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First records of the grasshopper *Machaerocera mexicana* Saussure, 1859 (Orthoptera: Acrididae) from the United States and Sonora, Mexico

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First records of the grasshopper *Machaerocera mexicana* Saussure, 1859
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Abstract. The grasshopper *Machaerocera mexicana* Saussure (Orthoptera: Acrididae) is added to the orthopteran faunas of the United States and Sonora, Mexico. Notes are presented on habitat and seasonality.

Key words. *Machaerocera mexicana*, Acrididae, Oedipodinae, grasshopper, distribution, United States, Sonora, Mexico, riparian, new records.

Resumen. El saltamontes *Machaerocera mexicana* Saussure (Orthoptera: Acrididae) se agrega a las faunas ortópteros de los Estados Unidos y Sonora, México. Se presenta notas sobre su hábitat y estacionalidad.

Palabras claves. *Machaerocera mexicana*, Acrididae, Oedipodinae, saltamontes, distribución, Estados Unidos, Sonora, México, ribereño, nuevos registros

Introduction

Machaerocera mexicana Saussure, 1859 (Orthoptera: Acrididae) is a band-winged grasshopper belonging to a monotypic genus. It is known from northern Mexico to Guatemala (Otte 1984). Dull brown and cryptic at rest (Figs 1-2), in flight it exhibits hindwings with brilliant blue bases (Fig. 3). Unlike most members of the subfamily Oedipodinae that sit on the ground, individuals of *Machaerocera* frequently perch as well on shrubs, trees, and herbaceous vegetation. Otte (1984: 26) reported *Machaerocera* occurring “mainly in rather lush mountain forests.” Additionally, it has been found in gallery woodland in southern San Luis Potosí, Mexico at an elevation of about 410 m; in southeastern Tamaulipas, Mexico, in rather dry deciduous woodland around 1,000 m elevation; and in gallery forest dominated by Montezuma bald cypress, *Taxodium mucronatum* Ten. (Cupressaceae) along the Río Corona in central Tamaulipas at an elevation of 150 m (Behrstock pers. obs.).

Discussion

The first U.S. record of *Machaerocera* was a female collected by entomology students on 19 August 1972 along Sonoita Creek, a south and west flowing **tributary** of the Santa Cruz River. The collection site, at an elevation of 1,219 m, is 3.2 km southwest of Patagonia, Santa Cruz Co., Arizona. Sonoita Creek’s riparian zone contains some trees over 33 m in height, including Fremont cottonwood, *Populus fremontii* S. Watson (**Salicaceae**), and Goodding’s willow, *Salix gooddingii* C.R. Ball (**Salicaceae**) (The Nature Conservancy 2011). The collectors (from the specimen label) were: R.W. Garrison, H. Rush, O. Francke, M. Kolner, and S. Szerlip. In 2008, while examining insects from the collection of Arizona State University, Carl Olson realized this specimen represented a new U.S. record.

On 20 September 2007, 35 years after the first occurrence, Philip Kline located a female *Machaerocera* at Cienega Creek Natural Preserve northeast of the town of Vail in eastern Pima County, Arizona.



Figures 1-2. *Machaerocera mexicana*. **1)** Male. 30 October, 2008. Cienega Creek Natural Preserve, Pima County, Arizona. Photo by Robert A. Behrstock/Naturewide Images. **2)** Female. 7 October, 2010. Rancho la Brisca, Sonora, Mexico. Photo by Thomas R. Van Devender and Ana Lilia Reina.

The stream is a northeast flowing tributary of the Santa Cruz River. Kline's photo was posted online and identified by David J. Ferguson as *Machaerocera* (BugGuide.Net 2007). Soon afterward, Carl Olson visited Cienega Creek, finding numerous individuals and obtaining specimens for the University of Arizona. On 16 October 2007, Kline returned to Cienega Creek, again posting images to BugGuide.Net.

