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The first representative of the beetle family Chelonariidae in Dominican amber

GEORGE POINAR JR. AND JIŘÍ HÁVA

Abstract

The present paper describes *Chelonarium dominicanum* sp. nov., the first fossil representative of the family Chelonariidae (Coleoptera: Byrrhoidea) in Dominican amber. The specimen is characterized by the shape of its body and head, absence of body pubescence, wide profemora and presence of small tubercles covering the abdominal sternites. The size, rounded clypeus with a small, blunt projection at the tip, flat pronotal disc with lateral margins extending over the head and the protibia much wider than the adjacent profemur and mesotibia, separate the present species from previously known members of the family. Since the larvae of Chelonariidae are assumed to be semi-aquatic, there would have been many fresh water habitats for it in the Dominican amber forest.

Key words: Taxonomy, new taxon, Coleoptera, Chelonariidae, Dominican amber.

1. Introduction

The small turtle beetle family Chelonariidae (Coleoptera: Byrrhoidea) is considered to include some 300 species in three extant genera: *Chelonarium* FABRICIUS, 1801 in the New World, *Pseudochelonarium* PIC, 1916 in the Old World and *Brounia* SHARP, 1878 in New Zealand (SHEPARD 2016). Adults of the genus *Chelonarium* are characterized by their seed-shaped body, deflexed head, legs retracted into ventral grooves, ventrally lobed penultimate tarsomeres, row of teeth at the base of the pronotum and broad flat protibia (TUFF 1975; WHITE 1983). Many turtle beetles are associated with the nests of ants and termites (SHEPARD 2016), while the larvae of some are considered to be semi-aquatic (TUFF 1975). Fossil representatives of the Chelonariidae are quite rare, with only three representatives known, an undescribed specimen in Eocene Baltic amber (ALEKSEEV 2019), *Chelonarium montanum* WICKHAM, 1914 in Eocene North American Florissant deposits (WICKHAM 1914), and the Early Cretaceous *Eochelonarium belle* KIREJTSHUK & AZAR, 2013 in Lebanese amber (KIREJTSHUK & AZAR 2013). The present study describes the first representative of the family Chelonariidae in Dominican amber.

2. Material and methods

The fossil originates from amber mines in the northern mountain range (Cordillera Septentrional) of the Dominican Republic, between Puerto Plata and Santiago. The amber was produced by the extinct tree legume *Hymenaea protera* POINAR 1991 that was probably widely abundant in the Caribbean and Central America at this time (POINAR 1991). Dating of Dominican amber is still controversial, with the youngest proposed age of 20–15 mya based on

foraminifera (ITURRALDE-VINENT & MACPHEE 1996) and the oldest of 45–30 mya based on coccoliths (CEPEK in SCHLEE 1990). Most of the amber is secondarily deposited in turbiditic sandstones of the Upper Eocene to Lower Miocene Mamey Group (DRAPER et al. 1994). DILCHER et al. (1992) suggested that “...the amber clasts, from all physical characteristics, were already matured amber at the time of re-deposition into marine basins. Therefore, the age of the amber is greater than Miocene and quite likely is as early as late Eocene”. The issue is further complicated by the discovery of Early Oligocene amber in Puerto Rico and Maastrichtian–Paleocene amber in Jamaica (ITURRALDE-VINENT 2001), indicating that the dating of Caribbean amber is still unresolved. Observations and photographs were made with a Nikon SMZ-10 stereoscopic microscope. Helicon Focus Pro X64 was used to stack photos for better clarity and depth of field.

3. Systematic palaeontology

Order Coleoptera LINNAEUS, 1758

Suborder Polyphaga EMERY, 1886

Superfamily Byrrhoidea LATREILLE, 1804

Family Chelonariidae BLANCHARD, 1845

Genus *Chelonarium* FABRICIUS, 1801

Chelonarium dominicanum sp. nov.
Figs. 1–4

Etymology: The specific epithet is based on the location of the fossil.



Fig. 1. Dorsum of *Chelonarium dominicanum* sp. nov. in Dominican amber. Scale bar = 1.3 mm.

Type: Holotype (unknown sex). Accession # C-7-403 deposited in the POINAR amber collection maintained at Oregon State University. Syninclusions include minute organic particles and a phoretic mite attached to the specimen.

Diagnosis: Large body; head with medium sized eyes; distance between eyes 1.6 times eye diameter when viewed ventrally; clypeus rounded with a small, blunt projection at tip; pronotal disc flat, but with lateral margins extending over head; all legs folded in body concavities; protibia much wider than adjacent profemur and mesotibia; body lacking pubescence except for scattered patches of white hairs on elytra and sub-recumbent microsetae on abdominal sternites.

