

A publication of the
ARIZONA GAME AND FISH DEPARTMENT
Robert Jantzen, Director

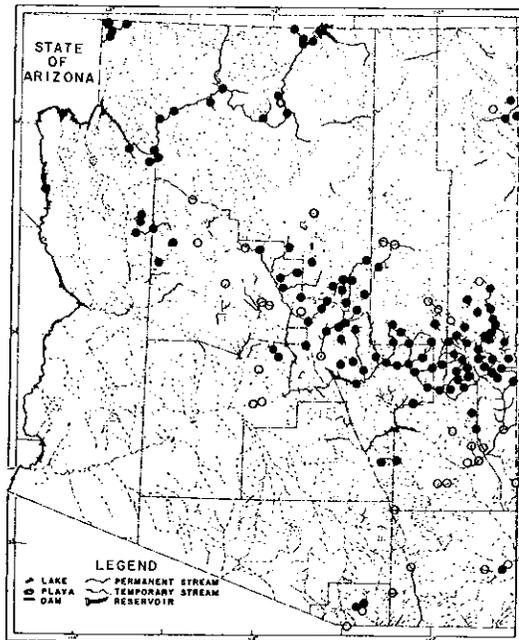
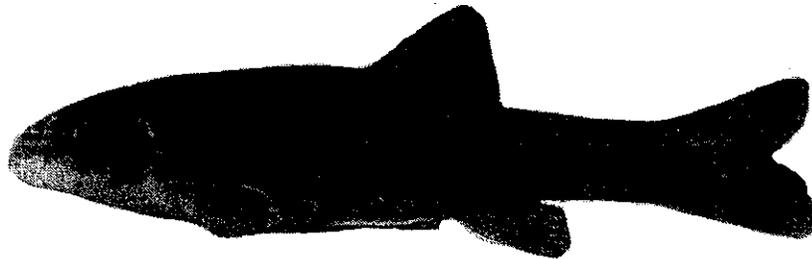
Published 30 June 1973

Copyright 1973
W. L. Minckley and Arizona Game and Fish Department
Library of Congress Catalog Card No. 73-620204
Published in United States of America

Printed by
Sims Printing Company, Inc.
Phoenix, Arizona

Speckled dace, *Rhinichthys osculus* (Girard)

(Fig. 63; Map 19)



Argyreus osculus, Girard, 1856: 186/ 1859a: 47.

Argyreus notabilis, Girard, 1856: 186 (Santa Cruz River, México).

Rhinichthys henshawii, var. III, Cope, 1874: 133.

Ceratichthys ventricosus, Cope, 1874: 136.

Apocope oscula, Cope and Yarrow, 1875: 647. Jordan and Gilbert, 1883: 211. Jordan, *et al.*, 1930: 141.

Apocope coesii, Yarrow, in Cope and Yarrow, 1875: 648. Jordan, *et al.*, 1930: 1411.

211. *Apocope ventricosa*, Cope and Yarrow, 1875: 649. Jordan and Gilbert, 1883: 210.
- Apocope vulnerata*, Jordan and Gilbert, 1883: 210.
- Agosia oscula*, Jordan, 1886: 122/ 1891b: 28. Evermann and Rutter, 1895: 484. Gilbert and Scofield, 1898: 495. Meek, 1904 xxxix, 80.
- Rhinichthys cataractae dulcis*, Evermann and Rutter, 1895: 484.
- Agosia couesii*, Evermann and Rutter, 1895: 485. Gilbert and Scofield, 1898: 496. Jordan and Everman, 1896: 310.
- Apocope oscula oscula*, Tanner, 1932: 135/ 1936: 160.
- Rhinichthys nubilus*, LaRivers, 1952: 99. LaRivers and Trelease, 1952: 117. Miller, 1952b: 30.
- Xyrauchen texanus* (mis-identification of larva; see Winn & Miller, 1954), Douglas, 1952: 151.
- Rhinichthys osculus*, Winn and Miller, 1954: 274. Koster, 1957: 64. Miller and Hubbs, 1960: 30. Miller, 1961b: 376/ 1963a: 5/ 1964a: 7. LaRivers, 1962: 425. John, 1963: 286/ 1964: 112. Sigler and Miller, 1963: 84. Lowe, 1967: 102. Miller and Lowe, 1964: 141/ 1967: 141. Minckley, 1965a: 51/ 1971: 184. Bradley and Deacon, 1967: 229. Minckley and Deacon, 1968: 1427. Moore, 1968: 70. Eddy, 1969: 73.
- Rhinichthys osculus osculus*, Barber and Minckley, 1966: 319. Minckley, 1969a: 3. Stour, et al., 1970: 110.
- Body chunky, rounded, somewhat flattened ventrally; body depth usually about equal to length of head. Upper jaw protractile, or, if a frenum is present, it is very small. Barbels usually present at sides of upper lips. Fins generally rounded (somewhat falcate in swift-water populations of larger rivers), dorsal-fin origin above or just behind pelvic-fin insertion. Scales moderately small, 60 to 90 (rarely more) along lateral line. Parhygeal teeth in two rows, 1, 4-4, 1, or 2, 4-4, 2, or a combination thereof. Dorsal fin with 6 to 9 rays, usually 8. Anal fin with seven rays (rarely six).
- Coloration highly variable, drab olivaceous with patterns ranging from large black blotches on body, through a single or double lateral band, to almost unicolor (darker above, lighter below). Breeding males with brilliant red on bases of paired fins and on body near those fins, on and near anal fin base, the lower caudal lobe, the mouth, and near the upper part of gill cleft.

