

Additional Observations on the Distribution and Habitats of *Palaemonetes kadiakensis* Rathbun (Crustaceae: Decapoda) in Oklahoma, 1992 to 1996.

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Information on the freshwater prawn (*Palaemonetes kadiakensis*) was presented in two earlier notes (1,2). In the two earlier notes we had very little data on the distribution of this species in Oklahoma. The purpose of the present study is to provide additional data on the abundance and distribution of this animal in Oklahoma.

The study period covers the years 1992 to 1996. Collections were obtained from aquatic habitat throughout the state of Oklahoma. Sampling was conducted during the Oklahoma Department of Environmental Quality (DEQ) biomonitoring programs. Specimens were collected during fish surveys taken two or three times each year from May 1992 to November 1995. A 200-m reach of the stream was sampled during each visit using a 3.3×1.3 m heavy-lead seine with 3.0-mm mesh. All prawns were preserved in 10% formalin in the field and transported to the DEQ Environmental Laboratory in Oklahoma City, Oklahoma, where all specimens were washed with water, sorted, and placed in a solution of 50% isopropyl alcohol.

We collected 8,721 specimen in 234 collections from 72 different sites. Figure 1 shows the location of each collection site where we found shrimp. A complete list of all sampling sites where we found this species, with number of collections containing shrimp, number of specimens collected, number of specimens collected by year and by month is available from DEQ in Oklahoma City.

To compare the data, we divided the sampling locales into the Red River and the Arkansas River drainages. For each drainage, we categorized rivers by their width as 'large' (greater than 200 m), 'medium' (50-200 m), and 'small' (less than 50 m); creeks were classified as 'large' (greater than 25 m) and 'small' (less than 25 m); other bodies of water as reservoirs, and ponds/wetlands.

We found the *P. kadiakensis* to be more abundant from the sites local on the mainstream of the Red River than in the Arkansas River. The largest number of specimens were collected from the Red River, primarily from sites near Waurika and Terral. However, prawns were twice as abundant in medium-sized tributaries of the Arkansas River than in medium-sized tributaries of the Red River. Two small tributaries of the Red River, Cow Creek at Waurika and Waterfall Creek south of Idabel, produced 172 and 338 specimens, respectively. In small creeks this species is rare, never occurring in large numbers (usually less than 10 specimens).

Lake Texoma and Wister Lake, two reservoirs, one from each river drainage, supported a substantial number of *P. kadiakensis*. In three collections from three sites in Lake Texoma we collected 183 specimens, while two collections from two sites in Lake Wister produced 87 specimens. Both lakes were very turbid at the time of each collection. A small, weed-filled pond southwest of Eagletown (Red River drainage) supported 184 specimens, while a very similar pond near the Neosho River west of Commerce (Arkansas River drainage) yielded 48 specimens, and floodwater pools on the west side of the river produced 55 shrimp.

Table 1 shows the Red River drainage yielded a greater number of specimens per collection. Those for the Red River averaged 57.9 specimens per collection (131 collections) compared to the Arkansas River drainage average of 11.8 specimens per collection (96 collections). Again, the average numbers of animals taken per collection were higher in the large and small rivers, reservoirs and ponds associ-

ated with the Red River drainage, while the mean number taken per collection was higher in the medium rivers and small creeks associated with the Arkansas River drainage.

TABLE 1. Habitat summary for *P. kadiakensis* in Oklahoma Waters, 1992–1996.

