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A NEW GENUS — HEBENARUS — AND THIRTEEN NEW SPECIES OF LEAFHOPPERS CLOSELY RELATED TO CLOANTHANUS (Homoptera, Cicadellidae)

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In working over the species of leafhoppers collected in Mexico, which belong to the *Platymetopius* groups, some 50 species have been placed in the genus *Cloanthanus*, one in *Scaphytopius*, while others did not seem to belong to any of the described genera. A series of rather closely related species have, therefore, been separated out and a new genus *Hebenarus* is being erected to include these thirteen species. *Scaphytopius ritanus* Ball is being placed in this genus and new species are described in the present treatment. Unless otherwise indicated all the holotype, allotype and paratype specimens are located in the author's collection.

Hebenarus DeLong, new genus

Related to *Cloanthanus* Ball but differing from it by a flat vertex which is usually bluntly angled and as a rule is about as wide or slightly wider than long. The sides of vertex are usually rather convexly rounded to the blunt apex. The vertex is also characteristically marked by a pale margin bordered above and below by a black line. This marking on the vertex margin is more like *Scaphoideus*. The face is not angled above as in *Cloanthanus* and is usually banded just beneath the apex. The venation is similar to that of *Cloanthanus* with numerous short costal veinlets. The species of this group are not marked with peppered or stippled pigment spots as is so frequently found in the color patterns of species of *Cloanthanus*.

The types of genitalic structures of both male and female, although differing among the species of this genus, are distinct from those types found in the species of *Cloanthanus*.

Genotype *Hebenarus pallidus* DeLong.

Hebenarus pallidus DeLong, new species

Resembling *ritanus* in general appearance but with shorter head, pale vertex and scutellum and with distinct male genitalia. Length 4.5-5 mm.

Vertex short, bluntly angled, distinctly wider between eyes than median length.

Color: Vertex and scutellum white tinged with yellow, margin of vertex pale bordered above and below with a brown line. Face with a narrow white band just beneath the lower black line, below this is a darker band between the eyes, and the remainder of the face is white. Pronotum white tinged with yellow, the disc appearing brown. Elytra subhyaline with dark brown veins.

Genitalia: Female last ventral segment with posterior margin almost truncate, punctured either side of a broad, shallow, U-shaped notch on median third. A broad black stripe extends from this portion of margin to base of segment. Male plates short, triangular. Style with a long finger-like process arising on inner margin and extending outwardly. Aedeagus composed of an L-shaped dorsal portion the base of which is bifid and about as long as the stem. This is attached to the base of the ventral portion which is composed of a pair of proximal pieces which in ventral view are tapered from the base to slender pointed tips. In lateral view each piece has a prominent spine on the dorsal side formed at the base of the arrowhead tip.

Holotype male and *allotype* female from MEXICO CITY, D. F., MEXICO, elevation 7,500 feet, collected September 1, 1939, by the author. Paratype male collected at same locality September 13, 1939, by the author. Paratype females collected at CARAPAN, MICH., MEXICO, elevation 6,000 feet, October 2, 1941, and at ZITACUARA, MICH., MEXICO, elevation 6,700 feet, September 29, 1941, by C. C. Plummer, E. E. Good, J. S. Caldwell and the author. A male and female paratype which were collected by Ball and Stone at Km. 66 on the Mexico City-Cuernavaca Road, August 17, 1936, are in the Ball collection in the U. S. National Museum.

HEBENARUS RITANUS (BALL)

Scaphytopius ritanus Ball Can. Ent. 63:221, 1931.

An orange yellow species with white areolar spots on the elytra. Length 4.5-5 mm.

Vertex bluntly angled, a little longer on middle than basal width between the eyes in female, about one-fourth longer than basal width in the male.

Color: Yellow tinged with orange, margin of vertex paler, bordered above and below with a slender brown line. Face dull orange brown a conspicuous pale arc just below margin. Elytra tinged with orange on basal portion with numerous pale spots and areas, posterior portion almost pale hyaline, veins orange.

