

*Stenaspidotus microptilus* n. gen., n. sp. (Coleoptera: Chrysomelidae:  
Chrysomelinae) in Dominican amber, with evidence of tachinid (Diptera:  
Tachinidae) oviposition

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## **Abstract**

A new genus and species of chrysomeline, *Stenaspidiotus microptilus*, n. gen., n. sp., (Coleoptera: Chrysomelidae: Chrysomelinae) is described from Dominican amber.

Diagnostic characters include an elongate, flattened body; small eyes; a narrow, long pronotum with a width/length ratio of 1.6, an irregular pronotal surface with marginated lateral edges, distinct humeral calli, confused elytral speckling, large scutellum, elongated mesosternum, emarginated but non-fissured 3<sup>rd</sup> tarsomere and simple claws. On the pronotum of *S. microptilus* is a macrotype egg characteristic of the family Tachinidae (Diptera). This is the first Chrysomelinae from Dominican amber and the first fossil record of tachinid oviposition.

**Keywords:** Chrysomelinae, Dominican amber, *Stenaspidiotus microptilus* n. gen., n. sp., fossil tachinid egg

## **Introduction**

Leaf beetles (Chrysomelidae) are quite diverse, with over 12,000 species just in the Neotropics alone (Blackwelder 1982; Hogue 1993). Of the 19 subfamilies, the worldwide Chrysomelinae attain their greatest diversity in Central, South and Meso-America, with over 1,000 species in some 28 genera (Kimoto 1988; Blackwelder 1982). The new fossil chrysomeline described in the present study represents the first Chrysomelinae in Dominican amber and provides the first fossil evidence of tachinid oviposition.

## **Materials and methods**

The specimen was obtained from mines in the Cordillera Septentrional of the Dominican Republic. Dating of Dominican amber is still controversial with the latest purposed age of 20-15 mya based on foraminifera (Iturralde-Vinent and MacPhee 1996) and the earliest as 45-30 mya based on coccoliths (Cêpek in Schlee 1990). In addition, Dominican amber is secondarily deposited in sedimentary rocks, which makes a definite age determination difficult (Poinar and Mastalerz 2000). A range of ages for Dominican amber is possible since the amber is associated with turbiditic sandstones of the Upper Eocene to Lower Miocene Mamey Group (Draper et al. 1994). Dominican amber was

produced by the leguminous tree, *Hymenaea protera* Poinar and a re-construction of the Dominican amber forest based on amber fossils indicated that the environment was similar to that of a present day tropical moist forest (Poinar and Poinar 1999). The specimen is in a rectangular block of amber 20 mm in length and 11 mm in width and is complete with the exception of the left fore leg and left middle leg that were both cut off at the mid femur. Observations, drawings and photographs were made with a Nikon SMZ-10 stereoscopic microscope.

## **Description**

Chrysomelidae

Chrysomelinae

Chrysomelini

*Stenaspidiotus* Poinar, n. gen.

Type species: *Stenaspidiotus microptilus* Poinar

Diagnosis: Elongate, flattened body; small eyes; a narrow, long pronotum with a width/length ratio of 1.6; pronotum with irregular surface and marginated lateral edges; distinct humeral calli; confused elytral specking; large scutellum; elongated mesosternum; emarginated but non-fissured 3<sup>rd</sup> tarsomere and simple claws.

Etymology: The generic name is from the Greek “stenotus” = narrow and the Greek “aspidiotus” = shield.

Comments: *Stenaspidiotus* clearly falls within the *Chrysomela* Linn. group as defined by Biondi and Daccordi (1996), which includes the genera *Plagiosterna* Motschulsky, 1860,

*Plagiodes* Chevrolat, 1836, *Gastrolina* Baly, 1859, *Chrysomela* Linn. 1758 and *Plagiomada* Biondi and Daccordi, 1998. The width (measured at the widest portion) /length (measured along the midline) ratio of the pronotum is one of the diagnostic characters of *Stenaspidiotus*. In *Plagiosterna*, *Plagiodes*, *Gastrolina*, *Chrysomela*, and *Plagiomada*, the width/length ratio is not less than 1.9 and usually greater than 2.0 (Balsbaugh and Daccordi 1987; Biondi and Daccordi 1996). There are two separate areas of elytral speckling in the upper two thirds of the elytrum. The patterns run obliquely but at right angles to each other (Figs. 1, 5).

