A REVISION OF THE GENUS PODABRUS WESTWOOD IN JAPAN (I) (INSECTA, COLEOPTERA, CANTHARIDAE)

Rep, Fac. Sci., Kagoshima Univ. (Earth Sci. & Biol.),
No. 14, p. 55–63, 1981

A REVISION OF THE GENUS *PODABRUS* WESTWOOD IN JAPAN (I) (INSECTA, COLEOPTERA, CANTHARIDAE)

Tadashi MAKINO & Takehiko NAKANE*

(Received Sep. 30, 1981)

Abstract

Two species-groups of the genus *Podabrus* in Japan are reviewed. *Heydeni*-group includes four species: *P. heydeni* Kiesenwetter, *P. abei* sp. n., *P. osawai* sp. n. and *P. hikosanus* sp. n.; *Longissimus*-group contains only *P. longissimus* Pic. Keys to species-groups and to species of *heydeni*-group are given.

Introduction

The genus *Podabrus* Westwood is a group of delicate soft-bodied beetles with strongly constricted neck, belonging to the family Cantharidae, and comprises about two hundred known species spread over the northern hemisphere. Up to the present twelve species and two varieties have been recorded from Japan, which were reported by Kiesenwetter (1874 & 1879), Harold (1878), Heyden (1879), Lewis (1895), Pic (1904, 1905 & 1938) and Wittmer (1960 & 1970), but no revisional work on Japanese members of this genus has ever been published. Nearly ten years ago Nakane, one of the authors, examined the male genitalia of *Podabrus* specimens of his possession and having recognized some unnamed species he presumed that there would be twenty or more additional species occurring in Japan. Since the last year we have reexamined this group of beetles and found some forty undescribed or unrecorded species from Japan, which may be classified into at least four subgenera or species-groups.

In the present paper we have treated the first two groups in the genus *Podabrus* occurring in Japan and described three new species. The material used in this study was selected from the collection of Nakane, with some additions from other sources.

Genus *Podabrus* Westwood

Podabrus Westwood, 1840, Introd. modern Classif. Ins., 2, append. Synops. Gen.: 27. (Type species: *Cantharis alpinus* Paykull, 1798)

Dichelotarsus Motschulsky, 1860, Bull. Soc. Nat. Moscou, 32, 2(4): 400; Schrenck's Reisen Amurl., **2**(2): 116, 174. (Type species: *D. flavimanus* Motschulsky, 1860)

* Laboratory of Biosystematics, Department of Biology, Faculty of Science, Kagoshima University.

Head exposed, protruded forwards, about as long as prothorax, rhomboidal, narrowly constricted at neck, without elevations between eyes, which are moderately large, prominent laterally; mandibles falcate, without tooth; last joint of both palpi securiform or tirangular; mentum transversely subquadrate; ligula subquadrate or rounded in front. Antennae filiform, moderately long, with 2nd joint subequal in length to 3rd or a little shorter. Prothorax subquadrate, nearly always transverse, with sides linear or rounded, more or less explanate and reflexed; front angles rounded or obtuse, hind angles briefly projected outwards with sides more or less sinuate before angles; base broadly arched-emarginate or nearly straight; apcial margin subtruncate. Scutellum triangular. Elytra soft, elastic, long, parallel-sided, completely covering the abdomen. Legs slender, with tarsi shorter than tibiae; 1st to 4th tarsal joints progressively diminishing their length; claws bifid or with a lobed tooth (appendiculate); all claws in female similar in shape, bifid or appendiculate; claws in male usually bifid in four anterior legs and appendiculate in posterior legs.