Description: Body broadly elongate, length, 5.7 mm; head deflexed, strongly convex, retracted into prothorax; eyes medium sized, reddish-brown, finely faceted; mouthparts and antennae obscure; pronotum light brown, smooth, lacking punctures but with small dark spots, lateral margins extending over head, 1.6 times as broad as long, broadest at base, with a faint line of small teeth along the basal margin; scutellum shield-shaped; elytra dull black, smooth, without striations, 1.3 times

as broad as pronotum, about 1.5 times as long as broad, broadest at apical third, with scattered patches of white hairs; legs flattened, withdrawn into body concavities; procoxae nearly adjacent, separated only by slender segment that extends to middle of mesocoxae; protibia greatly flattened, about 2.1 times as long as wide; procoxae and mesocoxae adjacent, quite distant from metacoxae; tarsi 5-5-25, third and fourth tarsomeres smallest; six abdominal sternites visible, all bearing very small surface tubercles, many of which have sub-recumbent microsetae in the center; terminal sternite with pointed tip extending beyond elytral tips.

Differential diagnosis: The size, rounded clypeus with a small, blunt projection at the tip, flat pronotal disc with lateral margins extending over the head and the protibia much wider than the adjacent profemur and mesotibia, separate the present species from previously known amber specimens of the family (ALEKSEEV 2019; KIREJTSHUK & AZAR 2013). The hemispherical pronotum and absence of punctulate striae on the elytra separate *C. dominicanum* from the subtriangular pronotum and punctulate striae on the elytra of the Eocene Florissant species *Chelonarium montanum* WICKHAM (1914).



Fig. 2. Ventrum of *Chelonarium dominicanum* sp. nov. in Dominican amber. Arrowhead shows attached mite. Scale bar = 1.4 mm.



Fig. 3. Lateral view of *Chelonarium dominicanum* sp. nov. in Dominican amber. Arrow shows eye. Arrowhead shows phoretic mite on pronotum. Scale bar = 0.9 mm.

4. Discussion

It is obvious that the family Chelonariidae is well distributed globally, including in the Americas (MÉQUIGNON 1934; TUFF 1975), the Malay Archipelago (SATÔ 2001) and regions of the Neotropics, Asia and Australia (PECK 2005). While no records of extant species of turtle beetles could be found in Hispaniola (PECK & PEREZ-GELABERT 2012), five extant species of *Chelonarium* are reported from Cuba (PECK 2005). A wide range of habitats have been indicated for turtle beetles, including moist to dry litter or under bark, in the refuse heaps of ants (PECK 2005), on foliage and leaf litter (WHITE 1983) and in semi-aquatic habitats (for larvae) (TUFF 1975). All of these habitats would have existed in the Dominican amber forest (POINAR & POINAR 1999).

Tertiary representatives of Chelonariidae existed in northern Europe (ALEKSEEV 2019), North America (WICKHAM 1914) and the Caribbean (present study). The oldest member of the family is *Eochelonarium belle* from Early Cretaceous Lebanese amber (KIREJTSHUK & AZAR 2013).

The small patches of white hairs on the surface of the elytra may be a feature of American turtle beetles since this character is listed as being present on extant North American members of the genus (WHITE 1983). Another interesting feature on North American species of *Chelonarium* is the row of small teeth at the base of the pro-