There are significant differences between *Stenaspidiotus* and other genera in this group. *Plagiodes* has fissured 3rd tarsomeres and a roundish, convex body. *Plagiosterna* has a non-elongated mesosternum and wide pronotum. *Chrysomela* has distinct lateral calli on the pronotum, a convex, elongated body and the 3<sup>rd</sup> tarsomere is fissured. *Gastrolina*, an Asian genus, (Seeno and Wilcox 1982) has a flattened body, but the claws are toothed and the base of the clypeus is raised. *Plagiomada* has abdominal sternites with lateral sclerites and the pygidium is trapezoidal (Balsbaugh and Daccordi 1987; Biondi and Daccordi 1996).

## Description

*Stenaspidiotus microptilus* Poinar, n. sp. (Figs. 1-7)

With characters listed in the generic diagnosis.

Holotype female: Length, 10.2 mm; dorsum dark, metallic brown-black; ventrum light brown; right elytrum covered with whitish deposit from fossilization process.

Head: Base of clypeus not raised; base of mandibles not protruding; eyes small, slightly protruding; antennae 11-jointed with the terminal 6 antennomeres enlarged; antennomere 6 as broad as long; antennomeres 7-10 broader than long; terminal antennomere longer than broad (Fig. 4).

Pronotum: Flattened; relatively long and narrow, metallic, lacking punctures, with irregular surface, length along midline, 1.6 mm; greatest width, 2.5 mm; width 1.56 times length, lateral calli and basal marginal bead absent, anterior margin deeply concave, not bordered, basal margin deeply convex, lateral edges marginated, all angles arcuate; elytra relatively long and narrow, 7.8 mm in length (4.9 times length of pronotum), metallic, with prominent lateral calli (without delimiting grooves), with series of faint striae and substriae (toward apex) bearing fine sutural punctures, with two separate areas of elytral speckling, elytral edges marginated, epipleura horizontal, not grooved, lacking bristles; scutellum large; free margin of prosternal appendix not extending beyond anterior coxae; mesosternum longer than prosternum between coxae; metasternum elongate, bordered; third tarsomere emarginate but not fissured; claws simple.

Abdomen: Smooth, light tan; first sternite lacking carina; pygidium pointed (arcuate apex); gonocoxae distinct, tips pointed, erect, setose; gonapophyses flattened, ventrally orientated (Fig. 7).

Comments: The lateral expansions of the anterior pronotal margins would probably cover the eyes in life. It was not possible to see whether the fore coxae are open behind. Two characters in this group pertain to the third tarsomere; whether it is emarginated and fissured (with an open groove running from the center toward the base). While the third tarsomere is emarginated in the fossil, a fissure could not be detected. There is a rather

abrupt size change between the 5<sup>th</sup> and 6<sup>th</sup> antennomeres (rather than a gradual one as occurs in some members of this group) (Balsbaugh and Daccordi 1987).

Type: Holotype deposited in the Poinar amber collection (accession # C-7- 305E) maintained at Oregon State University, Corvallis, Oregon.

Type locality: Amber mines in the northern portion of the Dominican Republic.

Etymology: The specific name is from the Greek “micros” = small and the Greek “optilos” = eye.

## **Discussion**

The fossil record of the Chrysomelini is unclear but may date back to the Jurassic, although most fossils from this period lack enough detail to be assigned to a subfamily and representatives of the subfamily Protoscelinae have since been attributed to the Anthribidae (Santiago-Blay 1994). Definite members of the Tribe can only be recognized from later Tertiary to Quaternary deposits. The compression fossil, *Plagiodesma novata* (Heyden and Heyden 1866) from the Early Miocene brown coal deposit in Rott, Germany clearly differs from the present fossil by its wider pronotum (Santiago-Blay 1994). A putative Chrysomelinae from the German Fossilfundstätte Eckfelder Maar (middle-Eocene) can be distinguished from the present fossil by the enlarged terminal 3 antennomeres forming a club (Wappler 2003).