Genitalia: Female last ventral segment broadly, slightly produced. Male plates short, triangular, apices blunt. Style with a long finger-like apical process arising on inner margin which curves outwardly. Aedeagus composed of a dorsal and a ventral portion. The dorsal portion in lateral view is L-shaped with the base of the "L" extending vertically in the basal portion of segment. This is attached to the ventral portion by a narrow basal strip. Ventral portion composed of a single piece. When viewed laterally it is broad at base and tapers to a slender apex which bears a pair of long spine-like processes extending laterally.

This species was originally described from specimens collected at Tucson, Santa Rita Mountains and Pima County, Arizona. A pair of specimens were collected in the Santa Rita Mountains and compared with the types by Dr. Oman and through his kindness have been available for study and dissection. This species has not been collected in Mexico, but undoubtedly occurs in some of the northern mountain ranges of that country.

Hebenarus ritanus var. *rubralineus* DeLong, new variety

Resembling *ritanus* in form and general appearance but marked with longitudinal red stripes on vertex, pronotum and scutellum. Length, female 5 mm.

Vertex produced and rather sharply angled, a little longer at middle than basal width between the eyes.

Color: Vertex, pronotum and scutellum pale brown. A pair of broad red stripes arise at margin of vertex and extend across vertex, pronotum and terminate in basal angles of scutellum. These form a narrow brownish margin next either eye and a broad median stripe which is narrow at apex and at base, and is broader on median half. Pronotum with a pair of longitudinal red stripes behind each eye. Margin of vertex reddish with a black line just above and just below. Face brown with a broad white band just beneath the black line and indications of several pale arcs. Elytra pale brown, with dark brown markings on disc, apex smoky and apical costal veinlets dark.

Genitalia: Female last ventral segment sloping from base to posterior margin which is slightly trilobate.

Holotype female collected at ORIZABA, V. C., MEXICO, October 17, 1941, by E. E. Good, J. S. Caldwell, C. C. Plummer and the author.

Hebenarus abruptus DeLong, new species

Resembling *ritanus* in general form and appearance but with a shorter vertex and a darker coloration. Male genitalia distinct. Length, male 4.5 mm.

Vertex bluntly angled, length at middle equaling the basal width.

Color dull yellow, tinted with brown. Vertex dirty yellow with a broad, pale brown stripe either side of middle, a slender black line just above pale margin and a black line dividing and another just below the pale marginal band on face. Main portion of face dark brown, the genae paler. Pronotum and scutellum brown. Elytra subhyaline, tinged with brown, veins dark brown.

Genitalia: Female last ventral segment broadly roundedly produced with a slight notch at middle. The central third of segment black from margin to base. Male valve large, triangular. Plates short, triangular with bluntly pointed apices exceeding valve by about one-half its length. Aedeagus with a large ventral and a small dorsal portion. The ventral process is long with the apical third bent at right angles and extending ventrally. This bent portion is enlarged at middle. The dorsal portion which consists of a rather small curved ring enlarged on the ventral side is connected to the ventral portion by a rather long and broad process.

Holotype male collected near CUERNAVACA, MOR., MEXICO, elevation 7,000 feet, from shrubs, October 21, 1941, by E. E. Good and the author. *Allotype* female and paratype females collected at CARAPAN, MICH., MEXICO, elevation 6,000 feet from Oak, October 2, 1941. Paratype male from URUAPAN, MICH., MEXICO, elevation 5,300 feet, October 1, 1941, and paratype female collected at ZACAPU, MICH., MEXICO, elevation 6,500 feet, October 4, 1941. All the paratypes and the allotype were collected by C. C. Plummer, E. E. Good, J. S. Caldwell and the author.

Hebenarus altus DeLong, new species

A blunt headed species resembling *abruptus* but with shorter vertex and paler coloration. Length, female 4.5 mm.

Vertex short, bluntly angled, slightly shorter at middle than basal width between the eyes.

