Bulletin de la Société entomologique de France, **126** (4), 2021 : 465-474. ISSN 0037-928X
https://doi.org/10.32475/bsef_2210 eISSN 2540-2641

The Clytini fauna of Benin and Togo, with the description of a new species from Benin (Coleoptera, Cerambycidae)

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http://zoobank.org/8087C387-E5F5-4A47-B1C7-EC3AE484C190

(Accepté le 3.XI.2021 ; publié le 7.XII.2021)

Abstract. – Four species are reported for the first time in Benin, *Carinoclytus cf. semiruber* (Quedenfeldt, 1882), *Chlorophorus deterrens* (Pascoe, 1862), *Denticerus muehlei* Mourglia & Téocchi, 1994, and *Plagionotulus sylvaticus* Hintz, 1911; a new species is described, *Calanthemis jossomonforti* n. sp. In Togo, four species are known and *Denticerus muehlei* Mourglia & Téocchi, 1994, is reported for the first time. *Plagionotulus sylvaticus* Hintz, 1911, is cited from Ivory Coast for the first time. An identification key to species of Clytini from Benin and Togo is provided.

Résumé. – **La faune des Clytini du Bénin et du Togo, avec la description d'une espèce nouvelle du Bénin (Coleoptera, Cerambycidae)**. Quatre espèces sont citées pour la première fois du Bénin, *Carinoclytus* cf. *semiruber* (Quedenfeldt, 1882), *Chlorophorus deterrens* (Pascoe, 1862), *Denticerus muehlei* Mourglia & Téocchi, 1994, et *Plagionotulus sylvaticus* Hintz, 1911 ; une nouvelle espèce est décrite, *Calanthemis jossomonforti* n. sp. Au Togo, quatre espèces sont connues et *Denticerus muehlei* Mourglia & Téocchi, 1994, y est mentionné pour la première fois. *Plagionotulus sylvaticus* Hintz, 1911, est cité pour la première fois de Côte d'Ivoire. Une clé de détermination pour les Clytini du Bénin et du Togo est présentée.

Keywords. – Dahomey Gap, Afrotropical, West Africa, taxonomy, morphology, new records.

The Dahomey gap is a dry forest-savanna corridor, which includes South Eastern Ghana and the South of Togo and Benin. It separates the West African and Central African rain forest blocks (Le Gall *et al.*, 2002, 2010). This rupture in the rain forest block only opened at the beginning of the Late Holocene (Salzmann & Hoelzmann, 2005). However, several relict forests persist in this region like the Niaouli, Pobé, or Lama forest in Benin (Touroult & Le Gall, 2001). These "forest-islands" host a peculiar forest fauna and more studies are required to understand whether the fauna present in these areas originates from the Congolese or from the Guinean fauna (Le Gall *et al.*, 2002).

The present paper targets the longhorn beetles (Coleoptera, Cerambycidae) fauna of the Dahomey gap in Togo and Benin. These beetles are usually closely associated with specific vegetation types, with fairly high levels of host-plant specificity (Farrell, 1998; Barraclough *et al.*, 1998). This is particularly true for the Clytini tribe (Adlbauer & Beck, 2017). It is a relatively small group containing 2050 species, distributed among 82 genera in the world (Tavakilian & Chevillotte, 2020). On the African continent, only about 70 species are recorded.

They are rarely collected, mostly captured by using a beating sheet and light traps. The West African fauna is represented by only a dozen species. In Benin, 172 Cerambycidae species are recorded but no Clytini have been previously recorded. In Ghana, 392 cerambycid species are recorded, and *Carinoclytus cf. semiruber* (Quedenfeldt, 1882) is the only known Clytini. However, in Togo, probably one of the best sampled countries in the West-African region with Ivory Coast, 364 cerambycids species, with four Clytini species, are recorded. In the present article, we report for the first time the presence of four Clytini species new for the fauna of Benin, and one new record for the Togolese fauna, while describing a new species of *Calanthemis* from the Pendjari National Park in Benin.

Material and methods

The present article is based on the collecting efforts realized by Alain Coache, Laurent Péru, Pierre Juhel and Bernard Rainon over a decade in Benin and Togo. Each trapping location was prospected thoroughly using sweep nets, Malaise traps, light traps, beating sheet and fruit traps.

Pictures were taken with an EOS 550D Canon and a 100 mm macro F/2.8 L IS UMS Canon lens flashed with a 580 EXII Canon Cobra. Lighting was achieved using techniques summarized in Buffington *et al*. (2005), Kerr *et al*. (2008), and Buffington & Gates (2008). Post-processing was realized using Photoshop CS6. Description terms follow Harris (1979).