Several chrysomelids have been figured or described from Mexican and Dominican amber but all have been assigned to the subfamilies Cryptocephalinae, Eumolpinae, Alticinae, Hispinae, Cassidinae or Galerucinae (Gressitt, 1963, 1971; Poinar, 1999; Santiago-Blay et al., 1996; Santiago-Blay & Craig, 1999).

The Chrysomelinae is quite depauperate in Hispaniola today and appears to be limited to members of the genus *Leucocera* Cheverolat (Perez-Gelabert 2007).

**Tachinid egg** (Figs. 8, 9)

On the surface of the pronotum of *Stenaspidiotus microptilus* is an attached egg that has characters of eggs of the family Tachinidae. The egg is white, ellipsoidal, 703  $\mu\text{m}$  in length and 324  $\mu\text{m}$  in width. The base is flat with a marginal flange. The surface is smooth and rounded with possibly some faint mottling. An apparent mucilaginous deposit attaches the egg to the pronotum. One end of the egg appears to be open.

The egg is typical of a tachinid macrotype egg. Such eggs are oblong, with the anterior end nearly as wide as the posterior and with the length ranging between 400  $\mu\text{m}$  and 900  $\mu\text{m}$  and the width 33-50 % of the length. Most are attached to the surface of the host by a mucilaginous deposit (Clausen, 1962). A marginal flange is characteristic of some tachinid macrotype eggs. There are two basic types of macrotype eggs. In the indehiscent type, the hatching larva penetrates directly into the body of the host through the egg membrane. In the dishiscent type, the larva leaves the egg through an opening exposed by the operculum (Clausen, 1962). Since the fossil egg appears to be empty and has an opening at one end, it is probably a dehiscent egg. The hatched larva may have entered the body cavity of the host by penetrating the membrane between the head and prothorax.



Macrotype eggs of the extant Neotropical genus *Strongygaster* Macquart (= *Hyalomyodes* Townsend) have been reported on adult *Chrysomela* and *Plagioder*a (Cox 1994; Thompson 1954; Parker et al. 1953). Unfortunately tachinid eggs are not known well enough to be correlated with adult groups, thus preventing further identification of the fly that deposited the egg. However this is the first fossil record of tachinid oviposition and shows that tachinid parasitism of leaf beetles occurred in the mid-Tertiary.

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**Figures.**

Figure 1. Dorsum of *Stenaspidiotus microptilus*. Scale bar = 2 mm.



Figure 2. Ventrum of *Stenaspidiotus microptilus*. Scale bar = 1.3 mm.



Figure 3. Lateral view of *Stenaspidiotus microptilus*. Scale bar = 1.4 mm.

