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## **Cossonine weevils in Dominican amber (Coleoptera: Curculionidae)**

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**A b s t r a c t :** Those weevils belonging to the subfamily Cossoninae occurring in Early Miocene (Burdigalian) amber from the Dominican Republic are described and figured. The fauna includes 10 species (nine new): *Micromimus orcus* nov.sp., *Caulophilus ashei* DAVIS & ENGEL, *C. falini* nov.sp., *C. swensoni* nov.sp., *C. bennetti* nov.sp., *Dryotribus ampliocolus* nov.sp., *Paralicus abnormis* nov.sp., *Proeces longirostrum* nov.sp., *Stenotrupis breviscapus* nov.sp., and *Cossonus hinojosai* nov.sp.

**K e y w o r d s :** Coleoptera, Polyphaga, Curculionoidea, new species, paleontology, West Indies.

### **1. Introduction**

Weevils (family Curculionidae s.l.) are today one of the most diverse lineages of all life, perhaps followed among Coleoptera only by the rove beetles (Staphylinidae). This amazingly diverse group of phytophagan beetles has a similarly ancient history, extending back to at least the Late Triassic. Unfortunately the fossil history of the Curculionidae has not been as intensively studied as deserved and extensive work remains before a meaningful synthesis of living and fossil weevils is possible. In particular, the remarkably well preserved amber faunas of Curculionidae have been largely ignored, particularly the Early Miocene fauna of the Dominican Republic. While various lineages of weevils have been known to occur in Dominican amber for quite some time (e.g., GRATSHEV & ZHERIKHIN 2003), only a few species have been studied or described and all within recent years (e.g., DAVIS & ENGEL 2006a, 2006b, 2006c). Herein we provide an overview of Dominican amber species belonging to the subfamily Cossoninae.

### **2. Material and methods**

All of the material discussed herein originates from the amber mines of the Dominican Republic. While the specific mine is not known for the present collection, these mines have been generally determined to be of Early Miocene (Burdigalian stage) age (ITURRALDE-VINENT & MACPHEE 1996). The age and origin of Dominican amber has been reviewed in detail by GRIMALDI & ENGEL (2005). The format and terminology for the descriptions follows that employed by DAVIS & ENGEL (2006a). Measurements were

made using an ocular micrometer on an Olympus SZX9 Stereomicroscope and should be considered approximate since the optimal angle for measuring was not always achievable. Specimens are deposited in the Department of Paleobiology, Natural History Museum, United States National Museum, Smithsonian Institution (USNM).

### 3. Systematic paleontology

#### Family *Curculionidae* LATREILLE 1802

#### Subfamily *Cossoninae* SCHÖNHERR 1825

#### Tribe *Dryotribini* LECONTE In: LECONTE & HORN 1876

#### Genus *Micromimus* WOLLASTON 1873

#### *Micromimus orcus* nov.sp. (Figs 1-2, 5-9)

**H o l o t y p e :** USNM 505348 (= Woodruff #9797), amber, Dominican Republic, Early Miocene (Burdigalian). **P a r a t y p e :** USNM 505324 (= Woodruff #9773), amber, Dominican Republic, Early Miocene (Burdigalian).

**D i a g n o s i s :** Integument heavily punctate (Figs 1-2). Compound eyes ovoid, length more or less 2× width (Figs 5-6, 8). Vertex glabrous, smooth, puncticulate. Ventral margin of rostrum nearly straight in lateral view. Antennal scape and scrobe short (Fig. 5). Profemora markedly enlarged apically (Figs 7, 9).

**D e s c r i p t i o n :** Total body length (including rostrum) ca. 2.69 mm; elytral length ca. 1.48 mm. Integument dark brown to black (as preserved). Compound eyes oval-elongate, length approximately twice width; interocular distance approximately slightly less than width of rostrum in dorsal view. Rostrum punctate, punctures small, irregularly spaced; rostrum more or less three-quarters length of pronotum; ventral margin nearly straight in lateral view, very broadly and uniformly curved along entire length (Figs 1-2, 5, 8); width subequal along length in dorsal view. Antenna inserted just before mid-length of rostrum, scrobe short, well-developed, extending anteriorly by 0.5× length of scape, extending posteriorly to anterior margin of compound eye; scape just reaching anterior margin of compound eye; scape short, slightly less than one-third length of rostrum; funicle 7-segmented, narrow and more or less glabrous, enlarging to setose club. Head slightly constricted at junction of head and rostrum, globular behind eyes. Vertex smooth and glabrous, puncticulate. Pronotum glabrous, length approximately 1.5× width; width subequal along length, slightly wider at mid-length; rounded dorsally; heavily sculptured with moderate, deep punctures, punctures separated by distance 0.5-1× a puncture diameter; lateral margins broadly rounded. Prosternum without depression between procoxae and with moderate, deep punctures. Scutellum small, ovoid, distinctly convex. Elytra each with approximately 10-11 striae; punctures of elytral striae circular, large and deep, separated by distance approximately 0.5× a puncture diameter; humeri rounded. Metepisternum narrower than width of antennal club, with a single, distinct, longitudinal row of minute punctures. Metasternum and abdominal ventrites with mode-

rate, deep punctures, punctures separated by distance 1-2× a puncture diameter. Femora enlarging apically, lightly punctate; profemur distinctly enlarged apically (Figs 7, 9); tibiae slightly punctate; apical tibial unci at outer angle large, subequal to length of tarsomere IV; a small denticle present on opposite side of uncus on inner angle, length less than pretarsal claw length.

**E t y m o l o g y :** The specific epithet is the Latin word *orcus*, meaning "abode of the dead" or "nether world", and is a reference to the fact that this is the first extinct species of the genus.

### **Genus *Caulophilus* WOLLASTON 1854**

#### ***Caulophilus ashei* DAVIS & ENGEL 2006a (Fig 3)**

*Caulophilus ashei* DAVIS & ENGEL 2006a: 102.

**N e w m a t e r i a l :** USNM 506622 (= Woodruff #11495), amber, Dominican Republic, Early Miocene (Burdigalian).

**C o m m e n t s :** This species, the first cossonine documented in Dominican amber, was recently described in detail and that discussion is, therefore, not repeated here. Refer to DAVIS & ENGEL (2006a) for a complete account of the species.

