

Lectotype Designation of *Ohomopterus yamato* (Coleoptera, Carabidae), with Descriptions of Four New Subspecies

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Abstract Lectotype of *Ohomopterus yamato* (NAKANE) is designated and four new subspecies are described under the names *kinkimontanus*, *takanonis*, *shikatai* and *ojikai*.

Ohomopterus yamato is a small-sized carabid beetle endemic to west-central Honshu in Central Japan. It was originally described by NAKANE (1953, p. 96) as a subspecies of “*Apotomopterus albrechti*” (= *Ohomopterus albrechti* in the present sense) based upon totally 42 specimens collected from ten different localities, without designation of the holotype at that time. In current classification, this taxon is regarded as a full species mainly because of the peculiarities of its aedeagus, though adopted genus has been different according to the authors, that is, *Apotomopterus* by HIURA (1965) etc., *Ohomopterus* by Kinki Research Group of Carabid Beetles (1979), *Carabus* in narrower sense by ISHIKAWA (1985), etc. and *Carabus* in a broad sense by IMURA and MIZUSAWA (1996). In this paper, we adopt *Ohomopterus* as a full genus for the species, in consideration with the classificatory system of the subtribe Carabina recently proposed by IMURA (2002).

This species is rather sporadically and discontinuously distributed on the hilly to mountainous areas of the Kinki and Chûbu Districts. Since the type locality of *O. yamato* was not strictly defined in the original description, all the known populations have been conventionally regarded as belonging to the nominotypical subspecies. KOMIYA (1971, pp. 55–56) briefly discussed on the geographical variation of this species, suggesting that the population of the southern part of Chûbu was somewhat different from that of Kinki in configuration of the genitalia of both sexes. Otherwise, however, little has been contributed to its geographical variation and subspecific differentiation.

In the present paper, we first designate the lectotype of *O. yamato* from NAKANE’s

syntypes and then describe four new subspecies based on the morphological studies by using some 1,200 specimens collected from over 130 localities. Lastly, a brief discussion will be made on a gap between the morphology, zoogeography and molecular phylogeny observed within the species.

The abbreviations employed herein are as follows: NSMT – Department of Zoology, National Science Museum (Nat. Hist.), Tokyo; HUMS – Hokkaido University Museum, Sapporo; TMNH – Toyohashi Museum of Natural History (Aichi Pref.); ICM – Iida City Museum (Nagano Pref.); IM – Y. IMURA; MZS – K. MIZUSAWA. Those for the endophallic structure are the same as those explained in previous papers of the first author.

Before entering into the text, we acknowledge our indebtedness to the following colleagues for their kind cooperation in submitting the specimens for study: Messrs. Toshiaki AOKI (The Research Institute of Evolutionary Biology, Tokyo), Toshhide FUJIEDA (Tsu), Keitaro HARUSAWA (Osaka-sakai), Michiaki HASEGAWA (Toyohashi Museum of Natural History), Jun-Ichiro KANEKO (Gunma), Masakazu KAWAHARA (Taka-tsuki), Naoki KAWASE (Nagoya), Kazunori MAEKAWA (Suzuka), Kiyoshi MASAKI (Kyoto), Tetsuo MIZUNUMA (Osaka), Shiro NISHIGAKI (Nagoya), Tôru OJIKI (Anjô), Takashi OKUMURA (Yokohama), Norio OHTANI (Hiroshima), Hiroki SATÔ (Matsuida), Keiichirô SHIKATA (Iida City Museum), Seiichi SHIMIZU (Shikatsu), Yoshihiro SYU (Yokohama), Toshiaki TAKANO (Toyama), Isamu TANAKA (Nishinomiya), Hiroshi TATENO (Hatano), Shuhei YAMAGUCHI (The Research Institute of Evolutionary Biology, Tokyo), Kazuhiro YOSHIDA (Yokohama), Ken YUASA (Kamakura), Dr. Toshio KISHIMOTO (Japan Wildlife Research Center, Tokyo) and Prof. Masaru NONAKA (The University of Tokyo). Also we thank Mr. Toshinobu MATSUMOTO (PREC Institute Inc.) for kindly supplying us necessary literature. The first author deeply appreciate Dr. Masahiro ÔHARA (Hokkaido University Museum, Sapporo) for kindly allowing him to examine the collection of the late Dr. T. NAKANE now preserved in Hokkaido University Museum, Sapporo. Hearty thanks are also due to Dr. Shun-Ichi UÉNO (National Science Museum, Tokyo) for critically reading the original manuscript of this paper.

Ohomopterus yamato (NAKANE, 1953)

Apotomopterus albrechti yamato NAKANE, 1953, Scient. Rept. Saikyo Univ., Kyoto, (Nat. Sci. & Liv. Sci.), **1**, p. 96; originally given type area: Kinki and Chûbu (Tôkai) Districts of central Honshu, Japan.

Apotomopterus japonicus yamato: NAKANE, 1962, Ins. Japon., Tokyo, **2**(3), p. 35; 1963, Icon. Ins. Japon. Col. nat. ed., Tokyo, **2** [Coleoptera], p. 11.

Apotomopterus yamato: HIURA, 1965, Bull. Osaka Mus. nat. Hist., Osaka, (18), p. 55. — ISHIKAWA, 1969, Bull. natn. Sci. Mus., Tokyo, **12**, p. 523. — KOMIYA, 1971, Ins. Mag., Tokyo, (76), p. 55.

Ohomopterus yamato: Kinki Research Group of Carabid Beetles, 1979, Spec. Publ. Osaka Mus. nat. Hist., Osaka, p. 29.

Carabus (Ohomopterus) yamato: ISHIKAWA, 1985, Coleopt. Japan Col., Osaka, **2**, p. 17. — IMURA & MIZUSAWA, 1996, The *Carabus* of the World, p. 106.

Carabus yamato: NARUKAWA *et al.*, 1989, Hirakura, Tsu, **33**, p. 96.

External morphology. Length: 18.4–23.5 mm (including mandibles). Body above reddish coppery, sometimes with greenish tinge on head, pronotum and elytral margins, or entirely greenish. Venter and appendages reddish black except for palpi, tibiae and tarsi as well as basal parts of mandibles and of each segment of antennae which are reddish brown. Head and pronotum almost as in the other species belonging to the *japonicus* species-group of the same genus, with frons minutely punctured and more roughly so on the discal surface. Male antennae with hairless ventral depression (thiridium) from segments 5 to 7. Pronotum with 2 to 5, usually 3 (2 central and 1 posterior) marginal setae. Elytra also as in the other species of the same species-group, with secondary and tertiary intervals notched in lateral and posterior portions, striae between intervals vaguely scattered with minute punctures. Inner margin of protibia not strongly angulate but rather obtusely rounded a little before the middle.

Male genitalic morphology. Aedeagus slender, gently arcuate throughout, narrowly tapered towards apex which is more or less curved ventrad. Apical lobe of aedeagus in lateral view more or less constricted at base, then a little inflated and hooked ventrad towards apex which is gently rounded. Its dorsal margin not carinate nor grooved. Ostium lobe completely absent. Endophallus with BL developed on both sides; right one rather simple and moderately inflated; left with an accessory process on the ventral side which is narrowly elongate and hooked inwards with rounded tip; ML not developed; PPL asymmetrical, with the right lobe much larger than the left; OL as in the other species of the same species-group; PPL absent; AL weakly inflated and PL unremarkable; AGG weakly protrudent apically, though neither sclerotized nor strongly pigmented. Digitulus elongate pentagonal or lingulate with rounded tip in ventral view, rectangularly curved inwards at basal third and sharply pointed at tip in lateral view.

Female genitalic morphology. Outer plate of ligular apophysis oblong or elongate subtriangular in ventral view, strongly sclerotized and pigmented along the midline. Inner plate entirely sclerotized, walnut-shaped or subquadrate in dorsal view, either deeply concave, cup-like, with the postero-lateral corners often obtusely protruded dorsad, or rather flat and plate-like. Discal surface of inner plate more or less irregularly rugulose, with the front margin broadly rimmed and the lateral sides more narrowly so.

Distribution. Hilly to mountainous areas of west-central Honshu in Central Japan (from the central part of the Kinki District to the western part of the Chûbu District).

1. *Ohomopterus yamato yamato* (NAKANE, 1953)

[Japanese name: Yamato-osamushi]

(Figs. 1–3, 8–11, 28–30, 43–45)

Apotomopterus albrechti yamato NAKANE, 1953, Scient. Rept. Saikyo Univ., Kyoto, (Nat. Sci. & Liv. Sci.), **1**, p. 96 [*partim*], p. 102, fig. 16, D-j (aedeagus) & D-13 (digitulus).

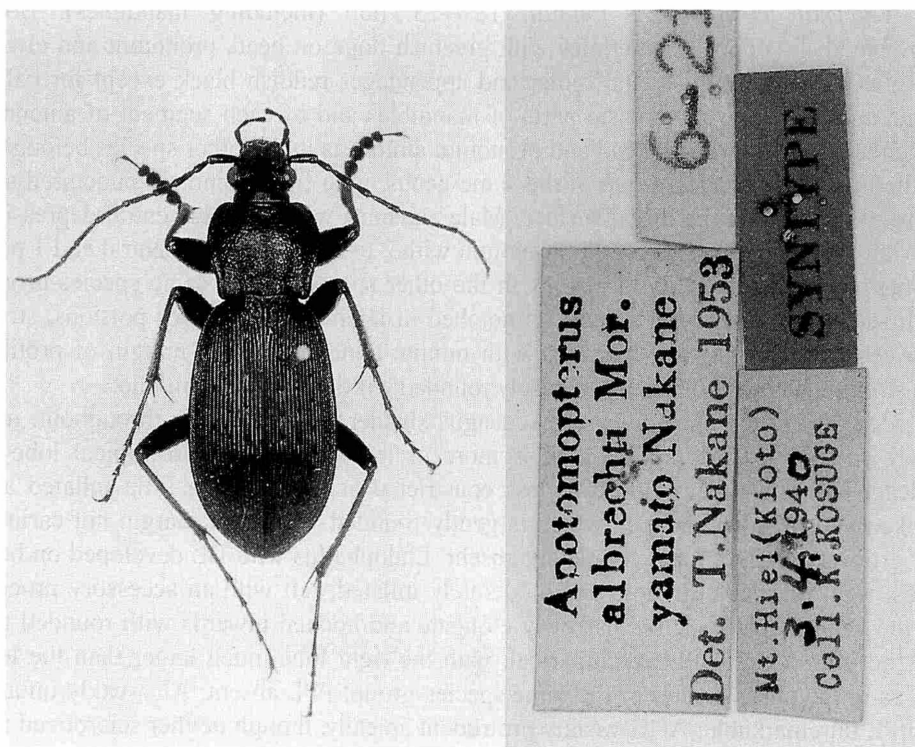


Fig. 1. Lectotype of *Ohomopterus yamato* (NAKANE) from "Mt. Hiei (Kioto)" (=Mt. Hiei-zan on the borders of Kyoto and Shiga Prefectures of the Kinki District in central Honshu, Central Japan) and the attached labels, in coll. HUMS.

