



## A new species of *Cosmoclopius* Stål, 1866 from Argentina (Hemiptera, Reduviidae)

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### Abstract

A new species of *Cosmoclopius* Stål, 1866, *C. joceliae* sp. nov. is described based on specimens collected in northern Argentina. This new species is recognized by the vertical and truncate median process of pygophore, and the short-recurved spine on the apex of the dorsal phallosclerite; and other features such as the dorsally black head, pronotum, and femora, and the thoracic sterna black with median pale markings; some females show lighter posterior pronotal lobe and femora with more conspicuous dark and pale bands. Digital images of the adult male and female and male genitalia are provided, as well as a comparison with the species of the genus are given.

**Key words:** Harpactorinae, *Cosmoclopius joceliae*, new species, Neotropical

### Introduction

Reduviids comprise a morphologically diverse family with ca. 7,000 species arranged in 24 subfamilies, with Harpactorinae being the largest and most common subfamily with ca. 2,800 species in more than 300 genera (Schuh & Weirauch 2020). They are mostly diurnal predators frequently found on different parts of plants searching for their prey (Readio 1927; Miller 1971; Schuh & Weirauch 2020).

*Cosmoclopius* Stål, 1866 includes seven Neotropical species distributed from Curaçao, in the West Indies about 80 km north from Venezuela, to Argentina (Maldonado Capriles 1990). All species show similar morphology and coloration patterns, although some slight differences can be found (Cobben & Wygodzinsky 1975) particularly in the male genital capsule (Melo & Coscarón 2004). Five species are found in Argentina, being *C. nigroannulatus* (Stål 1860) the most widespread species ranging from the northern provinces of Salta, Jujuy, Formosa, and Misiones to Mendoza, La Pampa and Buenos Aires provinces in the south (Melo *et al.* 2020).

Some species of the genus are commonly found in tobacco crops (Coscarón *et al.* 2002; Jahnke *et al.* 2002) and have been studied as possible biological control agents in Brazil and Argentina (Rocha *et al.* 2002; Delgado & Fedre 2003; Rocha & Redaelli 2004).

In this work we describe a new species from northern Argentina. Photographs of dorsal and lateral habitus as well as photographs of the male and female genitalia are included.

### Materials and methods

The terminology used is that of Schuh & Weirauch (2020) and Weirauch (2008a, b) for external structures; and that of Castro-Huertas & Forero (2014) for male genital structures.

The genital structures were dissected under a stereomicroscope, cleared in a 10% KOH aqueous solution, washed in distilled water, and preserved in a vial with glycerin. All measurements are in millimeters.

Acronyms used for the entomological collections studied are: USNM (National Museum of Natural History, Washington, D.C., USA); and MLP (Museo de la Plata, La Plata, Argentina).

Color images were captured using a digital camera (Micrometrics 391CU, 3.2 m, AccuScope, Commack, NY, USA) mounted to a Nikon SMZ1000 microscope. Multiple focal planes were merged using HeliconFocus software and edited in Adobe Photoshop CS6. Plates were created and numbered in Adobe Illustrator CC 2019.

## Results

### *Cosmoclopius joceliae* n. sp.

(Figs. 1, 2)

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**Diagnosis:** Head, pronotum, and femora mostly black dorsally, except in some females with lighter posterior pronotal lobe and femora with more conspicuous dark and pale bands. Thoracic sterna black with median pale markings (Fig. 1B). Median process of pygophore vertical and truncated (Figs. 2A–B), apical process of the dorsal phallosclerite with a short-recurved spine (Figs. 2E–F).

**Description** (male holotype, Fig. 1C): Total length 12.38. *Head.* Length 2.28, width 1.20. Antecular length 0.89, postocular length 0.91, interocular distance 0.67. Dorsal color black with pale yellow markings along inner margin of eyes and longitudinal faint stripe between ocelli; sides of head black with yellowish markings on mandibular plate and posterior rounded area behind eyes; gula yellow. Head with intermixed recumbent and erect yellowish setae. Antenna: scape black with three yellowish bands, first at middle of basal half, and remaining two at middle of apical half and at apex; pedicel black with a yellowish band at middle; flagellomeres yellowish brown. Scape with sparse short recumbent and erect setae; pedicel with more abundant erect setae, flagellomeres with abundant short decumbent setae. Antennal segment lengths: scape 2.87, pedicel 1.50, basiflagellomere 1.65, distiflagellomere 0.99. Ocelli slightly elevated on a tubercle, distance between ocelli longer than distance between ocellus and eye. Labial segments yellowish with lateral black markings, dorsal area darker; with scarce erect setae. First visible labial segment reaching anterior margin of eye; second segment reaching posterior margin of head. Labium length: segment I (first visible) 1.68, segment II 1.01, segment III 0.43.

