

## SCIENTIFIC NOTE

### URANOTAENIA ANHYDOR AMERICA'S RAREST MOSQUITO?

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**ABSTRACT.** The mosquito, *Uranotaenia anhydor*, certainly seems to be the rarest mosquito in America north of Mexico. The type species location is San Diego, CA, but is no longer present there. I collected it in Saratoga Springs, a remote oasis in Death Valley, CA, after a 65-year absence in scientific literature. This is likely the only remaining location for this mosquito species in America and, thus, its most northern range. The genus *Uranotaenia* is the 4th largest after *Culex*, *Aedes* complex, and *Anopheles*, with 265 listed species, mainly in the Afrotropical, Australasian, Oriental, and Neotropical regions. The *Uranotaenia* species has been reported to be able to develop in small quantities of water, similar to *Aedes aegypti*. The genus is unusual in that, unlike the 3 larger genera where females feed on homeotherms (warmbloods), mammals and birds, *Uranotaenia* spp. are known to feed only on poikilotherms (cold-blooded animals), amphibians, reptiles, leeches, annelid worms, and possibly snails, and, as such, are not a public health concern. I also discuss some of the unique aspects of Saratoga Springs relating to its flora and fauna and ability to sustain mosquito populations.

**KEY WORDS** Culicidae, Death Valley, Diptera, mosquito, *Uranotaenia*

On June 2, 1906, H. G. Dyar, 1st collected and described *Uranotaenia anhydor* Dyar taken from a swamp full of reeds at Sweetwater Junction (now part of National City), near San Diego, CA, on a West Coast collecting trip for the United States National Museum (Dyar 1907). Since then, it has been reported 10 times from only a few other localities: a pond in Old Town, San Diego, May 1916; at Camp Kearney, San Diego, May 1918 (Freeborn 1926); a grass-tule marsh in the San Luis Rey riverbed upstream from Bonsall, San Diego County, CA, September 15, 1944 (Seaman 1945); 48 km south of Tijuana, Baja California, Mexico, June 13, 1948 (Brookman and Reeves, California Academy of Sciences, San Francisco; personal observation of the specimen); Fairbanks Springs-Ash Meadows, Nye County, NV, July 21, 1949 (Phillip, California Academy of Sciences, San Francisco; personal observation of the specimen); St. David, Cochise County, AZ, May 9, 1953 (Richards et al. 1956); and Saratoga Springs, Death Valley, CA, June 16, 1954, September 11, 1954, and April 24, 1955 (Belkin and McDonald 1956).

As a volunteer at the San Diego County Natural History Museum, curating the Diptera collection, I found the collection contained 70 culicid species. I was surprised there were no specimens of *Ur. anhydor* even though San Diego is the type species location. An inquiry to the San Diego County Vector Control Program showed that they had not recorded any instances of the capture of this species (Stotelly, personal communication). Upon further research of the literature, no evidence or collection of this species has been found in San Diego County since 1944. Seaman (1945) reported only 1 3rd instar from a hoof print in a grassy area where cattle were grazing near the San Luis Rey River. I live by the mouth of the San Luis Rey River near where *Ur. anhydor* was last collected in

San Diego County and, so far, have been unsuccessful in several attempts to collect this species. Being unsuccessful in collecting it locally and wanting a specimen for the museum collection, I decided to make a trip to Saratoga Springs in Death Valley to see if it was still present there.

Saratoga Springs is located at the southern end of Death Valley on the southwestern edge of the Saratoga Hills. There are 3 large open water ponds surrounded by marshy reeds that appear little changed over the years, as seen from old photos viewed online. The spring has one of the highest discharge rates in the region at about 1,000 liter/min. The water source flowing into Saratoga Springs has a constant temperature of about 83°F (28.3°C).

