

Redescriptions and New Records of Japanese Species of *Neuraphes* Stephens and *Scydmoraphes* Reitter (Insecta, Coleoptera, Scydmaenidae)

Paweł Jałoszyński

Os. Wichrowe Wzgòrze 22/13, 61–678 Poznań, Poland
email: japawel@man.poznan.pl

Abstract Japanese species of the genera *Neuraphes* Stephens and *Scydmoraphes* Reitter (Coleoptera, Scydmaenidae) are redescribed. Habitus, mouthparts, aedeagi and spermathecae of *Neuraphes niponensis* Franz and *Scydmoraphes japonicus* Franz are illustrated. New findings of both species are reported for the first time since their original descriptions.

Key words: Coleoptera, Scydmaenidae, Cyrtoscydmini, taxonomy, Japan.

Introduction

The genera *Neuraphes* and *Scydmoraphes* belong to the tribe Cyrtoscydmini within the subfamily Scydmaeninae. They comprise beetles of small and moderate size, sharing the following set of features: body slender, elongate, moderately convex; antenna without club, gradually thickening toward apex; neck relatively broad; pronotum with well visible, often sharp edge of lateral margins; scutellum small but well visible; pro- and mesocoxae contiguous; metacoxae nearly contiguous, separated by a very narrow gap; mesosternal process low (i.e. not strongly expanded ventrally), short, its posterior margin not reaching mesocoxae. *Scydmoraphes* was originally described as a subgenus of *Neuraphes* (Reitter, 1891), but later it was raised to the genus level (Franz, 1961), on the basis of differences in the design of the ante-basal groove on the pronotum, presence or lack of setae inside basal elytral foveae, and the design of the aedeagus. In *Neuraphes*, the transverse basal pronotal groove or impression is interrupted in middle by a gap or a short, longitudinal carina, and basal elytral foveae are filled with very dense, short setae. In *Scydmoraphes*, the transverse pronotal groove is entire, not interrupted in middle, and the elytral foveae are not filled with setae. The most impor-

tant difference between the two genera seemed to be the lack of parameres in the aedeagus of *Neuraphes*, while *Scydmoraphes* has always well developed, slender parameres with apical setae. However, in the present paper structures resembling parameres in the aedeagus of *Neuraphes niponensis* Franz are reported. Externally, this species closely resembles similarly large, darkly pigmented members of *Neuraphes* known from other regions, especially Europe and the Himalaya Mts., and is not similar to any *Scydmoraphes* known to the author. A comprehensive revision of the both genera is required to clarify this problem. Since external characters are sufficient to discriminate between *Neuraphes* and *Scydmoraphes*, they are adopted in the present work as diagnostic features; the status of the paramere development as a diagnostic character yet remains to be verified.

Both *Neuraphes* and *Scydmoraphes* are represented in Japan each by a single species. *Neuraphes* (*Pararaphes*) *niponensis* Franz has been described on the basis of a male and female collected in a subalpine zone of Hokkaido. *Scydmoraphes japonicus* Franz has been discovered in Aomori Prefecture, North Honshu, and in Hokkaido; the type series consists of two males and one female. Both species have not been reported later. In the present paper, they are re-

described and illustrated on the basis of the type material deposited in the Naturhistorisches Museum Wien (NMW); both species are also reported from new localities, based on materials from the National Science Museum, Tokyo (NSMT), and the private collection of the author (PCPJ).

Taxonomy

Genus *Neuraphes* Thomson

Neuraphes Thomson, 1859: 61 (treated as incorrect original spelling in Newton & Franz, 1998). Type species: *Scydmaenus angulatus* Müller et Kunze, 1822 (des. orig.).

Neuraphes Thomson, 1862: 80 (subsequent, corrected spelling of *Neuraphes*).

Members of *Neuraphes* have relatively elongate, convex body, head with broad neck, antennae gradually thickening toward apex, pronotum with sharp lateral edges and transverse ante-basal groove or impression interrupted in middle by a short longitudinal carina or gap, each elytron with a single basal fovea filled with very short and very dense, usually yellowish setae, all coxae contiguous or nearly contiguous, and usually a relatively simple sac-like aedeagus with missing or reduced parameres (see Introduction). In some species males have modified apices of elytra, with small swellings, tubercles or peculiar setae.

