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STUDIES IN NEARCTIC DESERT SAND DUNE ORTHOPTERA

Part XII. A Remarkable New Genus and Species of Stenopelmatine Crickets from the Viscaïno Desert, Baja California, Mexico, with Key.

Ernest R. Tinkham¹

During the month of June, 1968, the author in company with five other men, none of whom were scientists, made a fast and very rough trip to the Viscaïno Desert of central western Baja California, Mexico. Accompanied by Mr. Joe Ingram, owner and driver of a new jeep, we were able to penetrate, with the help of a Pima Indian guide, to San José del Castro, an adobe hut, some 39 miles SE of San Bartolome Bay.

The purpose of the trip was various, but for the author chiefly scientific. These aims were to reexamine the flora and fauna of the Cirio and Viscaïno and Colorado Deserts; to collect a new genus of sand loving grasshoppers first found by the enterprising Mr. David Werner in the summer of 1965; to collect further specimens of the rare James' Horned Lizard for distributional studies and to obtain, if possible, additional material of a remarkable Stenopelmatine Cricket found by Werner in 1965 and which is the purpose of this paper.

The trip was considered highly successful and all the aims of expedition were realized except that no additional material of this Stenopelmatine cricket was obtained. In addition the trip brought several surprises. Several new acridids were discovered as well as camel crickets, sand roaches, dectidids, cicadas and scorpions as well as other insects of interest.

The writer wishes to acknowledge here the four summer National Science Foundation grants, 1957 to 1960 inclusive, which expedited his sand dune studies commenced in 1952 and initiated these studies which have produced eleven published parts to date.

KEY TO THE GENERA AND SPECIES OF THE STENOPELMATINE CRICKETS OF THE CALIFORNIAS

1. Caudal tarsi straight, normal in form. Caudal calcars of the caudal tibiae rather long, 6 in number and of irregular length, the one at the dorso-internal base the longest; that at the dorso-external base the shortest. Caudal tibial teeth absent or vestigial to well developed. Body form normal, size small to large 2

Caudal tarsi greatly modified for arenicolous habitus, the basal segment greatly flattened, planate, rotated laterally

¹Indio, California.

so that the 3 remaining segments are semicircularly twisted to the side, the ungues elongate with internal and external margins fringed with row of long hairs to aid in sand-surface propulsion. Caudal calcars, much shortened, broadly spathulate for sand excavation; caudal tibiae with only three very small, vestigial, external dorsal teeth. Body form normal *Viscainopelmatus* n.g.

2. Tibial teeth vestigial or lacking on the apical dorsal margins of the caudal tibiae. Ringlet of apical calcars of caudal tibiae subequal in length, broadly spathulate on inner surface for arenicolous habitus. Median or presubapical spur on the ventral surface of the foretibiae absent. Pronotum not expanding anteriorly. Coloration uniformly orange. Size medium to medium large. Kelso Dunes *Ammopelmatus kelsoensis* Tinkham

Tibial teeth prominently developed on the apical dorsal margins of the caudal tibiae. Ringlet of six apical calcars of hind tibiae conical or subconical in form, the innermost the longest. Median or presubapical spur on the ventral surface of the foretibiae present (except in *nigrocapitatus*). Pronotum expanding anteriorly and concealing the posterior portions of the large head. Size small to large. Coloration variable. Widely distributed in the western United States and Mexico *Stenopelmatus* Burmeister 3

3. Foretibia bearing only two ventral apical spurs posteriorly to calcars III and IV 4

Foretibia bearing 3 ventral apical and subapical spurs, the first two somewhat paired and proximal to the third and fourth calcars, the third subapical to this pair. Size small to very large. Coloration variable 5

4. Caudal tibiae with three dorsal apical and subapical teeth on each margin. Caudal tibiae with a pair of ventral apical spurs. Size large, coloration orangish *coahuilensis* Tinkham

Caudal tibiae with 3 dorsal apical and subapical teeth on each margin. Hind tibiae with usually one (sometimes a minute second) ventral apical spur immediately anterior to calcars III and IV. Occiput capped with black cap in adults and subadults *nigrocapitatus* Tinkham and Rentz

