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Three new species of tiger beetles and new data on Cicindelina species from Angola (Coleoptera: Carabidae: Cicindelinae)

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Abstract

Three new species of tiger beetles, two of the genus *Trichotaenia* Rivalier, 1957 and one of the genus *Cylindera* Westwood, 1831, subgenus *Ifasina* Jeannel, 1946 are described from Angola. An annotated list of species of Cicindelina sampled in this country is provided also. Records for three species previously unknow from Angola are given: *Ophryodera smrzi* Werner, 2005, *Lophyra clatharta* (Dejean, 1825) and *Lophyra sumlini* Cassola, 1976. Some considerations on the distribution and general ecology of these beetles in Angola are also presented. Further, two dichotomic keys are made available for the identification of *Trichotaenia* species with marked shoulders and *Cylindera* (*Ifasina*) species of western and southwestern Africa, respectively.

Key words: Cicindelina, Trichotaenia, Cylindera, new species, new records, Angola

Resumo

Três espécies novas de besouros tigre, duas do género *Trichotaenia* Rivalier, 1957 e uma do género *Cylindera* Westwood, 1831, subgénero *Ifasina* Jeannel, 1946 são descritas de Angola. Uma lista anotada de espécies de Cicindelina amostradas neste país é também apresentada. São dados registos novos de três espécies para Angola, a saber: *Ophryodera smrzi* Werner, 2005, *Lophyra clatharta* (Dejean, 1825) e *Lophyra sumlini* Cassola, 1976. São também feitas algumas considerações sobre a distribuição e ecologia geral destes coleópteros, nomeadamente em Angola. Além disso, são disponibilizadas duas chaves dicotómicas para a identificação respectivamente de espécies do género *Trichotaenia* com a região humeral dos élitros bem marcada e espécies de *Cylindera* do subgénero *Ifasina* da África ocidental e ocidental-meridional.

Palavras chave: Cicindelina, Trichotaenia, Cylindera, novas espécies, novos registos, Angola

Introduction

Tiger beetles due to their singular peculiarities concerning biology, behaviour and ecology, have attracted the curiosity and interest of professional scientists and amateurs. A synthesis on several aspects, such as their natural history, population dynamics, community composition, worldwide species richness patterns, and taxonomy is available (Serrano 2000; Pearson & Vogler 2001). Its comprehensive knowledge is an argument to support the use of tiger beetles as appropriate bioindicators (e.g. Cassola & Pearson 2000 and references herein). Tiger beetles are a speciose group and there are actually 2775 species of Cicindelidae known worldwide (J. Wiesner pers. comm.), and they are found all over the world land surface except Antarctica and some isolated oceanic islands (Serrano & Capela 2013).

Angola is the seventh largest country of Africa and is located in the southwestern part of the continent. Some insights on its orography, climate, major vegetation types and biodiversity threats can be found in Serrano and Capela (*op. cit.*). The tiger beetle fauna of Angola is one of the less known in the Afrotropical Region, with about

89 species/subspecies (Serrano & Capela 2013). Although there have been numerous historical entomological expeditons in Angola from the middle of the nineteenth century until the independence of the country in 1974 (Crawford-Cabral & Mesquitela 1989), there has been only one collecting effort that focussed on tiger beetles (Wellman & Horn 1908). More recently an annotaded catalogue of tiger beetles of Angola (Serrano & Capela 2013) aimed to compile all the taxonomic information concerning this group of beetles namely designating some neotypes.

Two trips to Angola during the year 2014 and some other sporadic collecting efforts (2013/2014) allowed us to capture some species of tiger beetles. The Dromicina representatives have been the subject of a previous work (Serrano & Capela 2015). Moreover, the study of this material resulted in the identification of twenty two species/ subspecies of Cicindelina, three of them representing new species for science and another three species new records for Angola. So, we aim in this work to: 1) present the description of the three new species, 2) give an annotaded list of the remaining species and, 3) provide two dichotomic keys, respectively for species with marked shoulders of the *Trichotaenia* Rivalier, 1957 genus and for *Cylindera* (*Ifasina*) species of western and southwestern Africa.

Material and methods

Field-work was carried out in Luanda, Bengo, Benguela, Kwanza Sul, Huambo, Huíla and Bié Provinces of Angola during the years 2013 and 2014, mainly in the end and the beginning of the rainy season by means of direct observation (abbreviation "DO in the text) using sweep nets and of light trapping (abbreviation "LT in the text).

The study of the tiger beetle specimens collected and of some additional specimens from Angola deposited in Andreas Oesterle and Peter Schüle collections resulted in the identification of twenty two species/subspecies of Cicindelina, three of them representing new species: two of the genus *Trichotaenia* and one of genus *Cylindera* Westwood, 1831, subgenus *Ifasina* Jeannel, 1949.

The morphological study of the adult specimens, including measurements of the new species, was performed with a Wild M5 stereomicroscope equipped with a dissecting microscope ocular micrometer. The photographs of adult specimens were taken by a Nikon D300S equipped with an objective EX Sigma 105mm 1:2.8 DG MACRO and four Nikon flashes wireless remote speedlight SB-R200 and with a stereomicroscope Zeiss Stereo Lumar.V12.

The measurements done were body length (posterior margin of labrum to apex of elytron, excluding the apical spine), labrum length (measured from anterior to basal margin along midline), labrum width (between the widest region of the lateral margins), head length (posterior margin of labrum to anterior margin of pronotum), head width (between the lateral region of the eyes), pronotum length (measured from anterior to basal margins along midline), pronotum width (between the widest region of the lateral margins), width between anterior lobes of pronotum, width between posterior lobes of pronotum, right elytron length (basal margin near scutellum to apex along the suture, without apical spine) and elytron width (measured across both elytra at their widest point).

We follow the interpretation of tiger beetles as a subfamily within the family Carabidae (Maddison *et al.* 2009) and the nomenclature order given in the Angolan Catalogue of tiger beetles recently published (Serrano & Capela 2013). The species/subspecies names are organized by alphabetical order.

For each taxon geographical information on the Angolan provinces for where it was already recorded (1) and the new recorded province(s) (2) are given. Moreover, in the material examined for each taxon, the localities [with geographic coordinates and altitude when possible, including the number of the correspondent aero-photogrammetric survey maps of Angola (scale 1:100 000, edited by the Junta de Investigações do Ultramar & Governo Geral de Angola (1948-1963)] (see Fig. 1 in Serrano & Capela 2013)], the Angolan Province (between parentheses), the date(s) of capture, the number and sex of specimens and the sampling method are also provided. Comments regarding the general distribution and ecological notes are included as available for each taxon.

The acronyms used for the entomological collections where the type material and the material here examined have been placed are as follows:

AOC = Andreas Oesterle Collection, Germany

- ASC = Artur Serrano Collection, Portugal
- GWC = Georg Werner Collection, Germany

MRAC = Musée Royal de l'Afrique Centrale, Tervuren, Belgium PSC = Peter Schüle Collection, Germany SMNS = Staatliches Museum für Naturkunde, Stuttgart, Germany

Results

Subtribe Cicindelina Latreille, 1802

Prothymidia Rivalier, 1957

Prothymidia angusticollis angusticollis (Boheman, 1848)

Distribution in Angola (provinces): 1) Benguela, Malanje, Huambo, Huíla and Namibe; 2) Kwanza Sul and Bié. Material examined: Chitembo (coord.: 13° 22′ 40.78′′ S, 16° 41′58.07′′ E, 1666 m alt., 281) (BIÉ), 30.X.2014, 1∂, 1♀, DO, A. Serrano leg., ASC; Cachingues-Chipica (coord.: 13° 10′ 15.74′′ S, 16° 45′48.17′′ E, 1649 m alt., 281) (BIÉ), 1.XI.2014, 12∂, 22♀, DO, A. Serrano & R. Capela leg., ASC; Chitembo (coord.: 13° 22′ 40.78′′ S, 16° 41′58.07′′ E, 1666 m alt., 281) (BIÉ), 1.XI.2014, 12∂, 22♀, DO, A. Serrano & R. Capela leg., ASC; Chitembo (coord.: 13° 22′ 40.78′′ S, 16° 41′58.07′′ E, 1666 m alt., 281) (BIÉ), 1.XI.2014, 1♀, DO, A. Serrano leg., ASC; Catota (coord.: 14° 00′37.17′′ S, 17° 24′00.33′′ E, 1532 m alt., 323) (BIÉ), 2.XI.2014, 10∂, 5♀, 3.XI.2014, 3∂, 6♀, DO, A. Serrano & R. Capela leg., ASC; Kakande (coord.: 12° 42′ 50.73′′ S, 16° 45′ 33.19′′ E, 1716 m alt., 233) (BIÉ), 4.XI.2014, 1∂, 1♀, DO, A. Serrano leg., ASC; Calulo–Cabuta (coord.: 9° 53′ 59.88′′ S, 14° 54′27.36′′ E, 831 m alt., 128) (KWANZA SUL), 5.XI.2014, 2♀, DO, A. Serrano leg., ASC.

Remarks. A wide spread species throughout Africa south of the Sahara, but only common in southern and eastern Africa (Werner 2000a). The genus *Prothymidia* Rivalier, 1957 is represented in Angola by 2 species (Serrano & Capela 2013). *Prothymidia angusticollis* (Fig. 8a), despite have been already recorded for several provinces of Angola (Serrano & Capela op. cit.) is a new record for Kwanza Sul and Bié provinces. The species occurs usually in savannah and open secondary forest habitats. The adults were found beneath the herbaceous vegetation in the edges of countryside roads or within the litter which covered the soil, running quickly when disturbed. Further adult specimens of tiger beetles were collected in the same habitats namely *Dromica similis* Cassola, 1980, *Trichodela nubifera* (Quedenfeldt, 1883), *Lophyra (Stenolophyra) infuscatula* (W. Horn, 1915), *Lophyra (Stenolophyra) saraliensis* (Guérin-Méneville, 1849) and *Cylindera (Ifasina) agualusai* **sp. n.** in Cachingues–Chipica (Fig. 8b) or *Dromica fredericoi* Serrano & Capela **sp. n.**, *Lophyra (Stenolophyra) uncivittata* (Quedenfeldt, 1883) and *Cylindera (Ifasina) agualusai* **sp. n.** in Catota (see Fig. 11 in Serrano & Capela 2015) or even *Trichotaenia nzingae* **sp. n.**, *Ophryodera rufomarginata poggei* (Harold, 1878), *Ophryodera smrzi* Werner, 2005, *Elliptica muata* f. *parallelestriata* (W. Horn, 1923), *L. (Stenolophyra) infuscatula*, *L. (Stenolophyra) saraliensis* and *Lophyra (Stenolophyra) sumlini* Cassola, 1976 at Kakande.

