

The Chisosensis Group

G. chisosensis Weissman & Gray, n. sp. and *G. veletisoides* Weissman & Gray, n. sp.

Geographically distant but genetically closely related 4-5 pulse chirping species (Figs 189, 190), separated by pulse rate, geography, and DNA (Fig. 191); closely related to *G. montis* genetic Clades 2 and 3 which are geographically intermediate.

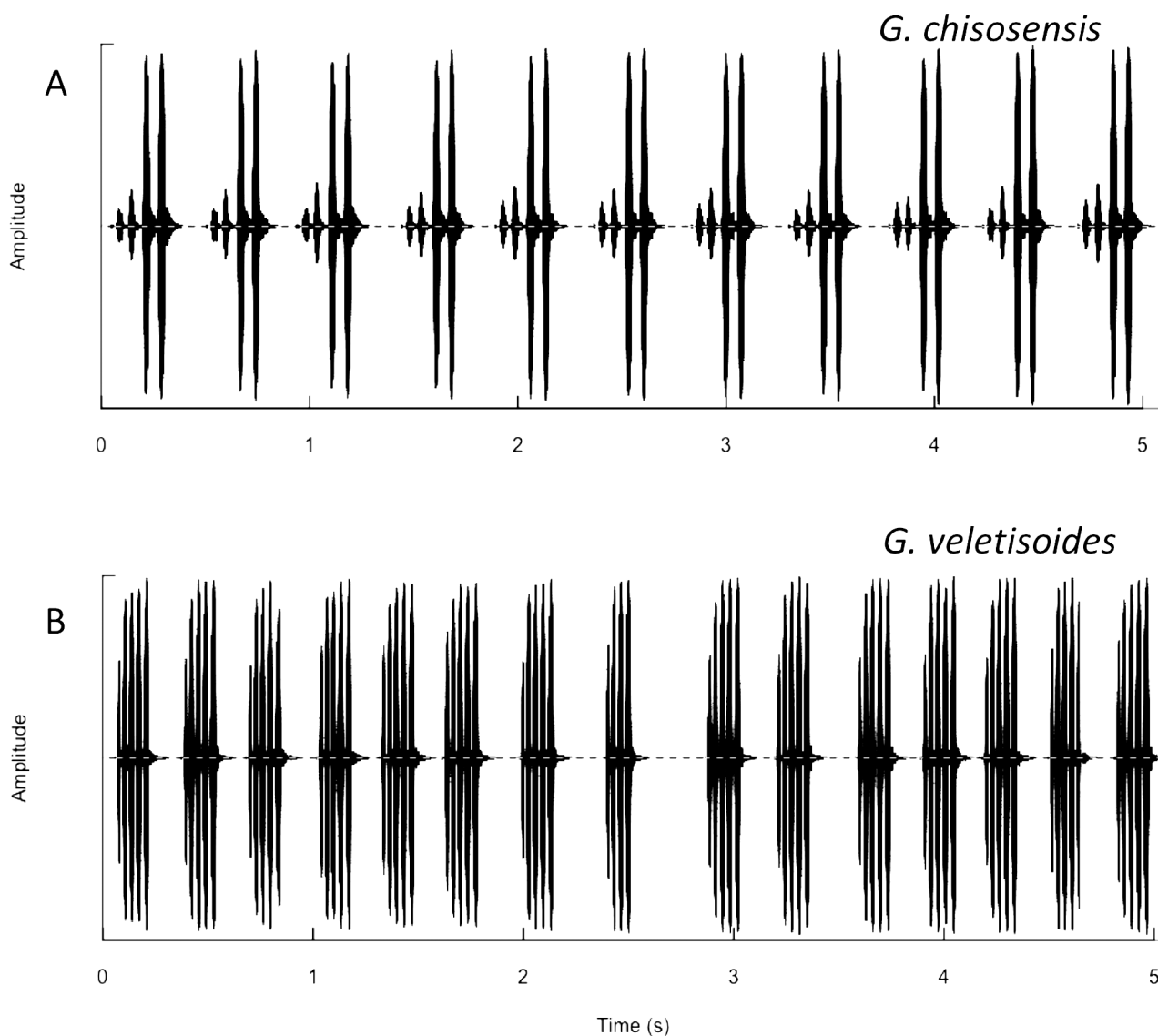


FIGURE 189. Five second waveforms of calling songs of (A) *G. chisosensis* and (B) *G. veletisoides*. (A) *G. chisosensis*: holotype male, at 24°C; (B) *G. veletisoides*: (R06-21) type locality (S06-30), at 25°C.

Gryllus chisosensis Weissman and Gray, n. sp.

Chisos Mountains Field Cricket

Figs 189–194, Table 1

Distribution. Known only from the Chisos Mountains in Big Bend National Park, Texas.

Recognition characters and song. A sky island, rock associated, completely black except for inside of hind femur (Fig. 192), long cerci probably always longer than ovipositor in situ, always short hind winged cricket. *Song* (Fig. 193, R07-116) a chirp of 4-5 p/c, 90-150 c/m, PR 14-17 at 25°C. Separated from morphologically similar *G.*

longicercus, whose nearest populations are in the Chianti Mountains, just south Shafter, Presidio Co., (or ~116 air km NW of the type locality) by the following: while both taxa have long cerci, > 168 teeth, and associated with rocky habitats, *G. longicercus* generally