Cretaceous fossils of Dermestidae (Coleoptera) and their phylogenetic significance

Adam Ślipiński

Lingzi Zhou

Australian National Insect Collection

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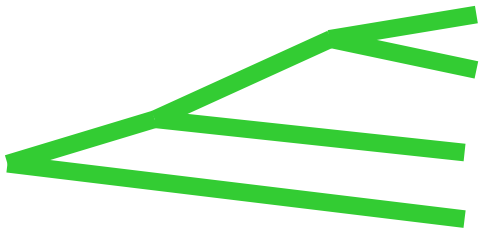
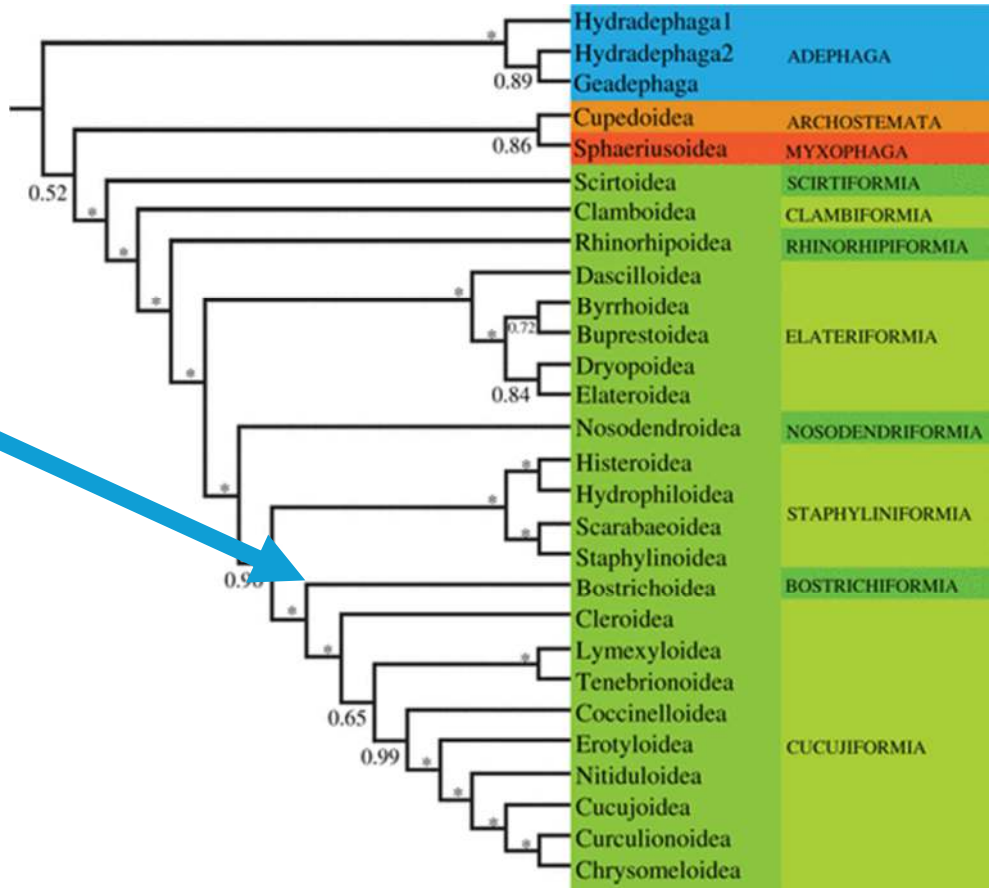
Location of the Hukawng Valley in Burma

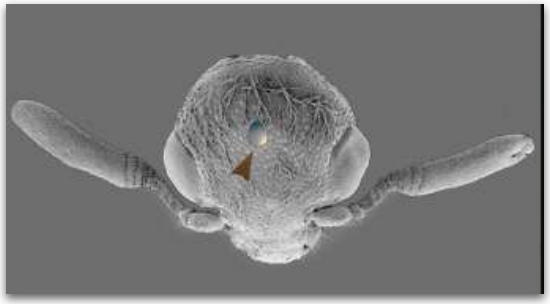
Superfamily Bostrichoidea

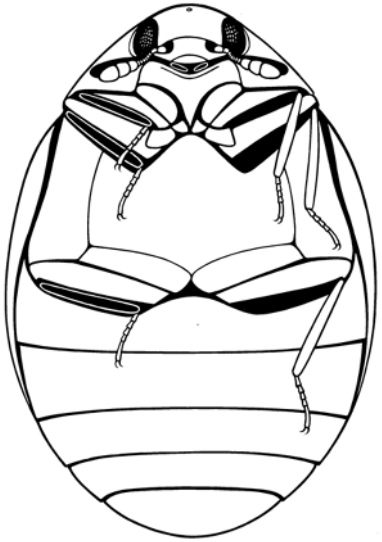
- **Bostrichidae** (incl. Lyctidae)
- **Endecatomidae**
- **Ptinidae** (incl. Anobiidae)
- **Dermestidae**

