

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/321113533>

Furcalabratum burmanicum gen. et sp. nov., a Short-winged Flower Beetle (Coleoptera: Kateritidae) in mid-Cretaceous Myanmar amber

Article in *Cretaceous Research* · November 2017

DOI: 10.1016/j.cretres.2017.11.010

CITATION

1

READS

93

2 authors:



George Poinar

Oregon State University

717 PUBLICATIONS **11,195** CITATIONS

[SEE PROFILE](#)



Alex Brown

none

35 PUBLICATIONS **475** CITATIONS

[SEE PROFILE](#)

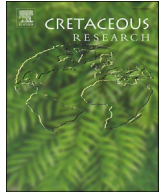
Some of the authors of this publication are also working on these related projects:



fossil orchid [View project](#)



Fossil Insects of mid-Cretaceous Burmese Amber [View project](#)



Short communication

Furcalabratum burmanicum gen. et sp. nov., a Short-winged Flower Beetle (Coleoptera: Kateretidae) in mid-Cretaceous Myanmar amber

George Poinar Jr. ^{a,*}, Alex E. Brown ^b^a Department of Integrative Biology, Oregon State University, Corvallis, OR 97331, USA^b 629 Euclid Avenue, Berkeley, CA 94708, USA

ARTICLE INFO

Article history:

Received 23 August 2017

Received in revised form

14 October 2017

Accepted in revised form 14 November 2017

Available online 15 November 2017

Keywords:

Furcalabratum burmanicum gen. et sp. nov.

Myanmar amber

Mid-Cretaceous

Kateretidae fossil

ABSTRACT

A new genus and species of Short-winged Flower Beetle, *Furcalabratum burmanicum* gen. et sp. nov. (Coleoptera: Kateretidae), is described from mid-Cretaceous Myanmar amber. The new genus is characterized by its small size (2.6 mm in length), prognathous head with extended forked mandibles, porrect forked labrum, 11-segmented antenna terminated with a loose 3-segmented glabrous club, beaded chain around the rim of the compound eye, punctures on the head and pronotum, elytra with striae and irregular transverse grooves, ridged femora, tarsal formula 5-5-5 with membranous appendages on the first three tarsomeres, claws with a prominent basal tooth and abbreviated elytra exposing the terminal 3 tergites.

© 2017 Elsevier Ltd. All rights reserved.

1. Introduction

The Kateretidae, commonly known as Short-winged Flower Beetles, is a small family within the Cucujoidea that are mostly distributed in temperate and subtropical zones of the Holarctic Region. Some kateretids also occur in Australia, the Neotropics and Asia (Hisamatsu, 2011). There are less than 100 species in 14 genera globally (Jelinek & Cline, 2010) and their fossil record dates back to the Early Cretaceous (Kirejtshuk and Azar, 2008). These are small beetles with the length of extant members of the family ranging from 1.4 mm to 3.6 mm (Kirejtshuk, 1992).

Adults and larvae of Kateretidae are anthrophagous with both feeding on angiosperm flowers of diverse families. Larval host families include Agavaceae, Caprifoliaceae, Cyperaceae, Juncaceae, Scrophulariaceae, Papaveraceae and Urticaceae. The adults have a wider host range that aside from the above mentioned larval host plants, also includes members of the Rosaceae, Melanthiaceae, Asteraceae and Apiaceae (Jelinek & Cline, 2010; Hisamatsu, 2011).

The present study describes a new genus of Short-winged Flower Beetles from Myanmar amber. It is possible that the larvae and/or adults fed on one of several angiosperm flowers that have recently been discovered from this amber source (Poinar & Chambers, 2017).

2. Materials and methods

The specimen originated from the Noije Bum 2001 Summit Site mine excavated in the Hukawng Valley and located southwest of Maingkhwan in Kachin State (26°20'N, 96°36'E) in Myanmar (Cruikshank and Ko, 2003, figs. 1–3). Based on paleontological evidence, this site was dated to the late Albian of the Early Cretaceous (Cruikshank and Ko, 2003), placing the age at 97 to 110 Ma. A more recent study using U-Pb zircon dating determined the age to be 98.79 ± 0.62 Ma or at the Albian/Cenomanian boundary (Shi et al., 2012). Nuclear magnetic resonance (NMR) spectra and the presence of araucaroid wood fibers in amber samples from the Noije Bum 2001 Summit Site indicate an araucarian tree source for the amber (Poinar et al., 2007). Observations and photographs were made with a Nikon SMZ-10 R stereoscopic microscope and Nikon Optiphot compound microscope with magnifications up to 800×. Helicon Focus Pro X64 was used to stack photos for better depth of field.

