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A Study of the Genus *Chrotogonus* AUDINET-SERVILLE, 1839 (Orthopt., Acrid., Pyrgomorphinae)

I. The Subgenera *Obbiacris*, Nov. and *Shoacris*, Nov.

by

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(University of Nottingham)

The genus, *Chrotogonus* SERVILLE, was first treated in a comprehensive manner by BOLÍVAR (1884) but it presents taxonomic problems of the greatest difficulty. In spite of (and, in large measure, because of) this author's subsequent revision (BOLÍVAR, 1904), the classification of the genus still remains in a state of utter confusion.

The majority of the species, despite much individual variation, are basically very similar. Two, however, are sufficiently different from the remainder to merit separate treatment and may be regarded as belonging to distinct subgenera. Both have been referred to in the literature and I present the following paper as a prelude to a more comprehensive one devoted to the species included in *Chrotogonus* in its more restricted sense. The first of the two species treated herein is that erroneously recorded by SCHULTHESS (1898) under the invalid name, *Chrotogonus angustatus* BLANCH.¹, and the second is *Ch. bormansi* I. BOL.

I have to thank Professor P. BOVEY, of the Entomologisches Institut der Eidg. Technischen Hochschule, Zürich, for the loan of the *Chrotogonus* material from the collection of Dr. A. VON SCHULTHESS-SCHINDLER which yielded the material referred to, and it is due to the kindness of Dr. A. MORALES AGACINO, of the Instituto español de Entomología, Madrid, that I was able to examine the type of *Ch. bormansi*.

¹ BLANCHARD (1836) described a species, *Ommexecha angustum* (now *Tenuitarsus angustum*), which, through a *lapsus calami*, was called *Chrotogonus angustatus* BLANCH. by BOLÍVAR (1884). SCHULTHESS would appear to have determined his material by means of BOLÍVAR's key.

Obbiacris, n. subg.

Rather robust, depressed, rugose. Antennae weakly clavate, the club distinctly segmented as in *Chrotogonus*, s. str. Eyes globose, prominent. Frons similar to *Chrotogonus*, s. str., very slightly inclined, somewhat rugose; frontal ridge compressed between the antennae, weakly sulcate, wider below the median ocellus and continuing weakly to the clypeus. Fastigium verticis very short, three or more times as broad as long, gibbous or very obtusely angled; dorsal impressions obsolescent or very indistinct. Vertex between the eyes concave with carinate margins. Thorax wide, pronotum rugose and tuberculate, of the same general form as in *Chrotogonus*, s. str. Fore and middle legs, especially the latter, slender; hind tibia with four very long apical spurs somewhat similar to those of *Tenuitarsus* I. Bol. Tegmina similar to those of *Chrotogonus*, s. str. (when these are fully developed). External genitalia unspecialized. Internal genitalia similar to *Chrotogonus*, s. str.

Type species: *Chrotogonus (Obbiacris) arenicola*, n. sp.

This new subgenus is very near to *Chrotogonus*, s. str. but may be distinguished by the extremely short, broad fastigium verticis with its obsolescent dorsal impressions, by the middle pair of legs, which almost suggest those of *Tenuitarsus* in their slenderness, and by the long hind tibial spurs which are also reminiscent of the same genus.

***Chrotogonus (Obbiacris) arenicola*, n. sp.**

(Figs 1-7).

Chrotogonus angustatus Blanch. [sic!], Schulthess, 1898, *Ann. Mus. Stor. nat. Genova* (2), 19: 189, (nec I. Bolivar, 1884).

