Cicindela formosa rutilovirescens (Mescalero Sands Tiger Beetle)

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Taxonomy

- **Class**: INSECTA
- **Order**: COLEOPTERA
- **Family**: CARABIDAE
- **Genus**: Cicindela
- **Scientific Name**: Cicindela formosa rutilovirescens Rumpp, 1986
- **Common Name**: Mescalero Sands Tiger Beetle
- **Synonyms**:
- **Taxonomic Name Source**:C. Barry Knisley, Mark S. Romero, Robert E. Acciavatti. 2023. Tiger Beetles of New Mexico: Identification, Biology, and Conservation.

Agency Status

- **NMDGF**:
- **Federal Status**:
- **BLM Sensitive**:
- **USFS**:
- **IUCN Red List**: Not Evaluated
- **Nature Serve Global**: T2
- **NHNM State**: S1
- **NM Endemic**:NO

Description

From Tiger Beetles of New Mexico: (C. Barry Knisley, Mark S. Romero, Robert E. Acciavatti. 2023. Tiger Beetles of New Mexico: Identification, Biology, and Conservation.) "Adults of this subspecies are easily distingueshed by their elytral maculation pattern reduced to only a small or sometimes absent apical lunule. The dorsal coloration is reddish-purple, with green reflections."

Habitat and Ecology

Open dry Shinnery Oak (Quercus havardii) dune blowouts are the preferred habitat of the Mescalero Sand Tiger Beetle, within which it favors the natural sandy blowouts, low-use roads, and oil gas pipeline right-of-ways that comprise the microhabitats it relies on (Knisley et al. 2023). It seems to be absent or rare on heavily used roads, including trails formed due to heavy ORV use in the area, disturbed patches, otherwise open dune slopes and ridges, and in dense areas of Shinnery Oak that are without sufficient open areas for foraging and oviposition, though

moderate disturbances may create favorable habitats by increasing open areas that provide a linear open habitat for dispersal and sufficient edges for shaded cover (Knisley et al. 2023). In areas which had increased Shinnery Oak encroachment, fewer adult beetles were observed than had been recorded before the increased Shinnery density (Knisley et al. 2023). Seasonality for adults of this subspecies seems to align with the spring-fall pattern with most records from May, August, and September while June and July had few or none (Knisley et al. 2023). However, like many other southwestern species, adult activity is affected by rainfall and soil moisture and less likely to be found during periods of extended droughts.

Geographic Range:

As its common name suggests, the Mescalero Sand Tiger Beetle occurs primarily in and around the Mescalero Sands area, located east of Roswell, New Mexico and west of Lubbock, Texas. It has been observed in Chaves, Curry, Eddy, Lea, and Roosevelt counties in New Mexico, and Cochrane, Terry, and Yoakum counties in Texas (GBIF.org 2024; Knisley et al. 2014, 2023).

Conservation Considerations:

Knisley et al. (2023) noted that the Mescalero Sand Tiger Beetle, despite its rarity, is not listed as endangered by the U.S. Fish and Wild Service. Granting endangered status to this subspecies would be key in providing protection at the local and state level while also informing essential conservation measures. More research is needed on specific actions for this subspecies and its habitat however likely first steps would include. Long term management and monitoring of population size and distribution in order to better assess the status of this tiger beetle. (Knisley 2020). Furthermore, biological study on the subspecies population dynamics, threats, and guidance for site protection as well as research on key conservation strategies especially captive rearing, translocation would also be extremely useful for recovery planning (Knisley 2020). Protection of currently occupied sites and the habitats within them is likely the most important strategies for combating the loss of this tiger beetle (Knisley 2020) since the Mescalaro Sands Tiger Beetle is a habitat specialist in a declining habitat. This habitat faces many threats due to the impacts of ORVs, agriculture, oil and gas, as well as vegetation encroachment and control of vegetation encroachment. The decline of this habitat and the threats to it have already resulted in another specialist on the same habitat being listed as federally endangered (the Sand Dunes Lizard). Creating an area based recovery plan to save this habitat and these two rare animals is an important next step towards identifying and mitigating habitat threats. In order to maintain healthy habitats for these creatures active, annual, or semiannual management is likely required to ensure sufficient habitat quality (Knisley 2020). Among the most significant and accomplishable of these management methods for habitat would be controlling vegetation to maintain necessary open space for tiger beetle foraging and feeding (Knisley et al. 2023). Furthermore, many known historic sites for threatened tiger beetles have been lost or permanently impacted by development or other anthropogenic impacts; including some for this tiger beetle. Over time, captive rearing and translocation in other tiger beetles have demonstrated to be effective methods which can efficiently create populations to recolonize extirpated sites (Knisley 2020). A lack of unoccupied sites with suitable habitat can be a significant limitation with this approach as supplementing existing populations in decline without concurrent habitat improvement yields a reduced likelihood of success (Knisley 2020). However, due to a century of laboratory work in the study of life history, developmental effects, and physiology of tiger beetles, captive rearing has shown remarkable success and standardization, with few modifications on a species by species basis, to reintroduce rare species to extirpated sites as a preferred alternative to using beetles from an existing population because it mitigates developmental mortality and amplifies the breeding potential of individuals taken from the wild (Knisley 2020).