3. Systematic paleontology

Features of the fossil that place it in the family Kateretidae are the body shape, shortened truncate elytra, exposed abdominal tergites, prognathous head, finely faceted eyes, and antennae with a weak 3-segmented club (Jelinek & Cline, 2010; Hisamatsu, 2011).

* Corresponding author.

E-mail address: poinarg@science.oregonstate.edu (G. Poinar).

Order: Coleoptera Linnaeus, 1758
 Superfamily Cucujoidea Latreille, 1802
 Family Kateretidae Erichson, 1843

Genus ***Furcalabratum*** Poinar & Brown, gen. nov.
 LSID: lsid:zoobank.org:act:CF7BD924-308A-48B0-8415-50CF46D8F08E

Type species: *Furcalabratum burmanicum* sp. nov.

Diagnosis. Small size (length 2.6 mm); head prognathous with extended mandibles forked at the tip (bidentate); porrect forked labrum; eyes finely faceted; beaded chain around the rim of compound eye; 11-segmented antenna terminated with a loose

3-segmented glabrous club; antennal insertions exposed, surfaces of head and pronotum punctate; elytra with striae and irregular transverse grooves; ridges on inner surfaces of femora; tarsal formula 5-5-5; first three tarsomeres with membranous lobes; claws with a prominent basal tooth; abbreviated elytra exposing 3 abdominal tergites.

Etymology. The genus name is derived from the Latin “furca” = forked and the Latin “labrum” = lip, in reference to the forked labrum.

Furcalabratum burmanicum Poinar & Brown, gen. et sp. nov. (Figs. 1–4).



Fig. 1. Holotype of *Furcalabratum burmanicum* gen. et sp. nov. in Myanmar amber. A. Lateral view. Scale bar = 0.6 mm. B. Dorsal view. Note striae and irregular transverse grooves on elytra. Scale bar = 0.4 mm. C. Ventral view. Upper arrow shows prosternal process. Lower arrow shows grooves on femur. Scale bar = 0.4 mm.

