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New Species and Records of Western Orthoptera

(Orthoptera: Tetrigidae; Acrididae; Tettigoniidae; Stenopelmatidae)

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This report is based on collections made primarily by staff members of the Oregon State Department of Agriculture (ODA) and the California Department of Food and Agriculture (CDA). A single record of a pygmy grasshopper is included here because it is the second known specimen of its species. A new band-winged grasshopper is described reinstating *Agymnastus* as a distinct genus.

The Jerusalem cricket described in this paper is of interest because of its endemic distribution in a sand dune system in northern Arizona. Such unique species merit special consideration especially in light of the destruction of dune habitats by off-road vehicles.

The author would like to thank Mr. Kenneth Goeden of the Oregon State Department of Agriculture and Drs. Fred G. Andrews and Alan R. Hardy of the California Department of Food and Agriculture for permitting me to study their material. Carolyn Mullinex is thanked for her illustrations. Figures 21 and 22 were provided by Dr. F. G. Andrews.

Tetrix sierrana Rehn and Grant

Tetrix sierrana Rehn and Grant, 1956, Proc. Acad. Nat. Sci. Phila. 108. 110. Type locality: Sugar Pine, Madera County, California, 4,300-5,000 feet elevation. Holotype female deposited in Academy of Natural Sciences of Philadelphia, number 5,792.

This species has been known only from the holotype. It is distinguished from *T. subulata* (Linnaeus), the only other species in the genus within its range (Rehn and Grant, 1961), by the anterior margin of the carina of the fastigium of the vertex which is interrupted by the median carina. In *T. subulata,* the transverse carina is only slightly in-

terrupted by the median carina. The tegmen is two-thirds or less the length of the middle femur in *T. sierrana* but in *T. subulata* it is as long or longer. Although the author has searched the type locality several times, the species was never located and the type was regarded as an aberrant or mislabelled individual. This record from a locality 20-25 air miles from the type locality provides substantial evidence for the validity of *T. sierrana.* Additional collecting is still necessary to provide males of this elusive little grasshopper.

Record. — CALIFORNIA: Mariposa County: El Portal, 23.VI.1953 (D. Giuliani, 1♀, CAS).

Agymnastus Scudder, **new status**

Agymnastus Scudder, 1897, Canadian Entomol., 29:75. Type of the genus: *Leprus ingens* Scudder, by original designation.

In 1968 Strohecker, Middlekauff and Rentz synonymized *Agymnastus* with *Xanthippus* noting that its generic status was best left to revisionary studies. At the same time *Agymnastus haemopterus* Strohecker was synonymized under *Xanthippus olancha* (Caudell). The synonymy of this species is unquestionable but the status of *Agymnastus* should be changed.

That *Agymnastus* is distinct from *Xanthippus* is apparent from both the type of the genus, *A. ingens,* and *A. venerabilis* Rentz, new species. The two genera are close but separable on the basis of the following: the fastigium of the vertex is always distinctly carinate or rugose in *Agymnastus* but smooth or with only a minute carina in *Xanthippus*; the pronotum is much more tuberculate in *Agymnastus* species than it is in any *Xanthippus* species and the median pronotal carina is less defined than it is in *Agymnastus* species; the internal pagina of the hind femur in *Agymnastus* is jet black, often with a bluish overcast. There are no subapical annuli. This combination of characters is approached in *Xanthippus* only by *X. corallipes pardalinus* and *X. olancha.* The tegminal coloration is different in *Agymnastus* from that of *Xanthippus.* In *Agymnastus* the tegmen is either concolorous dark brown or with a few obscure blotches. In *Xanthippus* the tegmen is usually marbled or speckled, never concolorous. The wing disc color in *Agymnastus* is always opaque and bright yellow. In *Xanthippus* this color can be yellow, orange, red, or various shades of pink. The two genera seem to be distinct with respect to the phallic complex although Barnum (1959) has shown this can be quite uniform in oedipodines. The epiphallus of *Agymnastus* is smoothly rounded at the base of the posterior projections. In *Xanthippus corallipes* (type of *Xanthippus*) and several other species which I have examined, there is a broad raised area with acute projections on each side. The lophi in *Agymnastus* are stout and gracefully incurved with apices rather blunt. In *Xanthippus* the lophi are twisted and the apices are acute. In *X. corallipes* the dorsal valves of the aedeagus are acute; in

Agymnastus they are blunt.

Agymnastus species may prefer a different habitat or feed on different host plants from *Xanthippus* species because I know of no records of both genera occurring sympatrically. A close relative, the ubiquitous *Cratypedes neglectus* (Thomas), is, however, sympatric with species of both genera.

