

First description of a fossil symphylan, *Scutigerella dominicana* sp. n. (Scutigerellidae: Symphyla), in Dominican amber

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Abstract. Two specimens of *Scutigerella dominicana* sp. n. are described from Dominican amber dated at 25–40 million years. The holotype specimen is represented by a fourth instar and the paratype by a third instar. These fossils represent the first description of a fossil symphylan, the first report of members of the phylum Symphyla from Dominican amber and the first report of a fossil Scutigerellidae.

Key words. Symphyla; symphylan; symphylid; *Scutigerella* fossil; Dominican amber.

Amber has the characteristic of preserving delicate creatures that normally do not otherwise appear in the fossil record¹. Recently, a piece of Dominican amber was discovered to contain a pair of symphylans belonging to the family Scutigerellidae Bagnall. Since symphylans, which are considered by some scientists to be the ancestors of insects, are terrestrial arthropods, it was unusual to find them in such a situation.

The amber piece originated from mines located in the Cordillera Septentrional between Santiago and Puerto Plata in the northern portion of the Dominican Republic. These mines are in the Altamira facies of the El Mamey Formation, which is a shale-sandstone interspersed with a conglomerate of well-rounded pebbles². Differences in the magnitudes of absorption peaks in nuclear magnetic resonance spectra of the exomethylene group of amber from different mines in the Dominican Republic were used to calibrate the ages of the various mines³ using the 20–23 million age of the Palo Alto mine as a standard⁴. The age of the mines in that region of the country varied from 25–40 million years.

Although the fossils were immatures, enough characters were available to place the specimens in the family Scutigerellidae Bagnall. The rounded posterior margins to the scuta, large styli at the base of the legs, form of the posterior sense calicles and form of the first pair of legs were all clearly visible as diagnostic characters of this family. They are described below as a new species of the genus *Scutigerella* Ryder.

Description

Scutigerella dominicana sp. n.

Holotype

Fourth instar (immature based on the presence of chitinous plates on the penultimate scutum and number of

legs), with head and body darkened, perhaps by decomposition before being completely covered by the resin (figs 1–4).

Head – 247 µm long, 180 µm at the widest portion, ratio of head length to width = 1.35; coronal suture complete, lateral branches reaching to base of the pedicel. Post-antennal organs raised on short peduncles; spiracles not visible. Tips of mandibles and maxille pointed, antennae 765 µm and 761 µm long with 17 segments which vary from globular-shaped near the base to cup-shaped for the remainder, only the terminal segment is completely spherical; each segment (except the terminal) contains a circlet of setae around the circumference.

Body (without antennae) – 2.8 mm long and 0.217 mm wide at the widest portion; with 13 dorsal scuta.

Scuta – Posterior margins of dorsal scuta emarginate; chitinous plates on the penultimate scutum, a short, narrow V-shaped cavity on the last scutum between the cerci.

Legs – Nine pairs of legs; forelegs not visibly much smaller than the remainder and positioned near the posterior end of the first dorsal scutum. Each leg terminating in a pair of claws, the posterior claw more robust and strongly curved than the anterior.

Cerci – Paired, 162 µm long and 45 µm wide at base, length to width ratio = 3.6, covered with a dense layer of moderately short setae.

Calicles – Approximately 25 µm long, each bowl-shaped and containing a centrally located seta approximately 130 µm long.

Paratype

Third instar immature with white head and body (the specimen appears somewhat bloated, perhaps as a result of gases released by fermentating bacteria inside the body) (figs 1, 5).

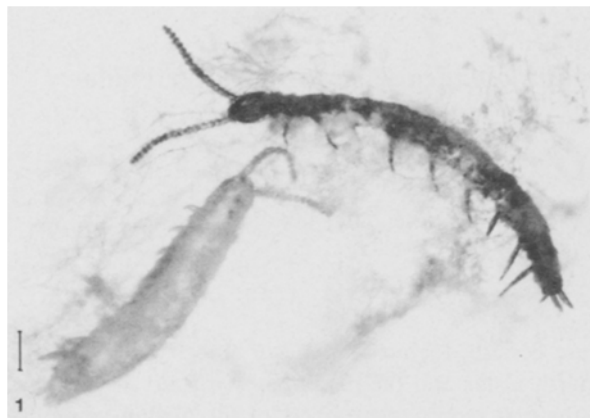


Figure 1. Holotype (dark specimen, top right) and paratype (light specimen, bottom left) of *Scutiggerella dominicana* sp. n. in Dominican amber (bar = 254 μ m).

