

Scientific Note

New distributional records for *Khamul* Gates, 2008 (Hymenoptera: Eurytomidae) from Brazil

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Abstract. *Khamul* Gates, 2008 (Hymenoptera: Eurytomidae), a small genus poorly represented in entomological collections, is widely distributed in the Neotropical region, occurring mainly in tropical forests. This study reports the expansion of the geographic distribution of *Khamul erwini* Gates, 2008 to the state of Amazonas and *Khamul lanceolatus* Gates, 2008 to the states of Goiás and Minas Gerais, Brazil. These new records are an important contribution to understanding the distribution patterns of *Khamul* species in Brazil. In addition, illustrations and maps of geographic distribution of the studied species are provided based on new records and data from the literature.

Keywords: Chalcidoidea, extension of geographic range, Neotropical Region.

Khamul Gates, 2008 (Hymenoptera: Eurytomidae) is a small genus infrequently encountered in entomological collections, comprising four species: *Khamul erwini*, *Khamul lanceolatus*, *Khamul gothmogi* and *Khamul tolkeini*, all of which were described by Gates (2008). The species of *Khamul* can be distinguished from other eurytomids by four unique characteristics that support their monophyly: female flagellomeres cylindrical and tightly appressed, parallel-sided, with decumbent setation; apex of clava with elongate sensillar region; deep notauli and reticulate scutellar boss present (Gates 2008). Additional characteristics useful for identifying *Khamul* species in combination with the aforementioned are described by Gates (2008).

All known species of *Khamul* are found solely within the Neotropical region, primarily inhabiting tropical forests. *K. erwini* has been documented in Costa Rica, Colombia, Ecuador and Brazil (ES); *K. lanceolatus* in Mexico, Costa Rica and Peru; while *K. gothmogi* and *K. tolkeini* are found in Ecuador and Peru (Gates 2008; Noyes 2019; UCD Community 2023).

The sole available information regarding *Khamul*'s biology originates from the label on a specimen of *K. lanceolatus* from Mexico. It states that the specimen was reared from eggs of *Prisopus* Saint-Fargeau & Audinet-Serville, 1828 (Phasmatodea: Prisopodidae) found in association with leaves of *Chamaedorea* sp. (Arecaceae) (Gates 2008).

Our knowledge of the fauna of Brazilian *Khamul* and its distribution remains limited and incomplete. The present study aims to incorporate new geographic distributional data for *K. erwini* and *K. lanceolatus*. These new records significantly enhance our comprehension of the distribution patterns of *Khamul* species in Brazil. Furthermore, illustrations and maps of the geographic distribution of the examined species are included based on both new findings and existing literature data.

The studied material consisted of two females of *K. erwini* from the Entomological Collection of the Instituto de Pesquisas da Amazônia (INPA), Manaus, AM, Brazil (Marcio Luiz de Oliveira, curator) and ten female specimens of *K. lanceolatus* collected using Malaise traps (model Townes 1972) in Brazilian savanna areas at Parque Nacional da Chapada dos Veadeiros (PNCV), in Alto Paraíso de Goiás, Goiás state, and at Parque Nacional Grande Sertão Veredas (PNGSV), in Chapada Gaúcha, Minas Gerais state, Brazil. These specimens were deposited

at the Entomological Collection of the Laboratório de Sistemática e Bioecologia de Predadores e Parasitoides (LRRP), Instituto Biológico, Ribeirão Preto, SP, Brazil (N. W. Perioto, curator). The sampling protocol conducted at PNCV and PNGSV is detailed in Lara & Perioto (2021).

Observations and descriptions were conducted under magnification using a stereomicroscope Leica S APO. Color images were captured with a digital camera Leica DFC295 attached to a stereomicroscope Leica M205C APO. The specimens under study were illuminated with high diffuse dome illumination Leica LED5000 HDI. Serial images from different layers were generated using Leica Application Suite software (LAS version 4.12.0) and merged with Helicon Focus software (v. 5.3). Figure plates were created using Adobe Photoshop software (v. 11.0).

Identification was carried out utilizing the key proposed by Gates (2008). Species distributions were compiled into a dataset and integrated into distribution maps. Geographic coordinates of species records, if absent from labels, were sourced from Google Earth software (<https://www.google.com/earth/>). The distribution maps were generated using the web software SimpleMappr (Shorthouse 2010).

The following acronyms refer to Brazilian states: AM, Amazonas; ES, Espírito Santo; GO, Goiás and MG, Minas Gerais.

Khamul erwini Gates, 2008

Figs. 1-2

Khamul erwini Gates, 2008: 27.

New distributional record: Manaus (AM), Brazil (Fig. 2).

Material Examined: 2 females: "Brasil, Amazonas, Manaus, Emprapa-Guar. conv., 26.x.2012, 2°53'42.18"S/59°59'10.58"O, Mata Malaise, Lote: 1673, Karine Schoeninger col."; same data except 23.xi.2012, Lote: 1951.

Biology: Unknown.

Distribution: Brazil (AM, ES), Costa Rica, Colombia and Ecuador (Gates 2008; Noyes 2019; UCD Community 2023) (Fig. 2).