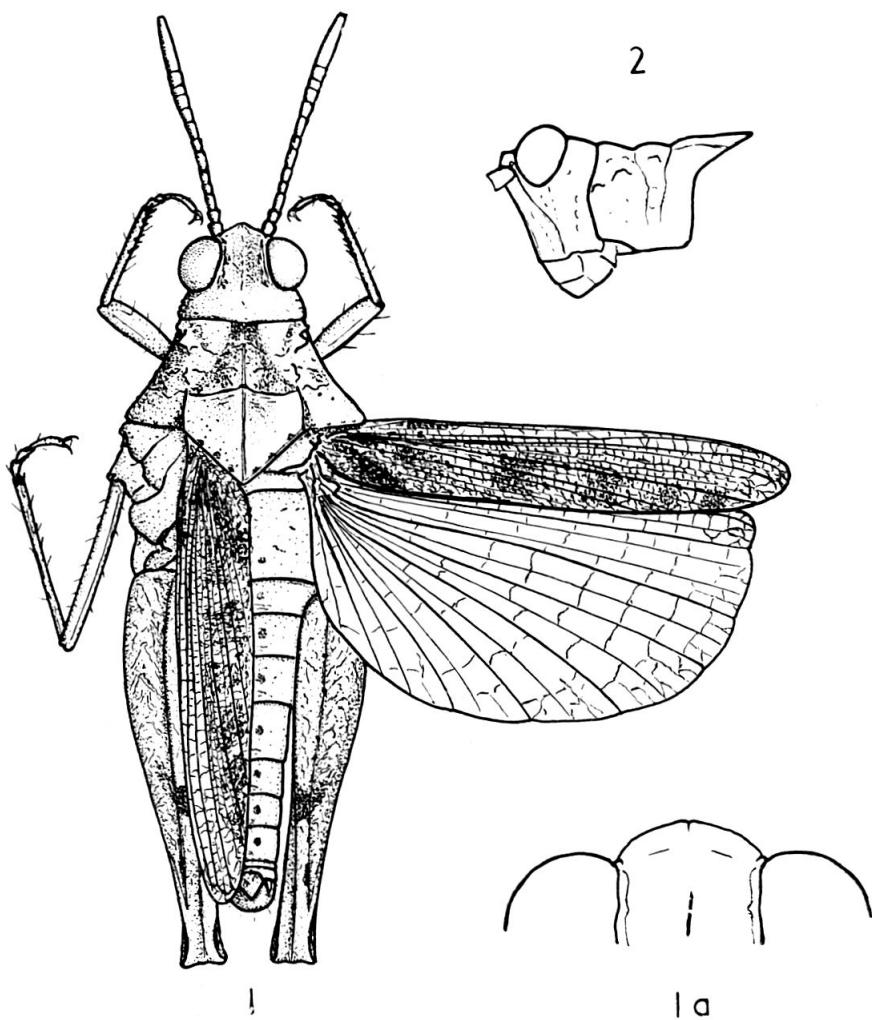
Type: ♂, [Somalia] Obbia, [Juin], 1891 (Rob[ecchi]-Brich[etti]).
(Entomologisches Institut, Zürich).

Smaller than any described species of *Chrotogonus* and less rugose than most; rather robust.

Head: Antennae weakly clavate, slightly longer than the head and pronotum together, 13-segmented, the club comprised of the terminal five segments, the apical segment truncated and six times as long as wide; remaining segments of variable length, mostly a little longer than wide but the length never more than twice the width. Eyes very prominent, extending above the vertex in profile (fig. 2). Frons rather strongly rugose, only very slightly oblique (fig. 2); frontal ridge rather narrow, expanded at the median ocellus and again gradually below it towards the clypeus; lateral frontal carinae strong, rather sinuous. Cheeks

strongly rugose. Vertex and fastigium as illustrated (fig. 1), median carinula obsolete; occiput smooth.

Thorax : Pronotum broad and rugose, dorsal aspect as illustrated (fig. 1); lateral lobes rugose with two large callosities above the middle



Figs. 1-2. — *Chrotogonus (Obbiacris) arenicola*, n. sg. & sp. — 1. Male (Type), dorsal; 1a. Female (Allotype), fastigium verticis. — 2. Male (Type), head and pronotum, lateral.

of the prozona and placed obliquely one behind the other, the anterior one near the anterior margin of the pronotal lobe and the posterior one a little above it (fig. 2); infero-anterior angle of pronotal lobe obtuse, infero-posterior angle a right-angle. Prosternum forming a distinct raised collar with a small compressed tubercle on either side. Meso- and metasterna as illustrated (fig. 3).

