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## A REVIEW ON THE GENUS *BRACHYCOLEUS* (HEMIPTERA, MIRIDAE) WITH IDENTIFICATION KEY TO THE SPECIES FOUND IN IRAN

R. Hosseini

Department of Plant Protection, Faculty of Agricultural Sciences,  
University of Guilan, Rasht, Iran,  
E-mail: rhosseini@guilan.ac.ir

**A Review on the Genus *Brachycoleus* (Hemiptera, Miridae) with Identification Key to the Species Found in Iran.** Hosseini, R. — Three species of the genus *Brachycoleus* Fieber, 1858 known from Iran, *B. caucasicus* (Poppius, 1912), *B. lineellus* Jakovlev, 1884, and *B. steini* Reuter, 1877 are briefly redescribed along with illustrated keys and distribution data provided.

Key words. Hemiptera, Miridae, Iran, Guilan, morphology, key, distribution.

### Introduction

The genus *Brachycoleus* was established by Fieber in 1858 to accommodate *Lygaeus scriptus* Fabricius, 1803. The genus belongs to the subfamily Mirinae and tribe Mirini (Schuh, 2014). It is recognized by the following characters including: species of this genus are large and relatively broad, males are usually slender than the female. Head is short and wide. Collar of pronotum thicker than the basal part of the second antennal segment. Calli of pronotum small and their margin not reaching each other. Corium with only 2 distinct veins. Body covered with erect and semierect yellowish fine hairs longer than thickness of tibia, isolated dark hairs sporadically occur near lateral margins of hemelytra. Coloration with prevailing red, orange and yellow tinges, black pattern more or less developed. Frons markedly projecting over clypeus. Subocular part of head 0.7 eye height. Rostrum reaching to the middle of mesosternum or in *B. pilicornis* and *B. caucasicus* mesocoxae. Genital segment of the male small, cone-shaped. Hypophysis of right paramere unclear. Left paramere sickle-shaped, hump flat, widened hypophysis, with a small tip. Aedeagus small, scarcely curved. Vesica sometimes with small spicula (Wagner, Weber, 1964, Wagner, 1974, Rosenzweig, 1997).

The genus comprises nine species known from the Palaearctic Region (Kerzhner, Josifov, 1999) with three species reported from Iran (Linnavuori, 2007).

The fauna of Iranian Miridae was recently studied by Hosseini (1997, 2013 a, b, c; 2014 a, b; 2012), Linnavuori (2006, 2007, 2009) and Wagner (1971). There are limited reports regarding to species of this genus from Iran, such as (Linnavuori, 2007, 2009) including *Brachycoleus caucasicus* (Poppius, 1912), *B. lineellus* Jakovlev, 1884 and *B. steini* Reuter, 1877.

There is a lack of information for identification of Miridae species in Iran especially in Guilan province. This work is continuing of a series of synoptic taxonomic treatments and redescription on the Miridae known from Guilan and other provinces of Iran in order to fill this information gap.

This study aims to provide data including diagnoses, distribution data, and illustrated identification keys for species of the genus *Brachycoleus* known from Iran. Illustrations of selected morphological characters are provided to facilitate identification.

## Material and methods

Specimens were collected by the sweeping and bush net from vegetation by means of a standard aspirator, killed by ethyl acetate and mounted on rectangular cards and all deposited at the Natural History Museum of the University of Guilan, along with the specimens kindly identified by Dr. R. E. Linnavuori involved into study. Photographs of specimens were taken using a Canon EOS 500D (Digital Rebel/Kiss X3 Digital) camera equipped by a Canon EF 100mm f/2.8 USM Macro Lens and combined form stacks in Combine ZM software. Keys by Wagner & Weber (1964) and Wagner (1974) were used; identification was confirmed Dr. R. E. Linnavuori (Finland). Classification and nomenclature follows the catalogue by Kerzhner & Josifov (1999).

