Among harvestmen, Cosmetidae is the second most diverse family of the suborder Laniatores, with more than 700 species (Kury 2003, 2011, 2013). They occur from southern United States of America to southern South America (with exception of Chile) (Kury 2003, 2009). However, the greatest species richness is recorded from tropical forests of Central and South America and from the Andes (Pinto-da-Rocha & Yamaguti 2013). Adult Cosmetidae can be easily recognized by the spoon-shaped pedipalps, in which the lateral compression of femur-tibia covers the chelicerae (Kury & Pinto-da-Rocha 2007).

Roewer (1912) divided the family in two subfamilies, based on the armature of claws III and IV: Cosmetinae, with smooth claws, composed of 680 species and 116 genera, and Discosomaticinae, with pectinate claws, including 29 species and 10 genera (Kury 2003, 2009, Kury & Pinto-da-Rocha 2007, Pinto-da-Rocha & Hara 2011). Using the morphology of the claws for dividing cosmetids into two subfamilies has been rejected since Ringuelet (1959). The smooth claws seem to be a plesiomorphic character, however there is no other character to support the monophyly of Cosmetinae and no hypothesis on how the pectinated claws evolved within the family (Ferreira & Kury 2010). Since no cladistics hypothesis has been advanced for the internal relationships of cosmetids, it is impossible to understand the evolution of this feature, and the validity and composition of Discosomaticinae (Ferreira & Kury 2010).

Carl F. Roewer proposed a system of classification for cosmetid genera based mainly on a combination of armature of dorsal scutum (e.g. areas, anal operculum) and number of tarsal segments (Roewer 1916, 1923, 1927, 1947). However, the number of articles is highly variable, even within the same species (see Mello-Leitão 1933, Kury et al. 2007, Pinto-da-Rocha & Yamaguti 2013). The “Roewerian system” led to the inclusion of several species in unrelated genera, and the erection of dozens of monotypic genera and several similar genera (see Kury 2003). An attempt to review this system was made by Goodnight & Goodnight (1953), who studied intraspecific variation in Mexican Cosmetinae, and concluded that tarsus I is less variable than the tarsi of other legs and that it can be used to define genera. However, evidence in support of their classification is not consistent and for this reason it has not been accepted by other researchers (Kury 2009). In the last 25 years, a few new contributions on the taxonomy of cosmetids have revealed new features that could be useful, such as the morphology of the penis, a structure that can provide characters for identification.

The genus Cosmetus Perty, 1833 is a good example of how problematic is the classification of the family. Pickard-Cambridge (1905) designated Cosmetus varius Perty, 1833 as its type species. After that, a few species were added to Cosmetus by authors such as Gervais (1842, 1844), Sørensen (1884), Koch (1839), and Simon (1880). The original concept of the genus, by Perty (1833), was similar to that of the family until 1839, when Koch (1839) described the following new genera: Cynorta, Fliletta, Gnidiia and Paecilaema. The author included in them species previously assigned to Cosmetus (see Pickard-Cambridge 1904, Kury 2003, Kury et al. 2007). Finally, Kury (2003) synonymized, within Cosmetus, all cosmetid genera with unpaired armature on area III (single or gminated spines), lateral margin of scutum without constriction, ocularium flattened and legs unarmed. The list of synonyms includes seven genera: Cosmetigyne Roewer, 1916; Cosmetellus Roewer, 1927; Belemnometus Mello-Leitão, 1940; Procosmetus Mello-Leitão, 1942; Verboetia Soares & Soares, 1946; Cosmetipus Roewer, 1947; and Orthogyne Avram & Soares, 1983 (Kury 2003).

Currently, Cosmetus includes 17 species that are distributed from Panama to northern South America (Venezuela, Ecuador, Colombia, Peru and Brazil) (Kury 2003).

The main goal of this paper is describe four sympatric species. It is based on the material described herein, as well as literature and other museum specimens examined. The illustrations of the male genitalia of C. arietinus (Mello-Leitão, 1940) and C. variolosus Mello-Leitão, 1942 were made from specimens deposited in the MZSP (numbers 14038 and 238, respectively) Fields (-) indicate lack of information, in literature or unknown male.

Additional material examined. Cosmetus arietinus (Mello-Leitão, 1940) (MNRJ 58202 holotype) from Brazil, Espírito Santo: Goitacazes, collected between 1936/1937 by E. May and M. Rosa; (MZSP 14038) from Brazil, Espírito Santo, Linhares (“Reserva Florestal Linhares”), collected in VIII/1992 by M.M. Angel-de-Oliveira; Cosmetus pulcher Goodnight & Goodnight, 1942 (MNRJ 08268) from Panama, Barro Colorado Island, collected in 2007 by A. Anker; Cosmetus variolosus Mello-Leitão, 1942 (MZSP 238) from Brazil, Espírito Santo, Colatina (São José River), collected in 26/IX/1942 by B. Soares; Cosmetus varius Perty, 1833 (MNRJ 2281) from Brazil, Bahia, collected in 09/V/2008 by T. Barnabé.

