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An Introduction to Subfamily Gomphocerinae Fieber, 1853 (Orthoptera; Acrididae) of Iran With Keys to Tribes and Genera

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ABSTRACT

The slant-faced grasshoppers (Gomphocerinae) with seven of the 20 known tribes in Iran are; Gomphocerini Fieber 1853, Arcypterini Shumakov 1963, Ochrilidini Brunner von Wattenwyll 1893, Stenobothrini Harz 1975, Chrysochraontini Brunner von Wattenwyl 1893, Dociostaurini Mishchenko 1974, and Ramburiellini Defaut 2012. Within the Gomphocerinae several genera have not been assigned to a specific tribe.

Leva Bolivar 1909, *Mesopsis*, Bolivar, 1906, *Stenohippus* Uvarov 1926, *Xenocheila* Uvarov, 1933, recorded in Iran, are genera without a specific tribe assignment. However, *Leva* shares many characters with the Dociostaurini. Keys for the identification of tribes, and genera found in Iran are provided. *Stauronotulus* Tarbinsky 1940, subgenus of *Dociostaurus* Fieber, 1953; is recorded with 3 species; five subspecies. *Dociostaurus diamesus* Bey-Bienko 1948, in a few morphological characters, is nearer to *Stauronotulus* than *Dociostaurus* subgenus.

Key words: Grasshoppers, faunistic, endemism, species, genera, tribes, identification.

INTRODUCTION

The slant-faced grasshoppers, or Gomphocerinae, with 20 tribes and more than thousand of species are one of the largest subfamilies of Acrididae. Within the Gomphocerinae the Dociostaurini Mishchenko, 1974 and Gomphocerini, Fieber 1853 represent two especially species rich tribes. Gomphocerinae tribes recorded in Iran are Ochrilidini, Chrysochraontini, Ramburiellini, Arcypterini, Dociostaurini, Gomphocerini and Stenobothrini. Many genera are not yet classified in a defined tribe. *Leva* Bolivar 1909, *Mesopsis*, Bolivar, 1906, *Stenohippus* Uvarov 1926 and *Xenocheila* Uvarov, 1933 are a few of these genera that have recorded species in Iran. Shumakov (1963) studied Acridoidea of Iran and Afghanistan and classified Gomphocerinae species for Iran and Afghanistan to Arcypterini, and Chorthippini. Dociostaurini is specifically interesting and have been studied by Mishchenko (1974) and Soltani (1974). Many species in the Dociostaurini are studied by these authors. Keys for identifying the world fauna of subgenera and species are provided. The tribe currently consists of seven valid genera (Eades *et al*. 2011), four of these are found in Iran: *Dociostaurus* Fieber, 1853, *Notostaurus* Bey-Bienko, 1933, *Mizonocaria* Uvarov, 1912, and *Eremippus* Uvarov, 1926. *Kazakia* Bey-Bienko, 1933 has not been recorded in Iran by Mirzayans (1959) or Garai (2010). However, according to Soltani (1978),

three species of *Dociostaurus (Kazakia*) can be found in Iran. In this study a list of Iranian species and their distribution with a short description of tribes and genera is presented and keys are provided.

MATERIAL AND METHODS

The list of Acridoidea species recorded in Iran, available in various publications, was compared with the list at the Orthoptera Species File (OSF) online (http://osf2.orthoptera.org). A new list was produced according to the recent classification of Gomphocerinae. The distribution of species in various localities was gathered from these publications and added to the list. A star indicates the individual species that have been studied at the Afshar museum. By choosing the appropriate morphological characters, keys to identify the recorded Iranian species, was generated. These keys were tested by comparative individual studies of the grasshoppers in the group with characters defined in the keys.

Following is a list of tribes and species recorded in Iran (Mirzayans, 1959; Shumakov, 1963). Special effort is made to produce keys for identifying Dociostaurini genera and *Dociostaurus* subgenera recorded in Iran.

RESULTS

The Gomphocerinae are represented by seven tribes and four genera of uncertain tribe assignments in Iran:

- Ochrilidini Brunner von Wattenwyl, 1893
- Chrysochraontini Brunner von Wattenwyl, 1893
- Arcypterini Shumakov, 1963
- Ramburiellini Defaut, 2012
- Dociostaurini Mishchenko, 1974
- Stenobothrini Harz, 1975
- Gomphocerini Fieber, 1853

Species of Gomphocerinae not assigned to any tribe

***Leva* Bolivar, 1909**

Leva hemiptera Uvarov, 1952; Demavand, Alborz, 2000m.

