

NEW MESOZOIC CUPEDID BEETLES FROM MONGOLIA. BROCHOCOLEINI AND NOTOCUPEDINI

A. G. Ponomarenko

Paleontological Institute, Russian Academy of Sciences

Abstract: Nine new species of cupedid beetles of the genera *Brochocoleus* and *Notocupes* are described from six Middle to Upper Jurassic and Lower Cretaceous localities. A new diagnosis of the genus *Brochocoleus*, previously known only from an isolated elytrum from China, is given. The taxonomic rank of the family based on genus is lowered to a tribe within the subfamily Ommatinae.

• • •

The cupedids occupy a special place among the early beetles. Although they are now extremely rare and undoubtedly relict, they were very abundant in the Mesozoic. It is especially important that, because of the characteristic cellular elytra and tuberculate body surface, almost any remnant of these beetles can be diagnosed at least to the familial level. Only rarely can such an identification be made for isolated elytra or other sclerites of other Mesozoic beetles. The geological history of the cupedids has, therefore, been more thoroughly studied than that of any other family.

A second distinctive feature of the cupedids is their discontinuous geographic range: They occur only in regions with a warmer climate, even under the Mesozoic conditions of the weak climatic zonation. Thus, they are absent in the Jurassic of the Siberian region. It is interesting that in ecotonic regions the cupedids appeared earlier in a climatic warming than the substantial change in assemblages of plant macrofossils.

In Mongolia, no cupedids have been found in the Triassic (probably just because of the

Translated from: *Novyye zhuki semeystva Cupedidae iz mezozoya Mongolii. Brochocoleini i Notocupedini.* Paleont. zhur., No. 3, pp. 83-93, 1994.

paucity of
formation
Late Jura
Cretaceo
Bon-Tsag
in Mongol

Bel
Ommatin
later. Tw
30 specie
described
localities

Bald
Upper Ju
1); Orto

Bon-
Bon-Tsag
23 (Bed 2
45, (Bed 1

Shan
Leg area.

Shan
Upper Ju

Khun
Bulak. L

Erde
area, 8 km

Diag
antennae

Comp

Rem

paucity of fossil insect finds) or in the oldest Jurassic, the Khamar-Khoburinskaya, and Zhargalant formations. They appear in the Bakhar group, which dates from the middle or beginning of the Late Jurassic, and become very numerous. Cupedids are less abundant at the beginning of the Cretaceous; thereafter, their frequency increases, until they become especially numerous in the Bon-Tsagan group, which is most likely Aptian. No cupedids are known from younger deposits in Mongolia.

Below, nine new cupedid species of the tribes Brochocoleini and Notocupedini subfamily Ommatinae are described. The representatives of the Ommatini and Cupedinae will be described later. Two species were described earlier [1]. The Mesozoic of Mongolia has yielded no less than 30 species of cupedids, including the fossils insufficiently complete to be described. The beetles described here are from the six localities listed below. More detailed information on these localities has been published by Sinitsa [2].

Bakhar. Bayan-Khongor district, Gobi Altai, 12 km north of Mt. Tsetsey-Ula. Middle or Upper Jurassic, Bakhar group; Togo-Khuduk formation, Outcrops 268 (Bed 14) and 275 (Bed 1); Ortsog formation, Outcrop 208 (Beds 2 and 3).

Bon-Tsagan. Bayan-Khongor district, Gobi Altai, Mt. Dund-Ula foothills; south of Lake Bon-Tsagan-Nur. Lower Cretaceous; Ulan-Argalant formation of Dund-Argalant group, Outcrop 23 (Bed 22); and Khurilt formation of Bon-Tsagan group, Outcrops 25 (Bed 6), 35, 36 (Bed 3), 45, (Bed 19), 60, 87 (Bed 8) and 88.

Shar-Tologoy. Bayan-Khongor district, southeast of Mt. Ikh-Bogdo, 33 km north of Bayan-Leg area. Lower Cretaceous, Bon-Tsagan group, Shar-Tologoy formation.

Shara-Teeg. Gobi Altai region, southeast of Adzhi-Bogdo Range, south of Mt. Shara-Teeg. Upper Jurassic, Shara-Teeg formation.

Khurilt. Bayan-Khongor district, Gobi Altai, 6 km north of Mt. Tsetsey-Ula, Khurilt-Ulan-Bulak. Lower Cretaceous, Bon-Tsagan group, Khurilt formation.

Erdeni-Ula. Gobi Altai, western end of Gobi Altai region, 40 km northeast of Chandman' area, 8 km south of Mt. Undur-Ukha. Lower Cretaceous, Undur-Ukha Formation.

FAMILY CUPEDIDAE LACORDAIRE, 1857

SUBFAMILY OMMATINAE SHARP ET MUIR, 1912

TRIBE BROCHOCOLEINI HONG, 1982

Nomen translatum hic ex Brochocoleidae Hong, 1982

Diagnosis. Upper part of head with longitudinal keels above eyes bearing pointed tubercles; antennae bristle-like; abdomen convex, its sternites not imbricately overlapping.

Composition. Single genus *Brochocoleus*.