According to Newton & Franz (1998), *Neuraphes* includes 108 species, most of them occur in the West Palearctis, relatively few members have been reported to inhabit the East Palearctis and the Himalaya Mts. The genus is divided into *Neuraphes* s. str. and *Pararaphes* Reitter.

Subgenus *Pararaphes* Reitter

Pararaphes Reitter, 1891: 131 (as subgenus of *Neuraphes*). Type species: *Neuraphes capellae* Reitter, 1881 (des. by Franz, in Newton & Franz, 1998).

Species belonging to this subgenus have no pits on the vertex, whereas members of *Neuraphes* s. str. have vertex with a pair of distinct foveae. *Pararaphes* comprises 53 species distributed mainly in West Palearctis (Newton & Franz,

1998). In Asia, less than twenty species have been discovered so far, mostly in Caucasus. A few members of the genus are known from Turkey, Siberia and Himalaya Mts. (Nepal, Kashmir, Pakistan) (Franz, 1966, 1970, 1971, 1973, 1974, 1975, 1976, 1979; Jakobson, 1910); *N. niponensis* Franz is the only species of *Pararaphes* known from the Far East. A single female of an undescribed *Pararaphes* from North Korea is known to the author; the occurrence of this subgenus in other parts of East Asia, especially in China and the Russian Far East, is highly plausible.

Neuraphes (Pararaphes) niponensis Franz

Neuraphes (Pararaphes) niponensis Franz, 1976: 53, fig. 2; O'Keefe & Li, 1998: 159.

(Figs. 1A, 2A–I)

Diagnosis. This species is relatively variable in body shape and size; it can be identified on the basis of nearly black head and pronotum and lighter, reddish-brown elytra, small swelling near apex of each elytron in male, and the shape of aedeagus.

Redescription. Body relatively large, slender, in mature individuals head and pronotum very dark brown, narrow anterior margin of pronotum and elytra reddish-brown, antennae, palpi and legs slightly lighter than elytra; setation yellowish.

Male (Fig. 1A). Body length: 1.53–1.78 mm (mean: 1.71 mm). Head slightly broader than long, widest at very convex, coarsely faceted eyes, length: 0.22–0.26 mm (mean: 0.25 mm), width: 0.3–0.31 mm (mean: 0.3 mm). Tempora relatively short, strongly convergent posteriorly, rounded; vertex flat or slightly convex, in some individuals with shallow, irregular impression in anterior part; frons subtriangular, moderately steeply lowering toward clypeus; supraantennal tubercles slightly raised, indistinctly delimited from frons and vertex. Punctuation fine and sparse; setation moderately long, sparse, suberect; eyes with short, erect setae. Antennae (Fig. 2E) gradually thickening toward apex, length: 0.75–0.87 mm (mean: 0.82 mm), scape

