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VALUE OF THE TERGITE PRECEDING THE SUPRA-ANAL PLATE IN THE CLASSIFICATION OF MALE ACRIDINAE [Orthoptera]

By

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THE TAXONOMIC VALUE OF THE TERGITE PRECEDING THE SUPRA-ANAL PLATE IN MALES OF THE ACRIDINAE.

By CLIFFORD L. CORKINS.*

While preparing a list of the *Orthoptera* of the state, from the collection and notes in the Montana State College, the writer found that the tergite preceding the supra-anal plate was of considerable taxonomic value in classifying males of the *Acridinae*. The use of this segment, because of the furculae, in separating the species of the *Melanopli*, has become general and well understood. The existence and value of a homologous structure in the *Acridinae* has not been considered. Yet, an examination of the males of fifteen Montana species represented by nine hundred and thirty-seven individuals, has shown this character to be of as constant taxonomic value as its homologue in the *Melanopli*.

The tergite preceding the supra-anal plate in males of the *Acridinae* is separated on the mid-dorsal line, either by a complete division or a distinct suture, into two lateral plates (Figure 1.) Some species have paired node-like processes on each of the lateral plates of the tergite, with the nodes overlying the supra-anal plate. In the case of the furculae of the *Melanopli*, the paired processes may be attenuated and finger-like on one species, only node-like on another, or entirely wanting on yet another. The furculae of the *Acridinae* species examined are never more than node-like. However, the structure of the nodes varies so greatly as to make them of as much use as if they were attenuated. Likewise, as in the *Melanopli*, the furculae may be entirely wanting. In such a case the structure of the lateral plates, usually, not invariably, is sufficiently different to make separation of the species possible.

The use of the furculae in the classification of the *Melanopli* is general, but not all species can be determined by them. However, this character in the group as a whole materially aids in the differentiation of the species. This is also true of the *Acridinae*. This one character has been of more use to the writer in accurately separating the Montana species of the group than has any other one used in a formal key.

Since the compilation, a year ago, of the notes on the taxonomic value of the tergite preceding the supra-anal plate, as applied to Montana *Acridinae*, the writer has had the opportunity to study the material in the collection of the Colorado Agricultural College. These studies further indicate that this structure is reasonably constant, and does have a distinct value in classi-

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April, 1921-July, 1923

fication. Only in the genus *Ageneotettix* does there seem to be a lack of constancy of the structure of the furculae of the Colorado species. Because the determination of these species were doubtful, and the series incomplete, they have been omitted at this time. The author feels certain that a larger series of specimens may show some graduation of the form of this tergite from the typical, but no more so than is the case with many other structural characters of taxonomic importance.

These further studies have indicated very clearly that the structure of the supra-anal plate, in addition to or in conjunction with the furculae, may often be of definite service taxonomically. For this reason, a short description of this tergite will also be given.

DESCRIPTIONS

The descriptions which follow are supplementary to the plates. They are given for the purpose of better familiarizing the user with many differences which occur in this structure.

Mermiria bivittata, (Serv.) (Fig. 2.)—Presence of furculae but faintly indicated by the incurving of the caudal margins of the lateral plates. Lateral plates narrowly separated on the median line.

Supra-anal plate long, extending distinctly beyond the ends of cerci. An indication of a transverse suture first curving caudad and then craniad, nearly bisects the plate. The lateral margins unbroken. The tip broadly rounded.

Mermiria neomexicana, (Thom.) (Fig. 3.)—Furculae absent. Lateral plates narrowly separated on the median line. Median margins of the lateral plates narrow and convex. Caudal margins concave.

Supra-anal plate long, extending beyond the tips of the cerci. Lateral margins broken caudally by a notching into the plate. Tip narrowly rounded.

Acrolophitus hirtipes (Say.) (Fig. 4).—Furculae distinctly present, of medium size. The lateral plates attingent or subattingent on the median line. Median margins of the furculae strongly concave. Caudal margins nearly straight. Notching not abrupt but cutting almost through the lateral plates. Lateral plates beyond the furculae broadening abruptly, the margins straight.

Amphitornus bicolor (Thom.) (Fig. 5).—Furculae distinctly present. Median margins of the furculae convex and meeting each other for a short distance from their orgin. Caudal margins also convex. Notching not abrupt and cutting only slightly into the lateral plate. Lateral plates beyond the furculae abruptly broadening, the margins convex.

Opeia obscura (Thom.) (Fig. 6).—Presence of the furcu-

lae but very faintly indicated. Lateral plates pointedly attingent or subattingent on the median line. Lateral and caudal margins of the furculae convex. Notching only indicated by a slight incurving of the caudal margins.

