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# *CHAPINARIA*, NEW GENUS OF CHILOCORINI FOR *ENDOCHILUS MERIDIONALIS* SICARD FROM AFRICA (COLEOPTERA: COCCINELLIDAE)

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**Abstract.**— *Chapinaria*, a new genus of Chilacorini (Coleoptera: Coccinellidae) from Tanzania and Zambia is described and illustrated. It is established for *Endochilus meridionalis* Sicard, 1929 (**comb. nov.**). Adult characters concerning similarities to other Chilacorini genera are discussed. Lectotype for *Endochilus meridionalis* Sicard is designated. Key to Afrotropical genera of Chilacorini is presented. A checklist to the known species of the tribe from Afrotropic Ecozone is also provided.



**Key words.**— Coleoptera, Cucujoidea, Coccinellidae, new genus, Tanzania, Zambia.

## INTRODUCTION

Chilacorini is a moderately large, cosmopolitan group of ladybirds, comprising 25 genera and about 280 species (Korschefsky 1932, Chapin 1965, Kovář 1995, Ślipiński and Giorgi 2006, Seago *et al.* 2011), and is characterized by distinctly hemispherical body, expanded clypeus and short appendages received in repose in various fossae on ventral surfaces of the body. The members of the tribe are mostly coccid feeders but some feed on aphids and other Hemiptera.

The tribe Chilacorini is classified in subfamily Coccinellinae as suggested by Ślipiński (2007), who proposed only two subfamilies for Coccinellidae, Microweiseinae and Coccinellinae. This division of the family was subsequently supported by molecular and combined analyses by Giorgi *et al.* (2009) and Seago *et al.* (2011), and was implemented by Ślipiński and Tomaszewska (2010) in a comprehensive synopsis of the family Coccinellidae.

In 1929 Sicard described *Endochilus meridionalis* from Tanganyika. The generic placement of this species was based mainly on the coloration and pubescence of the body.

During preparation of a review of the genus *Endochilus* (Łączyński in press), studying the type specimen of *E. meridionalis*, several features unusual for *Endochilus* were discovered. 3-segmented tarsi, 11-segmented antennae and mandible bidentate at apex found in *E. meridionalis* are unique for the tribe Chilacorini. Therefore we decided to remove this species from *Endochilus* and to establish a new genus of Chilacorini. It is described here as *Chapinaria* gen. nov. along with *meridionalis* comb. nov.

The tribe Chilacorini currently includes 26 genera distributed worldwide.

The present paper summarizes the knowledge of Afrotropical Chilacorini, providing key to the known genera and a checklist of all known species from this area.

## MATERIAL AND METHODS

This study was based on examination of the material, borrowed from the Natural History Museum, London, England (NHM).

Measurements were made using an ocular micrometer attached to an Olympus (SZH 10) dissecting microscope as follows: (TL) total length, from apical margin of clypeus to apex of elytra; (PL) pronotal length, from the middle of anterior margin to base of pronotum; (PW) pronotal width at widest part; (EL) elytral length along suture including scutellum; (EW) elytral width across both elytra at widest part.

Male and female genitalia were dissected, cleared in a 10% solution of KOH, and placed in glycerine on slides for further study. Structural illustrations were made from slide preparations using a camera lucida attached to a Leica dissecting microscope.

SEM photographs were made using a HITACHI S-3400N machine, and digital photographs were made using a Leica digital camera mounted on microscope and subsequently enhanced using AUTO MONTAGE software in the laboratory of the MIZ.

Terminology used for adult morphology and classification follows Ślipiński and Tomaszewska (2010) and Seago *et al.* (2011).

## SYSTEMATICS

### *Chapinaria* gen. nov. (Figs 1–21)

**Type species.** *Endochilus meridionalis* Sicard, 1929.

**Etymology.** The generic name is dedicated to the memory of Edward Chapin, an American coleopterist, who devoted many years of his life to study Scarabaeidae, Cleridae and Coccinellidae, and made the first generic revision of the tribe Chilocorini. Gender feminine.

