

SOME NEW FULGORIDAE FROM THE WESTERN UNITED STATES.

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Some years ago while the writer was planning a collecting trip to the Yellowstone Park he was visited by R. H. Beamer, of Kansas, and P. W. Oman, of the National Museum, and much time was spent in going over the collections and literature in *Homoptera*. At about this period, information came to the writer that a new species of *Scolops* taken in Utah had been described and named *tanneri* for its discoverer, Dr. V. M. Tanner, of the B. Y. U. at Provo. This was of much interest to the writer, as he was working on the group and he decided to visit Dr. Tanner on his trip and study the species, find out where it was collected and if possible get some material. It was probably even more interesting and intriguing because, after many years collecting in Utah, some of it in the Provo region, he had not found any new species of that genus.

The trip was made, Dr. Tanner visited. He was away working in the mountains and no one knew anything about *Scolops tanneri*, so my wife was left in the hotel and the writer started out to collect. As he was driving towards the canyon he saw a new road leading up to a high mesa on the side of Inspiration Mountain and took it, driving until it ended in a field, drove across the field, climbed through a fence and started to collect. Before going ten feet, he struck a new species of *Scolops*, larvae, and adult on a new and definite food plant, and collected a goodly set, all taken in a small patch two or three rods across. From here, he went up and down the side of the mountain and circled around for the rest of the afternoon, but found no more. The next winter, when the material of the trip was mounted and labeled, the new *Scolops* were put into the proper place in the collection and labeled *tanneri*. Then the trouble began. The writer could find no reference to such a species; he wrote to Dr. Beamer but the doctor had never heard of such a species; he wrote

to Mr. Oman, who had never heard of it, and could find no reference; he then wrote to Dr. Tanner and asked him who had described it. The good doctor had never heard of it. Each time an answer came the writer would go and look in his collection to test whether he had been dreaming things, but *Scolops tanneri* was always there, and is there now. In order to bring it into conformity with the requirements of the code that governs unimaginative minds, the following description is appended:

***Scolops tanneri* Ball n. sp.**

Resembling *hesperius* Uhl, slightly smaller, paler with three pairs of black spots and a strongly carinated, and almost parallel margined process, instead of an inflated and tapering. Length, ♀, 9 mm.

Cephalic process curved, strongly carinate, as long as the front, inclined to be expanded towards the apex, instead of tapering as in *hesperius*. The lateral margins mottled with brown. Two black spots on vertex, four each on pronotum and mesonotum, instead of unmarked as in *hesperius*. The venation is similar to that in *hesperius*, but the dark markings along the white veins are usually so faint as to give a pale appearance instead of the highly maculate one of *hesperius*.

Holotype ♀, allotype ♂, and fourteen paratypes taken on Inspiration Mountain, Provo, Utah, August 10, 1930, by the writer.

***Scolops virescens* Ball n. sp.**

Form of *marginatus* Ball, nearly, the elytra broader and rounder as in *maculosus*. Pea green with big black spots on the pronotum. Length, ♀, 6-7 mm., width, 3.5 mm.

Cephalic process very slender, parallel margined from above, not half as wide as the oval vertex, very slightly if at all curved. Elytra together broadly oval as in *maculosus*, the middle sector forking well back of the first, instead of opposite as in that species.

Color: Pea green, the eyes red, the disc of the mesonotum orange; cephalic process with dark lateral and dorsal lines; vertex with a dark crescent anteriorly. Pronotum with large round black spots, faint dark dots on mesonotum and rarely black dots at apices of the elytra.

Holotype ♀, allotype ♂, and seven paratypes, July 23, 1931, and seven, July 30, 1930, all taken at Sacaton by the writer. *S. viridis*,

the only other green species, is larger, more elongate, white mottled, with faint dark markings if any, while the elytral nervures fork opposite each other.

***Scolops virescens* var. *salsus* Ball.**

Form and structure of the species but entirely salmon pink in color, except for the black markings and the lighter elytra. Holotype ♀, allotype ♂, and nine paratypes, July 23, 1931, and four paratypes, July 31, 1930, all taken at Sacaton, Arizona, by the writer.

***Scolops nicholi* n. sp.**

Resembling *osborni* in color, shape, and primary venation, but a pygmy by comparison. Much smaller and paler than *robustus*. Length, ♂, 4-5 mm., ♀, 6 mm.; width, ♂, 2 mm., ♀, 3 mm.