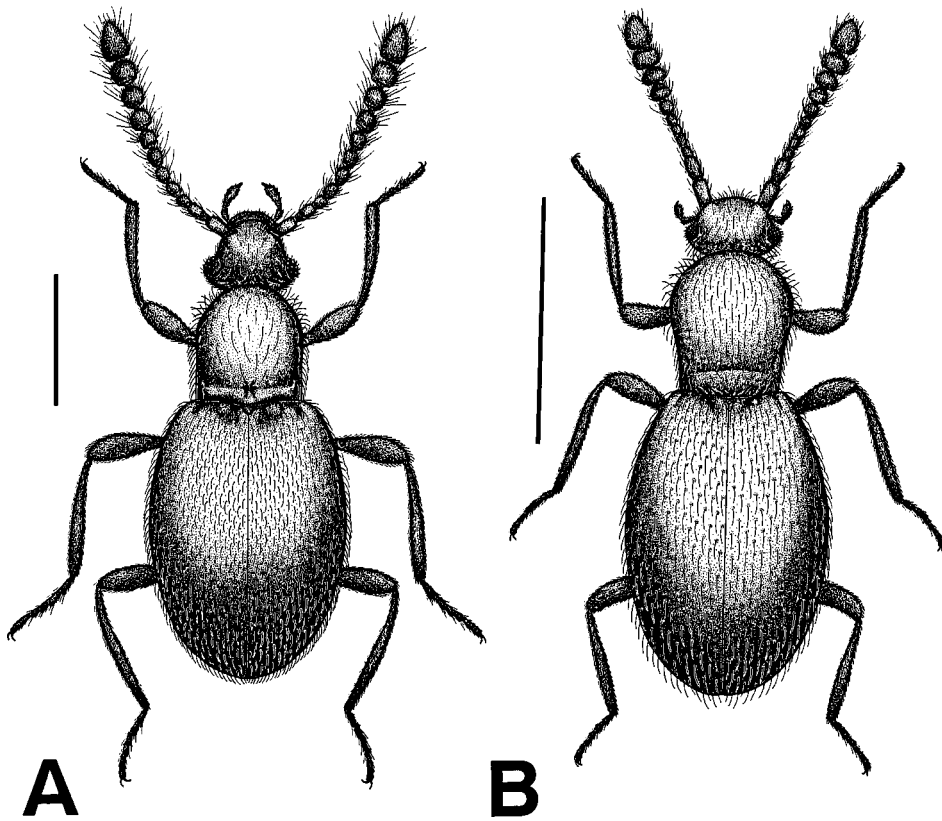


Fig. 1. *Neuraphes niponensis* Franz (A) and *Scydmoraphes japonicus* Franz (B), habitus of male. Scale: 0.5 mm.

and pedicel enlarged, about twice as long as wide; antennomeres III–X gradually increasing in width; antennomere III only slightly longer than wide, IV–VI about $1.5\times$ as long as wide, VII less than $1.5\times$ as long as wide, VIII–IX nearly as long as wide, XI subconical, twice as long as wide at base.

Mouthparts (Fig. 2A–D): Labrum (Fig. 2A) broader than long, subrectangular with rounded sides and slightly emarginate anterior margin bearing a row of seven short and thick setae; dorsal surface with symmetrically distributed setae and several small, circular pores leading to ovoid cavities under surface. Mandible (Fig. 2B) nearly planar, large, subtriangular, with broad base and strongly curved, narrow and pointed apex, without subapical teeth and with very short prostheca, external dorsal margin with three setae, internal dorsal margin with scale-like microsculpture.

Maxilla (Fig. 2C) with subtriangular, elongate stipes bearing a single, long seta at base, elongate palpifer with long setae in distal part; relatively large lacinia divided into broad basal part and elongate distal part with row of dense, thick setae along internal margin, and elongate, very slender galea with external margin bearing two long setae and apical margin with dense row of long, thick setae. Maxillary palpus with very small, only slightly longer than wide palpomere I; palpomere II long, pipe-shaped, curved in middle, with slender, aetose basal half and broadened distal part covered with sparse, long setae; palpomere III distinctly enlarged, slightly longer and much broader than II, widest near apical third, covered with relatively sparse, moderately long setae; palpomere IV small, conical, about twice as long as wide at base, with rounded apex, covered with relatively sparse, moderately long