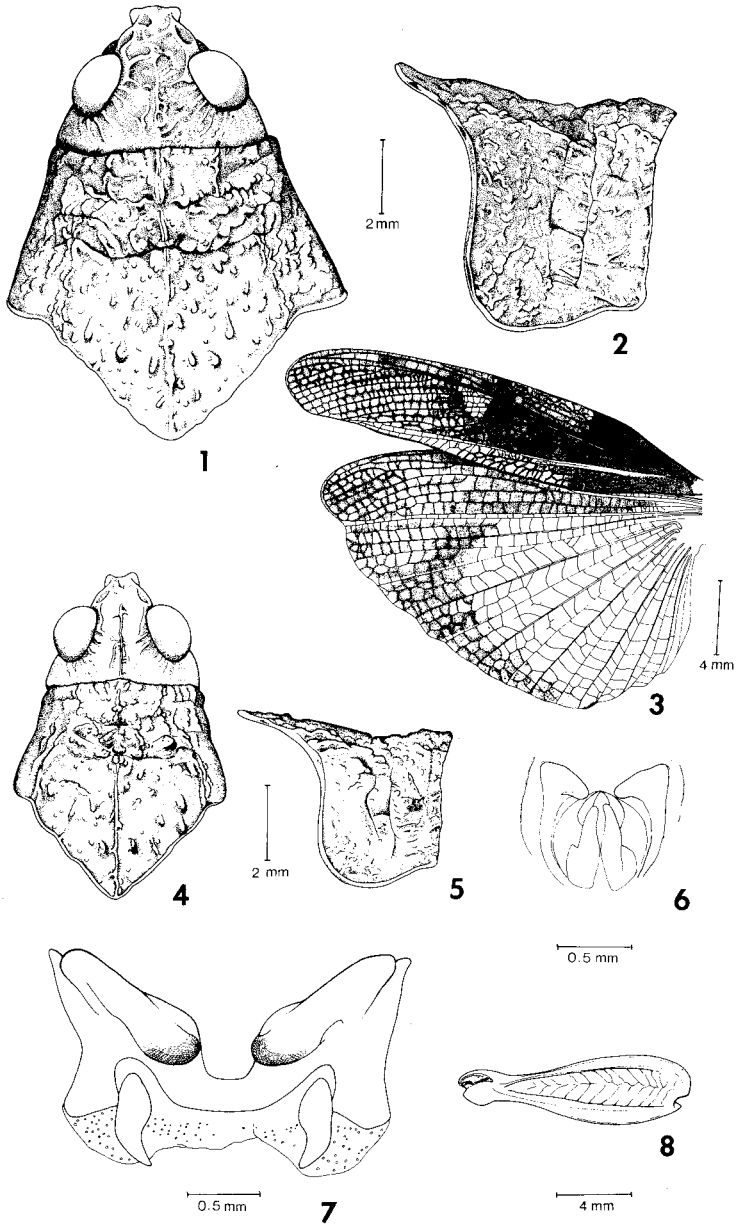
Agymnastus venerabilis, new species
(Figures 1-8)

HOLOTYPE MALE. CALIFORNIA: TUOLUMNE COUNTY: Dardanelle, 19 July 1961. D.C. Rentz collector. Holotype and allotype deposited in California Academy of Sciences, number 12772. Head highly rugose with margins of fastigium subparallel; fastigium of vertex deep, with short median carina; occiput with oblique ridges running from eye; frontal costa deep, narrowed dorsally, expanded mesad at bases of antenna, constricted again at base; eye small; antenna filiform, not at all flattened. Pronotum with median carina hardly definable, indicated on prozona which is tectately raised, mesozona with median carina completely obliterated, surface slanting distad, not raised as high as prozona, metazona with median carina indicated fairly well; lateral carinae faintly indicated on prozona as a series of coalesced tubercles; entire surface of pronotum with scattered large rugae; lateral lobe with sides parallel, surface somewhat rugose, metasternal interspace broad, at least 1½ times broader than long. Legs: hind femur without abnormal inflated development, inner and outer margins of hind tibia bearing 9 spines, apex with a pair of spurs, ventral surface with a pair of spurs on internal and external surfaces. Abdomen: apex of abdomen bulbate, cercus stout, straight, subconical, supra-anal plate almost smooth, longitudinal ridges indistinct; epiphallus (Fig. 7) with bridge narrow, ancorae elongate, directed dorsad and inward, anterior projections dorsally truncate and not extending above base of ancorae; lophi elongate, produced on internal margins, surface at that point highly granulate, anterior projections and dorsal margin of bridge connected by granulate membrane. Phallic complex (Fig. 6) with rami of cingulum hooklike, directed distad; dorsal valves of aedeagus stout, broad, apex blunt or slightly obtuse; apical valves produced basally, tapering to acute apex; apodemes straight, apices acute, not spatulate. Color: entire ground color of body dark brown, with faint tannish tinge; distal margin of pronotum rimmed with straw brown; tegmen with converging yellow stripes dorsally; field of tegmen mottled, always a light crescentic or quadrate mark mesad in distal third; wing intense yellow, opaque, brown band intensive, opaque, occupying entire distal edge exclusive of apical margin; spur long, narrow, extending almost to base of wing; outer pagina of hind femur with 3 faint black opaque bands; entire inner surface of hind femur dark black with bluish overcast except for subapical red annulus; hind tibia intense coral red throughout, no subapical annulus, spines black-tipped.

ALLOTYPE FEMALE. Same data as for holotype. Differs from holotype in following: size larger, form more robust; fastigium of vertex with poorly indicated transverse carina; metasternal interspace 3½ times broader than long; overall ground color grey, tegmen with light mottled areas as indicated for male; outer pagina of hind femur with only two small black areas.

Derivation of name. — This species is named after its importance in recognition of *Agymnastus* as a distinctive generic unit.

Variation. — Topotypes are variable to some extent in the rugulosity of the head and pronotum and coloration. Some males have the tegmina immaculate dark brown except for the dorsal stripes and light median mark. The tannish overcast of the type is overshadowed by the dark brown of darker specimens. The coral red color of the hind tibia is faintly present on both the fore and middle tibia of one of the topotypic males.



Figs. 1-8. Taxonomic characters in *Agymnastus venerabilis* Rentz, new species. Fig. 1. Head, pronotum, allotype female. Fig. 2. Lateral view pronotum, allotype female. Fig. 3. Left tegmen and wing, paratopotype male. Fig. 4. Holotype male, head and pronotum. Fig. 5. Holotype male, pronotum, lateral view. Fig. 6. Aedeagus. Fig. 7. Epiphallus, paratopotype male. Fig. 8. Hind femur holotype male.