*Thorax.* Pronotal length 2.49, width 3.06. Anterior pronotal lobe rounded with medial longitudinal sulcus deeply impressed, not extending into posterior lobe. Anterior lobe of pronotum black with lateral pale orange strip reaching anterolateral tubercles (Fig. 1, A), covered with abundant intermixed recumbent and long erect setae. Posterior pronotal lobe flattened, dark brown medially, pale orange laterally, with triangular pale-yellow mark medially on posterior margin (Fig. 1A), with semierect setae less abundant than on anterior lobe. Humeral angles rounded, posterior margin sinuous. Scutellum black with a pale-yellow strip at base of Y-shape carina, with long erect setae. Propleura with orange spot on proepimeron, proepisternum orange to dark brown to the venter. Meso and metapleura blackish. Pleurae with sparse long erect setae and irregular patches of recumbent setae. Acetabular areas with a whitish mark. Prosternum pale yellow, meso and metasterna black with central pale yellowish marks (Fig. 1B). Sterna with long erect setae. Legs mostly black; coxae black with ventral pale markings; trochanters black with lateral pale markings; femora black with narrow pale base and a pale yellowish spot on dorsal surface; tibiae annulated, black and white, apical band diffuse black, tibial spur and apex black; third tarsal segment as long as first and second combined, second and third tarsal segments with darker apices on anterior and middle legs, homogeneously colored on posterior leg. Legs with intermixed recumbent and erect setae, more abundant ventrally. Hemelytron smoky brown, shiny, corium and clavus with abundant short recumbent setae.

*Abdomen.* Abdominal width 2.82. Abdominal terga black with lateral margins next to pale areas of connexivum paler. Venter orange red to reddish brown on lateral margins, with short erect setae. Connexivum bicolored, dorsal laterotergites with anterior areas blackish, posterior area whitish, ventral laterotergites with smaller anterior blackish areas. *Male genitalia* (Fig. 2A–F): Pygophore mostly rounded, transverse bridge (*br*) dorsally elevated (Fig. 2A); area surrounding paramere socket (*ps*) postero-laterally produced with long setae (Figs. 2B–C); median process of pygophore (*mpp*) vertical and truncated apically (Figs. 2A–B). Aedeagus: Arms of articulatory apparatus (*apt*) abruptly curved and long in dorsal view, ponticulus basilaris absent (Fig. 2D–F); dorsal phallosclerite (*dps*) wide basally, tapering apically with a short recurved spine (Figs. 2 E, F); endosoma with a median (*mel*) and two lateral spined lobes (*lel*) (Figs. 2D–F).

**Paratypes:** Males with same characteristics as holotype, except for some specimens with ventral pale markings on femora (Fig. 1B). Females with these pale markings more conspicuous and more extended.

Triangular pale-yellow mark on posterior margin of pronotum more evident. *Female genitalia* (Figs. 2G–J): gonocoxite VIII trapezoidal, erect setae in middle area and posterior margin; gonapophysis VIII subtriangular with numerous erect setae in posterior margin (Fig. 2H); gonocoxite IX subtriangular with setose apex rounded (Fig. 2I). Syntergite IX+X wide, trapezoid and covered with erect setae (Fig. 2J); bursa copulatrix not examined.