#### ***Caulophilus falini* nov.sp. (Figs 4, 10-12)**

**H o l o t y p e :** USNM 505815 (= Woodruff #10265), amber, Dominican Republic, Early Miocene (Burdigalian).

**D i a g n o s i s :** Rostrum long, subequal to length of pronotum (Fig. 4). Head rugose laterally. Anterio-lateral margin of pronotum rugose. Procoxae situated from posterior margin of prosternum by more than diameter of coxa; procoxae separated by distance greater than diameter of coxa (Fig. 12). Sparse, elongate setae apically on elytra.

**D e s c r i p t i o n :** Total body length (including rostrum) ca. 2.5 mm; elytral length ca. 1.17 mm. Integument dark brown to black (as preserved). Compound eyes subcircular, slightly elongate, length approximately 1.1× width; interocular distance approximately slightly less than width of rostrum in dorsal view. Rostrum sculptured mostly laterally with rugae, with small, shallow punctures; rostrum long, approximately subequal to length of pronotum; ventral margin broadly and uniformly curved along entire length in lateral view (Fig. 10); width subequal along length in dorsal view. Antenna inserted immediately before mid-length of rostrum (Fig. 10), scrobe somewhat long, well-developed, slightly less than one-half length of rostrum; scape just reaching anterior margin of compound eye; scape short, slightly less than one-half length of rostrum; funicle 7-segmented, narrow basally, sparsely covered with setae, gradually enlarging to setose club. Vertex with small rugae, glabrous, punctulate. Head crenulate and rugose laterally. Pronotum glabrous, length approximately 1.6× width (dorsal view obscured in amber); anterior portion narrower than posterior portion; antero-lateral margin of pronotum distinctly rugose; small, shallow punctures present, punctures separated by distance 1-2× a puncture diameter; lateral margins broadly rounded. Prosternum without shallow depression between procoxae; with small, shallow punctures. Scutellum small, ovoid. Elytra each with approximately 8-10 striae; punctures of elytral striae small and

shallow, separated by distance approximately 0.5-1× a puncture diameter; humeri subquadrate; a sparse covering of long setae at posterior one-sixth of elytra, setae as long as antennal scape. Metepisternum narrower than width of antennal club, with a single, distinct, longitudinal row of minute punctures. Metasternum and abdominal ventrites with small, shallow punctures. Procoxae separated by distance greater than diameter of coxa; procoxae separated from posterior margin of prosternum by distance equal to diameter of coxa; femora petiolate basally; tibiae expanded apically; protibia with setal comb along posterior margin (Fig. 11); apical tibial unci at outer angle large, approximately 0.75 times length of tarsomere IV; a small denticle present on opposite side of unci on inner angle, length less than pretarsal claw length.

**E t y m o l o g y :** The specific epithet is a patronymic honoring Dr. Zachary H. Falin, a coleopterist of note at the University of Kansas.

**C o m m e n t s :** This species can be differentiated from the recently described *C. ashei* based on the largely equal width of the rostrum along its length, without a dilation along the apical half, the greater number of elytral striae, the greater distance separating the elytral striae punctuations, and presence of elongate setae posteriorly on the elytra. The rostrum in this species is also much longer than in *C. ashei* and those of extant members of *Caulophilus*.

***Caulophilus swensoni* nov.sp. (Figs 13-17, 23-24)**

**H o l o t y p e :** USNM 502877 (= Woodruff #5660), amber, Dominican Republic, Early Miocene (Burdigalian). **P a r a t y p e :** USNM 502666 (= Woodruff #5439), amber, Dominican Republic, Early Miocene (Burdigalian).

**D i a g n o s i s :** Rostrum more or less equal in length to length of pronotum (Figs 23-24). Procoxae situated from posterior margin of prosternum by slightly less than coxal diameter and from each other by one length of a coxa (Fig. 17). Elytra with approximately 10-11 striae. Sparse, elongate setae on apical end of elytra (Fig. 23).

**D e s c r i p t i o n :** Total body length (including rostrum) ca. 3.77 mm; maximal width ca. 0.75 mm; elytral length ca. 1.69 mm. Integument dark brown to black (as preserved). Compound eyes subcircular, length approximately equal to width; interocular distance approximately equal to width of rostrum in dorsal view. Rostrum densely punctate, punctures minute, separated by distance 1-2× puncture diameter; rostrum more or less subequal to length of pronotum; ventral margin broadly and uniformly curved along entire length in lateral view (Figs 13-14); rostrum width subequal along length, widened slightly apically in dorsal view; rostrum bearing two long setae on inner apical surface. Antenna inserted immediately after mid-length of rostrum; scrobe long, extending just before compound eye; scape just reaching anterior margin of compound eye; scape slightly more than one-half length of rostrum; funicle narrow (Fig. 15), enlarging to a distinct, setose club. Vertex crenulate and punctulate. Pronotum glabrous, length approximately 1.2× width; anterior portion narrower than posterior portion; small, shallow punctures present, punctures separated by distance 1-2× puncture diameter; lateral margins broadly rounded. Prosternum with shallow depression between procoxae; small, shallow punctures present, punctures separated by distance 1-2× puncture diameter. Scutellum loosely triangular with corners rounded, small, length subequal to anterior basal width. Elytra each with approximately 10-11 striae; punctures of elytral striae small and shallow, separated by distance approximately 0.5-1× puncture diameter; humeri

subquadrate; a sparse covering of long setae at posterior quarter of elytra, setae approximately one-third to nearly one-half length of antennal scape. Metasternum and abdominal ventrites punctulate. Femora widest at mid-length and punctulate; profemora enlarged (Fig. 16); tibiae laterally expanded apically; apical tibial unci at outer angle large, approximately equal to length of tarsomere IV; a small denticle present on opposite side of unci on inner angle, length equal to or slightly less than pretarsal claw length.

**E t y m o l o g y :** The specific epithet is a matronymic honoring Ms. Stephanie J. Swenson, distinguished coleopterist.

**C o m m e n t s :** This species is very similar to *C. falini* in overall body form, the elongate rostrum, and the presence of long setae apically on the elytra. *Caulophilus swensoni* can be differentiated from *C. falini*, however, by its larger body size, the longer scape length, the greater length of the pronotum in relation to the width of the pronotum, and the greater number of elytral striae.