Main characters used in distinguishing species or species-groups of Japan are as follows. 1. Claws of male legs: in most species they are bifid in four anterior legs and appendiculate in posterior pair, but middle legs of *P. lictorius* have appendiculate claws, all claws of *P. heydeni* are appendiculate and those of *P. longissimus* are bifid. 2. Pronotum: it is usually slightly transverse and the punctuation of disk is not so conspicuous, but sometimes it is strongly transverse as in *P. heydeni* or *temporalis* and strongly and densely punctured as in *P. lictorius*. 3. Antennae: in general the 2nd joint is nearly as long as 3rd, but sometimes distinctly shorter than 3rd. 4. Colour

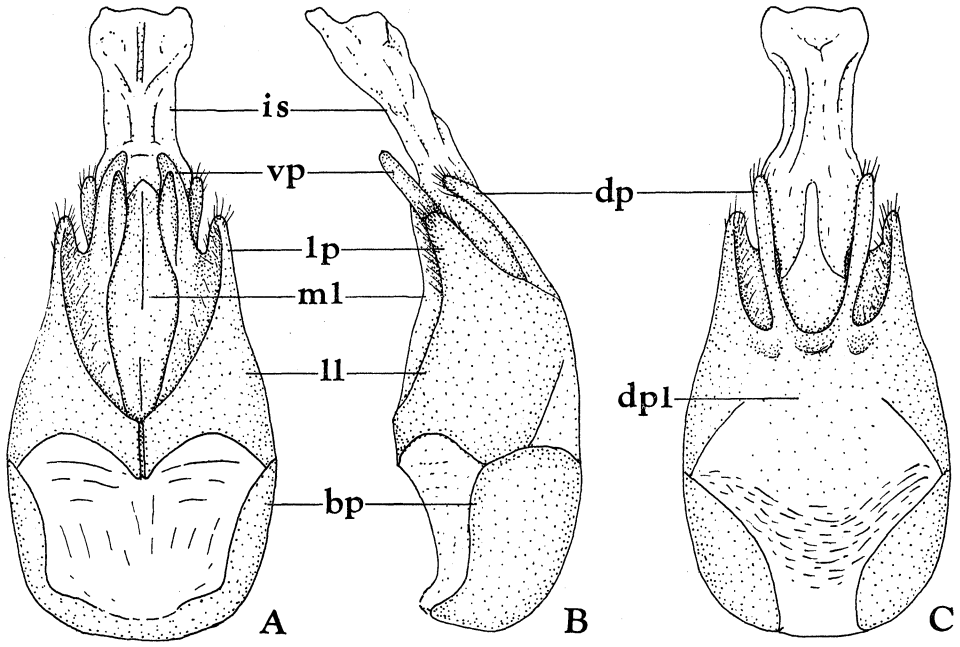

Fig. 1. Male genitalia of *Podabrus* sp. A. ventral view; B. lateral view; C. dorsal view. bp. basal piece; dp. dorsal process; dpl. dorsal plate; is. inner sac; 11. lateral lobe; lp. lateral process; ml. median lobe; vp. ventral process.

pattern: colouration of the body above and legs may be useful for discrimination in some cases. 5. Shape and structure of male genitalia: particularly important in distinguishing species or subspecies. Male genitalia consist of three main parts, median lobe (penis), lateral lobes (parameres) and basal piece; median lobe is situated at the centre of genitalia, but the shape is often obscured by the inversion of its inner sac; lateral lobes are well-developed, completely enclosing median part of genitalia, usually with three pairs of projections apically, which are dorsal, lateral and ventral processes.

Motschulsky (1860) proposed the name *Dichelotarsus* for the reception of some species with appendiculate claws on legs, but as mentioned above most Japanese species of the genus *Podabrus* have such claws in all legs of female and in posterior legs of male. The name *Dichelotarsus* is, therefore, not adopted here, though it has been used as a subgenus of *Podabrus*.

Key to the species-groups of the genus *Podabrus* in Japan

1(4) Tarsal claws of male all similarly formed, bifid or appendiculate. Dorsal process of male genitalia very broadly lobed.

2(3) Tarsal claws appendiculate. Apical incision separating dorsal processes not very deep. ..... *heydeni*-group

3(2) Tarsal claws bifid. Apical incision of dorsal processes very deep with its edges parallel..... *longissimus*-group

4(1) Tarsal claws of male bifid in anterior legs, appendiculate in posterior two or four legs. Dorsal process of male genitalia finger- or rod-like.

