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Research Article

First record and redescription of *Gerista dimidiata* Bolívar, 1905 (Orthoptera, Acrididae, Oxyinae) from Cameroon

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Abstract

Gerista dimidiata Bolívar, 1905 is the only species in its monotypical Afrotropical genus. It occurs at swampy-forest edges, where it is typically found on broad-leaved forest grasses. Prior to this study, *G. dimidiata* was only recorded from Nigeria and Bioko Island in Equatorial Guinea. Here, we report the first occurrence of *G. dimidiata* for Cameroon, specifically from the Littoral Region in Yansoki and Missole I, significantly expanding the known distribution range of the species. We also redescribe the species, based on material collected from Cameroon, including the first description of the male genitalia. This discovery highlights the incomplete state of knowledge regarding Afrotropical grasshopper diversity in general and specifically in Cameroon.

Key words: Afrotropical grasshopper, distribution range, genitalia, swampy-forest, taxonomy

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Introduction

Oxyinae Brunner von Wattenwyl, 1893 is one of the 16 subfamilies within the family Acrididae (Mestre and Chiffaud 2023). Members of this group are characterised by their small to medium-sized body; a pronotum that is cylindrical or weakly flattened with a weak or absent median and no lateral carinae; and tegmina and wings that may be fully developed, reduced or absent. Diagnostic features also include parallel transverse stridulatory veinlets; a hind femur with the lower basal lobe shorter than the upper one and the lower genicular lobe produced posteriorly into a spine; the hind tibia is usually expanded in the apical half or third with an external apical spine usually present (Khan et al. 2016).

Species of Oxyinae are distributed across Africa, Asia and Australia (Mestre and Chiffaud 2023; Oumarou-Ngoute et al. 2025). Currently, 230 extant species and 38 genera are recognised as valid (Oumarou-Ngoute et al. 2025; Cigliano et al. 2026). Of these, eight are African genera: *Oxya* Audinet-Serville, 1831, *Digentia* Stål, 1878, *Badistica* Karsch, 1891, *Pterotiltus* Karsch, 1893, *Cylindrotiltus*

Ramme, 1929, *Dirshia* Brown, 1962, *Parapterotiltus* Oumarou-Ngoute & Rowell, 2024 and *Gerista* Bolívar, 1905 (Mestre and Chiffaud 2023; Cigliano et al. 2026).

The genus *Gerista* is monotypic, containing only *Gerista dimidiata* Bolívar, 1905 (Mestre and Chiffaud 2023; Cigliano et al. 2026). This species is associated with forest-edges and is typically found on broad-leaved forest grasses (Jago 1962), where it is very scarce. Prior to the present study, *G. dimidiata* was known only from Nigeria and Bioko Island in Equatorial Guinea (Bolivar 1905; Ramme 1929; Jago 1962; Cornes and Riley 1972; Hollis 1975; Medler 1980; Mestre and Chiffaud 2023; Cigliano et al. 2026). This study reports the first record of *G. dimidiata* in Cameroon and provides its redescription based on new material. This new record extends the known range of the species eastwards within the Gulf of Guinea biogeographic region, enhancing our understanding of the diversity and distribution of African Oxyinae.

Materials and methods

Study sites

This study was conducted between February 2020 and March 2026 in the Littoral Region of Cameroon. Specimens were collected from two localities: Missole I (3°59'33"N, 9°52'37"E) and Yansoki (3°58'5.56"N, 9°47'21"E) (Fig. 1). The Littoral Region of Cameroon lies within the equatorial zone and is characterised by high annual rainfall (approximately 4,000 mm) and relatively constant temperatures (around 27 °C). The climate is of the "Cameroonian type", hot and humid, with a unimodal rainfall regime and two distinct seasons. The rainy season extends for approximately nine months (Suchel 1988). The vegetation is predominantly dense rainforest, covering approximately 20,248 km^2 and accounting for 4.4% of the country's total forest cover (Letouzey 1985). Mangrove ecosystems occur along the estuarine coasts of Cameroon, particularly around the mouths of the Sanaga and Nyong Rivers. This amphibious vegetation type is primarily characterised by species of the genus *Rhizophora* (Rhizophoraceae). Inland from the mangroves, lowland coastal forests extend approximately 50–100 km around Douala, where *Lophira alata* (Ochnaceae) is the dominant species. Beyond this zone, between 100 and 150 km inland, dense and humid evergreen forests of low to medium altitude prevail. Further north, increasing elevation gives rise to semi-deciduous forests dominated by Sterculiaceae species. However, these forests have been largely degraded and replaced, on a broad scale, by industrial plantations, including coffee, oil palm, banana and rubber (*Hevea brasiliensis*) (Wandji et al. 2021). In addition to the Cameroonian localities surveyed, previously documented occurrence records from Bioko Island (Equatorial Guinea) (Bolivar 1905) and Nigeria (Jago 1962) were included in the distribution map to improve our understanding of the species' known distribution range.

