Graduate Project - Insect Classification Fall 2005
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The Pygmy Grasshoppers (Orthoptera: Tetrigidae) of Florida

Pygmy grasshoppers or pygmy locusts, are so called because of their small size. As a group, they contain some of the smallest members of the Orthoptera; with overall length usually not surpassing 20mm. Worldwide there are about 200 genera and 1000 species, with most of these occurring in tropical regions of the world, where they can take on very elaborate forms. While tetrigids occur in every ecozone of the world except the artic and antartic regions, most species have localized distributions and do not occur worldwide. In the U.S., there are only 6 genera, and 23 species. Florida has a rich tetrigid fauna for the U.S., with all 6 genera, and 13 species occurring there. Of these, the two most common are, *Tettigidea lateralis* (Say), and *Parattetix mexicanus* (Saussure).

Members of the Tetrigidae can easily be distinguished from other Orthoptera by several external characters. They have an elongated pronotum covering the entire abdomen and most of the hind wings. They have a tarsal formula of 2-2-3, and the prosternum is projected forward into a chin piece or sternomentum, which partially covers the mouthparts. Very little genitalia work has been done in this group and external morphology is the principle means of identifying tetrigids. Characters of the head and face, such as the frontal costa, fastigium, and extent to which the eyes protrude, are used for determining species. Some pronotal characters that are used include texture, shape, and the median and lateral carina. Several characters on the appendages have also been used. Despite the simplicity of the characters used, tetrigids are a very difficult group to identify to species. The difficulties are caused chiefly by dimorphism and polymorphism in prontal length and surface. Many of the characters used in identification are so varied that the definitions of a particular morphological state can become melded and one is forced to make a decision on a character that is intermediate between the two described in a couplet. Complicating matters is the tendency for many tetrigids to be highly polychromatic, which eliminates using color as a diagnostic tool.

Collecting tetrigids can be quite difficult. Because of their small size, and cryptic coloration, they blend in very well with their surroundings. While many have functional wings, most never use them to escape, preferring to use a very quick and strong jump, similar to a flea. Keeping track of them as they jump from one cryptic location to the next can be a difficult task. Tetrigids spend most of their time near the ground, where they blend in with their environment hiding under vegetation and debris. They are usually associated with, but not limited to, moist environments, living along the shores of lakes and streams. Some have suggested that the often flattened front and median limbs are used like paddles for swimming. There diet consists mostly of vegetable molds and algae growing on the soil surface, along with lichens and mosses. They will also feed on tender new growth from the germinating seeds of grasses and other plants. While not much is known about their biology in Florida, in more temperate regions they are one of the few Orthoptera that over winter as adults. Because of this, adults can be found as early as March in the more northerly states. Tetrigids are not pests and of no economic importance, and little is known about their importance biologically. Perhaps the ground would become covered in mold and algae if they were to disappear.

Checklist of the Tetrigidae of Florida

Neotettix
- *N. femoratus* (Scudder)
- *N. proavus* Rehn and Hebard

Nomotettix
- *N. cristatus* (Scudder)

Paratettix
- *P. cucullatus* (Burmeister)
- *P. mexicanus* (Saussure)
- *P. rugosus* (Scudder)

Paxilla
- *P. obesa* (Scudder)

Tetrix

T. arenosa Burmeister

Tettigidea

T. acuta Morse
T. armata Morse
T. empedonepia Hubbell
T. lateralis (Say)
T. prorsa Scudder

Dichotomous Key to adult Florida Tetrigidae

1. Antennae with 20-22 segments, eyes not at all protuberant to slightly protuberant (Figs. 8-13, a and d).(Batrachideinae) 2

Antennae with 12-14 segments, eyes distinctly protuberant (Figs 1-7, a and d) Tetriginae) 8

2. Pronotum not extending beyond posterior tip of hind femur (Brachypronotal) (Fig. 22b) 3

Pronotum extending beyond posterior tip of hind femur (Macropronotal) (Fig. 22a) (*Tettigidea*) 4

3. Body with a smooth appearance overall and, in lateral view, tapering at each end (tear drop in shape) (Fig. 21). Tegmina present and elongate longitudinally. Anterior half of pronotum in lateral view very arcuate (curved in the form of a bow, bowlike) ..... *Paxilla obesa* (Scudder)

