

NEARCTIC DESERT SAND DUNE ORTHOPTERA
PART XIV. A NEW *EREMOPEDES* (DECTICIDAE)

Ernest R. Tinkham¹

ABSTRACT.— A new species, *Eremopedes kelsoensis*, is described from the Kelso Sand Dunes, San Bernardino Co., California, with notes on its biology, song, host plants, desert distribution, orthopteran associates, and a key to species in the genus.

The genus *Eremopedes* is one of the best defined of the various eremophilous genera of our Southwestern Decticidae. The genotype *E. Scudderi* Cockerell is largely confined to the Coahuila Desert, one of three eremological components of the Great Chihuahuan Desert; the other two being the northern Pecos and the extreme southeastern Salado deserts. *E. covilleae* Hebard is known only from the type locality about 4-5 miles SE of Persimmon Gap in the Coahuila Desert, not nine miles S of the park entrance as assumed by Rentz and Birchim. *E. shrevei* Tinkham is known only from the type locality in the Salado Desert. *E. bilineatus* (Thomas) is widespread in southeastern Arizona and southern New Mexico; *E. balli* inhabits the pine zone in the mountains of Arizona and New Mexico. *E. pallidus* Tinkham, originally described as a variety of *E. balli*, inhabits sand dune areas of the Painted Desert, one of four eremological components of the Great Basin Desert. The giant *E. ephippiatus sonorensis* Tinkham inhabits the Hermosillo Desert, the southernmost of seven eremological components of the Great Sonoran Desert.

The new species herein described is largely confined to certain xeric dune areas and their sparse vegetation in the Lahontan Desert, the westernmost member of the Great Basin Desert.

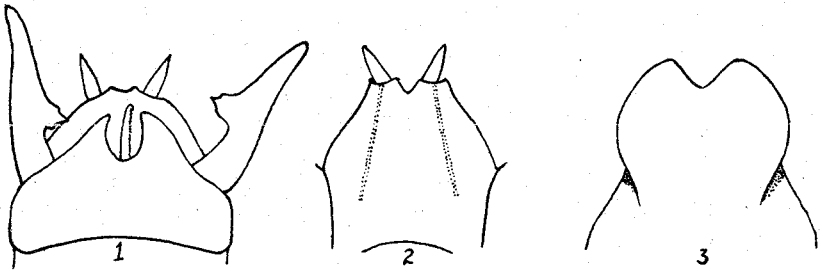
Eremopedes is easily recognized by the long barrel of the pronotum, with its well-developed lateral lobes, and by the characteristic cerci of the males which demonstrate two types: in *scudderi*, *bilineatus*, *shrevei*, *covilleae*, and the new species the cercus is long and slender, somewhat undulate with median internal tooth; in *balli*, *pallidus*, *ephippiatus* and *e. sonorensis* the male cercus is much shorter and heavier. The status of *E. spinosa* Hebard remains to be determined.

Key to the Species of *Eremopedes*

1. Cerci slender, elongate, somewhat undulate, with internal median subapical prominence and tooth; metazonal lobes pale 2
- Cerci short, heavy, rather quadrate, with internal, subapical tooth; metazonal lobes black 6
2. Color green or gray; size large to small; form slender,

¹81-441 Date Palm Avenue, Indio, California 92201.

- with white dorso-lateral stripe running length of pronotum and body 3
- Color green or gray; size medium, form heavier; dorso-lateral stripe, if present, confined to abdomen 4
3. Size large; Sahuaro Desert *bilineatus*
Size small; Great Basin Desert *kelsoensis*
4. Dorsolateral lobes of pronotum with marginal areas pale; metazona concolorous with prozona 5
Dorsolateral lobes of pronotum with pale arcuate area; metazona broadly buff in color; Coahuila Desert ... *covilleae*
5. Size medium; penultimate abdominal notite very deeply notched; Coahuila Desert *scudderi*
Size small; grayish; posterior penultimate notite shallowly notched; Salado Desert *shrevei*
6. Size very large; Hermosillo Desert *e. sonorensis*
Size medium to small 7
7. Outer pagina of caudal femora unmarked; Painted Desert *pallidus*
Outer pagina of caudal femora with two black longitudinal stripes 8
8. Cerci of male as broad as long; Oak Zone *e. ephippiatus*
Cerci more slender; Pine Zone *balli*



Figs. 1-3. *Eremopedes kelsoensis*, n. sp.: 1, dorsal view of terminalia of male holotype showing penultimate abdominal tergite with U-shaped notch, cerci, left titillator, and cerci of subgenital plate; 2, ventral view of subgenital plate of male holotype; 3, ventral view of subgenital plate of female allotype.