	Sex	Length Body	Length Pronotum	Width Prono-tum	Length Hind Femur	Width Hind Femur	Length Tegmen
Holotype	♂	24.6	6.0	4.7	13.2	3.9	23.5
Allotype	♀	39.3	8.3	6.3	16.4	5.3	26.0
Paratopotype	♂	22.3	5.5	4.0	11.8	3.5	22.0
Carrville	♀	35.5	8.4	6.3	15.7	5.3	26.8
"	♀	35.3	8.8	6.5	16.6	5.5	28.8
"	♂	22.3	5.4	3.7	12.1	3.5	24.5
Big Bend Mtn.	♂	25.0	6.5	4.3	12.2	3.9	23.7
Iceberg Mdw.	♂	24.9	6.4	4.5	12.0	3.6	23.5
North Fork	♀	36.5	9.5	7.2	18.0	5.8	30.3
West Point	♀	33.9	10.0	6.6	17.2	5.8	29.9

Table 1. Measurements in mm of specimens of *Agymnastus venerabilis* n.sp.

Records. — CALIFORNIA, BUTTE COUNTY: Big Bend Mountain, 23.V.1928 (H.H. Keifer, 1♂, CDA). CALVERAS COUNTY: West Point, 8.VIII.1929 (–, 1♀, CAS). MADERA COUNTY: Trinity County; Carrville, 29-VI-1913, 30.V.1934, 30.V.1935, 23.VI.1931 (E.C. Van Dyke, 1♂, 3♀, CAS). North Fork, 11.VI.1933 (R.P. Allen, 1♀, CAS). TUOLUMNE COUNTY: Dardanelle, 19.VII.1961 (D.C. Rentz, holotype, allotype, 1♂, CAS). Iceberg Meadow, 7,000 ft. elev., 27.VI.1961 (M. Lundgren, 1♂, DCR).

Diagnosis. — Differs from *A. ingens* by its more slender appearance, smaller size, more rugose head and pronotum and less "inflated" outer face of the hind femur. Females are much less robust than those of *A. ingens* and are fully capable of flight.

Discussion. — *A. venerabilis* was found along Highway 108 in grassy meadows among giant granite boulders. The exact locality is along the Stanislaus River. *Cratypedes neglectus* (Thomas) was taken at the same time and could be confused with this species unless carefully examined. Field separation of the two species may be made by the color of the inner face of the hind femur. *C. neglectus* never has the internal surface black with a bluish overcast. Instead, it is brown and there are two straw brown annuli. Females of *A. venerabilis* are fully capable of flight and do so without hesitation. This is in contrast to the more coastal *A. ingens* (Scudder) which is totally flightless in that sex.

I have an additional undescribed species of *Agymnastus* before me from the California Academy of Sciences collection labelled "Siskiyou County, Cal." It is part of the A. Koebele collection. Because the specimens lack specific locality data, Koebele collection material sometimes bears questionable data, and the three specimens are females, they are not being described at this time. They are immediately recognizable as members of *Agymnastus* by the characters noted above. The species is more robust than *A. venerabilis* and females seem capable of flight. The tegmen is colored

as described for the type of *A. venerabilis*. The hind tibia, however, is yellow and the internal surface of the hind femur is black with a subapical yellowish annulus.

Idiostatus Pictet

Idiostatus Pictet, 1888, Mem. Soc. Phys. Hist. Nat. Geneva, 30:63. Type of the genus: *Idiostatus californicus* Pictet, by monotypy.

Rentz revised this genus in 1973 and later Rentz and Lightfoot (1976) added a new species from Oregon and provided additional notes. Subsequently, Mr. Kenneth Goeden of the Oregon State Department of Agriculture submitted for identification an additional undescribed species of *Idiostatus* (in the Apollo Group) from Oregon. His collection also included specimens of *I. apollo* Rentz and extends the known range of that species into southern Oregon.

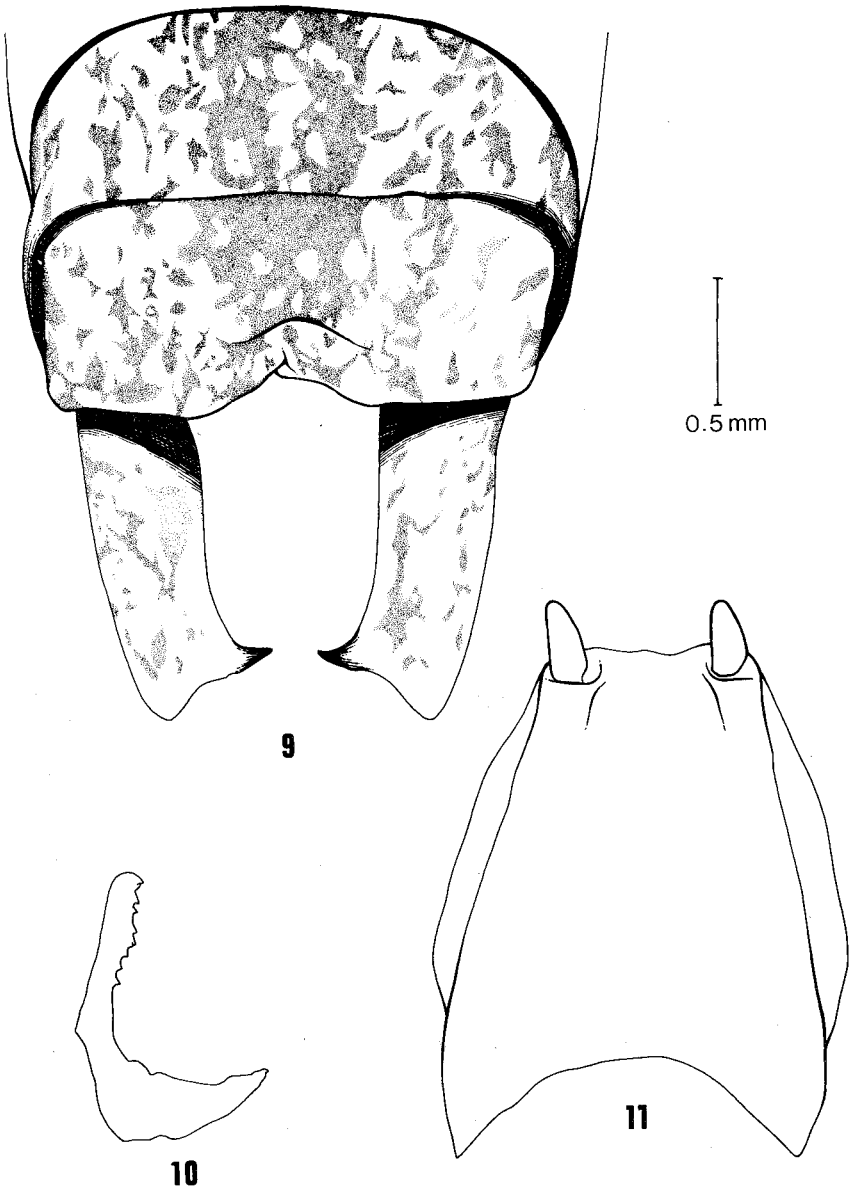
Mr. Goeden's collection notes indicate that both species, *I. apollo* and *I. goedeni*, new species, are rare in nature and could be easily overlooked because of their small size. There is also some suggestion that these species occur late in the year and are not present in consecutive years at a given locality. Many miles of night driving and searching were required before the small series was secured.

