



## The Moneda Bug, *Chrysodarecus moneta* Breddin = *Placocoris viridis* Mayr (Pentatomidae: Discocephalinae: Ochlerini)

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### Abstract

The pentatomid genus *Placocoris* Mayr is removed from Pentatominae and placed in Discocephalinae: Ochlerini based on the trichobothrial arrangement. Within the Ochlerini *Placocoris* shares characteristics with a clade composed of *Adoxoplatys* and allies including the rostrum arising anteriorad, abdomen with tubercle at middle base received by a notch in the metasternum, bucculae confluent posteriorly, pronotum flat, and a double row of spines on the femora. It appears to share the same host plants with *Neoadoxoplatys*, species of bamboo. It is further concluded that the genus *Chrysodarecus* Breddin is a junior synonym of *Placocoris* Mayr.

**Key words:** Trichobothria, stinkbug, bamboo, Jocelia Grazia

### Introduction

In December 1980 the author made his first visit to Brazil, a trip marked by two notable events. The first was the privilege of meeting with Professor Jocelia Grazia for the first time; the second was the collection of a single specimen of a rare and exceedingly unusual pentatomid, on a species of bamboo. With those events in mind it is an honor to dedicate this study of *Placocoris* to Professor Grazia on the occasion of her retirement from a celebrated career in which she became the world's foremost expert on the family Pentatomidae.

The specimen in question is unusual in several respects (Fig. 1). Firstly, it is extremely flat, and in fact, is the most dorso-ventrally compressed of any known stinkbug, rivaling the condition usually found in Aradidae. Secondly, the dorsal surface is polished, such as to appear coppery metallic with green reflections, depending on illumination and angle of view. Thirdly, the hind femora are much longer than the fore and middle femora with their inferior surface armed with a double row of spines along the entire length. The identity of the specimen was still unascertained when soon after returning from Brazil the author was invited to collaborate with L.H. Rolston and F.J.D. McDonald to construct a key to the New World Pentatomini. Professor Rolston recognized the insect because he had recently seen and published on the type, also from Brazil, and described by G. Mayr (1864) as *Placocoris viridis*. In the same paper Rolston (1976) synonymized *Mentisa smaragdina* Walker, 1868 under *P. viridis*. Walker (1868) had assigned his genus to the family Cydnidae, likely because of the polished surface and the spines on the hind legs. Froeschner (1960) citing a communication from W.E. China (*fn* p. 343) placed *Mentisa* Walker in the Pentatomidae. Cydnids usually have the spines on the tibia, less frequently on the femora, and all cydnids have spines on the meso- and metacoxae (Froeschner 1960). The coxal and tibial spines are missing in *Mentisa* = *Placocoris*.

Rolston *et al.* (1980) therefore included *Placocoris* in the key to Pentatomini section 3, those with a tubercle on the base of the abdomen in apposition to the elevated metasternum, including an illustration of the spines on the hind femur. I (we) failed to recognize that *Placocoris* actually belonged in a newly circumscribed tribe Ochlerini of the subfamily Discocephalinae (Rolston 1981), in part because the tribe had not yet been published. The oversight likely stemmed from the fact that *Placocoris* lacks a fundamental characteristic of the Discocephalinae; the labium arising from the cranium at or posterior to the anterior limit of the eyes (Rolston & McDonald 1979). The specimens at hand also lack the one characteristic unique to Ochlerini, a sulcus or flattening of the dorsal surface of the third metatarsomere. However, within the Ochlerini there is a clade that has the labium arising from the anterior portion

of the head and in which the modification of the tarsomere is present or obsolete. And perhaps not coincidentally, they feature a double row of spines on the inferior face of the femora, a flat pronotum, a forwardly directed tubercle at the mid-base of the abdomen in apposition to a raised metasternum, and unlike typical ochlerines, some of the species have a shiny, even polished integument. These are *Adoxoplatys* and allies (Fig. 2). In these genera only the females have the flattened third metatarsomere except for *Adoxoplatys* in which the flattening is reduced in both genders. The most definitive characteristic though, is the position of the abdominal trichobothria. Unlike most other pentatomid subfamilies, Discocephalinae, including the Ochlerini, characteristically have the trichobothria situated lateral to, rather than in line with, the abdominal spiracles, and so it is with *Placocoris*.

## Materials and methods

Photomicrographs of specimens available to the author were taken with a Keyence VHX Series 7000 digital microscope with Z-stack imaging software.

## Taxonomy

### Genus PLACOCORIS Mayr

*Placocoris* Mayr, 1864. Verh. Zool.-Bot. Ges. Wien 14:913. Type-species by monotypy: *Placocoris viridis* Mayr.

*Mentisa* Walker, 1868. Cat. Hemip. Heterop. Brit. Mus. 3:537. Type-species by monotypy: *Mentisa smaragdina* Walker.

*Chrysodarecus* Breddin, 1903. Sitz. Ges. Naturfors. Berlin 1903:383. Type-species by monotypy: *Chrysodarecus moneta* Breddin.