***Caulophilus bennetti* nov.sp. (Figs 18-22)**

**H o l o t y p e :** USNM 505352 (= Woodruff #9801), amber, Dominican Republic, Early Miocene (Burdigalian).

**D i a g n o s i s :** Similar to *C. swensoni* except rostrum approximately three-quarters length of pronotum, scape distinctly shorter (cf. Figs 13 and 18), ventral margin broadly and uniformly curved along entire length in profile.

**D e s c r i p t i o n :** Total body length (including rostrum) ca. 3.63 mm; maximal width ca. 1.83 mm; elytral length ca. 0.77 mm. Integument dark brown to black (as preserved). Compound eyes subcircular, length approximately equal to width; interocular distance slightly less than width of rostrum in dorsal view. Rostrum punctulate; rostrum approximately three-quarters length of pronotum; ventral margin weakly and uniformly curved along entire length in lateral view (Fig. 18); rostrum width subequal along length, widened very slightly and gradually apically in dorsal view (Fig. 19). Antenna inserted at mid-length of rostrum; scrobe short, well-developed, one-third length of scape; scape reaching slightly beyond anterior margin of compound eye; scape short, one-third length of rostrum (Figs 18, 20); funicle narrow with sparse setae basally, gradually enlarging to setose club. Vertex glabrous and punctulate. Pronotum glabrous, length approximately 1.2× width; anterior portion narrower than posterior portion; small, shallow punctures present, punctures separated by distance 1-3× puncture diameter; an elongate, low, longitudinal ridge along middle of pronotum; lateral margins broadly rounded. Prosternum with shallow, circular depression anterior from procoxae; circular area with small, shallow punctures, separated by distance 0.5-2× puncture diameter; posterior half of prosternum rugose and slightly crenulate; coxae positioned as in figure 22. Scutellum minute and ovoid. Elytra each with approximately nine to ten striae; punctures of elytral striae circular, small and shallow, separated by distance approximately 1× puncture diameter; humeri subquadrate; a sparse covering of long setae at apex of elytra, setae slightly shorter than length of antennal scape. Metasternum punctulate. Abdominal ventrites with punctures more dense than on metasternum. Femora widest at mid-length and punctulate; tibiae laterally expanded apically (Fig. 21); apical tibial unci at outer angle large, slightly less than length of tarsomere IV; a small denticle present on opposite side of unci on inner angle, length slightly less than pretarsal claw length.

**E t y m o l o g y :** The specific epithet is a patronymic honoring Mr. Daniel J. Bennett, noted field biologist and hymenopterist.

**Genus *Dryotribus* HORN 1873**

***Dryotribus amplioculus* nov.sp. (Figs 29-31)**

**H o l o t y p e :** USNM 505329 (= Woodruff #9778), amber, Dominican Republic, Early Miocene (Burdigalian).

**D i a g n o s i s :** Head distinctly constricted behind compound eyes; compound eyes situated at base of rostrum, bulging and subcircular (Fig. 29). Vertex with a shallow, rounded groove (Fig. 29). Pronotum with large, deep punctures; smaller and more sparse punctures anteriorly. Elytra with approximately 10 striae, with elytral striae small, shallow, and sparsely distanced. Venter heavily punctate. Profemora enlarged; tibiae bearing a large uncus on outer angle (Fig. 30); opposite of uncus at inner angle a smaller, less conspicuous denticle.

**D e s c r i p t i o n :** Total body length (including rostrum) ca. 1.88 mm; maximal width ca. 0.52 mm; elytral length ca. 0.71 mm (as preserved, apex of abdomen missing). Integument dark brown to black (as preserved). Compound eyes bulging and subcircular (Fig. 29), length approximately equal to width; positioned at base of rostrum; interocular distance approximately equal to width of rostrum in dorsal view. Rostrum punctulate and slightly longer than length of pronotum; ventral margin moderately curved in lateral view (Fig. 29), with curvature mostly at basal half; rostrum width widened along apical half in dorsal view. Antenna inserted at mid-length of rostrum, scrobe shallow; scape reaching middle of compound eye; scape more or less one-third length of rostrum; funicle narrow, enlarging to a distinct club. Vertex smooth and glabrous, with a shallow depression. Pronotum glabrous, length approximately 1.3× width; anterior portion narrower than posterior portion; large, deep punctures present, punctures separated by distance 1-4× puncture diameter; punctures smaller and sparser anteriorly; lateral margins broadly rounded. Prosternum without shallow depression between procoxae; large, deep punctures present, punctures separated by distance 0.5-1× puncture diameter; coxal positions as in figure 31. Scutellum triangular, small, length slightly less than anterior basal width. Elytra each with approximately 9-10 striae; punctures of elytral striae small and shallow, separated by distance approximately 2-4× puncture diameter; humeri rounded. Abdominal ventrites with large, deep punctures present, punctures separated by distance 0.5-1× puncture diameter. Femora clavate and punctulate; profemora enlarged (Fig. 30); tibiae laterally expanded apically; apical tibial unci at outer angle large, approximately equal or slightly longer than length of tarsomere IV; a small denticle present on opposite side of uncus on inner angle, length equal to or slightly less than pretarsal claw length.

**E t y m o l o g y :** The specific epithet is a combination of the Latin terms amplio (meaning "enlarge") and oculus (meaning "eye") and is a reference to the large, bulging compound eyes.

**C o m m e n t s :** This species is differentiated from extant congeners by the shallow depression on the vertex of the head; the relatively large, bulging compound eyes; the distance separating the pronotal punctures; the number of elytral striae; and the distance

separating the elytral striae. Other species of *Dryotribus* have a heavily punctate integument; however, the distance separating the punctures varies between species.

#### **Genus *Paralicus* O'BRIEN 1984**

##### ***Paralicus abnormis* nov.sp. (Figs 32-35)**

**H o l o t y p e :** USNM 505350 (Woodruff #9799), amber, Dominican Republic, Early Miocene (Burdigalian).

**D i a g n o s i s :** Body somewhat dorso-ventrally compressed. Compound eyes situated basally on rostrum (Figs 32-33), reduced (Fig. 33) and composed of approximately ten facets, distinctly convex and ovoid. Head constricted dorsally behind compound eyes. Rostrum long (Fig. 32), slightly longer than length of pronotum. Antennal scape long (Fig. 32), inserted at apical one-third of rostrum and reaching anterior margin of compound eye.