Body not smooth overall, and not tapering at each end. Tegmina present or not, if present then less elongate and more oval in shape. Anterior half of pronotum less arcuate. (*Tettigidea*) 4

4. Tegmina absent ..... *Tettigidea empedonepia* Hubbell

Tegmina present 5

5. When viewed from above, anterior margin of pronotum with a point or process (Figs. 10 and 11, a and d) 6

When viewed from above, anterior margin of pronotum without point or process. (Figs. 8,9,12, and 13, a and d) 7

6. Pronotum smooth granulose, shiny, with numerous poorly developed interconnecting wrinkles (Fig. 20). Its middle and lateral carina poorly developed .... *Tettigidea acuta* Morse

Pronotum more coarsely granulose, usually dull, with fewer more well developed and easily distinguishable wrinkles (Fig 19). Its middle and lateral carina well developed. .....*Tettigidea armata* Morse

7. When viewed from above, head tapers to a point (Fig 12, a and d). Tegmina usually elongate and narrow .....*Tettigidea prorsa* Scudder

When viewed from above, head does not taper to a point (Fig 8, a and d). Tegmina usually shorter and broader ..... *Tettigidea lateralis* (Say)

8. When viewed from above, fastigium (anterior most edge of top of head between the eyes) not extending or only slightly extending anterior of the eyes and usually narrower than the width of one eye. Fastigium truncate or squared off at end, not rounded (Figs. 5-7, a and d). (*Paratettix*) 9

When viewed from above, fastigium distinctly extending anterior of the eyes and wider than the width of one eye. Fastigium angular or rounded in shape not truncate (Figs. 1-4, a and d). 11

9. Ventral margin of median femora with two or three distinct lobes (Figs 14 and 15). In lateral view, median carina not undulate (wavy), macropronotal or brachypronotal (refer to definitions given in couplet number two) 10

Ventral margin of median femora may be lobulate, but never with two or three distinct lobes (Figs. 16 and 17). In lateral view, median carina undulate (Fig. 18), macropronotal only .....*Paratettix rugosus* (Scudder)

10. Median carina underdeveloped behind anterior margin of pronotum. When viewed in profile, frontal costa between antennae and eyes noticeably convex, (Fig. 5, c and f) macropronotal only. .....*Paratettix cucllatus* (Burmeister)

Median carina distinct behind anterior margin of pronotum. When viewed in profile frontal costa between antennae and eyes less convex, if convex at all, usually brachypronotal (Fig. 6, c and f) .....*Paratettix mexicanus* (Saussure)

11. When viewed in profile, face (Fastigio-facial agle) without distinct indentation directly infront of the eyes (Figs. 3 and 4, c and f). Profile arcuate (curved in the form of a bow, bowlike). (*Neotettix*) 12

When viewed in profile, face with distinct indentation directly in front of eyes (may be hidden in between the eyes) (Figs 1 and 2, c and f) 13

12. Tegmina exposed and large. Anterior first half of pronotum, in lateral view, not strongly arcuate ..... *Neotettix femoratus* (Scudder)

Tegmina usually concealed, if exposed, then very small. Anterior first half of pronotum, in lateral view, strongly arcuate ..... *Neotettix proavus* Rehn and Hebard

13. In anterior view, pronotum with median carina cristae (roof like), and arcuate in profile ..... *Nomotettix cristatus* (Scudder)

In anterior view, prontoum with median carina only slightly cristae if at all, and not arcuate profile ..... *Tetrix arenosa* Burmeister

(All figures taken from Rehn and Grant 1961, all photographs by Jason G. Froeba)