***albovenosus*** Kormilev Distribution: ARGENTINA

*Placocoris albovenosus* Kormilev 1949:4.

***viridis*** Mayr Distribution: BRAZIL, ARGENTINA, PERU, PARAGUAY

*Placocoris viridis* Mayr, 1864:913.

*Mentisa smaragdina* Walker, 1868:537.

*Chrysodarecus moneta* Breddin, 1903:383.

**Redescription of *Placocoris viridis* Mayr.** Body elongate-oval, length 10–12 mm, exceedingly dorso-ventrally compressed, flattened (Fig. 3). Dorsal surface polished, shiny, coppery with metallic green reflections; venter polished shiny, but without green reflections.

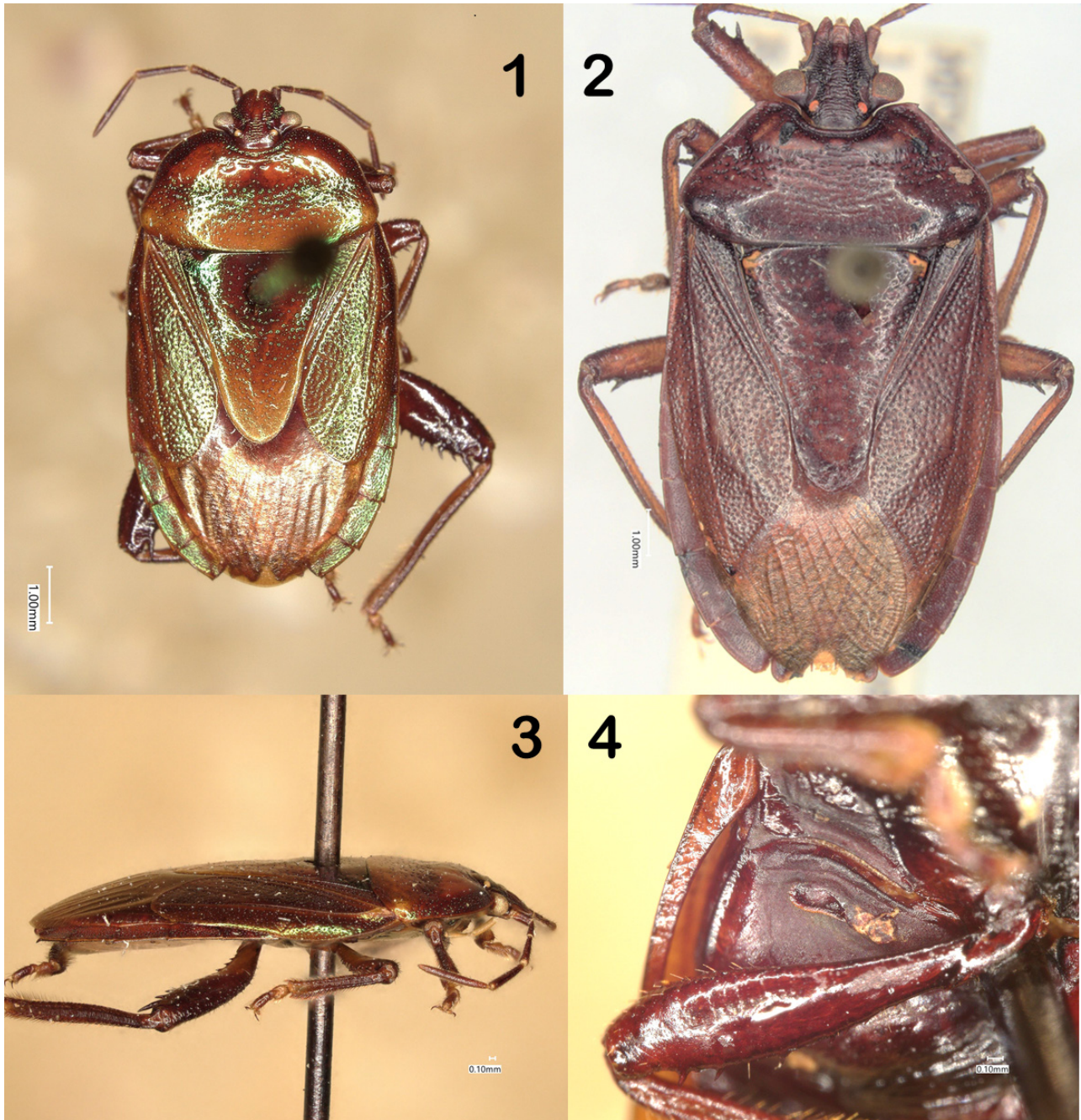
Head short, equal to about 80% of the length of pronotum at midline, trapezoidal in shape; eyes subpedunculate, proximal to cervix (Fig. 5). Vertex flat; paraclypei distinctly longer than clypeus and meeting or proximal anteriorly; lateral margins of paraclypei sinuate from dorsal view without anteapical or antecular processes, apices obtuse. Antennae five-segmented, first segment long, exceeding apex of paraclypeus; antennifers simple. Labium arising anterior to an imaginary line connecting anterior limit of eyes. Rostrum pale, four-segmented without intercalary segment; first segment reposing within and not surpassing the buccula. Buccula low anteriorly, angularly produced medially, low and confluent posteriorly; second rostral segment 2x length of first extending on to prosternum, apex of fourth segment just reaching anterior margin of mesosternum (Fig. 7).

