# On the status of Megalosphecia Le Cerf, 1916, with description of a remarkable new species of Cicinnoscelis Holland, 1893 from West Africa (Lepidoptera: Sesiidae: Sesiini)

Authors: Bartsch, Daniel, Sáfián, Szabolcs, and Wanke, Dominic

Source: Integrative Systematics: Stuttgart Contributions to Natural History, 6(2) : 71-77

Published By: Stuttgart State Museum of Natural History

URL: https://doi.org/10.18476/2023.385895

RESEARCH ARTICLE

# On the status of *Megalosphecia* Le Cerf, 1916, with description of a remarkable new species of *Cicinnoscelis* Holland, 1893 from West Africa (Lepidoptera: Sesiidae: Sesiini)

Daniel Bartsch[1], Szabolcs Sáfián[2] & Dominic Wanke[1,3]

Abstract

A new species of clearwing moth, *Cicinnoscelis grandiosus* Bartsch & Sáfián, **sp. n.** from Sierra Leone and Liberia in West Africa, is described and depicted. Two female specimens were collected while they were laying eggs on the freshly damaged stump of an unidentified tree. A third female was found in the collection of the Berlin Natural History Museum. The male is unknown. We also establish the following junior subjective synonyms: *Megalosphecia* Le Cerf, 1916 = *Cicinnoscelis* Holland, 1893, **syn. n.**, and *Megalosphecia gigantipes* Le Cerf, 1916 = *Cicinnoscelis longipes* Holland, 1893, **syn. n.**

Keywords: Afrotropical Region, clearwing moths, Liberia, new synonyms, Nimba Mountains, Sierra Leone, taxonomy.

Zusammenfassung

Eine neue Art der Glasflügler, *Cicinnoscelis grandiosus* Bartsch & Sáfián, **sp. n.** aus Sierra Leone und Liberia in West Afrika, wird beschrieben und abgebildet. Zwei weibliche Exemplare wurden gesammelt, während sie Eier an den Stumpf eines frisch geschlagenen unbekannten Baumes legten. Ein drittes Weibchen konnte in der Sammlung des Museums für Naturkunde Berlin gefunden werden. Das Männchen ist unbekannt. Weiterhin etablieren wir die folgenden jüngeren subjektiven Synonyme: *Megalosphecia* Le Cerf, 1916 = *Cicinnoscelis* Holland, 1893, **syn. n.**, und *Megalosphecia gigantipes* Le Cerf, 1916 = *Cicinnoscelis longipes* Holland, 1893, **syn. n.**

## Introduction

The outstanding clearwing moth genus *Cicinnoscelis* Holland, 1893 contains some of the largest species of the entire family worldwide. Apart from their size, the most striking common feature of members of this genus are the extraordinarily long, partially tufted hindlegs, which are among the longest in the entire Lepidoptera. Previously, the genus was only known from three species, all of which occur in sub-Saharan Africa (Bartsch 2013; De Prins & De Prins 2011–2023).

*Cicinnoscelis* was described by Holland (1893) based on a single male of *C. longipes* Holland, 1893 from Gabon. A few years later, Hampson (1919), without having seen this specimen, considered *Cicinnoscelis* to be a junior synonym of *Alonina* Walker, 1856. This assumption was maintained for almost a hundred years. Bartsch (2013), however, confirmed *Cicinnoscelis* as a distinct genus, placed it in the tribe Sesiini and published a detailed redescription based on two males of *C. longipes* and the female holotypes of *C. flavipes* Bartsch, 2013 and *C. krooni* Bartsch, 2013. He also pointed out the probable synonymy of *C. longipes* and *Megalosphecia gigantipes* Le Cerf, 1916. At that time, *C. longipes* was only known from males, while *M. gigantipes* was represented by two female holotypes, its own and that of f. *obscura*, both from Cameroon. Apart from the holotype, a few other, many decades old specimens of *C. longipes* are known, all housed in the collection of the Royal Belgian Museum for Central Africa (Tervuren, Belgium). Three males and two females were examined and are also included in the 'Global Sesiidae-Clearwing Moths of the World' project, embedded in the 'Barcoding of Life' initiative (Hebert et al. 2003). Two of these, a male and a female, which morphologically perfectly match the types of *C. longipes* and *M. gigantipes*, respectively, were successfully sequenced as part of the present study and the results clearly show the conspecificity of the two taxa. As a consequence, *Megalosphecia* Le Cerf, 1916 is here proposed as a junior synonym of *Cicinnoscelis* Holland, 1893, **syn. n.**, and *Megalosphecia gigantipes* Le Cerf, 1916 as a junior synonym of *Cicinnoscelis longipes* Holland, 1893, **syn. n.**