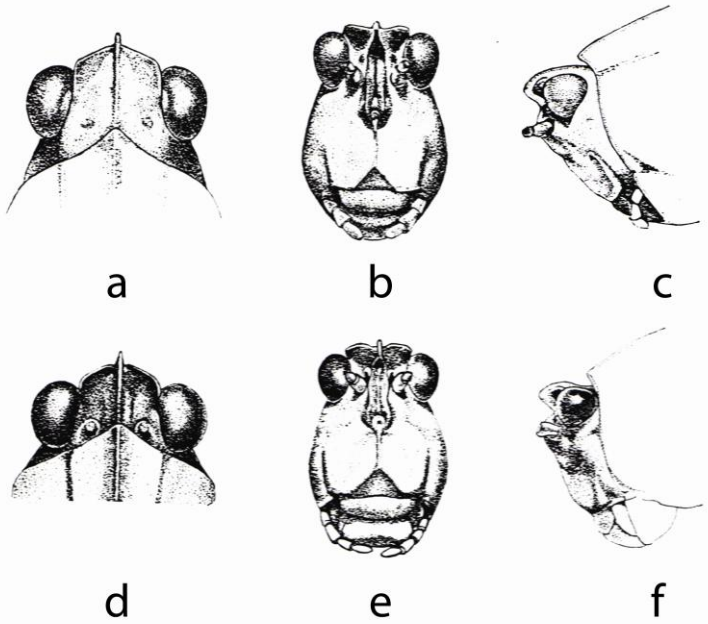

Fig1. *Nomotettix cristatus.* Male (a-c), Female (d-f).

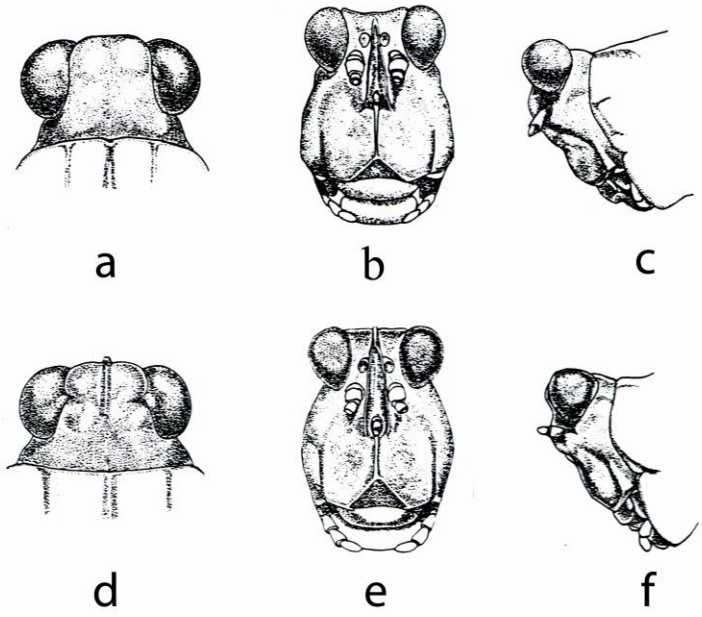

Fig 2. *Tetrix arenosa.* Male (a-c), Femal (d-f).

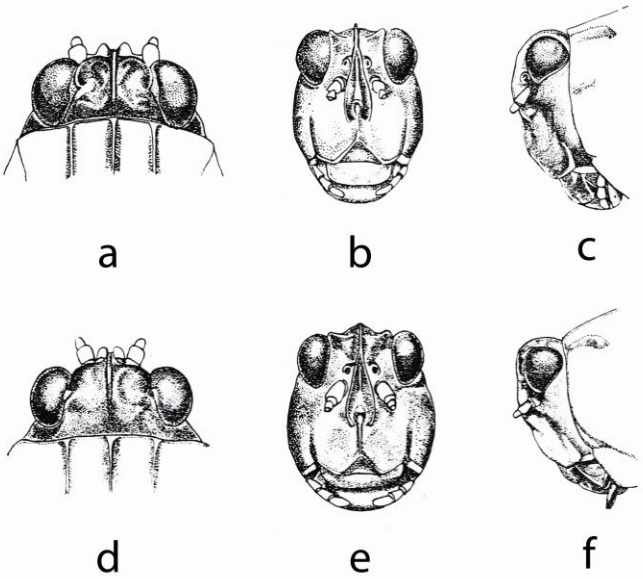

Fig 3. *Neotettix femoratus.* Male (a-c), Female (d-f).