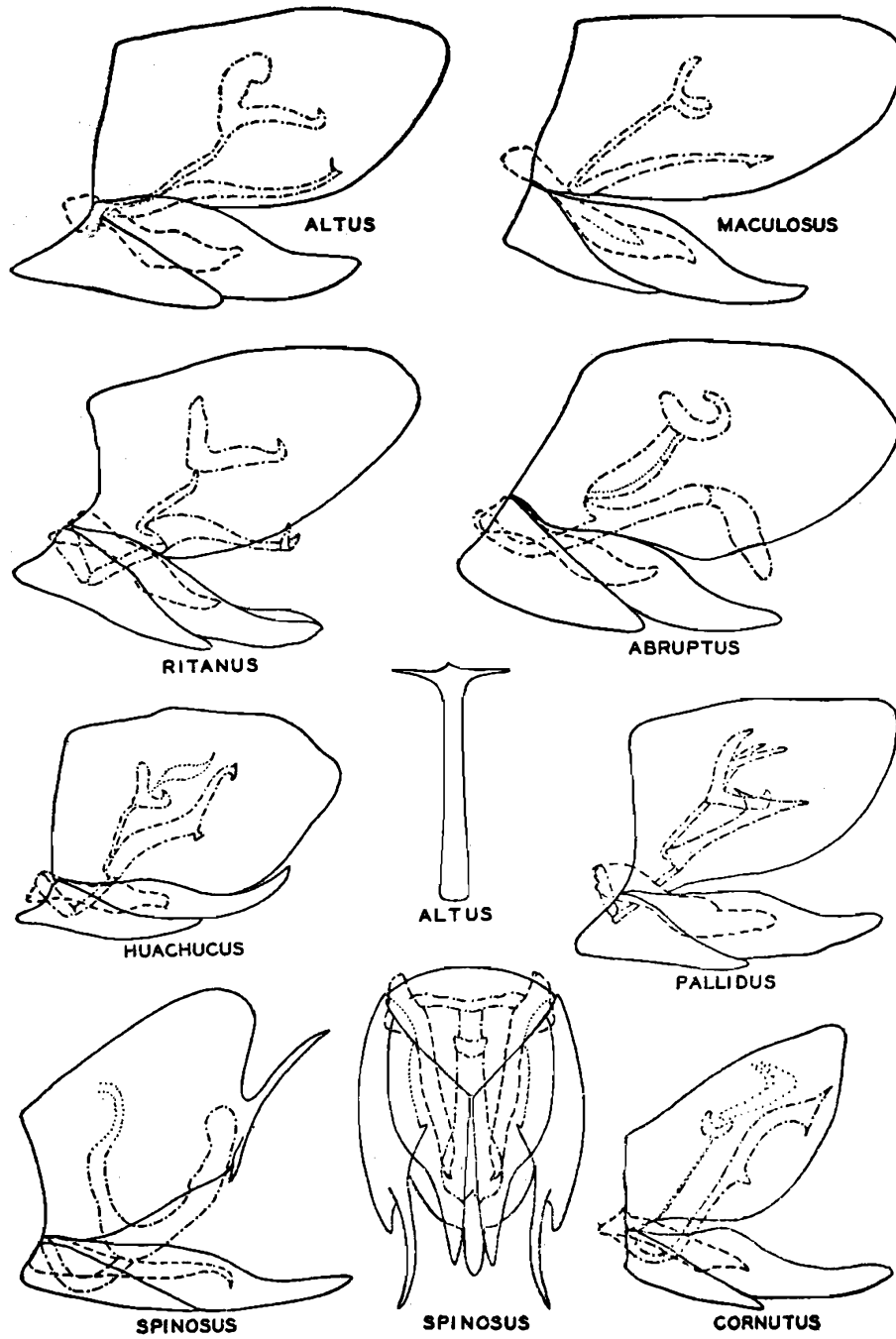


PLATE I

Lateral views of male genital structures as labeled, ventral view of aedeagus of *altus* (center), ventral view of male genital structure of *spinosis* (bottom center).

Color dirty white to pale yellow, with few definite markings. A faint brown line just above and one just below the pale margin. Pronotum darker brown. Scutellum pale with rust colored basal angles. Elytra subhyaline, veins except on claval area, dark brown. Disc and apex of clavus slightly tinged with brown. Face white slightly infuscated.

Genitalia: Female last ventral segment almost truncate with a slight U-shaped notch at middle. The central third of segment is broadly black margined and slightly, almost abruptly produced beyond the outer portions of posterior margin. Male plates short, broad at base, triangular, with blunt apices. Style with a curved finger-like process arising on inner margin at apex and directed outwardly. The aedeagus in general type resembles that of *ritanus* but the ventral portion is longer and the dorsal portion has a thicker, more curved basal structure. The ventral portion is a single structure, tapered to a slender apex with a pair of rather long slender spine-like processes which extend laterally. The dorsal portion is L-shaped with the base of the "L" thick and curved.