**Diagnosis.** Within Chilocorini, the new genus is most similar to *Endochilus* but can be easily distinguished from it by having 3-segmented tarsi, 11-segmented antennae, the mandible bidentate apically and very short prosternum.

**Description.** Length 2.6–3.0 mm. Body rounded and convex. Pronotum black; elytra dark reddish, margins blackish. Punctures shallow, about as large as eye facets, on elytra slightly sparser; interspaces between punctures polished and shiny; dorsum apparently glabrous except for pronotum and elytral margins which are covered with medium-length hairs. Ventral surface dark reddish to brown.

Head transverse. Eyes moderately large, finely faceted. Clypeus short, moderately emarginate, expanding laterally deeply into eye almost divide each eye into two parts (Figs 15, 18). Antenna 11-segmented (Figs 3, 17) sparsely setose; scape and pedicel entirely hidden under clypeal shelf; scape bent in the

middle, last antennomere embedded in penultimate. Ventral antennal grooves distinct, moderately deep, as long as first seven antennomeres jointly (Fig. 17). Labial palp 3-segmented (Fig. 16), ventral on prementum; labial terminal palpomere cylindrical, weakly tapering apically, truncate at apex, at base as wide as penultimate palpomere at apex. Maxilla (Fig. 2) with cardo transverse and stipes subtriangular in shape; maxillary palp 4-segmented; terminal palpomere with apex obliquely truncate. Mandible (Fig. 1) with two strong, acute apical teeth. Labrum visible from above; covered with short and sparse hairs (Figs 16, 19).

Prothorax strongly descending anteriorly; anterior margin deeply emarginate, anterior angles and lateral margins rounded (Fig. 18); pronotal base not bordered; hypomerion with vestigial foveae; prosternum very short, about 0.24 times as long as longitudinal coxal diameter, prosternal process rounded apically, without carinae.

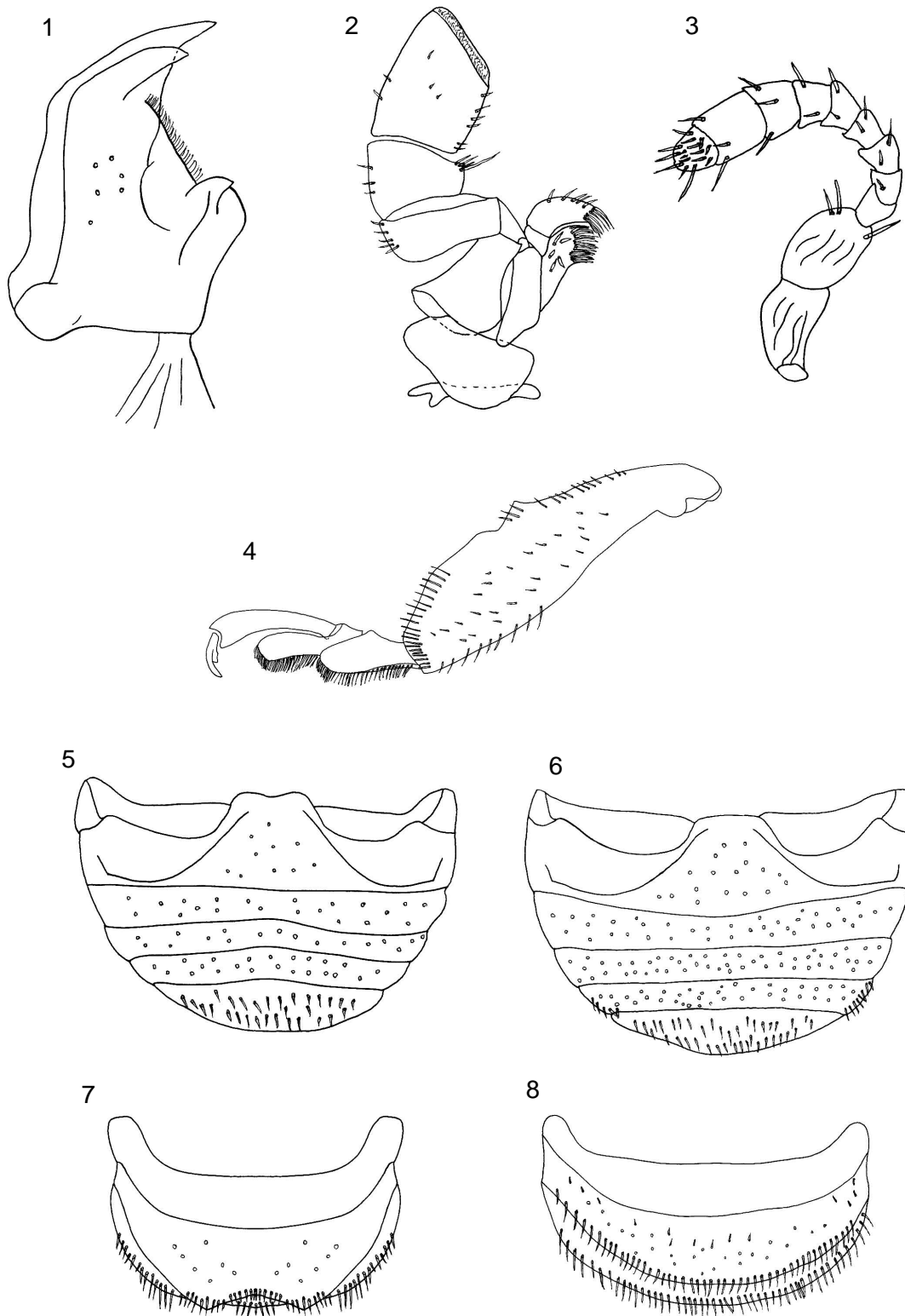
Meso-metaventral junction straight and broad. Mesoventrite distinctly and deeply punctate. Metaventrite deeply punctate, with complete discrimen; post-coxal lines separate at middle, recurved laterally. Metepimeron indistinct; outer margin of metepisternum without distinct tooth interlocking with fovea on elytron (Figs 19, 20). Scutellum triangular, very small, without setae (Fig. 21). Elytral epipleuron (Fig. 19) narrow, with maximum width at metaventrite, narrowing posteriorly, complete to apex, with weak foveae. Wings well developed.

