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A revision of the *Psammodius* FALLÉN species from Europe, Asia and Africa

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PHOTOS BY JIŘÍ PRADÁČ

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1 INTRODUCTION

During the identification of some original material of *Aphodiinae* collected in Iran (Second Expedition of the National Museum in Prague), Uzbekistan (A. OLEXA, S. BÍLÝ, and M. RAKOVIČ lgt.), Sudan (V. SEICHERT lgt.) and Pakistan (M. DANIEL lgt.), I encountered problems which called for examining type and non-type material of most Old World (Europe, Asia and Africa) species of *Psammodius* and for revising the whole genus.

The number of Old World species known at the present time was doubled since appearing the monograph of *Aphodiinae* by SCHMIDT (1922), which represented a treatise on the subfamily on the world basis. Of course, there are newer works containing the keys to species and/or revisions of the *Psammodius* FALLÉN species from the Palearctic and Oriental Regions (BALTHASAR 1964) and Central and East Africa (ENDRÖDI 1960, 1964), however, since 1964 15 new species were described – BALTHASAR (1965, 1971), PETROVITZ (1971, 1975), NOMURA (1973), RAKOVIČ (1977, 1978b), PITTINO (1979b,c), two formerly incorrectly synonymized species were restituted – RAKOVIČ (1978), PITTINO (1978), one species was transferred to the genus *Psammodius* FALLÉN - RAKOVIČ (1979), two species were removed from the genus – NAKANE (1972), RAKOVIČ 1979a, and one American species was found in England – JOHNSON (1976).

Besides this, most species included in the above mentioned revisions are quite insufficiently described in the literature and relevant illustrations are missing.

The facts pointed out in the two preceding paragraphs represent reasons for which I feel a new revision of the genus to be necessary. With respect to geographic distribution of some species (e. g. the *P. indicus* (HAROLD) is known from India, Celebes, the Mascarenes, Madagascar, and South and Southeast Africa), it was reasonable to revise the genus on the Old World basis rather than on the basis of individual zoogeographical regions.

The work is based on studying above 1300 specimens of 38 species. It would be impossible to accomplish the study without generous and efficient support of many scientists. I am indebted very much to my dear friends Z. TESAŘ (Opava) and J. JELÍNEK and S. BÍLÝ (National Museum, Prague) for discussion of many problems and for qualified advises, and to one out of top world scarabaeologists – S. ENDRÖDI (Hungarian Natural History Museum, Budapest) for many valuable suggestions.

My thanks are extended to the following entomologists and institutions, who sent me material either for study and identification or on exchange, and who enabled me to study their collections (for abbreviations see below): Z. TESAŘ (Opava), V. BALTHASAR (Prague), J. JELÍNEK and S. BÍLÝ (NMP), A. OLEXA (Zoological Garden, Prague), I. OKÁLI (NMB), S. ENDRÖDI (HNMB), CL. BESUCHET and I. LÖBL (MNHG), O. BISTRÖM (ZMUH), P. CLÉMENT (Saint-Ouen-l'Aumone), J. DECELLE (MRACT), R. DAMOISEAU (IRSNB), L. DIECKMANN (IPE), M. UHLIG (MNHUB), R. KRAUSE (SMTD), Z. STEBNICKA (Institute of Systematic and Experimental Zoology, Kraków), H. ROER (ZFMB), R. zur STRASSEN (NMSF), A. DESCARPENTRIES (MHNNP), F. JANCZYK (NMW), O. MARTIN (ZMK), T. NAKANE (National Science Museum, Tokyo), S. M. KHNZORYAN (Zoological Institute, Acad. Sci. Arm. SSR, Erevan), (Mrs.) M. K. THAYER (MCZC), E. H. SMITH (FMNHCh), J. MCNAMARA (BRIO), C. JOHNSON (MMM). Unfortunately, I did not meet with success when trying to come into contact with any institutions and/or individuals in Sweden, so that their material remained unattainable to me.

My special thanks are extended to Dr. R. PITTINO (Milano), who has been working on revising certain groups of this genus on the basis of the Palearctic and Oriental Regions about simultaneously with my work on this revision. At the time, when I was going to complete the manuscript, he has informed me friendly about results of his very important discoveries with a permission to quote them here. I admire his fine scientific contributions, particularly the manner of solving a very complicated and confused problem of two Mediterranean species and their synonyms.

To save space, when reporting the material examined, the following abbreviations will be employed:

BRIO	– Biosystematic Research Institute, Ottawa
CB	– Collection Balthasar
CSB	– Collection Bílý
CO	– Collection Olexa
CR	– Collection Rakovič
CT	– Collection Tesař
FMNHCh	– Field Museum of Natural History, Chicago
HNMB	– Hungarian National Museum, Budapest
IPE	– Institut für Pflanzforschung, Eberswalde
IRSNB	– Institute Royal des Sciences Naturelles, Bruxelles
ISEZK	– Institute of Systematic and Experimental Zoology, Kraków
MCZC	– Museum of Comparative Zoology, Harward University, Cambridge
MHNG	– Muséum d'histoire naturelle, Genève
MMM	– Manchester Museum, The University of Manchester, Manchester
MNHNP	– Muséum national d'histoire naturelle, Paris
MNHUB	– Museum für Naturkunde der Humboldt-Universität, Berlin
MRACT	– Musée Royal de l'Afrique Centrale, Tervuren
NMB	– National Museum, Bratislava

NMP	– National Museum, Prague
NMSF	– Natur-Museum Senckenberg, Frankfurt am Main
NMW	– Naturhistorisches Museum, Wien
SAMCT	– South African Museum, Cape Town
SMTD	– Staatliches Museum für Tierkunde, Dresden
ZFMB	– Zoologisches Forschungsinstitut und Museum A. Koenig, Bonn
ZMK	– Zoological Museum, Kobenhavn
ZMUH	– Zoological Museum of the University, Helsinki

2.1 STATUS OF THE GENUS

The genus *Psammodius* is one of largest genera in the tribe *Psammodiini.* It was established by FALLÉN (1807) to include seven species. Out of them CURTIS (1829) selected *Aphodius sulcicollis* ILLIGER as type-species of the genus, which is in accordance with International Rules. HEER (1841) established a new genus *Psammobius* HEER for *Aphodius sulcicollis* ILLIGER and *Aphodius vulneratus* STURM and used *Aphodius sulcicollis* ILLIGER as type for it, shifting the type of the genus *Psammodius* FALLÉN to *Scarabaeus sabuleti* PANZER. Thus, the name *Psammodius* became a subjective synonym of *Aegialia.* Of course this action is invalid. Thus, the correct status of the genus is as follows:

Psammodius FALLÉN, 1807 (= *Psammobius* HEER, 1841).

The type-species – *Psammodius sulcicollis* (ILLIGER) = *Psammodius asper* (FABRICIUS) n. valid.

Unfortunately, these facts, which were particularly emphasized by CHAPIN (1940) and CARTWRIGHT (1955), were disregarded by some European authors, who accepted the name *Psammobius* HEER. The only one reason for this could be to consider the name *Psammodius* FALLÉN as a nomen oblitum, however, this consideration would be incorrect which was demonstrated by LANDIN (1957), who reviewed the use of the two names between 1807 and 1957. They were both used promiscuously, without having a period longer than 50 years characterized by using exclusively the name *Psammobius.* Thus, the name *Psammobius* HEER should be definitely considered as a synonym of *Psammodius* FALLÉN.

2.2 DIAGNOSIS OF THE GENUS

The *Psammodius* species are relatively small, 2.2 to 5.0 mm (most typically about 3 to 4 mm), oval, more or less broader behind (from species which are strongly broadened posteriorly to those with only slightly convex, nearly parallel lateral

margins of elytra). Yellowish brown, reddish brown, dark brown to nearly black. Sometimes, certain parts darkened (e. g. pronotum, lateral impressions of the pronotum, posterior part of the head, trochanters, ends of the femora, etc.). Either smooth, shining or more or less shagreened and thus only weakly shining or matt.

The head always granulate anteriorly, with two pairs of oblique ridges arranged in a chevron posteriorly, in some species one or both pairs of oblique ridges either indistinct or even quite missing. The area behind the clypeofrontal suture (which may be either well developed, less distinct or quite indistinct) bearing the above mentioned oblique ridges (if present) either quite smooth, with individual small grains, or granulate (usually sparsely and finely as compared to the anterior part). The whole head strongly convex, strongly bent downward anteriorly. The clypeus anterior margin always emarginate (roundly or angularly), angular or rounded each side of the emargination. The clypeus lateral margins either straight, convex, or first concave and then, before the genae, convex. The genae more or less protruding, angular or rounded. The head lateral margins, particularly the genae, in some species with fine hairs, in the other species bare.

The pronotum with or without basal margin line, the lateral margins smooth or crenulate, bare, with hairlike setae or with clavate setae. Some species (subgenera *P.* s. str. and *Granulopsammodius*) with five transverse ridges and five transverse furrows. The ridges more or less distinct, sharp or flat, smooth or granulate, continuous or broken into individual granules. The first and third transversal furrows rather impressed laterally. In species without transverse ridges (subgenus *Leiopsammodius*), there are two pairs of lateral impressions of the pronotum, homologous with lateral parts of these first and third transverse furrows. The fourth and fifth (posterior) transverse ridges interrupted by a longitudinal furrow. Traces of this longitudinal furrow developed posteriorly even in the species without transverse ridges, though if often very indistinctly.

The scutellum small, triangular, always visible.

The elytra convex, with ten striae and ten intervals, with or without basal margin line, with or without humeral teeth. The striae more or less distinctly punctate, the intervals smooth or granulate, punctate or impunctate, flat or convex, the tenth interval either complete or shortened posteriorly.

The posterior femora thick, the lenght-to-widht ratio between 1 : 0.5 and 1 : 0.7. The posterior tibiae with toothed upper edge and a nearly longitudinal row of teeth on the outer surface, without transverse ridges, broadened apically (some American species with heavy transverse carinae will be necessarily transferred into a different genus). The posterior tarsi more or less shortened, shorter than the tibiae. The first to fourth tarsal segments distinctly triangularly widened. The upper terminal spur of the tibiae, in some species very thick and blunt, in the other species relatively slim and sharp, longer than the first tarsal segment (the thesis "longer than the first and second tarsal segments combined" as mentioned in many keys to genera is not valid generally).

2.3 POSITION OF THE GENUS IN THE TRIBE *PSAMMODIINI*

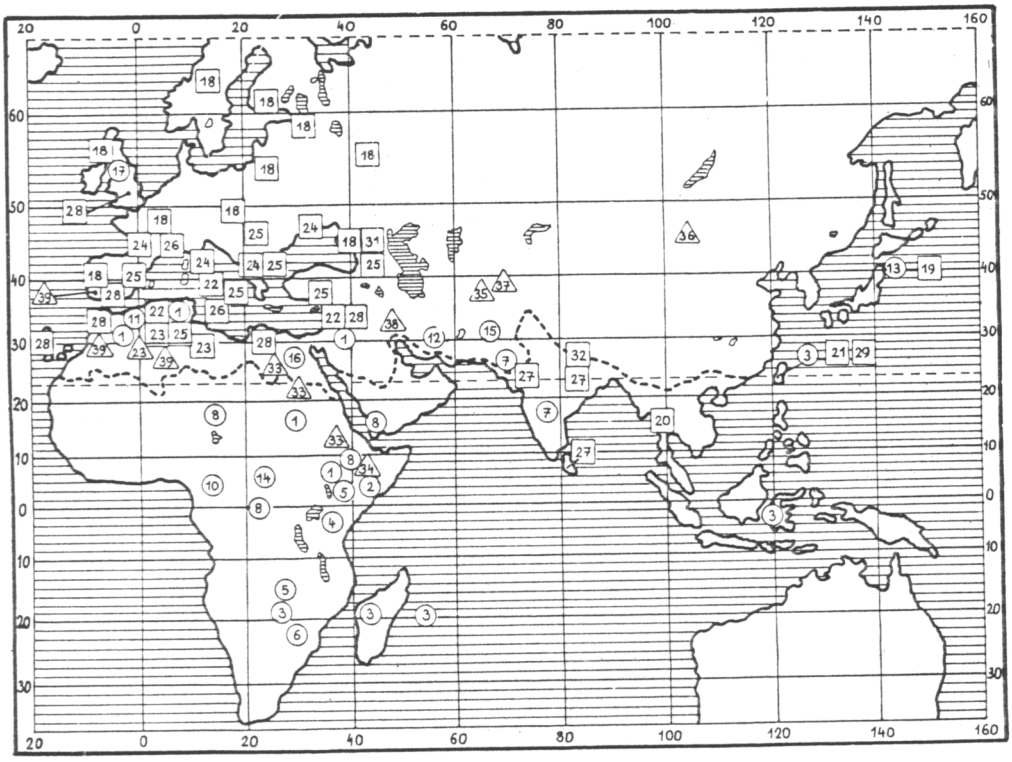
On the basis of relevant monographs – SCHMIDT (1922), BALTHASAR (1964), ENDRÖDI (1964) and some more recent original works – LANDIN (1960), PETROVITZ (1962, 1963, 1967), RAKOVIČ (1979a), we can conclude the following 16 genera of the tribe *Psammodiini* to be known at the present time: *Psammodius* FALLÉN (1807), *Diastictus* MULSANT (1842), *Rhyssemodes* REITTER (1892), *Pleurophorus* MULSANT (1842), *Odochilus* HAROLD (1877), *Rhyssemus* MULSANT (1842), *Myrhessus* BALTHASAR (1955), *Pararhyssemus* BALTHASAR (1955), *Trichiorhyssemus* CLOUËT (1901), *Rhyssemorphus* CLOUËT (1900), *Phycochus* BROUN (1886) with subgenera *Sicardia* REITTER (1896) and *Brindalus* LANDIN (1960) (I disagree with this combination, however, this is beyond the scope of the present work), *Aphodopsammobius* ENDRÖDI (1964), *Boucardius* PETROVITZ (1967), *Mysarus* PETROVITZ (1962), *Trichiopsammobius* PETROVITZ (1963), and *Petrovitzius* RAKOVIČ (1979).

Out of them, the following genera are characterized by triangularly widened tarsal segments: *Diastictus* MULSANT, *Rhyssemodes* REITTER, *Phycochus* BROUN, *Aphodopsammobius* ENDRÖDI, *Trichiopsammobius* PETROVITZ, and *Petrovitzius* RAKOVIČ. *Phycochus* BROUN either has setaceous claws or the claws are missing, *Aphodopsammobius* ENDRÖDI has transverse ridges of posterior tibiae, thus representing a bridge between the tribes *Aphodiini* and *Psammodiini, Petrovitzius* RAKOVIČ is characterized by strongly carinate elytral intervals, *Trichiopsammobius* PETROVITZ has haired elytra and the genera *Diastictus* and *Rhyssemodes* have only moderately widened tarsal segments and posterior femora.

Thus, the genus *Psammodius* FALLÉN can be separated from the other genera of the tribe on the basis of the following characters: remarkably broadened posterior femora, distinctly triangularly widened tarsal segments, hornlike claws, bare, striate (non-carinate) elytra, and posterior tibiae without transverse ridges.

In some American species, we can observe ridges (ante-apical carinae) on posterior tibiae. This is also the case of the species probably introduced from the USA to England (see p. 41). It is possible that this species should be removed from the genus, however, for this purpose, it would be necessary to study further American species in details, which is beyond the scope of this work.

Of course, it is not always easy to establish a definite dividing line between two genera. For relations of the *Psammodius* FALLÉN species to the other genera see also Chapter 3, where individual subgenera are established. In some species one of the two basic characters (triangularly widened tarsal segments of posterior tarsi and remarkably widened posterior femora) may be pronounced weakly. Thus, the differentiation of the genus from related genera (particularly *Rhyssemodes* REITTER) should be understood that either these two characters or at least one of them are remarkably manifested. It is impossible to offer complete classification of the whole tribe in this work, however, the author intends to pay attention to this problem later.



Distribution of *Psammodius* species in the Old World. Numbers in circles — sbg. *Leiopsammodius*, squares — *P.* s. str., triangles — sbg. *Granulopsammodius*

1 *P.* (*L.*) *laevicollis* KLUG
2 *P.* (*L.*) *somalicus* (PETROVITZ)
3 *P.* (*L.*) *indicus* (HAROLD)
4 *P.* (*L.*) *kenyensis* RAKOVIČ
5 *P.* (*L.*) *subciliatus* (HAROLD)
6 *P.* (*L.*) *modestus* (PÉRINGUEY)
7 *P.* (*L.*) *pelluscens* (PETROVITZ)
8 *P.* (*L.*) *laevis* (PAULIAN)
9 *P.* (*L.*) *evanidus* (PÉRINGUEY)
10 *P.* (*L.*) *substriatus* (BALTHASAR)
11 *P.* (*L.*) *desertorum* (FAIRMAIRE)
12 *P.* (*L.*) *jelineki* RAKOVIČ
13 *P.* (*L.*) *japonicus* (HAROLD)
14 *P.* (*L.*) *abyssinicus* (MÜLLER)
15 *P.* (*L.*) *gestroi* (CLOUËT)
16 *P.* (*L.*) *scabrifrons* WALKER
17 *P.* (*L.*) *caelatus* LECONTE
18 *P.* (s. str.) *asper* (FABRICIUS)
19 *P.* (s. str.) *convexus* WATERHOUSE
20 *P.* (s. str.) *thailandicus* (BALTHASAR)
21 *P.* (s. str.) *subopacus* NOMURA
22 *P.* (s. str.) *nocturnus* REITTER
23 *P.* (s. str.) *besucheti* (PETROVITZ)
24 *P.* (s. str.) *basalis* MULSANT et REY
25 *P.* (s. str.) *laevipennis* COSTA
26 *P.* (s. str.) *plicicollis* ERICHSON
27 *P.* (s. str.) *tesari* RAKOVIČ
28 *P.* (s. str.) *porcicollis* (ILLIGER)
29 *P.* (s. str.) *kobayashii* NOMURA
30 *P.* (s. str.) *sefrensis* (PETROVITZ)
31 *P.* (s. str.) *generosus* REITTER
32 *P.* (s. str.) *nepalensis* (BALTHASAR)
33 *P.* (*G.*) *plicatulus* (FAIRMAIRE)
34 *P.* (*G.*) *petrovitzi* RAKOVIČ
35 *P.* (*G.*) *transcaspicus* (PETROVITZ)
36 *P.* (*G.*) *mongol* (ENDRÖDI)
37 *P.* (*G.*) *centralasiae* RAKOVIČ
38 *P.* (*G.*) *mesopotamicus* (PETROVITZ)
39 *P.* (*G.*) *rotundipennis* REITTER

2.4 GEOGRAPHIC DISTRIBUTION OF THE GENUS

The genus *Psammodius* FALLÉN is represented in the Palearctic, Oriental, Ethiopian, Nearctic, Neotropical and Australian Regions.

At the present time, 43 species are known from the Old World (Europe, Asia and Africa). For their distribution see the Map. The detailed distribution is also mentioned below for each species. The genus is represented by its species essentially throughout the whole Europe, Asia and Africa. There are relatively large areas without records on finding any species of *Psammodius* (e. g. China), however, this should be attributed to a lack of data rather than to the fact that the *Psammodius* species are missing there. As a matter of fact, our knowledges about the distribution of the genus will be long fragmentary, since most species are relatively rare, some of them are known only as unique holotypes.

Species of the Nearctic and Neotropical Regions (Western Hemisphere) were revised by CARTWRIHT (1955). The revision contains 35 species, including 3 palearctic, probably introduced species – *P. basalis* (MULSANT et REY), *P. laevipennis* COSTA, and *P. asper* (FABRICIUS). Four species were described later – BALTHASAR 1961, PETROVITZ (1961, 1972), CHALUMEAU (1976), so that 36 originally present and 3 introduced species are known from the Western Hemisphere.

For the Australian Region, 5 species are listed in the SCHMIDT's monograph (1922), 6 were described later, LEA (1923), SCHMIDT (1925), PETROVITZ (1961), PETROVITZ (1964) – total 11 species.

So, 86 species of the genus *Psammodius* FALLÉN are known on the world basis today.

