

ORIGINAL ARTICLE

Xylographus globipennis Reitter, 1911 (Coleoptera: Ciidae): A barely studied species with broad distribution in the Afrotropical region

Vivian Eliana SANDOVAL-GÓMEZ¹, Cristiano LOPES-ANDRADE²
and Adilson Ariza ZACARO³

¹Programa de Pós-Graduação em Entomologia, Departamento de Entomologia, ²Departamento de Biologia Animal, and
³Departamento de Biologia Geral, Universidade Federal de Viçosa, Viçosa, Minas Gerais, Brazil

Abstract

Xylographus globipennis Reitter, 1911, a ciid beetle known only from its type locality in Eritrea, has in fact a broad distribution in the Afrotropical region. A redescription of the species is provided, including the description of its male terminalia, based on the lectotype and three paralectotypes, here designated, and specimens from several localities in Democratic Republic of the Congo and in Kenya. The geographic distribution and similarities of external morphological characters of *X. globipennis* to other African *Xylographus* species are also discussed.

Key words: Africa, Democratic Republic of the Congo, Eritrea, Kenya, minute tree-fungus beetle, systematics.

INTRODUCTION

Xylographus Mellié is currently the most speciose Orophini genus with 36 described species, and its highest diversity is found in tropical and subtropical regions. It is recognizable by the following features (Lopes-Andrade & Zacaro 2003; Lawrence & Lopes-Andrade 2010): (i) robust convex body, usually black; (ii) developed antennal club with a sinuous row of setae along its transversal midline; (iii) each sensillifer of the antennal club formed by a group of short setae organized in conspicuous concentric layers; (iv) first labial palpomere elongate, being almost as long or longer than the second palpomere; and (v) ovipositor reduced, devoid of gonostyli.

There are 17 described Afrotropical *Xylographus*, including continental and insular species: *X. anthracinus*

Mellié, 1849; *X. bicolor* Pic, 1916; *X. dentatus* Pic, 1922; *X. eichelbaumi* Reitter, 1908; *X. globipennis* Reitter, 1911; *X. hypocritus* Mellié, 1849; *X. longicollis* Pic, 1922; *X. madagascariensis* Mellié, 1849; *X. nitidissimus* Pic, 1916; *X. perforatus* Gerstaecker, 1871; *X. rufescens* Pic, 1921; *X. rufipennis* Pic, 1934; *X. seychellensis* Scott, 1926; *X. subopacus* Pic, 1929; *X. subsinuatus* Pic, 1916; *X. tarsalis* Fåhraeus, 1871; *X. testaceitarsis* Pic, 1916. These species were described in scattered works by Fåhraeus (1871), Gerstaecker (1871), Mellié (1849), Reitter (1908, 1911) and Pic (1916a,b, 1921, 1922, 1929, 1934). Additionally, Ferrer (1997) provided notes and drawings of the types of *X. tarsalis* and *X. eichelbaumi*. The species described by Pic (1916a,b, 1921, 1922, 1929, 1934) are the most problematic, since their descriptions are very brief and it is possible that they constitute synonyms of species previously proposed by other authors. The difficulty in recognizing species of African *Xylographus* has led Scott (1926) to write about his hesitation in describing *X. seychellensis*.

In this work, we redescribe *Xylographus globipennis* Reitter, 1911 based on the lectotype and three paralectotypes from Eritrea, here designated, and 842 specimens from the Democratic Republic of the Congo and

Correspondence: Vivian Eliana Sandoval-Gómez, Programa de Pós-Graduação em Entomologia, Departamento de Biologia Animal, Universidade Federal de Viçosa, 36570-000, Viçosa, Minas Gerais, Brazil.
Email: vivian.sandoval@gmail.com

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Kenya. We also describe its male terminalia, provide new data on its geographic distribution and compare it to other Afrotropical species of the genus.