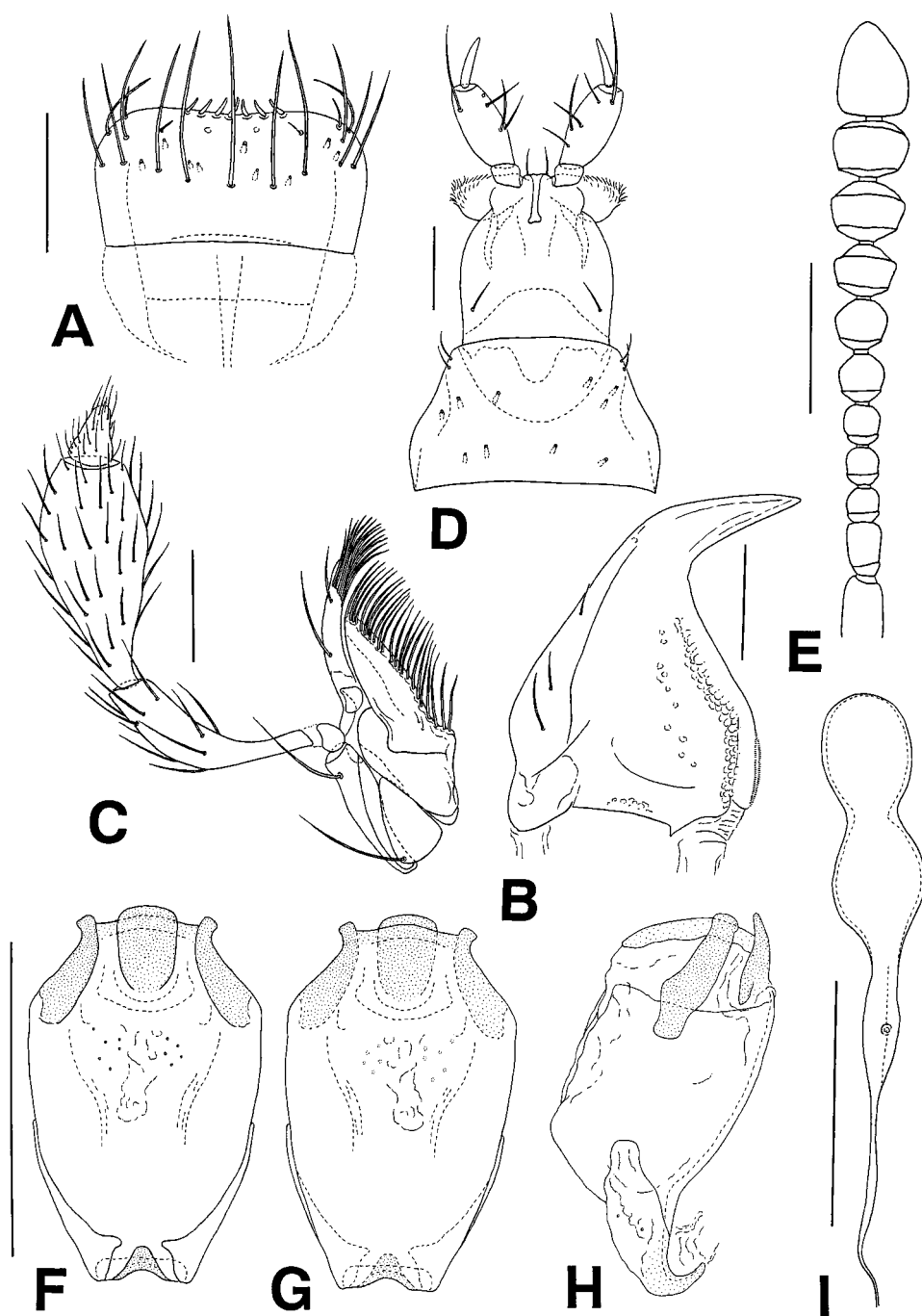


Fig. 2. *Neuraphes niponensis* Franz; labium in dorsal view (A), left mandible in dorsal view (B), right maxilla in ventral view (C), labium in ventral view (D), right antenna in dorsal view (E), aedeagus in ventral (F), dorsal (G) and lateral (H) views, and spermatheca (I). Scale: 0.05 mm for A–D, 0.2 mm for E–I.

setae. Labium (Fig. 2D) elongate, with large, trapezoidal mentum bearing a pair of relatively short setae in each distal external angle, with several small, circular pores on ventral surface; hypostome relatively small; palpus labialis well developed, with palpomere I small, subrectangular, broader than wide, aetose; palpomere II large, cubocylindrical, widest near middle, about $3\times$ as long as wide, with five long setae; palpomere III long and slender, slightly longer than half length of II, narrowing toward apex, aetose.

Pronotum slightly longer than wide, widest near anterior third, then slightly (in some specimens minimally) narrowing posteriorly, length: 0.39–0.45 mm (mean: 0.43 mm), maximum width: 0.35–0.41 mm (mean: 0.39 mm), width at base: 0.32–0.4 mm (mean: 0.37 mm). Anterior and lateral margins rounded together, sides in posterior 2/3 with sharp edge; base slightly arcuate, minimally expanded posteriorly in middle; ante-basal transverse groove relatively shallow, at each side connected to elongate lateral fovea, in middle interrupted by distinct, short longitudinal carina; area between lateral foveae and lateral margins of pronotum distinctly impressed. Punctuation fine and sparse; setation sparse, moderately long, suberect to erect.

