

THE REMARKABLE DISTRIBUTION OF AN
AMERICAN CICADA; A NEW GENUS,
AND OTHER CICADA NOTES¹

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QUESADA GIGAS, A REMARKABLE CICADA

(Plate VIII, Figs. 1, 2)

A number of species of North American cicadas occur from the Atlantic seaboard to about western Kansas, or to the one hundredth meridian, and northward from Florida and Southern Texas to Nova Scotia and the region of the Great Lakes. In Western North America, where there are a greater number of species than in the Eastern States and Canada, the species extend eastward to about the 100th meridian. Two species of *Okana-gana*, namely *rimosa* and *canadensis*, in the northern part of their range, where they follow the belt of evergreen forest extending from Nova Scotia to the far west, have a greater east and west distribution than the cicadas occurring more to the south. In: "A Preliminary Review of the West Coast Cicadidæ," 1915, Mr. E. P. Van Duzee states regarding *rimosa*: "This species occurs across the whole continent from Vancouver Island to Quebec and as far south on the west coast as Fresno Co., California."

In Texas there are at least 40 species of cicadas and several additional named forms or varieties. The most famous species occurring in Texas, is *Quesada gigas* Olivier, remarkable on account of its distribution as well as its loud song, which has been

¹ I am indebted to Howard Cleaves for photographing the specimens.

likened by many observers to the shrill whistle of a first-rate locomotive. In: "The Naturalist on the River Amazons," Bates states: "Added to these noises were the songs of strange cicadas, one large kind perched high on the trees around our little haven setting up a most piercing chirrup; it began with the usual harsh jarring tone of its tribe, but this gradually and rapidly became shriller, until it ended in a long and loud note resembling the steam-whistle of a locomotive engine. Half-a-dozen of these wonderful performers made a considerable item in the evening concert. I had heard the same species before at Pará, but it was there very uncommon."

The common name for *gigas* in some localities is the: "Locomotive Cicada," and it is also called the: "Soupbug," because it is at times attracted to light in its evening flights and lands on the supper table.

It is the only known American cicada that may be found in the mature or winged form every month in the year in some part of its extensive north and south distribution of about 4,000 miles, from southern Texas through Mexico, Central America, South America into Argentina.

In the writer's collection there are many specimens from southern Texas, where it has thus far been recorded from May to October; there are many records from Mexico; also from Central America, and in South America specimens from Colombia, Venezuela, Trinidad, Tobago Island recorded in February and March; British Guiana in September (Dr. Beebe and John Tee-Van); Ecuador; Brazil in September, December, January, May; Peru in March, June, September, October; Bolivia in February; Paraguay in December and January. Specimens from Argentina are dated November and December, and it doubtless occurs at other dates.

In his: "Synopsis of the Cicadidæ of Ecuador," 1925, Dr. Frederic W. Goding states regarding the Genus *Quesada* that: "One species has been recognized in Ecuador, which is greenish yellow, with a fuscous spot on the bases of the second and third apical cells of tegmina; it is one of our largest species."

Dr. Kenneth J. Haywood, Chief of the Department of Entomology, Tucuman, Argentina, has informed me that *Quesada*

gigas, is, speaking generally, distributed over Argentina north of a line drawn between Buenos Aires and Mendoza. So far there are no available records for Chile or Uruguay. The Doctor states that this fine cicada is called: "'Chichara grande' (chichara is a common name for the cicada here), 'Coyoyo,' or more commonly 'Coyuyo,' according to what part of this vast country you find yourself in."

Considering the extended distribution of the species, the specimens from the various parts of its wide range are surprisingly alike, but sometimes differ individually in color. Those from Brazil, Argentina, etc., are often quite large, with abdomen noticeably broad in the males, but Texas specimens may also differ considerably in size.

There is a colored figure of the insect under the name of *Tympanoterpes gigas* in "Biologia Centrali-Americana," 1881, with an interesting account of its song and habits. In: "Insect Singers, A Natural History of the Cicadas," Dr. J. G. Myers devotes considerable space to an account of this remarkable species, its song and habits.

