

Dung Beetles (Coleoptera, Scarabaeidae) of Thailand

Part 2, Genus *Onitis*

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Abstract In the second part of the present study on the Thai dung beetles, the genus *Onitis* is taken up. Eight species are identified from Thailand, a species of them being newly recorded. Besides, two synonyms are proposed: *Onitis kiuchii* MASUMOTO, syn. nov. (= *O. falcatus* (WULFEN)), and *O. Chiangmaiensis* MASUMOTO, syn. nov. (= *O. excavatus* (ARROW)). A key to all the species distributed in Thailand and explanatory photographs are also provided.

This is the second part of the study on the dung beetles from Thailand and deals with the genus *Onitis*.

According to CAMBEFORT (1988), 124 species of the genus are known from Africa and Asia, and 24 species are distributed in Asia. PAULIAN (1945) mentioned “Siam” as one of the distributional areas of *Onitis virens* LANSBERGE, 1875, and BALTHASAR (1963) also mentioned this area as that of *Onitis subopacus* ARROW, 1931. MASUMOTO (1987) recorded three *Onitis* species, *O. niger* LANSBERGE, 1875, *O. falcatus* (WULFEN, 1786), and *O. subopacus* ARROW, 1931, and he (1988) also recorded *Onitis feae* FELSCHE, 1907, each from North Thailand. Later, he (1996) described two species, *O. kiuchii* and *O. Chiangmaiensis* from the same area. Recently, HANBOONSONG *et al.* (1999) recorded three known species, *O. bordati* CAMBEFORT, 1988, *O. excavatus* ARROW, 1931, and *O. virens* LANSBERGE, 1875, and 3 undetermined species from Northeast Thailand.

LANSBERGE (1875) published the “Monograph des Onitides”, and JANSSENS (1937) also published the “Revision des Onitides”. Both are useful for determining the onitid beetles, but difficulty still remains for identifying some species, which are widespread in East Asia and show local and individual variations.

The present authors have re-examined all the Thai materials, more than 3,000 specimens in total, in the collections of Khon Kaen University, the Insect Museum at the Department of Agriculture, Bangkok, and the MASUMOTO collection at Yokohama, and the result obtained will be enumerated in the present paper. The species to be newly recorded from Thailand is indicated with an asterisk.

Before going into further details, the authors would like to acknowledge the grant received from the Thailand Biodiversity Research and Training Programme. They also thank Dr. Angoon LEWVANICH in the Insect Museum at the Department of Agriculture, Bangkok, for arranging access to the collection of dung beetles and for using facilities. Deep indebtedness should be expressed to Mr. Malcolm KERLEY, the Natural History Museum, London, for loaning the type specimen. They also thank Dr. Yves CAMBEFORT, Muséum National d'Histoire Naturelle, Paris, for permission to examine the type specimens under his care. Appreciation should be expressed to Dr. Makoto KIUCHI, National Institute of Sericultural and Entomological Science, for taking many excellent photographs inserted in this part and giving them invaluable advice, and also to Mr. Teruo OCHI, Osaka Prefecture, and Dr. Rowan M. EMBERSON, Lincoln University, New Zealand, for giving them useful comment concerning the Asian *Onitis* species.

Systematic Position of the Genus *Onitis*

ARROW (1931) placed the genus *Onitis* FABRICIUS in the tribe Coprini of the subfamily Coprinae. PAULIAN (1945) regarded this genus as a member of the tribe Coprini of the subfamily Scarabaeinae. BALTHASAR (1963) treated this genus as a member of the tribe Onitini in the subfamily Coprinae. OCHI, KON and KIKUTA (1996) placed this genus in the Onitini of the subfamily Coprinae.

Genus *Onitis* FABRICIUS, 1798

Onitis FABRICIUS, 1798, Ent. Syst., Suppl., 2. Type species: *Scarabaeus inuus* FABRICIUS.

General features. Body rather oblong; mostly moderately convex; medium-sized for the members of the tribe; dorsal surface glabrous.

Head not very broad; clypeus with margin rounded or a little excised at the middle; genae united by carinate sutures with clypeus. Antennae 9-segmented, all the segments except the basal one very short, club compact with the first segment cup-shaped, smooth and chitinous, enclosing the succeeding segment, which is spongy in texture together with the terminal one.

Pronotum without process or excavation; base a little prominent at the middle, usually without complete margin, but with a pit or impression on each side near the middle. Scutellum visible but minute.

Elytra 10-striated, though the 8th to 9th striae are not clear in some species, with a strongly raised carina continuous to the 8th stria; epipleura simple and narrow, the delimiting carinae very strongly marked and rather straight.

Procoxae very prominent; mesocoxae long, parallel and far apart. Abdomen completely covered with elytra, with a continuous carina around the sides and pygidium.

Except for front ones in male, legs stout and not long; protibiae with four external teeth; meso- and metatibiae strongly dilated at each apex; protarsi absent; meso- and metatarsi with progressively diminishing segments, the basal ones more than twice as long as 2nd.

Male. Front legs more or less elongate; pro-, meso- and metafemora, or some of them, mostly toothed at the edge, or metatrochanters spinose; protibiae generally slender and strongly curved apicad, without articulated terminal spur, but with the tip produced into a finger-like process, the external teeth feebler than those in female, and sometimes with one or more teeth on ventral face; mesotibia mostly with an angular projection at inner edge a little beyond the base.

Female. Head sometimes with a frontal tubercle or short horn, absent or feebler than in male. Protibia always broad, with strong teeth, provided with an articulated terminal spur. In some species, 6th abdominal sternite with a line of haired punctures, or in some others with a bristle bundle at the middle.

