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Description of a new species of *Iridana* Aurivillius, 1920 from Ghana (Lepidoptera, Lycaenidae, Poritiinae). Study on the Lycaenidae: note n 23.

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Abstract: A new Lycaenidae species of the genus *Iridana* Aurivillius, 1920 is described from Ghana, *Iridana maesseni* **sp. nov.** It is the seventh species of the "*hypocala* group". Genetic and morphological evidence are used to delineate the new species.

Key words: Africa, barcode, *Iridana* "*hypocala* group", **sp. nov.**

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INTRODUCTION

A species of *Iridana* Aurivillius, 1920 of the "*hypocala* group" although reported from Ghana as *Iridana hypocala* Eltringham, 1929 (Larsen, 2005) is in fact an undescribed species. The new species is described below as *Iridana maesseni* **sp. nov.**

The "*hypocala* group" of the genus *Iridana* is therefore now composed of seven species with the addition of *I. maesseni* **sp. nov.** (Bouyer, 2013; Bouyer, 2014; Bouyer & Ducarme, 2015; Bouyer, 2015b):

- *Iridana ducarmei* Bouyer, 2013
- *Iridana hypocala* Eltringham, 1929
- *Iridana jacksoni* Stempffer, 1964
- *Iridana larseni* Bouyer, 2015
- *Iridana maesseni* **sp. nov.**
- *Iridana magnifica* Hawker-Smith, 1933
- *Iridana noellae* Bouyer, 2014

METHODS AND MATERIALS

Genetic analysis of the "*hypocala* group"

Fig. 1 and Tables 1-2

Nineteen specimens of *Iridana* species of the "*hypocala* group", one of *Iridana incredibilis* (Staudinger, 1891) and one of *Teratoneura isabellae* Dudgeon, 1909 were submitted for barcoding, to sequence of a part of the mitochondrial gene COI (658 Bp). All the data of these samples, including their GenBank accession, are provided in Table 2. This fragment of mitochondrial DNA was proposed by Hebert *et al.* (2003 a and b) as a standard genetic marker (also known as DNA barcode) allowing the identification of species (Hajibabaei *et al.*, 2006). The sequences of the specimens studied were obtained at the Canadian Center for DNA Barcoding (CCDB, University of Guelph, Ontario, Canada) according to standard protocols used for these insects. The sequences were aligned with the BOLD alignment tool.

The analysis of the sequences obtained by the maximum likelihood method (TN substitution model) via the freeware MEGA11 (Tamura et al., 2021), makes it possible to obtain a phylogeny which groups samples according to phylogenetic informative characters. ANJ tree would be according to similarity. Genetic distances between two samples are expressed here as a percentage. The bootstrap value is obtained for 500 replications. This value is indicated for each branch.

RESULTS

The result was a phylogenetic reconstruction likelihood tree (generated by MEGA11) highlighting six very well individualized clusters (Fig. 1 and Table 1) with a maximum bootstrap at 99/100 for each. All the samples used were complete with 658 bp. Each of these clusters is considered to correspond to a distinct species. Five of these species are already described and the sixth corresponds to the new species (following methodology used in Bouyer, 2012). Only *Iridana jacksoni* could not be barcoded. Note that this last species is easily characterized by its habitus.

The new species (*maesseni*) is very well isolated within the "*hypocala* group". Its closest neighbor is *I. larseni* with a degree of divergence of 4.3%. This result is significant since it is more than double the difference that exists between *I. hypocala* and *I. noellae* (2%) which are the two most closely related species. They are sympatric related species and are easily separable by habitus (Bouyer, 2014).

Description and diagnosis of *Iridana maesseni* sp. nov.

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Fig. 2

Holotype: Ghana, Likpe, IX-2022, leg. A.C. Selorm, in coll. Th. Bouyer (Belgium, Chênée), Barcode label CTBB-37556 (Fig. 2). Male paratype: Ghana, Likpe, VI-2023, leg. A. C. Selorm, in coll. Bouyer, CTBB-37556. Female

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paratype, via photo from coll. ABRI (Kenya, Nairobi, SC Collins): E. Ghana, Mate Volta, 1/VII/2011, SY/RV, ABRI Leg.
Forewing length: male 14 mm, female 16 mm.

Iridana maesseni (Fig. 2, holotype) is close to *Iridana larseni* (Fig. 3, holotype) with which it is compared.

