

ARIZONA GAME AND FISH DEPARTMENT  
HERITAGE DATA MANAGEMENT SYSTEM

Animal Abstract

Element Code: AFCJB20031  
Data Sensitivity: Yes

**CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE**

**NAME:** *Lepidomeda mollispinis mollispinis*  
**COMMON NAME:** Virgin Spinedace  
**SYNONYMS:** *Lepidomeda mollispinis*, *Lepidomeda* sp.  
**FAMILY:** Cyprinidae

**AUTHOR, PLACE OF PUBLICATION:** Miller, R.R. and C.L. Hubbs. 1960. Misc. Publ. Mus. Zool. Univ. Michigan, 115:1-39.

**TYPE LOCALITY:** Santa Clara River, 4.8 km se of Shivwitz and 7.2 km nw of Santa Clara, Washington Co., Utah.

**TYPE SPECIMEN:** Holotype, University of Michigan Museum of Zoology, No. 141673; 103 paratopotypes, UMMZ 141674.

**TAXONOMIC UNIQUENESS:** Genus *Lepidomeda* contains four species; *L. albivallis*, *L. altivelis*, *L. mollispinis* and *L. vittata* while *L.m. mollispinis* and *L.m. pratensis* represent the two described subspecies of *L. mollispinis* (Miller and Hubbs 1960, Rinne 1971).

**DESCRIPTION:** Adults generally 6.0-12.0 cm (2.4-4.7 in.) total length (Rinne 1971, Addley and Hardy 1993). "Mouth less oblique than *L. vittata*. Spinose rays of dorsal fin weaker. Dorsal fin lower and rounded, its depressed length 2.2 to 2.4 in. (5.6 to 6.1 cm) predorsal length" (Minckley 1973). Anal fin-rays 9 (8-10), scales in lateral line usually fewer than 90 (77-91) and pharyngeal teeth 2, 5-4, 2 (Minckley 1973).

"Sides silvery, often with a brassy sheen and sooty speckles in dorsal half (sometimes extending below lateral line); sometimes with distinctly-darker blotches on the sides. Males with basal band on anal fin and bases of paired fins orange or pinkish-red when in breeding condition, and sometimes with pink, ventrolateral bands on abdomen, passing from pectoral bases to above anal fin. A spot of golden-red is developed at the upper end of gill slit in extremely colored males" (Minckley 1973).

**AIDS TO IDENTIFICATION:**

**ILLUSTRATIONS:**

Color photo (Addley and Hardy 1993:3)  
B&W photo (Minckley 1973:111)  
Color drawing (Page and Burr 1991)  
Color photo (Rinne and Minckley 1991:15)

**TOTAL RANGE:** Endemic to the Virgin River and its tributaries in Utah, Nevada and Arizona.

**RANGE WITHIN ARIZONA:** In Mohave County, found lower Beaver Dam Wash to its confluence with the Virgin River at Littlefield, Arizona. Historically present in the Virgin River from the Utah border to Littlefield, primarily in conjunction with clear water inflows of perennial tributaries.

### **SPECIES BIOLOGY AND POPULATION TRENDS**

#### **BIOLOGY:**

**REPRODUCTION:** Spawning occurs in spring through early summer (April-June) in water temperatures of about 13-17°C and during a photoperiod of greater than about 13 hours a day. Peak spawning is closely correlated with peak discharge. "One-year and two-year old fish spawn only once in a season, but there is some evidence that older females may spawn twice in a relatively short period of time" (Minckley 1973). Most individuals probably live no more than three years. "The main burden of over-all reproduction by the species is borne by the one-year-old fish..." (Minckley 1973).

Mean age-specific fecundity was 459, 788, and 693 mature eggs for one, two and three year old females, respectively. "Spawning behavior resembles that of *Meda fulgida*, in that a group of males congregate near the lower ends of pools" (Minckley 1973) and converges on single females as they move to the area to lay their eggs on or near the bottom. Males apparently fertilize eggs as they are deposited by females.

**FOOD HABITS:** Primarily insectivorous, but other invertebrates, plant material and organic debris are consumed when insects are rare. Feed continuously during the day at the surface and in the mid-water column on drifting prey. Use shear zones in a manner similar to salmonids.

**HABITAT:** Apparently prefer clear, cool, relatively swift streams with scattered pools (Minckley 1973). Found in pools with cover offered by boulders or undercut banks. Pool depths of 10-90 cm (3.9-35.4 in.) and current velocities of 10-100 cm/sec over sand and gravel substrates are preferred. Often utilize shear zones between low and high current velocities.

**ELEVATION:** 550 m (1,805 ft) to Unknown

**PLANT COMMUNITY:**

**POPULATION TRENDS:** Virgin Spinedace has completely disappeared from 37% of postulated historic habitat in the Virgin River. Decreases in habitat occupied in major tributaries vary between 31% and 100%. Last observed by Bureau of Land Management personnel in 1991, when fish were caught and deposited at the Arizona State University Museum (AGFD Native Fish Diversity Review 1995).

