

Uenohadesina styx, a New Cave-dwelling Genus and Species of
the Subfamily Omaliinae (Coleoptera, Staphylinidae)
from South Korea

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Abstract A new cave-dwelling genus and species, *Uenohadesina styx*, is described and illustrated from specimens taken in three different caves in South Korea. Important features of the new taxon are discussed and its taxonomic position and relationships within the tribe Omaliini are briefly discussed.

Introduction

Recently, a series of a conspicuous beetle, taken in three different caves in South Korea quite some time ago, was offered to me for study by my esteemed friend, Dr. Shun-Ichi UENO, Tokyo. It was suspected that the beetle may belong to the subfamily Omaliinae of Staphylinidae. After dissection and closer study of the specimens, this theory was indeed confirmed, despite the entirely “non-staphylinid” appearance of the beetle. In addition, it was also established, not surprisingly, that this obviously new species cannot be associated with any known genus. Consequently, it was necessary to establish a new genus for it. This new genus is now joining several other genera of the Omaliinae, with members whose general appearance does not suggest association with the Staphylinidae (e.g., *Brathinus*).

In the following, the new taxon is described and illustrated, and its taxonomic position and possible relationships within Omaliinae are briefly discussed.

Uenohadesina gen. nov.

(Figs. 1–15)

Type species: Uenohadesina styx sp. nov.

Gender: feminine.

Description. Body form small; in general with voluminous, markedly convex elytra, entirely covering abdomen in most specimens, and with small, anteriorly narrowed forebody; dorsal surface without microsculpture, with scattered, hardly visible, minute setae.

Head, from anterior margin of clypeus to dorsally indistinctly delimited nuchal constriction, about as long as width across eyes, rather flat; with indefinite, small, round impression posteromedial of each eye, and with variably pronounced, in general more or less elongate, impressions on posterior portion of disc in front of posterior margin of head, diverging anteriorly; ocelli absent but elongate impressions each with distinct, round pigmented spot. Epistomal suture not apparent. Eyes very small, slightly convex, tempora considerably longer than eyes seen from above (ratio 3.5), each with minute, obtuse denticle in front of nuchal constriction. Antenna filiform, gradually thickened anteriorly, about as long as combined length of head and pronotum (from anterior margin of clypeus to posterior margin of pronotum); first four basal segments with scattered fine setae, remaining segments with additional dense and short setae (Fig. 6). Maxilla with relatively robust and long palpus, first segment minute, segment 2 almost as long as two following segments combined, last segment almost twice as long as segment 3, moderately conically narrowed anteriorly (Fig. 3). Labium short, widely emarginate-bilobed, palpus three-segmented with middle segment small, narrower and shorter than stout last segment (Fig. 2). Mentum large, trapezoidal, with both anterior and posterior margins finely margined; with numerous, deep coarse punctures. Submentum and gula somewhat more finely and sparsely punctate than mentum, gular sutures from metatentorial pits markedly convergent posteromedial and disappearing in markedly developed basal impression; postgenae with distinct striae radiating from basal impression (Fig. 4). Pronotum at base slightly wider than length along midline (ratio 1.20), considerably narrowed anteriorly, basal margin therefore markedly wider than anterior margin (ratio 1.88); disc moderately transversely convex in anterior half, gradually flattened toward posterior margin, surface even, smooth, without any impressions; pronotal hypomeron conspicuously large, triangular. Prosternum quite short, markedly transverse with anterior margin widely concave; with minute, acute intercoxal projection at middle of posterior margin (Fig. 4). Mesosternum with distinctive microsculpture (Fig. 8), markedly margined anteriorly, marginal carina extended posteriorly as distinctive medial keel, markedly elevated in posterior half and then steeply falling toward intercoxal projection (lateral view, Fig. 8); intercoxal projection with apex relatively wide, angulately emarginate (Figs. 8, 9). Metasternum large, moderately coarsely and densely punctate, punctures bearing short, pale setae; anterior metasternal projection short and wide, broadly rounded and margined anteriorly, widely separating middle coxae (Fig. 9); posterior intercoxal projection minute, minutely notched; metasternum with series of small pits parallel to margin of hind coxa, leaving glabrous strip as wide as length of one seta along margin; distal part of hind coxa with posterolateral portion markedly extended and flattened before articulation with trochanter (Fig. 5). Legs long and slender, with very long tibiae; all tibiae without spines at lateral margin, with distinct apical ctenidium (Fig. 7). All tarsi with five segments, empodium of all tarsi bearing two moderately long empodial setae; last segment of all tarsi very long, about as long as three preceding segments combined. Scutellum minute, triangular, glabrous. Elytra elongate-oval in shape; without apparent

