

Kansas PEARLY MUSSEL Newsline



KANSAS DEPT. WILDLIFE & PARKS
Edwin J. Miller, Editor

March 1996

Editor's note: This is what you have been waiting for - the first issue of Kansas Pearly Mussel Newsline. It is a result of the interest expressed in freshwater mussels at the last three workshops and is supported by the loose organization dubbed the Kansas Mussel Study Group. Following is our policy statement: The Kansas Mussel Study Group has no membership dues and no business meetings. Its membership includes those curious individuals who have a compulsion to scour every gravel bar identifying unionid mussel shells. This low-budget publication will be attempted at least on an annual basis.***

Update on the illustrated mussel key by Blean, Couch and Distler

As with everything, this became a much larger project than what we originally anticipated. Illustrating, researching and writing has been intense. Sorting out some of these shells borders on nightmare. There is currently a major upheaval in taxonomy with many biologists nationwide regarding species within the genus *Quadrula* (Dr. Tom Watters in Ohio told me if it was easy, it wouldn't be any fun). Our Kansas key will attempt to stick with the basics on *Quadrula* (particularly *pustulosa*, *quadrula*, and *nodulata*) as much as possible without introducing additional confusion. At the same time, it will remain subject to revision if any reasonable conclusions are drawn from further studies.

We are nearing completion of one part of the key which was deemed "easier" than much of the remainder. It involves nine species of eight genera (not *Quadrula*) that are causing confusion but are less difficult to identify than others. Details on publication are not available at this time, but we'll keep everyone informed when we know more on it.***

Karen J. Couch

THE NEXT KANSAS MUSSEL STUDY GROUP WORKSHOP

- The dates are set: August 8 and 9, 1996.
- The place is still tentative: possibly Pittsburg with field trips to Spring River.
- Details will be sent in summer.
- Anyone who would like to present a program, contact editor.

FIELD TRIP REVIEW: AUGUST 1995

Following are species abundance lists from the August 1995 workshop. A special thanks to Don George and Tom Swan for lining up the facilities and getting permission for the group to visit two stream sites.

Little Osage River

Mussel Workshop Field Trip (16 participants)

SE 1/4 Sec 30, SW 1/4 Sec29, T23S,R24E, Bourbon Co., KS

11 August 1995

Three Ridge	<i>Amblyema plicata</i>	139	45.7%
Maple Leaf	<i>Quadrula quadrula</i>	57	18.8
Fragile Shell	<i>Leptodea fragilis</i>	23	7.6
Pimpleback	<i>Quadrula pustulosa</i>	17	5.6
Pistolgrip	<i>Tritogonia verrucosa</i>	15	4.9
Wabash Pigtoe	<i>Fusconaia flava</i>	14	4.6
Deertoe	<i>Truncilla truncata</i>	13	4.3
Squawfoot	<i>Strophitus undulatus</i>	9	3.0
White heelsplitter	<i>Lasmigonia complanata</i>	7	2.3
Pink heelsplitter	<i>Potamius alatus</i>	4	1.3
Fondmussel	<i>Ligumia subrostrata</i>	4	1.3
Wartyback	<i>Quadrula nodulata</i>	1	0.3
Floater	<i>Pyganodon grandis</i>	1	0.3
		<hr/>	
		304	100.0%

Fish species recorded during seining:

Red shiner (abundant)

Bluntnose minnow	Green-sided-darter
Brook silversides	Log perch
Fantail darter	Channel catfish
Orange-throated darter	Flathead catfish
Slender-headed darter	Stonecat

Marmaton River

Mussel Workshop Field Trip (20 participants)