### **SPECIES PROTECTION AND CONSERVATION**

**ENDANGERED SPECIES ACT STATUS:** CCA (Utah DWR 1995, revised 2002)  
 NW (USDI, FWS2021)  
 [UR (USDI, FWS 2015)]  
 [None (USDI, FWS 1996)]  
 [PT (USDI, FWS 1994)]  
 [C2 (USDI, FWS 1982, 1985, 1989, 1991)]

**STATE STATUS:** 2 (AZGFD AWCS 2022)  
 [1A (AGFD SWAP 2012)]  
 [WSC (AGFD, WSCA 1996 in prep)]  
 [Endangered (AGFD, TNW 1988)]

**OTHER STATUS:** Bureau of Land Management Sensitive  
 (USDI, BLM AZ 2008, 2010, 2017)  
 Not Forest Service Sensitive (USDA, FS  
 Region 3 1999, 2013)  
 [Forest Service Sensitive (USDA, FS  
 Region 3 1988)]

**MANAGEMENT FACTORS:** Major factors affecting Virgin Spinedace are water diversion, impoundment, channelization, degradation of water quality, and introduced species, both fishes and crayfish. Two specific problems are competition with *Richardsonius b. hydrophlox* and predation by brown trout (Minckley 1973).

**Management needs:** emphasize implementation of the Virgin River Spinedace Conservation Agreement, which includes protect and enhance, including water quantity and quality; ameliorate effects of nonnative fish species in spinedace waters; re-establish additional populations in historical habitat.

**PROTECTIVE MEASURES TAKEN:** Stream renovation using rotenone directed at eradication of nonnative fishes was attempted with limited success.

In 1995, a Conservation Agreement and Strategy was prepared and adopted in lieu of an ESA listing. Signatories to this agreement include the US FWS, Utah Dept of Natural Resources, US BLM, US NPS, Nevada Dept of Conservation and Natural Resources, the Washington County Utah Water Conservancy District and the Arizona Game and Fish Dept. This agreement was renewed in 2000, and revised again in 2002 (Utah DWR 2002).

**SUGGESTED PROJECTS:** Addley and Hardy (1993) recommend three primary methods to make large scale enhancements of populations: (1) providing instream flows; (2) removing and/or limiting numbers of nonnative fish species; and (3) reintroducing spinedace into historic habitat from which they have disappeared and introducing them into habitat that they have not occupied as a result of stream barriers. Provision of instream flows should be interpreted as maintaining the pattern of the historic hydrograph and species removals should also include crayfish.

**LAND MANAGEMENT/OWNERSHIP:** Habitat exists on Federal, State, and private holdings. Majority of Federal holdings are with the Bureau of Land Management.

### **SOURCES OF FURTHER INFORMATION**

#### **REFERENCES:**

- Addley, R.C. and T.B. Hardy. 1993. The current distribution and status of spinedace in the Virgin River Basin. Report to Washington County Water Conservancy District. Hardy, Addley and Associates, Inc., Logan, Utah. p. 198.
- Arizona Game and Fish Department. 1988. Threatened native wildlife in Arizona. Arizona Game and Fish Department Publication. Phoenix, Arizona. p. 5.
- Arizona Game and Fish Department. 1996, in prep. Wildlife of special concern in Arizona. Arizona Game and Fish Department Publication. Phoenix, Arizona. p. 5.
- Arizona Game and Fish Department. 2012. Arizona's State Wildlife Action Plan 2012-2022. Arizona Game and Fish Department, Phoenix, Arizona. 233 pages
- Arizona Game and Fish Department. 2022. Arizona Wildlife Conservation Strategy: 2022-2032. Arizona Game and Fish Department, Phoenix, Arizona. 378 pages.
- Arizona Game and Fish Department Native Fish Diversity Review. 1995. Tempe, Arizona.
- Angradi, T.R., J.S. Spaulding, and E.D. Koch. 1991. Diel food utilization by the Virgin River spinedace, *Lepidomeda mollispinis mollispinis*, and speckled dace, *Rhinichthys osculus*, in Beaver Dam Wash, Utah. The Southwestern Naturalist 36(2):158-170.  
<https://doi.org/10.2307/3671916>
- Cross, J.N. 1985. Distribution of fish in the Virgin River, a tributary of the lower Colorado River. Environmental Biology of Fishes 12(1):13-21.
- Deacon, J.E., P.B. Schumann and E.L. Stuenkel. 1987. Thermal tolerances and preferences of fishes of the Virgin River system (Utah, Arizona, Nevada). The Great Basin Naturalist 47(4):538-546. <https://www.jstor.org/stable/41712368>
- Gregor, P.D. and J.E. Deacon. 1988. Food partitioning among fishes of the Virgin River. Copeia 1988(2):314-323. <https://doi.org/10.2307/1445871>
- Lee, D.S., C.R. Gilbert, C.H. Hocutt, R.E. Jenkins, D.E. McAllister, and J.R. Stauffer, Jr. (editors). 1980. Atlas of North American Fishes. Publication 1980-12, North Carolina Biological Survey. North Carolina State Museum of Natural History, Raleigh, North Carolina. 867 pages.