*Paratypes measurements.* Males (n=6). Total length 12.13–13.00 (mean= 12.48). Head length 2.26–2.49 (mean=2.31), width 1.13–1.20 (mean=1.18). Antocular length 0.91–0.98 (mean=0.94), postocular length 0.86–0.98 (mean=0.93), interocular distance 0.65–0.72 (mean=0.68). Antennal segment lengths: scape 2.77–3.15 (mean=2.95), pedicel 1.46–1.50 (mean=1.49), basiflagellomere 1.60–1.93 (mean=1.75), distiflagellomere 0.89–1.27 (mean=1.07). Labium length: segment I 1.56–1.70 (mean=1.66), segment II 0.98–1.06 (mean=1.02), segment III 0.43–0.48 (mean=0.46). Pronotal length 1.40–2.68 (mean=2.50), pronotal width 2.87–3.10 (mean=3.01). Abdominal maximum width 2.35–2.77 (mean=2.60).

Females (n=2): Total length 13.00–13.50. Head length 0.72, width 1.15–1.25. Antocular length 0.96–0.98, postocular length 0.86–0.94, interocular distance 0.72. Antennal segment lengths: scape 2.87–3.10, pedicel 1.55–1.60, basiflagellomere 1.65–1.69, distiflagellomere 0.99. Labium length: segment I 1.70, segment II 1.03–1.10, segment III 0.46–0.48. Pronotal length 2.59–2.68, pronotal width 3.15–3.29. Abdominal maximum width 2.68–2.87.

**Type specimens.** Holotype ♂, Argentina, Salta, San Lorenzo, Hotel Selva Montana, 24°43.587'S 65°29.858'W, 1450 msnm, 4-II-2016, P. Dellapé col. (MLP). Paratypes: 1♀, same data as holotype; 1♂, Argentina, Salta, D[e]partamen]to. Rosario de Lerma, R.[osario] de Lerma, Feb. [1]992, Coll. Martinez (MLP); 1♂ 1♀, Argentina, Salta, D[e]partamen]to. Cerrillos, Sumalao, Marz. [1]992, Fritz leg., Coll. Martinez (MLP); 1♂, Argentina, Jujuy, 28-II-1945, M. Birabén leg. (MLP); 1♂, Argentina, Salta, Campo Quijano, RN 51 km 27, 24°53.277'S 65°42.076'W, 1590 msnm, Gimena Dellapé & Pablo Dellapé cols. (MLP); 1♂ 4♀, Argentina, Jujuy, San Salvador de Jujuy, 10-IV-1989, L.A. Pereira col. (USNM); 1♀, Tucumán, S[a]n. P.[edro] de Colalao, III-1979, Drake coll. (USNM).

**Etymology.** This new species is named after Dr. Jocelia Grazia (Departamento de Zoología Universidade Federal do Rio Grande do Sul, Brazil), in honor of her valuable lifetime contributions to the knowledge of Heteroptera.

## Discussion

Most species of *Cosmoclopius* show a remarkable similar appearance, as most of them have some banded coloration pattern in legs and antenna, as well as they are mostly yellow-orange blackish colored. Nevertheless, the examination of a considerable number of specimens demonstrate that some traits are useful to separate the species.

The comparison of at least six of the seven known species (*C. nigroannulatus*, *C. poecilus* (Herrich-Schaeffer 1848), *C. pallidus* Berg 1879, *C. annulosus* Stål 1872, *C. annulipes* (Fallou 1887) (we were able to examine only photographs of the male holotype deposited in (Musée d'histoire naturelle, Paris), *C. curacavensis* Cobben & Wygodzinsky 1975 (a photograph included in Forero 2006) allows us to confidently establish this new species. The only species not examined was *C. intermedius* Berg 1883 from which, we have access to a photograph of the four syntypes deposited in Museum fur Naturkunde in Berlin but with not enough magnification to examined thoroughly the main characteristics to discriminate species.

Based on the analysis of the material and photographs we found some features that can be used to sort out the species, unfortunately we are not confident enough on the identity of some species to build a key to separate them.