During an expedition in the Nimba Mountains, Liberia, two females of *Cicinnoscelis* were collected in an upland forest at about 1,100 m a.s.l. In flight, they strongly resembled a species of spider-hunting *Hemipepsis* Dahl-


**Figs. 1–4.** *Cicinnoscelis longipes* Holland, 1893. **1**. Holotype male; dorsal view. **2**. Male from Democratic Republic of the Congo, Bamanya; underside. **3–4.** Female holotype of *Megalosphecia gigantipes* Le Cerf, 1916. – **3**. Dorsal view. **4**. Underside. Scale bar: 10 mm.

bom, 1844 wasps (Pompilidae). Once landed, it became apparent that they were actually sesiid moths. Even in the wild, the great similarity of these specimens to *C. longipes* was noticeable. However, a more detailed morphological and genetic examination revealed that they are representatives of an as yet undescribed species.

## Material and methods

Type material and the original descriptions were used for the identification and comparison of specimens. Label data of type specimens are cited verbatim in quotation marks, with a slash at the end of each line. Specimens were photographed using a Visionary Digital photography system (LK Imaging System, Dun. Inc.) equipped with a Canon EOS 5 DSLR camera and Canon 100 mm macro lens.


**Figs. 5–8.** *Cicinnoscelis grandiosus* Bartsch & Sáfián, **sp. n.**, females (male unknown). **5–6.** Holotype. – **5**. Dorsal view. **6**. Underside. **7–8.** Paratypes. – **7**. Liberia, Nimba Mountains. **8**. Sierra Leone. Scale bar: 10 mm.

The examined specimens are deposited in the following collections:

CMNH: Carnegie Museum of Natural History, Pittsburgh, USA;
HNHM: Hungarian Natural History Museum, Budapest, Hungary;
MNB: Museum für Naturkunde, Berlin, Germany;
MNHN: Muséum National d'Histoire Naturelle, Paris, France;
RMCA: Royal Belgian Museum for Central Africa, Tervuren, Belgium;
SMNS: Staatliches Museum für Naturkunde, Stuttgart, Germany.

Barcoding analysis

DNA extraction and amplification of the barcode fragment (658 base pairs of the 5' terminus) of the mitochondrial gene Cytochrome-C Oxidase I were performed using standard protocols (e.g., Ivanova et al. 2006). PCR amplification products were sent to Macrogen for sequencing. Genetic distances were calculated using MEGA X (Kumar et al. 2018; Stecher et al. 2020) based on the K2P model by Kimura (1980). *COI* sequences of other taxa used in this study were downloaded from BOLD (http://www.boldsystems.org/ index.php/), Univer-

sity of Guelph, Ontario, Canada. A complete list of specimens used for the analysis is presented in Appendix 1 along with sampling sites and BOLD Process ID numbers.

## Taxonomy

### *Cicinnoscelis* Holland, 1893

*Cicinnoscelis* Holland, 1893: 183. Type species: *Cicinnoscelis longipes* Holland, 1893, by monotypy.

*Megalosphecia* Le Cerf, 1916: 13, pl. 381, fig. 319. **Syn. n.** Type species: *Megalosphecia gigantipes* Le Cerf, 1916, by monotypy. [Description: Le Cerf (1917: 359).]

References: Hampson (1919: 78, as *Cicinoscelis* [sic]); Dalla Torre & Strand (1925: 120, as *Cicinoscelis* [sic]); Naumann (1971: 14); Heppner & Duckworth (1981: 42); Fletcher & Nye (1982: 38); Pühringer & Kallies (2004: 43); Bartsch (2013: 5).

### *Cicinnoscelis longipes* Holland, 1893

*Cicinnoscelis longipes* Holland, 1893: 184. References: Hampson (1919: 78); Dalla Torre & Strand (1925: 120); Gaede (1929: 527); Heppner & Duckworth (1981: 42); Pühringer & Kallies (2004: 43); Bartsch (2013: 5).