SE 1/4 Sec 30, SW 1/4 Sec29, T23S,R24E, Bourbon Co., KS

10 August 1995

Threeridge	<i>Amblyema plicata</i>	51	42.5%
Fat Mucket	<i>Lampsilis radiata</i>	29	24.2
Wabash Pigtoe	<i>Fusconaia flava</i>	7	5.8
Squawfoot	<i>Strophitus undulatus</i>	6	5.0
Spike	<i>Elliptio dilatata</i>	6	5.0
Fragile Papershell	<i>Leptodea fragilis</i>	5	4.2
Pistolgrip	<i>Tritogonia verrucosa</i>	3	2.5
Mapleleaf	<i>Quadrula quadrula</i>	2	1.7
Pimpleback	<i>Quadrula pustulosa</i>	2	1.7
Deertoe	<i>Truncilla truncata</i>	2	1.7
White Heelsplitter	<i>Lasmigonia complanata</i>	2	1.7
Pink Heelsplitter	<i>Potamius alatus</i>	2	1.7
Fondmussel	<i>Ligumia subrostrata</i>	2	1.7
Plain Pocketbook	<i>Lampsilis cardium</i>	1	0.8
		<hr/>	
		120	100.2%

- no Corbicula found

Mussel Displays Attract Interest

Linn County has always been a strong supporter of the Kansas Department of Wildlife & Parks. For nine years they have provided office space in the courthouse for the two local biologists. Linn County has now gone a step further. They have provided a display stand for our collection of freshwater mussels. The display "Jewels of Kansas" consists of 10 species. Included is the flat floater, an endangered mussel from the Marais des Cygne Wildlife Area, and the beautiful deertoe mussel from an area river. Information is listed on each species such as status and required habitat. The species on display will change occasionally to provide an opportunity for visitors to view all of the mussels of the collection. The display is prominent in the main courthouse hallway. Don George, Fisheries Biologist for the Dept. explained "Before the display was complete, several people had stopped to view the collection. They could not believe how colorful and beautiful the shells are. I believe this is a positive step in improving the awareness and education of the public."***

FLAT FLOATER NEWS

Dr. Chris Barnhart, Andrew Roberts; Biology Dept., Southwest Missouri State Univ.
Springfield, MO 65804

We are continuing our studies of flat floaters, *Anodonta suborbiculata*. Some of the conclusions so far:

Fish hosts: Potential fish host identified so far by lab tests include white crappie, warmouth, largemouth bass, golden shiners, and mosquitofish.

In vivo transformation: We have transformed glochidia to juveniles in cell culture media as well as on fish. Hundreds of juveniles now available and we hope to introduce these to pond in the near future.

Estivation: Laboratory tests suggest that flat floaters are not capable of surviving more than a week or two of emersion, even in mild conditions of temperature and humidity. These animals were settled in appropriate substrate and water was removed gradually to mimic natural conditions. Impedance electrodes were used to monitor heartbeat and survival.

Sex: Observations so far indicate that flat floaters are gonochoristic (separate sexes) rather than hemaphroditic. Sperm balls (spermatozeugmata) are released in September and glochidia in Jan.-Feb.

Age and growth: Flat floaters grow fast and die young. It appears that males may mature within their first year and females the second year. We are anxious to obtain shell measurements of large samples to deduce age structure of populations--so far it looks as though populations may often not survive for long.

Toxicants: We are currently testing the acute toxicity of rotenone (Noxfish) to glochidia and juveniles. It appears that juveniles are very resistant, surviving concentrations 5-fold higher than those used for piscicide. We hope to test glyphosate (Rodeo herbicide) later this month.

Presentations: Results have been reported at the Kansas mussel workshop, the UMRCC mussel symposium in St. Louis, and the Mo. Forest, Fish & Wildlife Conference at Lake of the Ozarks. A report will be published in the UMRCC symposium volume, edited by Kevin Cummings. We also hope to present at AMU meeting in July at Chicago. Thanks to Kansas Dept. of Wildlife & Parks for support.***

NOTES FROM THE ST. LOUIS MUSSEL CONFERENCE: THE CONSERVATION AND MANAGEMENT OF FRESHWATER MUSSELS II

The Kansas contingent at the St. Louis conference included Brian and Bernie Obermeyer, Karen Couch, Jim Mason, and Edwin Miller. There were about 50 papers presented and a poster session. Kansas was well represented with the following paper and poster session presentations:

Range reduction of Kansas unionids.

Brian K. Obermeyer, David R. Edds, Carl W. Prophet and Edwin J. Miller

Reproduction and fish hosts of unionids from the Ozark uplifts.