MATERIALS AND METHODS

Dissected male terminalia were stained with Chlorazol Black E (C.I. no. 30235), and preparation of slide mounts followed the protocol described by Lopes-Andrade *et al.* (2009). Photography of slide mounts and measurement of the terminalia's sclerites, legs and antennomeres were made under a compound microscope (Axioskop 40, Zeiss, Oberkochen, Germany) equipped with a digital camera (A640, Canon, Tokyo, Japan). Measurements of specimens, final comparisons and descriptions of general external morphology were made under a stereomicroscope (MZ8, Leica, Wetzlar, Germany). Digital photographs of dorsal and lateral pronotal surfaces were taken with a Canon S70 adapted to a Leica MZ16, and final images were the result of joining 20 to 40 photographs in different focus using the image stacking freeware CombineZM (Hadley 2006).

For scanning electron microscopy (SEM), museum specimens glued onto cards were rehydrated and cleaned under a stereomicroscope. Then, specimens were dehydrated using ethanol (50, 70, 80, 95, 100%), dried in a critical point dryer (CPD 020, Balzers, Balzers, Liechtenstein), mounted on aluminum stubs and coated with sputtered gold (sputter module SCA 010, Balzers). Samples were then examined under a SEM (LEO VP 1430, Zeiss). The lectotype had another treatment: it was cleaned and photographed onto its original card, without dehydration and gold covering, and analyzed under a variable pressure SEM (SEM-VP) using a back-scattered electron detector.

The redescription of this species was based on the lectotype, which is a small weakly pigmented male, and three paralectotypes from Eritrea, here designated, and on subsamples of specimens from other localities in the Afrotropical region. The lectotype and paralectotypes were not dissected. Terms for external morphology and male terminalia of ciids are explained and discussed by Lopes-Andrade and Lawrence (2005).

Measurements provided in the redescription are those of the lectotype. At most ten specimens (five males and five females, arbitrarily chosen) from each locality represented in the available material were measured. When the size of specimens from each locality was visually different, we arbitrarily chose specimens from each distinguishable size category. Range, mean and standard deviation are given for measurements and ratios of these subsamples. The following symbols are used for measurements (in millimeters) and ratios: BW, basal width

of the scutellum; CL, length of the antennal club (corresponding to antennomeres eight to ten); EL, elytral length (median length from base of scutellum to elytral apex); EW, greatest elytral width; FL, length of the antennal funicle (corresponding to antennomeres three to seven); GD, greatest depth of the body (from elytra to metaventricle); GW, greatest width of the eye; PL, pronotal length along midline; PW, greatest pronotal width; TL, total length (= EL + PL; head not included). The ratio GD/EW was taken as an indication of degree of convexity; TL/EW indicates degree of body elongation. Differences among the specimens are given below in the section on Variation, together with standard measurements and ratios.

We examined named specimens of six Afrotropical species: *X. eichelbaumi*, *X. hypocritus*, *X. madagascariensis*, *X. perforatus*, *X. seychellensis* and *X. tarsalis*. We did not examine *X. anthracinus* and the remaining species of Pic.

The distribution map (Fig. 29) was created using latitude and longitude coordinates estimated by tracking localities in the online database GeoNames (Wick 2010) and plotting them in a map using the freeware DIVA-GIS 7.1.6 (Hijmans *et al.* 2001).

Specimens have been deposited in (or belong to) the following institutional and private collections (with acronyms used in this paper): HNHM, Coleoptera Collection, Hungarian Natural History Museum (Budapest, Hungary); LAPC, Cristiano Lopes-Andrade Private Collection (Viçosa, MG, Brazil); MRAC, Koninklijk Museum voor Midden Afrika (Tervuren, Belgium); SNSD, Senckenberg Naturhistorischen Sammlungen Dresden (Dresden, Germany).