- On the front of the forewing, the blue basal area is less extensive, clearly increasing the marginal black band as well as the black border located under the cell, even releasing a large black area at the base of the anal interval. The blue patch on the hindwing is also less extensive in *I. maesseni* widening the marginal black border

- On the underside, the general colour is lighter and less reddish, which accentuates the contrast of the pattern. The iridescent patterns, especially on the hindwing, are clearly thicker and slightly more irregular than in *I. larseni*. On the forewing, the post-cellular whitish spots are more extensive and blend into a large greyish area, poorly delimited with the dark grey of the bottom of the wing. The cubito-anal area located between the postdiscal iridescent band and the marginal line is narrower in *I. maesseni*.

The female is distinguished from the male by the shape of the wings, which are slightly more stretched (usual in the genus) and the colour of the upper side, which is entirely blackish brown (as in other species of the "*hypocala* group").

Note: Figs 282b and 282c given by Larsen (2005) are wrongly referenced. Figure 282b represents a female which comes from Cameroon (Mbalmayo, in coll. ABRI) and which could be a female of *I. larseni*, unconfirmed. Figure 282c represents the underside of the same female and is therefore not that of a male from Cameroon.

Derivatio nominis

The species is dedicated to Reverend Father Theodor Maessen, a renowned entomologist, who was one of the first to explore the rhopaloceran fauna of Ghana and who is responsible for a considerable number of discoveries and new species.

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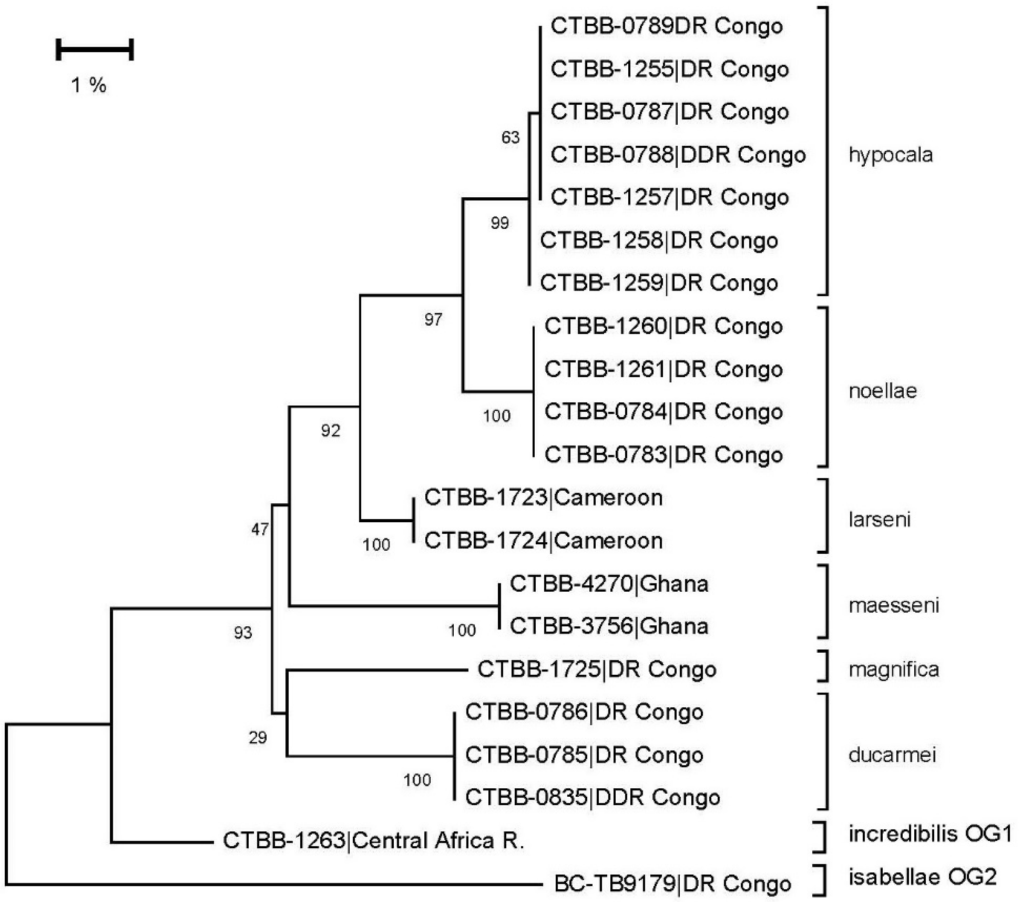

Figure 1 – Phylogenetic reconstruction likelihood tree (generated by MEGA11) of the barcoded samples (sequencing of part of the COI mitochondrial gene of 658 Bp) for the "*hypocala* group" with the bootstrap value obtained for 500 replications. *Iridana incredibilis* and *Teratonera isabellae* were used as outgroups (OG1 and OG2).