I dipped in and around the ponds for larvae with a standard larval mosquito dipper (Clarke.com) but did not collect any specimens. *Uranotaenia anhydor* has been reported to develop in shallow seepage near bodies of water and rivers and thus isolated from predators such as the endemic pupfish, *Cyprinodon nevadensis nevadensis* (Eigenmann and Eigenmann). Belkin and McDonald (1956) reported that the larvae are easily disturbed and stay underwater for long times when disturbed. A Centers for Disease Control and Prevention light trap from Bioquip Products (closed in 2022) and a similar homemade trap baited with dry ice were operated overnight to collect adult mosquitoes. The collection bags with mosquitoes were transported in a cooler and then frozen at the campground in Shoshone, CA. Two adults were trapped overnight on October 21–22, 2020, at Saratoga Springs. Traps were also set at the campground in Shoshone, in Death Valley where a hot spring emits water at a constant 83°F (28.3°C) temperature, and at ponds and seeps at Zzyzx, CA, south of Death Valley off Interstate 15. Neither of these 2 locations trapped any

# Illustrations

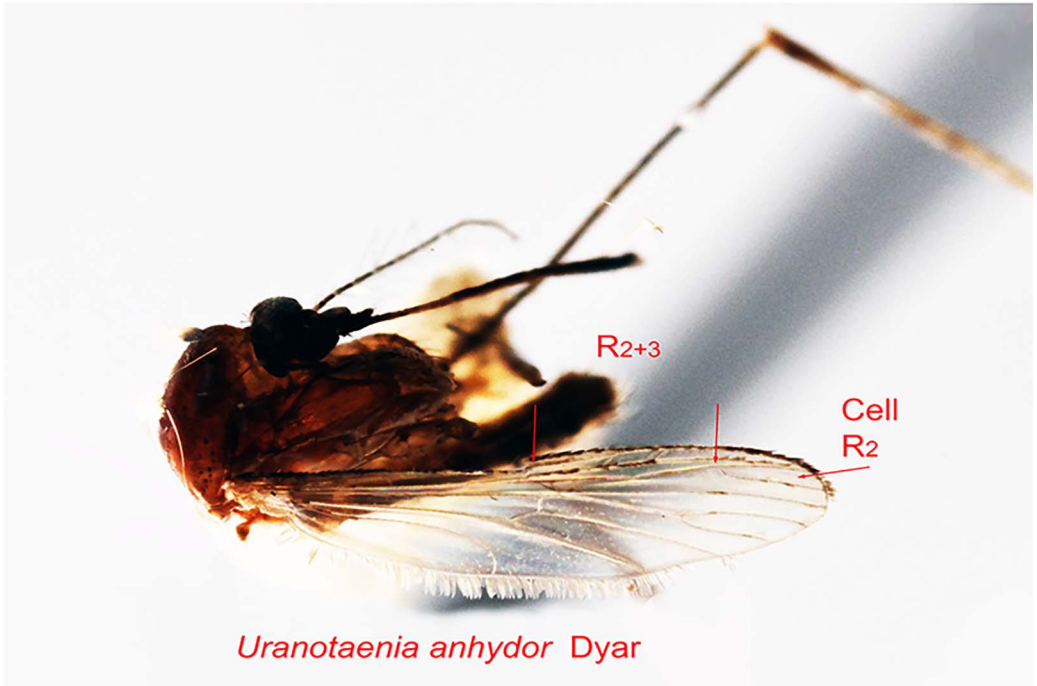
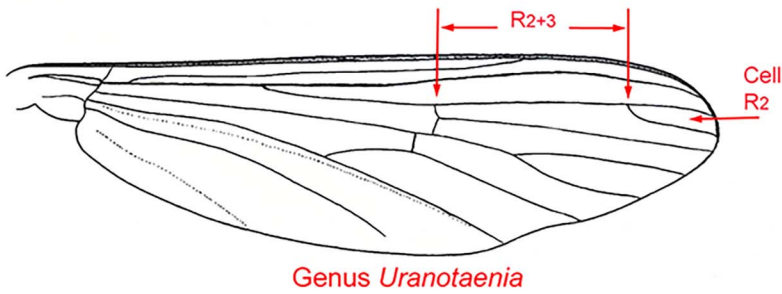
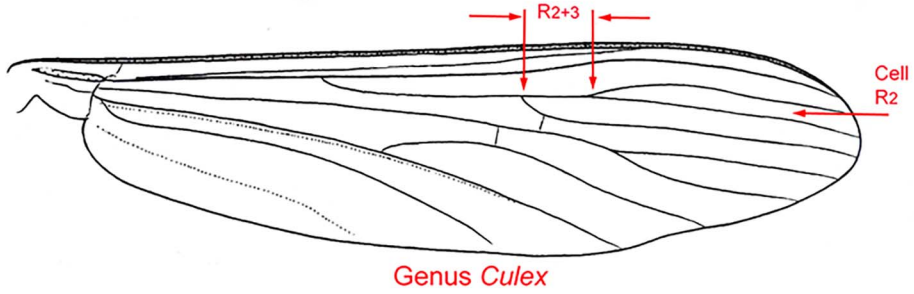