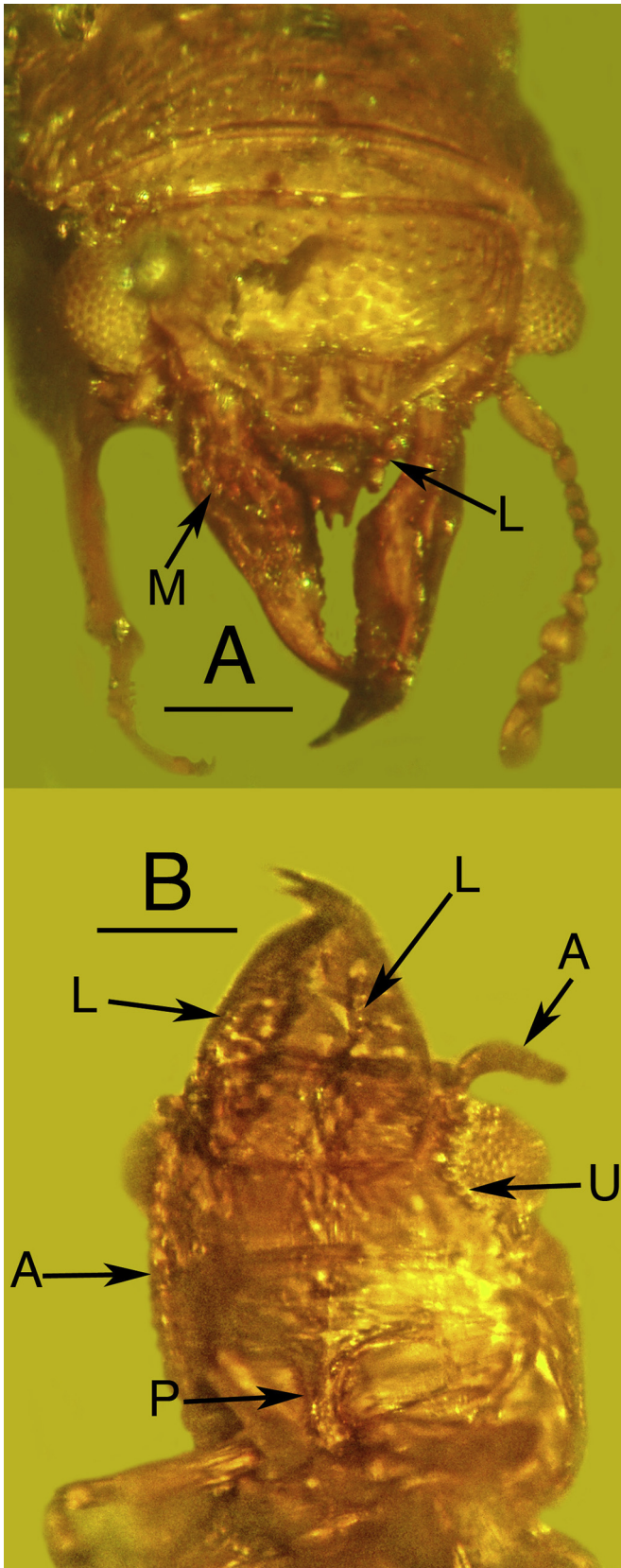


Fig. 2. Holotype of *Furcalabratum burmanicum* gen. et sp. nov. in Myanmar amber. A. Head, dorsal view. L = labial palp. M = maxillary palp. Scale bar = 0.23 mm. B. Head, ventral view. A = antennae; L = labial palps; P = prosternal process; U = Bead-like structures around the compound eye. Scale bar = 0.3 mm.

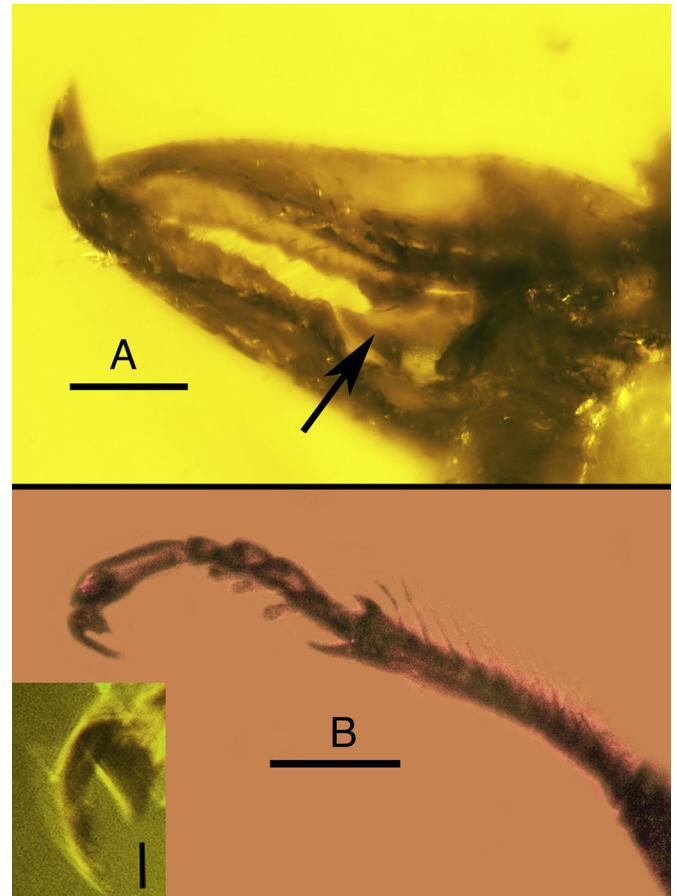


Fig. 3. Holotype of *Furcalabratum burmanicum* gen. et sp. nov. in Myanmar amber. A. mandibles, dorsal view. Arrow shows forked labrum. Scale bar = 0.2 mm. B. Protarsus showing membranous lobes on tarsomeres 1–3. Scale bar = 0.2 mm. Insert shows detail of tooth at base of tarsal claw. Scale bar = 24 μ m.

LSID Zoobank Isid:zoobank.org:act:5B6A0118-82D7-4648-8151-73E082C2DEDE

Included species: Type species only.

Etymology: The specific epithet “burmanicum” refers to the location of the fossil.

Type material. Holotype (#B-C-51) deposited in the Poinar amber collection maintained at Oregon State University.

Type locality. Hukawng Valley southwest of Maingkhwan in Kachin State (26°200N, 96° 360E), Myanmar, uppermost Albian-lowermost Cenomanian (mid-Cretaceous).

Description. Holotype male. Body small, reddish-brown, subquadrate, faintly convex, smooth, 2.6 mm in length, 1.1 mm in width.