**D e s c r i p t i o n :** Total body length (including rostrum) ca. 2.52 mm; maximal width ca. 0.48 mm; elytral length ca. 0.96 mm. Integument dark brown to black (as preserved). Body more or less cylindrical, somewhat dorso-ventrally compressed. Compound eyes at base of rostrum and generally reduced (Figs 32-33), composed approximately ten facets (although a couple more may be present), distinctly bulging, slightly ovoid, length approximately 1.5× width; interocular distance approximately equal to width of rostrum at mid-length in dorsal view. Rostrum punctulate and with sparse, short, scale-like setae; rostrum subequal to or slightly longer than length of pronotum; ventral margin broadly and uniformly curved along entire length in lateral view; rostrum width gradually widened slightly apically in dorsal view. Antenna inserted after mid-length of rostrum at apical one-third of length; scrobe long, extending just before compound eye; scape nearly reaching anterior margin of compound eye; scape long, slightly more than one-half length of rostrum; funicle 7-segmented, narrow basally, gradually enlarging to a rather indistinct, glabrous club. Vertex glabrous, punctulate, finely crenulate and rugose. Head distinctly constricted dorsally behind compound eyes. Pronotum more or less glabrous, length subequal to posterior width; anterior portion narrower than posterior portion; moderate, shallow punctures present, punctures irregularly spaced, separated by distance 0.5-2× puncture diameter; lateral margins broadly rounded. Prosternum shallowly depressed; moderately punctate, punctures separated by distance 0.5× puncture diameter; coxal positions depicted in figure 35. Scutellum small, ovoid. Elytra with sparse, fine setae, each with approximately 8-9 striae; punctures of elytral striae small and shallow, separated by distance approximately 1-2× puncture diameter; humeri subquadrate. Metasternum and abdominal ventrites punctate, punctures separated by distance 1-2× puncture diameter. Femora widest slightly beyond mid-length and punctulate; width of tibiae subequal along length, slightly expanded apically (Fig. 34); apical tibial unci at outer angle small, approximately equal to or slightly longer than length of pretarsal claw; no other smaller denticles present apically.

**E t y m o l o g y :** The specific epithet is the Latin word *abnormis*, meaning "deviating from the norm" and is a reference to peculiar development of the compound eye in this species.

**C o m m e n t s :** The compound eye is reduced in this fossil, typical of *Paralicus*, but

the facets are very small and there appear to be slightly more than 10, which is abnormal relative to modern species.

### Tribe *Proecini* VOSS 1956

#### Genus *Proeces* SCHÖNHERR 1838

##### *Proeces longirostrum* nov.sp. (Figs 25, 36-38)

**H o l o t y p e :** USNM 502728 (= Woodruff #5501), amber, Dominican Republic, Early Miocene (Burdigalian).

**D i a g n o s i s :** Body distinctly dorso-ventrally compressed, less than 2.0 mm in height, with sparse setae scattered throughout (Fig. 25). Compound eyes subcircular. Rostrum narrow, subequal in width along entire length, and elongate (Figs 36, 38), longer than length of pronotum, rugose. Width of metepisternum less than width of antennal club, with one longitudinal row of minute punctures. Femora petiolate basally (Fig. 37).

**D e s c r i p t i o n :** Total body length (including rostrum) ca. 2.67 mm; maximal width ca. 0.42 mm; elytral length ca. 1.29 mm. Integument black (as preserved). Body dorso-ventrally compressed. Compound eyes subcircular, length approximately equal to width; interocular distance approximately equal to width of rostrum at mid-length in dorsal view; interocular area with few elongate setae. Rostrum heavily rugose, with a few scattered elongate, fine setae apically, small scale-like setae scattered sparsely along rostrum; rostrum approximately 1.2× length of pronotum; ventral margin broadly and uniformly curved along entire length in lateral view (Fig. 36); rostrum width narrow, subequal along length, widened very slightly apically in dorsal view. Antenna inserted slightly beyond basal one-third of rostrum; scrobe long, well-developed, extending just before compound eye; scape just reaching anterior margin of compound eye; scape approximately one-half length of rostrum; funicle 7-segmented, narrow, enlarging to a distinct, setose club. Vertex glabrous, heavily sculptured with irregular punctures and rugose. Pronotum with sparse covering of short, scale-like setae, length approximately 1.8× width; anterior portion narrower than posterior portion; heavily rugose and irregularly punctate; lateral margins broadly rounded. Prosternum not visible; however, procoxae obviously distanced equal to or more than one length of coxa. Scutellum ovoid. Elytra with sparse covering of short, fine setae; each elytron with approximately eight striae; punctures of elytral striae moderately deep, separated by distance approximately 0.5-1× puncture diameter; humeri subquadrate. Metepisternum narrower than width of antennal club, with a single, distinct, longitudinal row of minute punctures. Metasternum and abdominal ventrites not visible. Femora elongate, petiolate (Fig. 37), expanding slightly apically and punctate; profemora markedly petiolate; tibiae slightly laterally expanded apically; apical tibial unci at outer angle small, approximately equal to or slightly longer than length of pretarsal claw; no other smaller denticles present apically.

**E t y m o l o g y :** The specific epithet is a combination of the Latin words longus (meaning "long") and rostrum (meaning "snout") and is a reference to the more elongate rostrum relative to modern species.

**Tribe C o s s o n i n i SCHÖNHERR 1825****Genus *Stenotrupis* WOLLASTON 1873*****Stenotrupis breviscapus* nov.sp. (Figs 26, 39-43)**

**H o l o t y p e :** USNM 505344 (= Woodruff #9793), amber, Dominican Republic, Early Miocene (Burdigalian). **P a r a t y p e s :** USNM 504857 (= Woodruff #9304) and USNM 505354 (= Woodruff #9803), amber, Dominican Republic, Early Miocene (Burdigalian).

**D i a g n o s i s :** Body distinctly dorso-ventrally compressed, less than 2.0 mm, with sparse setae scattered throughout. Compound eyes circular. Scape extending back only to near anterior margin of compound eye (Fig. 39). Rostrum nearly straight, slightly longer than length of pronotum. Width of metepisternum less than width of antennal club, with one longitudinal row of minute punctures.