2.5 BIOLOGY

The life of *Psammodius* FALLÉN species is probably exclusively tied to sandy areas. The adults can be found most frequently at the roots of plants, sometimes also under stones – in sand dunes of deserts or along the coast and in sand bars and terraces along rivers.

As to the experiences with original material that I had chance to study, the findings are usually very rare and individual. For example, two specimens of very rare *P. transcaspicus* (PETROVITZ) were collected at roots of the grass *Elymus* (desert Kizilkum, near Bukhara, Uzbekistan, A. OLEXA lgt.). Some species can be collected at lights, however, even in this case, the numbers of the animals taken are not usually too large. For example, the yield of *Psammodius* specimens from light traps from Sudan

(Dr. SEICHERT lgt.) and Iran (Second Expedition of the National Museum in Prague to Iran) was two orders of magnitude lower as compared to that of *Rhyssemus* and *Rhyssemodes* specimens.

The larvae were described for *Psammodius asper* (FABRICIUS) – MEDVEDEV (1952), and for two species from the U.S.A. – JERATH (1960). They are also living at roots of plants, feeding the plant detritus. One generation is developed in a year and the imago is hibernating – MEDVEDEV (1952).

The ecology is discussed in details and the larva and pupa are described of *Psammodius porcicollis* (ILLIGER) in theses by KIM JIN ILL (1978).

3 SUBGENERA AND SPECIES OF THE GENUS

In the genus *Psammodius* FALLÉN, three distinctively different groups of species can be distinguished, the first having pronotum without transverse ridges, the second having five transverse ridges on the pronotum and smooth elytra, and the third being characterized by a pronotum with five transverse ridges and granulate elytra. It may be a matter of discussion, whether it is reasonable to consider these groups as subgenera. CARTWRIGHT (1955) considered two groups – with and without transverse ridges of the pronotum, and did not feel a need of establishing subgenera of the genus *Psammodius* FALLÉN, with respect to few distinguishing characters.

On the other hand, there are two reasons for erecting the subgenera when considering on the one hand the *Psammodius* species and, on the other hand, genera of the tribe *Psammodiini* related to the genus *Psammodius* FALLÉN. As a matter of fact, the animals without transverse ridges on the pronotum are related to the genus *Diastictus* MULSANT, and those with transverse ridges on the pronotum and granulate elytra are related to the genus *Rhyssemodes* REITTER. These relations and further characters will be discussed in more details below, in connection with each subgenus. The second reason is that the dividing lines between individual subgenera are quite definite – it is even more easy to differentiate these subgenera than to distinguish some recognized genera of the tribe *Psammodiini*.

For geographical distribution of all subgenera and species see Table I. It can also serve to support the present concept of subgenera. Within the Old World the subgenus *Leiopsammodius* is represented prevalently in the Palearctic and Ethiopian Regions whereas most species of the subgenus *Psammodius* s. str. occur in the Palearctic and Oriental Regions. The subgenus *Granulopsammodius* is prevalently palearctic, similarly as the genus *Rhyssemodes* REITTER, which corresponds to the above mentioned close relation between them.

The subgenera can be identified according to the following key.

Table I. Distribution of subgenera and species of the genus *Psammodius* FALLÉN

	Species occurring in the Palearctic region	Species shared with the Palearctic and Ethiopian Region	Species occurring in the Ethiopian Region	Species shared with the Ethiopian and Oriental Regions	Species occurring in the Oriental Region
sbg. *Leiopsammodius*	*desertorum* (FAIRMAIRE) *jelineki* RAKOVIČ *japonicus* (HAROLD) *scabrifrons* WALKER *caelatus* (LECONTE)	*laevicollis* KLUG	*somalicus* (PETROVITZ) *kenyensis* RAKOVIČ *subciliatus* (HAROLD) *modestus* (PÉRINGUEY) *laevis* (PAULIAN) *seychellensis* RAKOVIČ *endroedii* sp. n. *evanidus* (PÉRINGUEY) *substriatus* (BALTHASAR) *abyssynicus* (MÜLLER)	*indicus* (HAROLD)	*pelluscens* (PETROVITZ) *gestroi* (CLOUËT) *liviae* PITTINO
sbg. *Psammodius* s. str.	*asper* (FABRICIUS) *porcicollis* (ILLIGER) *basalis* MULSANT et REY *laevipennis* COSTA *plicicollis* ERICHSON *nocturnus* REITTER *besucheti* (PETROVITZ) *convexus* WATERHOUSE *generosus* REITTER *sefrensis* (PETROVITZ)				*kobayashii* (NOMURA) *subopacus* (NOMURA) *thailandicus* (BALTHASAR) *nepalensis* (BALTHASAR) *tesari* RAKOVIČ
sbg. *Granulopsammodius*	*mesopotamicus* (PETROVITZ) *rotundipennis* REITTER *transcaspicus* (PETROVITZ) *mongol* (ENDRÖDI) *centralasiae* RAKOVIČ	*plicatulus* (FAIRMAIRE)	*petrovitzi* RAKOVIČ		

Key to subgenera

1(2) Species without transverse ridges on the pronotum, the elytra never granulate ..... *Leiopsammodius* subgen. n.

2(1) Species with five transverse ridges on the pronotum (the ridges either continuous or broken into individual tubercles), the elytra either smooth or granulate.

3(4) Species with smooth, non-granulate elytra ..... *Psammodius* s. str.

4(3) Species with granulate elytra (either the whole area or at least lateral intervals granulate) ..... *Granulopsammodius* subgen. n.

3.1 *LEIOPSAMMODIUS* SUBGEN. N.

The type species: *Psammodius laevicollis* KLUG.

Out of 40 species discussed in this work, 18 should be placed in this subgenus – 4 Palearctic species, 8 Ethiopian species, 3 Oriental species, 1 shared with the Palearctic and Ethiopian regions, and 1 shared with the Ethiopian and Oriental regions; 1 Nearctic species was reported from Great Britain (obviously introduced).

In all of them, the basic characters of the genus *Psammodius* FALLÉN (wide posterior femora and triangularly widened posterior tarsal segments) are well developed. The same holds for American species I had a chance to examine. Some Australian species have only slightly triangularly widened tarsal segments and essentially non-widened posterior femora, however, these species will be necessarily removed from the genus and transferred into *Diastictus* MULSANT.

The subgenus is characterized by missing transverse ridges on the pronotum and smooth, non-granulate elytra. Besides this, species of the subgenus do not have oblique ridges of the head (except for one species – *P.* (*L.*) *scabrifrons* WALKER, their lateral pronotum margins are smooth (except for *P. somalicus* (PETROVITZ)), and their elytra are not equipped with humeral teeth (except for *P. japonicus* (HAROLD)) and *P. somalicus* (PETROVITZ). The structure of the pronotum may be characterized by a medially and anteriorly shortened longitudinal furrow, which is homologous with the longitudinal furrow interrupting the fourth and fifth transverse ridges in *Psammodiini* who possess these ridges. Furthermore, there are one or two pairs of lateral impressions on the pronotum, homologous with lateral parts of furrows occurring behind the first and third transverse ridges. In some species, there is even a complete transverse furrow behind the pronotum anterior margin (premarginal groove). In some species coarse punctures are arranged to mark the above mentioned formations (premarginal groove, lateral impressions, posterior longitudinal furrow and possibly also vestiges of some transverse furrows).

The key to species, descriptions of all the species and relevant illustrations will be presented below.

1(38) Posterior tibia with a nearly longitudinal row of several teeth, without any transverse or oblique ridges on the outer surface.

2(3) The head posteriorly with oblique ridges. Reddish brown, 3 mm. – Egypt ..... *P.* (*L.*) *scabrifrons* WALKER (3.1.19)

3(2) The head posteriorly without oblique ridges.

4(7) The tenth elytral interval only slightly extended beyond one half the elytra length (the head remarkably narrowed anteriorly, the head, pronotum and elytra lateral margins remarkably haired).

5(6) A smaller species (below 2.8 mm). Genae about semicircular, well separated from the clypeus lateral margins. Both terminal spurs of posterior tibiae remarkably bifid apically. Pale, yellow, 2.2 to 2.8 mm. – Nepal, Cambodja, Burma, W. Pakistan, O. Afghanistan ..... *P.* (*L.*) *gestroi* (CLÖUET) (3.1.16)

6(5) A larger species (above 3 mm). Anterior margins of genae almost on one line with clypeus lateral margins. Terminal spurs of posterior tibiae simple, at the most slightly sinuate apically. Yellowish brown, 3.3 to 3.7 mm. – Burma, Laos ..... *P.* (*L.*) *liviae* PITTINO (3.1.17)

7(4) The tenth elytral interval either complete or achieving at least 3/4 elytra length (the head only moderately narrowed anteriorly, at the most the genae and pronotum lateral margins remarkably haired).

8(9) The longitudinal furrow on the pronotum remarkably impressed, extended from the basal margin nearly to the anterior margin. The elytral intervals strongly convex. A small species. Reddish brown, 2.6 to 2.7 mm. – Rhodesia ..... *P.* (*L.*) *endroedii* sp. n. (3.1.18)

9(8) The longitudinal furrow on the pronotum only slightly impressed, present only posteriorly or marked only by a row of punctures. The elytral intervals moderately convex or flat. Usually larger species.

10(17) Granules on the head, at least those occurring anteriorly, strongly transversal.

11(12) The head granulate behind the clypeofrontal suture. Punctures in elytral striae distinct. Anterior margins of genae quite on one line with the pronotum lateral margins and thus, the genae not pronounced anteriorly. Reddish brown, 2.8 to 3.0 mm. – Congo, Ethiopia ..... *P.* (*L.*) *abyssinicus* (MÜLLER) (3.1.15)

12(11) The head vertex at most with small grains. Punctures in elytral striae indistinct. Anterior margins of the genae not quite on one line with pronotum lateral margins and thus, genae anterior margins pronounced, though if weakly.

13(14) Majority of medium-sized or large punctures on the pronotum irregularly distributed; the pronotum disk remarkably punctate. Reddish brown, 3 mm. – Southwest Africa, South Africa, Ost Africa .... *P.* (*L.*) *subciliatus* (HAROLD) (3.1.5)

14(13) Majority of the punctures on the pronotum arranged along vestigal furrows; disk at most with few punctures.

15(16) Granules on the head located anteriorly transversal, those located medially rounded. The elytra wider (their length-to-width ratio 1 : 0.72). Elytral intervals convex. Reddish brown, 2.7 to 3.1 mm. – Seychelles .... *P.* (*L.*) *seychellensis* RAKOVIČ (3.1.10)

16(15) All the granules on the head transversal. The elytra narrower (their length-to-width ratio 1 : 0.67). Elytral intervals nearly flat. Reddish brown, 2.8 to 3.3 mm. – South Africa ..... *P.* (*L.*) *evanidus* (PÉRINGUEY) (3.1.9)

17(10) Granules on the head rounded, never strongly transversal.

18(19) A relatively large (4 mm and above) nearly black species from Japan. Dark brown, nearly black, 4 to 5 mm. – Japan .... *P.* (*L.*) *japonicus* (HAROLD) (3.1.14)

19(18) Smaller species (below 3.8 mm), yellowish brown to dark brown, from other geographic areas.

20(29) The elytral striae, when observed from above, either indistinct or distinct only near the elytra base. Punctures of the elytral striae replaced by rather large, more or less darkened, quite superficial spots.

21(24) The posterior part of the head (behind the frontal suture) glassy, essentially smooth (at the most with small, microscopic grains). The basal margin line of the pronotum interrupted at the middle. The pronotum glassy, transparent.

22(23) The genae, pronotum lateral margins and legs richly haired. The elytra quite transparent, punctures of elytral striae not visible from above, replaced by slightly darkened, oval, transverse spots occupying the whole width of elytral intervals. Yellowish brown, 3.4 mm. – Algeria .... *P.* (*L.*) *desertorum* (FAIRMAIRE) (3.1.12)

23(22) The genae, pronotum lateral margins and legs either bare or only sparingly haired. The elytra not transparent, punctures of elytral striae distinct, their diameters equal 1/4 to 1/3 interval width. Yellowish brown, 3.4 mm. – Iran ..... *P.* (*L.*) *jelineki* RAKOVIČ (3.1.13)

24(21) The posterior part of the head (behind the frontal suture) with a row of tubercles, with a transverse granulate swelling or with a transverse shagreened swelling. The basal margin line of the pronotum complete.

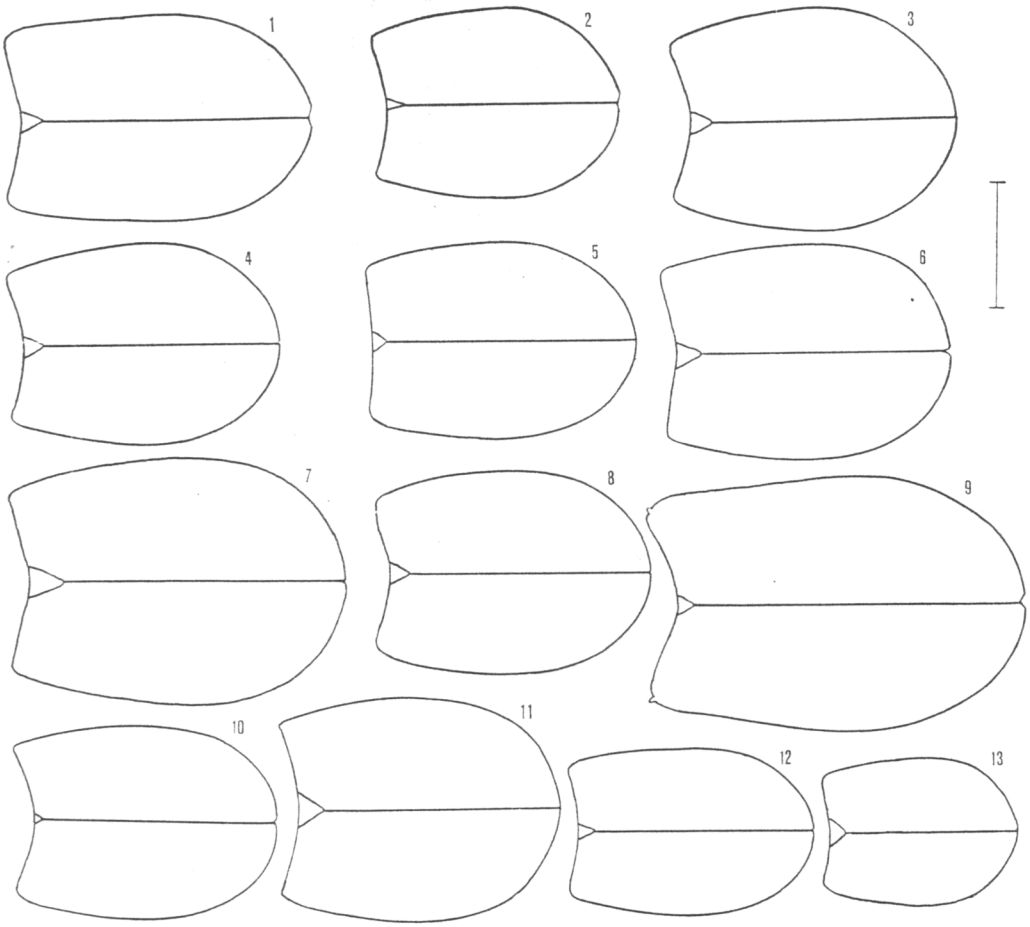
25(26) The head posteriorly (behind the frontal suture) with either a transverse, tuberculate swelling or a row of discrete tubercles. Reddish brown, 2.5 to 3 mm. – Namibia ..... *P.* (*L.*) *substriatus* (BALTHASAR) (3.1.11)

26(25) The head posteriorly (behind the frontal suture) with a non-tuberculate transverse swelling.

27(28) The elytral intervals somewhat convex. The head finely shagreened, however, yet bright. The elytra base not margined, bare. Reddish brown, 3 mm. – Mali, Benin, Chad, Zair, Ethiopia, Yemen ... *P.* (*L.*) *laevis* (PAULIAN) (3.1.8).

28(27) The elytral intervals essentially flat. The head strongly shagreened, quite matt The elytra base finely margined, haired. Yellowish brown, 2.8 to 3.0 mm. – India, Pakistan ..... *P.* (*L.*) *pelluscens* (PETROVITZ) (3.1.7)

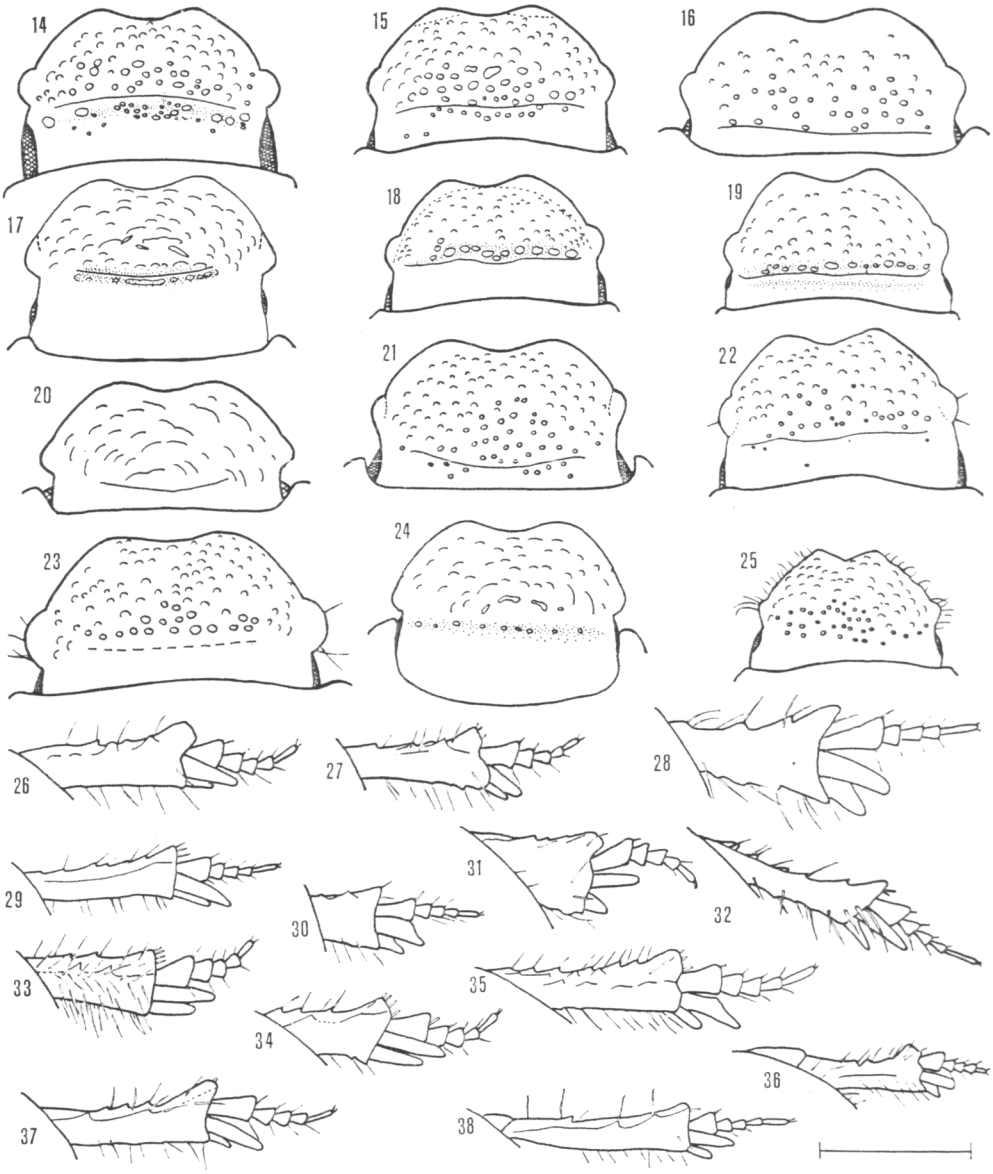
29(20) When observed from above, the elytral striae (at least some of them) distinct (not only at the base). Their punctures smaller or larger, more or less distinct, however, never superficial.