Head. (Figs. 1A; 2A,B; 3A; 4B,C). Prognathous, punctate, not covered by pronotum; almost as wide as pronotum (including eyes), non-retractile; antenna exposed, weakly geniculate, inserted at base of eyes, 11-segmented with short scape and weak three-segmented smooth club; length antenna, 0.7 mm, terminal club segment flattened; antennal scrobes under head; eyes round, large, 0.3 mm in diameter, finely faceted, positioned on sides of head with beaded chain around edge; mandibles prominent, 0.8 mm long, each with 5–6 shallow teeth and row of setae on inner margin, tips bent inward, molar areas not contiguous at base; labial palps 3-segmented; maxillary palps 5-segmented; labrum porrect, forked at apex.

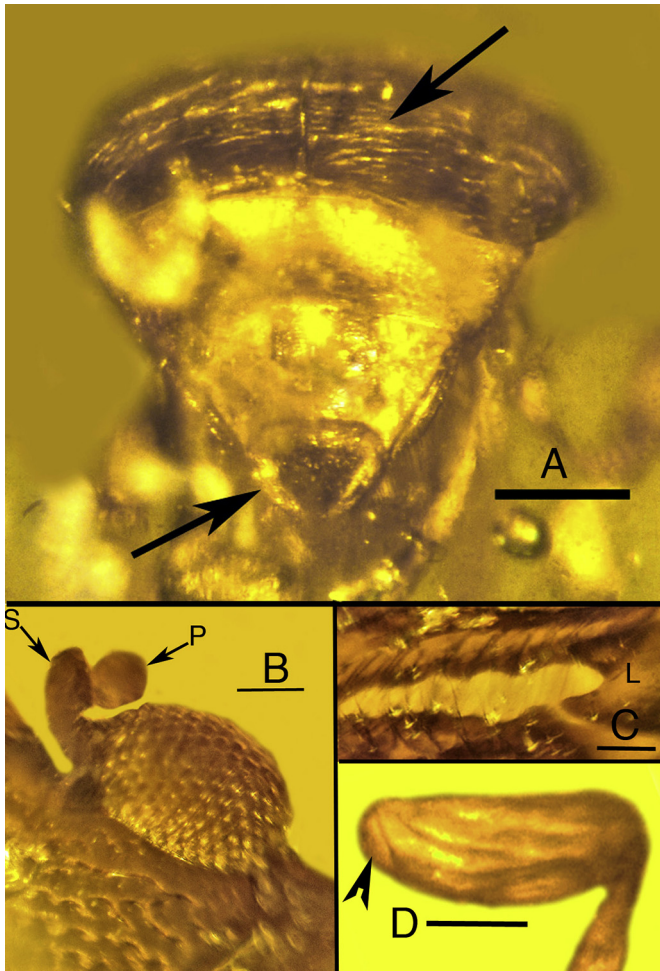


Fig. 4. Holotype of *Furcalabratum burmanicum* gen. et sp. nov. in Myanmar amber. A. Exposed posterior tergites. Top arrow shows irregular transverse grooves on elytra. Lower arrow shows externally visible anal sclerite (T-8) with curved segmented parameres surrounding the median lobe. Scale bar = 0.4 mm. B. Detail of compound eye showing antenna scape (S) and pedicel (P). Remainder of antenna removed. Note punctures on head. Scale bar = 92 μ m. C. Detail of teeth and setae on portion of inner blades of mandibles. L = lobed labrum. Scale bar = 64 μ m. D. Detail of trochanter (arrowhead) and grooved femur of middle leg. Scale bar = 180 μ m.

Thorax. (Figs. 1, 2B). Pronotum rectangular, transverse, 1.3 times as wide as long; as wide as elytra; sides slightly arcuate; posterior angles rounded, disc punctate, 0.8 mm long, 1.1 mm wide, with complete raised margin; prosternum wide, with traverse coxal cavities; procoxae separated by prosternal process almost reaching metacoxae; procoxal cavities incompletely closed posteriorly; mesocoxal and metacoxal cavities widely separated; elytra truncate, abbreviated, 1.0 mm long, 1.1 mm wide; surface with 9–11 faint striae on each elytron; fine irregular transverse ridges cover elytral surface; scutellum subtriangular; legs relatively long; femora broad, inner surface with longitudinal ridges and depressions; tibiae broad, with two short, unequal spines at apex and two sub-apical, less prominent spines; shaft of tibia with two rows of ventrally positioned setae; tarsal formula 5-5-5; first and second tarsomeres subequal, fifth as long as 3 preceding segments combined; membranous lobes (appendages) on 3 basal tarsomeres; tarsal claws paired, divergent; claw with prominent basal tooth.