Trichodela Rivalier, 1957

Trichodela nubifera (Quedenfeldt, 1883)

Distribution in Angola (provinces): 1) Lunda Norte, Malanje, Benguela and Huambo; 2) Bié.

Material examined: Cachingues-Chipica (coord.: 13° 10′ 15.74′′ S, 16° 45′48.17′′ E, 1649 m alt., 281) (BIÉ), 1.XI.2014, 1♂, DO, A. Serrano leg., ASC.

Remarks. A species found in southern D. R. of the Congo and Angola (Werner 2000b). The genus *Trichodela* is represented in Angola by a single species. It is well spread throughout northeastern and central provinces (Serrano & Capela 2013), being a new record for Bié province. We found the adult running in savannah on whitish sandy soil of a countryside road (Fig. 8b) together with some adults of other tiger beetles (see *P. angusticollis* ecological remarks).

Trichotaenia Rivalier, 1958

Trichotaenia nzingae Oesterle, Serrano & Capela sp. n.

(Figs 1, 2, 3, 6a)

Type series. Holotype, 3; Angola (BIÉ), 17 km ESE Cachingues (coord.: unknown, 1654 m alt., 281), 16.XI.2013, DO, A. Oesterle leg., SMNS. Allotype 1 \bigcirc , Paratypes 13, 1 \bigcirc , Kakande (coord.: 12° 42′ 50.73′′ S, 16° 45′ 33.19′′ E, 1716 m alt., 233) (BIÉ), 30.X.2014, DO, A. Serrano leg., ASC (Allotype 1 \bigcirc , Paratype 13), MRAC (Paratype 1 \bigcirc); Further paratypes: Angola (BIÉ), 17 km ESE Cachingues (coord.: unknown, 1650 m alt., 281), 16.XI.2013, 23, DO, A. Osterle leg., 17.XI.2013, 13, 2 \bigcirc , DO, A. Osterle leg., 17.XI.2013, 13, 2 \bigcirc , DO, A. Oesterle leg., AOC, Angola (BIÉ), 34 km ESE Cachingues (coord.: unknown, 1650 m alt., 281), 17.XI.2013, 1 \bigcirc , DO, G. Werner leg., GWC, 18.XI.2013, 2 \bigcirc , DO, G. Werner leg., GWC and PSC; Angola (BIÉ), 34 km ESE Cachingues (coord.: unknown, 1650 m alt., 281), 17.XI.2013, 1 \bigcirc , DO, A. Oesterle leg., AOC. Holotype deposited in the collection of SMNS; Allotype deposited in ASC; Paratypes deposited in AOC (103, 5 \bigcirc), ASC (13), GWC (2 \bigcirc), MRAC (1 \bigcirc) and PSC (1 \bigcirc).

Derivatio nominis. This species is dedicated to "Ngola Ana **Nzinga** Mbande", known as "Rainha Ginga" also, which was a queen (Ngola) of the kingdoms of Ndongo and Matamba in south–western Africa in the seventeenth century. The royal title in Kimbundu language, Ngola, was the name used by the Portuguese to name the region (Angola).

Diagnosis. A winged *Trichotaenia* species, black coloured with some slight punctual purpurish and bluish or violet reflections on head, pronotum and elytra. Clypeus mostly setose, blackish with some purpurish blue-greenish reflections. Labrum large, rounded and 5-toothed in front, variable setose on half posteriad surface with just four marginal sensorial setae, piceous in most specimens, triangularly doubled blackened in the first basal third (males) or triangularly blackened almost in the basal half and part of the apical half (females). A stripe of dense white recumbent pubescence on genae, continuing behind on the ventral half of pro and mesepisterna, on metepisterna up to the lateral sides of first four or five visible abdominal sternites. Sternum, except lateral half of metasternum, and abdominal sternites otherwise glabrous. Antennae attaining nearly the half of the elytral length in male, shorter in female; antennomeres 1-4 dark metallic black with bluish or violaceous reflections, antennomeres 5-10 strongly foliated. Elytral shoulders and part of the disk glabrous. Elytra with decumbent pubescence (Fig. 3) covering the submarginal sides, from the middle of basal third to the apex where it becomes slightly wider and closer to the elytral margin in its apical third, emitting three or sometimes four rami on disc (one slightly arcuate just above the apex, one or two near the middle and a longer one above the middle ascending diagonally to the base of scutellum). A subsutural small elongate tuft of closely appressed setae below the scutellum, sometimes prolonged by sparse setae along the suture. A stripe of setae descending diagonaly between the middle of the anteriad discal ramus and the sutural band, sometimes incomplete. Elytral decumbent pubescence leaving four, sometimes five, naked areoles in between, one subsutural below the appressed setae close to the scutellum, the second one immediately above the middle, the third and larger one below the middle, a fourth one below it and before the apical area, and sometimes a fifth smaller one between the subapical stripe and the lower ramus of the middle stripe.

Description. Length of Holotype: 10.3 mm. Length of paratypes (without labrum): 9.2–10.3 mm (males), 10.2–11.4 mm (females).

Head (Figs 2a–2b). Wider than long (1.4 times) [length: 1.76–2.08 mm (males), 1.95–2.40 mm (females), width 2.76–2.82 mm (males) and 2.85–3.18 mm (females)], with large eyes, slightly narrower than body (Fig. 1), dorsal colour black with coppery reflections; surface sculpture rugulose, rugae forming irregular longitudinal meshes on vertex and transverse meshes on occiput; rugae straight, more or less parallel on orbital plates and frons; occiput, lateral parts of vertex, frons and clypeus sparsely covered with short piceous decumbent setae, temples (lateral area of head behind eyes) indistinctly striaterugulose, glabrous, glossy; a continuous narrow strip in the middle region of vertex and occiput glabrous; genae covered with dense white decumbent pubescence; orbital plates with two sublateral setigerous punctures; labrum large, shape nearly semicircular in both sexes (Figs 2a–2b), transverse, wider than long (males: 1.4–1.5 times, females: 1.3–1.4 times), proportionally slightly longer in females [length: 0.90–1.07 mm (males), 1.22–1.44 mm (females), width 1.36–1.54 mm (males) and 1.60–1.92 mm (females)], anterior margin five-toothed, middle basal half slightly protruding, four sublateral sensorial setae, basal and median portions covered with sparse, white decumbent setae (males: 13–53, females: 5–71); colour yellowish

with outer margin black, males triangularly doubled blackened in the first basal third, females triangularly blackened almost in the basal half, rarely reaching the anterior margin; antennae reaching the beginning of the median elytral transverse stripe of decumbent setae in male, shorter in female; antennomeres 1–4 dark metallic black with bluish or violaceous reflections, antennomeres 5–10 strongly dilated and foliated, more pronounced in females; mandibles four-toothed, black with large yellow patch basally on outer edge; maxillary and labial palpi light yellow, except terminal palpomeres black with metallic reflections; penultimate palpomere of labial palpus moderately inflated.



FIGURE 1. Facies of *Trichotaenia nzingae* sp. n.: a) male holotype, b) female allotype.

Thorax. Pronotum (Figs 2c–2d) transverse slightly wider than long (1.1times) [length: 1.68–1.95 mm (males) and 1.79–2.08 mm (females); width: 1.82–2.05 mm (males) and 2.08–2.30 mm (females)], subcordiform-shaped, with the anterior margin slightly larger [width: 1.66–1.84 mm (males) and 1.95–2.11 mm (females)] than the

posterior one [width: 1.60–1.79 mm (males) and 1.79–1.92 mm (females)]; black, on each side with a broad sublateral band with cupric reflections, this bands are covered with dense piceous decumbent pubescence, which is transversaly directed on median lobe, oblique on posterior and anterior lobes; along each side of median lobe and on central portions of anterior and posterior lobes a few additional thin piceous setae; surface of pronotum rugulose, rugae forming irregular meshes on latero-dorsal portions, along middle line a narrow band with more transverse-parallel rugae; dorsal half of proepisterna glabrous, ventral half densely covered with white decumbent pubescence which continues that of genae and extends to mesepisterna, metepisterna, lateral portions of metasternum and metacoxae to lateral portions of the first four to five abdominal sterni; proepisterna not visible from above; coupling sulcus: a deeply pitted, funnel-formed impression centrally in upper half of mesepisternum.



FIGURE 2. Trichotaenia nzingae sp. n., head, mandibles and labrum, pronotum (dorsal view): a, c) male; b, d) female.

Elytra (Fig. 3) longer than wide (1.7–2.0 times) [(length: 5.61–6.47 mm (males) and 6.47–7.06 mm (females); width: 3.01–3.36 mm (males) and 3.58–3.96 mm (females)], subrectangular-shaped, elongated (males) (Figs 3a–c), more convex and enlarged (females) (Fig. 3d), shoulders very marked, apex ending in a short but acute sutural spine in both sexes, surface sculptured by coarse, but very densely arranged polygonal (quadrangular to hexagonal) alveoli slight sharply walled, apical margin with distinct microserrulation; posteriad disc near suture not (males) or slightly protruding in relief in its uppermost region (females); colour of elytra black with more or less coppery lustre only in the pubescent areas, otherwise with some bluish or violaceous reflections; Elytra with white-piceous decumbent pubescence, consisting of a submarginal band, from the middle of basal third to the apex where it becomes slightly wider and closer to the elytral margin, anteriad ramus bending inwards towards the base of elytron close to the base of scutellum in the basal third of elytron; this anteriad ramus is sometimes prolonged diagonally in the middle to the subsutural sparse band of setae; the sublateral band emits around or nearly behind



FIGURE 3: *Trichotaenia nzingae* **sp**. **n**., elytra (dorsal view): a) typical decumbent setae pattern, b–d) examples of variability among the decumbent setae pattern.

the middle a slightly backward straight spur on disc, sometimes divided into two rami (an upper ramus around the middle larger than a lower ramus below the middle, which sometimes can reach the base of the subapical band), and one oblique and slightly arcuate in the apical third of elytron not reaching the suture (sometimes discontinued, forming an isolated discal and more or less circular tuft); parallel to the suture occurs a narrow subsutural band of sparse decumbent setae, beginning near a small elongated tuft of closely appressed setae below the scutellum.

