

A Revisional Study of the Japanese Species of the Family Ischaliidae (Coleoptera, Heteromera)

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Abstract The Japanese species of the family Ischaliidae (Heteromera) are reviewed. *Ischalia patagiata* var. *luteolineata* PIC is raised to the species rank, and its diagnostic characters are pointed out in relation to a redescription of *I. patagiata* LEWIS. A new species, *I. takane* M. SAITÔ is described. Subgeneric position of the three species is discussed.

About one hundred years ago, G. LEWIS (1879) described a rare heteromeran from Hiogo and Nagasaki in West Japan, and named it *Ischalia patagiata*. Later, PIC (1912) recognized its variety, *luteolineata*, from the vicinities of Tokyo and Nikko, Central Japan. Since then, only one species of *Ischalia* with two forms has been recognized in Japan, and has currently been placed in the Pyrochroidae.

In recent years, there arose a question if *I. patagiata* is a mere polymorphic species. Though the type specimen of *I. patagiata* is fully winged, apterous individuals occur on the Japanese Alps. This fact has been known for some time, but no conclusive account has been published until now. In my own view, so-called *I. patagiata* seems to contain three different species, *I. patagiata* LEWIS, *I. luteolineata* PIC and *I. takane* M. SAITÔ, the last one of which is a new species to be described in the present paper.

Before going further, I wish to express my deep gratitude to Professor Masataka SATÔ (Biological Laboratory, Nagoya Women's University, Nagoya) for his kind support of this work, and to Professor Hiroyuki SASAJI (Fukui University, Fukui) for his continuous advice and encouragement. Hearty thanks are also due to Messrs. Kaoru HAGA (Kanagawa), Katsumi AKAITA (Mie), Kenichi EMOTO (Tokyo), Kôichi HOSODA (Yamanashi), Noboru KANIE (Nagoya), Nobuyuki NARUKAWA (Mie), Norio OKUDA (Osaka), Yoshinori KANEKO (Tokyo), and Dr. Takashi KISHII (Heian High School, Kyoto) for their kind help in offering materials, and to Mr. Masaru OSADA (Fukui) for taking photographs inserted in this paper.

Ischalia (Pseudohomalisis) patagiata LEWIS, 1879

[Japanese name: Herihane-mushi]

(Figs. 1, 4, 7, 10)

Ischalia patagiata LEWIS, 1879, Ann. Mag. nat. Hist., (5), 4: 463; type localities: Hiogo and Nagasaki; 1887, Ann. Mag. nat. Hist., (5), 20: 168, — NAKANE, 1960, Ent. Rev. Japan, 11: 60; 1963, Icon. Ins. Japon. Col. nat. ed., Tokyo, 2: 239, pl. 120, fig. 1 [*partim*]. — SASAJI, 1985, Coleopt.

Japan Col., Osaka, 3: 355, pl. 60, fig. 1 [*partim*]. — NIKITSKY, 1992, Opred. Nasek. Dal'nego Vostoka SSSR, 3(2): 497, fig. 239-1 [*partim*].

Description. Male and female. Body elongate, flat, somewhat shining; surface rather closely covered with pale yellowish brown pubescence except for antennae, which is shorter and closer on abdomen than on the other parts; antennae dark, thickly and closely pubescent. Body wholly brownish black in ground colour, with somewhat paler mouth parts and tarsi; lateral parts of elytra broadly yellowish brown, forming two distinct stripes reaching suture, whose width is less than half the width of each elytron on either side; the yellow stripe usually indented by blackish ground colour just before apex though the indentation does not extend onto reflexed margin.

Head suboval, sparsely and rather coarsely punctate on the surface, transversely concave between eyes, and roundly swollen from between eyes to vertex, the latter of which is simply rounded down to neck constriction; clypeus separated from frons by a transverse groove; eyes kidney-shaped and moderately produced. Antennal sockets carinate. Antennae shorter than half the body length, the third segment 1.71–2.33 times as long as wide, terminal segment obliquely truncated outwards. Terminal segment of maxillary palpus triangular, thick, outer margin the longest, anterior margin slightly longer than the inner.