has more teeth/mm and is not usually found in pinyon-juniper oak woodlands but in open, rocky Sonoran and Chihuahuan desert scrub habitats. The pulse rate in all western *G. longicercus* is typically <14 at 25°C while it is >14 in *G. chisosensis*. This higher pulse rate is approached by some Mt. Lemmon (R90-180, R90-235, R94-76, R09-132, R12-48), and Tucson (R90-240), Arizona, *G. longicercus* but not quite equaled. Even a male *G. longicercus* from Mountainair, New Mexico (S15-52, R15-341), with only 155 file teeth, fewer teeth than any of the 5 males of *G. chisosensis*, sang with a PR of 10.8. But, perhaps most importantly for these isolated crickets, is that their 16S, ITS2, and multilocus DNA profiles are significantly different from that seen in all populations of *G. longicercus*. Also, morphologically similar to sympatric, and more widespread and common, *G. transpecos* but separated (Table 1, p. 18) by no overlap in number of teeth and PR and minor overlap in teeth/mm and cerci length. The latter two taxa are also separated by microhabitat in that *G. chisosensis* prefers deep piles of rocks while *G. transpecos*, while preferring rocky habitats like rocky road cuts, is not associated with deep rock piles. The difference in pulse rate is apparent, in the field, between these three taxa, with *G. chisosensis* somewhat in between the PR of *G. longicercus* and *G. transpecos*.

