

Is False Spike, *Quadrula mitchelli* (Bivalvia: Unionidae), Extinct? First Account of a Very Recently Deceased Individual in Over Thirty Years

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In contrast to our findings, *S. hispidus* generally has not been reported as the most abundant prey of this owl (Marks et al., 1994); however, one study of an urban roost in Wichita, Kansas, reported that cotton rats comprised 56% of the diet (Maccarone and Janzen, 2005). In northeastern Kansas (Rainey and Robinson, 1954) and Missouri (Korschgen and Stuart, 1972), cotton rats accounted for the greatest biomass but were second in abundance of total prey to *Microtus*. Cotton rats also were reported as representing <15% of winter prey of long-eared owls in other studies in Kansas (Kaufman et al., 2010; Young et al., 2010). Variability in diet between years and locations is documented in this species, but does not always reflect relative abundance of species of prey (e.g., Kaufman et al., 2010). We do not have data on relative abundance of species of prey at our study site, but Kaufman et al. (2010) proposed that long-eared owls may selectively take large-bodied prey when their availability is high, even when smaller-bodied mice are more abundant. This may explain the high frequency of cotton rats in the winter diet of long-eared owls in western Texas.

Owl pellets also can be valuable in studying mammalian distributions and population dynamics. The presence of *R. montanus* in our samples is a slight extension of the recorded range for this species in Texas (Schmidly, 2004).

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IS FALSE SPIKE, *QUADRULA MITCHELLI* (BIVALVIA: UNIONIDAE), EXTINCT? FIRST ACCOUNT OF A VERY RECENTLY DECEASED INDIVIDUAL IN OVER THIRTY YEARS

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ABSTRACT—A recent survey of the San Saba River in San Saba County, Texas, has yielded the first record in >30 years of a very recently deceased individual (i.e., with tissue present within the shell) of the unionid mussel *Quadrula mitchelli* (false spike). This very recently dead individual suggests that living populations of *Q. mitchelli* might still exist in the San Saba River. Our results provide evidence that surveys in remote areas may help to locate populations of rare species of unionid mussels.

RESUMEN—Un muestreo recién del río San Saba en el condado de San Saba, Texas, ha dado el primer registro en >30 años de un individuo de mejillón unionido *Quadrula mitchelli* recientemente fallecido (es decir, con el tejido aún presente dentro de la concha). El encuentro sugiere que aún podrían existir más poblaciones actuales de *Q. mitchelli* dentro del río San Saba. Nuestros resultados rinden evidencia que muestreos realizados dentro de áreas remotas podrían ayudar a localizar poblaciones de especies raras del mejillón unionido.

False spike, *Quadrula mitchelli* (Simpson, 1895), is a rare unionid mussel in central and western Texas that historically inhabited the Rio Grande, Guadalupe, San Antonio, Colorado, and Brazos river basins. Basic life history, reproductive biology, ecology, and habitat requirements of this species are unknown (Howells et al., 1996; R. G. Howells, in litt.). In the Rio Grande drainage, the only contemporary records for this species are subfossil and fossil specimens collected in the early to middle 1970s (Metcalf, 1982; summarized in Howells, 2003). In central Texas, the only evidence that this species may still be present is the collection of two recently dead valves (i.e., no soft tissue remains, but shell is in good condition as it would be in a living specimen; Howells, 2003) from the San Marcos River in 2000 (R. G. Howells, in litt.). The decline of this species likely stems from human modification of streams and rivers combined with record droughts and floods in the late 1970s and early 1980s (R. G. Howells, in litt.). In 2009, this species was listed as state-threatened in Texas and proposed for listing under the Endangered Species Act (United States Fish and Wildlife Service, 2009).

