

A new subtribe of the tribe Phisidini from America and remarks on the genus *Arachnoscelis* (Orthoptera: Tettigoniidae: Meconematinae)

Новая подтриба трибы Phisidini из Америки и замечания по роду *Arachnoscelis* (Orthoptera: Tettigoniidae: Meconematinae)

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A new subtribe (Arachnoscelidina **subtrib. nov.**) and two new subgenera of the genus *Arachnoscelis* Karny (*Centrophisis* **subgen. nov.** and *Peruphisis* **subgen. nov.**) are described. All these taxa are distributed in America and probably belong to the tribe Phisidini of the katydid subfamily Meconematinae. Some problems of taxonomy and morphology of the Arachnoscelidina are briefly discussed.

Описываются новая подтриба (Arachnoscelidina **subtrib. nov.**) и два новых подрода рода *Arachnoscelis* Карны (*Centrophisis* **subgen. nov.** и *Peruphisis* **subgen. nov.**). Все эти таксоны распространены в Америке и, вероятно, относятся к трибе Phisidini подсемейства мелкотелых кузнечиков (Meconematinae). Кратко рассматриваются некоторые вопросы таксономии и морфологии Arachnoscelidina.

Key words: katydids, taxonomy, America, Orthoptera, Tettigoniidae, Meconematinae, Phisidini, *Arachnoscelis*, new taxa

Ключевые слова: кузнечики, таксономия, Америка, Orthoptera, Tettigoniidae, Meconematinae, Phisidini, *Arachnoscelis*, новые таксоны

INTRODUCTION

Gorochov (2012) indicated that systematic position of the genus *Arachnoscelis* Karny is not very clear. It was originally described in “tribus Listrosclinae” for only *A. arachnoides* (Redtenbacher, 1891) from Colombia (Karny, 1911). Later, six species have been added in *Arachnoscelis* (Hebard, 1927; Randell, 1964; Bowen-Jones, 1994; Nickle, 2002; Gorochov, 2012), and this genus was transferred to the tribe Phisidini of the subfamily Meconematinae (Gorochov, 1995). However, some authors (Montealegre-Z et al., 2013) do not agree with the latter action and present their objections. The arguments of all the opponents show that this disagreement is caused by some isolation of this genus from all other similar genera. Below, a new subtribe for this genus is described,

and some comments on the paper by Montealegre-Z et al. are given.

TAXONOMIC PART

Order **ORTHOPTERA**

Family **TETTIGONIIDAE**

Subfamily **MECONEMATINAE**

Tribe **PHISIDINI**

Subtribe **ARACHNOSCELIDINA**
subtrib. nov.

Type genus: *Arachnoscelis* Karny, 1911.

Diagnosis. Head large and very high, in region near subgenae somewhat or distinctly wider than pronotum; height of head distinctly or much greater than length of pronotum; mandibles of some males specialized: longer than in female, strongly arched

before molar part, with molar part strongly shortened and shifted to apex (but with apical tooth not very different in size from that of female). Legs similar to those of other representatives of Phisidini, but hind femora with rather strongly widened proximal third (maximal width of hind femur more or less similar to pronotal length). Wings of known representatives strongly shortened: male tegmina modified into small stridulatory organ; female ones scale-like; hind wings absent or invisible (possibly absent in all species).

Composition. Type genus only, but possibly three genera tentatively considered below as three subgenera of *Arachnoscelis*.

Comparison. The second subtribe of Phisidini, Phisidina **stat. nov.** (from Phisidini Jin, 1987), includes all the other genera of this tribe and differs from *Arachnoscelidina* in the following characters: head smaller (not wider or almost not wider than pronotum) and distinctly lower (its height not greater or slightly greater than pronotal length); male mandibles not specialized, similar to female mandibles; proximal third of hind femora less widened (pronotal length distinctly greater than maximal width of hind femur); all wings usually developed and longer.

