

Cretozemira elongata gen.n. & sp.n. (Hemiptera: Heteroptera: Aradidae) from Cretaceous Burmese amber

ERNST HEISS

Abstract

The Cretaceous ambers of Kachin in northern Myanmar contain a particularly large number of insect inclusions. Eleven genera and 14 species of the flat bug family Aradidae are recorded to date from Cretaceous Burmese amber. An unusually large female specimen of an aradid inclusion cannot be assigned to any recent or fossil genus and is described and illustrated as *Cretozemira elongata* gen.n. & sp.n.

Key words. Hemiptera, Heteroptera, Aradidae, Cretaceous, Myanmar, amber, new genus, new species.

Zusammenfassung

Die kreidezeitlichen Bernsteine von Kachin in Nord-Myanmar enthalten besonders viele Insekteninklusionen. Von der Heteropterenfamilie Aradidae sind bisher elf Gattungen mit 14 Arten beschrieben worden. Ein ungewöhnlich großes weibliches Exemplar einer Aradideninklusion kann keiner rezenten oder fossilen Gattung zugeordnet werden und wird als *Cretozemira elongata* gen.n. & sp.n. beschrieben und abgebildet.

Introduction

The mid-Cretaceous amber deposits from Kachin state in Northern Myanmar are famous for the great number of well-preserved inclusions containing biological objects. The heteropteran flat bug family Aradidae is represented by 11 genera and 14 species recorded and described to date (ROSS 2019, 2021, 2022, 2023). These are: *Aradoleptus* HEISS, 2016 (1 species); *Archeaneurus* HEISS, 2019 (1); *Archearadus* HEISS & GRIMALDI, 2001 (2); *Archeocalisius* HEISS, 2019 (1); *Archemezira* HEISS & CHEN, 2023 (1); *Calisiomorpha* HEISS, 2016 (1); *Cretopiesma* GRIMALDI & ENGEL, 2008 (4); *Ellenbergeria* HEISS, 2016 (1); *Kachinocoris* HEISS, 2012 (1); *Myanmezira* HEISS & POINAR, 2012 (1); *Pachytylaradus* HEISS, 2022 (1) (HEISS & GRIMALDI 2001, GRIMALDI & ENGEL 2008, HEISS & POINAR 2012, HEISS 2012, 2016, 2019a, b, 2022, AZAR et al. 2020, HEISS & CHEN 2023).

An unusually large female specimen of a flat bug cannot be placed into one of the extant or fossil genera of Aradidae and is recognized as a new taxon, *Cretozemira elongata* gen.n. & sp.n., and described and illustrated herein.

Material and methods

The Burmese amber specimen upon which this study is based was mined in Kachin province area without knowing a precise locality and is of mid-Cretaceous age of about 100 mya (GRIMALDI et al. 2002, SHI et al. 2012). It belongs to and will be permanently preserved in the collection of the author at the Tiroler Landesmuseum Ferdinandeum (TLMF), Innsbruck, Austria.

Photos were taken with a Nikon Coolpix 300 Camera and processed with Photoshop software.

Measurements were taken with a micrometre eyepiece and are given in millimetres.

Abbreviations: deltg = dorsal external laterotergite (connexivum) of abdomen; pt = paratergite.

Taxonomy and systematic palaeontology

Order Hemiptera LINNAEUS, 1758

Suborder Heteroptera LATREILLE, 1810

Infraorder Pentatomomorpha LESTON, PENDERGRAST & SOUTHWOOD, 1954

Family Aradidae BRULLÉ, 1836

Subfamily Archearadinae HEISS & GRIMALDI, 2002 (tentatively placed)

Cretozemira gen.n.

Type species. *Cretozemira elongata* sp.n.