SYSTEMATICS

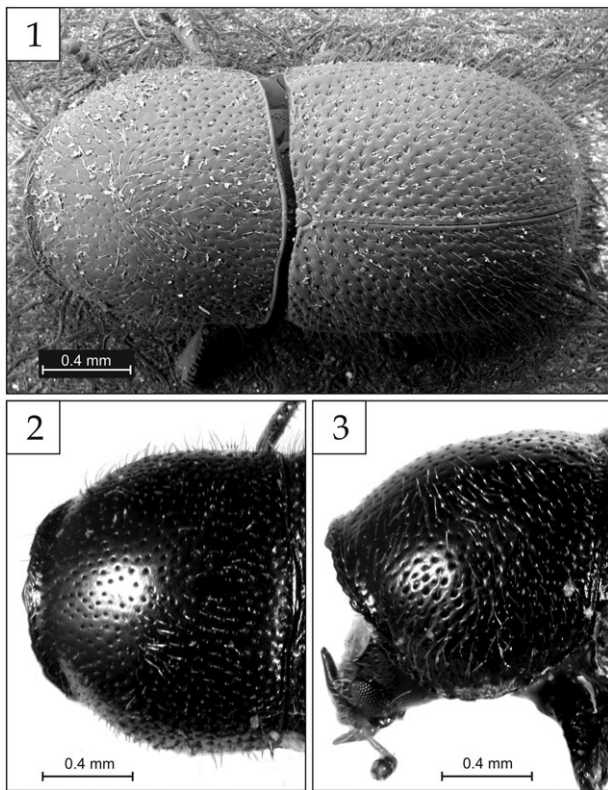
Xylographus globipennis Reitter, 1911

(Figs 1–29)

Redescription

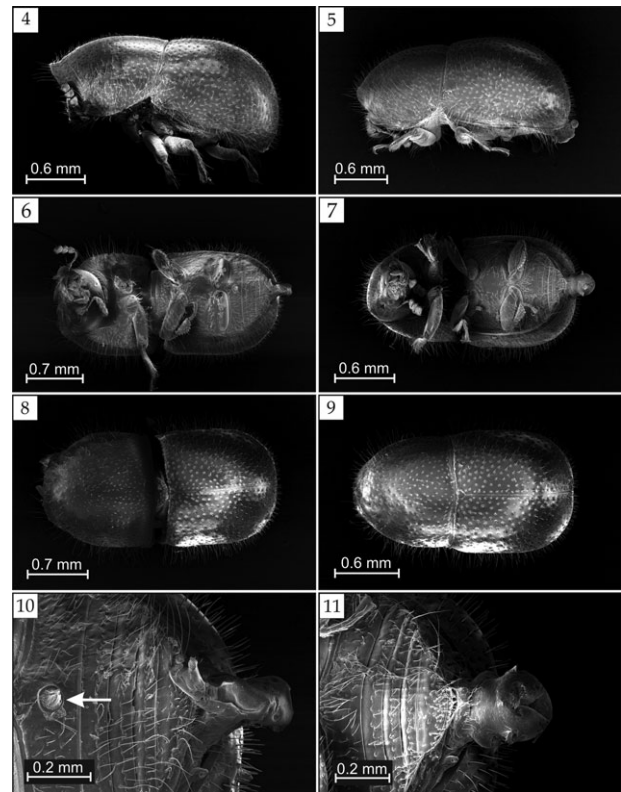
Diagnosis. Males with anterior and lateral margins of pronotum crenulated (Figs 1–4); pronotum and elytra coarsely punctate (Figs 14,15), covered with long and slender yellowish bristles; males with left mandible bearing a conspicuous tooth (Fig. 18, arrow).

Males (Figs 1,2,3,4,6,8,10,12,14,16–28). **Lectotype** (here designated): TL 2.45; PL 1.19; PW 1.14; EL 1.26; EW 1.19; GD 1.06. Ratios: PL/PW 1.04; EL/EW 1.06; EL/PL 1.06; GD/EW 0.89; TL/EW 2.06. Body robust, convex; dorsal and ventral surfaces mostly black, with punctation and vestiture single (Figs 1–4,8); basal antennomeres and funicle, mouthparts and tarsi dark yellowish brown; antennal club black. Head subquadrate (as



