Two new longhorned beetles from Dominican amber
(Coleoptera, Cerambycidae)

Francesco Vitali

Abstract: Two new fossil cerambycid species included in Dominican amber, Elaphidion tocanum nov.sp. (Cerambycinae Elaphidiini), from La Toca (Middle Eocene–Early Oligocene) and Kallyntrosternidius bucarensis nov. gen. nov.sp. (Lamiinae Acanthocini) from La Bucara (Late Oligocene) are described. Comparisons with extinct and extant Elaphidion-species and extant genera of American Acanthocinini are provided.

Key words: Coleoptera, Cerambycidae, Elaphidiini, Acanthocinini, palaeontology.

Introduction

Unlike Baltic amber, Dominican amber has a much more recent history regarding research on the cerambycid fauna; nevertheless, the amount of new fossil species increases year after year. After the first publication by MARTINS & GALILEO (1999), dating only 10 years ago, the papers by VITALI (2004), NEARNS & BRANHAM (2005) and VITALI (2006, 2007b) have allowed to know already five fossil cerambycid species included in Dominican amber.

In this paper new species belonging to Elaphidiini and Acanthocinini are described, strongly improving the knowledge of the Antillean and the American cerambycid fossil fauna.

According to the literature, fossil Elaphidiini have been described for nearly one century (WICKHAM 1911, 1914), already revised (LINSLEY 1942) and listed as such by well-known catalogues (LINSLEY 1961, CARPENTER 1992). Actually, Elaphidion tractum WICKHAM, 1911, Anelaphus extinctus WICKHAM, 1914 and Stenophenus pristinus WICKHAM, 1914 were described on poorly preserved specimens from the Early Oligocene shales of Florissant, Colorado. However, none of them showed at least one typical character (spines on antennae, apex of femora or elytra) that somehow justified their attribution to Elaphidiini; hence, they were finally deemed as Cerambycidae incertae sedis (LINGAFELTER 1998). So, the only verifiable Elaphidiine was the Elaphidion sp. that POINAR (1992) mentioned from Dominican amber much more recently. Nevertheless, only the description of Elaphidion inclusum VITALI, 2007 has provided the first certain fossil species belonging to this tribe.

Fossil Acanthocinini have also been known for nearly the same period of time, after the description of Leptostylus scudder WICKHAM, 1914 from Florissant. Only one other fossil Acanthocinini was described (Acanthocinus schmidti SCHMIDT, 1967 from Late Pliocene shales of Willershausen, Germany), but, while the European fossil is extremely similar or even identical to current species, the American one is very uncertain. In fact, though WICKHAM (1914) noticed a resemblance with Styloleptus biustus (LECONTE, 1852) and Leptostylopsis terraecolor (HORN, 1880) of the Recent, the asymmetrical shape of the prothorax does not allow recognising the genus either. Actually, POINAR (1992) also recorded Eugamandus sp. from Dominican amber, but this specimen is possibly referable to Pterolophosoma otiae VITALI, 2006. Hence, Kallyntrosternidius bucarensis nov.sp. is the first fossil belonging to Acanthocinini with a certain identity.
Materials and methods

The Elaphidion-specimen is fossilised in an oval piece of yellowish amber measuring 13x20 mm. Due to the original amber cutting and polishing, the cerambycid is missing the right antenna after the basal part of the antennomere III, the left antennae after the apical part of the scape, and the right hind leg after the knee. The longhorn lies with folded legs inside another piece of red amber, which also envelops two small spiders and a spider skin, a scelionid wasp, the incomplete wings of a barklice and several tiny flies of different unidentified families. Moreover, the lateral left margin of the pronotum is missing, though completely included in the amber. On the other side, the surface of the inner red amber looks as covered by very fine confused fissures and includes the legs of the cerambycid as a cloth. The fissures might be interpreted as fractures of the inner red amber, but the conditions of the longhorn let think that it was included in amber when it was already dead and even partially eaten, while the fissures are actually the rests of a spider cobweb.