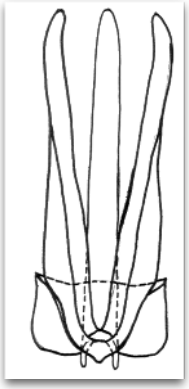


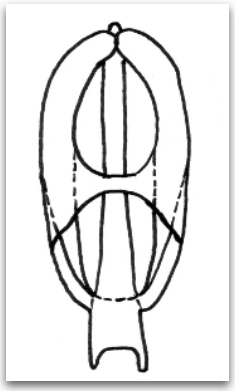


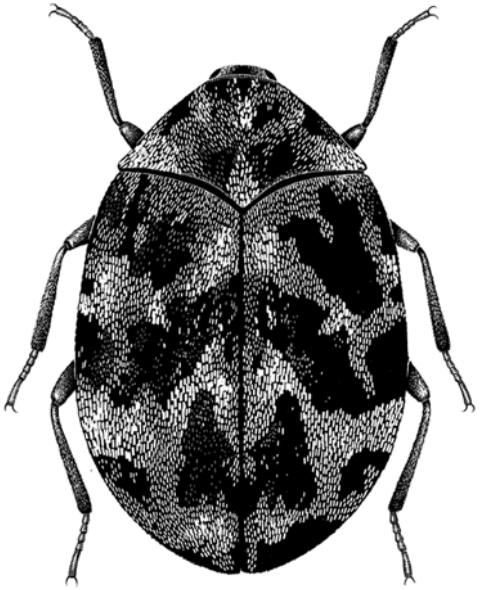
Dermestidae

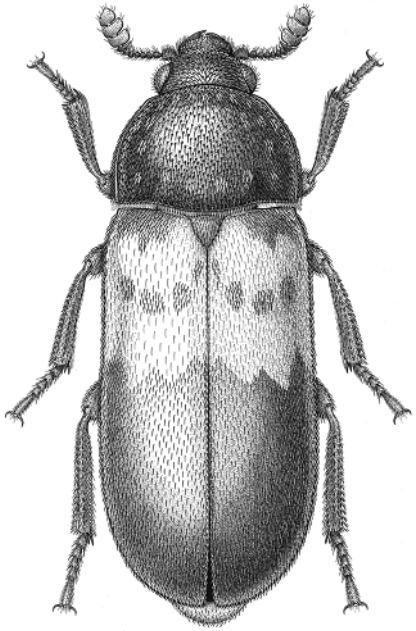








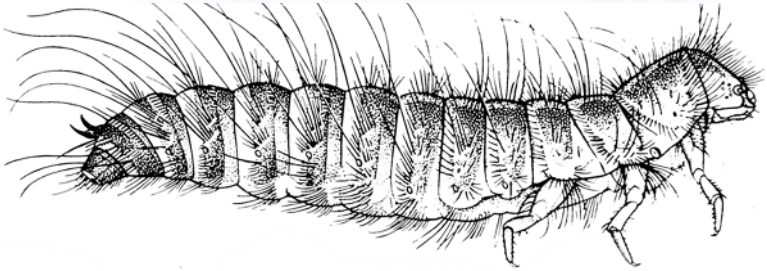




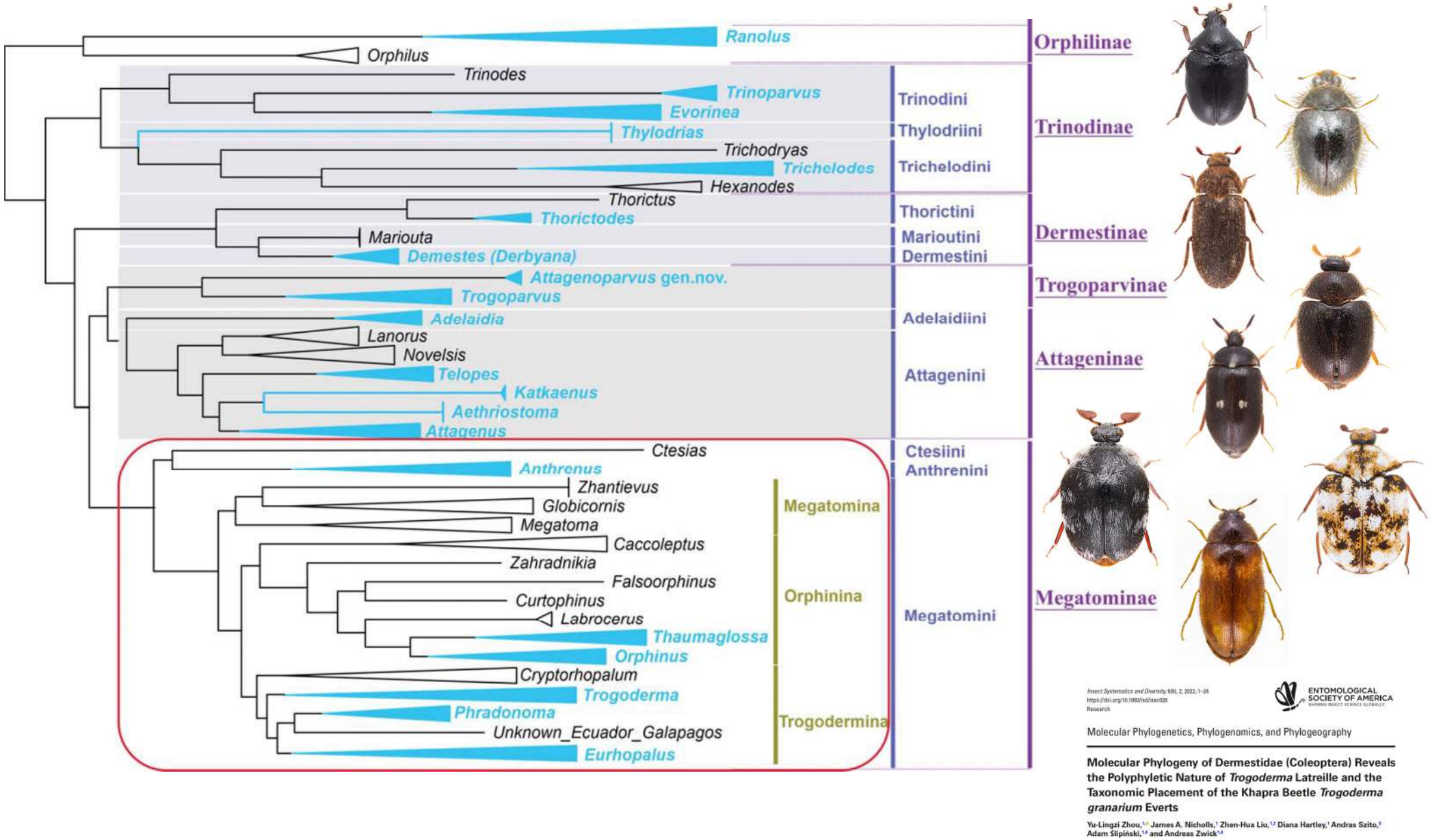
66 genera, 1700 species

6 Subfamilies:

- Orphilinae
- Dermestinae
- Trogoparvinae
- Attageninae
- Trinodinae
- Megatominae



Current phylogenetic hypothesis



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https://doi.org/10.1093/isd/ixac026
Research

ENTOMOLOGICAL SOCIETY OF AMERICA

Molecular Phylogenetics, Phylogenomics, and Phylogeography

Molecular Phylogeny of Dermestidae (Coleoptera) Reveals the Polyphyletic Nature of *Trogoderma* Latreille and the Taxonomic Placement of the Khapra Beetle *Trogoderma granarium* Everts