5(6) Tarsal claws of male appendiculate in hinder four legs ..... *lictorius*-group

6(5) Tarsal claws of male appendiculate in hind legs. ..... *macilentus*-group

Heydeni-group

This group includes four relatively large species (10–12 mm in length). They are closely allied to each other in having reddish yellow prothorax, very strongly constricted neck and similar colour pattern of elytra. The structure of their male genitalia indicates close relationship between them.

Key to the species of *heydeni*-group

1(6) Femora and tibiae usually blackish or dark brown, at least apex of femora infuscate. Front angles of pronotum rounded. Dorsal process of male genitalia gradually or scarcely narrowed towards apex, not abruptly narrowed at base.

2(3) Elytra black, only epipleura (on anterior half) narrowly yellowish. Anterior half of head blackish brown. Dorsal process scarcely narrowed towards apex ..... *hikosanus* sp. n.

3(2) Elytra at least sutural and lateral margins narrowly yellowish. Anterior half of head yellowish with apical portion infuscate. Dorsal process gradually narrowed towards apex.

4(5) Usually elytra largely blackish with sutural and lateral margins yellowish, but variable in colour; in pale-coloured individuals pronotum without a brownish central marking. Ventral process of male genitalia tapering, narrow, pointed and upturned at apex.....*heydeni* Kiesenwetter

5(4) Elytra largely yellow, each with a brownish longitudinal stripe often almost disappeared; pronotum with a central brownish patch on hind half of disk. Ventral process of male genitalia short and thick, rounded at apex. . .*abei* sp. n.

6(1) Femora and tibiae yellow, often tibiae outwardly somewhat brownish, femora never infuscate at apex. Anterior half of head black or blackish red-brown. Front angles of pronotum obtusely angulate or narrowly rounded. Dorsal process of male genitalia abruptly narrowed at base, then gradually so towards apex.....*osawai* sp. n.

Podabrus heydeni Kiesenwetter

Podabrus Heydeni Kiesenwetter, 1879, Deutsche Ent. Zeitschr., **23**: 306.
Podabrus Reinii Heyden, 1879, Deutsche Ent. Zeitschr., **23**: 351.
Podabrus Heydeni Ksw. var. *immaculicollis* Pic, 1905, Echange, **21**(243): 113.

This common species varies much in colour. Lewis (1895) mentioned that he examined an example being almost wholly black and two examples with the elytra wholly cinereous, and that the two last specimens were labelled *P. Hilleri* Kies. in Kiesenwetter's handwriting. In the British Museum (Nat. Hist.) there is one specimen labelled *P. helleri* Ksw., but its elytra are almost wholly black as in *P. hikosanus*. Kiesenwetter described on his species "Black, head before middle, sides of prothorax, elytral suture broadly and sides of elytra pallid, ...", but the prothorax of this species is wholly reddish yellow in most examples, which are named by Pic (1905) as var. *immaculicollis*.

Both *P. heydeni* and *P. reinii* were described basing upon the examples from Mino (Gifu Prefecture) collected by Dr. Rein.