Christopher Barnhart, Andrew W. Roberts, and Ashley P. Farnsworth

Population increase of *Quadrula metanevra* in southeast Kansas.

Edwin J. Miller and Brian K. Obermeyer.

Comparison of quantitative and qualitative sampling methods for assessing unionid mussel beds in the Neosho River, Kansas. (poster session)

Brian K. Obermeyer, Edwin J. Miller, David R. Edds, and Carl W. Prophet.

An excellent presentation by Dr. Barnhart was highlighted with the video showing the exploding spermball of the flat floater (*Anodonta suborbiculata*) that sparked a spontaneous round of applause.

A presentation by C. Richard Fassler, Hawaii Dept. Of Land and Natural Resources, entitled **The American mussel crisis: effects on the world pearl industry** was interesting. The presentation focused on commercial interests. The shell company representatives squirmed in their seats when he predicted that the only shell that would command premium prices would be thick washboards for culturing large pearls. He stated that smaller thinner shells would be worth very little because of development of synthetic nuclei, use of non-mussel species for nuclei (i.e. giant clam), utilization of freshwater mussels of other nations, and aquaculture of mussels. The shell industry people disagreed with Mr. Fassler's predictions.***

Muchas gracias

A well deserved thank you goes out to the following folks:
Karen Couch provided the artwork of Neosho mucket (the mascot?) on the front page. Don George and Tom Swan did an outstanding job in coordinating facilities (thanks also to Fort Scott Community College) and field trips during last year's workshop. Positive comments were heard concerning the high quality of presentations. The time and effort of the presenters was appreciated. They were: Dr. Don Distler and Karen Couch, Brian Obermeyer, Craig Thompson, Garold Sneegas, Don George, Andy Roberts, and Linda Drees.***

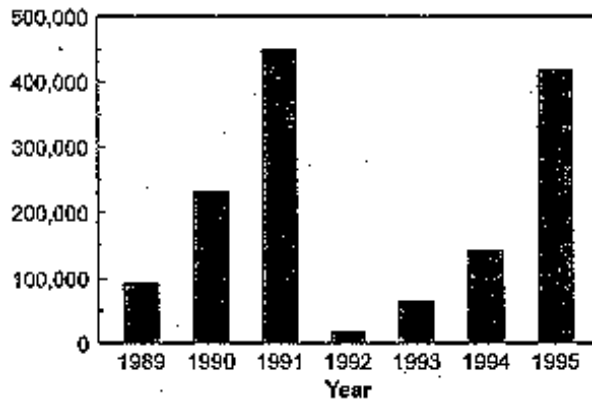
1995 COMMERCIAL MUSSEL HARVEST

The following is a summary of commercial mussel harvest for 1995. The data is from harvest reports tabulated by Tom Mosher, KDWP, Emporia Investigations Office. These are unofficial totals as of 15 February 1996.

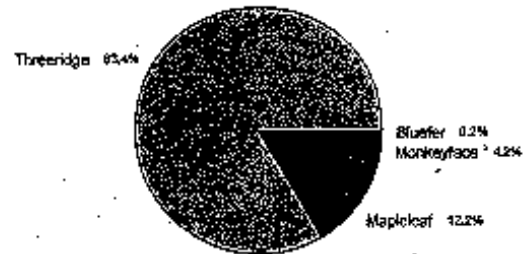
- Mussel harvest shifted from a reservoir harvest of mapleleaf in 1994 to a river harvest of threeridge in 1995.
- Total commercial harvest reported was 418,600 lbs (includes shells purchased as dressed and live weight).
- Threeridge made up the majority of harvested shells (83.4%).
- Nearly all (99.4%) the threeridge came from rivers (Verdigris 59%; Neosho 25%; Fall 14%; and Elk 2%).
- Mapleleaf was second most common in harvest (12.2%).
- Most mapleleaf harvest came from reservoirs (72%).
- Monkeyface made up only 4.2% of the total harvest.
- Nearly all monkeyface harvest came from rivers (99.5%).
- Very little harvest occurred on bluefers (790 lbs).
- Of the last 7 years, 1995 ranked second in total harvest and is very similar to the high harvest year of 1991.
- Typical prices paid were \$1.50/lb for #1 threeridge and river monkeyface, and mapleleaf. Processed lake mapleleaf over 4" sold for as high as \$4.40/lb.