Idiostatus apollo Rentz
(Figures 9-11)

Idiostatus apollo Rentz, 1973, Mem. Amer. Entomol. Soc., 29&136. Type locality: 7-9 miles East of Cedarville on Highway 299, 4,700 ft. elev., Modoc County, California. Holotype deposited in California Academy of Sciences, number 10,491.

This rare species was described from northeastern California with records from north of Reno to northwest Nevada, adjacent to its distribution in California. The records presented here extend the range of the diminutive species considerably. The record from Abert Lake region is of interest because the author visited the area in September 1968 and did not find the species. The area was also searched in 1974 and 1975 by D.C. Lightfoot while studying and collecting *I. chewaucan* Rentz and Lightfoot but no *I. apollo* were ever found. The tendency for desert-inhabiting *Idiostatus* species to not be found in consecutive years in certain localities is repeated over and over again (see Rentz, 1973, Rentz, and Lightfoot, 1976). *I. apollo* is apparently such a species.

Records. — OREGON: Lake County: Adel, 6 miles east, 14.VIII. 1974 (K. Goeden, 2♂, ODA). Abert Lake, north end, junction highway 395 and Paisly road, 2.VIII.1976 (K. Goeden, 1♂, last instar 1♀, ODA).



Figs. 9-11. Diagnostic structures in *Idiostatus apollo* Rentz, all drawn from male, 6 mi. E. Adel, Oregon. Fig. 9. Apex of abdomen, male. Fig. 10. Right arm titillator. Fig. 11. Subgenital plate.

Idiostatus goedeni, new species
(Figures 12-16)

HOLOTYPE MALE. OREGON: Klamath County: 4 miles northeast of Olene, 25.VIII.1971. K. Goeden collector. "In sagebrush". Holotype and allotype deposited in California Academy of Sciences, number 12,773.

Size small for genus, larger in size than *I. apollo*. Head with fastigium of vertex well produced, more truncate than in *I. apollo*; eye not as bulging, positioned lower on head. Thorax: pronotum with anterior sulcus more distinct, heavily engraved on shoulders, obsolete mesad; metazona with slight depression mesad. Fore tibia armed on dorsal surface with 2 spines on posterior margin, anterior margin unspined; middle tibia armed on dorsal surface with 2,3 spines on anterior margin, posterior margin with 4 spines; hind tibia with internal ventral apical spur long, three-quarters length of metatarsus. Abdomen: tenth tergite with median portion inflexed; cercus subquadrate in form, outer toe absent, internal tooth apical; titillators with arm long, without distinct teeth; subgenital plate with apex narrow, shallowly V-shaped, styles short. Coloration: ground color basically dark brownish, very similar to that described for *I. apollo*; dorsum of abdomen with 3 distinct longitudinal stripes; head striped dorsally, pronotum with lateral lobes dark, dorsal portion of disc pinkish, the lateral margins emphasized with white, posterior ventral portion of lateral lobe and veins of tegmen white; cells between tegminal veins dark smoky brown; femora and tibiae speckled, without annuli; outer pagina of hind femur speckled, without longitudinal stripe.

ALLOTYPE FEMALE. Same data as holotype. Similar to holotype except anterior sulcus of pronotum more deeply engraved. Subgenital plate with moderately narrow median incision, lateral lobes rounded; cercus conical, straight, apex subacute. Ovipositor slightly upcurved, dorsal surface with cutting edge minutely serrate.