Pronotum subcampanulate, 1.38–1.43 times as wide as long, and widest at the middle; lateral margins strongly arcuate in front and with very obtuse apical angles, sinuate towards hind angles which are obtusely produced; sides narrowly bordered, basal margin usually weakly bisinuate; disc gibbous in front with a clear median longitudinal furrow, transversely concave behind the gibbosity and with a very strong longitudinal median carina which is usually produced backwards; surface distinctly foveate at the sides of median carina and inside lateral borders in basal half, the two foveae being connected by a transverse depression on each side; punctures on the surface as on head. Scutellum triangular, usually rounded at the tip and becoming convex towards the tip, surface rather coarsely punctate.

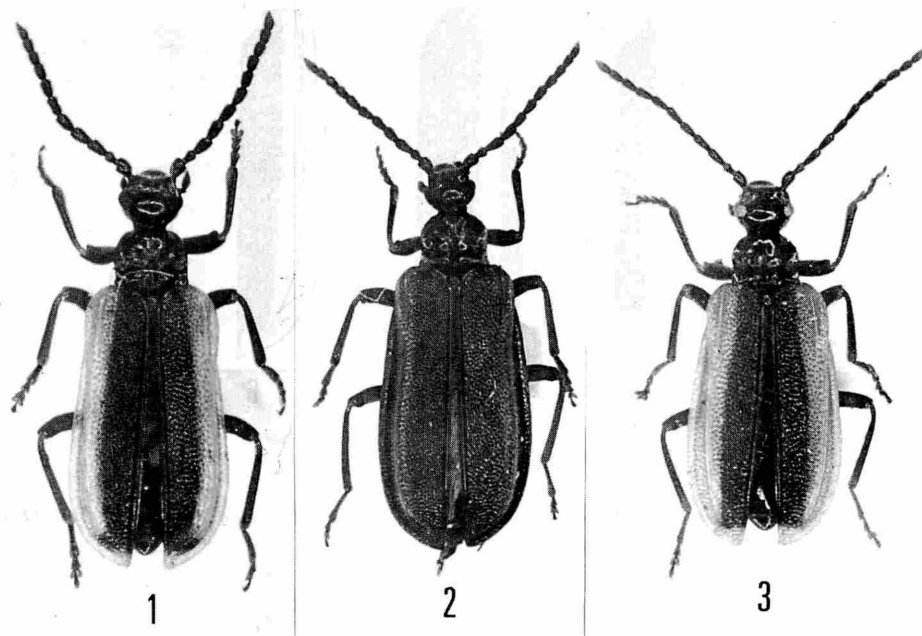
Elytra flat, subparallel-sided, with rounded but distinct shoulders; sides slightly divergent from behind shoulders, moderately and widely arcuate in apical third, and narrowly rounded at apex; surface coarsely and very densely punctate, though the punctures become indistinct on sutural and lateral costae and along lateral borders; suture clearly raised to form a costa; each elytron with a long sharp costa extending from base to near apex along lateral border, which is strongly arcuate over humeral part and does not reach suture, and also with a sharp short humeral costa inside the long one, which is more highly raised than the outer. Lateral edges of elytra obtuse; epipleuron wide. Wings full.

Mesepisterna approaching each other in front.

Male genitalia: paramere slender, 6.33–7.12 times as long as wide, dark reddish brown in colour, with the apex shallowly emarginate; sides haired in apical halves.

Length: 5.4–6.6 mm; breadth (between shoulders): 1.9–2.1 mm.

Specimens examined. 1 ex., Kojiri, Hakone-machi, Kanagawa Pref., 22–VI–1983.



Figs. 1–3. Habitus of the Japanese species of *Ischalia*. — 1, *I. (Pseudohomalisis) patagiata* LEWIS; 2, *I. (P.) luteolineata* PIC; 3, *I. (P.) takane* M. SAITÔ, sp. nov., holotype.