Habitat Type ^a	No. ^b of <i>P.k.</i> Coll.	Mean ^c No., <i>P.k.</i> per Coll.	Largest Coll. ^d , Mo/Yr
Large Rivers			
A.R.D.	18	5.4	10/92
R.R.D.	55	114.4	09/96
Summary	73	87.5	09/96
Medium Size River			
A.R.D.	59	13.1	06/92
R.R.D.	48	7.5	07/94
Summary	107	10.5	06/94
Small Rivers/Large Creeks			
A.R.D.	5	2.0	06/95
R.R.D.	12	43.0	06/94
Summary	17	31.0	06/94
Small Creeks			
A.R.D.	4	4.0	08/96
R.R.D.	6	1.3	06/96
Summary	10	2.4	06/96
Reservoirs			
A.R.D.	8	17.0	06/92
R.R.D.	7	27.0	05/93
Summary	15	21.7	06/93
Ponds/Flood waters/wetlands			
A.R.D.	2	51.5	07/95
R.R.D.	3	75.3	07/96
Summary	5	65.8	07/96
TOTAL COLLECTIONS ^e			
A.R.D.	96	11.8	06(46)/92(31)
R.R.D.	131	57.9	09(42)/96(32)
Total	227	38.4	09(44)/96(29)

a A.R.D. = Arkansas River Drainage;

R.R.D. = Red River Drainage.

b Number of collections with *P. kadiakensis*.

c Mean number of *P.k.* per collection.

d Largest collection of *P.k.*, Month/Year.

e In the last column, the number in parens is the percent of specimens collected that month/year.

TABLE 2. Major habitat grouping of *P. kadiakensis* in Oklahoma.

Habitat type	No. of Sites	No. of Coll.	Mean No. of <i>P.k.</i>
Large Rivers			
Impounded	8	24	27.5
Nonimpounded		40	140.2
Large Rivers			
Clear	9	36	22.1
Turbid	3	37	154.1
Medium-Sized Rivers			
I.P. ^a	8	17	12.1
Not I.P.	19	81	11.2
Medium-Sized Rivers			
Clear	15	40	18.2
Turbid	13	57	7.2
Impounded Medium-Sized River			
Above Dam	12	42	14.8
Below Dam	16	65	7.8
Small Rivers/Large Creeks			
I.P. ^a	2	13	13.9
Not I.P.	3	4	86.5
Small Rivers/Large Creeks			
Clear	2	3	2.6
Turbid	3	14	22.8
Small Creeks			
Clear	1	1	1.0
Turbid	9	9	2.7
Reservoirs			
Turbid	10	10	28.3
Clear	5	5	8.4
Ponds/Small Lakes			
W-F Ponds ^b	2	2	116.0
Flood Pools	2	2	47.5
Swampy Lakes	1	1	2.0

a Impacted by pollution.

b Weed-Filled Ponds.

We also observed that the year and month in which specimens were collected contributed to the distribution of *P. kadiakensis*. The year with the largest collections of shrimp from the Arkansas River was 1992, while 1996 was the year with the largest collection of shrimp from the Red River. Most specimens were collected from the Red River in September while most of the Arkansas River specimens were collected in June.

Table 2 shows the relationship between the mean number of shrimp collected and various aspects of Oklahoma waterways, such as impoundments and turbidity. The largest mean number of shrimp was found in the large river habitat above any impoundments and in sites with high turbidity. Medium-sized rivers above impoundments, but with clear water, supported 14.8 specimens of shrimp for collection. Small rivers or large creeks with little pollution had more shrimp than those with pollution problems. Small rivers/large creeks with high turbidity supported more shrimp than those with clearer water. We found

the shrimp to be more abundant in the turbid reservoirs of Lake Wister and the Red River arm of Lake Texoma than in the clear water reservoirs. Small turbid ponds filled with aquatic vegetation occurring in the flood plains of the large rivers or new pools and bar ditches filled by recent floodwaters also support large numbers of freshwater prawns.

During our survey we observed that the *P. kadiakensis* was very abundant (87.5 specimens/collections) in our collections from the large, and less abundant (31.0 specimens) from the small, river habitats. The typical environment where we found the largest numbers of *P. kadiakensis* was in areas of shallow waters with sandy bottom, but lacking aquatic vegetation of any kind.