In his: "Catalogue of the Cicadidæ," 1906, Mr. Distant cites a number of specific names that have been bestowed upon *Quesada gigas*, and when more specimens have been collected from the different parts of its remarkable range, and additional field studies have been made, including time of appearance, it may be discovered that there are some definite geographic races or even an additional species involved.

In his: "Preliminary Survey of the Cicadidæ of the United States, Antilles and Mexico," 1892, Uhler stated concerning *gigas*: "I have examined specimens from various parts of Mexico, and from Guatemala, Guiana, and Matto Grosso, Brazil. Specimens from Tamaulipas, Mexico, differ in no respect from others living further South, although the species is a very variable one especially in the amount and form of black marking on the upper surface of the body. The region of the Rio Grande of Texas is the most northern limit of this species, while the northern part of the Argentine Republic seems to be its most southern habitat."

In: "Notes Del Museo de la Plata," Tomo V, Buenos Aires, 1940, Prof. Belindo Adolfo Torres described and figured a dark-

colored female of *gigas*, but as he could find no structural difference he considered the variety unworthy of a name.

In Texas *Quesada gigas* has been recorded from Starr, Hidalgo, Cameron and Bexar counties by Mr. F. F. Bibby, and no doubt it will be discovered over a wider range. There are specimens from Kingsville, Kleberg County, in the collection of Cornell University.

Mr. H. B. Parks, Director of the State Agricultural Research Laboratory near San Antonio, Bexar County records *gigas* as a yearly visitor observed since 1934. The "Popcorn Whistlers" occur in the live-oaks about the Laboratory, usually in July and August, and he heard them singing in the evening and sometimes in the early morning in 1941. He has found dead specimens beneath the trees. He also reports their abundance in the coastal city of Corpus Christi, Nueces County, in August, 1940. The little boys in town found great sport in climbing trees and catching the cicadas. They had also been observed and collected in 1938 at Corpus Christi, and I received specimens from both Mr. Parks and Mr. Emmett S. Claunch, Jr., who reported that they: "whistle instead of buzz—that is they sound as though they whistle."

Many collectors have found *gigas* about Brownsville, Cameron County, and Dr. James A. G. Rehn, of the Philadelphia Academy, likened its song to the shrill tin whistle of a peanut roaster.

Dr. Raymond H. Beamer and associates from the University of Kansas collected in Bee County and Hidalgo County in July, 1928, and in sending specimens the Doctor wrote that they had 70 more if I cared to see them. This, as well as some of the other facts are mentioned to show what a highly successful species *gigas* really is, both in numbers as well as in wide distribution, for in some part of its range from north to south, a male *gigas* is in song every month in the year.

Mr. Paul C. Avery of Mission, Hidalgo County, near the Rio Grande, has sent me a great many *gigas*, which sometimes occurs very plentifully along the river where the soil is more or less damp. He has found them often on Mesquite, and describes the song as: "Very loud, continuous and shrill. The loudest of any species found," at Mission. He collected many in 1935, and in

1936 sent me as a sample 400 specimens—247 males and 153 females—collected in July of that year. He observed the first *gigas* on June 13, and in his letter of July 5, 1936, stated that they sang both early and late, and often were heard singing after dark. He heard the last one on September 21 in 1936. Mr. Avery has also observed the Cicada killer, *Sphex*, with a *gigas*, which: "sure was crying loud and mournfully." This species like many other cicadas, is subject to a fungus disease, and a number of specimens have been received with the terminal segments of the abdomen missing, as often happens when the Seventeen-year Cicada is attacked by fungus.

It will be seen from the foregoing, that in *Quesada gigas* the United States includes in its fauna one of the most remarkable of the known cicadas, which species is sure to attract more and more attention in the years to come.

Cornuplura, new genus.

In the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY for June, 1936, *Tibicen curvispinosa* was described and figured as a remarkable cicada from western Mexico. The two conspicuous upturned spines in the male protruding backward from segment IX, were described and figured, and it was stated that: "the uncus in *curvispinosa* is deeply cleft with the resulting two claw-like extremities long and curved inward." These characters are also noted by Smith and Grossbeck in: "Studies in Certain Cicada Species," Entomological News, April, 1907, and shown in their figures 7 and 8 on plate 3.