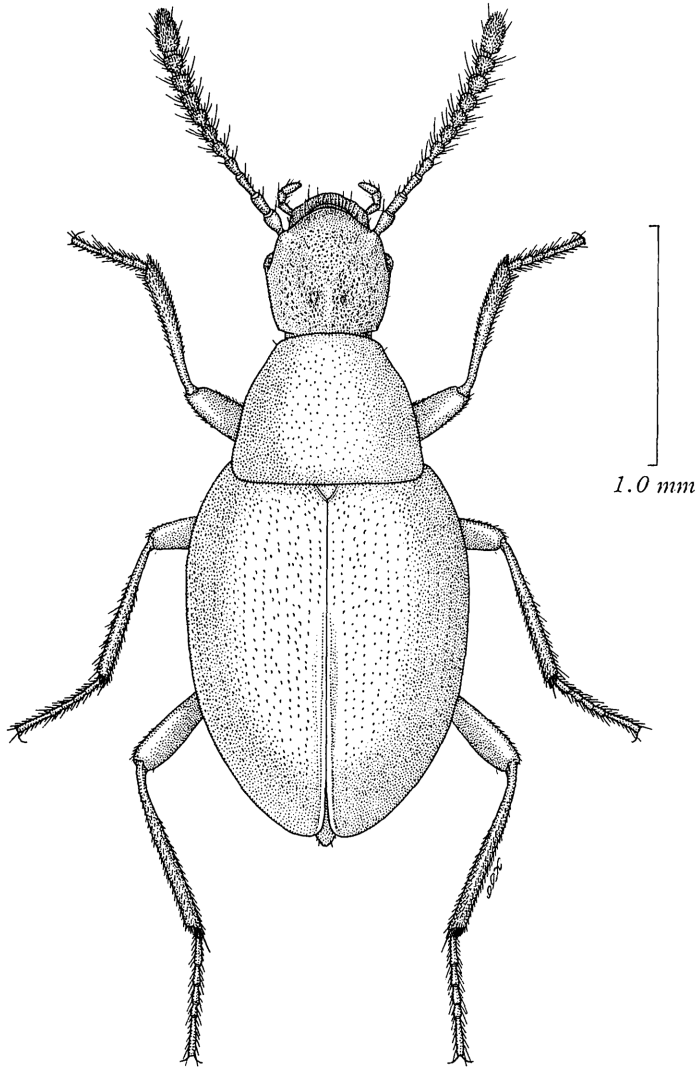
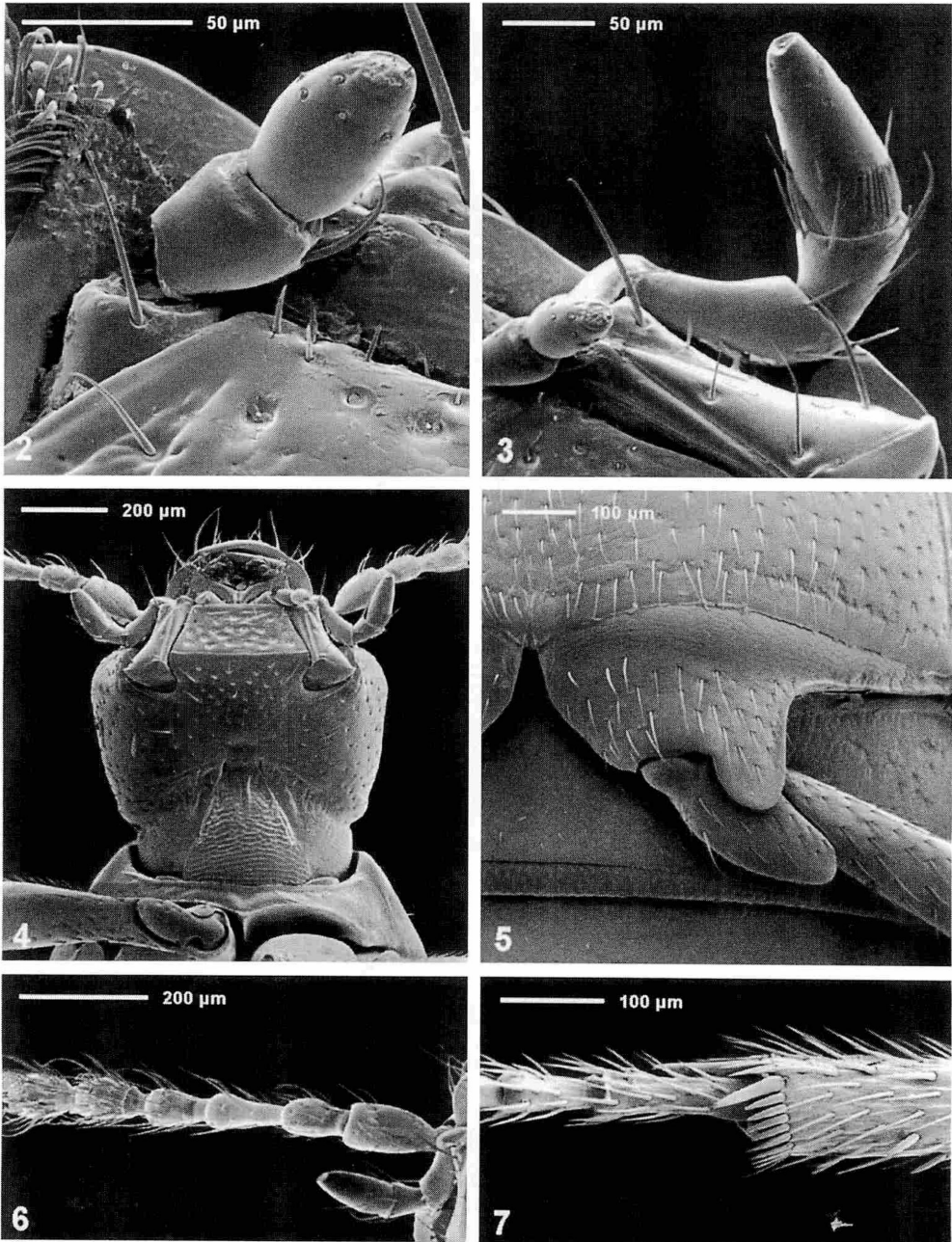