Figs. 1—13. Elytra shapes of *Psammodius* (*Leiopsammodius*) species: 1 — *P.* (*L.*) *laevicollis* KLUG, 2 — *pelluscens* (PETROVITZ), 3 — *desertorum* (FAIRMAIRE), 4 — *indicus* (HAROLD), 5 — *laevis* (PAULIAN), 6 — *jelineki* RAKOVIČ, 7 — *kenyensis* RAKOVIČ, 8 — *evanidus* (PÉRINGUEY), 9 — *japonicus* (HAROLD), 10 — *subciliatus* (HAROLD), 11 — *substriatus* (BALTHASAR), 12 — *abyssynicus* (MÜLLER), 13 — *gestroi* (CLOUËT).

30(31) The pronotum with only one pair of lateral impressions (including lateral parts of an anteriorly located premarginal transversal furrow, if present). Reddish brown, 3 mm. – Rep. of S. Africa .... *P.* (*L.*) *modestus* (PÉRINGUEY) (3.1.6)

31(30) The pronotum with two pairs of lateral impressions.



Figs. 14—38. Heads and tarsi of *Psammodius* (*Leiopsammodius*) species: heads 14 — *P.* (*L.*) *laevicollis* KLUG, 15 — *indicus* (HAROLD), 16 — *kenyensis* RAKOVIČ, 17 — *subciliatus* (HAROLD), 18 — *pelluscens* (PETROVITZ), 19 — *laevis* (PAULIAN), 20 — *evanidus* (PÉRINGUEY), 21 — *substriatus* (BALTHASAR), 22 — *jelineki* RAKOVIČ, 23 — *japonicus* (HAROLD), 24 — *abyssynicus* (MÜLLER), 25 — *gestroi* (CLOUËT); tarsi 26 — *P.* (*L.*) *laevicollis* KLUG, 27 — *indicus* (HAROLD), 28 — *kenyensis* RAKOVIČ, 29 — *subciliatus* (HAROLD), 30 — *pelluscens* (PETROVITZ), 31 — *laevis* (PAULIAN), 32 — *evanidus* (PÉRINGUEY), 33 — *desertorum* (FAIRMAIRE), 34 — *jelineki* RAKOVIČ, 35 — *japonicus* (HAROLD), 36 — *gestroi* (CLOUËT) (bifidity of spurs not visible here — see the description), 37 — *substriatus* (BALTHASAR), 38 — *abyssynicus* (MÜLLER).

32(33) The head posteriorly, behind the clypeofrontal suture, with a granulate transverse swelling or an essentially countinuous row of granules. The pronotum lateral margins smooth and haired. Reddish brown, 2.8 to 3 mm. – Algeria, Tunisia, Egypt, Arabic countries, Sudan, Ethiopia, Somalia, Djibouti, Zair ..... *P.* (*L.*) *laevicollis* KLUG (3.1.1)

33(32) The head posteriorly (behind the frontal suture) with discrete, sometimes indistinct granules. The pronotum lateral margins either smooth and bare or crenulate and haired.

34(35) The pronotum lateral margins crenulate, with short setae. The elytral striae wide and deep, with large punctures which do not disturb the intervals. Reddish brown, 2.7 mm. – Somalia .... *P.* (*L.*) *somalicus* (PETROVITZ) (3.1.2)

35(34) The pronotum lateral margins smooth, bare. The elytral striae narrow.

36(37) A smaller, paler species. A majority of coarse punctures of the pronotum distributed irregularly. The head relatively wider (the ratio head width: pronotum width 1 : 1.40). Reddish brown, 3 to 3.5 mm .– Ethiopian and Oriental Region ..... *P.* (*L.*) *indicus* (HAROLD) (3.1.3)

37(36) A larger, darker species. A majority of medium-sized to coarse punctures of the pronotum arranged along the posterior longitudinal furrow and along lateral vestiges of the first and third transverse furrows. The head narrower (the ratio head width: pronotum width 1 : 1.65). Dark brown, 3.7 mm. – Kenya ..... *P.* (*L.*) *kenyensis* RAKOVIČ (3.1.4)

38(1) The posterior tibia with a heavy transverse preapical carina. Piceous, 2.8 to 3.6 mm. – Canada (British Columbia), U.S.A. (California, Oregon), Great Britain (introduced) ..... *P.* (*L.*) *caelatus* (LECONTE) (3.1.20)

3.1.1 Psammodius (Leiopsammodius) laevicollis KLUG

Psammodius laevicollis KLUG, 1845: t. 42, f. 10.
Psammobius laevicollis: SCHMIDT, 1922: 480 (rev.); PAULIAN, 1942: 130 (key); ENDRÖDI, 1964: 339 (rev.); BALTHASAR, 1964: 537 (rev.).
Psammodius pallidus REITTER, 1892: 161 (syn.).
Psammodius chobauti D'ORBIGNY, 1898: 148 (syn.).

Oblong oval, convex, moderately broader behind, 2.8 to 4 mm (most typically 3.4 to 3.5 mm), the length – to – width ratio 1 : 0.45 (Fig. 93). Shining, reddish brown, the frontal suture somewhat darkened.

The head granulate anteriorly, the granules rounded, some of them slightly transversal. Posteriorly, behind the clypeofrontal suture, with a more or less distinct granulate swelling or with an essentially continuous row of granules. The whole area bright, at the most weakly shagreened. The clypeus roundly emarginate anteriorly, with rounded, lifted angles each side of the emargination. The lateral margins convex, the genae semicircular, sometimes sparingly haired (Fig. 14).

The pronotum transversal, the length – to – width ratio 1 : 1.56, without transverse ridges, with a distinct basal margin line. All the pronotum margins smooth, non-crenulate, lateral margins with relatively long, fine, non-clavate, pale hairs; basal margin with shorter hairs. A distinct furrow behind the anterior margin and a pair of distinct lateral impressions analogous to lateral parts of the third transverse furrow. Medium-sized punctures mostly irregularly distributed, only a minor portion situated along the lateral impressions and along an indistinct residue of the posterior longitudinal furrow.

The scutellum small, triangular, smooth, with slightly darkened lateral margins.

The elytra with non-margined base, without humeral teeth, with 10 striae and 10 intervals. Their length – to – width ratio 1 : 0.68, lateral margins moderately convex (Fig. 1). The striae distinct, with distinct, non-superficial, rounded punctures, disturbing remarkably the intervals. The intervals moderately convex, smooth, impunctate, the tenth interval achieving about 0.8 elytra length.

The posterior tibiae remarkably widened apically, with long hairs. Their upper edge toothed (two teeth in the apical half very remarkable). Their outer surface with a longitudinal row of teeth (1 to 2 teeth in the basal half indistinct, 2 teeth in the apical half very remarkable). The posterior tarsi shortened (the length of the tibiae to that of the tarsi 1 : 0.68), the first to third tarsal segments remarkably triangularly widened, the strong upper terminal spur of posterior tibiae longer than the first and second tarsal segments combined (Fig. 26).

The ventral surface also reddish brown, the abdominal sternites and femora smooth, the metasternal plate weakly shagreened, with a complete, narrow, longitudinal furrow, the prosternum and mesosternum shagreened. The femora haired along anterior and posterior margins. The posterior femora wide, their length – to – width ratio 1 : 0.63. The width of intermediate femur to that of posterior one 1 : 1.82.

Distribution: Algeria, Tunisia, Arabic countries, Sudan, Ethiopia, Somalia, Djibouti, Zair.

Material examined: Type — „Arab. d. ihrb.", MNHUB and 89 specimens — CR, CT, **IRSNB**, MRACT, NMSF, SMTD, ZFMB, ZMUH.

The synonymy with *P. pallidus* REITTER and *P. chobauti* D'ORBIGNY is reported by SCHMIDT (1922).

This, relatively widely distributed and frequently occurring species is characteristic (besides the characters presented in the key to species) by its structure of pronotum (medium sized, irregularly distributed punctures).

3.1.2 *Psammodius* (*Leiopsammodius*) *somalicus* (PETROVITZ)

Psammobius somalicus PETROVITZ, 1961: 129.

The description presented here is based on the original description.

Oblong oval, strongly broader behind, reddish brown, shining, 2.7 mm.

The clypeus emarginate anteriorly, rounded each side of the emargination. The head tuberculate anteriorly, with individual small grains behind a clypeofrontal suture. The genae protruding.

The pronotum transversal, its basal and lateral margins crenulate, equipped with short setae. The surface finely punctate; besides this, with coarse punctures arranged along an anterior transverse furrow, in a pair of lateral impressions, and along a residue of a posterior longitudinal furrow.

The scutellum small, narrow, smooth.

The elytra with fine humeral teeth, with 10 striae and 10 intervals. The striae wide and deep, their large, flat punctures not disturbing the intervals. The intervals convex, finely punctate medially, the tenth interval flat, complete.

The posterior tibiae slim, the tarsi short, however, their length yet exceeding the apical width of the tibiae.

The ventral surface of the same colour as the dorsal surface, with individual setae on the abdomen and metasternum.

The locality data of the type are as follows: Somalia, Benadir-Prov., Uarsciek, VIII. 1958, C. KOCH lgt. It is kept in the Frey Museum.

This, probably rare, species should be easily separated from any other *Psammodius* (*Leiopsammodius*) species by crenulate lateral margins of the pronotum.

3.1.3 *Psammodius* (*Leiopsammodius*) *indicus* (HAROLD)

Psammobius indicus HAROLD, 1877: 100.
Psammobius indicus: SCHMIDT, 1922: 481 (rev.); PAULIAN, 1942: 130; ENDRÖDI, 1964: 339 (rev.); BALTHASAR, 1964: 537 (rev.).
Psammodius indicus: NOMURA, 1973: 44 (key).
Psammobius sculpticollis FAIRMAIRE, 1877: 370 (syn.).

Oval, broader behind, 2.9 to 3.5 mm (most typically about 3.0 mm), the length – to – width ratio 1 : 0.49. Shining, reddish brown, the elytral suture moderately darker (Fig. 94).

The head granulate anteriorly; the granules of essentially uniform size, uniformly and rather densely distributed. Behind a weak clypeofrontal suture not quite smooth – with several grains which are smaller than the granules occurring anteriorly. The clypeus roundly emarginate anteriorly, rounded each side of the emargination, with remarkably convex sides. The genae prominent, about semicircular (Fig. 15). The head margins, the genae inclusive, bare.

The pronotum with a basal margin line, wider in posterior half, the length – to – width ratio 1 : 1.53. With bare margins. Without transverse ridges. Coarsely, sparsely punctate; some of the punctures, though if not a majority, located in the vicinity of lateral impressions, behind the anterior margin and posteriorly, along the midline.

The scutellum small, triangular, smooth.

The elytra with margined base, with indistinct humeral teeth, with convex lateral margins. The length – to – width ratio 1 : 0.78 (Fig. 4). With ten striae and ten intervals. The striae as well as their punctures quite distinct. The punctures surrounded by darkened circles, disturbing the intervals. The intervals moderately convex, smooth, impunctate, the tenth interval not shortened posteriorly; anteriorly, in the humeral region, fused with 9th and 8th intervals.

The posterior tibiae broadened apically. Their outer surface with 3 teeth, their upper edge with 2–3 teeth. The posterior tarsi remarkably shortened, the first to fourth segments triangularly widened. The upper terminal spur of the posterior tibia longer than the first and second tarsal segments combined (Fig. 27). The posterior tibia length – to – posterior tarsus length ratio 1 : 0.46.

The ventral surface also reddish brown. Femora each with about three setae in the vicinity of their posterior margins, trochanters with one seta each, otherwise the ventral surface bare. The femora, abdominal sternites and metasternum smooth, shiny, the mesosternum and prosternum coriaceous. The posterior femur length – to – width ratio 1 : 0.615. The ratio of the intermediate femur width to the posterior femur width 1 : 2.0.

Distribution: Zair, Tanzania, Kenya, Ethiopia, RSA, Rhodesia, Madagascar, The Mascarenes, Seychelles, India, Ceylon, Java, Cocos Keeling Island, Taiwan.

Material examined: 57 specimens — BRIO, CR, IPE, MNHUB, MRACT, SMTD.

Besides the characters reported in the key, this relatively frequently occurring species can be recognized on the basis of the typical pronotal and elytral structure. The synonymization of *P. sculpticollis* FAIRMAIRE was proposed by CLOUËT (1900).

3.1.4 *Psammodius (Leiopsammodius) kenyensis* RAKOVIČ

Psammodius kenyensis RAKOVIČ, 1978: 122.

Oblong oval, convex, broader behind, 3.7 mm, the length – to – width ratio 1 : 0.48. Shining, the head and pronotum dark brown, the elytra and legs slightly paler (Fig. 95).

The head granulate anteriorly, on the vertex with only small, discrete, somewhat indistinct grains. The area between the granules more or less shagreened. The clypeus roundly emarginate anteriorly, rounded each side of the emargination; its lateral margins convex, bare (the genae inclusive); the genae about semicircular (Fig. 16).

The pronotum transversal, the length – to – width ratio 1 : 1.40, without transverse ridges, with a distinct basal margin line. All the pronotum margins smooth (non-crenulate), bare. A nearly complete transverse row of coarse or medium-sized punctures behind the anterior margin, a medially interrupted transverse row of these punctures behind the middle (homologous to vestiges of the first and second trans-

verse furrows, respectively, occurring in *Psammodius* species with transverse pronotal ridges), and a posteriorly situated longitudinal row of punctures. Most medium-sized or coarse punctures arranged in these rows, only a minor portion distributed irregularly.

The scutellum small, triangular.

The elytra with margined base, without humeral teeth, with convex lateral margins (the length – to – width ratio 1 : 0.73 – Fig. 3) with 10 striae and 10 intervals (Fig. 7). The striae narrow, not particularly deep, however, yet distinct. Their punctures rather indistinct. The intervals moderately convex, impunctate, smooth or slightly shagreened, the 10th interval achieving about 3/4 elytra length.

The posterior tibiae widened apically. Their upper edge with 3 teeth. Their outer surface with a longitudinal row of 3 rather blunt teeth. The ratio of the length of the tibia to that of the tarsus 1 : 0.79. The first to fourth segments of the posterior tarsi triangularly widened (Fig. 28).The upper terminal spur about as long as the first and second tarsal segments combined. The posterior tibia length – to – width (at apex) ratio 1 : 0.56.

The ventral surface also dark brown. The abdominal sternites, femora, as well as metasternum smooth, bright, impunctate. The femora with two rows of setae along anterior and posterior margins, the pygidium with a transverse row of fine setae, trochanters each with one seta, otherwise the ventral surface bare. The metasternum with a distinct, narrow, complete longitudinal furrow. The posterior femora wide, their length – to – width ratio 1 : 0.65. The intermediate femur width – to – the posterior femur width ratio 1 : 2.0.

Distribution: Kenya.

Material examined: holotype — Kenya, Nairobi, Dec 2 to 3, 1973, H. SILFVERBERG, ZMUH; 1 paratype — same data, CR.

The *P.* (*L.*) *kenyensis* sp. n. is related to the *P.* (*L.*) *indicus* (HAROLD). These two species have the following common characters by contrast to the other Old World *Psammodius* (*Leiopsammodius*) species: distinct elytral striae, semicircular genae, discrete, rather indistinct granules (not continuous swelling) behind the frontal suture, smooth (non-crenulate) lateral margins of the pronotum. The *P.* (*L.*) *indicus* (HAROLD) is reddish brown, smaller, a majority of coarse punctures on its pronotum is distributed irregularly; the head is wider (the ratio head width: pronotum width 1 : 1.40). The *P.* (*L.*) *kenyensis* RAKOVIČ is dark brown, larger, a majority of coarse punctures on the pronotum are situated along residues of transverse and longitudinal furrows, the head is narrower (the ratio head width : pronotum width 1 : 1.65).

3.1.5 *Psammodius* (*Leiopsammodius*) *subciliatus* (HAROLD)

Psammobius subciliatus HAROLD, 1869: 103.
Psammobius subciliatus: SCHMIDT, 1922: 479 (rev.); ENDRÖDI, 1964: 338 (rev.).

Oblong oval, broader behind, the length of 3.0 to 3.2 mm, the length – to – width ratio 1 : 0.46. Moderately shining, reddish brown, the elytral suture (not the

whole sutural interval) and the tubercles of the head slightly darker, brown (Fig. 96).

The head with a very remarkable clypeofrontal suture forming a furrow between the anterior, tuberculate area and transverse tuberculate swelling situated just behind the suture. Without oblique ridges. The tubercles before the clypeofrontal suture strongly transversal, the area between them minutely shagreened. The swelling behind the suture tuberculate, shagreened, sparsely punctate, the area behind it smooth, minutely shagreened. The clypeus roundly emarginate anteriorly, rounded each side of the emargination. The clypeus lateral margins convex, nearly directly changed into the genae (separated by small notches) (Fig. 17). The head margins, the genae inclusive, bare.

The pronotum with a distinct, complete basal margin line, without transverse ridges. The widest near its half, the length — to — width ratio 1 : 1.53. The lateral sides not crenulate. The lateral and basal margins with pale, not too long, rather tough, non-clavate setae. The pronotum surface with large punctures, not arranged in rows, however, arranged in a special manner, forming zones, that may be considered as homologous with transverse and longitudinal furrows encountered in species with transverse ridges; most punctures occur in lateral impressions and in the premarginal furrow.

The scutellum small, smooth, triangular, rather narrow.

The elytra with slightly margined base and indistinct humeral teeth. The length — to — width ratio 1 : 0.76 (Fig. 10). With ten striae and ten intervals. The striae very remarkable, indistinctly punctate. The intervals finely shagreened, essentially impunctate (only few microscopic punctures near the scutellum on the sutural interval). The tenth interval insignificantly shortened before the apex, weaker than the other ones.

The posterior tibiae moderately broadened apically; the sharp upper edge essentially achieving the apex, with sharp teeth; a longitudinal row of about four remarkable teeth between the top and bottom edge. The posterior tarsi remarkably shortened, the first to fourth segments remarkably triangularly widened (Fig. 29).

The ventral side reddish brown, the trochanters and apical ends of the tibiae and femora only partially and slightly darkened. The abdominal sternites smooth, bare. The pygidium with several pale, long bristles. The metasternum smooth, bare, the metasternal plate concave about its longitudinal furrow, this furrow deeper and wider at the middle, anteriorly and posteriorly in the form of a line. The mesosternum and prosternum coriaceous. The femora smooth, bright. The posterior femora posteriorly each with one bristle (between the middle and the apex),the intermediate femora each with similarly located pair of bristles. The posterior trochanters each with a bristle. The femora remarkably flat, the posterior and intermediate femora posteriorly with a distinct margin line, the anterior femora anteriorly with a swollen edge. The posterior femur length — to — width ratio 1 : 0.56. The intermediate femur width to the posterior femur width 1 : 1.33. The posterior tibiae relatively long the tarsus length — to — tibia length ratio 1 : 1.7.

Distribution: Ethiopian Region (SW Africa, S. Africa, O. Africa — SCHMIDT, 1922, ENDRÖDI, 1964).

Material examined: 48 specimens — HNMB, IRSNB, SMTD, ZFMB.

This species is characteristic by only slightly prominent genae, very distinct, indistinctly punctured elytral striae and arrangement of the punctures of the pronotum.

3.1.6 *Psammodius* (*Leiopsammodius*) *modestus* (PÉRINGUEY)

Psammobius modestus PÉRINGUEY, 1901: 446.
Psammobius modestus: SCHMIDT, 1922: 477 (rev.); ENDRÖDI, 1964: 337 (rev.).

The description presented here is based on the original description, as reported by SCHMIDT, 1922.

Brown to black, the elytra paler, 3 mm.

The head wrinkled – punctate, granulate. The clypeus only moderately emarginate, rounded each side of the emargination. The pronotum coarsely and deeply punctate with a deep lateral impression and posterior longitudinal furrow, extending nearly to the middle.

The elytra broadest in posterior half, with deep striae, the striae remarkably punctate, the punctures disturb the intervals. The intervals convex posteriorly, at sides in the form of keels.

The intermediate and posterior tibiae widened. The upper terminal spur of the posterior tibia strong, as long as the first and second tarsal segments combined.

Distribution: Rep. of South Africa (Natal).

The type of this species should be in the South African Museum, Cape Town. Unfortunately, I received no answer from this Institution. I have never seen any specimen of this species identified by a known Scarabaeologist. Thus, it is probable that this species remained actually unknown to most specialists since its description.