Sampling

Monthly captures were carried out and grasshoppers were collected using sweep nets following the method of Launois (1979). Target species were collected for 60 minutes per sampling day between 10 a.m. and 4 p.m. (Yetchom

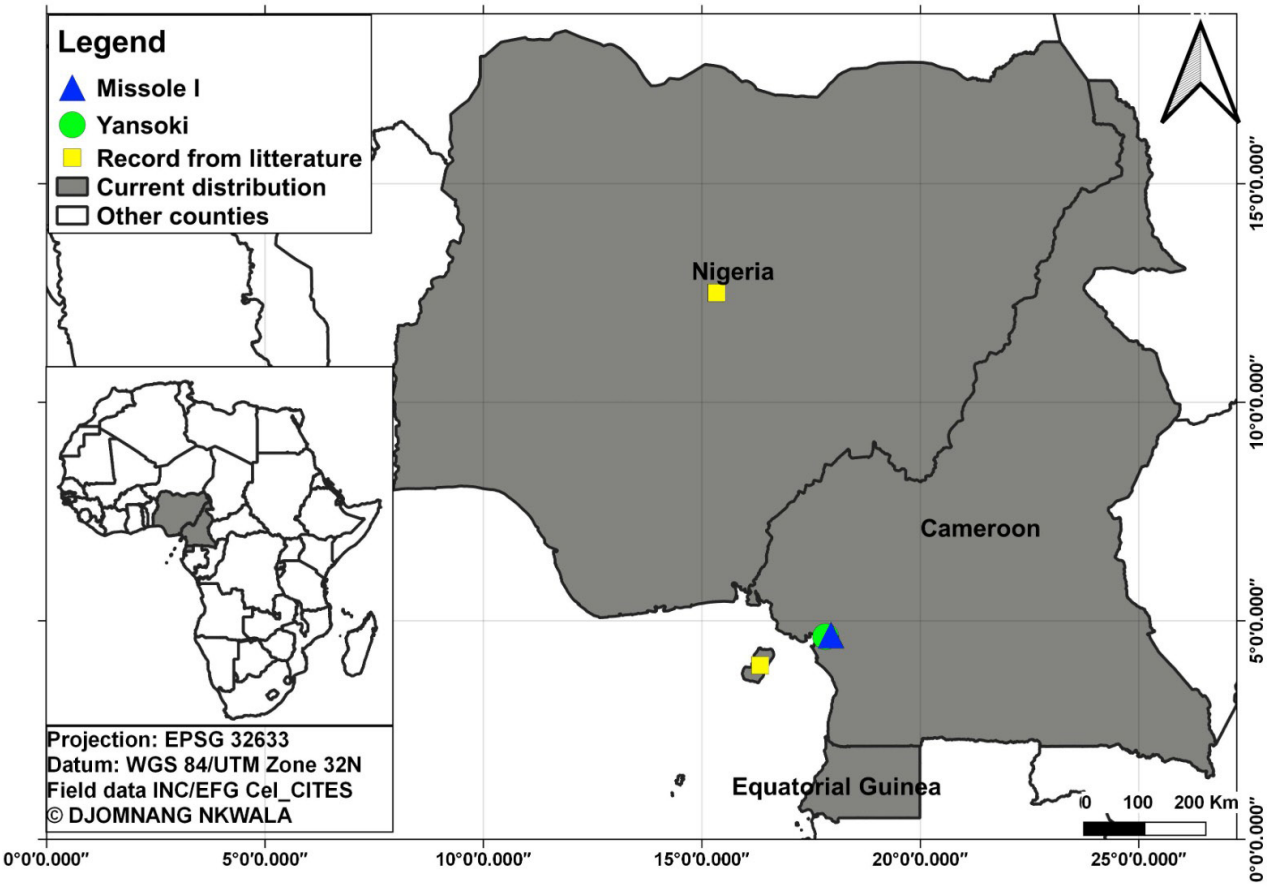

Figure 1. Distribution map of *Gerista dimidiata*, based on historical records and newly-documented occurrences in Cameroon.