Legs : Anterior femur slightly thickened; fore tibia of about the same length as the femur with a pair of apical, and four pairs of ventral spines in the apical half; fore tarsus with the apical segment compressed

and considerably longer than the other two together. Middle femur rather long and slender, compressed; middle tibia a very little shorter than the femur, with spines distributed similarly to those of the fore tibiae but the basal ones much weaker; middle tarsus similar to fore

tarsus. Hind femur rather stout, rugosely ribbed, about four times as long as wide; hind tibia a little shorter than the femur, with eleven inner and six outer dorsal spines, and terminating in four long spurs as illustrated (fig. 4), the outer ones considerably shorter than the inner; hind tarsus slender, compressed, segments as illustrated (fig. 4).

Wings: Tegmina rather short, not extending as far as the hind femora at rest; anterior and posterior margins sub-parallel, roundly tapering to the apex; main veins with a few small granular tubercles. Hind wings almost, but not quite, so long as the tegmina.

Abdomen: Unspecialized. Tenth tergums lightly excised. Epiproct broadly triangular, about as wide

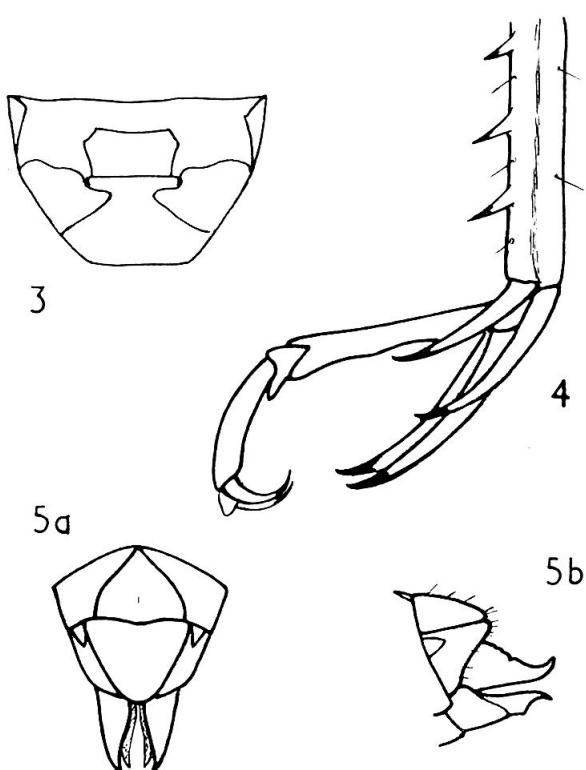
Fig. 3-5. — *Chrotogonus (Obbiacris) arenicola*, n. sg. & sp. — 3. Male (Type), sternal lamina. — 4. Male (Type), Hind tibia and tarsus. — 5. Female (Allotype), external genitalia: a) dorsal; b) lateral.

as long. Cerci only reaching to about two-thirds of the length of the epiproct. Subgenital plate rounded.

Internal Genitalia: Phallus and epiphallus as illustrated (fig. 6).

Measurements: Length 10.5, antenna 3.3, pronotum 2.3, tegmen 7.7, hind femur 7.3 mm.

Coloration: General colour pale testaceous, suffused fuscous, especially on the pronotum; tubercles and surrounding patches mostly whitish. Abdomen with a pair of fuscous spots on each tergum and a faint indication of a similar series on the sterna. Tegmina each with about five irregular fuscous maculae. Hind femur with a dark median dorsal fascia which is continued obliquely and indistinctly across the outer face; outer femoral carinae with a few small, dark fuscous specks; tibial spurs and spines tipped fuscous. Hind wings hyaline, colourless.



Allotype: ♀, [Somalia] Obbia, 1891 (Part of the same series as the type; Entomologisches Institut, Zürich).

