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Two new members of Tridactylidae (Orthoptera: Caelifera) from mid-Cretaceous Kachin amber

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Abstract

Two new members of Tridactylidae Brullé, 1835 are described based on specimens found in mid-Cretaceous Kachin amber from Northern Myanmar. *Duappendactylus melanocephalus* **gen. et sp. nov.** is assigned to the family based on its two-segmented cerci and inflated mesotibia. It is similar to *Birmitoxya* Gorochov, 2010 by its lack of (visible) paraproctal processes and the presence of an elongated, upward-facing subgenital plate, but differs from that genus in several other aspects of its morphology. Additionally, we describe *Hiemalidactylus eileenae* **gen. et sp. nov.** based on a well preserved, presumably nymphal specimen. It is assigned to Tridactylidae based on the two-segmented cerci and the inflated mesotibia. Like the two aforementioned genera, *Hiemalidactylus* does not have cerciform paraproctal processes. However, this genus differs from *Birmitoxya* and *Duappendactylus* by not having an elongated subgenital plate. Instead, the paraproct is elongated and reaches almost the length of the basal segment of the cercus. These new species of Tridactylidae raise the diversity of this family known from Kachin amber to nine genera and eleven species.

Key words: Burmese amber, fossil, nymph, pygmy mole crickets, taxonomy, Tridactyloidea

1. Introduction

Tridactylidae Brullé, 1835 is a family within the superfamily Tridactyloidea Brullé, 1835 (infraorder Tridactylidea Brullé, 1835), which is one of the two main groupings of the Caelifera Ander, 1936 (the other is the more diverse and commonly known Acrididea Targioni-Tozzetti, 1882). Tridactyloidea consists of three families: Tridactylidae, Ripipterygidae Ander, 1939 and Cylindrachetidae Giglio-Tos, 1914 (Cigliano *et al.*, 2025). Their monophyly is well supported by several morphological characters as stated by Heads (2010): 1) the prosternum directly connected to the pronotum via a precoxal bridge. 2) Pro- and mesotarsus with only two tarsomeres. 3) Metatarsus reduced to a single tarsomere. 4) Absence of arolia. 5) Abdomen with nine fully sclerotized sterna in both sexes, the ninth forming a simple subgenital plate lacking styli. 6) Presence of abdominal repugnatorial glands. 7) Paraproct bearing distinctive cerciform processes (secondarily lost in Cylindrachetidae). This grouping is further supported by recent molecular phylogenetic data (Song *et al.*, 2015).

Cylindrachetidae are known from Australia and New Guinea, as well as parts of South America and are heavily adapted to a subterranean lifestyle (Houston, 2007). This is reflected in their anatomy with forelegs highly modified for digging, reduced mid- and hindlegs, simple eyes instead of compound eyes, reduced antennae and cerci, and entirely absent wings (Houston, 2007). For now, there are no representatives of this family known from fossils. Tridactylidae and Ripipterygidae are superficially similar. Both taxa are present in the fossil record with a few species, 8 for Ripipterygidae and 21 for Tridactylidae (Cigliano *et al.*, 2025). Most of these findings were made in amber from the mid-Cretaceous found in Kachin state of northern Myanmar (Zhao *et al.*, 2024). Other

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findings have been made in Cretaceous deposits of Russia, Mongolia and the UK (Tridactylidae: Mongoloxyinae Gorochov, 1992) (Gorochov, 1992; Gorochov *et al.*, 2006; Sharov, 1968) as well as in the Crato Formation of Brazil (Tridacytlidae: Tridactylinae Brullé, 1835) (Martins-Neto, 1990). No tridactyloid has been discovered from older than the Cretaceous, however, the Triassic to Jurassic superfamily Dzhajloutshelloidea Gorochov, 1994 is believed to be a close relative of Tridactyloidea (Gorochov, 2005). Dated molecular phylogenies suggest the origin of Tridactyloidea in the Late Triassic, ca. 203 Mya (Song *et al.*, 2015).

Tridactylidae differ from Ripipterygidae as follows: 1) two-segmented cerci (Ripipterygidae one-segmented). 2) Inflated mesotibiae (the mesotibia is wider than or at least of equal width as the mesofemur; in Ripipterygidae the mesotibia is narrower than the mesofemur). 3) The ovipositor not being visible in female Tridactylidae (in Ripipterygidae, the ovipositor is visible). 4) The paraproctal lobes do not feature a distinct array of long setae, which is present in Ripipterygidae. 5) The paraproctal processes look like a second pair of cerci, but in Ripipterygidae they can have more modified shapes (Gorochov, 2010; Gu *et al.*, 2022; Heads, 2010).

In this study we describe two new genera and species of Tridactylidae from mid-Cretaceous Kachin amber. The new taxa add to the diversity of fossil species known from the family and are important for a better understanding of their evolutionary history.