We have examined specimens from the following localities: Hachimantai (Akita),

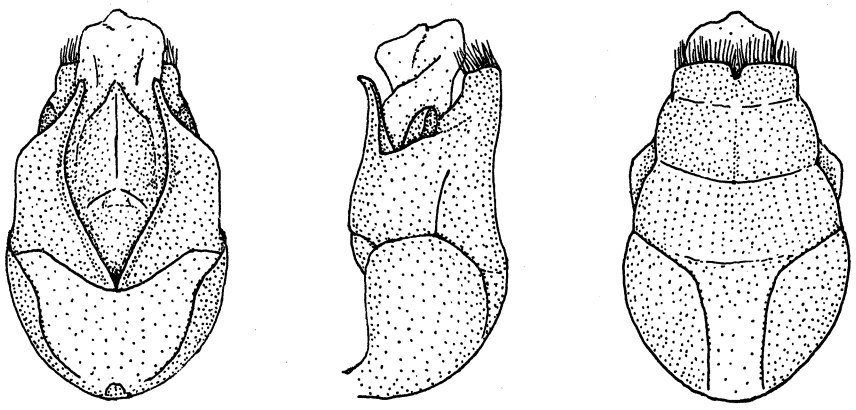

Fig. 2. Male genitalia of *Podabrus heydeni* Kiesenwetter

Shibata, Renge Spa, Echigo (Niigata), Mt. Ihzuna, Kamikochi, Shimashima, Mt. Ontake, Kiso-Fukushima, Komanoyu, Fujimidai (Nagano), Oku-Nikko (Tochigi), Ozegahara, Marunuma (Gumma), Takayama (Gifu), Urawa (Saitama), Hirakura, Ohsugidani (Mie), Seryo, Hiei, Kibune, Kurama, Daihizan, Kyoto (Kyoto), Mt. Myoken (Osaka), Kasuga (Nara), Mt. Nachi (Wakayama), Hataganaru (Hyogo), Hoki-Daisen (Tottori), Kabe, Gokurakuji, Sandankyo, Yuki Spa, Miyajima, Hiroshima (Hiroshima), Mt. Wakasugi, Yoshii (Fukuoka).

Distribution: Honshu, Shikoku, Kyushu.

Podabrus abei **Nakane** et **Makino** sp. nov.

Head black or blackish brown and shining in anterior half, yellow and somewhat less shiny in posterior half, but more or less infuscate medially at middle. Antennae black, with first two joints reddish yellow and base of median joints yellowish. Mandibles largely reddish brown; terminal joint of palpi infuscate. Pronotum reddish yellow, the median area of disk with a rounded dark brown patch, which usually occupies the depressed hind half. Scutellum black. Elytra pale yellow or yellowish brown, each with a median longitudinal brownish stripe arising from shoulder to apex, which is sometimes almost evanescent. Under surface black or blackish brown, but prothorax beneath yellow. Legs yellow, with base of coxae, apical portion of femora blackish; tibiae brownish and tarsi blackish.

This species is very closely allied to *P. heydeni* in structure and extremely resembles paler form of the latter in appearance. Head impunctate in front, narrowly emarginate at middle of apex, rather coarsely punctured behind, densely punctured and rugose behind eyes and at neck; interocular space broadly depressed, with a median longitudinal sulcus, which is narrow but sharp. Prothorax distinctly transverse, subquadrate, with sides slightly rounded or sublinear; front angles rather broadly rounded; disk moderately strongly raised, with a large median depression in front of scutellum, the depression embraced by a pair of arched elevations and including a small elevation anteriorly, the median sulcus extending across the small elevation and reaching antemedian

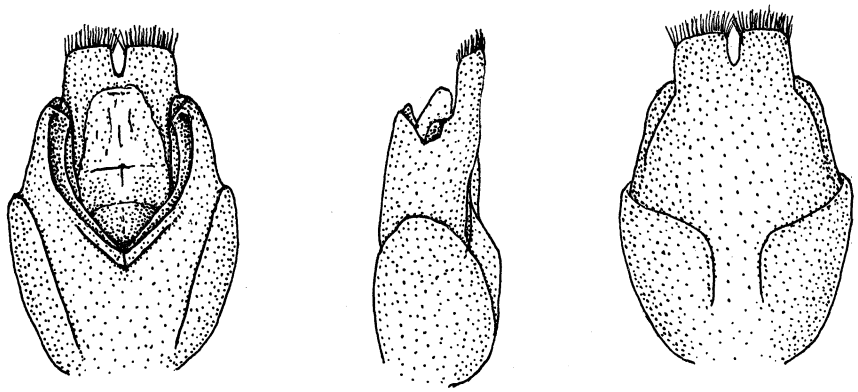

Fig. 3. Male genitalia of *Podabrus abei* Nakane et Makino sp. n.

transverse depression; base slightly arched-emarginate and reflexed. Scutellum triangular, more or less depressed medially. Elytra finely punctured, with surface finely and weakly rugose except for the basal area.

