

**ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM**

Invertebrate Abstract

Element Code: IICOL02362

Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Cicindela oregona maricopa*

COMMON NAME: Maricopa Tiger Beetle

SYNONYMS:

FAMILY: Cicindelidae

AUTHOR, PLACE OF PUBLICATION: Leng, C.W. 1902. Revision of the Cicindelidae of Boreal America. Trans. Amer. Entomological Society; 28:93-186.

TYPE LOCALITY: Lectotype locality: Phoenix, Arizona.

TYPE SPECIMEN: Because it was first described as a "variety" by Leng (1902), no type specimen designated. Dahl (1941) designated a lectotype.

TAXONOMIC UNIQUENESS: In designated lectotype, head and pronotum are shining metallic green; elytra are dull dark violet, and underparts are shining dark violet. Per Brock and Prchal (2001), "Intergrade or "hybrid" populations exist at the distribution boundaries of *Cicindela o. navejoensis* and *maricopa* in eastern Arizona and western New Mexico, and *Cicindela o. guttifera* and *maricopa* in northwestern Arizona and southern Utah. Bill Williams drainage may harbor pure populations of the *maricopa* genotype."

DESCRIPTION: Form of Cicindelidae distinctive. Elytra usually widest behind middle, with pronotum narrower than base of elytra. Eyes are large, bulging. Head (at eyes) as wide as, or wider than, pronotum. Antennae are threadlike; each one inserted above base of mandible. Long, slender legs. Body usually brown or black above, often with characteristic pattern of light markings. Head bald, finely striate between and in front of eyes; labrum three toothed, thorax slightly narrower behind, flat, impressions deep. Most are iridescent blue or green below. Tarsi 5-5-5. 6.0-40.0 mm (0.24-1.60 in.) with most species being 10.0-20.0 mm (0.4-0.6 in.).

AIDS TO IDENTIFICATION: In designated lectotype of *C. o. maricopa*, head and pronotum are shining metallic green; elytra are dull dark violet, and underparts are shining dark violet. In cotype series, there is little variation, except in size, which varies the same as in *C. oregona* Lec. Markings generally heavier than *C. oregona* Lec. There is sufficient evidence that this form should be known as *Cicindela oregona* subspecies *maricopa*.

The larval stage comprises the longest portion of the tiger beetle life cycle. The larvae are elongate, cylindrical, and somewhat grub-like. The mandibles are powerful and curve upwards. The head and prothorax are fused and rounded, forming a circular plate. The head is held at nearly a right angle to the axis of the body. The fifth abdominal segment has a tergal hump bearing anteriorly curved spines. (Brock and Prchal 2001).

Larval burrows of the tiger beetles are very characteristic. The entrance to the burrow is flush with the surface of the ground, and is clean and smooth. There is no "cone" of soil particles, as the larvae toss this material as far away from the burrow as possible. Most burrows are constructed so that they are perpendicular to the surface. When first sighted, larval burrows appear to be unoccupied. Larvae are very wary and quickly drop to the bottom of the burrow. They are sensitive to motion, and possibly to vibration of the substrate, but are quite insensitive to sound (Macnamara 1922). Larva also periodically plug the entrance to their burrow with soil, especially after eating, during rainy weather, during droughts, before hibernation or aestivation, before molting, and before pupation. (Brock and Prchal 2001).

ILLUSTRATIONS: B&W photo, cover of report. (McKown 1987)
Drawing of elytra of *C. oregona* Lec. (White 1983:5)
Color photo, and B&W drawing (Brock and Prchal 2001)

TOTAL RANGE: According to Dahl, *C. o. maricopa* restricted to southern arid regions of the Great Basin. Wismann states he has collected this species statewide. Per Brock and Prchal (2001), "*Cicindela oregona maricopa* occurs south of the Grand Canyon in a band extending from the "Canyon" southeastward to Cochise County. It probably does not occur in La Paz, Yuma, and Pima counties in the West or North of the tributaries of the Salt River in the eastern part of the State... If they do occur in this country, they are very limited in extent and probably exist only as relics in suitable microhabitats."