In the key to species, I employed (in accordance with ENDRÖDI, 1964) the existence of only one lateral impression as a distinguishing character, however, we should be aware that this is based on a vague original description (it is possible that the author of the species did not recognize lateral parts of the premarginal transverse furrow as the second pair of lateral impressions). We cannot preclude a possibility that some of African species described later is a synonym of this species, however, this situation cannot be changed until having a chance to study the Péringuey's type.

3.1.7 *Psammodius* (*Leiopsammodius*) *pelluscens* (PETROVITZ)

Psammobius pelluscens PETROVITZ, 1961: 133.
Psammobius gestroi: BALTHASAR, 1964: 535 (part.).
Psammodius pelluscens: RAKOVIČ, 1978: 140 (sp. pr.).

Oval, broader behind, the length of 2.8 to 3.0 mm, the length – to – width ratio 1 : 0.48, shining, yellowish brown, the frontal suture, anterior and posterior pronotum

margins, lateral impressions, scutellum, elytral suture and superficial punctures of the elytral striae darkened (Fig. 97).

The head shagreened, densely tuberculate anteriorly, with a shagreened swelling behind the clypeofrontal suture. The clypeus roundly emarginate anteriorly, rounded each side of the emargination. The clypeus lateral margins convex, bare. The genae prominent, essentially semicircular (Fig. 18), sparsely and finely haired.

The pronotum with a complete basal margin line. The widest near its half, the length – to – width ratio 1 : 1.95. Lateral sides not crenulate, sparsely haired, the hairs fine, not clavate. Only very indistinct (if any) trace of the longitudinal furrow. A shallow, rather wide transverse furrow behind the anterior margin and a very shallow lateral impression each side of the pronotum.

The scutellum small, triangular, situated somewhat below the elytra level, with a fine microscopical sculpture, however, yet bright, with somewhat darkened zones along its lateral margins.

The elytra with convex lateral margins, the length – to – width ratio 1 : 0.75 (Fig. 2) with a finely margined, haired base, without humeral teeth (Fig. 2–1). With 10 striae and 10 intervals. The striae very indistinct, with large, quite superficial punctures, disturbing remarkably the intervals – achieving about one third to one half the intervals width. The intervals flat, the tenth interval complete, non-shortened.

The posterior tibiae remarkably broadened apically, with strong, apically rounded terminal spurs. The upper spur somewhat longer than the first two tarsal segments combined. The posterior tarsi remarkably shortened, with the first to fourth segments remarkably triangularly widened (Fig. 30). The ratio of the length of the posterior tibia to that of the posterior tarsus 1 : 0.63.

The ventral surface also yellowish brown, the coxae, trochanters and apical ends of the femora and tibiae darkened. The abdominal sternites bright, with sparsely distributed medium-sized punctures, the metasternum and prosternum remarkably shagreened, quite matt, with pale, fine hairs, the mesosternum shagreened and granulate; the metasternal plate with a narrow, darkened, essentially non-impressed longitudinal line along its whole length. The femora less shagreened than the abdominal sternites, each with two rows of long, fine pale hairs, parallel with anterior and posterior margins (the posterior row more separated from the margin than the anterior one). The ratio of the intermediate femur width to the posterior femur width 1 : 1.71.

Distribution: India, Pakistan.

Material examined: Holotype — Eastindia, Scinde, Umarkot, STEVENS lgt., 1 specimen — Baloutchestan, Tchachbehari/Tisa, Apr 6 to 8, both MNHG; 3 — "Indes anglaises", Ajmer-Rajpudana, ex coll. MÜLLER, **IRSNB.**

Among similar species the *P.* (*L.*) *pelluscens* (PETROVITZ) is characteristic by strongly shagreened head, and shagreened, more or less swollen area behind the clypeofrontal suture. It is distinctively different from any other Oriental species.

3.1.8 *Psammodius* (*Leiopsammodius*) *laevis* (PAULIAN)

Psammobius laevis PAULIAN, 1942: 130.
Psammobius laevis: ENDRÖDI, 1964: 337 (rev.).

Oval, broader behind, the length – to – width ratio 1 : 0.48, the length of 3 mm. Shining, reddish brown, the legs slightly paler, the elytral suture (not the whole sutural interval), posterior margin of the pronotum, lateral impressions of the pronotum and frontal suture somewhat darkened (Fig. 98).

The head anteriorly with rather flat, rounded, relatively sparsely distributed tubercles; their surfaces shagreened. The tuberculate area posteriorly bounded by a furrow (clypeofrontal suture); a flat, shagreened swelling behind it. The clypeus roundly emarginate anteriorly, rounded each side of the emargination. Lateral sides of the clypeus convex. The genae prominent, nearly semicircular (Fig. 19). All the margins of the head, the genae inclusive, bare.

The pronotum with a complete basal margin line, without transverse ridges, wider in posterior half, the length – to – width ratio 1 : 1.58. A strong transverse furrow behind the anterior margin, a very weak longitudinal furrow shortened anteriorly as well as posteriorly and a lateral impression on each side. All the pronotum margins smooth, non-crenulate, bare. The pronotum surface finely shagreened, essentially impunctate.

The scutellum small, bright, triangular, with a few very fine punctures.

The elytra with a non-margined base, without humeral teeth, with convex lateral margins. The length – to – width ratio 1 : 0.73 (Fig. 5). With 10 striae and 10 intervals. The striae indistinct, with large, superficial punctures. The intervals moderately convex, finely, microscopically, sparsely punctate, finely shagreened (less than the head and pronotum and thus, the elytra brighter); the tenth interval non-shortened.

The posterior tibiae very remarkably widened apically, the posterior tarsi remarkably shortened, their first to fourth segments remarkably triangularly widened. The upper terminal spur longer than the first and second tarsal segments combined (Fig. 31).

The ventral surface yellowish brown, the coxae, trochanters and apical ends of femora only slightly darkened. The abdominal sternites smooth, bare. The metasternum, except for the metasternal plate, finely granulate, bare, the metasternal plate smooth, bare, essentially planar, with a narrow longitudinal furrow, uniformly deep along the whole length. The mesosternum and prosternum shagreened. The femora smooth, bright, each with two rows of punctures (along posterior and anterior margins), each puncture with a fine, pale hair. The ratio of the width of the intermediate femur to that of the posterior one 1 : 1.7. The posterior tibiae very remarkably widened apically. The ratio of the posterior tarsus length to the posterior tibia length 1 : 1.70.

Distribution: Mali, Benin, Chad, Zair, Ethiopia, Yemen.

Material examined: 1 specimen — Tschad, N'Gouri, distr. de Kanem, Aug 1958, HNMB; 1 — Abessinien, SMTD; 1 — W. Aden prot., July 1963, ZMUH.

This species is most similar to an oriental species – *P. (L.) pelluscens* (PETROVITZ) which is remarkably paler and can be separated from the *P. (L.) laevis* (PAULIAN) by quite flat elytral intervals, strongly shagreened head and haired, margined base of the elytra.

3.1.9 *Psammodius (Leiopsammodius) evanidus* (PÉRINGUEY)

Psammobius evanidus PÉRINGUEY, 1901: 446.
Psammobius evanidus: SCHMIDT, 1922: 479 (rev.); ENDRÖDI: 1964: 338 (rev.).

Oblong oval, only slightly broader behind, 2.8 to 3.3 mm, the length – to – width ratio 1 : 0.43. Only moderately shining, reddish brown.

The head granulate before a distinct clypeofrontal suture (all the granules strongly transversal), non-granulate (at most with few small grains) behind it. The clypeus roundly emarginate anteriorly, with a rounded angle each side of the emargination; lateral margins convex, the genae rounded, moderately prominent.

The pronotum transversal, the length – to – width ratio 1 : 1.48, with only finely margined base. Lateral and basal margins with short, non-clavate setae. The lateral margins with few notches. Almost complete first transverse furrow, laterally impressed, medially interrupted; lateral vestiges of the third furrow; a weak posterior longitudinal furrow. Medium-sized punctures, concentrated prevalently along these vestigal formations or in their vicinity; only few punctures, if any, on the pronotum disk.

The scutellum small, triangular.

The elytra with only weakly margined base and indistinct humeral teeth, with 10 striae and 10 intervals. The length – to – width ratio 1 : 0.66; the pronotum length – to – elytra length ratio 1 : 2.7. With 10 striae and 10 intervals. The striae distinct, their punctures rather indistinct. Intervals shagreened, impunctate, moderately convex, the 10th interval flat, achieving about 0.84 elytra length.

The posterior tibiae slim, widened only apically, with two remarkable, acute teeth on their upper edge (in the apical half) and with a nearly longitudinal row of five teeth on their outher surface. The posterior tarsi shortened (the tibia length – to – tarsus length ratio 1 : 0.66). The first to fourth tarsal segments triangularly widened. The upper terminal spur of the posterior tibia longer than the first and second tarsal segments combined.

The ventral surface also reddish brown, glabrous, minutely shagreened and thus, not quite bright. The metasternal plate with a narrow, complete longitudinal furrow. The posterior femora moderately widened; their length – to – width ratio 1 : 0.53; the intermediate femur width – to – posterior femur width ratio 1 : 1.33.

Distribution: Republic of South Africa, Namibia.

Material examined: 3 specimens — Cape, Dumbrody, 23. IV. 1901, SAMCT — one of them designated as neotype; 2 — RSA, Cape Prov., HNMB; 2 — Namibia, Gobabeb, HNMB.

This species can be separated from the three remaining ones with transverse granules on the head (*P.* (*L.*) *abyssinicus* (MÜLLER), *P.* (*L.*) *subciliatus* (HAROLD) and *P.* (*L.*) *seychellensis* RAKOVIČ) with the help of the key to species. I have considered the designation of the neotype to be necessary for the following reasons. The type is present neither in the SAMCT (where the PÉRINGUEY's collection is kept) nor in any other museum I have contacted. The above discussed four species with transversal granules on the head are mutually closely related and it would be impossible to write the key to species and determine them unambiguously without having the type of the *P.* (*L.*) *evanidus* (PÉRINGUEY). I have discussed this matter with Dr. S. ENDRÖDI from the HNMB, who is the most competent specialist in the field of African *Aphodiinae*, and who had a chance to discuss it with Dr. WHITEHEAD from the SAMCT. The above mentioned three specimens from the SAMCT are equipped with a label "*Psammobius evanidus* PNG". Dr. Endrödi informed me that this label was written by Péringuey, and that the types were lost.

3.1.10 *Psammodius* (*Leiopsammodius*) *seychellensis* RAKOVIČ

Psammodius (*Leiopsammodius*) *seychellensis* RAKOVIČ 1979: 633

Oblong oval, broader behind, lenght – to – width ratio 1 : 0.48, lenght of 2.7 to 3.1 mm (most typically about 2.9 mm). Shining, reddish brown, lateral parts of clypeofrontal suture, and impressions and basal margin line of pronotum somewhat darkened.

Head granulate before clypeofrontal suture, microscopically punctate and essentially smooth behind it. Anteriorly occurring granules transversal, those occurring medially rather rounded. Clypeofrontal suture very distinct, deep, somewhat V-shaped with forwards open angle. Clypeus emarginate anteriorly, with quite rounded angle each side of emargination; its lateral margins nearly on one line with anterior margins of genae. Only very small parts of eyes visible from above. Head margins (genae inclusive) bare. Surface structure as well as shapes of clypeus and genae very constant.

Pronotum tranversal, lenght – to – width ratio 1 : 1.54. Lateral margins anteriorly quite smooth, bare; behind middle with 4 to 5 minute notches, each notch equipped with a fine, acute hair: hair-bearing notches denser along posterior angles. Pronotum base with finely, shortly haired margin line. Pronotum surface coarsely punctate; majority of punctures arranged along vestiges of transverse furrows (corresponding to first and third transverse furrows occurring in *Psammodiini* with transverse ridges) and posterior longitudinal furrow. Both transverse furrows remarkably impressed laterally, thus forming two pairs of lateral impressions. Group of 3 to 4 punctures behind lateral impressions of the second (posterior) pair.

Scutellum small, triangular.

Elytra wider posteriorly (lenght – to – widht ratio 1 : 0.72), with margined, very finely and shortly haired base, with distinct humeral teeth, with 10 striae and 10 intervals. Striae very distinct, their punctures rather indistinct, however, surrounded by darkened spots disturbing intervals. Intervals remarkably convex, very finely, microscopically punctate, 10th interval flat, terminating about nine-tenth of way down elytra lenght. Wings well developed.

Posterior tibia widened apically, upper terminal spur about as long as first and second tarsal segments combined; upper edge with two teeth, outer surface with oblique row of four teeth. Posterior tarsi shortened, tibia lenght – to – tarsus lenght ratio 1 : 0.57.

Ventral surface also reddish brown. Abdominal sternites smooth, bare, pygidium with few bristles at apex. Metasternum also smooth, bare, metasternal plate with a complete, distinct, narrow longitudinal line, area surrounding this line moderately depressed. Mesosternum and prosternum shagreened. Femora with few bristles arranged in rows parallel with and somewhat separated from anterior and posterior margins. Posterior femur lenght – to – widht ratio 1 : 0.52. Intermediate femur widht – to – posterior femur widht ratio 1 : 1.33.

Distribution: Seychelles.

Material examined: Holotype and 27 paratypes — Seychelles, Praslin, Gran Anse, at light, 1/24. VIII. 1972, Miss. zool. belge aux Séchelles — PLG BENOIT et J. J. VAN MOL, in coll., MRACT; 11 paratypes, same data, CR.

This species is closely related to three other species characterized by transverse granules on the head – *P.* (*L.*) *abyssinicus* (MULLER), *P.* (*L.*) *evanidus* (PÉRINGUEY) and *P.* (*L.*) *subciliatus* (HAROLD). These four species can be separated from each other according to the present key to species. I have dissected 8 type specimens.They were all females, Thus, females were prevalently occurring at the time of collecting the beetles. The species was included into this work during its production and thus, it was impracticable to include relevant illustrations. For the illustrations see the original description.

3.1.11 *Psammodius* (*Leiopsammodius*) *substriatus* (BALTHASAR)

Psammobius substriatus BALTHASAR, 1941: 169.
Psammobius substriatus: ENDRÖDI, 1964: 339 (rev.).

Oval, moderately broader behind, the length of 2.5 to 3.0 mm. Shining, reddish brown, some sites, such as the frontal suture or the pronotum basal margin line somewhat darkened (Fig. 99).

The head granulate anteriorly, the granules round, regularly distributed. Posteriorly, behind the clypeofrontal suture, with a row of discrete grains. The clypeus roundly emarginate anteriorly, rounded each side of the emargination. The lateral margins convex. The genae prominent, semicircular, bare (Fig. 21).

The pronotum transversal (the length – to – width ratio 1 : 1.72), with a finely margined base and smooth, bare lateral margins. Anteriorly with a premarginal transverse furrow (medially shallow, laterally more impressed) and one pair of lateral impressions homologous to lateral parts of the third transverse ridge. The lateral longitudinal furrow indistinct. Sparsely and irregularly distributed fine and medium-sized punctures.

The scutellum small, triangular, smooth.

The elytra with 10 striae and 10 intervals, without humeral teeth. The length – to – width ratio 1 : 0.73 (Fig. 11). The striae indistinct, their punctures superficial, disturbing remarkably the intervals. The intervals shining, flat, sparsely, microscopically punctate. The tenth interval complete.

The ventral surface reddish brown, the coxae, trochanters, and apices of femora and tibiae somewhat darker brown. The pygidium with several pale bristles, abdominal sternites bare, moderately shining. The metasternal plate bare, bright, essentially planar, with a narrow, longitudinal, complete, darkened line. The mesosternum and prosternum coriaceous. The femora bright, each with two rows (along posterior and anterior margins) of punctures, each puncture with a pale hair; the anterior punctures more numerous and situated more close to the margin. The intermediate femur width – to – the posterior femur width ratio 1 : 1.9. The posterior tibia length – to – tarsus length ratio 1 : 1.54.

The posterior tibiae widened apically, their upper edge with four teeth, outer surface also with four teeth; the teeth distinct in the apical half, very small in the basal half. The tibia length – to – the tarsus length ratio 1 : 0.79, The tarsal segments moderately triangularly widened (Fig. 37).

Distribution: Namibia.

Material examined: Holotype — S. W. Africa, Farm Okaundua bei Okahandja, Jan 2 to 9, 1934, W. KRIEG lgt., NMP and 35 specimens — CB, MNHUB, NMW, ZFMB.

The *P.* (*L.*) *substriatus* (BALTHASAR) can be differentiated from related African species by very fine elytral striae and structure of the head vertex.

3.1.12 *Psammodius* (*Leiopsammodius*) *desertorum* (FAIRMAIRE)

Aegialia desertorum FAIRMAIRE, 1892: 95.
Psammobius laevicollis: SCHMIDT, 1922: 480 (part).
Psammobius desertorum: PETROVITZ, 1961: 132 (sp. pr.).
Psammobius desertorum: BALTHASAR, 1964: 538 (rev.).

Oval, remarkably broader behind, 3.4 mm, the length – to – width ratio 1 : 0.49, shining, glassy, transparent, yellowish brown, the clypeofrontal suture, pronotum basal margin and second pair of pronotal lateral impressions somewhat darkened (Fig. 100).

The head granulate anteriorly, the granules near the clypeus emargination somewhat transversal, those close to the clypeofrontal suture rather rounded; neither tubercles, nor swellings behind the clypeofrontal suture. The clypeus moderately roundly emarginate, with only moderately rounded angle each side of the emargination. The lateral margins convex, bare the genae semicircular, haired.

The pronotum transversal, the length – to – width ratio 1 : 1.7, with a fine, medially indistinct or missing basal margin line. Transparent, shining, the premarginal groove shallow, a pair of darkened spots instead of the second pair of lateral impressions. Only very sparsely microscopically punctate (nearly impunctate). Lateral margins anteriorly with remarkable, long, fine, pale hairs.

The scutellum small, triangular, posteriorly with rounded angle.

The elytra without humeral teeth, the length – to – width ratio 1 : 0.79 (Fig. 3), shining, transparent. With 10 striae and 10 intervals. The striae indistinct when observed from above, their punctures also indistinct, replaced by slightly darkened, oval, transversal spots occupying essentially the whole width of elytral intervals. The intervals impunctate, the 10th interval essentially complete.

The posterior tarsi remarkably haired, remarkably widened apically. The posterior tibiae shortened (the tibia length – to – tarsus length ratio 1 : 0.72), their segments remarkably triangularly widened, the upper terminal spur strong, longer than the first and second tarsal segments combined (Fig. 33).

The ventral surface similar as in the following species, the pygidium, abdominal sternites and legs more richly haired. The posterior femur length – to – width ratio 0.64. The ratio of the width of the intermediate femur to that of the posterior one 1 : 1.80.

Distribution: Algeria.
Material examined: Holotype — Algeria, Biskra, coll. H. MARMOTTAN, 1914, MNHNP.

In the group of specimens with indistinct elytral striae, the *P. (L.) desertorum* (FAIRMAIRE) is characterized by the medially interrupted pronotum basal margin line. From the *P. (L.) jelineki* RAKOVIČ it can be separated by richly occurring hairs, transparent elytra and quite different punctures of elytral striae. Formerly, I have published illustrations of and data on this species (RAKOVIČ, 1977), however, they are actually related to specimens of *P. (L.) laevicollis* KLUG. The error had its origin in my incorrect identification.

3.1.13 *Psammodius (Leiopsammodius) jelineki* RAKOVIČ

Psammodius jelineki RAKOVIČ, 1977: 318.

Oval, broader behind, the length of 3.4 mm, the length – to – width ratio 1 : 0.47. Shining, ferrugineous, the suture and scutellum somewhat darker (Fig. 101).

The head (Fig. 22) anteriorly with large tubercles. The tuberculate area bounded posteriorly by a somewhat darkened, transverse line (clypeofrontal suture). The area

behind it nearly smooth with only single microscopic grains, without oblique ridges. The clypeus emarginate, the emargination rounded, with rounded angles each side of the emargination. The lateral margins between these angles and the genae straight to convex (for their shape before the genae see Fig. 22). The genae about semicircular, with a few small hairs.