The acanthocinine specimen is fossilised in a round piece of yellow amber measuring 16x19 mm. Unlike the previous piece, this amber contains a multitude of bubbles, some of them double or triple, some even containing a small drop of water. This kind of amber is very different from all Dominican amber that I have examined containing cerambycids or tenebrionids (VITALI 2004, 2006, 2007a, b, 2008) both for colour and number of bubbles, but the means at my disposal do not allow to further look into the question.

Only a small non-biting midge (Diptera Chironomidae) is present along with the included cerambycid. Due to the original amber cutting and polishing, this specimen is missing the right antenna after the half of the antennomere VIII.

According to the collector, the former specimen was excavated at the mine La Toca and the latter one at La Bucara, both mines being located in the Cordillera Septentrional of the Dominican Republic (Hispaniola).

According to ITURRALDE-VINENT & MACPHEE (1996), all of the main amberiferous deposits in the Dominican Republic could have been formed in a single sedimentary basin during the late Early Miocene through early Middle Miocene (~20-15 Myr BP). Nonetheless, POINAR (1992) mentioned that other authors had stated that the amber excavated at La Toca and La Bucara is much more ancient. According to the nuclear magnetic resonance data, the age estimated for La Toca should be 30-40 Myr BP, while the age of surrounding sedimentary rock on basis of nannofossils suggests to date La Toca until 30-45 Myr BP and La Bucara until 20-30 Myr BP.

These geological dates were compared with the GeoWhen Database of the Physics Department, University of California at Berkeley, according to the 2004 time scale endorsed by the International Commission on Stratigraphy. According to such database, the most ancient period (La Toca) corresponds to the Middle Eocene-Early Oligocene, while the younger (La Bucara) to the Late Oligocene, making these amber contemporaneous or even previous to the Baltic ones and to the Florissant shales.

After purchase, both amber pieces have been little modified through the use of abrasive papers in order to obtain faces parallel to the features that need be examined, and successively smoothed with papers having finer and finer granularity.

Observations of the fossil were made using a stereomicroscope with 20-40x eyepieces equipped with micrometer and digital photographic system. After examination, the pieces were coated for preservation in viscous Araldite Epoxy.

The reconstruction of the habitus was obtained using a mixed traditional-computer graphic technique.

Results

Elaphidion tocanum nov.sp. (Figs 1-4)

Holotype: Hispaniola, Dominican Republic, mine La Toca, ex. coll. K. LUZZI DR4256, author’s coll. FS36B21.

Etymology: The species name derives from the mine La Toca, the collecting locality.

Description: ♀, body length 14 mm, width 4 mm (measured across humeri).

General habitus relatively small, flattened; body coloration pitch-brown with irregular patches of white pubescence, legs reddish brown.

Head glabrous and covered with a close extremely fine puncturing; frons largely concave; antennal tubercles widely separated and scarcely elevated; labrum transverse; eyes coarsely faceted, strongly reniform, prominent.

Antennae (11-segmented); scape bowed, glabrous; pedicle one-fifth as long as scape. Resting parts missing.

Pronotum obovate, imperceptibly transverse, scarcely narrower than head and evidently narrower than elytra; apex inflated and abruptly bowed, front margin deeply furrowed and constricted by a narrow apical bourrelet slightly convex anteriorly; sides laterally unarmed, rightly convergent toward the base; base b -
sinuate, finely furrowed along the margin. Disc sparsely pubescent and covered with a close large alveolate puncturing and three smooth callosities: a longitudinal drop-shaped median one, very narrow anteriorly and enlarged on the middle, occupying nearly the entire discal length without reaching both margins; two lateral ones in the form of the numeral "7" located on the middle of the pronotal length.

Scutellum small, semi-elliptical, transverse, twice as wide as long.

Elytra feebly constricted after humeri and enlarged apically, 2.5 times as long as wide (measuring at humeri excluding the apical spines), finely furrowed along the lateral margin; base straight; humeri rounded, fairly prominent; apex rightly truncate, with a fairly long acute spine at the sutural angle and another at the outer angle, slightly diverging exteriorly, 3 times as long as sutural one; surface covered with fine sparse points disappearing after the apical third, and with small irregular patches of recumbent short white hairs, letting large glabrous area; apical fifth with white erect pubescence along the outer and the apical margin.

