

INSECTA MUNDI

A Journal of World Insect Systematics

0199

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

Robert A. Behrstock
10359 S Thicket Place
Hereford, AZ 85615
rbehrstock@cox.net

Patrick H. Sullivan
The Haden Collection
4906 S. Bannock Ave.
Sierra Vista, AZ 85650
patolisa@cox.net

Date of Issue: November 2, 2011

R. A. Behrstock and P. H. Sullivan.

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

Insecta Mundi 0199: 1-4

Published in 2011 by

Center for Systematic Entomology, Inc.

P. O. Box 141874

Gainesville, FL 32614-1874 U. S. A.

<http://www.centerforsystematicentomology.org/>

Insecta Mundi is a journal primarily devoted to insect systematics, but articles can be published on any non-marine arthropod. Topics considered for publication include systematics, taxonomy, nomenclature, checklists, faunal works, and natural history. **Insecta Mundi** will not consider works in the applied sciences (i.e. medical entomology, pest control research, etc.), and no longer publishes book reviews or editorials. **Insecta Mundi** publishes original research or discoveries in an inexpensive and timely manner, distributing them free via open access on the internet on the date of publication.

Insecta Mundi is referenced or abstracted by several sources including the Zoological Record, CAB Abstracts, etc. **Insecta Mundi** is published irregularly throughout the year, with completed manuscripts assigned an individual number. Manuscripts must be peer reviewed prior to submission, after which they are reviewed by the editorial board to ensure quality. One author of each submitted manuscript must be a current member of the Center for Systematic Entomology.

Managing editor: Paul E. Skelley, e-mail: insectamundi@gmail.com

Production editor: Michael C. Thomas & Ian Stocks, e-mail: insectamundi@gmail.com

Editorial board: J. H. Frank, M. J. Paulsen

Subject editors: G.B. Edwards, J. Eger, A. Rasmussen, F. Shockley, G. Steck, Ian Stocks, A. Van Pelt, J. Zaspel

Printed copies deposited in libraries of:

CSIRO, Canberra, ACT, Australia

Museu de Zoologia, São Paulo, Brazil

Agriculture and Agrifood Canada, Ottawa, ON, Canada

The Natural History Museum, London, Great Britain

Muzeum i Instytut Zoologiczny PAN, Warsaw, Poland

National Taiwan University, Taipei, Taiwan

California Academy of Sciences, San Francisco, CA, USA

Florida Department of Agriculture and Consumer Services, Gainesville, FL, USA

Field Museum of Natural History, Chicago, IL, USA

National Museum of Natural History, Smithsonian Institution, Washington, DC, USA

Zoological Institute of Russian Academy of Sciences, Saint-Petersburg, Russia

Electronic copies in PDF format:

Printed CD mailed to all members at end of year.

Florida Center for Library Automation: <http://purl.fcla.edu/fcla/insectamundi>

University of Nebraska-Lincoln, Digital Commons: <http://digitalcommons.unl.edu/insectamundi/>

Goethe-Universität, Frankfurt am Main: <http://edocs.ub.uni-frankfurt.de/volltexte/2010/14363/>

Author instructions available on the *Insecta Mundi* page at:

<http://www.centerforsystematicentomology.org/insectamundi/>

Printed copies deposited in libraries (ISSN 0749-6737)

Electronic copies in PDF format (On-Line ISSN 1942-1354, CDROM ISSN 1942-1362)

Copyright held by the author(s). This is an open access article distributed under the terms of the Creative Commons, Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited. <http://creativecommons.org/licenses/by-nc/3.0/>

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

Robert A. Behrstock
10359 S Thicket Place
Hereford, AZ 85615
rbehrstock@cox.net

Patrick H. Sullivan
The Haden Collection
4906 S. Bannock Ave.
Sierra Vista, AZ 85650
patolisa@cox.net

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.

Acknowledgments

We are grateful to Carl Olson (Entomology Dept., University of Arizona, Tucson) for alerting us to the first U.S. record and making helpful suggestions during preparation of the final draft. Thanks also to Robert W. Duff (Downey, CA), Robert B. Parks, Jr. (Hereford, AZ), Dave Beaudette (Sierra Vista, AZ), Philip Kline, (Tucson, AZ), David J. Ferguson (Belen, NM), and Thomas R. Van Devender and Ana

Lilia Reina (Sky Island Alliance, Tucson, AZ) who shared their observations, and to Jason Weintraub and Daniel Otte (Academy of Natural Sciences, Philadelphia, PA) for comments on Mexican records. Sullivan thanks Kerry Baldwin, Natural Resources Division Manager, Pima County Natural Resources, Parks and Recreation Department for issuing a Scientific Collecting and Research Permit for Cienega Creek Natural Preserve.

Literature Cited

- ADWR (Arizona Department of Water Resources). 2010.** Hydrology of the Cienega Creek Basin. 2010. <http://www.adwr.state.az.us/AzDWR/StatewidePlanning/WaterAtlas/SEArizona/Hydrology/CienegaCreek.htm>. Posted 18 November, 2010. Accessed 8 January, 2011.
- BugGuide.Net 2007-2008.** Images: Species *Machaerocera mexicana* - Mexican Blue-wing Grasshopper. <http://bugguide.net/node/view/198506/bgimage>. Accessed 8 January, 2011.
- Otte, D. 1984.** The North American Grasshoppers, Volume II, Acrididae: Oedipodinae. Harvard University Press; Cambridge, Massachusetts. 366 p.
- Pima County. 1994.** Cienega Creek Natural Preserve Management Plan Background Report. Prepared by McGann and Associates, Inc. County Administrator's Office; Tucson AZ. 186 p.
- The Nature Conservancy. 2011.** Patagonia – Sonoita Creek Preserve. <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/arizona/placesweprotect/patagonia-sonoita-creek-preserve.xml>. Accessed 1 June 2011.

Received July 30, 2011; Accepted August 8, 2011.