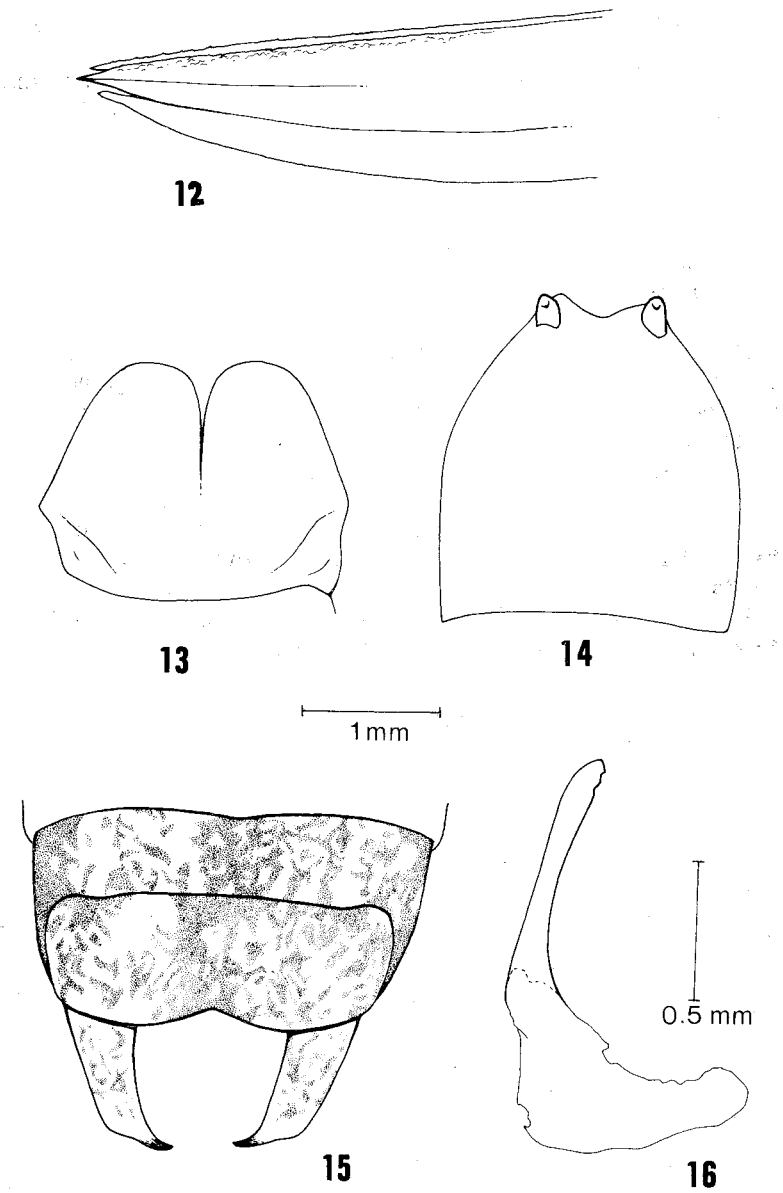
Records. — OREGON: Klamath County: Olene, 4 mi. northeast, 25.VIII.1971 (K. Goeden, holotype, allotype, 2♂ paratypes, CAS, ODA). Siskiyou County: 4 mi. southeast Malin, 21.VIII.1970 (R.L. Westcott, 1♂ paratype, ODA).

Variation. — The single male from near Malin, Oregon is significantly smaller in size than those from the topotypic series. However, the genitalia are similar enough to consider this specimen as *I. goedeni*. The topotypic series of males is uniform in the critical characters. The coloration of all specimens is dark grey brown with a purplish broad longitudinal stripe. No light brown specimens have been collected.

Diagnosis. — Recognized as a member of the Inyo Group (see Rentz, 1973: 134) by the small size, contrastingly-colored male tegmen without distal spot. As with its relative *I. apollo* Rentz, *I. goedeni* Rentz, new species is rare in nature and nocturnal. Males differ from *I. apollo* in lacking a distinct outer "toe" of the cercus (compare Figs. 9,15) and in slightly larger size and darker coloration. The titillator (Fig. 16) is toothed only at the tip. Females are slightly larger than those of *I. apollo* and the ovipositor is distinctly but minutely serrate on the dorsal and ventral margins. In *I. apollo* it is smooth.

	Total Length	Length Pronotum	Width Pronotum	Length Hind Femur	Length Exposed Tegmina	Length Ovipositor
Holotype	16.2	4.2	2.8	14.1	2.3	
Allotype	18.0	4.9	2.6	17.6		14.2

Table 2. Measurement in mm of specimens of *Idiostatus goedeni* n.sp.



Figs. 12-16. Diagnostic structures in *Idiostatus goedeni*, new species. Fig. 12. Ovipositor, allotype female. Fig. 13. Subgenital plate, allotype female. Fig. 14. Subgenital plate, holotype male. Fig. 15. Apex of abdomen, holotype male. Fig. 16. Right portion of titillator, holotype male.

Discussion. — The topotypic series was taken during the day in a sagebrush-juniper association. The collector states that the series was actually taken on shadscale, *Atriplex confertifolia* (Torr. and Frem.) Wats. not sagebrush as indicated on the label. Much searching was required before the small series could be obtained.

Idiostatus inermoides Rentz

Idiostatus inermoides Rentz, 1973, Mem. Amer. Entomol. Soc., 29:77. Type locality: 1.5-4.5 miles west of Denio junction on Highway 140, Humboldt County, Nevada. Elevation 1460 feet. Holotype male in California Academy of Sciences, number 10,487.

This species was described from a single locality in Nevada. Notes on its biology reveal that it has a preference for greasewood, *Sarcobatus vermiculatus* (Hook.) Torr. Rentz and Lightfoot (1976) recorded *I. inermoides* from Harney County, Oregon during the 1974 and 1975 seasons. The records listed below indicate that the species, which is another which may not be present at a given locality in consecutive years, was present in the same area of southern Oregon from 1972-1975. The specimens listed below were collected in shadscale, *Atriplex confertifolia* (Torr. and Frem.) Wats.

Records. — OREGON: Harney County: Denio, 10 mi. NE, 15.VIII.1972 (K. Goeden, 1♂, 1♀, CDA). Fields, 12 mi. S. 15,VIII.1973 (K. Goeden, 1♂, ODA).

Idiostatus martinellii Rentz

Idiostatus martinellii Rentz, 1973, Mem. Amer. Entom. Soc., 29:119. Type locality: 7-9 miles east of Cedarville on Highway 299, Modoc County, California. Holotype male in California Academy of Sciences, number 10,489.

This is the first record of the species from Oregon. Rentz, (1973: 122-123) cites particulars concerning the distribution and bionomics of the species in northeastern California and adjacent Nevada.