T. MAENAMI leg.; 1 ex., Pass Mennoki-tôge, Inabu-chô, Aichi Pref., 24-X-1982, N. KANIE leg.; Mt. Sanage-yama, Toyota-shi, Aichi Pref., 2-VII-1978, N. KANIE leg.; 1 ex., same locality, 16-VII-1985, N. KANIE leg.; 2 exs., Yufune, Ayama-chô, Mie Pref., 25-X-1992, K. AKITA leg.; 1 ex., Fukuro-tonda, Shirahama-chô, Wakayama Pref., 27-VII-1991, S. TANAKA leg.; 1 ex., Spa Yubara-onsen, Yubara-chô, Okayama Pref., 2-VII-1991, Y. KANEKO leg.; 1 ex., Futamata-gawa, Koyama-chô, Kagoshima Pref., 3-V-1991, K. HAGA leg.

Notes. This species is usually collected on relatively low mountains less than 1,000 m in altitude.

***Ischalia (Pseudohomalisis) luteolineata* PIC, 1912, stat. nov.**

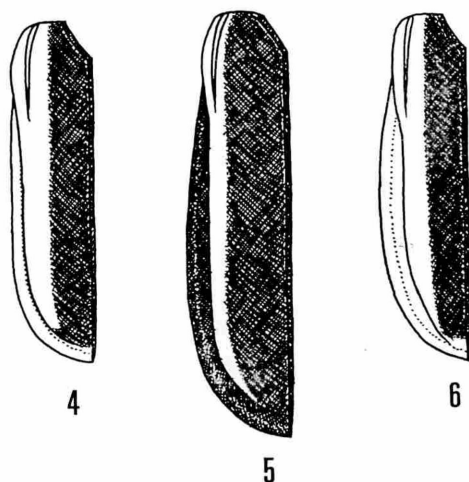
[Japanese name: Kisuji-herihane-mushi]

(Figs. 2, 5, 8, 11)

Ischalia patagiata var. *luteolineatus* PIC, 1912, Bull. Mus. Hist. nat., Paris, 18: 142; type localities: environs de Tokio et Alpes de Nikko. — NAKANE, 1960, Ent. Rev. Japan, 11: 60.

Ischalia patagiata: NAKANE & IGA, 1955, Col. Illustr. Ins. Japan, 1: 113, pl. 34, fig. 774 [*partim*]. — OKUDA, 1992, Gekkan-Mushi, Tokyo, (252): 36, with figs.

This species is allied to *I. patagiata*, and accords with the above description of



Figs. 4-6. Elytra of *Ischalia* (*Pseudohomalitus*) spp. — 4, *I. (P.) patagiata* LEWIS; 5, *I. (P.) luteolineata* PIC; 6, *I. (P.) takane* M. SAITÔ, sp. nov.

the latter in most characteristics. It is, however, different from *I. patagiata* and the next new species by the following features.

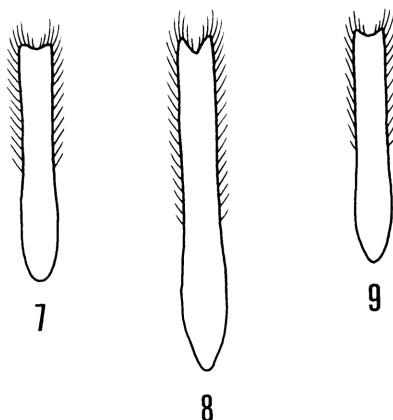
Elytra with a pair of orange stripes on lateral costae, though the end of the stripe does not reach the terminal point of the costa, and brownish black outside the lateral costae.

Head with a pair of obtuse protuberances at the sides of vertex, which are sometimes weak. Pronotum campanulate, 1.17-1.33 times as wide as long; longitudinal median carina on the disc more or less stronger than in the other Japanese species; pronotal disc with a pair of weak humps at the top of the anterior gibbosity. Scutellum W-shapedly emarginate, with the apical convex part extending over proximal portions of elytra. Elytral costae more or less stronger than in the other Japanese species, the longer one approaching and sometimes nearly reaching suture; lateral edges sharp throughout. Wings full.

