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Review of the neotropical Mezirinae genus *Limonocoris* KORMILEV, 1971 with description of two new species (Hemiptera, Heteroptera, Aradidae)

Ernst HEISS

A b s t r a c t : From the micropterous flat bug genus *Limonocoris* KORMILEV, 1971 only the type species *L. jolyi* is known and no further record published to date. Two new species, *Limonocoris schatzorum* nov.sp. from Panama and *Limonocoris kunzi* nov.sp. from Costa Rica are described and illustrated below. *Kormilevia aberrans* KORMILEV, 1963 is recognized as a taxon belonging to *Limonocoris* and is transferred here. A key to all species is presented.

K e y w o r d s : Heteroptera, Aradidae, Mezirinae, Neotropics, micropterous, new species, Panama, Costa Rica

Introduction

The neotropical fauna of Aradidae is still insufficiently known. Of the subfamily Mezirinae 42 genera are listed by COSCARON & CONTRERAS (2012) in their Catalog of Aradidae (Hemiptera - Heteroptera) for the neotropical Region. Three later described genera (*Osellaptera* HEISS, 2013; *Bahiamezira* HEISS, 2014; *Urucuca* HEISS, 2014) increased the number to 45 genera.

Most of them are macropterous (25), 12 genera are apterous, 3 genera include brachypterous species (*Placogenys brachypterus* USINGER & MATSUDA, 1959; *Mezira brachyptera* KORMILEV, 1964; *Rhynchomirus brachypterus* KORMILEV, 1976) and 5 genera with 12 species are micropterous (*Delnocoris* KORMILEV, 1982 (1 sp.); *Kelaino* KORMILEV, 1963 (1 sp.); *Kormilevia* USINGER & MATSUDA, 1959 (8 sp.); *Limonocoris* KORMILEV, 1971 (1 sp.); *Osellaptera* HEISS, 2013 (1 sp.).

The genus *Limonocoris* was described upon material from Venezuela, but then never recorded since. Specimens now available for study show some differences to the type species *L. jolyi* KORMILEV, 1971 which are recognized as distinct taxa, best placed in this genus and are described and illustrated below. A key to all male species of *Limonocoris* is presented.

Material and methods

The material upon which this study is based is deposited in the collection of the author (CEHI) at the Tiroler Landesmuseum (Innsbruck, Austria). As apterous and micropterous aradid specimens collected from litter are usually covered by incrustation obscuring the body structures, they were cleaned and remounted for examination.

Measurements were taken with a micrometer eyepiece and are given in millimetres.

When citing the text on the labels of a pin attached to the specimens / separates the lines and // different labels.

Abbreviations used: deltg = dorsal external laterotergite (connexivum), mtg = mediotergite, ptg = paratergite.

Photos were taken through a Nikon Coolpix 300 digital camera and paintnet software.

Taxonomy

Subfamily Mezirinae OSHANIN, 1908

Genus *Limonocoris* KORMILEV, 1971

Type species: *Limonocoris jolyi* KORMILEV, 1971

Redescription of *Limonocoris*

Micropterous species of 4.5–5.6mm, habitus of male characteristically expanded posteriorly; genae short, not produced over clypeus; antennae more than twice as long as width of head, antennal segment III longest, IV shortest; eyes not stalked, postocular lobes converging posteriorly with or without a tubercle; rostrum arising from a slit-like atrium.

Pronotum with rounded and produced anterolateral angles; mesonotum comprising a wide triangular, medially carinate scutellum and small lateral wingpads.

Metanotum consisting of two oval callosities; mtg I separated from mtg II by a suture, the latter partly or fully separated from mtg III; metathoracic scent glands slit like, their dorsal apex is visible from above between wingpads and apex of deltg II.

Abdomen. Tergal plate raised medially with a distinctly elevated dorsal scent gland along mtg IV-V, deltg II+III not fused; spiracles II-V ventral, VI-VIII sublateral close to margin or lateral and usually visible from above.