Legs (Figs 4, 19, 20) stout; mid and hind tibiae with weak triangular tooth on outer margin, near apex; tibial spurs absent; tarsi 3-segmented; tarsal claws with moderately large, quadrate basal tooth (Fig. 4); empodium without hairs.

Abdomen with 5 ventrites in both sexes; abdominal process distinctly punctate; postcoxal lines separated at middle, closely paralleling posterior margin, curved postero-laterally, incomplete; ventrite 1 along midline about 3.4 times longer than ventrite 2; ventrite 5 with apical margin weakly truncate in male, rounded in female, in both sexes covered with short hairs.

Male genitalia: tegminal basal piece with distinct strut (Fig. 11); parameres short and thin, covered with long setae apically; penis guide lanceolate almost two times longer than parameres; penis slender uniform throughout most of its length with medium sized basal capsule (Fig. 12).

Female genitalia: ovipositor well sclerotised, coxites elongate without styli, only with long setae (Fig. 9); proper infundibulum absent but bursal appendix present in form of membranous protuberance; spermatheca bean-shaped (Fig. 13), elongate with long beak; accessory gland slightly longer than spermatheca; sperm duct short of two different diameters.



Figures 1–8. *Chapinaria meridionalis* (Sicard). (1) mandible, ventral; (2) maxilla, ventral; (3) antenna, ventral; (4) mid tibiae, ventral; (5) abdomen, male, ventral; (6) abdomen, female, ventral; (7) abdominal segment VIII, male, ventral; (8) abdominal segment VIII, female, ventral.

*Chapinaria meridionalis* comb. nov.

(Figs 1–21)

*Endochilus meridionalis* Sicard, 1929: 518.