As evidenced by the number of names applied to this species in Arizona alone, which reflects not only the vagaries of taxonomy, but also the confusion of early (and later) workers, the speckled dace is one of the most highly variable fishes in western North America (Miller & Miller, 1948). Its proclivity for small, headwater streams has allowed the species to move from basin to basin as stream captures occurred or as drainage patterns shifted over low divides, and it is the only native fish that has representatives occurring naturally in all seven drainages of western United States (and in many of the internal drainages as well; Miller, 1958). In Arizona, *R. osculus* exists in at least two major body forms, a small, highly-speckled or blotched, chubby-bodied kind in the southern part of the Gila River system (which would be called *R. osculus osculus* [Girard] if a trinomial was applied), and a larger, banded or unicolorated, more streamlined kind in larger rivers and creeks to the north (*R. o. yarrowi* [Jordan and Evermann]). These two forms appear to intergrade chaotically

in a broad band from the northwest corner to the south-central border of the state, on either side of a line generally marked by the Mogollon Rim. This has presumably resulted from repeated headwater transfers, through stream captures, over the escarpment, and subsequent interbreeding of the two forms. Other morphotypes exist locally, such as swift-water types in the Grand Canyon and in the Salt River Canyon, which probably represent independent derivations from different stocks, and some blunt-nosed, dark-colored populations in springs along the Virgin River and in some hanging tributaries of the Verde River.

This species is presently rare below about 1,500 meters elevation, but once occurred in the larger streams below that level. It now reaches its peak abundance between 2,000 and 3,000 meters in relatively swift, moderate sized, pool-and-riffle creeks. As with many creek fishes, the lower Colorado River apparently was inhospitable; the only record from the mainstream of the lower Colorado is of a larva, taken in plankton hauls over breeding areas of razorback sucker in Lake Mohave (Douglas, 1952; specimen re-identified as *R. osculus* by Winn and Miller, 1954). Speckled dace usually live in water less than 0.5 meter deep, and often congregate below riffles and eddies. Breeding adults seem to prefer swifter water, particularly the males, and in the late winter and early spring the fish (both sexes) sometimes are numerous in swirling waters behind stones or other obstructions in the swiftest riffles. The fish is omnivorous, feeding on algae, detrital materials, and smaller aquatic invertebrates. It often forages on the bottom, but sometimes rises to mid-water to inspect, and sometimes devour, floating materials.

The reproductive habits of *R. osculus* are yet to be described in detail. Other species of *Rhinichthys* have been studied fairly intensively, especially those of northeastern United States (reviewed by Breder & Rosen, 1966). Nests are sometimes constructed by males, through fanning of gravel bottoms with the fins and body, and "rooting" with the snout. The males of some forms are markedly territorial, defending a nest site for a period of days and spawning with numerous females. The spacing of male speckled dace on some riffles implies that this may occur, but actual defense, etc., has not been observed by me. Spawning of most *Rhinichthys* species involves only a single pair, with the male pressing his head and anterior body against the female, placing his caudal peduncle over her body, and performing rapid vibrations and splashing of water. This continues for a second or so, then the pair lie quietly for a moment before parting. John (1963) studied the reproductive cycle of speckled dace in intermittent streams of the Chiricahua Mountains, finding two breeding periods, one in spring and the other in late summer. The first spawn was an apparent response to increasing water temperatures and length of daylight, and the spring runoff (from snow-melt in that area), and the second period was attributed to a response to summer rains. In years of lower summer rains, the later period of reproduction was deleted. No attunement of spawning to changes in water levels have been noted, however in the perennially-flowing Aravaipa

Creek (Minckley & Barber, 1970), by *R. osculus* or any other native fish species. Rapid, over-all responses to high runoff have been recorded, in which the fish was essentially extinct during years of low discharge, but when conditions improved enjoyed high reproductive success and became abundant (Minckley, 1969a); however, this did not apparently result from two spawns in a single summer.

Adult speckled dace appear quite capable of maintaining position in streams during flash flooding, but young are carried downstream, often to their deaths in pools that later desiccate (John, 1964). On the other hand, the species persists for amazing periods of time in intermittent pools, although greatly crowded, diseased, and starving.