Remarks. The family Brochocoleidae was described from an isolated elytrum [3] whose

Notocupes are new diagnosis China, is given. the subfamily

they are now It is especially surface, almost rarely can such beetles. The an that of any

ic range: They ns of the weak It is interesting the substantial

because of the

Brochocoleini i

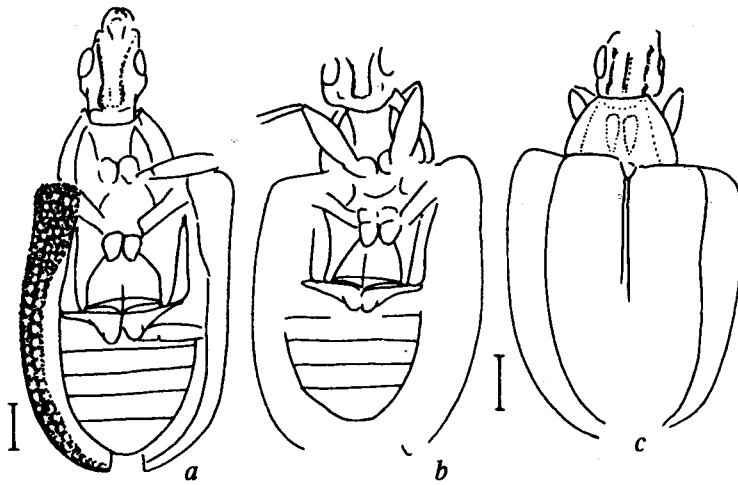


Fig. 1. *Brochocoleus cossyphus* sp. nov.: a - holotype PIN No. 3559/1640, ventral view; b, c - paratype PIN No. 3559/1623: b - ventral, c - dorsal; Bon-Tsagan; Lower Cretaceous.

venation was incorrectly interpreted, and it became the basis for distinguishing an independent family. The characteristic wide rim of this elytrum permits both an assignment of the species described below to the genus *Brochocoleus* and a new diagnosis of the Brochocoleidae, lowering its rank to a tribe within the subfamily Ommatinae of the family Cupedidae. The family Brochocoleidae Hong, 1982 must thus be regarded as a junior subjective synonym of the family Cupedidae Lacordaire, 1857.

Genus *Brochocoleus* Hong, 1982

Type species. *B. punctatus* Hong, 1982; Upper Jurassic of China.

Diagnosis. Pronotum and elytra laterally with fairly flat rim; elytral rim only twice narrower than disc and bearing up to three rows of cells in basal part. Principal vein closest to anterior margin of elytra bent around it; remaining veins ended on this vein. Last abdominal sternite less than twice length of penultimate one.

Specific composition. Type species, and three more species described below.

Brochocoleus cossyphus Ponomarenko, sp. nov.

Pl. VIII, fig. 1

Specific name. From genus *Cossyphus*.

Holotype
45, Bed 19

Descripti
narrowing
short. Neck
two longitu
lower surfac
forward, an
Metasternu
narrowing f
Length of e
in anterior t
third. Prin
Body is den
head and m

Dimensi

Composi
in epipleura

Materia
3559/1623 fr
Outcrop 35;
8).

Specific

Holotyp
22; Lower C

Descripti
narrowing m
short. Neck
elevation opp
spaced and fr
forward, and
that narrows
length half its
last sternite is
times; its aper
two rows of c
intermediate v
largest on pro

Holotype. PIN No. 3559/1640, mold and cast of beetle without legs; Bon-Tsagan, Outcrop 45, Bed 19; Lower Cretaceous, Khurilt sequence.

Description (fig. 1). Fairly small, flat beetle has head 1.5 times longer than its width, narrowing slightly forward. Genae and temples are somewhat shorter than eyes; occiput is cut short. Neck constriction is not too pronounced, temples do not protrude laterally. Vertex has two longitudinal oval flat tubercles. Wide and deep grooves for antennae merge in middle of lower surface of head. Pronotum is somewhat longer than its width, narrows strongly but roundly forward, and is fairly flat laterally. Disc of pronotum has pair of longitudinal depressions. Metasternum is transverse, its length less than half its width. Abdomen is wide and short, narrowing from base of third sternite; last sternite is 1.5-1.6 times longer than penultimate one. Length of elytrum exceeds its width 2.2 times; its apex is rounded. Epipleural rim is very wide, in anterior third has three, and beyond two rows of cells, and narrows quite sharply beyond basal third. Principal veins of elytrum differ slightly from intermediate veins; cells are pronounced. Body is densely covered with tubercles, which are largest on prothorax, then on lower surface of head and metathorax.

Dimensions in mm: Length of beetle - 6.5-8.0, width - 4.6-6.4; length of elytrum 5.0-5.8.

Comparison. Differs from type species, which is known only from elytra, in smaller size and in epipleural rim narrowing more sharply beyond basal third.

Material. Holotype and elytrum No. 3559/1671 from same outcrop and bed, and beetle No. 3559/1623 from Outcrop 36 (Bed 3); beetle No. 3559/1613 and elytrum No. 3559/1605 from Outcrop 35; beetle No. 3559/1640 from Outcrop 45; beetle No. 3559/6046 from Outcrop 87 (Bed 8).