*Megalosphecia gigantipes* Le Cerf, 1916: 13. **Syn. n.** References: Le Cerf (1917: 360); Hampson (1919: 79); Dalla Torre & Strand (1925: 172); Gaede (1929: 528); Heppner & Duckworth (1981: 43); Pühringer & Kallies (2004: 44); Bartsch (2013: 6).

Type material examined

Holotype ♂ of *Cicinnoscelis longipes* (Fig. 1): Valley of the Ogowé River, about two hundred miles from the mouth of the river, leg. Rev. Dr. Good; with labels: "Cicinnoscelis / longipes, Holl. / Type. / Ogové. Good", "276" (CMNH).

Holotype ♀ of *Megalosphecia gigantipes* (Figs. 3–4): Afrique occidentale, Johann-Albrechts-Höhe-Station, Kamerun, 1896, leg. L. Conradt; with labels: "Afriq. Occid. / Johann-Albrechts Höhe / Station-Kamerun / L. Conradt / 1896"; "TYPE"; "Megalosphecia gigantipes / ♀, Type Le Cerf / Et. Lep. comp. XII fig. 3192, XIV p. 360 / F. LE CERF det. 1917"; "Ex Collection / Ch. Oberthür / acquise en IV-1925 / par R. Biedermann". Holotype ♀ of *Megalosphecia gigantipes* f. *obscura*: Kamerun, Lolodorf, 1894–1895, leg. L. Conradt; with labels: "Kamerun / Lolodorf, / L. Conradt / 1894-1895"; "TYPE"; "Megalosphecia gigantipes / var. obscura Le Cerf / ♀, Type / Et. Lep. comp. XII fig. 3191, XIV p. 361 / F. LE CERF det. 1917"; "Ex Collection / Ch. Oberthür / acquise en IV-1925 / par R. Biedermann" (MNHN).

Other examined material

1 ♀, Congo, Kivu, [unreadable, probably Stanleyville = Kisangani], 31. Dec. 1921, leg. van Saceghem; 1 ♂, Democratic Republic of the Congo, Djibouti, Tshuapa [river]: Bamanya, 15. Jan. 1965, leg. R.P. Hulstaert; 2 ♂, 1 ♀, (1 ♂ Fig. 2): Congo, Eala. Nov. 1936, leg. J. Ghesquière (RMCA).

Remarks

So far, this species has been recorded from Cameroon, Gabon and the Democratic Republic of the Congo. A record from Sierra Leone (De Prins & De Prins 2011–2023) belongs to *C. grandiosus* **sp. n.**

### *Cicinnoscelis grandiosus* Bartsch & Sáfián, sp. n.

(Figs. 5–8)

Type material

Holotype ♀ (Figs. 5–6): "Liberia, Nimba County, / East Nimba NR Cellcom / Road cc., 1150 m, 16.XI.2022, / 7°31'44.2"N 8°31'38.4"W, / netted during egg laying, / Sz. Sáfián, D. Bartsch leg."; "Holotypus / Cicinnoscelis grandiosus / Bartsch & Sáfián, 2023 / ♀ / D. BARTSCH, des. 2023" (SMNS).

Paratypes: 1 ♀, same data as holotype (HNHM) (Fig. 7); 1 ♀, "Sierra Leone / 1888, Preuss [leg.]" (ZMHB) (Fig. 8).