**TAXONOMY**

**Cosmetus pollera sp. nov.**

Figs. 1, 5, 9, 13-15, 31

Diagnosis. Cosmetus pollera sp. nov. is similar to C. variolosus Mello-leitão, 1942 by the median pair of large spots on posterior prosoma and area I of dorsal scutum (see Mello-Leitão 1942: 4). The new species (Fig. 1) can be distinguished by two small yellow spots, anterior to large ones, on prosoma and two spots on posterior margin of dorsal scutum (C. variolosus does not have the small spots and granulations are yellow, see Mello-Leitão 1942: 4, fig. 2); area II smooth (C. variolosus possesses all dorsal scutum irregularly granulated, see Mello-Leitão 1942: 4, fig. 2); coxa IV with distal tubercle wide, short and blunt (C. variolosus with an enlarged tubercle, see Mello-Leitão 1942: 4, fig. 2); distal margin of penial ventral plate with strong V-cleft, with seven pairs of setae on penial lateral margin (Figs. 14 and 15); stylus flattened, serrate caruncle low and restricted to apex (Figs. 13 and 14) (C. variolosus has distal margin of penis slightly concave, with five pairs of setae and serrate caruncle of stylus with long projections on apex, Figs. 28-30).


The male genitalia were prepared according to Pinto-da-Rocha (1997). Nomenclature of genitalic description followed Kury & Villareal (2015). Descriptions of the external morphology of females only contain information on features that differ from the male.

Table 1 shows a set of characters that are useful to identify Cosmetus species. It is based on the material described herein, as well as literature and other museum specimens examined. The illustrations of the male genitalia of C. arietinus (Mello-Leitão, 1940) and C. variolosus Mello-Leitão, 1942 were made from specimens deposited in the MZSP (numbers 14038 and 238, respectively) Fields (-) indicate lack of information, in literature or unknown male.
Table 1. Diagnostic characters for the 21 species of *Cosmetus*. Abbreviations used (TUB) tubercles; (AM) anterior margin; (LM) lateral margin; (EM) external margin; (PM) posterior margin; (PR) prosoma; (AI-IV) areas I-IV; (ST) spots. Asterisk (*) indicate the diagnostic features of new species.