Yu-Lingzi Zhou,[1,5] James A. Nicholls,[1] Zhen-Hua Liu,[1,2] Diana Hartley,[1] Andras Szito,[3] Adam Ślipiński,[1,4] and Andreas Zwick[1,4]

Biological groups

Fungivorous - saprophagous group **ORPHILINAE**

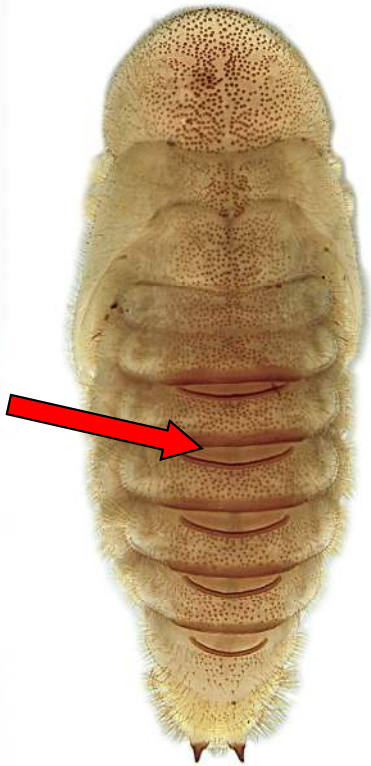
1. Adults with ocellus; need to feed on pollen to develop gonads (*Orphilus*)
2. Larvae without urogomphi, setae simple; feeding inside rotting wood or in litter
3. Pupa without gin traps (*Orphilus*)

Ranolus

Biological groups

Necrophagous group **DERMESTINAE**

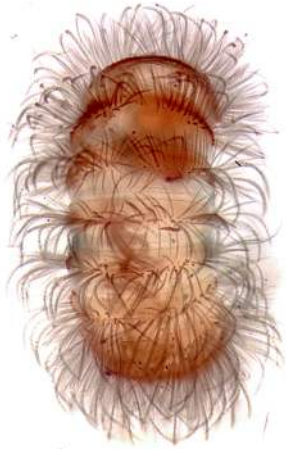
1. Adults and larvae gregarious, feeding jointly on carcasses with relatively high water content
2. Adult: no ocellus, live long , gonads develop gradually; female lays eggs in batches
3. Larvae with urogomphi, simple setae, develop quickly, often cannibalistic, no starvation
4. Pupa in chamber with gin trap



Biological groups

Nidicolous and scavenger groups

1. Adults short living, feeding on nectar-pollen or are aphagous; eggs develop in pupal stage, laid quickly in few large batches
2. Larvae with complex setae
3. Larvae feed on low water content keratinous substances; live long slowly develop; can stop feeding; no cannibalism
4. Pupa free rarely with gin traps



Dermestidae – oldest fossil record

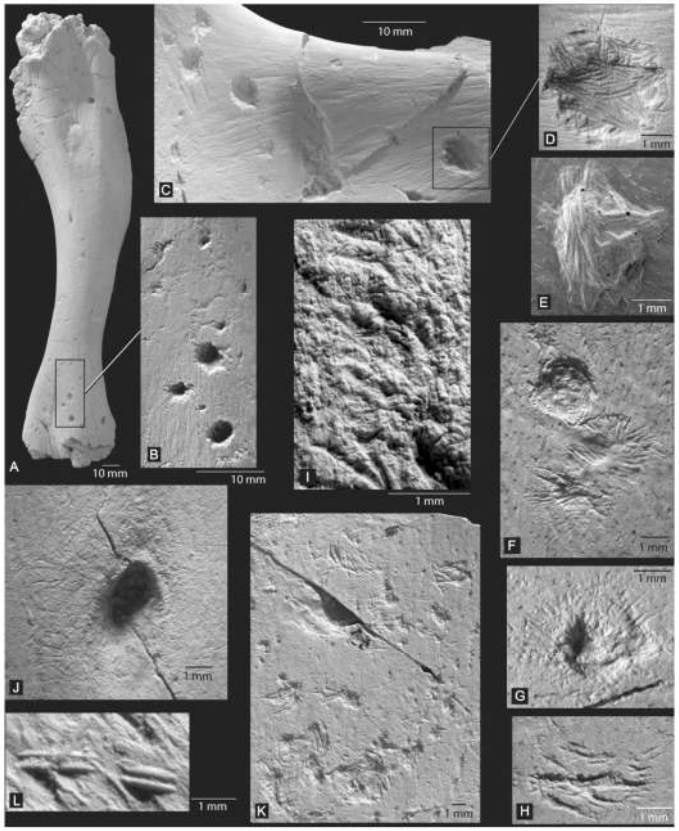


FIG. 1. Pit and mandible marks on *Camptosaurus*, BYU 17945. **A**, right humerus, in caudal view with box showing location of **B**, detail of pits on humerus; **C**, pits with mandible marks on underside of transverse process, ninth cervical vertebra showing position of **D**, pit with parallel and opposing sets of mandible marks; **E**, SEM image of mold of pit with parallel mandible marks; **F**, incipient pits in various stages of development. Terraces on two of the pits are covered with mandible marks. Middle pit partially obliterated by dissolution caused by a modern root; **G**, incipient pit with grooved (mandible marked) terrace and central excavation; **H**, mandible marks at early stage of pit development showing opposing pairs of parallel grooves; **I**, detail of intensely gnawed laminar bone on left femur with fine mandible marks superimposed on large marks. All topography is a function of consumption; **J**, nutrient foramen encompassed by array of mandible marks; **K**, clusters of mandible marks on laminar bone of left femur; **L**, mold of mandible marks composed of opposing pairs of parallel grooves, neural arch peduncle of ninth dorsal vertebra.

Ichnos, 15:59–71, 2008

ISSN: 1042-0940 print / 1563-5236 online
DOI: 10.1080/10420940701193284

A Suite of Dermestid Beetle Traces on Dinosaur Bone from the Upper Jurassic Morrison Formation, Wyoming, USA

Brooks B. Britt, Rodney D. Scheetz, and Anne Dangerfield

Earth Science Museum, Department of Geological Sciences, Brigham Young University, Provo, Utah, USA

Figure 1. Fossil bovid bones displaying insect modifications interpreted as dermestids pupation chambers by Kitching (1980) . Two bovid long bone fragments showing multiple circular bore holes, and elongated surface furrows excavated into the bone. Modifications previously attributed to dermestid beetles.