**Cordillacris affinis*, (Morse.) (Fig. 7).—Furculae faintly indicated by a slight incurving of the caudal margins of the lateral plates. Lateral plates on the median line pointed and widely separated. Caudal margins of the plates first convex and then slightly concave.

Supra-anal plate short, not extending to the tips of the cerci. An indication of a transverse suture curving craniad, nearly bisects the plate. The lateral margins unbroken. The tip broad and almost a straight line.

Cordillacris cinerea, (Brun.) (Fig. 8).—Furculae absent, Lateral plates pointedly attingent or subattingent on the median line. Lateral margins of the lateral plates concave.

Supra-anal plate relatively short, not reaching the tips of the cerci. An indication of a transverse suture curving craniad occurs about one-fourth of the distance caudad. Lateral margins of irregular curvature and finally broken caudally by a notching into the plate. Tip pointed, the portions of the lateral margins forming it being slightly convex.

Cordillacris crenulata (Brun.) (Fig. 9).—Presence of furculae indicated only by an incurving of the caudal margins. Lateral plates widely separated on the median line. The median margins of the furculae a straight line and strongly divergent. Lateral plates beyond the furculae scarcely broadening at all.

Cordillacris occipitalis (Thom.) (Fig. 10).—Presence of furculae but faintly indicated by a slight incurving of the otherwise unbroken line of the medio-caudal margin of the lateral plates. Lateral plates pointedly attingent or subattingent on the median line.

Phlibostroma quadrimaculatum (Thom.) (Fig. 11).—Furculae distinctly present. Lateral plates pointedly attingent or subattingent on the median line. Median margins of the furculae straight or slightly concave. Caudal margins straight or slightly convex. Notching into the lateral plates abrupt and cutting about one-half the way through. Lateral plates beyond the furculae broadening abruptly, the margins convex.

Orphulella pelidna (Burm.) (Fig. 12).—Furculae absent. Median margins of the lateral plates but slightly convex. Caudal margins first gently convex and then varying to gently concave. Lateral plates broadly attingent on the median line.

* The determination of a single male of this species in the collection is doubtful according to Dr. C. P. Gillette, who listed it in Bulletin 94 of the Colorado Agricultural Experiment Station.

Since first writing this paper, Mr. Morgan Hebard examined the specimen of *C. affinis* above described and pronounced it *C. cinerea*. Our specimens determined as *C. cinerea* are distinctly different from this, and are possibly some other species.

Orphulella salina, (Scudd.) (Fig. 13).—Furculae faintly indicated by a slight incurving of the caudal margins of the lateral plates. Lateral plates broadly attingent on the median line. Caudal margins first convex, then, near the cerci, concave.

Supra-anal plate short, not reaching the tips of the cerci, and shield shaped. An indication of a transverse suture curving gently craniad occurs about one-third of the distance caudad. Lateral margins from their points of origin, first concave then strongly convex, and later strongly concave, forming a pointed tip.

Chloealtis abdominalis (Thom.) (Fig. 14).—Presence of furculae faintly indicated. The lateral plates attingent on the median line. Median and caudal margins of the furculae strongly divergent, continuous, nearly straight lines. A slight notching is made by the caudal margin of the lateral plate beyond the furculae becoming strongly convex, thus resulting in a broadening of the plate.

Chloealtis conspersa, (Harr.) (Fig. 15).—Furculae absent. Lateral plates on the median line pointed and narrowly separated. Caudal margins from the median line are first concave, then slightly convex and again concave in proximity to the base of the cerci.

Supra-anal plate short, not reaching the tips of the cerci. Lateral margins unbroken and slightly convex. Tip sharply pointed.

Chorthippus curtipennis (Harr.) (Fig. 16).—Furculae absent. The lateral plates pointedly attingent or subattingent on the median line. The medio-caudal margins are first gently concave, varying to gently convex and are strongly divergent. The lateral plates grow rapidly in width from the points of their origin on the median line.

Platybothrus brunneus (Thom.) (Fig. 17).—Furculae distinctly present. The lateral plates broadly attingent on the median line. The median and caudal margins of the furculae convex. Notching into the lateral plates abrupt and cutting in about one-fourth of the distance. The margin of the lateral plates extends immediately laterad from the deepest portion of the notch.

Gomphocerus clavatus, (Thom.) (Fig. 18).—Furculae absent. Lateral plates on the median line pointed and narrowly separated. Caudal margins from the median line first concave, then strongly convex, and finally in proximity to the base of the cerci, concave.

Supra-anal plate short, not quite reaching the tips of the cerci. A strong indication of a transverse suture curving craniad occurs about two-thirds of the distance caudad. The lateral margins are broken by a notching into the plates at the points of origin of this suture. Tip broadly pointed.