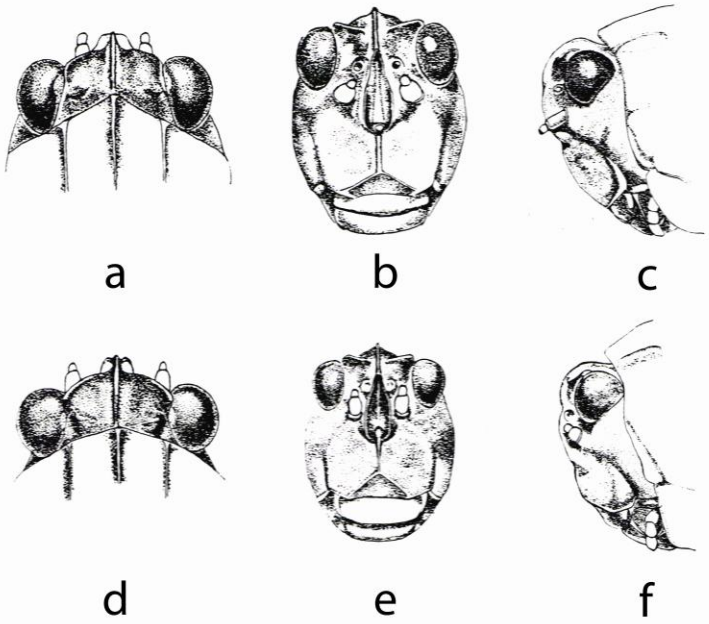

Fig 4. *Neotettix proavus.* Male (a-c), Female (d-f).

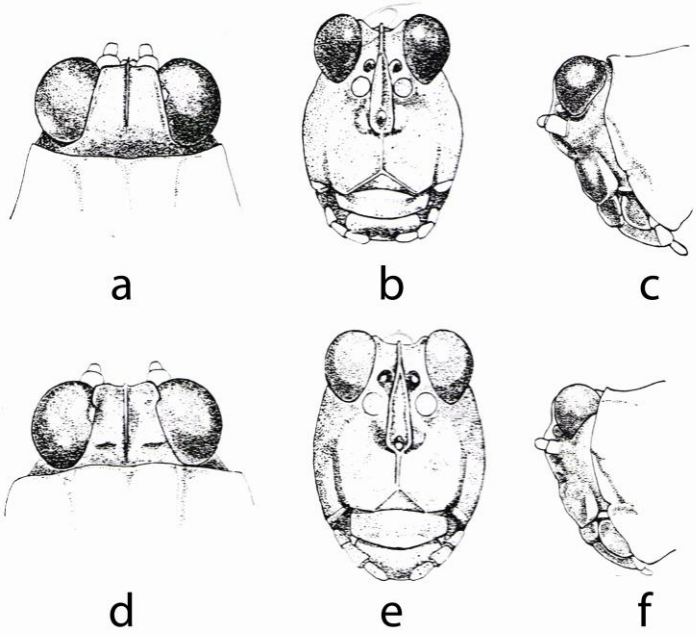

Fig 5. *Paratettix cucullatus.* Male (a-c), Female (d-f).

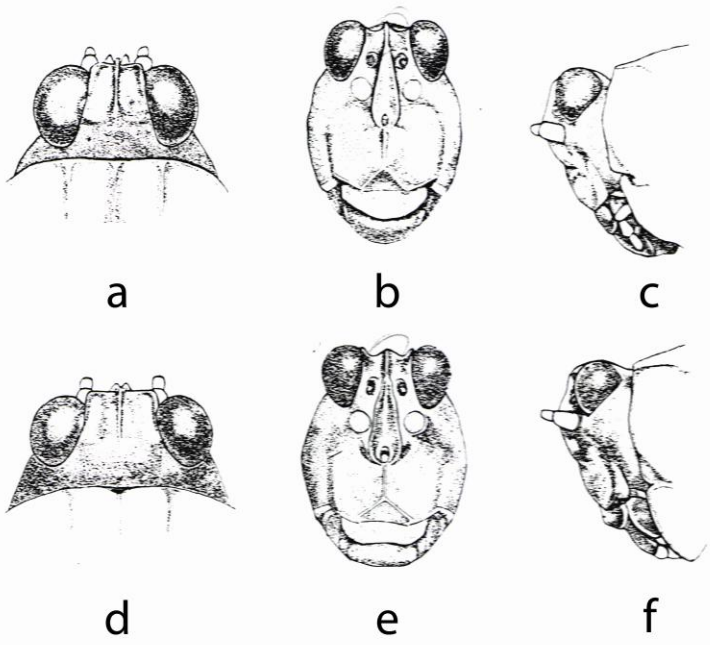

Fig 6. *Paratettix mexicanus.* Male (a-c), Female (d-f).