Record. — OREGON, Lake County: Adel, 10 mi. SE, 15.VII.1976 (K. Goeden, 3♂ 1♀, ODA), in shadscale in association with *I. apollo* Rentz.

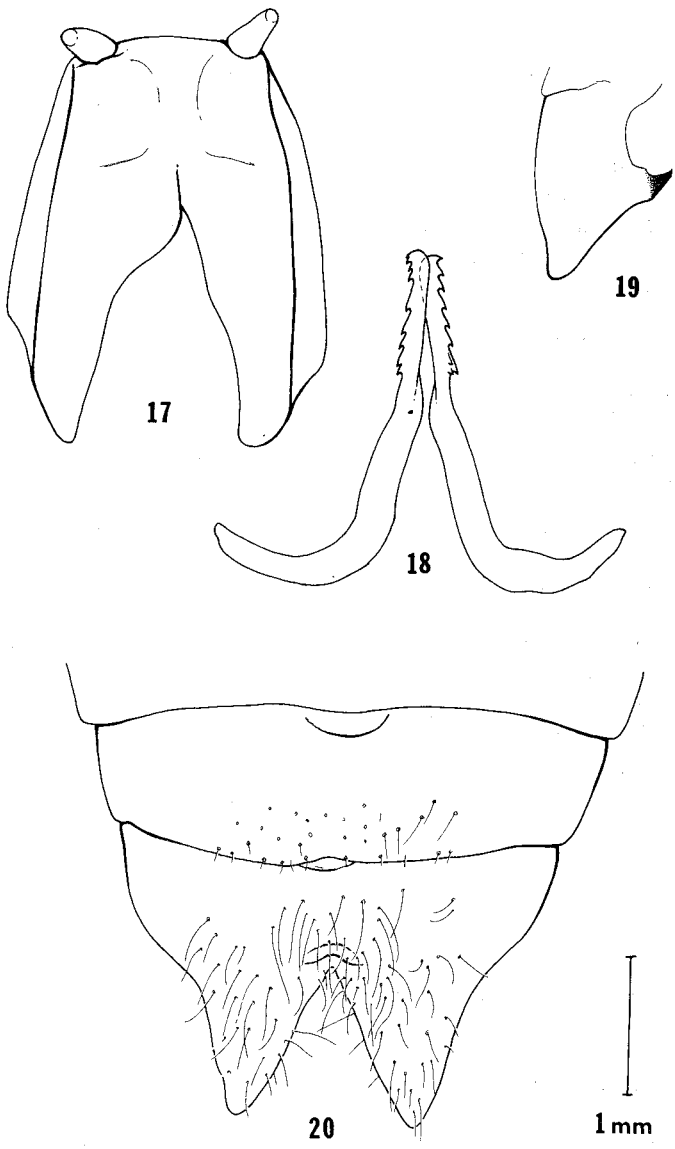
Eremopedes (Eremopedes) ateloploides (Caudell) (Figures 17-20)

Stipator ateloploides Caudell, 1907, Proc. U.S. Nat. Mus., 32:350. Type locality: San Jose del Cabo, Baja California, Mexico. Holotype female, last instar, deposited in U.S. National Museum, number 10,172.

Pediodectes ateloploides, Rehn and Hebard, 1916, Trans. Amer. Entomol. Soc., 42:45.

Eremopedes (Eremopedes) ateloploides, Rentz, 1972, Proc. Acad, Nat. Sci. Phila., 124:55.

This species was described from a last nymphal instar female and has been known only from immature specimens. The specimen



Figs. 17-20. Diagnostic structures of male *Eremopedes (E.) atelo-ploides* Caudell. Fig. 17. Subgenital plate. Fig. 18. Titillator. Fig. 19. Left cercus. Fig. 20. Apex of abdomen, cerci hidden.

reported here is the first adult and first male ever seen. As noted previously (Rentz 1972:55), *E. (E.) anteloploides* shows certain similarities with the mainland Mexican *E. (E.) colonialis* Rentz in that all femoral carinae are armed on the ventral surface with large, stout teeth. Such a condition is unique in the genus. It can now be said that the last abdominal segment of males, including cerci and tenth tergite, is also very similar in the two species.

The coloration of the male is almost precisely as seen in the photograph of the immature type (Rentz, 1972: 55, Figs. 6,7).

Description of male. Head with eye situated high, very large, round, moderately protruding; fastigium of vertex moderately produced, about as broad as first antennal article, weakly longitudinally sulcate. Thorax: pronotum rather smooth, not glabrous, transverse sulcus present on prozona, moderately deeply engraved. Obsolete mesad for a short distance; surface of disc with V-shaped median impression indicated solely by color; anterior margin of disc feebly emarginate, posterior margin truncate; surface of disc entirely without any trace of median or lateral carinae. Prosternum armed with a pair of widely separated peg-like processes; mesosternal lobes acutely produced, much more so than metasternal lobes which are low and rounded; thoracic auditory structure elongate, half concealed by lateral pronotal lobe. Appendages: fore tibia armed dorsally with 3 equally spaced spines on posterior margin, anterior margin unarmed, ventral surface bearing 6 spines on both margins; fore femur armed on ventral surface only on internal margin with 1,2 teeth, genicular lobe armed only on internal surface; median tibia armed on dorsal surface with 2 spines on anterior margin, positioned medially, posterior margin with 4 evenly spaced spines, ventral surface bearing 6 spines on both margins; median femur armed on ventral surface on anterior margin only with 2,3 teeth positioned distad, both genicular lobes armed, the internal lobe with 2 teeth; posterior tibia armed dorsally with a great many spines of alternating lengths, ventral surface with 7 evenly distributed spines on both margins; apex of hind tibia armed dorsally with a pair of stout spurs of equal lengths, positioned somewhat subapically, ventral surface with 4 spurs positioned apically, the internal of which is the longest, two-thirds as long as adjacent metatarsus; plantula quadrate in outline, about half as long as metatarsus; posterior femur armed ventrally on outer margin with 5,7 teeth distributed in distal half, internal margin with 5 teeth positioned as above, genicular lobes unarmed. Tegmina slightly protruding beyond pronotum, veins heavy but not appreciably raised. Abdomen: tenth tergite rather deeply incised (Fig. 20), with V-shaped incision, very hirsute between the projections; cercus with single internal tooth, preceded by a distinct swelling; subgenital plate (Fig. 17) without a distinct median incision; titillators (Fig. 18) with arms convergent, heavily toothed on external margin. Coloration: ground color washed greyish brown, dorsum with broad lighter brown, contrasting median longitudinal stripe; lateral pronotal lobes darker, intensified medially; tegmen with veins very light, cells of lateral portion jet black, those of median portion straw brown; fore and median femora with ill-defined subapical annulus, hind femur plain, without annuli or markings on outer surface.