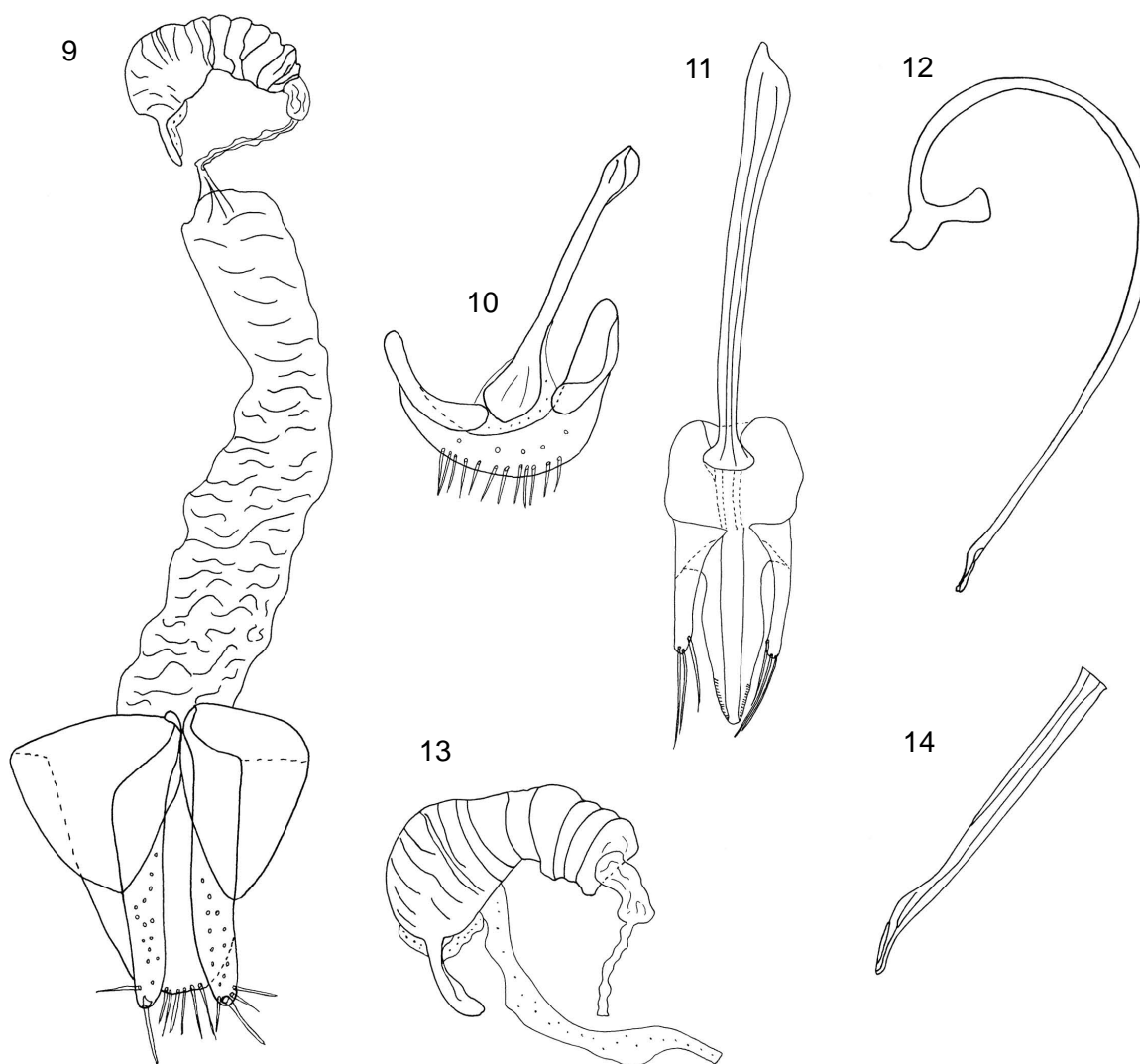
**Redescription.** Length 2.6–3.0 mm; TL/EW = 1.03–1.07; PL/PW = 0.20–0.23; EL/EW = 0.82–0.92.

Body (Fig. 21) with pronotal margins very narrow; elytral margins weakly explanate. Head and pronotum black; labrum, ventral mouthparts and antennae brown. Scutellum dark reddish. Elytra predominantly dark reddish except black margins. Punctures on pronotum and elytra 2 diameters apart, moderately coarse and deep.