Elytra oval, elongate, widest at middle or slightly anterior to middle, length: 0.92–1.07 mm (mean: 1.03 mm), width: 0.65–0.77 mm (mean: 0.7 mm), elytral index (EI; length/width): 1.39–1.41. Humeri distinct, delimited by short but well marked internal humeral impression; base of each elytron with single large, circular fovea located closer to scutellum than to humerus, filled with very short and dense setae. Scutellum small, subtriangular, with distinct median circular impression at base. Each elytron with small, oval swelling near apex, with lateral and anterior margins indistinct, and sharply delimited posterior edge. Punctuation fine and sparse; setation sparse, but denser than that on pronotum, relatively short, suberect. Hind wings well developed, about twice as long as elytra.

Legs long and slender, all femora moderately

clavate, tibiae minimally curved, tarsi slender, tarsomeres I–IV gradually reducing in size, tarsomere V about as long as III–IV together.

Aedeagus (Fig. 2F–H) small, 0.24 mm in length, with strongly curved basal part surrounded by a pair of relatively short and broad, translucent structures (parameres?); apical part of median lobe subtrapezoidal, with darkly sclerotized median ventral plate surrounded at each side by elongate structure curved at apex; internal armature hardly visible, very lightly sclerotized.

Female. Externally distinguishable from male on the basis of the lack of apical swelling on elytra, slightly larger body and distinctly higher elytral index. Body length: 1.8–1.88 mm (mean: 1.83 mm), length of head: 0.29–0.3 mm (mean: 0.29 mm), width of head: 0.3–0.31 mm (mean: 0.3 mm), length of antenna: 0.87–0.9 mm (mean: 0.88 mm), length of pronotum: 0.46–0.49 mm (mean: 0.48 mm), maximum width of pronotum: 0.41–0.45 mm (mean: 0.42 mm), width of pronotum at base: 0.4–0.44 mm (mean: 0.42 mm), length of elytra: 1.05–1.09 mm (mean: 1.06 mm), width of elytra: 0.72–0.75 mm (mean: 0.74 mm), EI: 1.45–1.46.

Spermatheca (Fig. 2I) elongate, length: 0.37 mm, with two constrictions dividing capsular part into three compartments, base gradually reducing in width, insertion of ductus spermathecae not sharply delimited.

Distribution. Japan: Hokkaido.

Holotype, ♂, white printed label “Hokkaido, Nakayama Paß, südl. Sapporo”, white handwritten label “*Neuraphes (Pararaphes) niponensis* m.” and printed “det. H. Franz”, red handwritten label “Typus, ü [über] Holotyp.” (according to the original description, this specimen was collected between 12. v. and 15. vi. 1974) (NMW); paratype, ♀ mounted on the same pin, over the holotype (NMW). Additional material studied: ♂, Hokkaido, Sapporo-shi, Kitano-sawa, 12–30. ix. 1992, Shigehisa Hori leg. (NSMT); ♂, same data, except for 5–21. vi. 1992 (NSMT); ♂, Hokkaido, Hidaka, Shizunai-cho, Takami Dam, 5. vii. 1993, pitfall trap, Shigehisa Hori leg. (NSMT); 2 ♂♂, 3 ♀♀, Hokkaido, Kamikawa-

Horokanai towns, Mikuni Pass, 29. vi. 2002, 4–7 p.m., car netting, Shigehisa Hori leg. (NSMT, PCPJ); 1 ♂, 2 ♀♀, Hokkaido, Ootoinoppu Valley, Kamiotoineppu, 15–23. vii. 1997, pitfall trap, Shigehisa Hori leg. (NSMT).

Genus *Scydморaphes* Reitter

Scydморaphes Reitter, 1891: 131 (as subgenus of *Neuraphes*). Type species: *Neuraphes geticus* Saulcy, 1877 (des. by Franz, in Newton & Franz, 1998). Treated as genus by Franz (1961) and Newton & Franz (1998).

Atropidus Croissandeau, 1894: 361 (as subgenus of *Neuraphes*). Type species: *Neuraphes occipitalis* Saulcy, 1878 (des. by Franz in Newton & Franz, 1998). Subgenus synonymized by Ganglbauer (1899).

