

Studies on the Coprophagous Scarab Beetles (*Coleoptera*, *Scarabaeidae*) from Vietnam in the collections of Zoological Institute St. Petersburg and of the Naturkundemuseum Erfurt

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Abstract

Presented herein is the list of 66 species of the subfamily *Scarabaeinae* from Benen National Park in Thanhhoa Province, Vietnam, and the outskirts of the Tamdao resort, Vinhphu Province collected by Alexander Napolov (Riga Zoo, Latvia). The 6 new species of *Onthophagus* LATR.: *O. (Gibbonthophagus) chineicus* sp.n., *O. (Gibbonthophagus) privus* sp.n., *O. (Gibbonthophagus) euryceros* sp.n., *O. (Gibbonthophagus) lenis* sp.n., *O. (Paraphanaeomorphus) comotoides* sp.n. and *O. (s.l.) nasonis* sp.n. from Vietnam are also described and illustrated. The preliminary key of the species of *Gibbonthophagus* BALTH. of Vietnam is provided here as well. Specimens of the most species are in the collection of Zoological Institute St. Petersburg and in the ERFURT Museum of Natural History.

Zusammenfassung

In vorliegender Arbeit werden 66 Arten der Unterfamilie *Scarabaeinae* aus dem Benen National Park in der Province Thanhhoa/Vietnam und außerhalb diesen aus dem Tamdao Resort (Vinhphu Province) behandelt, die durch Alexander Napolov (Riga Zoo, Latvia) gesammelt wurden. 6 Arten der Gattung *Onthophagus* LATR. sind davon neu für die Wissenschaft: *O. (Gibbonthophagus) chineicus* sp.n., *O. (Gibbonthophagus) privus* sp.n., *O. (Gibbonthophagus) euryceros* sp.n., *O. (Gibbonthophagus) lenis* sp.n., *O. (Paraphanaeomorphus) comotoides* sp.n. und *O. (s.l.) nasonis* sp.n. aus Vietnam werden beschrieben und abgebildet. Ein vorläufiger Bestimmungsschlüssel der vietnamesischen Arten des subgenus *Gibbonthophagus* BALTH. wird vorgestellt. Belege zu den meisten Arten sind in den Sammlungen des Zoologischen Institutes St. Petersburg und im Naturkundemuseum Erfurt.

1. Introduction

Vietnam and the adjacent areas of the Indochina peninsula have yet not been adequately explored as far as entomofauna is concerned. Every time Coleoptera are collected, more and more new species appear, even in such relatively well known groups as *Coprophagini*. The present study uses the material collected by Alexander Napolov (entomologist from the Riga Zoo, Latvia) during baseline biological surveys in the protected areas of North Vietnam carried out as a result of a joint venture between the Society for Environmental Exploration (London) and the Institute for Ecology and Biological Resources (Hanoi) through the SEE-Vietnam Forest Research Project.

Presented herein is a list of 66 species of the subfamily *Scarabaeinae* from Ben En National Park in Thanhhoa Province, Vietnam, and the outskirts of the Tamdao resort, Vinhphu Province. Described are also 6 new species of *Onthophagus* LATR. using the data from other localities of Vietnam and Thailand as well as those obtained by other scientists: I.Vassiljev, I.Boguslavski (Russia) and J.Srnad, D.Kral, J.Picka, V.Kuban (Czech Republic).

2. Locality

Benen National Park is located in the seaside lowland zone of Thanhhoa Province, altitude between 50-100 m above sea level. Presented there are landscapes of secondary savannah, which now occupies the place where once existed wet tropical forests. Today there grow high grasses (*Thysonalaena*, *Sacharum spontanum*, etc.), with groups and isolated trees of *Trema*, *Liquidambar*, *Mallotus*, *Melia*, etc. and bamboo. In the zone of the Tamdao resort, there are partially survived mountain tropical forests (altitude between 800-900 m a.s.l.), with trees predominantly of the families *Lauraceneae*, *Fagaceae*, *Theaceae*, *Magnoliaceae* etc. The undergrowth includes many ferns and shrubs (*Rubus*, *Citrus*, *Randia* etc.).

3. Material and Methods

Specimens were collected late in the rainy season (August to September) from man's dung, occasionally from dung of cows, buffaloes and small mammals, such as *Viverridae*. The beetles were collected using Barber traps and the light of quartz lamps.

The collected material: 66 species (about 26% of the total known fauna of *Coprophagini* of Vietnam) of 16 genera (about 45% of the known fauna of *Coprophagini* of Vietnam) reflects all the above-mentioned factors, the set of genera being specific to both the season when the specimens were collected and the corresponding landscapes.

The author to scale of 1 mm has prepared the figures presented herein.

The Holotypes of the new species have been given to the Zoological Institute of the Academy of Sciences of Russia in St.-Petersburg. Paratypes and specimens of the other species are particular in the collection of the Naturkundemuseum Erfurt.

I wish to express my deep gratitude to all my colleagues, with particular thanks to A.Napolov (Riga/Latvia), for the interesting material and assistance in my studies.

4. Results

Explanations to the list of species: N.P. = National Park; prov. = province;
excr. = excrement.

List of species

Paragymnopleurus melanarius HAROLD: Benen N.P., 23.7-20.8.1997 (1 ♀).

Paragymnopleurus brahminus WATERHOUSE: Benen N.P., 23.7-20.8.1997 (1 ♂); Tamdao, 15-23.9.1997 (1 ♂, 6 ♀) human's excr.

Synapsis yama GILLET: Benen N.P., 23.7-20.8.1997 (1 ♂, 1 ♀); Tamdao, 15-23.9.1997 (5 ♂, 4 ♀) human's excr.

Synapsis sp.: Tamdao, 15-23.9.1997 (4 ♂, ♀) human's excr.

Catharsius molossus (LINNAEUS): Benen N.P., 23.7-20.8.1997 (1 ♂) human's excr.