Materials and methods

Amber pieces used in this study are deposited in the collection of the Leibniz Institute for the Analysis of Biodiversity Change (Hamburg) (collection numbers GPIH07246 and GPIH07247). They were excavated in Myanmar in a mining site either near Tanai village or Hkamti village. The age of the two amber sites differs by ca. 10 My. Amber from Tanai is estimated to be 98.79 ± 0.62 My old (Shi *et al.* 2012), amber from Hkamti is ca. 110 My old (Xing & Qiu, 2020). Studies on amber from Myanmar, especially if it was obtained post 2017, are connected to a controversial ethical debate. However, reports such as Peretti (2021) illustrate the possible problems for the indigenous people of Myanmar that a generalized ban on Myanmar amber studies as requested by the Society of Vertebrate Paleontology (Engel, 2020) may hold. With the situation being as described by Peretti (2021), we agree with Haug *et al.* (2020) that scientific studies on amber from Myanmar should continue, as they open the door to an invaluable treasure of knowledge, especially in the case of Cretaceous invertebrate evolution and diversity.

The specimens presented in this study were imaged using a DUN. Inc. stacking system with a Canon EOS 5Dsr Camera (65 mm lens, magnification 2.5x). Individual pictures were taken with VD Passport and Capture One program (Capture One A/S, Denmark) and stacked with Zerene Stacker (v. 1.04) (Zerene Systems LLC, Washington, USA). They were edited with the Photoshop CS6 extended application by Adobe Inc. (version Adobe Photoshop 2024) (USA; https://www.adobe.com). Further modifications were performed in Inkscape (v. 1.3.2) (the Inkscape Team, 2025). Drawings were created in GIMP (v. 3.0.2-1) (the GIMP Team, 2025).

Taxonomy in this study follows the Orthoptera Species File (OSF) (https://orthoptera.speciesfile.org/, Cigliano *et al.*, 2025).

Systematic paleontology

Order: Orthoptera Olivier, 1789
Suborder: Caelifera Ander, 1936
Infraorder: Tridactylidea Brullé, 1835
Superfamily: Tridactyloidea Brullé, 1835
Family: Tridactylidae Brullé, 1835

Genus *Duappendactylus* gen. nov.

Zoobank-ID: urn:lsid:zoobank.org:act:6C168A1C-3C14-44BA-86CE-F2AA01693B34

Type species: *Duappendactylus melanocephalus* sp. nov.

Etymology: The genus name is a combination of the Latin words “duo” (two) and “appendix” (appendage) as well as the ending -dactylus which is commonly used in Tridactylidae. It refers to the absence of the paraproctal processes of the genus, meaning there are only two and not four (as usually in Tridactylidae) abdominal appendages.

Diagnosis: Small body size, 1.41 mm (head to abdominal apex; not including subgenital plate). Antennae ten-segmented. Only forewings present, with reduced venation. Protibia with three dactyls. Mesotibia distinctly inflated. Metafemur heavily inflated along entire length, dorsally with setae. Metatibia shorter than metafemur and without swimming plates. Apical metatibial spurs slightly longer than subapical tibial spurs. Metatarsus one-segmented, present (i.e. not very reduced as in *Ellipes* Scudder, 1902 or *Xya* Latreille, 1809). Cerci two-segmented, basal segment much wider and longer than distal segment; both segments with setae. Paraproct very prominent, broadly triangular, but without paraproctal processes. Subgenital plate elongated, reaching to ca. half the length of basal cercus segment; directed upwards and with long distinct apical setae.

***Duappendactylus melanocephalus* sp. nov.**

Zoobank-ID: urn:lsid:zoobank.org:act:B8C217F9-6655-4F0D-97FA-6BC398BE05B0
Figs. 1–2