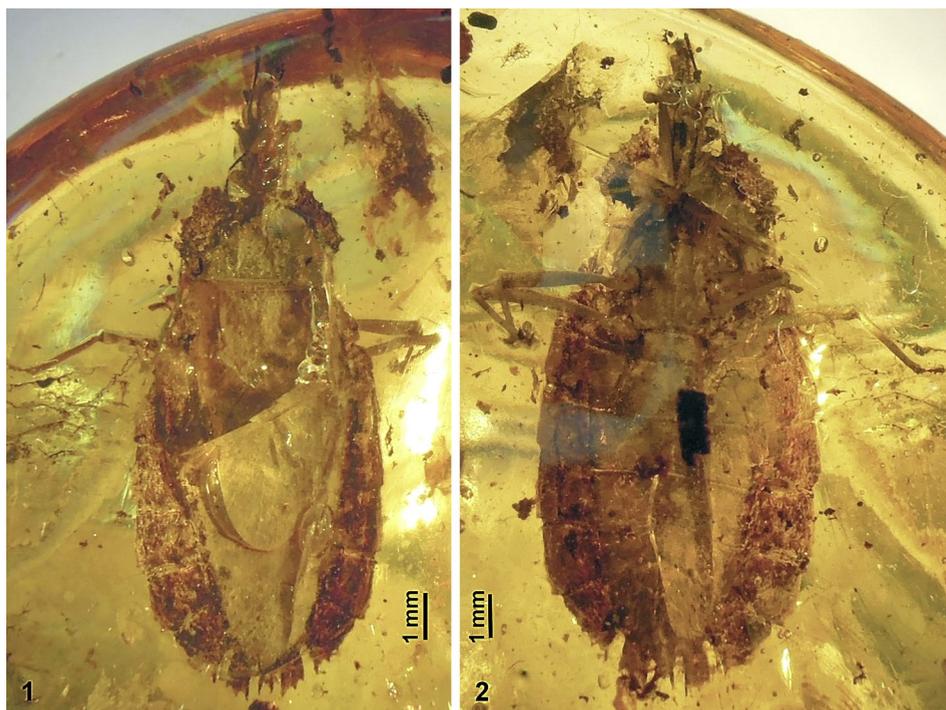
Etymology. The name of the genus refers to the Cretaceous age and is an anagram of *Mezira*, resembling this widespread genus.

Diagnosis. Distinguished from all Aradidae described to date from Burmese amber by a combination of characters never observed together in other genera: large size; structure of head with elongate, crested clypeus, its apex with spines; long, anteriorly diverging antenniferous lobes; no metathoracic scent glands. These characters are partly shared by *Archemezira* HEISS, 2023 but the latter differs by the structure of the pronotum with angular humeri and narrow, not produced anterolateral angles; by a widely rounded abdomen; and by lateral margins of deltg II–VII dentate (female) or beset with spines (male).

Description. Body size about 15 mm.

Head distinctly longer than wide. Tylus and genae fused into a narrow clypeus, its surface crested; apex of antenniferous lobes diverging anteriorly, dentate. Eyes subglobular, laterally protruding; postocular lobes diverging posteriorly. Rostrum arising from an open atrium, about as long as head.

Pronotum wider than long. Lateral margins of paranota dentate, converging anteriorly, anterolateral angles acute; paranota expanded and reflexed. Disk flat, posterior margin straight. Scutellum of the submacropterous specimen slightly longer than wide; apex rounded. Legs unarmed; femora slender, with trochanters, tibiae straight; claws with thin pulvilli. Hemelytra: corium concealed by opaque layer; membrane reaching anterior margin of mediotergite VI; veins present but hardly discernible.



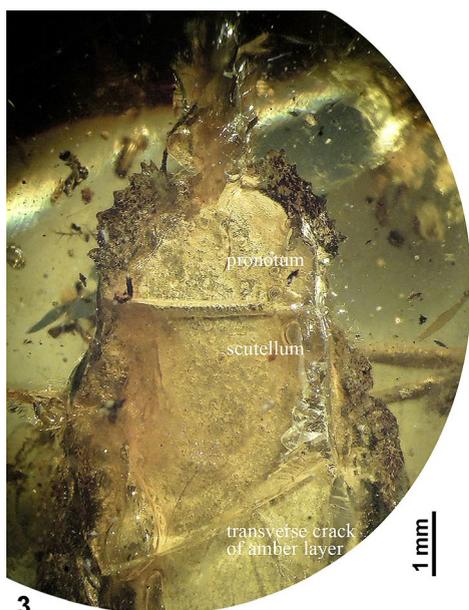
Figs 1–2. *Cretozemira elongata* gen.n. & sp.n., holotype female, dorsal (1) and ventral (2) aspect of amber inclusion. Body length 15.3 mm.

Abdomen elongate oval; lateral margins of deltg II–VII nearly straight, with few small lateral denticles, posterolateral angles slightly produced; ventral segments separated by sutures. Metathoracic scent glands, spiracles and pattern of apodemal impressions not traceable.