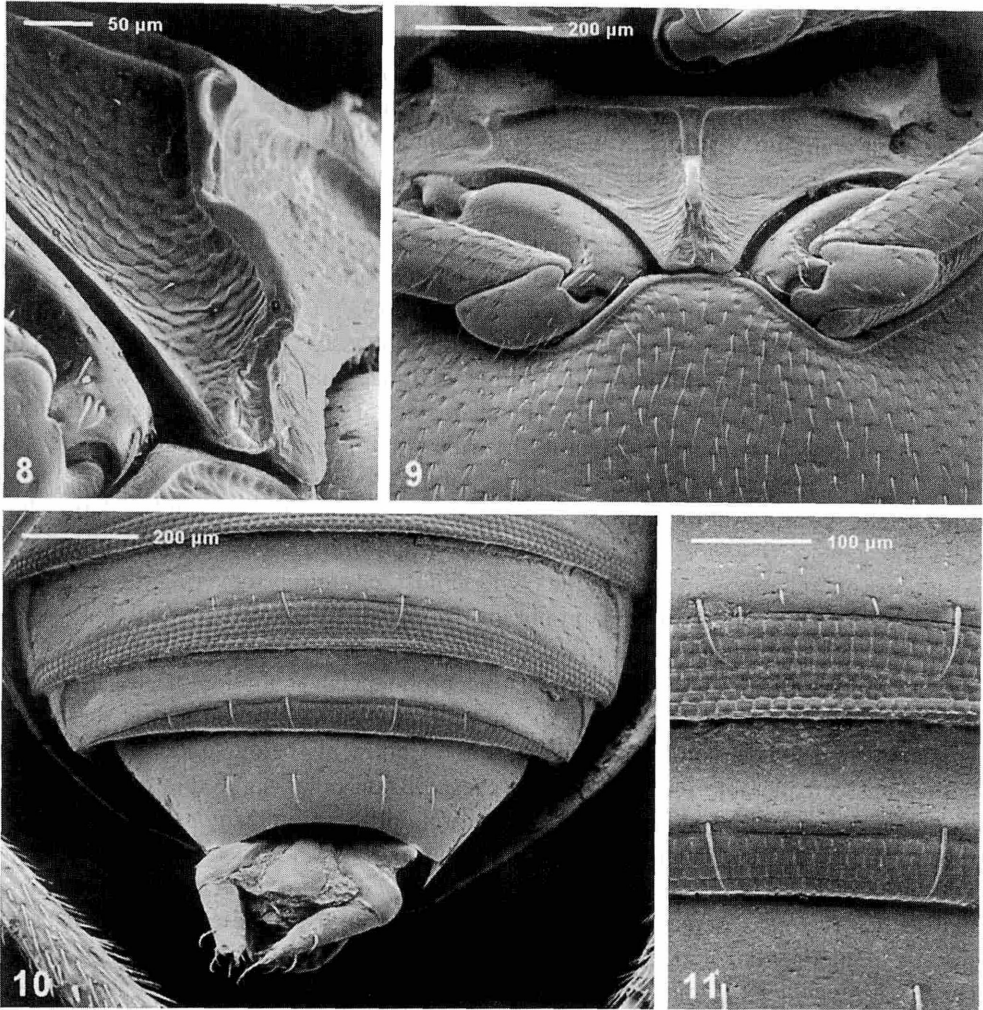