Discussion: *Khamul erwini* was described by Gates (2008) based on specimens collected from Ecuador (type locality: Orellana), Costa Rica, Colombia and Brazil (ES). This note extends the distribution range of *K. erwini* to Manaus, AM, Brazil, about 1900 km east from the type locality.

Khamul lanceolatus Gates, 2008

Figs. 3-4

Khamul lanceolatus Gates, 2008: 30.

New distributional records: Alto Paraíso de Goiás (GO) and Chapada Gaúcha (MG), Brazil (Fig. 4).

Material Examined: 10 females: "BRA, GO, Alto Paraíso de Goiás, PARNA Chapada dos Veadeiros, 14°08'34"S / 47°46'00"W, Cerrado / Arm. Malaise, 2 / I / 2019, NW Perito & RIR Lara, cols." 5 females (LRRP# 20910-20914); same data except 15 / I / 2019, 1 female (LRRP# 20915); same data except 26 / II / 2019, 2 females (LRRP# 20916-20917); same data except 6 / XI / 2018, 1 female (LRRP# 20918); "BRA, MG, Chapada Gaúcha, PARNA Grande Sertão Veredas, 15°10'30.6"S / 45°43'16.6"W, Cerrado / Arm. Malaise, 18 / 12 / 2018, NW Perito & RIR Lara, cols.", 1 female (LRRP# 20919).**Biology:** Unknown.**Distribution:** Brazil (GO, MG), Mexico, Costa Rica and Peru (Gates 2008) (Fig. 4).**Discussion:** *Khamul lanceolatus* was described by Gates (2008) based on specimens collected from Costa Rica (type locality: Guanacaste), Mexico and Peru. This note expands the distribution range of *K. lanceolatus* to Alto Paraíso de Goiás (GO) and Chapada Gaúcha (MG), Brazil, approximately 5,000 km southeast of its type locality and is its first report in the Brazilian savanna. It appears reasonable to propose the existence of seasonality in the occurrence of these insects in the studied environments, as all specimens of *K. lanceolatus* obtained were captured between November and February, corresponding to late spring and summer in the southern hemisphere, which are the hottest and wettest periods of the year.**Acknowledgements**

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Authors' Contributions

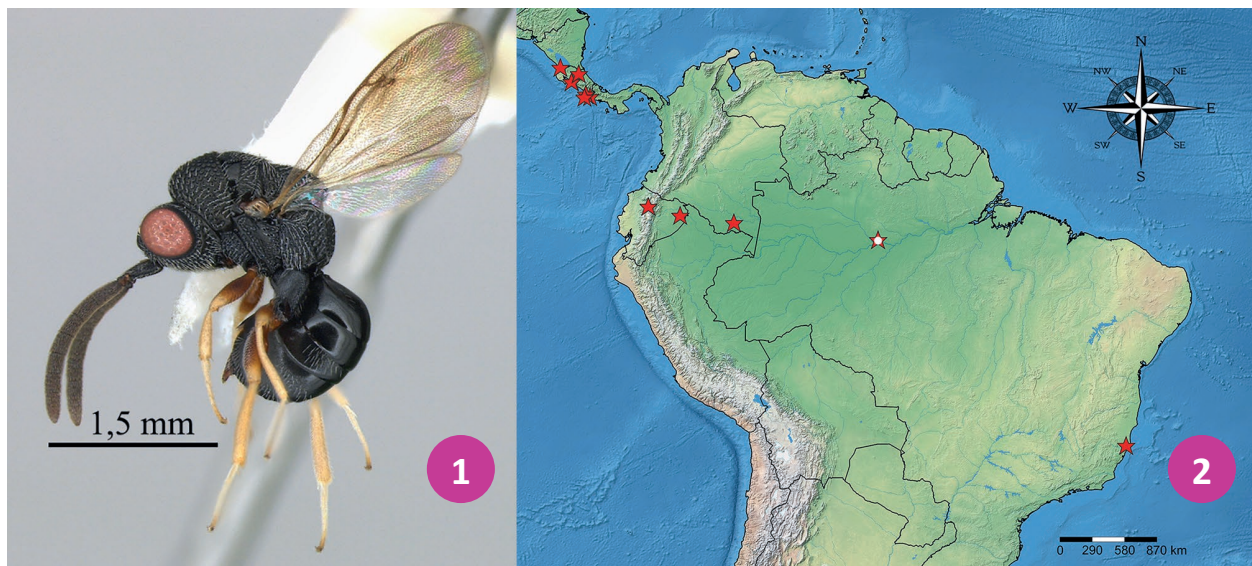
NWP and RIRL: Conceptualization, Formal Analysis, Writing – original draft, Writing – review & editing.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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**Figures 1-2.** *Khamul erwini* Gates, 2008 (Hymenoptera: Eurytomidae). 1. Lateral habitus; 2. Part of Central and South Americas, showing its distribution (red stars: known distributional records, red star with white center: new distributional record).**Figures 3-4.** *Khamul lanceolatus* Gates, 2008 (Hymenoptera: Eurytomidae). 3. Lateral habitus; 4. Part of Central and South Americas, showing its distribution (red dots: known distributional records, red dots with white center: new distributional records).



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