REFERENCES

1. Cheper NJ, *Palaemonetes kadiakensis* Rathbun in Oklahoma (Crustacea: Decapoda). Proc Okla Acad Sci 1988;68:77-78.
2. Cheper NJ, *Palaemonetes kadiakensis* (Crustacea: Decapoda) in Oklahoma, 1982 and 1987. Proc Okla Acad Sci 1992;72:65.

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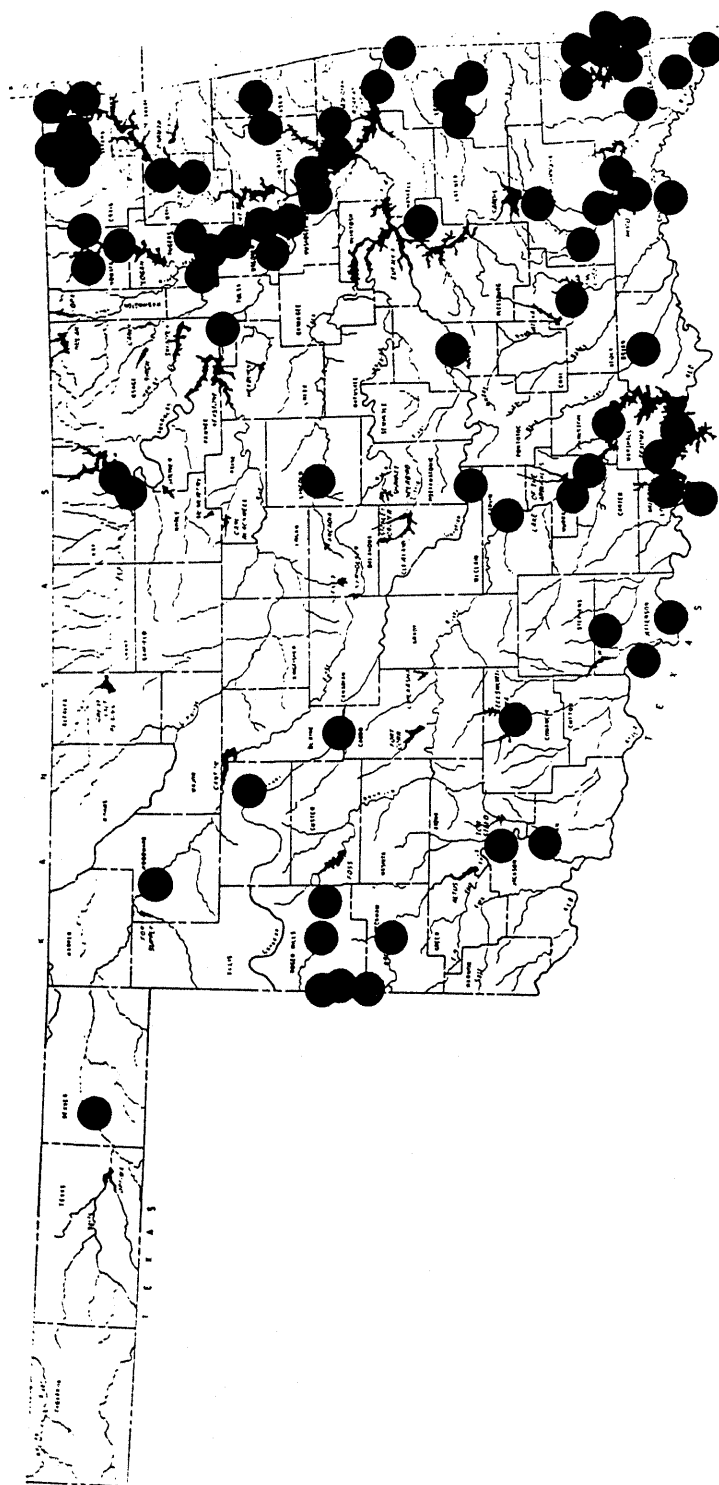


Figure 1. Distribution of *Palaemonetes kadiakensis* in Oklahoma, 1992–1996.