ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Invertebrate Abstract **Element Code:** IMGAS92180

Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Ashmunella levettei* Bland 1880
COMMON NAME: Huachuca Woodlandsnail

SYNONYMS: *Triodopsis levettei*
FAMILY: Polygyridae

AUTHOR, PLACE OF PUBLICATION: T. Bland, 1880, Annals of the New York Academy of Sciences. 2:115–116.

TYPE LOCALITY: *Ashmunella levettei* (formerly *Triodopsis Levettei)* locality initially described as Santa Fe Canyon, New Mexico (Bland 1880). Corrected locality is the Huachuca Mountains in Coronado National Forest, Cochise County, AZ (Pilsbry 1905).

TYPE SPECIMEN: HT: AMNH 1274, collected by Levette and described by Bland (1880)
PT: FMNH 146228, J.H. Ferriss, No date given.

TAXONOMIC UNIQUENESS: The genus *Ashmunella* encompasses 39 recognized species including *Ashmunella levettei* (Nekola 2014, Integrated Taxonomic Information System 2024, Myers et al. 2024). Pilsbry (1905) and Pilsbry and Ferriss (1909) proposed 7 subspecies of *Ashmunella levettei* including *Ashmunella l. angigyra, Ashmunella l. bifurca, Ashmunella l. heterodon, Ashmunella l. heterodonta, Ashmunella l. levettei, Ashmunella l. proxima,* and *Ashmunella l. ursina*. The most widely recognized subspecies is *Ashmunella l. angigyra,* identified in Ramsey Canyon near Fort Huachuca. All subspecies occur within the Huachuca mountain range and many are specific to distinct canyons or geological formations.

DESCRIPTION: Snails in the genus *Ashmunella* resemble the closely related genus *Polygyra.* In both taxa, the shell is "helicoid, depressed and umbilicated, dull colored, not banded so far as known, with lunate aperture and reflexed peristome." (Pilsbry and Cockerell 1899) *Ashmunella* genitalia possess features lacking in *Polygyra* including a well-developed epiphallus, short flagellum, partial penial sheath, and long cylindric spermatheca located near the heart and not enlarged distally (Pilsbry and Cockerell 1899). In the species *Ashmunella levettei,* "the [shell] aperture has four teeth, but sometimes the two basal teeth are contiguous, and partially united. The length of the spermatheca and its duct is from 55 to 73 percent." (Pilsbry 1905)

AIDS TO IDENTIFICATION: The genus *Ashmunella* is limited in distribution to the southwestern United States and northern Mexico. *Polygyra* has a wider distribution encompassing the entire southern portion of North America. Additionally, *Ashmunella* and *Polygyra* ranges are not known to overlap. *Ashmunella* occurs in New Mexico, Arizona, and northern Texas whereas *Polygyra* is found in surrounding southern regions. The closest range overlap occurs in the Trans–Pecos region in Texas (Bequaert and Miller 1973).

The genus *Ashmunella* can be distinguished by specific genital features. *Ashmunella* genitalia resemble those of the family Cepolidae, an Asiatic-American group of dart-bearing snails analogous to the *Belogona Euadenia* described by Pilsbry and Cockerell (1899). *Ashmunella*, dart sacs and mucous glands are degenerate and apertural structure is similar to that of *Polygyra* (Pilsbry and Cockerell 1899). The species *Ashmunella levettei* is found in numerous canyons throughout the Huachuca Mountains (unpublished AZGFD data, 2019). Various subspecies are associated with particular geological features: *A. l. angigyra* is found in Ramsey Canyon, *A. l. bifurca* in Garden Canyon, *A. l. heterodonta* in Ida Canyon (a tributary of Cave Creek Canyon), and *A. l. varicifera* is widespread at high elevation from 6,000 to 9,800 ft. (Bequaert and Miller 1973).

ILLUSTRATIONS: Illustration of the Huachuca Mts. (Pilsbry and Ferriss 1909: P. 212)
Illustration of the type specimen (Pilsbry and Ferriss 1909, P. 509, Fig S)
Photographs of live specimens (Sorensen 2016)
Illustrations of *Ashmunella* genital tracts (Pilsbry and 1909, Plate XX)

TOTAL RANGE: Huachuca Mountains, Cochise County, Arizona

RANGE WITHIN ARIZONA: See "**TOTAL RANGE**."

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: Terrestrial gastropods do not move much, usually only to find food or reproduce. Olfaction is the primary sensory behavior utilized to find and move toward a food item (on the scale of centimeters to meters). A moving terrestrial gastropod lays down water- laden mucus on which it moves exposing its integument to a potentially drying atmosphere, and increasing its water losses through the pallial cavity because of the necessity for gas exchange (A. Cook, in Barker 2001). A resting terrestrial gastropod deploys a variety of passive mechanisms for water conservation, including the direct protection of its wet surfaces from drying conditions, avoidance of temperature extremes, the creation of more favorable microclimates and decreases in gas exchange (A. Cook, in Barker 2001).