Fondjo et al. 2020). Specimens were actively searched on grasses edging swamps in gallery forests. Photographs of specimens in their natural habitat were taken using a digital camera (OM SYSTEM TG-7, Olympus, Japan); colour descriptions of the species were based on these photographs. Geographical coordinates were recorded in decimal degrees (WGS84 coordinate system) with a GPS device (Garmin GPSMAP 64s, USA). Collected specimens were preserved in 95% ethanol and transported to the Laboratory of Biology of Animal Organisms, University of Douala, for subsequent examination and identification.

Identification and morphometric analysis

Specimens were identified under a stereo-microscope (Wild Heerbrugg, Switzerland) using the identification keys of Jago (1962) and Bolivar (1905). Measurements (Table 1) were taken using digital calipers (NEICO, USA) to the nearest 0.1 mm. The measured parameters included head length (HL), head width (HW), number of antennal segments (NA), antenna length (AL), interocular distance (ID), pronotum length (PL), pronotum width (PW), hind tibia length (HTL), hind femur length (HFL), hind femur width (HFW) and total body length (BL). The type image from the Orthoptera Species Files website was also consulted.

Table 1. Collection data and preservation details of *Gerista dimidiata* specimens examined.

Locality	Date of collection	Number of individuals	Sex	Type of vegetation	Geographical coordinates	Collector	Preservation method
Missole I	22.01.2026	1	Male	Gallery forest	3°59'33"N, 9°52'37"E	A.L. Djomnang Nkwala	Dry
Missole I	18.03.2026	1	Male	Gallery forest	3°59'33"N, 9°52'37"E	A.L. Djomnang Nkwala	Dry
Yansoki	16.02.2020	2	Male	Gallery forest	3°58'5.56"N, 9°47'21.48"E	J.A. Yetchom Fondjo	Ethanol 95%
Yansoki	06.05.2020	3	Male	Gallery forest	3°58'5.56"N, 9°47'21.48"E	J.A. Yetchom Fondjo	Dry

Imaging and genitalia preparation

Ethanol-preserved specimens were photographed in frontal, lateral and dorsal views at the State Museum of Natural History Karlsruhe (SMNK), Germany, using a Keyence VHX-7000 digital microscope (Keyence, London, UK). Dissection and preparation of male genitalia followed the standard procedures described by Kevan et al. (1969) and Martinelli et al. (2017). Photographs of male genitalia were obtained using the same digital microscope. Terminology for male genitalia follows the conventions established by Dirsh (1965), Rowell (2013) and Khan et al. (2016).

Depositories

SMNK State Museum of Natural History Karlsruhe, Germany.
JAYF Collection of JA Yetchom Fondjo, Cameroon.
ALDN Collection of AL Djomnang Nkwala, Cameroon.

Statistical analysis

The mean values and standard deviation (SD) were calculated for each morphometric character using PAST 4.17 software (Hammer et al. 2001)..

Results

A total of seven individuals, all male, were collected for this study, respectively in Yansoki (5 individuals) and Missole I (2 individuals) (Table 1). Measurements are presented in Table 2.

Re-description of *Gerista dimidiata* Bolívar, 1905
Figs 2, 3

Holotype. Equatorial Guinea • 1♂; Fernando Póo; L. Conradt leg.; MNCN Madrid

Examined material: • Cameroon; 2♂, Littoral region, Yansoki (3°58'5.56"N, 9°47'21.48"E), 16 February 2020, J.A. Yetchom Fondjo leg., specimens N° 0012020JAYF 0022020JAYF; 3♂, Littoral region, Yansoki (3°58'5.56"N, 9°47'21.48"E), 06 May 2020, J.A. Yetchom Fondjo leg., specimens N° SMNK-ORTH-0003008 SMNK-ORTH-0003009, and SMNK-ORTH-0003010; 2♂, Missole I (3°59'33"N, 9°52'37"E), 10 February 2026; gallery forest, A.L. Djomnang Nkwala leg.; specimens N° 0012026ALDN 0022026ALDN.