Species belonging to *Scydморaphes* usually have small, relatively elongate, moderately convex body, head with broad neck, antennae gradually thickening toward apex, pronotum with moderately sharp lateral edges and entire transverse ante-basal groove or impression never interrupted in middle, often accompanied by a pair of variously developed lateral pits or impressions, each elytron with a single basal fovea not filled with setae, all coxae contiguous or subcontiguous, and aedeagus with well developed, slender parameres with apical setae.

This genus comprises 104 species distributed mostly in the West Palearctis. Some species have been discovered in the Neotropics (Brazil, Peru, and Venezuela). A relatively small group of about ten species is known from Asia: from Caucasus, Turkey, Pakistan, the Himalaya Mts, the Russian Far East and Japan (Newton & Franz, 1998; Franz, 1975, 1976, 1981, 1982; Jakobson 1910, Kurbatov, 1998; Vit, 1999).

Scydморaphes japonicus Franz

Scydморaphes japonicus Franz, 1976, 54, fig. 3; O'Keefe & Li, 1998: 159.

(Figs. 1B, 3A–I)

Diagnosis. Small and slender, relatively variable species, with elongate, very finely punctate pronotum. Examination of aedeagus is necessary for certain identification.

Redescription. Body small, slender, moder-

ately light brown, palpi, antennae and legs yellowish-brown; setation yellowish.

Male (Fig. 3B). Body length: 0.92–1.13 mm (mean: 1.03 mm). Head slightly broader than long, widest at large, very convex and coarsely faceted eyes, length: 0.14–0.16 mm (mean: 0.15 mm), width: 0.17 mm. Tempora short, strongly convergent posteriorly, rounded; vertex convex; frons subtrapezoidal, relatively steeply lowering toward clypeus; supraantennal tubercles only slightly raised, indistinctly demarcated from frons and vertex. Punctuation barely visible, very fine and sparse; setation sparse, relatively short, suberect to erect. Antenna (Fig. 3E) slender, length: 0.45–0.47 mm (mean: 0.46 mm), with enlarged scape and pedicel, small, slightly shorter than long antennomere II, III–V subequal in size, slightly longer than II, as long as wide and with rounded sides, antennomeres VII–X gradually increasing in size, VII nearly as wide as long, VIII–X distinctly transverse, XI subconical, about twice as long as broad at base.

Mouthparts (Fig. 3A–D): Labrum (Fig. 3A) only slightly broader than long, subrectangular with rounded sides and anterior margin, dorsal surface with symmetrically distributed setae. Mandible (Fig. 3B) nearly planar, moderately large, subtriangular, with broad base and strongly curved, narrow apex, with barely marked subapical tooth and finely, slightly irregularly serrated subapical internal margin, prostheca not visible. Maxilla (Fig. 3C) with subtriangular, elongate stipes, elongate palpifer with two long setae at base and near apex; moderately large lacinia divided into broad basal part and elongate distal part with row of dense, thick setae along internal margin; and elongate, slender galea with two expansions on external margin, each bearing single long seta, additional long seta is located near apex, apical margin bears dense row of long, thick setae. Maxillary palpus with very small, only slightly longer than wide palpomere I bearing long setae near apex; palpomere II long, pipe-shaped, moderately curved, with slender, aetose basal third and broadened distal part covered with sparse, long setae; palpomere III dis-