Eremopedes kelsoensis, n. sp.

COMPARISON: *E. kelsoensis* is most closely related to the much larger *bilineatus* and is entirely confined to desert regions west of the Colorado River, whereas *E. bilineatus* is restricted to desert regions east of the Colorado River. There is no area of contiguity or intergrade. Relationships with the other species are clearly expressed in the Key.

DESCRIPTION.— Male holotype: Size small, slender, typical of more slender element of *Eremopedes*. Face typical of genus. Pronotum almost twice as long as broad; fore margin almost squarely truncate and very slightly emarginate; posterior margin almost squarely truncate; lateral lobes of pronotum fairly deep, especially at prozonal lobe; shallower in metazonal lobe area, ventral margin showing a very slight emargination immediately above oval tympanum which lacks hairy margin.

Abdominal penultimate notite bearing a moderate U-shaped emargination, but much shallower than very deep V-shaped emargination of *bilineatus*. Cerci slender, quite elongate, outer margin slightly undulate, inner margin bearing an internal, median, subapical prominence tipped with a minute tooth. Subgenital plate narrow, keeled, with a deep U-shaped median notch on posterior margin. Titillators straight, slightly spatulate with a row of retrose teeth on exterior margin.

Leg spination: Fore legs with long procoxal spine; fore femora unarmed; fore tibiae with ventral keels bearing six pairs of long aciculate spines (two pairs in basal half, four pairs in apical half), and outer dorsal ridge with basal spine on apical portion of synchronometer, the other two, one medianly and one apical. Mesotibiae with six pairs of ventral spines and four internal and two external dorsal spines widely and irregularly distributed. Caudal femora with externoinferior keel unarmed; internoinferior keel with six widely spaced small teeth in apical two-thirds. Caudal tibiae with 20-22 spines on ventral keels and six pairs of dispersed dorsal spines.

Living coloration: General coloration pale viridian. Head with entire face, antennal scrobes, and fastigium viridian; cheeks very pale green, occiput same palely tinged with very pale orange. Pronotum with median dorsal area dark green, outwardly edged with rusty orange; dorsolateral area nacreous white; dorsolateral lobar area deep green; prozonal margin nacreous, metazonal area rusty brown; meso- and metathoracic areas green. Abdominal notites deep green, with nacreous dorso-lateral stripe having both margins edged irregularly with rusty red. Sternites viridian; ventrolateral areas nacreous. Fore and middle legs greenish with some pale reddish tinge dorsally. Caudal legs with femora largely green, sulcus ventrally tinged with very pale red; tibiae pale viridian. Tegmina pale reddish brown.

Female allotype: Closely similar to holotype in body size and coloration; fore and middle legs with spination as in holotype. Caudal femora with only one spine on inner ventral keel. Caudal tibiae with 24-26 ventral teeth on each keel; 5-6 widely spaced dorsal teeth. Ovipositor long, exceeding the length of the body and slightly recurved in the apical three-quarters. Subgenital plate circular in outline with an open V-shaped median notch on the posterior margin.

TYPE MATERIAL.—Male holotype: Kelso Dunes, 10, 11-VI-1958, nymph which became adult 1-VIII, Creosote margin of dunes, E. R.

Tinkham. Calipered measurements in mm: body length 21.1; pronotum 5.8 x 4.8 max. breadth; exposed tegmina 3.0; caudal femora 19.8 x 2.5; cerci 2.1. Type in the Tinkham Eremological Collection.

Female holotype: Dunes on north side of Owens dry lake, Owens Valley, California (several miles west of Keeler), 26-VIII-1957; on *Suaeda torreyana*, night collecting, E. R. Tinkham. Calipered measurements in mm: total length to tip of ovipositor 43.2; ovipositor 25.1 x 1.4; body length 19.8; caudal femora 20.8 x 2.5. Allotype in the Tinkham Eremological Collection.