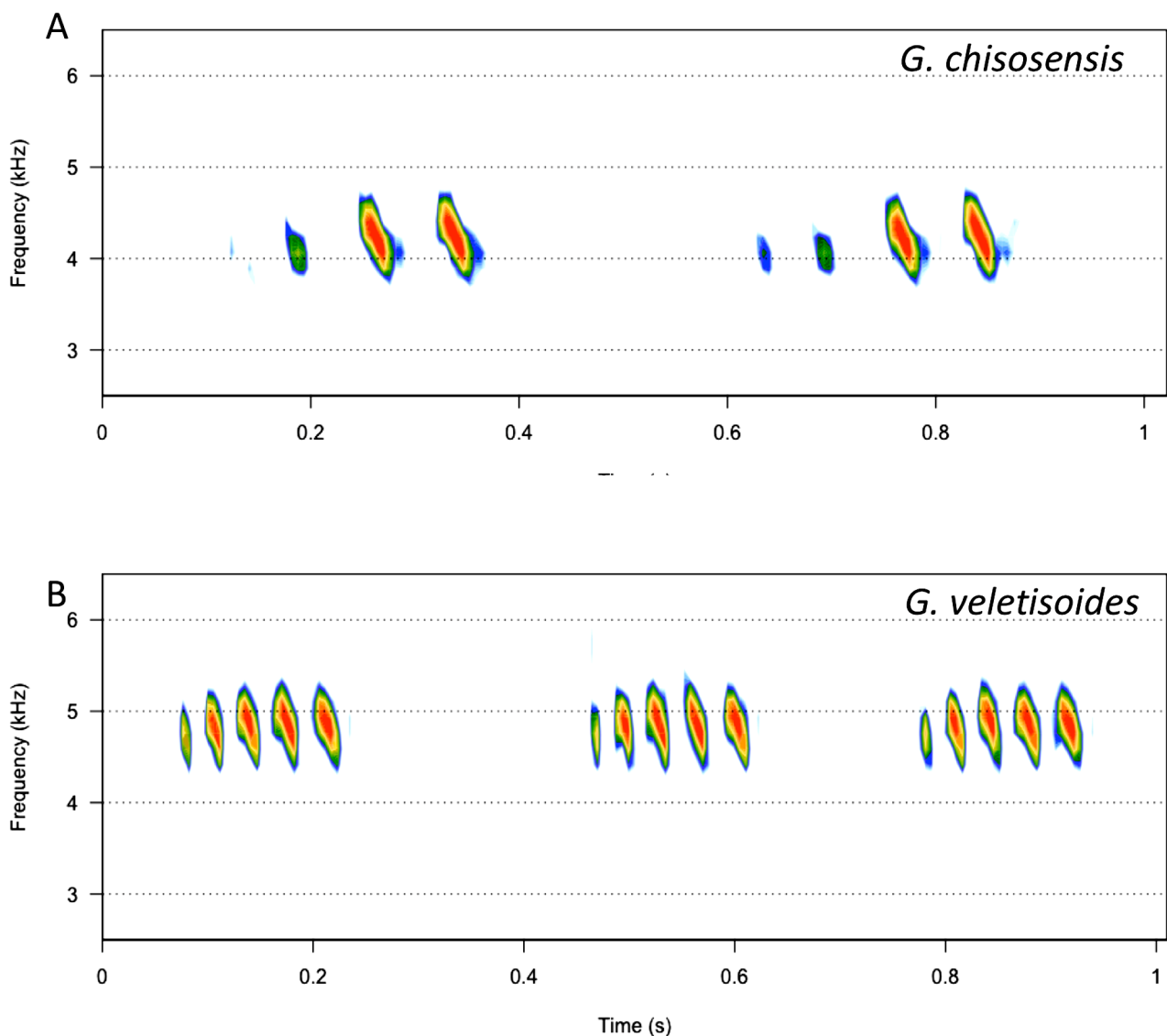


FIGURE 190. One second spectrograms of calling songs of (A) *G. chisosensis* and (B) *G. veletisoides*, same males as in Fig. 189.