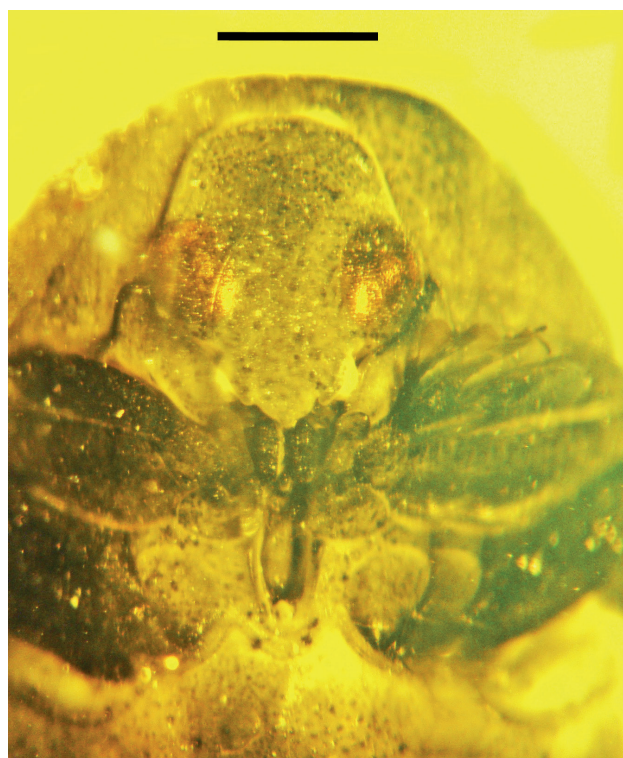


Fig. 4. Ventral view of head with mouthparts of *Chelonarium dominicanum* sp. nov. in Dominican amber. Scale bar = 0.7 mm.

notum (WHITE 1983). WICKHAM (1914) noted this feature (crimping of the pronotal base) on the Eocene *C. montanum* from the Florissant beds. The pronotal teeth of *C. dominicanum* are very faint and most noticeable on the right side of the pronotal base.

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5. References

- ALEKSEEV, V. I. (2019): New Extinct Coleoptera in Baltic amber of Friedhelm Eichmann's collection (Germany). – *Baltic Journal of Coleoptera*, **19**: 11–22.
- DILCHER, D. L., HERENDEEN, P. S. & HUEBER, F. (1992): Fossil Acacia flowers with attached anther glands from Dominican Republic amber. – In: HERENDEEN, P. S. & DILCHER, D. L. (eds.): *Advances in legume systematics: 4. The fossil record: 33–42*; Kew (The Royal Botanical Gardens).
- DRAPER, G., MANN, P. & LEWIS, J. F. (1994): Hispaniola. – In: DONOVAN, S. & JACKSON, T. A. (eds.): *Caribbean geology: an introduction: 129–150*; Kingston (The University of the West Indies Publishers' Association).
- ITURRALDE-VINENT, M. A. (2001): Geology of the amber-bearing deposits of the Greater Antilles. – *Caribbean Journal of Science*, **37**: 141–167.
- ITURRALDE-VINENT, M. A. & MACPHEE, R. D. E. (1996): Age and paleo-geographic origin of Dominican amber. – *Science*, **273**: 1850–1852.
- KIREJTSHUK, A. G. & AZAR, D. (2013): Current knowledge of Coleoptera (Insecta) from the Lower Cretaceous Lebanese amber and taxonomic notes for some Mesozoic groups. – *Terrestrial Arthropod Reviews*, **6**: 103–134.
- MÉQUIGNON, A. (1934): Les Chelonarium de l'Amerique continentale. – *Annales de la Société entomologique de France*, **103**: 199–256.
- PECK, S. B. (2005): A checklist of the beetles of Cuba with data on distributions and bionomics (Insecta: Coleoptera). – *Arthropods of Florida and Neighboring Land Areas*, **18**: 1–241.
- PECK, S. B. & PEREZ-GELABERT, D. E. (2012): A summary of the endemic beetle genera of the West Indies (Insecta: Coleoptera); bioindicators of the evolutionary richness of this Neotropical archipelago. – *Insects Mundi*, **718**: 1–29.
- POINAR JR., G. O. (1991): *Hymenaea protera* sp. n. from Dominican amber has African affinities. – *Experientia*, **47**: 1075–1082.
- POINAR JR., G. O. & POINAR, R. (1999): *The Amber Forest*. Princeton (Princeton Univ. Press).
- SATÔ, M. (2001): A remarkable new species of the genus *Chelonarium* (Coleoptera, Chelonariidae) from Borneo. – *Elytra*, **29**: 315–317.
- SCHLEE, D. (1990): Das Bernstein-Kabinett. – *Stuttgarter Beiträge zur Naturkunde, Serie C*, **28**: 1–100.
- SHEPARD, W. D. (2016): Beetles (Coleoptera) of Peru: A survey of Families Chelonariidae Blanchard, 1845. – *Journal of the Kansas Entomological Society*, **89**: 254–255.
- TUFF, D. W. (1975): New distributional record for *Chelonarium elcontei* Thompson (Coleoptera: Chelonariidae). – *The Southwestern Naturalist*, **19**: 437–453.
- WHITE, R. E. (1983): *A field Guide to the beetles of North America*. Boston (Houghton Mifflin).
- WICKHAM, H. F. (1914): New Miocene Coleoptera from Florissant. – *Bulletin of the Museum of Comparative Zoology*, **58**: 423–494.

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