RANGE WITHIN ARIZONA: Along banks of semipermanent streams throughout Central Highlands below Mogollon Rim; collections (historical or present) made in Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, and Yavapai counties. Historical data place it in the Salt River in Phoenix, Prescott, Camp Verde, and Southeastern Arizona.

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: Generally active from March to mid-June and September to early to mid-November. According to Wismann, they are active as adults and there are always some around depending on rainfall. Wismann states stream integrity not important, they require open areas with soil moisture. Never many, observed in twos and threes. Not social, very aggressive except during mating season.

REPRODUCTION: Unknown

FOOD HABITS: Cicindelidae in general feed on other insects and sometimes pounce on prey quite suddenly. *C. o. maricopa* not specifically mentioned regarding food habits.

HABITAT: *C. o. maricopa* collected in several different habitats within its range, most commonly on sandy stream banks and less commonly on gravels and clays along streambanks. May occur near seeps or reservoir banks. According to McKown, substrate utilized by larval stages is a major factor determining presence, absence and abundance of this subspecies throughout its range. Substrate appears to be a sand/silt material capable of holding together around a burrow throughout larval stage development, and capable of retaining sufficient moisture to prevent larval desiccation and capable of being burrowed into by larval stages. Wismann states that the larvae burrow into moist soil, seal mouth of burrow and pupate there. No nest site per se.

ELEVATION: From 1,092 - 6,940 ft. (330 - 2,117 m). Most easily located along stream drainages in the Central Highlands (Schultz 1988) between 300 and 1,000 m.

PLANT COMMUNITY:

POPULATION TRENDS: Unknown

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None (USDI, FWS 1996)
[C2 USDI, FWS 1994]
[C2 USDI, FWS 1991]

STATE STATUS: None

OTHER STATUS: Forest Service Sensitive (USDA, FS Region 3 1999)
[Bureau of Land Management Sensitive (USDI, BLM AZ 2000, 2005)]

MANAGEMENT FACTORS: “An observation is the short term and potentially long term impact of sand and gravel operations on the ability of this species to survive and recolonize... Sand and gravel operations below dams present a double whammy because deposition of sand and gravel is severely reduced by dams. ...dams not only trap sediment, but act to regulate stream flow and hence to eliminate (reduce) stream bank erosion.” (Brock and Prchal 2001).

Cattle generally do not damage the adults, but continually trample the larval burrows. This impact results in severe reductions in both larvae and adults and soon the potential for recolonization is eliminated and species is in trouble. (Brock and Prchal 2001).

PROTECTIVE MEASURES TAKEN:

SUGGESTED PROJECTS: According to McKown, due to logistical and monetary reasons, several areas of potentially suitable habitat were not surveyed for purposes of the source report. These areas should be surveyed to better delineate the range of *C. o. maricopa* and to provide a baseline for future monitoring. Possible survey sites are: the Gila River between the I-10 bridge and the Colorado River, the Bill Williams River and tributaries, the Agua Fria River above Lake Pleasant, the Hassayampa River where considerable habitat occurs that is protected from human impacts and the Salt River and Gila River tributaries except Tonto Creek.

Research: The highest priority is to conduct beetle population censuses of adults and larvae on perennial river channels and some temporary channels throughout the northern three-fourths of Arizona and New Mexico. If there are significant lengths of suitable riparian habitat with populations of Maricopa Tiger beetles, and if these areas are likely to remain free of disturbance and destruction in the foreseeable future, much of the other research suggested here for management is moot. For determination of the usefulness of this beetle as a bioindicators for monitoring habitat degradation, tests in toxicology labs are needed to determine precisely the tolerance level of pollutants known to occur in the range of this tiger beetle subspecies. Measure actual levels of these chemicals in appropriate habitat for the Maricopa Tiger Beetle, and correlate them with number of seasons of successful occurrence of adults and larvae on polluted and non-polluted, heavily trafficked and nontrafficked portions, etc. (Pearson and Wismann 1995). (Brock and Prchal 2001).