Ventral surface. Black, with stronger coppery-golden reflections in head and thorax parts, violet lustre in abdominal sternites; sides of these sternites with decumbent pubescence, except the ultimate or sometimes the ultimate and penultimate ones, becoming sparser towards apex; trochanters black.

Legs. Metallic black with greenish reflections in tarsi and violaceous-bluish in femora and tibiae, a few rows of spiniform setae on femora and tibiae;

Aedeagus (Fig. 6a) relatively small (length: 2.56-2.85 mm), arched, tapering, with a straight, simple apex.

Intraspecific variation. The range of variability observed in *T. nzingae* **sp. n.** (19 specimens) affects the colour and the number of labral decumbent setae (see description) and slightly the elytral decumbent pubescence. The variability within this last character is associated with colour (more or less whitish or piceous) and with minor gaps of setae in the anteriad diagonal band, in the transversal middle band, in the posteriad transversal middle band and in the subapical band (e.g., Figs 3b–d). The shapes of pronotum and elytra are very conservative, but variation in the length of the apical denticle of elytra is very common, with individuals having longer denticles than others. Asymmetries in the length of left and right elytron denticles within the same specimen are common too.

Trichotaenia pepetela Serrano & Capela sp. n.

(Figs 4, 5, 6b, 7a, b)

Type series. Holotype, 3; Angola (BIÉ), Catota (coord.: 14° 00'37.17'' S, 17° 24' 00.33'' E, 1532 m alt., 323), (BIÉ), 2.XI.2014, DO, A. Serrano leg. Allotype 2 and paratypes same locality, 2.XI.2014, 13, 12, 3.XI.2014, 13, DO, A. Serrano leg. Holotype and paratypes deposited in ASC.

Derivatio nominis. The specific epithet, *pepetela*, is used as a noun in apposition based on the pen name "Pepetela" of Artur Carlos Pestana dos Santos, a great Angolan writer descent of Portuguese colones of Benguela, which fought together with MPLA (Popular Liberation Movement of Angola) for liberation of their homeland.

Diagnosis. A winged *Trichotaenia* species, black coloured with some slight punctual purpurish and bluish or violet reflections on head, pronotum and elytra. Clypeus mostly setose, blackish with some purpurish blue-greenish reflections. Labrum large, rounded and 5-toothed in front, very slightly setose on half posteriad surface with just four whitish marginal sensorial setae, only triangularly doubled blackened in the first basal third (males) or triangularly blackened in the two basal thirds (females). A stripe of dense white recumbent pubescence on genae, continuing behind on the ventral half of proepisterna up to the lateral sides of first five abdominal sternites, where it is much narrower. Sternum and abdominal sternites otherwise glabrous. Antennae barely attaining nearly the half of the elytral length in male, shorter in female; antennomeres 1-4 dark metallic black with bluish or violaceous reflections, antennomeres 5-10 strongly foliated. Elytral shoulders and parts of the disk glabrous. Elytral decumbent pubescence (Figs 7 a–7b) covering the lateral sides, from the middle of basal third to the apex where it becomes slightly wider, emitting two rami on disc (one slightly arcuate above the apex and one almost straight and large near the middle). A small tuft of closely and diagonally appressed setae on each side of the base of scutellum and a subsutural elongate tuft of closely appressed setae below the scutellum. Absence of decumbent setae along the suture. Elytral decumbent pubescence leaving three naked areoles in between, one large above the middle stripe, the second one immediately below the middle stripe and a third one smaller between the subapical stripe and the apical area.

Description. Length of Holotype: 10.2 mm. Length of paratypes: 10.1 mm (males), 11.2–11.4 mm (females).

Head (Figs 5a–5b). Wider than long [length: 1.63–2.02 mm (males), 2.05–2.08mm (females), width 2.75–2.78 mm (males) and 3.04–3.10mm (females)], with large eyes, slightly narrower than body (Fig. 4), dorsal colour black with coppery reflections; surface sculpture rugulose, rugae forming irregular longitudinal meshes on vertex and transverse meshes on occiput; rugae straight, more or less parallel on orbital plates and frons; occiput, vertex and frons covered with dense and short piceous decumbent setae, clypeus with sparsely decumbent setae, temples (lateral area of head behind eyes) indistinctly striaterugulose, glabrous, glossy; genae covered with dense white

decumbent pubescence; orbital plates with two sublateral setigerous punctures; labrum large, shape nearly semicircular in both sexes (Figs 5a–5b), transverse, wider than long [length: 1.06–1.12 mm (males), 1.34–1.36 mm (females), width 1.47–1.54 mm (males) and 1.71–1.76 mm (females)], anterior margin five-toothed, middle basal half slightly protruding, four sublateral sensorial setae, basal portions covered with few sparse, white decumbent setae (males: 1–10, females: 4–8); colour yellowish with outer margin black, males triangularly doubled blackened in the first basal third, females triangularly blackened almost in the two basal thirds; antennae reaching nearly the half of the elytral length in male, shorter in female; antennomeres 1–4 dark metallic black with bluish or violaceous reflections, antennomeres 5–10 strongly dilated and foliated, more pronounced in females; mandibles four-toothed, black with a large yellow patch basally on outer edge; maxillary and labial palpi light yellow, except terminal palpomeres black with metallic reflections; penultimate palpomere of labial palpus moderately inflated.



FIGURE 4. Facies of Trichotaenia pepetela sp. n.: a) male holotype, b) female allotype.



FIGURE 5. Trichotaenia pepetela sp. n., head, mandibles and labrum, pronotum (dorsal view): a, c) male; b, d) female.

Thorax. Pronotum (Figs 5c–5d) more or less as long as wide (1.0–1.1 times) [length: 1.82–1.98 mm (males) and 2.02–2.10 mm (females); width: 1.86–1.94 mm (males) and 2.08 mm (females)], subcordiform-shaped, the anterior margin slightly larger [width: 1.74–1.82 mm (males) and 2.05 mm (females)] than the posterior one [width: 1.70–1.73 mm (males) and 1.95 mm (females)]; black, on each side with a broad sublateral band with cupric reflections, this bands are covered with dense piceous decumbent pubescence, which is transversaly directed on median lobe, oblique on posterior and anterior lobes; along each side of median lobe and on central portions of anterior and posterior lobes a few additional thin piceous setae; surface of pronotum rugulose, rugae forming irregular meshes on latero-dorsal and dorsal portions; dorsal half of proepisterna glabrous, ventral half densely covered with white decumbent pubescence which continues that of genae and extends to mesepisterna, metepisterna, lateral portions of metasternum and metacoxae to lateral portions of the first five abdominal sterni; proepisterna slightly visible from above; coupling sulcus: a deeply pitted, funnel-formed impression centrally in upper half of mesepisternum.

Elytra (Figs 7a–7b) longer than wide (1.8–1.9 times) [(length: 6.27–6.47 mm (males) and 7.13–7.26 mm (females); width: 3.33–3.46 mm (males) and 3.90–3.96 mm (females)], subrectangular-shaped, elongated (males) (Fig. 7a), more convex and enlarged (females) (Fig. 7b), shoulders smooth and glossy very marked, apex ending in a short but acute sutural spine in both sexes, disc surface sculptured by coarse, but very densely arranged polygonal (quadrangular to hexagonal) alveoli most slightly flattened walled in the middle and posteriad half, apical margin with distinct microserrulation; posteriad disc near suture not (males) or slightly protruding in relief in its uppermost region (females); colour of elytra black with more or less coppery lustre only in the pubescent areas, otherwise with

some bluish or violaceous reflections; Elytra with white-piceous decumbent pubescence (Figs 7 a–7b), consisting of a marginal band, from the middle of basal third to the apex where it becomes slightly wider, emitting two rami on disc, one almost straight and large near the middle and another subapical slightly arcuate; a small tuft of closely and diagonally appressed setae on each side of the base of scutellum and a subsutural elongate tuft of closely appressed setae below the scutellum. Absence of of sparce or decumbent setae along the suture.

Ventral surface. Black, with stronger coppery-golden reflections in head and thorax parts, violet lustre in abdominal sternites; sides of these sternites, except the ultimate, with decumbent pubescence, becoming sparser towards apex; trochanters black.

Legs. Metallic black with greenish reflections in tarsi and violaceous-bluish in femora and tibiae, a few rows of spiniform setae on femora and tibiae;

Aedeagus (Fig. 6b) relatively small (length: 2.64–2.78 mm), arched, tapering, with a straight, simple apex.



FIGURE 6. Aedeagus (lateral view): a) *Trichotaenia nzingae* sp. n., paratype, Kakande, Bié, Angola, b) *Trichotaenia pepetela* sp. n., holotype, Catota, Bié, Angola.



FIGURE 7. Elytra (dorsal view): a and b) *Trichotaenia pepetela* **sp. n.**, male and female, respectively, c) *Trichotaenia tereticollis* (W. Horn), d) *Trichotaenia pseudotereticollis* (W. Horn), e) *Trichotaenia suturata* (W. Horn).

Intraspecific variation. The range of variability observed in *T. pepetela* **sp. n.** (5 specimens) affects slightly the number of labral decumbent setae (see description), but not the elytral decumbent pubescence. As happens with *T. nzingae* **sp. n.** the shapes of pronotum and elytra are very conservative, but variation in the length of the apical denticle of elytra is very common, with individuals having longer denticles than others. Asymmetries in the length of left and right elytron denticles within the same specimen are common too.

Remarks. A total of fifteen species, including the two new ones, are known so far within the genus *Trichotaenia*. Cassola (1983) revised the eight then known species of this Afrotropical genus and Schüle (2011) provided an identification key for the thirtheen then known species. Until now the genus was represented in Angola by two species [*T. pseudosuturalis* (W. Horn, 1914) and *T. suturata* (W. Horn, 1915)] (Serrano & Capela 2013).