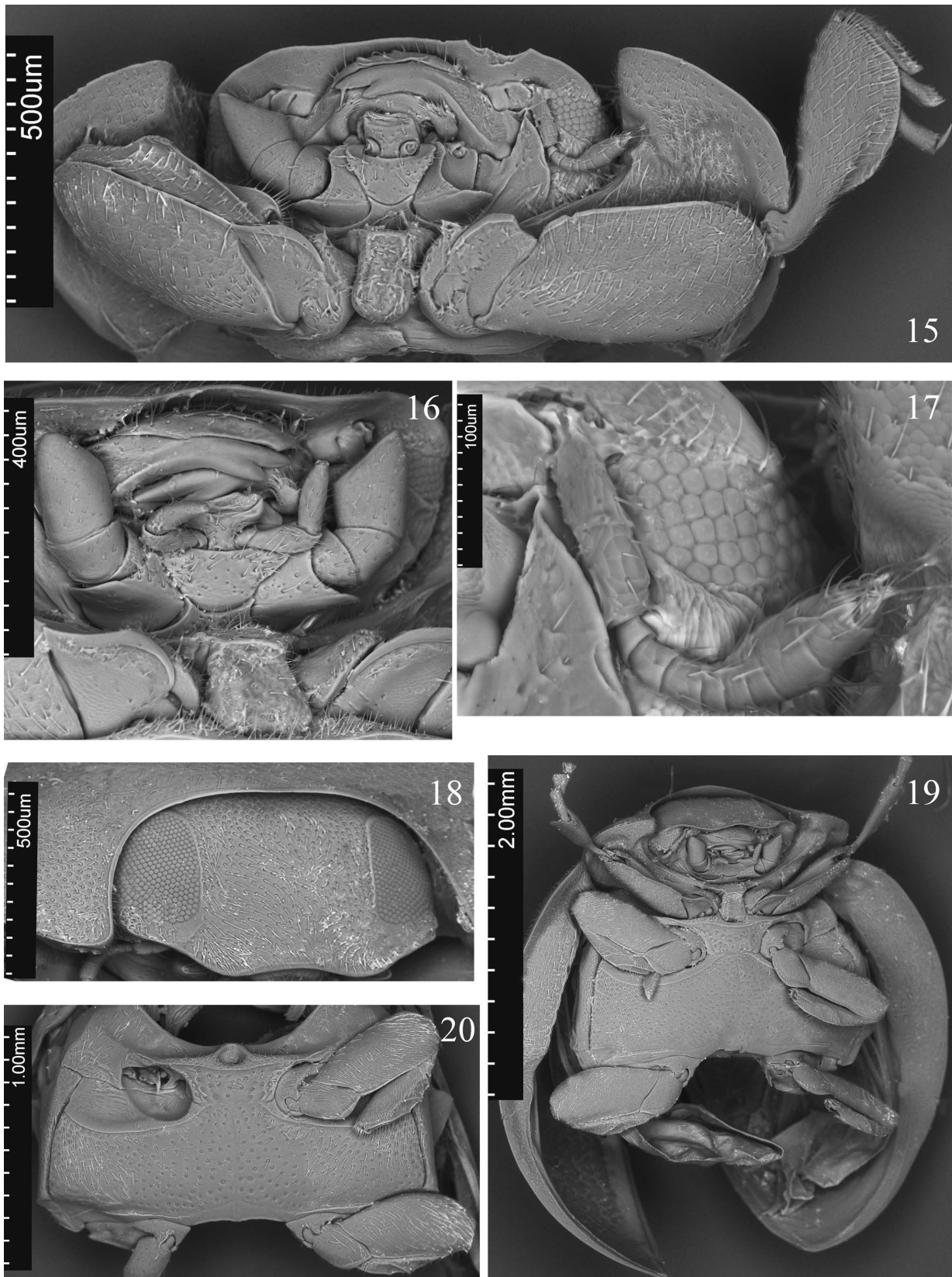
Head flat medially, punctate, covered with rather dense and short setae. Clypeus (Fig. 18) weakly