Pronotum reniform with anterolateral and posterior margins evenly arcuate, humeri not protruding; anterior margin deeply concave with anterolateral angles weak but situated distinctly laterad of the eyes. Pronotal collar demarcated by an inframarginal groove posterior to the head. Scutellum long, about 1.6 times pronotal length at midline; basal angles devoid of fovea, sides almost straight with constriction at frenal angles nearly obsolete; apex obtuse, broad with width across frenal angles about 70% of basal width; length of postfrenal scutellum subequal to basal portion of scutellum. Corium longer than scutellum, apex arcuate; exocorium broad, about half width of mesocorium; membrane with 9 simple veins, apex coincident with apex of abdomen.

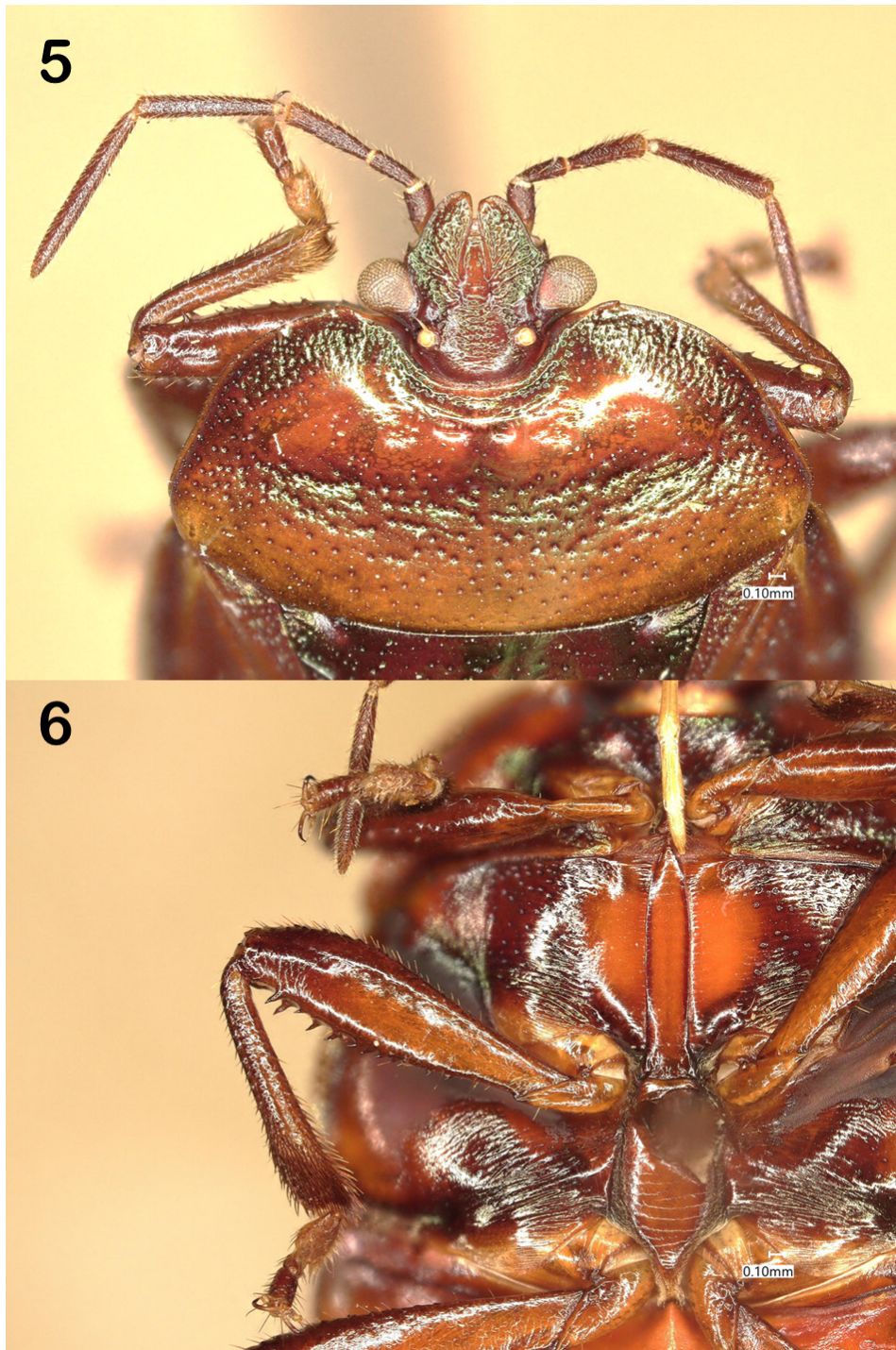
Prosternum weakly tumid anteriorly with elevated keel on posterior half on midline. Mesosternum polished, flat, long and parallel sided, not elevated, coplanar with mesopleura, apex acuminate anteriorly, base truncate posteriorly. Mesosternal evaporatorium extending as a shagreened strip from cleft of mesocoxa along posterior margin to lateralmost angle. Metasternum flat, elongate, ovoid, with evenly curved margins, length about 2.5 x