Apotomopterus japonicus yamato: NAKANE, 1962, *Ins. Japon.*, Tokyo, **2**(3), pl. 4, fig. 57; 1963, *Icon. Ins. Japon. Col. nat. ed.*, Tokyo, **2** [Coleoptera], pl. 6, fig. 2 f.

Apotomopterus yamato n. yamato: KOMIYA, 1971, *Ins. Mag.*, Tokyo, (76), p. 56 [*partim*].

Ohomopterus yamato: Kinki Research Group of Carabid Beetles, 1979, *Spec. Publ. Osaka Mus. nat. Hist.*, Osaka, pp. 29–31 [*partim*].

Length: 18.7–22.2 mm (including mandibles). Reddish coppery, often with faint greenish tinge. Strongly greenish form was not found so far as concerned with the specimens examined. Pronotum with the basal foveae shallow and longitudinally elongate, lateral margins often with four setae on each side. Inner margin of male protibia gently rounded. Apical lobe of aedeagus not so elongate, weakly bent ventrad, faintly constricted near base and gently rounded at tip in lateral view. Viewed dorsally, it is almost straight or somewhat curved to the right. Digitulus elongate pentagonal or linguulate in ventral view, with the outer margin gently rounded and not subangulate at basal third in lateral view. Inner plate of ligular apophysis variable in shape according to individuals, either almost rounded or subquadrate, with the disc moderately concave.

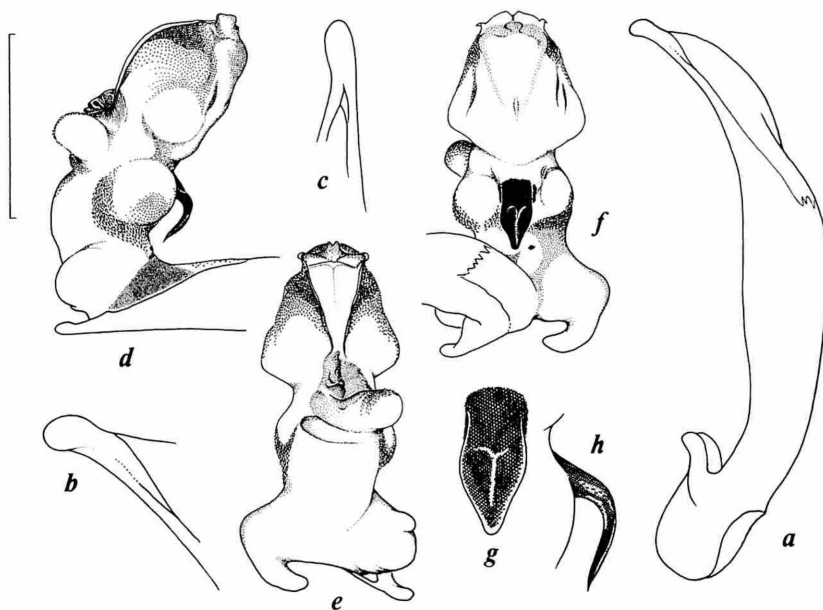
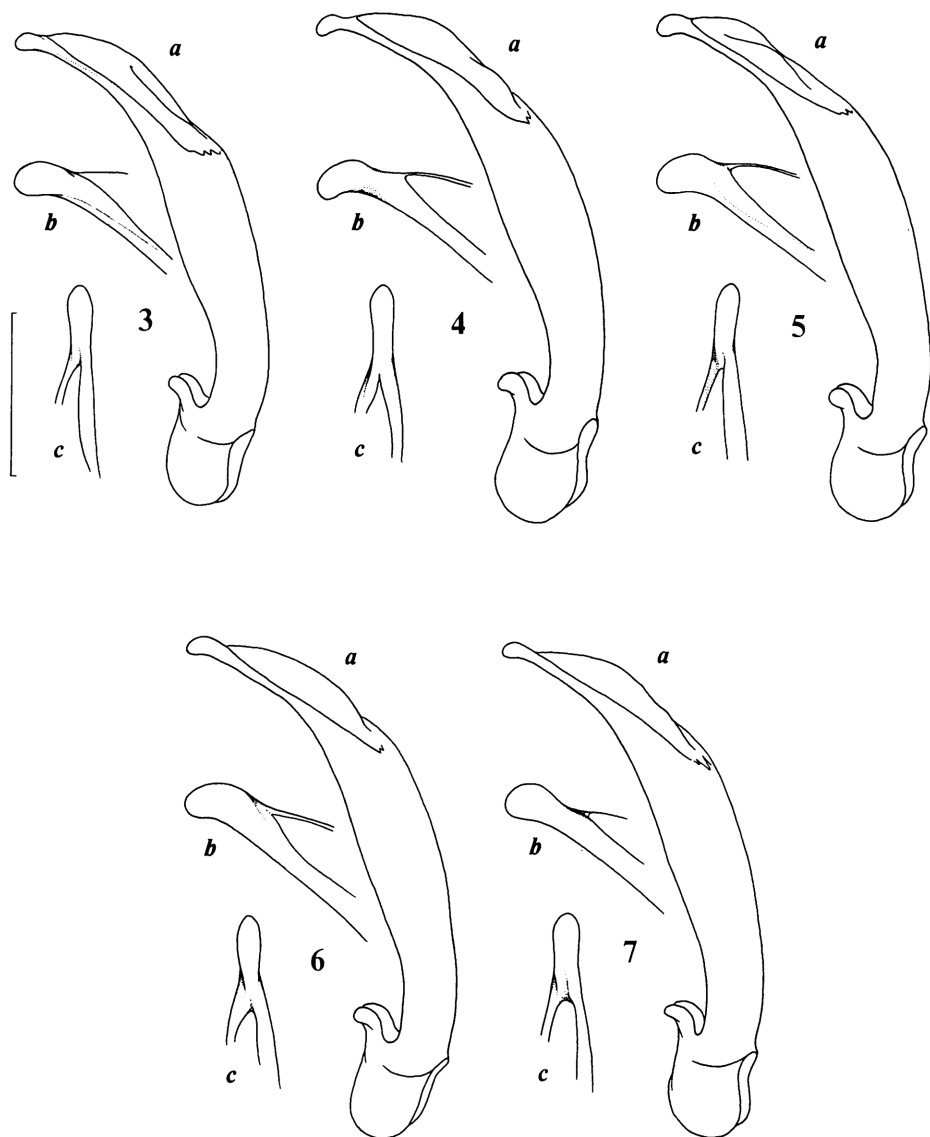


Fig. 2. Male genital organ of *Ohomopterus yamato* (subsp. *yamato* from Mt. Hiei-zan, Kyoto). — a, Aedeagus in right lateral view; b, apical part of aedeagus in right lateral view; c, ditto in dorsal view; d, fully everted endophallus in right lateral view; e, ditto in dorsal view; f, ditto in ventral view; g, digitulus in ventral view; h, ditto in right lateral view. Scale: 2 mm for a, d–f; 1 mm for b, c, g & h.

As mentioned in the introduction, the nominotypical *yamato* was originally described by NAKANE (1953, p. 96) as a subspecies of *Apotomopterus albrechti* based upon totally 42 specimens collected from ten different localities in the Kinki and Chûbu (Tôkai) Districts, without designation of the holotype. Late in the spring of 2001, the first author, Y. IMURA, visited the Hokkaido University Museum, Sapporo, and was able to examine the entomological collection of the late Dr. Takehiko NAKANE now preserved in the same museum, which contains most part of the syntypes of the same taxon. From these, we propose to designate as the lectotype of *yamato* a male specimen from Mt. Hiei-zan which was illustrated twice by the author (NAKANE, 1962, pl. 4, fig. 57; 1963, pl. 6, fig. 2f) (Recommendation 74B of Article 74, ICZN). The nominotypical *yamato* is restricted to the population isolated on the hills located southwest of Biwa-ko Lake.

Lectotype (present designation): ♂, //Mt. Hiei (Kioto) (=Mt. Hiei-zan [比叡山] lying on the borders of Kyoto and Shiga Prefectures of the Kinki District in west-central Honshu, Japan)/3. 4. 1940/Coll. K. KOSUGE//SYNTYPE//6–2f//*Apotomopterus/albrechti* MOR./*yamato* NAKANE/Det. T. NAKANE 1953 //, in coll. HUMS.