Gomphocerus clepsydra (Scudd.) (Fig. 19).—Furculae moderately distinct and small. The lateral plates pointedly attingent or subattingent on the median line. Notching into the lateral plates gradual and shallow. Lateral plates beyond the furculae much broadened, the margins convex.

Boopedon nubilum, (Say.) (Fig. 20).—Furculae distinctly present and lobe-like. Lateral plates narrowly separated on the median line. Median margins of the plates convex. Caudal margins first convex in continuity with the median margins, then notching abruptly into the plates, cutting about one-half of the distance through.

Supra-anal plate relatively short, not reaching the tips of the cerci. A strong indication of a transverse suture curving slightly craniad, almost bisects the plate, the lateral margins being broken at this point. Otherwise, the lateral margins are unbroken and are slightly convex. The tip is broadly pointed.

Stiraplcura decussata (Scudd.) (Fig. 21).—Furculae distinctly present and large. The lateral plates pointedly attingent or subattingent on the median line. The median margins of the furculae almost a straight line and divergent. The caudal margins slightly convex or straight. The notching into the lateral plates abrupt and cutting about one-half of the way through. The lateral plates beyond the furculae broadening, the margins convex.

Ageneotettix deorum (Sc.) (Fig. 22).—Furculae absent. The lateral plates distinctly separated on the median line. The median margins straight and but slightly divergent, almost parallel. The caudal margins slightly concave, the lateral plates broadening but little laterally.

Aulocara elliotti (Thom.) (Fig. 23).—Furculae indistinctly present because of a very gradual incurving of the caudal margin beyond the lobe. The curving into the lateral plates deep, cutting about one-third the way through.

Aulocara femoratum (Scudd.) (Fig. 24).—Furculae distinctly present. Median margins concave. Caudal margins convex. Lateral plates narrowly separated on the median line. Notching into the lateral plates abrupt and cutting about one-half the way through. Lateral plates beyond the furculae broadening, the margins convex.

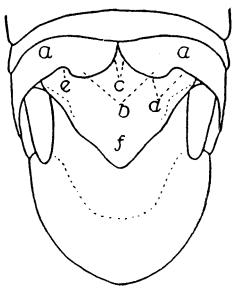
Heliaula rufa, (Scudd.) (Fig. 25).—Furculae distinctly present, and lobe-like. Lateral plates narrowly separated on the median line. Median margins of the plates from the median line first convex, then concave. Caudal margins first convex to form the lobes of the furculae, then notching about one-half of the distance through the plate.

Supra-anal plate of medium length, reaching the tips of the furculae. An indication of a transverse suture occurs across the

plate about one-third of the distance caudally. The lateral margins slightly convex, terminating in a broadly pointed tip.

ACKNOWLEDGMENTS

The writer wishes to acknowledge his deep gratitude to his professor, Mr. R. A. Cooley, under whom this paper was prepared as a part of graduate work, for his inspiring interest and timely suggestions. He also wishes to thank Mr. Morgan Hebard for correcting the manuscript, Dr. C. P. Gillette for publishing the manuscript and the courtesy of permitting of the study and inclusion of Colorado species, and Mr. A. N. Caudell and Dr. G. C. Crampton for help received.



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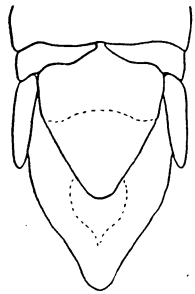

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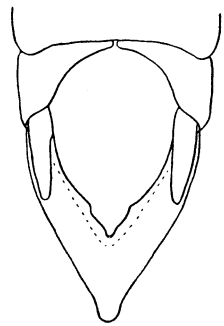

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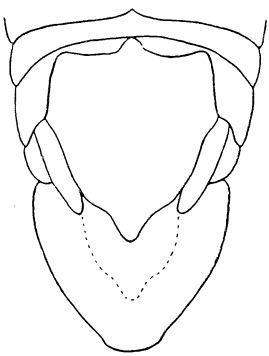

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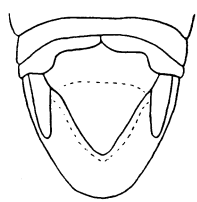

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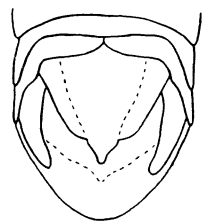

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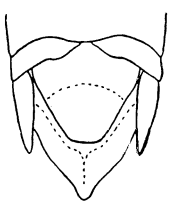

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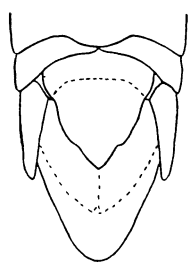

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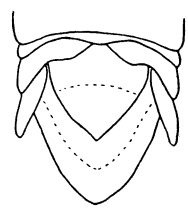

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KEY TO PLATES

Figure 1. *Platybothrus brunneus.* Showing structure of the terminal dorsal segment of the abdomen. (a) lateral plates; (b) furculæ; (c) median margin of the lateral plate; (d) caudal margin of the lateral plate; (e) notching into lateral plate to form the furcula; (f) supra-anal plate.