width, coplanar with mesosternum and metapleura; base shallowly, narrowly sulcate for reception of abdominal protuberance (Fig. 6). Scent gland orifice situated about half-way along length of an elongated auricle that extends a little more than half-way to the metapleural margin; apex of auricle obtusely truncate and somewhat elevated (Fig. 4). Metapleural evaporatorium surrounding the auricle but covering only about a quarter of the metapleural area.

Profemora thickened, apex simple, with a double row of very short, stout, well-spaced, dark tubercles along entire length of inferior surface. Protibia markedly swollen apically with superior surface distinctly, narrowly sulcate. Tubercles on mesofemora similar to arrangement on profemora except those distally are longer, drawn out into curved spines; mesotibia longer than protibiae but not as markedly swollen apically and more broadly sulcate on superior surface. Metafemora long and subclavate, spines arranged in double row on inferior surface, long and curved, becoming longer distally such that length of ultimate pair exceeding width of tibiae. Metatibiae long and distinctly bent at middle. Distal metatarsomere cylindrical on all legs.

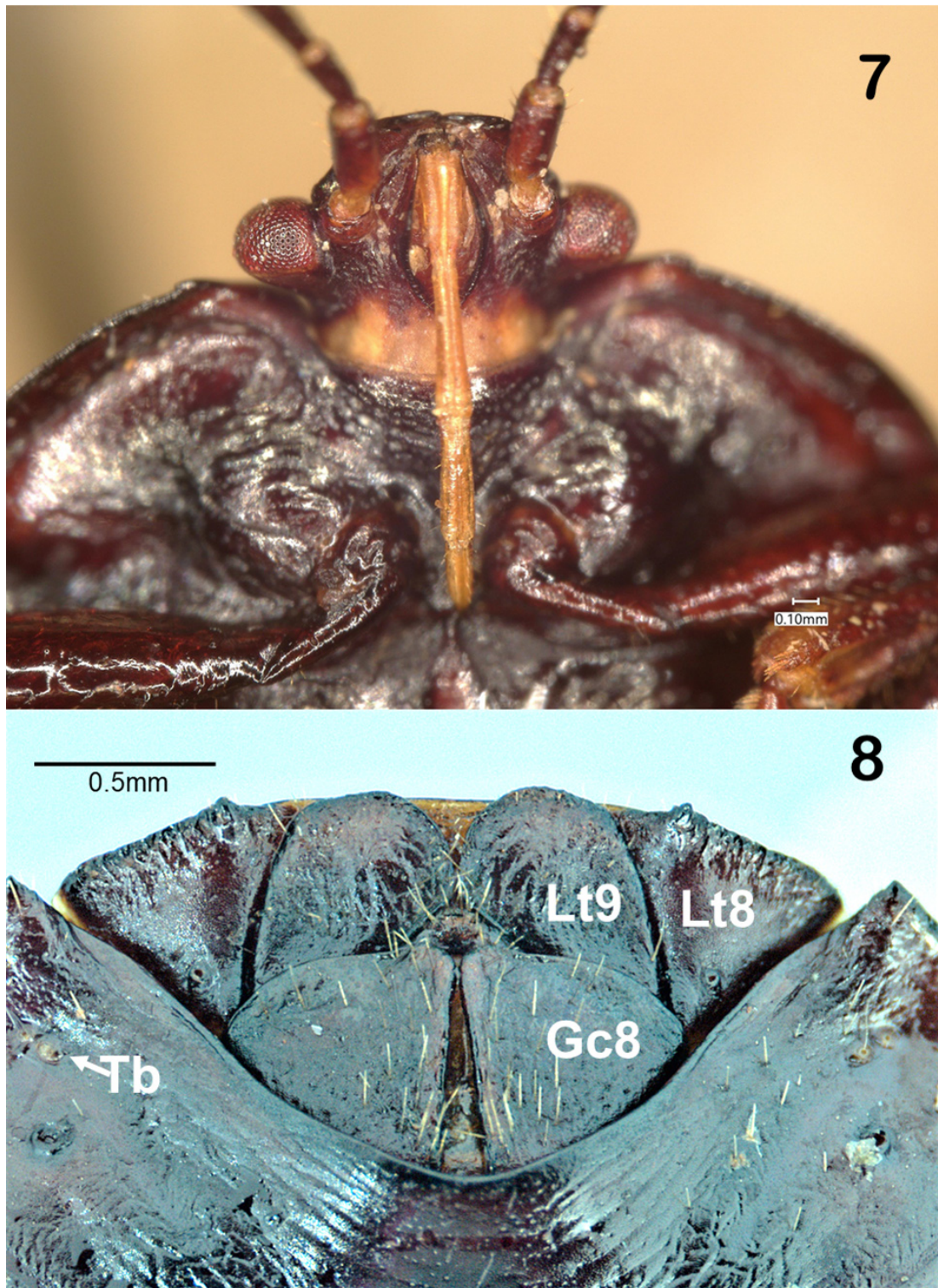