HISTORICAL BIOLOGY
2023, VOL. 35, NO. 4, 567–579
https://doi.org/10.1080/08912963.2022.2054714

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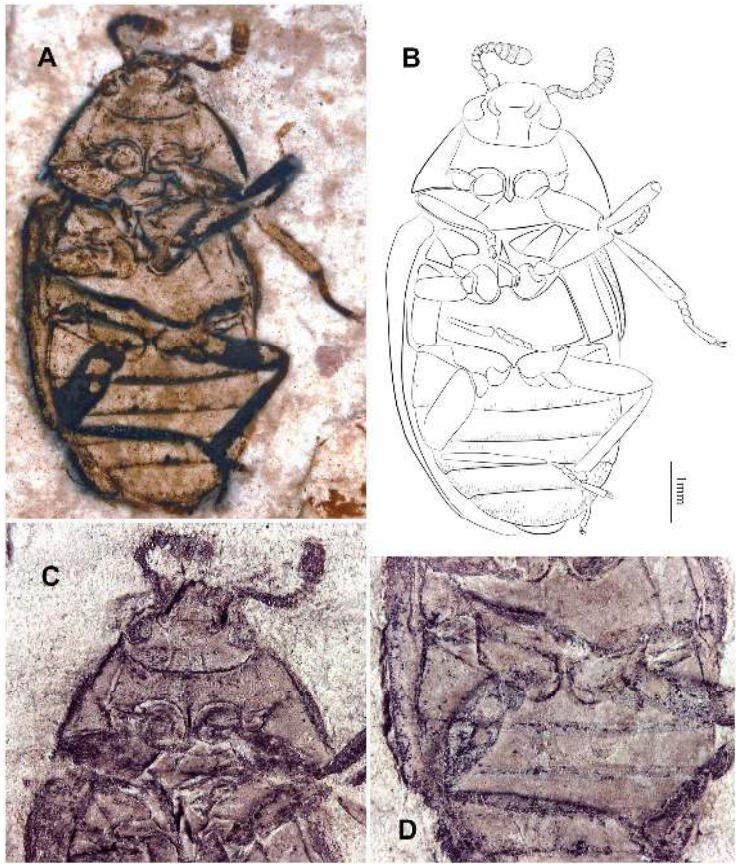
Modern bone modification by *dermestes maculatus* and criteria for the recognition of dermestid traces in the fossil record

Alexander Parkinson [a,b]

Dermestidae – oldest fossil record

Paradermestes jurassicus



Daohugou Bed, Middle Jurassic 160Ma

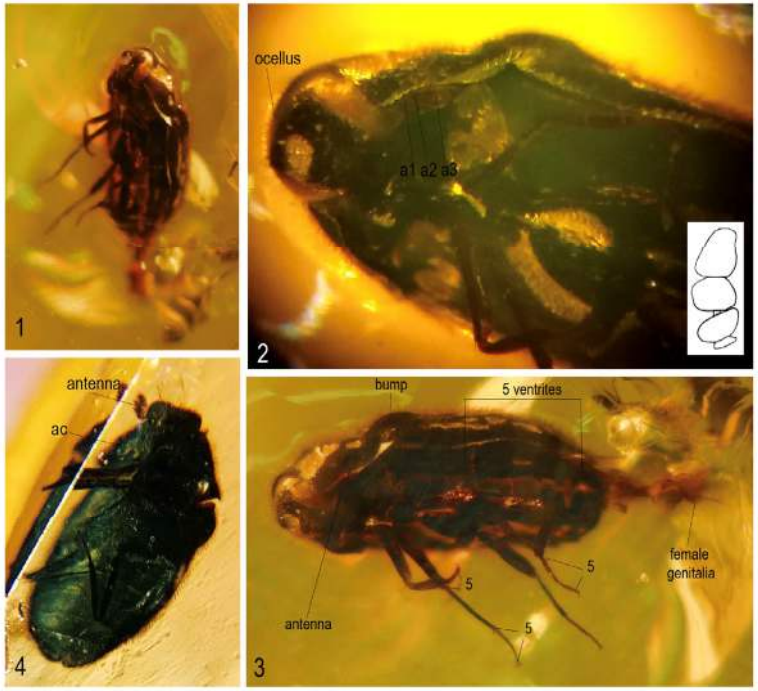
ANNALES ZOOLOGICI (Warszawa), 2017, 67(1): 109-112

THE OLDEST DERMESTID BEETLE FROM THE MIDDLE JURASSIC OF CHINA (COLEOPTERA: DERMESTIDAE)

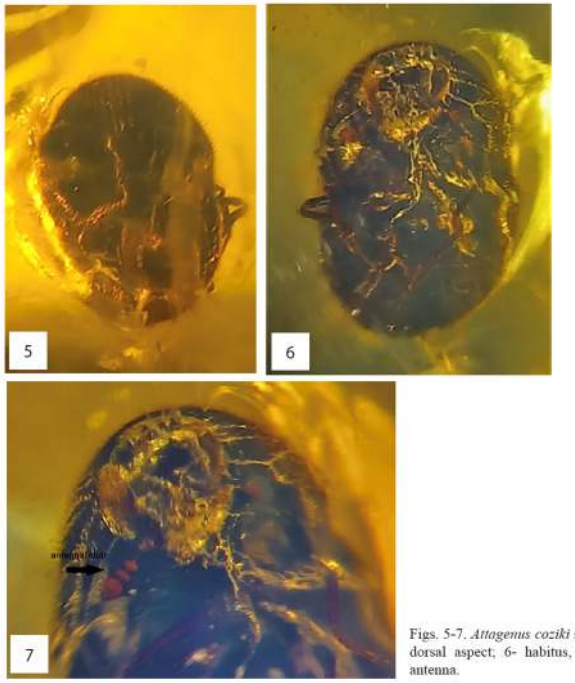
CONGSHUANG DENG[1,3], ADAM ŚLIPIŃSKI[2], DONG REN[3], and HONG PANG[1,*]

Cretaceous amber - described taxa

Burmese amber -10 species in 7 genera
Lebanese amber – 1 genus; 1 species



Figs 1–4. *Tuberphradonoma burmitica* sp.n.: 1 — holotype, habitus dorso-lateral; 2 — holotype, head, pronotum and antennal club, ventral (a1–a3 — antennomeres); 3 — holotype, habitus, dorso-lateral; 4 — paratype, dorsal (ac — antennal cavity).
Рис. 1–4. *Tuberphradonoma burmitica* sp.n.: 1 — голотип, внешний вид, дорсо-латерально; 2 — голотип, голова, переднеспинка и булава усиков, вентрально (a1–a3 — членики усиков); 3 — голотип, внешний вид, дорсо-латерально; 4 — паратип, дорсально (ac — усиковая впадина).