***Stenohippus* Uvarov, 1926**

S. mundus Walker, 1871; Khuzestan, Hormozgan, central Iran.

S. xanthus (Karny, 1907) = *S. iranicus* Bey-Bienko, 1960; Kordestan. Gom, Kashan. Kohnooj, Kerman, Yazd, Isfahan.

***Xenocheila* Uvarov. 1833**

X. zarudnyi Uvarov, 1833; Zanjan, Ghazwin, Khorasan, Isfahn, Shiraz, Baluchestan, Birjand.

***Mesopsis*, Bolivar, 1906 = *Aswatthamnus* Kirby, 1914**

Mesopsis iranicus (Uvarov, 1933); Isfahan, Kerman, Iranshahr, Khash.

OCHRILIDINI Brunner von Wattenwyll, 1893

***Gonista* Bolivar, 1898**

Gonista rotundata Uvarov, 1933. Zagros, Isfahan, Iranshahr, Taftan.

G. sagitta Uvarov, 1912. Azarbaydjan,

***Kirmania* Uvarov, 1833**

Kirmania exilis Uvarov, 1933; Kerman, south Iran.

***Oxypterna* Ramme, 1952**

Oxypterna afghan Ramme, 1952; Sistan, Zabol.

***Ochrilidia* Stal, 1873**

O*. curta* Bey-Bienko 1960; Iranshahr.

O. filicornis (Krauss, 1902); Mocran, Iranshahr.

O. geniculata (Bolivar.1013)= *O. pictipes* Uvarov 1922; Mokran= *O. variopicta* (Salfi 1931); Bushehr, Mokran, Isfahan, Kerman

O. gracilis gracilis gracilis (Kraus,1907)= *Ochrilidia acuta* Bolivar, 1908; Khuzistan region, Ahwaz, Shushtar, Dezful (Shumakov, 1963)

O. hebetata (Uvarov, 1926) ; Azarbaydjan, Jask, Bandar-Abbas, Torkamanestan.

O. orientalis Salfi, 1931= *O. obtusa* Salfi,1931; Khuzestan, Alborz. Zagros Mountains, Sistan (Shumakov, 1963).

O. persica (Salfi 193; Bushehr,Mokran, Alburz, Isfahan, Kerman, Birjand.

O*. richteri* Bey - Bienko 1960; Iranshahr, Khash.

CHRYSIOCHRAONTINI Brunner von Wattenwyl, 1892

***Euchorthippus* Tarbinsky, 1925**

E. pulvinatus, Fischer vonWaldheim, 1846; Not recorded in Iran but because of its distribution in central Asia it may also be found in Afghanistan and Iran (Shumakov, 1963)

E. transcaucasicus Tarbinsky, 1930; Gorgan, Bandar Lengeh, Mokran, Alborz*.

ARCYPTERINI Shumakov 1963

Arcyptera (Pararcyptera) microptera, Fischer von Waldhaim, 1833.*

A.(P.) microptera elbursiana Bey-Bienko, 1948; North Iran.

A. (P.) m. transcaucasicus Uvorov, 1917. North Alborz regions.

A. (P.) m. turanica Uvarov, 1925. Caspian sea coasts.

RAMBURIELLINI Defaut, 2012

***Ramburiella* (*Ramburiella*) Bolivar, 1906**

No registered record of this subgenus from Iran,

***Ramburiella (Palaeocesa*) Kocak &Kemal, 2010**

R. (P.) bolivari (Kuthy, 1907); Alborz districts, Zagros, Shiraz, Kazerun.

R.(P.) foveolata Tarbinsky1931; Azarbayjan. Alborz, Khorasan, Khash. Turkmenen*.

