



Page Springsnail

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ILLUSTRATION BY NATHAN REDWOOD

SCIENTIFIC NAME: *Pyrgulopsis morrisoni*. Derivation of genus is unclear, but appears attributable to mistaken taxonomy. Original description refers to *Pyrgula*, the European snail genus from which *Pyrgulopsis* was split, and the Latin *opsis*, meaning like, thus we have *Pyrgula*-like. Specific epithet *morrisoni* honors the late Dr. J. P. E. Morrison for contributions to our knowledge of hydrobiid snails.

DESCRIPTION: Medium-size hydrobiid snail with ovate to ovate-conic shell approximately 0.1 inch long. Shell has four to five slightly convex whorls. Foot opening usually less than half of body whorl length. Pigment either absent from head-foot or with light to moderate dusting, except for tentacles. Scraping organ with large numbers of cusps on central and inner marginal teeth. Sexual dimorphism obvious; females larger than males. Distinguished from other *Pyrgulopsis* primarily by shell height and characteristics of male genitalia.

DISTRIBUTION: Restricted to several springs within 0.5 miles of one another in the Verde Valley, Yavapai County, Arizona. One population is located in Page Springs, a water source for an Arizona Game and Fish Department fish hatchery. Another, at Tavasci Springs, has disappeared from that site.

HABITAT: Occurs in springs that emerge from the Verde limestone formation. Usually restricted to head springs and upper sections of outflows, but also may occur in spring-fed pools and nearby wetlands. Typically found on firm substrates, such as larger rocks, dead wood, or aquatic plants, in moderately flowing water.

BIOLOGY: The genus *Pyrgulopsis* contains 65 known species inhabiting diverse inland waters of North America. At least several additional species remain undescribed. Known species share a need for reliable sources of water, but they are found in habitats as varied as alkali lakes, rivers, small springs, and streams.

Our knowledge of the biology and ecology of springsnails is limited largely to observations made during taxonomic and distributional studies. Only one study has been conducted on the Page springsnail. Food is obtained by scraping organic material, including algae, bacteria, and detritus, from the surfaces of objects on which it resides. Scraping is accomplished with the radula, a longitudinal, toothed, straplike structure that occupies a position analogous with that of the human tongue.

The Page springsnail is truly aquatic; it must be in water to survive. Respiration occurs through an internal gill, or etenidium, a structure consisting of a series of narrow, flat leaflets of tissue, well supplied with blood and arranged like the

teeth of a comb. Blood of the springsnail contains a dissolved, copper-containing compound, hemocyanin, which, like the hemoglobin in human blood, transports oxygen to various parts of the body via the circulatory system.

The Page springsnail is oviparous. Females lay eggs that later hatch outside the body. There appears to be one annual period of reproduction, late in the year, and most adults perish in the ensuing winter when food and shelter are in decline. Juveniles are evidently more hardy, as they persist through the inclement conditions.

STATUS: Included on the Department's draft list of *Wildlife of Special Concern in Arizona* (AGFD in prep.). Listed by the U.S. Fish and Wildlife Service as a candidate for threatened or endangered status.

MANAGEMENT NEEDS: Future health of Page springsnail populations is dependent on continued flow of unpolluted groundwater from Verde Valley springs. Springs that provide habitat for the Page springsnail need to be protected from alteration of water chemistry, dewatering, or any other physical modification that would diminish habitat quality. Herbicides or pesticides should not be applied in this area without careful consideration for the springsnail. Mosquitofishes, which prey on Page springsnails, and exotic snails that compete with the native snails must be kept from these waters. Efforts to increase and improve habitat, such as those already undertaken at Page Springs Hatchery, should be continued, and hatchery operations should be conducted with welfare of the Page springsnail in mind. A conservation agreement should be developed to protect Page springsnail populations and reintroduce the deceased population at Tavasci Springs. 🐌