Figs. 5-7. *Attagenus coziki* sp. nov.: 5- habitus, dorsal aspect; 6- habitus, ventral aspect; 7- antenna.

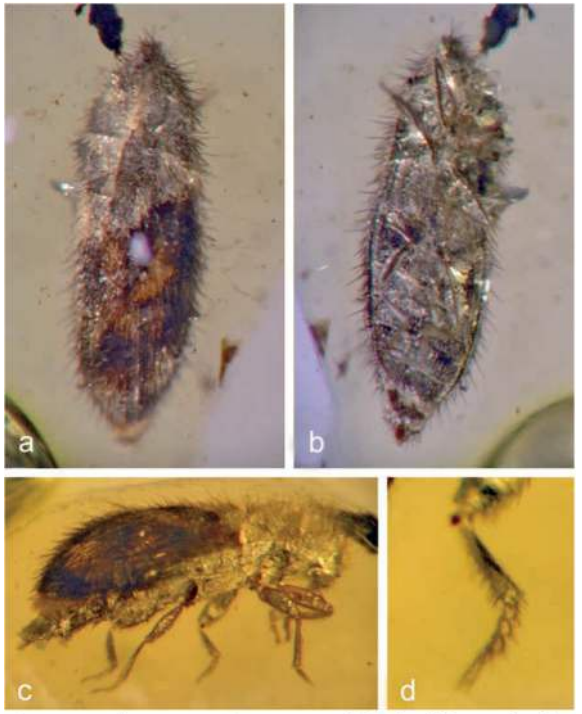


Fig. 1: *Cretonodes antounazari* gen. et sp.nov.: (**a**) body of holotype, dorsal; (**b**) ibid., ventral; (**c**) ibid., lateral; (**d**) mesotibia and tarsus, lateral.

Евразиатский энтомол. журнал 20(6): 343–345
doi: 10.15298/euroasentj.20.6.08

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Two new genera and species of Dermestidae (Coleoptera) from Cretaceous Burmese amber

Два новых рода и новый вид жуков-кожеедов (Coleoptera, Dermestidae) из мелового бирманского янтаря

J. Háva
И. Гава

Studies and Reports
Taxonomical Series 19 (2): 267-284, 2023

A contribution to the knowledge of amber Dermestidae (Coleoptera: Bostrichoidea) with a list of all known fossil species

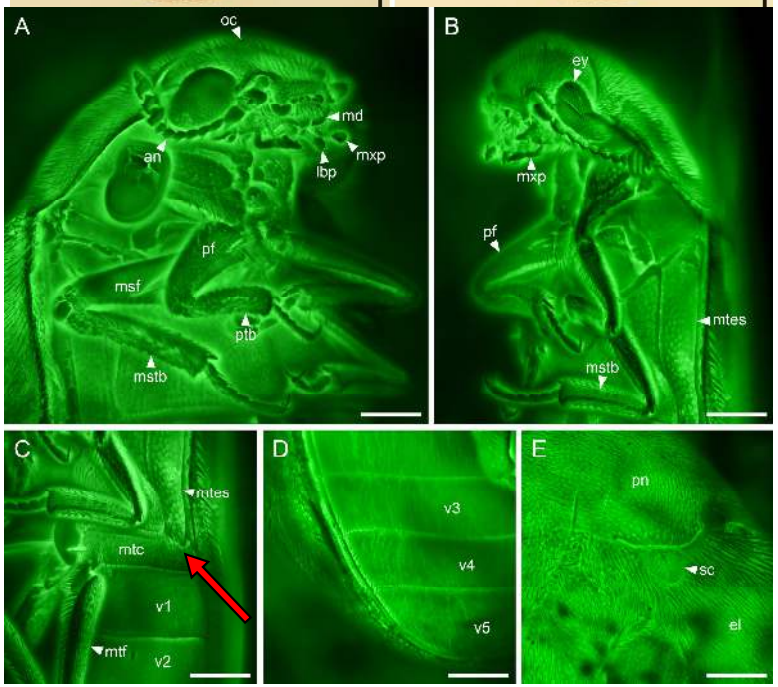
Jiří HÁVA

Private Entomological Laboratory & Collection,
Rýznerova 37/37, CZ-252 62 Únětice u Prahy, Prague-west, Czech Republic
e-mail: jh.dermestidae@volny.cz

New beetles of Polyphaga (Coleoptera, Polyphaga) from Lower Cretaceous Lebanese amber

Alexander G. KIREJTSHUK, Dany AZAR, Paul TAFFOREAU, Renaud BOISTEL & Vincent FERNANDEZ

Fossil Orphilinae (former *Attagenus*)