<table>
<thead>
<tr>
<th>Species</th>
<th>Spine on area III</th>
<th>Granulation on dorsum / spine</th>
<th>Dorsal / ventral armature on pedipalps</th>
<th>Shape of penial distal margin</th>
<th>Number of penial ventral plate basal setae (group A)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>C. arietinus</em> (Mello-Leitão, 1940)</td>
<td>single present on both</td>
<td>one row of short basal TUB / one row of long TUB</td>
<td>shallow concavity</td>
<td>two</td>
<td></td>
</tr>
<tr>
<td><em>C. biaucatus</em> Roewer, 1947</td>
<td>(dorsal half) present on both</td>
<td>smooth / one row of short TUB</td>
<td>truncated</td>
<td>two</td>
<td></td>
</tr>
<tr>
<td><em>C. birramosus</em> (González-Sponga, 1998)</td>
<td>(dorsal half) present on both</td>
<td>smooth / one row of short TUB</td>
<td>truncated</td>
<td>two</td>
<td></td>
</tr>
<tr>
<td><em>C. columnaris</em> Roewer, 1927</td>
<td>single present on both</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><em>C. faveapunctatus</em> Roewer, 1927</td>
<td>single absent on both</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><em>C. flaviopictus</em> Simon, 1880</td>
<td>single present on both</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><em>C. mesacanthus</em> Kollar in Koch, 1839</td>
<td>geminate only on dorsum</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><em>C. migdaliae</em> (González-Sponga, 1992)</td>
<td>(dorsal half) present on both</td>
<td>short basal TUB / one row of long TUB</td>
<td>deep U-cleft</td>
<td>one</td>
<td></td>
</tr>
<tr>
<td><em>C. penicus</em> (Avram &amp; Soares, 1983)</td>
<td>geminate present on both</td>
<td>short TUB / one row of long TUB</td>
<td>none</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>C. pleurostigma</em> Sorensen, 1932</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><em>C. pulcher</em> Goodnight &amp; Goodnight, 1942</td>
<td>single present on both</td>
<td>one row of TUB / one row of TUB</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><em>C. semiplatus</em> (González-Sponga, 1992)</td>
<td>(dorsal half) present on both</td>
<td>short basal TUB / one row of long TUB</td>
<td>–</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td><em>C. soerenseni</em> (Mello-Leitão, 1942)</td>
<td>geminate only on dorsum</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><em>C.十堰urus</em> Roever, 1916</td>
<td>(dorsal half) present on both</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><em>C. variolosus</em> Mello-Leitão, 1942</td>
<td>geminate (dorsal half)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><em>C. varius Perty, 1833</em></td>
<td>geminate present on both</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><em>C. pollera</em> sp. nov.</td>
<td>geminate (dorsal half)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><em>C. balboa</em> sp. nov.</td>
<td>single present on both</td>
<td>short basal TUB / one row of long TUB</td>
<td>*shallow concavity</td>
<td>*two</td>
<td></td>
</tr>
<tr>
<td><em>C. burbayar</em> sp. nov.</td>
<td>single present on both</td>
<td>basal TUB / one row of long TUB</td>
<td>*shallow concavity</td>
<td>*none</td>
<td></td>
</tr>
<tr>
<td><em>C. tamboritos</em> sp. nov.</td>
<td>geminate (dorsal half)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Coloration of dorsal scutum</th>
<th>Claws III-IV Shape of spine apex on area III</th>
<th>Surface of femur IV</th>
<th>Dimorphic chelicerae</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>C. arietinus</em> (Mello-Leitão, 1940)</td>
<td>small rounded ST</td>
<td>smooth pointed</td>
<td>smooth</td>
<td>absent</td>
</tr>
<tr>
<td><em>C. biaucatus</em> Roewer, 1947</td>
<td>small rounded ST, two larger ST near AM</td>
<td>smooth pointed</td>
<td>smooth</td>
<td>–</td>
</tr>
<tr>
<td><em>C. birramosus</em> (González-Sponga, 1998)</td>
<td>irregular V-shape ST between distal PR and AI, small rounded ST</td>
<td>smooth pointed</td>
<td>one row of short TUB</td>
<td>present</td>
</tr>
<tr>
<td><em>C. columnaris</em> Roewer, 1927</td>
<td>uniformly colored of brown</td>
<td>smooth blunt</td>
<td>smooth</td>
<td>–</td>
</tr>
<tr>
<td><em>C. faveapunctatus</em> Roewer, 1927</td>
<td>irregular ST on LM and lateral sides of dorsal areas, small rounded ST</td>
<td>smooth pointed</td>
<td>smooth</td>
<td>–</td>
</tr>
<tr>
<td><em>C. flaviopictus</em> Simon, 1880</td>
<td>small rounded ST, narrow stripe on EM of AM and LM</td>
<td>smooth pointed</td>
<td>smooth</td>
<td>–</td>
</tr>
<tr>
<td><em>C. mesacanthus</em> Kollar in Koch, 1839</td>
<td>pale with small dark rounded ST</td>
<td>smooth pointed</td>
<td>smooth</td>
<td>absent</td>
</tr>
<tr>
<td><em>C. migdaliae</em> (González-Sponga, 1992)</td>
<td>irregular and discontinuous ST from PR to PM, small rounded ST</td>
<td>smooth pointed</td>
<td>one row of short TUB</td>
<td>present</td>
</tr>
<tr>
<td><em>C. penicus</em> (Avram &amp; Soares, 1983)</td>
<td>small rounded ST</td>
<td>pectinate blunt</td>
<td>lateral long row of TUB</td>
<td>absent</td>
</tr>
<tr>
<td><em>C. pleurostigma</em> Sorensen, 1932</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><em>C. pulcher</em> Goodnight &amp; Goodnight, 1942</td>
<td>narrow stripe on AM and LM</td>
<td>smooth pointed</td>
<td>smooth</td>
<td>absent</td>
</tr>
<tr>
<td><em>C. semiplatus</em> (González-Sponga, 1992)</td>
<td>irregular continuous ST from PR to PM posterior, small rounded ST</td>
<td>smooth pointed</td>
<td>ventral row of short TUB</td>
<td>present</td>
</tr>
<tr>
<td><em>C. soerenseni</em> (Mello-Leitão, 1942)</td>
<td>–</td>
<td>smooth pointed</td>
<td>smooth</td>
<td>absent</td>
</tr>
<tr>
<td><em>C.十堰urus</em> Roever, 1916</td>
<td>narrow stripe on LM</td>
<td>smooth pointed</td>
<td>smooth</td>
<td>–</td>
</tr>
<tr>
<td><em>C. variolosus</em> Mello-Leitão, 1942</td>
<td>small rounded ST</td>
<td>smooth pointed</td>
<td>smooth</td>
<td>–</td>
</tr>
<tr>
<td><em>C. varius Perty, 1833</em></td>
<td>irregular ST, V-shaped between posterior region of PR and sulcus I,</td>
<td>smooth pointed</td>
<td>*dorsal and ventral small TUB</td>
<td>present</td>
</tr>
</tbody>
</table>
Ozopore. Prosoma smooth, ocularium with median depression, small-tuberculuate. Area I with one pair of tubercles; area II smooth; area III with spine geminate and bifid on its apical third, apex rounded and directed backwards, base more tuberculuated than apex. Posterior margin and free sternites with a row of small tubercles. Anal operculum with setae.

Venter. Coxa I with one row of 14 tubercles and 13 sparse tubercles. Coxa II, III and IV with sparse setiferous tubercles. Genital operculum and stigmatic area with few sparse small tubercles.

Chelicera. Dimorphic. Bulla with one large tubercle on proximal retrolateral region, eight small retrolateral tubercles, one tubercle on median region and two-three tubercles on prolateral
Four new species of Cosmetus from Panama, with comments on the systematics of the genus

Apical region. Segment II with setae on distal region, fixed finger smooth. Segment III without tooth and with intracheliceral space.