Holotype male from SALTILLO, COAH., MEXICO, elevation 7,500 feet, September 23, 1941. *Allotype* female collected near MEXICO CITY, D. F., MEXICO, elevation 8,000 feet, September 1, 1939, and paratype females from both localities collected by C. C. Plummer, J. S. Caldwell, E. E. Good and the author.

Hebenarus rubranotus DeLong, new species

Resembling *altus* in general form with pronotum, scutellum and clavus heavily irrorate with red. Length, female 5 mm.

Vertex bluntly angled, slightly longer at middle than basal width between eyes.

Color pale yellow, a faint pencil line just above and another just below pale margin. Pronotum, scutellum and clavus stippled with red, except the basal angles and apex of the scutellum and the apical fourth of clavus. Veins of elytra, except clavus, pale brown, and a brown spot at apex of clavus. Face pale yellow, unmarked.

Genitalia: Female last ventral segment appearing almost truncate on posterior margin with the median third slightly abruptly produced, truncate at apex and black margined.

Holotype female and paratype female collected from Oak on the mountains at 6,500 feet elevation just west of SALTILLO, COAH., MEXICO, September 23, 1941, by the author.

When the males of this brilliantly colored species are obtained and examined it may prove to be only a color variety of *altus*.

Hebenarus curtus DeLong, new species

A blunt headed species resembling *altus* but with a shorter head, different coloration, and distinct female genitalia. Length 4.5 mm.

Vertex short, almost one-third wider between eyes at base than median length.

Color: Vertex dull yellowish with a white longitudinal stripe either side of median line which does not extend to apex and a short white longitudinal stripe next either eye. Vertex margin white bordered above and below with a brown line. Another white band on face touches marginal band at middle but is narrower and more distant from marginal band at the ends. Face dark brown. Pronotum dark brown with a few paler spots. Scutellum dull orange with a darker oblique broad stripe either side of middle. Elytra pale subhyaline with dark brown veins. The portion covering body appears very dark.

Genitalia: Female last ventral segment concavely roundedly produced from near base to form a produced rounded lobe either side of a deep median, narrow V-shaped incision, reaching more than halfway to the base. Each lobe is black colored.

Holotype female collected at ZACAPU, MICH., MEXICO, elevation 6,500 feet, October 4, 1941, by E. E. Good, C. C. Plummer, J. S. Caldwell and the author. Paratype female collected at Km. 57, elevation 8,500 feet, on the Cuernavaca Road in MORELIA, MEXICO, October 21, 1941, by E. E. Good and the author. A female paratype collected by Ball and Stone at Km. 66 on the Mexico City-Cuernavaca Road, August 17, 1936, is in the Ball collection in the U. S. National Museum, Washington, D. C.

Hebenarus cornutus DeLong, new species

Resembling *curtus* in form and general appearance but with distinct genitalia. Length 4-4.5 mm.

Vertex bluntly angled. About as long as width between eyes at base.

Color: Vertex brown, margin white with a narrow black line above. A white elongate spot just back of apex which is replaced on the basal three-fourths by a pair of white parallel lines extending to pronotum, one either side of middle. Pronotum brown, mottled with pale. Scutellum reddish brown, a white spot about the middle on either side. Elytra hyaline with brown veins, a brown spot on middle and a smaller one on apex of clavus. Face reddish brown a complete pale arc a little below marginal band and indications of three other pairs below.

Genitalia: Female last ventral segment with short lateral margins from which the posterior margin is gradually produced to form a broadly rounded lobe either side of a short narrow V-shaped median notch. Male plates rather short, thick and blunt, almost rounded at apex. A conspicuous lateral rounded lobe on outer margin of each plate at base. Aedeagus composed of a pair of rather long proximal pieces which are slender at base and are widened on apical half to form a broad funnel-like tip. A small rather square-shaped tooth is present on the ventral side of each process at about its middle. There is also a small curved dorsal portion which is just above the paired ventral processes.