LAND MANAGEMENT/OWNERSHIP: BIA - Fort Apache, Havasu, and San Carlos Reservations; BLM - Arizona Strip, Phoenix, and Safford Field Offices; USFS - Coconino, Prescott, and Tonto National Forests; State Land Department; Cities of Clarkdale and Clifton; TNC - Aravaipa Canyon and Hassayampa River Preserves; Private.

SOURCES OF FURTHER INFORMATION

REFERENCES:

- Brock, J. and S. Prchal. 2001. Sensitive Insect Species of the Coronado National Forest: Maricopa Tiger Beetle (*Cicindela oregona maricopa*). A training project by Sonoran Arthropod Studies Institute, Tucson, AZ.
- McKown, R. R. 1994. The Status of *Cicindela oregona maricopa* in Arizona. Report prepared for Fish and Wildlife Service, Ecological Services. Phoenix, Arizona.
- Pearson, D. L. and Wismann, K. 1995. Habitat Conservation Assessment of the Maricopa Tiger Beetle (*Cicindela oregona maricopa* LENG). Report prepared for USDA Forest Service Southwestern Region (3). 11 pages.
- Schultz, T.C. 1985. Letter to the Department of the Interior, Washington, D.C. October 10, 1985.
- Schultz, T. D. 1988. Destructive effects of off-road vehicles on tiger beetle habitat in central Arizona. In: *Cicindela*, June, 1988. 20(2):25-28
- USDA, Forest Service Region 3. 1999. Regional Forester's Sensitive Species List.

- USDI, Bureau of Land Management. 2000. Arizona BLM Sensitive Species List. Instruction Memorandum No. AZ-2000-018.
- USDI, Bureau of Land Management. 2005. Arizona BLM Sensitive Species List.
- USDI, Fish and Wildlife Service. 1991. Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered or Threatened Species, Proposed Rule. Federal Register 56(225):58826.
- USDI, Fish and Wildlife Service. 1994. Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered or Threatened Species, Proposed Rule. Federal Register 59(219):59014.
- USDI, Fish and Wildlife Service. 1996. Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species. Federal Register 61(40):7596-7613.
- White, R. E. 1983. A field guide to the beetles of North America. Houghton Mifflin Company, Boston. pp 82-85.

MAJOR KNOWLEDGEABLE INDIVIDUALS:

- Ronald McKown - Bureau of Reclamation, Boise, Idaho.
- T.D. Schultz - Yale University, New Haven, Connecticut.
- Kim Wismann - Hayden Library, Arizona State University, Tempe, Arizona. email: kim.wismann@asu.edu.

ADDITIONAL INFORMATION:

According to McKown, *C. o. maricopa* may be in more localities than are recorded at the present time. Timing of the searches is critical as this beetle is only believed to be active from March to mid-June and September to early to mid-November. Schultz states that "*C. oregona maricopa* is not endangered in Arizona . . . However, the combined impact of water projects and off-road vehicles continues to diminish the available habitat for this subspecies."

According to McKown, *C. o. maricopa* has been extirpated from significant stretches of suitable habitat within its range. However, the "adaptive plasticity of this species in recovering from the natural habitat disturbances to which it is frequently subjected may allow for rapid recovery in some areas once the impacts are reduced or eliminated."

According to Pearson and Wismann (1995), a total revision including "the most reliable data on taxonomic status, geographical distribution and historical changes ever published for North American tiger beetles, including the subspecies *Cicindela oregona maricopa*, since a major taxonomic monograph published by R. Freitag (1965), and a monograph of Arizona tiger beetles published by J. Bertholf(1983)" should be completed by Dr. Mont Cazier and publication expected in 1997. [Note: Mont Cazier passed away prior to publication but it is expected to be published posthumously]

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