**D e s c r i p t i o n :** Total body length (including rostrum) ca. 2.13 mm; maximal width ca. 0.29 mm; elytral length ca. 1.23 mm. Integument light brown to brown (as preserved) (Fig. 26). Body markedly dorso-ventrally compressed (Fig. 26). Compound eyes circular, length approximately equal to width; interocular distance approximately equal to width of rostrum at mid-length in dorsal view. Rostrum with dense covering of short, fine setae, punctulate, punctures minute; rostrum slightly longer than length of pronotum; ventral margin nearly straight in profile, only very broadly and uniformly curved along entire length (Fig. 39); rostrum gradually expanded slightly apically in dorsal view (Fig. 40). Antenna inserted immediately before mid-length of rostrum; scrobe short and shallow; scape extending near to posterior margin of compound eye; scape moderately long (albeit still short by comparison to modern species), slightly more than one-third length of rostrum; funicle 5-segmented (Fig. 41), gradually enlarging to distinct, setose club. Vertex mostly glabrous and punctulate. Head slightly constricted behind compound eyes, with distinct, transverse region of glabrous integument beyond constriction and near posterior margin of head. Pronotum with dense covering of short, fine setae, length approximately 1.2× width; anterior portion narrower than posterior portion; small, shallow punctures present, punctures separated by distance 0.5-1× puncture diameter; two longitudinal rows, each of four larger punctures separated by distance much less than 0.5× puncture diameter, along middle of pronotum; lateral margins broadly rounded. Prosternum without shallow depression between procoxae, punctulate, and with dense covering of short, fine setae; coxal positions depicted in figure 43. Scutellum ovoid, convex. Elytra with dense covering of short, fine setae, each with approximately 7-8 striae; punctures of elytral striae small and shallow, separated by distance approximately 1× puncture diameter; elytra approximately four times length of pronotum; humeri subquadrate. Metepisternum narrower than width of antennal club, with a single, distinct, longitudinal row of minute punctures. Metasternum and abdominal ventrites punctulate, with somewhat dense covering of short, fine setae. Femora generally broad (Fig. 42), widest at mid-length and punctulate; tibiae slightly laterally expanded apically; apical tibial unci at outer angle small, partially obscured by amber piece; denticle on opposite side of unci on inner angle obscured, it is unclear as to its presence.

**E t y m o l o g y :** The specific epithet is a combination of the Latin words *brevis* (meaning "short") and *scapus* (meaning "stem") and is a reference to the relatively short scape by comparison to modern species of the genus.

**C o m m e n t s :** This species is very similar to its modern congeners except in the reduced length of the scape.

**Genus *Cossonus* CLAIRVILLE & SCHELLENBERG 1798**

***Cossonus hinojosai* nov.sp. (Figs 27-28, 44-48)**

**H o l o t y p e :** USNM 505580 (= Woodruff #10029), amber, Dominican Republic, Early Miocene (Burdigalian).

**D i a g n o s i s :** Compound eyes subcircular (Fig. 44). Rostrum broadening along apical half in dorsal view (Fig. 45), with antennal scrobe partially visible; rostrum short, with ventral margin nearly straight in lateral view. Antennal club not distinctly inflated from funicle (Fig. 46). Pronotum with two rows, each composed of approximately four punctures, posteriorly, emanating closely from scutellum (Fig. 45).

**D e s c r i p t i o n :** Total body length (including rostrum) ca. 2.65 mm; maximal width ca. 0.71 mm; elytral length ca. 1.40 mm. Integument brown to light brown (as preserved) (Figs 27-28). Compound eyes subcircular (Figs 27-28, 44-45), length approximately 1.2× width; interocular distance approximately 0.5× width of rostrum in dorsal view. Rostrum heavily sculptured and punctate; rostrum short, approximately one-third length of pronotum; ventral margin nearly straight in lateral view, very broadly and uniformly curved along entire length (Fig. 44); width broadening slightly after mid-length in dorsal view. Antenna inserted immediately after mid-length of rostrum, scrobe short, well-developed, one-half length of rostrum; scape reaching anterior margin of compound eye; scape short, slightly less than one-half length of rostrum; funicle 7-segmented (Fig. 46), narrow basally, sparsely covered with setae, gradually and weakly enlarging to indistinct, setose club. Vertex smooth, glabrous, puncticulate. Pronotum glabrous, length approximately 1.2× posterior width; anterior portion narrower than posterior portion; small, shallow punctures present, punctures separated by distance subequal to puncture diameter; punctures fewer in middle; two distinct rows, each of three to four punctures, arising posteriorly near scutellum (Fig. 45); lateral margins broadly rounded. Prosternum with shallow depression between procoxae; with punctures similar to those in dorsal view; coxal positions depicted in figure 48. Scutellum small, ovoid. Elytra each with approximately 7-8 striae; punctures of elytral striae circular, moderately large and shallow, separated by distance approximately 0.5-1× puncture diameter; humeri subquadrate. Metepisternum narrower than width of antennal club, with a single, distinct, longitudinal row of minute punctures. Metasternum and abdominal ventrites with small, shallow punctures. Apical tibial unci at outer angle large, approximately equal in length to tarsomere IV (Fig. 47); a small denticle present on opposite side of unci on inner angle, length less than pretarsal claw length.

**E t y m o l o g y :** The specific epithet is a patronymic honoring Mr. Ismael A. Hinojosa-Díaz, prominent insect systematist and esteemed colleague.

**C o m m e n t s :** This species is placed within *Cossonus* based on the widening of the rostrum in the apical half, the antennal insertion beyond mid-length of the rostrum, the antennal scrobe extending slightly to the dorsal surface of the rostrum, the large tibial unci on the outer angle, and the smaller denticle opposite the unci on the inner angle which is smaller than the pretarsal claws. This species appears exceedingly similar to the

extant *Cossonus impressus* BOHEMAN, distributed throughout the Caribbean, including Cuba, Jamaica, and Puerto Rico. *Cossonus impressus*, however, has the distinct rows of punctures posteriorly on the pronotum consisting of five to six punctures that are larger in size than those in the fossil species. Also, the antennal funicle is narrower in *C. impressus*, and much more constricted at the funicle-club junction, whereas in this species this junction is not so differentiated.

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We are grateful to Conrad C. Labandeira (USNM) for permitting us to study the material discussed herein. Work on Tertiary amber fossils at the University of Kansas has been generously supported by the General Research Fund of the Department of Ecology & Evolutionary Biology (#2301360 to M.S. Engel). This is contribution No. 3480 of the Division of Entomology, University of Kansas Natural History Museum.