Table 1. Estimated distances (in %) between the clusters of the "*hypocala* group" and *I. incredibilis* (OG1 = outgroup 1) and *T. isabellae* (OG2 = outgroup 2) outgroups.

	maesseni	*noellae*	*ducarmei*	*hypocala*	*larseni*	*magnifica*	*incredilbilis*	*T. isabellae*
maesseni	■							
noellae	5,1%	■						
ducarmei	5,0%	5,1%	■					
hypocala	5,9%	2,0%	5,4%	■				
larseni	4,3%	3,0%	3,8%	3,1%	■			
magnifica	5,8%	5,8%	4,6%	5,2%	3,8%	■		
incredilbilis	6,2%	6,1%	5,1%	6,2%	5,2%	5,6%	■	
T. isabellae	12,7%	12,3%	11,8%	11,5%	10,7%	11,8%	9,8%	■

Table 2. Data of the barcoded samples. Process id = Bold id, Sample id = collection id, GenBank acc. = GenBank id.

Process ID	**Identification**	**Sample ID**	**GenBank acc.**	
TBMOT1938-13	*Iridana ducarmei*	CTBB-0786	PQ628512	DR Congo, Nord-Kivu, Kasuo, I-2013.
TBMOT1987-13	*Iridana ducarmei*	CTBB-0835	PQ628523	DR Congo, Nord-Kivu, Kasungo, II-2013.
TBMOT1937-13	*Iridana ducarmei*	CTBB-0785	PQ628519	DR Congo, Nord-Kivu, Kasuo, I-2013.
TBMOT1939-13	*Iridana hypocala*	CTBB-0787	PQ628524	DR Congo, Nord-Kivu, Lume, XI-2009.
TBMOT1940-13	*Iridana hypocala*	CTBB-0788	PQ628505	DR Congo, Nord-Kivu, Lume, XI-2009.
TBMOT1941-13	*Iridana hypocala*	CTBB-0789	PQ628518	DR Congo, Nord-Kivu, Lume, II-2009.
SUBHB2468-22	*Iridana hypocala*	CTBB-3756	PQ628516	Ghana, Volta, Likpe, IX-2022.
SUBHB160-14	*Iridana hypocala*	CTBB-1255	PQ628517	DR Congo, Nord-Kivu, Kasuo, XI-2009.
SUBHB162-14	*Iridana hypocala*	CTBB-1257	PQ628507	DR Congo, Nord-Kivu, Lume, IX-2009.
SUBHB163-14	*Iridana hypocala*	CTBB-1258	PQ628521	DR Congo, Nord-Kivu, Kasuo, IV-2014.
SUBHB164-14	*Iridana hypocala*	CTBB-1259	PQ628525	DR Congo, Nord-Kivu, Maliva, XI-2013.
SUBHB2982-24	*Iridana hypocala*	CTBB-4270	PQ628522	Ghana, Volta, Likpe, VI2023.
SUBHB168-14	*Iridana incredibilis*	CTBB-1263	PQ628508	Centralafrica, Mambele, 27-VII-2008.
SUBHB534-15	*Iridana larseni*	CTBB-1724	PQ628506	Cameroon, West, Koutaba, IX-2014.
SUBHB533-15	*Iridana larseni*	CTBB-1723	PQ628515	Cameroon, West, Koutaba, IX-2014.
SUBHB535-15	*Iridana magnifica*	CTBB-1725	PQ628510	DR Congo, Orientale, Biakato, III-2004.
TBMOT1935-13	*Iridana noellae*	CTBB-0783	PQ628511	DR Congo, Nord-Kivu, Kasuo, VI-2000.
SUBHB165-14	*Iridana noellae*	CTBB-1260	PQ628520	DR Congo, Nord-Kivu, Bikara, X-2013.
SUBHB166-14	*Iridana noellae*	CTBB-1261	PQ628509	DR Congo, Nord-Kivu, Kasuo, IV-2014.
TBMOT1936-13	*Iridana noellae*	CTBB-0784	PQ628514	DR Congo, Nord-Kivu, Mabolio, III-2013.
TBBUT1361-12	*Teratoneura isabellae*	BC-TB9179	PQ628513	DR Congo, Nord-Kivu, Mapimbi, VIII-2011.

Figure 2 – (left) *Iridana maesseni* **sp. nov.**: Male holotype, front on top, back on bottom (Photo T. Bouyer).
Figure 3 – (right) *Iridana larseni* Bouyer 2015: Male holotype, front on top, back on bottom (Photo T. Bouyer).