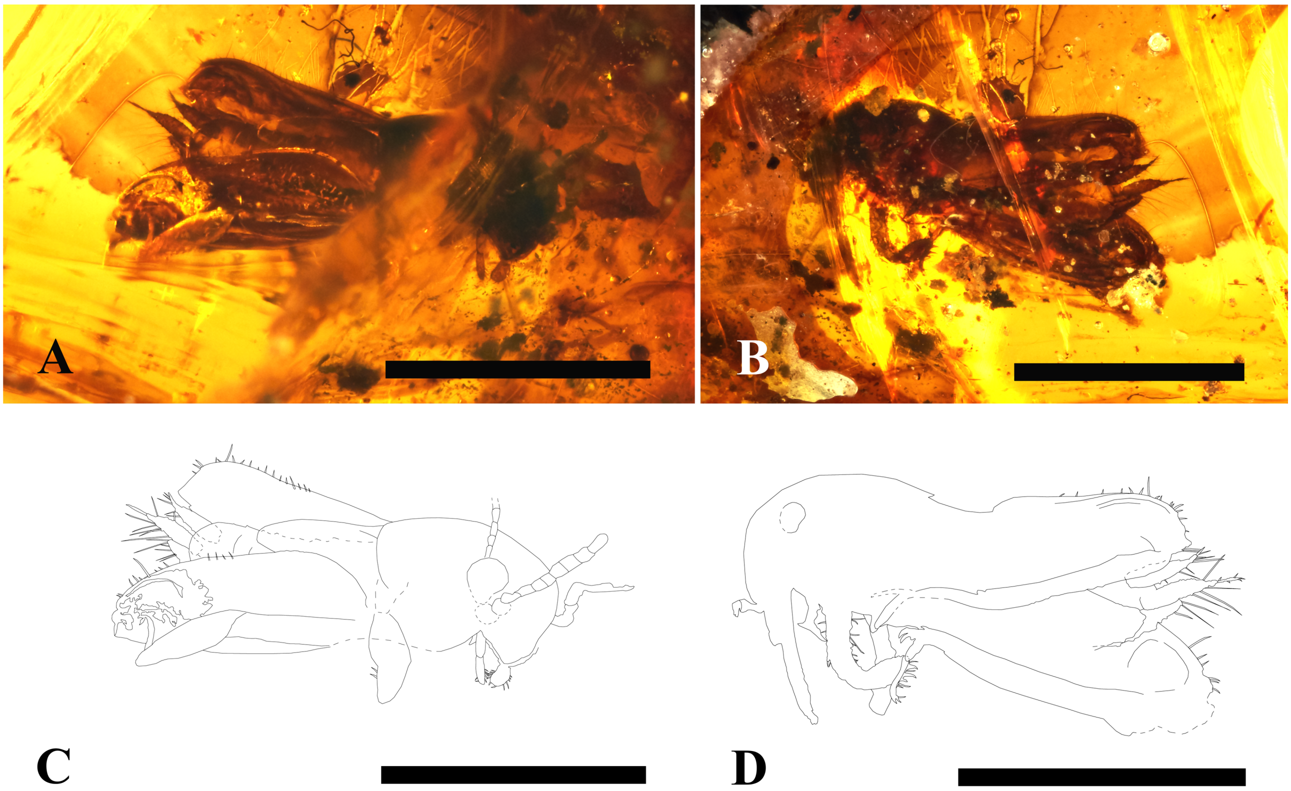

FIGURE 1. *Duappendactylus melanocephalus* gen. et sp. nov. holotype (sex unknown) GPIH07246. **A.** and **C.** Specimen, right lateral view. **B.** and **D.** Specimen, left lateral view. **Scale bars** = 1 mm.

Etymology: The species is named after its dark-colored head (ancient Greek “mélas” = black and “kefáli” = head).

Locality and horizon: The specimen was included in amber found in Hkamti, Sagaing Division, Myanmar or Tanai, Kachin State Burma, Myanmar, two nearby amber mining locations. The amber from Hkamti is ca. 110 My and the amber from Tanai ca. 99 My old.

Holotype: Sex unknown. Specimen part of the LIB-Hamburg collection; collection number GPIH07246 (ex collection Martin Husemann MH0108).

Diagnosis of species: As for genus (monotypic).

Description: Preservation of an entire specimen with parts of the head and thorax somewhat obscured by additional matter in the amber.

Measurements (mm): Values given with a “ca.” are partly based on estimation as structures are not clearly or fully visible. Body length 1.41 (head to abdominal apex; not including subgenital plate). Head-height 0.54. Antenna length 0.55. Forewing length 0.47. Mesotibia length 0.45. Metafemur length 0.96. Metafemur width 0.38 . Metatibia length ca. 0.89. Paraproct 0.34 . Subgenital plate extending beyond paraproct by 0.16. Basal cercus segment length 0.21. Basal cercus segment width 0.06. Distal cercus segment length 0.09. Distal cercus segment width 0.01. Apical setae of subgenital plate length up to ca. 0.15.

Head: Antennae ten-segmented (including pedicel and scape), moniliform and with antennomeres relatively thick. Coloration of both head and antennae dark, close to black.

Thorax: Pronotum smooth, without elevation; of dark color. Forewings present, with reduced venation. Hindwings absent.

Legs: Prothoracic leg: Femur and tibia with setae which are more numerous on the tibia. Tibia apically with three dactyls, the longest of which is 0.04 mm long. Tarsus slender, with two claws.

Mesothoracic leg: Middle of tibia distinctly inflated.

Metathoracic leg: Femur greatly inflated along the entire length. Distal half of dorsal margin with evenly spaced setae of varying length. Tibia with a pair of subapical and apical spurs. Tarsus morphology uncertain due to poor visibility in the amber (Fig. 2B shows best interpretation of what is visible).

Abdomen: Cerci two-segmented with basal segment longer and wider than distal segment. Distal segment very slender. Both segments with setae. Paraproct prominent, broad-triangularly shaped. Paraproctal processes absent. Subgenital plate prominent, orientated upwards and elongated far beyond paraproct, reaching up to half of the basal cercus segment; apically with long setae.