Pedipalp (Figs. 5, 9). Trochanter elongated with one ventro-distal tubercle. Femur elongate, with one ventral row of 20 tubercles, with tubercles irregularly distributed dorsally. Patella with two small prolateral distal tubercles and several sparse setae. Tibia elongate, with one row of lateral setae that increase in width towards apex, with one distal tube and six prodorsal tubercles. Tarsus covered by thin setae, with one retrolateral row of thick setae and other prolaral row until apex (setae larger than retrolateral).

Legs. Coxa I with one dorsal tubercle and one tubercle on each side: one directed towards pedipalp and one directed towards coxa II, three prolaral tubercles. Coxa II with one tubercle directed towards coxa I. Coxa III smooth. Coxa IV with small tubercles irregularly distributed and one distal wide, short and blunt tubercle. Trochanter I with three ventral tubercules; II and III smooth; trochanter IV with two distal retrolateral tubercles. Femora I-IV small-tuberculated; I with slightly larger tubercules on proximal ventral region; II with one-two median-lateral tubercules; III with two dorsal rows of small tubercles, increasing in size towards apex. Patella IV with four distal retrolateral tubercles, one prolaral tubercle. Tibiae smooth. Tarsal segmentation: 7(3), 16(3), 12, 13.

Penis (MZSP 67283) (Figs. 13-15). Distal margin of ventral plate with strong V-cleft, corners divergent. Thin microsetae only on ventro-lateral margins, from base to apex, median-ventral region smooth. Lateral margins convergent until sub-apical region; presence of two distal pairs of straight and cylindrical setae and one pair shorter than others setae (group C); one pair of median, straight and cylindrical (group B), and three pairs of cylindrical and straight basal setae from base to median region (group A). Glans elongated, dorsal process well developed. Stylus flattened dorso-ventrally and swollen at apex, serrate caruncle on apex, with small and sparse projections.

Coloration. Dorsal scutum dark brown with lighter margins. A pair of small yellow spots close to anterior margin, two large yellow spots on prosoma, from lateral margin to area I, two large yellow spots on area III, from posterior margin to near base of spine. Chelicera, pedipalp, legs and free tergites light brown.

Female (MZSP 67281 paratype). Measurements. Dorsal scutum: length: 3.9, width: 3.85; Prosoma: length: 1.2, width: 2.3; Intercocular distance: 0.7; Chelicera: 2.0; Pedipalp: 5.0, femur: 1.3; Legs I: 17.3, II: 40.4, III: 23.1, IV: 32.0; Femur IV: 10.0.

Anterior margin narrow. Area I with one pair of small tubercles, area III with bifid spine, less tuberculate than male. Free tergites with few small tubercles sparsely distributed. Chelicera: bulla with three retrolateral tubercules, six proximal tubercules and three distal retrolateral tubercules. Pedipalpal patella with one distal retrolateral tubercle, tibia with small lateral spines. Coxa I with one tubercle directed towards pedipalp and one small tubercle directed towards coxa II. Trochanter I with two ventral tubercules. Femora small tuberculated. Patella IV smooth.

Material examined. Male holotype from Panama, Provincia Panama (“Reserva Natural Privada Burbayar” 9°19’57”N, 78°59’15”W), 20.I.2013, R. Pinto-da-Rocha & A.
Cosmetus balboa sp. nov.

Figs. 2, 6, 10, 16-18, 32

Diagnosis. Cosmetus balboa sp. nov. (Figs. 2, 10) is similar to C. columnaris (Roewer 1927) in having a high, tuberculate and blunt spine on area III and dorsal scutum without spots (see Roewer 1927: 627, fig. 50). It is also similar to C. biacutus Roewer, 1947 in having two tubercules on the apex of the spine on area III and one proximal dorsal tubercule on coxa IV (see Roewer 1947: 31, fig. 102). C. balboa sp. nov. can be distinguished by its smooth ocularium (ocularium with tubercles in C. columnaris, see Roewer 1927), larger distal tubercule on pedipalpal femur (tubercules of same size in C. columnaris and C. biacutus), coxa I with large ventral tubercule directed upwards (C. columnaris and C. biacutus without ventral tubercule directed upwards, see Roewer 1927 and Roewer 1947: 31, pl. 12, fig. 102 respectively), coxa IV with one large dorsoproximal tubercule (C. columnaris possesses three dorsoproximal tubercules), two geminate (from base) dorsoapical tubercules with blunt apex (C. columnaris possess two apical tubercules not geminate, see Roewer 1927: 627, fig. 50 and C. biacutus have one distal apophysis, see Roewer 1947: 31, pl. 12, fig. 102).

Description. Male (holotype). Measurements. Dorsal scutum: length: 3.65, width: 3.45; Prosoma: length: 1.45, width: 2.5; Interocular distance: 0.9; Chelicera: 1.75; Pedipalp: 4.5, femur: 1.3; Legs I: 18.45, II: 46.5, III: 25.0, IV: 36.2; Femur IV: 12.2.

Dorsum (Figs. 2, 32). Body shape type beta (Kury et al. 2007). Anterior margin smooth, with two elongated paracrichicular projections. Lateral margin with small sparse tubercules, ozopore with lateral projection. Prosoma with one pair of small tubercules behind ocularium and scutum irregularly distributed. Ocularium with sparse small tubercules. Areas not well delimited, tuberculate. Area III with long and tuberculated spine, apex with two large tubercules, base wide, from sulcus III to sulcus IV. Posterior margin and free tegitures with one row of small tubercules. Anal operculum small tuberculate, with setae.