Male genitalia: paramere more slender than in the other Japanese species, 9.86-12.33 times as long as wide; apex deeply incised in a V-shape.

Length: 4.9-6.5 mm; breadth (between shoulders): 1.7-2.1 mm.

Specimens examined. 1 ex., Dôdaira, Tanzawa, Kanagawa Pref., 4-VII-1993, T. KINOSHITA leg.; 1 ex., Pass Ohdarumi-tôge, Kanagawa Pref., 6-VIII-1990, N. KOBAYASHI leg.; 1 ex., Fuji-rindô, Mt. Fuji, Yamanashi Pref., 10-VII-1988, K. EMOTO leg.; 2 exs., near Kanayama, Sudama-chô, Yamanashi Pref., 8-X-1989, N. KOBAYASHI leg.; 2 exs., Mt. Kushiga-take, Nakakoma-gun, Yamanashi Pref., 11-VIII-1974, Y. HIRANO leg.; 9 exs., Pass Kannon-tôge, Kitakoma-gun, Yamanashi Pref., 26-X-1991, N. OKUDA leg.; 1 ex., Hirakura, Misugi-mura, Mie Pref., 16-XI-1991, K. KAWASE leg.;



Figs. 7-9. Parameres of *Ischalia (Pseudohomalisis)* spp., dorsal view. — 7, *I. (P.) patagiata* LEWIS; 8, *I. (P.) luteolineata* PIC; 9, *I. (P.) takane* M. SAITÔ, sp. nov.

1 ex., same locality, 4-VII-1993, K. AKITA leg.; 1 ex., same locality, 22-VIII-1993, N. NARUKAWA leg.

Notes. This species is distributed in the same general area as the range of *I. patagiata*, but usually occurs at higher places.

***Ischalia (Pseudohomalisis) takane* M. SAITÔ, sp. nov.**

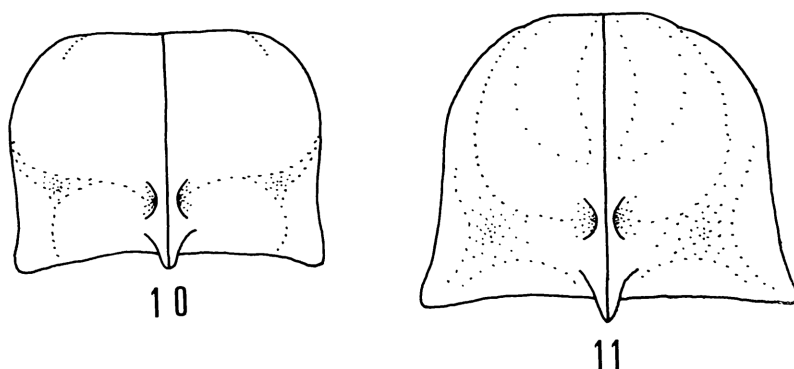
[Japanese name: Takane-herihane-mushi]

(Figs. 3, 6, 9)

Description. Male and female. Body elongate, flat, somewhat shining; surface rather closely covered with pale yellowish brown pubescence except for antennae, which is shorter and closer on abdomen than on the other parts; antennae dark, thickly and closely pubescent. Body wholly brownish black in colour, with somewhat paler mouth parts and tarsi; elytra broadly yellowish brown at the sides, the stripes being more than half the width of elytra, indented before apices and reaching suture.

Head suboval, rather sparsely punctate on the surface, transversely concave between eyes, and roundly swollen from between eyes to vertex, which is simply rounded down to neck constriction; antennal sockets carinate; clypeus separated from frons by a transverse groove; eyes kidney-shaped and moderately produced. Antennae shorter than half the body length, the third segment 2.00-2.18 times as long as wide, the terminal segment obliquely truncated outwards. Terminal segment of maxillary palpus triangular, thick, outer margin the longest, anterior margin slightly longer than the inner.