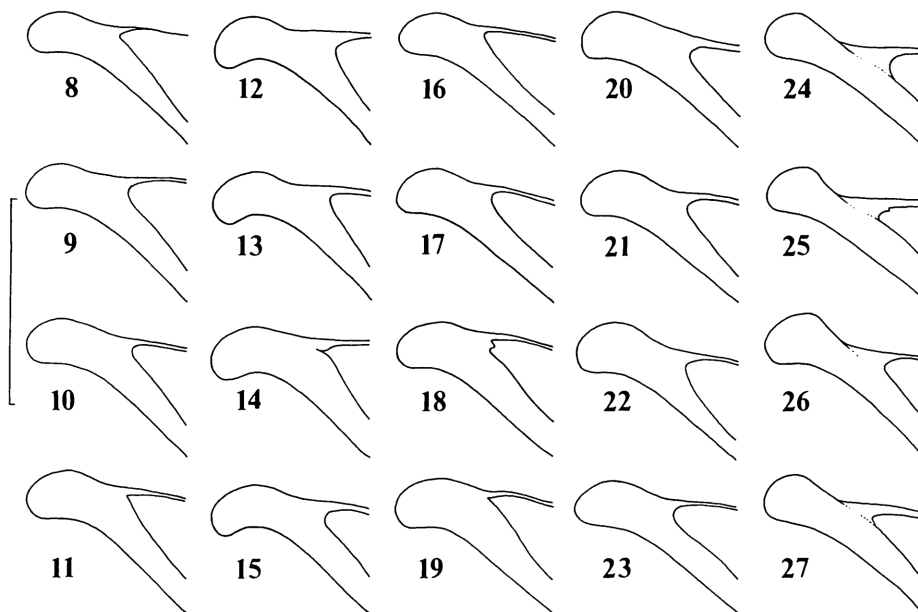
Paralectotypes (6♂♂, 2♀♀): 1♂, //Hiei (Kyoto)/30–3–1934/K. KOSUGE //; 1♀, //Mt. Hiei (Kioto)/3–4–1940/K. KOSUGE //; 1♂, //Mt. Hiei (Kioto)/X. 1941/K. KOSUGE //; 1♂, 1♀, //Mt. Hiei/14–3–1946/A. MUTUURA //; 1♂, //Kyoto, Mt. Hiei/Nov.–



Figs. 3–7. Aedeagus of *Ohomopterus yamato* subspp. — 3, Subsp. *yamato* (from Mt. Hiei-zan, Kyoto); 4, subsp. *kinkimontanus* (from Mt. Yamato-katsuragi-san, Nara); 5, subsp. *takanonis* (from San-no-kuma, Toyama); 6, subsp. *shikatai* (from Karakasa of Yasuoka-mura, Nagano); 7, subsp. *ojikai* (from Sugidaira of Tsukudé-mura, Aichi). — a, Right lateral view; b, apical part in right lateral view; c, ditto in dorsal view. Scale: 2 mm for a; 1 mm for b & c.

4–1951/T. HORIO //; 1♂, //Mt. Hiei/Kyoto, Japan/13–I–1952/H. ISHIDA; 1♂, //Kurama [鞍馬]/21–8–1947//Ca. ohom, 36//, all preserved in coll. HUMS.

Further specimens examined. [Kyoto Pref.] 5♂♂, 5♀♀, Mt. Hiei-zan, 16–III–



Figs. 8–27. Aedeagal apex of *Ohomopterus yamato* subsp. — 8–11, Subsp. *yamato* (8 & 9, Mt. Hiei-zan, Kyoto; 10 & 11, Ôhara, Kyoto); 12–15, subsp. *kinkimontanus* (12, Mt. Mitsuishi-yama, Wakayama; 13, Mt. Kasagi-yama, Kyoto; 14, Asaka-jinja Shrine of Matsuzaka City, Mié; 15, Kamino of Suzuka City, Mié); 16–19, subsp. *takanonis* (16, Senkô-ji Temple of Nyûkawa-mura, Gifu; 17, Mukaikodara of Shirotori-chô, Gifu; 18, Mt. Ôtani-yama of Imadaté-chô, Fukui; 19, Mt. Fujiwaradaké, Mié); 20–23, subsp. *shikatai* (20, Ômagari of Hasé-mura, Nagano; 21, Waseda of Anan-chô, Nagano; 22, Pass Hyô-koshi of Minami-shinano-mura, Nagano; 23, Ôno of Misakubo-chô, Shizuoka); 24–27, subsp. *ojikai* (24, Yasunaga of Tsukudé-mura, Aichi; 25, Azakai of Asahi-chô, Aichi; 26, Mt. Sanagé-yama of Toyota City, Aichi; 27, ruins of Iwamura Castle of Iwamura-chô, Gifu). Scale: 1 mm.

1983, I. TANAKA leg.; 5 ♂♂, 3 ♀♀, ditto, 29–I–1996, K. HARUSAWA leg.; 2 ♀♀, ditto (Shugakuin [修学院]), 14–V–2002, J. KANEKO leg.; 1 ♂, 9 ♀♀, ditto (Peak Shimeigataké [四明ヶ岳], 800 m alt.), 15–V–2002, J. KANEKO leg.; 3 ♀♀, Mt. Daimonji-yama [大文字山], 17–XI–1981, K. MASAKI leg.; 3 ♂♂, 8 ♀♀, Ôhara [大原], 25–VI–1997, I. TANAKA leg.; 1 ♀, Pass Hanasé-tôgé [花背峠], 11–VI–1990, I. TANAKA leg.; all from Sakyô-ku in Kyoto City; [Shiga Pref.] 1 ♀, Yokokawa [横川] of Ôgi in Ôtsu City, 15–V–2002, J. KANEKO leg.; all preserved in colls. IM and MZS.

Distribution. Narrowly localized on the hills located southwest of Biwa-ko Lake, including the Hiei-zan Mountains, southeastern edge of the Tanba Highlands and a part of the Hira-san Mountain Range.

Notes. Besides the lectotype and paralectotypes designated above, NAKANE's type series contain the specimens of *O. yamato* from the following four localities: 1) 4 ♂♂, 1 ♀ (not "3 ♂♂ ♀" as shown in the original description!), "Mt. Kongo"; 2) 1 ♀, "Iwawaki"; 3) 1 ♂, "Amami"; 4) 1 ♂, "Mt. Katsuragi"; 5) 1 ♂, "Horaiji in Mikawa". All these belong to other subspecies of *yamato*, 1) to 4) to *kinkimontanus* nov. and 5) to

ojikai nov., to be described on later pages.

The same series also contain the following specimens: 6) “1 ♂1 ♀” (2 ♂♂, 1 ♀ are now preserved in HUMS) “Mt. Ryuso” (=Mt. Ryûsô-zan [竜爪山] in Shizuoka City, Shizuoka Pref.); 7) “2 ♂5 ♀” (not preserved in HUMS), “Hamaishi” (=Mt. Hamaishidaké [浜石岳] on the borders of Ihara Co. and Shimizu City, Shizuoka Pref.) and 8) “1 ♀” (not preserved in HUMS), “Ashitaka in Suruga” (=Mt. Ashitaka-yama [愛鷹山] in Numazu City, Shizuoka Pref.). All these do not belong to *O. yamato* but are obviously referable to two different species, *O. kimurai* ISHIKAWA (6 & 7) and *O. lewisianus* BREUNING (8). They should therefore be excluded from the paralectotypes, though at least a part of them now preserved in HUMS bear the syntype labels attached by NAKANE.

2. *Ohomopterus yamato kinkimontanus* subsp. nov.

[Japanese name: Minami-yamato-osamushi]

(Figs. 4, 12–15, 31–33, 46–48)

Apotomopterus albrechti yamato NAKANE, 1953, Scient. Rept. Saikyo Univ., Kyoto, (Nat. Sci. & Liv. Sci.), **1**, p. 96 [*partim*], p. 102, fig. 16, D-i, i' (aedeagus) & D-12 (digitulus).

Apotomopterus japonicus yamato: HOZUMI *et al.*, 1965, Kakôchô, Nagoya, (60), p. 148 [*partim*], pl. 2 (p. 159), fig. 24.

Apotomopterus yamato: HIURA, 1965, Bull. Osaka Mus. nat. Hist., Osaka, (18), pp. 55–56. — ISHIKAWA, 1969, Bull. natn. Sci. Mus., Tokyo, **12**, p. 527, fig. 12 (aedeagus), p. 530, fig. 34 (male right protibia).

Apotomopterus yamato n. *yamato*: KOMIYA, 1971, Ins. Mag., Tokyo, (76), p. 56 [*partim*].

Ohomopterus yamato: Kinki Research Group of Cabradid Beetles, 1979, Spec. Publ. Osaka Mus. nat. Hist., Osaka, pp. 29–31 [*partim*].

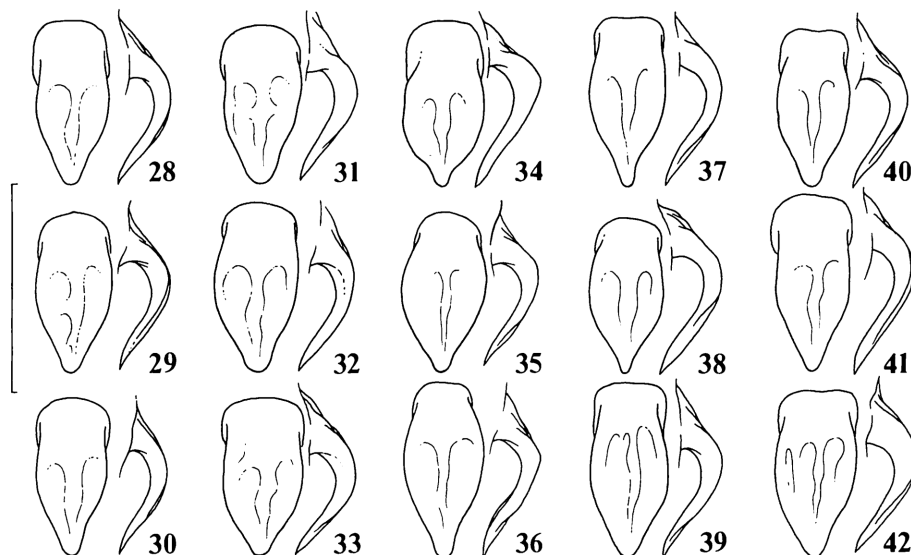
Carabus yamato: NARUKAWA *et al.*, 1989, Hirakura, Tsu, **33**, p. 96, pl. 1 (p. 138), fig. 1. — TOMINAGA, 2000, Spec. Publ. ent. Lab., Osaka Mus. nat. Hist., Osaka, p. 165.

Carabus (Ohomopterus) yamato: IMURA & MIZUSAWA, 1996, The *Carabus* of the World, pl. 6, figs. 41-1, 2.

