

2004

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Spomer, Stephen M., "A New Subspecies of *Cicindela nevadica* LeConte (Coleoptera: Carabidae: Cicindelinae) from the Badlands of South Dakota" (2004). *Papers in Entomology*. 153.

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A NEW SUBSPECIES OF *CICINDELA NEVADICA* LeCONTE
(COLEOPTERA: CARABIDAE: CICINDELINAE) FROM
THE BADLANDS OF SOUTH DAKOTA

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Abstract

A new subspecies of *Cicindela nevadica* LeConte, *Cicindela nevadica makosika* Spomer, is described from the South Dakota Badlands. Geographically, the population occurs at the periphery of the range of *C. nevadica knausii* Leng. However, this new population is geographically isolated from the nearest *C. n. knausii* populations, which occur ca. 100 air miles N and over 100 air miles south. Phenotypically, *C. n. makosika* appears most similar to *C. n. tubensis* Cazier from NE Arizona. A possible threat to this population is habitat destruction by cattle.

Cicindela nevadica LeConte is a tiger beetle that occurs in isolated populations often associated with wet, saline or alkaline soils in western North America. Currently, seven subspecies are recognized: the nominotypical subspecies, *C. n. nevadica* LeConte, which occurs in the Great Basin of California/Nevada; *C. n. knausii* Leng, the most widespread member, occurring from N Texas, N across the Great Plains to S Manitoba, W to S Alberta; *C. n. lincolniana* Casey, the most localized member occurring only in Lancaster Co., Nebraska and currently a candidate species for federal Endangered Species Act listing; *C. n. citata* Rumpp, from SE Arizona into Sonora, Mexico; *C. n. olmosa* Vaurie from SE Texas, with similar phenotypes across W Texas to south-central New Mexico; *C. n. tubensis* Cazier, from NE Arizona, SE Utah, and NW New Mexico, and *C. n. metallica* Sumlin, from Coahila, Mexico. In this paper, a new subspecies of *C. nevadica* is described from the periphery of the range of *C. n. knausii*.

Methods

While searching for tiger beetles in remote areas of South Dakota in 2002, Douglas Backlund (South Dakota Game, Fish, and Parks) made several interesting discoveries: a population of *C. terricola* Say that appeared to represent a transitional between *C. t. cincitipennis* LeConte and *C. t. terricola* Say, and a new phenotype of *C. nevadica* that looked so unusual that it was at first difficult to identify to species. Additional trips were made to this new *C. nevadica* site to determine its range and relationship with *C. n. knausii*. Previously, there was only one record of *C. n. knausii* in South Dakota, a Hand Co. record listed in Willis (1967). Additionally, a new locality for *C. n. knausii* in Perkins Co. was discovered by Backlund in 2002 (Backlund *et al.* 2002); however, no clinal populations were found between the new *C. nevadica* and *C. n. knausii* despite extensive searches. This new population of *C. nevadica* occurs in a desolate area of South Dakota known as the Badlands, and is geographically isolated by at least 100 air miles from populations of *C. n. knausii* that occur to the north and south. Specifically, it occurs in the Buffalo Gap National Grassland, just a few miles N of Badlands National Park. It occurs sympatrically with *C. cuprascens* LeConte and *C. punctulata*

Olivier, but in lower numbers. Damage to the habitat by cattle trampling was evident at the type locality in 2002 and 2003, and may represent a threat to the population.

Cicindela nevadica makosika Spomer, new subspecies

(Fig. 1)

Type Series. Holotype (male) labeled “23: VII: 2002, Pennington Co., SD, T3S R12E Sec. 27, Indian Creek, D. Backlund.” Holotype deposited at USNM. Paratypes (16 males, 16 females) collected 6 July, 23 July, and 30 July 2002 by D. Backlund, S. Spomer, and W. Allgeier. Three paratypes deposited at USNM, two paratypes to UNSM (Univ. Nebraska State Museum), two paratypes to SDSU (South Dakota State University), two paratypes to CSU (Colorado State University), four paratypes to the author, sixteen paratypes to D. Backlund, and three paratypes to W. Allgeier.

Description. Male. Length 10.5 mm. Color coppery with pronounced white maculation. *Head.* Color coppery, with greenish reflections, especially along edges of eyes, near scape, and on clypeus and gena. Frons with wrinkles, most distinctive near eyes; middle of frons punctate and bearing many white, decumbent setae. Clypeus also punctate and bearing many white, decumbent setae. Labrum white, outer edge dark, unidentate with blunt tooth. Mandible white on outer edge about one-half way toward tip, teeth and tip of mandible black with green reflectance. Scape with 1 sensory seta and 3 decumbent setae, first 4 segments of antenna coppery with green reflectance, remaining 7 segments tomentose and dark brown. Maxillary palpi light brown with proximal segment dark brown; labial palpi identical in color to maxillary palpi, penultimate segment longest and heavily setose. *Thorax.* Pronotum narrower than head across eyes, slightly wider than long; color coppery; median sulcus shallow, anterior sulcus deep with green reflectance, posterior sulcus deep, with slight green reflectance; numerous white setae except at prominent points. *Elytra.* Color coppery; punctures with blue reflectance except on maculations; humeral edge with green reflectance. Scutellum coppery. Maculation wide, occupying approximately 50% of surface area. Middle band nearly fused with apical lunules; maculation continuous at outer edges of elytra; apical lunules and middle bands traceable but expanded. Microserrations present. *Ventral surface.* Lateral surface coppery and setose; prosternum coppery with green reflectance, glabrous. Metasternum and proepisternum metallic green. Genae coppery and metallic green, heavily setose. Femora coppery green. Tibiae and tarsi coppery with slight green reflectance. Legs with numerous white setae.