Commercial Mussel Harvest 1989-1995.

Total Harvest (lbs).



Proportion of Commercial Mussel Harvest 1995 by Weight (lbs).



MUSSELS ARE INDICATORS OF WATERSHED HEALTH

Freshwater mussels won't wave a red mantle flap when they're in trouble. Systematic surveys of freshwater mussels, however, can reveal a stressed system. The Verdigris River in Montgomery County is a good example. With data from only 5 sites surveyed in 1994, we found reason for concern. Two of the sites were north (N1, N2) and three south (S1, S2, S3) of Independence, KS. The data suggests a possible water quality problem due to the differences in number of small mussels, catch-per-unit effort, and species found alive. Independence city officials have an interest in this data because there is resistance to upgrading the wastewater treatment plant. Mussel surveys may not explain the cause of environmental stress, but they can show us where to concentrate future efforts (Data collected by Obermeyer et al. 1995 *).

Recruitment Index (no. mussels 40mm or less in height)		
	North of Independence	South of Independence
Threeridge	6	0
Wabash pigtoe	30	0
Monkeyface	10	1
Pimpleback	7	2
Total	53	3

Catch per Unit Effort (CPUE)

Site N1	137.5
Site N2	95.8
Site S1	46.5
Site S2	34.9
Site S3	27.3

No. Of Species Found Alive

Site N1	20
Site N2	21
Site S1	13
Site S2	12
Site S3	9

*Obermeyer, E. K., D. R. Edds, and C. W. Prophet. 1995. Distribution and abundance of federal 'candidate' mussels (Unionidae) in southeast Kansas. Final rept. Kans. Dept. Wildl. & Parks. 128pp.

Neosho River Oxbows Still Hold Flat Floaters

The shoreline of two oxbows along the Neosho River in southern Allen County were shoreline searched on 21 February 1996 to document the continued existence of the flat floater. Jerry Horak and Edwin Miller searched and found fresh shells at Dickerson's Oxbow (Stewart's Lake) and Krone Oxbow. Four different size classes of shells were found. Other species noted were bluefer (*Potamius purpuratus*), pink paper shell (*Potamius ostensts*), yellow sand shell (*Lampsilis teres*), lilliput (*Toxolasma parva*), giant floater (*Anodonta grandis*), and paper pondshell (*Anodonta imbecillis*).

WILDLIFE OFFICERS ATTEMPT TO KEEP COMMERCIAL SHELLFISH HARVESTERS IN COMPLIANCE

Commercial shellers are responsible for knowing the species of mussels they are taking, the legal size limits, and the waters that are open to harvest. However, this doesn't always occur. That is why Wildlife Officers regularly check compliance. A survey of 4 Wildlife Officers (Officers Ramshaw, Knuth, Funke, and Wilkard) in southeast Kansas revealed that they wrote the following Notices to Appear in Court (NTA's) to shellfish harvesters in 1995:

Harvesting shells without commercial permit.....	2
Take and possess illegal size shells.....	13
Illegally take mussels from refuge area.....	3
Harvest of illegal species.....	3
Failure to send in mussel harvest reports.....	7

The typical fine and court cost for harvesting without a commercial license is \$125 plus court cost (\$42), illegal size shells (\$50 to \$100 plus court cost), and harvest on refuge \$125 plus court cost. There are three outstanding felony warrants on nonresident commercial shellers pending.