Fig. 1. *Uenohadesina styx* gen. et sp. nov.: habitus (male paratype).

striae, except sutural stria vaguely indicated on posterior half; each elytron finely, moderately sparsely punctate, punctures slightly unequal in size, coarser punctures vaguely subseriately arranged on middle portion of elytron. Each elytron with complete, fine epipleural carina, epipleuron wide anteriorly but markedly, gradually narrowed posteriorly, moderately coarsely and densely punctate. Abdomen with sternite 3 (first visible) with minute, short keel in middle of basal margin; sternite 8 with rounded projection in middle of basal margin, associated with reservoir of a defensive gland (Fig. 12); ab-



Figs. 2–7. *Uenohadesina styx* gen. et sp. nov.: 2, labial palpus; 3, maxillary palpus; 4, underside of head; 5, hind coxa and trochanter; 6, first six antennal segments; 7, apex of hind tibia with apical ctenidium.



Figs. 8–11. *Uenohadesina styx* gen. et sp. nov.: 8, mesosternal keel, oblique lateral view; 9, mesosternal keel and anterior projection of metasternum; 10, ventral end of abdomen with exposed female genital segment with gonocoxites; 11, brickwall-like pattern on the abdominal intersegmental membrane.

dominal intersegmental membranes wide, covered by characteristically developed, coarse brickwall-like sculpture (Figs. 10, 11).

Male genital segment of characteristic omaliine type. Aedoeagus (Figs. 13, 14) of usual omaliine type, resting within abdomen in repose on its side; basal bulbous small; parameres markedly developed, large, contiguous mediobasally.

Female genital segment with first gonocoxites not fused; second gonocoxites markedly elongate, each with minute stylus (Fig. 15).

Discussion. *Uenohadesina* may be easily recognized by the conspicuous habitus of its sole member, that seemingly does not suggest any association with the Staphylinidae (Fig. 1). Nevertheless, several characters of *Uenohadesina* undoubtedly link it to the subfamily Omaliinae of Staphylinidae. 1) The presence of the anteromedian process on abdominal sternite 8 which is associated with the reservoir of a defensive gland. 2) The presence of a pair of pigmented spots on the vertex of head, located in an area where typically a pair of ocelli occurs in almost all members of Omaliinae. There is little doubt that these pigmented spots are remnants of the ocelli that were secondarily lost. 3) The presence of the markedly developed, brickwall-like pattern on the abdominal intersegmental membranes (see HAMMOND, 1971, 65; SMETANA, 1985, 475).