### Zusammenfassung

Kornkäfer aus der Unterfamilie Cossoninae, die im Bernstein des frühen Miozäns (Burdigalian) am Territorium der Dominikanischen Republik nachgewiesen wurden, konnten beschrieben und abgebildet werden. Die Fauna beinhaltet 10 Arten, wobei neun davon als neu für die Wissenschaft festgehalten werden: *Micromimus orcus* nov.sp., *Caulophilus ashei* DAVIS & ENGEL, *C. falini* nov.sp., *C. swensoni* nov.sp., *C. bennetti* nov.sp., *Dryotribus amplioculus* nov.sp., *Paralicus abnormis* nov.sp., *Proeces longirostrum* nov.sp., *Stenotrupis breviscapus* nov.sp. und *Cossonus hinojosai* nov.sp.

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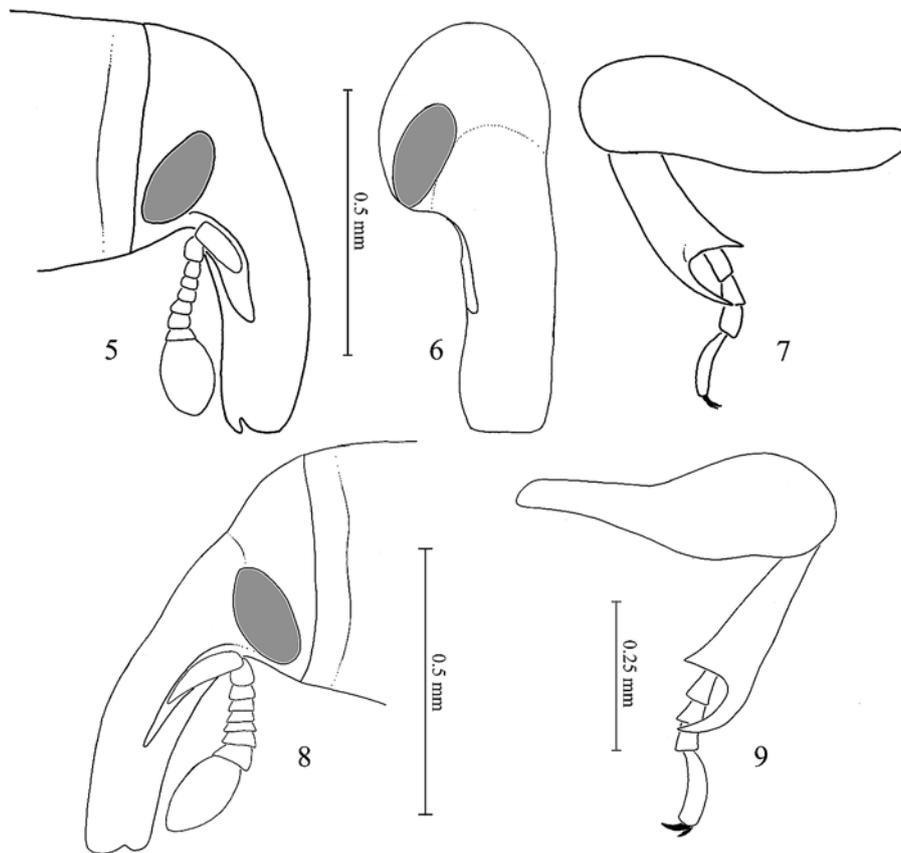
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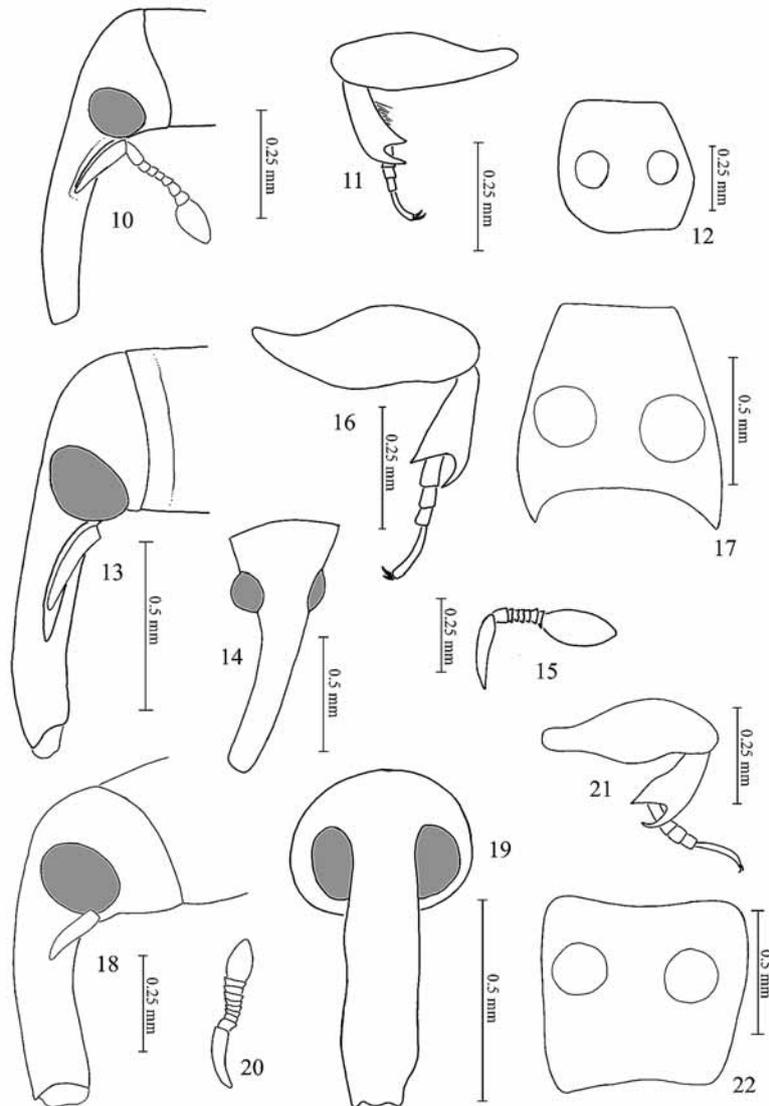
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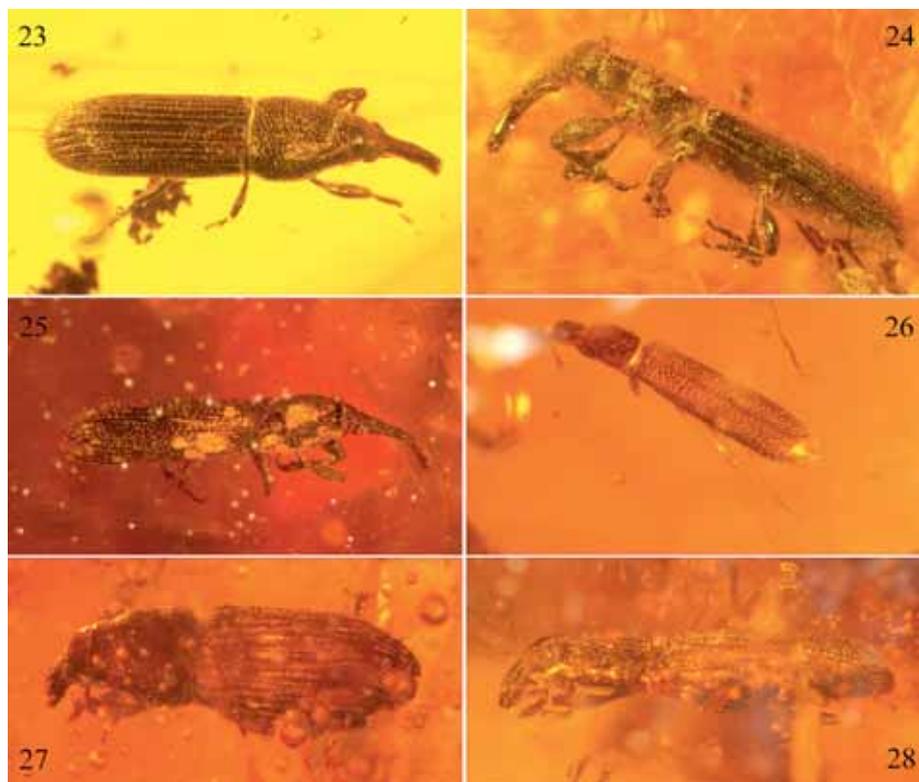
**Figs 1-4:** Photomicrographs of Dominican amber cossonine weevils. (1) holotype of *Micromimus orcus* nov.sp. (USNM 505348); (2) paratype of *M. orcus* (USNM 5053243); (3) holotype of *Caulophilus ashei* DAVIS & ENGEL 2006a (AMNH DR-10-809); (4) holotype of *C. falini* nov.sp. (USNM 505815).