Male paratypes: 1 ♂, Kelso Dunes, San Bernardino County, 17-X-1970, on *Hymenoclea* in sand dune arroyo; 1, Kelso Dunes in Creosote margin, 11-VI-1958, 2, N side Owens Lake dunes, 26-VIII-1957, on *Suaeda*; 2, 1-2 miles W of Tonopah Dunes in Big Smokey Valley about 15 miles NW Tonopah, 19-IX-1957. All collected by E. R. Tinkham. 1, Adelante, 28-VIII-1957, Theodore Cohn.

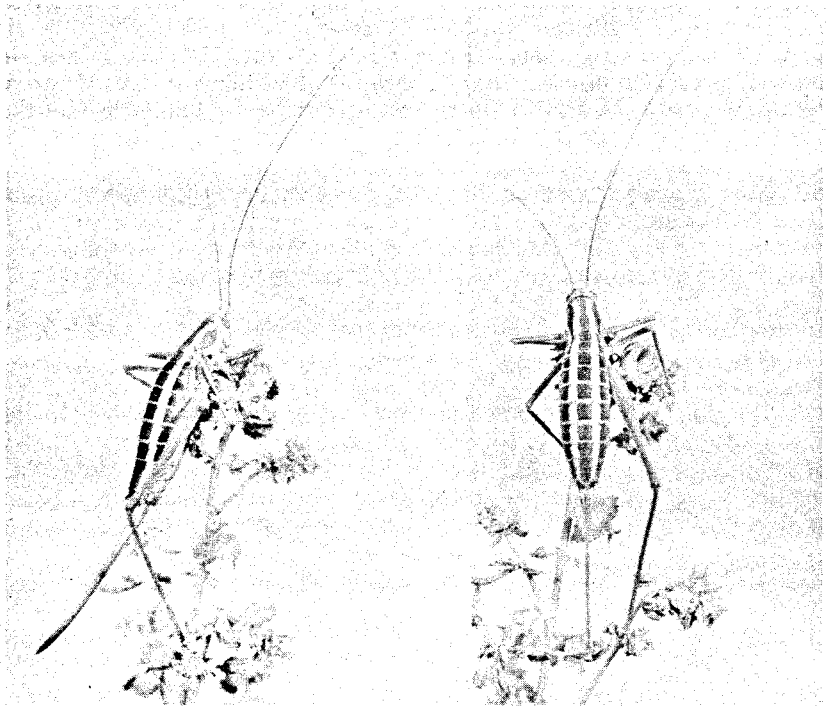
Paratype males closely similar to holotype; size smallest from Adelante, Owens Lake, and Tonopah, maximum size from Kelso Dunes. Coloration closely similar except in Adelante male, which is dark greenish gray in coloration.

Calipered range measurements in mm: body length 16.3-21.5; pronotum 5.2-5.8 x 3.9-4.4; caudal femora 18.7-20.8.

Female paratypes: 3 same data as the allotype. Coloration same as in allotype. 2 subadults with shorter ovipositors. Calipered measurements in mm: adult, total length to apex of ovipositor 45.9; ovipositor 25.5, body length 23.0; pronotum 5.8 x 5.1; caudal femora 22.2. Eclousure of one subadult imperfect due to confinement. 1 female subadult: total length to tip of ovipositor 40.0 mm; ovipositor 21.1 mm and straight; body length 20.2 mm; pronotum 5.6 x 4.8 mm; caudal femora 22.3 mm.

HABITAT.—At the Kelso Dunes *E. kelsoensis* inhabits the creosote margin, in good wet years, where also *Croton californicum*, *Rumex hymenelytra*, clumps of *Petalonyx Thurberi*, *Hilaria rigida*, and a stiff silvery *Gilia* sp. are always present. In good years *Oenothera deltoides*, *primaverens*, *Gilia aurea decora*, *Baileya pauciradiata*, and many other flowers are present. The arroyo that cuts a deep valley through the towering dunes is dominated by *Larrea divaricata*, *Acacia Greggii*, *Hymenoclea salsola*, *Opuntia echinocarpa*, *O. ramosissima*, *Haplopappus acradenius*, and other plants.