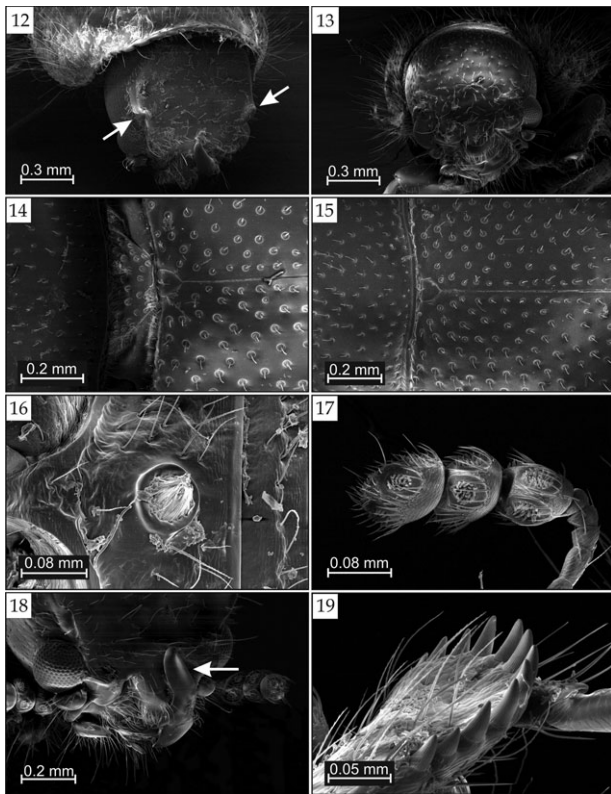
Figures 1–3 Male *Xylographus globipennis* Reitter. 1 SEM-VP micrograph of the lectotype from “Gorbatuco” (Eritrea) in dorsal view; 2,3 dorsal and lateral view of pronotum of a specimen from Mahagi (Democratic Republic of the Congo, Ituri Province).

seen from above) and concave, with dorsum almost glabrous, but with some erect yellowish bristles mainly near each eye; punctation fine and sparse, in between punctures smooth; frontoclypeal region sinuous, the sides slightly projected and broadly rounded; frons slightly elevated at middle; each lateral margin of vertex just behind the eye elevated into a small subtriangular tubercle with an oblique longitudinal orientation (Figs 3,12, arrows). Mouthparts with distinct asymmetric mandibles, in which the left mandible bears a conspicuous tooth projected upward (Fig. 18, arrow). Each antenna (Fig. 23) with ten antennomeres (FL 0.16, CL 0.23, CL/FL 1.43); length of the antennomeres (in mm) as follows: 0.11, 0.06, 0.07, 0.03, 0.03, 0.02, 0.01, 0.07, 0.06, 0.1; developed antennal club, in which each antennomere has a sinuous row of erect setae surrounding the sensillifers, somewhat dividing the antennomere into an upper region with short setae and a lower bearing scale-like cuticle (Figs 17,24); each sensillifer formed by a group of short setae organized in conspicuous concentric layers (Fig. 17). Each eye glabrous, with

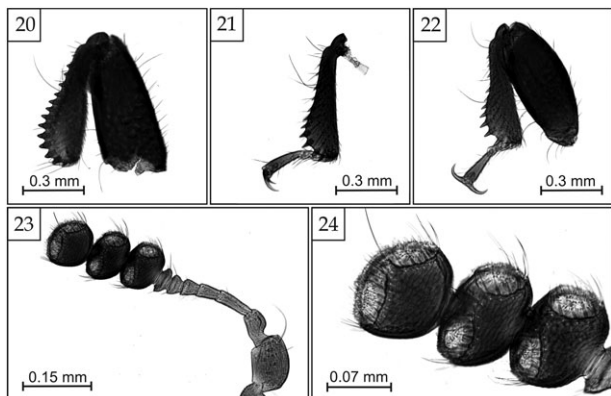


Figures 4–11 SEM micrographs of male (figures at left) and female (figures at right) of *Xylographus globipennis* Reitter from Mahagi (Democratic Republic of the Congo, Ituri Province). 4,5 Habitus, lateral view; 6,7 habitus, ventral view; 8,9 habitus, dorsal view; 10,11 abdominal ventrites, showing the male setose sex patch (arrow).