The *Trichotaenia* species can be included in some artificial groups based on two sets of characteristics (Table 1). Two groups are easily discriminated based on the presence / absence of full wings, a condition that is correlated with the evidence of distinct elytral humeri against effaced elytral humeri and three groups based on the presence /

absence of decumbent setae on the labrum. So far, it has not been proved to be any phylogenetic mean of these features, but they are practical to discriminate those groups of species. A lot of eight species seems to share both the elytral humeri distinct plus the labrum setose [*T. duplosetosa* (W. Horn, 1929), *T. kudrnai* Cassola, 2008, *T. nzingae* **sp. nov.**, *T. pepetela* **sp. nov.**, *T. pseudosuturalis* (W. Horn 1914), *T. pseudotereticollis* (W. Horn, 1929), *T. rivalieri* Basilewsky, 1958 and *T. suturata* (W. Horn, 1915)] and other three the elytral humeri effaced plus the labrum glabrous (*T. mireki* Werner, 2003, *T. mufumbweana* Cassola, Werner & Schüle, 2009 and *T. mwinilungae* Cassola, Werner & Schüle, 2009). The remaining four species, by presenting either the labrum setose or glabrous [*T. africana* Cassola, 1983 and *T. tereticollis* (Boheman, 1860)] or by presenting a distinct elytral humeri plus a glabrous labrum (*T. allardi* Cassola, 1983) or even exhibiting elytral humeri effaced plus a setose labrum (*T. minettii* Schüle, 2011) do not enter wholy in the two former groups (Table 1).

TABLE 1. Artificial groups of *Trichotaenia* species based on two sets of characters: presence or not of labral pubescence and elytral humeri distinct or effaced. Within each set of characters, groups are joined simultaneously by the same background color and the same small letters.

Species	Labrum	Elytral humeri		
	With decumbent setae	Glabrous	Distinct	Effaced
T. africana Cassola, 1983	+(a)	+(a)	-(d)	+(d)
T. allardi Cassola, 1983	-(b)	+(b)	+(e)	-(e)
T. duplosetosa (W. Horn, 1929)	+(c)	-(c)	+(e)	-(e)
T. kudrnai Cassola, 2008	+(c)	-(c)	+(e)	-(e)
T. minettii Schüle, 2011	+(c)	-(c)	-(d)	+(d)
T. mireki Werner, 2003	-(b)	+(b)	-(d)	+(d)
T. mufumbweana Cassola, Werner & Schüle,	-(b)	+(b)	-(d)	+(d)
2009				
T. mwinilungae Cassola, Werner & Schüle,	-(b)	+(b)	-(d)	+(d)
2009				
T. nzingae sp. n.	+(c)	-(c)	+(e)	-(e)
T. pepetela sp. n.	+(c)	-(c)	+(e)	-(e)
T. pseudosuturalis (W. Horn, 1914)	+(c)	-(c)	+(e)	-(e)
T. pseudotereticollis (W. Horn, 1929)	+(c)	-(c)	+(e)	-(e)
T. rivalieri Basilewsky, 1958	+(c)	-(c)	+(e)	-(e)
T. suturata (W. Horn, 1915)	+(c)	-(c)	+(e)	-(e)
T. tereticollis (Boheman, 1860)	+(a)	+(a)	+(e)	-(e)

The two new species belong to the first group presenting well distinct elytral shoulders as well as a labrum more (T. nzingae sp. n.) or less (T. pepetela sp. n.) setose. Within this group both new species, and taking into account the morphological characters, are more akin with T. pseudosuturalis and T. pseudotereticollis. However, they can be segregated from the former species by the position of the elytral median transverse decumbent setae stripe located around or slightly after the middle (located before the middle in T. pseudosuturalis), by the presence of a subapical arcuate decumbent stripe of setae (absent in T. pseudosuturalis) and even by the absence of sparse pubescence on shoulders (present in T. pseudosuturalis). Both new species can be discriminated from the later species also by the shoulders slightly more distinct and the shape of pronotum which is slightly cordiform (subrectangular in T. pseudotereticollis). Moreover Trichotaenia nzingae sp. n. can be discriminated from T. pseudotereticollis by a pronotum slightly wider than long, a different elytral decumbent setae distribution pattern (cf. Figs 3 and 7d) and the alveoli of the elytral disk slightly sharply walled (most flattened walled in T. pseudotereticollis, conferring to this species a coppery lustre on whole disk, but not in the new species). On the other hand, Trichotaenia pepetela sp. n. can be separated also from T. pseudotereticollis by a very different elytral decumbent setae distribution pattern (cf. Figs 7a-7b and 7d) and labral blackish colour pattern. Both new species can be discriminated easily from T. allardi by the 5-9 antennomeres enlarged and foliated and the setose labrum, from T. duplosetosa by the absence of depigmented areas in the elytrae, from T. suturata by a very different elytral pubescence pattern (cf. Figs 3, 7a-7b and 7e, see also Plate 46, Fig. 12 in Horn 1938), from T. rivalieri by the shape of pronotum (cordiform or subcordiform *vs*. subquadrate) and the very distinct notopleural suture and from *T. kudrnai* by the position of the elytral median transverse decumbent stripe of setae located around or only slightly after the middle and the presence of a transverse and arcuate subapical band (cf. Figs 3, 7a–7b and Fig. 1 in Cassola 2008).

The two new species are very close also with *T. tereticollis*, a species with distinct shoulders, but with labrum either setose or glabrous. Both new species can be segregated from *T. tereticollis* by a different elytral pubescence pattern (cf. Figs 3, 7a–7b and 7c) as well as the shape of pronotum.

The two new species are easily discriminated between them by some features such as the elytral decumbent setae distribution pattern (cf. Figs 3 and 7a–7b), prothoracic epipleura visible (*T. pepetela* **sp. n.**) or not (*T. nzingae* **sp. n.**) from above and elytral punctures in apical half not anastomosing to longitudinal chains (*T. nzingae* **sp. n.**). Finally both new species, by the distinct elytral shoulders, are easily separated from the remaining species of *Trichotaenia* which are characterized by more or less effaced humeri, among other characters.

Ecological remarks. Both *Trichotaenia* new species are until now restricted to Angola. The adults were found together with some adults of other tiger beetles (see also *P. angusticollis* ecological remarks concerning Kakande and Catota localities) in countryside roads of whitish sandy soil. At such roads and paths with sand-clayish soil (or even small fields) in secondary open forest, *T. nzingae* **sp. n.** could be observed at the Cachingues localities rather at the margins with darker soil, litter and herbaceous plants. Other sympatric tiger beetles (with preferences of their micro-habitats) have been *P. angusticollis* (litter), *D. serietuberculata* f. *lundana* (litter), *O. rofomarginata poggei* (white sandy soil), *L. infuscatula* (white sandy soil), *E. muata* f. *parallelestriata*, (dark soil), *L. saraliensis* (dark soil), *D. similis* and *C. agualusae* **sp. n**. Unlike to what was said by Cassola *et al.* (2009) that "all *Trichotaenia* species, even if normally winged, never fly and prefer to rapidly run on the ground through the grasses", most of the adults of both new species were captured also on the ground when attempted to run into the edges of the roads, but this behaviour seems more connected with the lower environmental temperature conditions in early morning or later near dusk or even under overcast sky.

Key to the species of Trichotaenia with distinct humeri

Taking into account part of the identification key for the *Trichotaenia* species given by Schüle (2011), we present an updated key of the representants with distinct shoulders, including the new species:

1.	Clypeus and labrum glabrous
-	Clypeus setose, labrum more or less sparsely setose
2.	Ventral sides completely pubescent
-	Pubescence of ventral side reduced to genae and proepisterna
3.	Remnants of depigmented, whitish spots under the elytral pubescence
-	No remnants of depigmented spots under the elytral pubescence
4.	Elytral pubescence forming a dense and large, whitish sutural band in basal half of elytra
-	Elytral pubescence not forming a dense and large, whitish sutural band in basal half of elytra, sometimes pubescence is
	arranged to indistinct, longitudinal stripes
5.	Pronotum cordiform or slightly subcordiform, basal lobe distinctly narrower than apical lobe
-	Pronotum subquadrate, as wide as long, or slightly longer than wide, basal lobe as wide as apical lobe or slightly narrower 8
6.	Elytral pubescence with transversal band before the middle, absence of a subapical arcuate band; pubescence of pronotum
	denser in lateral and middle portions
-	Elytral pubescence with transversal band in the middle or slightly behind the middle, presence of a subapical arcuate band;
	pubescence of pronotum dense only in lateral portions
7.	Elytral first-third with a continuous pubescent band connecting diagonally the submarginal band and the base of the scutellum;
	proepipleura not visible from above
-	Elytral first-third with a short and dense diagonal pubescent band near the base of the scutellum; proepipleura slightly visible
	from above
8.	Apex of elytra sparsely pilose, elytral punctures in basal half isolate, not anastomosing to longitudinal chains
-	Apex of elytra with well-defined densely pilose area, elytral punctuation in basal half coarse, anastomosing to longitudinal
	chains
9.	Elytral punctuation coarser, alveoli slight sharply walled, elytral pilosity not arranged to longitudinal stripes in basal half (up to
	here specimens of <i>T. tereticollis</i> with a few additional clypeal and labral setae)

-	Elytral punctuation finer, alveoli most slightly flattened walled, elytral pilosity arranged into longitudinal stripes in basal half.
10.	Elytral pubescence with transversal band around the middle, notopleural suture indistinct
-	Elvtral pubescence with transversal band behind the middle, notopleural suture distinct

Ophryodera Chaudoir, 1860

Ophryodera rufomarginata poggei (Harold, 1878)

Distribution in Angola (provinces): 1) Lunda Norte, Lunda Sul; 2) Bié.

Material examined: Kakande (coord.: 12° 42′ 50.73′′ S, 16° 45′ 33.19′′ E, 1716 m alt., 233) (BIÉ), 30.X.2014, 2♂, 4.XI.2014, 1♂, DO, A. Serrano leg., ASC.

Remarks. A subspecies distributed throughout D. R. of the Congo and north-eastern Angola (Werner 2000b). The adults appear isolate and were found hunting in a countryside road, flying quickly into the open secondary forest as soon as they perseive a threat from many meters away. Further adults of other tiger beetles are syntopic with *O. rufomarginata poggei* (see *P. angusticollis* ecological remarks for Kakande). It is a new record for the Bié province.

Ophryodera smrzi Werner, 2005

Distribution in Angola (provinces): 2) Bié.

Material examined: Kakande (coord.: 12° 42′ 50.73′′ S, 16° 45′ 33.19′′ E, 1716 m alt., 233) (BIÉ), 30.X.2014, 6♂, 3♀, 4.XI.2014, 5♂, 3♀, DO, A. Serrano & R. Capela leg., ASC.

Remarks. The species was discovered in Zambia (Werner 2005) and now in Angola extending westernly its known distribution. The adults (Fig. 8c) were found in hunting activity in a countryside road with whitish sandy soil within an open secondary forest, flying into the forest when disturbed. Further tiger beetle species occur in syntopy (e.g. *O. rufomarginata poggei*, *L. sumlini*) or very close along this countryside road (see *P. angusticollis* ecological remarks for Kakande).