Remarks: The new specimen can be assigned to Tridactylidae based on the two-segmented cerci and the distinctly inflated mesotibia. Tridactylidae consists of three subfamilies: the Cretaceous to extant Tridactylinae Brullé, 1835 and Dentridactylinae Günther, 1979 and the Cretaceous Mongoloxyinae Gorochov, 1992. The first two subfamilies are separated by a subapical denticular process which is present in Dentridactylinae, but not in Tridactylinae (Heads, 2009). Because the morphology of the metatarsus in *Duappendactylus melanocephalus* gen. et sp. nov. is obscured, the presence or absence of a subapical denticular process cannot be confirmed. Mongoloxyinae is characterized by a more elaborate forewing venation than in the other subfamilies (Gorochov *et al.*, 2006). The forewing venation of *D. melanocephalus* gen. et sp. nov. seems to be reduced (as in Tridactylinae and Dentridactylinae), but this aspect of morphology is somewhat difficult to see in the fossil. Gorochov (2010) attributed the Burmese amber species *Birmitoxya intermedia* Gorochov, 2010 to Mongoloxyinae, but this act was solely based on the species not matching known characters of the other two subfamilies and the body morphology of Mongoloxyinae is rather unknown (Gorochov, 2010). Recently, Schall *et al.* (2025) have speculated that the Burmecaelidae Uchida, Husemann & Kotthoff, 2024 may be allied to Mongoloxyinae as they share similar venation characters. Because of the above, the subfamily position of *D. melanocephalus* cannot be determined for now.

Within Tridactylidae, *D. melanocephalus* differs from all other members of the family except *Birmitoxya intermedia* by the absence of paraproctal processes. From *Birmitoxya*, the new taxon is separated by 1) a proportionally shorter metatibia. 2) Two-segmented cerci. In *Birmitoxya* the cerci were one-segmented. It is unlikely that the reason for this is found in the nymphal status of the specimen described by Gorochov (2010) as modern nymphs of the species *Ellipes deyrupi* Woo, 2021 and *Ellipes eisneri* Deyrup, 2005 already have two-segmented cerci like the adults (Woo, 2021). 3) Three strong dactyli on the protibia. Gorochov (2010) mentions "small fossorial denticles" in his description of *B. intermedia*, but they are not shown in Figure 6A of the species. 4) Smaller body size. In total, the scale of these differences appears to justify generic separation from *Birmitoxya* despite the shared absence of paraproctal processes.

The absence of paraproctal processes is unusual for Tridactylidae and also the closely related Ripipterygidae Ander, 1939. However, it is an apomorphy of Cylindrachetidae Giglio-Tos, 1914, but this family differs from the rest of Tridactyloidea in several other important characters (see introduction). Cylindrachetidae were estimated to have evolved 202.67 Mya, ca. 50 My prior to the other two families of Tridactyloidea (Song *et al.*, 2015). This would make a relationship between Cylindrachetidae and the Kachin amber Tridactyloidea without paraproctal processes seem unlikely. For now, it seems more conclusive to suggest this character state was once present in Tridactylidae and subsequently lost in their evolutionary history.

