



A new species of *Afrodiaphanes* Geisthardt, 2007 (Coleoptera, Lampyridae), the first firefly described from the Central African Republic

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Abstract

A new species of firefly, *Afrodiaphanes pulcher* **sp. nov.**, is described, diagnosed and illustrated. This is the first species of *Afrodiaphanes* described from the Central African Republic as well as the first firefly described from this nation.

Key words: Lampyridae, Africa, new taxon, entomology

Introduction

Commonly called fireflies or lightning bugs, the Lampyridae is a family of Coleoptera well known for its many species that produce a glowing light from the last sternites. Fireflies are distributed throughout the world except in the Antarctic, with known species estimated from 2200 (Zaragoza-Caballero *et al.* 2020) to about 2500 (Martin *et al.* 2019), and many more thousands of taxa still to be studied and described (Lloyd 2006). Even though fireflies have an important and interesting bio-ecology, their general taxonomy in the African part of the Afrotropical region has been the subject of relatively little study. This includes older papers describing new species (*e.g.*, Kolbe 1883; Olivier 1911, 1914a, 1914b; Pic 1931a, 1931b, 1949, 1951, 1952, 1956) and an older taxonomic paper (McDermott 1964)—to which a world catalog (McDermott 1966) was recently added with subsequent corrections (Keller & Branham 2018), as well as a few new works on genera and species (Geisthardt 1983, 2007; Fu & Ballantyne 2008; Ballantyne & Lambkin 2009).

It's clear there is much more to be learned about African Lampyridae and their biology. Firefly species in Africa are often known from only a few specimens that do not include females or larvae, and many other species have yet to be discovered. With this contribution, we describe the first *Afrodiaphanes* from the Central Africa Republic, and the first firefly described from this nation.

Material and methods

The specimen was photographed using a 3D Microscope with Full HD camera and LED lighting. The images were edited with a Ulead PhotoImpact Viewer SE program. The aedeagus was extracted, and the pigidium and epipleura removed for an in-depth study under the stereomicroscope, and then were glued to a standard tag next to the specimen. The new species is preserved in the Fabrizio Fanti entomological collection, housed at Piazza (Siena, Tuscany, Italy). The holotype carries a red printed label: Holotypus//*Afrodiaphanes pulcher*//Fanti & M. G. Pankowski, 2022. The new species has been compared with all known literature.

Systematic treatment

Family Lampyridae Rafinesque, 1815

Subfamily Lampyrinae Rafinesque, 1815

Tribe Lampyrini Rafinesque, 1815

Genus *Afrodiaphanes* Geisthardt, 2007s

Type species: *Lampyris marginipennis* (Boheman, 1851) [designated by Geisthardt 2007: 45]

Afrodiaphanes pulcher FANTI & M. G. PANKOWSKI sp. nov.

(Fig. 1)

Description. Male, adult, alate, robust, elongate, slightly convex. Body length: 17 mm. Entirely golden orange and testaceous, with elytra having two black lines (wider basally and narrower apically) near suture in scutellar zone, abdomen testaceous, legs and antennae black.

Head small, entirely covered by pronotum. Eyes black, wide, rounded, occupying most of head. Antennae 10-segmented, short, thick, pubescent; scape club-shaped, very robust, widened apically; antennomere II short; antennomere III elongated, longest (except tenth antennomere), about 2.0 times longer than second; antennomere IV similar to third and very slightly shorter; antennomeres V-IX short, thick, sub-equal; antennomere X longer than previous ones, thick and robust, elongated, and longest of antennomeres. Pronotum slightly wider than long, anterior margin rounded, finely bordered; posterior margin almost straight, slightly bordered, sides almost parallel, corners very slightly protruding backwards, surface convex in disc and with deep depression near corners and depression before anterior margin, surface with punctuation that is slightly impressed (more impressed in middle of pronotum), falcate transparent spots totally absent, an evident ridge longitudinally in middle. Scutellum elongated, narrow, rounded at apex, with shallow punctuation. Elytra rugose, elongated, parallel-sided, rounded at apex, surface with carinulae, humeral and scutellar convex and gibbous. Hind wings covered by elytra. Prosternum robust. Tergites wide and transverse; penultimate tergite with sides at apex slightly protruding backwards. Ventrites transverse, wide, pubescent, with small punctuation; last ventrite with light organs absent, wide basally and rounded apically with a very slightly emargination in middle. Pygidium robust, with sides strongly curved, slightly sinuous apically with extremely short and rounded lobe in middle. Legs relatively short and robust, pubescent with short and numerous setae; femora flat and almost straight; tibiae flat, especially at apex, nearly as long as femora. Tarsal formula 5-5-5, tarsomere I elongated; tarsomere II triangular-shaped, shorter than first; tarsomere III about 0.8 times shorter than second; tarsomere IV strongly bilobed, with lobes narrow and elongated, metatarsomere IV very slightly shorter than first metatarsomere; tarsomere V thin, extremely long; claws simple, strongly curved, smooth, with ventral base strongly expanded. Aedeagus with median lobe (*penis*) curved, enlarged apically, without ventral dilatations (slightly present only at base); parameres shorter than penis, wide basally, apically with a short lobe that is rounded apically.