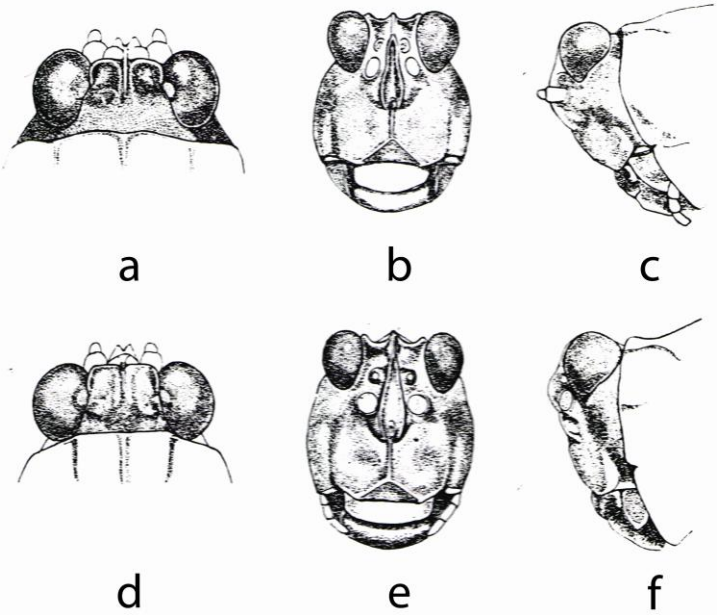

Fig 7. Paratettix rugosus. Male (a-c), Female (d-f).

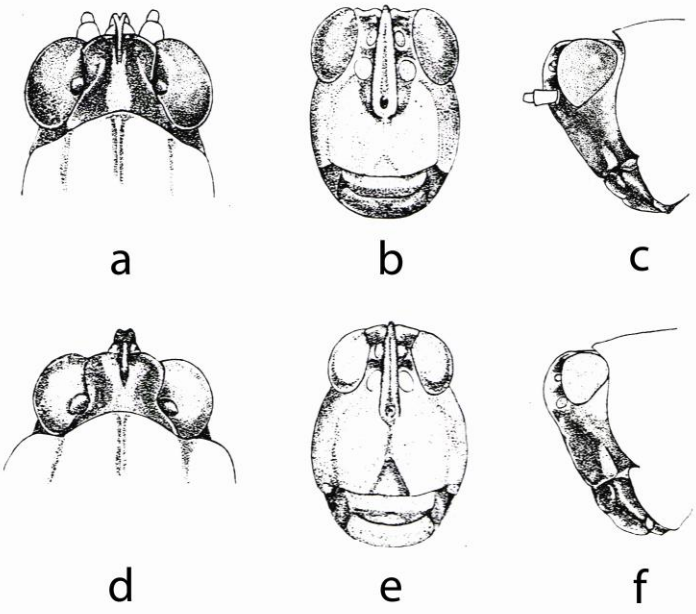

Fig 8. *Tettigidea lateralis*. Male (a-c), Female (d-f)