Specimen depositories. – Specimens examined for this study are deposited in the following collections: **CAC**, collection Alain Coache; **CBR**, collection Bernard Rainon; **CLP**, collection Laurent Péru; **CPJ**, collection Pierre Juhel; **CPOM**, collection Pierre-Olivier Maquart.

Results

A total of 64 specimens were collected, belonging to seven species. Their known records in Benin and Togo are presented in fig. 1.

Carinoclytus cf. semiruber (Quedenfeldt, 1882) (fig. 2)

Clytus semiruber Quedenfeldt, 1882: 335.
Gen. nov.? semirufa; Jordan, 1903: 143 (misspelling).
Carinoclytus semiruber (Quedenfledt); Aurivillius, 1912: 367 (comb.); Adlbauer & Mourglia, 1995: 220 (syn.); Adlbauer & Beck, 2015: 68 (fauna).
Syn. *Xylotrechus Reichenowi* Quedenfeldt, 1883: 137.
Gen. nov.? reichenowi; Jordan, 1903: 143.
Carinoclytus reichenowi (Quedenfeldt); Aurivillius, 1912: 367 (comb.); Lepesme, 1953: 33 (distribution); Duffy, 1955: 213 (distribution); Adlbauer & Mourglia, 1995 (syn.).

Material examined. – **Benin**. 1 ♂, Attogon, forêt de Niaouli, 6°44'08''N 2°08'18''E, 102 m, 3.VI.2016, sweep net (CAC); 1 ♂, *idem*, 20.VIII.2013, beating sheet (CBR); 1 ♀, Bohicon quartier Soglogon, 7°10'54''N 2°01'54''E, 200 m, 20.X.2017, UV light trap (CBR); 1 ♀, forêt de Houéyogbé, 6°33'43''N 1°52'02''E, 82 m, 25.IX.2012, light trap (CAC); 1 ♀, Ouidah, forêt de Pahou, 6°23'03''N 2°09'32''E, 29 m, 21.XI.2015, beating sheet (CBR); 1 ♂, *idem*, 22.XI.2015 (CBR). **Togo**. 1 ♂, Région des Plateaux, Préfecture de Danyi, Danyi Dzogbégan, abbaye de l'Ascension, 7°14'17''N 0°41'50''E, 790 m, 26. XI.2005, *L. Péru leg*. (CLP); 1 ♀, *idem*, 27.XI.2005 (CLP); 2 ♂, 1 ♀, *idem*, 29.XI.2005 (CLP); 2 ♂, 1 ♀, *idem*, 30.XI.2005 (CLP); 1 ♂, Région des Plateaux, nord de Mimpassen, bord du Blissakotofoué, 7°14'29''N 0°41'56''E, 760 m, 28.XI.2005, *L. Péru leg.* (CLP); 2 ♀, Préfecture du Kloto, Canton de Kuma, 6°57'18''N 0°34'49''E, 610 m, X.2010, *K. Tusah leg*.; 2 ♀, *idem*, XI.2010 (CLP); 1 ♀, Préfecture du Kloto, Kouma Konda, route Château-Vialle, 6°57'08''N 0°34'53''E, 670 m, 9.II.2011, *K. Abotsi leg*. (CLP); 1 ♀, Préfecture du Kloto, Kouma Konda, 6°57'18''N 0°34'49''E, 610 m, VIII.2013, *K. Tusah leg*. (CLP); 1 ♀, *idem*, VII.2014 (CLP); 1 ♀, *idem*, XI.2016 (CLP).

Distribution. – This species is described from Angola (Quedenfeldt, 1882), known from Ghana (Quedenfeldt, 1883), Ivory Coast, Togo, Ethiopia, Popular Republic of the Congo,