**FIGURES 1–4.** 1. *Placocoris viridis*, male from Brazil, dorsal view. 2. *Neadoxoplatys saileri*, dorsal view. 3. *Placocoris viridis*, male from Brazil, lateral view. 4. *Placocoris viridis*, male from Brazil, auricle of metathoracic scent gland.



**FIGURES 5–6.** 5. *Placocoris viridis*, male from Brazil, head and pronotum. 6. *Placocoris viridis*, male from Brazil, meso- and metathorax.

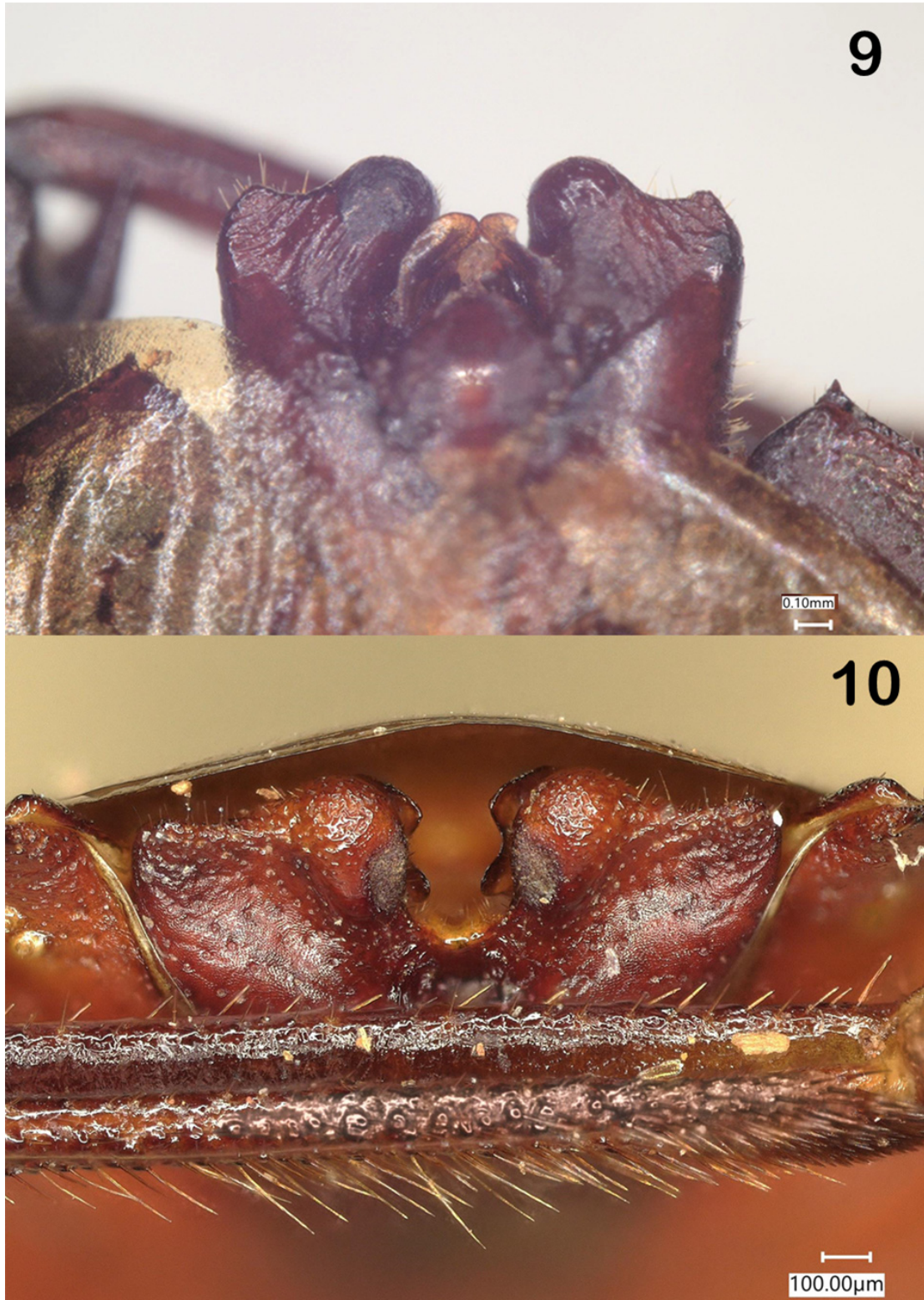
Abdominal third urosternite with a small angular protuberance at middle base directed anteriorad in apposition to vertical sulcus on metasternum. Each abdominal sternite is narrowest at the midline except sternite VII which is conspicuously longer at the middle; with IV–VI subequal in width to one another. Spiracular rims darkened. Pair of trichobothria on sternites III–VI situated closer to abdominal margin than to spiracle and somewhat more posterior than spiracle. On segment VII the trichobothrial pair is situated about half-way between the spiracle and the posterolateral angle of the sternite. Four posterior-most connexival segments exposed from above with hemelytra in repose, each connexival angle ending in a minute point. Because of the uniqueness of the specimens the internal reproductive structures were not dissected.