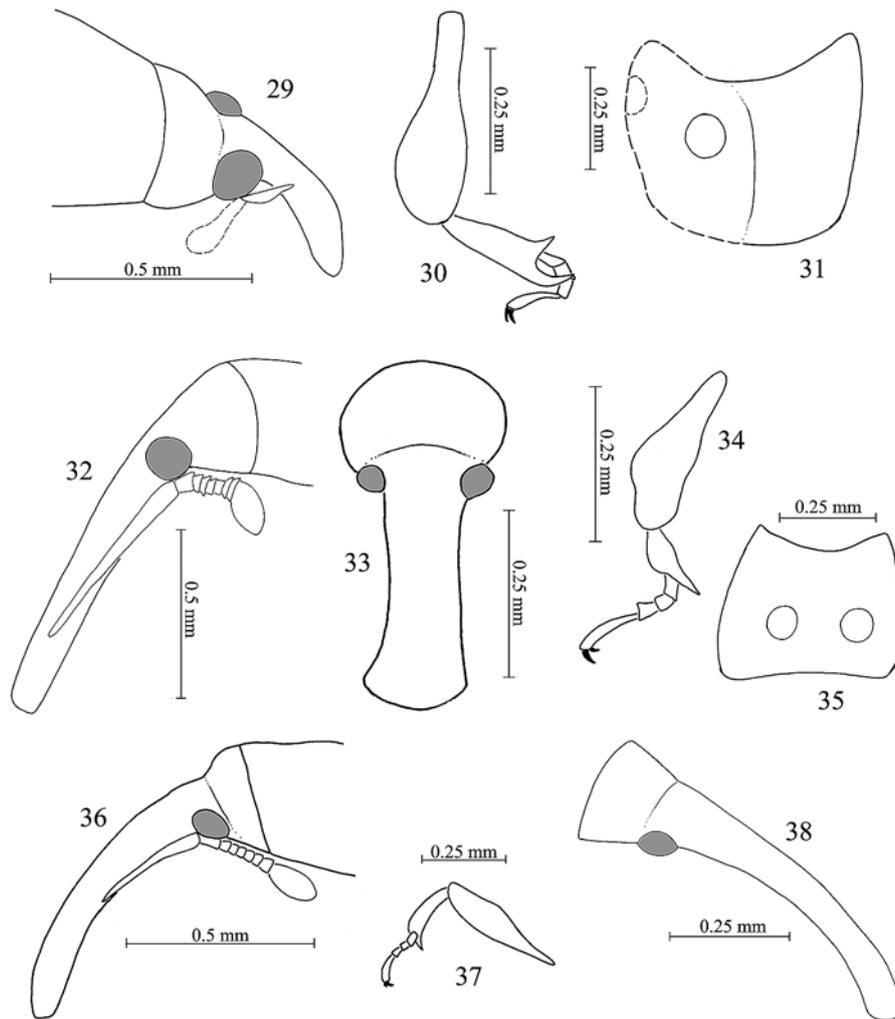
**Figs 5-9:** *Micromimus orcus* nov.sp. (5) lateral aspect of head of holotype (USNM 505348); (6) slightly oblique frontal aspect of head of holotype; (7) protibia, profemur, protarsus, and pro-pretarsus of holotype (same scale as for 5 and 6); (8) lateral aspect of head of paratype (USNM 505324); (9) protibia, profemur, protarsus, and pro-pretarsus of paratype. All drawn as preserved.