On the north side of dry Owens Lake, representing the Lahontan Desert, the principal dominants on the dunes are *Atriplex confertifolia*, *A. canescens*, *Sarcobatus vermiculatus*, *Suaeda Torreyana*, *Artemesia tridentata*, *Franseria dumosa*, *Dalea polyadenia*, and *Distichlis* sp. One dune had a spring flowing out of the top of it, well surrounded by tules and other water-loving plants. On the west side of the towering Tonopah Dunes in Big Smokey Valley, about 15 miles NW of Tonopah, Nevada, the habitat ranged 1-3 miles west of the dunes which carried a stunted vegetation of *Atriplex spinifera*, *Coldenia plicata*, *A. canescens*, *Dalea polyadenia*, and perhaps other rarer plants growing on the sandy soil.



Figs. 4-5. *Eremopedes kelsoensis*, n. sp. Female allotype: 4, dorsolateral aspect; 5, dorsal aspect.

EREMOGRAPHY.— The Tonopah and Owens Lake dunes (north and west sides) lie within the periphery of the Lahontan Desert, the westernmost component of the Great Basin Desert. This desert is dominated by halophilous species of *Atriplex* in the saline valley bottoms and by *Artemisia tridentata* on the flanks or bajadas of the valleys. The Great Sonoran Desert is dominated by *Larrea divaricata* with its associated subdominants. The Kelso Dunes lying within the confines of the Gila Desert show many more northern elements, probably due to their elevation, which ranges between 2400 and 3100 feet, and their very cold winters, which undoubtedly make it possible for this northern element to exist at a more southern latitude. Thus the Tenebrionids, such as *Lariverius*, *Trogloderus*, and *Eusattus*, as well as *Ammobaenetes* and *Eremopedes kelsoensis* and perhaps others, are examples of this eremographic picture.

HOST PLANTS.—At the Kelso Dunes, *Hymenoclea salsola* was the host plant, but it is not known which plant serves as the host plant in the creosote margin. At the north side of the Owens Lake dunes *Suaeda Torreyana* was the host, but elsewhere the host plant is not known.

BIOLOGY.— It is very evident that due to the severe winters of its environment *E. kelsoensis* must hatch from the over-wintered egg in the spring; its time of hatching varying with the character of the spring and with the moisture in the soil or sand. The first specimen captured at the Kelso Dunes on 10-11 June 1957, was a male nymph which became adult on 1 August 1957. This species was discovered during the first of four summers of study supported by the National Science Foundation, to which the author is most indebted. The time of adulthood would also depend on the time of the adventitious rains, if they do arrive, the emergence ranging anywhere from August into early October.

On 26 August 1957, at 10:30 p.m., the writer captured a pair that had just mated in a *Suaeda* bush at the north Owens Lake dunes; the male was still in the bush and the female was feeding on the spermathecal sac. In 1970 the rains came late, and although they did not touch the Kelso Dunes, heavy rains in the Granite and Providence mountains to the east sent a big arroyo down through the dunes for the first time in 15 years. This event accounted for the discovery of the two males on 17 October on *Hymenoclea salsola* after long and diligent searching.

SONG.—the song is a soft and continuous “zee” characteristic of the genus *Eremopedes*.

ORTHOPTERAN ASSOCIATES.— At the Tonopah location the only associate was *Coniana snowi*, which is very rare in this xeric habitat. At the Owens Lake dunes *Anconia integra*, *Eremiacris*, *Ligurotettix coquilletti*, *Derotmema*, and *Aeoloplus* were the acridids and the tettigoniids were the new species and *Anoplodusa arizonensis*, the latter being the first of this rare dectid reported for Owens Valley, which is the Zoogeographical Center of this family. At the Kelso Dunes the associates were more numerous: Acridids were *Cibolacris*, *Tanaeocerus*, *Tytthotyle*, *Coniana*, *Eremiacris*, *Bootettix*, *Xeracris*, and *Trimerotropis p. pallidipennis*, although some of these have not been seen since the fifties. The tettigoniids were *Capnobotes fuliginosus*, *Anoplodusa arizonensis* (1954), and *Insara covilleae*; the rhabdophorids were *Ammobaenetes* sp., *Macrobaenetes kelsoensis*, *Ampepmatus kelsoensis*, and *Ceuthophilus fossor*.

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