Notes. The members of this genus possess various peculiar features. The most important ones might be the absence of protarsi, combined with short, dilated metatibiae, the basal impressions of the pronotum, visible scutellum, and strong single lateral carina of the elytron.

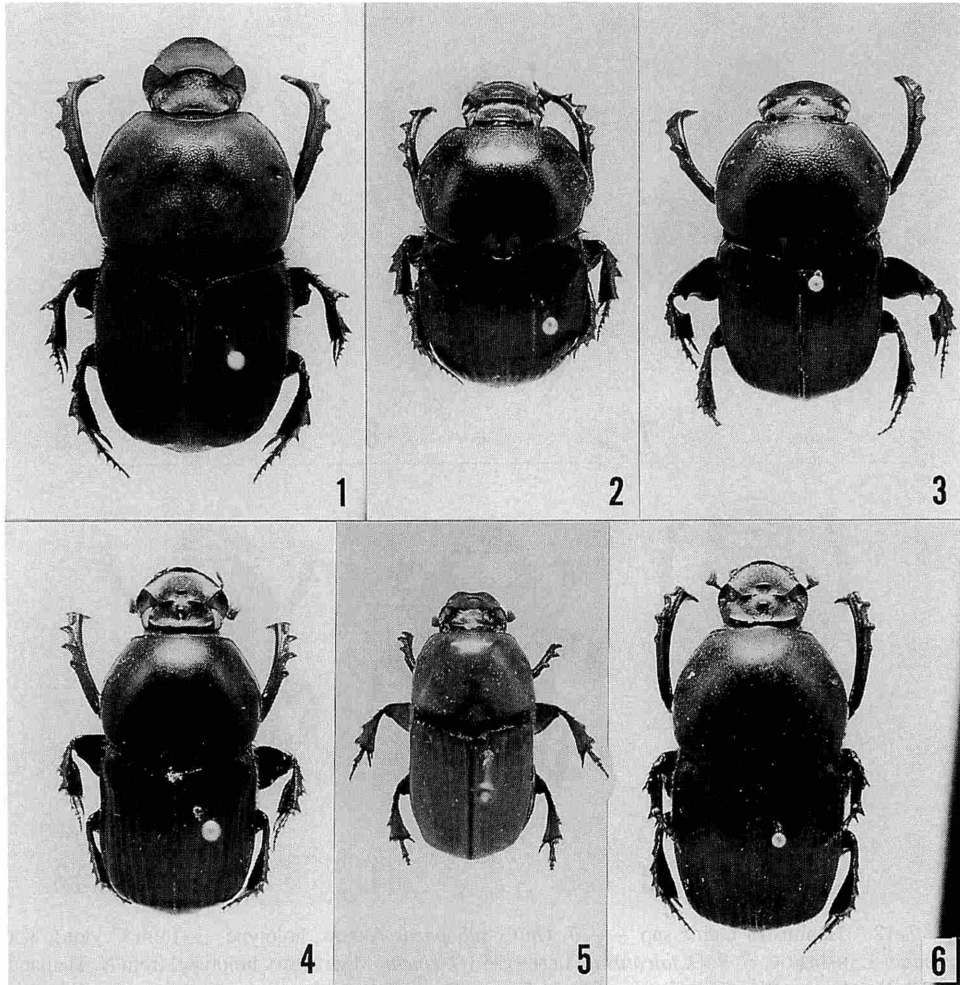
The male usually exhibits curious modifications of the legs. In some species, the pronotum in both sexes with the base margined between basal impressions. Also in some ones, development of the head armature in female is more conspicuous than in male. Carinae and tubercles on head are useful for identifying species, while the male genitalia are not so distinguishable characteristics in some species.

Distribution. Ethiopian, Palearctic and Oriental Regions.

Key to the Species of the Genus *Onitis* from Thailand

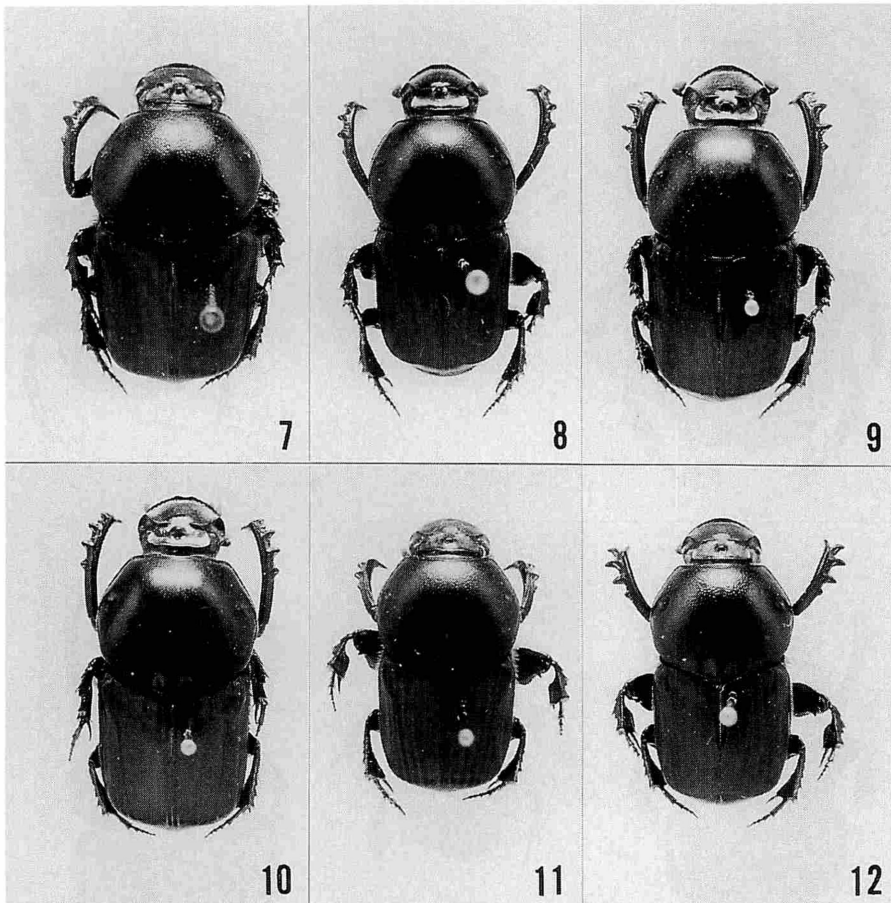
- 1 (2) Pronotum covered with elongated imbricate granules; clypeus noticeably produced apicad in female, without a transverse carina in both sexes; frontal carina entire and arcuate, basal carina entire and bilobed with a distinct tubercle at the middle in female, interrupted on each side in male; pronotum with base margined between basal impressions; 30–32 mm; N. Vietnam, Thailand (Figs. 1, 13, 22, 34, 46). *O. bordati* CAMBEFORT.
- 2 (1) Pronotum not granulate but smooth or punctate; clypeus moderately produced apicad.
- 3 (4) Pygidium noticeably haired; body rather rounded; frontal carina entire with a short carina anteriorly; basal carina almost entire with a short carina immediately before it; pronotum rather closely punctate, with base almost completely bordered; elytra shallowly striate; intervals very weakly convex, finely punctate; male profemur with a sharp tooth near base; male protibia