Agrees closely with the type but is larger. It differs also in having a more rounded and even wider fastigium verticis and a comparatively wider interocular space (fig. 1 a); the frons is almost vertical; the antennal segments are sometimes slightly more than twice as long as wide; the pronotum is broader and mesosternal interspace is a little wider; the hind wings when at rest are equal in length to the rather broader tegmina and the tenth abdominal tergum is triangularly excised to the base (fig. 5 a). The ovipositor is very short and stout (fig. 5 b).

In coloration the allotype is a little darker, the fuscous suffusion and maculations being a little more distinct, especially a dark chevron on the anterior part of the pronotal disc and a blackish patch at the base of each tegmen.

Measurements: Length 14.0, antenna 4.5, pronotum 3.2, tegmen 11.3, hind femur 9.1 mm.

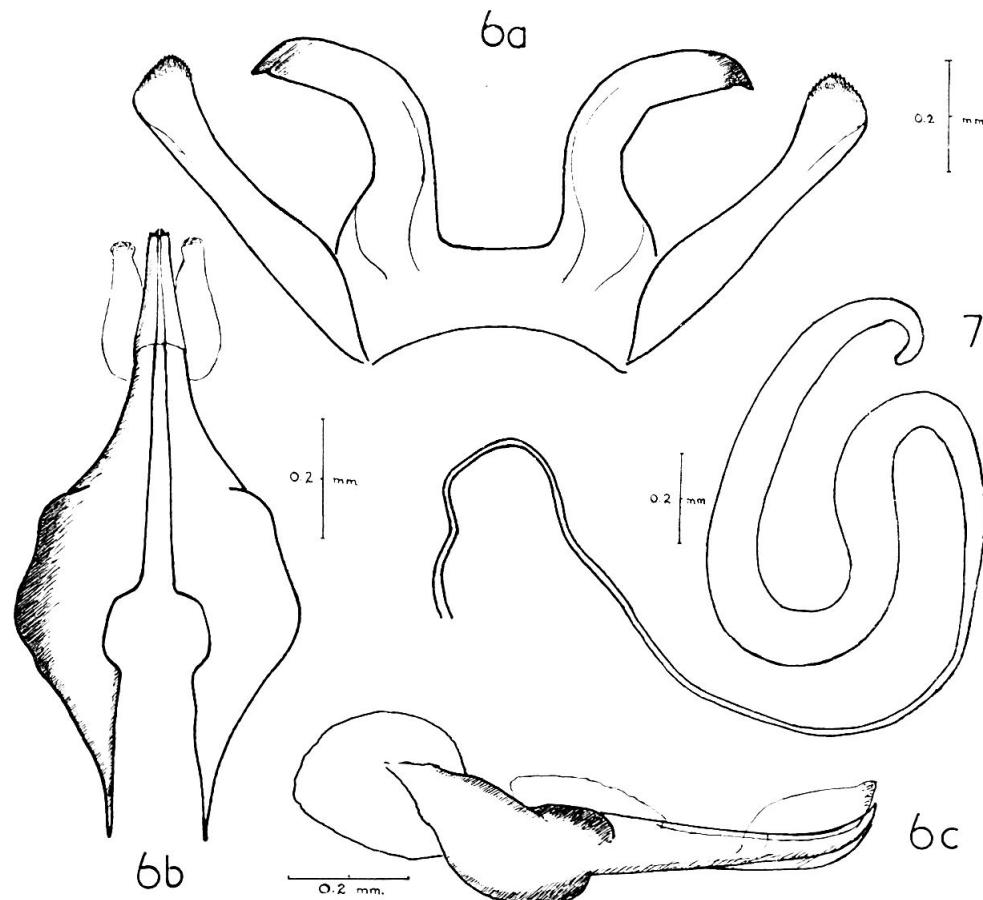


Fig. 6-7. — *Chrotogonus (Obbiacris) arenicola*, n. sg. & sp. — 6. Male (Type), internal genitalia, a) epiphallus; b) phallus, dorsal; c) *Id.* lateral. — 7. Female (Paratype), spermatheca.

Paratypes : 3 ♀♀, [Somalia] Obbia, 1891 (Part of the same series as the type ; one presented to the British Museum, others in Entomologisches Institut, Zürich).