Cephalic process, shorter than front, tapering uniformly with front and vertex throughout, claval nervures united at three-fourths of their length, medius with each fork forking again opposite the end of clavus. Cubitus forking before the union of the clavals, but the branches do not fork again. A row of transverse nervures in a light area some distance from apex.

Color: Pale straw, the front green, the process pale with broad lateral and narrow dorsal line black. Pronotum white with small black areas back of the eyes. Nervures pale broadly interrupted with brown, those on costa large, black, apical cells broadly smoky. Anterior femora slightly more flattened than usual, heavily irrorate with fuscous, fore and middle tibiae white with a narrow basal and a broad apical band of black.

Holotype ♂ taken September 9, 1928, in the Empire Mountains, 5,000 feet, by A. A. Nichol. Allotype ♀ and fourteen paratypes taken by O. W. Bryant in the Santa Cruz Valley on September 5, 1933. This is by far the smallest species in the group, as its closest relative *osborni* is the largest. Its size, the short black-lined cephalic process, the white collar and the fact that in *osborni* the black bands do not cross the veins will readily separate it. It might be mistaken for a small *robustus* but the tapering process and the venation remove it from that group. Named in honor of Professor A. A. Nichol whose remarkable ability to discriminate species in the field is a constant source of wonder and delight.

Phylloscelis pennatus Ball n. sp.

Resembling *pallescens* Germar, much larger, light with a white band on face and a beautiful herring-bone pattern on the numerous parallel nervures of elytra. Length, ♀, 5 mm., width, 3 mm.

Head and pronotum about as in *pallescens*, venation unique in that the claval suture is obsolete and its place taken by a nervure that forks and extends around the angle of the elytra, making about ten parallel nervures across the disc. These nervures fork irregularly but are rarely united by cross nervures until well before the apex where they may be a single fairly definite, white marked, transverse line. Fore femora foliaceous on both margins, the inner leaf gradually widening towards apex where it is little more than half as wide as the corresponding half-heart shaped expansion of *pallescens*.

Color: Gray, face and all below dark with definite white flecks, a transverse white band across the middle of face and the middle of the tibiae, usually bordered by shining black. Vertex black with a narrow transverse band, anterior half of pronotum black, remainder and mesonotum pale. Elytra creamy with a heavy herring-bone pattern omitting a few scattered areas, and a narrow line on the nervures.

Holotype ♀, allotype ♂, and seven paratypes, Comstock, Texas, August 9, 1936; six paratypes, Marathon, Texas, August 8, 1936, and one Comstock, Texas, September 1, 1936, all collected by the writer.

Orgamara argentia Ball n. sp.

Resembling *acuta* Ball, larger, much lighter colored with a broader process. Silvery gray, the lateral margins darkened. Length, ♀, 5.5 mm., width, 2.5 mm.

Cephalic process long, straight truncate, with the apex only a little deeper than wide instead of twice as deep as in *acuta*. Elytra brachypterous, reticulate, exposing five or six segments of abdomen, abdomen with two pairs of lateral white stripes. The outer pair carinate.

Color: Silvery gray, the median line almost white, the lateral margin dark with the two white stripes on abdomen distinct. Femora with marginal rows of dark dots.

Holotype ♀, allotype ♂, and thirteen paratypes taken by the writer

on Joshua trees (*Yucca brevifolia*) 14 miles west of Congress Junction, Arizona, August 19, 1933.

Yucanda miniata Ball n. sp.

Smaller and much narrower bodied than *albida* Ball with a stouter less upturned process. Tawny with a pair of dark stripes on the abdomen and scarlet lacing on elytra. Length, ♀, 5 mm., width, 2 mm.

Cephalic process shorter and stouter (relative to body size) than in *albida*, deeper than wide so that the end does not approach a regular pentagon as in *albida*. Dorsal tablet narrowing to apex. Lateral tablets of pronotum, mesonotum and abdominal segments much more heavily pustulate than in *albida*.

Color: Pale tawny, the pustules lighter, the abdomen mottled, with a pair of dark stripes. Elytra with fine scarlet lacing. Legs and below scarcely marked.