Elliptica Farmaire, 1884

Elliptica muata f. parallelestriata (W. Horn, 1923)

Distribution in Angola (provinces): 1) Malanje; 2) Bié.

Material examined: Kakande (coord.: 12° 42′ 50.73′′ S, 16° 45′ 33.19′′ E, 1716 m alt., 233) (BIÉ), 30.X.2014, 1♂, DO, A. Serrano leg., ASC; Satchijamba (coord.: 13° 44′ 46.50′′ S, 17° 11′ 2.26′′ E, 1611 m alt., 283) (BIÉ), 31.XI.2014, 1♂, LT, A. Serrano leg., ASC.

Remarks. A tiger beetle subspecies common in the southern territory of D. R. of the Congo (Werner 2000b). The genus *Elliptica* is represented by three species in Angola. The form *parallelestriata* was firstly recorded for Angola by Serrano & Capela (2013). Neverthless this form seems to have not taxonomic validity, as the typical morph occurs in sympatrie with it in some places (P. Schüle pers. comm.). These new findings confirm its presence in Angola. It is also a new record for the Bié province. The adult in Kakande was in activity in a countryside road within an open secondary forest with withish sandy soil and in syntopy with some other tiger beetle species (see *P. angusticollis* ecological remarks for this locality). In Satchijamba the adult was attracted to the light trapping within an open secondary forest.

Lophyra Motschulsky, 1859

Lophyra (s. str.) clathrata Dejean, 1825

Distribution in Angola (provinces): 2) Benguela, Huíla.

Material examined: Biópio–Benguela (coord.: 12° 27'38.17'' S, 13° 44' 02.92'' E, 148 m alt., 228) (BENGUELA), 26.X.2013, 1 $\stackrel{\circ}{\rightarrow}$, 1 $\stackrel{\circ}{\rightarrow}$, DO, R. Capela leg., ASC; Bicuar, Parque Nacional (coord.: unknown) (HUÍLA), 21.II.2014, 4 $\stackrel{\circ}{\rightarrow}$, 4 $\stackrel{\circ}{\rightarrow}$, DO, R. Capela leg., ASC.

Remarks. Wiesner (1992) included Angola in the distribution of this species surely based in the erroneous record given by Wellman & Horn (1908) under the name of *L. brevicollis clathrata* [regarding this matter see also Cassola (1993) and Serrano & Capela (2013)]. Later Cassola (1993) and Werner (2000b) refer that the species is only widespread throughout South Africa, Mozambique and Malawi.

The adults got in both localities conform very well to the description given by Cassola (1993) to segregate this species from *L. endroedyi* Cassola, 1993. Cassola (1993) also postulated the possibility of *L. clathrata* and *L. endroedyi* be the same species as soon as intermediate forms are found. However, the Angolan specimens now got are not intermediate forms, presenting the same elytral drawing pattern of the southern populations. The fourth antennomere of the male has not a penicillum, which allows easily separating the species from *L. bertolonia* (W. Horn, 1926) and *L. fasciculicornis* (Barker, 1919) also. The adults in Biópio and Bicuar were found in a sandy dry riverbed and in small irrigation ditches connected with a pond within a corn field plantation, respectively. Based on these findings it may be stated that *L. clathrata* is a new record for the Angolan tiger beetle fauna, increasing to northern its known southwestern distribution.

Lophyra (s. str.) neglecta neglecta (Dejean, 1825)

Distribution in Angola (provinces): 1) Cabinda, Luanda, Lunda Norte, Malanje; 2) Bengo.

Material examined: Camama, Lagoa (Luanda) (coord.: 8° 56′ 34.61′′ S, 13° 16′ 30.72′′ E, 81 m alt., 89) (LUANDA), 18.IV.2013, 7 \Diamond , 3 \bigcirc , 29.V.2013, 2 \Diamond , 1 \bigcirc , 17.X.2013, 6 \Diamond , DO, R. Capela leg., ASC; Lagoa Mazozo (Catete) (coord.: 9° 8′ 25.91′′ S, 13° 36′ 22.76′′ E, 16 m alt., 107) (BENGO), 30.IV-17.V.2013, 5 \Diamond , 1 \bigcirc , DO, R. Capela leg., ASC; Mabubas (coord.: 8° 31′ 55.22′′ S, 13° 41′ 47.57′′ E, 71m alt., 71) (BENGO), 23.III.2014, 1 \bigcirc , DO, R. Capela leg., ASC; 17.X.2013, 6 \Diamond , DO, R. Capela leg., ASC; 17.X.2013, 6 \Diamond , DO, R. Capela leg., ASC; Barra do Rio Kwanza (coord.: 9° 20′ 21.43′′ S, 13° 09′ 25.08′′ E, 6m alt., 107) (LUANDA), 17.IV.2014, 4 \Diamond , 1 \bigcirc , DO, A. Serrano & R. Capela leg., ASC; Barra do Rio Kwanza (coord.: 9° 19′ 11.61′′ S, 13° 09′ 57.06′′ E, 9m alt., 107) (LUANDA), 18.IV.2014, 14 \Diamond , 6 \bigcirc , DO, A. Serrano & R. Capela leg., ASC; Rio Onzo (Caxito) (coord.: 8° 9′ 47.54′′ S, 13° 25′ 27.23′′ E, 38m alt., 71) (BENGO), 25.X.2014, 3 \Diamond , 4 \bigcirc , DO, A. Serrano & R. Capela leg., ASC; Rio Onzo & R. Capela leg., ASC.

Remarks. A species widespread throughout Western and Central Africa (Werner 2000b). It is very common in northwestern part of Angola, being easily found in the surrowdings of ponds, lakes, rivers and other souces of water. It is a new record for the Bengo province.

Lophyra (s. str.) neglecta intermediola (W. Horn, 1921)

Distribution in Angola (provinces): 1) Luanda; 2) Kwanza Sul.

Material examined: Cambambe (coord.: 9° 45′ 27.15′′ S, 14° 30′ 38.15′′ E, 111 m alt., 109) (KWANZA SUL), 6.XI.2014, 2♂, DO, A. Serrano leg., ASC.

Remarks. A subspecies more common and widespread throughout Central-southern and eastern Africa (Werner 2000b). The adults were observed in Cambambe close to the clay-sandy edges of the Kwanza River (Fig. 9 d). In this habitat, adults of *Habrodera nilotica* Dejean, 1825 occur also, but they search for prey closer to the river water than *L. neglecta intermediola*. It is a new record for Kwanza Sul province.

Lophyra (s. str.) obliquograciliaenea (W. Horn, 1920)

Distribution in Angola (provinces): 1) Lunda Norte, Moxico; 2) Bi, Huíla.

Material examined: Bicuar (coord.: unknown) (HUÍLA), 21.II.2014, 1 $\overset{\circ}{,}$ 3 $\overset{\circ}{,}$ DO; R. Capela leg., ASC; Mumbué (coord.: 13° 51′ 51.96′′ S, 17° 18′29.41′′ E, 1504 m alt., 303) (BIÉ), 1.IV.2014, 8 $\overset{\circ}{,}$ 3 $\overset{\circ}{,}$ 3.IV.2014, 2 $\overset{\circ}{,}$ 1 $\overset{\circ}{,}$ 3.XI.2014, 1 $\overset{\circ}{,}$ 2 $\overset{\circ}{,}$ DO, A. Serrano & R. Capela leg., ASC.

Remarks. A species with a distribution throughout D. R. of the Congo, People's Republic of Congo and Angola (Werner 2000b). There is some controversy in considering *L. obliquograciliaenea* as a synonym of *Lophyra reliqua* Barker, 1920. Some authors (e.g. Rivalier 1948; Basilewsky 1955) consider the former species a junior synonym of the latter. Although Wiesner (1992) and Werner (2000b) keep both species in their works. Without a deep study to solve this intricate problem, the question remains open. Moreover both species have been described in the same year, making their eventual synonymy a rather difficult problem. Until this matter is resolved, we maintain with some reserves the current status for the specimens sampled by us. The adults (Fig. 8d) were found in small sand patches within reeds immediately beyind the edges of a rivulet (Fig. 8e). It is a new record for the Bié and Huíla provinces.

Lophyra (Stenolophyra) infuscatula (W. Horn, 1915)

Distribution in Angola (provinces): 1) Malanje, Benguela, Huambo, Huíla; 2) Bié.

Material examined: Cachingues–Chipica (coord.: 13° 10′ 15.74′′ S, 16° 45′48.17′′ E, 1649 m alt., 281) (BIÉ), 1.XI.2014, 1♂, DO, A. Serrano leg., ASC; Kakande (coord.: 12° 42′ 50.73′′ S, 16° 45′ 33.19′′ E, 1716 m alt., 233) (BIÉ), 4.XI.2014, 2♂, DO, A. Serrano leg., ASC.

Remarks. A species known from Angola, D. R. of the Congo and Tanzania (Werner 2000b). The adults were found beneath the herbaceous vegetation in the edges of countryside roads within savanah (Cachingues-Chipica) or open secondary forest (Kakande). Further adults of other tiger beetle species are syntopic in the same habitats (see *P. angusticollis* ecological remarks for both localities).

Lophyra (Stenolophyra) obtusidentata (Putzeys, 1880)

Distribution in Angola (provinces): 1) Luanda, Kwanza Sul.

Material examined: Veados, Morro dos (coord.: 8° 57′ 43.29′′ S, 13° 7′ 16.62′′ E, 54 m alt., 89) (LUANDA), 12.IV.2013, 5 $\stackrel{\circ}{\supset}$, 1 $\stackrel{\circ}{\ominus}$, 16.III.2014, 8 $\stackrel{\circ}{\supset}$, 6 $\stackrel{\circ}{\ominus}$, DO, A. Serrano & R. Capela leg., ASC; Palmeirinhas (coord.: 9° 11′ 26.46′′ S, 13° 3′ 43.79′′ E, 8 m alt., 89) (LUANDA), 18.III.2014, 1 $\stackrel{\circ}{\supset}$, 3 $\stackrel{\circ}{\ominus}$, DO, A. Serrano & R. Capela leg., ASC.

Remarks. A species restricted to Angola and Namibia (Werner & Wiesner 1995). A neotype based on one specimen deposited in Museu Zoológico da Universidade de Coimbra, Portugal, was designated recently (Serrano & Capela 2013). Adults (Fig. 8f) occurs mostly south of Luanda toward the Cuanza River in open bush habitat with giant *Adansonia digitata* trees and sparse grassy vegetation on sandy yellow-reddish soil (Fig. 8g). Conspecific larvae of second and third instars (L_2 and L_3) can be observed in the same habitat in hunting activity (Fig. 8h) after the occurrence of the imagos, a month later (sympatric and allochronic with the adults).