Distribution : The species is known only from the type locality. I have myself observed what was undoubtedly the same species at Obbia (31. XII. 1946) among extremely short sparse vegetation upon an extensive belt of sand some little distance behind the coastal dunes. Unfortunately the specimens collected by me were accidentally destroyed. I have not observed the species at any of the several other coastal localities visited by me in Somalia, neither have I come across it inland. I have, however, not met quite comparable ecological conditions elsewhere and it may be that the species requires a rather specialized habitat.

Obbiacris arenicola appears to have some features in common with the genus *Tenuitarsus*. This may perhaps be due to a certain similarity of habit since it will (like certain members at least, of that genus) bury itself in the sand, whereas I have not yet observed true *Chrotogonus* to do this. *O. arenicola*, however, seems to leave rather more of itself exposed than does *Tenuitarsus* since, in the very few observations I was able to make, both the head and the pronotal disc remained visible, whereas in *Tenuitarsus* only the eyes, vertex and antennae are left uncovered. This habit is recorded for *T. angustus* (BLANCH.) by MORALES AGACINO (1944) and I have observed it also (in what now proves to be the same species) in the Mudugh, Somalia (8. I. 1947).

Shoacris, n. subg.

Robust, strongly depressed, granulose and rugose. Antennae short, weakly clavate, the club for its greater part distinctly segmented, the terminal segment subtruncate. Eyes smaller than in *Chrotogonus*, s. str. and not especially prominent, the distance between their outer faces much less than the greatest width of the head. Frons rather similar to *Chrotogonus*, s. str. but with the lateral frontal carinae a little less oblique; frontal ridge strongly compressed between the antennae and distinctly sulcate, slightly constricted below the median ocellus and continuing to the clypeus. Fastigium verticis very short and obtuse, considerably more than twice as wide as long ; dorsal impressions distinct and narrowly margined. Vertex between the eyes gradually sloping to the fastigium, not concave and only indistinctly margined. Thorax very wide ; pronotum less angular than in *Chrotogonus*, s. str. but of the same general form, rugoso-tuberculate and granulated. Wings absent. Legs and abdomen as in *Chrotogonus*, s. str.

Type species : *Chrotogonus bormansi* I. BOLÍVAR, 1886.

This subgenus is separated from *Chrotogonus*, *s. str.* on account of its very broad, toad-like appearance, its wide, short fastigium verticis (which is, however, less wide than in *Obbiacris*), its short, broad head, already remarked upon by BOLÍVAR (1884), its small, non-globose eyes, and its short, rather more feebly clavate antennae. The completely apterous condition can probably also be regarded as a subgeneric character. The coloration and sculpturation of the type species is also quite distinctive.

Although BOLÍVAR has already described this species, the description leaves much to be desired and, since no figure has previously been published, I give the following illustrated redescription of the type.

Chrotogonus (Shoacris) bormansi I. BOL.

(Figs. 8-12)

Chrotogonus Bormansi I. BOLÍVAR, 1884, *An. Soc. esp. Hist. nat.* **13** : 37, 39.

Chrotogonus Bormansi BOL., I. BOLÍVAR, 1904, *Bol. Soc. esp. Hist. nat.* **4** : 95, 110.

Chrotogonus Bormansi, BOLÍVAR, I. BOLÍVAR, 1909, *Gen. Insect.* **90** : 7.

Chrotogonus Bormansi, BOL., KIRBY, 1910, *Syn. Catal. Orthopt.* **3** : 302.