This new subspecies is widely distributed in the central and eastern parts of the Kinki District and has long been regarded as nothing but the nominotypical subspecies. However, it can be discriminated from the nominate form mainly by differently configurative genitalia of both sexes.

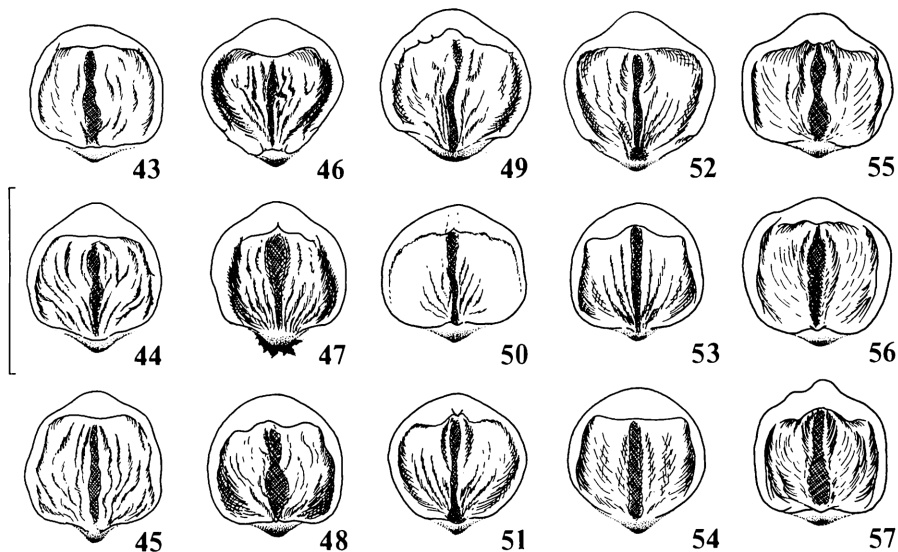
Length: 19.3–23.2 mm (including mandibles). A little larger in size than the nominotypical subspecies. Entirely greenish individuals are relatively frequent on the Izumi and Kongô Mountains. Tibiae and tarsi a little darker than in the nominotypical form. Pronotum a little more transverse, with the disc less strongly rugulose in basal portion. Primary foveoles of elytra a little larger on an average. Inner margin of male protibia more evidently subangulate at middle. Apical lobe of aedeagus longer and more acutely curved ventrad, with the basal portion a little more evidently constricted in lateral view. Digitulus usually a little robuster, with the tip a little less sharply pointed in ventral view. Female genitalia with the inner plate of ligular apophysis deeply concave and broadly margined except for distal portion.

Type series. Holotype: ♂, northern slope of Mt. Yamato-katsuragi-san [大和葛城



Figs. 28–42. Digitulus in male genitalia of *Ohomopterus yamato* subsp. — 28–30, Subsp. *yamato* (all from Mt. Hiei-zan, Kyoto); 31–33, subsp. *kinkimontanus* (31, from Mt. Yamato-katsuragi-san, Nara; 32, from Mt. Kongô-zan, Osaka; 33, from the Pass Sakura-tôgê of Shigaraki-chô, Shiga); 34–36, subsp. *takanonis* (34, from San-no-kuma, Toyama; 35, from Senkô-ji Temple of Nyûkawa-mura, Gifu; 36, from Mt. Ushi-daké of Shôgawa-machi, Toyama); 37–39, subsp. *shikatai* (37, from Karakasa of Yasuoka-mura, Nagano; 38, from linuma of Nakagawa-mura, Nagano; 39, from Ômagari of Hasé-mura, Nagano); 40–42, subsp. *ojikai* (40, from Yasunaga of Tsukudé-mura, Aichi; 41, from Mt. Hongû-san of Nukata-chô, Aichi; 42, from Mt. Sanagé-yama of Toyota City, Aichi). — Left, ventral view; right, right lateral view. Scale: 1 mm.

山], 700–900 m alt., in Gosé City, Nara Pref., 25–VII–1989, Y. IMURA & T. MIZUNUMA leg. (NSMT). Paratypes: [Nara Pref.] 10♂♂, 46♀♀, same collecting data as for the holotype; 2♂♂, 3♀♀, same locality, 2–I–2000, K. HARUSAWA leg.; 1♂, “Katsuragi-yama (written in Japanese), 29–X–1939/Ca. ohom, 23” (HUMS); 1♂, “Mt. Katsuragi, Nara-ken, Jap., 20–X–1935, S. FUKUI” (HUMS); 1♂, “Mt. Kongo (=Kongô-zan [金剛山]), Nara, Nippon, 2–Jan–1937, S. FUKUI/Ca. ohom, 27” (HUMS); 1♂, “Mt. Kongo, VI–1934/343” (HUMS); 1♂, 1♀, “Mt. Kongo, Nara-ken, 20–XI–1938, K. SAKAGUTI/345” (HUMS); 1♂, “Kongo, 2–XI–47/Ca. ohom, 119” (HUMS); 1♂, Mt. Kongô-zan in Gosé City, 22–X–1961, N. OHTANI leg.; 1♀, ditto, 25–X–1963, I. KÔNO leg.; 1♂, 3♀♀, ditto, 22–V–1985, I. TANAKA leg.; 2♂♂, 2♀♀, ditto, 22–V–1988, I. TANAKA leg.; 2♂♂, 2♀♀, ditto, 17–IV–1995, I. TANAKA leg.; 1♂, 1♀, ditto, 4–XI–1996, K. HARUSAWA leg.; 7♀♀, ditto (1,050 m), 2–VII–1998, T. KISHIMOTO leg.; 1♂, 1♀, Pass Fushimi-tôgê [伏見峠], 950 m, on the southern slope of Mt. Kongô-zan in Gosé City, 4–XI–1995, K. HARUSAWA leg.; 1♀, Mikumari-jinja [水分神社] Shrine on the southern slope of the Kongô-zan Mountains, 22–XI–1970, T. ASADA leg.; [Osaka Pref.] 1♂, “Amami (Osaka)” (=Amami [天見] of Kawachi-nagano City), 13–VIII–1946, S. UÊNO



Figs. 43–57. Inner plate of ligular apophysis (dorsal view) in female genitalia of *Ohomopterus yamato* subspp. — 43–45, Subsp. *yamato* (all from Mt. Hiei-zan, Kyoto); 46–48, subsp. *kinkimontanus* (46, from Mt. Yamato-katsuragi-san, Nara; 47, from Hirakura, Mié; 48, from the Sekisui-kei Valley of Kameyama City, Mié); 49–51, subsp. *takanonis* (49, from San-no-kuma, Toyama; 50, from Senkô-ji Temple of Nyûkawa-mura, Gifu; 51, from Mt. Ôtani-yama of Imadaté-chô, Fukui); 52–54, subsp. *shikatai* (52, from Karakasa of Yasuoka-mura, Nagano; 53, from Mt. Jinbagata-yama of Nakagawa-mura, Nagano; 54, from Ômagari of Hasé-mura, Nagano); 55–57, subsp. *ojikai* (55, from Yasunaga of Tsukudé-mura, Aichi; 56, from Mt. Hongû-san of Nukata-chô, Aichi; 57, from Mt. Sanagé-yama of Toyota City, Aichi). Scale: 1 mm.

leg. (HUMS); 1 ♀, “Mt. Izumi-katsuragi (Osaka)” (=Mt. Izumi-katsuragi-san [和泉葛城山]), 31-X-1948, S. UÉNO leg. (HUMS); 1 ♀, Mt. Izumi-katsuragi-san in Kishiwada City, 21-VII-1985, T. KISHIMOTO leg.; 1 ♂, 12 ♀♀, ditto, 30-VIII-1998, M. KAWAHARA leg.; 1 ♀, the Ushi-taki [牛滝] Falls in Kishiwada City, 21-VII-1985, T. KISHIMOTO leg.; 1 ♀, “Mt. Iwaki (Osaka)” (=Mt. Iwawaki-yama [岩湧山]), 9-III-1951, S. UÉNO leg. (HUMS); 1 ♂, Mt. Kongô-zan of Chihaya-akasaka-mura in Minami-kawachi Co., 3-XI-1979 (collector unknown); 1 ♀, ditto, 21-XI-1989, T. NONAKA leg.; 12 ♂♂, 4 ♀♀, ditto, 16-XI-1996, K. HARUSAWA leg.; 8 ♂♂, 6 ♀♀, ditto, 30-XII-1999, K. HARUSAWA leg.; 14 ♂♂, 6 ♀♀, Mt. Yamato-katsuragi-san of Chihaya-akasaka-mura in Minami-kawachi Co., 21-VI-1985, T. MIZUNUMA leg.; 1 ♀, ditto, 22-IV-1996, K. HARUSAWA leg.; [Wakayama Pref.] 1 ♀, Mt. Izumi-katsuragi-san of Naga-chô in Naga Co., 25-VIII-1951, M. YOSHIDA leg.; 1 ♂, 1 ♀, Mt. Mitsuishi-yama [三石山] in Hashimoto City, 25-III-1962, N. OHTANI leg.; [Kyoto Pref.] 6 ♀♀, Dôsenbô [童仙房] of Minamiyamashiro-mura in Sôraku Co., 19-IX-1995, K. MASAKI leg.; 5 ♂♂, 5 ♀♀, ditto, 3-VI-1997, K. MASAKI leg.; 1 ♂, 1 ♀, Mt. Kasagi-yama [笠置山] of Kasagi-chô in Sôraku Co., 2-II-1964, N. OHTANI leg.; [Shiga Pref.] 1 ♂, 4 ♀♀, “Shigaraki [信楽]”,