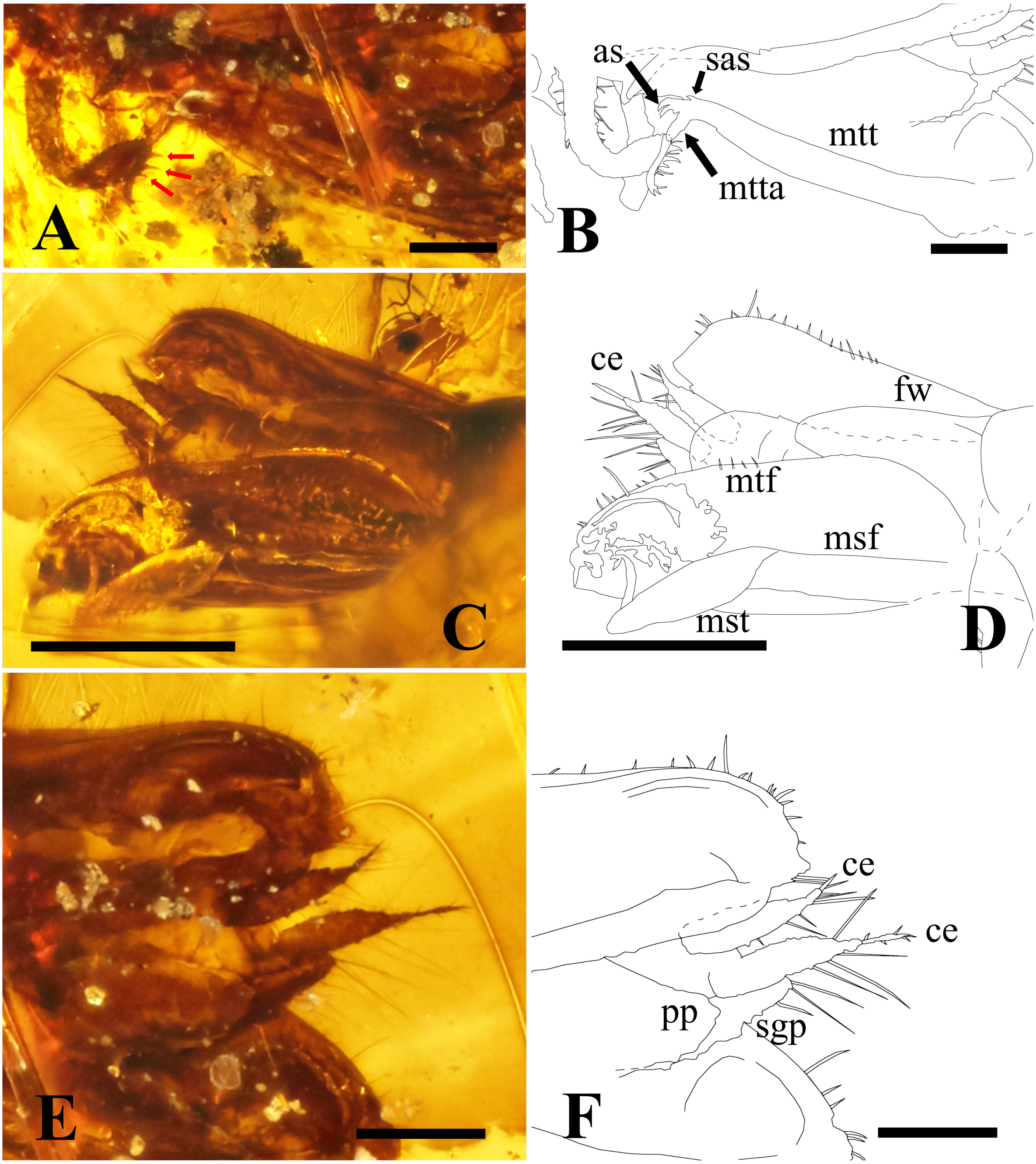

FIGURE 2. *Duappendactylus melanocephalus* gen. et sp. nov. holotype (sex unknown) GPIH07246. **A.** and **B.** Detail of prothoracic leg and metathoracic tibia. Red arrows in A mark dactyli on protibia. **Abbreviations:** as = apical spurs; sas = subapical spurs; mtta = metatarsus; mtt = metatibia. **Scale bars** = 0.2 mm. **C.** and **D.** Detail of forewing, mesothoracic leg and metafemur. **Abbreviations:** ce = cerci; fw = forewing; mtf = metafemur; msf = mesofemur; mst = mesotibia. **Scale bars** = 0.5 mm. **E.** and **F.** Detail of abdomen. **Abbreviations:** pp = paraproct; sgp = subgenital plate; ce = cerci. **Scale bars** = 0.2 mm.

Subfamily Tridactylinae Brullé, 1835

Genus *Hiemalidactylus* gen. nov.

Zoobank-ID: urn:lsid:zoobank.org:act:CA6C708A-EC4E-492F-8ECC-DDF91638C3E6

Type species: *Hiemalidactylus eileenae* sp. nov.

Etymology: The genus is named after the coloration of its face; a contrasting dark and light pattern, looking like the specimen just came in from a wintery, snowy walk (from Latin "hiemalis" meaning "wintery").

Diagnosis: Distinct facial coloration consisting of highly contrasting darker and lighter areas, including the compound eye. Protibia with three long dactyls. Metafemur inflated along entire length, but comparably slender for a Tridactylidae (length/width ratio 3.4). Metatibia with few small denticles. Subapical and apical spurs approximately of equal length. Metatarsus pointed apically, without denticular process, hairs, or spines. Cerci two-segmented, basal segment longer than distal segment and tapering consistently with no clear constriction between segments. Both segments with sparse long setae. Paraproct elongated and prominent, narrow triangular and reaching almost length of basal cercus segment. Paraproct without paraproctal processes. Subgenital plate not elongated (not visible).

Hiemalidactylus eileenae sp. nov.