- Copris* (s. str.) *corpulentus* GILLET: Benen N.P., 23.7-2.9.1997 (8 ♂, 10 ♀) buffalo's excr.
- Copris* (s. str.) *confucius* HAROLD: Benen N.P., 8.8-2.9.1997 (163 ♂, ♀) on UV light, 1 specimens – buffalo's excr.
- Copris* (s. str.) *sinicus* HOPE: Benen N.P., 27.7-19.8.1997 (6 ♂, 6 ♀) buffalo's excr.
- Copris* (s. str.) *carinicus* GILLET: Benen N.P., 27.7-19.8.1997 (7 ♂, 9 ♀) buffalo's excr.
- Copris* (s. str.) *vietnamicus* KABAKOV: Tamdao, 15-29.9.1997 (1 ♂) human's excr.
- Copris* (*Paracopris*) *corniceps* FELSCHE: Benen N.P., 23.7-19.8.1997 (8 ♂, 5 ♀) buffalo's excr.
- Copris* (*Microcopris*) *reflexus* (FABRICIUS): Benen N.P., 23.7-19.8.1997 (3 ♂, 5 ♀) buffalo's excr.
- Copris* (*Microcopris*) *propinquus* FELSCHE: Benen N.P., 23.7-19.8.1997 (4 ♂, 1 ♀) human's excr., 1 specimen – buffalo's excr.; Tamdao, 15-23.9.1997 (1 ♀) human's excr.
- Onitis falcatus* (WULFER): Benen N.P., 19.8.1997 (3 ♂, 1 ♀); Tamdao, 15-23.9.1997 (7, 8a) human's excr.
- Oniticellus cinctus* (FABRICIUS): Benen N.P., 29.7-4.9.1997 (23 ♂, ♀) cow's excr., buffalo's excr.; Tamdao, 15-23.9.1997 (1 ♀) human's excr.
- Oniticellus tessellatus* HAROLD: Benen N.P., 29.7-4.9.1997 (2 ♂, 1 ♀) cow's excr.
- Liatongus vertagus* (FABRICIUS): Benen N.P., 7.8-19.8.1997 (11 ♂ 4 ♀) cow's excr., buffalo's excr.; Tamdao, 15-23.9.1997 (1 ♂, 6 ♀).
- Liatongus tridentatus* BOUCOMONT: Benen N.P., 19.8.1997 (1 ♂, 1 ♀).
- Drepanocerus sinicus* HAROLD: Benen N.P., 19.8.1997, (2 ♂).
- Caccobius* (*Caccophilus*) *unicornis* (FABRICIUS): Benen N.P., 29.7-4.9.1997 (507 ♂, ♀) human's excr., cow's excr.
- Caccobius* (*Caccophilus*) *yunnanicus* KABAKOV: Benen N.P., 5-9.8.1997 (1 ♀) human's excr.
- Caccobius* (*Cleptocaccobius*) *simplex* BOUCOMONT: Benen N.P., 4.9.1997 (1 ♂).
- Onthophagus* (*Micronthophagus*) *falsivigilans* MASUMOTO: Benen N.P., 23.7-5.8.1997 (1 ♀) human's excr.
- Onthophagus* (*Indachorius*) *bonengus* KABAKOV: Benen N.P., 27.7-8.8.1997 (1 ♀) human's excr.
- Onthophagus* (*Onthophagiellus*) *crassicollis* BOUCOMONT: Benen N.P., 23.7-4.9.1997 (460 ♂, ♀) human's excr.
- Onthophagus* (*Furconthophagus*) *papulatus papulatus* BOUCOMONT: Benen N.P., 29.7-4.9.1997 (1 ♂, 1 ♀), cow's excr.
- Onthophagus* (*Furconthophagus*) *papulatus boucomonti* PAULIAN: Benen N.P., 26.8-4.9.1997 (35 ♂, ♀) cow's excr.
- Onthophagus* (*Furconthophagus*) *dapcauensis* BOUCOMONT: Benen N.P., 4.9.1997 (1 ♂) cow's excr.
- Onthophagus* (*Colobonthophagus*) *tragus* (FABRICIUS): Benen N.P., 4.9.1997 (2 ♀) cow's excr.
- Onthophagus* (*Gibbonthophagus*) *proletarius* HAROLD: Benen N.P., 23.7- 4.9.1997 (126 ♂, ♀) human's excr.
- Onthophagus* (*Gibbonthophagus*) *luridipennis* (BOHEMAN): Benen N.P., 5.8- 4.9.1997 (32 ♂, ♀) human's, cow's and buffalo's excr.
- Onthophagus* (*Gibbonthophagus*) *rectecornutus* LANSBERGE: Benen N.P., 4.9.1997 (1 ♂, 1 ♀) cow's excr.
- Onthophagus* (*Gibbonthophagus*) *limbatus* HERBST: Benen N.P., 9-17.8.1997 (4 ♀) human's excr.
- Onthophagus* (*Gibbonthophagus*) *taurinus* WHITE: Benen N.P., 29.7-4.9.1997 (205 ♂, ♀) human's excr.
- Onthophagus* (*Gibbonthophagus*) cf. *remotus* HAROLD: Benen N.P., 23.7-2.9.1997 (48 ♂, ♀) human's excr.
- Onthophagus* (*Gibbonthophagus*) *lenis* sp.n. (see description).
- Onthophagus* (*Gibbonthophagus*) *chineicus* sp. n. (see description).
- Onthophagus* (*Gibbonthophagus*) *privus* sp.n. (see description).
- Onthophagus* (*Gibbonthophagus*) *euryceros* sp.n. (see description).
- Onthophagus* (*Paraphanaeomorphus*) *trituber* WIEDEMAN: Benen N.P., 29.7-2.9.1997 (89 ♂, ♀) human's excr.
- Onthophagus* (*Paraphanaeomorphus*) *strnadi* KABAKOV: Benen N.P., 23.7-28.8.1997 (9 ♂, 8 ♀); Tamdao, 15-23.9.1997 (1 ♂, 1 ♀) human's excr.

- Onthophagus (Paraphanaeomorphus) cf. sobrius* BALTHASAR: Benen N.P., 23.7-4.9.1997 (192 ♂, ♀) human's excr.
- Onthophagus (Paraphanaeomorphus) argiropygus* GILLET: Benen N.P., 18-24.8.1997 (1 ♂) human's excr.
- Onthophagus (Paraphanaeomorphus) comottoides* sp.n. (see description).
- Onthophagus (Paraphanaeomorphus) semipiceus* KABAKOV: Nahang, 11-14.06.1996 (1 ♀) leg A.Napolov & I.Roma; Benen N.P., 19.8-2.9.1997 (3 a) human's excr.; Tamdao, 15-23.9.1997 (2 ♂, 1 ♀) human's excr.
- Onthophagus (s.l.) rugulosus* HAROLD: Benen N.P., 10.8-2.9.1997 (4 ♀) human's excr.
- Onthophagus (s.l.) orientalis* HAROLD: Benen N.P., 23.7-2.9.1997 (173 ♂, ♀) human's excr.
- Onthophagus (s.l.) boucomontianus* BALTHASAR st. n.: Benen N.P., 23.7-2.9.1997 (5 ♂, 7 ♀) human's excr.
- Onthophagus (s.l.) pacificus* LANSBERGE: Benen N.P., 23.7-2.9.1997 (25 ♂, ♀) human's excr.
- Onthophagus (s.l.) tricolor* BOUCOMONT: Benen N.P., 5.8-2.9.1997 (5 ♂ 3 ♀) human's excr.
- Onthophagus (s.l.) vaulogeri* BOUCOMONT: Benen N.P., 5-17.8.1997 (2 ♀).
- Onthophagus (s.l.) parvidens* FREY: Benen N.P., 5-24.8.1997 (3 ♂, 4 ♀) excr. of middle-size forest mammals (*Viverridae?*).
- Onthophagus (s.l.) purpurascens* BOUCOMONT: Benen N.P., 23.7-2.9.1997 (28 ♂, ♀) human's excr.
- Onthophagus (s.l.) nasonis* sp. n. (see description).
- Parascatonomus muticifrons* ENDRÖDI: Benen N.P., 23.7-2.9.1997 (49 ♂, ♀) human's, cow's and buffalo's excr.
- Parascatonomus atratus* KABAKOV: Benen N.P., 23.7-7.8.1997 (2 ♀) human's excr.
- Parascatonomus anguicorius* BOUCOMONT: Benen N.P., 23.7-2.9.1997 (15 K, L) excr. of middle-size forest mammals (*Viverridae?*) and human's excr.
- Parascatonomus anceyi* BOUCOMONT (= *P. topaly* ENDRÖDI): Benen N.P., 23.7-2.9.1997 (7 ♂, 3 ♀) human's excr.
- Serrophorus seniculus* (FABRICIUS): Benen N.P., 4.9.1997 (1 ♀) cow's excr.
- Serrophorus diabolicus* HAROLD: Benen N.P., 23.7-9.8.1997 (1 ♂, 1 ♀); Tamdao, 15-23.9.1997 (1 ♂, 2 ♀) human's excr.
- Serrophorus avocetoides* KABAKOV (Figs 33-37): Tamdao, 15-23.9.1997 (8 ♂, 8 ♀) human's excr.
- Pseudonthophagus mulleri* LANSBERGE: Tamdao, 15-23.9.1997 (1 ♀) human's excr.
- Phacosoma obscurum* BOUCOMONT: Benen N.P., 23.7-2.9.1997 (1 ♂, 2 ♀) human's excr.
- Phacosoma fallacilaetum* MASUMOTO: Tamdao, 15-23.9.1997 (2 ♂, 1 ♀) human's excr.
- Panelus tonkinensis* PAULIAN: Benen N.P., 23.7-5.8.1997 (1 ♀); Tamdao, 15-23.9.1997 (2 ♂) human's excr.
- Haroldius perroti* PAULIAN: Benen N.P., 27.8-2.9.1997 (2 ♂); Tamdao, 15-23.9.1997 (1 ♀) on the forest humus.