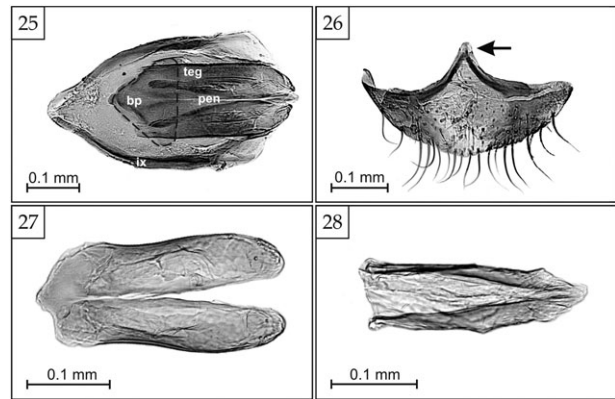
GW of 0.18 mm. Pronotum coarsely punctate; punctures separated by a distance of one to three puncture-widths; each puncture bearing a slender, yellowish, erect or decumbent, long and slender bristle; in between punctures smooth (Figs 1–3); anterior and lateral margins somewhat denticulate and curved upward (Figs 2–4); anterolateral angles broadly rounded (Fig. 3); lateral margins not seen from above (Figs 1,2,8). Scutellum small (BW 0.08), subtriangular, subglabrous and bearing a few punctures (Fig. 14). Elytra convex, lateral and posterolateral margins broadly rounded, their margins not seen from above; punctation coarser and slightly sparser than that of pronotum, with similar in between punctures and vestiture; punctures separated by a distance of one to two puncture-widths. Hind wings present and fully developed (macropterous species), with apical area longer than basal area; apical area bearing two incomplete pigmented lines, one line near the anterior margin and the other almost reaching the posterior margin; each line diffused on their beginning



Figures 12–19 SEM micrographs of *Xylographus globipennis* Reitter from Mahagi (Democratic Republic of the Congo, Ituri Province). 12,13 Frontal view of male head, showing the small subtriangular tubercles on each lateral margin of the vertex (arrows), and female head devoid of such tubercles, respectively; 14,15 dorsal view of pronotum, scutellum and elytra of male and female, respectively; 16 male setose sex patch; 17 antennal club; 18 frontal view of male head, showing the tooth in the left mandible (arrow); 19 anterior tibia, showing the teeth along its outer margin.



Figures 20–24 Slide preparations of male *Xylographus globipennis* Reitter from Mahagi (Democratic Republic of the Congo, Ituri Province). 20 Protibia; 21 mesotibia; 22 metatibia; 23 antenna; 24 antennal club.



Figures 25–28 Slide preparations of male terminalia of *Xylographus globipennis* Reitter from Mahagi (Democratic Republic of the Congo, Ituri Province). 25 Ninth segment and aedeagus; 26 eight sternite, showing a median strut (arrow); 27 tegmen; 28 penis. bp, basal piece (dashed line); pen, penis; teg, tegmen; ix, ninth segment.

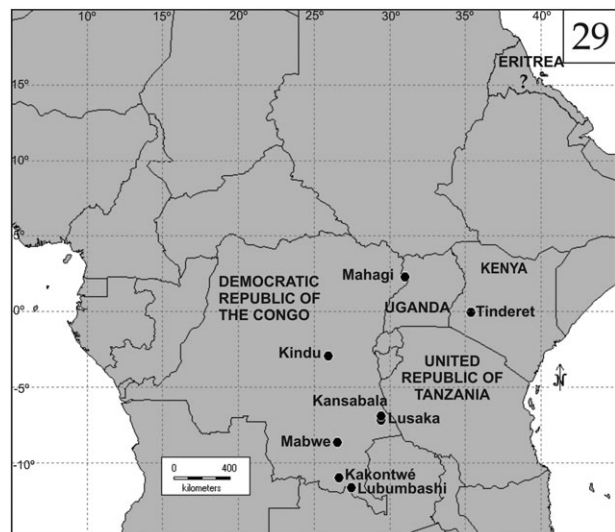


Figure 29 Map showing the known localities (●) of *Xylographus globipennis* Reitter in the Afrotropical region. The exact locality in Eritrea is unknown and for this reason it is represented by (?).

