagle Stadium parking area, S of St. Hwy 107 and US 64 (35.08455°N, 92.19810°W), 30 March 2005, INHS 10639. (4).

FRANKLIN COUNTY (79 specimens)

1. Pond 13.4 km S of Combs, 26 Feb. 1955. (2). (Hobbs and Robison 1988).
2. Prairie Creek, 3.2 km N of Charleston off St. Hwy 217, 24 May 1980, USNM 208532. (1). (Hobbs and Robison 1988).
3. 3.2 km E of Branch off St. Hwy 22, 15 Mar. 1981. (1). (Hobbs and Robison 1988).
4. Roadside area, 0.3 km E of Branch off St. Hwy 22, 15 Mar. 1981, USNM 177943. (1).
5. Seepage 0.6 km E of Branch off St. Hwy 22, 16 Apr. 1982, USNM 208538. (14). (Hobbs and Robison 1988).
6. Roadside ditch, 12.9 km W of Cass on FSR 1003 (33.66762°N, 93.89267°W), 20 May 2005. (7).
7. Intersection of White Rock Mountain Road (FSR 1003) and Mineral Hill Road (33.67610°N, 93.92035°W), 20 May 2005. (8).
8. Roadside seepage, 0.8 km S of White Rock Mountain (35.68327°N, 93.96545°W), 20 May 2005. (15).
9. Roadside seepage on FSR 1003 (Reimer site), 0.8 km S of White Rock Mountain (35.68686°N, 93.96696°W), 20 May 2005. (11).
10. Mill Creek, 1.7 km SSE of Cecil, 30 November 2007, INHS 11027. (1).
11. W of Bee Rock on FSR 1003 (35.66762°N, 93.8927°W), no date. (7). (Crandall et al. 2009).
12. Cherokee Prairie Natural Area, 3.2 km N of Charleston (35.343°N, 93.9986°W), no date. (4). (Crandall et al. 2009).
13. H. E. Flanagan Prairie Natural Area, jct. St. Hwy 60 and St. Hwy 217, N of Charleston (35.36°N, 93.9986°W), no date. (7). (Crandall et al. 2009).

JOHNSON COUNTY (9 specimens)

1. P.L. Hill Work Center off St. Hwy 21, N of Clarksville, 1 Feb. 1986, USNM 218978. (1). (Hobbs and Robison 1988).
2. Gene Leeds residence, 4.8 km E of Lamar (35.4358°N, 93.3906°W), no date. (7).
3. Forest Service parking lot, Clarksville (35.488°N, 93.442°W), no date, USNM 260306. (1). (Crandall et al. 2009).

LOGAN COUNTY (7 specimens)

1. 1.3 km E of Midway city limits off St. Hwy 22, 15 Mar. 1981 & 16 Apr. 1982, USNM 177953, 208537. (2 & 3). (Hobbs and Robison 1988).

2. Roadside ditch along St. Hwy 22, 1.3 km E of Caulksville (35.299°N, 93.85°W), USNM 260307, 14 May 1993. (1). (Crandall et al. 2009).
3. Roadside ditch along St. Hwy 22, 1.0 km W of New Blaine and jct. St. Hwy 197, 14 May 1993, USNM 260305. (1).

LONOKE COUNTY (12 specimens)

1. Roadside ditch, 16.1 km S of Lonoke off St. Hwy 31 (T1N, R8W, Sec. 6), 16 Apr. 1985, USNM 218840. (1) (formerly *P. ferrugineus*, HOLOTYPE, Hobbs and Robison 1988).
1. Roadside ditch, 4.6 km S of Lonoke off St. Hwy 31 (T1N, R9W, Sec. 36), 11 Apr. 1987, USNM 218841. (10). (formerly *P. ferrugineus*).
2. 9.6 km S of St. Hwy 70 (34.675N, 91.915W), USNM 218843. (1). (formerly *P. ferrugineus*, Crandall et al. 2009).

MADISON COUNTY (3 specimens)

1. 13.4 km S of Combs, Natural Brood Pond, 26 Feb. 1955, USNM 129484. (1).
2. Roadside seepage off St. Hwy 16, 2.3 km NW of Crosses (35.895°N, 93.922°W), 17 Aug. 1991, USNM 260303. (1). (Crandall et al. 2009).
3. 5.3 km S of jct. St. Hwy 247 on St. Hwy 154 on St. Hwy 247, 17 Aug. 1991, USNM 260034. (1).

MONTGOMERY COUNTY (3 specimens)

1. Roadside seepage, 0.6 km N of Story off St. Hwy 27, 17 Mar. 1986 & 12 Mar. 1988, USNM 177831, 219505. (2).
2. 3.5 km N of Story off St. Hwy 27, no date, USNM 208555. (1).

PERRY COUNTY (11 specimens)

1. Roadside seepage off St. Hwy 247, 2.1 km S jct. St. Hwy 247 & 154 (35.036°N, 93.035°W), 25 Apr. 1992, USNM 260016. (2). (Crandall et al. 2009).
2. Roadside at Hollis (34.861°N, 92.903°W), no date. (7). (Crandall et al. 2009).
3. Roadside near Hollis (34.85°N, 93.1°W), no date. USNM 260008, 260022. (2). (formerly *P. ferrugineus*, Crandall et al. 2009).