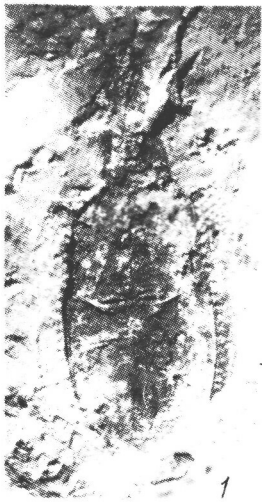
Brochocoleus alatus Ponomarenko, sp. nov.

Pl. VIII, figs. 2, 3

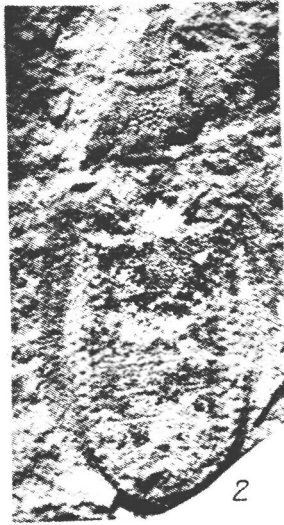
Specific name. Latin *alatus* (winged).

Holotype. PIN No. 3559/1583, mold of beetle without legs; Bon-Tsagan, Outcrop 23, Bed 22; Lower Cretaceous, Ulan-Argalant formation.

Description (fig. 2). Fairly small, flat beetle has head 1.5 times longer than its width, narrowing markedly forward. Genae and temples are somewhat shorter than eyes; occiput is cut short. Neck constriction is not pronounced; temples protrude laterally. Vertex has transverse elevation opposite posterior end of eyes. Antennal grooves on lower surface of head are widely spaced and fairly shallow. Pronotum is twice smaller in length than in width, narrows slightly forward, and is fairly flat on sides, with quite wide paranota. Disc of pronotum has flat elevation that narrows slightly posteriorly and has depression in middle. Metasternum is transverse, its length half its width. Abdomen is wide and short, narrowing from base of penultimate sternite; last sternite is 1.7 times longer than penultimate one. Length of elytrum exceeds its width 2.5 times; its apex is rounded. Epipleural rim is very wide; its anterior third has three, and beyond, two rows of cells, narrowing gradually rearward. Principal veins of elytrum differ slightly from intermediate veins; cells are distinct. Body of insect is densely covered with tubercles, which are largest on pronotum, then on lower surface of head and metathorax.



1



2



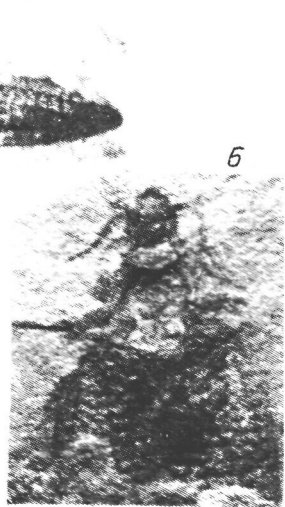
3



4



8



6



5



7



9

PLATE VIII

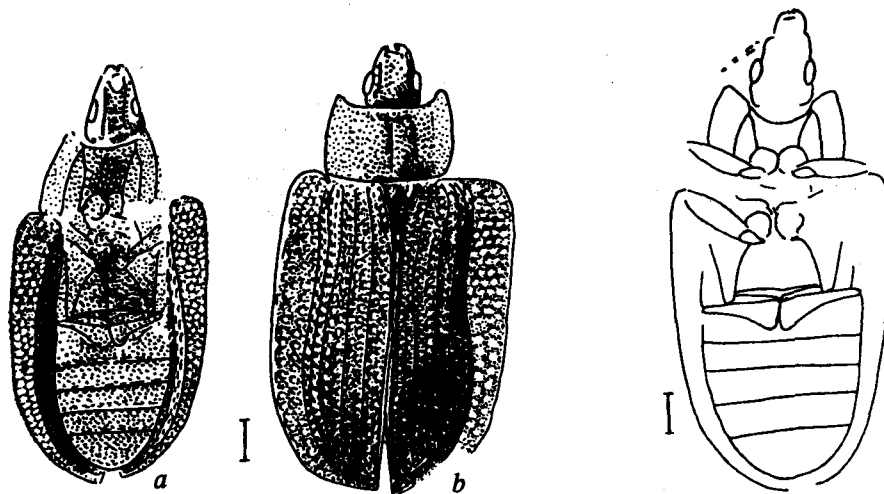


Fig. 2. *Brochocoleus alatus* sp. nov.: a - Holotype PIN No. 3559/1583, ventral view; b - Paratype PIN No. 3559/6057, dorsal view; Bon-Tsagan; Lower Cretaceous.

Fig. 3. *Brochocoleus planus* sp. nov., Holotype PIN No. 3559/6058, ventral view; Bon-Tsagan; Lower Cretaceous.

Dimensions in mm: Length of beetle - 10.0-10.2, width 4.6-6.2; length of elytrum 7.0-7.9 mm.

Comparison. Differs from type species, which is known only from elytra, in smaller size and narrower epipleural rim. Differs from above species flat transverse tubercle on vertex and in wide pronotum narrowing slightly forward.