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Short Communication

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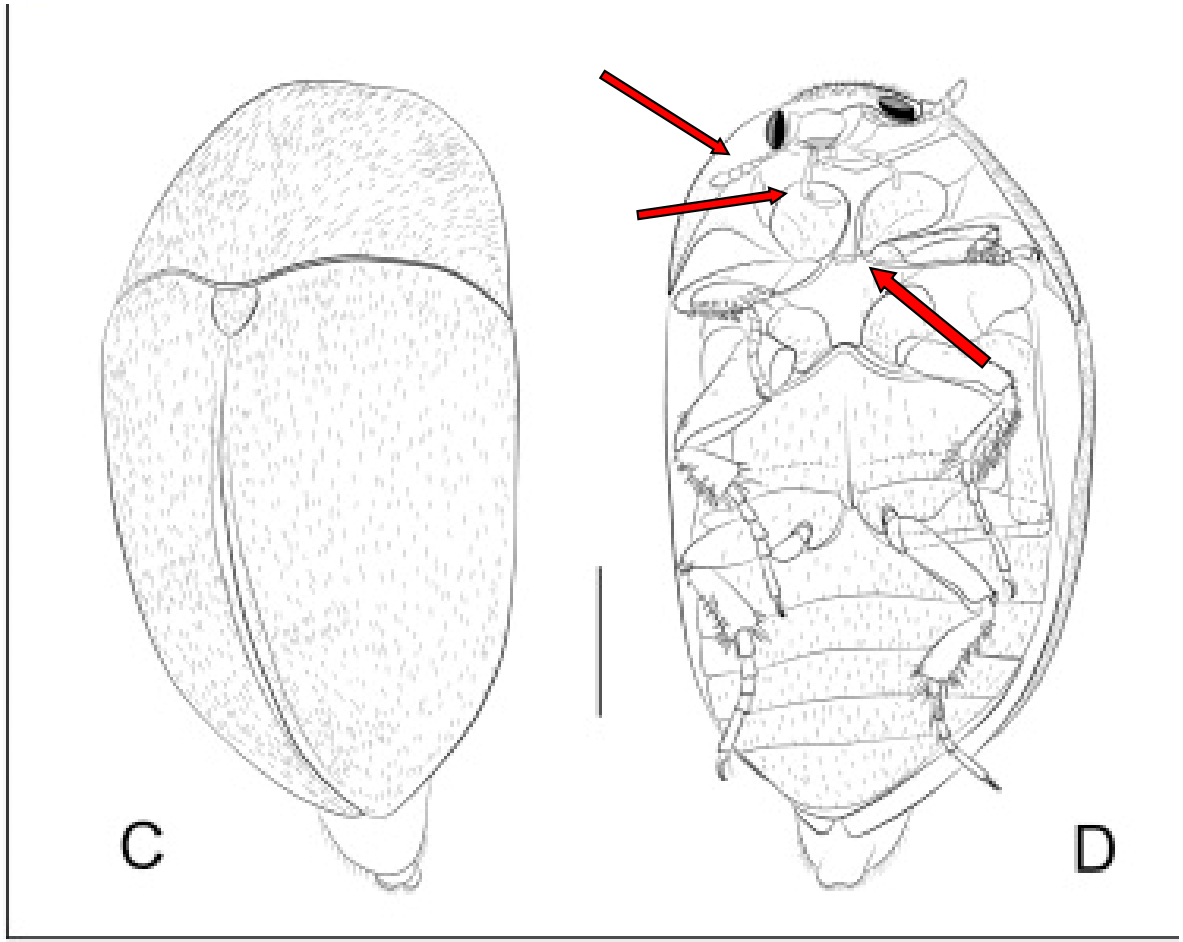
"*Attagenus*" *burmiticus* from mid-Cretaceous amber reinterpreted as a member of Orphilinae (Coleoptera: Dermestidae)

YAN-DA LI[1, 2], DI-YING HUANG[1] & CHEN-YANG CAI[1, 2, *]

Cretodermestes palpalis (Cretodermestinae)



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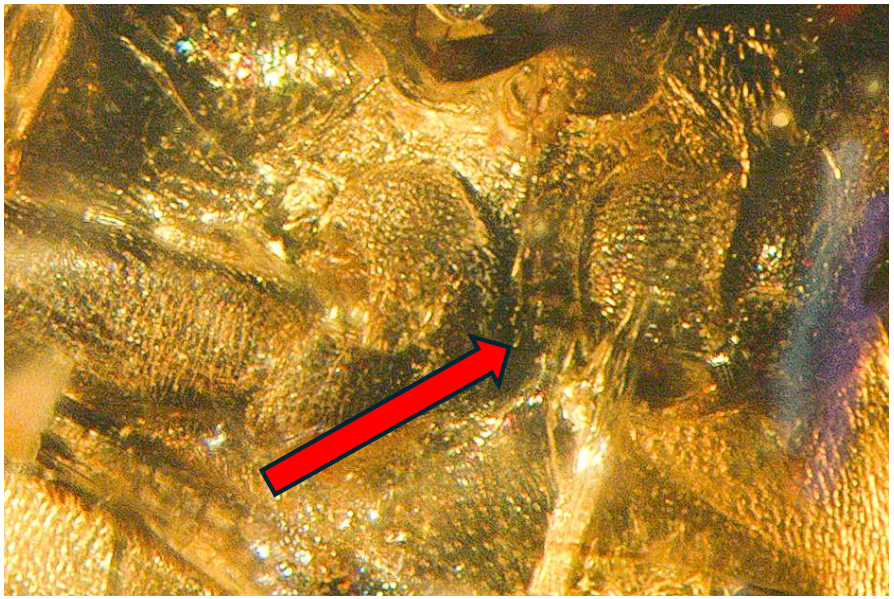
Short communication

New Cretaceous carpet beetles (Coleoptera: Dermestidae) from Burmese amber

Congshuang Deng [a, c], Adam Ślipiński [b], Dong Ren [c], Hong Pang [a, *]