R. (P.) turcomana (Fischer von Waldheim, 1846); Gorgan, Alborz, Zagros, Azarbaydjan*

DOCIOSTAURINI Mishchenko, 1974

***D. (Dociostaurus)* Fieber, 1853**

D. (D.) plotnikovi Uvarov 1921; North east Iran.*

D. (D.) marrocanus Thunberg, 1815; Khorasan, Fars, Azarbayjan, Kurdestan, Khuzestan, Semnan.*

***D. (Stauronotulus)* Tarbinsky, 1940**

D. (S.) diamesus Bey-Bienko 1948; Damavand, Alborz mountain, Khash, Zabol, Zahedan.*

D. (S.) crassiusculus (Pantel, 1886); Alborz regions.*

D. (S.) hauensteini hauensteini Bolivar (1893); Azarbayjan, Moghan, Khorasan, Bojnourd.*

D. (S.) hauensteini kurdus Uvarov, 1921; Kermanshah, Kurdestan.*

D. (S.) hauensteini farsistanicus Descamps 1967; Fars regions.

D. (S.) hauensteini elbursianus Uvarov,1933=*D. Caspicus* Ramme, 1951; Alborz regions.*

D (S.) hauensteini cappadocius (Azam, 1913)= *D. Iranicus* Ramme, 1951; North Iran.

D. (S.) kraussi (Ingetisky, 1897); Zanjan*

D. (S.) kraussi nigrogeniculatus Sergive and Tarbinsky,1928; Khorasan, Azerbayjan, Zahedan.*

***D. (Kazakia)* Bey-Bienko, 1933**

D. (K.) jagoa jagoa Soltani 1978; Kermanshah, Mehran, Naft-Shahr.

D. (K.) brevicollis (Eversmann,1646); Azarbayjan.*D (K.) tartarus* (Stschelkanovzev, 1921); Khuzestan, Khorassan.*

***Notostaurus* Bey- Bienko, 1933.**

N. albicornis (Eversmann, 1848); Gorgan, Azarbayjan, Lankaran, Khorasan, Kazerun, Zagros, Kordestan.*

N. anatolicus (Krauss, 1816); Alborz regions, Khorasan, Zagros, Azarbayjan, Ghazwin, Kerman, Bam, Iranshahr.*

N. larensis Soltani 1978= *D.(N.) larensis* (Soltani, 1978); South Iran.

***Mizonocara* Uvarov, 1912.**

M. inornata Mishchenco 1935; North Iran*.

***Eremippus* Uvarov, 1926.**

E. haghighii Descamps, 1967; Baluchestan, Khash, Gusheh.

E. guttatus. notius Mishchenko, 1951; Khorasan.

E. g. guttatus Mishchenko, 1851: Gazvin, Semnan (Mirzayans, 1959).

E. kermanicus Mishchenko, 1976 ; Kerman.

E. onerosus Mishchenko, 1951; Khorasan region.

E. persicus Uvarov. 1929 (=*E. uvarovi* (Moritz, 1928); Khorasan, Kashan.

E. robustus Mishchenko 1976; Khuzestan, West Iran.

E. tenellus Mishchenko, 1951; Azarbayjan, Gilan. (Garai, 2010).

STENOBOTHRINI Harz, 1975

***Omocestus* Bolivar, 1878**

Omocestus (Omocestus) zenojkoi Mishchenko,1951: Azarbayjan*.

***Stenobothrus* Fischer, 1853.**

Stenobothrus werneri iranicus Ramme, 1951; North Iran.

Stenobothrus werneri werneri Adelung, 1907; North Iran.

GOMPHOCERINI Fieber, 1853

***Chorthippus* Fieber, 1852**

Chorthippus albomarginatus, De Geer, 1773; Gorgan, Azarbayjan, Khirassan.

Ch. brunneus, (Thunberg, 1815); Gorgan, Azarbayjan, Khorasan, Alborz regions.*

Ch. Dorsatus (Zettetstedt,1821); Alborz regions.

*Ch. davatchi,*Descamps, 1967; Fars, Shiraz districts.

Ch. giganteus Mishchenko, 1951. Zagros, Kurdestan regions.

Ch. (Glyptobothrus) macrocerus (Fischer von Waldheim, 1846); Borazjan, Safe Abad (Garai, 2910).

Ch. longicornis Latreille,1804; Alborz moutains , Azarbayjan.

Ch. loratus, Fischer von Waldheim, 1846; Kurdestan, Alborzmoutains and Azarbayjan.

Ch. macrocerus, Fischer Waldheim, 1846; Alborz moutains , Azarbayjan, Caspian sea areas.*

Ch. mistshenkoi, Avakyan,1956; Azarbayjan.

Ch. mollis, Charpenter, 1826; Alborz moutains.

Ch. savalanicus Uvarov, 1933. Azarbayjan.*

***Stauroderus* Bolivar, 1897.**

Stauroderus scalaris demavandi Popov, 1951; Damavand regions.