arcuate anteriorly. Eyes dorsally separated by about 2.2 times width of eye; interocular distance 0.54 times head width; inner margins of eyes almost parallel. Maxillary terminal palpomere (Figs 2, 15, 16) 1.6 times longer than wide, outer margin 2.2 times as long as inner, subparallel along basal half of its length, strongly tapering apically. Antenna (Figs 3, 17) with scape bent in the middle, obconical in shape; pedicel barrel-shaped, as long as scape, tapering to apex; antennomere 3 obconical in shape; antennomeres 4–7 same length, antennomeres 8–10 each slightly longer than preceding but similar in shape, last antennomere embedded in penultimate.

Prothorax 0.88 times basal width of elytra; prosternal process (Figs 15, 16) covered with sparse, long hairs. Mesoventral intercoxal process (Fig. 20) about



Figures 9–14. *Chapinaria meridionalis* (Sicard). (9) female genitalia, ventral; (10) male genital segment, ventral; (11) tegmen, inner view; (12) penis, lateral view; (13) spermatheca; (14) apex of penis.



Figures 15–20. *Chapinaria meridionalis* (Sicard). (15) head, prothorax, ventral; (16) head, ventral; (17) antenna, ventral; (18) head, antero-dorsal; (19) body, ventral view; (20) meso- and metathorax, ventral.

1.1 times as wide as mesocoxal diameter; distinctly punctate, punctures 2.0–2.5 diameters apart. Metaventricle laterally covered with short hairs, punctate; punctures as on mesoventral intercoxal process.

Intercoxal process of abdomen (Figs 5, 6) with punctures 3.5–4.0 diameters apart; ventrites 1–5 with punctures 3–4 diameters apart. Abdominal segment VIII (Figs 7, 8) with sternite deeply emarginate medially in male, weakly rounded in female. Male genital segment (Fig. 10) with long apophysis, swollen at base and simple at apex.

Male and female genitalia as in Figs 11, 12, 14, 9, 13.

**Material examined. Types.** Lectotype (**here designated**), female: “*Endochilus meridionalis* n. sp., typus Sic., Tanganyika, Bukoba, 27-9-26, Coll. A.H. Ritchie/Type” (NHM).

**Other material.** Climbing fern./N. RHODESIA, Lake Bangweulu, Kapola, N. of Kapata., 27.x.1946/*Endochilus meridionalis* Sic., R.D. Pope det. 1953 (NHM).

**Note.** The designation of the lectotype for *E. meridionalis* Sicard, 1929, is made to fix the taxonomic status of this species.

**Distribution.** Tanzania, Zambia.

## DISCUSSION

*Chapinaria* shares various characters with other genera of Afrotropical Chilocorini. A shape of antenna with terminal antennomere embedded in the penultimate is similar to *Brumus* Mulsant and *Exochomus* Redtenbacher, appendiculate claws are similar to *Brumus* while labrum and clypeus resemble those of *Exochomus*.

In particular it shares numerous features with *Endochilus* Weise like shape of mentum, characters of maxillae, labium, foveolate hypomera and epipleura, shape of meso-metaventricle junction, arrangement of metaventral postcoxal lines, pattern of dorsal coloration.

Distinct and long antennal grooves, stout femora and triangular tooth on outer side of tibia resemble those in *Chilocorus* Leach. Infundibulum replaced by a fleshy protuberance is present also in *Chilocorus* and *Endochilus*. Moreover, some external characters of *Chapinaria* are shared with Neotropical and Oriental genera. Abdominal postcoxal lines separated at middle, curved posteriorly, closely paralleling posterior margin and incomplete laterally, resemble those in *Arawana* Leng, *Chujochilus* Sasaji and some species of *Orcus* Mulsant (Łączyński and Tomaszewska 2009). Sperm duct of different diameters occur in most of Chilocorini genera and also shape of penis is characteristic to this tribe.



Figures 21. *Chapinaria meridionalis* (Sicard). (21) Habitus, dorsal view.

All these features make the mosaic of relationships, which hopefully will be resolved by the thorough cladistic analysis of the entire tribe (in prep. by the senior author).