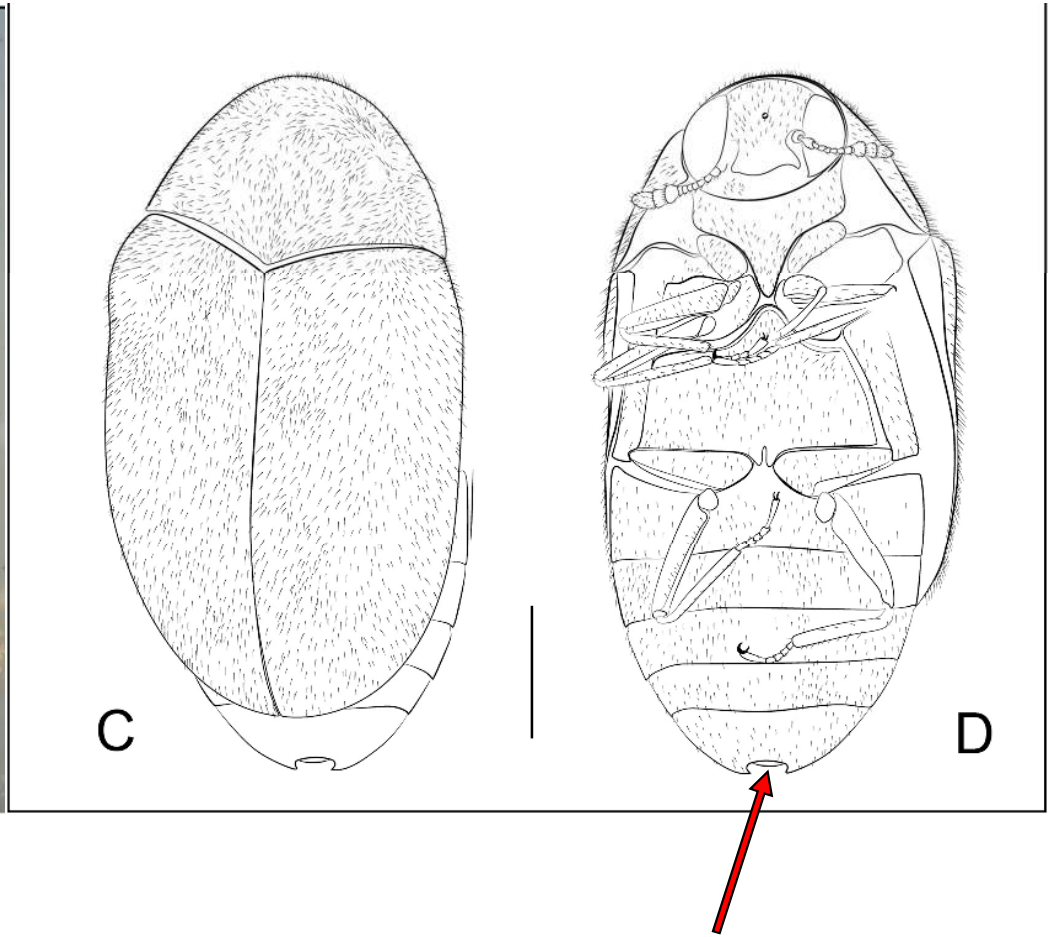
New discoveries – *Dermestes (2 spp.)*

New discoveries - *Dermestes*



Drishti animation by Ajay Limaye (ANU)

Megatominae – *Megatoma atypica*



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New Cretaceous carpet beetles (Coleoptera: Dermestidae) from Burmese amber

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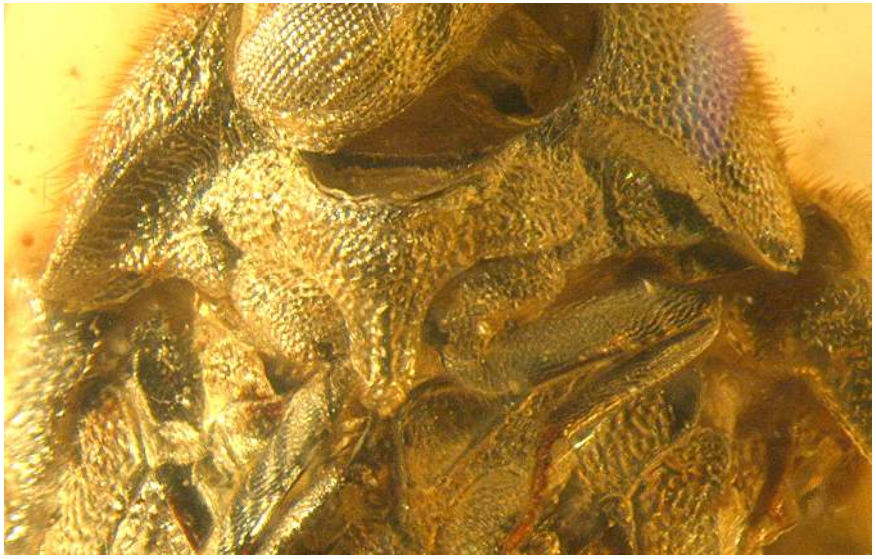
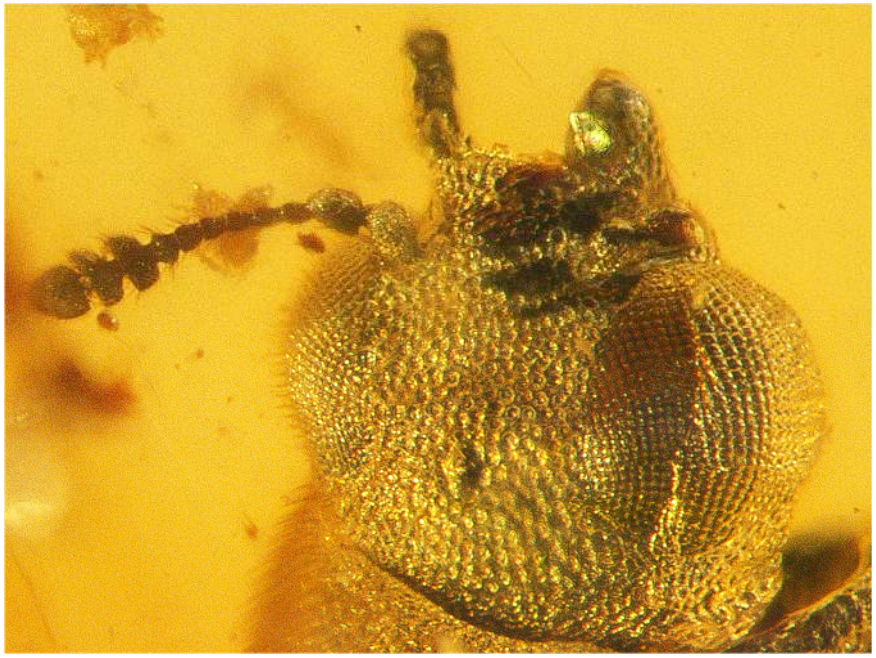
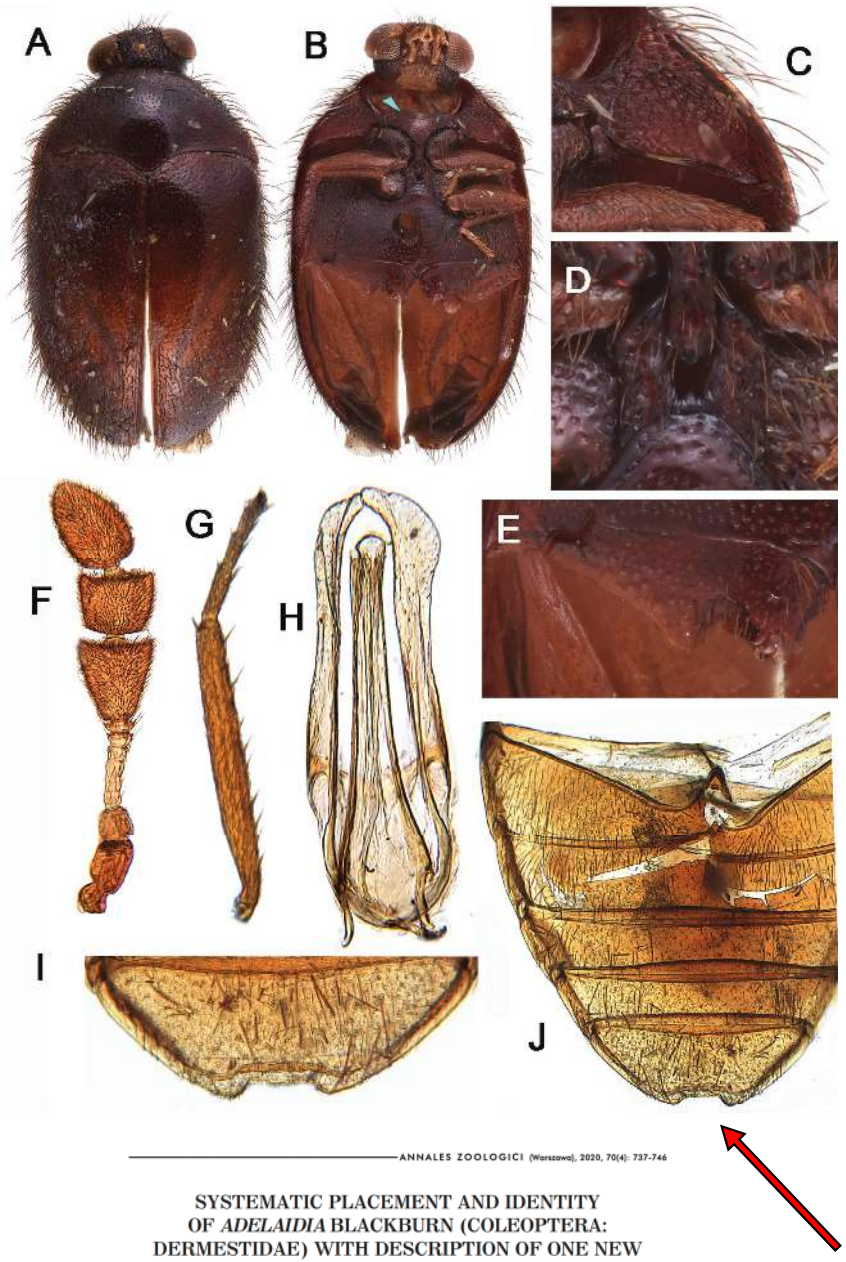
Megatoma atypica - Cretomegatoma