Tibicen nigroalbata was also described in the 1936 paper, and its resemblance to *curvispinosa* noted. Only a single female *nigroalbata* taken by Prof. E. D. Ball in Arizona was available in 1936.

In the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY for June, 1942, these remarkable cicadas are again considered in the light of additional specimens from Nayarit, Mexico, and Santa Cruz County, Arizona, and it was suggested that *nigroalbata* might be a northern race of the southern *curvispinosa*.

The general form of the body except for the curved spines in the males of both *curvispinosa* and *nigroalbata*, including the position of the cross-veins in the fore wings, and the terminal central spine on the last dorsal segment in the males, is as in the genus *Tibicen*, but the deeply cleft and curved uncus is not as found in the other species of that genus native to North America, nor as in *plebeja* Scopli, of Europe, the type of the genus. It is suggestive of the uncus in some species of *Diceroprocta*, but in that genus the dorsal segment in the male terminates in two lateral lobes and the venation is different.

It would appear from the above that a new genus should be erected for these remarkable insects with *curvispinosa* as a type, to be placed between *Tibiden* and *Diceroprocta*, for which the name *Cornuplura* is here proposed. The genus may also include *rudis* Walker, from Mexico, as a closely related species.

The student is referred to several of the structural characters illustrated in the above-mentioned three papers, as characteristic of the Genus *Cornuplura*.

OKANAGANA SYNODICA (SAY), ITS HABITS, DISTRIBUTION, AND A NEW COLOR FORM

In 1825 Thomas Say described his *Cicada synodica*, and stated that: "Dr. James and Mr. Peale observed this species in great numbers in one locality at the base of the Rocky Mountains but it did not occur elsewhere." He described the body as black above, and also enumerated the extensive testaceous colored lines and spots that generally give a number of the insects when seen together a yellow-brown appearance. Say states: "Scutel [mesonotum] with a lateral marginal line the elevated X and two dorsal dilated lines testaceous; the dorsal lines are merely emarginate on the inner side, and do not form the W; at the tip of each anterior line of the X is a conspicuous, black impressed puncture, and behind the X the posterior edge of the scutel [metanotum] is visible and testaceous: beneath very pale testaceous. . . . Length to the tip of the hemelytra less than one inch."

In the Kansas University Science Bulletin, March, 1920, p. 345, Dr. P. B. Lawson, in: "The Cicadidæ of Kansas," records *synodica* from the western part of the state only, and describes it as: "A small black and honey-yellow species," with length of body 15 to 18.5 millimeters, and expanse of fore-wings 38 to 44 mm.

Mr. Joseph Duncan Putnam in his: "Remarks on the Habits of Several Western Cicadæ," Pro. Davenport Academy of Natural Sciences, March, 1881, records that: "*Cicada synodica* Say, was quite common on the grassy plains near Denver and Boulder, in Colorado, in June, 1872. The male makes a tolerably loud rattling noise." In June, 1920, the late Dr. Lutz, of the American Museum of Natural History, collected four male *synodica* at Medicine Bow, Wyoming, about 6,600 feet, and recorded that: "The small brown cicada in grass has a continuous note, but sometimes continues for only a short time."

In June and July of 1935 a brood of this species appeared in Colfax County, New Mexico. In the writer's collection there are 135 specimens representing this brood, and they are all of the typical brownish-colored form.

In his account of: "Characteristics of Certain Western Cicadas," JOUR. N. Y. ENTO. SOC., June, 1940, Dr. John W. Sugden records that: "A large brood of *Okanagana synodica* was observed in Emery County, Utah (June 7, 1928). At first, the sound was mistaken for the humming of the carburetor of the car. In the field, so many were buzzing that it was impossible to locate the position of any individuals. After examining the low, sage-like bushes, thousands of the insects were found. Fifteen or twenty could be easily collected on a bush not over a foot high. The note similar to the typical *Okanagana* song, was not very loud, but shrill and long continued and what the individual lacked in volume was made up for by the large numbers. Very few would fly if disturbed, but would remain on the bushes and could be collected by hand. Others would become quiet when disturbed and fall to the ground, where their color closely resembled the buff-colored soil. Many were mating. The exuvia were on the ground or attached to the stems."