Holotype male and *allotype* female from SAN CRISTOBAL, GUATEMALA, 7,200 feet elevation, March 30, 1942. Paratype male and female from PANAJACHAL, GUATEMALA, elevation 5,000 feet, March 5, 1942, all collected by Dr. C. C. Plummer.

Hebenarus marginellus DeLong, new species

Resembling *ritanus* in general form but with different coloration. Length, female 5 mm.

Vertex produced and bluntly angled, length at middle equalling basal width between the eyes.

Color: Dull orange to brown. Vertex with a pale longitudinal stripe either side of median line. Pronotum and scutellum with faint, longitudinal, paler stripes. Elytra brownish subhyaline with darker brown veins. Margin of vertex with a double white band separated by a narrow brown line and margined above and below by a brown line. Face pale brown.

Genitalia: Female last ventral segment produced on lateral margins from near base, posterior margin truncate or slightly concave.

Holotype female from ORIZABA, VERA CRUZ, MEXICO, 3,500 feet elevation, collected October 17, 1941, and paratype females from CARAPAN, MICH., MEXICO, elevation 6,000 feet, October 2, 1941, and ZITACURA, MICH., MEXICO, elevation 6,700 feet, September 29, 1941. All collected from oak by E. E. Good, J. S. Caldwell, C. C. Plummer and the author.

Hebenarus arcuatus DeLong, new species

Closely related to *marginellus* but with a shorter vertex and different coloration. Length, female 5.5 mm.

Vertex slightly longer at middle than basal width between the eyes.

Color: Vertex pale brown, margin paler. An elongated pale spot at apex and two oblique pale stripes either side extending from margin to base, one next each eye and one either side and not far from median line. Pronotum dark brown, paler along anterior margin. Scutellum pale brown, basal angles orange. Elytra subhyaline, veins, nervures and ramose pigment lines on disc and clavus, brown. Face pale washed with light brown, a narrow brown transverse line just beneath pale margin and a pale "sharks mouth" mark between eyes not far below margin.

Genitalia: Female last ventral segment with posterior margin almost truncate, broadly, slightly emarginate. The color markings cause it to appear deeply squarely notched because of a dark arc shaped spot between the ends of which and the posterior margin the segment is brown.

Holotype female collected at JALAPA, GUATEMALA, elevation 4,854 feet, March 24, 1942, by Dr. C. C. Plummer.

Hebenarus huachucus DeLong, new species

Resembling *ritanus* in general form but with a shorter vertex and distinct male genitalia. Length 5 mm.

Vertex rather broad and bluntly angled, length at middle equaling width between the eyes.

Color yellow, marked with brown. Vertex yellowish, with a wedge-shaped white mark at apex and a pair of white median longitudinal stripes which are slightly separated extending from apex of wedge-shaped spot to the base. Margin white with a narrow dark line just above and another just below. Face with a brown band just below marginal white band and another narrow white band just beneath the brown. Between this and the clypeus the face is pale brown distinctly tinted with red. In color it is strikingly contrasted with the yellowish clypeus, lorae and genae. Pronotum pale brown. Scutellum orange. Elytra white with dark brown veins and numerous pigment marks which appear as cross veins.

Genitalia: Female last ventral segment with posterior margin gently sloping from either side to form a pair of rounded lobes between which is a median broad V-shaped notch which extends more than halfway to base of segment and is brown bordered. Male plates short, triangular, apices bluntly angled. Style with a short, tapered, sharply pointed finger-like apical process which is directed outwardly. Aedeagus consisting of a ventral portion which is bifid at about its middle, so that the apical half is composed of a pair of proximal structures. In lateral view the basal half is broad with a curved ventral bulge at middle bearing a short square tooth. The apical half is tapered from middle to form a ventrally

curved broadened tip. The dorsal process is short with a bifid basal portion and a short apically curved and pointed ventral or apical portion.