*Chapinaria*, however, differs from all other genera of Chilocorini in having 11-segmented antennae, apically bidentate mandibles, very short prosternum in front of procoxa, 3-segmented tarsi and very short and apically setose parameres.

## Key to the Afrotropical genera of Chilocorini

1. Tibial spurs present on mid and hind legs . . . . . **2**
- Tibial spurs absent . . . . . **4**
2. Tarsal claw simple, sometimes thickened at base . . . . . **3**
- Tarsal claw with distinct subquadrate basal tooth . . . . . *Exochomus* Redtenbacher
3. Antenna 10-segmented . . . . . *Brumus* Mulsant
- Antenna 8-segmented . . . . . *Brumoides* Chapin
4. Antenna 11-segmented . . . . . *Chapinaria* gen. nov.
- Antenna 8-segmented . . . . . **5**
5. Antennal grooves very deep and short, receiving antennomeres 3 and 4, all tibiae simple on outer margin . . . . . *Endochilus* Weise
- Antennal grooves shallow and long, receiving almost whole antennae, all tibiae dentate on outer margin . . . . . *Chilocorus* Leach

## Checklist of the Afrotropical species of Chilocorini

### *Brumoides* Chapin, 1965

*Brumoides* Chapin, 1965: 237. Type species: *Coccinella suturalis* Fabricius, 1798: 78, by original designation.

*adonensis* Fürsch, 1987: 44. Ethiopia.

### *Brumus* Mulsant, 1850

*Brumus* Mulsant, 1850: 465, 492. Type species: *Brumus octosignatus* (Gebler), through synonymy with *Coccinella desertorum* Gebler, by subsequent designation of Crotch, 1874.

*caeruleotinctus* Sicard, 1907: 413. Djibouti.

*frater* Weise, 1895: 325. Madagascar.

*nigrifrons* Gerstaecker, 1871: 347. Zanzibar.

*Brumus fulviventris* Fairmaire, 1884: 149.

*Brumus trivittatus* Weise, 1891: 80.

*Brumus nigeriana* Korschefsky, 1938: 41.

### *Chapinaria* gen. nov.

*meridionalis* (Sicard), 1929: 518. comb. nov. Tanzania, Zambia.

*Endochilus meridionalis* Sicard, 1929: 518.

### *Chilocorus* Leach, in Brewster, 1815

*Chilocorus* Leach, in Brewster, 1815: 116. Type species *Coccinella cacti* Linnaeus, 1767, by monotypy.

*adustus* Weise, 1898a: 119. Gabon, Cameroon.

*angolensis* Crotch, 1874: 186. Angola.

*bennigseni* Weise, 1900: 128. Tanzania.

*calvus* Weise, 1898b: 228. Mozambique, South Africa.

*cooki* Casey, 1899: 165. Liberia.

*distigma* Klug, 1835: 49. Angola, Ethiopia.

*dohrni* Mulsant, 1850: 456. Guinea, Nigeria, Senegal, Zimbabwe.

*elegans* Mader 1954: 75. Democratic Republic of the Congo.

*haematocephalus* Sicard, 1909: 92. Madagascar.

*insularis* Weise, 1906b: 208. Madagascar.

*marshalli* Gorham, 1901: 414. Angola, Zimbabwe.

*metallescens* Sicard, 1909: 94. Madagascar.

*midas* Klug, 1833: 214. Madagascar.

*nigripes* Mader, 1954: 73. Tanzania.

*pilosus* Sicard, 1920: 212. São Tomé and Príncipe.

*quadriguttatus* Weise, 1888: 93. South Africa.

*quadrinaculatus* Weise, 1910a: 45. East Africa.

*reinecki* Weise, 1905b: 140. South Africa.

*rubrocinctus* Sicard, 1909: 93. Madagascar.

*rufithorax* Mader, 1954: 78. Democratic Republic of the Congo.

*schioedtei* Mulsant, 1850: 456. Guinea, Sierra Leone, Uganda.

*Chilocorus discoideus* Crotch, 1874: 184.