Table 2. Measurements [mm] of *Gerista dimidiata*. HL: Head Length; HW: Head Width; NA: Number of Antennal Articles; AL: Antennal Length; ID: Interocular Distance; PL: Pronotum Length; PW: Pronotum Width; PrL: Prozona Length; ML: Metazona Length; HTL: Hind Tibia Length; OTS: Outer Tibial Spines; ITS: Inner Tibial Spines; HFL: Hind Femur Length; HFW: Hind Femur Width; BL: Body Length.

Parameters	Range	Mean ± SD (n)
HL	2.90–3.40	3.20 ± 0.19 (5)
HW	3.47–3.60	3.50 ± 0.05 (5)
NA	26.00–26.00	26.00 ± 0.00 (5)
AL	12.26–14.57	13.80 ± 0.90 (5)
ID	0.34–0.44	0.38 ± 0.04 (5)
PL	4.48–5.02	4.76 ± 0.24 (5)
PW	2.11–2.97	2.34 ± 0.35 (5)
PrL	3.01–3.30	3.10 ± 0.12 (5)
ML	1.60–1.75	1.69 ± 0.06 (5)
HTL	10.94–11.96	11.48 ± 0.37 (5)
OTS	7.00–7.00	7.00 ± 0.00 (5)
ITS	10.00–10.00	10 .00 ± 0.00 (5)
HFL	13.25–14.31	13.50 ± 0.46 (5)
HFW	2.37–2.81	2.70 ± 0.17 (5)
BL	19.43–20.15	19.90 ± 0.29 (5)

Redescription. Male: of small size; ***Head*****:** large; eyes prominent; fastigium of vertex obtusely produced forwards; interocular distance narrower than antennal scape; frons reclinate, with lateral carinae slightly sinuate near the antennae; frontal ridge grooved, gradually widened towards the ocellus and almost obliterated at the sulci; antennae thick, filiform, much longer than the head and pronotum combined; integument finely rugose. ***Thorax*****:** pronotum rugose, subcylindrical, with obtuse posterior margin, lateral lobes slightly wider than long, median carina weak, linear, crossed by three sulci; lateral carina absent; metazona about one-third length of the prozona; tegmina brachypterous, only reaching mid-line of abdomen segment in dorsal view, with strong longitudinal veins, gradually tapering towards the apex, wings smoky; mesosternal interspace open with rounded lobes; hind femur slightly robust, longer, with a slightly expanded lower marginal area not visible from above; hind tibiae strongly hirsute, slightly sinuate, expanded in apical half, with sharp edges; external apical spine absent; presence of seven outer and nine inner tibial spines. ***Abdomen*****:** somewhat compressed; last abdominal tergite sinuated, tympanum present, open; supra-anal plate triangular, with acute apex, bearing mid-longitudinal furrow; cercus compressed, long conical, but not reaching apex of subgenital plate; subgenital plate with obtuse apex in dorsal view, pointing upwards in lateral view (Fig. 2).

Colouration**:** Predominantly yellow with black stripes; head yellow, vertex and occiput black; eyes black; antennae brown with pedicel and scape yellow, fifth basal antennal segments bluish in life specimen, remaining apical segments black; anterior margin of pronotum black, prozona yellow, metazona bluish, lateral lobes of pronotum yellow with large black bands extending from behind eyes to the posterior margin of pronotum, posterior margin black,

