

Post Release Evaluation of the Arundo Wasp, *Tetramesa romana*, at Big Bend National Park

John A. Goolsby¹, Caroline Hill² and Jeffery Bennett³

¹USDA-ARS (Ret.), McAllen, TX (Goolsby1600@gmail.com).

²U.S. Dept. of Interior, National Park Service, Big Bend National Park, Panther Junction, TX

³American Bird Conservancy, Alpine, TX

*Corresponding author email: Goolsby1600@gmail.com

The arundo wasp, *Tetramesa romana* Walker, (Hymenoptera: Eurytomidae) is a host specific, stem galling wasp and biological control agent of *Arundo donax* L. (Poales: Poaceae), which is an invasive weed in the Rio Grande Basin (Goolsby and Moran 2009, Yang et al. 2011, Goolsby et al. 2023). *Tetramesa romana* has recently become established in the upper reach of the Rio Grande River in Big Bend National Park in Brewster Co., Texas. The arundo wasp has been established on the lower reach of the Rio Grande between Ciudad Acuña, Coah. /Del Rio, TX and Matamoros, Tamps. /Brownsville, TX since 2009 where it has reduced biomass of *A. donax*, and has led to increased abundance of native plant species in the riparian zone (Goolsby et al. 2015, Martínez Jiménez et al. 2017, Moran et al. 2017). Impacts of *T. romana* have been greatest between Laredo and Brownsville, TX where annual heat units are above 5000 (Marshall et al. 2018).

In 2017 and 2018, 16,000 *T. romana* were released within mature stands of *A. donax* along the Rio Grande at Santa Elena Canyon and Rio Grande Village (Big Bend National Park) and at Adams Ranch and La Linda, TX (Goolsby et al. 2019). Galls of *T. romana* used in the releases were collected from infested *A. donax* at Delta Lake in Monte Alto, TX in the Lower Rio Grande Valley. In 2019, two years after releases of *T. romana*, surveys were conducted at all four release locations on October 23-25, 2018 to check for establishment. Survey methods included visual inspection of the *A. donax* stems and side shoots for evidence of *T. romana* galls and exit holes. No wasp galls or exit holes were observed at Rio Grande Village, Adams Ranch or La Linda, but the wasp was established at low levels at Santa Elena Canyon sites (Goolsby et al. 2019). The wasp was expected to spread along the Rio Grande in Big Bend at 25 river-km per year (Racelis et al. 2009). In 2021, arundo wasp exit holes were found south of Big Bend National Park along the Rio Nazas near Gomez Palacio, Durango, MX (JB personal observation). Heat units in Big Bend are lower at 3200 as compared to Brownsville at 5200, but still higher than locations in Ventura, CA and Mediterranean Europe at 2000 (see Marshall et al. 2018). Therefore, we expected that over time *T. romana* would cause significant impacts to *A. donax*. Land managers Big Bend National Park monitored popula-

tions of *T. romana* after releases by using yellow sticky traps (Trécé Inc. Adair, OK) and by counting the number of exit holes per two minutes as described in Goolsby et al. (2014). Trapping was conducted at the Santa Elena Canyon site from June 2018 to May 2025 and at Rio Grande Village from April 2020 to May 2025. Traps were sent to JG for identification and counting of *T. romana*. Exit hole counts were conducted from November 2024 to May 2025. Weather data from Castolon, TX for March 2018 to April 2025 was obtained from West Texas Mesonet, Texas Tech University.

In 2025, 8 years after initial releases, arundo wasp populations have increased substantially at the Santa Elena Canyon sites and dispersed 76 km. downstream to Rio Grande Village (Fig. 1). In April 2025, Santa Elena #1, Santa Elena USGS site #2 had 65 and 68 exit holes respectively within a 2 m² site per two minutes as compared to 24 exit holes within the whole site (50 m²) after 1.5 hours of searching in 2018. Downstream at Rio Grande Village, 59 and 24 exit holes were counted in April 2025 where in Oct. 2018 no wasps were detected. Average monthly temperatures and rainfall in nearby Castolon, TX were analyzed and no significant trends were observed. The counts at Santa Elena sites are approximately 50% of those found in the lower reach of the Rio Grande between Brownsville and Del Rio in 2017, eight years after release of *T. romana*. Although no above ground biomass counts were conducted at Big Bend, an approximate 25% reduction is estimated based on previous studies (Moran et al. 2017, Goolsby & Moran 2019). This level of biomass reduction is associated with increased light penetration of the *A. donax* canopy and increased density of the native riparian vegetation along the Rio Grande. Additional benefits of the biological control program include: increased visibility within stands of *A. donax* for law enforcement, increased water conservation, and gradual restoration of the riparian ecology of the Rio Grande within Big Bend National Park (Goolsby et al. 2023).

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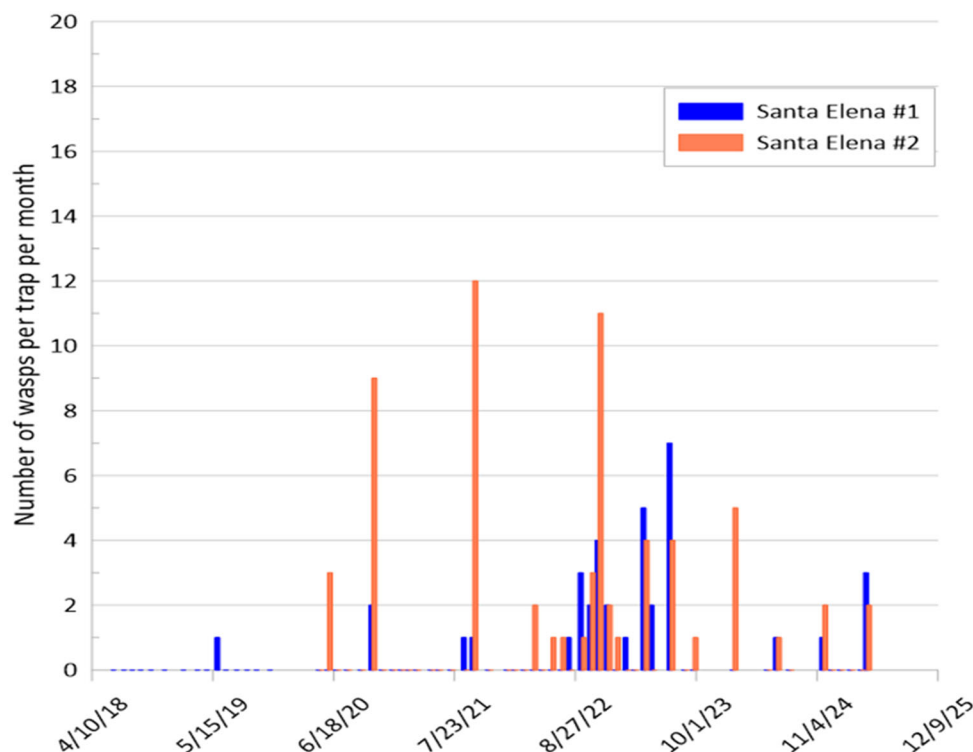


Fig. 1. Population levels of the arundo wasp, *Tetramesa romana* captured on yellow sticky traps at two sites along the Rio Grande near Santa Elena Canyon at Big Bend National Park.

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