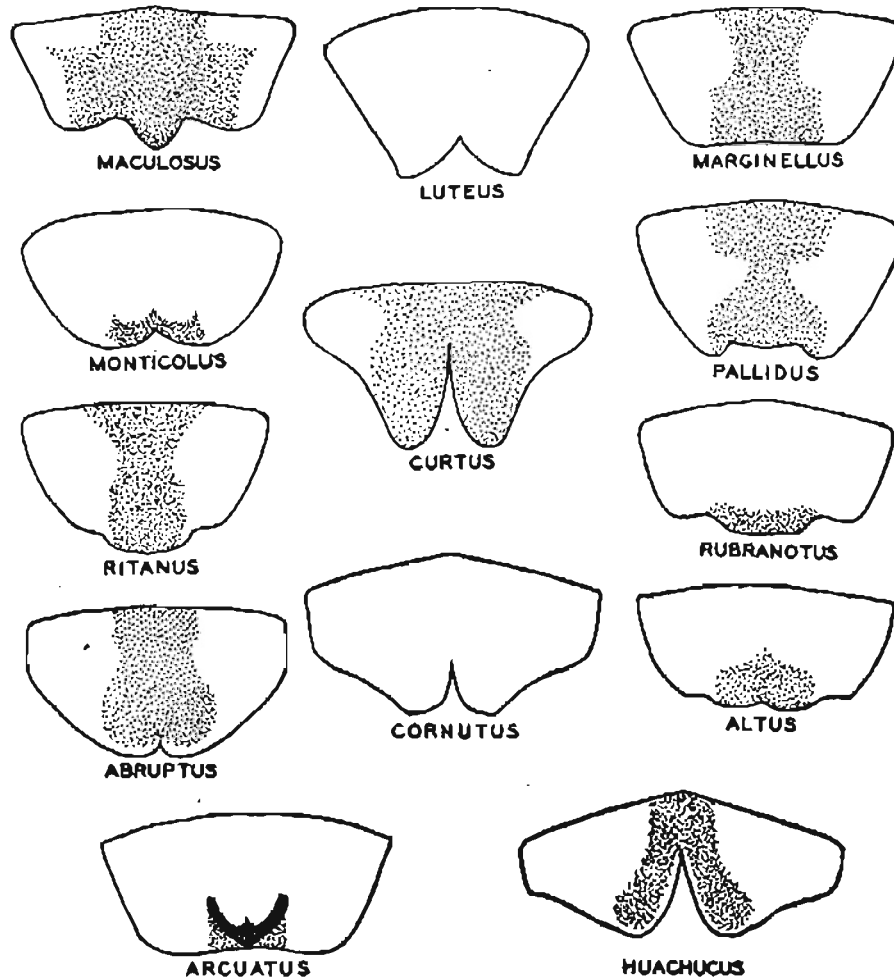


PLATE II

Ventral views of last ventral segments of females as labeled.

Holotype male, *allotype* female and male and female paratypes collected in the HUACHUCA MOUNTAINS, ARIZONA, July 20, 1936, and June 9, 1935, by Prof. J. N. Knull.

Hebenarus monticolus DeLong, new species

In general form resembling *ritanus* but with brown banded elytra. Length, female 5 mm.

Vertex produced and bluntly angled, longer at middle than basal width between eyes.

Color: Vertex bright yellow with white longitudinal markings, in the form of an elongated spot at apex and a longitudinal stripe each side of middle not extending to the white margin which is bordered above and below by a black line. Pronotum brown with five pale longitudinal stripes. Scutellum yellow, Elytra white, spotted with yellow and with two prominent brown bands. One crosses the middle of clavus and one crosses apex of clavus. Apex of elytra brown bordered, veins brown. Face brown with pale arcs above.

Genitalia: Female last ventral segment sloping from base to posterior margin which is broadly rounded either side of a broad shallow, median notch.

Holotype female collected at TAXCO, GUERRERO, MEXICO, September 9, 1939, by C. C. Plummer and the author. This was swept from a thick growth of shrubs on the mountainside at an elevation of 6,000 feet.

Hebenarus maculosus DeLong, new species

Resembling *ritanus* in general form but with different coloration and male genitalia distinct. Length 4.5-5.5 mm.

Vertex bluntly angled, length about equaling width.

Color: Vertex pale with longitudinal pale orange markings. A prominent black line above and another below the white margin. Face with a white band just below the lower black line. Upper portion of face pale brown, lower portion lighter. Pronotum brownish with paler longitudinal stripes. Scutellum with basal angles pale brownish, median portion paler. Elytra whitish subhyaline, veins brown, a brownish spot at apex of clavus and apical portion of elytra infuscated.