Legs fairly long; femora fusiform, without carinae, covered with semi-recumbent pubescence, profemora with obtuse rounded teeth at the apex, meso- and metafemora with longer rounded teeth at the apex; tibiae sub-linear, without carinae, acutely bispinose at the apex, covered with no detectable pubescence; tarsi rela-
By considering the extant species (MONNÉ et al. 2007), E. tocanum is difficult to compare with its congeners since its incomplete antennae do not allow establishing whether they were unispinose or bispinose. Nonetheless, this fossil is clearly characterised by an obovate pronotum with alveolate puncturing and well-developed callosities, elytra with bispinose apex and patches of white pubescence, femora obtusely spinose at the apex.

Most of the characters are reminiscent of some species closely related to E. irroratum (LINNAEUS, 1767) – E. laeve WHITE, 1853, E. lewisi FISHER, 1941, E. mimeticum SCHAFFER, 1905, E. quadriruberculatum CHEVROLAT, 1862, E. williamsi CHEMSAK, 1967 – largely widespread in the Antilles and Central America. Nevertheless, this fossil differs from all those species in the finer pronotal callosities and in the obovate (rather than elliptical) pronotal shape, similar to that of E. androsensis FISHER, 1942 from Bahamas or E. glabratum (FABRICIUS, 1775) from the West Indies.

In conclusion, E. tocanum seems to be a fairly specialised species, being more specialised than the group of small species – E. inclusum VITALI, 2007, E. costipenne FISHER, 1932, E. cristalensis ZAYAS, 1975, E. elongatum FISHER, 1942, E. glabriusculum (BATES, 1885) and E.
**Kallyntrosternidius nov.gen.**

Type species: *Kallyntrosternidius bucarensis* nov.sp. (monotypic).

Etymology: This name is the composition of the old-Greek word "Kallyntron" (= brush) and the generic name "Sternidius" (Lamiinae, Acanthocinini). Gender masculine.

Description: Oval, elongate.

Head vertical; front squared, convex, longitudinally grooved, finely punctured; antennal tubercles widely separated and feebly elevated; labrum transverse; eyes reniform, finely faceted, lower eye lobes very long, 3 times as long as cheeks.

Antennae (♂) eleven-segmented, 2 times as long as body, surpassing the elytral apex with the base of the antennomere VI; apex of the scape and antennomeres II-VI fringed with sparse semi-erect setae beneath; scape without cicatrix, very elongate; pedicel one-sixth as long as scape; antennomere III third-fourth as long as scape; antennomeres IV-VII regularly decreasing; antennomere VIII as long as scape; antennomeres IX-XI regularly decreasing (antennomere proportions according to the formula: 3: 0.5: 4: 3.5: 3.2: 2.8: 2.5: 3: 2.8: 2.5: 2.2).

Pronotum transverse, twice as wide as long (measuring across teeth) and anteriorly convergent; apex less than three-fourth as wide as base, grooved with a wide, slightly incised transversal furrow along the margin; base two-third as wide as elytra (measuring across humeri), sinuate, grooved with a fine, transversal furrow extending below teeth onto sides; sides with an outward directed, strong blunt conical teeth placed at basal third; disk with two blunt callosities placed at each side of the middle; surface smooth. Scutellum extremely small, scarcely visible due to amber bubbles.

Elytra parallel-sided to the apical third; base right; humeri rounded; middle of the disc with a conspicuous basal tuft of black hairs located on a short longitudinal callus, and a small pre-median tuft of black hairs; apex obliquely truncated; disc covered by fine irregular and fairly dense puncturing.

Legs normal; procoxal cavities posteriorly largely open; mesocoxal cavities outer closed; femora club-shaped; tibiae regularly enlarged at the apex; mesotibiae feebly grooved a bit before the apex; meso- and metatibiae feebly sinuate, with two very small apical spines and a dense short, black pubescence at the apex. Tarsi relatively long; metatarsi only one-seventh shorter than metatibiae; metatarsomere I more than 2.5 times as long as II, acutely spined at the apex; metatarsomere II acutely spined at the apex; metatarsomere III scarcely shorter than II, very deeply incised at the apex; onychium twice as long as II, with simple, very widely divergent claws.