On the other hand, it is at present very difficult to assess the phylogenetic relationships of *Uenohadesina* within the subfamily Omaliinae, mainly because of the unsatisfactory subdivision of this subfamily. The characters of *Uenohadesina* (mainly mouthparts) seem to justify its assignment to the tribe Anthophagini, which unfortunately is still a poorly defined, artificial assemblage of heterogeneous genera (see SMETANA, 1985, 475). Within Anthophagini, *Uenohadesina* seems to show possible relationship with the genera *Trigonodemus* LÉCONTE, 1863 and *Tanyrhinus* MANNERHEIM, 1852 based on general appearance, with the elytra almost, or entirely, covering the abdomen, as well as on the shape of the pronotum. It would be understandable that *Uenohadesina*, due to its cryptic life in caves, lost the frontal extension of the head, most conspicuously displayed in *Tanyrhinus*, the pronounced sculpture of the head and pronotum, as well as the striation of the elytra (however, vestiges of elytral striae may be actually present in some specimens, see the Comments below, under *U. styx*), and underwent considerable reduction of the eyes. On the other hand, this may just be a matter of convergence. At any rate, *Uenohadesina* differs from *Trigonodemus*, in addition to the characters mentioned above, by the markedly reduced, short prosternum with minute intercoxal projection (in *Trigonodemus*, the intercoxal projection is markedly developed, acutely elongate and reaching almost middle of front coxa), by the conspicuously developed, complete medial longitudinal carina of the mesosternum (in *Trigonodemus*, the mesosternum bears at most a minute, inconspicuous, linear ridge posteriorly), and by the wide, broadly rounded anterior intercoxal projection, widely separating the middle coxae (in *Trigonodemus*, the anterior intercoxal projection is narrow, narrowly separating the middle coxae).

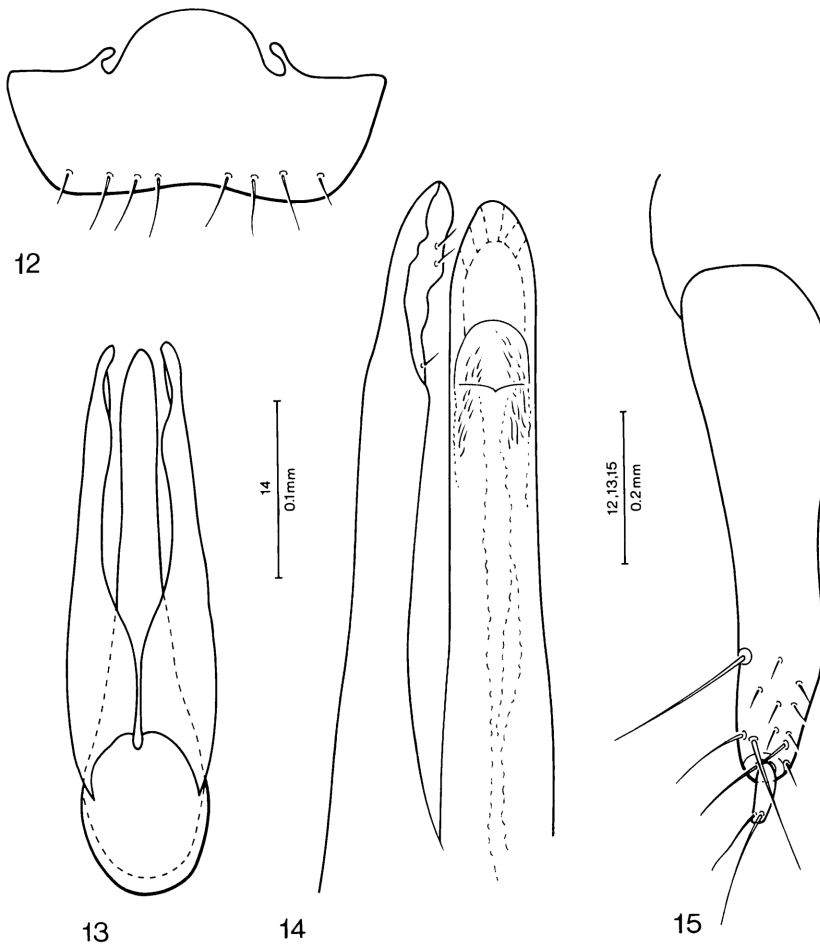
Etymology. Patronymic; this genus was named in honour of Dr. Shun-Ichi UÉNO (National Science Museum, Tokyo), the renowned Japanese coleopterist and speleologist, and one of the discoverers of this new genus. The name is a combination of the family name UÉNO, the Greek word Αἰδῆς -ου, ὄ, and the ending *-ina*. The second portion of the name is acknowledging the occurrence of this genus in caves. *Hades* was, in Greek mythology, the abode of the dead, conceived usually as a dark and gloomy realm. At its entrance was the three-headed watchdog *Cerberus*; beyond was the river *Styx* (see below), across which *Charon*, the dark ferryman, conducted the souls of those who had been buried with due rites. In transferred meaning the word is