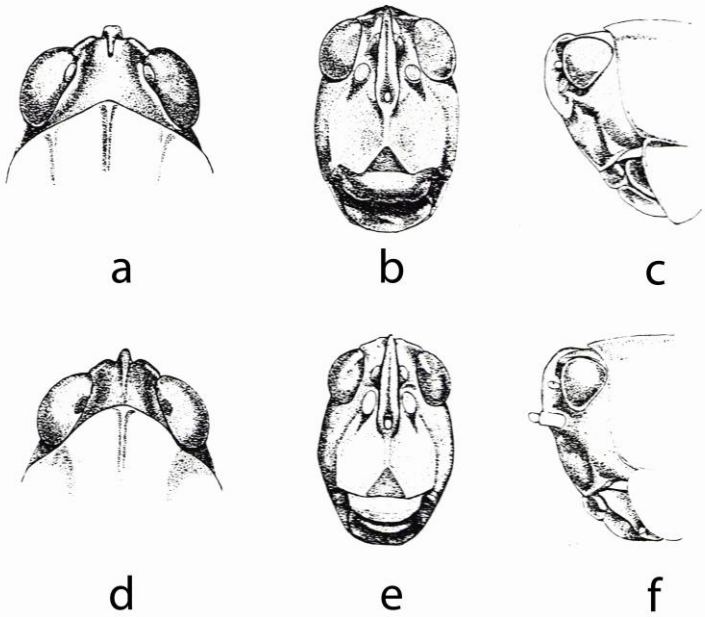

Fig 9. *Tettigidea empedonepia.* Male (a-c), Female (d-f).

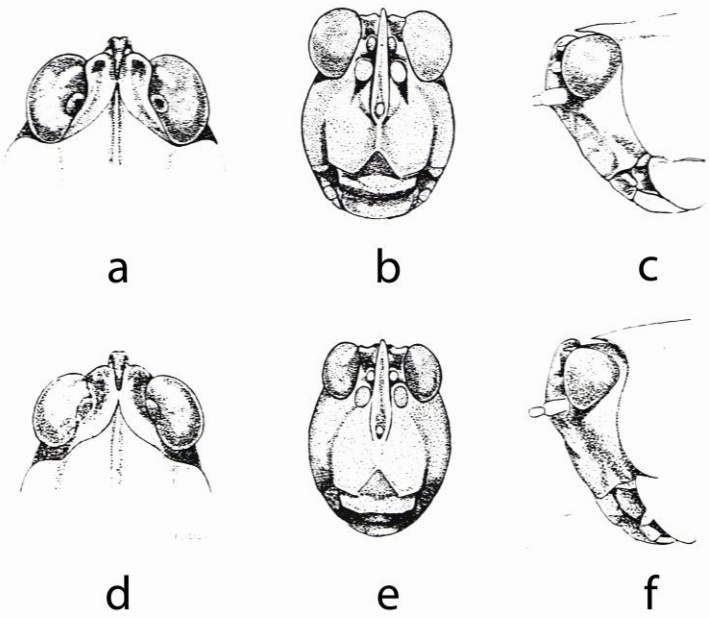

Fig 10. *Tettigidea armata.* Male (a-c), Female (d-f).

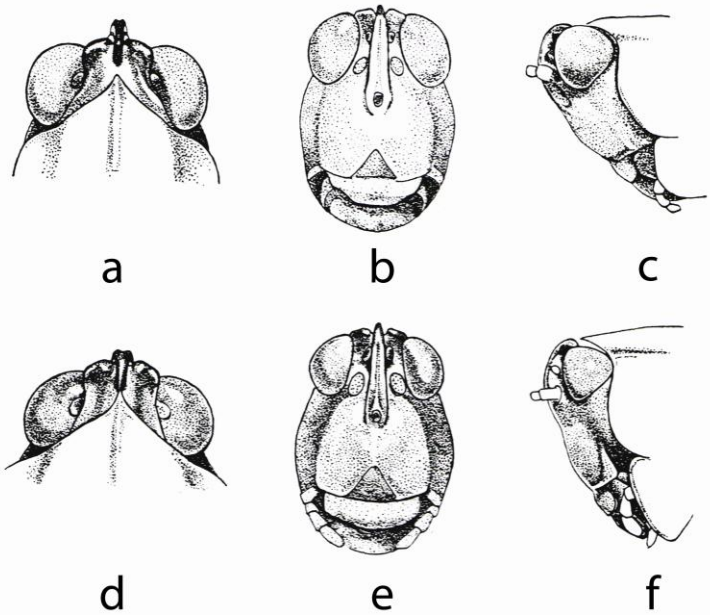

Fig 11. *Tettigidea acuta.* Male (a-c), Female (d-f).