Descriptions of new species

Onthophagus (Gibbonthophagus) chineicus sp.n.

Holotype: male, Vietnam, Hasonbinh prov., Chine, 20.5.1976, leg. I.Boguslavskiy;

Paratype: 2 ♂, 1 ♀ the same data of the Holotype; 10 ♂, 6 ♀ Hatuyen prov., Nahang, 1.-14.6.1996, human's excr., leg. A.Napolov & I.Roma; 7 ♂, 4 ♀ Thanhhoa prov., Benen National park, 23.7-2.9.1997, human's excr., leg. A.Napolov. Length 6.5-8.2 mm.

Piceous-black, head and pronotum shining with feebly metallic lustre, elytra subopaque; basal half of the segments of the antennal club reddish-brown, distal half yellowish, antennal funicles, mouth parts, palpi and tarsus reddish-brown. Dorsal surface pronotum glabrous, sides and elytra clothed with rather fine grey hairs, pygidium and lower surface with longer yellow-grey hairs.

Male: **Head** (Fig. 1) broad, clypeus produced forwards and strongly reflexed along outer

margin, ocular lobes rounded externally, clypeo-frontal suture carinate and raised, slightly curved hind; vertex bears a very high, short and straight carina between the eyes; the surface head is rather evenly, not very finely or closely punctured.

Pronotum (Fig. 1) strongly convex, in anterior half steeply inclined anteriorly with a longitudinal median groove, of which each side is strongly ridged; front angles rather acute, posterior angles obtuse, the lateral margins are feebly curved in front and gently sinuated behind; without basal border; surface is strongly but unevenly punctured, medial groove in front is smooth, hind part very slightly wrinkled.

Elytra shallowly punctato-striate, the striae duplicate finely ridged and with the punctures feebly notching intervals, intervals slightly convex, feebly shagreened, scattered with fine granules and rasp-like punctures, external intervals with densely raspelating punctures.

Pygidium gently convex, carinate at base, shagreened and rather strongly umbilicate punctures.

Inner distal end of **protibiae** sharply produced, terminal spur short, with an acute tip. Ratio of the length of metatarsal segments and terminal spur of metatibia as follows: 1.0, 0.28, 0.16, 0.12, 0.30, 0.9. Aedeagus – Fig. 2, 3.

Female. Head semicircular, clypeus rugoso-punctate, and separated from frons by slightly arcuate carina; vertex with carina arcuate hind, which lies between the eyes. **Pronotum** almost evenly convex, frontal declivite with a pair of slightly distinct tubercles, surface with more strongly marked punctures, than a male.

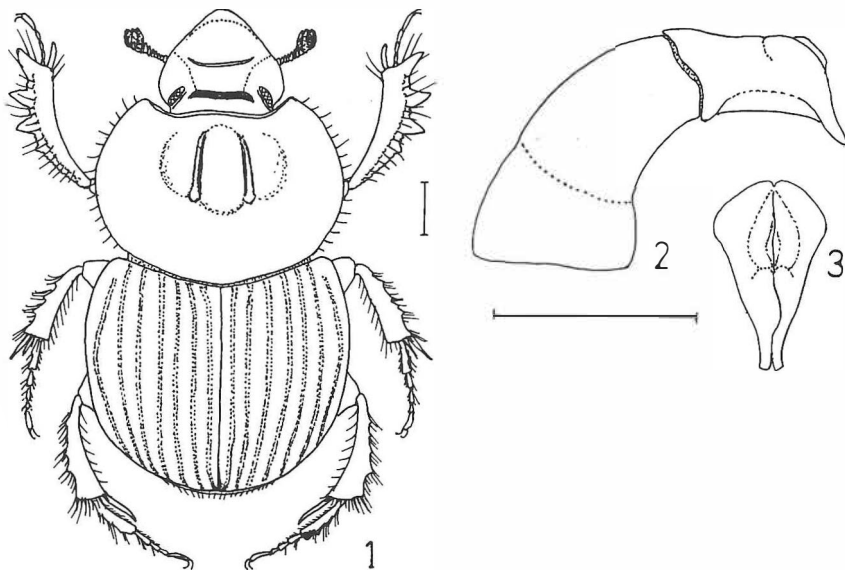


Fig. 1-3: *Onthophagus (Gibbonthophagus) chineicus* KABAKOV sp.n.; Holotype (male): 1 – dorsal view; 2 – aedeagus, lateral view; 3 – paramera, dorsal view.

Onthophagus (Gibbonthophagus) privus sp.n.

Holotype: male, Vietnam, Bacthai prov., N Thainguyen, 7.6.1976, leg. I.Boguslavskyi;
Paratype: 1 ♂, 1 ♀ Thanhhoa prov., Benen National Park, 18.8-2.9.1997, leg. A.Napovol.
Length 8.0-8.5 mm.

Black, head and pronotum shining, elytra and pygidium subopaque, the antennae (except basal parts of segments of club of dark colour), tarsi and mouth organs reddish. Dorsal and ventral surface and pygidium clothed with minute grey hairs, legs with longer hairs.

Male: Head (Fig. 4) not very broad, clypeus produced and reflexed along outer margin, ocular lobes gently rounded externally, clypeo-frontal suture slightly raised, long and strongly curved hind, vertex with carina produced upward at each end, forming a pair of short erect, nearly divergent horns (Fig. 5).

Pronotum (Figs 4, 5) highly convex, the front in the middle bears a short longitudinal process, median furrow very gentle, front angles rather acute, posterior angles obtuse, surface strongly umbilicate punctured, without basal border.

Elytra shallowly punctate-striate, the striae duplicate finely ridged with feeble punctures, intervals slightly convex, feebly shagreened, scattered with fine raspeleting punctures.

Pygidium convex, carinate at base, shagreened, scattered with densely strongly umbilicate punctures.

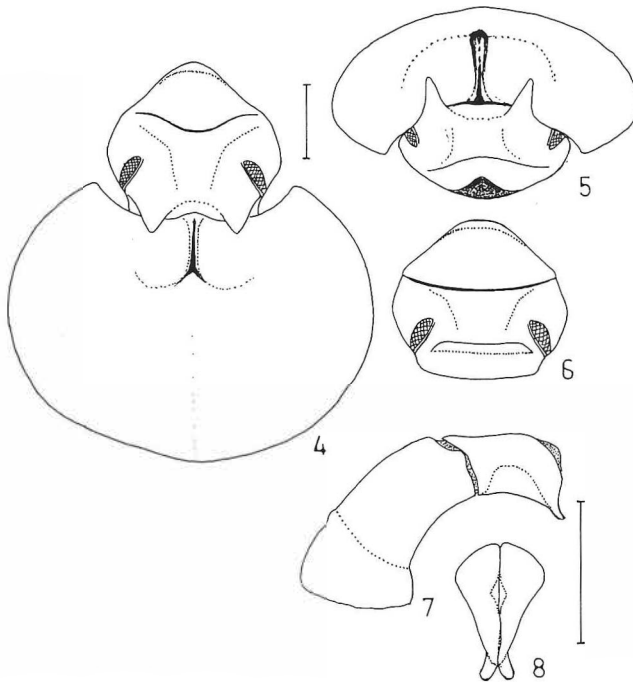


Fig. 4-8: *Onthophagus (Gibbonthophagus) privus* KABAKOV sp.n.; Holotype (male), paratype (female):
4 – head and pronotum of male, dorsal view; 5 – head and pronotum of male, frontal view;
6 – head of female; 7 – aedeagus, lateral view; 8 – paramera, dorsal view.

Onthophagus (Gibbonthophagus) euryceros sp.n.