S. scalaris scalaris (Fischer von Waldheim, 1846); Alborz mountains.

S. scalaris znojkoi (Miram, 1938); North Iran.

A key to the tribes and genera of Gomphocerinae recorded in Iran

1. Tarsal claws asymmetrical. Pronotum with distinct lateral carinae. Female with short small ovipositor valves.....*Chrysiochraontini* Brunner vonWattenwyl, 1892

-Tarsal claws not asymmetrical… ……..……2

2. Labium with large pyramidal extension, it extends beyond the middle of prothorax.....*Xenocheila* Uvarov 1833

-Labium normal or at most with rounded outer lobes……..……3

3. Head large and 1.25-1.75 times longer than pronotum. If short, foveolae below the margin of vertex. Pronotum with distinct lateral margin. Antennae with wider basal segments.....*Ochrilidini* Brunner von Wattenwyll, 1893

-Head shorter than pronotum. Foveolae seen from above. Antennae filiform……..4

4.Metasternal lobes contiguous Vertex wide, its width between the eyes twice more than the width of frontal ridge between the antennae. Pronotum with sharp median carina and weak lateral carinae...……*Ramburiellini* Defaut 2012

-Metasternal lobes may be close but notcontiguous ……..……5

5. Frontal ridge flat. Second segment of hind tarsus as long as the other two segments 6

-Frontal ridge with edge and narrower. Second segment of hind tarsus at most less than 2/3 the length of other two segments…….....…..……..…7

6. Apical part of tegmina with dense venation. Tegmina with a wide cubital field; in male 4 times and in female 2 times the narrowest parts of the median field. Antennae short, the length of a median segment 2-3 times its width.….....*Arcypterini* Shumakov, 1963

- Apical part of tegmina without dense venation. Pronotum with lightly inflexed lateral carinae. Fastigium narrow and long with pentagonal raised margin. Median field of tegmina without spurious vein. Body with short sporadic hairs, more dense on the underside of thorax, conspicuous under the front legs .....……*Leva* Uvarov, 1952

7. Pronotum often with distinct X marking. Frontal ridge wide and flat. Median field of tegmina often without spurious vein .....*Dociostaurini*, Mishchenko, 1974

- Pronotum often without a distinct X marking. Frontal ridge not very wide or flat …8

8. Tegmina with a projection at anterior basal parts. Fastigium weakly project forward. Head short and face generally oblique. Median field of tegmina often with a spurious vein. Frontal ridge with edge, or with a furrow……*Gomphocerini* Fieber, 1853

- Anterior basal part tegmina with no projection .Median carina of pronotum sharp. Lateral carinae of pronotum distinct. Ovipositor is with preapical notch in the dorsal margin. Hind wings with widened median field (*Stenobothrodes,* Tarbinsky, 1948) or narrower median field (*Stenobothrus*Fischer, 1853). Precostal field of tegmina not widened .....*Stenobothrini* Harz,1975

Key to Dociostaurini genera

1. Face oblique and vertex projecting forward. First segment of hind tarsi 2/3 or shorter than the length of other two segment.....2

- Face perpendicular or vertex not projecting forward… 3

2. Tegmina with spurious vein. Frontal ridge with narrowly furrow ....*Eremippus* Uvarov, 1926

- No spurious vein. No deep furrow on frontal ridge. Foveolae subtriangular. Body hairs more dense under the thorax and fore leg….....*Leva* Bolivar, 1909

3. Vertex smooth and without median carina. Pronotum with X marking or the marking is not defined in prozona. Tegmina without spurious median vein…..…….. .....*Dociostaurus* Fieber, 1853

- Vertex rugose and with median carina. Tegmina with or without spurious vein in median field…….....…….4

4. Lateral carinae of pronotum sharply converging toward the median carina in the middle. With X- marking on pronotum. Metasternum with nearly contiguous lobes. ……..... *Notostaurus* Bey-Bienko, 1933

- Lateral carinae of pronotum straight or nearly parallel. Without X- marking. Metasternum with distinctly separated lophi. Tegmina without spurious vein ....*Mizonocara* Uvarov, 1912