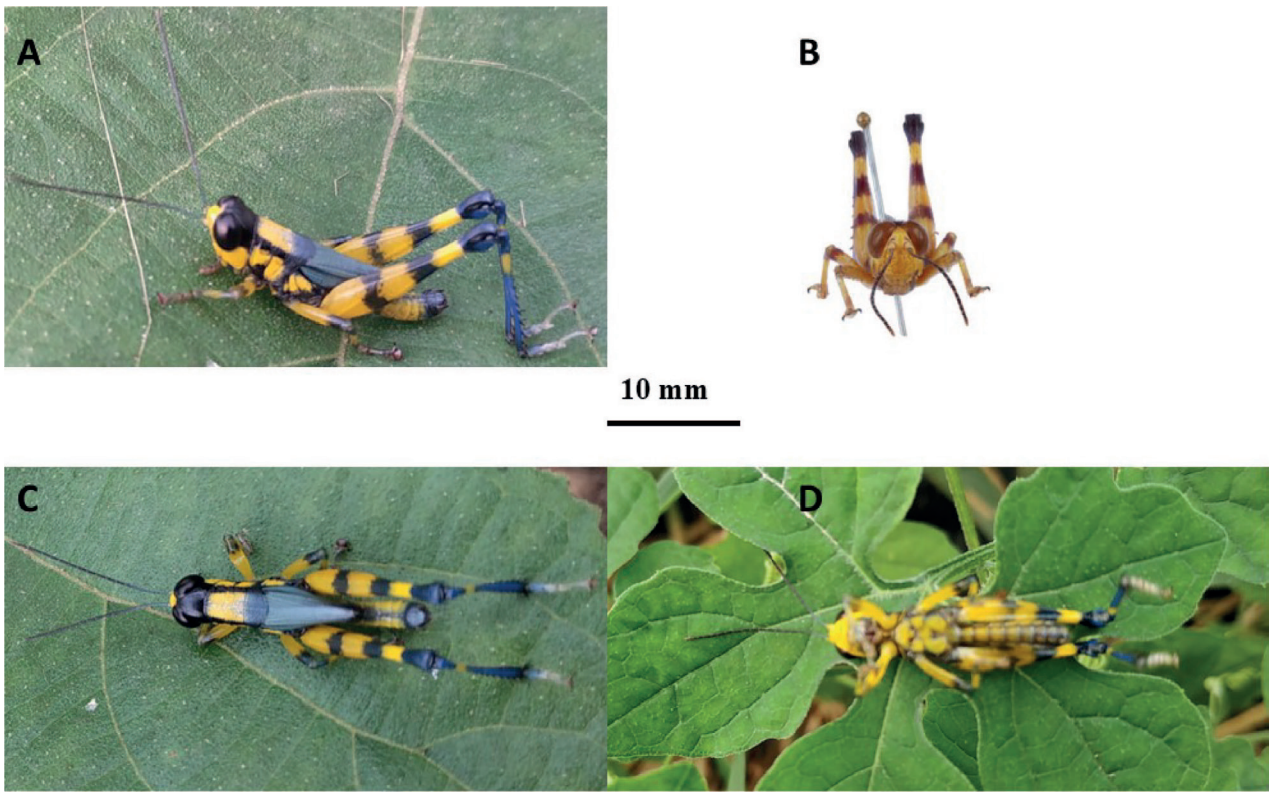

Figure 2. *Gerista dimidiata*. **A, C, D.** Male specimen freshly killed (because of the species' rarity) in lateral, dorsal, and ventral views; **B.** Male specimen preserved in alcohol in frontal view.

ventral margin of the lateral lobes of pronotum black; fore- and middle legs yellow, knees and tarsi suffused with black and blue; hind femur yellow with two large black stripes; hind knees black dorsally, with blue basal lobes; hind tibiae blue with yellow basal stripe and bearing black spines; elytra bluish with black radial vein; abdomen yellow, with last abdominal segment suffused with black and blue (Fig. 2).

Epiphallus: Bridge divided, typical of Oxyinae; ancorae well-developed, pointed inwards with acute apices; lophi lobiform, curved upwards, with angular apices, bearing small inner lobes; oval sclerites narrow and slender; lateral plate slightly straight and parallel (Fig. 3A).

Phallic complex: Phallic complex stout and robust; dorsal arch of cingulum U-shaped; apodemes of cingulum narrow, curved inwards and extending beyond endophallic apodeme tips; Endophallic apodemes large, laterally expanded; zygoma weakly sclerotised, broad; arch of cingulum fused with zygoma, medio-posteriorly produced forming valvular plate; basal valves of penis concave; rami large; ventrolateral sclerites large, weakly sclerotised; ventral lobes fused with ventral sclerites, not extending beyond endophallic valves; apical valves of penis slender, with divergent tip; flexure of endophallus slender in lateral view; ejaculatory sac cylindrical, longer than wide and extending beyond endophallic apodemes; spermatophore sac cylindrical (Fig. 3B, C, D).

Ecological notes. *Gerista dimidiata* was collected during the dry and rainy seasons. The species occurs in gallery forests located along the margins of swamps.