- prolonged apicad, ventral surface with a distinct tooth at basal 1/3, and also with small teeth in basal half; male mesocoxa with a distinct tooth; 19–21 mm; Laos, Myanmar, Thailand (Figs. 2, 14, 23, 35, 47) . . . *O. feae* FELSCHÉ.
- 4 (3) Pygidium not haired; body more or less elongate; frontal carina interrupted in middle.
- 5 (8) Pronotal base margined between basal impressions.
- 6 (7) Pronotum strongly, rather closely punctate; frons with a subconical tubercle; elytra more clearly striate; intervals somewhat coriaceous, microscopically punctate; male protibia slenderer, with inner side of apex remarkably projected, ventral surface weakly crenulate in basal half; male mesofemur with a sharper tooth on posterior edge near apex; dorsal surface dark greenish; 18–23 mm; India, Myanmar, Thailand, Laos, N. Vietnam, S. China (Figs. 3, 15, 24, 36, 48) *O. virens* LANSBERGE.
- 7 (6) Pronotum very finely, sparsely punctate; frons with a slightly transverse tubercle; elytra less clearly striate; intervals alutaceous, almost impunctate except for the 1st ones; male protibia less slender, with apical part somewhat obliquely truncate and weakly produced, inner side of apex just finely pointed, ventral surface irregularly toothed in basal half; male mesofemur with a less sharp tooth on posterior edge near apex; 6th abdominal sternite in female with a row of haired punctures; dorsal surface brownish black; 18–24 mm; India, Myanmar, Thailand, Indochina, Philippines (Figs. 4, 9–10, 16, 25–26, 37–38, 49–50) *O. falcatus* (WULFEN).
- 8 (5) Pronotal base not margined between basal impressions.
- 9(10) Head truncate and feebly bilobed at apex; frontal and basal carinae interrupted in middle; head almost smooth; pronotum closely punctate in medio-posterior part; elytra clearly striate; intervals weakly convex, coriaceous, scattered with microscopic punctures; metasternum without hairs; male metafemur with a small tooth at apical 2/3 on posterior edge; body brownish yellow, partly darker in colour, with feeble greenish or coppery lustre in posterior part of head and areas along elytral suture; 14–15.5 mm; Indochina, Thailand, Malay Peninsula, Sunda Is., New Guinea (Fig. 5)
. *O. corydon* BOISDUVAL.
- 10 (9) Head not truncate, mostly gently produced forwards; basal carina not widely interrupted in middle; body mostly blackish.
- 11(12) Male metasternum strongly convex in middle, with a transverse impression at posterior 2/5; clypeus scarcely incised at apex; frons with a very short, transverse tubercle at anterior 2/5 of the area surrounded by frontal and basal carinae; pronotum sparsely punctate, with area between basal impressions rather remarkably punctate; elytra clearly but shallowly striate; intervals coriaceous, the odd ones weakly convex and scattered with microscopic punctures; 6th abdominal sternite in female with a line of bristles in middle; male metatrochanter sharply toothed; 23–27 mm; N. India, Myanmar, Thai-