Venter. Coxa I with two rows of wide tubercules, one row near to coxa II with 9-11 tubercules, other row near pedipalpal coxa with four tubercules, short tubercules on posterior region, one distal tubercule directed towards coxa II. Coxa II with small tubercules, two small tubercules directed towards coxa I, four tubercules united to coxa III. Coxa III with five-seven tubercules united to coxa IV. Genital operculum with setiferous small tubercules, stigmatic area smooth.

Cosmetus burbayar sp. nov.

Figs. 3, 7, 11, 19-21, 33

Diagnosis. Cosmetus burbayar sp. nov. is similar to C. birramosus (González-Sponga, 1998), C. migdaliae (González-Sponga, 1992) and C. serrulatus (González-Sponga, 1992) by the irregular spot on dorsal scutum (Figs. 3, 33), additionally...
Four new species of Cosmetus from Panama, with comments on the systematics of the genus

Figures 13-21. Penis of Cosmetus. (13-15) Cosmetus pollera sp. nov. (MZSP 67283); (13) Lateral view; (14) dorsal view; (15) ventral view. (16-18) Cosmetus balboa sp. nov. (MZSP OP 1565); (16) lateral view; (17) dorsal view; (18) ventral view. (19-21) Cosmetus burbayar sp. nov. (MZSP 67286); (19) lateral view; (20) dorsal view; (21) ventral view. Scale bars: (13-15; 19-21) = 20 µm; (16-18) = 10 µm.
shares with *C. serrulatus* the bifid tubercle on coxa II (Fig. 3). *Cosmetus burbayar* **sp. nov.** can be distinguished from other species of the genus by the irregular and discontinuous shape of its yellow spot, extending from lateral anterior to posterior margins and invading prosoma, areas I-III and free tergites (Figs. 3, 33; *C. birramosus* possesses an irregular spot only on prosoma and area I, see GONZÁLEZ-SPONGA 1998: 3, fig. 8; *C. migdaliae* possesses irregular spot from behind ocularium to areas I and II, and irregular spot from posterior margin to area III, see GONZÁLEZ-SPONGA 1992: 186, fig. 220; *C. serrulatus* possesses irregular spot continuous from leg II to posterior margin, see GONZÁLEZ-SPONGA 1992: 190, fig. 226); coxa I with one bifid prolateral tubercle (absent in *C. birramosus, C. migdaliae* and *C. serrulatus*) (Fig. 3); cheliceral segment II with large basal tooth on fixed finger (absent in *C. birramosus*, while *C. migdaliae* and *C. serrulatus* possess a small basal tooth, see GONZÁLEZ-SPONGA 1992: 186, fig. 222 and GONZÁLEZ-SPONGA 1992: 190, fig. 228).

**Description.** Male (holotype). Measurements. Dorsal scutum: length: 4.1, width: 4.25; Prosoma: length: 1.3, width: 3.25; Interocular distance: 1.25; Chelicera: 3.25; Pedipalp: 6.25, femur: 1.9; Legs I: 18.9, II: 45.0, III: 25.0, IV: 35.8; Femur IV: 11.0. 

Dorsum (Figs. 3, 33). Body shape type Beta (KURT et al. 2007). Anterior margin smooth, with two short paracheliceral projections. Lateral margin slightly projected near ozopore. Prosoma smooth, ocularium with small tubercles. Ocularium with moderate median depression. Area I with one small tubercle, sulcus I visible; area II with sparse small tubercles; area III with central elongated single spine with rounded apex and covered with small tubercles. Posterior margin and free tergites with small setiferous tubercles in one row (tergites I and II with 14, III with 11 small tubercles). Anal operculum with irregularly distributed setae.

Venter. Coxa I with anterior row of 10 large tubercles and several small, sparsely distributed. Coxae II, III and IV densely covered by sparse tubercles. Genital operculum with small tubercles, stigmatic area smooth.

Chelicera. Dimorphic. Bulla with one-two distal tubercles, four retrolateral tubercles, two tubercles on proximal dorsal region, three proximal retrolateral tubercles. Tuberculate dorsally. Segment II with setae on distal region, with one basal tooth on fixed finger. Segment III with one basal tooth, with intracheliceral space.

Pedipalp (Figs. 7, 11). Trochanter with two ventro-distal tubercles. Femur compressed, with one dorsal row of six tubercles, one ventral row of 16 tubercles. Patella with one distal retrolateral tubercle, two retrolateral distal ventral setae. Tibia with retrolateral margin depressed, with setae on lateral margin directed downwards, two wide setae on distal region. Tarsus with lateral margin covered with short setae, one ventral retrolateral setae larger.

Legs. Coxa I with one bifid prolateral and one single retrolateral tubercles. Coxa II with one bifid tubercle directed towards coxa I, one single tubercle directed towards coxa III. Coxa III with one tubercle directed towards coxa II. Coxa IV with one wide distal elevation. Trochanters I-IV with ventral tubercles, trochanter III with one distal prolateral tubercle, IV with one distal retrolateral tubercle. Femora smooth. Patella IV with one distal prolateral and one retrolateral projections. Tarsal segmentation: 12(3), 21(3), 16, 18.