Remarks. *Cretozemira* gen.n. shares some characters with the subfamily Archeonadinae described from Burmese amber (e.g., large size, elongate head, dentate antenniferous lobes, nearly straight lateral margins of connexivum in female), but it has no discernible metapleural scent glands while these are well visible in Archeonadinae and its type species *Archeonadus burmensis* HEISS & GRIMALDI, 2001. Therefore, the new genus is tentatively placed in this fossil amber subfamily. Together with *Archemezira*, *Cretozemira* gen.n. may also represent a new subfamily. However, such a decision should be based on a phylogenetic analysis as a result of careful comparison and examination of characters of extant and fossil Burmese amber taxa. Such a study is presently not feasible.

***Cretozemira elongata* sp.n. (Figs 1–6)**

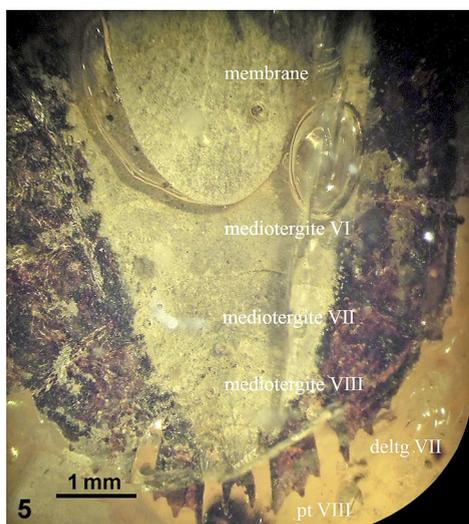
Holotype. Female (submacropterous specimen) embedded in a round lens-shaped honey-coloured piece of Burmese amber (50 × 42 × 15 mm, Fig. 4), which contains several syninclusions of plant material, detritus and remnants of animal origin. Dorsal and ventral side are fairly visible (Figs 1, 2), however, the head is damaged and antennae detached and only partly preserved; opaque layers of resin on dorsal and ventral side obscure structural details of the body and appendages. This specimen is designated as holotype BUR-ARAD-10 and deposited at TLMF.



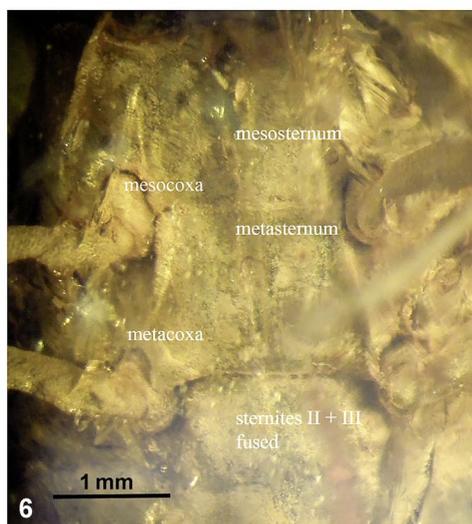
3



4



5



6

Figs 3–6. *Cretozemira elongata* gen.n. & sp.n., holotype female. (3) Pronotum and scutellum; (4) whole amber stone containing holotype specimen and syninclusions; (5) membrane of hemelytra and terminal segments, dorsal aspect; (6) meso- and metasternum, ventral aspect.

Etymology. The species epithet refers to the oval elongate habitus of the holotype specimen.

Description. (Measurements approximate as far as readable.) Body length 15.3 mm. Colouration reddish brown. Surface of deltg II–VII, corium and paranota rugose; surface of tergal plate, scutellum, membrane, and pronotal disk rather smooth.

Head about twice as long as wide (3.0 / 1.6); antennae displaced and damaged.

Thorax: Pronotum wider than long (4.2 / 2.4); lateral margins with irregular dentation, subparallel at humeri, then slightly widening and converging anteriorly; anterolateral angles acute, anteriorly produced over constricted collar; surface of disk depressed, shallow traces of longitudinal carinae badly visible (Fig. 3). Scutellum slightly longer than wide (2.5 / 2.2), apex widely rounded (Fig. 3). Membrane distinct, posteriorly extending to anterior margin of tergite VI, narrowly rounded at apex; veins discernible (Fig. 5); small triangular clavus present. Legs unarmed; femora slender; trochanters widening posteriorly; tibiae thinner and straight; claws with long thin pulvilli.

Abdomen of egg-shaped outline, width across tergite IV 6.2 mm, lateral margins of deltg II–VII nearly straight, posterior half with flat denticles, posterolateral angles of deltg II–VI angularly produced, of deltg VII with three acute spines, posterior margin of paratergite VIII tricuspidate with acute apices, tergite IX bispinous.

Remarks. This specimen and other inclusions of Aradidae were already imaged and published but not described in a Chinese book on life relics of the past in amber (FANGYUAN et al. 2015). The precious amber stone of the book illustration could later be aquired and is now available for the present study.