used for infernal, lower world.

Uenohadesina styx sp. nov.

(Figs. 1–15)

Description. Entirely testaceorufous to rufobrunneous; mouthparts pale testaceous; antennae testaceous, gradually becoming pale testaceous toward apex; legs testaceorufous with slightly paler tarsi. Head on posterior half with moderately coarse and sparse punctation becoming somewhat coarser and denser mediobasad of elongate impressions in front of posterior margin of head and, to the contrary, gradually finer and sparser toward clypeus, clypeus along anterior margin without punctures; clypeus



Figs. 12–15. *Uenohadesina styx* gen. et sp. nov.: 12, male sternite 8; 13, aedeagus, ventral view; 14, apical portion of aedeagus, including internal sac; 15, female second gonocoxite.

with scattered, rudimentary microscopical striae on disc and with even finer, obliquely directed microscopic striae at lateral margins. Antenna with first two segments about equally, moderately long, first segment slightly more robust than segment 2, segment 3 elongate, longer than segment 2 (ratio 1.17), segments 4–6 longer than wide, gradually becoming shorter and wider, segments 7–10 about as long as wide, gradually becoming wider, segments 9 and 10 appearing slightly wider in some specimens, last segment about as long as two preceding segments combined. Pronotum quite finely, sparsely punctate; with two larger punctures in front of middle portion of posterior pronotal margin. Elytra each markedly transversely convex, entirely covering abdomen, or exposing it from eighth segment. Apparently apterous (elytra were not entirely removed from any of the available specimens).

Male. Sternite 8 as in Fig. 12, apical margin vaguely, broadly emarginate apically. Aedoeagus (Figs. 13, 14) in general narrow and elongate with small basal bulb, median lobe narrow and quite elongate, almost parallel-sided, with narrowly arcuate apex. Parameres markedly developed, large and elongate, with wide basal portion, gradually narrowed to subacute apex, vaguely exceeding apex of median lobe; each without sensory peg setae, with three minute setae on medioapical portion; internal sac with elongate medial structure, composed of fine, seta-like elements.

Female. Sternite 8 with apical margin slightly extended medioapically; tergite 8 subtruncate apically.

Length 2.7–2.9 mm.

Type material. Holotype (male) and allotype (female): SOUTH KOREA: “Yong’yeon-gul Cave nr. Hwangji, Changseong-eub, Kangweon-do, S. KOREA”/“8–IV–1966 Leg. S. Uéno & F. Nagao”. In the National Science Museum (Natural History), Tokyo, Japan.

Paratypes: SOUTH KOREA: same data as holotype, 2♂♂, 1♀, in the National Science Museum (Natural History), Tokyo (1♂), and in the SMETANA collection, Ottawa, Canada; same data as holotype, but “6–IV–1966 Leg. S. Uéno”, 1♂, in the National Science Museum (Natural History), Tokyo; “Hwanseon-gul Cave, Daei-ri, Dogye-eub, Samcheog, Kangweon-do, S. KOREA”/“14–I–1966 Leg. J. Namkung”, 1♀, same data but “15–I–1966”, 1♂, both in the National Science Museum (Natural History), Tokyo; “Kosi-gul Cave, Jiron-ri, Hadong-myeon, Kangweon-do, S. KOREA”/“13–IV–1966 Leg. S. Uéno”, 1♀ in the National Science Museum (Natural History), Tokyo.