Penis (MZSP 67286) (Figs. 19-21). Ventral plate with shallow concavity on distal margin, lateral margins parallel on basal 2/3, apical 1/3 slightly wider. Ventro-median to distal margin with small triangle-like projection. Three pairs of curved and flattened dorso-distal setae (group C); three pairs of cylindrical setae on median region, distal most pair smaller than others (group D), without setae on basal region. Glans elongated, dorsal process well developed. Stylus swollen apically, serrate caruncle with short ventral projections until subapical region.

**Coloration.** Brown orange, reticulate with dark brown on dorsum, chelicerae and legs. Two large yellow and rounded spots on posterior margin. Yellow stripe on lateral margin from coxa I to posterior margin, projecting to prosoma near leg I. Yellow spot on anterior to center of area I and surrounding areas I, II and III. One yellow spot anterior to spine of area III, one behind it. One yellow spot from margin of area II to lateral margin.

**Female (MZSP 67285 paratype).** Measurements. Dorsal scutum: length: 4.55, width: 4.35; Prosoma: length: 1.25, width: 2.55; Interocular distance: 0.95; Chelicera: 2.25; Pedipalp: 5.0, femur: 1.25; Legs I: 19.05, II: 45.1, III: 24.75, IV: 36.2; Femur IV: 11.25.


Female coloration differs from male in having only two yellow spots on anterior margin, with yellow narrow stripe surrounding the dorsal scutum external margin, beginning on anterior margin and entering in the prosoma. Two patches on prosoma anterior to area I. Small patches surrounding area II, three patches on central of area, near spine, one patch behind each spine.

**Material examined.** Male holotype from Panama, Provincia Panama (“Reserva Natural Privada Burbayar” 09°19’57”N, 78°59’15”W), 20.I.2013, R. Pinto-da-Rocha & A. Santos leg. (MIUP). Paratypes, same data as holotype: 3 females (MIUP); 1 male 3 females (MZSP 67284); 1 female (MZSP 67285); 1 male (MZSP 67286).

**Distribution.** Known only from the type locality.
Four new species of *Cosmetus* from Panama, with comments on the systematics of the genus.

Figures 22-30. Penis of *Cosmetus*. (22-24) *Cosmetus tamboritos* sp. nov. (MIUP): (22) lateral view; (23) dorsal view; (24) ventral view. (25-27) *Cosmetus arietinus* (MZSP 14038): (25) lateral view; (26) dorsal view; (27) ventral view. (28-30) *Cosmetus variolosus* (MZSP 238): (28) lateral view; (29) dorsal view; (30) ventral view. Scale bars = 1 mm.
Etyymology. The specific name is a noun in apposition and refers to the type locality of this species, an astonishing private reserve in Burbayar. The name is taken from the Kuna language (spoken in southwestern Panama and northwestern Colombia) and means “spirit of the mountains”.

Cosmetus tamboritos sp. nov.

Figs. 4, 8, 12, 22-24, 34

Diagnosis. Cosmetus tamboritos sp. nov. (Figs. 4, 34) is similar to C. coxaepectatus Roewer, 1927 and C. unispinosus (Roewer, 1916) by the discontinuous patch along all extension of lateral margin of dorsal scutum, although in C. coxaepectatus the patch is V-shaped when surrounding the margin of all areas (see Roewer 1927: 609, fig. 40), in C. unispinosus the patch is restricted to lateral margin of dorsal scutum, and does not reach areas or posterior margin of opisthosoma (see Roewer 1916: 394, fig. 486). Cosmetus tamboritos sp. nov. is distinguished by having two retrolateral apical tubercles on bulla, one being double size of other (absent in C. coxaepectatus and C. unispinosus); coxa IV lacks patches of a cluster of four tubercles on dorsolateral proximal region and two pointed tubercles fused at their apices (C. coxaepectatus possesses five yellow patches, one dorsal apical tubercle on coxa IV; see Roewer 1927: 609, fig. 40; C. unispinosus has one patch and one apical tubercle on coxa IV, see Roewer 1916: 394, fig. 486); femur IV with bifid retrolateral apical tubercle (C. coxaepectatus and C. unispinosus have a smooth femur IV, see Roewer 1927 and Mello-Litao 1932, respectively).

Description. Male (holotype). Measurements. Dorsal scutum: length: 5.8, width: 5.3; Prosoma: length: 2.12, width: 4.3; Interocular distance: 1.3; Chelicera: 5.9; Pedipalp: 7.8, femur: 2.18; Legs I: 24.5, II: 53.0, III: 33.7, IV: 44.8; Femur IV: 13.2.

Dorsum (Figs. 4, 34). Body outline type Beta (Kury et al. 2007). Anterior margin smooth, two lateral paracarapaceal projections short and rounded. Lateral margin with small projection on the lateral surface of the ozopore. Prosoma with 10 small tubercles behind ocularium. Ocularium with shallow median depression, with seven small tubercles. Area I divided, with one pair of larger tubercles, two pairs of small tubercles on external side; II with six small tubercles; III with eight small tubercles, one single large spine at base, bifid on distal half, covered by tubercles. Posterior margin with one pair of central tubercles. Free tergites with one row of small tubercles. Anal operculum with several sparse small tubercles.