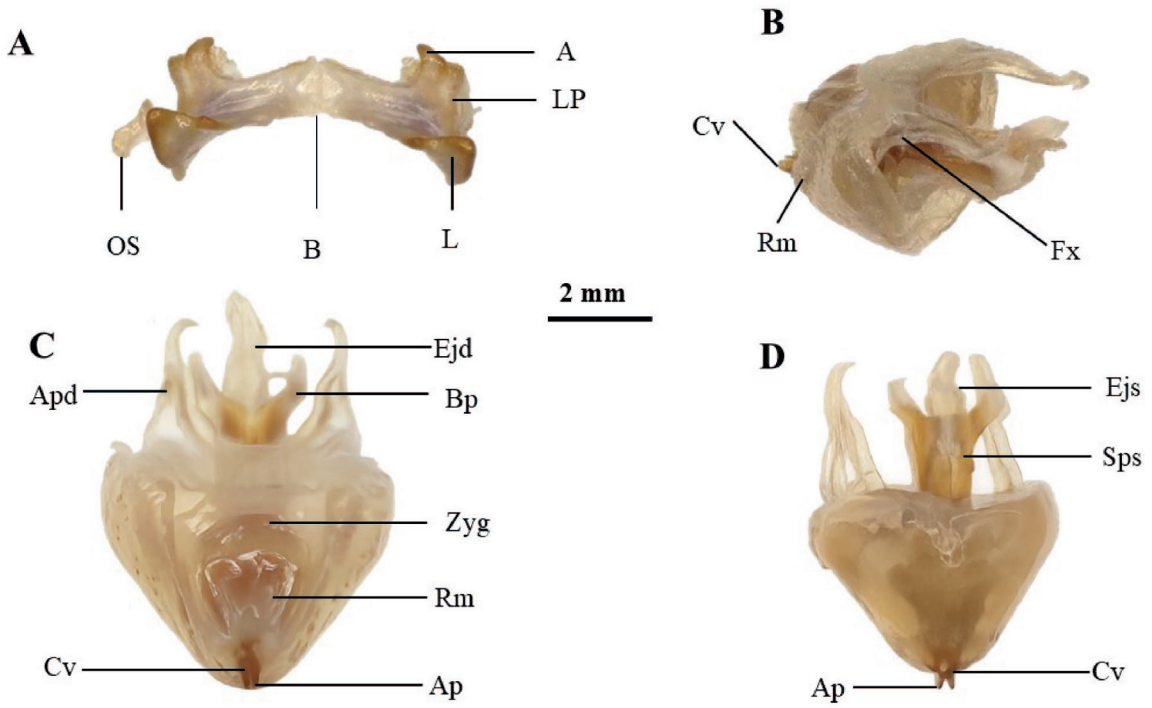

Figure 3. Phallic structures of *Gerista dimidiata* (from ethanol preservation). **A.** Epiphallus in dorsal view; **B.** Ectophallus + Endophallus in lateral view; **C.** Ectophallus + Endophallus in dorsal view; **D.** Ectophallus + Endophallus in ventral view. A: ancorae; Ap: apical valves of penis; Apd: apodeme of cingulum; B: bridge of epiphallus; Bp: basal valves of penis; BS: CB: corpulatory bursa; Ejd: ejaculatory duct; Ejs: ejaculatory sac; Fx: flexure of the endophallus; L: lophus of epiphallus; LP: lateral plate of epiphallus; OS: oval sclerite; Rm: ramus of cingulum; Sps: spermatophore sac; Zyg: zygoma of cingulum.

Discussion

Gerista Bolívar, 1905 is an Afrotropical monotypic genus represented solely by *Gerista dimidiata* Bolívar, 1905 (Mestre and Chiffaud 2023). The present study constitutes the first confirmed record of this species from Cameroon and significantly expands its known geographic range. Before this work, *G. dimidiata* was known only from Bioko Island (Equatorial Guinea) and Nigeria (Bolivar 1905; Ramme 1929; Jago 1962; Cornes and Riley 1972; Hollis 1975; Medler 1980; Mestre and Chiffaud 2023; Cigliano et al. 2026). The new records from the Littoral Region of Cameroon fill an important distributional gap between these previously known localities and suggest that the species may be more widespread within the Guineo-Congolian forest block than currently documented.

All specimens were collected in gallery forests bordering swampy areas and wetlands. These observations corroborate the ecological notes provided by Jago (1962), who described *G. dimidiata* as a forest-edge species associated with broad-leaved grasses. The occurrence of the species in humid gallery forests further suggests a close ecological dependence on dense herbaceous vegetation occurring within forest-wetland transition zones. Such habitats provide suitable microclimatic conditions, food resources and shelter, which may be essential for the persistence of this apparently localised species (Voje et al. 2009; Tomoki et al. 2021; Wandji et al. 2026).