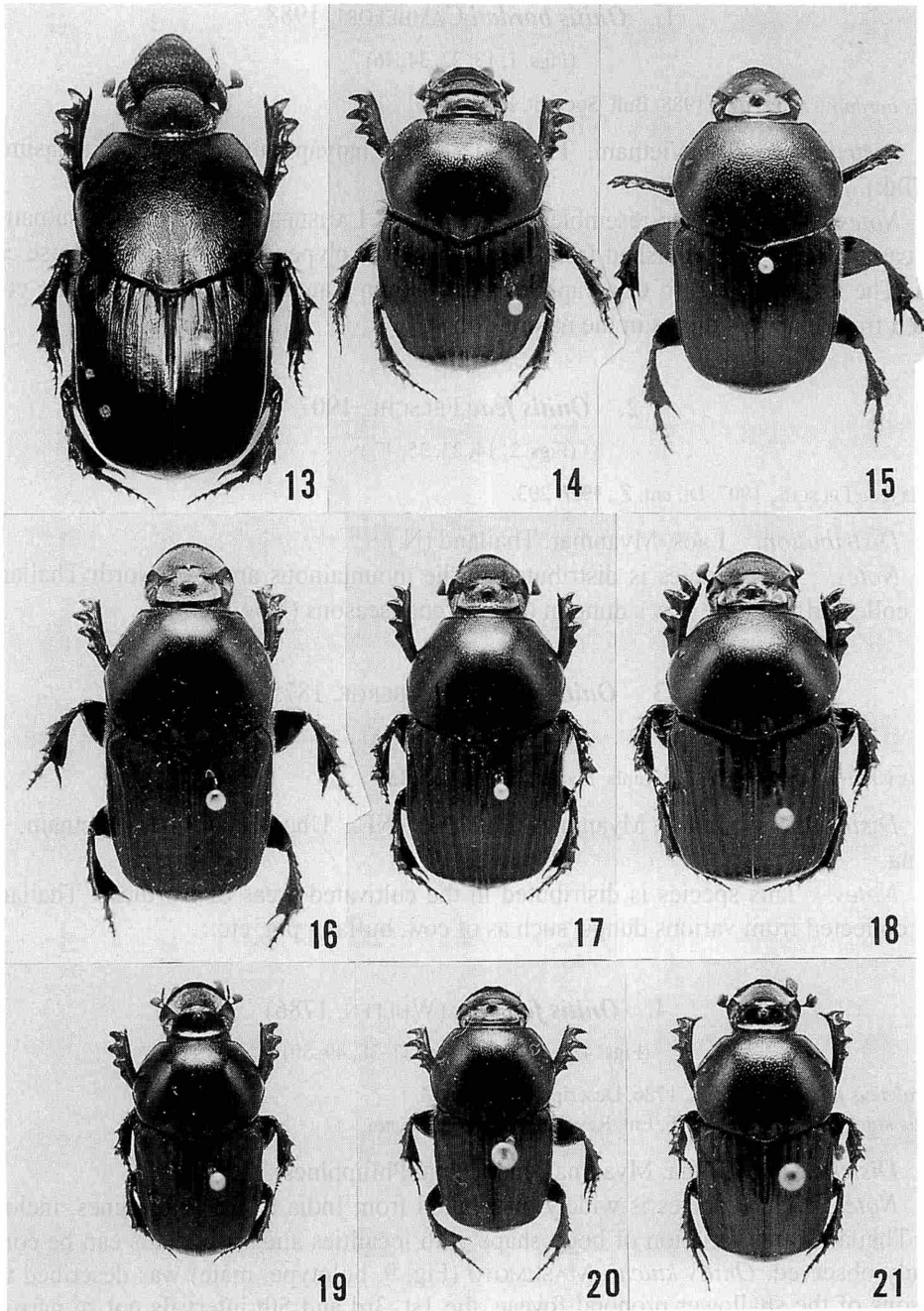
Figs. 1-6. Habitus of *Onitis* spp. — 1, *Onitis bordati* CAMBEFORT, ♂; 2, *O. feae* FELSCHÉ, ♂; 3, *O. virens* LANSBERGE, ♂; 4, *O. falcatus* (WULFEN), ♂ (from N. India); 5, *O. corydon* BOISDUVAL, ♀; 6, *O. excavatus* ARROW, ♂ (*O. Chiangmaiensis* MASUMOTO, holotype).

- land, China (Figs. 6, 17, 27, 39, 51, 57) *O. excavatus* ARROW.
- 12(11) Metasternum in male neither convex nor excavated in middle.
- 13(14) Male protibia less elongate, with outer side of apex noticeably lobed; frons with a somewhat transverse tubercle at the middle between frontal and basal carinae; male mesofemur with a slightly hooked lobe near the middle of posterior edge, and also with a slightly hooked lobe near apex; 6th abdominal sternite with a line of haired punctures; dorsal surface more or less with coppery tinge; 16-22 mm; India, Afghanistan, Kashmir, Nepal, Sri Lanka, Malay Peninsula, Myanmar, Thailand, S. China, Sunda Is. (Figs. 7, 11-12,



Figs. 7–12. Habitus of *Onitis* spp. — 7, *Onitis subopacus* ARROW, holotype, ♂ (from Ceylon); 8, *O. niger* LANSBERGE, ♂; 9, *O. falcatus* (WULFEN), ♂ (*O. kiuchii* MASUMOTO, holotype, from N. Thailand); 10, *O. falcatus* (WULFEN), ♂ (from Chiang Rai, N. Thailand); 11, *O. subopacus* ARROW, ♂ (from Khon Kaen, NE. Thailand); 12, *O. subopacus* ARROW, ♂ (from Roi Et, NE. Thailand).

- 18, 20, 28–31, 40–43, 52–54) *O. subopacus* ARROW.
 14(13) Male protibia more elongate, with outer side of apex obliquely truncate; frons with a subconical tubercle located just behind interruption of frontal carina; male mesofemur with a tooth at apex of lower side; male metafemur with a coarse longitudinal ridge on ventral surface but without angle on posterior edge; dorsal surface blackish and without coppery tinge; 13–18 mm; N. & C. Vietnam, Thailand, Java (Figs. 8, 19, 33, 45, 56) . . . *O. niger* LANSBERGE.



Figs. 13–21. Habitus of *Onitis* spp. — 13, *Onitis bordati* CAMBEFORT, ♀; 14, *O. feae* FELSCH, ♀; 15, *O. virens* LANSBERGE, ♀; 16, *O. falcatus* (WULFEN), ♀ (from N. Thailand); 17, *O. excavatus* ARROW, ♀ (*O. Chiangmaiensis* MASUMOTO, paratype); 18, *Onitis subopacus* ARROW, ♀ (from N. Thailand); 19, *O. niger* LANSBERGE, ♀; 20, *O. subopacus* ARROW, ♀ (from Khon Kaen, NE. Thailand); 21, *O. philemon* FABRICIUS, ♀ (from India).