Chelicera. Dimorphic. Bulla with three proximal prolateral tubercles, one proximal retrolateral tubercle, two retrolateral apical tubercles of different sizes, two large distal prolateral tubercles. Segment II with setae on distal region, fixed finger smooth. Segment III with one basal tooth, one median tooth enlarged, eight small distal teeth, with intrachelicular space.

Pedipalp (Figs. 8, 12). Trochanter elongate, with two ventro-distal tubercules (proventral larger than retroventral). Femur compressed, with one row of 10-11 ventral tubercles on anterior third, one row of six dorsal tubercles on anterior half. Patella with two distal prolateral tubercles, one small setiferous retrodorsal ventral tubercle. Tibia with prolateral and retrolateral margins compressed, with two distal lateral spines, small spines on lateral margins, two dorsal subapical tubercles. Tarsus with four prolateral wide setae (the basal much larger than other), 10 retrolateral wide setae, thin setae sparse.

Legs. Coxa I with two anterior tubercles fused at their base, one posterior tubercle directed towards coxa II. Coxa II with one anterior tubercle directed towards coxa I. Coxa III small apophysis directed towards coxa II. Coxa IV with a cluster of four well developed tubercles on dorsolateral proximal region, two pointed tubercles contiguous at their apices. Trochanter I with one enlarged retrolateral tubercle directed towards leg II, one distal retrolateral tubercle and four ventral tubercles; II with two prolateral basal tubercles directed towards leg I, one large retrolateral basal tubercle directed towards leg III, one tubercle on each lateral distal side and four ventral tubercles; III with one enlarged tubercle on each lateral basal side, two smaller tubercles on each lateral distal surface, nine-ten ventral tubercles; IV with one enlarged tubercle on each basal lateral, two tubercles fused at their base on each lateral distal, nine ventral tubercles. Femora I and II with one row of dorsal small tubercules, one row of lateral small tubercles and two ventral rows of small tubercles; III with two dorsal rows of small tubercules, two ventral rows of large tubercles increasing in size to apex, proventral row of tubercles higher than the retroventral one; IV with two dorsal rows, one prolateral row of higher tubercles on anterior ¼, rows of tubercles increasing in size to apex, proventral row with higher tubercles than the retroventral one, with one apical retrolateral bifid tubercle. Patellae I and II smooth; III with small sparse tubercles; IV with two dorsal rows of eighth tubercles each (retrodorsal larger), one apical prolateral tubercle longer than other of the segment, two retrodorsal longer than other of the same row. Tibia IV with two ventral rows of small tubercles, increasing in size to apex, retroventral apical larger than other, with distal apophysis. Basitarsus I swollen. Tarsal segmentation 7(3), 20(3), 11, 14.

Penis (MIUP) (Figs. 22-24). Ventral plate quadrangular, lateral margins parallel and straight, distal margin straight; three pairs of distal long setae (group C), two distal most pairs falciform, two intermediary pairs of straight setae and shorter (half the length of the distal setae) (group D), two rounded areas on ventral region. Truncus with one ventral short setae (group E). Glans elongate and thin. Serrate caruncle of stylus with short projection from ventral region to almost apex.
Four new species of Cosmetus from Panama, with comments on the systematics of the genus

Coloration. Dorsal scutum and coxae dark brown. Chelicera brown. Legs and pedipalps light yellowish brown. Yellow patch U-shaped covering irregularly anterior margin, lateral surface of prosoma and areas, reaching the posterior margin and forming a narrow stripe behind spine. Dorsal scutum dark brown with small irregular yellow patches. Free tergites I-III with one stripe each.

Female (MZSP 67288 paratype). Measurements. Dorsal scutum: length: 5.4, width: 5.35; Prosoma: length: 1.85, width: 3.9; Interocular distance: 1.25; Chelicera: 3.2; Pedipalp: 7.75, femur: 2.25; Legs I: 10.0, II: 51.0, III: 32.75, IV: 43.6; Femur IV: 13.43.

Anterior margin narrower than male. Ocularium with nine small tubercles near eyes. Area II with nine small tubercles. Genital operculum with nine small tubercles. Bulla densely tuberculate dorsally, three-four tubercules on lateral surface of distal prolateral large tubercle, two proximal central dorsal tubercles, retralateral tubercles smaller than male; apical retralateral and prolateral tubercles well developed, movable finger with small teeth. Pedipalpal femur with one row of 10-11 ventral tubercles, dorso-proximal row with four tubercules. Pedipalpal tibia with four small prolateral distal tubercles. Trochanter II with seven ventral tubercles. Femora III-IV with short tubercles, except on apical region of femur IV, with ventral tubercles slightly longer than the others. Patella IV with two dorsal rows of tubercles, three distal prolateral tubercles, several small tubercles on ventral region. Tibia IV with similar diameter as distitarsus. Tarsal segmentation: 7(3), 19-20(3), 11, 12.