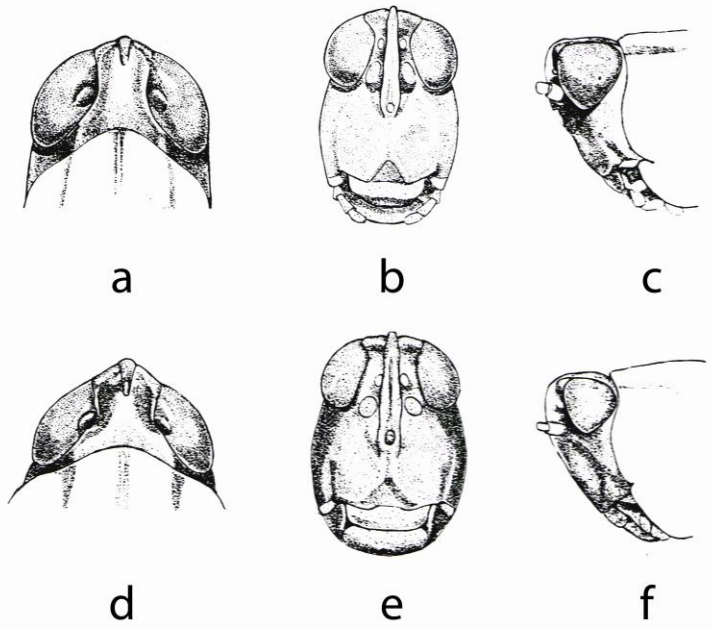

Fig 12. *Tettigidea prorsa.* Male (a-c), Femal (d-f).

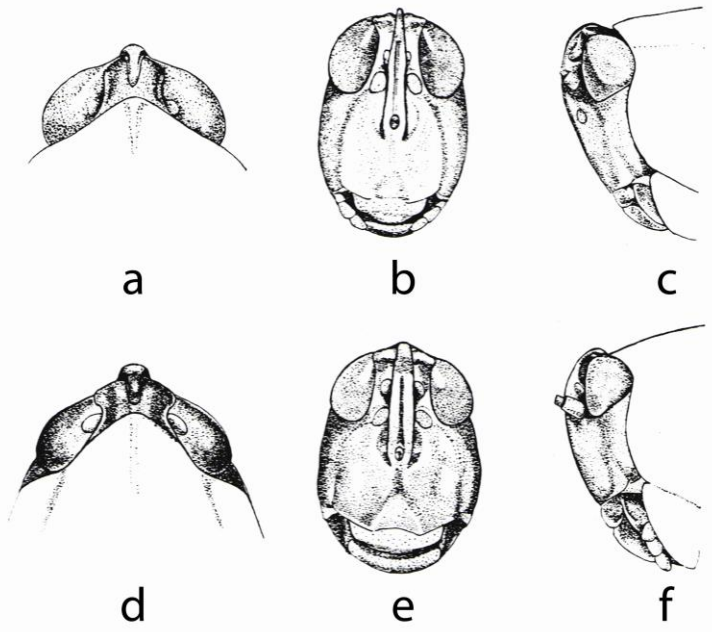

Fig 13. *Paxilla obesa.* Male (a-c), Female (d-f).

Fig. 14. *Paratettix cucullatus.* Median femur.

Fig 15. *Paratettix mexicanus.* Median femur.