1. *Onitis bordati* CAMBEFORT, 1988

(Figs. 1, 13, 22, 34, 46)

Onitis bordati CAMBEFORT, 1988, Bull. Soc. ent. Fr., **92**: 5–6.

Distribution. N. Vietnam, Thailand (NE.: Chaiyaphum, Nakhon Ratchasima; N.: Tak).

Notes. This species resembles *Onitis hageni* LANSBERGE, 1886, from Sumatra, but can be easily distinguished from the latter by the clypeus without a transverse carina. The specimens from Chaiyaphum and Nakhon Ratchasima Provinces were collected from elephant dungs in the natural forest.

2. *Onitis feae* FELSCHE, 1907

(Figs. 2, 14, 23, 35, 47)

Onitis feae FELSCHE, 1907, Dt. ent. Z., **1907**: 293.

Distribution. Laos, Myanmar, Thailand (N.).

Notes. This species is distributed in the mountainous areas of North Thailand and collected from the cow's dung in dry and cool seasons (Nov.–Feb.).

3. *Onitis virens* LANSBERGE, 1875

(Figs. 3, 15, 24, 36, 48)

Onitis virens LANSBERGE, 1875, Annl. Soc. ent. Belg., **13**: 135.

Distribution. India, Myanmar, Thailand (NE.: Ubon), Laos, N. Vietnam, S. China.

Notes. This species is distributed in the cultivated areas of Northeast Thailand and collected from various dungs, such as of cow, buffalo, pig, etc.

4. *Onitis falcatus* (WULFEN, 1786)

(Figs. 4, 9–10, 16, 25–26, 37–38, 49–50)

Scarabaeus falcatus WULFEN, 1786, Descript. Cap. Ins., 14.*Onitis kiuchii* MASUMOTO, 1996, Ent. Rev. Japan, **50**: 88. *Syn. nov.*

Distribution. India, Myanmar, Indochina, Philippines, Thailand.

Notes. This species is widely distributed from India to the Philippines, including Thailand, and variation of body shape with localities and individuals can be commonly observed. *Onitis kiuchii* MASUMOTO (Fig. 9, holotype, male) was described for reasons of the shallower pronotal foveae, the 1st, 3rd and 5th intervals not so narrow, and the apex of protibia feebly produced forwards, etc., which might be the characteristics distinguishing Thai specimens from northern Indian ones. On the occasion of this study, the authors have re-examined Thai specimens and have come to the conclu-

sion that they should be a junior synonym of *O. falcatus*, since those character states are included in local and individual variations.

This species was collected from dungs of cow, elephant, etc., both in cultivated and forested areas.

5. *Onitis corydon* BOISDUVAL, 1835

(Fig. 5)

Onitis corydon BOISDUVAL, 1835, Voyage Astrolabe, Ent., 2: 154.

Distribution. Indochina, Thailand* (N.: Phrae Prov., NE.: Chaiyaphum, C.: Chantaburi, Bangkok, Kanchanaburi), Malay Peninsula, Sunda Is., New Guinea.

Notes. This species is widely distributed from Laos through the Malay Peninsula and the Sunda Islands to New Guinea. It is easy to identify this species because the body coloration is very distinct brownish yellow. The specimens were collected from cow and buffalo dungs.

6. *Onitis excavatus* ARROW, 1931

(Figs. 6, 17, 27, 39, 51, 57)

Onitis excavatus ARROW, 1931, Fn. Brit. Ind., Lamellicornia 3, London, 391.