22-I-1988, T. KISHIMOTO leg.; 2 ♀♀, Tarao [多羅尾] of Shigaraki-chô in Kôka Co., 21-IX-1995, K. MASAKI leg.; 2 ♂♂, 4 ♀♀, Pass Sakura-tôgê [桜峠], 330 m alt., of Shigaraki-chô in Kôka Co., 24-V-1987, Y. IMURA leg.; 5 ♂♂, 5 ♀♀, Mt. Watamuki-yama [綿向山] of Hino-chô in Gamô Co., 20-V-1998, K. MASAKI leg.; [Mié Pref.] 1 ♀, Okumura [奥村] of Shima-ga-hara-mura in Ayama Co., 9-III-1996, F. ICHIKAWA leg.; 4 ♂♂, 4 ♀♀, the Ko-ochi-dani [香落溪] Valley along the Riv. Shôrenji-gawa in Nabari City, 8-VI-1998, K. MASAKI leg.; 1 ♂, 1 ♀, “Hirakura [平倉]”, 30-IV-1951; 1 ♀, “Hirakura-enshû-rin”, 27-VII-1977; 1 ♂, 2 ♀♀, Hirakura of Misugi-mura in Ichishi Co., 29-V-1988, M. NAKANISHI leg.; ditto, 8-VI-1991, M. HASEGAWA leg.; 4 ♂♂, 4 ♀♀, near Nishi-aoyama [西青山] Station of Aoyama-chô in Naga Co., 21-VII-1989, T. AOKI & S. YAMAGUCHI leg.; 3 ♀♀, Pass Horisaka-tôgê [掘坂峠], 450 m alt., in Matsuzaka City, 8-VIII-1998, K. MAEKAWA leg.; 1 ♂, Asaka-jinja [阿坂神社] Shrine in Matsuzaka City, 6-I-2001, H. TATENO leg.; 2 ♀♀, Kami-sada [上佐田], 180 m alt., of Hakusan-chô in Ichishi Co., 7-XI-1992, S. SHIMIZU leg.; 1 ♀, Mt. Kyô-ga-miné [経ヶ峰] of Geinô-chô in Agé Co., 20-VIII-1995, T. FUJIEDA leg.; 2 ♂♂, Shirakawa-jinja [白川神社] Shrine, 170 m alt., Kami-shiraki [上白木] of Shiraki-chô in Kameyama City, 11-XII-1993, S. SHIMIZU leg.; 5 ♂♂, 5 ♀♀, the Sekisui-kei [石水溪] Valley, in Kameyama City, 20-VI-1998, K. MASAKI leg.; 2 ♂♂, Kamino [上野], 180 m alt., of Nishi-shônai-chô in Suzuka City, 1-I-1994, S. SHIMIZU leg.; 1 ♀, Minamibata [南畑], 100 m alt., of Nishi-shônai-chô in Suzuka City, 1-I-1994, S. SHIMIZU leg.; 1 ♀, same locality & collector, 12-XI-1994; 1 ♂, 1 ♀, Tôkai-shizen-hodô [東海自然歩道] in Suzuka City, 3-IV-1999, H. TATENO leg.; 1 ♀, Yunoyama [湯の山] of Komono-chô in Mié Co., 3-V-1988, T. AOKI & S. YAMAGUCHI leg.; 1 ♂, 2 ♀♀, ditto, 1-XI-1988, T. AOKI & S. YAMAGUCHI leg.; 1 ♂, 1 ♀, ditto, 26-XII-1994, M. HASEGAWA leg.; all preserved in colls. IM and MZS.

Distribution. Central to eastern part of the Kinki District (the Izumi and Kongô Mountains with the southern margin sharply bordered by the Ki-no-kawa River, the Kasagi Mountain Range, the Minakuchi Hills, the Takami and Nunobiki Mountain Ranges and their eastern slope with the southeastern edge partly reaching the southern bank of the Miya-gawa River, and the greater part of the Suzuka Mountains).

Notes. Although unified into a single subspecies, the aedeagal apical lobe of *kinkimontanus* is considerably variable in shape according to localities, and it seems to be divided into several sub-forms. In the specimens from the northern part of the Suzuka Mountains, the basal portion of the same lobe is wider and less strongly constricted in lateral view, showing a tendency to intergrade with the following subspecies.

3. *Ohomopterus yamato takanonis* subsp. nov.

[Japanese name: Kita-yamato-osamushi]

(Figs. 5, 16-19, 34-36, 49-51)

Apotomopterus yamato n. *yamato*: KOMIYA, 1971, Ins. Mag., Tokyo, (76), p. 56 [*partim*].

Our knowledge has been rather poor about the population of *O. yamato* distributed in the Hokuriku and Tôsan Districts (northwestern and west-central part of the Chûbu District, respectively), as well as its taxonomical evaluation. It has been tentatively regarded as belonging to the nominotypical subspecies by most authors. However, it seems possible to discriminate these populations as belonging to a new subspecies by characteristically featured genital organ of both sexes, though the difference is not so large.

Length: 19.0–23.4 mm (including mandibles). Reddish coppery, sometimes with strong greenish tinge on head and pronotum. Entirely greenish individuals were not found so far as concerned with the specimens examined. Most closely allied to the nominotypical subspecies in many respects, but distinguished from that race mainly by different configuration of the genital organ. Apical lobe of aedeagus shorter, robuster and only faintly constricted at base in lateral view, weakly but apparently curved to the left in dorsal view. Digitulus with the lateral sides usually more remarkably convergent towards base in ventral view, outer margin more strongly subangulate at basal third in lateral view. Female genitalia usually more weakly concave or sometimes almost flat, with the surface less strongly uneven and the lateral sides narrowly margined.

Type series. Holotype: ♂, San-no-kuma [三熊] in Toyama City, Toyama Pref., 1–VI–1988, T. TAKANO leg. Paratypes: [Toyama Pref.] 1♂, same collecting data as for the holotype; 1♂, same locality, 6–VI–1989, T. TAKANO leg.; 2♂♂, ditto, 19–V–1988, T. TAKANO leg.; 2♀♀, ditto, 22–V–1988, T. TAKANO leg.; 1♂, 6♀♀, ditto, 1–VI–1988, T. TAKANO leg.; 2♀♀, ditto, 16–V–1989, T. TAKANO leg.; 3♀♀, ditto, 24–VI–1989, T. TAKANO leg.; 2♂♂, 2♀♀, Toga [利賀] of Toga-mura in Higashi-tonami Co., 2–VI–1993, T. AOKI & S. YAMAGUCHI leg.; 2♂♂, 1♀, Mt. Ushi-daké [牛岳], Yudani of Shôgawa-machi in Higashi-tonami Co., 18–VI–1990, T. TAKANO leg.; 2♀♀, ditto, 30–VII–1990, T. TAKANO leg.; 1♀, Nunome [布目] of Ôyama-machi in Kami-niikawa Co., 14–IX–1993, T. SHIMOTORI leg.; 2♀♀, Buna-zaka [ブナ坂] of Tateyama-machi in Naka-niikawa Co., 15–IX–1990, T. TAKANO leg.; 1♀, Unazuki [宇奈月] in Shimo-niikawa Co., 25–VII–1979 (collector unknown); [Fukui Pref.] 3♀♀, Shimo-uchinami [下打波], 320 m alt., of the Kuzuryû-kyô [九頭竜峡] Valley in Ôno City, 26–VI–1987, S. SHIMIZU leg.; 1♂, 6♀♀, Mt. Ôtani-yama [大谷山] of Imadaté-chô in Imadaté Co., 27–IX–1995, H. SATÔ leg.; [Gifu Pref.] 1♀, Ishigami [石神], 600 m in alt., of Kamiokachô in Yoshiki Co., 9–23–VII–1995, T. TAKANO leg.; 5♂♂, 6♀♀, Senkô-ji [千光寺] Temple of Nyûkawa-mura in Ôno Co., 4–12–IX–1974, Y. SYU leg.; 1♀, Iijima [飯島] of Shirakawa-mura in Ôno Co., 13–X–1996, K. YOSHIDA leg.; 1♀, Hatogaya [鳩谷] of Shirakawa-mura in Ôno Co., 20–V–1997, K. YUASA leg.; 1♀, ditto, 20–VIII–1997, T. UESUGI leg.; 3♂♂, 1♀, Ogimachi [荻町] of Shirakawa-mura in Ôno Co., 17–IX–1993, S. NISHIGAKI leg.; 1♂, 1♀, Ôshirakawa [大白川], ca. 1,400 m alt., of Shirakawa-mura in Ôno Co., 1–3–VII–1988, M. HASEGAWA leg.; 2♂♂, 2♀♀, Tateishi [立石], ca. 1,100 m alt., of Takasu-mura in Gujô Co., 14–IX–1997, H. TATENO leg.; 1♂, Mukaikodara [向小駄良], 500 m alt., of Shirotori-chô in Gujô Co., 26–VI–1987, S. SHIMIZU leg.; 1♂, Mt. Sasa-ga-miné [笹ヶ峰] of Fujihashi-mura in Ibi Co., 25–IX–1995, H. SATÔ leg.; 2♀♀,