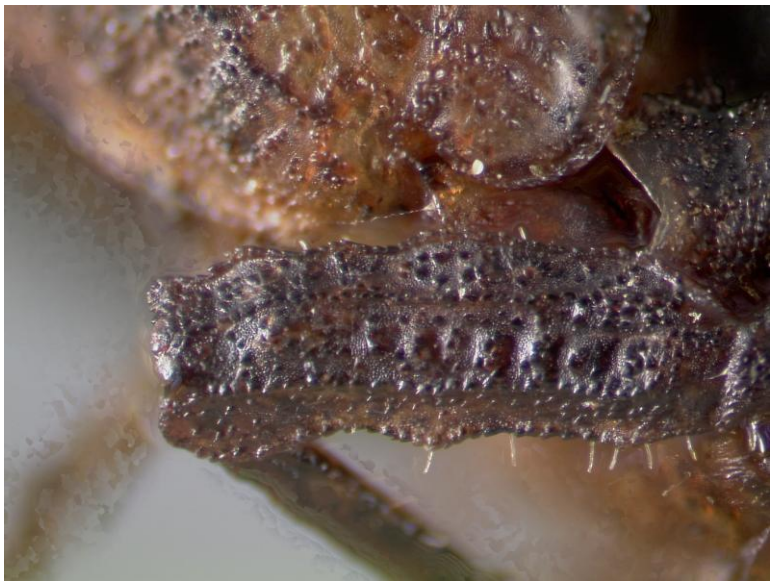

Fig 16. *Paratettix rugosus.* Median femur.

Fig 17. *Paratettix rugosus.* Median femur.

Fig 18. *Paratettix rugosus.* Lateral view of pronotum.

Fig 19. *Tettigidea armata.* Dorsal view of pronotum.

Fig 20. *Tettigidea acuta.* Dorsal view of pronotum.

Fig 21. *Paxilla obesa.*

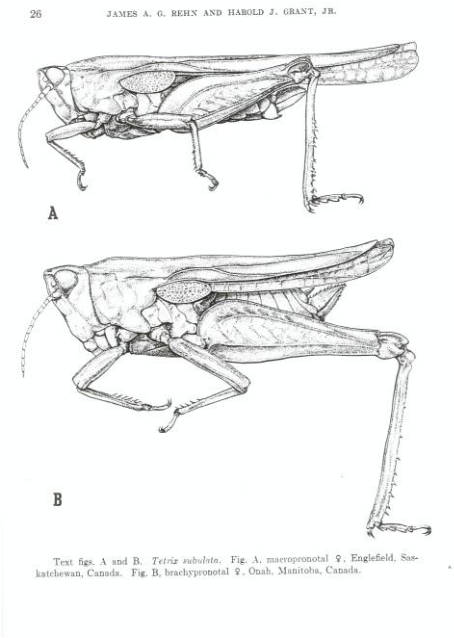

Fig 22. a. Macropronotal. b. Brachypronotal

Checklist of Tetrigidae – North America

(D. Otte, Nomina Nearctica – Orthoptera)

TETRIGIDAE

Neotettix Hancock 1902

Neotettix femoratus Scudder 1869 (Tettix)
Neotettix nullismus Hancock 1919 (Cavotettix)
Neotettix proavus Rehn and Hebard 1916 (Neotettix)

Nomotettix Morse 1902

Nomotettix cristatus Scudder 1862 (Batrachidea)
Nomotettix parvus Morse 1895 (Nomotettix)

Paratettix Bolivar 1887

Paratettix azteca Saussure 1861 (Tettix)
Paratettix brevipennis Hancock 1902 (Apotettix)
Paratettix cucullata Burmeister 1838 (Tetrix)
Paratettix freygessneri Bolivar 1887 (Paratettix)

Paratettix mexicana Saussure 1861 (Tettix)
Paratettix rugosa Scudder 1862 (Tettix)
Paratettix schochii Bolivar 1887 (Paratettix)
Paratettix tolteca Saussure 1861 (Tettix)

Telmatettix Bolivar 1887

Telmatettix obesa Scudder 1877 (Tettigidea)

Tetrix Latreille 1802

Tetrix americana Hancock 1908 (Tetrix)
Tetrix aradicus Scudder 1876 (Tetrix)
Tetrix arenosa Burmeister 1838 (Tetrix)
Tetrix bipunctatus Linnaeus 1785 (Gryllus)
Tetrix brunnerii Bolivar 1877 (Tettix)
Tetrix ornatum Say 1824 (Acrydium)
Tetrix sierrana Rehn and Grant 1956 (Tetrix)
Tetrix subalatus Linnaeus 1761 (Gryllus)

Tettigidea Scudder 1862

Tettigidea acuta Morse 1895 (Tettigidea)
Tettigidea armata Morse 1895 (Tettigidea)
Tettigidea empedonepia Hubbell 1937 (Tettigidea)
Tettigidea laterale Say 1824 (Acrydium)
Tettigidea prorsa Scudder 1877 (Tettigidea)

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