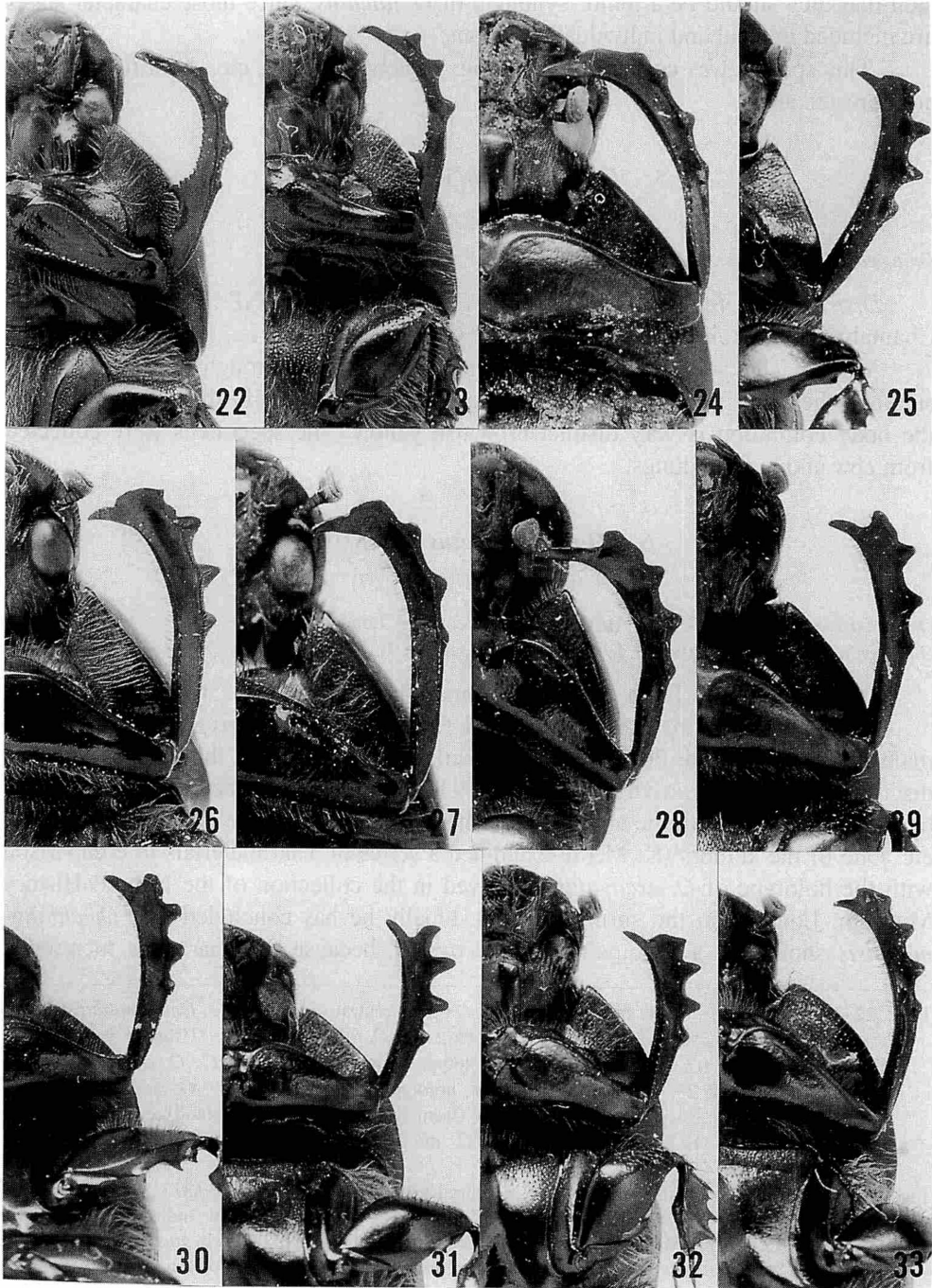
Onitis Chiangmaiensis MASUMOTO, 1996, Ent. Rev. Japan, 50: 91. *Syn. nov.*

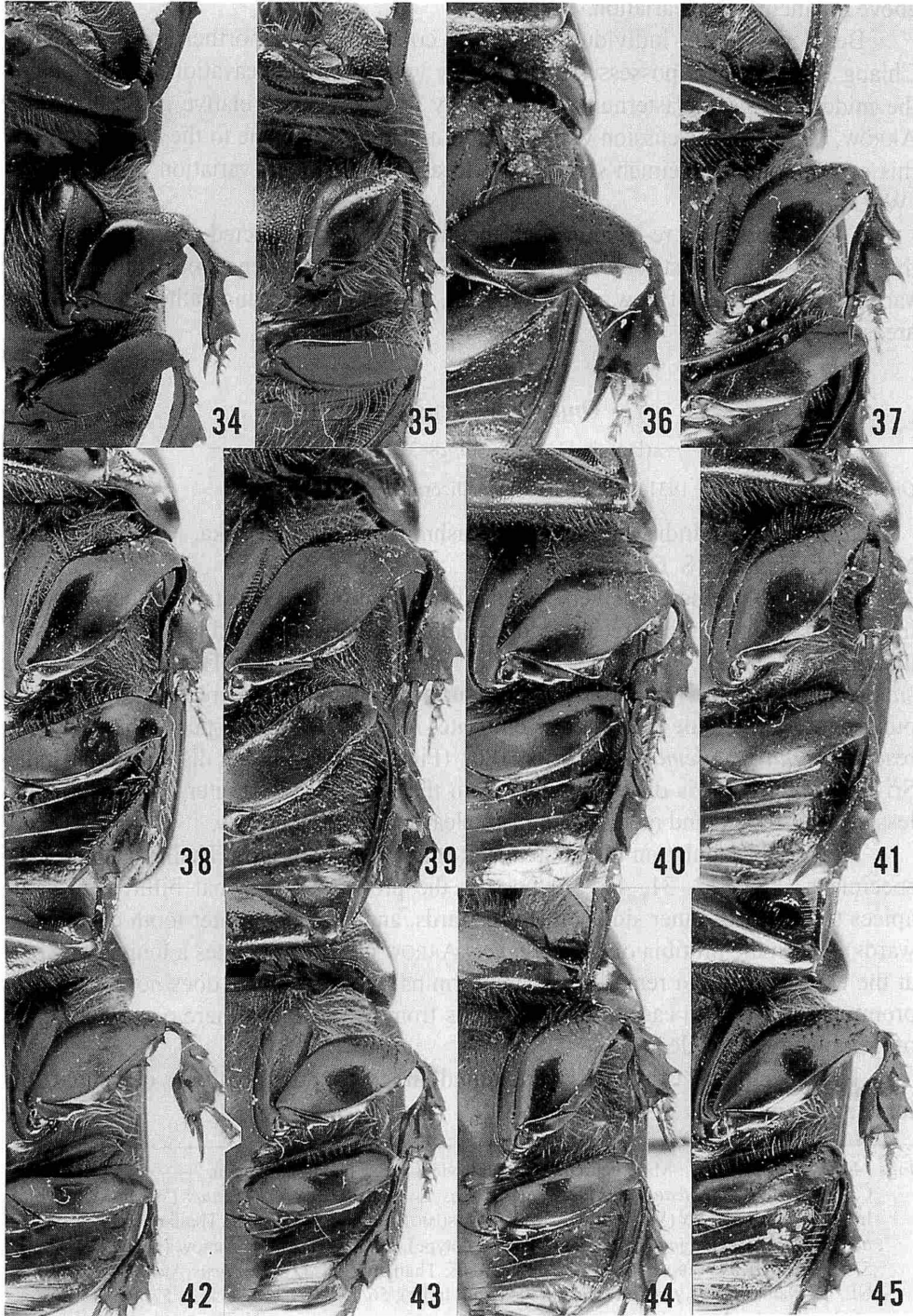
Distribution. N. India, Myanmar, China, Thailand (N. & NE.).