Description

Female. Holotype with alar expanse of 60.0 mm, forewing 27.0 mm, antenna 16.5 mm, body length (without legs) 31.5 mm, hindlegs outstretched 46.0 mm. Head: labial palpus rust-red, mottled with some black scales, ventrally orange-rust, first palpomere in distal portion laterally black; frons rust-red, white adjacent to eyes, medially dark grey; vertex dark greyish brown, medially black, bald between antenna and ocellus, with light spot in front of ocellus; pericephalic scales dorso-medially dark greyish brown, dorso-laterally black, laterally rust-red, ventrally ochre-yellow; antenna rust-red, dorsally with some black scales in proximal portion. Thorax: patagia rust-red, medially blackish grey, laterally orange; mesothorax dorsally smooth, black, rust-red adjacent to tegula, laterally covered with short, hair-like, mixed blackish grey and rust-red to orange-rust scales, caudal portion orange-rust; tegula rust-red, framed with black, caudally with dense tuft of hair-like, ochre, laterally black scales; metathorax with dorso-lateral scale tufts ochre, basally brown, with an additional long, dense, dark grey tuft laterally at hindwing base. Legs: predominantly smooth, except for hindleg all legs almost entirely rust-red to orange-rust; mid tibia proximally with little black spot; hind tibia densely tufted on inner side and distal third of outer side, dorsally pale orange-rust, sub-distally with black, dorso-lateral spot, laterally black proximal to mid-spurs, at level of spurs an indistinct, narrow, white diagonal stripe. Wings: forewing opaque, velvet black, part distad of discal vein with light violet shine, wing base with oblique, dark rust-red stripe from base of costal margin to anal margin; hindwing opaque, black, at discal cell mixed with rust-red, distally slightly transparent, especially along veins, at anal angle transparent, indistinctly bordered, a small transparent area at wing base between second anterior and posterior cubital veins; fringes of all wings black. Abdomen: black with slight steel-blue gloss; first tergite dorsally with small tufts of dark rust-red scales; tip dark rust-red, anal tuft absent. Genitalia not examined.

Male unknown.

### Variation

Insignificant in colour and pattern; wingspan of paratypes 61 and 63 mm, respectively; slight variation in translucence of hindwings.

### Diagnosis

Very similar in size and shape to *Cicinnoscelis longipes*. Females of both species are easily distinguished by their colouration. *Cicinnoscelis longipes* is much darker, with labial palpus densely dark grey; antenna, vertex, patagia and tegula predominantly black; legs dark rust-red, densely mixed with black-grey; forewing base and hindwing discal cell without rust-red marking; anal area of hindwing with transparent part smaller and proximally more clearly defined. Females of *C. flavipes* and *C. krooni* are very different and cannot be confused with *C. grandiosus* **sp. n.**

### Behaviour

Two females were observed flying over a recently partially cleared patch in a disturbed upland forest close to stumps and trunks of cut shrubs and young trees near the ground between 14.00 and 15.00 local time. The first specimen observed flew in large circles to locate a potential host plant, then landed on the ground near the cut stem of a young tree or creeper and probably performed oviposition. In flight, the insect strongly resembles spider-hunting wasps in the genus *Hemipepsis*, potentially mimicking *Hemipepsis tamisieri* (Guérin, 1848) (Pompilidae), which is widespread in tropical Africa and has been recorded also from Sierra Leone (VAN NOORT 2022). Within half an hour, a second female appeared with very similar behaviour. No further specimens were observed during the next week, despite regular checks.

### DNA barcoding

Alongside morphological examination, we compared the *COI* sequence of *C. grandiosus* **sp. n.** with those of the apparently nearest species *C. longipes* and other species of the tribes Sesiini, Osminiini, Paranthrenini and Synanthedonini. Our results correspond well with the morphological results, with *C. grandiosus* **sp. n.** differing from *C. longipes* by 10.3% and by more than 14% from the other taxa (Table 1).

### Etymology

From the Latin grandis (= great, grand).

**Acknowledgements**

We are grateful to HUGO DAL'ASTA and JURATE DE PRINS (RMCA), WOLFRAM MEY (MNB) and JOËL MINET (MNHN) for their kind support, the loan of museum specimens and/or the permission to take photos of type specimens. The late JOHN RAWLINS (CMNH) provided photos of the holotype of *Cicinnoscelis longipes*. FRANZ PÜHRINGER provided photos of *C. longipes* specimens from the RMCA collection. We also acknowledge his outstanding efforts in building the 'Global Sesiidae-Clearwing Moths of the World' project gene database.