## Results

### Key to the species of *Brachycoleus*

1. Pronotum and hemelytra with distinct black marks. Cuneus orange, hair of hind tibiae almost as long as the spines, 2nd antennal segment about 2 times as long as width of head. ....*B. steini*
- Pronotum and hemelytra without distinct black marks. [Other characters variable]. .... 2
2. Pronotum bright, with 1 or 3 small dark longitudinal stripes. Corium pale, each with only a narrow dark longitudinal stripes on clavus and on the radial artery. ....*B. lineellus*
- Pronotum bright, without dark longitudinal stripes. Corium not as above. ....*B. caucasicus*

### *Brachycoleus lineellus* (Jakovlev, 1884) (table 1, fig. 1, A; 2, A; 3, A–B, 4, A)

Material examined. Guilan Province: Sang Rud — Jirandeh (36°39'59" N, 49°42'06" E, 1338 m), 31.05.1995. Zanjan Province: 20–35 km E of Zanjan (36°34'06" N, 48°42'16" E, 1740 m), 13.07.2004. Albourz Province: Azad Bar (36°08'38" N, 51°15'27" E, 2590 m), 8–10.07.1995.

Diagnosis. Color light green to yellow-green with small black markings. Pubescence of the upper surface dense, bright. Behind of vertex black, rarely bright. Tylus with two

Table 1. Diagnostic taxonomical characters in three species of *Brachycoleus* (numbers are ratio or size, mm)

Taxonomic characters	Ratio / Size, mm		
	<i>Brachycoleus lineellus</i>	<i>Brachycoleus steini</i>	<i>Brachycoleus caucasicus</i>
Proportions among antennal segments	0.6 : 1.52 : 0.86 : 0.54	0.74 : 2.3 : 1.1 : 0.7	0.64 : 1.9 : 0.7 : 0.5
Width of head across the eyes in dorsal view	1.3	1.2	1.1
Interocular width	0.7	0.6	0.6
Ocular index <sup>1</sup>	2.3	2	2
Base of pronotum	2.24	2.5	2.26
Length of pronotum	1.2	1.1	1.1
1st antennal segment / times as long as head width	0.46	0.61	0.58
2nd antennal segment / times as long as head width	1.17	1.9	1.72
2nd antennal segment / times as long as basal width of pronotum	0.67	0.92	0.84
Pronotum / times as broad basally as long in middle	1.86	2.27	2
Scutellum length	0.72	1.2	0.9
Scutellum width	1.1	1.5	1.12
Height of head	0.9	0.92	0.7
Length of head	0.6	0.74	0.72
Collar length	0.2	0.16	0.12

<sup>1</sup>Interocular width / width of eye.

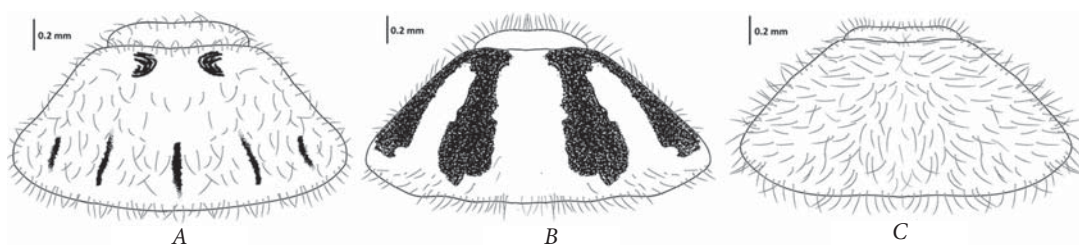


Fig. 1. Pronotum from above view: A — *Brachycoleus lineellus* Jakovlev, 1884; B — *Brachycoleus steini* Reuter, 1877; C — *Brachycoleus caucasicus* (Poppius, 1912).

black stripes. Antenna black, the first segment and the basal part of the second yellow-brown, first segment 0.55× as long as the wide of head, second segment 0.63× as long as wide of the pronotum. Collar yellow. Rear portion of pronotum with 3 or 5 narrow black stripes. Calli may partially black. Scutellum sometimes at the base and the sides and with black stripe. Color mostly greenish gray. Clavus and inner side of commissure blackish. Corium with blackish stripes. Cuneus bright colored. Membrane dark gray with greenish veins, its back black. Legs green. Leg at the tip with blackish ring or half-ring. End of the tibia and tarsi black. Sides of abdomen with black stripes.

Length. 6.75–8.5 mm (male), 7.5 mm (female).

Comments. Linnavuori (2007) has reported this species from Guilan, Tehran, Zanjan provinces.