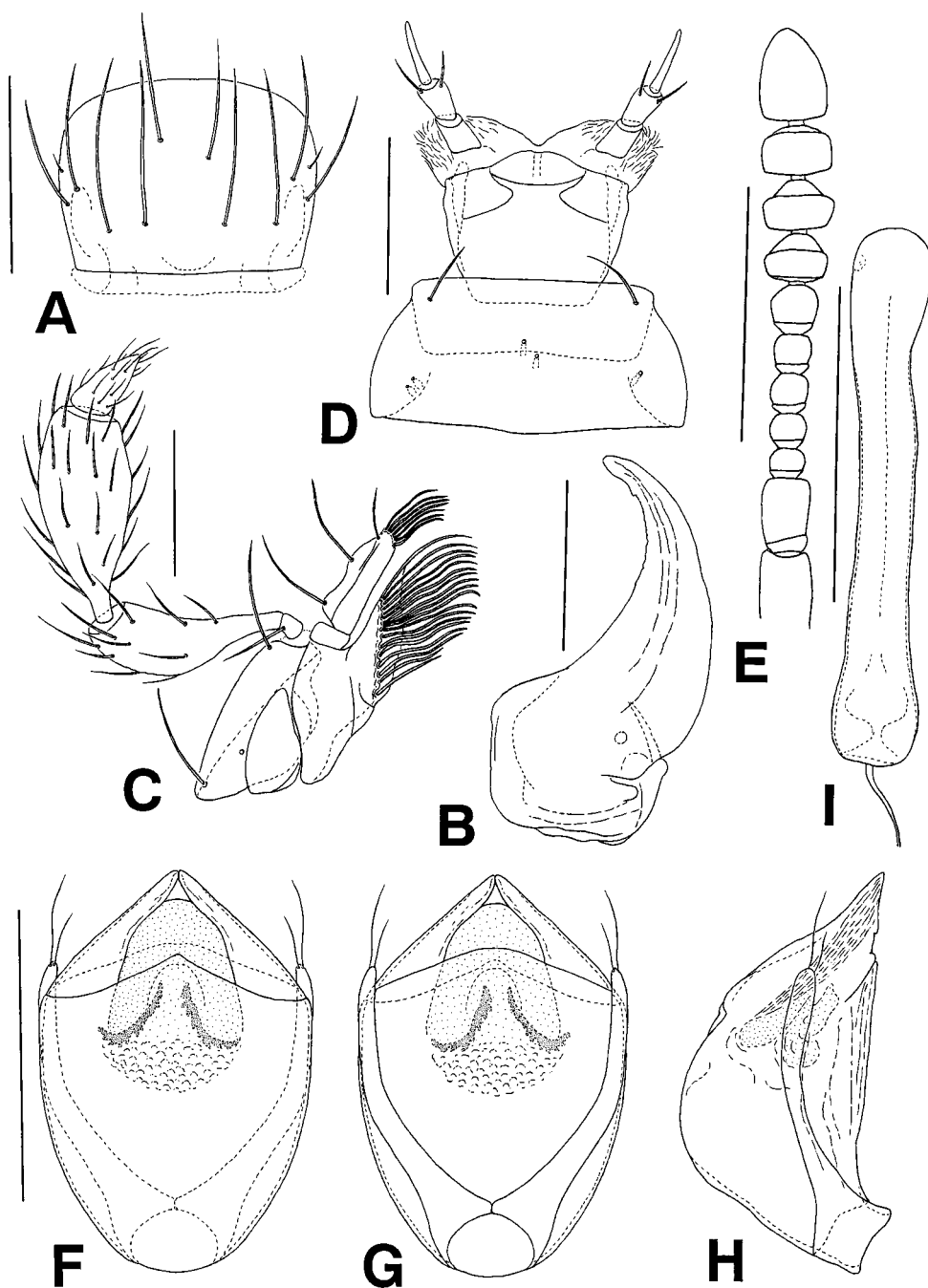


Fig. 3. *Scydmoraphes japonicus* Franz; labium in dorsal view (A), right mandible in dorsal view (B), right maxilla in ventral view (C), labium in ventral view (D), right antenna in dorsal view (E), aedeagus in dorsal (F), ventral (G) and lateral (H) views, and spermatheca (I). Scale: 0.05 mm for A–D, 0.2 mm for E, and 0.1 mm for F–I.

tinctly enlarged, slightly longer and much broader than II, widest near distal third, covered with relatively sparse, moderately long setae; palpomere IV small, conical, about twice as long as wide at base, with pointed apex, covered with relatively sparse, moderately long setae. Labium (Fig. 3D) relatively short, with large, very broad, trapezoidal mentum bearing pair of moderately long setae in each distal external angle, with several small, circular pores on ventral surface; hypopharynx relatively small; palpus labialis small, with palpomere I subcylindrical, slightly less than twice as long as broad, asetose; palpomere II small, widest at apex, with two long setae; palpomere III long and slender, distinctly longer than II, narrowing toward apex, asetose.