Underside very sparsely irregularly punctured and covered with a very fine recumbent pubescence; prosternum very narrow (one-sixth as wide as each procoxal cavity), posteriorly slightly shorter than coxae, abruptly enlarged and truncate, hind slope flat; mesosternum trapezoidal, posteriorly restricted and truncate, anteriorly scarcely wider than prosternum and nearly one-half as broad as mesocoxal cavities, front slope arched; ventrites equal, each shorter than metasternum; pygidium (ventrite VII) truncate in the middle and acutely produced at each side forming an equilateral triangle; ventrite VIII acutely produced at each side forming a long triangle, ventrite IX acutely triangular.

Differential diagnosis: *Kallyntrosternidius* is characterised by the following set of characters: pronotum with outward directed, strong blunt conical teeth placed at basal third, basal furrow extending onto sides, disk with two blunt callosities; elytra flat with basal callus and brushes of hairs; antennae very long.

The myriad of taxonomic problems due to the cryptic and extremely variable morphology of the Acanthocinini makes questionable the attribution of real affinities to extant taxa; however, this new genus is not apparently related to other ones currently present in Hispaniola. *Lagocheirus*, *Leptostylopsis* and *Styloleptus* have pronoctal teeth placed at middle of sides; *Styloleptus* has broad rounded tubercles, *Urgleptes* has backward directed acute spines, *Alcidion* has variable spines or teeth, but always misses callosities on pronotum and elytra.

Among the remaining Antillean genera, *Kallyntrosternidius* seems more related to *Sternidius* LECONTE, 1873 (= *Liopinus* LINSLEY & CHEMSAK, 1995). Such genus, which is especially widespread in Western North America and fragmentally present in Mexico, Cuba and Venezuela, is characterised by similar size, antennae, pronoctal teeth and maybe also elytral pattern. Though some specimens of *S. gracilipes* (LINSLEY, 1942) and *S. misellus* (LECONTE, 1852), and the holotype of *Amniscus alpha vicinus* HALDEMAN, 1847 show smooth elytral callosities analogue to the tuft of hairs of *Kallyntrosternidius*, this genus is nonetheless characterised by smooth pronotum and elytra. The differences between *Kallyntrosternidius* and *Sternidius* are possibly specific or sub-
generic, practically the same slight differences that have been observed (VITALI 2007b) between Hemierana Aurivillius, 1923 and Paleohemilophus Martins & Galileo, 1991. Nonetheless, the fact that the elytral tufts of hairs in Kallyntrosternidius are not evidently a primitive character justifies the formation of a new genus. This genus, therefore, seems to be paraphyletic with respect to other allied genera.

A close relation also seems to occur with Astylidius parus (LeConte, 1873), since this species is characterised by similar size, antennae, pronotal callosities and teeth, though it is also missing the tufts of hairs on the elytra. Yet the apparently Vancouverian distribution of such species makes this relationship problematic.

However, Kallyntrosternidius apparently seems more specialised than both genera due to the presence of the tuft of hairs. Similar structures are present in the Neotropical genus Nealcidion Monné, 1977, which, nevertheless, misses teeth at the pronotal sides and has spines at the elytral apex.

**Kallyntrosternidius bucarensis nov.sp.**
(Figs 5-8)

**Holotype**: Hispaniola, Dominican Republic, mine La Bucara, ex. coll. K. Luzzi D9519, author’s coll. FS37B22.

**Etymology**: The species name derives from the mine La Bucara, the collecting locality.

**Description**: ♂, body length 6.5 mm, width 2.6 mm (measured across humeri). Characters of the genus.

Pubescence pattern difficult to assess: apparently brown; elytra reddish at base, with a post-basal irregular V-shaped whitish band, some small irregular black vitrea forming a post-median band, and some small black points along the posterior half of the sutural margin.