Figure 2. *Mermiria bivittata.* (Colorado)

Figure 3. *Mermiria neomexicana.* (Colorado)

Figure 4. *Acrolophitus hirtipes.* (Montana)

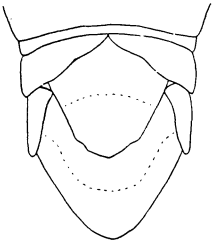
Figure 5. *Amphitornus bicolor.* (Montana)

Figure 6. *Opeia obscura.* (Montana)

Figure 7. *Cordillacris affinis.* (Colorado)

Figure 8. *Cordillacris cinerea.* (Colorado)

Figure 9. *Cordillacris crenulata.* (Montana)



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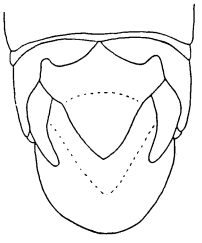

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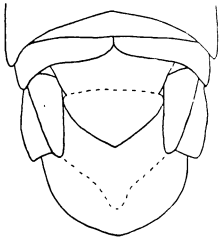

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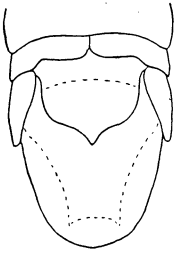

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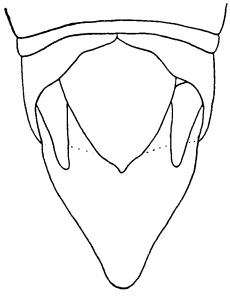

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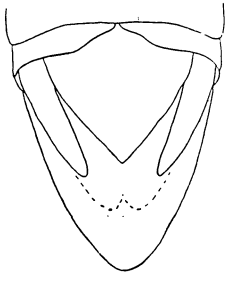

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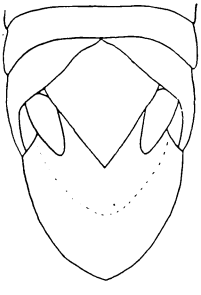

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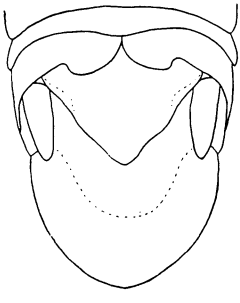

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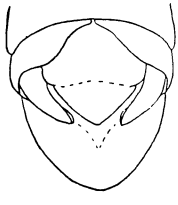

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Figure 10. *Cordillacris occipitalis.* (Montana)
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Figure 12. *Orphulella pelidna.* (Montana)
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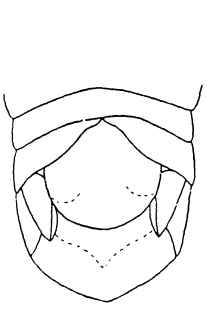

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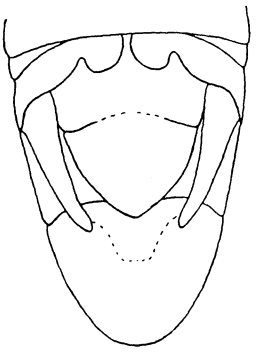

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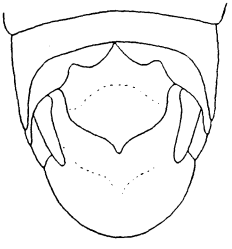

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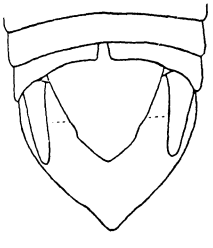

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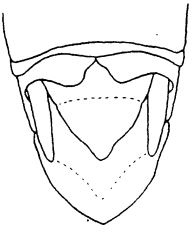

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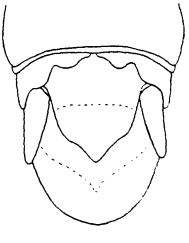
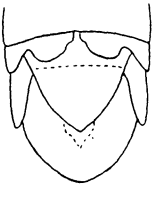


24



25

Figure 19. *Gomphocerus clepsydra.* (Montana)
Figure 20. *Boopedon nubilum.* (Colorado)
Figure 21. *Stirapleura decussata.* (Montana)
Figure 22. *Ageneotettix deorum.* (Montana)
Figure 23. *Aulocara elliotti.* (Montana)
Figure 24. *Aulocara femoratum.* (Montana)
Figure 25. *Heliaula rufa.* (Colorado)