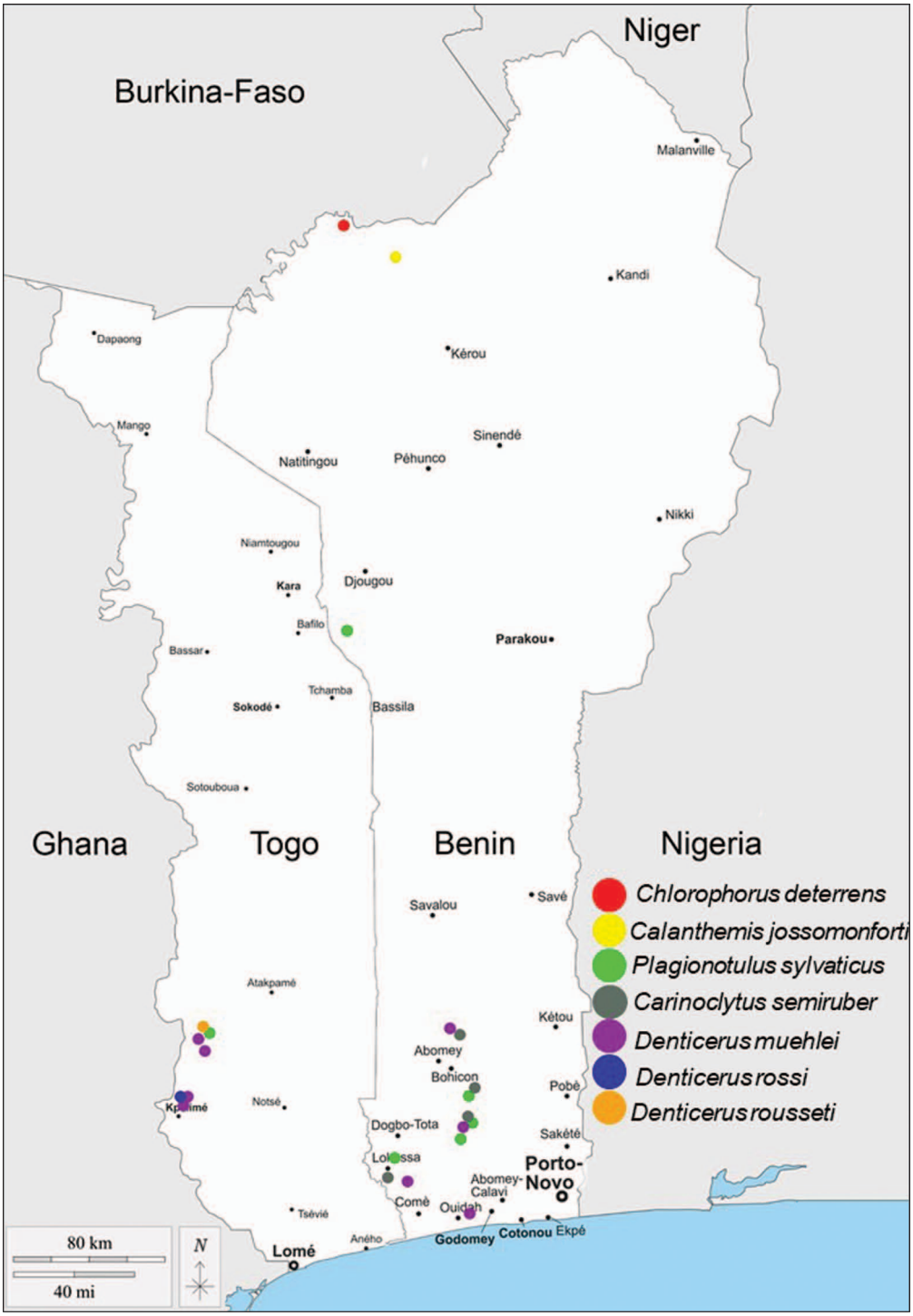

Fig. 1. – Known records of the different Clytini species in Benin and Togo.

Democratic Republic of the Congo, Rwanda, Burundi and Zimbabwe (Adlbauer & Beck, 2015; Lepesme, 1953). This species is newly recorded from Benin.

Chlorophorus deterrens (Pascoe, 1862) (fig. 3)

Clytus deterrens Pascoe, 1862: 359.
Clytanthus deterrens (Pascoe); Jordan, 1903: 144.
Chlorophorus deterrens (Pascoe); Aurivillius, 1912: 405 (catalog); Adlbauer, 1998: 538 (distribution, host plant); Delahaye, 2009: 7 (distribution); Adlbauer & Beck, 2015: 69 (fauna).

Material examined. – **Benin**. 1 ♂, forêt de Boudjagou, Parc National de la Pendjari, Nord Benin, 11°05'45''N 1°46'22'' E, 315 m, 6.VI.2005, collected on *Acacia sp*. (CPJ).

Distribution. – Species described from South Africa (Pascoe, 1862), known from Uganda (Adlbauer, 1998), Zambia (Delahaye, 2009), Ethiopia, Kenya, Mozambique, Zimbabwe, Botswana, Namibia (Adlbauer & Beck, 2015). This species is newly recorded from Benin.

Denticerus muehlei Mourglia & Téocchi, 1994 (fig. 4)

Denticerus muehlei Mourglia & Téocchi, 1994: 409.