Material examined. Male holotype from Panama, Provincia Panama (“Reserva Natural Privada Burbayar” 9°19’57”N, 78°59’15”W). 20.I.2013, R. Pinto-da-Rocha & A. Santos leg. (MIUP). Paratypes, same data as holotype: 2 females (MIUP); 3 females (MZSP 67287); 1 female (MZSP 67288).

Distribution. Known only from the type locality.

Etymology. The specific name “tamboritos” is a noun in apposition taken from the popular culture of Panama that refers to a drum style of music and a typical dance. Tamborito is danced by men and women from the central provinces of the country, dressed with colorful clothes.

Figures 31-34. Habitus of males of Cosmetus on the field. (31) Cosmetus pollera sp. nov.; (32) Cosmetus balboa sp. nov.; (33) Cosmetus burbayar sp. nov.; (34) Cosmetus tamboritos sp. nov. Photos by RPR.
Description of the penis of two additional Cosmetus species

Cosmetus arietinus (Mello-Leitão, 1940) (MZSP 14038) (Figs. 25-27). Ventral plate elongate, distal margin concave, two apical pairs of long and curved setae and one pair median apical of short setae (group C). Two basal pairs of setae (group A). One pair ventral basal of short setae (group E). Truncus narrow and with the same diameter throughout almost all its extension. Glans elongated, with dorsal process. Serrate caruncle of stylus with short projections on apical region.

Cosmetus variolosus Mello-Leitão, 1942 (MZSP 238) (Figs. 28-30). Ventral plate elongate, distal margin slightly concave, two groups of lateral setae, one basal pair (group A) and one median pair of short setae (group D) (basal most twice as long as median pair), three pairs of apical long and curved setae (group C) (basal most smaller than others). Truncus elongated and with same diameter throughout almost all its extension. Glans elongated, with dorsal process almost as high as stylus. Serrate caruncle of stylus with elongated projections from median region to apex.

DISCUSSION

Among Laniatores, Cosmetidae has an impressive number of species, being almost as rich as Gonyleptidae, the richest family in this suborder. However, it has received much less attention than gonyleptids (see references in Pinto-da-Rocha et al. 2014). The limited interest on cosmetids is likely due to the absence of modern opiliologists in regions where the group is most diverse (Amazonian and Andean regions, and Central America), and the fact that researchers that work on other Neotropical groups are not very interested on cosmetids. An exception is the impressive work of González-Sponga (1992), who described and redescribed 92 cosmetid species from Venezuela. Thus, it was not a surprise to find four new species of Cosmetus in the northern part of its distribution, on Chocó-Darién moist forest ecoregion (WWF 2015). That region also harbors the species C. flavopictus Simon, 1880. Northern to the Chocó-Darién is the Isthmian-Atlantic moist forests ecoregion (WWF 2015), whereas a geminated spine is observed in C. arietinus (Roewer, 1927), C. coxaepunctatus Roewer, 1927, C. pulcher Goodnight & Goodnight, 1942, C. birramosus (Roewer, 1927), C. columnaris (Roewer, 1927), C. coxaepunctatus Roewer, 1927, C. pulcher Goodnight & Goodnight, 1942, C. birramosus (Roewer, 1927), C. coxaepunctatus Roewer, 1927, C. columnaris (Roewer, 1927), C. unispinosus (Roewer, 1916), C. variolosus Mello-Leitão, 1942, C. variolosus Mello-Leitão, 1942, C. pollera sp. nov. and C. tamboritos sp. nov. The distribution of thin, short bristles on the venter of the ventral plate of the penis also seems to be an informative character. It should be noted that the Caribbean genus Aracillus Silhay, 1971 exhibits a similar armature. The armature of Aracillus, however, has very wide base, distal half bifid (contiguous or divergent in males, divergent in females see González & Vasconcellos 2003) and dorsal scutum type alfa (gama in Cosmetus).

The species exhibiting sexual dimorphism in the size of the chelicerae also have noticeable ornamentation on male femur IV, which varies from granulation (C. pollera sp. nov.) to rows of lateral and ventral large tubercles (C. birramosus, C. migdaliae, C. peruvicus, C. serrulatus, and C. tamboritos sp. nov.). It should be noted that some species are known only from females (C. biacutus, C. columnaris, C. coxaepunctatus, and C. unispinosus) and sexual features are unknown. The ornamentation on femur IV seems to be a good source of diagnostic characters.

The penis of less than half of the species is known (C. arietinus, C. birramosus, C. migdaliae, C. peruvicus, C. serrulatus, C. variolosus, C. pollera sp. nov., C. balboa sp. nov., C. birramosus sp. nov., C. tamboritos sp. nov.). There are differences in the shape of the distal margin of the penis (straight or concave) and the number of setae in the basal groups of the penial ventral plate.

The structure of the spine of area III, sexual dimorphism of chelicerae and armature of posterior legs, and pigmentation of dorsal scutum (see Table 1) are good diagnostic features at the species level. However, at present, without a phylogenetic hypothesis, it is difficult to recognize species clades within Cosmetus, or even to know if the genus is monophyletic.

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