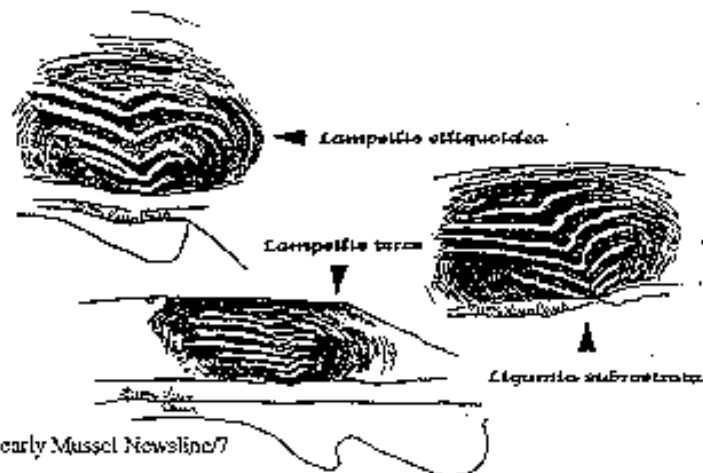
Wildlife Officer Bob Funke relayed an incident that occurred in Arkansas in November 1995. A fifth wheel trailer owned by an Arkansas shell buyer and carrying 13,800 lbs. of shell was stopped. The owner claimed they came from Kansas. If so, 30% of the load was illegal. After further investigation it was found that they came from Oklahoma. The shell buyer was trying to protect a pair of Oklahoma shellers who were on probation for a past shelling offense. In Oklahoma, shellers can be charged with felony theft of state property if found with illegal shells and if convicted also lose their shelling permit. This had happened to one of the Okies. The buyer had his load of cargo and 24-foot fifth-wheel trailer confiscated and had to pay over \$1000 in fines.***

USING BEAK SCULPTURE FOR IDENTIFICATION

Many mussel species have distinct beak sculpture. If not eroded away, this can be a very useful tool in mussel identification, particularly with juveniles and live animals. However, it is not entirely foolproof. Some species have beak sculpture that superficially resemble each other. Illustrated here are close-ups of the umbo area of three mussels: Fat mucket (*Lampsilis siliquoides*), yellow sandshell (*Lampsilis teres*), and pondmussel (*Ligumia subrostrata*). The sculpture is similar, but not identical.

To further complicate matters, the adults of these species, and several others, exhibit sexual dimorphism. This obligates us to rely on other shell characteristics besides general shape. A combination of consistent features, (that phrase is used with reservations) therefore, is what enables us to identify our little green, brown, and yellow friends.***

Karen J. Couch



KANSAS MUSSEL LAWS...1929

Fish and Game Laws of Kansas, Revised April 1, 1929, Forestry, Fish and Game Comm

In 1929, it was "unlawful to take, catch or kill mussels for the pearls therein contained or for commercial purposes without a license issued by the state fish and game warden." There were no established species or quantity limits, but there was a size limit: "but no mussel of less than one and three quarters inches in largest dimension shall be retained, but such small mussels shall at once be returned to the water." License fees back then were \$5 for resident and \$50 for nonresident. The season was closed between 1 December and 15 June. Mussel harvest had to be reported, "Such licensee shall report to the state fish and game warden before the 31st of December of each year the amount of mussels taken by him under his license the previous year..."***
Dennis Knuth, KDWP Wildlife Officer

ZEBRA MUSSEL THREATENS NATIVES

Many native unionids have been casualties of zebra mussel infestations. Richard Neves, in an article submitted to Proceedings of the 12th International Malacological Congress, describes the impacts of zebra mussels on native mussels. Dr. Neves' review of studies conducted in Lake St. Clair concludes that "unionid density and species richness are significantly reduced within 3-5 years of initial infestation by zebra mussels. Some researchers conclude that unionids will be extirpated as a result of zebra mussel colonization. Neves states that zebra mussels adversely affect unionid survival by: 1) impairing locomotion and burrowing behaviors, 2) prohibiting occlusion of valves, 3) prohibiting gaping of valves, 4) occluding apertures, 5) competition for food resources, 6) shell deformities, 7) exposure of unionids to toxic metabolic wastes, and 8) addition of weight to unionids promoting settlement in soft sediment.

A study conducted by the U. S. Fish and Wildlife Service indicates that zebra mussels will likely be introduced to western waters, including Kansas, by recreational boating and angling activity. Zebra mussel larvae can be carried in live wells and bait buckets. Adults can attach to boats and other hard surfaces.***

Linda Drees, USFWS

Kansas Dept. Wildlife & Parks
P.O. Box 945
Independence, KS 67301