*sexguttatus* Weise, 1912a: 115. Angola, Democratic Republic of the Congo, Tanzania.

*silvestrii* Weise, 1913: 221. Democratic Republic of the Congo, Guinea.

*simoni* Sicard, 1907: 413. South Africa.

*solitus* Weise, 1899: 62. Mozambique.

*stillatus* Sicard, 1912a: 411. Congo.

*subaenescens* Weise, 1898b: 227. Tanzania.

*tibialis* Weise, 1897: 300. Tanzania.

*wahlbergi* Mulsant, 1850: 462. Democratic Republic of the Congo, South Africa, Tanzania, Zanzibar.

### *Endochilus* Weise, 1898

*Endochilus* Weise, 1898a: 119. Type species *Endochilus cavifrons* Weise, 1898, by original designation.

*brunneocinctus* Sicard, 1930: 73. Cameroon, Congo, Gabon.

*cavifrons* Weise, 1898a: 120. Cameroon.

*compater* Weise, 1910a: 46. Cameroon.

*epipleuralis* Mader, 1954: 68. Democratic Republic of the Congo.

*minor* Weise, 1898a: 121. Cameroon.

*niger* Fürsch, 1963: 304. Guinea.

*plagiatus* Sicard, 1920: 211. São Tomé and Príncipe.

*rubicundus* Weise, 1898a: 120. Cameroon.

*styx* Sicard, 1911: 289. São Tomé and Príncipe.

*weisei* Mader, 1954: 70. Democratic Republic of the Congo.

### *Exochomus* Redtenbacher, 1844

*Exochomus* Redtenbacher, 1844: 11. Type species: *Coccinella quadripustulata* Linnaeus, 1758: 367, by subsequent designation of Thomson, 1859: 160.

*bipunctiger* (Gorham), 1901: 76

*Lotis bipunctiger* Gorham, 1901: 412.

*Exochomus bipunctiger*: Fürsch, 1996: 76.

*Exochomus gorhami* Sicard, 1912b: 261.

*Lotis angolensis* Korschefsky, 1935b: 170.

*cherenensis* Weise, 1915: 230. Eritrea.

*corallinus* Weise, 1898c: 196. Ghana.

*difficilis* Mader, 1954: 86. Democratic Republic of the Congo.

*densepubescens* Mader, 1941: 181. Democratic Republic of the Congo.



*famelicus* Weise, 1913: 223. Eritrea.  
*flaviventris* Mader, 1954: 85. Democratic Republic of the Congo.  
*foudrasi* Mulsant, 1850: 487. Senegal.  
*fulvimanus* Weise, 1912b: 51. Uganda.  
*fulvipennis* Mader, 1954: 81. Tanzania.  
*haemorrhoidalis* (Thunberg), 1781: 1047. Democratic Republic of the Congo.  
*Coccinella haemorrhoidalis* Thunberg, 1781: 21.  
*Erochomus haemorrhoidalis*: Mulsant, 1850: 1047.  
*hospes* Weise, 1909b: 124. Madagascar.  
*hypomeles* Crotch, 1874: 194. Madagascar.  
*kohlschütteri* Weise, 1906a: 64. Kilimanjaro, Tanzania.  
*laeviusculus* Weise, 1909b: 124. Madagascar.  
*lajoyei* Sicard, 1909: 96. Madagascar.  
*metallicus* Korschefsky, 1935a: 60. Ethiopia.  
*plumbeus* Sicard, 1909: 98. Madagascar.  
*promptus* Weise, 1913: 222. West Africa.  
*pulchellus* Gerstaecker, 1871: 346. Kilimanjaro, Tanzania.  
*rubropictus* Sicard, 1930: 73. Democratic Republic of the Congo.  
*scheini* Fürsch, 1960: 307. Tanzania.  
*sjöstedti* Weise, 1909a: 260. Kilimanjaro, Tanzania.  
*tellinii* Weise, 1905a: 139. Eritrea.  
*ventralis* Gerstaecker, 1871: 346. Democratic Republic of the Congo, Tanzania.  
*viridipennis* Weise, 1909a: 261. Uganda.

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