Tree scale: 0.001

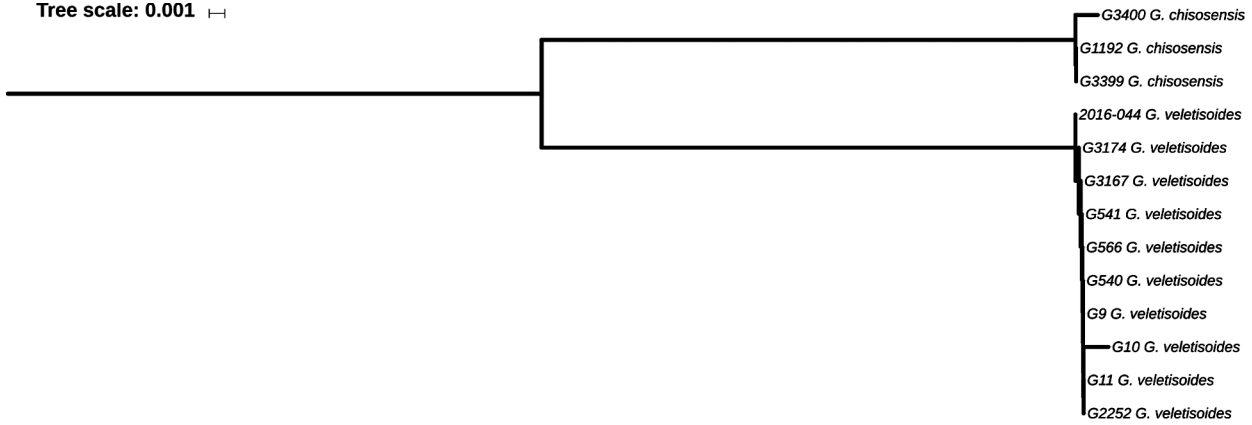


FIGURE 191. ITS2 gene tree. Collection stop numbers for *G. chisosensis*: S07-36 (G1192); S16-13 (G3399, G3400). Collection stop numbers for *G. veletisoides*: S03-21 (G9, G10); S03-23 (G11); S06-30 (G540, G541, G566); S12-41 (G2252); S15-81 (G3167, G3174, 2016-044).



FIGURE 192. Holotype male (left) of *G. chisosensis*. Female (right) from near type locality in Big Bend National Park (S16-13).

Holotype. Male (Fig. 192). USA. Texas. *Brewster Co.*, Big Bend National Park, Basin Junction Road, near Lost Mine Trail, 12-vi-2007, 5460', 29° 16.471' -103° 17.211', S07-36, R07-116, G1192, right tegmen removed, 192 teeth, BL 18.32, HF 11.81, left cercus 17.71. Deposited at CAS, Entomology type # 19225. GenBank accession numbers: 16S = MK446451; ITS2 = MK441857.

Paratypes. (4♂ 1♀) **Texas.** *Brewster Co.*, Big Bend National Park, tunnel 18.7 m SE Panther Junction, 9-vi-1985, 2057' 29° 12' 08.04" -102° 58' 38.87" (S85-57) 1♂; 5-vi-1991 (S91-42) 2♂. Basin Junction Road, 28-v-2016,

5555', 29° 16' 37.68" -103° 16' 59.95" (S16-13) 1♂, 1 last instar female (molt to adult 6-vi-2016).

Song records only. Type locality, 5-vi-1991 (S91-41) 1♂.

Derivation of name. Named after the Chisos Mountains, a sky-island mountain range that is the only known locality.

Geographic range. (Fig. 194). Restricted to the Chisos Mountains in the Big Bend region of Texas.