During 2008, several researchers made visits to Cienega Creek to assess the status of *Machaerocera*. These included: 19 August (Behrstock, Sullivan and Dave Beaudette) one nymph collected; 29 October (Robert Parks), photos and specimens, males and females present; 30 October (Behrstock and Sullivan) photos and specimens, males and females present; and 14 November (Parks), photos and specimens, males and females present. Additionally, on 25 October 2008, Ferguson found *Machaerocera* along 3-5 km of Cienega Creek, and in a wash with lush grasses and some native deciduous trees north of Cienega Creek near the historic Pantano town site, Pima County, photos and specimens (pers. comm. and BugGuide.Net 2008). During October visits especially, *Machaerocera* was easily located near areas with flowing water. Various individuals were observed on sand and gravel in the stream channel and on leafy vegetation or current-deposited piles of branch litter at the stream's margin. Riparian habitat at Cienega Creek where *Machaerocera* was recorded is bordered by an overstory of netleaf hackberry, *Celtis laevigata* Willd. var. *reticulata* (Torr.) L.D. Benson (**Ulmaceae**); blue palo verde, *Parkinsonia florida* (Benth. ex A. Gray) S. Watson (**Fabaceae**); Arizona ash, *Fraxinus velutina* Torr. (**Oleaceae**); Arizona walnut, *Juglans major* (Torr.) A. Heller (**Juglandaceae**); Arizona sycamore, *Platanus wrightii* S. Watson (**Platanaceae**); Fremont cottonwood; velvet mesquite, *Prosopis velutina* Woot. (**Fabaceae**); Goodding willow; Mexican elderberry, *Sambucus mexicana* C. Presl (**Caprifoliaceae**); and introduced salt cedar, *Tamarix ramosissima* Ledeb. (**Tamaricaceae**) (Pima County 1994).

Sonoita Creek and Cienega Creek are part of the Cienega Creek Basin, an alluvial valley surrounded by fault-block mountains (ADWR 2010). Both have perennial stretches that are protected as conservation areas and provide habitat for various aquatic/riparian insects. Adjacent to the riparian zones are semi-desert grasslands and shrubby habitat characteristic of the Chihuahuan Desert.

During the summer of 2009, Robert W. Duff observed a blue-winged grasshopper at a small stream that feeds into Parker Canyon Lake, Santa Cruz County, Arizona and mentioned the sighting to Sullivan—alerting us to the possibility of *M. mexicana* south of its previously known Arizona locations. On 21 September 2010, we visited a stream crossing in Bodie Canyon, southeastern Santa Cruz Co., Arizona. At 09:05 hrs, one male *Machaerocera* was flushed from streamside grasses and collected. This canyon receives water from the vicinity of Parker Canyon Lake and the southern flank of the Huachuca Mountains. The stream, at an elevation of 1,513 m, is broad and shallow with sandy to muddy sediments over bedrock. It is shaded by Arizona sycamore, Fremont cottonwood, and oaks, *Quercus* spp. Streamside vegetation included tall grasses, poison ivy, *Toxicodendron radicans* (L.) Kuntze (**Anacardiaceae**), annual sunflower, *Helianthus annuus* L. (**Asteraceae**), and seep willow, *Baccharis salicifolia* (Ruiz



Figure 3. Female wing. 30 October, 2008. Cienega Creek Natural Preserve, Pima County, Arizona. Photo by Robert A. Behrstock/Naturewide Images.

& Pav.) Pers (**Asteraceae**). The location is 0.90 km north of the Mexican border and 76.35 km south-southeast of the Cienega Creek site.

Machaerocera mexicana had not been reported in Sonora, Mexico (pers. comm. Jason Weintraub and Daniel Otte). On 7 October 2010, Thomas R. Van Devender and Ana Lilia Reina found the species common and obtained documentary photos (Fig. 3). The site is Arroyo Santo Domingo, at Rancho la Brisca, 15.3 km ENE of Cucurpe (Municipio de Cucurpe) 30°22'46"N 110°33'25"W, at an elevation of 970 m. The Arroyo is in the Río San Miguel de Horcasitas drainage, a tributary of the Río Sonora. Habitat was moist gravel near a stream bottom in a rocky canyon with cottonwood-willow riparian forest. Surrounding vegetation was desert grassland. This location is 107 km SSW of the Bodie Canyon, Santa Cruz County location.

Conclusion

These records indicate that *Machaerocera mexicana* is more widespread in northern Mexico than was previously documented. They also suggest that it entered the U.S. via the riparian zone of the Santa Cruz River. So far, field work to the east in Cochise County, Arizona has failed to yield additional specimens along the San Pedro River (which flows northward from Sonora, Mexico), or at San Bernardino National Wildlife Refuge, whose riparian habitat is linked to the Yaqui River of Chihuahua and Sonora, Mexico. Future investigations will focus on locating new sites for *Machaerocera* and determining whether it exhibits any host plant specificity within the riparian community.

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