Antennae light; scape, pedicle and apex of the remaining antennomeres dark.

Legs light; femora confusedly darkened at apex; tibiae darkened at the apical third, metatibiae also with a dark ring at the end of the basal fourth; tarsi light with the tarsomeres I-II narrowly darkened at the apex, onychium darkened on the apical half.

**Biological remarks**

The coarsely facetted eyes and the systematic position of *Elaphidion tocanum* imply a nocturnal phenology, while opposite characters of *Kallyntrosternidius bucarensis* imply the opposite phenology. Like other fossil cerambycids included in Dominican amber, both species were in all likelihood characterised by activity on logs and branches of humid forests of *Hymenaea protera* Poinar, 1991, the amber-producing tree (Poinar 1991). It is questionable whether the larvae could also be directly related to such plant; presently, no larva of the genus *Elaphidion* bores *Hymenaea*-trees (Monné 2001).

**Discussion**

The description of two further cerambycids included in Dominican amber confirms some particularities already previously noticed about that fauna (VITALI 2007b).
The fossil cerambycid fauna of Hispaniola included both extant genera living in the Antilles (Plectromerus, Elaphidion) and extinct genera having relationship with extant taxa living on the continent (Paleohemilophus, Pterolophosoma). Elaphidion tocanum nov.sp. belongs to the former group, Kallyntronstemidius bucarensis nov.sp. to the latter one.

Moreover, all species found in Dominican amber, though fairly primitive, were nonetheless more specialised than others present today on the American continent: Elaphidion tocanum is more specialised than some species, such as E. glabriusculum (BATES, 1885) from Panama and E. scabricolle (BATES, 1872) from Nicaragua, while Kallyntronstemidius bucarensis is more specialised than Astyladius and Sterndius spp.

This fact can be explained by the presence of an ancient bridge once connecting the northern Greater Antilles to the northwestern South America (ITURRALDE-VINENT & MACPHEE 1999). Accordingly, this bridge carried into the Antilles primitive Gondwanan species, which independently evolved and gradually substituted the more primitive ones. Instead, the larger availability of continental habitats allowed the surviving of such primitive species.

An original observation is that, among the genera found in Dominican amber, all still living genera belong to the Cerambycinae, while all extinct ones belonged to the Lamiinae.

This fact might depend on the puzzled systematics of Lamiinae, whose taxa sometimes have uncertain definitions and limits. A reason for this might be that Lamiinae are a relatively young group, whose intermediate taxa are still existing and do not allow to define split groups.

Nevertheless, an ecological reason might be that Lamiinae are actually more related to tropical habitats than Cerambycinae. Accordingly, the climatic cooling occurring during the Quaternary Ice Ages, together with the scarce possibility of displacing, might have had dramatic consequences especially on Lamiinae, extinguishing many members of that subfamily.

Zusammenfassung

Aus Dominikanischem Bernstein aus den Mine La Toca (Mitteleozän bis Unteraligozän) und La Bucara (Oberoligozän) werden zwei neue fossile Cerambyciden-Taxa beschrieben: Elaphidion tocanum nov.sp. (Cerambycinae Elaphidiini), hzw. Kallyntronstemidius bucarensis nov.gen. nov.sp. (Lamiinae Acanthocinini). Diese werden zu systematischen Zwecken mit fossilen wie rezenten Elaphidion-Arten sowie mit heutigen Gattungen der amerikanischen Acanthocinini verglichen.

Acknowledgements

The author thanks Dr. Larry BEZARK, California Department of Food and Agriculture, Sacramento (USA) for the photographic catalogue of the Cerambycids of the New World available in the Web (http://plant.cd- fa.ca.gov/byciddb/) and Dr. Iuri ZAPPI, Casalecchio di Reno (Italy) for the help given in finding both species on the international market.

References


Address of author:
Francesco VITALI
corso Torino 5/7
16129 Genova, Italy
E-Mail: vitalfranz@yahoo.de
Two new longhorned beetles from Dominican amber (Coleoptera, Cerambycidae) 223-230