**Table 1.** Comparison of pairwise genetic distances (in %) between *Cicinnoscelis grandiosus* Bartsch & Sáfián, **sp. n.**, *Cicinnoscelis longipes* Holland, 1894 and other Afrotropical species: *Alonina rygchiiformis* Walker, 1856; *Anaudia felderi* Wallengren, 1863; *Barbasphecia hephaistos* Pühringer & Sáfián, 2011; *Felderiola candescens* Naumann, 1971 (Sesiini); *Homogyna xanthophora* (Hampson, 1910) (Osminiini); *Sura xylocopiformis* Walker, 1856 (Paranthrenini) and *Tipulamima flavifrons* Holland, 1893 (Synanthedonini), based on *COI* barcodes (658 bp). Analyses were conducted using the Kimura 2-parameter model (KIMURA 1980). The analysis was conducted in MEGA X (KUMAR et al. 2018; STECHER et al. 2020).

| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
|---|---|---|---|---|---|---|---|---|
| 1 *Cicinnoscelis grandiosus* **sp. n.** | | | | | | | | |
| 2 *Cicinnoscelis longipes* | 10.3 | | | | | | | |
| 3 *Alonina rygchiiformis* | 14.8 | 17.5 | | | | | | |
| 4 *Anaudia felderi* | 15.4 | 17.8 | 12.6 | | | | | |
| 5 *Barbasphecia hephaistos* | 16.4 | 18.3 | 16.6 | 13.9 | | | | |
| 6 *Felderiola candescens* | 14.7 | 17.6 | 10.7 | 10.3 | 14.6 | | | |
| 7 *Homogyna xanthophora* | 14.8 | 16.7 | 15.3 | 15.0 | 17.2 | 14.5 | | |
| 8 *Sura xylocopiformis* | 15.5 | 16.2 | 19.3 | 18.2 | 20.6 | 19.8 | 19.4 | |
| 9 *Tipulamima flavifrons* | 16.1 | 19.1 | 17.7 | 15.5 | 18.0 | 16.4 | 17.1 | 22.4 |

## References


Bartsch, D. (2013): Revisionary checklist of the Southern African Sesiini (Lepidoptera: Sesiidae) with description of new species. – Zootaxa **3741** (1): 001–054. https://doi.org/10.11646/zootaxa.3741.1.1

Dalla Torre, K. W. & Strand, E. (1925): Aegeriidae. Lepidopterorum Catalogus. Volume 31, pp. 1–202; Berlin (W. Junk). https://doi.org/10.5962/bhl.title.143714

De Prins, J. & De Prins, W. (2011–2023): Afromoths, online database of Afrotropical moth species (Lepidoptera). World Wide Web electronic publication, available from: http://www.afromoths.net (accessed 18 October 2022).

Fletcher, D. S. & Nye, I. W. B. (1982): Bombycoidea, Castnioidea, Cossoidea, Mimallonoidea. Sesioidea, Sphingoidea, Zygaenoidea. – In: Nye, I. W. B. (ed.): The generic names of moths of the world. Volume 4, 192 pp.; London (British Museum (Natural History) Publication No. 848).

Gaede, M. (1929): 22. Familie: Aegeriidae (Sesiidae). – In: Seitz, A. (ed.): Die Großschmetterlinge der Erde. Die afrikanischen Spinner und Schwärmer. Band 14, pp. 515–538; Stuttgart (Alfred Kernen).

Hampson, G. F. (1919): A classification of the Aegeriadae of the Oriental and Ethiopian Regions. – Novitates Zoologicae **26** (1): 46–119. https://doi.org/10.5962/bhl.part.5633

Hebert, P. D. N., Cywinska, A., Balland, S. L. & deWaard, J. R. (2003): Biological identifications through DNA barcodes. – Proceedings of the Royal Society B: Biological Sciences **270** (1512): 313−321.

Heppner, J. B. & Duckworth, W. D. (1981): Classification of the superfamily Sesioidea (Lepidoptera: Ditrysia). – Smithsonian Contributions to Zoology **314**: 1–144. https://doi.org/10.5479/si.00810282.314

Holland, W. J. (1893): Four new genera and species of West African Sesiidae. – Journal of the New York Entomological Society **1**: 181–184.