Material examined. – **Benin**. 1 ♂, Athiémé, 6°34'30''N 1°40'03''E, 15 m, 26.III.2006, sweep net (CBR); 1 ♀, 1♂, Attogon, forêt de Niaouli, 6°44'08''N 2°08'18''E, 102 m, 1.XII.2011, beating sheet (CAC); 1 ♀, Bohicon, quartier Soglogon, 7°10'54''N 2°01'54''E, 200 m, XI.2008, sweep net (CAC); 1 ♀, Zogbodomey, forêt de la Lama, 6°58'27''N 2°08'02''E, 74 m, 12.V.2009, beating sheet (CBR); 1 ♂, *idem* (CAC). **Togo**. 1 ♀, Région des Plateaux, Préfecture de Danyi, Danyi Dzogbégan, abbaye de l'Ascension, 7°14'17''N 0°41'50''E, 790 m, 25.X.2004, *L. Péru leg*. (CLP); 1 ♀, *idem*, 28.XI.2005 (CLP); 2 ♂, Région des Plateaux, Préfecture du Kloto, Kuma Apoti, 6°58'40''N 0°33'33''E, 670 m, 26.X.2004, *L. Péru leg.* (CLP); 2 ♂, Région des Plateaux, Préfecture du Kloto, Kuma Tokpli, 6°58'16''N 0°34'36''E, 550 m, 27.X.2004, *L. Péru leg*. (CLP); 1 ♀, Région des Plateaux, forêt de Missahoé, 6°55'53''N 0°34'22''E, 759 m, 1.XI.2004, *K. Adjima leg*.; 1 ♂, *idem*, X.2005, *K. Tusah leg*.; 2 ♀, *idem*, XII.2010, *K. Tusah leg.* (CLP); 1 ♀, Région des Plateaux, Kuma Bala, 6°59'28''N 0°33'60''E, 725 m, 3.XI.2004, *L. Péru leg.* (CLP); 1 ♀, Région des Plateaux, Canton de Kuma, X.2005 (CLP); 1 ♂, *idem*, X.2012, *K. Tusah leg*. (CLP); 1 ♂, Région des Plateaux, Kouma Konda, 6°57'18''N 0°34'49''E, 610 m, X.2014, *K. Tusah leg*. (CLP).

Distribution. – This species is known from Democratic Republic of Congo, Cameroon and Uganda (Mourglia & Téocchi, 1994). It is newly recorded from Benin and Togo.

Denticerus rousseti Mourglia & Téocchi, 1994 (fig. 5)

Denticerus rousseti Mourglia & Téocchi, 1994: 407.

Material examined. – **Togo**. 1 ♂, forêt de Missahoé, 6°55'53''N 0°34'22''E, 759 m, X.2005 (CPJ).

Distribution. – This species is known from Central African Republic, Togo, Cameroun, Popular Republic of Congo, and Democratic Republic of Congo (Mourglia & Téocchi, 1994).

Known host plants. – *Celtis zenkeri* Engl. (Ulmaceae), *Erythrina abyssinica* Lam. ex DC. (Fabaceae), *Acacia sp.* (Mimosaceae), *Ficus sp*. (Moraceae), *Strombosia grandifolia* Hook. f. ex Benth. (Olacaceae), *Triplochiton scleroxylon* K.Schum. (Sterculiaceae), *Dalbergia sp.* (Fabaceae), *Aubrevillea kerstingii* (Harms) Pellegr. (Mimosaceae), *Milicia excelsa* (Welw.) C.C.Berg (Moraceae), *Albizzia adianthifolia* (Schumach.) W.Wight (Mimosaceae) (Mourglia & Téocchi, 1994).

Denticerus rossii Mourglia & Téocchi, 1994 (fig. 6)

Denticerus rossii Mourglia & Téocchi, 1994: 405.

Material examined. – **Togo**. 1 ♂, Kloto forest, 6°57'47''N 0°42'54''E, 238 m, XI.2011 (CPJ).

Distribution. – This species is known from Sierra-Leone and Togo (Mourglia & Téocchi, 1994).

Plagionotulus sylvaticus Hintz, 1911 (fig. 7)

Plagionotulus sylvaticus Hintz, 1911: 432; Aurivillius, 1912: 406 (catalog); Damoiseau & Cools, 1987: 22; Adlbauer, 1998: 538 (distribution); Juhel, 2014: 15 (distribution, host plant); Adlbauer & Beck, 2017: 6 (distribution).