The known range of *synodica* has been greatly extended in recent years, and specimens have been examined from Alberta, Montana, North and South Dakota, Wyoming, Nebraska, western Kansas, Colorado, Utah, western Texas, New Mexico and Arizona. It should also be found in Oklahoma as some of the known localities are close to the state line. About 600 specimens have been examined, and it has been observed as the specimens accumulated that the broods appearing in Arizona and New Mexico were sometimes composed of darker-colored individuals than the broods occurring in Colorado and other more eastern localities.

On May 26, 1941, Mr. Frank H. Parker collected a great many almost entirely black-bodied individuals at Holbrook, Navajo County, eastern Arizona, and wrote as follows concerning them: "The Holbrook series was taken on a large, slightly rolling mesa covered chiefly with bunch grass, *Gutierrezia*, and a low (1 foot or less) shrub somewhat resembling Fairies Feather Duster, among which was to be found an occasional diminutive *Opuntia*."

The capacity of my cyanide jars, and time, were the only factors preventing the capture of many thousands of this species." Mr. Parker sent 67 males and 33 females from this brood.

In the writer's collection there are also two females of the dark form collected at Holbrook, May 22, 1934, and a male and female of the same form from the White Mountains, Arizona, July, 1935. Broods of both the light and dark forms occur in New Mexico, and both dark and light colored specimens have been received from Utah, collected by Dr. Sugden, June 7, 1928, in Emery County.

It will be noted that broods of the dark, or almost wholly black individuals, generally occur in the area drained by the Colorado, while those of the lighter-colored form described by Say, are on the more eastern watershed, or streams tributary to the Rio Grande, Missouri, etc.

Okanagana synodica (Say) variety *nigra*, new variety (Plate VIII, fig. 3). Type male and allotype female from Holbrook, Arizona, May 26, 1941 (Frank H. Parker). Davis collection.

In this dark or melanistic form of *synodica*, the testaceous markings as described by Say are absent or very much reduced. The head is entirely black save for two pale spots one above each antenna, and the ruby-colored ocelli. The pronotum is narrowly edged all around with orange, and has a short, median pale line extending to the anterior margin. The mesonotum has a very small orange spot at the base of each fore wing; the posterior margin, including the X, pale, and the two torch-shaped orange marks, extending forward from the anterior limbs of the X generally lack the often conspicuous tooth-like mark or sinuation on the inner side found in typical *synodica*. The metanotum is pale and the abdominal segments are black or very narrowly margined posteriorly with orange. In the female the segments at the end of the body are more broadly margined with orange. The upper surface of the uncus of the male is black, and the valve pale. The venation is darker than in typical *synodica*.

OKANAGANA PALLIDULA DAVIS; ADDITIONAL NOTES AND OBSERVATIONS

(PLATE VIII, FIG. 4)

In the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY for September, 1938, there is an account of this species, its distribution and color forms, and the variety *nigra* is described and recorded from Yolo and Kern counties, California. *Pallidula* can be confused with some of the forms of *Okanagana vanduzeei*

which, however, are usually conspicuously hairy on the head, and often on the pronotum, as well as on the under side of the abdomen. Also *pallidula* is duller and does not present the shining appearance usual in *vanduzeei* and its forms. While there are dark specimens of *pallidula* there are also green ones, which apparently do not occur in *vanduzeei* and its varieties *consobrina*, etc.

Okanagana pallidula has thus far been examined from the great Central Valley of California, and from the following counties: Sutter, Yuba, Yolo, Sacramento, Contra Costa, Merced, Madera, Fresno, Tulare, Kings, Kern and San Luis Obispo. In some years it occurs in great numbers.

As reported on page 308 of the September, 1938, paper referred to above, this small cicada may be found singing from its hole in the ground. In June, 1941, Mr. and Mrs. J. N. Knull of the Ohio State University, while in the Santa Maria River Valley, California also found specimens of *pallidula* singing from their burrows where it was believed they had undergone their last transformation. If the males ultimately found mates, they probably in due time left the burrows, or perhaps the females flew to them as has been observed in other species. This is a matter for future observation and record. Dr. Charles D. Michener of the American Museum of Natural History, while looking over my collection of cicadas in 1942, assured me that he had discovered males of *pallidula* singing from their one-time burrows, thus adding to the observations made by others.