The pronotum widest closely behind the middle, without transverse ridges, with a very weak, anteriorly shortened, longitudinal furrow, with fine and sparsely occurring punctures, the length – to – width ratio 1 : 1.7. The lateral margins without notches, the basal as well as lateral margins without hairs. The basal margin line interrupted at the middle.

The scutellum small, triangular, with somewhat convex sides. A zone along each side somewhat depressed, finely, irregularly, microscopically punctate, so that there is a small, smooth, about triangular field bounded anteriorly by the scutellum base and laterally by the two punctate zones.

The elytra with convex lateral margins, the length – to – width ratio 1 : 0.79 (Fig. 6), without humeral teeth. With 10 striae and 10 intervals. The tenth interval non-shortened. The intervals flat along their whole length, smooth – without punctures and tubercles. The striae very indistinct, with medium-sized, superficial punctures, the distances between neighbouring punctures being somewhat larger than the puncture diameter.

The posterior tibiae very wide with a distinct upper edge achieving the apex. The outer area (between the upper and bottom edge) with one tooth. The posterior tarsi remarkably shortened, the length of tibia to that of tarsus 1 : 0.78, the first to fourth tarsal joints remarkably triangularly widened. The long spur of the posterior tibia remarkably longer than the first and second tarsal segments combined (Fig. 34).

The ventral surface brown, the metasternal plate smooth, bare, the femora and abdominal sternites with only single punctures, each puncture with a pale hair. The posterior femur about twice as wide as the intermediate one. The posterior femur length – to – width ratio 1 : 0.67.

Distribution: Iran.
Material examined: Holotype — SE Iran, Tis, Apr 6 to 7, 1973, Exp. Natl. Mus. Prague, NMP.

The *P. (L.) jelineki* RAKOVIČ can be distinguished from related species particularly by essentially smooth vertex of the head and interrupted basal margin line of the pronotum. See the preceding, most closely related species for their mutual separation.

3.1.14 *Psammodius (Leiopsammodius) japonicus* (HAROLD)

Psammobius japonicus HAROLD, 1878: 69.
Psammobius japonicus: SCHMIDT, 1922: 480 (rev.); BALTHASAR, 1964: 536 (rev.).
Diastictus nomurai TESAŘ, 1949: 60 (syn.).

Oblong oval, moderately broader behind, 3.6 to 5.0 mm, the length – to – width ratio 1 : 0.45. More or less shining, dark brown to black, the legs, anterior clypeus margin and anterior pronotum margin reddish brown (Fig. 102).

The head granulate anteriorly (the granules rather flat), behind an indistinct clypeofrontal suture not granulate, finely shagreened. The clypeus roundly emarginate anteriorly, broadly rounded each side of the emargination. The lateral margins bare, convex, the genae sparsely haired, prominent, about semicircular (Fig. 23).

The pronotum without transverse ridges, with a remarkable, complete basal margin line, broadest behind middle, the length – to – width ratio 1 : 1.47. The first pair of lateral impressions very distinct, the second pair very weak, indistinct. All the margins bare, smooth, non-crenulate. The surface smooth, shining or finely shagreened, with sparsely and irregularly distributed coarse punctures. A more densely arranged row of large punctures posteriorly, along the midline.

The scutellum small, triangular, somewhat prolonged, finely shagreened, with a rounded apex.

The elytra with margined base and distinct humeral teeth, with 10 striae and 10 intervals. The length – to – width ratio 1 : 0.67 (Fig. 9). The striae distinct, their punctures only slightly disturbing the intervals. The intervals moderately convex, finely shagreened, impunctate, the tenth interval relatively narrow, more convex, non-shortened posteriorly, shortened anteriorly (in the humeral region).

The posterior tibiae only moderately broadened apically. The posterior tarsi somewhat shortened (the posterior tibia length – to – the posterior tarsus length ratio 1 : 0.62), with triangularly widened first to fourth tarsal segments. The upper terminal spur of the posterior tibiae about as long as the first and second tarsal segments combined (Fig. 35).

The ventral surface dark brown. The abdominal sternites, femora and metasternum very shining, bare, impunctate, the metasternal plate convex, with a longitudinal furrow. The ratio of the intermediate femur width to the posterior femur width 1 : 1.60. The posterior femur length – to – width ratio 1 : 0.55.

Distribution: Japan.

Material examined: Holotype of *Diastictus nomurai* TESAŘ — Beppu No.-Kiushu, Japan; 7 specimens — CR, CT, MNHUB, NMSF.

This species is remarkably different from any other because of its large size and dark color. Diastictus nomurai TESAŘ was synonymized with this species by BALTHASAR (1964).

3.1.15 *Psammodius* (*Leiopsammodius*) *abyssinicus* (MÜLLER)

Psammobius abyssinicus MÜLLER, 1942: 84.
Psammobius abyssinicus: ENDRÖDI, 1964: 340 (rev.).

Oblong oval, moderately broader behind, the length of 2.8 to 3.2 mm, the length – to – width ratio 1 : 0.43. Moderately shining, yellowish to reddish brown, the clypeofrontal suture, anterior and posterior pronotum basis, lateral margins of the

scutellum, elytral suture (not the whole sutural interval) and punctures of the elytral striae darkened; the elytra somewhat paler than the head and pronotum (Fig. 103).

The head with an impressed frontal suture. The area before this suture with mostly transversal tubercles. Behind the suture a tuberculate swelling, laterally broken into individual tubercles. The area behind this swelling free of tubercles, shagreened. The whole head surface finely shagreened. The clypeus roundly emarginate, rounded each side of the emargination. The clypeus lateral margins convex, nearly directly changed into the anterior margins of the genae (Fig. 24). All the head margins, the genae inclusive, bare.

The pronotum with a complete basal margin line, without transverse ridges. The widest behind the middle, the length – to – width ratio 1 : 1.65. With a transverse, coarsely punctate furrow behind the anterior margin, lateral, coarsely punctate impression on each side and weak, also coarsely punctate posterior longitudinal furrow; the lateral impressions connected mutually by a medially interrupted row of coarse punctures homologous to the transverse furrow behind the third transverse ridge); several (very few) coarse punctures occurring independently of the above mentioned formations; besides this, the whole surface finely punctured. Posterior and lateral margins smooth (non-crenulate), with rather short, tough, pale, non-clavate setae.

The scutellum remarkably shagreened, small, triangular.

The elytra with distinctly margined base and small humeral teeth. Moderately convex lateral margins, the length – to – width ratio 1 : 0.69 (Fig. 12). The striae very remarkable, with large punctures disturbing the intervals. The intervals convex, shagreened, the tenth interval non-shortened and relatively flat.

The posterior tibiae relatively long, only moderately widened apically, their upper edge achieving the apex, equipped with remarkable teeth; the outer surface with a longitudinal row of about 4 teeth. The posterior tarsi remarkably shortened (the posterior tarsus length – to – tibia length ratio 1 : 1.8) their first to fourth segments triangularly widened. The upper terminal spur of the posterior tibia somewhat longer than the first and second tarsal segments combined (Fig. 38).

The ventral surface reddish brown, the coxae, trochanters and femur apices only slightly and partially darkened. The abdominal sternites and metasternum smooth, bare, moderately bright. The metasternal plate with several irregularly situated darkened lines which are dividing its area into several irregular fields; concave along the longitudinal furrow, which is anteriorly formed by a narrow line, then behind the middle somewhat widened and then, posteriorly, narrowed again. The mesosternum coriaceous, the prosternum shagreened. The femora smooth, bright, the posterior and intermediate femora posteriorly with a distinct basal margin line, the anterior femora anteriorly with a swollen edge. Posterior and intermediate femora each with a bristle located posteriorly, between the middle and the apex. Posterior and intermediate trochanters each with one bristle. The posterior femur length – to

– width ratio 0.55. The width of the intermediate femur to that of the posterior one 1 : 1.42.

Distribution: Congo, Ethiopia, Tanzania.

Material examined: 2 paratypes — both Miss. E. ZAVATTARI, Sagan Omo A. O. I., Caschei, July 16, 1939, HNMB; 2 paratypes — same data, MRACT; 45 specimens — MRACT, MNHUB.

From all the *P.* (*Leiopsammodius*) *species* this species can be separated by its shape of genae.

3.1.16 *Psammodius* (*Leiopsammodius*) *gestroi* (CLOUËT)

Psammobius gestroi CLOUËT, 1900: 13.
Psammobius gestroi: SCHMIDT, 1922: 480; BALTHASAR, 1964: 535 (rev.).

Oblong oval, convex, broader behind, 2.3 to 2.8 mm. Moderately shining, pale – yellow brown, lateral impressions of the pronotum darkened (Fig. 104).

The head remarkably narrowed anteriorly. The frontal suture weak, interrupted medially; the head anteriorly with round tubercles, penetrating (in some specimens) medially behind the frontal suture. The clypeus angularly emarginate anteriorly, with only slightly rounded angles each side of the emargination. In some species the lateral margins nearly straight and somewhat uneven, however, very often first distinctly concave and then convex, smooth, richly haired. The genae with many long hairs, about semicircular (Fig. 25).

The pronotum transversal, the length – to – width ratio 1 : 1.9, transparent, with a distinct basal margin line. The premarginal groove moderately impressed laterally. The second pair of lateral impressions (corresponding to the residues of the third transverse furrow) also rather weak, however, yet distinct. The surface with irregularly distributed medium-sized punctures. Lateral margins smooth, richly haired.

The scutellum small, triangular, smooth, somewhat below the level of the sutural interval.

The elytra with convex lateral margins (the length – to – width ratio 1 : 0.77) (Fig. 13), without humeral teeth, with 10 striae and 10 intervals. The striae weak, however, yet distinct, with medium-sized, round punctures. The intervals smooth, impunctate, essentially flat, the tenth interval achieving about 0.6 elytra length.

The posterior tibiae strongly widened apically, remarkably haired, with petit teeth on the upper edge and outer surface, their very strong upper terminal spur longer than the first and second tarsal segments combined. The posterior tarsi strongly shortened, the length of the tibia to that of the tarsus 1 : 0.50; the tarsal segments triangularly widened (Fig.36). Both terminal spurs of posterior tibiae remarkably bifid apically. In Fig. 36 this bifidity cannot be seen, since the spurs are projected from side.

The ventral surface also pale, smooth, shining, only sparingly haired. The posterior femora wider than the intermediate ones by a factor of 2.4. The posterior femur length – to – width ratio 1 : 0.63.

Distribution: Afghanistan, Pakistan, Nepal, Burma, Cambodja.
Material examined: 86 specimens — BRIO, CT, SMTD.

This species is easy to distinguish on the basis of many specific characters, such as remarkably haired lateral base of the clypeus, shortened tenth elytral interval, and medially interrupted frontal suture.

3.1.17 *Psammodius* (*Leiopsammodius*) *liviae* PITTINO

Psammodius liviae PITTINO, 1979b: 149.

Oblong oval, broader behind, 3.3 to 3.7 mm, yellowish brown.

This species is closely related to the preceding one. Besides the most important differences as presented in the key to species, the *P.*(*L.*) *liviae* PITTINO differs from *P.* (*L.*) *gestroi* (CLOUËT) by elytra less widened posteriorly, deeper elytral striae, somewhat convex elytral intervals, different arrangement of hairs on elytra margins and coarser punctures of elytral striae.

Distribution: Burma, Laos (Vientiane).

It was possible to include this species thanks to the kindness of its author, Dr, PITTINO, who has sent me the above data when my work on the manuscript was nearly completed. I have not seen the species, however, the data on its characters can be considered as definitely reliable results of observations of a top specialist.

3.1.18 *Psammodius* (*Leiopsammodius*) *endroedii* sp. n.

Oblong oval, remarkably broader behind, small – 2.6 to 2.7 mm, the length – to – width ratio 1 : 0.40. Moderately shining, reddish brown.

The head granulate. Before a distinct clypeofrontal suture the granules moderately transversal; behind the suture the granules smaller, denser, rather rounded and poorly delimited. The clypeus roundly emarginate anteriorly, rounded each side of the emargination. The clypeus lateral margins convex. The genae rounded, prominent. The eyes large, well visible from above. The head margins (including genae) non-haired.

The pronotum transversal (the length – to – width ratio 1 : 1.44). A transverse row of granules along the anterior margin. Lateral margins non-haired, anteriorly smooth, posteriorly with very fine notches. The basal margin with very short, fine

setae. Very deep, medially interrupted vestiges of the first and third transverse furrows. A deep longitudinal furrow extended from the basal margin nearly to the anterior margin. Very large punctures situated prevalently in the vestigal transverse and longitudinal furrows.

The scutellum small, triangular, situated below the level of the sutural interval.

The elytra with distinct humeral teeth, with 10 striae and 10 intervals. The length – to – width ratio 1 : 0.65; the pronotum length – to – elytra length ratio 1 : 2.5. The striae wide (nearly as wide as the intervals), their punctures essentially indistinct on the disk, deeper and more distinct posteriorly. The intervals strongly convex, impunctate, the 10th interval flat, only insignificantly shortened posteriorly (achieving about 0.9 elytra length).

Posterior tibiae widened apically, with two remarkable teeth on the upper edge and nearly longitudinal row of four teeth on the outer surface (two of them, located near the base small, the remaining two teeth medium-sized). The first to fourth tarsal segments triangularly widened. The upper terminal spur longer than the first and second tarsal segments combined. The posterior tarsi shortened, the tarsus length – to – tibia length ratio 1 : 1.7.

The ventral surface also reddish brown, glabrous. The metasternum and abdominal sternites remarkably shagreened and thus, quite matt. The metasternal plate with a complete longitudinal furrow. The posterior femora moderately widened, their length – to – width ratio 1 : 0.52; the intermediate femur width – to – posterior femur width ratio 1 : 1.57.

Distribution: Rhodesia.

Type material: Holotype — Rhodesia, Wankie N. Park, X. 1959, C. KOCH, HNMB; 1 paratype — same data, CR.

This species can be easily separated from any other *Psammodius* (*Leiopsammodius*) species by a row of granules along the pronotum anterior margin, a remarkable longitudinal pronotal furrow extended from the basal margin nearly to the anterior margin, and extremely convex elytral intervals.

I have described this species during the production of this work. Thus, it was already impracticable to include relevant illustrations. They will be published later.

3.1.19 *Psammodius Leiopsammodius scabrifrons* WALKER

Psammodius scabrifrons WALKER, 1871: 12.
Psammodius scabrifrons: SCHMIDT, 1922: 475 (rev.); BALTHASAR, 1964: 535 (rev.).

The description presented here is based on the original description.

Strongly convex, broader behind, 3 mm, reddish brown, shining.

The clypeus emarginate, with rounded angle each side of the emargination. The head tuberculate anteriorly, posteriorly with two pairs of oblique ridges, the left ridges being separated by a longitudinal furrow from the right ones.

The pronotum without transverse ridges, with a pair of impressions in anterior corners, and a posterior, short, longitudinal furrow.

The elytra with punctate striae.

Distribution: Egypt.

The type of this species is probably in the British Museum of Natural History, London. The species probably has not been found since the original description, which is surprising. Neither BALTHASAR (1964) nor SCHMIDT (1922) had a chance to examine it, similarly as me.

This species should be easily recognized, since it is an only one *P.* (*Leiopsammodius*) species with oblique ridges on the head, however, I consider the presence of these ridges as doubtful, nearly impossible. As a matter of fact, all the Psammodiini without five pronotal ridges can also be characterized by the absence of oblique ridges on the head. It is possible that the description is incorrect in the sense that the animal has a deep clypeofrontal suture; this suture is sometimes rather V-shaped, with forwards open angle and thus, a swelling behind the suture may be considered erroneously as a pair of oblique ridges. On the other hand, it is possible that the animal has transverse ridges on the pronotum, which are low and broken into discrete tubercles, which resulted in that they were disregarded by the author.

3.1.20 *Psammodius* (*Leiopsammodius*) *caelatus* (LECONTE)

Aegialia caelatus LECONTE, 1857: 42.
Psammobius caelatus: SCHMIDT, 1922, 484 (rev.).
Psammodius caelatus: CARTWRIGHT, 1955, 446 (rev.).

Oblong oval, strongly convex, strongly broader behind. Reddish brown, 2.8 to 3.6 mm.

The head strongly convex, rather sparsely tuberculate anteriorly, smooth posteriorly; the clypeofrontal suture missing. The clypeus roundly emarginate anteriorly, rounded each side of the emargination; the lateral margins convex, the genae haired, their margins somewhat crenulate, not distinctly separated from the lateral margin of the clypeus. The eyes not visible from above.

The pronotum with a margined base. Lateral margins anteriorly with long hairs. Posterior corners and basal margin with short setae. Medium-sized punctures prevalently concentrated along the premarginal furrow, second pair of lateral impressions and posterior longitudinal furrow.

The scutellum very small, triangular.

The elytra very convex, the widest near the middle, strongly narrowed anteriorly as well as posteriorly. With 10 striae and 10 intervals. The striae with punctures not disturbing the intervals. The intervals smooth, the tenth interval complete.

The posterior femora wide. The posterior tibiae remarkably broader apically, with a heavy preapical carina. The first to fourth tarsal segments triangularly widened. The upper terminal spur of the posterior tibia about as long as the first and second tarsal segments combined.

Distribution: Canada (British Columbia), U.S.A. (California, Oregon), Great Britain (introduced) — JOHNSON (1967).

Material examined: 7 specimens — CR, FMNHCh, MMM.

In the CARTWRIGHT's (1955) revision, this species is considered in the group with "more or less distinct transverse grooves" on the pronotum, however, in our classification of the genus, we should put it formally in the subgenus Leiopsammodius, since on its pronotum, there are actually no ridges, but only certain rows of punctures homologous to vestiges of some furrows, which are, however, absent. This is also supported by the absence of oblique ridges on the head vertex. On the other hand, the generic pertinence of this species is not quite clear with respect to the following characters: absent frontal suture, eyes not visible from above, presence of a heavy preapical carina on the hind tibia, and rather setaceous claws. The animal seems to be closely related to *Phycochus sulcipennis* LEA. This may, however, also hold for some other American species. To solve this problem, it will be necessary to revise some American species of *Psammodius* FALLÉN and the status of the genus *Phycochus* BROUN, which is beyond the scope of this work; this American animal is mentioned here just for completeness' sake with respect to the JOHNSON's finding (1976).

3.2 *PSAMMODIUS* S. STR. SUBGEN. N.

The type species: *Psammodius asper* (FABRICIUS).

In the Old World, the species of this subgenus can be found exclusively in the Palearctic (9 species) and Oriental (5 species) Region. The subgenus is not represented in the Australian Region, and has only few species in the Western Hemisphere (CARTWRIGHT, 1955), some of them introduced from Europe into the U.S.A.

Whereas the subgenera *Leiopsammodius* and *Granulopsammodius* can be considered as transitions to the genera *Diastictus* MULSANT and *Rhyssemodes* REITTER, respectively, the representatives of the subgenus *Psammodius* s. str. are distinctively different from them. All the Old World species are remarkably convex and strongly broader behind except for *P.* (s. str.) *laevipennis* COSTA, which is rather subparallel.

The subgenus is characterized by the presence of 5 transverse ridges on the pronotum and non-granulate elytra, with saving basic characters of the genus *Psammodius* (p. 9), which need not be repeated. It is just to remind that all the species of this subgenus are equipped with more or less distinct one or two pairs of oblique ridges on the vertex of the head (by contrast to the subgenus *Leiopsammodius*).

The key to species, description of individual species and relevant illustrations will be presented below.

Key to species

1(18) The tenth elytral interval achieving the apex or at least exceeding beyond 3/4 elytra length.

2(11) Pronotum lateral margins always crenulate anteriorly with distinctly clavate setae.

3(4) A slender, relatively larger species from Formosa, with coarsely punctate elytral striae. Piceous, 3.6 mm. – Taiwan .... *P.* (s. str.) *subopacus* NOMURA (3.2.5)

4(3) Smaller species from different areas, more widened behind, with smaller punctures of elytral striae.