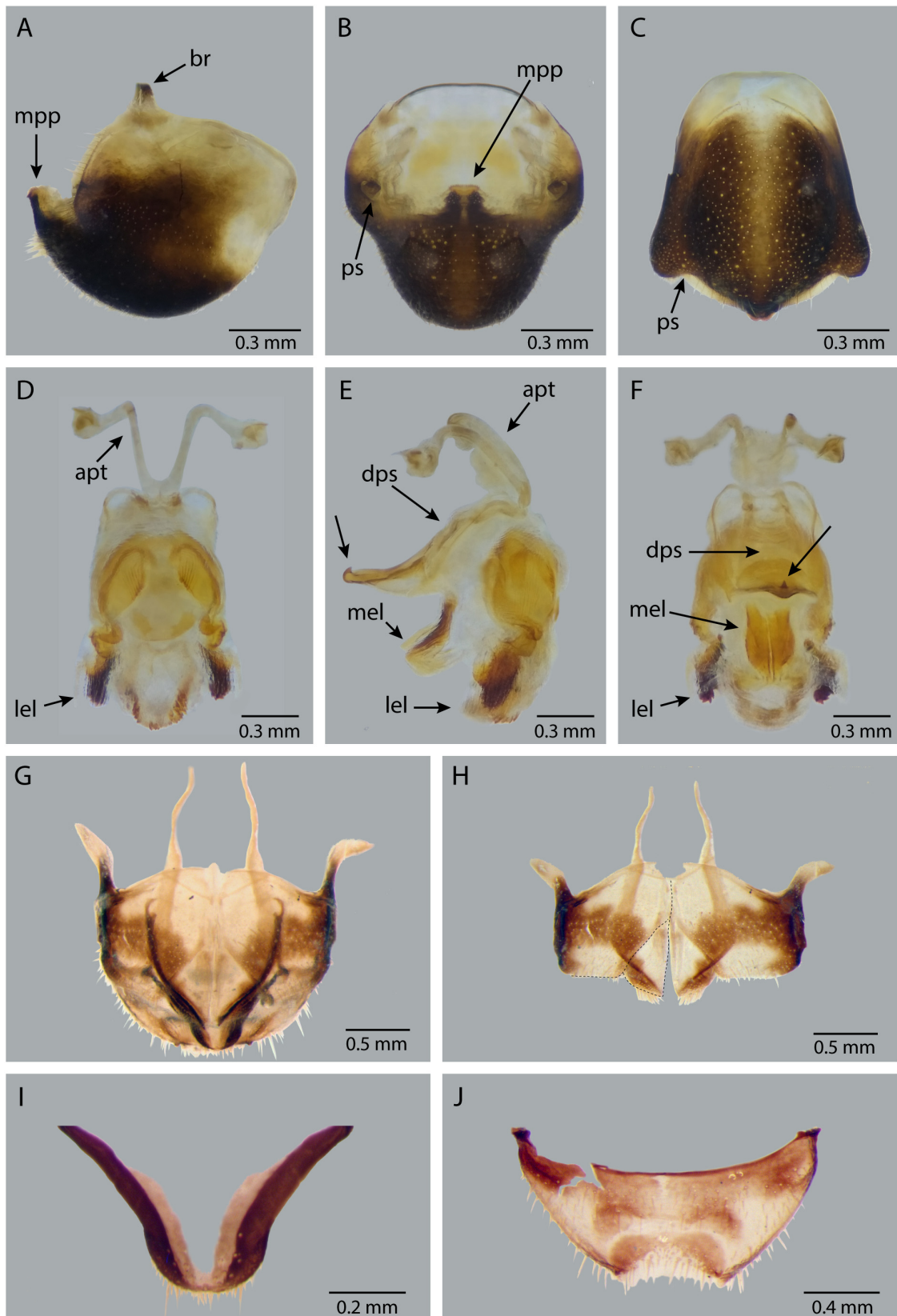
The head in *Cosmoclopius* is mostly black with pale yellow areas. A few species show a narrow longitudinal pale stripe on the antocular region, e.g. *C. nigroannulatus*, and *C. annulosus*, that is absent in the others. Other species show a black longitudinal stripe laterally before the eyes, eg. *C. nigroannulatus*, *C. annulosus* and *C. joceliae* n. sp. (Fig. 1C).

Most of the species show dark antenna with two pale bands at middle and one pale band at the apex of the scape (eg. *C. nigroannulatus*, *C. annulosus*, and *C. curacavensis*, and *C. joceliae* n. sp., Fig. 1C), *C. annulipes* shows only two pale median bands on the scape, and *C. pallidus* and *C. poecilus* show homogenously colored scapes with a faint pale band at middle.