Genitalia: Female last ventral segment with posterior margin concavely rounded either side of a median roundedly produced lobe which extends beyond the lateral angles, male plates of medium length and triangular. Style rather long and with a prominent apical finger-like process on inner margin which is directed caudally and outwardly. Aedeagus composed of a pair of long slender ventral processes which are pointed at apex and bear a prominent pointed tooth on inner margin just before apex. These are connected by a long slender process from the base to a small dorsal portion composed of a single ventro-apical process and a bifid dorsal process.

Holotype male collected at CARAPAN, MICH., MEXICO, elevation 6,000 feet, October 2, 1941, from Oak. *Allotype* female taken at PUEBLA, PUEBLA, MEXICO, elevation 8,500 feet, October 18, 1941, both collected by J. S. Caldwell, E. E. Good, C. C.

Plummer and the author. Paratype female collected from shrubs by Dr. Dampf at BELLA VISTA, D. F., MEXICO, 8,000 feet elevation, September 17, 1933 (M. B. 366).

Hebenarus luteus DeLong, new species

Resembling *ritanus* in general form. A sharp headed species with different coloration and different female genitalia. Length, female 5 mm.

Vertex produced, apex bluntly angled, distinctly longer on middle than basal width between the eyes.

Color: Vertex orange yellow with a paler longitudinal stripe either side of median line. Margin white, bordered above and below by a black line. Face dark brown with a broad white arc just below margin and traces of four pairs of arcs on upper portion. Pronotum dark brown, scutellum pale brown. Elytra pale subhyaline, washed with pale brown, veins dark brown. The body gives a dark brown appearance to the elytra as seen from above.

Genitalia: Female last ventral segment strongly sloping to posterior margin which is convexly rounded from either side to form a broad, conspicuous V-shaped notch which extends about one-fifth the distance to the base.

Holotype female and paratype female collected at ORIZABA, VERA CRUZ, MEXICO, Km. 280, elevation 7,700 feet, October 17, 1941, by C. C. Plummer, E. E. Good, J. S. Caldwell and the author. These were collected from a growth of shrubs on one of the higher mountains several miles west of the city of Orizaba.

Tenuarus DeLong, new subgenus

This subgenus is distinguished from the other species placed in this genus by a thin edged vertex margin which is slightly turned up and the sides of vertex distinctly convexly rounded. The costal margin has very few costal veinlets and the male genitalia are entirely different in general form. The pygofer bears a pair of long spines on the ventro-caudal margin and the styles are long and very slender.

Genotype Hebenarus (Tenuarus) spinosa DeLong.

Hebenarus (Tenuarus) spinosus DeLong, new species

Resembling *ritanus* in general form but with vertex, pronotum and scutellum longitudinally striped and with distinct male genitalia. Length, male 5 mm.

Vertex rather strongly produced but bluntly angled, longer at middle than basal width between the eyes, sides convexly rounded.

Color: Orange yellow, vertex with a pale median longitudinal spot at apex, a broad white longitudinal stripe either side of middle and a pale longitudinal spot along the anterior portion of each eye. Margin pale bordered above and below by a conspicuous brown line. Pronotum with seven longitudinal stripes. Scutellum orange yellow with a paler median longitudinal stripe terminating in the apical angle which is also paler. A white longitudinal stripe on inner margin of either basal angle. Elytra pale brown with dark brown veins, and with round, white, brown bordered spots in antepical and apical cells just before and just posterior to the cross veins. Face rather uniform pale brown except a conspicuous angled white stripe just beneath margin which is bordered beneath by a dark brown line.

Genitalia: Male plates long, rather broad at base, convexly rounded on basal two-thirds then tapered to pointed apices. Style long and narrow with pointed apex which is slightly curved inwardly. Aedeagus consisting of a single portion which curves dorsally at base and is more slender. In ventral view the aedeagus is enlarged at apex forming two rounded lobes. Each pygofer bears a long slender spine on inner ventral portion which extends decidedly beyond the pygofer.

Holotype male collected at VERGEL, CHIAPAS, MEXICO, valley of the Rio Huixtla, elevation 3,000 feet, June 6, 1935, by Dr. A. Dampf (M. F. No. 4458).