Pronotum longer than wide, widest near anterior fourth, sides distinctly narrowing toward base, length: 0.26–0.3 mm (mean: 0.27 mm), maximum width: 0.25–0.27 mm (mean: 0.26 mm), width at base: 0.24–0.25 mm (mean: 0.24 mm). Anterior and lateral margins rounded together, sides in basal third to half with sharp lateral edge; base slightly arcuate; ante-basal groove shallow and relatively short, not reaching shallow elongate lateral pits. Punctuation very fine and sparse; setation sparse, moderately long, suberect to erect.

Elytra elongate, oval, widest slightly anterior to middle, length: 0.52–0.67 mm (mean: 0.61 mm), width: 0.41–0.5 mm (mean: 0.45 mm), EI: 1.27–1.34. Humeri well marked, demarcated by shallow but relatively narrow and long internal humeral impression; each elytron with single, very well visible, deep, circular fovea, without setal filling, fovea located closer to triangular scutellum than to humerus. Punctuation composed of sparse, small, very shallow punctures with diffused margins; setation relatively sparse, moderately long, suberect. Hind wings well developed, about twice as long as elytra.

Legs slender, moderately long, all femora moderately clavate, tibiae nearly straight, tarsi slender, tarsomeres I–IV gradually reducing in size, tarsomere V about as long as III–IV together.

Aedeagus (Fig. 3F–H) relatively small, length: 0.14 mm, median lobe oval, narrowing toward base, apex subtriangular, with a pair of elongate lateral lobes and darkly sclerotized rounded median plate; parameres slender, curved, not reaching apex of median lobe, with two (in some specimens three) apical setae. Internal armature relatively simple, with a pair of C-shaped, darkly sclerotized structures with irregularly serrated internal margins; basal wall of internal sac with scale-like texture.

Female externally differs from male only in higher elytral index. Body length: 1.00–1.05 mm (mean: 1.02 mm), length of head: 0.15–0.16 mm (mean: 0.155 mm), width of head: 0.17 mm, length of antenna: 0.45 mm, length of pronotum: 0.26–0.27 mm (mean: 0.265 mm), maximum width of pronotum: 0.25–0.26 mm (mean: 0.255 mm), width of pronotum at base: 0.24–0.25 mm (mean: 0.245 mm), length of elytra: 0.59–0.62 mm (mean: 0.6 mm), width of elytra: 0.41–0.45 mm (mean: 0.43 mm), EI: 1.38–1.44.

Spermatheca (Fig. 3I) elongate, length: 0.17 mm, nearly cylindrical, with minimally expanded ends, ductus spermathecae sharply delimited from base of capsular part.

Distribution. Japan: Honshu, Hokkaido.

Holotype, ♂, white printed labels “Oirase-Tal [Obrase in the original description], Präf. Aomori, N-Honshu”, “Japan 1974, lg. H. Franz”, white, handwritten label “*Scydmorephes japonicus* m.” and printed “det. H.; Franz”, red handwritten “Typus” (according to the original description, this specimen was collected on 29. v. 1974) (NMW); paratypes: ♂ (with damaged last abdominal segment), same data as holotype, except for yellow handwritten label “*Scydmorephes japonicus* m.” and printed “PARATYPUS” (collected together with the holotype) (NMW); ♀, white printed label “Nakayama-Paß, südl. Sapporo, Hokkaido”, yellow handwritten label “*Scydmorephes japonicus* m.” and printed “PARATYPUS” (specimen collected by Franz on 30. v. 1974, according to the original description) (NMW). Additional material studied: ♂, Honshu, Ibaraki Pref., Mt. Tsukuba, ca. 700 m, 8. vi.

2002, in rotten *Fagus* wood in *Fagus* forest, P. Jałoszyński leg. (PCPJ); Hokkaido, Ebetsu C., Nopporo Forest Park, "6441-44-60 HMH", 20. vi. 2002, in a nest of *Lasius* sp., Shigehisa Hori leg. (NSMT); ♂, same data, except for 30. v. 2002, flight intercept trap (NSMT); ♀, Hokkaido, Shari Town, Minehama, "6544-76-12", 9. vi. 2002, Shigehisa Hori leg. (NSMT).

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