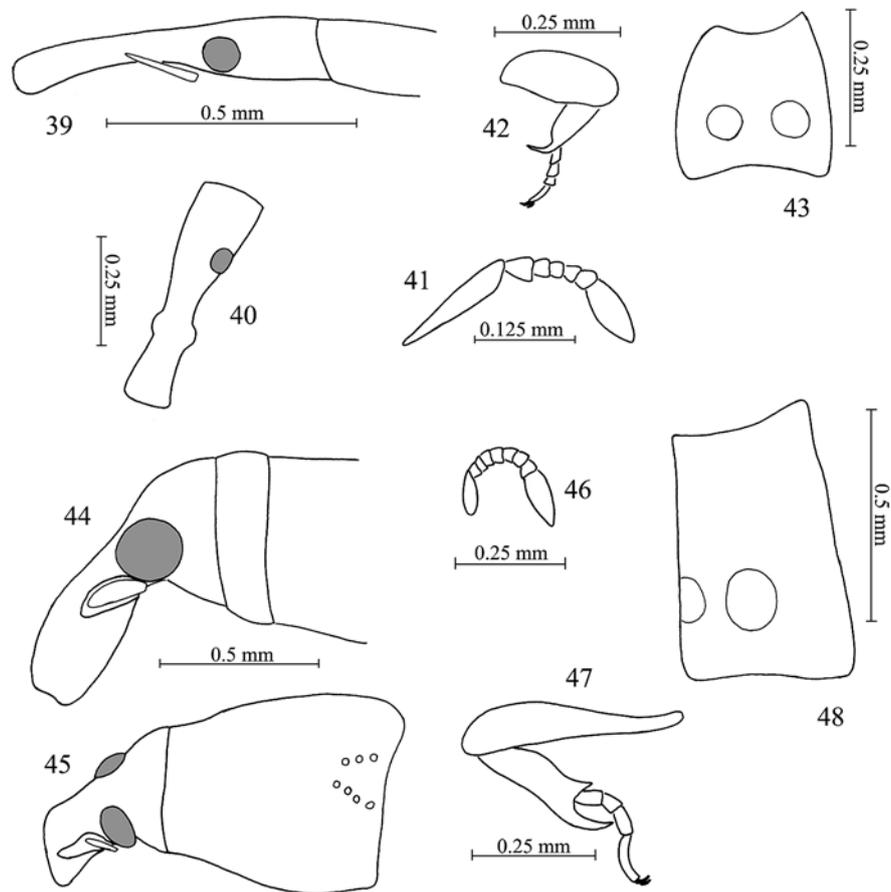
**Figs 10-22:** Three species of *Caulophilus*, *Caulophilus falini* nov.sp. (holotype, USNM 505815), *C. swensoni* nov.sp. (holotype, USNM 502877, and paratype, USNM 502666), and *C. bennetti* nov.sp. (holotype, USNM 505352). (10) lateral aspect of head of *C. falini*; (11) protibia, profemur, protarsus, and pro-pretarsus of *C. falini*; (12) ventral aspect of prothorax of *C. falini* depicting position of procoxae; (13) lateral aspect of head of paratype of *C. swensoni*; (14) dorsal, slightly oblique aspect of head of holotype of *C. swensoni*; (15) antenna of holotype of *C. swensoni*; (16) protibia, profemur, protarsus, and pro-pretarsus of paratype of *C. swensoni*; (17) ventral aspect of prothorax of holotype of *C. swensoni* depicting position of procoxae; (18) lateral aspect of head of *C. bennetti*; (19) dorso-frontal aspect of head of *C. bennetti*; (20) antenna of *C. bennetti*; (21) protibia, profemur, protarsus, and pro-pretarsus of paratype of *C. bennetti*; (22) ventral aspect of prothorax of *C. bennetti* depicting position of procoxae. All drawn as preserved.



**Figs 23-28:** Photomicrographs of Dominican amber cossonine weevils. (23) holotype of *Caulophilus swensoni* nov.sp. (USNM 502877); (24) paratype of *C. swensoni* (USNM 502666); (25) holotype of *Proeces longirostrum* nov.sp. (USNM 502728); (26) holotype of *Stenotrumpis breviscapus* nov.sp. (USNM 505344); (27) holotype of *Cossonus hinojosai* nov.sp. (USNM 505580), dorsal aspect; (28) holotype of *C. hinojosai*, lateral aspect.



**Figs 29-38:** Two species of Dryotribini, *Dryotribus amplioculus* nov.sp. (holotype, USNM 505329) and *Paralicus abnormis* nov.sp. (holotype, USNM 505350), and one of Proecini, *Proeces longirostrum* nov.sp. (holotype, USNM 502728). (29) dorsal oblique aspect of head and anterior pronotum of *D. amplioculus*; (30) protibia, profemur, protarsus, and pro-pretarsus of *D. amplioculus*; (31) ventrolateral oblique view of prothorax of *D. amplioculus* depicting position of procoxae; (32) lateral aspect of head of *P. abnormis*; (33) dorsal aspect of head of *P. abnormis*; (34) protibia, profemur, protarsus, and pro-pretarsus of *P. abnormis*; (35) ventral aspect of prothorax of *P. abnormis* depicting position of procoxae; (36) Lateral aspect of head of *P. longirostrum*; (37) protibia, profemur, protarsus, and pro-pretarsus of *P. longirostrum*; (38) dorsal oblique aspect of head of *P. longirostrum*. All drawn as preserved.



**Figs 39–48:** Two species of Cossonini, *Stenotrupis breviscapus* nov.sp. (holotype and paratype) and *Cossonus hinojosai* nov.sp. (holotype). (39) lateral aspect of head and anterior pronotum of *S. breviscapus* (USNM 504857); (40) dorsal, oblique aspect of head of *S. breviscapus* (USNM 504857); (41) antenna of *S. breviscapus* (USNM 504857); (42) protibia, profemur, protarsus, and pro-pretarsus of *S. breviscapus* (USNM 505344); (43) ventral aspect of prothorax showing position of procoxae of *S. breviscapus* (USNM 504857); (44) lateral aspect of head and pronotum of *C. hinojosai* (USNM 505580); (45) dorsal, slightly oblique aspect of head and pronotum of *C. hinojosai*; (46) antenna of *C. hinojosai*; (47) protibia, profemur, protarsus, and pro-pretarsus of *C. hinojosai*; (48) ventro-lateral oblique aspect of prothorax showing position of procoxae of *C. hinojosai*. All drawn as preserved.

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