Fig. 1. Wing venation in *Uranotaenia anhydor*.

mosquitoes. As shown in Fig. 1, species identification was verified from the unique wing venation (Darsie and Ward 1981). Specimens were deposited in the San Diego Natural History Museum entomology collection.

Saratoga Springs is a desert oasis located in southern Death Valley National Park 16 mi (25 km) off California State Route 127 on gravel and dirt roads. It was an important water source for the 20-mule team borax wagons of

the 1880s. Three large ponds at Saratoga Springs are fed by several underground springs flowing into pools totaling 6.6 acres (2.7 ha) in area, making the site the 3rd largest marsh habitat in the park. The springs feeding the oasis have flowed continuously for millennia. This unique desert wetland supports a rich community of flora and fauna, including many that are rare and endemic. Two aquatic Hemiptera species, the Saratoga Springs Giant Water Bug, *Belastoma saratogae* Menke, (Belostomatidae), and the Amargosa naucorid bug, *Ambrysus amargosus* La Rivers (Naucoridae), as well as the Death Valley June beetle *Polyphylla erratica* (Hardy and Andrews 1978) (Scarabaeidae) are endemic. Present also is the Saratoga pupfish, which is found nowhere else in the world. The male is iridescent blue. Two other rare invertebrate species present include the Amargosa Tryonia snail, *Tryonia variegata* Hershler and Sada and the Amargosa springs snail (*Pyrgulopsis amargosae* (Hershler). Plant life includes common reeds, bulrushes, and salt grass. These wetlands are a regular stop for migrating birds and are a great place for bird-watching. Summer temperature reached 124°F (51°C) in 2023, indicating these are very high temperature-tolerant species.

In my initial research, I was curious as to what *Ur. anhydor* fed on in such an inhospitable location as Death Valley. *Uranotaenia anhydor* is a very small mosquito, and unlike most other mosquitoes that feed on warm-blooded mammals and birds, it is reported to be a cold-blood feeder, probably feeding on frogs; it did not take human blood under laboratory conditions (Chapman 1964). The bionomics of *Uranotaenia* is mentioned in Barraud 1926. Little is known of the habits of the adults listed (22 species). They do not appear to attack man to any extent. Two related species, *Ur. sapphirina* (Osten Sacken), a common mosquito found throughout eastern North America feeds exclusively on annelid worms and leeches, and *Ur. lowii* Theobald the smallest mosquito species feeds only on anurans (frogs and toads; Reeves et al. 2018). Borkent and Belton (2006) report it was attracted to recorded frog calls in Costa Rica. From what is known, it is likely that the entire genus feeds on cold-blooded species, but further research is warranted. There are frogs and many other cold-blooded species in Saratoga Springs; thus, (Chapman 1964) is probably correct. Due to urban growth in San Diego in the last 100 years, and generally throughout southern California, ponds containing frogs have been drained for urban development, which is

believed to be the primary reason *Ur. anhydor* has not been collected and is extirpated now from its original type species location.

A future collection trip to see if *Ur. anhydor* is still present in Fairbanks Springs, Nye County, NV, is planned.

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