KEY TO PLATE VIII

- Fig. 1. *Brochocoleus cossyphus* sp. nov., holotype PIN No. 3559/1640 (x8.5)
 Figs. 2, 3. *Brochocoleus alatus* sp. nov.: 2 - holotype PIN No. 3559/1583, ventral view; 3 - Paratype PIN No. 3559/6057 (x6.5).
 Fig. 4. *Brochocoleus planus* sp. nov., holotype PIN No. 3559/6058 (x3.6).
 Fig. 5. *Notocupes brachycephalus* sp. nov., holotype PIN No. 3791/3811 (x6.6)
 Fig. 6. *Notocupes exiguus* sp. nov., holotype PIN No. 3791/42% (x10).
 Fig. 7. *Notocupes longicollis* sp. nov., holotype PIN No. 3791/3812 (x9.2).
 Fig. 8. *Notocupes mongolicus* sp. nov., holotype PIN No. 3559/6028 (X3.9).
 Fig. 9. *Notocupes dundulaensis* sp. nov., holotype PIN No. 3559/1631 (x4.4)

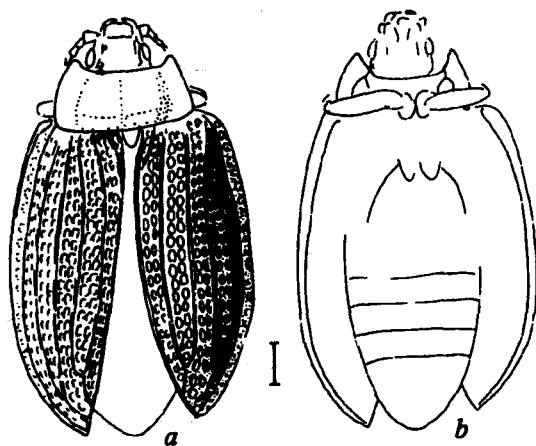


Fig. 4. *Notocupes brachycephalus* sp. nov., Holotype PIN No. 3791/3811: *a* - dorsal view, *b* - ventral view; Bakhar, Middle or Upper Jurassic.

Material. Holotype, plus beetle No. 3559/6057 from Outcrop 87 (Bed 8) and elytrum No. 3559/1621 from Outcrop 35 of same locality; two elytra, mesothorax, and abdomen No. 3790/279 from Khurilt locality, Outcrop 206 (Bed 4).

Brochocoleus planus Ponomarenko, sp. nov.

Pl. VIII, fig. 4

Specific name. Latin *planus* (flat).

Holotype. PIN No. 3559/6058, mold and cast of beetle without parts of legs; Bon-Tsagan, Outcrop 87, Bed 8; Lower Cretaceous, Khurilt formation.

Description (fig. 3). Fairly flat beetle of medium size has head 1.3 times longer than wide, and narrower in front of eyes than at occiput. Genae and temples are somewhat shorter than eyes, occiput is cut short. Neck constriction is not pronounced, and temples do not project laterally. Vertex has transverse elevation opposite posterior end of eyes. Antennal grooves on lower surface of head are widely spaced and deep. Pronotum is half as long as wide, narrows slightly both forward and rearward, is rounded and fairly flat along sides, with quite wide paranota. Disc of pronotum has flat elevation narrowing slightly rearward and depression in middle. Metasternum is transverse, half as long as wide. Abdomen is wide and short, narrowing from base of penultimate sternite; last sternite is 1.7 times longer than penultimate one. Length of elytrum is 2.5 times greater than its width; its apex is rounded. Epipleural rim is very wide; in its first third are three, and beyond, two rows of cells, and narrows gradually rearward.

Principal veins covered with tubercles on mesothorax.

Dimension

Comparison with other species, which have a narrow scarp on the pronotum.

Material. Holotype, PIN No. 3559/6058 from Outcrop 87, Bed 8; Lower Cretaceous, Khurilt locality; elytra, mesothorax, and abdomen No. 3790/279 from Khurilt locality, Outcrop 206 (Bed 4).

Specific name

Holotype. PIN No. 3559/6058 from Outcrop 87, Bed 14; Middle Cretaceous, Khurilt formation.

Description (

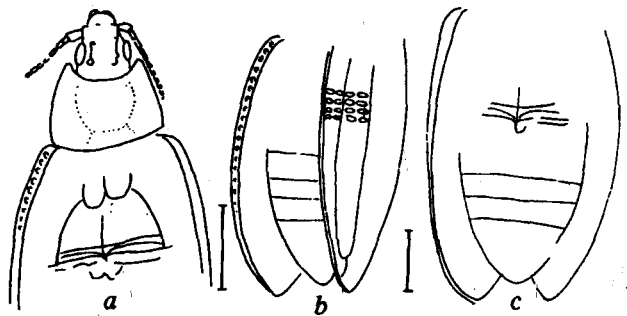


Fig. 5. *Notocupes exiguus* sp. nov.: a - holotype PIN No. 3791/4296, b - paratype PIN No. 3791/4059, c - paratype PIN No. 3791/4591; Bakhar; Middle or Upper Jurassic.

No.
le or

Principal veins of elytra differ slightly from intermediate veins; cells are distinct. Body is densely covered with tubercles, which are largest on prothorax, then on lower surface of head, meso- and metathorax.