Pronotum subcampanulate, 1.28-1.41 times as wide as long, widest at the middle; lateral margins strongly arcuate in front, with very obtuse apical angles, sinuate to-



Figs. 10–11. Pronotum of *Ischalia* (*Pseudohomalisis*) spp. — 10, *I. (P.) patagiata* LEWIS; 11, *I. (P.) luteolineata* PIC.

wards hind angles which are very obtusely produced outwards; sides narrowly bordered throughout, border weakly bisinuate; disc gibbous in front and with a clear median longitudinal furrow, transversely concave behind the gibbosity as in *I. patagiata*, longitudinal median carina very strong and usually projecting backwards; punctures on the surface as on head. Scutellum triangular, usually rounded at the tip, convex posteriorly, and rather closely punctate on the surface.

Elytra flat, subparallel-sided though slightly dilated apically, with rounded shoulders; sides widely arcuate in preapical parts; each elytral apex slightly produced; surface coarsely and very densely punctured, but the punctures become indistinct on sutural and lateral costae and along lateral borders, suture clearly raised; each elytral disc with a long sharp costa from base to near apex along lateral border, which is strongly arcuate over the humeral part and separated from suture at the apical end, and also with a short sharp costa inside the longer one, which is not obviously higher than the latter; lateral edges obtuse; epipleuron wide. Wings atrophied.

Mesepisterna approaching each other in front.

Male genitalia: paramere slender, 8.00 times as long as wide, dark reddish brown in colour, with the apex shallowly emarginate, and narrowly rounded at the sides; marginal hairs as in *I. patagiata*.

Length: 4.8–5.5 mm; breadth (between shoulders): 1.5–1.8 mm.

Type series. Holotype: ♂, Pass Ohdarumi-tôge, Kanagawa Pref., 18–VII–1990, N. KOBAYASHI leg. Allotype: ♀, Hatchô-taira, Koma, Yamanashi Pref., 12–VIII–1985, T. KINOSHITA leg. Paratypes: 1 ex., same locality as for the holotype, 22–VII–1990, N. KOBAYASHI leg.; 1 ex., Mts. Hohwoh-san, Nirasaki-shi, Yamanashi Pref., 15–VIII–1993, K. HAGA leg.; 1 ex., same locality, 23–VII–1991, K. HOSODA leg.; 1 ex., same data as for the allotype; 1 ex., Pass Tokugô-tôge, Azumi-mura, Nagano Pref., 25–VII–1951, H. ISHIDA leg.; 1 ex., same locality, 28–VII–1951, H. ISHIDA leg.

The holotype and allotype are preserved in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Notes. Though the present new species is very similar to *I. patagiata*, it is discriminated from the latter by the following points: 1) wings atrophied; 2) yellowish stripe more than half the width of each elytron; 3) elytra slightly dilated towards apices, with each apex slightly produced; 4) longer and shorter elytral costae about equal in height to each other; 5) antennae and legs more slender; 6) body smaller. This new species occurs on higher mountains, usually more than 2,000 m in altitude, than the habitats of *I. patagiata*, so that the two species do not coexist with each other.

Discussion

Systematic position of the genus *Ischalia* is not stable, since it is included either in the family Pyrochroidae or in the family Pedilidae. Recently, ΝΙΚΙΤΣΚΥ (1992) erected the family Ischaliidae, though no explanation for this arrangement was expressed. In this paper, I have followed his opinion, because the genus *Ischalia* bears such unique characters, as the simple antenna, distinctly triangular terminal segment of maxillary palpus, strong pronotal median carina projecting backwards, long strong elytral carinae accompanying short strong humeral ones, and simple parameres.

As all the three Japanese ischaliids described above bear the mesepisterna which are not widely distant, they can be placed in the subgenus *Pseudohomalisus* established by PAULUS (1971), who already suggested this arrangement for *I. patagiata*.