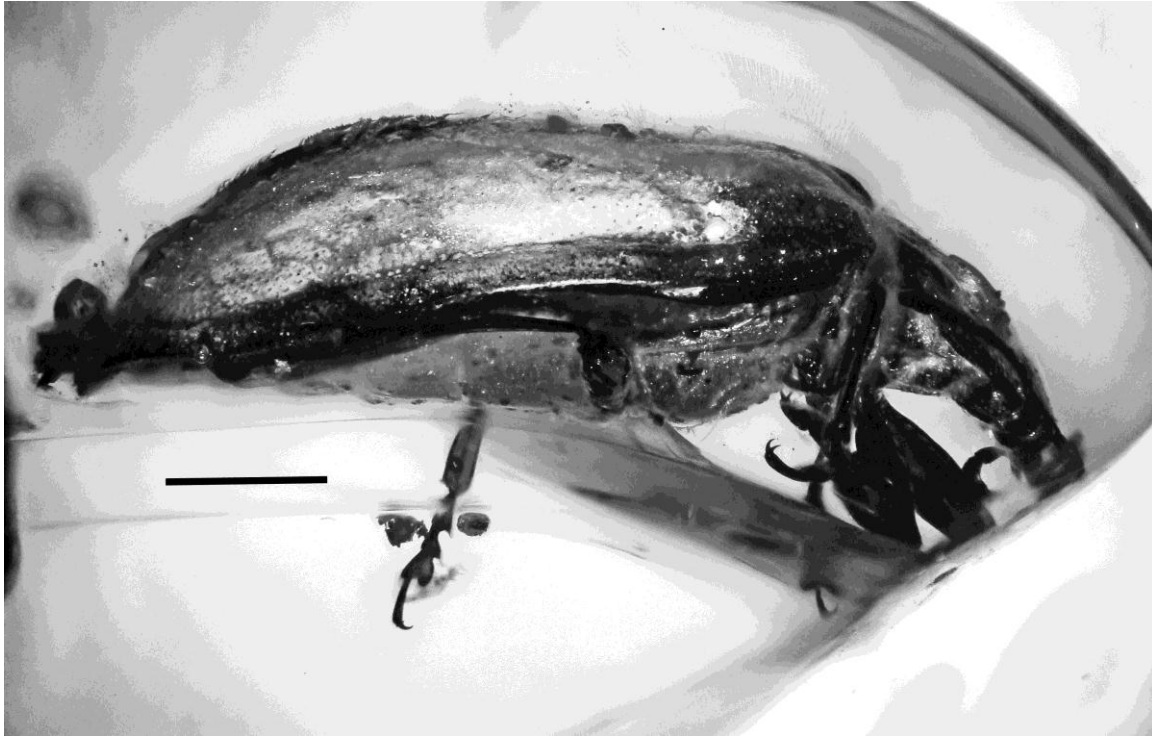


Figure 4. Head and pronotum of *Stenaspidiotus microptilus*. Scale bar = 750  $\mu$ m.