Remarks on the genus *Arachnoscelis*

In the paper by Montealegre-Z et al. (2013), the following critical notes were made:

1) “Gorochov (2012) ... was inaccurate in assigning his species (*A. tanasijtshuki*) to *Arachnoscelis* (as other authors did), without careful comparison with the holotype and/or type species.” – I would agree that *A. tanasijtshuki* may belong to a new genus or one of the new subgenera described below, and that Hebard (1927), Randell (1964), Bowen-Jones (1994), Nickle (2002) and Montealegre-Z et al. (2006) were “inaccurate” when they included their males in *Arachnoscelis* but refrained from any description of new genera or subgenera

for these specimens. However, I am against usage of this word (“inaccurate”) in such cases. Also I don’t understand a reason for usage of this word in relation to Gorochov (2012), because he had only a female. Probably, Montealegre-Z et al. consider that Gorochov must describe new genera basing on study of female morphology, i.e. without study of male. It is difficult to agree with such opinion, as females of katydids usually have not some structures important in the generic taxonomy: tegminal stridulatory apparatus, complicated copulatory device consisting of highly modified cerci and/or specialized structures on some other external abdominal parts, hook-like sclerites in genitalia, and so on. I think that Gorochov was maximally accurate when he refrained from such description and included his female in a taxon containing most similar, close-related representatives. Moreover, Gorochov compared his female with the photographs of types of *A. arachnoides* and other congeners presented in Internet (since 2012 as minimum; Eades et al., 2013). These photographs give a more adequate information about some important characters of *Arachnoscelis* than the redescription by Montealegre-Z et al. (2013): for example, the latter authors described only distal half of sclerites of male genitalia in *A. arachnoides* and didn’t explain morphological position of these sclerites (the term “titillators” of these authors is often used by different specialists for sclerites of the male genitalia as well as for processes of the male paraprocts), but the above-mentioned photographs clearly show that these sclerites belong to genitalia and have complicated, plate-like structure of their basal part. Additionally, I must note that description of tympanal organ (contra opinion by Montealegre-Z et al.) and transference of *Arachnoscelis* in Phisidini were originally made on the base of material from “Museum für Naturkunde der Humboldt-Universität” (Berlin) determined by Redtenbacher as “*Listroscelis arachnoides*” (Gorochov, 1995) but not on the base of *A. tanasijtshuki* de-

scribed much later. When I was preparing the description of *A. tanasijtshuki* (Gorochov, 2012), I also decided that *Arachnoscelis* consists of three subgenera or related genera but refrained from describing them. If it is my inaccuracy (in accordance to the critique of my opponents), I correct this inaccuracy below, in a key for the *Arachnoscelis* subgenera.

2) **“In Listroschelidinae, the strong specialization of male mouthparts leads to the development of a long hook at the apex of one of male mandibles, and this is observed in *Arachnoscelis arachnoides*”** – The apical mandibular hook of male in *A. arachnoides* is similar in the size (but somewhat different in the shape) to that of female; it is clearly visible in the pictures given by Montealegre-Z et al. (2013: figures 2, B, C). Main mandibular differences between male and female of this species are subapical position of the molar part in male, and a narrower and strongly arched more proximal part of its mandibles. However in Listroschelidinae, the molar part of mandibles in male is not modified and similar to that of female, but often one of the male mandibles has a very long apical hook (much longer than in female and than in male of *Arachnoscelis*) directed more or less forwards. These modifications of male mandibles are very dissimilar and may be an additional argument against inclusion of *Arachnoscelis* in Listroschelidinae (contra views of my opponents).