Holotyp: male, Vietnam, Vinhphu prov., SW Tamdao, 300 m.a.s.l. , 24.5.1973, leg. I. Vasiljev

Paratype: 1♂, the same data as the Holotype; 10♂, 7♀ Hatuyen prov., Nahang, 1-14.6.1996, human's excr., leg. A.Napolov & I.Roma; 8♂, 5♀ Thanhhoa prov., Benen National park, 23.7-24.8.1997, leg. A.Napolov. Length 6.8-9.4 mm.

Brownish black, opacus, head and frontal declivite pronotum fairly shining and with feebly metallic lustre, each elytron decorated with reddish-yellow patches: one occupying basal parts of 3rd, 4th, 5th and 7th, 8th intervals; basal half of the segments of the antennal club reddish-brown, distal half yellowish, antennal funicles, mouth parts, palpi and tarsus reddish-brown; sides of pronotum and elytra with very small yellowish-grey hairs, pygidium and lower surface with longer hairs.

Male: Head (Figs 9, 10) slightly wider than long, clypeus parabolic produced and reflexed along outer margin, ocular lobes rounded externally, clypeo-frontal ridge effaced, clypeo-genal border prolongate up to basis vertex horns, vertex is produced backward on each side as a pair of horns strongly curved outwards, not united, but broadly dilated inwardly (Fig. 10), surface head rather closely finely punctate, horns sparsely scattered with very small punctures.

Pronotum (Fig. 9) a little hollowed on each side behind the cephalic horns, with medial longitudinal prominence, surface frontal declivite feebly umbilicatus punctured, anterior angles acute, lateral margins gently rounded in front, sinuate behind, basal margins not bordered, discus of pronotum is shagreened and with rare feebly umbilicatus punctures, more strongly and closely punctured on the anterior angles.

Elytra punctato-striate, the striae duplicate finely ridged with feebly distinct punctures, intervals flat, shagreened, and with very small raspeleting punctures, three inner intervals almost lack punctures, external intervals densely and strongly punctured.

Pygidium gently convex, carinate at base, shagreened and with rather small umbilicate punctures.

Inner distal end of **protibia** not pointed, terminal spur short, with an acute tip. Ratio of the length of metatarsus segments and terminal spur of metatibia as follows: 1.0, 0.25, 0.12, 0.06, 0.25, 0.8. Aedeagus – Figs 14, 15.

Female: Head semicircular, clypeus rugoso-punctate and separated from frons by raised long and straight carina, extending from side to side, frons and genae not closely finely punctured, vertex bears a pair of strong short, perpendicular flattened horns (Fig.13). **Pronotum** with its front margin vertical and bears a short curved carina just behind the front margin.

Variation: basal patches sometimes reduced, elytra entirely black. Armature of vertex male f. *media* – Fig. 11, f. *minor* – Fig. 12. Male and female f. *minor* are alike, clypeo-frontal carina very feeble, pronotum with feebly bicuspid tubercle is placed close behind the front margin.

Inner distal end of **protibia** sharply pointed terminal spur short, with acute tip. Ratio of the length of metatarsus segments and terminal spur of metatibia as follows: 1.0, 0.3, 0.16, 0.12, 0.32, 0.9. Aedeagus – Figs 7, 8.

Female: Head (Fig. 6) with parabolic clypeus, clypeo-frontal carina long and straight, extending from side to side, surface transversely rugose, frons and genae rather densely punctured, vertex with rather short carina which lies between the eyes.

Pronotum almost evenly convex, frontal declivite with a small tubercula at middle, surface strongly umbilicate punctured.

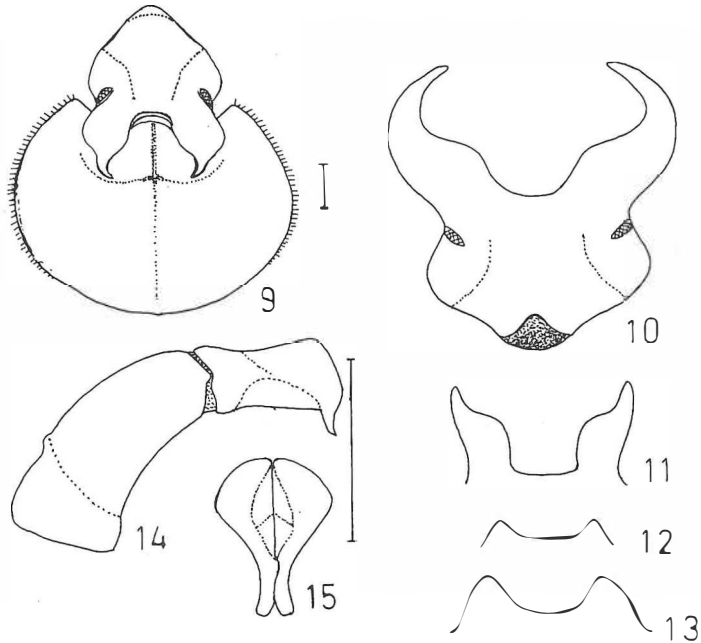


Fig. 9-15: *Onthophagus (Gibbonthophagus) euryceros* KABAKOV sp.n.; Holotype (male), paratype (female):
 9 – head and pronotum of male, dorsal view; 10 – head of male, frontal view; 11, 12 – horns of male (11 – f. media, 12 – f. minor); 13 – horns of female, frontal view; 14 – aedeagus, lateral view; 15 – paramera, dorsal view.

Onthophagus (Gibbonthophagus) lenis sp.n.

Holotype: male, Vietnam, Thanhhoa prov., Benen National Park, 26.8-2.9.1997, human's excr.

Paratype: 4 ♂, 3 ♀, 23.7-2.9.1997, the same data, leg. A.Napolov; 6 ♂, 4 ♀ Hatuyen prov., NE Nahang, 1-14.6.1996, leg. A.Napolov & I.Roma. Length 5.8-7.8 mm.

Brownish-yellow, the head, disk of pronotum, two small spots on the each sides pronotum and parts of the lower surface dark with metallic-green or bronze lustre. Antennae, mouth organ and tarsi yellow-reddish. Upper surface and pygidium are scantily clothed with minute yellowish-grey setae, lateral sides of pronotum with rather long yellowish setae.

Male, f. major: The head (Figs 16, 17) is flat and broad, in front produced and reflexed, sides of clypeus are sinuated and with expanded portions near the clypeo-genal sutures (as the *O. (G.) luridipennis* BOH.), genae gently rounded, clypeo-frontal carina completely effaced, vertex with a pair of triangular short horns near eyes, surface of the head is fairly strongly and evenly punctured.

Pronotum (Fig. 16) with anterior angles is gently produced forwards and pointed, front margin bisinuate (as seen from above), in middle with rounded median prominence and above with a pair of short longitudinal carina-like processes divided with a smooth groove

(Fig. 17), lateral margins rounded and slightly sinuate behind, basal margin without border, the surface except smooth frontal declivite with rather closely and umbilicate punctured.

Elytra with double striae and the dorsal intervals flat and minutely punctured, external intervals rather strongly and closely punctured.

Pygidium at the base bordered, gently convex and rather strongly but weakly punctured.

Protibia is thin with short external dents and long terminal spur. Ratio of the length of metatarsus segments and terminal spur of metatibia as follows: 1.0, 0.3, 0.15, 0.11, 0.4, 0.8. Aedeagus – Figs 19, 20.

Female: Clypeus parabolic, rounded and truncate at apex, clypeo-frontal carina short and straight, not connected with clypeo-genal sutures, vertex with longer straight carina between the eyes; frontal declivite of pronotum has a small double prominence just behind the front margin in the middle; protibia is broad (Fig. 18).

Variation. The male f. *media*: vertex with a pair of little dents; male f. *minor*: vertex with a short ridge between the eyes. The female f. *minor*: pronotum almost simple.

