

**ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM**

Invertebrate Abstract

Element Code: IICOL63020

Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE



ME: *Psephenus montanus*
COMMON NAME: White Mountains Water Penny Beetle
SYNONYMS: None
FAMILY: Psephenidae

AUTHOR, PLACE OF PUBLICATION: Brown and Murvosh, Trans. Amer. Ent. Soc., Vol. 100. 1974.

TYPE LOCALITY: East Fork of the Black River in the White Mountains, Apache County, Arizona at an elevation of about 8,000 feet, 6 July 1971.

TYPE SPECIMEN: Holotype male at U.S. National Museum of Natural History, Smithsonian Institution, Washington D.C. Thirty eight males and 25 female paratypes in various museums and private collections throughout the United States. No collection numbers given.

TAXONOMIC UNIQUENESS: Taxonomic status of *P. montanus* and closely related *P. arizonensis* is uncertain. Individuals from these two populations were originally assigned as separate species based on differences in ecology and ethology. Believed, however, that these will be synonymized as subspecies of the same species.

DESCRIPTION: Adult bodies are oval, flattened, brownish or black. The forewing is broadest posteriorly loosely covering abdomen. Dorsal surface is sparsely pubescent, while the ventral surface is densely pubescent. The abdomen has 5-7 ventral segments, 4.0-6.0 mm (0.16-0.24 in.) in length. Larvae are brownish, greatly flattened and nearly circular, therefore earning name "water-penny" (Borror and White 1970). For a detailed description of males and females see Brown and Murvosh 1976.

AIDS TO IDENTIFICATION: Compared to *P. oresbius*, *P. montanus* differs in having a narrower second palpal segment, male genitalia with parameres tapering from base as seen in lateral aspect, and ventral sclerite of penis basally enlarged and somewhat campanulate. As seen from above, the legs of *P. arizonensis* are about the same color as the elytra, while the legs of *P. montanus* are usually lighter than the elytra.

ILLUSTRATIONS: Drawing (Borror and White 1970)
Black and White Drawing (D. Moore)

TOTAL RANGE: Three Forks and several nearby locales in the West and East Forks of the Black River in Apache and Greenlee Counties, Arizona. Historic and present distribution of *P. montanus* are likely identical.

RANGE WITHIN ARIZONA: See "Total Range."

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: All life stages except larvae, are restricted to distinct microhabitats, typically in riffles within one meter of shoreline. Peak emergence of adults occurs from about late June to early July. Adults of both sexes are short-lived, females for several days, males 1-2 weeks. Therefore, adults only present from late June through early August.

Adult females occur on partly submerged rocks near shoreline. Males occur on same rocks but are often in moist or slightly wet depressions or pits, and tend to be very inactive. Larval stage includes several instars and lasts one to two years. Larval collections of W.D. Shepard included two distinct size classes (small and mature), which indicate a semi-voltine life cycle. During this stage, larvae disperse to all parts of the stream but move back close to shoreline shortly before pupation. Pupation occurs beneath rocks or in other protected sites near the stream. Adults usually emerge from the pupal stage in 10-12 days.

The larvae are clingers. Water pennies are very effective at holding on to rocks, because the thin, flat plates extending away from their body are flexible and collectively assume the shape of whatever surface they are on. In addition, their grip on rock surfaces is made tighter by a dense fringe of short, fine hairs around the outer edge of the extended plates. Water pennies are seldom dislodged into a net merely by moving rocks. They have to be picked from the rocks with forceps or fingernails, and even then they are sometimes hard to remove. Water pennies obtain dissolved oxygen through gills on the underside of the abdomen as well as through the general body surface.

REPRODUCTION: Mating ensues soon after adults emerge, probably beneath the same rocks from which the individuals emerged. Mating probably lasts less than a minute but does not appear to include "play" behavior. However, according to Murvosh and Brown (1976) there is play behavior during mating (for a detailed description see their 1976 report). After mating, females crawl beneath partly submerged stones near shoreline in riffle habitats where they spend the rest of their life (a few days) laying eggs in small patches. Each patch contains 400-600 bright yellow eggs in a single layer. First instar larvae develop in about 2 weeks.

FOOD HABITS: Largely herbivores/detritivores. Adults probably do little, if any, feeding. Larvae graze on diatoms and other algae that occur on rocks and pebbles in stream riffles. The larvae are scrapers. Water pennies are highly adapted for removing the thin layer of

algae, especially diatoms, that occurs on stones in swift current. Their jaws have a thin, sharp inner edge, much like a paint scraper. The cupped shape of the jaws, along with hairs at the bases help push the dislodged material in their mouths. Water pennies feed under the protection of the extended body plates, so the current does not wash their food away.

HABITAT: Probably restricted to cold, fast-flowing high elevation streams in the White Mountains in Apache and Greenlee counties, Arizona. This restricted distribution may be caused by poor dispersal ability, dispersal appearing to occur only during larval stages. Elevation at U.S. Forest Service Road 249 on the North Fork of the Black River is 2576 meters which is the highest elevation that psephenids have been found in North America. July water temperature [1992] was about 20° to 25°C.

ELEVATION: 6,720 - 8,830 ft (2048-2691 m) according to AGFD HDMS unpublished records (accessed 2003).

PLANT COMMUNITY: Unknown

POPULATION TRENDS: Unknown

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None (USDI, FWS 1996)
[C2 USDI, FWS 1994]
[C2 USDI, FWS 1991]
[C2 USDI, FWS 1989]

STATE STATUS:

OTHER STATUS: Forest Service Sensitive (USDA, FS Region 3 1999)
[Forest Service Sensitive USDA, FS Region 3 1988]

MANAGEMENT FACTORS: Measures should be employed to mitigate all impacts to running waters including erosion and siltation. Threats are restricted to those that affect aquatic areas and include grazing, logging, development of campgrounds and other recreational facilities, various recreational impacts, pollution by recreationists, and any other impacts that affect water quality and or quantity in the Black River and its tributaries.

PROTECTIVE MEASURES TAKEN: Unknown

SUGGESTED PROJECTS: Further surveys to obtain more information regarding distribution, abundance and possible threats are needed. Searches should only be considered verifiable if they are conducted by riffle beetle experts, as members of this family are typically distributed patchily in various microhabitats and are difficult to find.

LAND MANAGEMENT/OWNERSHIP: USFS - Apache-Sitgreaves National Forest.

SOURCES OF FURTHER INFORMATION

REFERENCES:

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MAJOR KNOWLEDGEABLE INDIVIDUALS:

R. Johnson - biologist under contract to United States Fish and Wildlife Service.

ADDITIONAL INFORMATION:

See Robert Johnson's status survey report for a listing of pertinent literature as well as a listing of experts in this taxon.

Psephenus montanus
Revised: 1995-06-19 (DBI)
1997-03-03 (SMS)
2003-08-15 (AMS)

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