The legs show a diverse coloration pattern. The profemur is almost uniformly pale in *C. annulosus*, and it is similar in *C. nigroannulatus* and *C. annulipes* but with more conspicuous darker bands, it is distinctly banded in *C. curacavensis*, and it is half orange and half black in *C. poecilus*. The femora in *C. joceliae* n. sp. are mostly black with some pale markings laterally and ventrally (Figs. 1A–C).



**FIGURES 1.** A–C. *Cosmoclopius jocelliae* n. sp. A: Dorsal habitus (male paratype); B: Ventral view (male paratype); C: Lateral view (male holotype).



**FIGURES 2.** A–J. Male and female genitalia of *Cosmoclopius joceliae* n. sp. A–C: Pygophore: A: Lateral view; B: Posterior view; C: Ventral view. D–F: Aedeagus: D: Ventral view; E: Lateral view; F: Dorsal view; G–J: G: Female genital; H: Gonocoxite and gonapophysis VIII; I: Gonocoxite IX; J: Tergite IX+X. Abbreviations: *apt*, arms articulatory apparatus; *br*, transverse bridge; *dps*, dorsal phallothecal sclerite; *mel*, middle endosomal lobe; *mpp*, median process of pygophore; *lel*, lateral endosomal lobe; *ps*, paramere socket.

The hemelytron is homogeneously colored in most of the species, except in *C. curacavensis* where its apical region is yellowish orange, and in *C. poecilus* that shows the base of corium and clavus concolorous with the orange posterior pronotal lobe.

The scutellum in the genus presents a Y-shaped carina, that can be completely pale yellow or just pale yellow in the base. We found that this carina is completely pale yellow in *C. nigroannulatus*, *C. annulosus*, and *C. annulipes*; and is only pale yellow on the base of the carina in *C. curacavensis*, *C. poecilus*, *C. pallidus*, and *C. joceliae* **n. sp.** (Fig. 1A).

Most of the species show the ventral region of the body pale or concolorous with an orange-red pronotum (eg. *C. poecilus*), on the other hand *C. joceliae* **n. sp.** shows the thoracic sterna dark with pale areas between meso and metathoracic legs (Fig. 1B).

The male genitalia offer some good characters to discriminate species, particularly the median process of pygophore (Melo & Coscarón 2004) as for most of the species the shape of this region is quite different. The aedeagus have not been studied before this contribution, and we were not able to compare with any other species; but a further study exploring this structure would probably give more characters to discriminate species.

Despite the differences exhibited among some species, the identity of some of these is not clear. The group formed by the species with banded legs, *C. nigroannulatus*, *C. annulosus*, *C. annulipes*, and *C. intermedius* needs of a more thorough study probably exploring other character sources besides morphology and coloration.