5(6) The first (anterior) transverse ridge on the pronotum consisting of a row of discrete tubercles, widened at the middle. The head posteriorly (around the oblique ridges) very remarkably coarsely punctate. The elytral striae nearly as wide as intervals. Reddish brown, the pronotum slightly darker, 2.8 mm. Thailand ..... *P.* (s. str.) *thailandicus* (BALTHASAR) (3.2.4)

6(5) All the five pronotal ridges continuous. The head posteriorly (in the area of oblique ridges) impunctate. The elytral striae much narrower.

7(10) The elytral intervals more convex, the anterior margins of the genae more prominent and thus, the genae asymmetrical about their transversal axes; darker species.

8(9) The genae without hairs. Dark brown to black (immature specimens reddish brown), 2.6 to 4 mm. – Europe, Caucasus, Transcaucasia .... *P.* (s. str.) *asper* (FABRICIUS) (3.2.1)

9(8) The genae haired. Dark brown to black. 2.6 to 3.6 mm. – Italy, Spain, Algeria, Caucasus, Iran ..... *P.* (s. str.) *pierottii* PITTINO (3.2.2)

10(7) The elytral intervals less convex, the genae essentially symmetrical about their transversal axes (Fig. 51); less dark species. Reddish brown to dark brown. 2.6 to 3.6 mm. – Japan ..... *P.* (s. str.) *convexus* WATERHOUSE (3.2.3)

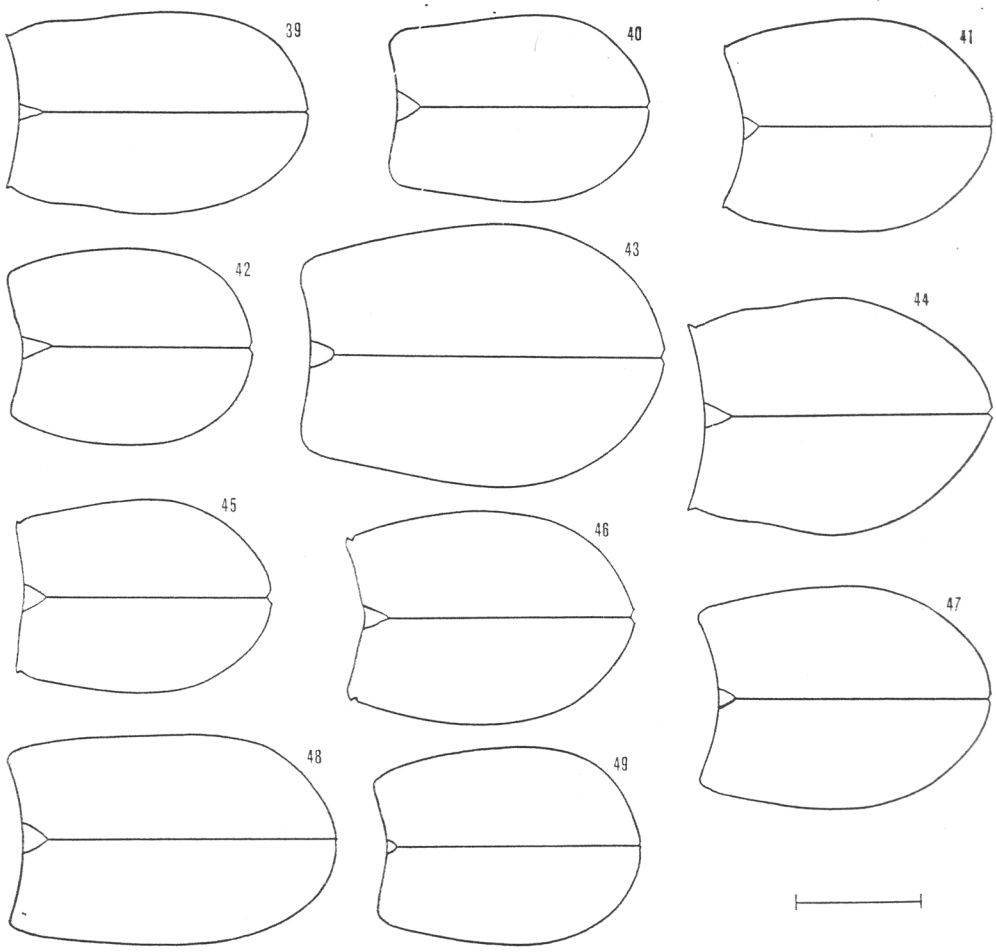
11(2) The lateral margins of the pronotum either crenulate or smooth, with fine, hairlike, sometimes abruptly truncate and slightly dilatate, however, never clavate setae.

12(15) The elytra nearly parallel.

13(14) Hairlike setae on pronotum lateral margins acute apically. Dark brown, 3.0 to 4.3 mm. – The whole South Europe (Northward up to Panonia and South Slovakia), N. Africa, Syria, Transcaucasia .... *P.* (s. str.) *laevipennis* COSTA (3.2.9)

14(13) Setae on the pronotum lateral margins abruptly truncate and often dilatate apically. Dark brown, 3.7 to 4.9 mm. – Sardinia, Corsica, S. Italy, S. France ..... *P.* (s. str.) *plicicollis* ERICHSON (3.2.10)

15(12) Species remarkably broader behind.



Figs. 39—49. Elytra shapes of *Psammodius* (s. str.) species: 39 — *P.* (s. str.) *asper* (FABRICIUS), 40 — *convexus* WATERHOUSE, 41 — *thailandicus* (BALTHASAR), 42 — *nocturnus* REITTER, 43 — *basalis* MULSANT et REY, 44 — *porcicollis* (ILLIGER), 45 — *tesari* RAKOVIČ, 46 — *nepalensis* (BALTHASAR), 47 — *sefrensis* (PETROVITZ), 48 — *laevipennis* COSTA, 49 — *besucheti* (PETROVITZ).

16(17) A larger species with shining elytra. The clypeus lateral margins continuously curved up to the anterior margins of the genae (Fig. 60). The elytra without humeral teeth. The elytral intervals only moderately convex, the striae fine. Dark brown, 3.5 to 4.5 mm. – Spain, S. France, Italy, Balcan, Caucasus (Eastward up to Krym) ..... *P.* (s. str.) *basalis* MULSANT et REY (3.2.8)

17(16) A smaller species, with shagreened elytra. The clypeus lateral margins bent inwardly before the genae (Fig.54). The elytral intervals strongly convex, the striae deep and wide. The elytra with small humeral teeth, reddish brown to dark brown, 3.3 to 3.8 mm. – Algeria, Tunisia, Libya ..... *P.* (s. str.) *besucheti* (PETROVITZ) (3.2.7)

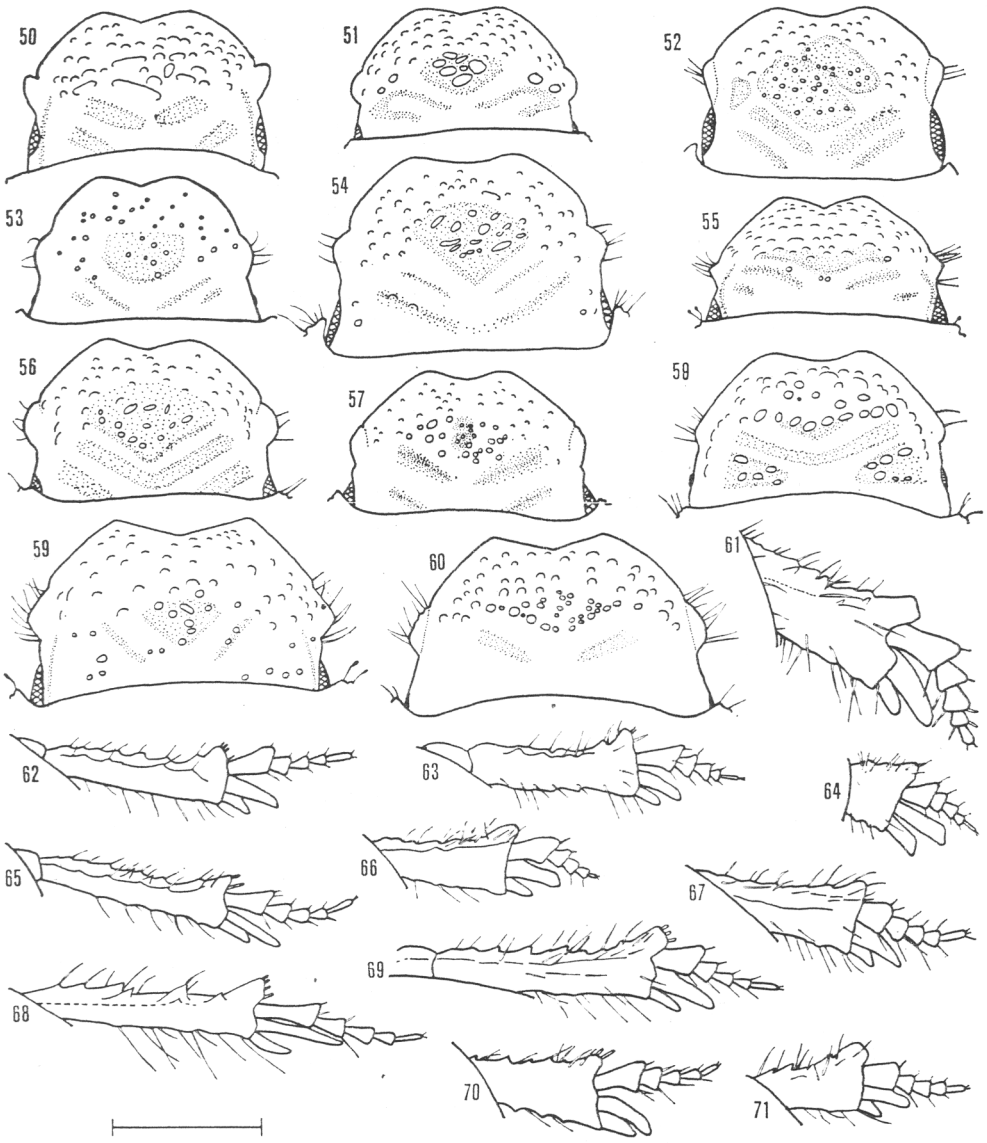


Fig. 50—71. Heads and tarsi of *Psammodius* (s. str.) species: heads 50 — *P.* (s. str.) *asper* (FABRICIUS), 51 — *convexus* WATERHOUSE, 52 — *thailandicus* (BALTHASAR), 53 — *nocturnus* REITTER, 54 — *besucheti* (PETROVITZ), 55 — *tesari* RAKOVIČ, 56 — *laevipennis* COSTA, 57 — *nepalensis* (BALTHASAR), 58 — *sefrensis* (PETROVITZ), 59 — *porcicollis* (ILLIGER), 60 — *basalis* MULSANT et REY; tarsi 61 — *P.* (s. str.) *basalis* MULSANT et REY, 62 — *asper* (FABRICIUS), 63 — *convexus* WATERHOUSE, 64 — *nocturnus* REITTER, 65 — *thailandicus* (BALTHASAR), 66 — *tesari* RAKOVIČ, 67 — *sefrensis* (PETROVITZ), 68 — *porcicollis* (ILLIGER), 69 — *laevipennis* COSTA, 70 — *nepalensis* (BALTHASAR), 71 — *besucheti* (PETROVITZ).

18(1) The tenth elytral interval achieving only about 1/2 to 3/4 elytra length.
19(24) The pronotum lateral margins with clavate setae.
20(21) The elytra without humeral teeth. Dark reddish brown, 2.6 mm. – Taiwan ..... *P.* (s. str.) *kobayashii* NOMURA (3.2.13)
21(20) The elytra with humeral teeth.
22(23) A larger species. Transverse ridges on the pronotum not sharp; the first ridge punctate, not granulate. The pronotum longitudinal furrow with several (about 10) large punctures. The tenth elytral interval achieving at the most 1/2 elytra length. Dark brown (immature species reddish brown), 3.3 to 4.4 mm. – W. and S. Europe, S. England, Canary, N. Africa, Arabic countries ..... *P.* (s. str.) *porcicollis* (ILLIGER) (3.2.12)
23(22) A smaller species. The transverse ridges on the pronotum sharp. The first ridge impunctate, slightly granulate. The pronotum longitudinal furrow with 1 to 3 small punctures. The tenth elytral interval achieving more than 2/3 and less than 3/4 elytra length. Reddish brown, 2.8 to 3.3 mm. – Pakistan, Ceylon, Nepal, India..... *P.* (s. str.) *tesari* RAKOVIČ (3.2.11)
24(19) The pronotum lateral margins either bare or with fine hairs.
25(26) The pronotum lateral margins bare. The first transverse ridge on the pronotum partially broken. Dark brown to black, 2.8 to 3.0 mm. – Nepal .... *P.* (s. str.) *napalensis* (BALTHASAR) (3.2.16)
26(25) The pronotum lateral margins with fine hairs. The first pronotal ridge quite continuous.
27(28) The pronotum base without hairs, the tenth elytral interval achieving only 1/2 elytra length. Yellow to reddish brown, 2.8 to 3.3 mm. – Transcaucasia ..... *P.* (s. str.) *generosus* REITTER (3.2.15)
28(27) The pronotum base haired, the tenth elytral intervals terminating before 3/4 elytra length.
29(30) A dark species with small, however, distinct humeral teeth. The eyes well visible from above. The elytra length – to – width ratio 1 : 0.75. Reddish brown, 3.5 to 4 mm. – Algeria .... *P.* (s. str.) *sefrensis* (PETROVITZ) (3.2.14)
30(29) A paler species without humeral teeth. The two eyes hardly visible simultaneously from above. The elytra length – to – width ratio above 0.80. Yellowish brown, 2.6 to 3.4 mm. – Italy, Sicily, Tunisia, Israel, Lebanon .... *P.* (s. str.) *nocturnus* REITTER (3.2.6)

3.2.1 *Psammodius* (s. str.) *asper* (FABRICIUS)

Scarabaeus asper FABRICIUS, 1775.
Aphodius sulcicollis ILLIGER, 1802: 20 (syn.).
Psammobius sulcicollis: HEER, 1848: 531 (rev.); SCHMIDT, 1922: 473 (rev.); BALTHASAR, 1964: 530 (rev.).
Psammodius sulcicollis: CARTWRIGHT, 1955: 421 (rev.).

Psammodius canaliculatus MULSANT, 1842: 321 (syn.).
Psammodius costatus STIERLIN, 1863: 489 (syn.).
Psammodius asper; LANDIN, 1956: 222 (n. valid.).

Oblong oval, broader behind, 2.6 to 4.0 mm (most typically 2.9 to 3.5 mm), the length – to – width ratio 1 : 0.46. Moderately shining, dark brown, legs and clypeus margins reddish brown. Immature, ferrugineous specimens are often encountered (Fig. 105).

The head granulate anteriorly (the granules rather transversal), posteriorly with two pairs of oblique ridges. The ridges flat, however, yet distinct. The whole head surface shagreened, the furrows behind the oblique ridges coarsely punctate. The clypeus broadly angularly emarginate anteriorly, rounded each side of the emargination. The lateral margins convex, bent inward before the genae; the genae strongly asymmetrical (see Fig. 50), their anterior margins at about right angles to the lateral margins of the clypeus. The clypeus margins as well as the genae bare.

The pronotum with five transverse ridges, wider in posterior half, the length – to – width ratio 1 : 1.58. The transverse ridges not sharp, however, very remarkable, finely shagreened, smooth (except for the first ridge which tends to be somewhat punctate and granulate in some specimens). The furrows behind the transverse ridges, as well as the longitudinal furrow interrupting the fourth and fifth ridge coarsely punctate. The lateral and posterior margins with clavate setae. The lateral margins remarkably crenulate anteriorly, the basal margin represented by a sharp edge.

The scutellum small, triangular, strongly shagreened.

The elytra with small humeral teeth, with ten striae and ten intervals. The length – to – width ratio 1 : 0.68 (Fig. 39). The striae very deep, their punctures indistinct when observed from above, distinct, longitudinal, when observed from the side. The intervals shagreened, strongly convex, the 10th interval flatter, essentially not shortened posteriorly, fused with the 9th interval anteriorly.

The posterior tibiae only moderately widened apically. Their upper edge toothed, their outer area with a longitudinal row of about 7 sharp, medium-sized teeth. The upper terminal spur somewhat longer than the first and second tarsal segments combined (Fig. 62). The posterior tarsi remarkably shortened, their first to fourth tarsal segments remarkably triangularly widened. The length of posterior tibia to that of posterior tarsus 1 : 0.62.

The ventral surface also dark brown. The abdominal sternites shagreened. The metasternal plate smooth, with a longitudinal furrow that is somewhat deeper medially. The mesosternum and prosternum finely coriaceous. The femora finely shagreened, with rows of hairs on the margins and with few fine, short hairs on the surface. The posterior femur length – to – width ratio 1 : 0.56. The width of intermediate femur to that of posterior one 1 : 1.6.

Distribution: Europe, Caucasus, Transcaucasia (north to Norwegia — Trondheim, Sweden — Uppland and Jamtland, Finland — Isthmus, Helsinki, Abo, USSR — Karel. ASSR; east to USSR — Arm. SSR), USA (Pennsylvania, New Jersey) — introduced.

Material examined: 306 specimens, incl. type of *P. costatus* STIERLIN — USSR, Sarepta, IPE, from CT, IPE, IRSNB, MHNG, SMTD, ZFMB, ZMUH.

This species can be easily recognized, since it is an only one European species with clavate setae on pronotum margins.

Psammodius (s. str.) *asper* (FABRICIUS) has long been known as *Psammodius sulcicollis* (ILLIGER). LANDIN (1956) revealed that this species was first described by FABRICIUS (1775) as *Aphodius asper*. Then, it was incorrectly synonymized with *Rhyssemus germanus* (L.). Thus, LANDIN restituted the old, quite forgotten Fabrician name. I do not invite this LANDIN's action, which is quite against the principles of the stability of the zoological nomenclature. Unfortunately, this action was done before issuing the International Codex and thus, I am accepting it, since now, it is difficult to decide, what would involve larger confusion.

3.2.2 *Psammodius* (s. str.) *pierottii* PITTINO

Psammodius pierottii PITTINO, 1979c: 598.

This species is closely related to the *P.* (s. str.) *asper* (FABRICIUS). Thus, differences between these two species will be presented below instead of complete description.

The genae haired (never haired with *P.* (s. str.) *asper* (FABRICIUS)), less asymmetrical (nearly semicircular). The specimens less shining.

The absence or presence of the hairs on the margins of the genae is qiute constant, whereas the shape of the genae and microstructure of the surface are rather variable.

Distribution: Italy, Spain, Algeria, Caucasus, Iran.
Material examined: 9 specimens — ZFMB; 7 — NMSF.

I have received the diagnosis of this species from Dr. PITTINO, when his work was yet in print. After that, I have re-examined large series of "*Psammodius* (s. str.) *asper* (FABRICIUS)" and I have found between them the above mentioned 16 specimens from the ZFMB and NMSF. I agree with Dr. PITTINO that this species is definitely different from the *P.* (s. str.) *asper* (FABRICIUS).

3.2.3 *Psammodius* (s. str.) *convexus* WATERHOUSE

Psammodius convexus WATERHOUSE, 1875: 94.
Psammobius convexus: SCHMIDT, 1922: 483 (rev.); BALTHASAR, 1964: 533 (rev.).

Oblong oval, broader behind, 2.6 to 3.5 mm (most typically 2.8 to 3.0 mm), the length — to — width ratio 1 : 0.48. Moderately shining, reddish brown to dark brown (Fig. 106).

The head granulate anteriorly, posteriorly with two pairs of distinct oblique ridges. The whole surface either smooth or shagreened. The clypeus angularly emarginate anteriorly, with rounded angle each side of the emargination. The lateral margins convex, bare, bent inward before genae (Fig. 51). The genae about semicircular, essentially symmetrical.

The pronotum with five transverse ridges, wider in posterior half, the length – to – width ratio 1 : 1.56. The ridges not sharp, however, very remarkable, smooth (only the first ridge sparsely punctate). The furrows behind the ridges as well as the longitudinal furrow interrupting the fourth and fifth ridges coarsely punctate. The lateral and posterior margins with clavate setae. The lateral margins remarkably crenulate anteriorly, the basal margin in the form of a sharp edge.

The scutellum small, triangular.