The discovery of *G. dimidiata* in Cameroon considerably extends its previously known distribution and raises important questions regarding its biogeographi-

cal history. Two non-exclusive hypotheses may explain the observed distribution pattern. First, the species may naturally exhibit a fragmented distribution, with populations restricted to isolated patches of suitable habitat throughout the Guineo-Congolian Region. Alternatively, *G. dimidiata* may once have possessed a broader and more continuous distribution, subsequently fragmented by historical climatic fluctuations, geological processes and more recent anthropogenic disturbances. Evidence from the Guineo-Congolian Region indicates that historical contractions and fragmentation of tropical rainforest have influenced the distribution and diversification of forest-associated organisms (de la Estrella et al. 2020). More recently, extensive deforestation and increasing forest fragmentation have been documented in the Littoral Region of Cameroon, driven primarily by agricultural expansion, logging, land clearing, oil-palm cultivation and settlement growth (Mahmoud et al. 2020). Such landscape changes may reduce habitat connectivity and promote the isolation of populations occurring in suitable forest-edge and wetland-associated habitats. Similar effects of forest fragmentation on biodiversity and population connectivity have been documented in other Afrotropical forest systems (Beier et al. 2002; Githiru and Lens 2004). Consequently, the current distribution of *G. dimidiata* may reflect either naturally discontinuous populations or remnants of formerly more widely connected populations that have become increasingly isolated through long-term environmental change and anthropogenic habitat modification.

The apparent rarity of *G. dimidiata* is further supported by both historical and contemporary evidence. Prior to the present study, the species was known solely from the holotype preserved in the Museo Nacional de Ciencias Naturales (MNCN Madrid), with no paratypes or additional confirmed specimens reported in literature. This lack of material suggests that the species has either remained genuinely rare throughout its known range or has been largely overlooked because of its cryptic habits and restricted habitat preferences. Moreover, despite monthly surveys conducted between 2020 and 2026, only seven adult individuals were captured during the present study. Such a low detection rate over an extended sampling period strongly indicates that *G. dimidiata* is either naturally uncommon, occurs at very low population densities or persists in highly localised populations. These findings highlight the need for further targeted surveys throughout the Guineo-Congolian forest region to clarify the species' true distribution, population status, habitat requirements and conservation needs.

From a taxonomic perspective, previous accounts of *G. dimidiata* were based almost exclusively on external morphological characters (Bolivar 1905; Ramme 1929; Jago 1962; Cornes and Riley 1972; Hollis 1975; Medler 1980; Mestre and Chiffaud 2023; Cigliano et al. 2026). The present study supplements these descriptions by providing the first detailed documentation and illustrations of the male genitalia. Male genital structures have proven to be highly informative in Orthoptera taxonomy and often provide reliable characters for species identification, species delimitation and phylogenetic reconstruction (Vera and Prelo 2022). By incorporating genital morphology into the diagnosis of *G. dimidiata*, our study contributes to a more comprehensive characterisation of the species and follows current taxonomic practices increasingly adopted in Acrididae systematics (Yetchom Fondjo et al. 2024, 2025). These new morphological data improve the diagnostic framework for the species and contribute to ongoing efforts to enhance taxonomic resolution within the still poorly-documented Afrotropical Orthoptera fauna.

Conclusions

The discovery of *G. dimidiata* in Cameroon highlights the incomplete state of knowledge of Afrotropical grasshopper diversity. Additional surveys conducted throughout different seasons and across other forested regions of Cameroon will be necessary to better understand the distribution, habitat preferences and conservation status of *G. dimidiata*. Additionally, this study underscores the need for further taxonomic and faunistic surveys in Central African forest ecosystems, which continue to yield previously unrecorded or poorly-known species. This study emphasises the critical role of gallery forests as refugia for endemic and potentially vulnerable grasshopper species, while underscoring the urgent need for integrated conservation strategies regarding the higher rate of urbanisation in the Littoral Region of Cameroon.

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Additional information

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The authors have declared that no competing interests exist.

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Author contributions

All authors conceived the ideas and designed the methodology. ALDN and JAYF collected the data. JAYF dissected the genitalia and produced the photos in the laboratory. JAYF, ALDN, ACW, MMN, MH and SK identified the species. ALDN, ACW and JAYF led the writing of the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

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Data availability

This study is based on original specimen data collected in Cameroon. All data supporting the findings are included in the manuscript.