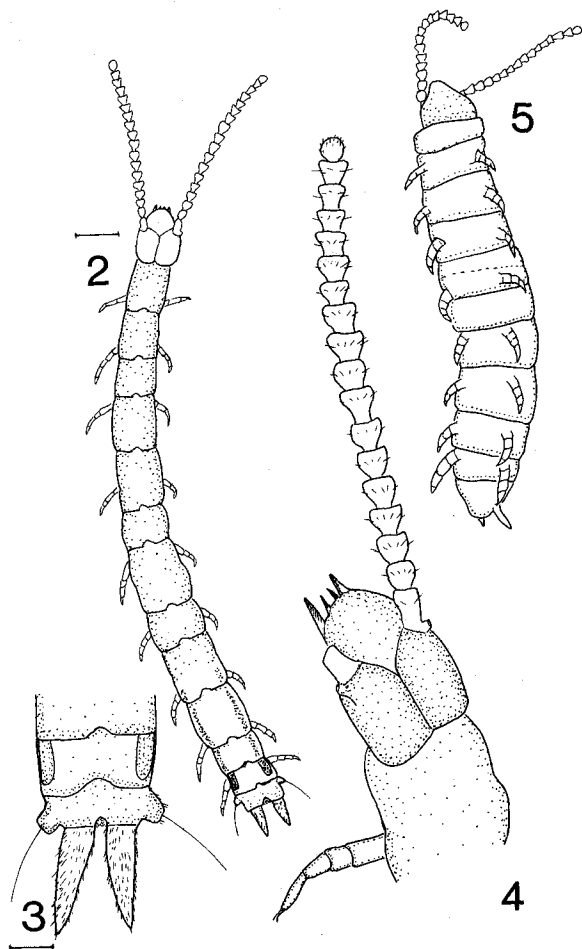


Figure 2. Dorsal view of holotype of *S. dominicana* sp. n. (bar = 180 μ m).

Figure 3. Dorsal view of cerci, calicles and posterior two scuta (with chitinous plates) of holotype of *S. dominicana* sp. n. (bar = 63 μ m).

Figure 4. Dorsal view of head, antenna and leg of holotype of *S. dominicana* sp. n. (mag. same as fig. 3).

Figure 5. Ventral view of paratype of *S. dominicana* sp. n. (mag. same as fig. 2).

Head – 179 μ m long, 242 μ m wide at the widest portion, ratio of head length to width = 0.73.

Antennae – 600 μ m and 592 μ m long with 15 segments ranging from globular to cup-shaped.

Body (without antennae) – 1.9 mm long and 0.370 μ m wide at the widest portion; with 11 body segments.

Legs – Eight pairs of legs, the foremost pair posteriorly positioned on the first segment.

Cerci – 132 μ m long and 38 μ m wide at base; ratio of length to width = 3.5.

Unfortunately, the arrangement of the setae on the scuta was either masked by a deposit or by the position of the specimens.

Type specimens

The holotype and paratype specimens are in the same piece of amber which is deposited in the Poinar amber collection (No. SAY-1-1) maintained at the University of California, Berkeley.

Diagnosis

While the fossil specimens fall clearly into the family Scutiggerellidae Bagnall as defined by Edwards^{5,6}, the generic determination is reasonably certain although specific characters are less well confirmed⁷. It was noted that some characters found in the fossil specimens, such as the posterior position of the first pair of legs, the raised post antennal organs, the degree of emargination of the scuta and the shape of the antennal segments, do not occur typically in described extant members of *Scutiggerella*. However, although the fossils were subadult specimens, they did not conform with any of the extant genera, so it was decided to describe them at this time in the genus *Scutiggerella*.

Discussion

Both specimens of *S. dominicana* sp. n. are surrounded by fine strands of what appears to be a mixture of silk and fungal hyphae. The darkened cuticle of the holotype and bloated condition of the paratype, together with the fungal remains suggests that the specimens were either recently dead at the time they were covered with the resin or that they became initially only partially submerged, died and underwent partial decomposition before finally becoming completely immersed in the tree deposit.

The small size and delicate nature of symphylans accounts for their rare occurrence in the fossil record. Only a single record of a fossil symphylan exists and that was a specimen of a *Scolopendrella* Gervais (Scolopendrellidae Bagnall) in Baltic amber⁸. However, the latter specimen was never described and its where-

abouts is now unknown. Thus, *S. dominicana* is the first described fossil symphylan, the first fossil representative of the Scutigerellidae and the first symphylan from Dominican amber.

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