Lophyra (Stenolophyra) saraliensis saraliensis (Guérin-Méneville, 1849)

Distribution in Angola (provinces): 1) Malanje, Benguela, Huambo, Huíla; 2) Bié.

Material examined: Cachingues–Chipica (coord.: 13° 10′ 15.74′′ S, 16° 45′ 48.17′′ E, 1649 m alt., 281) (BIÉ), 1.XI.2014, 1♀, DO, A. Serrano leg., ASC; Kakande (coord.: 12° 42′ 50.73′′ S, 16° 45′ 33.19′′ E, 1716 m alt., 233) (BIÉ), 4.XI.2014, 2♂, DO, A. Serrano leg., ASC.

Remarks. A polymorphic tiger beetle species widespread throughout the western, central and eastern countries of Africa (Werner 2000b). Wellman & Horn (1908) referred that "in Angola it was found on dark soil, but Peter Schüle (pers. comm.) found the adults during daytime in meadows, arable fields and open secondary forests. Our adult specimens were found in countryside roads within savanah (Cachingues–Chipica) or open secondary forest (Kakande) with withish sandy soil beneath the marginal vegetation, running rapidly when disturbed. *Lophyra saraliensis* is syntopic with further tiger beetle species in the two localities (see *P. angusticollis* ecological remarks). It is a new record for the Bié province.



FIGURE 8. a) Adult of *Prothymidia angusticollis*, Catota, Bié; b) habitat of *P. angusticollis*, Cachingues-Chipica, Bié; c) adult of *Ophryodera smirzi*, Kakande, Bié; d) adult of *Lophyra obliquogracilinea*, Mumbué, Bié; e) habitat of *Lophyra obliquogracilinea*, Mumbué, Bié; f) adults of *Lophyra obtusidentata* in copula, Golf Coarse, Morro dos Veados, Luanda; g) habitat of *Lophyra obtusidentata*, Golf Coarse, Morro dos Veados, Luanda; h) opening of larvae tunnels of L_2 and L_3 instars of *Lophyra obtusidentata*, Golf Coarse, Morro dos Veados, Luanda.

Lophyra (Stenolophyra) sumlini Cassola, 1976

Distribution in Angola (provinces): 2) Bié.

Material examined: Kakande (coord.: 12° 42′ 50.73′′ S, 16° 45′ 33.19′′ E, 1716 m alt., 233) (BIÉ), 30.X.2014, 133, 69, 4.XI.2014, 83, 49, DO, A. Serrano & R. Capela leg., ASC; Chitembo (coord.: 13° 22′ 40.78′′ S, 16° 41′58.07′′ E, 1666 m alt., 281) (BIÉ), 1.XI.2014, 13, LT, A. Serrano leg., ASC.

Remarks. A species with a distribution throughout D. R. of the Congo, Uganda and Zambia (Werner 2000b, 2003). Numerous adults (Fig. 9a) were found in hunting activity in a countryside road with whitish sandy soil within an open secondary forest. Further tiger beetle species occur in syntopy (see *P. angusticollis* ecological remarks for Kakande). One adult was attracted to the light trapping (Chitembo), but in the same area, during daytime, we did not detect any individual. It is a new record for the Angolan tiger beetle fauna.



FIGURE 9. a) Adult of *Lophyra sumlini*, Kakande, Bié; b) adult of *Lophyra wellmani*, Cruzeiro, Huambo; c) adult of *Habrodera nilotica*, Cambambe, Kwanza Sul; d) habitat of *Habrodera nilotica* and *Lophyra neglecta intermediola*, Cambambe, Kwanza Sul (notice the waste on the sandy as well); e) adult of *Habrodera nitidula*, Cabo Ledo, Bengo; f) habitat of *Habrodera nitidula*, Cabo Ledo, Bengo.

Lophyra (Stenolophyra) uncivittata (Quedenfeldt, 1883)

Distribution in Angola (provinces): 1) Malanje, Benguela, Huambo, Huíla; 2) Bié.

Material examined: Mumbué (coord.: 13° 50′ 30.56′′ S, 17° 18′ 47.26′′ E, 1578 m alt., 303) (BIÉ), 2.XI.2014, 2♂, 1♀, DO, A. Serrano leg., ASC; Catota (coord.: 14° 00′ 37.17′′ S, 17° 24′ 00.33′′ E, 1532 m alt., 323) (BIÉ), 2.XI.2014, 1♂, 1♀, 3.XI.2014, 2♂, 1♀, DO, A. Serrano & R. Capela leg., ASC; Mumbué (coord.: 13° 51′ 44.99′′ S, 17° 24′ 41.16′′ E, 1573 m alt., 303) (BIÉ), 3.XI.2014, 2♂, 1♀, DO, A. Serrano leg., ASC.

Remarks. A species with a distribution throughout People's Republic of Congo, D. R. of the Congo, Angola, Zambia, Zimbabwe and Malawi (Werner 2000b, 2003). It seems to occur such as in clay soils as in sandy soils (Wellman & Horn 1908, Serrano & Capela 2013). The adults were found during day in countryside roads with withish sandy soils within open secondary forests. Further adult specimens of other tiger beetle species occur in syntopy in Catota (see *P. angusticollis* ecological remarks). It is a new record for Bié province.

Lophyra (Bothryolophyra) wellmani (W. Horn, 1907)

Distribution in Angola (provinces): 1) Benguela, Huambo, Huíla.

Material examined: Cruzeiro (Pedra do Alemão) (coord.: 12° 46′ 41.14′′ S, 15° 54′ 09.49′′ E, 1743 m alt., 232) (HUAMBO), 30.X.2014, 5♂, 6♀, 4.XI.2014, 5♂, 6♀, DO, A Serrano & R. Capela leg., ASC.

Remarks. A very small *Lophyra* species, endemic of Angola. The ecological remarks given by Wellman & Horn (1908) are in line with our observations. The adults (Fig. 9b) were found on bare paths of clayey soil covered with litter within an open bush (see Fig. 13 in Serrano & Capela 2015). The colour of the beetle matches very well the substratum and they move like ants. Another species of tiger beetle, *Foveodromica strandi* (W. Horn, 1913), was found in the same habitat (see Serrano & Capela 2015).

Habrodera Motschulsky, 1862

Habrodera nilotica nilotica (Dejean, 1825)

Distribution in Angola (provinces): 1) Cunene; 2) Kwanza Sul.

Material examined: Cambambe (coord.: 9° 45′ 27.15′′ S, 14° 30′ 38.15′′ E, 111 m alt., 109) (KWANZA SUL), 6.XI.2014, 6♂, 5♀, DO, A. Serrano leg., ASC.

Remarks. One of the three species of *Habrodera* genus present in Angola. The species occurs throughout the African countries south of the Sahel (Werner 2000b) and in Egypt (Abdel-Dayem *et al.* 2003). It occupies the shores and banks of rivers and lakes. The adults (Fig. 9c) were found in hunting activity in the clay-sandy Kwanza river edge near the Cambambe dam (Fig. 9d). Very close and behind appears *L. negleta intermediola*. The presence of *H. nilotica* in Cambambe locality increases its distribution far to the north of Angola. It is a new record for the Kwanza Sul province.

Habrodera nitidula nitidula (Dejean, 1825)

Distribution in Angola (provinces): 1) Cabinda, Benguela; 2) Luanda, Bengo.

Material examined: Sangano, praia (coord.: 9° 33′ 13.12′′ S, 13° 12′ 3.77′′ E, 5 m alt., 107) (BENGO), 15.III.2014, 4°_{\circ} , 2°_{\circ} , DO, A. Serrano leg., ASC; Barra do Kwanza (coord.: 9° 20′ 31.48′′ S, 13° 9′ 7.49′′ E, 4 m alt., 107), (LUANDA), 17.IV.2014, 7°_{\circ} , 3°_{\circ} , DO, A. Serrano & R. Capela leg., ASC; Cabo Ledo (coord.: 9° 40′ 45.16′′ S, 13° 12′ 4.35′′ E, 2 m alt., 107) (BENGO), 23.IV.2014, 9°_{\circ} , 4°_{\circ} , DO, A. Serrano & R. Capela leg., ASC.

Remarks. A tiger beetle species with a distribution throughout the sandy seashores of the western African countries (Jaskuła & Cassola 2005; Serrano 2007). *Habrodera nitidula* is a sandy seashore species occurring sympatrically with *Habrodera cabinda* (Bates) in some Angolan localities (see Serrano & Capela 2013). The adults (Fig. 9e) were found in hunting activity on the infralitoral level of the beach, running or flying quikly for the upper

part (medio or supralitoral) when disturbed. However, in Cabo Ledo the species was found just behind the beach in the mud edges of large ponds (Fig. 9f). It is a new record for Bengo province.

Cylindera Westwood, 1831

Cylindera (Ifasina) agualusai Serrano & Capela sp. n.