Zoobank-ID: urn:lsid:zoobank.org:act:DDCE5FA5-DACC-4A60-BD71-7D65BC0559CB

Figs. 3–4

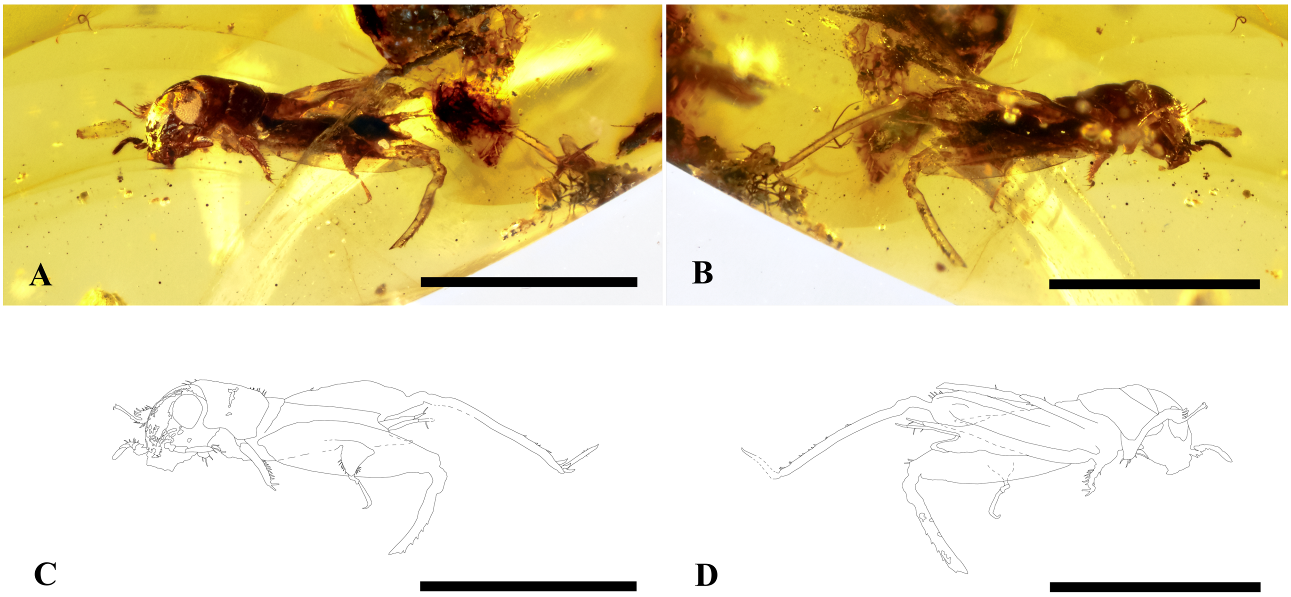

FIGURE 3. *Hiemalidactylus eileenae* gen. et sp. nov. holotype (sex unknown; nymph) GPIH07247. **A.** and **C.** Specimen, left lateral view. **B.** and **D.** Specimen, right lateral view. **Scale bars** = 1 mm.

Etymology: The species is named for Eileen Nguyen from the LIB Hamburg in thanks of her continued help concerning imaging and collection access during the first authors' doctoral studies and the last authors works.

Locality and horizon: The specimen was included in amber found in Hkamti, Sagaing Division, Myanmar or Tanai, Kachin State Burma, Myanmar, two nearby amber mining locations. The amber from Hkamti is ca. 110 My and the amber from Tanai ca. 99 My old.

Holotype: Sex unknown. Specimen part of the LIB-Hamburg collection; collection number GPIH07247 (ex collection Martin Husemann MH0110).

Diagnosis of species: As for genus (monotypic).

Description: Well-preserved, probably late instar nymph. Only missing distal parts of the left metathoracic leg (right side fully intact).