Length: 10.0–12 mm.

Holotype (♂) & 2 paratypes: Mt. Towada, Owani, Aomori Prefecture, Honshu, Japan, 8. vii. 1958, A. Abe leg. Paratypes: 1♂, Mt. Oda, N. Aizu, Fukushima Pref., Honshu, Japan, 15. v. 1947, K. Nagayama leg.; 1♀, Hachinohe, Aomori Pref. Honshu, Japan, 2. vi. 1957, A. Fukuda leg.

The shape of male genitalia is nearly the same with that of *P. heydeni*, but the ventral process is short and thick, not pointed at apex.

Podabrus hikosanus **Nakane** et **Makino** sp. nov.

Blackish brown, with prothorax reddish yellow; posterior half of head above truly black and somewhat opalescent; mouth parts largely yellowish, with terminal joint of palpi and base of maxillae infuscate, and mandibles brownish except base. Antennae dark brown, with 1st joint yellowish and apically brownish, and 2nd brown. Legs dark brown, with basal articulations partly paler and claws yellowish. Meso- and metathorax and abdomen blackish brown, with side and hind margins of abdominal sternites narrowly yellowish.

Head smooth and sparsely finely punctured in front, subopaque behind; basal and postocular areas coarsely and densely punctured, subrugose; interocular space broadly depressed, not closely punctured; anterior part longitudinally grooved at middle; median sulcus fine but sharp, extending from middle to neck. Prothorax distinctly transverse, with sides gently rounded and sinuate before triangularly projected hind angles; front angles rounded; disk moderately convex, strongly and closely punctured, with a rather shallow antebasal depression and an antemedian transverse groove; median sulcus relatively deep, sharply cut, but becoming fine and shallow in front behind frontal margin; basal margin well-raised, weakly arched-emarginate. Scutellum traingular, finelly granulate-punctate and triangularly depressed at base. Elytra rather

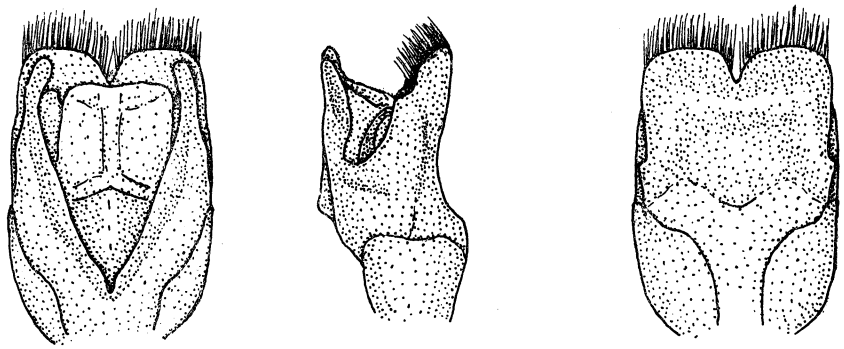

Fig. 4. Male genitalia of *Podabrus hikosanus* Nakane et Makino sp. n.

finely punctured, weakly transversely rugose and somewhat granular. Femora of front legs weakly but distinctly swollen on lower side before apex.

Length: 10 mm.

Holotype: ♂, Mt. Hikosan, Fukuoka Pref., Kyushu, Japan, 5. vi. 1952, T. Nakane leg.

This species closely resembles blackish form of *P. heydeni* Kiesenwetter, but the fore head is wholly blackish red-brown, the epipleural margin of elytra is very narrowly yellowish and the median depression of pronotal disk is much shallower.

Podabrus osawai **Nakane** et **Makino** sp. nov.

