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Threatened fishes of the world: *Menidia riojai* Solórzano and López 1965 (Atheriniformes: Atherinopsidae)

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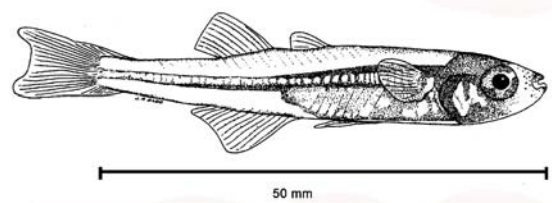
Abstract Menidia riojai is endemic of the Lerma River headwaters considered critically endangered because its populations have been severely fragmented.

Keywords Lerma River · Silverside · Fragmented populations · Critically endangered · Menidia riojai



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Common names: Toluca silverside (English), charal de Santiago (Spanish). (Illustration by J.A. Dodd). **Conservation status:** "Extinction risk" species under special protection (SEMARNAT 2001). **Identification:** Transparent to pale green with a lateral silver band. Maximum standard length, 98 mm; D1III-V; D2I, 9–11; A12–15. Lateral scales 39–43; 13–15 branchiospinae in the first arc. Small head, flattened snout, two sets of small pointed teeth in both jaws (Solórzano and López 1965). **Distribution:** Endemic to the headwaters of the Lerma River, Mexico (Barbour 1973). Current distribution reduced to only two localities (Méndez-Sánchez and Soto-Galera 1996), the Guadalupe Victoria lagoon (GV) and the Ignacio Ramirez dam (IR), comprising only 15% of its previous range. **Abundance:** In 1996, IR and GV

population densities were 0.12+/−0.7 and 0.4+/0.13 fish·m^{-2} respectively. **Habitat and Ecology:** GV is a small spring (0.15 km^2) with high water transparency, dominated by emergent and submerged vegetation (Solórzano and López 1965); conversely, IR is a highly turbid 6.5 km^2, artificial reservoir with scarce vegetation and little phytoplankton production (Chávez-Toledo 1987). **Reproduction:** Females lay a maximum of 3,000 eggs on vegetation. Maturation patterns suggest continuous sperm in males and three reproductive events each year in females. Females and males reach sexual maturity at 0+ years old and 30 and 40 mm (approximately 0.5 gr) standard length respectively (Méndez-Sánchez 1996). **Threats:** Significant and permanent environmental deterioration of the Lerma headwaters has occurred as following the introduction of exotic fish and frogs, water extraction and domestic and industrial pollution (Soto-Galera et al. 1998; Méndez-Sánchez et al. 2002). **Conservation actions:** National legal protection but no active conservation activity. **Conservation recommendations:** Habitats supporting the remnants of the population require urgent protection. Establishment of refuge populations in the last two localities and other suitable habitats should be considered. **Remarks:** Must now be considered Critically Endangered because is sensitive to environmental degradation (Soto-Galera et al. 1998) and its range is now less than 10 km^2 and previously contiguous populations are now severely fragmented.

References

Barbour C (1973) A biogeographical history of *Chirostoma* (Pisces: Atherinidae): a species flock from the mexican plateau. Copeia 1(3):533–556

Chávez-Toledo C (1987) Ictiofauna del Alto Lerma: Aspectos sistemáticos, zoogeográficos y ecológicos. Tesis profesional: Biólogo. Escuela Nacional de Ciencias Biológicas, México

Méndez-Sánchez, JF (1996) Contribución al conocimiento biológico de *Chirostoma riojai* Solórzano y López, 1965, (Charal del Alto Lerma) en el embalse Ignacio Ramíerez, Almoloya, México. Tesis profesional. Universidad Autónoma del Estado de México. México

Méndez-Sánchez JF, Soto-Galera E (1996) Peces Dulceacuícolas Mexicanos. XIV. *Chirostoma riojai* Solórzano y López 1965 (Atheriniformes: Atherinidae). Zoología Informa 34:49–58

Méndez-Sánchez JF, Soto-Galera E, Paulo-Maya J, Hernández-Hernández MA (2002) Ictiofauna del Estado de Mexico. Ciencia ergo sum 9:87–90

SEMARNAT (2001) Norma Oficial Mexicana NOM-059-ECOL-2001. Diario Oficial de la Federación. México

Solórzano A, López Y (1965) Nueva especie de *Chirostoma* capturada en la Laguna de Victoria o de Santiago Tilapa, Edo. de Méx. (Pisces: Atherinidae). Ciencia 24(3–4):145–150

Soto-Galera E, Díaz-Pardo E, López-López E, Lyons J (1998) Fish as indicator of environmental quality in the Río Lerma Basin, México. J Aquat Ecosyst Health Manage 1:267–276