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## References

- Berg, C. (1879) Hemiptera Argentina (cont.). *Anales de la Sociedad Científica Argentina*, 7 (2), 86–92.
- Berg, C. (1883) Addenda et emendanda ad Hemiptera Argentina. *Anales de la Sociedad Científica Argentina*, 16, 105–125.
- Castro-Huertas, V. & Forero, D. (2014) First record of the genus *Tagalis* Stål, 1860 (Hemiptera: Reduviidae: Saicinae) from Colombia with the description of two new species. *Zootaxa*, 3838 (4), 475–485.  
<https://doi.org/10.11646/zootaxa.3838.4.6>
- Cobben, R.H. & Wygodzinsky, P. (1975) The Heteroptera of the Netherlands Antilles. IX. Reduviidae (Assassin Bugs). *Studies on the Fauna of Curaçao and other Caribbean islands*, 158, 1–62.
- Coscarón, M. del C., Melo, M.C. & Ohashi, D.V. (2002) Description of the egg and fourth instar of *Cosmoclopius nigroannulatus* (Stål) (Heteroptera, Reduviidae, Harpactorinae). *FACENA*, 18, 59–61.
- Delgado, H.A. & Fedre, D. (2003) Factores que afectan la abundancia poblacional de *Helicoverpa (Heliothis) virescens* en tabaco en el noroeste argentino. *Manejo Integrado de Plagas y Agroecología, Costa Rica*, 70, 36–45.
- Melo, M.C., Montemayor, S.I., Minghetti, E., Varela, P.S. & Dellapé, P.M. (Continually updated) Cimicomorpha (Hemiptera: Heteroptera) species from Argentina and Uruguay. Available from: <https://biodar.unlp.edu.ar/cimicomorpha/> (accessed 7 January 2020)
- Fallou, G. (1887) Diagnoses d'Hémiptères nouveaux de Minas Geraes (Brésil intérieur). *Le Naturaliste*, 9 (2), 68.
- Forero, D. (2006) New records of Reduviidae (Hemiptera: Heteroptera) from Colombia and other Neotropical countries. *Zootaxa*, 1107 (1), 1–47.  
<https://doi.org/10.11646/zootaxa.1107.1.1>
- Herrich-Schaeffer, G.H.W. (1848) Die Wanzenartigen Insekten. Vol. 8. C. H. Zeh'schen Buchhandlung, Nürnberg, 130 pp.
- Jahnke, S.M., Redaelli, L.R. & Diefenbach, L.M.G. (2002) Population dynamics of *Cosmoclopius nigroannulatus* Stål (Hemiptera, Reduviidae) in tobacco culture. *Brazilian Journal of Biology*, 62 (4B), 819–826.  
<https://doi.org/10.1590/S1519-69842002000500011>
- Maldonado Capriles, J. (1990) *Systematic catalogue of the Reduviidae of the world (Insecta: Heteroptera)*. Caribbean Journal of Science, Special Edition. University of Puerto Rico, Mayaguez, Puerto Rico, 694 pp.
- Melo, M.C. & Coscarón, M. del C. (2004) Comparative notes on some species of *Cosmoclopius* Stål, 1866 and redescription of *C. pallidus* Berg, 1879 (Heteroptera: Reduviidae: Harpactorinae). *Physis*, 60, 51–55.

- Miller, N.C.E. (1971) *The biology of the Heteroptera*. E.W. Classey Ltd., Hampton, 206 pp.
- Radio, P.A. (1927) Studies on the biology of the Reduviidae of America north of Mexico. *The University of Kansas Science Bulletin*, 17 (1), 1–291.
- Rocha, L. da & Redaelli, L.R. (2004) Functional response of *Cosmoclopius nigroannulatus* (Hem.: Reduviidae) to different densities of *Spartocera dentiventris* (Hem.: Coreidae) nymphae. *Brazilian Journal of Biology*, 64 (2), 309–316.  
<https://doi.org/10.1590/S1519-69842004000200017>
- Rocha, L. da, Redaelli, L.R. & Steiner, M.G. (2002) Extração de alimento por *Cosmoclopius nigroannulatus* Stål (Hemiptera: Reduviidae) de ninfas de *Spartocera dentiventris* (Berg) (Hemiptera: Coreidae). *Neotropical Entomology*, 31 (4), 601–607.  
<https://doi.org/10.1590/S1519-566X2002000400013>
- Schuh, R.T. & Weirauch, C. (2020) *True Bugs of the World (Hemiptera: Heteroptera). Classification and Natural History. 2<sup>nd</sup> Edition*. Siri Scientific Press, Manchester, 767 pp., 32 pls.
- Stål, C. (1860) Bidrag till Rio Janeiro-Traktens Hemipter-Fauna. *Kongliga Vetenskaps Akademiens Handlingar*, 7 (2), 1–84.
- Stål, C. (1866) Bidrag till Reduviidernas kannedom. *Ofversigt of Kongliga Vetenskaps- Akademiens Forhandlingar*, 23 (9), 235–302.
- Stål, C. (1872) Enumeratio Reduviidarum Americae. In: Enumeratio Hemipterorum. *Kongliga Vetenskaps- Akademiens Forhandlingar*, Series 2, 10 (4), pp. 66–128.
- Weirauch, C. (2008a) Cladistic analysis of Reduviidae (Heteroptera: Cimicomorpha) based on morphological characters. *Systematic Entomology*, 33 (2), 229–274.  
<https://doi.org/10.1111/j.1365-3113.2007.00417.x>
- Weirauch, C. (2008b) From four- to three-segmented labium in Reduviidae (Hemiptera:Heteroptera). *Acta Entomologica Musei Nationalis Pragae*, 48 (2), 331–344.