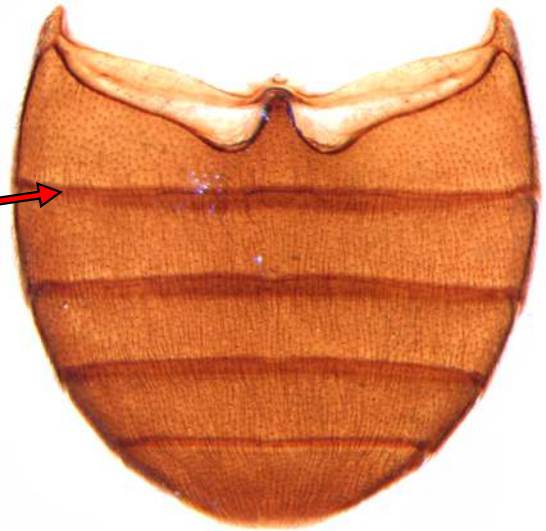
Megatominae – Attageninae dilema



ANNALES ZOOLOGICI (Warszawa), 2020, 70(4): 737-746

SYSTEMATIC PLACEMENT AND IDENTITY OF *ADELAIDIA* BLACKBURN (COLEOPTERA: DERMESTIDAE) WITH DESCRIPTION OF ONE NEW SPECIES FROM QUEENSLAND AND A NEW GENUS

YU-LINGZI ZHOU[1], ADAM ŚLIPIŃSKI[1,*] and ZHENHUA LIU[1,2]



Attageninae

Megatominae

Megatominae gen., nr *Cretomegatoma*

Drishti animation by Ajay Limaye (ANU)

Phylogenetic evaluation

55 Adult characters;
parsimony; TNT-Winclada

Endecatomus_rugosus
Clada_postica
Thorictus_castaneus
Thorictodes_heydeni
Dermestes_burmite
Derbyana_matthewsi
Dermestes_lardarius
Dermestes_maculatus
Nothattagenus
Orphilus_subnitidus
Ranolus_sp._Philippines
Orphilodes_australis
Cretodermestes_palpalis
Aethriostoma_undata
Katkaenus
Telopes_fasciatus
Adelaidia_rigua
Attagenus_pelio
Paranovelsis
Attagenoparvus
Trogoparvus_49
Trinoparvus_suturalis
Trichodryas_esoterica
Thylodrias_contractus
Evorinea_sp.
Trinodes_sp
Hexanodes_vulgata
Trichelodes_delicatula
Megatoma_atypica
Ctesias_serra
Reesa_vespulae
Megatoma_undata
Trogoderma_granarium
Labrocerus
Orphinus
Thaumaglossa_nigricans
Anthrenus_verbasci
Anthrenus_scrophulariae
Trogoderma_glabrum
Anthrenocerus_australis
Trogoderma_apicipenne
Trogoderma_froggatti
Cryptorhopalum
Phradonoma_nobile

Dermestinae

Orphilinae

Cretodermestinae

Attageninae

Trogoparvinae

Trinodinae

Megatominae

Thank you !!!

Adam Ślipiński

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