The genus was compared by KORMILEV (1971) with *Kormilevia* USINGER & MATSUDA, 1959 sharing similar habitus and abdominal structures, differing however by genae as long as clypeus (vs distinctly longer), mesonotum with less elevated scutellum (vs strongly elevated with median groove), spiracles VI-VIII lateral (vs V-VIII lateral), male pygophore conical, slightly wider than long (vs about twice as wide as long), deltg V-VII of male laterally produced and reflexed (vs converging posteriorly).

Limonocoris jolyi KORMILEV, 1971 (Figs 1, 3)

Material examined: Paratype ♂ labelled: Los Aguaitas: N.Col. / Tovar, 2000m / 4 II 1967 / L.J.Joly T.//; Hda. El Limon D.F. / Venezuela //; Paratype //; Limonocoris / jolyi / N. Kormilev 69 //.

Diagnosis: Male differs from congeners by its triangular habitus, the outline of laterally expanded deltg V-VII, longest antennae about 2.5 times as long as width of head, anterolateral angles of pronotum narrowly rounded and suture between mtg II and III fading.

Measurements: Length 4.6mm; head length / width 0.75 / 0.85; l / w pronotum 0.50 / 1.40; l / w scutellum incl. wingpads 0.55 / 1.55; length of antennal segments I / II /

III / IV = 0.60 / 0.37 / 0.75 / 0.375; width of abdomen across tergites IV-VII = 2.5 / 2.85 / 2.85 / 2.25.

D i s t r i b u t i o n : Venezuela at 2000m altitude.

Limonocoris schatzorum **nov.sp.** (Figs 2, 4)

H o l o t y p e ♂ labelled : PA-Panama / Prov. Chiriqui, Cordillera / Talamanca, Volc. Baru / 2000m send. Quetzales / 21 II 2004 I+H Schatz //.

D i a g n o s i s : This species is recognized and differing from congeners primarily by its glabrous dorsal surface and the outline of lateral expansions of deltg V-VII.

D e s c r i p t i o n : Head about as long as wide (1.00 / 0.95), antennae 2.25 times as long as width of head; length of antennal segments I / II /III / IV = 0.60 / 0.35 /0.85 /0.40, I thickest.

Thorax : Pronotum three times as wide as long (14.5 / 0.5), lateral margins sinuate and reflexed, anterolateral angles widely rounded and produced over thin collar.

Scutellum more than three times as wide as long (18.5 / 0.55), distinctly raised above level of metanotal sclerites, with a median carina and laterally rounded and reflexed wingpads. Metanotum consisting of two oval callosities with smooth surface.

Abdomen: Mtg I and mtg II medially raised and separated by transverse sutures; tergal plate wider than long, deltg II+III not fused, deltg V-VII triangularly produced and reflexed, ptg VIII finger like. Legs unarmed, claws with pulvilli and a median seta.

M e a s u r e m e n t s : Length 4.8mm; length of antennae 2.2; width of abdomen across tergites IV-VII = 2.60 / 2.85 / 2.45 / 1.8.

E t y m o l o g y : Dedicated to my dear friends Irene and Heinz Schatz (Innsbruck) who collected this and several other interesting apterous neotropical Aradidae, recognizing also their kind assistance and guide when visiting them in Galapagos years ago.

D i s t r i b u t i o n : NW Panama at 2000m.

Limonocoris kunzi **nov.sp.** (Figs 5, 7, 9, 10-15)

Holotype ♂ labelled: Costa Rica: S.Jose / Cart. Km 69 Int.Am.Hwy / Tres de Junio, 2600m // 09,39.30 N, 83,51.30 W / cloud forest litter 97-004 / 7 VI 97 R.S. Anderson //. Paratype ♂ collected with holotype, pygophore dissected.

D i a g n o s i s : Largest species, differs from congeners by the size and outline of lateral expansions of deltg V-VII.

D e s c r i p t i o n : Head about as long as wide (0.80 / 0.95);), antennae 2.26 times as long as width of head; length of antennal segments I / II / III / IV = 0.60 / 0.35 / 0.80 / 0.40, I thickest.