Etymology. The specific epithet derives from the Latin adjective “*pulchěr*” = beautiful, graceful.

Holotype. ♂, originally labeled as follows: Central African Rep./Nana-Grebizi Prov./25 km NNE Mbres//16-18.7.2011 550 m//A. Kudrna Jr. lgt. All of the original writing is in capital letters.

Distribution. Central African Republic.

Type locality. Central African Republic: Nana-Grébizi Prefecture, 25 km NNE Mbrès, 550 m a.s.l.

Differential diagnosis. *Afrodiaphanes pulcher* sp. nov. differs from *Afrodiaphanes marginipennis* (Boheman, 1851) in several ways. The new species possesses elytra with black lines near the suture on the scutellar zone, while *A. marginipennis* has a blackish elytra with suture, and apex and margins testaceous (Geisthardt 2007; Martin *et al.* 2019). *Afrodiaphanes pulcher* sp. nov. also has the median lobe (*penis*) of its aedeagus more curved and more enlarged apically, and the penis also lacks ventral dilatation; furthermore, it has slightly different parameres and no luminous spots on the last sternite (where *A. marginipennis* has two very small luminous spots). In addition, the first

metatarsomere is about 1.1–1.2 times longer than the fourth metatarsomere, while the first is as long as or shorter than the fourth in *A. marginipennis* (Geisthardt 2007). *Diaphanes pallidior* Pic, 1956 has more testaceous coloration than *Afrodiaphanes pulcher* **sp. nov.** (Pic 1956); *Lampyris tinctoria* Gorham, 1900 has a delicately carinate pronotum with different punctures, and the elytra are opaque with a different coloration (Gorham 1900); and the little-known *Lampyris bicoloripes* Pic, 1931 is slightly smaller in size, has a different coloration of the legs and the elytra is more elongated and narrower (Pic 1931b).

Note. The holotype lacks the last three left antennomeres. With only this specimen found so far, the bioecology, eggs, larva and females are unknown.