the Nishi-maenotani [西前の谷] Valley near Higashi-sugihara [東杉原] of Fujihashimura in Ibi Co., 23-VII-2002, N. KAWASE leg.; 2 ♀♀, Ozu [小津] of Kuzé-mura in Ibi Co., 16-VIII-2002, N. KAWASE leg.; 1 ♂, Naré [名礼], 100 m alt., of Tanigumi-mura in Ibi Co., 19-XI-1987, S. SHIMIZU leg.; 2 ♂♂, 5 ♀♀, same locality & collector, 5-IV-1990; 1 ♀, Yatani [八谷] of Neo-mura in Motosu Co., 15-VIII-2002, N. KAWASE leg.; 1 ♂, 1 ♀, Hinata [日当], 120 m alt., of Motosu-chô in Motosu Co., 17~21-VII-1988, S. SHIMIZU leg.; 1 ♀, near Ôtaki [大滝], 130 m alt., south of the Fuwa-no-taki [不破ノ滝] Falls, of Tarui-chô in Fuwa Co., 22-V-1987, S. SHIMIZU leg.; 3 ♀♀, east of Enkô-ji [円興寺] Temple, 50-100 m alt., of Aohaka-chô [青墓町] in Ôgaki City, 10-XII-1994, S. SHIMIZU leg.; 1 ♀, // Yôrô [養老], Gifu/18-11-1962/Coll. T. HOZUMI// (TMNH-I-20366); 10 ♂♂, 24 ♀♀, Tsuya [津屋], 100 m alt., of Nannô-chô in Kaizu Co., 21~29-VI-1997, S. SHIMIZU leg.; 1 ♀, Pass Kachiji-tôgé [勝地峠], 200 m alt., of Kami-ishizu-chô in Yôrô Co., 11-II-1991, S. SHIMIZU leg.; 1 ♂, 2 ♀♀, near Uwahara [上原] along the Ôbora-rindô [大洞林道], 250-300 m alt., of Kami-ishizu-chô in Yôrô Co., 29-I-2000, S. SHIMIZU leg.; 1 ♀, Kawanishi [川西] in Ichinosé [一之瀬] near Tsubaidani-rindô [椿井谷林道], 130 m alt., of Kami-ishizu-chô in Yôrô Co., 13-II-1993, S. SHIMIZU leg.; [Shiga Pref.] 2 ♂♂, Ôshimizu [大清水], 280 m alt., at the southern foot of Mt. Ibuki-yama [伊吹山] of Ibuki-chô in Sakata Co., 15-III-1990, S. SHIMIZU leg.; 1 ♂, ditto (230 m alt.), 31-I-1998, S. SHIMIZU leg.; 11 ♂♂, 1 ♀, Yataka [弥高], 260-300 m alt., at the southern foot of Mt. Ibuki-yama of Ibuki-chô in Sakata Co., 4-I-1992, S. SHIMIZU leg.; 1 ♂, Kami-niu [上丹生], 180-230 m alt., of Maibara-chô in Sakata Co., 23-I-1992, S. SHIMIZU leg.; [Mié Pref.] 1 ♂, // Pass Mikuni-tôgé [三国峠]/3-1-1969/Coll. T. HOZUMI// (TMNH-I-20365); 1 ♂, // Mt. Fujiwara-daké [藤原岳], Mie/4-12-1960/Coll. T. HOZUMI// *Apotomopterus/japonicus*/subsp./*yamato*/NAKANE/Yamato-osamushi (written in Japanese)/Det. HOZUMI (1960)// (TMNH-I-20362); 1 ♂, 1 ♀, same collecting data (TMNH-I-20363, 20364); 1 ♂, same locality & collector, 14-5-1961 (TMNH-I-20361); 9 ♂♂, 22 ♀♀, Shôbô-ji [聖宝寺] Temple, 220 m alt., in Sakamoto [坂本] at the northeastern foot of Mt. Fujiwara-daké, of Fujiwara-chô in Inabé Co., 31-V~14-VI-1992, S. SHIMIZU leg.; 1 ♀, Narutani-jinja [鳴谷神社] Shrine, 180 m alt., Sakamoto of Fujiwara-chô in Inabé Co., 14-VI-1992, Y. ITO leg.; 1 ♀, same locality, 4~14-VI-1992, S. SHIMIZU leg.; preserved in colls. TMNH, IM and MZS.

Distribution. The Hokuriku District (except the Noto Peninsula and most part of the alluvial plains on the Japan Sea side, with the northeastern edge sharply defined by the Kurobé-gawa River), the Hida Highlands, the Ryôhaku Mountain Range, the Etsumi Mountain Range, approaching in the south to the Ibuki and Yôrô Mountains including the northernmost part of the Suzuka Mountains represented by Mt. Fujiwara-daké.

Notes. The aedeagal apical lobe of the present new subspecies in lateral view resembles that of the nominotypical *yamato*, above all in some specimens from the southwestern part of the range, but it is shorter and robuster in lateral view and more or less curved to the left in dorsal view.

Derivatio nominis. This new subspecies is named after Mr. Toshiaki TAKANO

(Toyama), who collected most part of the specimens from Toyama Prefecture including the holotype.

4. *Ohomopterus yamato shikatai* subsp. nov.

[Japanese name: Shimo-ina-yamato-osamushi]

(Figs. 6, 20–23, 37–39, 52–54)

Apotomopterus yamato: ISHIKAWA, 1969, Bull. natn. Sci. Mus., Tokyo, **12**, p. 527, fig. 14 (aedeagus), p. 530, fig. 36 (male right protibia).

Apotomopterus yamato n. "Mikawa": KOMIYA, 1971, Ins. Mag., Tokyo, (76), p. 56 [*partim*].

Length: 18.7–22.7 mm (including mandibles). Body above light reddish coppery, rarely with strong greenish tinge as a whole. Basal foveae of pronotum a little more deeply concave and not elongate longitudinally. Elytra shorter and robuster, with the lateral sides often nearly parallel-sided. Inner margin of male protibia moderately subangulate. Apical portion of aedeagus long, less strongly bent ventrad, with the dorsal margin much more gently arcuate and not strongly emarginate at base in lateral view. Digitulus slender in ventral view, with the apex often more sharply pointed than in the other subspecies, its outer margin not subangulate but gently rounded at basal third in lateral view. Inner plate of ligular apophysis roundish in shape, moderately concave, with the discal surface not remarkably uneven.

Type series. Holotype: ♂, Karakasa [唐笠] on the eastern bank of the Tenryû-gawa River of Yasuoka-mura in Shimo-ina Co., Nagano Pref., central Honshu, Japan, 25–XI–1973, Y. IMURA leg., in coll. NSMT. Paratypes: [Nagano Pref.] 3 ♀♀, same collecting data as for the holotype; 11 ♂♂, 17 ♀♀, same locality, 27–VII–1995, T. OKUMURA leg.; 3 ♂♂, 1 ♀, below Ômagari [大曲], on the eastern bank of the Mibu-gawa River, 1,120 m alt., of Hasé-mura in Kami-ina Co., 30–VI–1997, K. SHIKATA leg.; 1 ♂, north of Iinuma [飯沼], on the eastern bank of the Tenryû-gawa River, 550 m alt., of Nakagawa-mura in Kami-ina Co., 22–V–1988, Y. IMURA leg.; 2 ♀♀, Mt. Jinbagata-yama [陣馬形山], 850 m alt., of Nakagawa-mura in Kami-ina Co., 15–VIII–1995, T. OKUMURA leg.; 1 ♀, Iwama [岩間], 680 m alt., of Iijima-machi in Kami-ina Co., 15–19–V–1998, K. SHIKATA leg.; 2 ♀♀, Chiyo [千代], in Iida City, 7–VII–1995, T. KISHIMOTO leg.; 2 ♀♀, Ôkubo [大久保] of Shimojô-mura in Shimo-ina Co., 25–VII–1995, T. OKUMURA leg.; 1 ♀, Sakyô [左京] of Yasuoka-mura in Shimo-ina Co., 21–VII–1994, M. HASEGAWA & S. KATÔ leg.; 1 ♂, 5 ♀♀, Waseda [早稲田], 600 m alt., of Ananchô in Shimo-ina Co., 5–8–VI–1998, K. SHIKATA leg.; 1 ♂, Shiteguri [為栗], 300 m alt., of Tenryû-mura in Shimo-ina Co., 5–VII–1997, K. SHIKATA leg.; 7 ♀♀, Hiraoka [平岡] of Tenryû-mura in Shimo-ina Co., 26–VII–1995, T. OKUMURA leg.; 1 ♂, 4 ♀♀, ditto, 25–VIII–1995, T. OKUMURA leg.; 4 ♂♂, ditto, 28–VII–1996, T. OKUMURA leg.; 1 ♀, Matsushima [松島] near Hiraoka, on the western bank of the Tenryû-gawa River, of Tenryû-mura in Shimo-ina Co., 21–III–2001, K. SHIKATA leg.; 1 ♂, Nakaisamurai [中井侍] of Tenryû-mura in Shimo-ina Co., 6–X–1996, K. SHIKATA leg.; 1 ♀, SSW of the Pass Hyô-koshi [ヒヨ越], 1,140 m alt., of Minami-shinano-mura in Shimo-ina Co.,

14-V-1997, K. SHIKATA leg.; 1♂, 1♀, ditto, 1,100 m alt., 14~16-V-1998, K. SHIKATA leg.; [Shizuoka Pref.] 1♂, southwestern slope of Mt. Narashiro-yama [奈良代山], 1,290 m alt., of Misakubo-chô in Iwata Co., 15~17-VI-1998, K. SHIKATA leg.; 6♀♀, Kon [根], 920 m alt., near Misakubo-ko Lake [水窪湖] of Misakubo-chô in Iwata Co., 15~17-VI-1998, K. SHIKATA leg.; 10♂♂, 14♀♀, ditto, 850 m alt., 22~25-V-1999, K. SHIKATA leg.; 1♂, 6♀♀, near Misakubo Reservoir, 550 m alt., of Misakubo-chô in Iwata Co., 15~17-VI-1998, K. SHIKATA leg.; 3♂♂, 14♀♀, ditto, 530 m alt., 22~25-V-1999, K. SHIKATA leg.; 6♂♂, 26♀♀, Ôno [大野], 670 m alt., of Misakubo-chô in Iwata Co., 22~25-V-1999, K. SHIKATA leg.; 1♀, Shonô [所能], 500 m alt., near Nishiurê [西浦] of Misakubo-chô in Iwata Co., 5~8-VI-1998, K. SHIKATA leg.; 15♂♂, 74♀♀, southwestern slope of Mt. Nakané-yama [中根山], 580 m alt., of Misakubo-chô in Iwata Co., 22~25-V-1999, K. SHIKATA leg.; 3♂♂, 14♀♀, Mukôshima [向島] near Misakubo, 410 m alt., of Misakubo-chô in Iwata Co., 22~25-V-1999, K. SHIKATA leg.; 2♀♀, Ôsato [大里], 470 m alt., near Misakubo of Misakubo-chô in Iwata Co., 15~17-VI-1998, K. SHIKATA leg.; 1♂, 13♀♀, Kuzugô [久頭合], 400 m alt., of Misakubo-chô in Iwata Co., 15~17-VI-1998, K. SHIKATA leg.; 4♂♂, 8♀♀, ditto, 22~25-V-1999, K. SHIKATA leg.; 8♂♂, 4♀♀, western slope of Mt. Gochôzaka-kashira-yama [五丁坂頭山], 1,220 m alt., of Misakubo-chô in Iwata Co., 14~16-V-1998, K. SHIKATA leg.; 4♀♀, ditto, 12-VII-1998, T. Tsuboi leg.; 2♂♂, 9♀♀, Pass Yamazumi-tôgê [山住峠], 1,100 m alt., of Misakubo-chô in Iwata Co., 28-VII~8-VIII-1995, M. Hasegawa leg.; 15♂♂, 10♀♀, ca. 1.5 km to NNE from the Pass Yamazumi-tôgê, 1,150 m alt., of Misakubo-chô in Iwata Co., 14~16-V-1998, K. SHIKATA leg.; 4♂♂, 1♀, ca. 0.5 km to SW from the Pass Yamazumi-tôgê, 1,130 m alt., of Misakubo-chô in Iwata Co., 14~16-V-1998, K. SHIKATA leg.; 6♂♂, 2♀♀, Shironishi [城西] of Sakuma-chô in Iwata Co., 26-VII-1996, T. Okumura leg.; 4♂♂, 3♀♀, Minami-nota [南野田], 640 m alt., on the northeastern slope of the Pass Hôji-tôgê [北条峠], of Sakuma-chô in Iwata Co., 5~8-VI-1998, K. SHIKATA leg.; 4♂♂, 56♀♀, ditto (650 m alt.), 22~25-V-1999, K. SHIKATA leg.; 2♀♀, Pass Hôji-tôgê, 560 m alt., of Sakuma-chô in Iwata Co., 14-V-1997, K. SHIKATA leg.; 9♀♀, Hirasawa [平沢], 180 m alt., near Chûbu-tenryû of Sakuma-chô in Iwata Co., 5~8-VI-1998, K. SHIKATA leg.; preserved in colls. ICM, IM and MZS.