Thorax : Pronotum strongly transverse, about 3 times as wide as long (1.45 / 0.55), lateral margins reflexed, sinuately converging to rounded and produced anterolateral angles.

Mesonotum. Scutelllum medially raised and carinate 3.6 times as wide incl. wingpads as long (1.80 / 0.50), wingpads rounded and laterally reflexed. Metanotum consisting of two oval sclerites with granulate surface.

Abdomen: Mtg I+II transverse and raised medially, separated by sutures; tergal plate with distinct pattern of flat impressions marking the fused mtg III-VI; deltg V-VII angularly expanded and reflexed laterally. Male pygophore conical and narrowly rounded, parameres as Figs. 12-15.

M e a s u r e m e n t s : Length, 5.0mm; length of antennae 2.2; width of abdomen across tergites IV-VII = 2.60 / 2.80 / 2.45 / 2.00.

E t y m o l o g y : This species is dedicated to Gernot Kunz, Biologist at the University of Graz, Austria, recognizing his ambitious and successful efforts to compile the Mobile App "Animals of Costa Rica", an excellent field guide with 7000 photos of about 4700 species.

D i s t r i b u t i o n : Central Costa Rica at an altitude of 2350-2600m.

C o m m e n t s : A brachypterous female labelled: Costa Rica: S. Jose / Cart. Km 55 Int.Am.Hwy / 3km S El Palme, 2350m / 09,42.30 N, 83,57 W / oak forest litter 97-008 / 8 VI 97 R.S.Anderson // although of different not posteriorly widening habitus as the males, but sharing their essential structures, might be the opposite sex of *L.kunzi* sp.n. (Fig. 7). As however females are only recorded from *L. jolyi* but never been figured and not available for comparison, its status remains uncertain and is therefore not included as paratype.

***Limonocoris aberrans* (KORMILEV, 1963) nov.comb.** (Figs 6, 8)

Kormilevia aberrans KORMILEV, 1963 (not figured)

M a t e r i a l e x a m i n e d : ♂ labelled: Colombia / Bogota / XII-78 Schuster //.

The genus *Kormilevia* USINGER & MATSUDA, 1959 comprises to date 8 species of which 5 are reported from Brazil, 1 from Argentina, 1 from Ecuador and 1 from Colombia (HEISS, 2013). *Kormilevia aberrans* was described from Bogota Colombia and assigned to this genus although remarkable differences to the congeners but sharing other characters. Photos of the holotype deposited at the Naturhistoriska Riksmuseum, Stockholm, made available through internet (www2.nrm.se/en/het_nrm/a/kormilevia_aberrans.html) show a specimen with posteriorly widening abdomen, rounded and produced anterolateral angles of pronotum, short clypeus and genae resembling species of *Limonocoris*. *Kormilevia aberrans* is therefore transferred to *Limonocoris*. A male specimen from Bogota corresponds to the description of *aberrans* and is reported here.

D i a g n o s i s : Compared to males of congeners it shares e.g. the distinctive, posteriorly widening habitus, but the lateral margins of deltg V-VII are less and more roundly not angularly produced; in addition it differs from all other species of *Limonocoris* by postocular tubercles lacking in others

D e s c r i p t i o n : Head shorter than wide (0.90 / 0.95); antennae about twice as long as width of head, length of antennal segments I / II / III / IV = 0.50 / 0.33 / 0.70 / 0.40; postocular lobes with tubercle adjacent to eyes.

Thorax. Pronotum more than three times as wide incl. wingpads as long (0.55 / 1.60); anterolateral angles rounded and produced anteriorly, surface of disk with flat oblique callosities.

Mesonotum. Scutellum triangular, medially raised and carinate, 3.5 times as wide as long

(0.50 / 1.75), wingpads small, round and laterally reflexed. Mtg I+II separated by distinct sutures.

Abdomen. Tergal plate medially raised with shallow oval impressions on mtg III-VI, deltg V-VII laterally expanded and reflexed.

M e a s u r e m e n t s : Length, 4.5mm; length of antennae 1.95 mm; width of abdomen across tergites IV-VII = 2.80 / 2.60 / 2.40 / 2.00.