Abdomen. (Figs. 1A,C; 4A). Five visible abdominal ventrites; truncate elytra exposes three tergites (T- 6–8) with eighth representing externally visible anal sclerite with curved

segmented parameres surrounding median lobe (Fig. 4A). Propygidium (T-6) and pygidium (T-7) trapezoidal in shape; anal sclerite triangular.

Comments: Synapomorphic characters of the fossil are the prognathous head, 11-segmented antennae with the last 3 segments forming a loose club and procoxal cavities incompletely closed posteriorly. One unusual feature is beaded chains surrounding the margins of both eyes (Fig. 2B). These ocular chains represent a unique feature of the fossil. Both the labial and maxillary palps are exposed on the dorsal side of the head (Fig. 2).

4. Discussion

The fossil record of the Kateretidae dates back to the Early Cretaceous (Kirejtshuk and Azar, 2008). This significant specimen indicates the presence of angiosperms in the Lebanese amber forest. The three completely exposed abdominal segments on *Lebanoretetes andelmani* Kirejtshuk and Azar (2008) is an apomorphic feature it shares with *Furcalabratum burmanicum*, the only other kateretid reported from Cretaceous deposits.

The large tooth at the base of the claw and membranous pads on tarsomeres 1–3 could have assisted *Furcalabratum burmanicum* in feeding on specific flower parts in the Myanmar amber forest. Membranous pads are not common in beetles but evolved in various lineages within different families depending on their habits. For instance, adult clerid beetles (Coleoptera: Cleridae) found in wood or under bark also have membranous lobes on their tarsi (White, 1983).

It is unknown how the large, pointed bifid mandibles with recurved tips would have served *Furcalabratum burmanicum*. Perhaps they were used for defense, to consume specific flower parts or to combat other males for mates. Autapomorphies of *Furcalabratum burmanicum* include the beaded chains around the rims of the compound eyes, the long prolonged mandibles and the membranous pads on the basal tarsomeres. It is possible that the beaded chains around the edge of the compound eyes represent enlarged ommatidia but this cannot be determined.

5. Concluding remarks

Furcalabratum burmanicum provides novel features of Short-winged Flower Beetles that existed in the Myanmar amber forest some 100 million years ago. It provides likely paleoecological associations between anthophagous beetles and primitive angiosperms and increases our understanding of the phylogenetic evolution of early lineages of the Cucujoidea.

Acknowledgements

The authors thank Andrew R. Cline and A. G. Kirejtshuk for their comments on various morphological features of the fossil and three anonymous reviewers for their helpful comments that improved the paper.

References

- Cruickshank, R.D., Ko, K., 2003. Geology of an amber locality in the Hukawng Valley, northern Myanmar. *Journal of Asian Earth Sciences* 21, 441–455.
- Hisamatsu, S., 2011. A review of the Japanese Kateretidae fauna (Coleoptera: Cucujoidea). *Acta Entomologica Musei Nationalis Pragae* 51, 551–585.
- Jelinek, J., Cline, A.R., 2010. Chapter 10.25 Kateretidae Erichson in Agassiz, 1846. In: Leschen, R.A.B., Beutel, R.G., Lawrence, J.F. (Eds.), *Handbook of Zoology, Arthropoda: Insecta, Coleoptera, Beetles Morphology and Systematics*. De Gruyter, Berlin, pp. 386–390.

- Kirejtshuk, A.G., 1992. Family Kateretidae Erichson, 1846. In: Lehr, P.A. (Ed.), Identification Key to the Insects of the Far East of the USSR. Volume 3. Part 2. Nauka, St. Petersburg, Russia, pp. 210–216 (in Russian).
- Kirejtshuk, A.G., Azar, D., 2008. New taxa of beetles (Insects, Coleoptera) from Lebanese amber with evolutionary and systematic comments. *Alavesia* 2, 15–46.
- Poinar Jr., G., Lambert, J.B., Wu, Y., 2007. Araucarian source of fossiliferous Burmese amber: spectroscopic and anatomical evidence. *Journal of the Botanical Research Institute of Texas* 1, 449–455.
- Poinar Jr., G., Chambers, K.L., 2017. *Tropidogyne pentaptera*, sp. nov., a new mid-Cretaceous fossil angiosperm flower in Burmese amber. *Palaeodiversity* 10, 135–140.
- Shi, G., Grimaldi, D.A., Harlow, G.E., Wang, J., Wang, J.Y.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.
- White, R.E., 1983. *A Field Guide to the Beetles of North America*. Houghton Mifflin Company, Boston.