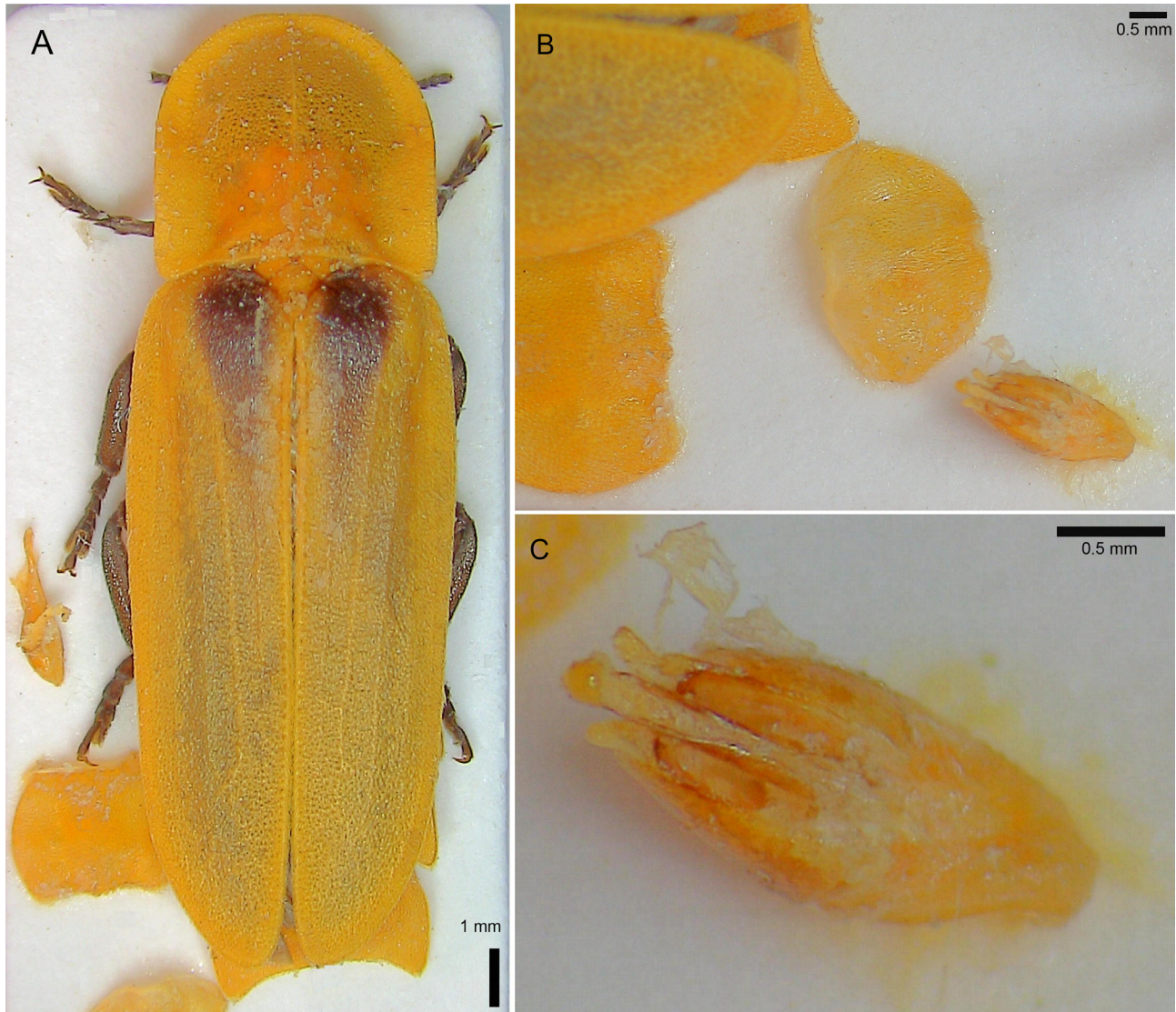


FIGURE 1. *Afrodiaphanes pulcher* **sp. nov.**, holotype. A, habitus (dorsal view); B, detail of pygidium, last sternite and aedeagus; C, detail of aedeagus.

Discussion

It's very likely that a large number of firefly species have yet to be described and studied in Africa. Still, we do have records of numerous diverse species. In the African part of the Afrotropical region, we currently find more than 180 species of fireflies. The genus *Luciola* Laporte, 1833 has the most species, with Madagascar home to the greatest number of species of this genus: 25 (McDermott 1966). The genus *Diaphanes* Motschulsky, 1853 is also rich in species on this continent and is frequently seen as well in the Oriental region (McDermott 1966; Li & Liang 2007). The greatest diversity of fireflies can be found in the Democratic Republic of Congo and South Africa, where

tropical and equatorial regions produce great biodiversity hotspots. Our knowledge of their distribution, however, is incomplete, and the documentation of numerous taxa in these areas could be due, in part, to the fact that more research has been concentrated in these localities than others.

The genus *Afrodiaphanes* Geisthardt, 2007 was fairly recently described, and until now it was monotypic with the species *A. marginipennis* (Boheman, 1851). *A. marginipennis* has several subspecies and is widely dispersed, having been found in Kenya, Uganda, Rwanda, South Sudan and South Africa (Geisthardt 2007). It is possible, as demonstrated by our finding, that there are other species yet to be described as well. It is also probable that many little-known species of the genus *Diaphanes* Motschulsky, 1853 are actually attributable to *Afrodiaphanes*.

This highlights the enormous need for additional taxonomic-systematic work and research throughout Africa. Not only will this increase our bioecological knowledge of these wondrous creatures, but it will help us to preserve their various populations. Deforestation is clearly a looming problem, so time is running out to save these fascinating insects and all the other fauna and flora around them.

Acknowledgements

We are indebted to Dr. Francesco Parisi (University of Florence, Department of Agricultural, Food and Forestry System - DAGRI) for the photographs of the holotype.

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