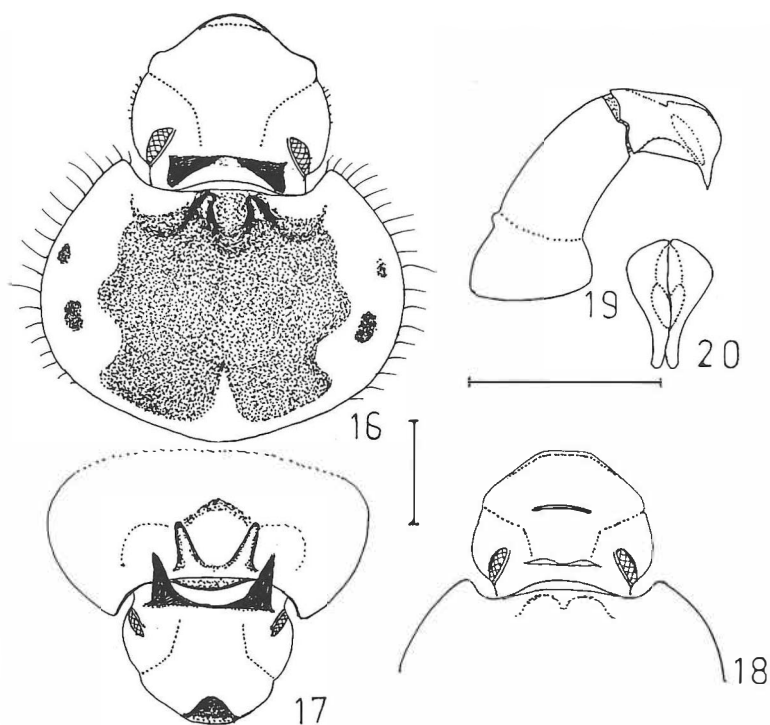


Fig. 16-20: *Onthophagus (Gibbonthophagus) lenis* KABAKOV sp.n.; Holotype (male), paratype (female): 16 – head and pronotum of male, dorsal view; 17 – head and frontal part of pronotum of male, frontal view; 18 – head and frontal part of pronotum of female, dorsal view; 19 – aedeagus, dorsal view; 20 – paramera, dorsal view.

Onthophagus (Paraphanaeomorphus) comottooides sp.n.

Holotype: male f. *major*: Vietnam, Thanhhoa prov., Benen National Park, 10-17.8.1997, human's excr., leg. A.Napolov.

Paratype: 165 ♂, ♀ the same data of the holotype (27.7-2.9.1997) leg. A.Napolov; 4 ♂, 4 ♀ Vinhphu prov., Tamdao, 12-24.5.1989, leg. J.Strnad; 1 ♂, N Sonla, 15.5.1987, leg. I.Boguslavskiy; 2 ♂, 2 ♀ Tamdao, 3-11.6.1985, leg. I.Picka; 1 ♂ Tamdao, 5-10.6.1989, leg. Brantlova; 1 ♂ Hasonbinh distr., Huongson, 26-29.4.1991, leg. J. Strnad; Thailand: 1 ♂, 3 ♀ Umphang river, 1000 m a.s.l., 28.4-6.5.1991, leg. D.Kral; 2 ♂ Lansang Nat. Park, 500 m a.s.l., 18-24.4.1991, leg. D.Kral; 2 ♂ Palong, Akha vill., 750 m a.s.l., 26-28.5.1991, leg. V.Kuban; 1 ♂, 2 ♀ Chiang Dao, 1000 m a.s.l., 17-24.5.1991, leg. V.Kuban. Length 4.0 – 6.6 mm.

Shining, metallic-green, bronze or coppery, elytra orange-yellow except a black sutural line, spot at the base 5th interval, and broad irregular transverse median band, and small transverse spot near hind margin; lower body and legs piceous-black, with metallic lustre, pygidium the same colour, partly or completely orange-yellow; the antennae yellowish, mouth-organ and tarses reddish.

Male, f. major: Head (Fig. 21) short and broad, semicircular, margins of the clypeus very weakly raised, clypeo-frontal suture effaced, clypeo-genal suture fairly distinct, forehead bears a slender horn (Fig. 21), arising between the anterior parts of eyes, triangularly dilated at the base, directed backward, and slightly notched at the tip. Surface of head and proximal half of the horn with sparsely fairly strong punctures intermixed with very small punctures, eyes completely divided.

Pronotum (Fig. 21) has a sharp longitudinal medial carina extending past the middle and continued by a groove to the base; the sides are flat on each side of the carina, and hind angles are produced obliquely backward as strong hooked and upwards-curved process; anterior angles are rather sharp, the sides very weakly sinuated in front, rounded and sub-parallelled on the middle, and sinuate anterior hind angle, sometimes bisinuate, basal margin not bordered, surface finely and not closely punctured in front, more strongly and closely behind, clothing of minute pale setae.

Elytra punctato-striate, the striae duplicate finely ridged and with punctures notching intervals, last flat and moderately strongly, sparsely punctured and 7th stria rather straight and parallel with the 6th stria.

Pygidium moderately convex, margined along base, protibia a little longer and thinner than that of the female.

Ratio of the length of metatarsomeres and terminal spur of metatibia: 1.0, 0.22, 0.11, 0.10, 0.25, 0.8. Aedeagus – Figs 27, 28.

Female: Clypeus transversely rugose, separated from the sparsely punctured forehead by a curved forward carina, with a second carina between the eyes (Fig. 25).

Pronotum very convex, with its front margin vertical in the middle, surface clothed with strongly, fairly closely punctate and short pale hairs, remaining smooth area nearly hind angles.

Protibia (Fig. 26) shorter than that of the male, with 1st and 2nd external teeth very long.

Variation. Male f. *media*: head with shorter acute horn (Fig. 23); pronotum weakly flattened in front, and with three short longitudinal carinae; male f. *minor*: head with short dent (Fig. 24) or very short carina between the eyes, pronotum nearly uniformly convex above, occasionally weakly flattened in front. Female f. *minor*: head with short curved clypeo-frontal carina and short and weakly raised second carina between the eyes; pronotum simple convex above.

The present new species is closely related to *O. (P.) comottoi* LANSB. Originally described from Burma, but can be distinguished from it by the following characteristics: 1) body small, frontal declivite pronotum of male with longitudinal carina [while in *O. (P.) comottoi* LANSB. – obtusely angular], pronotum of female without three tubercles, rest as of the *O. (P.) comottoi* LANSB.

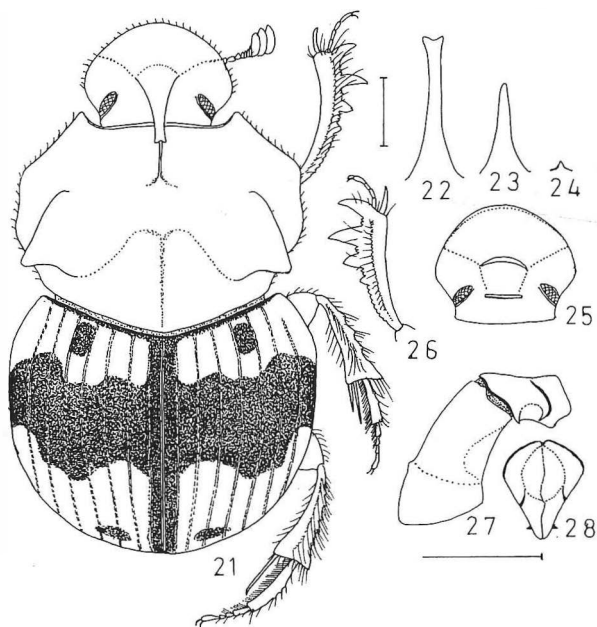


Fig. 21-28: *Onthophagus (Paraphanaeomorphus) comottoides* KABAKOV sp.n.; Holotype (male), paratype (female): 21 – male, dorsal view; 22-24 – horn of male, frontal view (22 – f. major, 23 – f. media, 24 – f. minor); 25 – head of female, dorsal view; 26 – protibia of female, dorsal view; 27 – aedeagus, lateral view; 28 – paramera, dorsal view.