(Figs 10, 11, 12)

Type series. Holotype, ♂; Angola (BIÉ), Cachingues–Chipica (coord.:13° 10′ 15.14′′ S, 16° 45′ 33.52′′ E, 1668 m alt., 281), 1.XI.2014, DO, A. Serrano & R. Capela leg., ASC: 2921AF. Allotype 1 \bigcirc , paratypes 7 $\stackrel{\circ}{\triangleleft}$, 3 \bigcirc , same locality and date as holotype, DO, A. Serrano & R. Capela leg., ASC: 2926AF, 2922AF, 2923AF, 2924AF, 2925AF, 2927AF. Further paratypes: Angola (HUILA), 20 km S Caluquembe (coord.: 13° 57' S, 14° 36' E, 1606 m alt., 298), 6-7.XI.2011, 3⁽³⁾, 20 km NE Cacula (coord.: 14° 21′ 48′′ S, 14° 14′ 43′′ E, 1567 m alt., 317), 29.XI.2012, 1^o, 3,5 km SW Negola (coord.: 14° 08′ 53′′ S, 14° 28′ 16′′ E, 1613 m alt., 317), 8.XII.2012, 3^o, 11–12.XI.2013, 1♂,15 km NE Cacula (coord.: 14° 23'S, 14° 13' E, 1570 m alt., 317), 10.XI.2013, 1♂, DO, P. Schüle leg., PSC; Angola (HUAMBO), 75 km N Caconda (coord.: 13° 26' S, 15° 21' E, 1587 m alt., 279), 8.XI.2011, 1³, DO, P. Schüle leg., PSC; Angola (BIÉ), Calucinga (coord.: 11°13' S, 16° 09' E, 1766 m alt., 189), 17.XI.2013, 1♀, N Quarenta (coord.: unknown), 17.XI.2013, 1♀, DO, P. Schüle leg., PSC; Angola (HUÍLA), 15 km W Kuvango (coord.: unknown, 1600 m alt., 321), 14.XI.2013, 1♂, 15.XI.2013, 1♀, DO, A. Oesterle leg., Angola (CUANDO CUBANGO), Kuvango – Menongue (coord.: unknown), 15.XI.2013, 1∂, DO, A. Oesterle leg., AOC, Angola (HUÍLA), 79 km SSE Ganda (coord.: unknown, 1600 m alt., 279), 22.XI.2013, 1, DO, A. Oesterle leg., AOC, Angola (HUÍLA), 17 km S Caluquembe (coord.: unknown, 1150 m alt., 297), 24.XI.2013, 19, DO, A. Oesterle leg., AOC; Angola (BIÉ), 34 km ESE Cachingues (coord.: unknown, 1650 m alt., 281), 17.XI.2013, 1♂, 18.XI.2013, 1♀, DO, A. Oesterle leg., AOC; Angola (HUAMBO), 5 km E Nova Monção (coord.: unknown, 1650 m alt., 279), 23.XI.2013, 1♀, DO, A. Oesterle leg., AOC; Angola (BIÉ), Catota (coord.: 14° 0' 37.17" S, 17° 24' 0.33" E, 1532 m alt., 323), 2.XI.2014, 13, DO, A. Serrano & R. Capela leg., ASC: 2934AF. Holotype, allotype (1 \bigcirc) and eleven paratypes (8 \bigcirc , 3 \bigcirc) deposited in ASC at the Faculty of Sciences of the University of Lisbon, twelve paratypes (6 $3, 6 \circ$) at PSC and eight paratypes (3 $3, 5 \circ$) at AOC.

Derivatio nominis. This species in a modest homage is dedicated to José Eduardo Agualusa, an Angolan journalist and writer born in Huambo, and a growing name in world Portuguese-speaking literature. He was awarded by the Portuguese Grand Prize for Literature (1997) and was the first African writer to win the Independent Foreign Fiction Prize in 2007. He spends nowadays most of his working time in Portugal, Angola and Brazil.

Diagnosis. A small and slender *Ifasina* with head and pronotum finely sculptured, dull bronze with metallic coppery reflections. Head striation fine, parallel near the eyes, waved on frons and vertex. Lateral parts of clypeus above antennal base with some thin setae. Genae finely hairy in the lower region, pronotum with a few lateral white decumbent hairs. Pronotal sculpture fine, similarly as in *C. (Ifasina) lutaria* (Guérin-Méneville, 1849). Elytral markings faint, resembling the pattern of *C. (Ifasina) lutaria* also. Aedeagus as in figure 12a.

Description. Length of Holotype: 7.8 mm. Length of paratypes: 7.3–8.8 mm (males), 7.6–9.7 mm (females).

Head (Fig. 11) 1.5 times wider than long [length: 1.28–1.60 mm (males) and 1.31–1.92 mm (females), width: 1.89–2.26 mm (males) and 1.98–2.40 mm (females)] with cupreous bronze reflections, some greenish or violetpurpurish reflections near the antennal base and lateral parts of clypeus; genae with decumbent white setae on the lower region, clypeus with thin setae, one [61% (males), 67% (females)] in the middle and some others in the lateral parts above antennal base [100% (males and females)]; two juxtaorbital sensorial setae near both eyes. Striation parallel near the eyes, irregularly waved on frons and behind, longitudinally waved on vertex, finely and longitudinally striated on genae. Labrum 2.2 times wider than long (Figs 11a–11b) [length: 0.45–0.53 mm (males) and 0.45–0.59 mm (females), width: 0.99–1.17 mm (males) and 1.02–1.29 mm (females)], testaceous, lateral and anterior edges slightly darker, similar in male and female, with one well developed central tooth, eventually one strongly roundish tooth in each side of apex, sometimes almost absent, six to eleven setae near forward edge [mean: 6 (males), 8 (females)]. Mandibles testaceous, darkened on apical and inner teeth. Labial and maxillary palpi testaceous, last palpomere metallic green. Antennae with scape and antennomeres 2–4 metallic coperish, apex of 1–4 tinged with metallic greenish reflections, glabrous, with a few white spiniform setae; antennomeres 5–11 brownish-black, finely and regularly pubescent.

Pronotum (Fig. 10) slightly wider than long (males: 1.02 times, females: 1.07 times) [length: 1.36-1.71 mm (males) and 1.41-1.76 mm (females), width: 1.41-1.73 (males) and 1.50-1.98 mm (females)], dark with metallic cupreous reflections, slightly green reflections at sides, quadrangular [males (Fig. 10a) and some females] or slightly trapezoidal (some females, Fig. 10b), glabrous in the middle, only a few thin decumbent hairs near lateral margins; pronotal sculpture finely waved, similar to that of *C. lutaria*.

Proepisterna and metepisterna copperish, pilose; prosternum, mesosternum and metasternum glabrous and bluish in the middle; Mesepisterna copperish finely rugose in male, smooth in female, the later with a distinct posteriad coupling sulci funnel-shaped.



FIGURE 10. Facies of Cylindera agualusai sp. n.: a) male holotype, b) female allotype.



FIGURE 11. Cylindera agualusai sp. n., head, mandibles and labrum (dorsal view): a) male, b) female.



FIGURE 12. Aedeagus (lateral view) and median lobe apex (ventral view): a) *Cylindera agualusai* n. sp., paratype, Cachingues–Chipica, Angola; b) *Cylindera lutaria* (Guérin-Méneville), Canchungo–Calequisse, Guinea-Bissau.

Elytra (Fig. 10) 1.8 times longer than wide [length: 4.62–5.58 mm (males) and 4.75–6.20 mm (females), width: 2.59–3.07 (males) and 2.72–3.65 mm (females)] dark cupreous, with many medium, irregularly spaced, metallic blue-green punctures, more large in lateral and last apical third, having a streaked and patterned appearance like that of variegated marble. Elytral markings faint, similar to *C. lutaria*: a humeral thin lunule, sometimes almost invisible in dorsal view, a discal anterior dot, a transversal middle band slightly directed obliquely forward away from the suture and never reaching the lateral margin, a roundish discal dot below, nearer to the suture, a subapical roundish spot not connected with a short and thin lunule near the apical margin which does not reach the suture. Apical margin finely serrulated, sutural spine distinct in both sexes. Epipleura testaceous.

Abdominal segments blue-green with bluish reflections, covered with sparse erect hairs in the middle, more heavily public public third; last segment more or less rufescent in the middle. Legs metallic, green on femora and tibia, violaceous on knees, bluish on tarsi; trochanters brown-testaceous.

Aedeagus (Fig. 12a). Relatively long (length: 3.10–3.55 mm) straight, tapered, with a short blunt apex slightly bent upward (lateral view) and largely triangular (ventral view); inner sac typical of genus *Cylindera*.

TABLE 2. Comparison of some structural measurements (mean and minimum and maximum values) between *Cylindera agualusai* **sp. n.** and *Cylindera lutaria* (Guérin-Méneville) (males and females) (TL—total length, HL—head length, HW—head width, LbrL—labral length, LbrW—labral width, 3rdAnt L—3rd antennomer length, 4thAnt L—4th antennomer length, PrL—pronotum length, PrW—pronotum width, IPr—Pronotal index=PrL/PrW, ElL—elytral length, ElW—elytral width) and presence (+, %) or absence (-, %) of clypeal setae (LatClyp setae—lateral clypeal setae, M Clyp seta—median clypeal seta). (* No overlapping values).

Species	N/Sex	TL	HL	HW	LbrL	LbrW
C. agualusai sp. n.	1833	8.07 (7.34–8.75)	1.39 (1.28–1.60)*	2.09 (1.89–2.26)	0.49 (0.45–0.53)*	1.07 (0.99–1.17)*
C. lutaria	1533	7.21 (6.75–7.52)	1.17 (1.12–1.26)*	1.81 (1.71–1.90)	0.38 (0.35–0.42)*	0.87 (0.80–0.91)*
<i>C. agualusai</i> sp. n.	15♀♀	8.64 (7.59–9.73)	1.47 (1.31–1.92)	2.19 (1.98–2.40)	0.53 (0.45–0.59)*	1.11 (1.02–1.29)*
C. lutaria	15♀♀	7.61 (6.89–8.09)	1.23 (1.15–1.33)	1.88 (1.66–2.05)	0.37 (0.32–0.42)*	0.90 (0.77–0.99)*
Species		3 rd Ant L	4 th Ant L	PrL	PrW	IPr
C. agualusai sp. n.	1888	0.73 (0.69–0.82)	0.65 (0.61–0.70)	1.51 (1.36–1.71)	1.54 (1.41–1.73)*	0.98 (0.94–1)*
C. lutaria	1588	0.66 (0.61–0.70)	0.57 (0.51–0.61)	1.39 (1.26–1.47)	1.29 (1.20–1.36)*	1.08 (1.03–1.13)*
C. agualusai sp. n.	15♀♀	0.72 (0.62–0.80)	0.65 (0.59–0.72)	1.55 (1.41–1.76)	1.64 (1.50–1.98)*	0.94 (0.89–0.98)*
C. lutaria	15♀♀	0.64 (0.54–0.72)	0.53 (0.46–0.59)	1.42 (1.28–1.52)	1.37 (1.22–1.47)*	1.04 (1–1.08)*
	N/Sex	EIL	ElW	LatClyp setae	M Clyp seta	
C. agualusai sp. n.	1833	5.11 (4.62–5.58)	2.85 (2.59–3.07)	+ (100%)	+ (N=11, 61.1%)	
C. lutaria	1533	4.60 (4.29–4.79)	2.50 (2.24–2.69)	- (0%)	- (0%)	
C. agualusai sp. n.	15♀♀	5.41 (4.75–6.20)	3.05 (2.72–3.65)	+ (100%)	+ (N=10, 66,7%)	
C. lutaria	15♀♀	4.91 (4.42–5.21)	2.80 (2.51–3.04)	- (0%)	- (0%)	

Remarks. At a first sight the new species seems to conform well to *C. lutaria*. However, with a more careful analysis we can easily separate both. *Cylindera agualusai* **sp. n.** clearly differs from *C. lutaria*, its closest species, by the slight bigger body length, the shape of pronotum (quadrate or slightly trapezoid in the females of the new

species vs. rectangular in *C. lutaria*), the presence of some thin setae in the lateral parts of clypeus above the antennal base, one seta inserted in the middle of this structure in the majority of the specimens analized (absent in *C. lutaria*) and the shape of the median lobe of aedeagus (cf. Figs 12a and 12b, Table 2). Some differences can be better appreciated in the dimensions of pronotum and also of the labrum (see Table 2). For instance the labral length and width and the pronotum width are rather different and do not overlap. The pronotal index (pronotum length/pronotum width) does not overlap, too. On the other hand, the lateral labral teeth are fairly more protruding in *C. agualusai* **sp. n.** than in *C. lutaria*. The shape of the apex of the median lobe of the aedeagus (lateral and ventral views) definitively allows segregating both species. While in *C. agualusai* **sp. n.** the apex is slightly bent downward (lateral view). The difference is still more evident looking the apex in ventral view. The shape of apex in the former species is largely triangular while in the later is quite narrower. As a final remark concerning *C. agualusai* **sp. n.** and *C.lutaria* affinities, based on previous records (e.g. Werner 2000b), the new species seem to be a sister species with vicariant (allopatric) distribution.