and darker on the end; the upper line expands in a conspicuous pigmented patch covering a great area of the wing tip. Prosternum concave; prosternal process tapering to an acute apex. Metaventrite (Fig. 6) with disc almost glabrous; lateral sides with coarse, irregular, sparse punctures; each puncture bearing a slender, yellowish, decumbent, long bristle; in between punctures smooth. Abdominal ventrites (Fig. 10) with sparse slender setae; first abdominal ventrite almost twice as

long as the second at the longitudinal midline; disc of first ventrite with a small, margined, circular and setose sex patch at middle (Fig. 10, arrow; Fig. 16). Each tibia (Figs 19–22) with a row of teeth along the entire outer margin.

Male terminalia (lectotype and paralectotypes were not dissected). Ninth segment (Fig. 25) V-shaped. Sclerotized anterior edge of the eighth sternite bearing a median strut (Fig. 26, arrow). Aedeagus (Figs 25,27,28) subquadrate, twice as long as wide. Basal piece (Fig. 25, dashed outline) subtriangular, membranous, twice as wide as long and with rounded angles. Tegmen (Figs 25,27) as long as the penis, bearing a deep and long emargination that forms two lateral lobes, each lobe with a patch of sensillae at the apex. Penis (Figs 25,28) subcylindrical; apex subtriangular.

Females (Figs 5,7,9,11,13,15). Similar to males except in the following features: abdominal sex patch absent (Figs 7,11); head convex or flat (Fig. 13), covered with more bristles than in males; left mandible devoid of projected tooth (Fig. 13); anterior and lateral margins of pronotum broadly rounded and not denticulated, and anterior portion of pronotum narrower than in males (Fig. 9).

Variation. Males ($n = 32$, including the lectotype): TL 2.06–2.95 (2.59 mean \pm 0.19 SD); PL 0.95–1.42 (1.21 \pm 0.12); PW 1.05–1.53 (1.29 \pm 0.12); EL 1.11–1.58 (1.38 \pm 0.11); EW 1.16–1.53 (1.36 \pm 0.11); GD 1.00–1.42 (1.22 \pm 0.10). Ratios: PL/PW 0.75–1.18 (0.94 \pm 0.08); EL/EW 0.88–1.25 (1.02 \pm 0.08); EL/PL 0.96–1.40 (1.15 \pm 0.11); GD/EW 0.76–1.04 (0.90 \pm 0.05); TL/EW 1.64–2.33 (1.91 \pm 0.14). Females ($n = 30$): TL 2.16–2.69 (2.45 \pm 0.15); PL 0.95–1.32 (1.12 \pm 0.08); PW 1.10–1.42 (1.24 \pm 0.09); EL 1.16–1.53 (1.33 \pm 0.10); EW 1.14–1.53 (1.33 \pm 0.09); GD 1.08–1.37 (1.21 \pm 0.08). Ratios: PL/PW 0.81–0.96 (0.90 \pm 0.04); EL/EW 0.88–1.15 (1.00 \pm 0.07); EL/PL 1.04–1.44 (1.20 \pm 0.10); GD/EW 0.85–0.96 (0.91 \pm 0.03); TL/EW 1.70–1.98 (1.84 \pm 0.07). Specimens from “Elisabethville” (currently Lubumbashi) have shorter and denser erect bristles in elytra in comparison to the other specimens. A variation between light-brown to solid black tegument is evident. However, light-brown and dark-brown specimens may be adults preserved soon after their emergence and, consequently, not fully pigmented yet. The biggest specimens are from Lusaka and the smallest ones are from Mahagi.