Holotype ♀, allotype ♂, and four paratypes, September 17, 1932, eight, August 4, 1930, and two, August 31, 1935, all taken by the writer from a small shrub that looks like a dwarf mesquite, at the Grand Canyon Bridge, Arizona.

Yucanda ornata Ball n. sp.

Size and form of *miniata* nearly, the cephalic process much larger, the dorsal plate very broad throughout, narrowing just before apex to about twice the width in *miniata*. Gray with dark markings. Length, ♀, 6.5 mm., width, 2.5 mm.

Cephalic process very wide throughout, front definitely wider at apex than between the eyes, dorsal tablet scarcely narrowing. Hind femora slender, strongly curved.

Color: Gray powdered with white, and black marked. Process pale tawny, the pustules lighter, the dorsal tablet powdered with white. Lateral tablet of pronotum and mesonotum black anteriorly, the pustules white. Elytra very light, blackened on the basal angles and the sutural margin. Abdomen light and lightly irrorate, a pair of dark stripes on the inner third, the enclosed area dark in the females. Legs and below dark in contrast with the light tawny face, the basal portion of the slender femora pale.

Holotype ♀, allotype ♂, and seven paratypes taken by the writer on a dwarf mesquite-like shrub, on the Arizona side of the Boulder Dam, June 29, 1935.

***Deserta raptorius* Ball n. sp.**

Resembling *bipunctata* Ball but much larger, lighter, with the cephalic process one half longer and strongly hooked. Pale gray peppered with dark on the cephalic process. Length, ♀, 6.5 mm., width, 3 mm.

Cephalic process much broader and longer than in *bipunctata*, one-half longer and nearly that much broader, as broad as its width between the eyes for three-fourths of its length, then narrowing between high carinae into a raptorial beak, the lateral compartments long and acute almost twice the length of the eye.

Color: Rather uniform pale gray with a greenish tinge, especially on the face; process heavily irrorate with dark omitting the vertex and lower part of face. Pronotum slightly irrorate, the median shield and the mesonotum usually unmarked. Elytra with the reticulations and apical portions light. Abdomen pale, rarely with traces of lines and irrorations.

Holotype ♀, allotype ♂, and 14 paratypes taken by the writer from a heavy stand of *Chrysothamnus* (Rabbit Brush) in the Tehachapi Pass, California, June 30, 1930.

***Aridia nodosa* Ball n. sp.**

Broader and more highly ornamented than *compressa* Ball with a broader process. Pale testaceous with a dark transverse band margining the elytra anteriorly and posteriorly. Length, ♀, 4 mm., width, 2.5 mm.

Cephalic process not as long as and one-half broader than *compressa* as seen from the side with about the same inclination. The vertex one-half broader than in *compressa* and the angular portion shorter and therefore not nearly as acutely angled. Disc of vertex with two broad pits almost as in *Timonidia solitaria* Ball. Tip of projection a convex polished triangle instead of a linear depression as in *compressa*. Male genitalia showing no trace of the lateral triangle seen in the other species.

Color: Tawny with two transverse bands. Face and process tawny, the carinae broadly light with narrow dark lines. Pustules light. Pronotum light with the anterior margin darkened. Mesonotum light with the dorsal shield brown. Elytra light or tawny. The anterior and posterior margins and a "shadow" on the abdomen forming the transverse dark bands.

Holotype ♀, allotype ♂, and four paratypes, Tucson, June 19,

1933, and ten paratypes, Tucson, from May 19 to June 11, all taken from the north end of the Tucson Mountains, Arizona, by the writer.

This is the only species so far found in Arizona, and has been taken from Yuma to Tucson and north to the Grand Canyon Bridge.

***Cixius clitellus* Ball n. sp.**

Resembling *vandykei* Van D., but with a much shorter vertex. Larger than *compta* Fowl. with a more intricate pattern in the female and a salmon colored male. Length, ♀, 6 mm., width, 2.5 mm.

Vertex twice as wide as its median length, slightly obtusely angled in front with high carinate walls. Frontal tablets with their anterior margins parallel with the vertex, quadrangular sloping to the broad front. Face in profile with a definite angle to the inflated clypeus instead of broadly rounding as in *vandykei*. Male pygofers with a broad opening and a broad short projection. The styles narrow for half their length, then broadening and making a semicircular turn which scarcely exceeds the pygofers. The dorsal membrane long, narrow, twice as long as the styles, then recurved into two short acute points.