Distribution. Mountainous regions along the middle course of the Tenryû-gawa River and its tributaries.

Notes. This subspecies is considerably variable in shape of the aedeagal apex, above all in the specimens from the southern part of the distributional range (e.g., Misakubo-chô and Sakuma-chô in Shizuoka Prefecture). Some individuals have the aedeagal apex of typical *shikatai*-type, and others with *ojikai*-type, and not a few intermediary occurs between the two extremes, which suggests that the two subspecies may be hybridized in this region.

Derivatio nominis. This new subspecies is named after Mr. Keiichirô SHIKATA of Iida City Museum, who collected the greater part of the type series and kindly submitted them to the first author for study.

5. *Ohomopterus yamato ojikai* subsp. nov.

[Japanese name: Mikawa-yamato-osamushi]

(Figs. 7, 24–27, 40–42, 55–57)

Apotomopterus albrechti yamato: NAKANE, 1953, Scient. Rept. Saikyo Univ., Kyoto, (Nat. Sci. & Liv. Sci.), **1**, p. 96 [*partim*], p. 102, fig. 16, D-k (aedeagus) & D-14 (digitulus).

Apotomopterus japonicus yamato: HOZUMI *et al.*, 1965, Kakôchô, Nagoya, (60), p. 148 [*partim*].

Apotomopterus yamato: ISHIKAWA, 1969, Bull. natn. Sci. Mus., Tokyo, **12**, p. 527, fig. 13 (aedeagus), p. 530, fig. 35 (male right protibia).

Apotomopterus yamato n. “Mikawa”: KOMIYA, 1971, Ins. Mag., Tokyo, (76), p. 56 [*partim*], fig. 8 (aedeagus & outer plate of ligular apophysis).

It was KOMIYA (1971) who discriminated the populations of *yamato* occurring in the Mikawa District (eastern half of Aichi Prefecture in southern Chûbu) from those of the Kinki District (=complex of the nominotypical *yamato* and *kinkimontanus* in the present sense), though he did not properly describe them as a subspecies but only gave the name “n. (=natio) Mikawa”. This is the subspecies most characteristic in the configuration of the aedeagal apex, and readily discriminated from all the other races.

Length: 18.4–23.5 mm (including mandibles). Body above as in the preceding forms, partly greenish in some individuals, but entirely greenish form was not found in the specimens examined in this study. Size the largest on an average of all the known subspecies. Elytra usually a little more elongate, with the secondary and tertiary intervals much less remarkably notched. Apical lobe of aedeagus less strongly arcuate towards apex and less strongly curved at the tip, with the dorsal margin more strongly inflated in lateral view. Digitulus narrow and slender, with the lateral sides nearly parallel-sided and not sharply pointed at the tip in ventral view, its outer margin not strongly subangulate but gently arcuate in lateral view. Inner plate of ligular apophysis subquadrate in dorsal view, with the disc moderately concave.

Type series. Holotype: ♂, above Sugidaira [杉平], 400–500 m alt., of Tsukudémura in Minami-shitara Co., Aichi Pref., central Honshu, Japan, 28–XII–1970, Y. IMURA leg., in coll. NSMT. Paratypes: [Aichi Pref.] 1 ♂, 2 ♀♀, same collecting data as for the holotype; 3 ♂♂, 12 ♀♀, Yasunaga [保永] of Tsukudémura in Minami-shitara Co., 13–VI–30–VII–1996, T. OJIKI leg.; 10 ♂♂, 14 ♀♀, ditto, 8–VI–1997, T. OJIKI leg.; 3 ♂♂, 9 ♀♀, Totsuro [戸津呂] of Tsukudémura in Minami-shitara Co., 14–VI–1997, T. OJIKI leg.; 1 ♂, “Horaiji, Mikawa” (=Hôrai-ji [鳳来寺] Temple or Mt. Hôrai-ji-san of Hôrai-chô in Minami-shitara Co.), 22–V–1947, T. NAKANE leg. (HUMS); 2 ♀♀, Usugo [臼子] in Shinshiro City, 31–VII–1999, T. OJIKI leg.; 3 ♂♂, 6 ♀♀, Mt. Hongû-san [本宮山], 780 m alt., of Nukata-chô in Nukata Co. 16–VI–1995, M. HASEGAWA leg.; 3 ♂♂, 1 ♀, Azô [阿蔵] of Shimoyama-mura in Higashi-kamo Co., 2–VIII–1998, T. OJIKI leg.; 1 ♀, Mt. Iimori-yama [飯盛山], 150 m alt., of Asuké-chô in Higashi-kamo Co., 6–I–1988, S. SHIMIZU leg.; 1 ♀, Mt. Nebiso-daké [寧比曾岳], 1,120 m alt., of Asuké-chô in Higashi-kamo Co., 27–V–1990, S. SHIMIZU leg.; 5 ♂♂, 49 ♀♀, Odo [小渡] of Asahi-chô in Higashi-kamo Co., 26–VII–1998, T. OJIKI leg.; 3 ♂♂, 10 ♀♀, Azakai [浅谷] on the left bank of the Riv. Azuma-gawa of Asahi-chô in Higashi-

kamo Co., 30–VII–1999, T. OJIKAWA leg.; 1 ♂, Pass Mennoki-tôgê [面ノ木峠], ca. 1,200 m alt., of Inabu-chô in Kita-shitara Co., 25–IV–1994, M. HASEGAWA leg.; 1 ♂, 10 ♀♀, Goshogaitsu [御所貝津] of Inabu-chô in Kita-shitara Co., 13–VIII–2000, T. OJIKAWA leg.; 1 ♀, ditto, 19–IX–1999, T. OJIKAWA leg.; 3 ♂♂, 3 ♀♀, Takeshima [竹島] in Daminé [田峯] of Shitara-chô in Kita-shitara Co., 17–X–1999, T. OJIKAWA leg.; 14 ♂♂, 25 ♀♀, near Shingen-kô [信玄坑] at Kanayama [金山] of Tsugu-mura in Kita-shitara Co., 20–VIII–2000, T. OJIKAWA leg.; 2 ♀♀, Pass Tawagané-tôgê [太和金峠], 650 m alt., of Toyoné-mura in Kita-shitara Co., 5~8–VI–1998, K. SHIKATA leg.; 2 ♂♂, 1 ♀, Shimo-kurogawa [下黒川], of Toyoné-mura in Kita-shitara Co., 23–VIII–2000, T. OJIKAWA leg.; 3 ♂♂, 2 ♀♀, Mt. Sanagé-yama [猿投山] in Toyota City, 21–XII–1975, M. HASEGAWA leg.; 2 ♂♂, 2 ♀♀, ditto, 7–I–1994, M. HASEGAWA leg.; 3 ♀♀, ditto, 4–VIII–1996, T. OJIKAWA leg.; 1 ♂, 2 ♀♀, ditto, 23–VIII–1997, M. NONAKA leg.; 1 ♂, between Hazama-chô [巡間町] and Kamiyamaji-chô [上山路町], 200–380 m alt., at the western foot of Mt. Sanagé-yama in Seto City, 24–XI–1988, S. SHIMIZU leg.; 1 ♂, north of Aichi Institute of Technology [愛知工業大学] of Hirokuté-chô in Seto City, 30–VII–1996, T. OJIKAWA leg.; 1 ♀, near Shinodai-ké Lake [篠田池] of Kaisho-chô in Seto City, 5–VIII–1997, Saori & Satoshi OJIKAWA leg.; 1 ♂, south of Shinodai-ké Lake, 200 m alt., of Kaisho-chô in Seto City, 20–XII–1997, S. SHIMIZU leg.; [Gifu Pref.] 2 ♂♂, 1 ♀, Noshi [野志] on the southwestern slope of the Pass Noshi-tôgê, 540–580 m alt., of Akechi-chô in Ena Co., 20–I–1996, S. SHIMIZU leg.; 1 ♀, southeast of the Jurô-no-taki [寿老滝] Falls, 550 m alt., Shimo-tôgê [下手向] of Yamaoka-chô in Ena Co., 28–II–1998, S. SHIMIZU leg.; 8 ♂♂, 25 ♀♀, the ruins of Iwamura Castle [岩村城址], 700 m alt., of Iwamura-chô in Ena Co., 7~11–VII–1988, S. SHIMIZU leg.; [Nagano Pref.] 2 ♀♀, Iya [伊谷], 850 m alt., of Kiso-fukushima-machi in Kiso Co., 19–IX–1996, T. KISHIMOTO leg.; 1 ♀, Tono [殿] of Ôkuwamura in Kiso Co., 18–IX–1996, T. KISHIMOTO leg.; preserved in colls. TMNH, T. OJIKAWA, IM and MZS.