The species has been collected from a hilly steppes. It is a Anatolian species, known from Caucasus, Iran, Iraq, Syria and Turkey (Linnavuori, 2007). In the plant bug website (Schuh, 2014) *Artemisia* sp. (Asteraceae) and *Phlomis* sp. (Lamiaceae) have been reported as the hosts of species (Seidenstucker, 1959).

#### ***Brachycoleus steini* Reuter, 1877 (table 1, fig. 1, B; 2, B; 3, C; 4, B)**

Material examined. Albourz Province: Azad Bar (36°08'38" N, 51°15'27" E, 2590 m), 8–10.07.1995; Kandovan tunnel (36°09'01" N, 51°18'38" E, 2982 m), 3–4.07.1995. East Azarbaijan, near Mianeh (37°24'31" N, 47°45'42" E, 1048 m), 18.06.2005 (Linnavuori, 2009).

Diagnosis. The largest species of the genus. Black with yellow drawing. Pubescence on the bright area is bright and black on black areas. Head black, with a yellow spot on

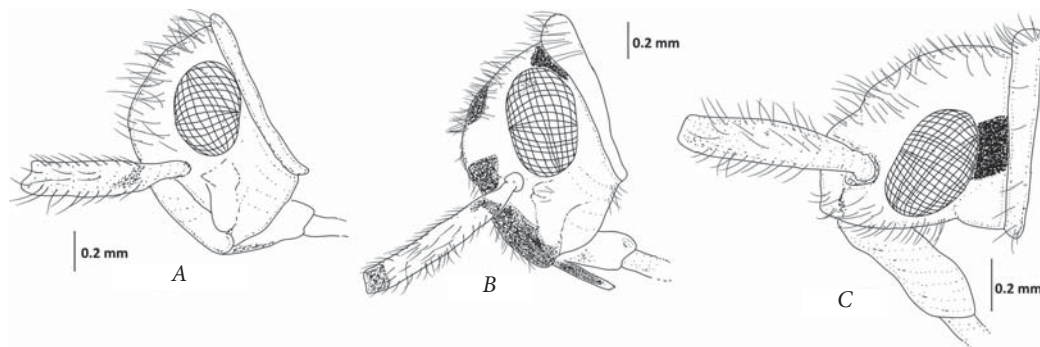


Fig. 2. Head from lateral view: A — *Brachycoleus lineellus* Jakovlev, 1884; B — *Brachycoleus steini* Reuter, 1877; C — *Brachycoleus caucasicus* (Poppius, 1912).

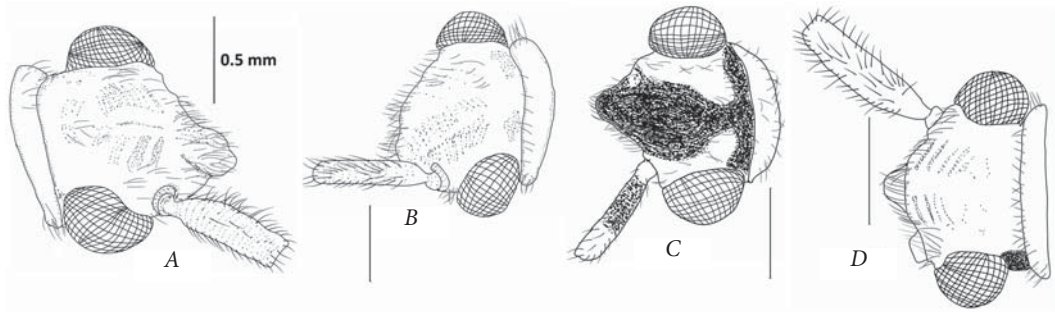


Fig. 3. Head from above view: A, B — *Brachycoleus lineellus* Jakovlev, 1884; C — *Brachycoleus steini* Reuter, 1877; D — *Brachycoleus caucasicus* (Poppius, 1912).

the eye. Ocular index in male 1.95 while in female 2.0–2.05. Antenna black, first antennal segment 0.66× as long as wide of head; second antennal segment black, in male 1×, in the female ~ 0.9× as long as the width of pronotum. Collar bright. Pronotum black, lateral and posterior margin narrowly yellow, rear section with two longitudinal yellow stripes and a central elongated spot. Scutellum black in the rear part, with a more or less extensive yellow spot. Clavus with black longitudinal spot. Inner angle of the corium and the outer edge just before the rear corner yellow. Cuneus yellow, its apex black. Legs reddish yellow. Base of the legs black. Tarsi black. The hair on the tibia is as long as the spins.