D i s t r i b u t i o n : Only recorded from Bogota, Colombia.

Key to male specimens of *Limonocoris*

(Females are not available)

1 (4) Abdominal segments V-VII roundly expanded laterally Figs. 1, 3 2

2 (3) Width of abdomen across deltg V twice as wide as width of pronotum, antennae about 2.5 times as long as width of head, postocular lobes without tubercle (Venezuela) Figs. 1, 3 ..... *jolyi* KORMILEV, 1971

3 (2) Width of abdomen across tergite V about 1.65 times as wide as width of pronotum, antennae shorter, twice as long as width of head, postocular lobes with a distinct tubercle (Colombia) Figs. 6, 8 ..... *aberrans* (KORMILEV, 1963)

4 (1) Abdominal segments V-VII angularly expanded laterally Figs. 2, 4, 5, 9 5

5 (6) Surface of body glabrous, habitus wider and more rounded, lateral expansions of deltg V-VII larger and more produced (Panama) Figs. 2, 4 ..... *schatzorum* nov.sp.

6 (5) Surface mat, habitus more slender, lateral expansions of deltg V-VII narrower and less produced (Costa Rica) Figs. 5,7,9,10-15 ..... *kunzi* nov.sp.

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Zusammenfassung

Von der mikropteren neotropischen Aradidengattung *Limonocoris* KORMILEV, 1971 ist nur die Typusart *L. jolyi* bekannt geworden und seither sind keine weiteren Nachweise erfolgt. Sie ist besonders durch die distal stark verbreiterten Laterotergite V-VII des Abdomens gekennzeichnet. Zwei neue Arten, *L. schatzorum* nov.sp. von Panama und *L. kunzi* nov.sp. von Costa Rica erweitern das Verbreitungsgebiet. Diese werden nachstehend beschrieben und abgebildet. Eine aus Kolumbien bereits 1963 von KORMILEV beschriebene *Kormilevia aberrans* zeigt die Merkmale der Gattung *Limonocoris* und wird nun dazugestellt. Ein Bestimmungsschlüssel für die Arten der Gattung *Limonocoris* wird vorgelegt.