Notes. MASUMOTO (1996) described *Onitis Chiangmaiensis* (Fig. 6, holotype, male) from Chiang Mai Province, North Thailand, and stated that this species could be discriminated from *O. excavatus* ARROW, 1931, originally described from Tenasserim, by the larger body with the area between the two pronotal foveae noticeably punctate, etc. One of the authors (K. M.) re-examined a series of Thai materials in comparison with the holotype of *O. excavatus* preserved in the collection of the Natural History Museum, London, in the spring of 1999. Finally he has concluded that *O. Chiangmaiensis* should be a synonym of *O. excavatus*, because the characters mentioned

Figs. 22–33 (on p. 110). Male front legs of *Onitis* spp. in ventral view. — 22, *Onitis bordati* CAMBEFORT; 23, *O. feae* FELSCHE; 24, *O. virens* LANSBERGE; 25, *O. falcatus* (WULFEN) (from N. India); 26, *O. falcatus* (WULFEN) (*O. kiuchii* MASUMOTO, holotype, from N. Thailand); 27, *O. excavatus* ARROW (from N. Thailand); 28, *O. subopacus* ARROW, holotype (from Ceylon); 29, *O. subopacus* ARROW (from N. Thailand); 30, *O. subopacus* ARROW (from Khon Kaen, NE. Thailand); 31, *O. subopacus* ARROW (from Roi Et, NE. Thailand); 32, *O. philemon* FABRICIUS (from India); 33, *O. niger* LANSBERGE.

Figs. 34–45 (on p. 111). Male middle legs in ventral view. — 34, *Onitis bordati* CAMBEFORT; 35, *O. feae* FELSCHE; 36, *O. virens* LANSBERGE; 37, *O. falcatus* (WULFEN) (from N. India); 38, *O. falcatus* (WULFEN) (*O. kiuchii* MASUMOTO, holotype, from N. Thailand); 39, *O. excavatus* ARROW (from N. Thailand); 40, *O. subopacus* ARROW, holotype (from Ceylon); 41, *O. subopacus* ARROW (from N. Thailand); 42, *O. subopacus* ARROW (from Khon Kaen, NE. Thailand); 43, *O. subopacus* ARROW (from Roi Et, NE. Thailand); 44, *O. philemon* FABRICIUS (from India); 45, *O. niger* LANSBERGE.





above are included in variation.

Besides, a male individual (Fig. 10) collected from northernmost Thailand, Chiang Rai Province, possesses a large body with a round excavation slightly behind the middle of the metasternum. Superficially it looks like a relative of *O. excavatus* ARROW, but after a discussion with M. KIUCHI, the authors came to the conclusion that this problematical specimen should be a local (or individual) variation of *O. falcatus* (WULFEN).

The authors have re-examined all the materials they collected and confirmed that this species is also distributed in NE. Thailand. The specimens were collected from various dungs, e.g., of cow, elephant, gaur, in the forested and rather mountainous areas.

7. *Onitis subopacus* ARROW, 1931

(Figs. 7, 11–12, 18, 20, 28–31, 40–43, 52–54)

Onitis subopacus ARROW, 1931, Fn. Brit. Ind., Lamellicornia 3, London, 395.

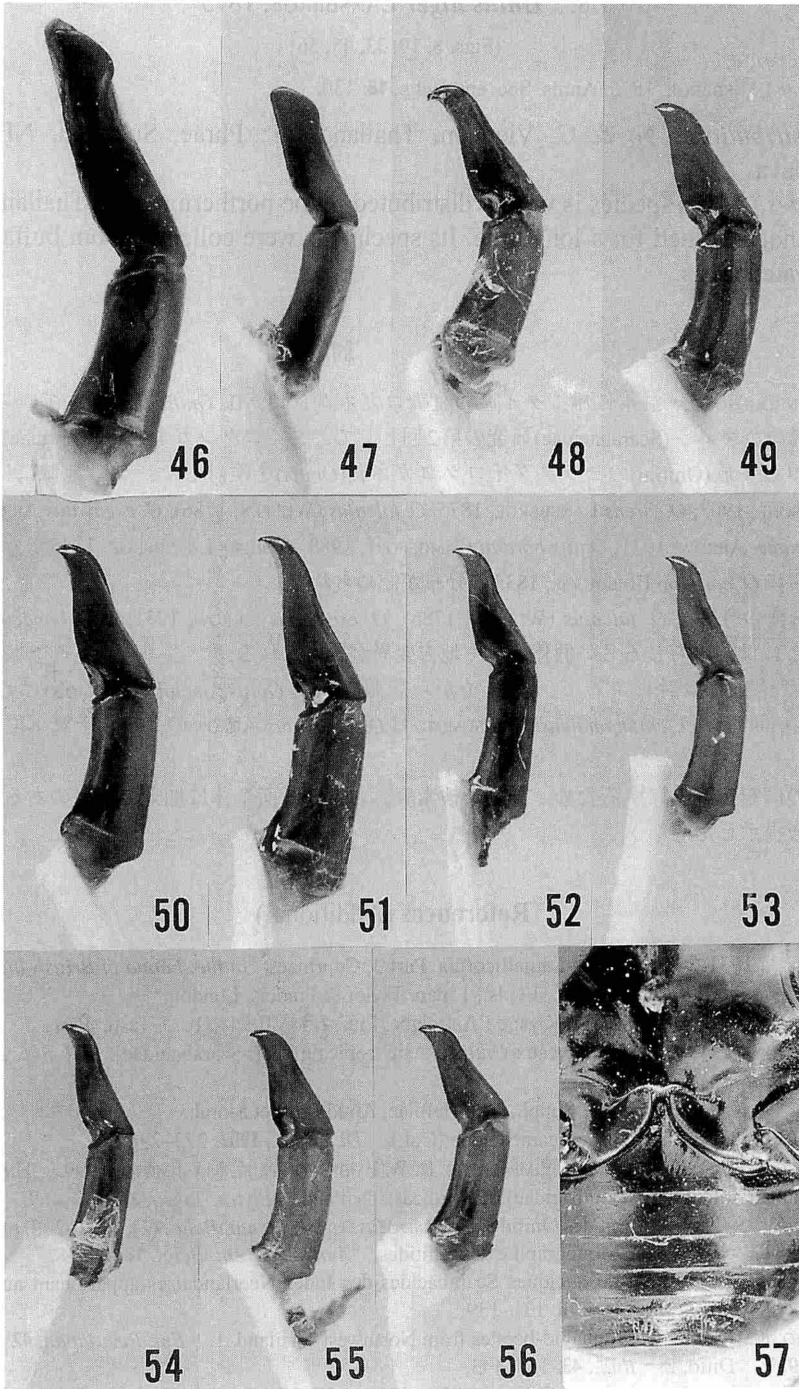
Distribution. India, Afghanistan, Kashmir, Nepal, Sri Lanka, Malay Peninsula, Myanmar, Thailand, S. China, Sunda Is.