Dimensions in mm: Length of beetle 16.5, width 8.5; length of elytrum 10.5-11.2.

ly and elytrum No.
men No. 3790/279

Comparison. It is close to *B. alatus*, from which it differs in considerably greater size, head, narrow scarp forward of eyes, and faint cells on epipleural fold. Differs in last feature also from type species, which has similar size.

Material. Holotype, plus incomplete pronotum No. 3559/1612 and elytra Nos. 3559/1595 and /1598 from Outcrop 35; elytra Nos. 3559/1667 and /1675 from Outcrop 45 (Bed 19) of same locality, elytra, metathorax, and abdomen No. 3787/321 from Outcrop 213 (Bed 25) of Erdeni-Ula locality.

legs; Bon-Tsagan,

TRIBE NOTOCUPEDINI PONOMARENKO, 1966

Genus *Notocupes* Ponomarenko, 1964

Notocupes brachycephalus Ponomarenko, sp. nov.

Pl. VIII, fig. 5

Specific name. Greek *brachys* (short) and Greek *kephalon* (head).

Holotype. PIN No. 3791/3811, mold and cast of almost complete beetle; Bakhar, Outcrop 268, Bed 14; Middle or Upper Jurassic, Togo-Khuduk formation.

Description (fig. 4). Quite small, wide, fairly flat beetle has head almost equal in length and

longer than wide,
what shorter than
les do not project
tenal grooves on
; as wide, narrows
, with quite wide
and depression in
l short, narrowing
mate one. Length
l rim is very wide;
ly rearward.

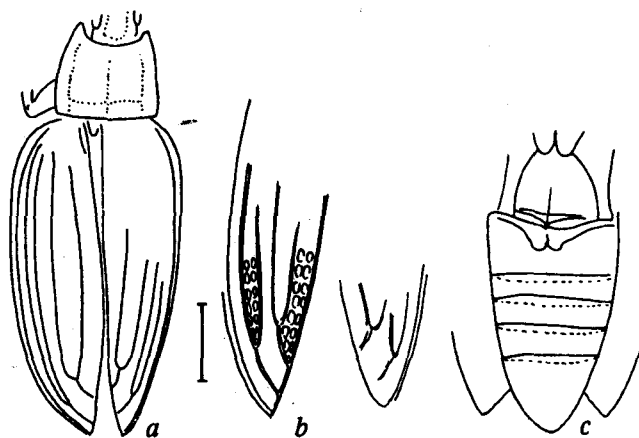


Fig. 6. *Notocupes longicollis* sp. nov.: a - holotype PIN 3791/3812; b, c - paratype PIN No. 3791/3814: b - dorsal view, c - ventral view; Bakhar, Middle or Upper Jurassic.

width, and narrowing slightly forward. Genae and temples are shorter than eyes, occiput is slanting, neck constriction is slight. Vertex has two longitudinal keels, which in turn bear pointed tubercles behind eyes and above bases of antennae. Antennae are short, their first and second segments larger than rest. Pronotum is transverse, its length 1/2 its width, and narrowing quite strongly forward; its anterior corners are drawn out and anterior margin is notched. Disc of pronotum has small square elevation that is divided by deep longitudinal groove. Metasternum is short, its length half its width. Relief of middle sternites of abdomen is quite sharp. Last sternite is 2.8 times longer than penultimate one. Length of elytrum exceeds its width 3.5 times; its apex is drawn out into "tail." Epipleural rim is wide, with row or indistinct cells. Principal veins of elytrum differ sharply from intermediate veins; they are joined in pairs in front of apex, points of junction of two nearest to suture being markedly more proximal than those of outer ones; cells are round, longitudinal in distal part of elytrum, with about 25 cells in row. Body of insect is evenly covered with not very large tubercles.

Dimensions in mm: Length of beetle - 8.8-9.2, width 4.5-5.0; length of abdomen - 4.2; length of elytrum 6.8-7.2.

Comparison. In ratios of lengths of abdominal sternites, resembles Upper Jurassic *N. reticulatus* Oppenheim, from which it differs in smaller size and shorter head.

Material. Holotype, and incomplete elytrum No. 3791/3944 from same locality, and incomplete beetle No. 3791/2998 from Orsog formation of same locality (Outcrop 208, Bed 2) and possibly disarticulated elytra, metasternum, and abdomen No. 4270/888 from Outcrop 444 (Bed 4) and isolated elytrum No. 4270/45 from Outcrop 434 (Bed 2) of Shara-Teeg locality.