Variation. *Length:* male ($n = 17$), $x = 10.6$ mm, ranging from 10.0 mm to 11.2 mm; female ($n = 16$), $x = 11.6$ mm, ranging from 10.7 to 12.2 mm. *Head.* Color coppery but greenish reflections sometimes absent; greenish reflections often present at posterior vertex. Scape with up to 11 decumbent setae. *Thorax.* Anterior sulcus with or without green reflectance, posterior sulcus usually without green reflectance. *Elytra.* Color coppery (88%) or coppery with green reflectance (12%); pits with green or blue reflectance except on maculations; humeral edge with blue or green reflectance in most (94%) specimens; scutellum coppery (55%) or with blue or green reflectance (45%); maculation wide to very wide, occupying up to nearly 70% of the surface area. One specimen (3%) with humeral band fused with middle band and 7 specimens (21%) with middle band fused with apical lunules. *Ventral surface.* Genae often only metallic green; femora green or coppery green; tibiae and tarsi coppery or coppery with green reflectance.

Etymology. The name *makosika* is a composite of two Sioux Indian words for “land” and “bad” (*i.e.*, badlands), the area in which this subspecies occurs.

Similar Subspecies. *Cicindela n. makosika* most closely resembles *C. n. tubensis* and the population of *C. nevadica* in Torrance Co., New Mexico being referred to as *C. n. olmosa*. However, *C. n. makosika* is slightly larger and less reddish than *C. n. tubensis* and much more coppery than the Torrance Co. population. The most heavily maculated *C. n. knausii* examined was less maculated than the least maculated *C. n. makosika*.

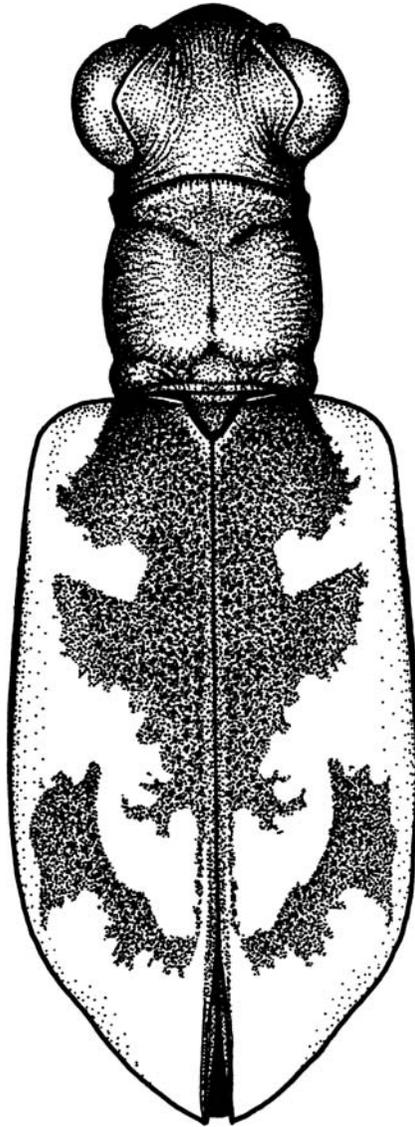


Fig. 1. Habitus, holotype of *Cicindela nevadica makosika* Spomer.

Habitat. Indian Creek is an intermittent stream that probably picks up salinity from seeps through cracks in the underlying Pierre shale. In lower Indian Creek (where *C. n. makosika* occurs), portions of the streambed consist of a light colored, viscous mud overlying the Pierre shale. *Cicindela n. makosika* was found almost exclusively where this mud occurred and was not found on other badlands streams that lacked this feature of Pierre shale underlying the stream bed. Willis (1967) suggested that selection pressure on tiger beetles in saline habitats has caused certain species to match the color

of the soil in the local area and to match the white of the salt. The expanded white maculations on the elytra of *C. n. makosika* seems to correspond with the light colored mud along Indian Creek, thus fitting this hypothesis.

Acknowledgments

I thank Doug Backlund (South Dakota Game, Fish, and Parks) for discovering this new population and for his relentless search for tiger beetles in South Dakota and W. Allgeier (Univ. Nebr. Entomology) for his help collecting tiger beetles and his thirst for tiger beetle knowledge. Thanks also to Brett Ratcliffe (Univ. Nebr. State Museum) and Lance Meinke (Univ. Nebr. Entomology) for their initial reviews. A special thanks to Jim Kalisch (Univ. Nebr. Entomology) for the illustration. This is paper no. 13978 of the Journal Series of the University of Nebraska Agricultural Research Division and contribution no. 1145 of the Department of Entomology.

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(Received 25 January 2003; accepted 20 August 2003. Publication date 18 October 2004.)