Little is known of the species *Ashmunella levettei*. The most widely distributed form, *A. levettei angigyra*, shows the most affinity to species of the Chiricahua and other ranges and is thought to resemble the ancestral species stock (Pilsbry and Cockerell 1909). Intermediate morphological forms suggest that *Ashmunella levettei* apertural teeth degenerated from the

ancestral form. Current understanding of the species is based almost solely on the work of Pilsbry and Ferriss, although recent surveys by the Arizona Game and Fish Department (AZGFD) indicate the species is widespread throughout the Huachuca Mountain range (unpublished AZGFD data, 2019).

REPRODUCTION: All members of the family Polygyridae are hermaphroditic. Most terrestrial snails mate at approximately one year old and eggs typically hatch four weeks after fertilization (Binney 1878). Reeder (1975) observed 58 chromosomes in *Ashmunella levettei* during mitosis, further describing the karyotype as consisting of 5 M, 19 m, 3 sm, and 2 st chromosome pairs. Reproduction in *Ashmunella* of the Huachuca Mountains has not been studied.

FOOD HABITS: Terrestrial snails are typically omnivorous and play an essential role in nutrient cycling and decomposition (Bequaert and Miller 1973); leaf litter likely serves as food and habitat for *Ashmunella*. Woodlandsnails likely have a diet similar to other terrestrial snails which feed on plant material (including algae, mosses, lichens, and possibly roots, shoots, leaves, flowers, flowers, anthers, pollen, fruit, seeds and rotting wood), and microorganisms associated with live and decaying vegetation; followed to a lesser extent by fungi and soil (Speiser, *in* Barker 2001).

HABITAT: Many *Ashmunella* species are found in isolated mountain ranges and have numerous habitat requirements, making them particularly susceptible to environmental fluctuation and habitat disturbance (Kroll et al. 2003). Kroll et al. (2003) found that habitat features including substrate, elevation, vegetation cover, and soil pH differ among species and that most populations in the genus were found on north aspects which were coolest and supported the most mesic vegetation. In preliminary surveys in the Huachuca Mountains, *Ashmunella levettei* were found in rocky habitats and wet litter (unpublished AZGFD data, 2019). *Ashmunella* were very common in Bear Canyon, Miller Canyon, Garden Canyon, Carr Canyon near Comfort Spring, and Huachuca Canyon at elevations above 5,500 ft (unpublished AZGFD data, 2019).

ELEVATION: Based on recent surveys elevation ranges from at least 1,733 m (5,685 ft) in Huachuca Canyon (unpublished AZGFD data, 2019) to 1,788–2,745 m (5,866–9,000 ft) (Bequaert and Miller 1973).

PLANT COMMUNITY: Madrean evergreen woodland.

POPULATION TRENDS: Unknown, but unpublished AZGFD data (2019) indicates robust populations in many of the canyons and drainages throughout the Huachuca Mountain range based on high densities of shells and estimates of Catch-Per-Unit-Effort timed snail counts of live snails during or following rainy weather.

SPECIES PROTECTION AND CONSERVATION

Status definitions: https://bit.ly/hdms-status-definitions
Heritage Network Conservation Status Rank definitions: https://bit.ly/hdms-rank-definitions

ENDANGERED SPECIES ACT STATUS: UR (USDI FWS, 2009)
STATE STATUS: 2 (AZGFD, AWCS 2022)
HERITAGE NETWORK STATUS: G1G2
S1
OTHER STATUS:

PREVIOUS STATUS
ENDANGERED SPECIES ACT STATUS:
STATE STATUS: 1C (AZGFD, SWAP 2012)
OTHER STATUS:

MANAGEMENT FACTORS: Factors that may affect this species are restricted and declining distribution with associated potential for extinction due to chance events; potentially intense fires resulting from increased fuel loads.

PROTECTIVE MEASURES TAKEN: There is an overlap of terrestrial habitat used by these woodlandsnails (and other native land snails) near springs and creeks managed for populations of Huachuca Springsnail (*Pyrgulopsis thompsoni*) covered under a partner-signed conservation agreement in 2017. Many of the landscape-level habitat management actions taken by Fort Huachuca and Coronado National Forest for the springsnail also benefit *Ashmunella levettei* and other native land snails within those drainages.

The Huachuca Woodlandsnail was included in the list of 475 species Forest Guardians (2007) petitioned to list as threatened or endangered under the Endangered Species Act. On 1/6/2009, the Fish and Wildlife Service announced a 90-day finding that listing may be warranted and initiated a status review.

SUGGESTED PROJECTS: Research is needed on effects of controlled burns and exposure to fire retardant residues; periodic monitoring on snail populations and their habitats; genetic analysis of specimens to determine if subspecies are valid within the species; and research on ecology and systematics.

LAND MANAGEMENT/OWNERSHIP: DOD – Fort Huachuca Military Reservation; USFS Coronado National Forest; TNC Ramsey Canyon Preserve.

SOURCES OF FURTHER INFORMATION

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MAJOR KNOWLEDGEABLE INDIVIDUALS:

ADDITIONAL INFORMATION:

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