Distribution. The Mikawa District and the middle to upper parts of the Kiso-dani Valley.

Notes. The present new subspecies is most peculiar in the configuration of the genitalia of both sexes, and readily discriminated from all the other races. As shown in Figs. 7 and 24–27, the aedeagal apex of *ojikai* is less remarkably bent ventrad on the ventral side but conspicuously inflated on the dorsal side. This trend becomes more remarkable in the specimens from the westernmost area (*e.g.*, Sanagé-yama, Seto City, etc.), where most specimens bear subtriangularly protruded dorsal margin of the aedeagal apex (Fig. 26). In the population from the Kiso-dani, this trend may become rather unclear (*cf.* ISHIKAWA, 1969, p. 527, fig. 13), though we failed to see any male specimens from the upper part of the same valley. In Toyoné-mura and Tsugu-mura, representing the easternmost distributional range of the subspecies, the aedeagal apical lobe is variable according to individuals, suggesting that these area may be the transitional or hybrid zone between *ojikai* and *shikatai*.

Derivatio nominis. This new subspecies is named after Mr. Tôru OJIKAWA (Anjô) who is a member of the Mikawa Insects Association and an enthusiastic amateur ento-

mologist.

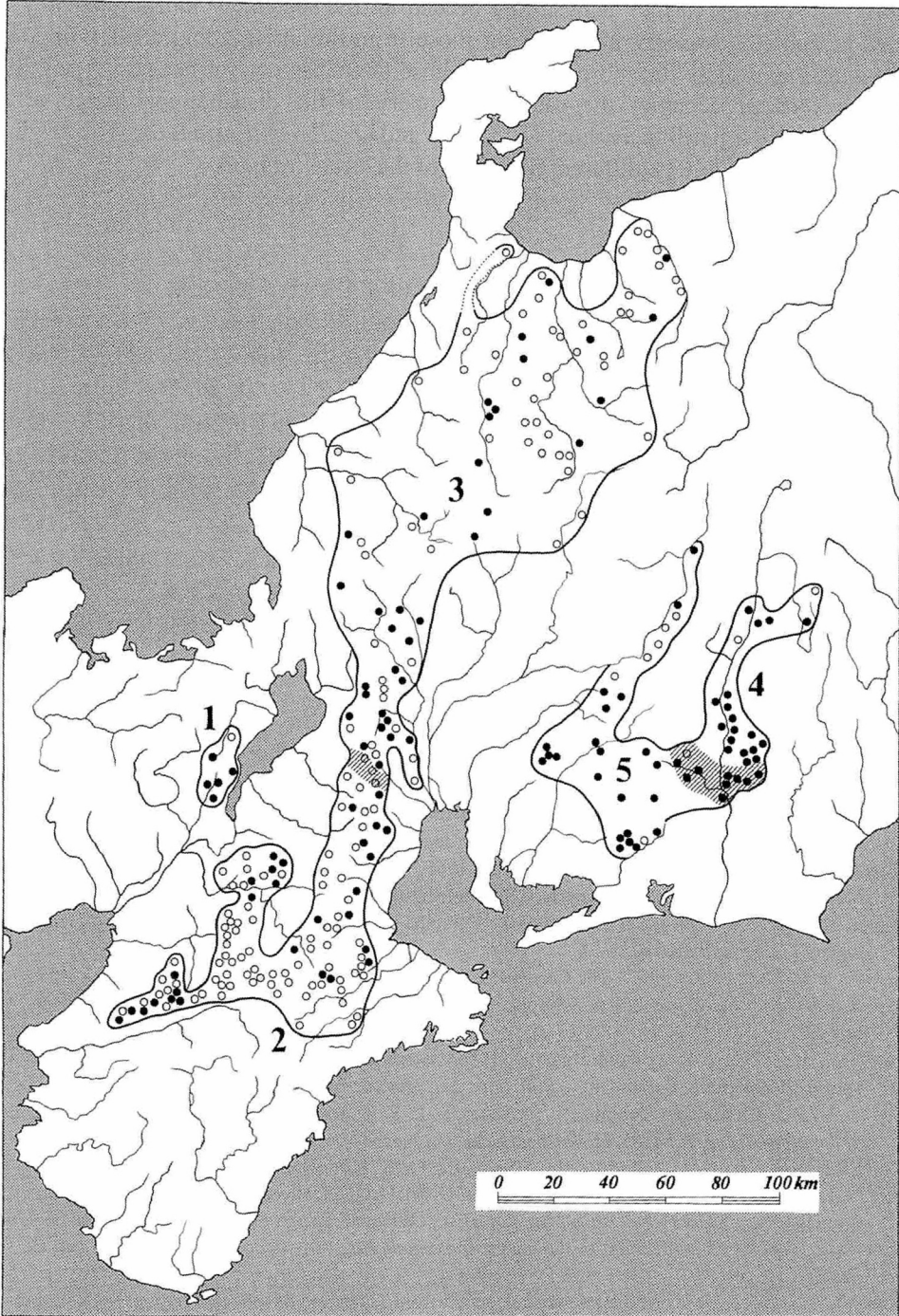
Discussion

Viewed from the pattern of distribution, *Ohomopterus yamato* is clearly divided into two groups. One is composed of the three subspecies, *yamato*, *kinkimontanus* and *takanonis*, which widely occupy the western part of the distributional range of the species. The other contains the remaining two subspecies, *shikatai* and *ojikai*, which are more narrowly distributed in the southeastern part. The two groups are clearly separated from each other by a distributional blank obliquely stretching from northeast to southwest, represented respectively by the Hida Mountains and the Nôbi-heiya Plains.

In contrast, morphologically defined *yamato* cannot be united into a monophyletic series but split into two different lineages according to the molecular phyloanalysis by using mitochondrial ND5 and COI gene sequences (SU *et al.*, 1996; OYAMA *et al.*, 2000; OSAWA *et al.*, 2002). One is composed solely of *yamato* from several spots in the Kinki and Mikawa Districts (complex of subspp. *yamato*, *kinkimontanus* and *ojikai* in the present sense). All the five examples from the Kinki District (containing both nominotypical *yamato* and *kinkimontanus*) seem very homogeneous in the sequences, while the branching point between the Kinki complex and the Mikawa population is considerably deep. On the other hand, those distributed in northwestern Chûbu (referable to subsp. *takanonis* in the present sense) appear in another cluster intermingled with several races of *O. albrechti* distributed along the Japan Sea side of northern Honshu (OSAWA *et al.*, 2002, p. 164, fig. 8-8 & p. 166, fig. 8-9). Thus, as observed in many other groups belonging to *Ohomopterus*, morphology does not run parallel with molecular phylogeny.

So far as judging from the molecular genealogical tree, it is highly plausible that subsp. *ojikai*, which is the most peculiar of all the known races, has been derived from a common ancestor of the two subspecies distributed in the Kinki District. Since the branching point between the *yamato*–*kinkimontanus* complex and *ojikai* is rather deep, the time of differentiation between these two is assumed to be old, maybe much before the formation of Isé-wan Bay and the Nôbi-heiya Plains. The problem is that what we call *takanonis* might be phylogenetically different from the above three races, though it is doubtless conspecific with *yamato* in view of morphology, and besides, its range seems to be contiguous with that of *kinkimontanus*. For this population, OSAWA *et al.* (2002, p. 167) suggested the possibility of hybridization between *yamato* and

Fig. 58. Map showing the distribution of *Ohomopterus yamato* in west-central Honshu, Central Japan. — 1, Subsp. *yamato*; 2, subsp. *kinkimontanus*; 3, subsp. *takanonis*; 4, subsp. *shikatai*, 5, subsp. *ojikai*. — Closed circles indicate the collecting sites of the specimens examined in this study; open circles indicate those recorded by previous authors (HOZUMI *et al.*, 1965; KOMIYA, 1971; Kinki Research Group of Carabid Beetles, 1979; TANAKA, 1979; SASAJI & SAITO, 1985; TOGASHI *et al.*, 1990; TAKAMI & ISHIKAWA, 1997; TOMINAGA, 1982, 2000; TAKANO, 2002, pers. comm.; etc.). Obliquely hatched areas show intervening zone between subspecies.



albrechti. Anyway, further analyses are needed for the specimens morphologically defined as subsp. *takanonis*, above all for those from the intergrading areas with *kinki-montanus*, as well as for subsp. *shikatai* whose DNA has not yet been analysed. Subspecies *shikatai* occupies the eastern periphery of the distributional range of the species, where it partly neighbors *O. kimurai* and *O. albrechti okumurai*. The origin of *shikatai* may possibly be different from that of the “true” *yamato*.

要 約

井村有希・水沢清行：ヤマトオサムシの後基準標本指定と4新亜種の記載。—— ヤマトオサムシは近畿地方中部から中部地方西部にかけての基盤山地に分布するオオオサムシ属の1種だが、その地理的変異に関する検討はこれまで不十分であった。本論文では、北海道大学博物館に保管されている故中根猛彦コレクションにあるヤマトオサムシの総基準標本の中から、京都府比叡山産の♂を本種の後基準標本に指定し、京都府東部から滋賀県西部にかけての琵琶湖南西方山地に孤立分布する集団を基亜種と定義したうえで、1)同地以外の近畿地方中東部、2)北陸地方、飛騨高地から伊吹・養老山地を経て鈴鹿山脈北端、3)下伊那地方を中心とする天竜川中流域、4)三河地方から木曾谷、に産するよっつの集団を新亜種と認め、それぞれに1) *kinki-montanus* (ミナミヤマトオサムシ)、2) *takanonis* (キタヤマトオサムシ)、3) *shikatai* (シモイナヤマトオサムシ)、4) *ojikai* (ミカワヤマトオサムシ) という名を与えて記載した。最後に、これら5亜種の形態・分布と分子系統学的研究から得られている結果とを対比して、本種の成りたちに関する若干の考察を加えた。

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