Notes. This species is very widely distributed in the Oriental Region. Variation in body shape is distinctly recognized according to individuals and localities. In a population (Figs. 11, 20, 30, 42, 53) from the Khon Kaen area, NE. Thailand, the body is smaller (17–18 mm), with the pronotal surface roughly sculptured and less clearly punctate, and the male protibia less elongate. At a glance, these specimens somewhat resemble *Onitis philemon* FABRICIUS, 1801 (Figs. 21, 32, 44, 55) distributed in India, Sri Lanka, etc., but is distinguishable from the latter by the stouter body with elytra less clearly striated and metasternum less clearly grooved medially.

In another population distributed in Roi Et Province of NE. Thailand, some male specimens (Figs. 12, 31, 43, 54) possess the protibiae somewhat bifurcated at the apices (the apex of inner side pointed forwards, and the apical outer tooth curved outwards). The male protibia of *O. subopacus* ARROW usually possesses a long blunt spine at the extremity, and a remarkable blunt terminal process, which does not taper but is prominent in front. In case of the specimens from Roi Et Prov., there occur both types of protibiae in the male.

The specimens examined were found in cow's dung both in cultivated and forested mountainous areas.

Figs. 46–57 (on p. 113). Male genitalia in lateral view and a female abdomen. — 46, *Onitis bordati* CAMBEFORT; 47, *O. feae* FELSCH; 48, *O. virens* LANSBERGE; 49, *O. falcatus* (WULFEN), (from N. India); 50, *O. falcatus* (WULFEN) (*O. kiuchii* MASUMOTO, holotype, from N. Thailand); 51, *O. excavatus* ARROW (*O. chiangmaiensis* MASUMOTO, holotype); 52, *O. subopacus* ARROW (from N. Thailand); 53, *O. subopacus* ARROW (from Khon Kaen, NE. Thailand); 54, *O. subopacus* ARROW (from Roi Et, NE. Thailand); 55, *O. philemon* FABRICIUS (from India); 56, *O. niger* LANSBERGE; 57, female abdomen of *O. excavatus* ARROW (*O. chiangmaiensis* MASUMOTO, paratype, from N. Thailand).



8. *Onitis niger* LANSBERGE, 1875

(Figs. 8, 19, 33, 45, 56)

Onitis niger LANSBERGE, 1875, *Annls. Soc. ent. Belg.*, **18**: 130.*Distribution.* N. & C. Vietnam, Thailand (N.: Phrae, Sukhotai, NE.: Khon Kaen), Java.*Notes.* This species is widely distributed in the northern part of Thailand but remains undetermined for a long time. Its specimens were collected from buffalo dung in cultivated areas.

要 約

Y. HANBOONSONG · 益本仁雄：タイ産の食糞コガネムシ類。II. *Onitis*属について。—— タイ産の食糞コガネムシ(Scarabaeidae)研究の第2回として、ダイコクコガネ亜科(Coprinae)ヒラタダイコクコガネ族(Onitini)のヒラタダイコクコガネ属(*Onitis*)を検討した。この地域には、*Onitis feae* FELSCH, 1907, *O. virens* LANSBERGE, 1875, *O. falcatus* (WULFEN, 1786), *O. excavatus* ARROW, 1931, *O. subopacus* ARROW, 1931, *Onitis bordati* CAMBEFORT, 1988, *O. niger* LANSBERGE, 1875が分布している。さらに*O. corydon* BOISDUVAL, 1835の分布が認められた。

上記8種のうち、*O. falcatus* (WULFEN, 1786), *O. excavatus* ARROW, 1931, *O. subopacus* ARROW, 1931などには、いちじるしい個体変異や地方変異が認められる。

今回の詳細な検討によって、北タイから記載された*Onitis kiuchii* MASUMOTOは*O. falcatus* (WULFEN), 同じく*O. Chiangmaiensis* MASUMOTOは*O. excavatus* ARROWの、それぞれ下位同物異名とした。

今後の同定を容易にするため、詳細な検索表、および背面全体に加えて特徴のある部分の写真を多数提示した。

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