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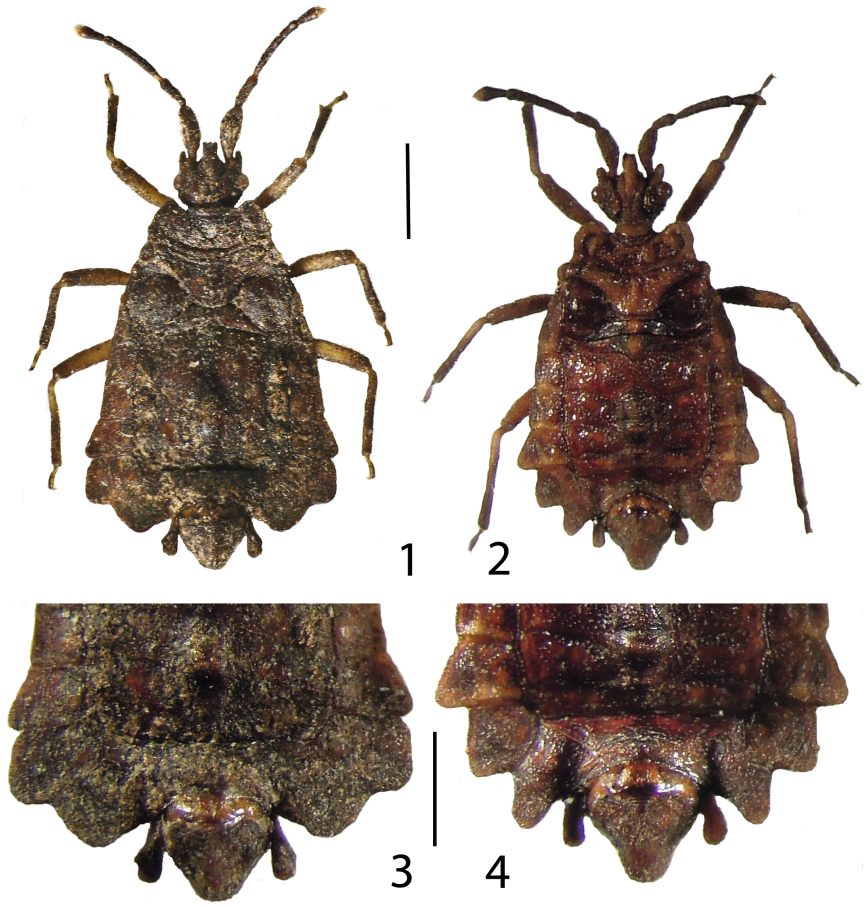
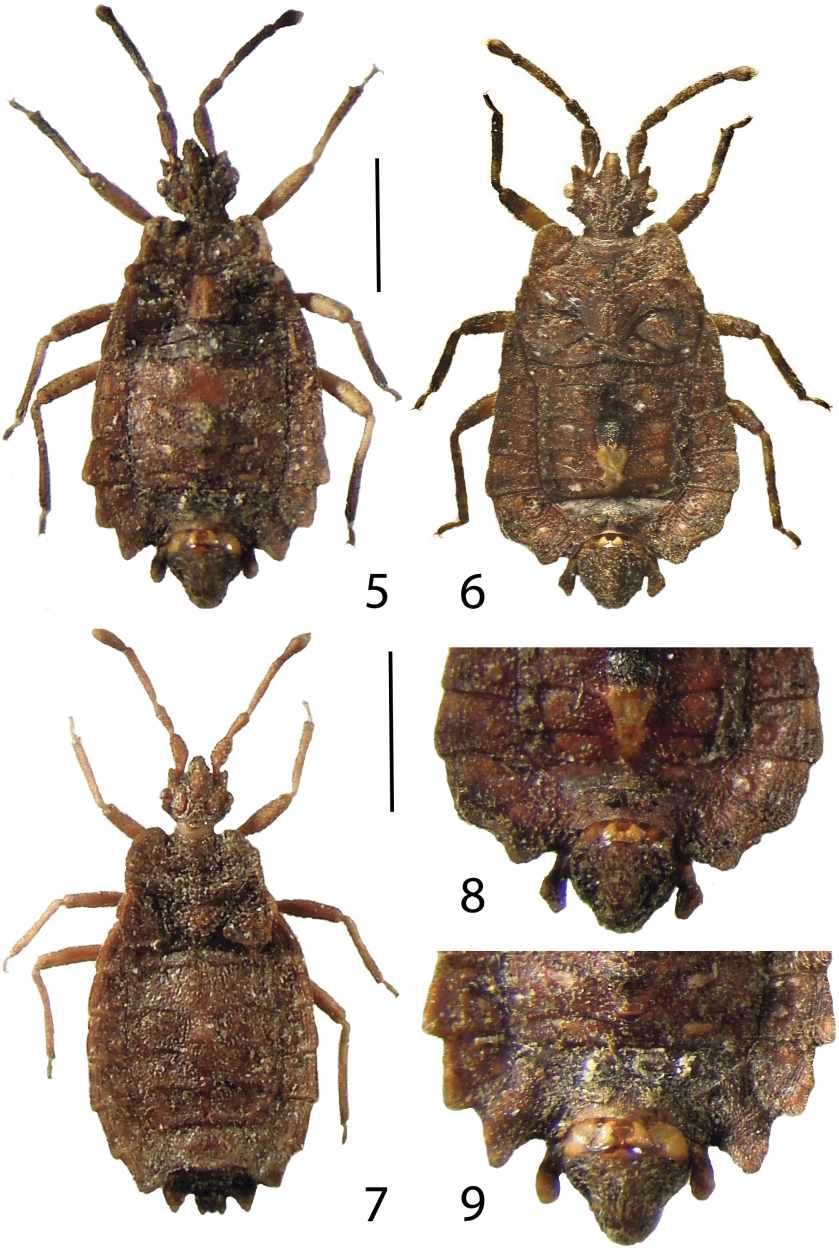
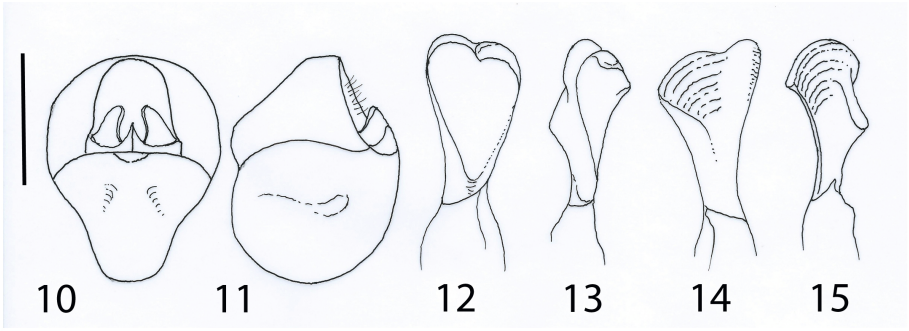
Author's address: DI Dr. Ernst HEISS
Entomology Research Associate
Tiroler Landesmuseum
Josef Schraffl Straße 2a
A-6020 Innsbruck, Austria
E-mail: aradus@aon.at