Material examined. Eritrea, lectotype, male (HNHM) \Erythraea [Eritrea], Gorbato, 7.III.1909 [handwritten] \Erythraea [Eritrea], Gorbato, 7.III.1909 [handwritten] \ Holotypus [printed] 1911, *Xylographus globipennis*, Reitter [handwritten] \ Coll. Reitter [printed] \ [pink label] LECTOTYPE Sandoval-Gómez,

Lopes-Andrade & Zacaro [handwritten]; 3 paralectotypes (2 HNHM, 1 SNSD) \Erythraea [Eritrea], Gorbato, 7.III.1909 [handwritten] \ Paratypus [printed] 1911, *Xylographus globipennis*, Reitter [handwritten] \ Coll. Reitter [printed] \ [orange label] PARALECTOTYPE Sandoval-Gómez, Lopes-Andrade & Zacaro [handwritten]. DEMOCRATIC REPUBLIC OF THE CONGO, 52 specimens (36 MRAC, 16 LAPC) \MUSÉE DU CONGO, Ituri, Mahagi [printed], 31 [handwritten] -V-25, Dr H. Schouteden [printed]; 29 specimens (9 LAPC, 20 MRAC) \[light blue label] Récolté sur [printed] Polypore [handwritten] \ Coll. MUS. CONGO, Katanga, Kakontwé, IX-48, N. Leleup; 38 specimens (14 LAPC, 24 MRAC) \[light blue label] Récolté sur [printed] Polypore [handwritten] \ Coll. MUS. CONGO, Katanga, Kakontwé, Sav. Bois, VIII-48, N. Leleup; 1 specimen (MRAC) \Coll. MUS. CONGO Katanga: Kakontwé Sav. Bois. VIII-1948 N. Leleup \ Grotte Defrensre (Kakontwé) Septembre 1948 N. LELEUP [handwritten]; 2 specimens (1 LAPC, 1 MRAC) \MUSÉE DU CONGO [printed] Kindu II-1919 [handwritten] R. Mayné [printed]; 15 specimens (5 LAPC, 10 MRAC) \MUSÉE DU CONGO Elisabethville [Lubumbashi] [printed] -1932 [handwritten] De Loose [printed] Ch-37 [handwritten]; 2 specimens (1 LAPC, 1 MRAC) \MUSÉE DU CONGO Elisabethville [Lubumbashi] [printed] -1932 [handwritten] De Loose [printed] Ch-43 [handwritten]; 128 specimens (88 MRAC, 40 LAPC) \MUSÉE DU CONGO Elisabethville [Lubumbashi] -1932 De Loose [printed] Ch-33 [handwritten]; 94 specimens (63 MRAC, 31 LAPC) \MUSÉE DU CONGO Elisabethville [Lubumbashi] -1932 De Loose [printed] Ch-39 [handwritten]; 1 specimen (MRAC) \Congo Belge: P.N.U. Mabwe (r E. lac Upemba) (585 m) 11-26-I-1949 Mis. G. F. de Witte. 2212a \ A Janssens det., 195 [printed] 2 Cioidae Gen. *Xylographus* ou voisin. [handwritten]; 409 specimens (280 MRAC, 129 LAPC) \Dans polypore [light blue label] \ COLL. MUS. CONGO Tanganika: Lusaka Rte Baudouin. - Manono H. Bomans V-1953; 8 specimens (6 MRAC, 2 LAPC) \Dans polypore [light blue label] \ COLL. MUS. CONGO Tanganika: Kansabala 1200 m VIII-1953. KENYA, 63 specimens (21 LAPC, 42 MRAC) \Rift Valley Prov. Tinderet for. 2300 m Kipsigis farm 20/24-VIII-1977 \ Coll. Mus. Tervuren Kenya: VII/IX-1977 G. Coulon.