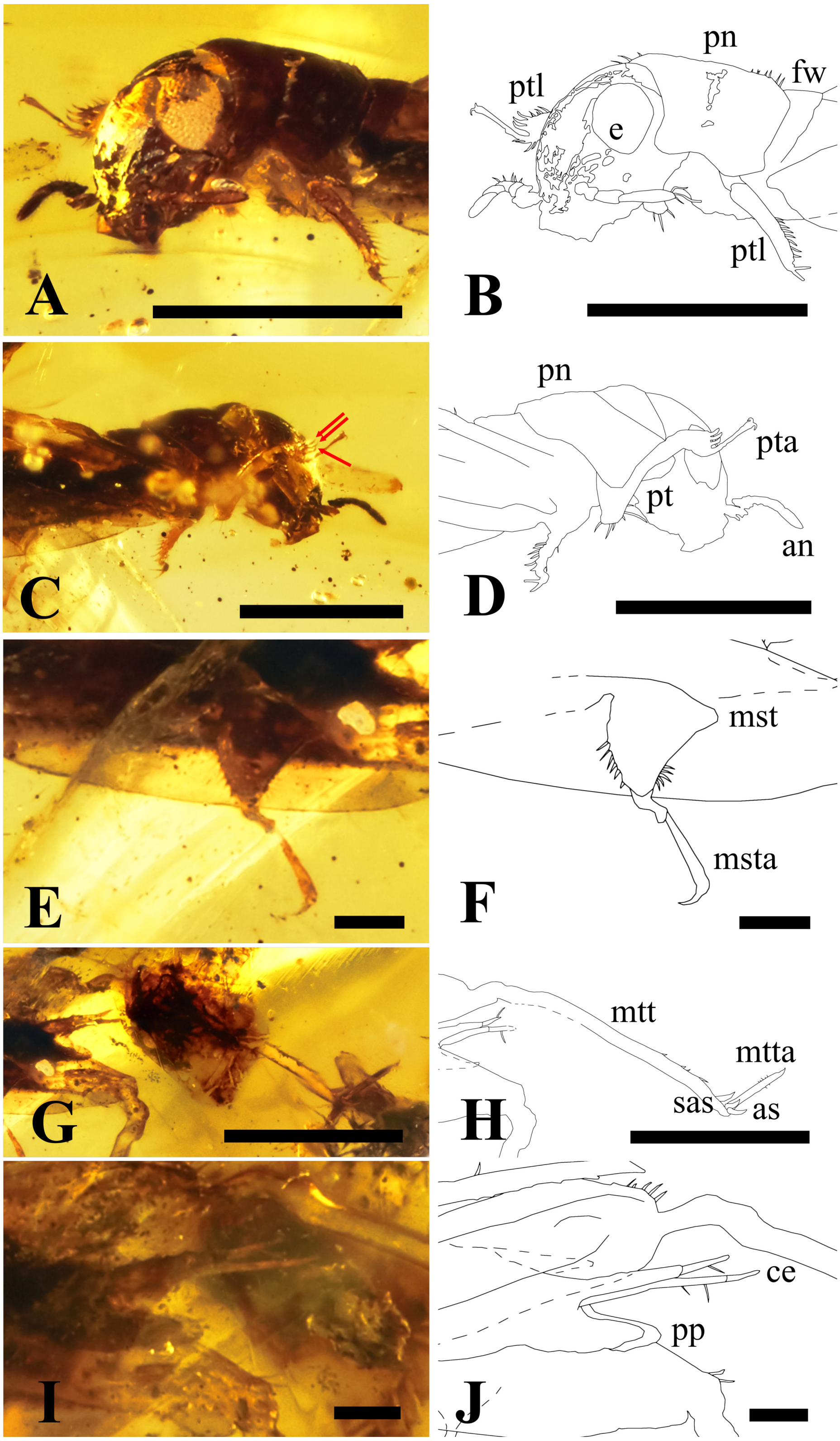

FIGURE 4. *Hiemalidactylus eileenae* gen. et sp. nov. holotype (sex unknown; nymph) GPIH07247. **A.** and **B.** Detail of head, thorax and prothoracic leg. **Abbreviations:** ptl = prothoracic leg; e = eye; pn = pronotum; fw = forewing. **Scale bars** = 0.5 mm. **C.** and **D.** Detail of pronotum and prothoracic leg. Red arrows mark dactyli of protibia. **Abbreviations:** an = antenna; pn = pronotum; pt = protibia; pta = protarsus. **Scale bars** = 0.5 mm. **E.** and **F.** Detail of mesothoracic leg. **Abbreviations:** mst = mesotibia; msta = mesotarsus. **Scale bars** = 0.1 mm. **G.** and **H.** Detail of metathoracic leg. **Abbreviations:** mtt = metatibia; sas = subapical spur; as = apical spurs; mtta = metatarsus. **Scale bars** = 0.5 mm. **I.** and **J.** Detail of abdomen. **Abbreviations:** pp = paraproct; ce = cerci. **Scale bars** = 0.1 mm.

Measurements (mm): Body length 1.12 (head to abdominal apex; not including cerci or paraproct). Head height 0.4. Compound eye width 0.14. Compound eye height 0.16. Pronotum length 0.32. Pronotum height ca. 0.24. Forewing bud 0.09. Prothoracic leg: tibia 0.34, tarsus 0.12. Mesothoracic leg: tibia length 0.42, tibia width 0.15, tarsus 0.17. Metathoracic leg: Femur length 0.85, femur width 0.25, tibia length 0.81, tibia width 0.05. Tarsus 0.2. Subapical spurs 0.06, apical spurs 0.05. Paraproct ca. 0.2. Basal cercus segment length 0.17. Basal cercus segment width 0.04. Distal cercus segment length 0.05-0.08. Distal cercus segment width 0.01.

Head: With conspicuous coloration of contrasting light and dark areas, including compound eye. Compound eye not protruding, lateral position on head. Antennomeres with short setae.

Thorax: Pronotum without elevation, bearing sparse setae, especially on posterior margin. Forewings present as underdeveloped buds. Hindwings absent.

Legs: Prothoracic leg: Femur rather short. Tibia with setae and three long apical dactyli, the longest of which is 0.04 mm long. Tarsus two-segmented; basal segment shorter than distal segment; distal segment bearing two claws.

Mesothoracic leg: Femur inconspicuous. Tibia distinctly inflated with triangularly shaped extension at widest point on one side. Distal part with setae. Tarsus two-segmented; basal segment shorter than distal segment; distal segment bearing two claws.

Metathoracic leg: Femur apically with few dorsal setae. Inflated along entire length, but still rather slender. Tibia with small denticles placed at a distance along the entire length. Subapical and apical spurs present (only one subapical spur can be seen, apical spurs as pair); approximately of same length. Tarsus much longer than spurs, pointed apically and without hair, spines, or denticular process.

Abdomen: Cerci two-segmented, basal segment longer than distal segment. Tapering consistently without distinct reduction in width from basal to distal segment. Both segments with few setae. Paraproct prominent, narrow triangular, extending far beyond the abdominal apex to almost the length of the basal cercus segment; not setulose. Paraproctal processes absent. Subgenital plate not elongated and not visible.