3) **“Although the tympanal slits and inflation of *A. arachnoides* depart well from *A. tanasijtshuki* ..., the elongated slits suggest that *A. arachnoides* is more similar to some Listroschelidinae in this regard However, we do not consider the tympanal structure as a strong enough character to move genera across subfamilies.”** – Tympanal organ of typical representatives of Phisidini differs from that of the probably monophyletic group “Tettigoniidae” (Tettigoniinae, Bradyporinae, Nedubinae, Glyphonotinae, Hexacentrinae, Conocephalinae, Hetrodinae, Sagi-

nae, Tympanophorinae, Listroschelidinae) in a distinct inflation of its lateral parts, not very narrow (almost not slit-like) tympanal openings, and the absence of characteristic small concavities on the inner and outer sides near distal edges of these openings. Most representatives of Phisidini have this set of characters. However, some of these characters are somewhat varied: tympanal inflation may be sometimes rather weak or very strong; tympanal openings may be almost slit-like (long but not very narrow; very narrow but short, somewhat reduced) or more or less oval. But the above-mentioned concavities are always absent (!). The similar structure of inner half of tympanal organ is present in the genus *Euanisous* Hebard (Meconematinae: Meconematini). But in most representatives of “Tettigoniidae” (including Listroschelidinae), tympanal organ is almost not inflate, its openings are slit-like (very narrow and rather long), and small lateral concavities near distal edges of the tympanal openings are always developed (!). Sometimes in “Tettigoniidae” (for example in the genus *Viriacca* Ingr., Conocephalinae), tympanal organ may be inflate and with distinctly widened openings, but the above-mentioned concavities are distinct (!). In described species of Arachnoscelidina having the tympanal organ studied, the latter is typical or almost typical of Phisidini: in *A. arachnoides*, its openings are only somewhat longer than in *A. tanasijtshuki* but clearly wider than in Listroschelidinae [see figures 7, A, D from Montealegre-Z et al. (2013); these figures clearly show that in *A. arachnoides*, tibia under tympanal inflation is 2–2.5 times as wide as tympanal opening, but in *Listroschelis*, this ratio is more than 4]. Thus, the statement by Montealegre-Z et al. about the similarity of the tympanal openings in *Arachnoscelis* and Listroschelidinae in length don’t take into account their dissimilarity in width as well as some other dissimilar characters of the tympanal organ, and cannot be any rationale for inclusion of *Arachnoscelis* in Listroschelidinae.

Key to subgenera of *Arachnoscelis*

1. Last abdominal tergite of male with a pair of rather small lateral lobes (each lobe shorter than median length of this tergite and lacking distinct notch near apex) or with large articulated processes; male genital (subgenital) plate with a pair of posterolateral lobes and wide median notch between them 2
- Last abdominal tergite of male with a pair of large unarticulated lateral lobes (each lobe longer than median length of this tergite and with distinct notch near apex); male genital (subgenital) plate with only unpaired median projection slightly notched at apex ***Centrophisis* subgen. nov.**
[Composition, in original binomen: *Arachnoscelis magnifica* Hebard, 1927 (type species), Panama; *A. rehni* Randell, 1964, Costa Rica; *A. feroxnotha* Bowen-Jons, 1994, Costa Rica]
2. Male last abdominal tergite with articulated processes; styles of male genital (subgenital) plate unarticulated, probably fused with lateral lobes of this plate. ***Peruphis* subgen. nov.**
[Composition, in original binomen: *Arachnoscelis meriti* Nickle, 2002 (type species), Peru; possibly *A. tanasijtshuki* Gorochov, 2012, Peru]
- Male last abdominal tergite without articulated processes; styles of male genital (subgenital) plate articulated with lateral lobes of this plate ***Arachnoscelis* s. str.**
[Composition, in original binomen: *Listroskelis arachnoides* Redtenbacher, 1891 (type species), Colombia]

This key is prepared with usage of the data by Hebard (1927), Randell (1964), Bowen-Jones (1994), Nickle (2002), Gorochov (2012), and Eades et al. (2013). Etymology of the names *Centrophisis* and *Peruphis* is following: the first name originates from Central America and the genus *Phisis*; and the second one, from Peru and the genus *Phisis*.

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