Onthophagus (s.l.) *nasonis* sp.n.

Holotype: male, Vietnam, Thanhhoa prov., Benen Nat. Park, 23.7.1997, leg. A.Napoloov;

Paratype: 5 ♂, 2 ♀ the same data, 23.7-2.9.1997, excr. of the middle-size forest mammals (*Viverridae*), leg. A.Napoloov. Length 4.0-5.0 mm.

Brownish-black, head and pronotum metallic bronze or coppery, elytra black or brownish-black with orange spots on the base 4th, 6th, 7th, sometimes 8th intervals, often also has a posterior marginal stripe; antennae club yellowish, anterior margin clypeus, epipleval elytra, legs and mouth organs reddish, the upper surface fairly closely clothed with minute pale hairs, lower surface and legs with rather longer yellowish-grey setae.

Male: Head (Fig. 29) arrow-like, clypeus produced to a point, which is strongly reflexed on

tip, rounded or very weakly bilobed, genae broad rounded, surface flat, with completely effaced clypeo frontal and vertex carinae; clypeo-genal suture distinct and curved backward, sides clypeus, genae and hind forehead rather strongly punctured, eyes not completely divided by hind ocular lobes.

Pronotum (Fig. 29) with front angles rather sharp, anterior margin emarginate and bordered, but the marginal line in middle with short sinusoid; the lateral margin is bisinuate, basal margins not bordered; the anterior median part of pronotum is flattened, the flattened area generally extending backward beyond the middle and limited by an angular elevation, sometimes with bilobed tip, surface flattened area is shagreened and finely, not densely punctured, rest surface smooth and strongly and not closely punctured.

Elytra punctato-striate, the striae duplicate and with punctures notching intervals, last flat and strongly rasp-like punctured, lateral intervals highly strongly and densely punctured, often with rugose.

Pygidium with basal carina, gently convex, closely and strongly punctured.

Protibia with inner distal end is sharply produced and bears a short terminal spur; ratio of the length of metatarsomeres and terminal spur of metatibia: 1.0, 0.22, 0.1, 0.08, 0.22, 0.7. Aedeagus – Figs 31, 32.

Female: Head (Fig. 30) as wide as long, clypeus rather sharply bidentate in front, separated by curved carina from the well-punctured forehead, and there is a straight, semicircular raised carina which lies between the eyes.

Pronotum almost evenly convex, frontal declivite with small double prominence just behind the front margin in the middle.

This new species somewhat resembles *O. deflexicollis* LANSB. and *O. aloysiellus* ZUNINO, but can be distinguished from them by the following characteristics: punctate head, pronotum and pygidium fairly strongly and densely punctured, punctate intervals of elytra rasp-like; male has a sharply produced inner distal end of protibia; female has well-distinguished bicarinate head.

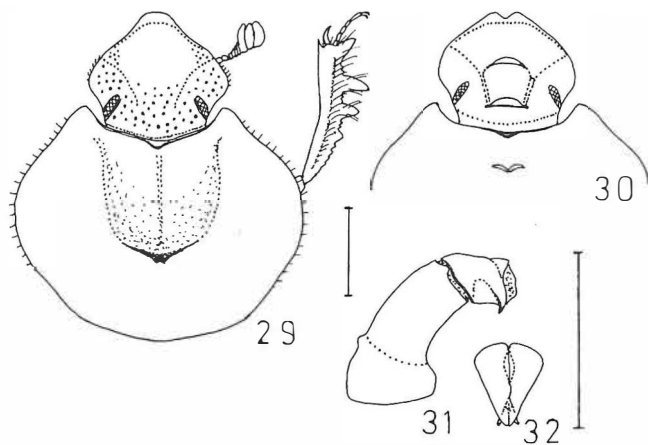


Fig. 29-32: *Onthophagus (s.l.) nasonis* KABAKOV sp.n.; Holotype (male), paratype (female): 29 – head and pronotum of male, dorsal view; 30 – head and frontal part of pronotum of female, frontal view; 31 – aedeagus, lateral view; 32 – paramera, dorsal view.

Subgenus *Gibbonthophagus* BALTHASAR, 1935

Type species: *Onthophagus atripennis* WATERHOUSE

The species of this subgenus are of a rather short, compact form and moderate size, length 4.0-12.0 mm, black or mottled, elytra dark with orange patches or testaceous-yellow with transverse black band, or entirely reddish. Clypeus of the male produced and reflexed in front, semicircular or truncate, rarely very weakly notched at the tip; eyes completely divided by hind ocular lobes, their lower part mostly is of a larger size than the antennal club; segments of the antennal club symmetric; the mentum wide as long. Clypeo-frontal suture of the male generally completely effaced sometimes presents, occasionally long, extending side as side head; of female always present. The vertex of male with carina, or carina with two dents, or a pair of horns. Antennal scape on the front side is simplex or serrate. Pronotum of male in front generally hollowed or with dents, tubercles or longitudinal carinae, of female with perpendicular short carina, bicuspid prominence or simply convex; basalaire border of pronotum indistinct or very thin. The 7th stria of the elytra more strongly curved than 6th. Pygidium with basal border. Protibia of some more highly evolved males is very long (as with subgenus *Diastellopalpus* LANSB., 1886). Aedeagus of male is of primitive form: paramera (see lateral views) are beak-like with subparallel or weak divergent depressed apices, wedge-like (see dorsal views), as with the *Onthophagus* (s.str.) *taurus* (L.); distinctly shorter than fallobase. Subgenus distinctly distinguished by aforementioned features from the *Onthophagus* (s.str.) according to M.ZUNINO, 1979.

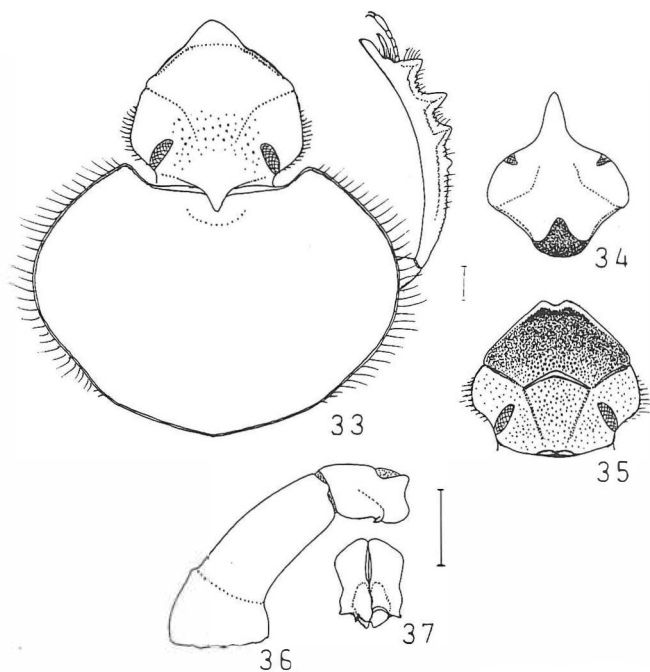


Fig. 33-37: *Serrophorus avocettoides* KABAKOV; 33 – head and pronotum of male, dorsal view; 34 – head of male, frontal view; 35 – head of female, dorsal view; 36 – aedeagus, dorsal view; 37 – paramera, dorsal view.