Material examined. – **Benin**. 1 ♂, Attogon, forêt de Niaouli, 6°44'08''N 2°08'18''E, 102 m, 1.XII.2011, beating sheet (CBR); 3 ♂, Pénéssoulou, forêt de Pénélan, 9°14'58''N 1°31'34''E, 401 m, 27.V.2013, light trap (CBR); 1 ♀, *idem* (CBR); 2 ♂, *idem*, 28.V.2013 (CAC); 1 ♂, *idem*, 23.V.2013, beating sheet

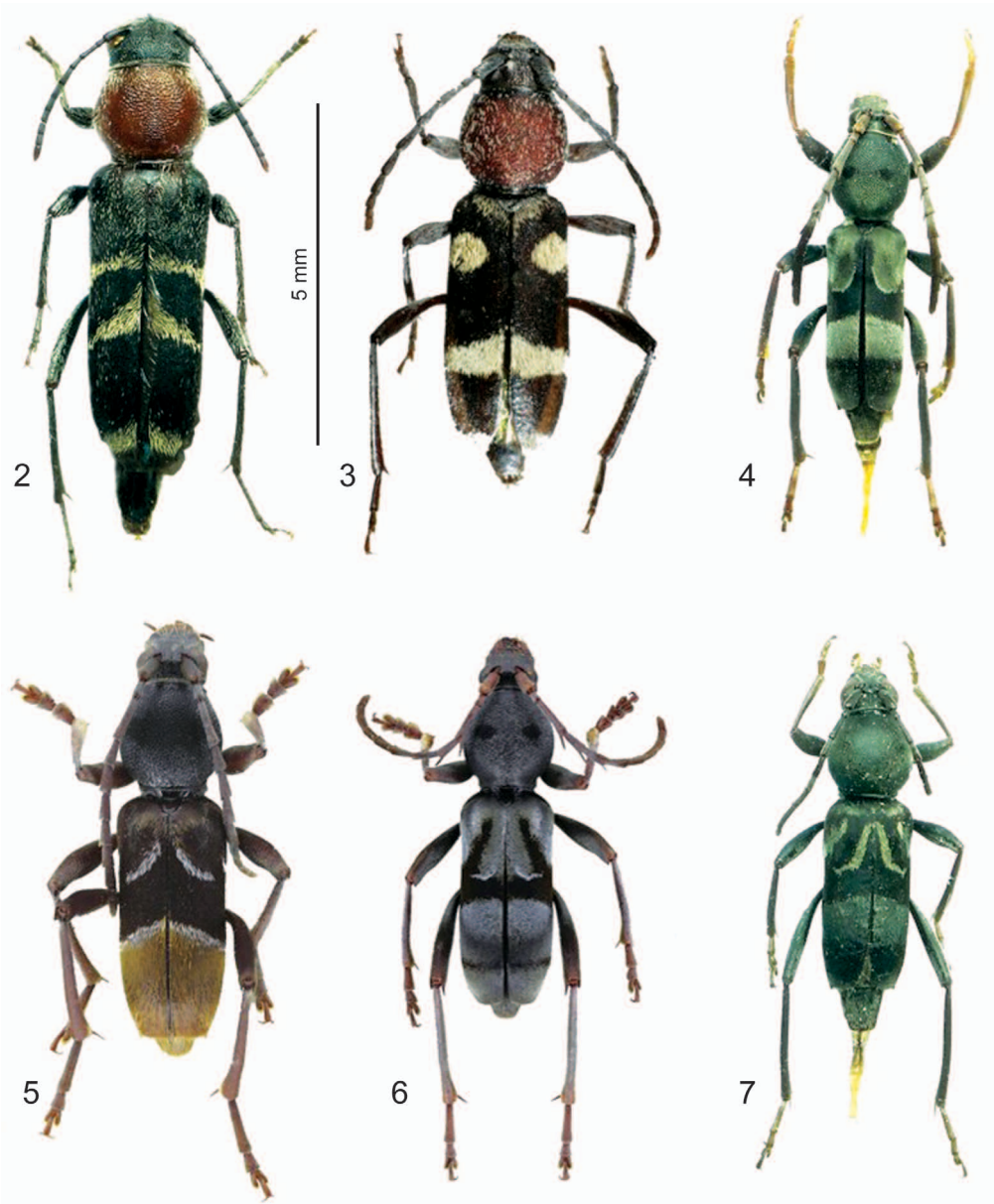

Fig. 2-7. – Clytini, habitus. – **2**, *Carinoclytus cf. semiruber* (Quedenfeldt). – **3**, *Chlorophorus deterrens* (Pascoe). – **4**, *Denticerus muehlei* Mourglia & Téocchi. – **5**, *D. rousseti* Mourglia & Téocchi. – **6**, *D. rossii* Mourglia & Téocchi. – **7**, *Plagionotulus sylvaticus* Hintz. Scale bar: 5 mm.