5. Adult size very large (35-50mms long). Color of head and pronotum orange red. Head often megacephalous 6
Adult size medium to small (less than 35 mms in body length). Color of head and pronotum not orange red but piceus or shining black, the black isolated into irregular areas by pale suture lines 7

6. Calcars of the hind tibiae forming a semi-ringlet of six long spurs, innermost two longest, cylindrical and acuminate in form *longespina* Brunner

Calcars of the hind tibiae forming a semi-ringlet of 6 spurs, these spathulate or trowel-shaped on their inner faces, the inner three relatively equal, but longer than the outer three *fuscus* Haldeman

7. Entire head and body uniformly dark brown with black abdominal tergites. Caudal tibiae with four to five internal and two to three external apical and subapical dorsal teeth *intermedium* Davis & Smith

Upper part of head shining black with tan sutural areas. Pronotum dorsally with irregular areas of shining black. Outer face of all femora with irregular pale brown patches of infuscation. Caudal tibiae with three to four internal and two external apical and subapical dorsal teeth *pictus* Scudder

Viscainopelmatus Tinkham n.g.

GENERIC DIAGNOSIS: This new genus is remarkably characterized by the strange and unique form of the caudal tarsi, showing an adaptation so unusual to arenicolous environment that were the entire eremicolous world searched over, it is doubtful whether another such case exists. This remarkable modification is shown by the caudal tarsi which seldom exhibits much change except perhaps in Schizodactylinae where lateral tarsal pads are present. In the new genus the caudal tarsi are semicircularly twisted laterally; the first basal segment is greatly expanded and planate and the ungues are ampliate or swollen in basal five-sixths so that only the apices are uncinat and chitinous, the median internal and external sides lined with several rows of long hairs, the whole of which assists greatly in propulsion of a heavy bodied creature over fine sands.

Form normal and size large for the subfamily. *Viscainopelmatus*, new genus, is amply distinct from *Ammopelmatus* Tinkham, 1965, and *Stenopelmatus* Burmeister, 1832, by the strange modifications of the caudal tarsi; it is further distinguished from these genera by lacking the strong, dorsal, internal and external apical teeth of the caudal tibiae and in addition there are only three vestigial, subapical dorsal teeth on the external margin of the caudal tibiae. The pronotum in the new genus more closely approximates that in *Stenopelmatus* than *Ammopelmatus* since it is very slightly broader anteriorly. Naturally closest relationships appear to be to *Ammopelmatus* because both genera are strictly arenicolous in habitus.

In addition to above salient features, *Viscainopelmatus* n.g. like *Ammopelmatus* has shorter and stouter legs for sand propulsion and digging, with all femora and tibiae quite arcuately or convexly bowed on their forward or dorsal margins.

Genotype: *Viscainopelmatus davewernerii* n.g. et n.sp.

Viscainopelmatus is named after the Viscaino Desert of west-central Baja California and the great Viscaino Peninsula. This desert is named after Sebastian Viscaino, the great Spanish explorer of the seventeenth century. This desert is characterized by low sandy reaches, with dune areas rare inland but fairly common coastally; with night and morning fogs dissipating by noon and with a great variety of plants, many of which are endemic to this desert.

Extensive coastal and inland areas, such as surrounding the south end of Scammon's Lagoon are dominated by *Frankenia Palmeri* and drier areas often show a great admixture of plants such as Peninsular Ocotillo (*F. peninsularis*), Agaves, cacti, both giant and small, Jatrophas and many other trees and shrubs. A breathtaking sight in June is to see the Copalquin (*Pachycornus discolor Veatchiana* (Kell) Gentry) emblazoning an arroyo, their massive short trunks crowned with myriads of salmon rose flowers.

Although the soil is extensively sandy, dune areas are low and infrequent inland, but quite extensive coastally. The Giant Yucca, *Yucca valida*, forms extensive Yucca savannahs just inland of the coastal dunes northeast of Guerrero Negro.

Viscainopelmatus at present is known only from the coastal dunes at Laguna Manuela, some fifteen miles or so northeast of Guerrero Negro where it is extremely rare.

Viscainopelmatus davewernerii n.sp.