Remarks: The new species is placed in Tridactylidae based on the distinct inflation of the mesotibia as well as the two-segmented cerci. It is suggested to be part of the subfamily Tridactylinae due to the absence of a subapical denticular process on the metatarsus. *Hiemalidactylus* can be differentiated from all previously described genera of the family except for *Birmitoxya* Gorochov, 2010 and *Duappendactylus* described herein, by the absence of paraproctal processes. From these two genera it can be readily separated by the absence of an elongated subgenital plate. Due to the underdeveloped forewings, as well as the very small body size of *Hiemalidactylus eileenae*, the specimen is probably a nymph. The classification of nymphs of Tridactylidae is problematic, because very little is known about morphological differences between adult and nymphs of the family (Baena-Bejarano *et al.*, 2018). However, Gorochov (2010) described *Birmitoxya intermedia* based on a nymphal specimen and in this species the subgenital plate was clearly visible, suggesting that the absence/presence of an elongated subgenital plate can be used as a diagnostic character even in nymphs of Tridactylidae. Likewise, the presence/absence of paraproctal processes can be used to diagnose nymphal specimens, too, as paraproctal processes - if present in the adults - are usually found in the nymphs as well (see *Ellipes deyrupi* Woo, 2021 and *Ellipes eisneri* Deyrup, 2005 in Woo (2021)). In terms of species identification, Baena-Bejarano *et al.* (2018) considered the coloration pattern a reliable character for associating nymphs with the correct species in *Mirhipipteryx pulicaria* (Saussure, 1896). The likeness of coloration between nymphs and adults of *Ellipes deyrupi* and *Ellipes eisneri* is apparent too (see Fig. 2 and 7 in Woo (2021)), although coloration is lighter in the nymphs. *Hiemalidactylus eileenae* has distinct head coloration which should facilitate species identification once adult specimens are found. The description of this well-preserved individual helps to better understand nymph morphology in Tridactylidae.

Discussion

This study describes two new genera and species of Tridactylidae Brullé, 1835 from mid-Cretaceous amber of Myanmar. Previously, nine species of this family had been known from the Burmese amber forest, whereby two—*Latedactylus longapedi* Zheng, Cao & Gu, 2023 and *Phyllotridactylus wangi* Xu, Wang, Fan, Jarzembowski, Fang, Wang, Li, Zhuo, Ding & Engel, 2022—were assigned to the subfamily Tridactylinae Brullé, 1835, four—*Burmadactylus grimaldii* Heads, 2009, *B. tenuicerci* Fan, Gu & Cao, 2023, *Cascogryllus lobiferus* Poinar, 2020 and

C. setosus Du, Xu & Zhang, 2021—were assigned to Dentridactylinae Günther, 1979, one was preliminarily placed into Mongoloxyinae Gorochov, 1992 (*Birmitoxya intermedia* Gorochov, 2010), and two were not assigned to a subfamily (*Amberotridactylus cheni* Du *et al.*, 2021 and *Paraxya hui* Cao *et al.*, 2019). In the case of *Cascogryllus*, the metatarsal structure (i.e. presence of a subapical denticular process) is unknown for *C. setosus*, because the distal portion of the metatibia and -tarsus were not preserved in the holotype specimen (Du *et al.*, 2021). The characters Poinar (2020) lists to justify the placement of *C. lobiferus* in Dentridactylinae (absence of leaf-like tibial spurs [sometimes referred to as swimming lamellae], antennae nine-segmented, hind tibiae with denticles on dorsal surface, extended metatarsus longer than metatibial spurs, two-segmented cerci and well-developed paraproctal lobes) are not unique to members of this subfamily, but can also be found in species of Tridactylinae. Instead, the author has considered the absence of a subapical denticular process in *C. lobiferus* as a unique character of this genus in Dentridactylinae (Poinar, 2020). However, the presence of a subapical denticular process on the metatarsus is what unites the subfamily Dentridactylinae (Heads, 2009). Thus, its absence in *C. lobiferus* suggests that the genus should be placed in the other subfamily Tridactylinae. The new species from this study were placed in Tridactylinae (*Hiemalidactylus eileenae* gen. et sp. nov.) and Tridactylidae *incertae sedis* (*Duappendactylus melanocephalus* gen. et sp. nov.).

Both new species feature an unusual morphology of their abdominal structure, i.e. the absence of paraproctal processes in both taxa and absence of a subgenital plate in *H. eileenae*. The absence of paraproctal processes is shared with *Birmitoxya intermedia*. However, this species was described as having a metatarsus somewhat bifurcated apically (Gorochov, 2010), which may indicate a placement within Dentridactylinae; anyhow, it certainly seems to contradict a position within Tridactylinae, thus the taxon is separated from *Hiemalidactylus*. The shared morphology of absent paraproctal lobes seems to be a rather distinct feature, however. Perhaps it is possible that these three genera even constitute a separate subfamily within Tridactylidae. If so, the presence/absence of a subapical denticular process might be a plesiomorphic character in Tridactylidae. Hopefully, future findings can enlighten our understanding of these enigmatic little orthopterans and help to resolve the internal systematics of Tridactylidae.

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