Color: Female, dark chestnut on mesonotum and below, remainder cinnamon with three white bands on elytra, the media one the broadest, the anterior one oblique. Male, pale cinnamon brown above and below without bands, the mesonotum chestnut.

Holotype ♀, allotype ♂, and 8 paratypes, Chiricahua Mountains, Arizona, July 17, 1933, and six paratypes from the same location, July 26, 1935, all taken by the writer.

***Cixius cinctus* Ball n. sp.**

Resembling *vandykei*, smaller, with a much narrower face, pale with heavy setigerous punctures and two dark bands in the female. Length, ♀, 5 mm., width, 2.5 mm.

Vertex twice as wide as its median length, half wider than in *vandykei*, the front less than half wider at apex than base while in *vandykei* it is twice as wide. In profile the face is more convex than in *vandykei* but much less angled than in *clitellus*. Male pygofers with a narrow notch and a triangular projection as long as wide, the plates half longer than the pygofers, separated by a long oval space, the inner angles prominent instead of rounding as in *clitellus*. The dorsal

membrane long, narrow, with an oval expansion at apex and no teeth.

Color: Pale tawny above and below the margins and carinae of vertex and pronotum lighter. Elytra milky subhyaline with heavy dots on the nervures, these dots with long black hairs in fresh examples. Female with a dark band just before the middle enclosing a circular light area inside costa and irregular transverse marking from the stigma back to the darker apical nervures. Sometimes two smoky areas on the clavus. Male with all markings reduced in size and intensity.

Holotype ♀, allotype ♂, and three paratypes, Tucson, September 1, 1929, and two, September 29, 1929, and two, Chiricahua Mountains, September 11, 1935, all taken in the mountains of southern Arizona by the writer.

Cixius comptus Fowler.

This species was described from two females from the Sierra Madre Mountains of Mexico (Hine) that the writer sent Canon Fowler. It has since been taken in the Santa Rita, Chiricahua, and Huachuca Mountains of southern Arizona by the writer and the male is described as follows:

Male: Resembling the female in form and markings, smaller. The vertex very short and broad, three times its medium length. The face broad and evenly convex. Male pygofer opening narrow, the projection broad, rounding, the plates one-half longer than the pygofer, broad towards the apex and broadly rounding. The dorsal membrane narrow, reflexed, and the angles extending under the plates as two long spines.

Allotype ♂, August 2, 1931, and paratype, July 29, 1935, both taken in the Huachuca Mountains of Arizona by the writer.

Cixius montanus Fowler.

This species was described, from females only, from Guerrero, Mexico. A series taken in that region last year by Ball and Stone shows that *C. flavo-brunneus* Fowler, described from males only from the same place, is the male of this species. These, like the males of *clitellus*, lack the color pattern of the females. Fowler did not show the dorsal membrane, the most distinctive character in this group. It is narrow, reflexed, and has two stout, blunt approximate projections.

Cixius cultus var. *ephratus* Ball n. var.

Size and form of *cultus*, nearly, including the long vertex and narrow elytra. Vertex and mesonotum black, the carinae reddish. Fovea of front and vertex, the lateral carinae, pronotum and tegulae broadly white in sharp contrast. Elytra milky white with a pair of black stripes outside the inner claval nervure, interrupted before the apex of clavus, another pair arising just outside the fork of the cubitus and running to the extremity of the elytra.

Holotype ♀, allotype ♂, and one paratype taken by the writer at Ephrian, Utah, June 15, 1904. This is probably a distinct species as there are differences in the head, in the breadth of the styles and in the breadth of the dorsal membrane, but as there is but the one male available it is probably best to describe it as a variety of *cultus* and hope that more material will appear.

Myndus nigrifrons Ball n. sp.

Size and form of *catalinus* Ball nearly, but the front black with a pair of oblique white lines below instead of white with oblique black lines above. Length, ♀, 4.5 mm., width, 1.5 mm.

Vertex as in *catalinus*, the front slightly narrower, the clypeus with the disc flat, the lateral margins carinated. The apex at an oblique angle instead of the disc rounding as in that species. Venation of the same pattern but the radius forking three times as far back of the stigma as in *catalinus*.