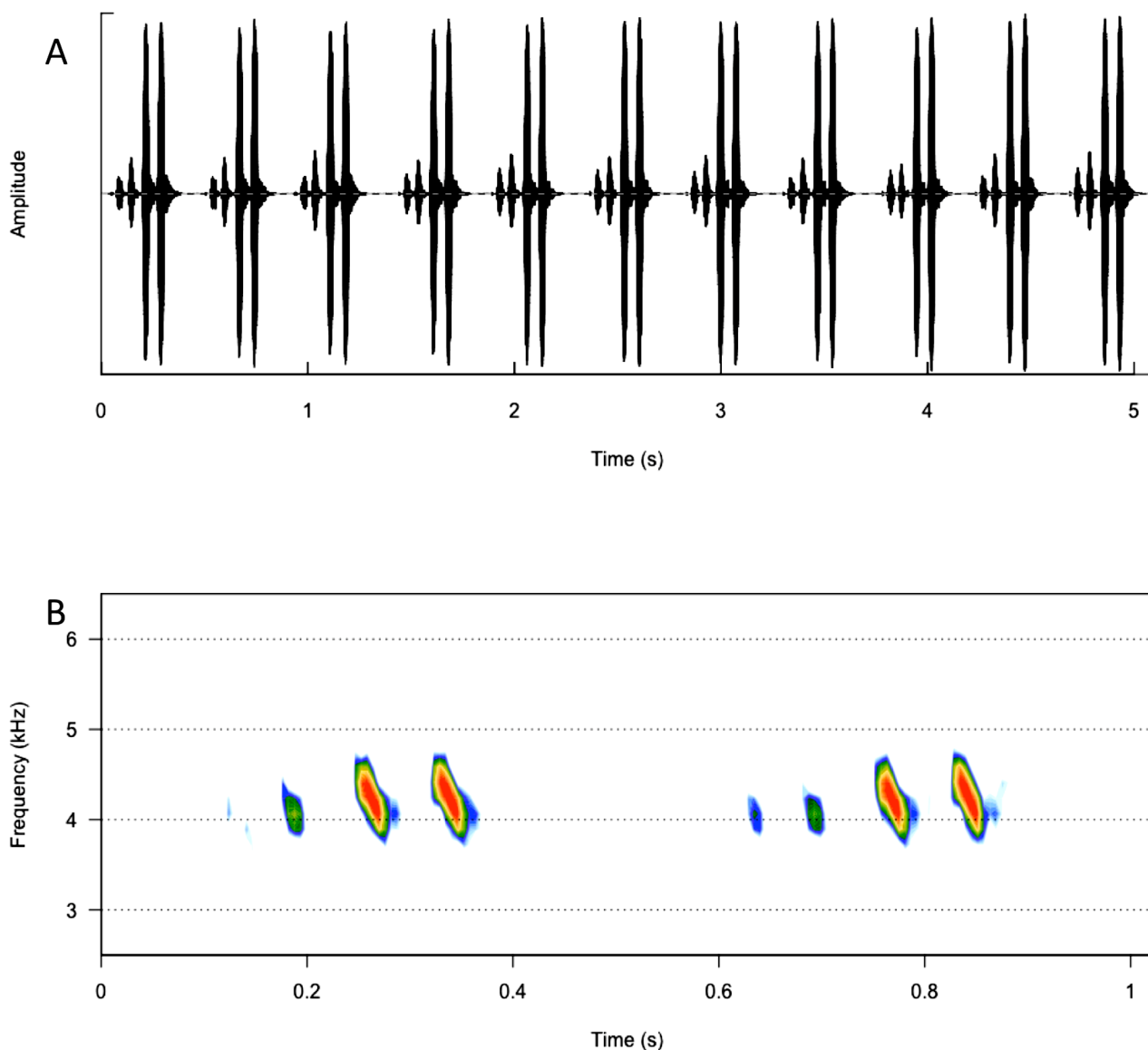


FIGURE 193. Calling song (R07-116) of holotype *G. chisosensis*, recorded at 24°C. Top: 5 s waveform; Bottom: 1 s spectrogram. Note that in this recording, the first two pulses are much quieter than the last two pulses. The four additional recordings that we have of *G. chisosensis* males also show a similar pattern (R85-134 [S85-57]; R91-71 & R91-129 [S91-42], R16-27 [S16-13]). It is fairly common in *Gryllus* for the first few pulses to be of lower amplitude than the last pulses, so we caution that, even if typical for this species, this is not a diagnostic feature.

Habitat. Pinyon-Juniper oak woodland, usually in extensive rock piles on talus slopes. The immediate area around the tunnel on the road to Rio Grande Village is not tree associated, or with talus slopes, but the pulse rate in the 3 males collected there agrees with that from around the type locality. Unfortunately, given the age of the material, no DNA was available for comparison.

Life cycle and seasonal occurrence. Egg diapause not checked but we assume not present. Probably one generation/year. Singing adults only known from May 28th until June 12th as collecting limited. Our only collected female was a last instar on 28-v-2016. No males heard at the tunnel 30 km SE Panther Junction on 28-v-2016 nor attracted to oatmeal.