The elytra with 10 striae and 10 intervals, with indistinct humeral teeth. The length – to – width ratio 1 : 0.73 (Fig. 40). The striae very remarkable, their punctures longitudinal. The intervals smooth, or finely shagreened, convex, the tenth interval weak, essentially not shortened posteriorly, however, nearly vanishing anteriorly, near the humerus.

The posterior tibiae and tarsi similar as with the *P.* (s. str.) *asper* (FABRICIUS) (Fig. 63); the tibia length – to – tarsus length ratio 1 0.52.

The ventral surface similar as with the *P.* (s. str.) *asper* (FABRICIUS). The posterior femur length – to – width ratio 1 : 0.48. The ratio intermediate femur width: posterior femur width 1 : 1.14.

Distribution: Japan.
Material examined: 4 specimens — CR, CT.

This species is very closely related to the *P. asper* (FABRICIUS). The *P.* (s. str.) *convexus* WATERHOUSE has a different shape of the genae (see Figs. 50 and 51), and less widened posterior femora.

3.2.4 *Psammodius* (s. str.) *thailandicus* (BALTHASAR)

Psammobius thailandicus BALTHASAR, 1965: 445.

Oval, broader behind, the length of 3.1 mm, the length – to – width ratio 1 : 0.46. Moderately shining reddish brown, the legs, and pronotum margins somewhat paler – reddish brown to yellowish brown (Fig. 107).

The head very convex, tuberculate anteriorly (the tubercles round, relatively sparsely distributed); at the middle with irregular, remarkably swollen, tuberculate areas; posteriorly with two pairs of well developed oblique ridges; a very remarkably coarsely punctate furrow behind each ridge; a remarkable longitudinal swelling above each eye. All the swellings, tubercles, ridges as well as the area between them (except for the above mentioned coarsely punctate furrows) essentially smooth, bright. The

clypeus relatively shallowly, roundly emarginate anteriorly, with a quite rounded angle each side of the emargination. The lateral margins convex, the genae angularly rounded, non-symmetrical – their anterior margin remarkably shorter than the posterior one. The genae with pale, non-clavate hairs (Fig. 52).

The pronotum with a basal margin represented by a sharp edge, wider in posterior half, the length – to – width ratio 1 : 1.45. Five transverse ridges; the first (anterior one formed by individual, though if not quite discrete tubercles, widened at the middle; the second to fifth ridges well developed, essentially non-tuberculate, all of about the same height and width. The fourth and fifth (posterior) ridges interrupted by a longitudinal furrow. The ridges very finely, microscopically punctate. The lateral as well as basal pronotum margins with short, clavate setae along their whole length.

The scutellum small, triangular, remarkably shagreened.

The elytra with non-margined base and very small humeral teeth, with 10 striae and 10 intervals the length – to – width ratio 1 : 0.46 (Fig. 41). The striae deep and wide (nearly as wide as the intervals), with large, longitudinal, oval punctures which somewhat disturb the intervals; the punctures are contacting or even overlapping each the 2 neighbouring ones. The intervals strongly convex, essentially smooth or, at the most, with a very fine, microscopic structure. The tenth interval flat, non-shortened.

The posterior tarsi remarkably shortened, the first to fourth segments triangularly widened. The upper terminal spur of the posterior tibia longer than the first and second segments combined (Fig. 65). The upper edge of the posterior tibia with medium-sized teeth. The outer area of the posterior tibiae (between the upper and lower edge) with a longitudinal row of sharp, larger teeth. The tibia length – to – tarsus length ratio 1 : 0.51.

The ventral surface colored similarly as the dorsal surface. The prosternum with numerous, long, pale hairs. The mesosternum and metasternum (except for the metasternal plate) coriaceous, with decumbent, pale hairs. The metasternal plate smooth, bright, with a remarkable longitudinal furrow. The trochanters with one seta each. The whole surface of the femora with very short, pale hairs. The anterior margins of the anterior femora with long, pale hairs. The abdominal sternites smooth, bright, with only very fine, microscopic structure.The ratio of the width of the intermediate femur to that of the posterior one 1 : 1.60.

Distribution: Thailand.
Material examined: Holotype — Thailand, Bangkok, Nov 1961, CB.

This species is related to the *P.* (s. str.) *asper* (FABRICIUS), *convexus* WATERHOUSE and *tesari* RAKOVIČ. It can be easily separated from them by very characteristic structure of the pronotal ridges, shape of the genae and very remarkable punctures behind the head oblique ridges. From other oriental species it can be separated not only by complete 10th interval, but also by wide elytral striae.

3.2.5 *Psammodius* (s. str.) *subopacus* NOMURA

Psammodius subopacus NOMURA, 1973: 44.

Original description will be presented below.

Elongate-oval, moderately convex, subopaque, piceous, with clypeus, anterior margin of pronotum and legs dark red-brown, antennae yellowish brown.

Head somewhat convex, coarsely granulate, with two oblique grooves and ridges on occiput. Clypeus moderately emarginate in the middle, rounded at each apex, feebly arcuate at sides, notched in front of genae, which are rounded and somewhat lobed. Pronotum broader than long (1.35 : 0.9 mm), narrowed anteriorly, with front and hind angles rounded, base obtusely angulate in the middle, lateral margins and base serrate and fringed with clavate setae. Surface of pronotum densely, minutely punctate, with four coarsely punctate transverse grooves and five transverse ridges, anterior ridge coarsely, sparsely punctate, two basal ones interrupted by a coarsely punctate median longitudinal line. Scutellum triangular, as long as wide, coriaceous and opaque. Elytra feebly convex, at base as broad as pronotum, slightly broadened posteriorly, with the broadest point across behind the middle, length 2.2, breadth 1.7 mm, base margined, shoulders toothed, lateral margins without setae, each elytron 10-striated, strial punctures coarse, close and distinctly incised into intervals, which are moderately convex, finely coriaceous, broader than width of strial punctures, 10th interval nearly flat, reaches near apex.

Abdominal sternites finely coriaceous and opaque. Posterior four femora slightly dilated, twice as long as wide, coarsely, vaguely punctate. Hind tibiae broadened apically, 2.8 times as long as wide at apex, with four rows of setigerous tubercles on ventral face, terminal spurs rather slender, very slightly dilated, rounded at tip, the longer spur as long as basal three tarsal joints combined. Hind tarsi short, a little longer than breadth of tibia, with basal joint elongate-triangular. Length 3.6 mm, breadth 1.7 mm.

Holotype ♀, Is. Lutao, 18 June 1972, leg. S. TAKEDA, in coll. T. SHIBATA.

Distribution: Taiwan (Is. Lutao).

This is somewhat closely allied to *P. laevipennis* COSTA, but it differs from the latter in the clavate setae of the pronotum and the coarse punctures of the elytral striae.

According to the original description, the characters are rather similar to those of *P.* (s. str.) *asper* (FABRICIUS), however, there are no doubts about the validity of this species, since the occurrence of the *P.* (s. str.) *asper* (FABRICIUS) in Taiwan is essentially impossible. The similarity with *P.* (s. str.) *laevipennis* COSTA emphasized by the author indicates the species to be more elongate than *P.* (s. str.) *asper* (FABRICIUS).

3.2.6 *Psammodius* (s. str.) *nocturnus* REITTER

Psammodius nocturnus REITTER, 1892: 160.
Psammobius nocturnus: SCHMIDT, 1922: 484 (rev.); BALTHASAR, 1964; 533 (rev.).
Psammobius lacoi ROUBAL, 1929: 32 (syn.).
Psammobius brevior NORMAND, 1936: 197 (syn.).

Oval, convex, very strongly broader behind, the length of 2.6 to 3.4 mm, the length – to – width ratio 1 : 0.52. Shining, yellowish brown (Fig. 108).

The head rather sparsely tuberculate anteriorly; posteriorly glassy, transparent, with two pairs of oblique ridges, the second pair sometimes less distinct. The clypeus broadly angularly emarginate anteriorly, rounded each side of the emargination. The clypeus lateral margins straight to slightly convex. The genae rounded (Fig. 42).

The pronotum with five transverse ridges, with a basal margin line, the widest behind the middle, the length – to – width ratio 1 : 1.7. The ridges not particularly sharp, however, well developed, essentially smooth. The transverse furrows sparsely, shallowly, sometimes indistinctly, coarsely punctate. The third furrow remarkably impressed laterally. Lateral and basal margins with fine, long, pale hairs; anteriorly the hairs longer; lateral margins remarkably crenulate anteriorly.

The scutellum small, triangular, laying below the level of the sutural interval.

The elytra with 10 striae and 10 intervals, very wide, length – to – width ratio 1 : 0.82 (Fig. 53), without humeral teeth. The striae distinct, their punctures surrounded by darkened spots disturbing the intervals. The intervals moderately convex, the tenth interval somewhat less convex, achieving about 0.68 elytra length.

The posterior tibiae remarkably widened posteriorly, richly haired, with relatively large teeth on the outer surface. The posterior tarsi strongly shortened – the tibia length – to – tarsus length ratio 1 : 0.75. The first to fourth tarsal segments very short, triangularly widened, the claws very short, nearly setaceous, the upper terminal spur about as long as the first to third tarsal segments combined (Fig. 64).

The ventral surface also yellowish brown, shining, femora remarkably, longly haired (the hairs present not only in rows along margins, as usual with many *Psammodius* species). The posterior femora remarkably widened, their length – to – width ratio 1 : 0.75. The intermediate femur width – to – the posterior femur width ratio 1 : 2.3. The metasternal plate with a complete, narrow longitudinal furrow.

Distribution: Italy, Sicily, Tunisia, Israel, Lebanon.

Material examined: Lectotype (designated by PITTINO, 1979) — Lebanon, Beirut 1879, MHNG; 1 specimen — Israel, Haifa, ZMUH; holotype of *Psammobius lacoi* ROUBAL — Italy, Riccione, Jos. Laco lgt., SNMB.

P. (s. str.) *brevior* (NORMAND) was synonymized with this species by PITTINO (1979a). *P.* (s. str.) *lacoi* (ROUBAL) was first synonymized by BALTHASAR (1964) with *P.* (s. str.) *asper* (FABRICIUS). PETROVITZ (1975), on the basis of examining specimens collected from the same place, suggested the name to be rather a synonym of *P.* (s. str.) *nocturnus* REITTER. This synonymy was definitely established by PITTINO (1979a). I can support this conclusion after studying the ROUBAL's holotype from the SNMB.

3.2.7 *Psammodius* (s. str.) *besucheti* (PETROVITZ)

Psammobius besucheti PETROVITZ, 1975: 616.

Oval, strongly convex, remarkably broader behind, the length of 3.0 to 3.6 mm, the length – to – width ratio 1 : 0.50. Some specimens shagreened and thus matt, some shining, reddish brown, the head and pronotum somewhat darker than the elytra. The suture (not the whole sutural interval) and the punctures of the elytral intervals somewhat darkened (Fig. 109).

The head rather sparsely tuberculate anteriorly, posteriorly with two pairs of distinct oblique ridges. The posterior pair somewhat granulate. The furrow behind the ridges sparsely, coarsely punctate. The clypeus roundly emarginate anteriorly, with rounded angles each side of the emargination. The lateral margins essentially straight, distinctly bent inward before the genae (Fig. 54). The genae prominent, about semicircular, equipped with fine, pale hairs, otherwise the head margins bare.

The pronotum with five transverse ridges, with a basal margin line, the widest behind the middle, the length – to – width ratio 1 : 1.51. All the transverse ridges quite distinct, the first and fifth ridges somewhat weaker than the second to fourth ones. The fourth and fifth ridges interrupted by a longitudinal furrow. The longitudinal as well as transverse furrows coarsely punctate. The transverse ridges, particularly the first one, very finely, microscopically punctate. The first ridge somewhat widened and tuberculate medially. The lateral and posterior margins furnished with fine, pale, hairlike (non-clavate) setae. The lateral margins remarkably crenulate anteriorly.

The scutellum small, triangular, with fine structure, with somewhat darkened lateral margins.

The elytra with distinctly margined base, the humeral teeth indistinct (Fig. 49). With 10 striae and 10 intervals. The striae very remarkable, with distinct, medium-sized, somewhat longitudinal punctures, only very slightly disturbing the intervals. The intervals strongly convex, extremely finely, microscopically punctate, the tenth interval nearly achieving the apex.

The posterior tibiae remarkably widened apically, remarkably haired, their upper edge indistinct, not achieving the apex, essentially represented by a row of about 6 small teeth; the outer area with a longitudinal row of about 6 medium-sized teeth. The tarsi remarkably shortened, their first to fourth segments remarkably triangularly widened. The upper terminal spur of the posterior tibia very strong, longer than the first and second tarsal segments combined (Fig. 71). The ratio of the posterior tibia length – to – the posterior tarsus length 1 : 0.50.

The ventral surface also reddsih brown, with both ends of femora partially darkened, and a darkened furrow of the metasternal plate. The pygidium with long hairs. The abdominal sternites bare, strongly shagreened. The metasternum smooth, moderately shining, laterally with few hairs, the metasternal plate bare, convex, with a complete, narrow longitudinal furrow having a uniform depth along its whole

length. The mesosternum coriaceous, bare. The prosternum coriaceous, with decumbent hairs. The femora moderately bright, with rows of erected hairs along their margins. The ratio of the width of the intermediate femur to that of the posterior one 1 : 1.75.

Distribution: Algeria, Tunisia, Libya.

Material examined: Holotype — Tunisia, Djuba, Apr 1, 1962, Cl. Besuchet, MHNG; 2 specimens — Tunisia, CT, 5 — ZFMB.

In the present key to species the *P.* (s. str.) *besucheti* (PETROVITZ) falls close to *P.* (s. str.) *basalis* MULSANT et REY. When disregarding the length of the tenth elytral interval, then it can be compared with *P.* (s. str.) *nocturnus* REITTER. From these two species the *P.* (s. str.) *besucheti* (PETROVITZ) can be separated by the presence of humeral teeth, larger eyes reduced wings, etc.

3.2.8 *Psammodius* (s. str.) *basalis* MULSANT et REY

Psammodius basalis MULSANT et REY, 1871: 475.
Psammobius basalis: SCHMIDT, 1922: 474 (rev.). BALTHASAR, 1964: 532 (rev.).

Oval, broader behind, 3.5 to 4.5 mm (most typically 4.0 to 4.3 mm), the length — to — width ratio 1 : 0.50, shining, reddish brown to dark brown (Fig. 110).

The head equipped with essentially round granules anteriorly, posteriorly with two pairs of oblique ridges, the second pair rather indistinct. The whole surface essentially smooth, impunctate, at the most with a very fine microscopic structure. The clypeus emarginate anteriorly (the emargination shallow, rather angular than rounded), with an only slightly rounded, somewhat elevated angle each side of the emargination. The clypeus lateral margins convex, smooth, bare, the genae prominent, rounded, remarkably haired, with somewhat uneven margins (Fig. 60).

The pronotum with five remarkable transverse ridges, broader in the posterior half, with a basal margin line, the length — to — width ratio 1 : 1.57. Transverse furrows behind the ridges coarsely punctate, the ridges finely, sparsely, microscopically punctate. The longitudinal furrow, interrupting the fourth to fifth transverse ridges, only slightly developed in some specimens; in the other specimens essentially missing, however, then the fourth and fifth ridges remarkably flattened medially. The lateral margins anteriorly remarkably crenulate. The basal and lateral margins with pale, hairlike, non-clavate setae.

The scutellum small, triangular, medially with a distinct longitudinal impression.

The elytra (Fig. 43) with 10 striae and 10 intervals, without humeral teeth. The striae relatively weak, their punctures rather indistinct; in reddish brown, probably immature specimens, the punctures surrounded by dark spots. The intervals smooth, sparsely microscopically punctate, only moderately convex, the tenth interval non-shortened.

The posterior tibiae remarkably widened apically, with 4 remarkable teeth on the upper edge and also on the outer surface. The posterior tarsi remarkably shortened, with first to fourth segments remarkably triangularly widened. The tibia length — to — the tarsus length ratio 1 : 0.70. The strong upper terminal spur of the posterior tibia nearly as long as the first to third tarsal segments combined (Fig. 61).

The ventral surface ferrugineous. The abdominal sternites smooth, each with a row of hairs. The metasternum smooth, with microscopic punctures; the metasternal plate impunctate, smooth, concave, with a narrow longitudinal furrow along its whole length. The femora essentially smooth, haired, the ratio of the intermediate femur width to the posterior femur width 1 : 1.80.

Distribution: Spain, S. France, Italy, Balcan, Caucasus (eastward up to Krym), USA (Maryland) — introduced.

Material examined: 44 specimens — CT, IPE, MHNG, MNHUB, MNDF, SMTD, ZFMB, ZMUH.

As a species with complete tenth elytral interval and non-clavate pronotum setae, the *P.* (s. str.) *basalis* MULSANT et REY is most closely related to *P.* (s. str.) *laevipennis* COSTA and *P.* (s. str.) *nocturnus* REITTER. The former and latter species are different particularly by nearly parallel shape and very strongly convex elytral intervals, respectively.

3.2.9 *Psammodius* (s. str.) *laevipennis* COSTA

Psammodius laevipennis COSTA, 1844: 18.
Psammobius laevipennis: SCHMIDT, 1922: 474 (rev.); BALTHASAR, 1964: 532 (rev.).
Psammodius rugicollis ERICHSON, 1848: 816 (syn.).
Psammodius ciliatus KÜSTER, 1849: 51 (syn.).
Psammodius scutellaris MULSANT et WACHANRU, 1895: 178 (syn.).

Oblong oval, subparallel, 3.0 to 4.3 mm, the length — to — width ratio 1 : 0.42. Moderately shining, dark brown, the legs and clypeus margins ferrugineous (Fig. 111).

The head granulate anteriorly (the granules transversal), posteriorly with two pairs of well developed oblique ridges. Oblique furrows before the first pair of ridges and behind the first and second pairs coarsely punctate. The clypeus roundly emarginate anteriorly, with a rounded angle each side of the emargination. The clypeus lateral margins bare, convex, bent inward before the genae (Fig. 56). The genae prominent, about semicircular, with a few hairs.

The pronotum with a basal margin line, with five remarkable transverse ridges, all of about the same height, smooth, microscopically punctate. The transverse furrows rather coarsely punctate. Broader in posterior half, the length — to — width ratio 1 : 1.49. The longitudinal furrow, interrupting the fourth and fifth transverse ridges, also coarsely punctate. The lateral and basal margins with hairlike, non-clavate setae, the lateral margins crenulate anteriorly.

The scutellum small, triangular, remarkably alutaceous.

The elytra nearly parallel, the length – to – width ratio 1 : 0.64 (Fig. 48), with ten striae and ten intervals, with margined base and small humeral teeth. The striae very distinct, their punctures small, only slightly disturbing the intervals, however, quite distinct. The intervals finely alutaceous and thus, only moderately shining, moderately convex, very finely microscopically punctate. The tenth interval flat, not shortened.

The posterior tibia only moderately broadened apically, its upper edge less distinct, equipped (essentially in its apical half) with medium-sized teeth; a longitudinal row of larger teeth on the outer surface. The tarsi remarkably shortened (tibia length – to – tarsus length ratio 0.48), their segments remarkably triangularly widened. The upper terminal spur of the tibiae about as long as the first to third tarsal segments combined (Fig. 69).

The ventral surface reddish brown to dark brown. The abdominal sternites alutaceous, bare. The metasternum smooth, finely microscopically punctate, the metasternal plate flat, with a complete longitudinal furrow of uniform depth and width along its whole length. The femora smooth, haired, finely, microscopically punctate. The mesosternum and prosternum strongly shagreened. The ratio of the intermediate femur width to the posterior femur width 1 : 1.67. The posterior femur length – to – width ratio 0.52.

The synonymy of *P. cilliatus* KÜSTER and *P. scutellaris* MULSANT et WACHANRU was established by REITTER (1892), that of *P. rugicollis* ERICHSON by SCHMIDT (1922).

Distribution: The whole S. Europe (northward up to S. Slovakia and Hungary), USSR (Caucasus, Transcaucasia), Morocco, Algeria, Tunisia, Syria, Lebanon, Turkey, USA (Maryland, Virginia, Indiana) — introduced.

Material examined: 115 specimens — CT, IPE, IRSNB, MNHUB, NMSF, SMTD, ZFMB, ZMK, ZMUH.