Specific name

Holotype.
1; Middle or Upper Jurassic

Description
narrowing slightly
necklike constriction
tubercles above
larger than other
forward, but its a
has large rearward
length half its width
strongly elevated
Length of elytrum
with row of indistinct
veins closest to suture
with about 30 cells
larger on last abdominal

Dimensions
length of elytrum

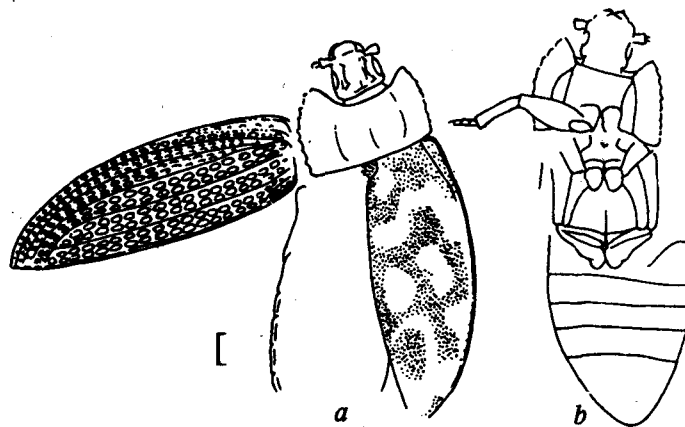


Fig. 7. *Notocupes mongolicus* sp. nov., Holotype PIN No. 3559/6028: a - dorsal view, b - ventral view; Bon-Tsagan; Lower Cretaceous.

Notocupes exiguus Ponomarenko, sp. nov.

PL. VIII, fig. 6

Specific name. Latin *exiguus* (little).

Holotype. PIN No. 3791/4296, mold of anterior half of beetle; Bakhar, Outcrop 275, Bed 1; Middle or Upper Jurassic, Togo-Khuduk formation.

Description (fig. 5). Small, wide, fairly flat beetle has head somewhat longer than its width, narrowing slightly forward. Genae and temples are shorter than eyes, occiput is cut short, and necklike constriction is indistinct. Vertex has two longitudinal keek, which in turn bear pointed tubercles above eyes and behind their posterior ends. Antennae are short, their first segment larger than others. Pronotum is transverse 1.3 times longer than its width, narrowing roundly forward, but its anterior corners are drawn out and anterior margin is notched. Disc of pronotum has large rearward-narrowing elevation divided by longitudinal groove. Metasternum is short, its length half its width. Relief of middle abdominal sternites is pronounced, their posterior half of strongly elevated above anterior half. Last sternite is almost twice as long as penultimate one. Length of elytrum is 2.5 times its width, its apex not drawn out into "tail." Epipleural rim is wide, with row of indistinct cells. Principal veins of elytrum differ sharply from intermediate veins; two veins closest to suture join in front of apex; cells are round; basal parts of elytrum are transverse, with about 30 cells in row. Body is quite evenly covered with not very large tubercles, which are larger on last abdominal sternite and depressed parts of preceding sternites.

Dimensions in mm: Length of beetle - 5.5-6.5, width - 3.0-3.2; length of abdomen - 2.5-3.0; length of elytrum - 3.5-4.5.

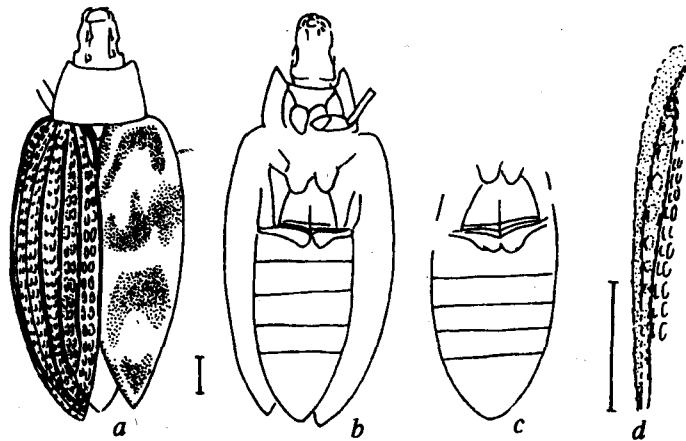


Fig. 8. *Notocupes elegans* sp. nov.: a, b - Holotype PIN No. 3559/1624: a - dorsal view, b - ventral view; c - Paratype No. 3559/1642; d - Paratype No. 3559/1652; Bon-Tsagan; Lower Cretaceous.

Comparison. Differs in longer last sternite from all small species of its genus with sharp relief of abdominal sternites.

Material. Holotype, and from same outcrop and bed, beetles without head and prothorax Nos. 3791/4059, /4213, /4591, and elytrum No. 3791/3026, and from Outcrop 268 (Bed 14) of same locality, paired elytra No. 3791/3813.

Notocupes longicollis Ponomarenko, sp. nov.

PL VIII, fig. 7

Specific name. Latin *longus* (long) and Latin *collis* (neck).

Holotype. PIN No. 3791/3812, mold and cast of almost complete beetle; Bakhar, Outcrop 268, Bed 14; Middle or Upper Jurassic, Togo-Khuduk formation.

Description (fig. 6). Quite small, fairly narrow, cylindrical beetle has head almost equal in length and width, occiput cut short, and indistinct neck constriction. Pronotum is only somewhat longer than its width, and widest in posterior third, narrowing somewhat more strongly forward than rearward; its anterior corners are drawn out, anterior margin is notched. Disc of pronotum has large square elevation divided by longitudinal groove. Metasternum is short, its length half its width. Relief of middle abdominal sternites is sharp. Length of elytrum is almost four times its width, but its apex is not drawn out into "tail." Epipleural rim is narrow, with row of indistinct cells. Principal veins of elytrum differ clearly from intermediate veins; they are joined in pair before apex, points of junction of two closest to suture being markedly more proximally located than of those two outer veins; cells are round, longitudinal in distal part of elytra, with about 30 cells in row. Body of insect is quite evenly covered with not very large tubercles.