Head black, with anterior half blackish or dark brown and shining. Antennae blackish or dark brown, with 1st joint yellowish and infuscate apically, and 2nd brown. Mandibles reddish brown; terminal joint of palpi and base of maxillae infuscate; mouth parts broadly yellow. Pronotum reddish yellow, the median area of disk with a large dark brown patch or longitudinally brownish. Scutellum blackish brown, but sometimes paler apically. Elytra dark brown, with sutural and lateral areas yellow. Under surface blackish or dark brown; prothorax beneath yellow, with a small brownish spot on each side of prosternum; last abdominal sternite often paler in colour. Legs reddish yellow, with tarsal joints infuscate.

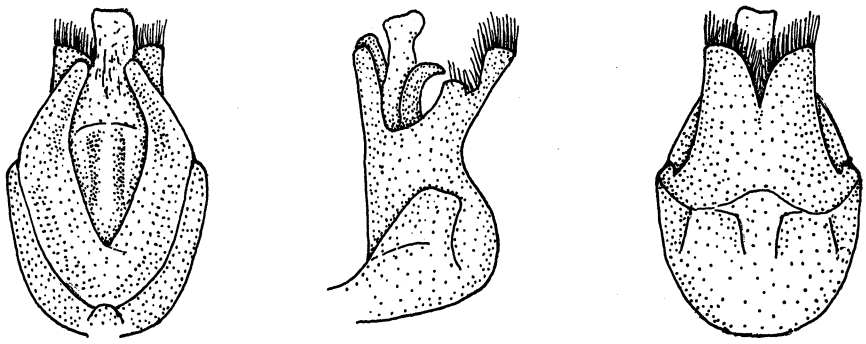

Fig. 5. Male genitalia of *Podabrus osawai* Nakane et Makino sp. n.

Head subopaque, coarsely and closely punctured, but the punctuation variable on interocular space, frontal area smooth, sparsely and finely punctulate; median sulcus distinct but variable in extent and strength. Prothorax markedly transverse, subquadrate, widest before middle, with sides slightly rounded and broadly but very feebly sinuate before triangularly projected hind angles; front angles obtuse or very narrowly rounded; basal margin well-reflexed, slightly arched-emarginate; disk moderately elevated, with a large rounded depression embraced by a pair of arched carinate elevations; median sulcus distinct and sharply cut, extending from base to antemedian transverse groove across the central low elevation situated in the antebasal depression; punctuation finer than in head, not conspicuous, usually relatively close

and distinct on arched elevations beside antebasal depression. Scutellum triangular, with apex narrowly rounded. Elytra finely punctured, weakly but closely rugose as in other species of *heydeni* group, except basal part rather smooth.

Length: 8–10 mm.

Holotype: ♂, Mt. Ushiroyama, Aida, Okayama Pref., Honshu, Japan, 14. v. 1976, T. Aono leg. Paratypes: 2♂, Sandankyo, Aki, Hiroshima Pref., Honshu, Japan, 30. iv. 1966, S. Osawa leg.; 1♂, Kurama – Kibune, Kyoto, Honshu, Japan, 3. v. 1956, T. Nakane leg.

This species can be distinguishable from the preceding species in having entirely yellow femora and tibiae.

Longissimus-group

This group includes the species with bifid claws in all legs. In Japan only one species has been known.

Podabrus longissimus Pic

Podabrus longissimus Pic, 1905, Echange, Rev. Linn., **21**(243): 113.

Large (10–14 mm), black species, with front half of head, sides and narrow reflexed basal margin of prothorax, and extreme apex of femora yellowish.

We have examined specimens from the following localities: Mt. Daisetsu, Aizankei, Yukomanbetsu, Horomi-toge, Shikaribetsu, Hidaka, Rausu (Hokkaido), Shibata (Niigata). Pic. (1905) described this from 'Japon: Iturup'.

Distribution: Hokkaido, Honshu (new record); Kuriles (Iturup).