(CAC); 1 ♀, Tokpota, 30.V.2016, beating sheet (CAC); 1 ♀, Zogbodomey, forêt de la Lama, 6°58'27''N 2°08'02''E, 74 m, 12.VII.2009, beating sheet (CAC); 1 ♀, Lokossa, 6°37'03''N 1°43'09''E, 31 m, 24.III.2006, sweep net (CAC). **Ivory Coast**. 1 ♀, Mopodji, Alépé, 27.X.1984, hand collecting (CPOM). **Togo**. 2 ♀, Région des Plateaux, Préfecture du Kloto, 6°58'40''N 0°33'33''E, 670 m (CLP); 1 ♂, 1 ♀, forêt de Missahoé, 6°55'53''N 0°34'22''E, 759 m, X.2005, *K. Tusah leg*. (CLP); 2 ♀, forêt de Missahoé, 6°55'53''N 0°34'22''E, 759 m, X.2014 (CPJ).

Distribution. – This species was described from Beni in Democratic Republic of the Congo, from the western side of the Rwenzori range (Hintz, 1911). It is known from Uganda (Adlbauer, 1998), Gabon (Juhel, 2014) and more recently was cited from Togo, Congo and Ethiopia (Adlbauer & Beck, 2017). The species is now newly recorded from Benin and Ivory Coast.

Known host plant. – *Millettia versicolor* Welwitsch (Fabaceae) (Juhel, 2014).

Calanthemis jossomonforti Juhel, **n. sp.** (fig. 8-11)

http://zoobank.org/108162AA-E0C9-439B-91C3-23A42DFFF6B4

Holotype: ♂, Benin, forêt de Boudjagou, Parc National de la Pendjari, Nord Benin, 11°05'45''N 1°46'22''E, 315 m, 6.VI.2005, à vue sur *Acacia sp*., *J.-F. Josso, P. Juhel & A. Monfort leg*. (CPJ).

Description. – Length: 11 mm; elytral width: 3 mm. Habitus: fig. 8-9; large and stout for this genus.

Colouration. Head, antennae and legs testaceous, pronotum very dark brown with four yellow tomentum spots (two antero-lateral and two oblique baso-paramedian), elytra dark brown except the basal fifth testaceous and six yellow tomentum spots (two wide transverse on the anterior third, two narrower on the apical fourth, and two small oblique suturo-apical); the four anterior spots not reaching elytral suture. Ventral surface dark brown, sternites III-V with a transverse yellow tomentum stripe on the apical half, wider laterally.

Head (fig. 10) short, evenly and densely punctured, each puncture associated to a short white hair, with a short longitudinal glabrous line but no longitudinal carina. Antennae short, just reaching the basal fifth of elytra. Scape rounded, finely and densely punctured, third antennomere the longest, distal segments gradually shorter.

Pronotum very convex, globular, almost as broad as long, evenly covered by rough punctures, with a longitudinal lump on the basal half of the median line.

Scutellum rounded, minutely punctured and hairy.

Elytra parallel, apex rounded, convex transversally, finely and densely punctured and hairy. *Legs*. Metafemora not exceeding the elytral apex, all femora gradually and moderately clavate in the apical half, tibiae straight, widening to the apex, first metatarsi almost as long as IV-V combined together. All the legs with sparse white or testaceous short hair, longer on the ventral side.

Abdomen surface densely punctured with sparse long white hair (except the three abdominal transverse yellow stripes).

Genitalia (fig. 11) with pedon angulate at apex; tectum rounded, broader than pedon; tegmen with long lobes, without basal crest, the hairy area limited to the apical half.

Female unknown.

Etymology. – This new species is dedicated to Jean-François Josso and Alain Monfort, who contributed to the collection of this specimen.

Differential diagnosis. – This species has the characters of the genus *Calanthemis* Thomson, 1864: frons without longitudinal carina and not separated from the vertex by the antennal tubercles. Some other species in this genus have a wasp-like yellow spotted pronotum (*C. flavomaculatus* Adlbauer, 2001, *C. garnieri* Adlbauer & Dauber, 2002, *C. lerui* Adlbauer, 2019, *C. montium* Hintz, *C. morettoi* Adlbauer, 2004, *C. riccardoi* Adlbauer & Björnstad, 2012). They differ in having a smaller size, a very different colour pattern of elytra and a distinct distribution area.

Distribution. – Benin (Pendjari National Park).