**FIGURES 7–8.** 7. *Placocoris viridis*, male from Brazil, rostrum and bucculae. 8. *Placocoris viridis*, female from Paraguay, terminalia, ventral view. Gc8 = Eighth Gonocoxite, Lt8 = Eighth Laterotergite, Lt9 = Ninth Laterotergite, Tb = Trichobothria.

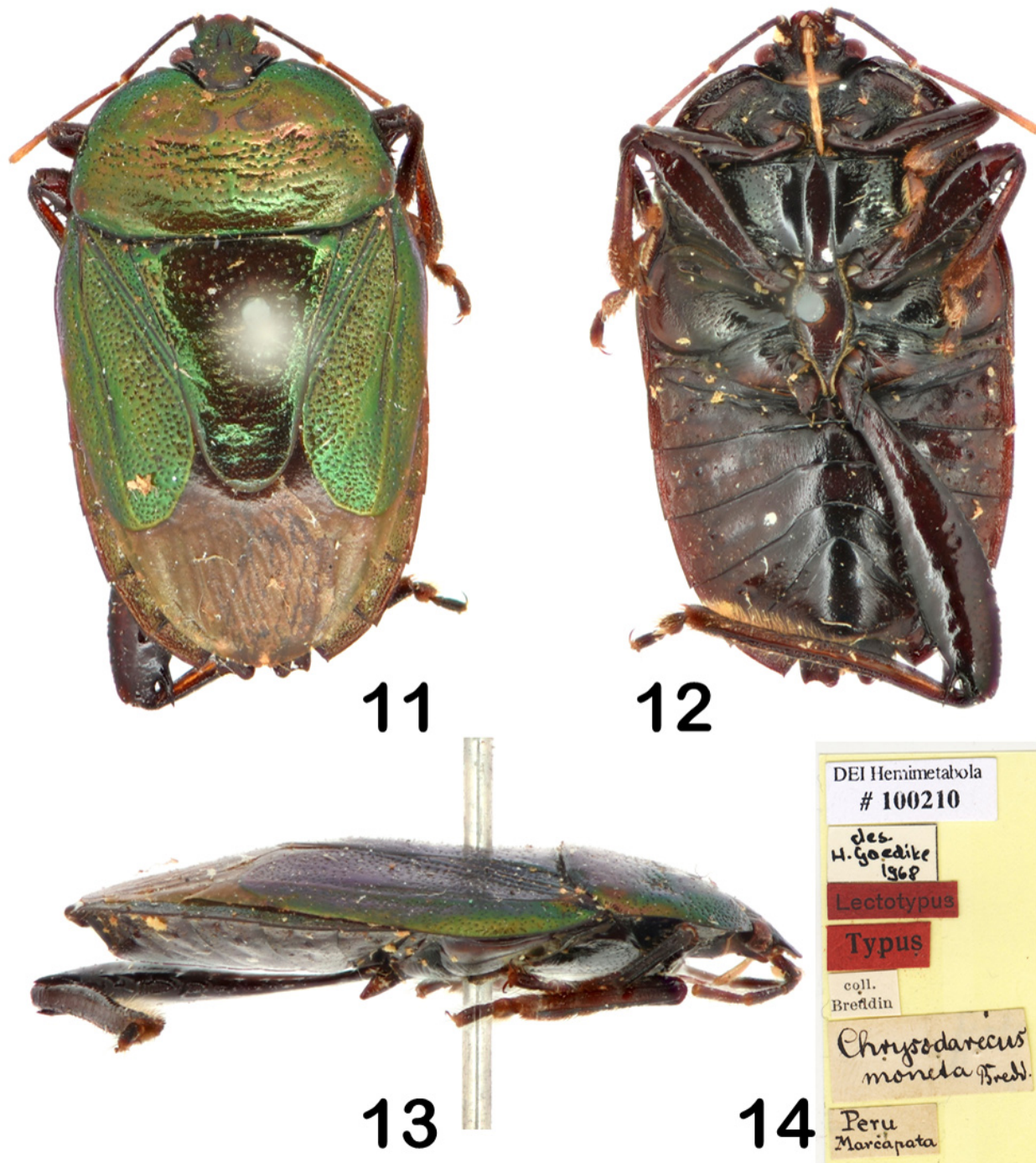
**Male Genitalia.** The pygophore is heavily sclerotized, dorso-ventrally compressed and seated within abdominal segment VII such that the lumen opens dorsally in reposed position; the posterior surface and the latero-dorsal surfaces are flattened (Fig. 9). In ventral view the posterior margin of the pygophore is lobate on each side of the middle, the thickened lobes separated by a deep U-shaped emargination (Fig. 10). The proctiger is large, almost filling the pygophoral lumen, suborbicular, about equal in width and length, somewhat angularly produced posteriorly. Parameres foliate, cupped, terminating in two short angular lobes separated by a shallow emargination.