Record. — MEXICO, BAJA CALIFORNIA: SUR, Bahia El Coyote, 12.VIII.1968 (R. Bandar, 1♂, CAS).

Measurements. — Total length 25.0; pronotum, length 7.0, width 4.5; length hind femur 18.9.

Stenopelmatus Burmeister

Stenopelmatus Burmeister, 1838, Handbuch der Entomologie, 2:720.

Jerusalem crickets of the genus *Stenopelmatus* attract attention wherever they occur because of their size and ferocious appearance.

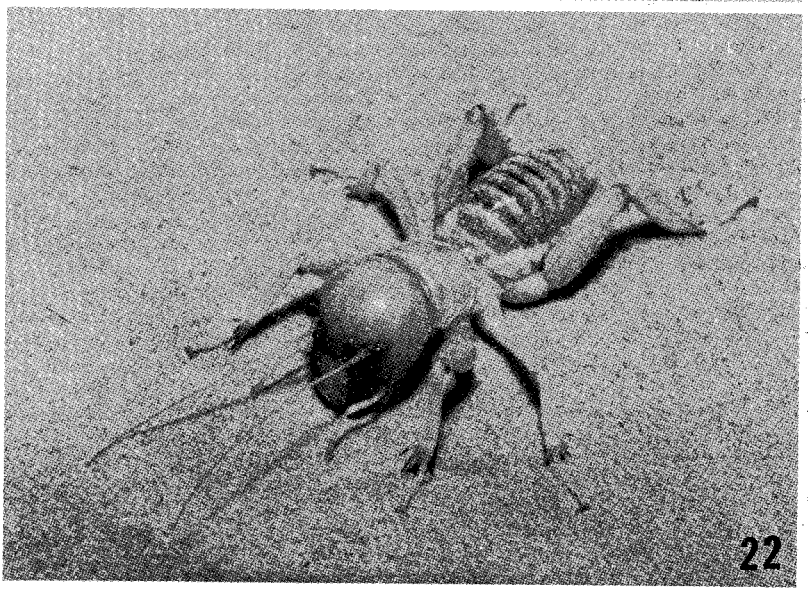


Fig. 21. Moenkopi dunes, habitat of *Stenopelmatus navajo*, new species. Fig. 22. Living male, *S. navajo*.

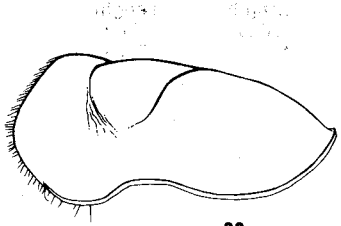
As a result there are a great many specimens in collections, although most are immature and not of great use in taxonomic studies (Tinkham and Rentz 1969).

The discovery of a large undescribed species apparently endemic to a system of isolated sand dunes in northern Arizona is of great interest. This species is very large and immediately recognizable as different because of its pale, almost white coloration (Fig. 22). *S. fuscus* (Haldeman), the widespread species typically found in northern Arizona, occurs on the periphery of the dunes and may venture onto the dunes at times. *S. navajo,* new species, is probably most closely related to *S. fuscus* since the spination of the legs is almost identical between the two species. *S. navajo* is larger than any individuals of *S. fuscus* seen from the periphery of the dunes. The pale coloration of the new species is of obvious protective value when the crickets are foraging on the dune's surface.

Stenopelmatus navajo, new species
(Figures 21-30)

HOLOTYPE MALE. ARIZONA: Coconino County: 3.1 miles southwest of Moenkopi, 17 July 1975. F.G. Andrews, A.R. Hardy collectors. Holotype, in alcohol, deposited in California Academy of Sciences, number 12,775 through courtesy of California State Department of Food and Agriculture. Head megacephalic, depth of head from occiput to apex of mandibles (16.5 mm), greatest width of head (13.0). Eye inverted pyriform, prominent. Thorax: pronotum ampliate forward, lateral margins broadened at ventral projecting edge; in lateral profile, pronotum not appearing especially humped, anterior suture marked; anterior margin of pronotum emarginate, fringed with decurved hairs, posterior margin obtuse. Abdomen: supra-anal plate minute, triangulate (Fig. 25), uncinate hooks prominent at lateral bases; cercus erect, pubescent, cylindrical; subgenital plate (Fig. 24) with apex broad, truncate, with minute median projection. Legs: forelegs with femur in lateral profile with upper margin arcuate, ventral margin straight; fore tibia unspined dorsally, apical calcars typical, 3 inner long, 2 outer short, dorsal external the shortest; ventral surface of fore tibia with 2 staggered apical calcars, distal one slightly longer. Middle femur typical; middle tibia with 5 calcars, much smaller than those of fore tibia, preceded by a single spine of similar size situated mesad on dorsal surface; ventral surface with a pair of subapical spurs positioned at base of calcars III and IV. Hind legs typical in form; hind tibia with 6 apical calcars increasing in size gradually from outer-external to innermost calcar; dorsal surface with 3 outer stout spines, 5 inner spines much more widely spaced, the first placed beyond middle of tibia; number II calcar subequal to number III but same length as number I; ventral surface of tibia with a pair of subapical spines, the innermost much the longer, situated opposite calcars III and IV. Setation: vestiture sparse, hind tibia with a row of close-set setae on dorsal margin of outer surface, the ventral margin of internal surface with similar row of setae; outer surface of hind femur with a row of widely spaced setae on dorsal margin, ventral margin