HOLOTYPE: 1 specimen minus abdomen which was cut off while excavating a rodent burrow. Coastal dunes at Laguna Manuela, some 15 miles northeast of Guerrero Negro, Distrito Sul, Baja California, July 5, 1965, David Werner and party. Since the author's expedition failed to discover additional material of this curious creature, the writer finally decided after much thought and consultation to make known this new genus and species to the scientific world. Furthermore and fortunately both male and female crickets are usually identical in morphological features other than the sex organs which exhibit no specific characteristics.

DESCRIPTION: Size large, head typical of Stenopelmatine crickets; clypeal boss, when viewed in lateral profile slightly more prominent than in *Stenopelmatus* or *Ammopelmatus*. Pronotum, when viewed from above, approximating more closely *Stenopelmatus* than *Ammopelmatus* in that it is slightly ampliate forward; the posterior margin squarely truncate, the anterior margin typically emarginate with margin hirsute. In lateral profile the pronotum is typical of the subfamily. Abdomen missing, cut off by a spade while excavating the burrow that housed the cricket.

LEG SPINATION AS FOLLOWS: Forelegs, smooth, fore femora with dorsal margin quite arcuately rounded; fore tibiae with both dorsal and ventral margins arcuate; calcars five, typical, numbers II and III much the longest and subequal, number IV next in size and

number V shorter than number I. Apical spurs on the ventral margin of the foretibiae, two in number, with the largest immediately caudad of calcar III and with a smaller spur slightly subapical and caudad of calcar IV; protarsi typical. Mesolegs with mesofemora typical; mesotibiae typical with six terminal calcars, and with a median placed small spur on the internal dorsal margin and a similar spur on the external, dorsal margin placed in a subapical position. Mesotarsi typical.

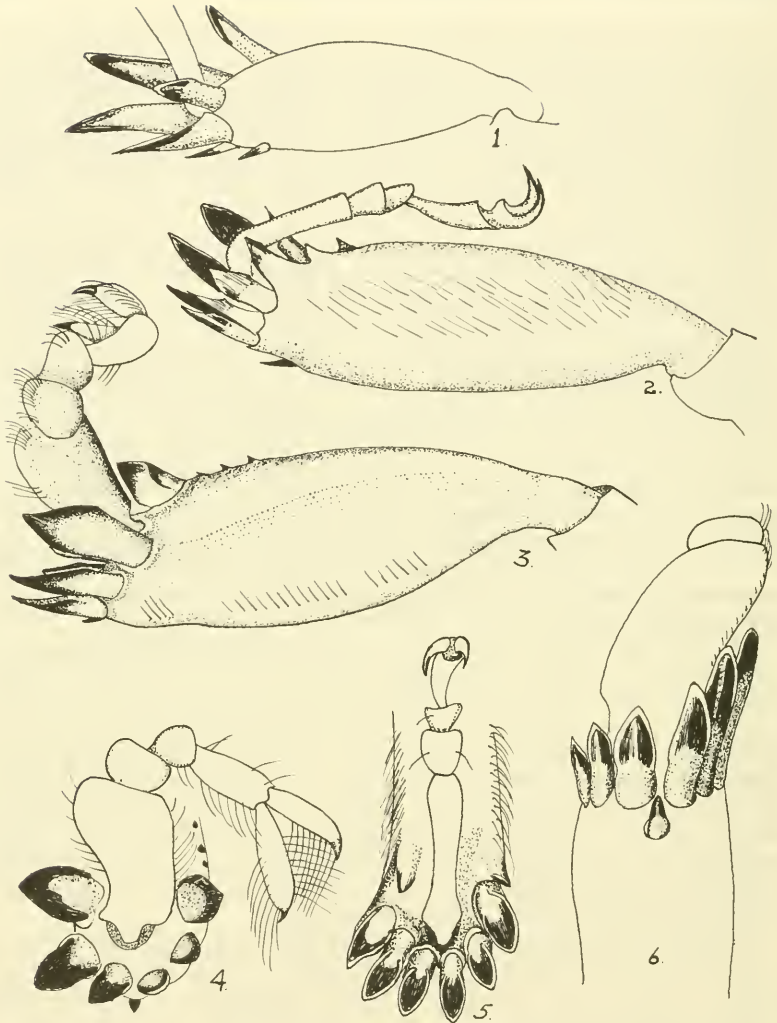
Hindlegs with caudal femora smooth, with dorsal margin strongly arched (see figure 1), ventral margin straight, with fine scattered hairs in sort of two rows externally and just below the dorsal margin, and another row supraventrally. Caudal tibia with dorsal and ventral margins arcuate, the dorsal internal margin devoid of teeth, the dorsal external margin bearing three minute black teeth in almost apical position (see figure 6); ventral margin bearing a single, short but stout, apical, black spur situated immediately basad of space between the two calcars; this spur having great generic and specific import. Calcars six in number, greatly shortened and broadened; numbers I to III of equal size, numbers IV to VI very slightly longer with number VI the longest. Inner surface of all calcars truncate and trowel-shaped for excavation and forward propulsion across the surface of soft sand.