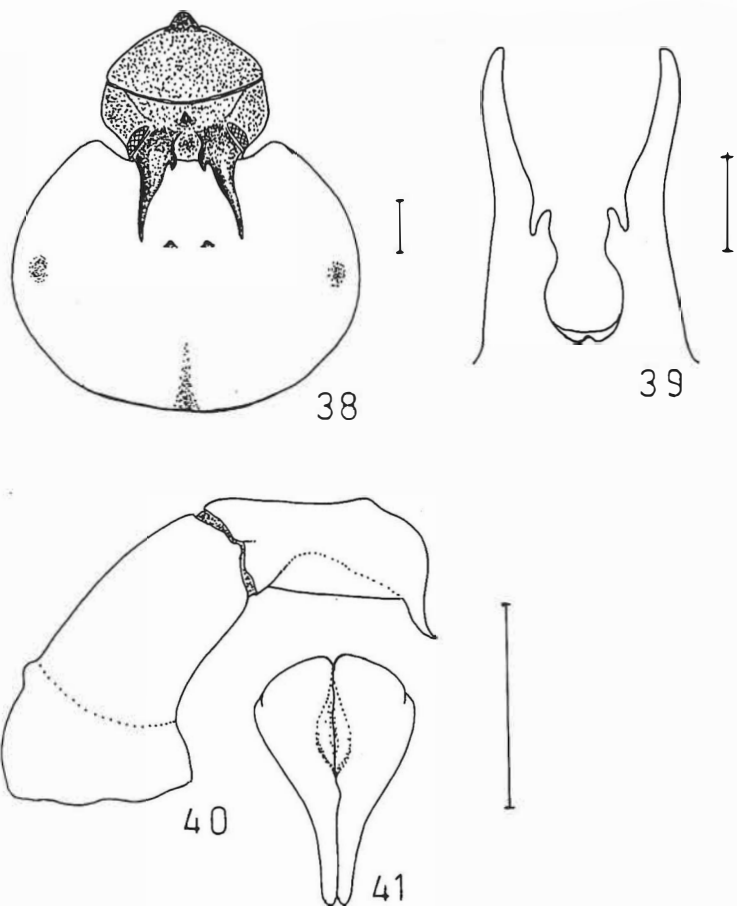


Fig.: 38-41: *Onthophagus (Gibbonthophagus) denticornis* BOUC.; 38 – head and pronotum of male, dorsal view; 39 – horns of male, f. major, frontal view; 40 – aedeagus, lateral view; 41 – paramera, dorsal view.

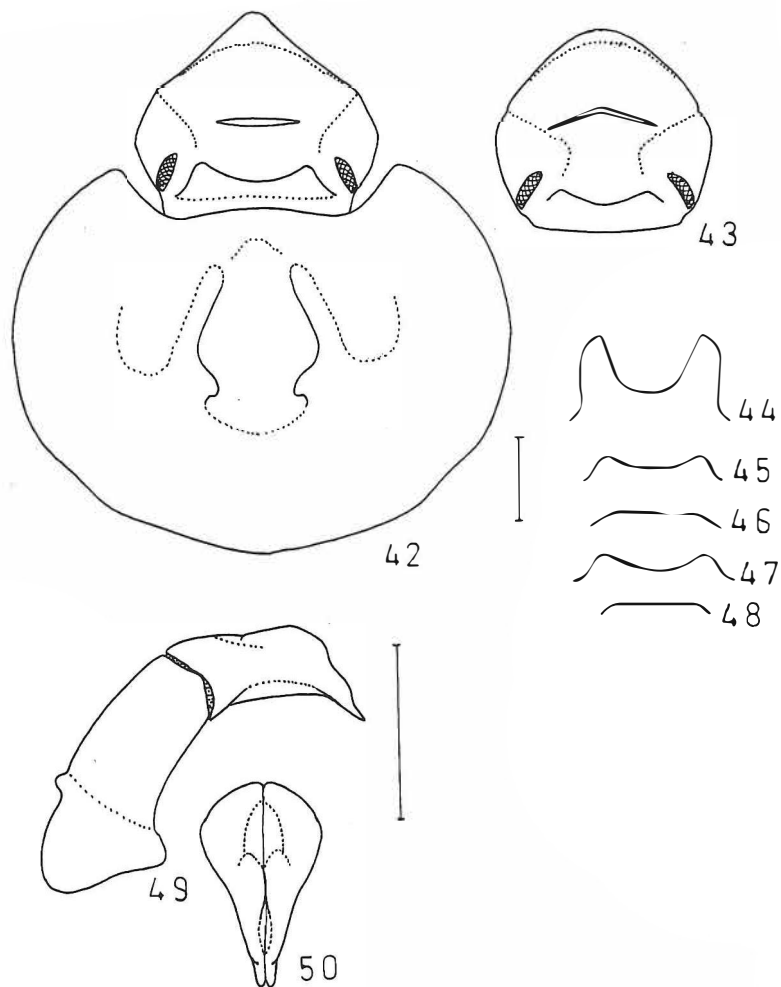


Fig. 42-50: *Onthophagus (Gibbonthophagus) atripennis* WATERHOUSE; 42 – head and pronotum of male, dorsal view; 43 – head of female, dorsal view; 44-46 – horns of male (vertex carina), frontal view (44 – f. major, 45 – f. media, 46 – f. minor); 47, 48 – vertex carina of female, frontal view (47 – f. major, 48 – f. minor); 49 – aedeagus, lateral view; 50 – paramera, dorsal view.

Key to subgenus

- 1(4) Paramera simplex, beak-like (lateral view) and wedge-shaped (dorsal view).
- 2(3) Eyes not completely divided by the hind ocular lobes, small size (ventral view), smaller than the antennal club. *Onthophagus* (s. str.) LATREILLE, 1802, (ZUNINO 1979)
- 3(2) eyes completely divided by the hind ocular lobes, larger than the antennal club (ventral view). *Gibbonthophagus* BALTHASAR, 1935
- 4(1) Paramera very variable in shape, not beak-like; eyes not or completely divided by the hind ocular lobes. Rest of the subgenus *Onthophagus* LATREILLE, 1802

Key of the species of *Gibbonthophagus* BALTH. of Vietnam

- 1(12) Entirely black, head and pronotum occasionally with metallic lustre. Punctuation of the pronotum and pygidium umbilicate.
- 2(9) Head of the male with clypeo-frontal carina. Pronotum of the female with one or two prominences or tubercles.
- 3(8) Clypeo-frontal carina of the male straight or nearly straight. Pronotum of the female with two prominences on the middle frontal declivite.
- 4(7) Clypeo-frontal carina of the male long, half-wide as the head.
- 5(6) Disk of the pronotum of male in middle with round cavity, restricted at the sides with semicircular elevations; vertex with two short horns, connected by a ridge. The vertex of female armed with carina having two semicircular prominences on each side; the pronotum with two weak tubercles near front margin. Length 7.0-11.0 mm. SE Russia, N China, Japan (Figs 42-50).
[O. (G.) atripennis WATERHOUSE]
- 6(5) Disk of the pronotum of male with a longitudinal hollow, ridged on each side; vertex with short and straight carina. The vertex of the female with straight carina; the pronotum with two weak tubercles near front margin. Length 6.5-8.5 mm. *O. (G.) chineicus* sp.n.
- 7(4) Clypeo-frontal carina of the male very short, shaped as perpendicular tubercles; vertex armed with short carina with a pair of semicircular prominences on each side; pronotum with a tubercle on the front margin, and two tubercles in middle disk; surface weakly hollowed between above-mentioned tubercles. Length 7.0 m, female unknown. S China.
O. (G.) susterai BALTHASAR
- 8(3) Clypeo-frontal carina of the male long, strongly curved backward; vertex with carina produced upward at each end, forming a pair of short erect horns. Pronotum of the front in middle bears short longitudinal process. Clypeo-frontal carina of the female long and straight, vertex with simple carina; pronotum on the front with very short longitudinal carina. Length 8.0-8.6 mm.
O. (G.) privus sp.n.
- 9(2) Head of the male without clypeo-frontal carina, last completely effaced. Pronotum of the female bears three tubercles on the frontal declivite
- 10(11) The vertex of the male with a pair of small tubercles; pronotum in middle on the front bears erect horn, past which there is a cavity restricted at the sides by a pair of dentiforme processes. Vertex carina of the female bears on each end acute dents, pronotum with three tubercles on the frontal declivite. Length 8.5-9.5 mm. *O. (G.) asiaticus* ENDRÖDI