Figs. 23-30. Diagnostic structures in holotype male *Stenopelmatus navajo* new species. Fig. 23. Lateral view pronotum. Fig. 24. Subgenital plate. Fig. 25. Apex of abdomen. Fig. 26. Lateral view apex of abdomen. Fig. 27. Head. Fig. 28. Right hind tibia. Fig. 29. Middle tibia. Fig. 30. Fore tibia.



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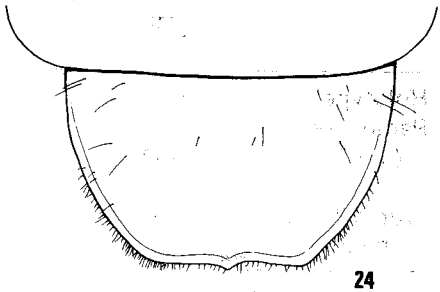

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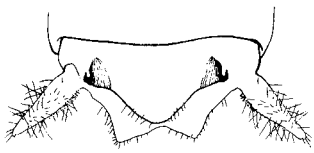

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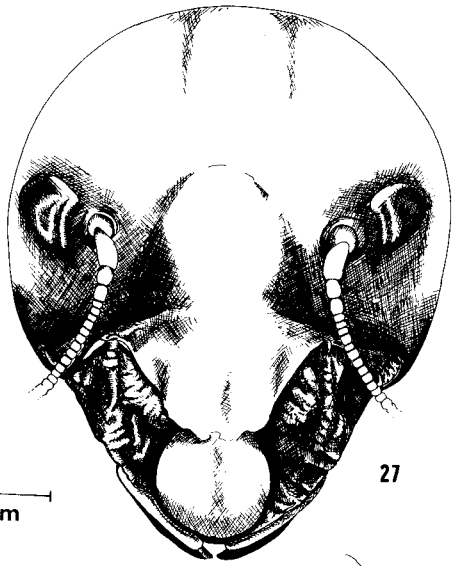

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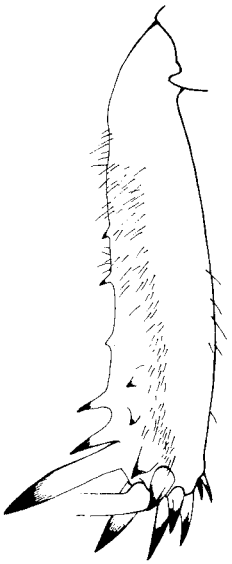
4mm



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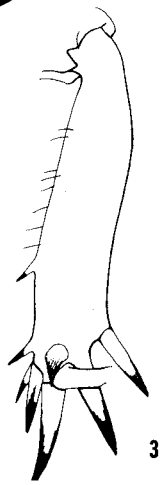

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	Length Body	Length Pronotum	Length Hind Femur	Length Hind Tibia
Holotype	45.3	9.6	13.5	12.0
Paratypes (n = 7)	32.0-41.0	7.0-9.0	10.2-12.8	10.0-12.0

Table 3. Measurements in mm of specimens of *Stenopelmatus navajo* n.sp.

with much more dense row of setae; cercus sparsely setose, inner surface with a shorter, more densely packed coat of setae; supra-anal plate with 10 elongate setae positioned around periphery; entire abdomen sparsely setose, the setae more concentrated at lateral margins, especially near spiracles. Coloration: ground color pale whitish; bands of abdomen very pale brown; head and pronotum pale whitish except mandibles and genae dark brown; eye darker brown; legs concolorous pale whitish, spines all with apices dark brown.

Records. — ARIZONA: Coconino County: Moenkopi, 2.4 mi., and 7.6 mi. southeast, 3 July 1972, 17.VII, 1975, F.G. Andrews, E.A. Kane, A.R. Hardy, 7♂, 3 first instars, (CAS, CDA).

Diagnosis. — Size very large for genus. Ground color whitish, bands of abdomen very pale brown. Spination of legs very similar to that described for *S. fuscus* (Haldeman) in Tinkham and Rentz (1969).

Discussion. — No adult females have been discovered. The entire type series consists of males as indicated above. Such is unusual among Jerusalem crickets where most collections contain females and juvenile males, (Tinkham and Rentz 1969). Experience with species in the genus from central California indicates that adult and subadult males of *Stenopelmatus* bear hooks at the base of the cerci. To date there are no known external characters to definitely recognize adult males. The type of *S. navajo* was selected because it bears the hooks at the base of the cerci and is the largest specimen in the type series.

F.G. Andrews (pers. comm.) states that the first locality listed above is a sand ridge running north and south along Highway 264; the other locations are an immense sand dune area extending many miles. The two dominant shrubs are greasewood (*Sarcobatus* sp.) and mormon tea (*Ephedra* sp.).

The activity of the Jerusalem crickets begins at dusk when individuals can be seen searching the sand from bush to bush. According to Andrews, this activity extends into the early morning hours. Their pale coloration renders them difficult to see on the dunes except when moving. When disturbed, the crickets rapidly burrow in the sand where they are difficult to locate despite their large size.

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