It is interesting to note that *I. takane* which is apterous occurs only on high mountains, while its close relative, *I. patagiata*, is a low altitude inhabitant and has fully developed hind wings. A similar specialization is known in Taiwan, where according to SATÔ (1990), apterous *I. uenoi* M. SATÔ is found only in the alpine zone and winged *I. arisana* KÔNO occurs at lower places. Probably, an ancestral species spread its range onto higher places, and became differentiated into an independent species. It is possible that further speciation has taken place between different high mountains. This may be confirmed by future investigations.

As the ischaliid species are rare in Japan, there are only a few ecological records. It is, however, worth noting that OKUDA (1992) recorded *I. luteolineata* (not *I. patagiata*) growing in groups on fungi adhering to dead trees. The pupa is very unique in the Heteromera; it hangs itself from fungus by the tip of its abdomen and bears several long spines on the body, which seem to serve for protection from enemies. Just after ecdysis, adults stay there for some time. According to SATÔ (1992), Taiwanese *I. uenoi* which is apterous was collected from under dead leaves accumulated in a narrow depression near the top of a high mountain. Japanese *I. takane*, which is also apterous, can be collected by beating low bushes or by sweeping grasses. Hibernation is known to take place in the adult stage, but the exact wintering place is unknown. These ecological data, though not much, also support the view that this group of beetles form their own family different from other related families.

要 約

斎藤昌弘：日本産ヘリハネムシ科の研究。— 100年ほど前，LEWIS (1879) は西日本からヘリハネムシ *Ischalia patagiata* LEWIS を記載し，のちに PIC (1912) が var. *luteolineata* PIC を報告した。それ以来，日本のヘリハネムシ類は，すべて同一種だと考えられてきた。近年，別種が含まれているのではないかという意見が出され，わたしも検討したところ3種を認めたので，ヘリハネムシ *Ischalia patagiata* LEWIS を再記載し，PIC の記載した変種を独立種キスジヘリハネムシ *Ischalia luteolineata* PIC に昇格させ，さらに高山種であるタカネヘリハネムシ *Ischalia takane* M. SAITÔ を新たに記載した。

ヘリハネムシ属 *Ischalia* の所属は従来，不安定であったが，NIKITSKY (1992) は理由をつけずに独立の科へ昇格させた。わたし自身もこの甲虫群の特異性を認めて NIKITSKY の処置に賛同した。また，日本産の3種は，PAULUS (1971) の創設した亜属 *Pseudohomalibus* に該当するものと判断した。

日本における高山性の無翅種タカネヘリハネムシが低山性の有翅種ヘリハネムシに近似する点は，台湾における高山性の無翅種ウエノヘリハネムシ *Ischalia uenoi* M. SAITÔ が，中山性の有翅種アリサンヘリハネムシ *Ischalia arisana* KÔNO に似ていることと平行する。多分，低山のものが高山に進出して，無翅の高山種を形成したのだろう。

生態の報告はほとんどない。奥田 (1992) によれば，菌類で成育して，蛹は垂体で剛毛を生やしている。佐藤 (1992) は，台湾のウエノヘリハネムシが落葉下から採集されたと報告した。いっぽう，日本のタカネヘリハネムシは，低いブッシュや草のスウィーピングで採集される。また越冬は，成虫態で行われる。これらの生態的特徴も，ヘリハネムシ類の近縁科からの独立性を支持するものである。

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Elytra, Tokyo, **22** (2): 343, Nov. 15, 1994

Stenotarsus ryukyuensis CHÛJÔ et KIUCHI (Coleoptera,
Endomycidae) New to the Fauna of Taiwan

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Stenotarsus ryukyuensis CHÛJÔ et KIUCHI (1974, Bull. Japan ent. Acad., **8**, p. 5) has been known only from the Ryukyu Islands (Nakanoshima, Amami-Oshima and Okinawa). I have recently captured numerous individuals of this species in Taiwan as follows: 36 exs., Chihpen, Taitung Hsien, SE Taiwan, 22–IV–1994, S. OSAWA leg. (under bark).

I thank Dr. Hiroyuki SASAJI, Fukui University, who kindly confirmed the identity of the specimens above with those from Amami.