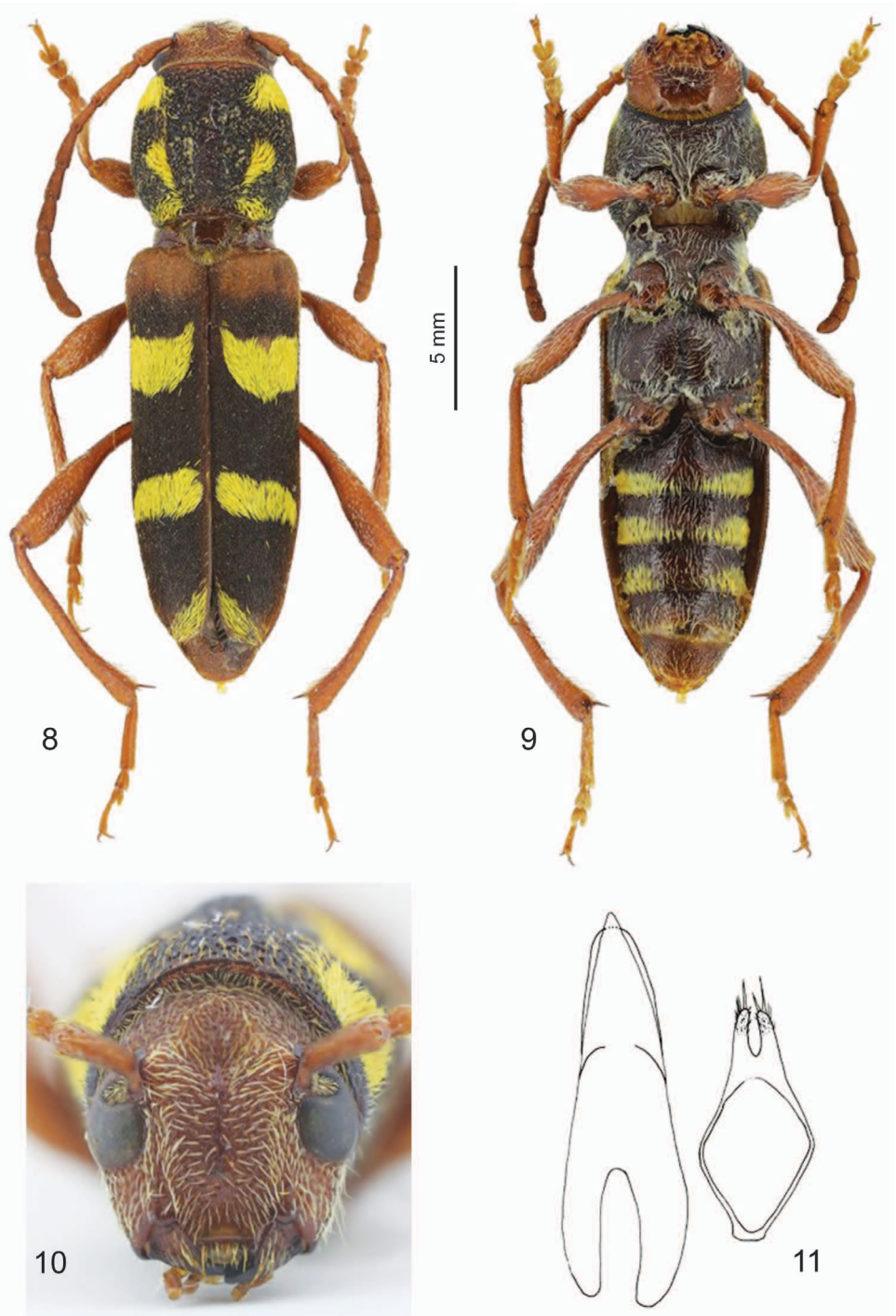

Fig. 8-11. – *Calanthemis jossomonforti* n. sp. – **8**, Dorsal habitus. – **9**, Ventral habitus. – **10**, Details of the head. – **11**, Genitalia. Scale bar: 5 mm.