Dimension
length of elytr

Compari
and long pron

Material
No. 3791/3814
head and pro

Holotype.
Outcrop 23, B

Description
length than in v
eyes, with slant
which bear poin
1.7 times longe
drawn out and
faint longitudin
Relief of middl
one. Length of
into "tail." Epi
sharply from int
evenly covered v

Dimension
of elytrum - 9.3-

Compariso
ronotum and al
ne, and wide ej

Material. I
om same outcr
559/1644 and r
559/1656 and el

Specific nam

Dimensions in mm: Length of beetle - 6.2-7.5, width - 2.2-2.4; length of abdomen - 3.1; length of elytrum - 4.5-5.0.

Comparison. Differs from all other species with long last abdominal sternite in small size and long pronotum.

Material. Holotype, and from same outcrop and bed, beetle without head and prothorax No. 3791/3814, and from Ortsog formation in same locality (Outcrop 208, Bed 3) beetle without head and prothorax No. 3791/3014.

Notocupes mongolicus Ponomarenko, sp. nov.

Pl. VIII, fig. 8

Holotype. PIN No. 3559/6028, mold and cast of almost complete beetle; Bon-Tsagan, Outcrop 23, Bed 22; Lower Cretaceous, Ulan-Argalant formation.

Description (fig. 7). Quite wide, flat beetle of medium size has head somewhat greater in length than in width, narrowing slightly forward. Genae are shorter than eyes, temples equal to eyes, with slanting occiput, and indistinct neck constriction. Vertex has two longitudinal keels, which bear pointed tubercles behind eyes and above bases of antennae. Pronotum is transverse, 1.7 times longer than its width, and narrows quite strongly forward, with its anterior corners drawn out and anterior margin notched. Disc of pronotum has large square elevation divided by faint longitudinal groove. Metasternum is quite short, its length almost twice less than its width. Relief of middle sternites of abdomen is slight. Last sternite is 2.7 times longer than penultimate one. Length of elytrum is somewhat more than three times its width; its apex is not drawn out into "tail." Epipleural fold is wide, with row of distinct cells. Principal veins of elytra differ sharply from intermediate; cells are longitudinal, with about 25 in row. Body of insect is quite evenly covered with very large tubercles.

Dimensions in mm: Length of beetle -14-15, width - 7.5-8.5 mm; length of abdomen - 6.5, of elytrum - 9.3-10.5.

Comparison. Differs from all other species of genus in combination of faint relief of pronotum and abdominal sternites, last abdominal sternite being 2.7 times longer than preceding one, and wide epipleuron with row of cells.

Material. Holotype, and pronotum No. 3559/1584 and elytra Nos. 3559/1577, /1581, /1591 from same outcrop and bed; elytra Nos. 3559/1615 and /1616 from Outcrop 35; elytrum No. 3559/1644 and metasternum No. 3559/1668 from Outcrop 45 (Bed 19); and abdomen No. 3559/1656 and elytrum No. 3559/6038 from Outcrop 87 (Bed 8).

Notocupes elegans Ponomarenko, sp. nov.

Specific name. Latin *elegans* (refined).

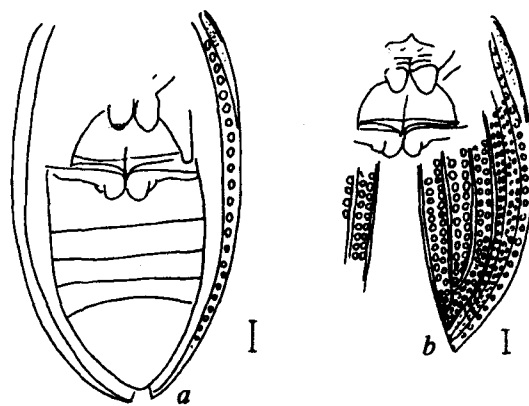


Fig. 9. *Notocupes dundulaensis* sp. nov.: a - Holotype PIN No. 3559/1631, ventral view; Bon-Tsagan; Lower Cretaceous; b - Paratype PIN No. 4271/185; Shar-Tologoy; Lower Cretaceous.

Holotype. PIN No. 3559/1624, mold and cast of almost complete beetle; Bon-Tsagan, Outcrop 36, Bed 3; Lower Cretaceous, Khurilt formation.

Description (fig. 8). Fairly flat, medium-sized beetle has head markedly longer than its width, and narrowing forward. Genae are longer than eyes, temples shorter, occiput is slanting, neck constriction is slight. Vertex has two longitudinal keels, bearing pointed tubercles above eyes and bases of antennae. Pronotum is transverse, its length 1.5 times its width, narrowing markedly forward, with its anterior corners drawn out and anterior margin notched. Disc of pronotum has large square elevation divided by faint longitudinal groove. Metasternum is quite short, its length almost twice shorter than its width. Relief of middle abdominal sternites is slight, punctuation on convex and concave parts of sternites similar in size. Last sternite is twice the length of penultimate one. Length of elytra somewhat more than three times exceeds its width; its apex is not drawn out into "tail." Epipleural rim is fairly narrow, with row of distinct cells only in its basal third. Principal veins of elytrum differ sharply from intermediate veins; cells are longitudinal with about 25 in a row. Body of insect is quite evenly covered with fairly small tubercles.