Color: Vertex and face black, the carina white, a pair of oblique white stripes from the lower margin of the front reaching almost to the center of disc. Clypeus black, pronotum white with a black "shadow" behind the head and a pair of black spots in front of the alulets. Mesonotum black in the female, tawny with light carinae in the male. Elytra white with the oblique black apical pattern of *catalinus*.

Holotype ♀, allotype ♂, and one male paratype taken on Bear grass (*Nolina*) by the writer, September 2, 1936, Alpine, Texas.

Oliarus sonoitus Ball n. sp.

Resembling *aridus* Ball, much larger, darker, with the elytra unmarked, the vertex much broader than long. Length, ♀, 10 mm., ♂, 8 mm.; width, ♀, 4 mm.

Vertex one-half or more broader than long, rather than

about equal as in *aridus*. The lateral fovea broadly triangular, the face broader than in *aridus*. Elytra both long and broad, the central anteapical much longer than in *aridus*. Male styles right-angled at apex, the reflexed portion very broad, scarcely exceeding the pygofers. The dorsal membrane broad, curved, the apex truncate instead of narrowly produced as in *aridus*.

Color: Black, the carinae and margins of segments narrowly light, the broad median tablet of pronotum often tawny. Face testaceous in the female, dark brown in the male with large almost rectangular creamy spots on the sides. Elytra subhyaline, the nervures very faintly embrowned, becoming darker apically, weakly setigerous, no spots or banding even in the darkest forms.

Holotype ♀, allotype ♂, and 14 paratypes received from Dr. W. W. Jones and collected at Douglas, Arizona, July 12, 1932. This is the species the writer keyed out as *pima* Kirkaldy in his 1934 paper. A recent study of the Kirkaldy type series in the California Academy collection, however, shows that while it is mixed, the majority are what the writer described as *nogalantus* and that the greater portion of Kirkaldy's description was based on that species. It is, therefore, fixed as the type of *pima* and this species given a new designation as above.

Oliarius pygmaeus Ball n. sp.

Resembling *apache* Ball in the heavy dotting on elytra but much smaller, paler, without the setigerous bristles. Pale brown with a white collar. Elytra milky with dots and cross nervures dark. Length, ♀, 4 mm., ♂, 3.5 mm.; width, 1.5 mm.

Vertex twice longer than wide, much narrower than in *apache* with extremely long acute fovea. Face long and slender, the lateral margins of front definitely concave, then broadly expanded and suddenly contracted to the clypeus without foliaceous lateral margins and no median carinae, while in *apache* the lateral carinae of face are foliaceous throughout and the median carina continuous. Pronotum with the posterior margin definitely angular as is the submarginal carina, instead of rounding as in *apache*. Elytra with light nervures heavily and uniformly dotted, the dots inclined to be staggered on the sides of the nervures, sometimes almost opposite each other instead of in a single median row as in *apache*. Male plates resembling *apache*, much broader and flatter at the base with the reflexed ends narrower, the dorsal membrane a broad semi-

circular fold close to the plates rather than a tapering scoop-like process at some distance, as in *apache*.

Color: Pale, the base of vertex darker, usually a pair of dark marks running back from behind the eyes on the very light pronotum. Lateral compartments of mesonotum brown, the central tablet testaceous or lighter. Elytra milky with black dots on nervures throughout and all the cross nervures narrowly dark. Below almost black, the carinae on front light.

Holotype ♀, allotype ♂, and 14 paratypes taken by the writer at Willcox, Arizona, August 9, 1937.

Oecleus texanus Ball n. sp.

Resembling *nolina* B. & P., slightly stouter with a shorter head and a dark mesonotum with three light carinae. Length, 6 mm., width, 2.1 mm.

Vertex not projecting as far beyond eyes as in *nolina*, about as in *lineata* but the front definitely angled as seen from the side, the apex right angled, the vertex extending little more than its own width in front of the eyes. The nodal cell as in *lineata*, the stigma dark.

Color: Front and below black, the carinae and sutures white, the median carina not more than half the length of the front and broadly interrupted at the ocellus. Vertex and pronotum dark with the carinae broadly light. Mesonotum very dark, the central tablet very broad with three white carinae, the median one sometimes dilated posteriorly, a pair of oblique dashes outside this tablet. Elytra milky subhyaline, the black abdomen showing through; the nervures are pale and finely dotted, the apical ones brown.