POPE COUNTY (100 specimens)

1. Roadside ditch, 2.1 km N of Hector off St. Hwy 105, 17 Apr. 1973, USNM 144607. (3). (Hobbs and Robison 1988).
2. Stream 4.2 km NW of St. Hwy 7 on St. Hwy 164, 16 Apr. 1973, USNM 144605. (16). (Hobbs and Robison 1988).
3. Dry stream-bed, 2.9 km S of Hector off St. Hwy 105, 12 Mar. 1981 & 16 Apr. 1982. USNM 208539, 219499. (11 & 43). (Hobbs and Robison 1988).
4. 3.2 km E of Scottsville off St. Hwy 27 (35.45°N, 93.02°W), 12 Mar. 1983, 20 Mar. 1986 & 20 Mar. 1987. USNM 219236, 219498. (1 & 3). (Hobbs and Robison 1988).
5. Roadside seepage, 5.5 km S jct. US 64 on St. Hwy 105, SW of Atkins, 25 Mar. 1981 & 12 Mar. 1988, USNM 219500, 219502. (22 & 1).

PULASKI COUNTY (5 specimens)

1. Fourche Creek, no date. (5). (Crandall et al. 2009).

SCOTT COUNTY (52 specimens)

1. Roadside ditch, 8.0 km E of Waldron off St. Hwy 80, 18 Apr. 1973, USNM 144614. (17). (Hobbs and Robison 1988).
2. Roadside seepage off St. Hwy 88, 10.5 km E jct US 71, 12 Mar. 1988, USNM 219504. (17).
3. Waldron, 1990-1994, USNM 220676. (4).
4. Waldron High School, Waldron (34.89°N, 94.08°W), no date. (14).

SEBASTIAN COUNTY (95 specimens)

1. Seepage area, 4.8 km E of Central City off St. Hwy 22, 15 Mar. 1981 & 16 Mar. 1986. (16 & 12). (Hobbs and Robison 1988).

2. Roadside ditch off St. Hwy 22, 2.4 km E of Bloomer, 15 Mar. 1981, USNM 177950. (50, juveniles).
3. 0.8 km E jct. St. Hwy 22 and St. Hwy 96 on St. Hwy 22, 16 Mar. 1986, USNM 219140. (5).
4. Massard Prairie, 9.7 km S of Ft. Smith, 1 Feb. 1986 & 23 May 1988, USNM 219783–219784. (2).
5. Tributary of Massard Creek, jct. Phoenix and 69th Street in Fort Smith, 13 November 2007, INHS 10973. (10).

WASHINGTON COUNTY (15 specimens)

1. Low area near University of Arkansas campus, Fayetteville, 11 May 1949, USNM 129485. (2). (Hobbs and Robison 1988).
2. 2.4 km NW of US 71, W edge of Fayetteville at Clabber Creek (36.1019°N, 94.2050°W), 8 April 2004, INHS 10166. (2).
3. 0.4 km N jct. St. Hwy 121 and US 71, NNW edge of Fayetteville (36.1101°N, 94.1805°W), 9 April 2004, INHS 10164. (1).
4. Old drive-in, Fayetteville (36.11048°N, 94.17760°W), 9 April 2004. (4).
5. Roadside ditch, 16.1 km SE of Fayetteville off St. Hwy 16, 15 March 2005. (1).
6. Roadside ditch in West Fork across from elementary school, 13 November 2007, INHS 10993. (2).
7. Fayetteville (36.0456°N, 94.1498°W), no date. (3). (Crandall et al. 2009).

YELL COUNTY (37 specimens)

1. Roadside ditch, 9.3 km SW of St. Hwy 7 on St. Hwy 28, 17 Apr. 1973, USNM 144609. (17). (Hobbs and Robison 1988).
2. Roadside ditch, 2.7 km SW of St. Hwy 154 on St. Hwy 27, 17 Apr. 1973, USNM 144611. (3). (Hobbs and Robison 1988).
3. Roadside ditch, 51.5 km N of Story off St. Hwy 27, 15 Mar. 1981, USNM 177952. (1). (Hobbs and Robison 1988).
4. Roadside seepage, 16.4 km E of Scott–Yell county line on St. Hwy 80, 12 Mar. 1988, USNM 219503. (16).

OKLAHOMA (54 specimens of *P. liberorum*)

LEFLORE COUNTY (3 specimens)

1. Roadside seepage off St. Hwy 128, 3.2 km W of OK/AR state line (34.532°N, 94.272°W), 24 April 2006. (3). (Robison and McAllister 2006).

MCCURTAIN COUNTY (45 specimens)

1. Eastern Oklahoma State College Campus, Idabel, Intersection of US 70 and US 259 (33.92164°N, 94.774504°W), 20 & 25 April 2011, 2, 8–9, 15 & 21 November 2011, 14 December 2011, 10 & 31 January 2012. INHS 11939. (45).

ROGERS COUNTY (6 specimens)

1. Unknown locale, 21 July 1935, USNM 118643. (6). (Robison and McAllister 2006).