Threats:

The Mescalero Sand Tiger Beetle is extraordinarily rare. Even in its highly localized habitat in the Mescalero Sands

area the subspecies is not common as it is found at low densities and in just a few scattered sites throughout the area (Knisley et al. 2023). Few of these populations and sites are protected and most are on unprotected, largely private rangelands, so the presence and fate of subpopulations in much of its range are uncertain and subject to human-related impacts (Knisley et al. 2023). Unprotected areas also have evidence of increased vegetation encroachment and few or no adult beetles have been reported recently likely as a result (Knisley et al. 2023). Vegetation encroachment is a serious threat to this species. However, efforts used to combat encroachment such as the use of Tebuthiuron for the control of Shinnery Oak (Quercus havardii), a common practice within this tiger beetles range, might also be influencing decline. For example, two sites that utilized this method for 5-6 years became dominated by bluestem grass, sunflower, and other forbs instead (Peterson and Boyd, 1998). This seems to have caused a significant reduction in sufficient open areas needed by tiger beetles resulting in local extirpations. However, adults of the Mescalero Sand Tiger Beetle were found in nearby areas that were uncontrolled for Shinnery Oak which, under normal conditions, have open areas sufficient for tiger beetles (Knisley et al. 2014). Furthermore, studies of the Sand Dune Lizard, (Sceloporus arenicolous), which frequently co-occurs with the Mescalero Sand Tiger Beetle and shares a habitat, showed their numbers decreased 70-94% as a result of Tibuthiuron treatment (Painter et al. 1999, Kinsley et al. 2014). Some disturbances associated with oil and gas development could create more open habitat that actually benefits this Tiger Beetle as supported by observations recorded of more adults along pipeline right-of-ways and sandy roads, though Painter et al. (1999) found a negative relationship between oil and gas well density and lizard abundance with some specific impacts including: loss of habitat from vegetation clearing and possible chemical contamination of well pads (Knisley et al. 2014, Knisley et al. 2023). It is also significant that while the Sand Dune Lizard is under consideration for listing as an endangered species (USFWS 2020) the Mescalero Sand Tiger Beetle was found to be much rarer, having occurrences at less than 10% of the open sand patches within Shinnery Oak habitat where these lizards were reported (Knisley et al. 2023). Though some Off Road Vehicle (ORV) activity might be benefitting this Tiger Beetle by controlling vegetation and maintaining more open space, heavier use areas seemed to yield no adults (Knisley et al. 2023). Larval burrows were not found in even moderate ORV use areas, suggesting these burrows are sensitive to disturbance and readily disrupted by vehicle activity. Effects of grazing are unknown and require further study but may have a negative impact by increasing grass density which could reduce open areas of potential habitat (Knisley et al. 2023). Additionally, past studies on tiger beetles in the southwestern United States have found that population trends are mainly determined by rainfall (Knisley et al. 2023). This is concerning as the Southwestern U.S. saw its driest 22-year period from 2000 to 2021 since at least 800 CE (the time period used in previous climatic reconstructions) (Williams et al. 2022) and droughts are projected to become more prolonged, severe, and common in the region under future climate change scenarios (USGCRP 2018). This may be resulting in population declines however, more information is needed on the subject.

Population:

While no populations of this subspecies throughout its range have been studied in enough detail to determine population size, visual counts of adult abundance have been made at many sites over a number of years by Knisley and Hill (Knisley et al. 2014, 2023). High-end counts ranged from 20 to as high as 80 in some sites with ideal habitat. Most sites, however, were small patches with 5 or fewer adults, primarily because there was not a sufficiently large areas of open, bare sand (Knisley et al. 2014, 2023). The observed population sizes and densities of this subspecies was lower than some other subspecies of this species, potentially because the area of suitable habitat was more limited . Sites with higher numbers had more extensive open areas, such as disturbed areas (pipelines or sandy roads) and larger natural blowouts. Throughout most of its range, the natural blowouts are too small, often with encroaching oaks, and with too little open areas to support a persistent presence of the species. These low densities are in contrast to subpopulations of C. formosa throughout its range where large populations at higher densities are often observed. Surveys in the past several years have found increasing density and encroachment of oaks and many fewer adults in some areas where they were more abundant in 2000 surveys. Field surveys of many known and new sites from 2000 to 2020 found this subspecies at 20 distinct sites, including several new ones. It was not found at any of the southernmost documented Eddy County sites despite extensive searches in that area. It also was not observed at about 80 other sites surveyed. the Mescalero Sand Tiger Beetle population densities varied across sites. While five

sites were found with 20-80 individuals, most sites were represented by five or fewer adults. Contact with other collectors and information in the database suggest similar experiences with population size for this subspecies.

References:

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More Information