We have located four *X. globipennis* syntypes, one labeled as the holotype and three as paratypes. Therefore, although Reitter has not mentioned a holotype or a type series, we are able to assume that *X. globipennis* was described from a series of specimens from Eritrea. We also assume that holotype and paratype labels were added after the species' description. We here designate

the specimen bearing the “holotype” label as the lectotype (Fig. 1), and each of the three specimens bearing paratype labels as paralectotypes. Appropriate labels have been added to their pins. We have chosen the specimen labeled as “holotype” to be the lectotype since it belongs to the collection containing the largest number of syntypes of the nominal species-group taxon (HNHM) and it is the only one with an additional handwritten locality label, possibly the original label written by the collector.

DISCUSSION

The species of *Xylographus* are difficult to recognize due to the lack of diagnostic characters for most species and insufficient morphological features cited in their original descriptions, making difficult the identification of specimens without comparison to type material (Lopes-Andrade & Zacaro 2003). The lack of taxonomic keys for species of the genus makes it a slow task to identify any sample of specimens. There are two African species of *Xylographus* described as possessing bristles at the dorsal surface: (i) *X. dentatus* distributed in the Democratic Republic of the Congo; and (ii) *X. subsinuatus* from Madagascar. Both are too briefly and inadequately described for close comparison, but *X. dentatus* is described as having short scattered body bristles and *X. subsinuatus* as having few bristles. Therefore, their vestiture is quite distinct from the vestiture of long and slender yellowish bristles of *X. globipennis*.

The remaining 14 species of Afrotropical *Xylographus* are easily distinguished from *X. globipennis* by their glabrous body with a sinuous anterior edge of pronotum. *Xylographus hypocritus* and *X. anthracinus* have the anterior sides of pronotum angulate. On the other hand, *X. eichelbaumi*, *X. madagascariensis*, *X. perforatus*, *X. rufescens*, *X. seychellensis*, *X. subopacus* and *X. tarsalis* have the anterior sides of pronotum broadly rounded as *X. globipennis*. The examined named specimens of *X. hypocritus*, *X. perforatus*, *X. seychellensis* and *X. tarsalis* are visibly bigger than *X. globipennis*. The limited information about *X. bicolor*, *X. longicollis*, *X. nitidissimus*, *X. rufipennis*, *X. subopacus* and *X. testaceitarsis*, all described by Pic after Reitter (1911) described *X. globipennis*, is about the coarse and strong dorsal punctuation of those species.

The Palearctic species of *Xylographus* are similar to *X. globipennis* in the dense dorsal vestiture of long setae of pronotum and elytra. *Xylographus bostrichoides* (Dufour, 1843) and *X. tomicoides* Reitter, 1902 have long and erect brownish to black bristles in the body,

and *X. scheerpeltzi* Nobuchi and Wada, 1956 has the body covered with rather long yellowish setae. The denticulation of the anterior and lateral pronotal margins of male *X. globipennis* is the most conspicuous character that clearly distinguishes it from all the other described *Xylographus*.

Xylographus globipennis was originally known only from the type locality “Gorbatuco” in Eritrea; which exact geographical position was not elucidated. Now, its distribution is expanded to seven localities in the Democratic Republic of the Congo and one locality in Kenya (Fig. 29). The Afrotropical region comprises Central Africa (southern Sahara), the Arabian Peninsula, Madagascar and the West Indian Ocean islands (Morrone 2002) and is well known for its huge biodiversity and endemic taxa. *Xylographus globipennis* is the only known species of *Xylographus* showing a broad distribution in this region and the one with the northernmost localities, followed by *X. longicollis* which is known from Benin (Western Africa). It seems that like *X. globipennis*, other *Xylographus* species have a common pattern of being widely distributed in a biogeographical region. For instance *X. gibbus* Mellié, 1849 and *X. punctatus* Mellié, 1849 are commonly found throughout the Neotropical region (C. Lopes-Andrade, pers. obs., 2010); *X. bostrichoides* and *X. tomicoides* have a broad Palearctic distribution including Europe, northern Africa and Asia. This condition will only be confirmed with a revision of the genus and further studies on the distribution of its species.

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