Dimensions in mm: Length of beetle -10-12, width - 3.7-4.5; length of abdomen - 4.5-6.2; length of elytrum - 7-9.

Comparison. In length of head, pronotum, and proportions of abdominal sternites, it resembles *N. caudatus* Ponomarenko, 1966, from which it differs in smaller size, faint relief of head and pronotum, narrower epipleuron, on which row of cells is present only in basal third, and in apex of elytrum not drawn out into "tail."

Material. Holotype, and from same locality almost complete beetles Nos. 3559/1639, /1642 (Outcrop 45, Bed 19), elytra No. 3559/29, /50, /1559 (Outcrop 23, Bed 22), /1593 (Outcrop 25)

Bed 6), /1602
/1652, /1658, /
Bed 8), abdo
(Outcrop 45,
4271/167 (Out
4), /174, and
3790/279 (Out

Specific n

Holotype.
Bon-Tsagan, O

Description
quite short, its l
punctuation on c
times longer th
out into "tail." I
of elytra differ
Body of insect i

Dimension

Compariso
1966, but differ
of elytra.

Material. I
/1607, /1610 (Ou
3559/1588 (Outc
paired elytra, m
4271/168 (Outcr

1. Ponomare
stemakh
Mongolia)
84-85.
2. Sinitza, S.
Cretaceou
Nauka Pre
3. Hong, Y., 1
House, Pek

Bed 6), /1602 (Outcrop 35), /11624 (Outcrop 36, Bed 3), /1637, /1639, /1642, /1647, /1649, /1651, /1652, /1658, /1660, /1665, /1669 (Outcrop 45, Bed 19), /1678 (Outcrop 60), /6060 (Outcrop 87, Bed 8), abdomen No. 3559/1601, /1603 (Outcrop 35), /1643, /1647 (1673), /1663, and /3498 (Outcrop 45, Bed 19). From Shar-Tologoy locality come paired elytra and abdomen Nos. 4271/167 (Outcrop 368, Bed 4), /187 (Outcrop 382, Bed 5), elytra No. 4271/170 (Outcrop 368, Bed 4), /174, and /178 (Outcrop 368, Bed 5); and from Khurilt locality, beetle without legs No. 3790/279 (Outcrop 206, Bed 4).

Notocupes dundulaensis Ponomarenko, sp. nov.

Pl. VIII, fig. 9

Specific name. From Dund-Ula Mountains.

Holotype. PIN No. 3559/1631, mold and cast of beetle without head, pronotum and legs; Bon-Tsagan, Outcrop 45, Bed 19; Lower Cretaceous, Khurilt formation.

Description (fig. 9). Beetle is medium-sized, fairly flat, and quite wide. Metasternum is quite short, its length almost twice less than width. Relief of middle abdominal sternites is faint, punctuation on convex and concave parts of sternites differs sharply in size. Last sternite is four times longer than penultimate one. Length of elytra twice exceeds its width, its apex not drawn out into "tail." Epipleural rim is wide, with row of distinct cells extending to apex. Principal veins of elytra differ sharply from intermediate veins; cells are longitudinal with about 30 cells in row. Body of insect is quite evenly covered with fairly small tubercles.

Dimensions in mm: Length of abdomen - 6.5-7.0, length of elytrum - 13.5-14.0.

Comparison. In length of last sternite of abdomen, resembles *N. vitimensis* Ponomarenko, 1966, but differs in larger size and wider epipleural rim, on which row of cells extends to apex of elytra.

Material. Holotype, and from same locality elytra Nos. 3559/1529 (Outcrop 23, Bed 22), /1607, /1610 (Outcrop 35), /1627, /1674 (Outcrop 45, Bed 19), /6032 (Outcrop 88); abdomen No. 3559/1588 (Outcrop 23, Bed 22), and /1599 (Outcrop 35). From Shar-Tologoy locality come paired elytra, metathorax, and abdomen No. 4271/185 (Outcrop 382, Bed 5), and elytrum No. 4271/168 (Outcrop 368, Bed 4).

REFERENCES

1. Ponomarenko, A. G., 1986, Family Cupedidae. In: Nasekomyye v rannemel. ekosistemakh Zap. Mongolii (Insects in the Early Cretaceous Ecosystems of Western Mongolia). Tr. Sovm. sov. -Mongol, paleont. eksped., No. 28, Nauka Press, Moscow, pp. 84-85.
2. Sinitsa, S. M., 1993, Yura i nizhniy mel Tsentr. Mongolii (The Jurassic and Lower Cretaceous of Central Mongolia). Tr. Sovm. Sov. -Mongol, paleont. eksped., No. 42, Nauka Press, Moscow.
3. Hong, Y., 1912, Mesozoic Fossil Insects of Jiuquan Basin in Gansu Province. Geol. Publ. House, Peking, 187 pp.