- Miller, R.R. and C.L. Hubbs. 1960. The spiny-rayed cyprinid fishes (Plagopterini) of the Colorado River system. Miscellaneous Publications, Museum of Zoology, University of Michigan 115:1-39.
- Minckley, W.L. 1969. Native Arizona fishes Part II - spiny-rayed minnows. Arizona Wildlife Views 16(6):4-9.
- Minckley, W.L. 1973. Fishes of Arizona. Arizona Game and Fish Department, Phoenix, Arizona. pp. 111-113.
- Page, L.M. and B.M. Burr. 1991. A field guide to freshwater fishes: North America, north of Mexico. Houghton Mifflin Co., Boston, Massachusetts. pp. 81-82.
- Rinne, J.N. and W.L. Minckley. 1991. Native fishes of arid lands: a dwindling resource of the desert southwest. General Technical Report RM-206. U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado. pp. 15-16.
- Rinne, W.E. 1971. The life history of *Lepidomeda mollispinis mollispinis* (the Virgin River spinedace) a unique western cyprinid. M.S. thesis, University of Nevada, Las Vegas. Las Vegas, Nevada. 109 pages.
- Sigler, W.F. and R.R. Miller. 1963. Fishes of Utah. Utah State Department of Fish and Game, Salt Lake City, Utah. p. 203.
- USDA, Forest Service Region 3. 1988. Regional Forester's Sensitive Species List.
- USDA, Forest Service Region 3. 1999. Regional Forester's Sensitive Species List.
- USDA, Forest Service Region 3. 2013. Regional Forester's Sensitive Species List.
- USDI, Bureau of Land Management Region 2. 2008. Arizona BLM sensitive species list. Bureau of Land Management, Arizona State Office, Phoenix, Arizona.
- USDI, Bureau of Land Management Region 2. 2010. Arizona BLM sensitive species list. Instruction memorandum No. AZ-IM-2011-005. Bureau of Land Management, Arizona State Office, Phoenix, Arizona.
- USDI, Bureau of Land Management. 2017. Arizona BLM sensitive species list. Instruction memorandum No. AZ-IM-2017-009. Bureau of Land Management, Arizona State Office, Phoenix, Arizona.
- USDI, Fish and Wildlife Service. 1982. Endangered and threatened wildlife and plants; review of vertebrate wildlife for listing as endangered or threatened species; notice of review. Federal Register 47(251):58454-58460.
- USDI, Fish and Wildlife Service. 1985. Endangered and threatened wildlife and plants: review of vertebrate wildlife; notice of review. Federal Register 50(181):37958-37967.
- USDI, Fish and Wildlife Service. 1989. Endangered and threatened wildlife and plants; animal notice of review; notice of review. Federal Register 54(4):556.
- USDI, Fish and Wildlife Service. 1991. Endangered and threatened wildlife and plants; animal candidate review for listing as endangered or threatened species; notice of review. Federal Register 56(225):58815.
- USDI, Fish and Wildlife Service. 1994a. Endangered and threatened wildlife and plants; proposal to list the fish Virgin spinedace as a threatened species; proposed rule. Federal Register 59(95):25875-25880.

- USDI, Fish and Wildlife Service. 1994b. Endangered and threatened wildlife and plants; animal candidate review for listing as endangered or threatened species; proposed rule. Federal Register 59(219):58998.
- USDI, Fish and Wildlife Service. 1996a. Endangered and threatened wildlife and plants; withdrawal of the proposed rule to list the fish Virgin spinedace as threatened and withdrawal of the proposed rule to designate critical habitat for the Virgin spinedace; proposed rule; withdrawal. Federal Register 61(25):4401-4406.
- USDI, Fish and Wildlife Service. 1996b. Endangered and threatened wildlife and plants; review of plant and animal taxa that are candidates for listing as endangered or threatened species; notice of review. Federal Register 61(40):7596-7613.
- USDI, Fish and Wildlife Service. 2015. Endangered and threatened wildlife and plants; 90-day findings on 25 petitions; notice of petition findings and initiation of status reviews. Federal Register 80(181):56423-56432.
- USDI, Fish and Wildlife Service. 2021. Endangered and threatened wildlife and plants; 17 species not warranted for listing as endangered or threatened species; notification of findings. Federal Register 86(184):53255-53261.
- Utah Division of Wildlife Resources. 2002. Virgin spinedace (*Lepidomeda mollispinis mollispinis*) conservation strategy. Utah Division of Wildlife Resources, Salt Lake City, Utah. 64 pages.
- Valdez, R.A., W.J. Masslich, R. Radant, and D. Knight. 1991. Status of the Virgin spinedace (*Lepidomeda mollispinis mollispinis*) in the Virgin River drainage, Utah. Report to Utah Division of Wildlife Resources, Salt Lake City, Utah. BIO/WEST, Inc. Report No. PR-197-1. p. 43.

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#### ADDITIONAL INFORMATION:

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