ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Invertebrate Abstract **Element Code:** IMGASL9120

Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Physella acuta*
COMMON NAME: Wandering Physa

SYNONYMS:
Physella cubensis
Physella heterostropha
Physella integra
Physella mexicana
Physella virgate
Physella winnipegensis
Physa acuta,
Physa anatine,
Physa cupreonitens,
Physa halei,
Physa penisuaris
Physa squalida
Physa traskii
Physa virgata

OTHER COMMON NAMES:
Protean Physa
Striped Physella
Acute Bladder snail

FAMILY: Physidae

AUTHOR, PLACE OF PUBLICATION: Gould, A.A. (1855). New Species of land and freshwater-shells from western (N.) America. Proceedings of the Boston Society of Natural History 5:127-130.

TYPE LOCALITY: According to Bequaert & Miller (1973), specimens first described were from the Gila River, AZ. and San Diego, CA.

TYPE SPECIMEN: Unknown

TAXONOMIC UNIQUENESS: The classification within the Physidae family has been heavily debated. Dillon et al (2024) assigns to *Physa acuta*, but the Freshwater Mollusk Conservation Society (FMCS 2019, 2023) and MolluscaBase (2024) consider it to be *Physella acuta*. Returned to FMCS list in 2019 from analyses by Lydeard et al (2016).

Dillon et al. (2005) found no evidence of reproductive isolation between *Physa virgata* and *Physa acuta*, indicating *Physa virgata* is a junior synonym of *Physa acuta*. Further, Wethington and Lydeard (2007) concluded that *Physa acuta*, *Physa heterostropha, Physa integra, Physa virgata, Physa cubensis* and *Physa integra niagarensis* to constitute an exclusive clade, and all are attributed to one phylogenetic species, to which the name *Physa acuta* applies. It is now clear that almost all of the nominal diversity previously recognized in the North American Physidae is attributable to phenotypic plasticity and that the true number of American species is closer to ten (Wethington and Lydeard 2007).

DESCRIPTION: Shell shape is oval and spire is pointed (acute). Aperture is large and narrow at the top. Shell is dull and striated longitudinally. Whorls are convex with deep sutures. A good bit of color variation exists in the shell and mantle from very pale to dark, from striped to mottled to plain. An individual reaches maturity between 5–7 mm and can get as large as 15 mm. The penial morphology of the acuta group includes a preputial gland along with a one-part muscular penial sheath (Wethington 2004).

AIDS TO IDENTIFICATION: The members of the genus *Physella* are distinguished primarily by shell shape. However, genetic and environmental factors appear to influence shell shape in *P. virgata*, making its use as the sole species discriminating characteristic within the *Physella* genera problematic (Britton 2002).

Physidae is closely related to the Lymnaeidae family. In general, Physidae are distinguished from Lymnaeidae by their sinistrally coiling shells, whereas Lymnaeid shells are dextral (with a few exceptions) (Cowie 1997).

ILLUSTRATIONS:

TOTAL RANGE: Arizona, Arkansas, California, Hawaii, Illinois, Iowa, Kansas, Kentucky, Louisiana, Montana, Nebraska, Nevada, New Mexico, Oklahoma, South Dakota, Texas, Utah, Wisconsin, Wyoming (NatureServe, 2003).

RANGE WITHIN ARIZONA: This species is present in all Arizona counties (Bequaert & Miller 1973).

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: The species within the Physidae family are all aquatic pulmonates. This family has retained the terrestrial mode of respiration; they come to the surface for air. In these physids, the edges of the mantle around the pneumostome periodically form a long retractable siphon that can be extended to the water surface to obtain air. Depending on the amount of oxygen in the water, aquatic air-breathing snails can remain submerged from several minutes to several

hours. Some of the species within this family never come to the surface for air but obtain oxygen from the water circulated through the mantle cavity (Barnes 1963).

REPRODUCTION: The Physidae family is hermaphroditic with the ability to self-fertilize. In the freshwater pulmonates *Physa* and *Ancylis*, several eggs embedded in an albumen mass are surrounded by a single capsule or case which is either planktonic or attached to the substratum. The size and shape of the case and nature of its wall, which may be leathery or gelatinous, are extremely variable and characteristic of the species (Barnes 1963).

FOOD HABITS: Food sources for Physella include green algae and periphyton.

HABITAT: Populations may inhabit any freshwater habitat, but reach maximum densities in temperate, lentic environments, especially those that are rich, disturbed and/or artificially eutrophic (Dillon et al. 2024).

ELEVATION: In Arizona, *Physella virgata* is found at elevations ranging from 1,000 to 8,700 ft. (305–2,652 m) (Bequaert & Miller 1973).

PLANT COMMUNITY: Found on, around, and where there is an abundance of green algae.

POPULATION TRENDS: Unknown.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None
STATE STATUS: 3 (AZGFD, AWCS 2022)
HERITAGE NETWORK STATUS: G5
SNR
OTHER STATUS: None

PREVIOUS STATUS
STATE STATUS: 1C (AZGFD, SWAP 2012)

MANAGEMENT FACTORS: None

PROTECTIVE MEASURES TAKEN: None

SUGGESTED PROJECTS: Inventories are needed to determine the full extent of the distribution and abundance of this species.

LAND MANAGEMENT/OWNERSHIP: Maricopa County: White Tanks Regional Park.

SOURCES OF FURTHER INFORMATION

REFERENCES:

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MAJOR KNOWLEDGEABLE INDIVIDUALS:

Robert T. Dillon, Jr.
Amy R. Wethington

ADDITIONAL INFORMATION: Scientists have closely examined the predator avoidance behavior of the freshwater snail *Physella virgata* in response to the crayfish *Procambarus simulans*. In both laboratory and field enclosure experiments snails crawled above the waterline for 2 h or longer, then returned to the water. *Physella virgata* reacts to chemical signals given off by crayfish actively foraging on conspecific snails; they do not react to inactive crayfish. Low dissolved oxygen, crowding, and disturbance of the sediments did not elicit "crawlout" behavior. Crawling above the waterline, by reducing the probability of encounter between vulnerable, thin-shelled snails and crayfish, is an adaptive response to predation. The snail *Physella virgata virgata* was observed to change its life-history characteristics in the presence of the crayfish *Orconectes virilis* in spring-fed Oklahoma streams. In the presence of the cue, snails exhibited rapid growth rates and little reproduction until they reached a size of about 10 mm after 8 months. In the absence of the cue, snails typically grew to about 4 mm (3.5 months) and then began reproduction. The chemically inducible shift indicates that the life histories of these snails are phenotypically plastic. By increasing the variance associated with size and age of maturity, prey may increase the likelihood of coexisting with seasonal predators. (Alexander and Covich 1991).

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