Length: 9.2–10.0 mm (male), 8.0–8.9 mm (female).

Comments. This species has been collected on *Centaurea* sp. in hilly steppes (Linnavuori, 2007) and *Scolymus hispanicus* (Linnavuori, 2009). It has been reported from Albourz provinces (Heiss, Linnavuori, 2002). It is a Pontomediterranean species, found in Spain, Italy, Sicily, in the Balkan Peninsula, Hungary and Eurasia Minor (Wagner, Weber, 1964)

***Brachycoleus caucasicus* (Poppius, 1912)** (table 1, fig. 1, C ; 2, C; 3, D; 4, C)

Material examined. Tehran Province: Kandovan tunnel (36°09'01" N, 51°18'38" E, 2982 m), 3–4.07.1995. East Azerbaijan Province: near Hashtrud (37°29'34" N, 47°02'59" E, 1676 m), 18.06.2005. Kohgiluyeh & Boyerahmad Province: Vazag 15S E of Yasuj (30°33'40" N, 51°41'20" E, 1924 m), 18.06.2003 (Linnavuori, 2007, 2009).

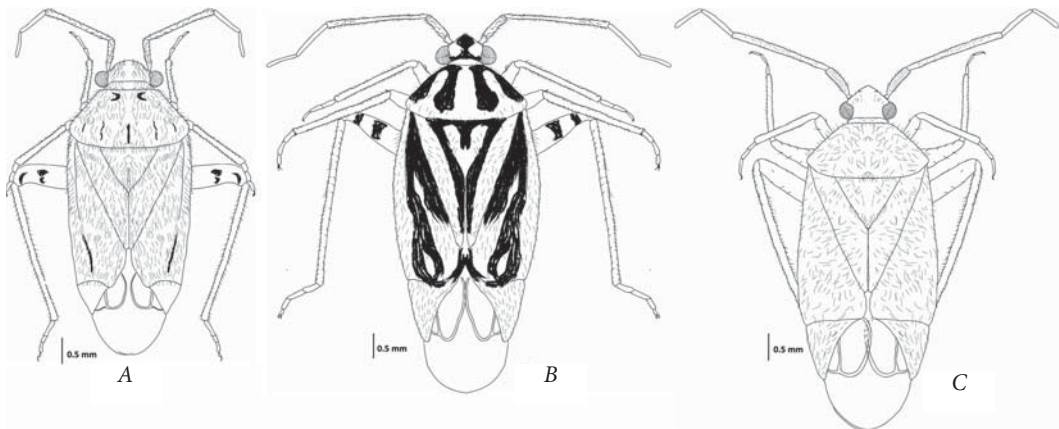


Fig. 4. Adult: A — *Brachycoleus lineellus* Jakovlev, 1884; B — *Brachycoleus steini* Reuter, 1877; C — *Brachycoleus caucasicus* (Poppius, 1912).

**Diagnosis.** Long — oval, light gray to greenish whitish gray. Pubescence fine and dark with fine light hair especially in the front part. Head wider than in its height. First antennal segment 0.62–0.69× as long as width of the head, hairs on it black and thick; second antennal segment 1.5–1.7× as long as the pronotum. Tegula black or dark brown. Hind leg in the apical part with small brown spots. Tibia with fine, black spines. The rostrum reaches the middle of the middle coxa.

Length: male 7.3–7.5 mm.

**Comments.** This species has been collected on gently sloping hillsides with plants such as Asteraceae, *Astragalus*, *Phlomis*, *Thymus* and *Verbascum*. It is known from Azerbaijan (Linnavuori, 2007).

\**Brachycoleus decolor* Reuter, 1887

Sakenin et al. (2010) claimed that *Brachycoleus decolor* along with 133 other species were collected from west of Iran, surprisingly in a completely similar work Samin et al. (2011) reported and published mostly same species in a vanity fake journal named "Calodema" (Tin et al., 2014). Also no depository has been stated in both papers for the collected and identified specimens. Therefore the validity of these reports is in doubt as it is unclear if vouchers were deposited for further examination.

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