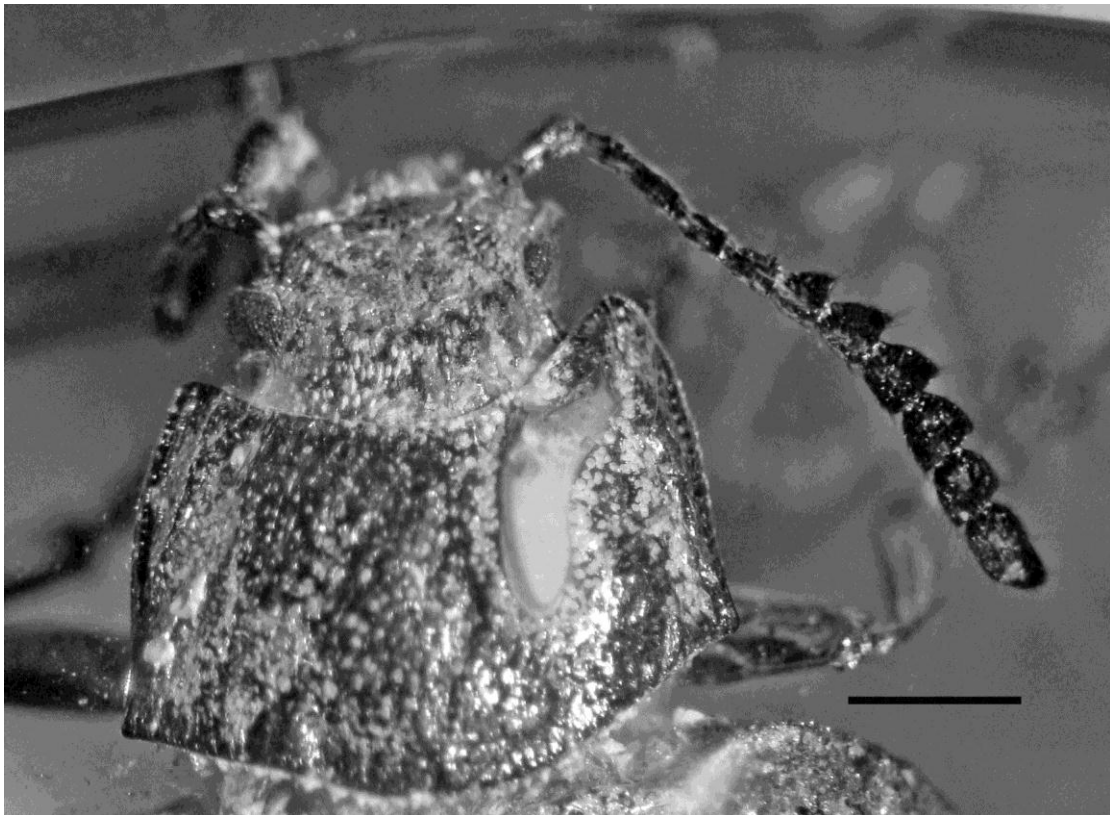




Figure 5. Elytrum of *Stenaspidiotus microptilus*. Arrow shows lower area of elytral speckling and oblique striae. Scale bar = 1 mm.

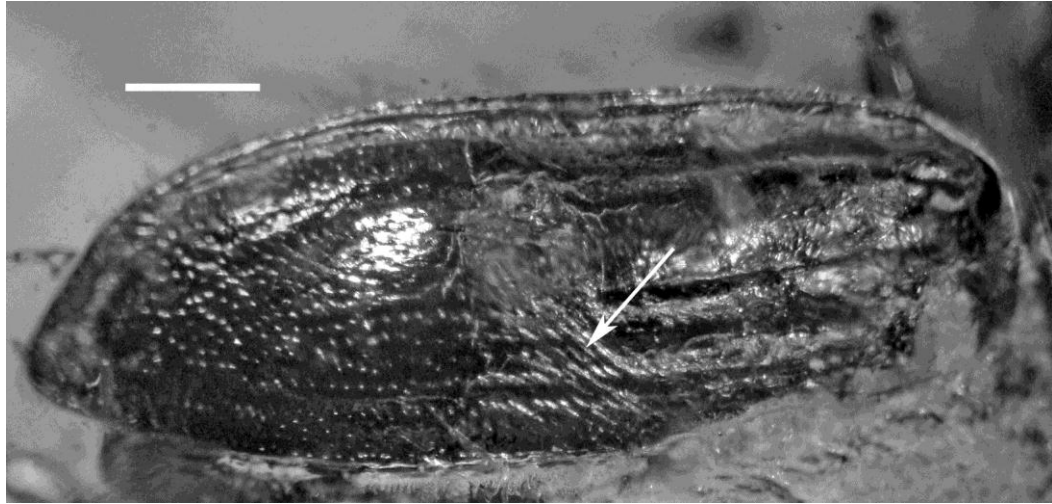


Figure 6. Tarsus of *Stenaspidiotus microptilus*. Note emarginated, but unfurrowed third tarsomere. Scale bar = 57  $\mu$ m.

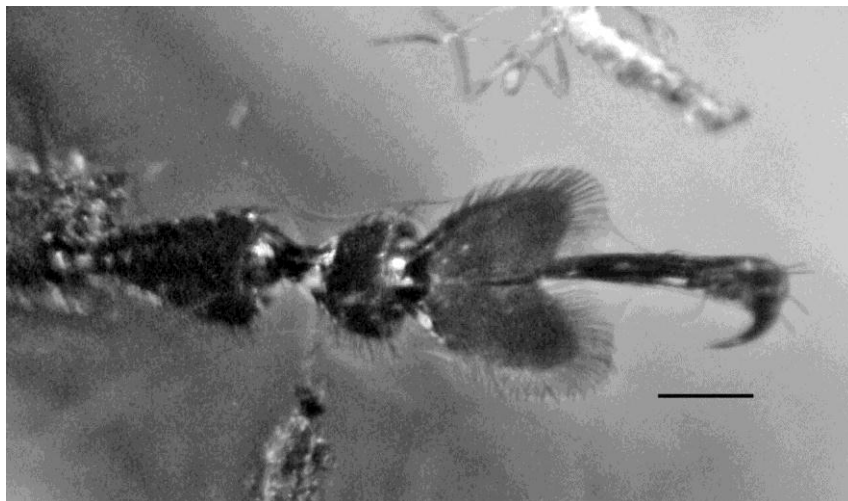


Figure 7. Terminalia of *Stenaspidiotus microptilus*. Long arrows show gonocoxae; short arrows show gonapophyses. Scale bar = 300  $\mu\text{m}$ .