Type: ♀, Ethiopia, Scioa [Schoah or Shoá], Kolla de Giagane¹ (*Antinori*)
(Instituto español de Entomología, Madrid)

Very robust, slightly above average size as compared with most species of *Chrotogonus*, *s. str.*

Head : Antennae scarcely longer than the pronotum, as illustrated (fig. 8 a), with eleven distinct segments, the terminal one almost six times as long as wide and with some segmentation imperfectly indicated; remaining segments of variable length, mostly sub-quadratae. Eyes small, of the shape and proportions illustrated (figs. 8, 10). Frontal profile nearly vertical, slightly sinuous, somewhat rounded at the fastigium (fig. 10); frontal ridge (fig. 9) distinct but not very strong below the median ocellus, compressed between the antennae, widening at the ocellus, constricted below it and widening again a short distance thereafter, uniform below this almost to the clypeus (fig. 9); lateral frontal carinae scarcely sinuous. Fastigium verticis as illustrated (fig. 8); median carinula of head only very faintly indicated; inter-ocular

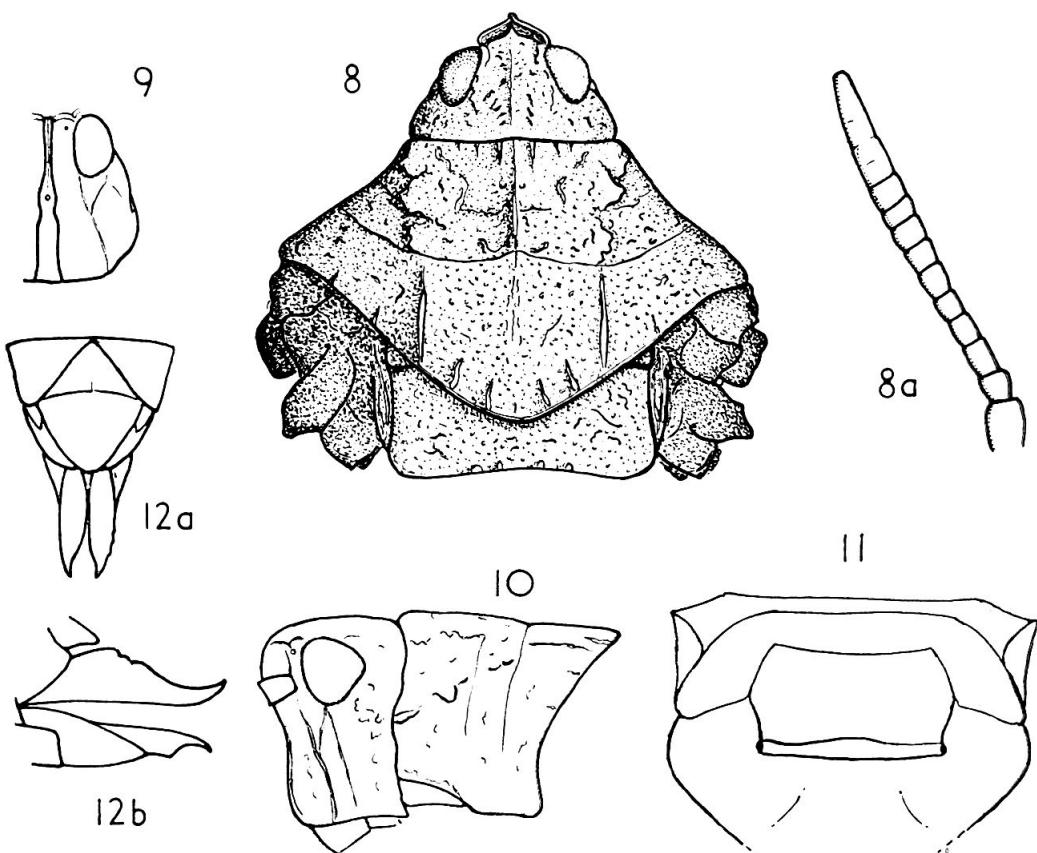
¹ The specimen was lost for some time but was rediscovered by Dr. A. MORALES AGACIÑO in Madrid. BOLÍVAR presumably never returned it to DE BORMANS from whose collection it was described, so that it did not go with that author's Acridid material to Oxford per Dr. M. BURR. DE BORMANS' own label is missing from the specimen which bears the number 21 and, in BOLÍVAR's hand, the following : « *Chrotogonus Bormansi* BOL. Scioa, Antinori (Tipo). »

space more than twice the width of an eye (as seen from above). Whole head somewhat rugose and considerably widened behind the eyes.