Key to the rest of Iranian genera of Gomphocerinae

1. Antennae sword shaped or with wider basal segment……..…….2

- Antennae filiform…….....…….…….6

2. Head longer than pronotum……..……...…….5

- Head equal to or shorter than pronotum……..……3

3. Foveolae under the edge of fastigium and not seen from above. Vertex moderately projecting forward. Median field of tegmina with false vein..... .....*Ochrilidia* Stal, 1873

- Foveolae seen from above. Vertex strongly projecting forward. Tegmina long and extends beyond the middle of the hind tibiae……..*Gonista* Bolivar, 1878

4. Head 1.75 times longer than pronotum……...*Mesopsis* Uvarov, 1933

- Head 1.25 times longer than pronotum. ……*Kirmania* Uvarov, 1933

5. Metasternal lobes contiguous. Median field of tegmina with spurious vein. ……...6

- Metasternal lobes well separated……..……..…....7

6. Vertex wide and short. Pronotum with weak lateral carinae. Occiput is smooth. Hind tibiae without long terminal spur……..……*Ramburiella,* Bolivar, 1996

- Vertex narrower. Pronotum with sharp lateral carinae. Hind tibiae with a long ventral spur on the inner aspect. Foveolae only partly seen when examined from above...……...……...*Stenohippus* Uvarov 1926

7. Pronotum very narrow in the anterior part. Foveolae long and narrow. Ovipositor with rounded preapical notch. Precostal field of tegmina not widened in the basal parts. Vertex short…...…….....……*Omocestus* Bolivar, 1878

- Pronotum not narrowed in the anterior part……...……..8

8. Radial veins of hind wings thickened. Costal and subcostal veins of hind wings curved in the apical third. The subcostal field of the wing widened in the middle…..... .....*Stauroderus* Bolivar, 1897

- Radial veins of hind wings not thickened……...…….……9

9. Tarsal claws asymmetrical. ……. *Euchorthippus* Tarbinsky, 1940

- Tarsal claws symmetrical …...……..……..……10

10. Labium with large beak shaped part reaching beyond the middle of pronotum .....……..……..……*Xenocheila* Uvarov, 1933

-Labium is with only small rounded outer lobes not resembling the beak. Pronotum with distinct lateral carinae, straight or concave.....*Chorthippus* Fieber, 1852

DISCUSSION

Bey-Bienko (1951) produced species identification keys for Acridoidea of Russia and adjacent countries. Mol and Unal (2013) gave a list of Gomphocerinae species collected in Black Sea Regions of Turkey. In this study the list of the Gomphocerinae published by various authors in Iran is updated according to recent classification presented in the OSF (Eades *et al*., 2011; Eades, 2000). The published distribution data for Iranian Orthoptera species are often fairly coarse and the exact localities or dates of collection for many species are not known. Producing an accurate distribution map for species will require the cooperation with other museums and researchers in the future. In some cases species are recorded from the borders of Afghanistan, Pakistan, Azerbaijan, Turkey, Armenia or Turkmenistan, and the location data cannot be confirmed. For example *Oxypterna afghana* Ramme, 1952 (Ochrilidini) is reported from Zabol at the border with Afghanistan and are only found in Afghanistan (Shumakov, 1963).

Arcyptera Serville, 1839 and *Pararcyptera* Tarbinsky, 1940 were described as separate genera (Bey-Bienko and Mishchenko, 1951). Only *Pararcyptera microptera* Tarbinsky, 1940 is recorded from the North and North West of Iran and classified in Arcypterini (Shumakov, 1963). Arcypterini is now a tribe of Gomphocerinae with one species and three subspecies in Iran. *Leva hemiptera* Uvarov, 1952 is classified in this tribe (Garai, 2010). *Leva* is synonym to *Bodenheimerella* Uvarov 1933. Therefore *Leva hemiptera* Uvarov, 1952 can also be classified as Dociostaurini or without a specific tribe in Gomphocerinae.

By comparing Soltani (1978) work, with Mishchenko (1974) and other recent publications, Dociostaurini species of Iran should go through a complete revision.

The existance of *Stauronotulus* was doubted by Soltani (1978). *Dociostaurus* (*Stauronotulus*) Tarbindsky, 1940 species and subspecies clearly exist in Iranian fauna.

The distinguishing morphological characters of *Stauronotulus* Tarbinsky 1940, is in the shape of the X-band on the pronotum and the robustness of hind femora. Wings and tegmina in the *Dociostaurus (Stauronotulus) hauensteini* group are also generally shorter and mostly not covering all abdominal segments.

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