Holotype ♀, Leverton, Texas, May 5, 1934; allotype ♂ and two paratypes, Brownfield, Texas, May 1, 1934, all taken on the dwarf yucca (*Y. glauca*) by the writer. Mr. Oman sent badly rubbed examples of this species from Texas.

Oecleus natatorius Ball n. sp.

Resembling *planus* but much larger, form of *texanus* nearly but light straw with two lines on mesonotum. Length, 6-7 mm., width, 2.5 mm.

Vertex and front meeting in a very slightly acute angle, the front in profile rounding without trace of angle. Vertex rather narrow and projecting beyond eye a little more than its width.

Face narrow, the median carina extending the full length except where interrupted by the distinct red median ocellus. The nodal cell strongly arched, but little longer than wide, the stigma unmarked or with a black dot posteriorly. One or more of the apical nervures twice forked. Male with the dorsal membrane extremely long, two or three times the length of the styles, the apex broadly rounding and canopied.

Color: Face and all below straw, occasionally a pair of dark lines on face. Above pale, the mesonotum tawny with the carinae white and occasional dark lines. Elytra pale straw, becoming slightly golden apically. The nervures concolorous, dark dots appearing on the apical half.

Holotype ♀, allotype ♂, and 14 paratypes taken by the writer on clumps of grass growing in a damp wash in Brown Canyon, Baboquivari Mountains, July 26, 1933.

Anotia caliginosa Ball n. sp.

Resembling *bonneti* but much smaller and darker. Smoky above, elytra smoky with narrow margins and central area pale. Length, 5 mm.

Head as seen from side continuing the slope of the mesonotum instead of projecting angularly above that line as in *bonneti*, then rounding over to the convex front which is much in advance of the broad clypeus. Male antennae very broad and flat, much broader than in *bonneti* and more deeply notched at the attachment of the bristle. Elytra broader at apex and shorter than in *bonneti*, with the fourth to seventh anteapical cells long, slender, and nearly parallel margined, instead of quite diverse in size and shape as in that species. Male plates long, slender, nearly parallel, margined before the long obliquely narrowing apices which entirely lack the sickle-like hooks of *bonneti*.

Color: Eyes brown, pronotum and mesonotum smoky, elytra deep smoky with the nervures concolorous. The margins of elytra narrowly creamy white, apical portion of disc subhyaline with dusky margins to the nervures. The apical and two costal nervures often narrowly scarlet with a white margin. Head and all below ivory white.

Holotype ♀, and allotype ♂ (damaged), Patagonia, Arizona, August 8, 1932. Paratype male, Nogales, Arizona, August 7, 1932.

All collected by the author. This is by far the smallest and darkest species of this fragile group.

Anotia lineata Ball n. sp.

Form of *caliginosa* slightly larger, smoky with white nervures throughout, a pale stripe on dorsum and on each elytron. Length, 6 mm.

Head as seen from side nearly as in *caliginosa* or *Amalopota fitchi*. The front more produced below and therefore more nearly vertical in profile. The vertex decidedly wider at base than in *caliginosa*. Elytra longer and narrower than in that species. The anteapical cells regular and nearly parallel margined. Male plates long and slender as in *fitchi* but broadening at the apex and transversely folded over each other, instead of narrowing and curving upwards.

Color: A creamy median stripe starting on vertex and widening to occupy half the mesonotum, then narrowing to the apex of claval areas, outside this a smoky brown or black stripe on either side arising on the apex of front and running back across the antennae, eyes, lateral tablets of pronotum and mesonotum widening on the elytra to occupy all but the costal and sutural margins and a narrow oblique ivory stripe arising on the hinge and running straight to the anterior apical angle occupying the membrane between the medius and cubitus. Elytral nervures white. Below pale yellow, the tibiae smoky.

Holotype ♀, allotype ♂, and a paratype male (with the wings broken) taken in the Santa Rita Mountains, September 1, 1929 (labeled Tucson). Three male paratypes Atascasa Mountain, August 15, 1935, and one male Huachuca Mountains, September 13, 1935, all taken by the writer in the mountains of Southern Arizona. This species resembles *Amalopota fitchi* but is smaller, lacks the red on stigma, and has a distinct color pattern and male plate.