Thorax : Pronotum as illustrated (figs. 8, 10), granules and tubercles characteristic (as in original description), the former rounded and very dense; typical sulcus weak, placed about the middle of the disc; anterior sulcus obsolescent; median carina indicated in the pro- and mesozona but obsolete in the metazona; lateral carinae distinct in the metazona but irregular and tuberculate in the pro- and mesozona. Mesonotum almost completely concealed by the pronotum, and with four small tubercles on the posterior margin. Menanotum about as long as the pronotum in front of the typical sulcus. Prosternum as in typical *Chrotogonus*. Sternal lamina as illustrated (fig. 11) [the metasternum is distorted posteriorly].

Legs : Unspecialized, as in *Chrotogonus*, s. str. Hind femora slightly less than four times as long as wide; hind tibial spurs and hind tarsi rather short.

Abdomen : External genitalia as illustrated (fig. 12).



Figs. 8-12. — *Chrotogonus (Shoacris) bormansi* I. Bol. (n. sg.), female (Type). — 8. Head and pronotum, dorsal; 8 a. Antenna. — 9. Frons. — 10. Head and pronotum, lateral. — 11. Sternal lamina. — 12 a. External genitalia, dorsal; b. ovipositor, lateral.

Measurements : Length 19.5, antenna 4.5, pronotum 4.0, hind femur 8.3 mm. (N. B. These measurements are more exact than those given in the original description.)

Coloration : Given rather fully in the original description but duller than might be expected from this so that the insect as a whole presents a generally greyish-brown appearance when viewed from above. The numerous minute granules are yellowish-testaceous. The pronotum, the posterior margins of the metanotum and abdominal terga and the whole of the ventral surface are dark reddish- or purplish-grey ; a maculation at the middle of the dorsal keel of the hind femur and various spots on the lower keel, together with the hind tibiae are of the same colour. The margins of the lateral pronotal lobes, the posterior margin of the sternal lamina, a lateral maculation on each of the last few abdominal segments and ventral ovipositor valves, and the tibial spines (except for their black tips) are all yellowish-testaceous. The frons is strongly maculated testaceous and is crossed by a yellowish-testaceous band which extends backwards just below the eyes to the anterior margins of the lateral pronotal lobes.

Distribution : The type is unique. This is almost undoubtedly a high-altitude species, possibly occurring only above 8,000-9,000 feet. I have examined a good deal of Abyssinian material of the genus *Chrotogonus* from various lower elevations but they all belong to more typical species.

These two new subgenera seem to represent specialized offshoots from the main *Chrotogonus* stem. Both of them apparently occur in very localized, rather peculiar habitats not favoured by more normal members of the genus. In spite of their special features, however, it would be inadvisable to regard them as having full generic status since their affinities with *Chrotogonus*, s. str. are very close. Treated individually, *Obbiacris* and *Shoacris* would undoubtedly be regarded as generically distinct from each other.

In conclusion the major points of difference between the three subgenera may be summarised as follows :

Fastigium verticis three or more times as wide as long, rounded or very obtuse, dorsal impressions very ill-defined ; eyes globose, prominent ; head not very greatly wider behind the eyes than the greatest width between their outer faces ; middle tibiae notably slender ; hind tibial spurs very long ; (alate)... *Obbiacris*.

Fastigium verticis much more than twice as wide as long, very obtuse, dorsal impressions distinct and strongly margined ; eyes not globose nor particularly prominent ; head very considerably wider behind the eyes than the greatest width between their outer faces ; middle tibiae and hind tibial spurs unspecialized ; (apterous)... *Shoacris*.

Fastigium verticis at most not much more than twice as wide as long, dorsal impressions distinct but usually not very strongly margined ; eyes globose, prominent ; head not very greatly wider behind the eyes than the greatest width between their outer faces ; middle tibiae and hind tibial spurs unspecialized ; (alate even if extremely brachypterous)... *Chrotogonus*, s. str.

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