The sculpture of head and pronotum, as well as the characters of the labrum, pronotum, elytral drawing and aedeagus conformation clearly separates *C. agualusai* **sp. n.** from the other West-African species such as *C. octoguttata*, *C. genofiae* Rivalier, 1973, *C. decellei* Basilewsky, 1968 and *C. gulbenkiana* Serrano, 2007 or even South-eastern African *Ifasina* such as *C. marshallisculpta* (W. Horn, 1914), *C. ocellifera* (W. Horn, 1905), *C. centropunctata* (Dejean, 1831), *C. rectangularis* (Klug, 1832), *C. disjuncta* (Dejean, 1825) and *C. dregei* (Mannerheim, 1837). *Cylindera proserpina* (W. Horn, 1904) and *C. lizleri* Werner, 1994 are rather different occurring faraway in Ethiopia.

Ecological notes. A species known until now only from Angola. The adults were found either in countryside roads of whitish and moist sandy soil or on the edges of small, temporary puddles also (see comments on *C. lutaria* in Serrano & Capela 2013). The adults when disturbed fly rapidly 2-3 m along the road, rarely into the neighbouring savannah or open forest. Further adults of one ground beetle species (*Graphipterus alternatus* Burgeon, 1928) are syntopic in Cachingues–Chipica with this new species within the litter on the ground and other adults of tiger beetles occur close along the countryside road (see ecological remarks in *P. angusticollis* concerning Cachingues-Chipica and Catota localities). These ecological remarks seem more or less similar to the ones given for *C. lutaria*. By our own observations in Guinea-Bissau (Serrano, 2007) adults are active on the muddy edges of puddles originated by the rain-fall in the field roads or field patches near the forests, but there sometimes together with *C. octoguttata* and *M. melancholica*.

Key to the West African species of Cylindera (Ifasina)

Taking into account the identification key for the western subgenus *Ifasina* African species given by Serrano (2007), we present an updated key including the new species:

1.	Elytral markings without humeral spot; apical lunule reduced to a spot near the outer apical angleC. genofiae Rivalier
-	Elytral markings with a humeral spot, apical lunule near the apical margin
2.	The transversal middle band slightly directed anteriad
-	The transversal middle band perpendicular to the suture or slightly directed posteriad
3.	Pronotum slightly rectangular sub-parallel withdrawn at the anterior angles; apex of median lobe slightly bent downward (lat-
	eral view) and narrowly triangular (ventral view)
-	Pronotum quadrangular or even slightly trapezoidal; apex of median lobe slightly bent upward (lateral view) and largely trian-
	gular (ventral view)
4.	Elytral markings with two connected discal anterior dots, apical lunule reaching the suture near the apical tooth; pronotum
	withdrawn at the anterior and posterior angles, more or less rounded at sides
-	Elytral markings with one discal anterior dot, apical lunule not reaching the suture
5.	Elytra domed in the middle region of the second third; proepisterna pilose only at the inner region; mandibles extensively more
	darkened and metallic
-	Elytra not domed; proepisterna pilose at the entire surface; mandibles almost entirely testaceous, darkened at the apex of teeth

Cylindera (Ifasina) octoguttata octoguttata (Fabricius, 1787)

Distribution in Angola (provinces): 1) Cabinda, Luanda, Lunda Norte; 2) Bengo.

Material examined: Mabubas (coord.: 8° 31′ 55.22′′ S, 13° 41′ 47.57′′ E, 71m alt., 71) (BENGO), 23.III.2014, 63, 89, DO, A. Serrano & R. Capela leg., ASC.

Remarks. A species spread throughout the western, central and southern countries of Africa (Werner 2000b; Serrano 2007, 2012). The adults were in activity on clay-sandy moist bed of a rivulet near the dam edges. It is a new record for the Bengo province.

Myriochila Motschulsky, 1862

Myriochila (s. str.) melancholica (Fabricius, 1798)

Distribution in Angola (provinces): 1) Cabinda, Luanda, Benguela, Lunda Norte, Malanje, Kwanza Sul, Huíla, Cunene; 2) Bié.

Material examined: Camama, Lagoa (Luanda) (coord.: 8° 56′ 34.61′′ S, 13° 16′ 30.72′′ E, 81 m alt., 89) (LUANDA), 17.X.2013, 2Å, 1 \bigcirc , DO, R. Capela leg., ASC; Palmeirinhas (coord.: 9° 11′ 26.46′′ S, 13° 3′ 43.79′′ E, 8 m alt., 89) (LUANDA), 18.III.2014, 1Å, 2 \bigcirc , , 28.IV.2014, 1Å, DO, A. Serrano leg., ASC; Mumbué (coord.: 13° 51′ 51.96′′ S, 17° 18′ 29.41′′ E, 1504 m alt., 303) (BIÉ), 3.IV.2014, 1Å, 9.IV.2014, 1 \bigcirc , DO, A. Serrano leg., ASC; Barra do Rio Kwanza (coord.: 9° 19′ 11.61′′ S, 13° 09′ 57.06′′ E, 9 m alt., 107) (LUANDA),18.IV.2014, 1Å, 2 \bigcirc , DO, A. Serrano leg., ASC; Cambambe (coord.: 9° 45′ 27.15′′ S, 14° 30′ 38.15′′ E, 111 m alt., 109) (KWANZA SUL), 6.XI.2014, 1 \bigcirc , DO, A. Serrano leg., ASC.

Remarks. A common species widespread throughout southern Europe, Middle East, Asia, and Africa and neighbouring islands (Serrano 2007, 2012). Adults are frequently attracted to night lights and are active during dry and rainy seasons. As happens normally they were active on the muddy edges of bogs (Barra Rio Kwanza), ponds (Palmeirinhas) and rivulets and rivers (Mumbué and Cambambe). Despite is wide distribution in Angola it is a new record for the Bié province.

Discussion

A historical review of the tiger beetles knowledge of Angola was carried out by Serrano & Capela (2013). These authors recorded a total of 89 species/subspecies for this country, although some of them with some reserves and needing to be confirmed by new and more plausible records [e.g. Ophryodera foliicornis W. Horn, 1896, Elliptica lugubris (Dejean, 1825), Ropaloteres fatidicus (Guérin-Mèneville, 1847), Ropaloteres regina (Kolbe, 1885), Calomera aulica (Dejean, 1831), Lophyra herero Péringuey, 1892)]. It was postulated also that with more field work in the near future some genera not yet recorded (e.g. Neochila Basilewsky, 1953, Chaetodera Jeannel, 1946) and species of some genera already present in Angola could be added to the angolan fauna, using direct search and various other sampling techniques (e.g. pitfall, light traps). The new species records (O. smrzi, L. clathrata and L. sumlini) confirm part of that prediction. Serrano & Capela (2013) recommended also that to obtain more data on the tiger beetles of Angola it would be necessary to increase the field work to sites not visited so far. We begin to try to achive this goal prospecting some areas of the central-southeastern regions of Angola, such as the axis between Kuito and Menonge cities. On the other hand, as the field work has been done until now basically during the beginning of the rainy season, we have extended our field prospections to the second half of this season. Part of this strategy seems to be promising when considering the results achieved so far (e.g. Serrano & Capela 2015, this work). New species to science were discovered, new faunistic records were got and the regional distribution in Angola of many species was improved. For instance, the Trichotaenia genus was represented in Angola until now by two species, one of them endemic [T. suturata (W. Horn, 1915)]. Our researches allowed adding two new endemic species to the Angolan fauna. Interestingly also, is that we clarify the specific status of one of the two Cylindera species recorded to Angola. With the description of C. agualusai sp. n. and based on previous records (e.g. Werner 2000b), C.lutaria and the new species seem to be sister species with vicariant (allopatric) distribution.

The sum of all these results (Serrano & Capela 2015, this work) allows us updating to 96 the total number of species/ subspecies of tiger beetles recorded for the fauna of Angola.

Taking into account the great area of the country (Angola is the seventh largest country of Africa with 1.246.700 km²), its considerable climatic, orographic, and edaphic variability and the scanty network road available it will be necessary a colossal effort during several years to gain a better full idea of the Angola tiger beetle fauna and its distribution.

Additional concerns and constrains to achieve those targets are the threats to biodiversity in Angola. The deforestation and the riverine pollution are major concerns that can affect local or regional populations linked with forests or river edges (e.g. Fig. 9d) or riverbeds, respectively (see comments in Serrano & Capela 2013 and references herein). An effort to minimize or to stop the fragmentation and/or destruction of forests should be implemented rapidly at least in the Reserves and Natural Parks. Moreover, the creation of new Reserves and Natural Parks would be recommendable namely in some of the most biodiverse ecosystems of the country, such as the afro-montane cloud forests or the semi-deciduous humid forests of Angola's northwestern highland (Uíge, Cuanza Norte, and Bengo).

Finally urgently needed is the implementation of biodiversity studies in the more pristine areas of Angola. Ideally these studies must be done on some insect target groups and if possible in association with botanic and vertebrate experts, to allow integrative recommendations and proposal measures which surely would contribute to a better protection/management of Angola's biodiversity.

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