Acknowledgements

The author thanks Huarong Chen (Toronto) for his generous gift of this inclusion, Herbert Zettel and Alice Laciny (Natural History Museum, Vienna), managing editors of the “Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen” for considering the publication of this contribution, and the anonymous reviewer for his suggestions improving the paper. Thanks to Tomáš Tóth (Innsbruck) who kindly arranged the photographic plates.

References

- AZAR D., HEISS E. & HUANG D.Y., 2020: Review of the flat bug genus *Cretopiesma* GRIMALDI & ENGEL, 2008 from mid-Cretaceous Burmese amber and description of three new species (Hemiptera: Heteroptera: Aradidae: Archearadinae). – *Palaeoentomology* 3 (1): 6–31.
- FANGYUAN X., YANG G., ZHANG Q., SHI G. & WANG B., 2015: Amber: spirit through time and space. – Science Press, China, 198 pp. (image on p. 77). [in Chinese]
- GRIMALDI D.A., ENGEL M.S. & NASCIBENE P.C., 2002: Fossiliferous Cretaceous amber from Myanmar (Burma): Its rediscovery, biotic diversity, and paleontological significance. – *American Museum Novitates* 3361: 1–71.
- GRIMALDI D.A. & ENGEL M.S., 2008: An unusual primitive Piesmatidae (Insecta: Heteroptera) in Cretaceous amber from Myanmar (Burma). – *American Museum Novitates* 3611: 1–17.
- HEISS E., 2012: *Kachinocoris brevipennis* n. gen., n. sp. in Cretaceous Burmese amber (Hemiptera: Heteroptera). – *Zootaxa* 3227: 64–68.
- HEISS E., 2016: New genera and species of Aradidae in Cretaceous Burmese amber (Hemiptera: Heteroptera). – *Linzer Biologische Beiträge* 48 (1): 419–429.

- HEISS E., 2019a: New genus and species of Calisiinae from Cretaceous Burmese amber (Hemiptera, Heteroptera, Aradidae). – Linzer Biologische Beiträge 51 (1): 83–87.
- HEISS E., 2019b: *Archeaneurus neli* gen. et sp. nov. from Cretaceous Burmese amber (Heteroptera, Aradidae). – Palaeoentomology 2 (6): 566–569.
- HEISS E., 2022: *Pachytlaradus cretaceous* gen. et sp. nov. from Burmese amber (Heteroptera, Aradidae). – Palaeoentomology 5 (4): 294–297.
- HEISS E. & CHEN H., 2023: *Archemezira nuoxichenae* gen. et sp. nov. from Burmese amber (Heteroptera, Aradidae). – Palaeoentomology 6 (1): 17–21.
- HEISS E. & GRIMALDI D., 2001: *Archearadus burmensis* gen., sp. n., a remarkable Mesozoic Aradidae in Burmese Amber (Heteroptera, Aradidae). – Carolina 59: 99–102.
- HEISS E. & GRIMALDI D., 2002: The first known female of *Archearadus burmensis* HEISS & GRIMALDI, 2001 in Cretaceous Burmese amber (Heteroptera: Aradidae). – Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen 54: 55–59.
- HEISS E. & POINAR G. JR., 2012: New Aradidae in Mesozoic Burmese amber (Hemiptera, Heteroptera). – Annalen des Naturhistorischen Museums Wien, Series A, 114: 307–316.
- ROSS A.J., 2019: Burmese (Myanmar) amber checklist and bibliography 2018. – Palaeoentomology 2 (1): 22–84.
- ROSS A.J., 2021: Supplement to the Burmese (Myanmar) amber checklist and bibliography, 2020. – Palaeoentomology 4 (1): 57–76.
- ROSS A.J., 2022: Supplement to the Burmese (Myanmar) amber checklist and bibliography, 2021. – Palaeoentomology 5 (1): 27–45.
- ROSS A.J., 2023: Supplement to the Burmese (Myanmar) amber checklist and bibliography, 2022. – Palaeoentomology 6 (1): 22–40.
- SHI G., GRIMALDI D.A., HARLOW G.E., WANG J., YANG M., LEI W., LI Q. & LI X., 2012: Age constraint on Burmese amber based on U–Pb dating of zircons. – Cretaceous Research 37: 155–163.

Author's address: Ernst HEISS
 Research Entomologist, Tiroler Landesmuseum
 Josef-Schraffl-Straße 2a,
 A-6020 Innsbruck, Austria
 E-mail: aradus@aon.at