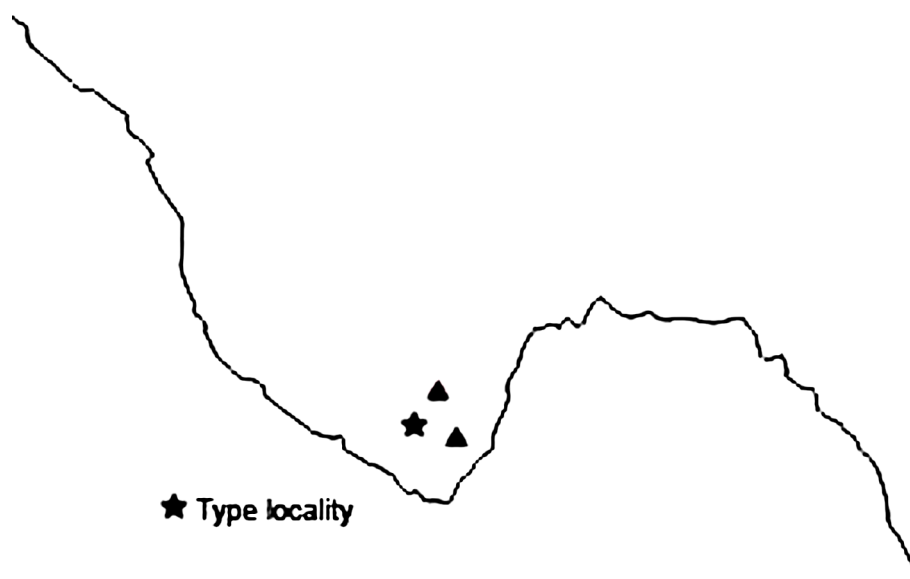


FIGURE 194. Known distribution of *G. chisosensis*.

Variation. Nothing of note in the small series collected by us.

DNA. Multilocus G3400 maps by itself (Gray *et al.* 2019) but associated with the Lineaticeps Group and *G. veletisoides*. ITS2 (Fig. 191) also places *G. chisosensis* near *G. veletisoides*. Despite phenotypic, ecological, and song similarity, *G. chisosensis* and *G. longicercus* are not especially closely related: genetic similarity using Tamura-Nei distances for ITS2 was 98.8 ± 1.02 within *G. chisosensis* ($n = 3$), and 98.9 ± 0.69 within *G. longicercus* ($n = 16$), but only 85.3 ± 0.28 between species [Note: ITS2 distances are heavily influenced by repeat regions and gaps; 85% similarity in ITS2 is not equivalent to 15% sequence divergence in coding DNA].

Discussion. In the field, the pulse rate of *G. chisosensis* never sounded slow enough for *G. longicercus*, despite the appropriate rocky habitat, long cerci, and high number of file teeth. Only after uncovering initial significant differences in 16S (ca. 3.4% sequence divergence) and ITS2, with later agreement from multilocus analysis (Gray *et al.* 2019), coupled with its sky island habitat, did we decide to call this a species endemic to the Chisos Mountains. The slower pulse rate could also be distinguished from sympatric *G. transpecos* when both found together at the type locality and at the northwest end of the tunnel 30 km SE Panther Junction (S85-57 and S91-42). This cricket is never common and where found, is difficult to collect since it retreats into the deep rock piles from whence it may continue to sing while rocks are being moved, a behavior seen in other rock-chirping species.

The Chisos Mountains are home to at least two other described endemic orthopteroids: the walking stick *Diapheromera torquata* Hebard and the katydid *Paracyrtophyllus excelsus* (Rehn and Hebard).

***Gryllus veletisoides* Weissman & Gray, n. sp.**

West Coast Spring Field Cricket

Figs 137, 138, 189–191, 195–200, Table 1

‘G. VII’ of Weissman & Rentz 1977a.

G. veletis of Weissman *et al.* 1980.

G. veletis and ‘G. western veletis’ of DBW notebooks.