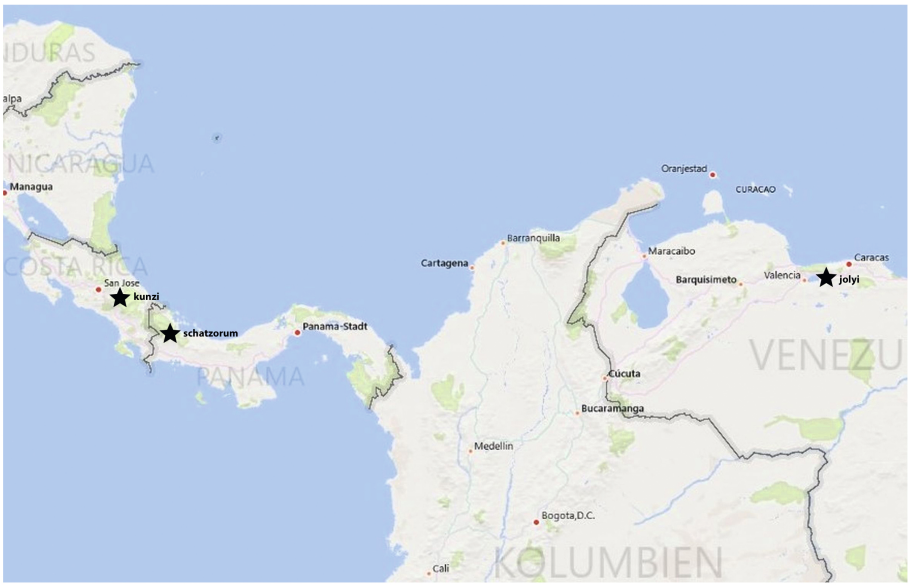


Figs 1-4: *Limonocoris* (**1**) *jolyi,* paratype ♂, habitus; (**2**) *schatzorum* nov.sp. holotype ♂, habitus; (**3**) *jolyi*, ♂ terminal segments, dorsal; (**4**) *schatzorum* nov.sp., ♂ terminal segments, dorsal. Scale 1mm.



Figs 5-9: *Limonocoris* (**5**) *kunzi* sp.nov. holotype ♂, habitus; (**6**) *aberrans* ♂, habitus; (**7**) c.f. *kunzi* nov.sp.,♀ habitus; (**8**) *aberrans* ♂, terminal segments, dorsal; (**9**) *kunzi* nov.sp., ♂ terminal segments, dorsal. Scale 1mm.





16

Figs 10-15: *Limonocoris kunzi* nov.sp. (**10**) male pygophore dorsal; (**11**) ditto lateral; (**12-15**) left paramere, different positions. Scale; (10-11) 0.5mm; (12-15) 0.2mm. **Fig. 16**: Map with distribution of *Limonocoris.*