Identification key to the Clytini species of Togo and Benin

1. Antennomeres without apical spine **4**
– Antennomeres with spine at apex (genus *Denticerus*) **2**
2. Pronotum with large blackish spots indistinctly limited; antennae with slender and elongated articles; apical third of elytra evenly covered by a golden pubescence ... ***Denticerus rousseti*** Mourglia & Téocchi
– Pronotum with two distinct black spots; antennae with swollen and stout articles **3**
3. Pronotum with perfectly oval dark spots; spine of the third antennal joint shorter than one third of the length of the fourth antennomere ..... ***Denticerus muehlei*** Mourglia & Téocchi
– Pronotum with blurred and irregular dark spots delimitation; spine of the third antennal joint longer than one third of the length of the fourth antennomere ..... ***Denticerus rossii*** Mourglia & Téocchi
4. Antennae not widely separated at base; frons separated from occiput, without carinae **5**
– Antennae widely separated at base; frons not separated from occiput, with more or less visible carinae **6**
5. Prothorax globular; femora carinate (genus *Plagionotulus*); last third of elytra dark .... ***Plagionotulus sylvaticus*** Hintz
– Prothorax elongated, femora not carinate in African species (genus *Chlorophorus*); pronotum red; presence of two distinct white spots on the basal third of the elytra, median stripe anteriorly straight, posteriorly drawing a "v" shaped, white stripe at the elytral apex .... ***Chlorophorus deterrens*** (Pascoe)
6. Frons without carinae or the carinae short and feebly raised (genus *Calanthemis*); wasp-like yellow spotted pronotum, large size ..... ***Calanthemis jossomonforti*** Juhel, n. sp.
– Frons with distinct median carina and feeble lateral ones; the lateral ones not continuous with the raised edge of the antennal groove (genus *Carinoclytus*); elytral apex yellowish, post-median stripe displaying a triangle shape ..... ***Carinoclytus cf. semiruber*** (Quedenfeldt)

Conclusion

The Dahomey gap is known to host several endemic species. Some, like *Fornasinius klingbeilei* Zöller, Fiebig & Schulze, 1995 (Coleoptera, Cetoniinae) (Maquart & Malec, 2017), or *Eyprepocnemis djeboboensis* Jago, 1962 (Orthoptera, Acridoidea) are restricted to middle-altitude forests of the Plateau region encompassing Togo and Ghana. While several other species are known to be endemic of the lowlands, like for example *Phryneta silacea* Aurivillius, 1907 (Coleoptera, Cerambycidae), *Strongylium legalli* Robiche, 2001 (Coleoptera, Tenebrionidae), *Adoretus rainoni* and *A. deschampsi* Limbourg & Coache 2014 (Coleoptera, Scarabaeidae, Rutelinae), *Pericordus goergeni* Delaunay, Coache & Rainon, 2015 (Coleoptera, Brentidae), *Microplidus rainoni* Lacroix & Coache, 2017 (Coleoptera, Scarabaeidae, Hopliinae), *Paraholotrichia rainoni* Lacroix & Coache, 2017 (Coleoptera, Scarabaeidae, Melolonthinae), *Aspidimorpha rainoni* Borowiec & Coache, 2018 (Coleoptera, Chrysomelidae, Cassidinae), *Nolafigura coachei* Opitz, 2018, et *Korynetes clavulus* Opitz, 2018 (Coleoptera, Cleridae), *Scopaeus lescuyeri* Delaunay, Coache & Rainon, 2019 (Coleoptera, Staphylinidae), *Mecynotarsus coachei* Kejval, 2020 (Coleoptera, Anthicidae) or *Tamithericles quagga* (Karsch, 1893) (Orthoptera, Thericleidae) (Le Gall *et al.*, 2002, 2010). Considering that *Calanthemis jossomonforti* was collected in the Pendjari National Park, in Northern Benin, further collecting efforts are required to confirm whether it is a true endemic of the Dahomey gap, or only a species evolving in dry environments, and therefore possibly found in the Sahelian region. The record of *Chlorophorus deterrens* is interesting since the species was previously known from Southern and Eastern Africa (Adlbauer & Beck, 2015). Its distribution area may be broader than previously thought, probably going through the entire Sahelian region.

In summary, in Benin, five species are now recorded: *Calanthemis jossomonforti* n. sp., *Carinoclytus cf. semiruber*, *Chlorophorus deterrens, Denticerus muehlei* and *Plagionotulus sylvaticus*. In Togo, five species are now recorded: *Carinoclytus cf. semiruber*, *Denticerus*

rossi, D. rousseti, D. muehlei and *Plagionotulus sylvaticus.* However, it is very likely that *Calanthemis jossomonforti* n. sp. and *Chlorophorus deterrens* are also present in Togo, considering the ecosystems similarities of the two countries. Reciprocally, future collection efforts might highlight the presence of *Denticerus rossii* and *D. rousseti* in Benin.

Further entomological prospection is urgently required to continue to build the knowledge of the fauna from this peculiar region, especially in the numerous forest relict of the Dahomey Gap which are now facing deforestation (Le Gall *et al*., 2002; 2010; Tchibozo *et al.*, 2008).

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