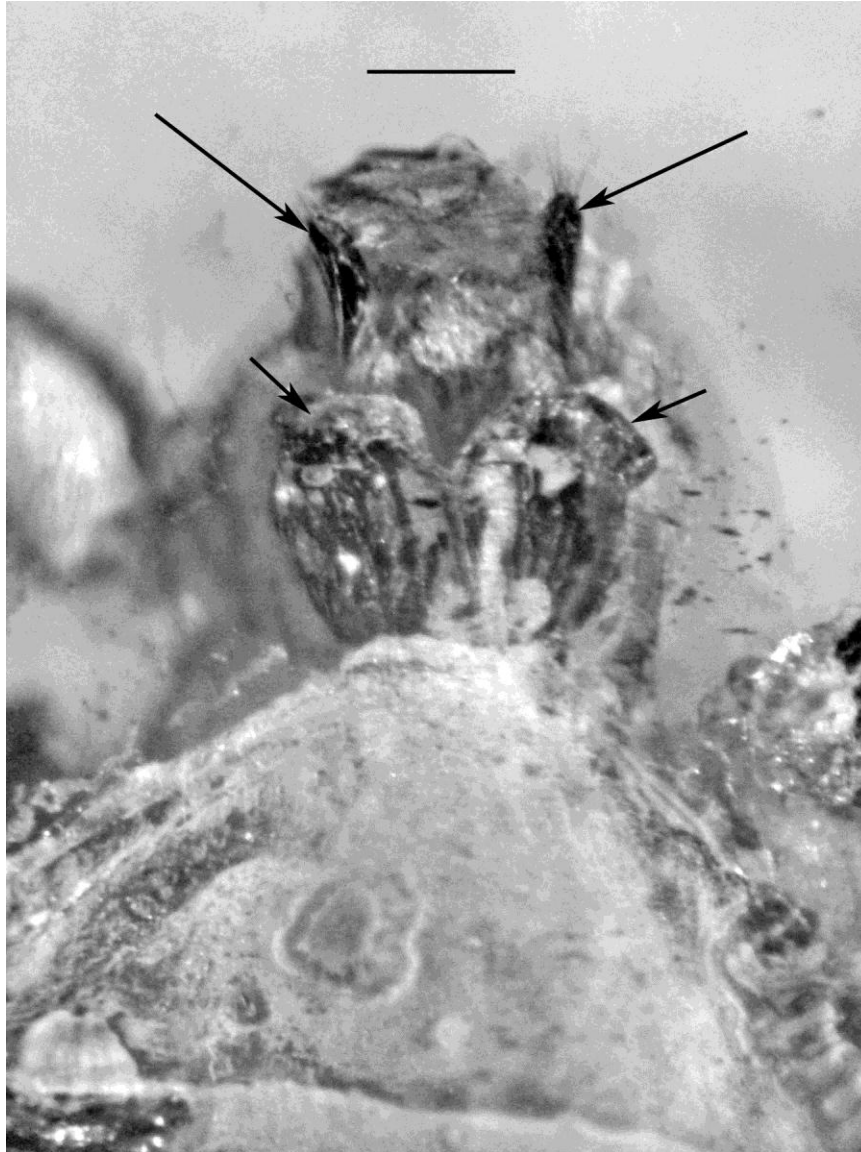


Figure 8. Tachinid egg (arrow) on pronotum of *Stenaspidiotus microptilus*. Scale bar = 500  $\mu\text{m}$ .



Figure 9. Detail of tachinid egg on pronotum of *Stenaspidiotus microptilus*. Scale bar = 215  $\mu\text{m}$ .