Ivanova, N. V., deWaard, J. R. & Hebert, P. D. N. (2006): An inexpensive, automation-friendly protocol for recovering high-quality DNA. – Molecular Ecology Notes **6**: 998–1002. https://doi.org/10.1111/j.1471-8286.2006.01428.x

Kimura, M. (1980): A simple method for estimating evolutionary rates of base substitutions through comparative studies of nucleotide sequences. – Journal of Molecular Evolution **16**: 111–120. https://doi.org/10.1007/BF01731581

Kumar, S., Stecher, G., Li, M., Knyaz, C. & Tamura, K. (2018): MEGA X: Molecular Evolutionary Genetics Analysis across computing platforms. – Molecular Biology and Evolution **35** (6): 1547–1549. https://doi.org/10.1093/molbev/msy096

Le Cerf, F. (1916): Explication des planches. – In: Oberthür, C. (ed.): Études de Lépidoptérologie Comparée **12** (1): 7–14, pls. 373–381. https://doi.org/10.5962/bhl.title.8792

Le Cerf, F. (1917): Contributions à l'étude des Aegeriidae. Description et iconographie d'espèces et de formes nouvelles ou peu connues. – In: Oberthür, C. (ed.): *Études de Lépidoptérologie Comparée* **14**: 137–388, pls. 475–481. https://doi.org/10.5962/bhl.title.8792

Naumann, C. M. (1971): Untersuchungen zur Systematik und Phylogenese der holarktischen Sesiiden (Insecta, Lepidoptera). Volume 1, 190 pp.; Bonn (Bonner Zoologische Monographien).

Noort, S. van (2022): WaspWeb: Hymenoptera of the Afrotropical region. Available from: http://www.waspweb.org/ (accessed 11 January 2023).

Pühringer, F. & Kallies, A. (2004): Provisional checklist of the Sesiidae of the world (Lepidoptera: Ditrysia). – Mitteilungen der Entomologischen Arbeitsgemeinschaft Salzkammergut **4**: 1–85.

Stecher, G., Tamura, K. & Kumar, S. (2020): Molecular Evolutionary Genetics Analysis (MEGA) for macOS. – Molecular Biology and Evolution **37** (4): 1237–1239. https://doi.org/10.1093/molbev/msz312



Authors' addresses:

[1]Staatliches Museum für Naturkunde Stuttgart, Rosenstein 1, D-70191 Stuttgart, Germany;
e-mails: daniel.bartsch@smns-bw.de (DB; corresponding author), dominic.wanke@smns-bw.de (DW);
https://orcid.org/0000-0002-3778-2187 (DB), https://orcid.org/0000-0001-5390-8993 (DW)

[2]Hungarian Natural Heritage Trust. 9945 Kercaszomor, Fő út 57, Hungary;
e-mail: szsafian@gmail.com; https://orcid.org/0000-0002-0614-4203

[3]University of Hohenheim, Schloss Hohenheim 1, 70599 Stuttgart, Germany



ZooBank registration: https://zoobank.org/References/8FD0B93C-8E61-41F5-BBB4-451A186F9D73

Manuscript received: 13.III.2023; accepted: 28.XI.2023.

**Appendix 1.** List of specimens used for the calculation of genetic distances, with species, sampling site and BOLD Process ID.

| **Taxon identification** | **Sampling site** | **Process ID** |
|---|---|---|
| *Cicinnoscelis grandiosus* **sp. n.** | Liberia, Nimba Mountains | GSCMS002-23 |
| *Cicinnoscelis longipes* | Democratic Republic of the Congo, Eala | GSCMB733-12 |
| *Cicinnoscelis longipes* | Democratic Republic of the Congo, Bamanya | GSCMA1231-11 |
| *Alonina rygchiiformis* | Kenya, Malindi | GSCMA1327-11 |
| *Anaudia felderi* | South Africa, Kalahari, Hotazel | GSCMA876-11 |
| *Anaudia felderi* | South Africa, Kalahari, Hotazel | GSCMA883-11 |
| *Barbasphecia hephaistos* | Ghana, Central, Kakum | GSCMA272-10 |
| *Felderiola candescens* | South Africa, Bethlehem (?) | GSCMA1317-11 |
| *Felderiola candescens* | South Africa, Bethlehem (?) | GSCMA1319-11 |
| *Homogyna xanthophora* | South Africa, KwaZulu-Natal, Utrecht | GSCMA909-11 |
| *Sura xylocopiformis* | South Africa, Mpumalanga | GSCMW1277-10 |
| *Sura xylocopiformis* | South Africa, Louis Trichard | GSCMA515-10 |
| *Tipulamima flavifrons* | Democratic Republic of the Congo, Bokatola | GSCMB473-12 |