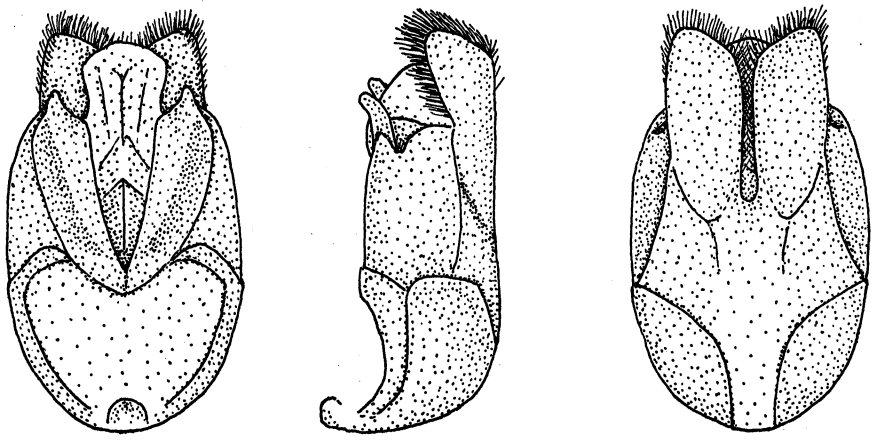

Fig. 6. Male genitalia of *Podabrus longissimus* Pic

References

DELKESKAMP, K., 1977. Coleopterorum Catalogus Supplementa. Pars 165, Fasc. 1. Cantharidae. The Hague, Dr. W. Junk.

HEYDEN, L.V., 1879. Die coleopterologische Ausbeute des Prof. Dr. Rein in Japan 1874–1875. Deutsche Ent. Zeitschr., **23**(2): 321–365.

KIESENWETTER, H.v., 1874. Die Malacodermen Japans nach dem Ergebnisse der Sammlungen des Herrn G. Lewis während der Jahre 1869–1871. Berliner Ent. Zetischr., **18**: 241–288.

———— 1879. Coleoptera Japoniae collecta a Domino Lewis et aliis. Deutsche Ent. Zeitschr., **23**(2): 305–320.

HAROLD, E.v., 1878. Beiträge zur Käferfauna von Japan (Viertes Stück). Japanische Käfer des Berliner Königl. Museums. Deutsche Ent. Zeitschr., **22**(1): 65–88.

LACORDAIRE, J.T., 1857. Histoire naturelle des insectes. Genera des Coléoptères ou expose methodique et critique de tous les genre proposes jusqu'ici dans cet ordre d'insectes. Tome Quatrième. Paris, Librairie Encyclopedique de Roret.

LEWIS, G., 1895. On the Dascillidae and Malacoderm Coleoptera of Japan. Ann. Mag. Nat. Hist., (6)**16**: 98–122.

MARSEUL, S.A., 1864. Telephorides. Tribu de la famille des Malacodermes. Abeille, **1**: 1–108.

MOTSCHULSKY, V. de, 1860. Coléoptères de la Sibérie orientale et en particulier des rives de l'Amour. Dr. L.v. Schrenck's Reisen und Forschungen im Amur-Lande. **2**(2): 77–257.

PIC, M., 1904. Diagnoses de Coléoptères asiatiques provenant surtout de Sibérie. Echange, Rev. Linn., **20**(232): 25–27.

———— 1904. Diagnoses de Coléoptères palearctiques et exotiques. Echange, Rev. Linn., **20** (233): 33–36.

———— 1905. Descriptions abrégées et notes diverses (2^{e} article). Echange, Rev. Linn., **21** (243): 113–115.

WESTWOOD, J.O., 1840. An introduction to the modern classification of insects, founded on the natural habits and corresponding organisation of the different families. Vol. II. London, Longman.

WITTMER, W., 1960. 24. Beitrag zur Kenntnis der palaearktischen Malacodermata (Col.). Mitt. Schweiz. Ent. Ges., **33**: 107–110.

———— 1970. Cantharidae und Malachiidae von den Inseln Okinawa und Ryukyu, gesammelt durch Herrn Prof. Dr. Michio Chûjô. (46. Beitrag zur Kenntnis der palaearctischen Cantharidae und Malachiidae). Mem. Fac. Educ. Kagawa Univ., Pt. 2, (192): 22–27.