Caudal tarsi spectacularly modified for sand habitus, first segment twisted laterally and greatly expanded so as to form a plane surface or sole with a small tuft of short hairs apically on each margin. Second segment short and broad, ampliate forward, the inner margin arcuate and longer than the outer so that the third segment of smaller and similar shape is twisted exteriorly and circularly outward, thus forcing the fourth into a downward position (see figure 4). The unguis are unusual, too, since they appear elongated and unsclerotized so that only the extreme apex is uncinat and sclerotized. The lateral margins of unguis also bear long curving hairs which further assist in sand propulsion.

CALIPER MEASUREMENTS: Body length approximately 30 to 35 mms; pronotum 7.2x8.8 mms in breadth; caudal femora 10.0x4.1; caudal tibiae 10.8 3.5 mms. Type deposited in the Tinkham Eremological Collection.

ORTHOPTERA ASSOCIATES: These were several but must be studied. The sand roaches, *Pristoceuthophilus* and *Ceuthophilus* and other species are probably new.

COASTAL DUNES AT LAGUNA MANUELA: These dunes are low, probably no more than 10 to 15 feet in greatest height and semi-stabilized. The shrub growth was considerable and of a height for one to become easily lost at night, especially if foggy. The main shrub was a cut-leaved, yellow flowered composite, but no special study of the dune flora has been made. Our camp was at the east edge of dunes in *Yucca Savannah* and was infested with a reduviid bug, called the Hualpai Tiger. Large numbers were collected at night with forceps. While endeavoring to pick up one carefully by



EXPLANATION OF PLATE

1. External view of foretibiae of Holotype of *Viscainopelmatus daveverneri* Tinkham n.g. et s. sp. greatly enlarged.
2. External view of right caudal tibia and tarsus of *Ammopelmatus kelsoensis* Tinkham, greatly enlarged.
3. Internal view of caudal tibiae and tarsus of Holotype of *Viscainopelmatus daveverneri* Tinkham n.g. et n.sp., greatly enlarged.
4. Ventro-posterior view of the apical area of the right tibia and tarsus of the Holotype of *Viscainopelmatus daveverneri* Tinkham n.g. et n.sp. portraying the remarkable modifications of caudal tibia and tarsus, all greatly enlarged.
5. Ventro-posterior view of the apical area of the right caudal tibia and tarsus of *Ammopelmatus kelsoensis* Tinkham, greatly enlarged.
6. Ventral view of apical portions of left caudal tibia and tarsus of Holotype of *Viscainopelmatus daveverneri* Tinkham n.g. et n.sp. showing the diagnostic ventral apical tibial spur and the planate tarsal segment, all greatly enlarged.

hand, the writer received an excruciating puncture. Fortunately none succeeded in getting into our sleeping bags.

FAUNAL DESIGNATION: As already indicated, *Viscainopelmatus* is a most distinctive and bizarre member of the Viscaino Desert which has hardly been studied. Stanley C. Williams in the last three years has named numerous new scorpions from Baja California, some from the Viscaino Desert, showing that the fauna of Baja California peninsula has been hardly touched by zoologists.

It is a great privilege to name this remarkable new genus and species in honor of its discoverer, Mr. Dave Werner, an enterprising and persevering entomologist, an educator of note, a naturalist and bird artist of distinction, who in recent years has devoted his life as a medical missionary to bring life and hope to the impoverished folk inhabiting the beautiful barrancas of the Sierra Madre Occidentale of central Sinaloa, Mexico.

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