During the summer of 2011, we conducted surveys for state-threatened unionid mussels on the San Saba River 12 km east of San Saba, Texas. At a riffle near the confluence with the Colorado River, we collected the first very recently dead individual (i.e., with tissue present within the shell; Howells, 2003) of *Q. mitchelli* found in the last 30 years (Fig. 1). This specimen is consistent with taxonomic descriptions provided by Howells et al. (1996). The exact time of death cannot be determined, but the presence of tissue in both valves indicates that the individual was recently alive and inhabited the site. Other rare species of mussels were collected at the same locality, including smooth pimpleback, *Quadrula houstonensis* (I. Lea, 1859); Texas pimpleback, *Quadrula petrina* (Gould, 1855); and Texas fawnsfoot, *Truncilla macrodon* (I. Lea, 1859). These species are listed as state-threatened in Texas and have been proposed for listing under the Endangered Species Act (United States Fish and Wildlife Service, 2009).

The site where this specimen was collected is characterized by steep, grass-covered banks with no overhead canopy cover. The adjacent land is used as pecan orchards and rangeland. During sampling, we observed livestock accessing the stream. The mesohabitat consisted of a pool-riffle-run sequence with substrates of cobbles and gravel in the riffle and cobbles, gravel, and coarse sand in the run and pool. Threatened mussels collected in the

riffle were primarily found buried in the gravel underneath a layer of cobble. In the pool and run, threatened mussels were partially buried in a mixture of gravel and coarse sand. In the pool, riffle, and run, mean velocity rates during sampling were 0.02, 0.05, and 0.02 m/s, and mean water depths were 0.58, 0.12, and 0.21 m, respectively.

Our discovery suggests that *Q. mitchelli* is not extinct and potentially inhabits the San Saba River in low densities. We are unaware of any stream or river in central or western Texas that is inhabited by so many rare unionid species. Consequently, it would seem that the San



Fig. 1—Photograph of a very recently deceased individual (with tissue present within the shell) of *Quadrula mitchelli* (false spike) from the San Saba River, San Saba County, Texas.

Saba River has a greater likelihood of being inhabited by populations of *Q. mitchelli*. However, this evidence is circumstantial, and, therefore, further surveys are needed to locate surviving populations of *Q. mitchelli* and to determine the distribution of the species in the San Saba River. Given the rarity of this species and declining habitat, the present time may be the only opportunity to study this species before it actually becomes extinct. Finally, this finding underscores the conclusions of Randklev et al. (2010) that populations of rare unionid species do exist and future studies must be undertaken with a focus on remote or difficult-to-access areas.

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HORSEHAIR WORM, *PARAGORDIUS VARIUS* (NEMATOMORPHA: GORDIIDA): NEW TO THE FAUNA OF OKLAHOMA

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ABSTRACT—During July 2011, collections of several freshwater horsehair worms were made at two sites (Mud and Salt creeks) in McCurtain County, Oklahoma. The specimens were subsequently identified as *Paragordius varius* (Leidy, 1851), which represents a new nematomorph for the state. The only previously reported horsehair worm from Oklahoma is *Gordius robustus* Leidy, 1851, from Stillwater, Payne County. *Paragordius varius* is probably the most common and widespread gordiid species in the New World. It is now known from 25 (plus the District of Columbia) of the contiguous United States and three provinces of Canada and also has been reported from Hawaii and throughout South America. Collecting at several other sites in the eastern part of the state failed to recover additional *P. varius*.

RESUMEN—Durante julio del 2011, colecciones de varios gusanos crin de caballo se realizaron en dos sitios (Mud y Salt Creeks) en el condado de McCurtain, Oklahoma. Los especímenes fueron identificados después como *Paragordius varius* (Leidy, 1851), lo que representa un nuevo nematomorfo para el estado. El único gusano crin de caballo anteriormente registrado de Oklahoma es *Gordius robustus* Leidy, 1851, de Stillwater, condado de Payne. *Paragordius varius* es probablemente la especie gordiida más común y ampliamente distribuida en el Nuevo Mundo. Actualmente se conoce en 25 estados (más el Distrito de Columbia) de los Estados Unidos contiguos y tres provincias de Canadá y también se ha registrado de Hawaii y en toda América