**Female Genitalia.** The tenth abdominal segment is not visible, covered by the 9<sup>th</sup> laterotergites which are broad, rounded in outline posteriorly, contiguous medially, their surface somewhat rough with sparse, coarse, pale setae, the apex only slightly surpassing posterior margin of 8<sup>th</sup> tergite. Posterior margin of 8<sup>th</sup> laterotergite bearing a short tooth-like projection either side of the 9<sup>th</sup> laterotergites and with a spiracle near basal angle. Eighth gonocoxites separated at base, contiguous at apex; about as broad as long, posterolateral margin arcuate, medial margin straight, surface flat, bearing scattered coarse, pale, stiff setae (Fig. 8).



**FIGURES 9–10.** 9. *Placocoris viridis*, male from Peru, pygophore, dorsal view. 10. *Placocoris viridis*, male from Brazil, pygophore, ventral view.

**Material Examined:** Male: labeled: (a) "BRAZIL, Parana, 10 mi. W. Guaraniaçu, 24 FEB 1980, D.B. Thomas Coll." (b) "Collected on Bamboo" (c) "Placocoris viridis Mayr, LHR 80." Male: labeled: (a) "PERU: Jajua Prov., Junin Dept. Sani Beni, 840m. ele 16–21 June 1935, Felix Woytkowski." (b) "Placocoris viridis Mayr, Det. D.B. Thomas." 1 female "PARAGUAY: Alto Parana Dept., 21–23-X-1989, G. Arriagada." Collection of J.E. Eger.



**FIGURES 11–14.** 11. *Chrysodarecus moneta*, lectotype, dorsal view. 12. *Chrysodarecus moneta*, lectotype, ventral view. 13. *Chrysodarecus moneta*, lectotype, lateral view. 14. *Chrysodarecus moneta*, lectotype specimen labels.

## Discussion

In their key to the subfamilies of Pentatomidae (Rolston & McDonald 1979) members of the subfamily Pentatominae were distinguished from members of the subfamily Discocephalinae because in the latter the labium originates

at or posteriorad of the antennal base and the trichobothria are situated lateral to the abdominal spiracles. In Pentatominae the labium arises anteriorad of the antennal base and the trichobothria are in line with the spiracles. There are exceptions, however, and thus the key separation required a sequence of couplets. Their couplet 3 used the trichobothrial character (lateral to the spiracles) sending most but not all Discocephalines and a few, unnamed genera of Pentatomines to couplet 4. At couplet 4 the anomalous Pentatomines were then separated from the Discocephalines by the former having a tubercle on the abdomen in apposition to an elevated, flat, metasternum. This combination of characters later defined Section 3 of the tribe Pentatomini. Although unidentified by Rolston & McDonald (1979), the anomalous Pentatomine genera were *Priapismus* Distant, *Mathiolus* Distant, *Phineus* Stål and *Placocoris*. Another genus, *Chrysodarecus* Breddin, was unassigned.

Rolston *et al.* (1980) formally removed *Phineus* Stål from the Pentatominae and placed it in the nominal tribe of the Discocephalinae “on the basis of rostral and trichobothrial characters,” when they defined Section 3 of the Pentatomini. *Phineus* although previously classified as a Pentatomine, was therefore not actually exceptional with regard to the defining characters. All genera of Discocephalinae have the trichobothria lateral to the spiracles except for the genus *Priapismus* Distant. Rolston (1984) assigned *Priapismus* to Discocephalini because of the posteriorad origin of the labium. No pentatomines have the labium arising posteriorad of the antennal bases and no pentatomines have the trichobothria lateral to the spiracles, except *Mathiolus* and *Placocoris*. Rolston (1988) removed *Mathiolus* Distant, originally classified as a Discocephaline, to the Pentatomini Section 1 (without an abdominal tubercle), in spite of the trichobothrial arrangement. Among Pentatominae the genus *Caonabo* Rolston is unique in having the trichobothria mesial to the spiracles, a configuration also found in the subfamily Phyllocephalinae (Rolston 1974). But in this case it could be argued that it is the spiracles rather than the trichobothria that are displaced from the typical position. Recently, Roell & Campos (2019) reassigned the genus *Janeirona* Distant from the Pentatominae to the Discocephalinae: Ochlerini because of the trichobothria being lateral to the spiracles and in spite of the rostral insertion anterior to the antennal base.