Geographical distribution. *Uenohadesina styx* has so far been known from three limestone caves in the vicinities of Mt. Taebaek-san at the northeastern part of South Korea. They belong to drainages of three different rivers; Yong’yeon-gul Cave, the type locality, lies at the source of the Naktong-gang River which empties into the Korea Straits; Hwanseon-gul Cave, about 14 km distant to the north-northeast from Yong’yeon-gul Cave, belongs to the Oship-cheon drainage emptying into the Japan Sea; and Kosi-gul Cave, about 37 km distant to the west-southwest from Yong’yeon-gul Cave, lies on the right bank of the Han-gang River which empties into the East

China Sea.

Bionomics. At the type locality, Yong'yeon-gul, which is a large two-storeyed cave lying near the top of a ridge about 980 m above sea-level (cf. UENO *et al.*, 1966, 473–475, fig. 2), *Uenohadesina styx* occurs in the large room on the upper level, where no other cave beetles were found though phreatic crustaceans were abundant in small drip pools. There the omaliine beetle was found leisurely crawling about on the muddy floor among boulders. Though two species of cave trechines (a *Kurasawatrechus* and a *Gulaphaenops*) occur in the same cave, they are restricted to damp places at the deeper parts and never coexist with *Uenohadesina*.

In Hwanseon-gul Cave, which is the best known commercialized cave in South Korea and is protected as a natural monument of the Korean Government, a pair of the specimens of *Uenohadesina* was said to have been taken, in coexistence with *Kurasawatrechus latior*, in the northern branch which is humid and rich in organic matters. Unfortunately, foreign scientists were not permitted to make faunal investigation of this cave, and nothing is known about the present situation of the habitats of cave beetles. The third locality, Kosi-gul Cave, is a long limestone cave but is poor in the fauna, probably due to unfavourable environmental condition. A single known specimen of *Uenohadesina* was found crawling on the muddy floor in a short passage leading off from the large entrance room (cf. UENO *et al.*, 1966, 482–483).

Comments. The specimens of the three different cave populations are essentially identical, except for a few minute details that are considered to be within intraspecific variability. There are slight differences in the proportions of the antennal segments; the two impressions on the disc of head are variably pronounced; the subseriately arranged coarser punctures on medial portion of each elytron tend to appear in vague, linear impressions in some specimens, and the average size of the two specimens from Hwanseon-gul Cave seems to be larger. All three populations are considered to belong to one species, in contrast to the fact that two of the caves harbor different species of blind trechine beetles: Yong'yeon-gul Cave: *Gulaphaenops leptodiroides* UENO, 1987, and a new *Kurasawatrechus*; Hwanseon-gul Cave: *Kurasawatrechus latior* UENO *et* NAMKUNG, 1968. However, these blind trechine beetles were found, unlike *Uenohadesina styx*, usually in deeper, environmentally more stable sections of the caves.

Etymology. The specific epithet is the name Στυξ, Στυγος, ἦ, the name of the mythological river (see above), in apposition.

Acknowledgments

I thank Dr. Shun-Ichi UENO for allowing me to study the specimens of this quite interesting staphylinid, and for providing important geographical and biological details. I also thank Dr. D. E. BRIGHT and Mr. A. DAVIES, who commented on the original draft of the manuscript. Mr. DAVIES also provided the SEM photomicrographs, and Mr. Go SATO carefully finished the line drawings. Thanks are also extended to the artist Mr. Itsuro KAWASHIMA, Tokyo, who provided the habitus drawing of *Uenohadesina styx*.

要 約

A. SMETANA : 韓国産ヨツメハネカクシ亜科の洞窟性の新属新種 *Uenohadesina styx*. —— 韓国北東部の石灰洞3カ所から、ヨツメハネカクシ亜科の洞窟性の新属新種を記載し、*Uenohadesina styx* SMETANA という新名を与えた。この新種は、ハバビロヨツメハネカクシ族に含まれるものと考えられるが、族内の分類が不十分な現時点では、真の類縁関係が明らかでない。地下生活にいちじるしく適応した結果、形態的に大きい変化を起こしている可能性が高いが、外形的に似ている既知の属とは、複眼の退化や、おもに腹面の特異な形状によって明らかに区別できる。

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