- 11(10) The vertex of the male with weak two short carina; pronotum on the middle frontal declivite with v-shaped process. Female unknown. Length 5.5-6.2 mm.
O. (G.) hiabunicus KABAKOV, 1998 (in litt.)
- 12(1) Not entirely black, pronotum and elytra dark or yellowish, mostly with spots and bands, or nearly entirely reddish or yellowish.
- 13(16) Longitudinal medial groove of the pronotum completely across disk (male), or hind half disk (female).
- 14(15) Brown, head and pronotum with metallic lustre, anterior angle of pronotum and base of the elytra with orange-yellow spots. Head of male armed with a pair backwardly produced divergent horns; of the female with clypeo-frontal carina and vertex carina; pronotum with two slight tubercles behind the front margin, disk closely and rather strongly punctured. Length 6.0-7.0 mm.
O. (G.) taurinus WHITE
- 15(14) Testaceous-yellow, with a faint metallic lustre, and closely mottled with the punctures, margins and sutures black. The head with two divergent long horns (male), or subparallel horns (female); pronotum without tubercles, disk strongly and irregularly punctured. Length 7.0-11.0 mm.
O. (G.) rectecornutus LANSBERGE
- 16(13) Longitudinal medial groove of the pronotum very short, on the basal quarter.
- 17(18) Reddish, with the head and tibiae dark, vertex of the male bears a sharp medial tubercle and behind it a pair of long horns; pronotum with two tubercles on the disk. Female unknown. Length 10.0-12.0 mm. (Figs 38-41).
O. (G.) denticornis BOUCOMOUNT
- 18(17) Not reddish.
- 19(24) Punctures of the pronotum umbilicate; inner intervals of the elytra very minutely and sparsely punctured, external intervals densely and rasp-like, rather strongly punctured
- 20(21) Pronotum matt, shagreened, with small-scattered umbilicate punctures intermixed with very minute punctures. Vertex of the male armed with a pair of backwardly produced divergent horns; the female vertex with a pair of semicircular perpendicular dents. Brownish-black, opacus, the head and pronotum with weakly metallic lustre, each elytron with series of basal orange patches. Length 6.4-9.8 mm.
O. (G.) euryceros sp.n.
- 21(20) Pronotum shining, rather closely umbilicate punctured.
- 22(23) Vertex of the male with a pair backwardly produced divergent horns; head of the female with short clypeo-frontal and longer vertex carina. Pronotum on the frontal declivite with three hollowed (male), or small double prominences (female). Yellowish-brown, the head and disk of the pronotum with copper or bronze lustre. Length 5.5-7.5 mm.
(G.) cf. remotus HAROLD (= *luridipennis* PAULIAN, non BOHEMAN)
- 23(22) Vertex of the male with short triangular horns near eyes or two tubercles, or short carina; head of the female with short fronto-clypeal and longer vertex carina. Pronotum of the male with a pair of short longitudinal carina on the frontal declivite, of female with a small double prominences. Yellow, the head and disk of the pronotum dark, with copper or bronze lustre. Length 5.8-7.8 mm.
O. (G.) lenis sp.n.
- 24(19) Punctuation of the pronotum not umbilicate; intervals of the elytra has punctuation moderately or rather strongly, rasp-like, granulate or simple.
- 25(36) Protibia of male of normal size, not long. Clypeus not strongly truncated; pronotum with basal border.

- 26(27) Basal border of pygidium in middle effaced; lateral margins of clypeus strongly expanded near clypeo-genal suture. Testaceous-yellow, partially dark with metallic lustre. Head of male with a pair of horns, female with clypeo-frontal and vertex carina. Length 5.0-7.0 mm.
O. (G.) luridipennis (BOHEMAN) (= *fuscopunctulatus* BOUCOMOUNT)
- 27(26) Basal border of pygidium not effaced in middle.
- 28(31) Pronotum bicolor, disk dark with metallic lustre, lateral margins broad yellowish.
- 29(30) Frontal declivite of pronotum of male not closely very finely punctured, and slightly hollowed in middle; of male f.minor with tubercles on each side of the hollow. Head of male with a pair of horns or tubercles; female with clypeo-frontal and vertex carina. Length 5.0-7.5 mm.
O. (G.) balthasari VŠETECKA
- 30(29) Frontal declivite of pronotum of male smooth and shining, not punctured, female with a short and feebly bicuspid transversely ridged on the front margin of the pronotum. Vertex of male with a pair of horns, very broad at the base; head of female with clypeo-frontal and vertex carina. Length 6.0-7.5 mm.
O. (G.) dubernardi BOUCOMOUNT
- 31(28) Pronotum unicolor, dark with metallic lustre, rarely anterior angle yellowish.
- 32(33) Head of male with clypeus produced into a reflexed lobe, behind the eyes arises a pair of parallel horns with a short acute intermediate dent; head of female with truncate clypeus and clypeo-frontal and vertex carina. Pronotum of male hollowed just behind the head, female with short perpendicular carina near middle of the front margin. Elytra dark with basal and apical orange-yellow stripes. Length 5.0-7.0 mm.
O. (G.) proletarius HAROLD
- 33(32) Head of male and female very broad, clypeus parabolic rounded or truncate on the tip with a small emarginate in front.
- 34(35) Elytra dark with basal and apical orange-yellow stripes. Head of male with a pair of conical horns near eyes; female has a clypeo-frontal carina and another carina near front parts of eyes. Pronotum of male and female without tubercles. Length 5.0-8.0 mm.
O. (G.) limbatus (HERBST)
- 35(34) Elytra testaceous-yellow with the suture and an irregular medial black band. Head of male with short and weak clypeo-frontal carina and another carina near front parts of eyes armed a pair of conical blunt horns. Pronotum of male bears three small tubercles on the frontal declivite, female with one tubercle in the middle of the front margin. Length 6.5-8.0 mm.
O. (G.) duporti BOUCOMOUNT
- 36(25) protibia of the male long and thin, with long and s-like curved terminal spur. Head of male with the vertex has a short feebly bilobed carina; head of female has a long clypeo-frontal carina and a shorter carina between front parts of the eyes. Pronotum nearly simplex convex. Testaceous yellow, with the head and disk of pronotum metallic-greenish-black or coppery, elytra with a broad irregular transversely dark band. Length 6.0-7.5 mm.
O. (G.) gracilipes BOUCOMOUNT

In addition to above mentioned species I have to trace subgenus *Gibbonthophagus* BALTHASAR: *O. (G.) viduus* HAROLD, *O. (G.) solivagus* HAROLD, *O. (G.) kuluensis* Bates, *O. (G.) fossor* ARROW, *O. (G.) babirusa* ESCHSCHOLTZ, *O. (G.) cervus* (FABRICIUS), *O. (G.) falsus* GILLET, *O. (G.) expansicornis* BATES, *O. (G.) ventralis* LANSBERGE, *O. (G.) fasciatus* BOUCOMOUNT, *O. (G.) cervicarpa* BOUCOMOUNT, *O. (G.) favrei* BOUCOMOUNT, *O. (G.) parafasciatus* BALTHASAR, *O. (G.) roubali* BALTHASAR, *O. (G.) sunantaus* MASUMOTO and *O. (G.) gosoli* MASUMOTO.

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Jahr/Year: 1998

Band/Volume: [17](#)

Autor(en)/Author(s): Kabakow Oleg N.

Artikel/Article: [Studies on the Coprophagous Scarab Beetles \(Coleptera, Scarabaeidae\) from Vietnam in the collections of Zoological Institute St. Petersburg and of the Naturkundemuseum Erfurt 39-58](#)