Another character that was not mentioned by Rolston & McDonald (1979) is the configuration of the oral groove. Perhaps associated with the displacement of the labial origin posteriorad on the cranium, the oral groove is deep and rimmed in Discocephalinae. The bucculae typically demarcate this rim even when the bucculae are notably more elevated laterally and lower posteriorly (as in *Xynocoris* Garbelotto & Campos, 2014). This character is not unique to the Discocephalinae, being found as well in the Asopinae and Edessinae, all of which have the labium modified from the typical Pentatomine condition. Kirkaldy (1909) in his key to subfamilies distinguished the Asopinae by the bucculae united behind the labium. In all New World Pentatominae at least, the bucculae terminate on each side of the labium truncately, lobately or evanescently. The bucculae are confluent behind the oral groove in *Placocoris*. The only members of the family Pentatomidae that have the combination of trichobothria lateral to the abdominal spiracles by a distance greater than the width of the spiracle, the bucculae confluent behind the oral groove, and with the labium arising anterior to the eyes, are seven genera of Ochlerini, *Janeirona* and *Placocoris*. Among the seven genera of ochlerines with the labium arising anterior to the eyes, *Adoxoplatys* and *Neoadoxoplatys* share characters with *Placocoris* in having armate femora, and the base of the abdomen with a tubercle directed forward in apposition to a notch in the metasternum. The convergence of these character-states in the three genera provides further support for the relocation of *Placocoris* to Discocephalinae: Ochlerini.

In their cladistic analysis of the Ochlerini, Campos & Grazia (2006) found that *Adoxoplatys* and allies formed a clade basal to the main stem Ochlerini. The characteristics defining the clade were a flat pronotum and armed profemora, both of which are found in *Placocoris*. *Placocoris* differs from *Adoxoplatys* and *Neoadoxoplatys* primarily by the condition of the labium which is short, the first segment shorter than the bucculae (surpassing the bucculae in all other ochlerines) and without an intercalary segment (a defining characteristic of *Adoxoplatys* and *Neoadoxoplatys*, but absent also in *Pseudadoxoplatys*); and in the shape of the mesosternum, which is flat in *Placocoris* but carinate in the latter two. Similarly, Roell & Campos (2019) placed *Janeirona* with the *Adoxoplatys* clade sharing the abdominal tubercle in apposition to the elevated metasternum. *Janeirona*, like *Placocoris*, has a short labium and bucculae confluent behind. The external male and female genitalia of *Placocoris* do not differ materially from the configuration found in *Adoxoplatys* and allies. On that basis it is proposed that *Placocoris* is an Ochlerine related to *Adoxoplatys* and not a Pentatomine.

In their opus on higher systematics of the Pentatomoidea, Rider *et al.* (2018) included *Placocoris* Mayr among the “questionably placed genera,” specifically mentioning the flatness of the body and the double row of spines on the femora. Under the genus *Chrysodarecus* Breddin, also listed as questionable, they noted that the original



description was quite similar to that of *Placocoris*. The trichobothrial arrangement was not mentioned for either genus. Breddin's (1903) description of *Chrysodarecus moneta* from Peru agrees in every detail with that of the available *Placocoris viridis* from Peru, including the description of the mesosternum as demarcated by two long impressed lines. No other extant genus fits Breddin's description and because of the absence of any character which would distinguish them it was obvious that *Chrysodarecus* Breddin must be a synonym of *Placocoris* Mayr. At my request the curators of Hemimetabola at the Deutsches Entomologisches Institut where the types repose (Gaedike 1971) were kind enough to provide photomicrographs of the male lectotype, reproduced herein (Figs. 11–13). I have compared the genitalia of the male specimens from Brazil and Peru and found the pygophore and parameres to be identical. The outline of the pygophore in the photomicrograph of the male lectotype matches that of the specimens at hand. On the basis of this evidence it is proposed that *Chrysodarecus moneta* Breddin be placed in synonymy of *Placocoris viridis* Mayr. One minor discrepancy is worth remark. The handwritten label on the lectotype specimen (Fig. 14) is "*Chrysodarecus moneta*," whereas the published name is latinized to "*C. moneta*." The name, whether in Spanish or Latin, meaning a "coin" is most appropriate given the shape of the insect as flat and coppery. It should be noted that the type material of *Placocoris albovenosus* Kormilev, located at the Natural Science Museum of Argentina in Buenos Aires (Bachmann 1999), was not available for study due to the situation with the ongoing pandemic at the time of this study.

It is also notable that the Brazilian specimen of *Placocoris* was collected on bamboo which is the only known host plant for *Neadoxoplatys* (Cervantes-Peredo & Ortega-Leon 2014). It may be that the flattened, polished body with long spinose legs is an adaptation for hiding beneath the leaf sheaths of the bamboo, which is where *N. saileri* Kormilev lays its eggs. It is therefore possible that the similarity in body form is an instance of convergence. But combined with the confluent bucculae and the lateral position of the trichobothria, one is presented with a nested set of characters compelling the conclusion that these genera are phylogenetically related.

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