3.2.10 *Psammodius* (s. str.) *plicicollis* ERICHSON

Psammodius plicicollis ERICHSON, 1848: 916.
Psammodius insculptus MULSANT, 1870: 638 (syn.).
Psammodius accentifer MULSANT et REY, 1859: 172 (syn.).
Psammodius planipennis REITTER, 1892: 103 (syn.).
Psammodius laevipennis: REITTER, 1892: 22 (part.).
Psammodius plicicollis: PITTINO, 1979: 34 (sp. pr.).

This species is very similar to the preceding one. *P.* (s. str.) *plicicollis* ERICHSON can be separated from *P.* (s. str.) *laevipennis* COSTA by the following characters.

Setae on the pronotum lateral margins shorter, abruptly truncate, often distinctly dilatate apically. Elytral striae very finelly, shallowlly, indistinctly punctate. Elytral intervals almost flat, wider. The tenth interval slightly convex neither shagreened, nor lying below the level of the 9th interval and epipleura. The metatarsus distinctly longer than the second and third segments combined.

I have not seen this species. It was possible to include it into my revision thanks to the kindness of Dr. PITTINO from Milano, who yielded these quite sufficient and highly qualified data when his work was yet in print. The whole synonymy is reported by PITTINO (1979).

Distribution: Italy (Liguria), Sardinia, Corsica, S. France. Type is in the ZFMB.

3.2.11 *Psammodius* (s. str.) *tesari* RAKOVIČ

Psammodius tesari RAKOVIČ, 1977: 317.

Oval, broader behind, 2.8 to 3.3 mm, the length – to – width ratio 1 : 0.5. Only moderately shining, reddish brown, the transverse ridges of the pronotum, the tubercles of the head, and the apical part of the elytra somewhat darker (Fig. 112).

The head (Fig. 55) alutaceous, anteriorly with remarkable tubercles, posteriorly with two pairs of oblique ridges, the inner ridges longer than the outer ones. A longitudinal swelling along each eye. The clypeus emarginate, the emargination angular, with rounded angles each side of the emargination. The genae angular. The clypeus bare, the genae with long hairs which are not clavate by contrast to the setae of the pronotum.

The pronotum alutaceous, with a distinct basal margin line along the whole base, wider in posterior half, the length – to – width ratio 1 : 1.65. Its lateral sides crenulate anteriorly (with about 5 small notches), the crenulation visible from above. The basal and lateral margins of the pronotum with clavate setae, the setae along the basal margins shorter than those along the lateral margins. The transverse ridges on the pronotum very remarkable, sharp, not granulate, except for the first ridge that is slightly weaker than the second to fifth ones and more or less granulate. The fourth and fifth ridges interrupted by a longitudinal furrow. The transverse furrows with large, superficial, matt, irregularly situated punctures.

The scutellum small, triangular, strongly alutaceous, with slightly convex sides.

The elytra wider in posterior half, the length – to – width ratio 1 : 0.77 (Fig. 45), with distinct, laterally directed humeral teeth. With ten striae and ten intervals. The tenth interval achieving more than 2/3 and less than 3/4 the elytra length. The intervals remarkably convex, finely alutaceous (more minutely than the head and pronotum), not granulate. The striae quite distinct, with indistinctly bounded punctures, which somewhat disturb the intervals.

The posterior tibiae with a distinct upper edge achieving the apex. The outer area (between the upper and bottom edge) with a longitudinal row of several small teeth. The posterior tarsi remarkably shortened (the tibia length – to – tarsus length ratio 1 : 0.75), the first to fourth tarsal joints remarkably triangularly widened. The long spur of the tibia longer than the first and second tarsal segments combined (Fig. 66).

The ventral surface also ferrugineous, with darker coxae and trochanters, impunctate, finely microscopically shagreened. Posterior as well as anterior margins of the

femora and pygidium with fine hairs. The posterior femur length – to – width ratio 1 : 0.62; the ratio intermediate femur width: posterior femur width 1 : 1.40.

Distribution: Pakistan, Ceylon, Nepal, India.

Material examined: Holotype and 1 paratype — Pakistan, Rawalpindi-Jhelum, Aug 25, 1967, M. DANIEL lgt, CR; 1 paratype — same data, CT; and 120 specimens — BRIO, IRSNB, MNHUB.

There are only two *Psammodius* (s. str.) species (*P.* (s. str.) *porcicollis* (ILLIGER) and *P.* (s. str.) *kobayashii* (NOMURA)) (BALTHASAR, 1964; NOMURA, 1973) which have some of the basic characters identical with *P.* (s. str.) *tesari* sp. n. (pronotum with transverse ridges, 10th interval shortened, pronotum setae clavate). *P.* (s. str.) *porcicollis* (ILLIGER) is much larger, more broadened behind, with remarkably larger punctures of elytral striae. *P.* (s. str.) *kobayashii* (NOMURA) is more shining, with less convex elytral intervals and rounded genae.

3.2.12 *Psammodius* (s. str.) *porcicollis* (ILLIGER)

Aphodius porcicollis ILLIGER, 1803: 195.
Psammobius porcicollis: SCHMIDT, 1922: 475 (rev.); BALTHASAR, 1964; 531 (rev.).
Psammobius rugulosus MULSANT, 1842: 323 (syn.).

Oval, strongly convex, remarkably broader behind, 2.6 to 4 mm, the length – to – width ratio 1 : 0.51. Only moderately shining. Dark brown, immature specimens reddish brown, clypeus margins somewhat paler, legs reddish brown (Fig. 113).

The head relatively sparsely granulate anteriorly. The granules large, rounded, sometimes rather irregular and flat. The first pair of the oblique ridges flat, the second pair usually not developed. The whole area of the head alutaceous. Several coarse punctures behind the oblique ridges, otherwise the head impunctate. The clypeus anteriorly with a rounded emargination, angular or moderately rounded each side of the emargination; the lateral margins first straight or even concave and then, before the genae, convex. The genae prominent, somewhat angular (only moderately rounded) (Fig. 59). The genae haired, otherwise the head margins bare.

The pronotum with five transverse ridges, the length – to – width ratio 1 : 1.45. All the ridges flat, however, well distinct, the fourth and fifth ridges interrupted by a longitudinal furrow. The transverse furrows behind the ridges, the longitudinal furrow and the first ridge coarsely punctate. Besides this, medially, the coarse punctures tend to penetrate from the longitudinal furrow into the third and second ridges. All the pronotum area alutaceous. The lateral and basal margins with clavate setae; the lateral margins anteriorly remarkably crenulate.

The scutellum small, triangular, less alutaceous than the other parts.

The elytra with small humeral teeth, with ten striae and ten intervals. The length – to – width ratio 1 : 0.79 (Fig. 44). The striae deep, with remarkable, though if indistinctly bounded punctures disturbing remarkably the intervals. The intervals strongly convex, alutaceous, the 10th interval achieving only one half the elytra length.

The posterior tibiae only moderately widened apically, the upper edge with three large, sharp teeth, the outer area also with a row of three large sharp teeth, the upper terminal spur slim, about as long as the first and second tarsal segments combined. The first to fourth tarsal segments triangularly widened, however, the first segment relatively (as compared to the other species) long – nearly as long as the second to fourth tarsal segments combined (Fig. 68). The posterior tarsus length to – the posterior tibia length ratio of 1 : 1.40.

The ventral surface slightly paler than the dorsal surface. The abdominal sternites bare, shagreened, the first to third sternites each with a transverse row of coarse, shallow punctures. The longitudinal furrow of the metasternal plate extended only anteriorly, then changed to an oval, very deep and wide impression; the furrow is missing posteriorly. The prosternum and mesosternum coriaceous, with pale, decumbent hairs. The femora with irregularly distributed, coarse punctures and erected hairs. The posterior femur length – to – width ratio 1 : 0.50. The ratio of the intermediate femur width to the posterior femur width 1 : 1.5.

Distribution: S. England, Portugal, Spain, France, Italy, Corsica, Sicily, Greece, Crete, individual findings from Austria and Hungary, Canary, Morocco, Algeria, United Arabic Republic, Syria, Lebanon.

Material examined: 9 syntypes (Corsica, Lusitania, Creta, Gallia, Sicilia, MNHUB; and 211 specimens — IPE, MNHUB, NMSF, SMTD, ZFMB, ZMK, ZMUH.

The name *P. rugulosus* MULSANT is a synonym of this species (immature specimens) – BALTHASAR (1964).

As a species with clavate setae of the pronotum margins and with humeral teeth the *P.* (s. str.) *porcicollis* (ILLIGER) is most closely related to the *P.* (s. str.) *tesari* RAKOVIČ, the latter being not only smaller and paler, but also different by sharp ridges on the head and pronotum, longer 10th elytral interval and less distinct punctures of the elytral striae.

3.2.13 *Psammodius* (s. str.) *kobayashii* NOMURA

Psammodius kobayashii NOMURA, 1973: 43.

The author's original description is as follows.

Oval, strongly convex, shining, dark red-brown, with legs paler, antennae yellowish brown.

Head coarsely granulate in front, smooth on occiput, with an oblique short ridge on each side behind the middle and a trasnverse row of several coarse punctures upon occiput. Clypeus angularly emarginate in the middle of anterior margin, obtusely rounded at each apex, with lateral margins nearly straight, notched before genae. Pronotum broader than long (1.2 : 0.7 mm), front angles feebly produced and rounded, hind ones widely rounded, lateral margins arcuate, base obtusely angulate in the middle, nearly straight at sides, both margins feebly serrate, margined

and fringed with clavate, frequently bifurcate setae. Surface of pronotum feebly coriaceous, almost smooth and shining, sparsely, minutely punctate, with five transverse ridges and four sulci, each sulcus with a row of coarse punctures, basal two transverse ridges slightly separated by a shallow longitudinal impression. Scutellum triangular, coriaceous and opaque. Elytra convex, at base narrower than pronotum, broadened posteriorly, with the broadest point across behind the middle, length 1.8, breadth 1.5 mm, base margined, shoulders not toothed, lateral margins without setae. Each elytron 10-striated, strial punctures elongate, scarcely incised into intervals, which are feebly convex, each with a row of minute punctures in the middle, 10th interval short, flat and coriaceous.

Basal three abdominal sternites smooth in the middle, minutely coriaceous on each side, 4th sternite smooth, each with a row of shallow punctures along basal margin. Anal sternite sulcate transversely before the middle. Pygidium strongly coriaceous. Hind femora dilated, half longer than broad, with scattered coarse setigerous punctures. Hind tibiae broadened apically, twice as long as wide at apex, with four rows of setigerous tubercles on ventral surface, terminal spurs stout, slightly dilated apically, rounded at tip, the longer spur as long as basal two tarsal joints together. Hind tarsi short, but a little longer than breadth of tibia, with basal joint elongate-triangular, as long as following three joints combined. Length: 2.6 mm, breadth: 1.5 mm.

Holotype: ♂, Kenting Park, 9 April 1970, leg. T. KOBAYASHI, in coll. T. SHIBATA.

Distribution: Taiwan.

According to the characters in the original description, the species is related to the *P.* (s. str.) *porcicollis* (ILLIGER) and can be separated from it by missing humeral teeth.

3.2.14 *Psammodius* (s. str.) *sefrensis* (PETROVITZ)

Psammobius sefrensis PETROVITZ, 1961: 130.
Psammobius sefrensis: BALTHASAR, 1964: 534 (rev.).

Oblong oval, broader behind the length of 2.9 to 3.5 mm, the length – to – width ratio 1 : 0.48 shining, reddish brown (Fig. 114).

The head coarsely tuberculate anteriorly, posteriorly with two pairs of oblique ridges. The ridges of the first pair sometimes fused together. The second pair weaker, flat. The whole head only moderately bright, finely shagreened. Coarse punctures behind all the oblique ridges. The clypeus anteriorly roundly emarginate, with a broadly rounded angle each side of the emargination. The lifted lateral margins of the clypeus either quite directly or nearly directly changed into the genae and thus, the anterior margins of the genae either quite absent or only slightly pronounced (Fig. 58). The genae with pale, fine hairs.

The pronotum with a complete basal margin line and 5 transverse ridges. The widest in posterior half, the length – to – width ratio 1 : 1.55. The lateral margins crenulate anteriorly. The lateral and basal margins with pale, non-clavate setae; the setae of the basal margin shorter than those of the lateral margins. All the five transverse ridges flat (particularly the fifth one), weak, however, yet distinct. The transverse furrows with large, rather shallow punctures, which also penetrate into the first ridge. The ridges finely, microscopically punctate. The longitudinal furrow interrupting the fourth and fifth transverse ridges essentially smooth, sometimes with unique coarse punctures penetrating there from the transverse furrows.

The scutellum small, triangular, shagreened.

The elytra with a basal margin line, without distinct humeral teeth, the widest behind the middle, the length – to – width ratio 1 : 1.74 (Fig. 47). With 10 striae and 10 intervals. The striae with large, rather superficial, darkened punctures remarkably disturbing the intervals. The intervals moderately, however, quite distinctly convex, finely, microscopically punctate. The tenth interval posteriorly fused with the 9th one before three-fourths from the base.

The posterior tarsi remarkably shortened (the length of tibia – to – the length of tarsus ratio 1 : 0.62). The first to fourth tarsal joints remarkably triangularly widened. The upper terminal spur thick, longer than the first and second tarsal joints combined (Fig. 67).

The ventral surface bright, ferrugineous, paler than the dorsal surface, coxae, trochanters and both ends of femora darkened, with pale hairs (the prosternum and femora haired densely, the metasternum, mesosternum and sternites haired very sparsely). A large portion of the metasternal plate area remarkably concave, with a longitudinal central line which looks rather like a suture than like a furrow. The ratio of the width of intermediate femora to that of the posterior ones 1 : 2.0. The ratio of the length of the posterior tarsi to that of the posterior tibiae 1 : 1.62.

Distribution: Algeria (Ain Sefra).

Material examined: 4 paratypes — Ain Sefra, Algeria, Mai 1896, Dr. CHOBAUT lgt.,MHNG; and 2 specimens — CR, NMW.

PETROVITZ (1961) compared the species with those having complete 10th elytral intervals. As a matter of fact, the 10th elytral interval is fused with the 9th one before three-fourths from the base. There is only one further specimen in this subgenus with non-clavate setae of the pronotum margins and incomplete 10th elytral interval – *P.* (s. str.) *generosus* REITTER. The *P.* (s. str.) *generosus* REITTER is paler, its 10th interval achieves only 1/2 elytra length, elytral intervals are flatter and pronotal ridges higher.

3.2.15 *Psammodius* (s. str.) *generosus* REITTER

Psammodius generosus REITTER, 1892: 161.
Psammobius generosus: SCHMIDT, 1922: 483 (rev.); BALTHASAR, 1964: 534 (rev.).

The description presented here is based on the original description.

Yellow to reddish brown, shining, short, strongly convex and strongly broader behind, 2.8 to 3.3 mm.

The head rather strongly and densely granulate, posteriorly with 2, somewhat granulate oblique ridges, each bounded on both sides by shallow, oblique furrows. The clypeus finely emarginate, rounded each side of the emargination. The pronotum with 5 narrow, smooth high ridges and 4 coarsely punctate furrows. The fourth and fifth ridges interrupted by a longitudinal furrow. Lateral as well as basal margins with fine hairs. The elytra with shallow striae. The punctures in the striae rather indistinct. The intervals only slightly convex, the tenth interval achieving one half the elytra length. The ventral surface nearly smooth, shining, finely haired. The posterior tibiae strongly widened apically, the upper spur truncate. The posterior tarsus shorter than the apical width of the tibia. The tarsal segments strongly widened, the second to fourth segments very short.

Distribution: USSR (Armeniya, Turkmeniya).

The type locality Ordubad (basin of the river Arax, Armeniya). I did not meet with success when trying to search for the type. Even YABLOKOV-KHNZORYAN, who possesses a very good collection of Armenian Coleoptera, have never seen this animal (personal communication). NIKOLAEV informed me that he has seen a specimen from Turkmeniya in Leningrad Museum (personal communication).

By its hairlike setae of the pronotum base, this species can be easily separated from the *P.* (s. str.) *asper* (F.) who lives in the same area. For differences from the other species see the key to species.

3.2.16 *Psammodius* (s. str.) *nepalensis* (BALTHASAR)

Psammobius nepalensis BALTHASAR, 1971: 18.

Oval, broader behind, the length of 2.8 to 3.0 mm, the length – to – width ratio 1 : 0.5. Shining, dark brown to black, the sutural interval, humeri, the first (anterior) transverse ridge of the pronotum paler – reddish brown, the legs and clypeus margin palest – yellowish brown (Fig. 115).

The head tuberculate anteriorly, the tubercles round. Posteriorly with two pairs of distinctly developed, smooth oblique ridges, the anterior pair higher than the posterior one; a distinct furrow behind each oblique ridge, each with 2 to 3 coarse punctures. A longitudinal swelling above each eye. The surface of the tubercles essentially smooth – bright, the area between them finely, microscopically shagreened. The clypeus relatively shallowly, roundly emarginate, with quite rounded angles each side of the emargination. The lateral margins straight. The genae of very characteristic shape (Fig. 57), rounded, their anterior margin separated by a small notch.

The pronotum with a basal margin line, the widest behind the middle, the length – to – width ratio 1 : 1.50. Lateral margins crenulate. Five transverse ridges well deve-

loped; the first (anterior ridge) widened, at the middle at some sites partially interrupted, thus being broken into several, though if not quite discrete, swellings and tubercles; the remaining four ridges continuous, the fifth ridge slightly weaker than the second to fourth ones. The ridges smooth, bright, only very finely and sparsely microscopically punctate. A coarsely punctate furrow behind each ridge.

The scutellum small, triangular, shagreened.

The elytra wider in the posterior half, the length – to – width ratio 1 : 0.75 (Fig. 46). With 10 striae and 10 intervals and with a basal margin line which forms small, blunt humeral teeth laterally. The striae very distinct, with rather large punctures which are somewhat longitudinal, thus only slightly disturbing the intervals. The intervals convex, bright, essentially impunctate. The tenth interval flat, achieving about 3/4 elytra length.

The posterior tarsi remarkably shortened, the first to fourth tarsal segments triangularly widened. The tibia length – to – tarsus length ratio 1 : 0.51. The upper terminal spur of the posterior tibia longer than the first two tarsal segments combined (Fig. 70). The upper edge of the posterior tibia with sharp teeth, achieving the apex. The outer area with a longitudinal row of several small teeth, which are distributed fairly uniformly from the knee to the apex.

The ventral surface dark brown, shining, with non-bounded irregular, paler, glassy areas. Femora, abdominal sternites, and metasternum smooth, bright, at the most very finely punctate. The pygidium and femora haired, the abdominal sternites and metasternal plate bare. The longitudinal furrow of the metasternal plate widened at the middle. The ratio of the intermediate femur width to the posterior femur width 1 : 1.44. The posterior femur length – to – width ratio 1 : 0.58.

Distribution: Nepal.

Material examined: A paratype — Nepal, Rapti Tal, Jhawani, 200 m, May 1967, DIERL-FOSTER-SCHACHT lgt., CB.

This species possesses very characteristic features (shape of genae, crenulation of the whole pronotum basal and lateral margins, etc.), and thus, it can be easily separated from other species. Even its appearance (a small, shining, nearly black animal) is very characteristic. A possibility should be considered that setae on pronotum margins were rubbed off in type material. Then, the animal is close to *P.* (s. str.) *tesari* RAKOVIČ and can be separated from it by dark and shining surface and different shape of genae.

3.3 *GRANULOPSAMMODIUS* SUBGEN. N.

The type species: *Psammodius plicatulus* (FAIRMAIRE).

This subgenus is proposed to include 7 species – 5 from the Palearctic Region, 1 shared with the Palearctic and Ethiopian Regions, and 1 from the Ethiopian Region.

The animals of this subgenus can be easily separated from those of the remaining two subgenera by the presence of tubercles on the elytral striae. In the *Psammodius* (*Granulopsammodius*) *rotundipennis* REITTER, the granulation is restricted to lateral intervals, whereas in the remaining four species, all the elytral intervals are bearing granules. When disregarding the granulation of the elytra, then the *P.* (G.) *rotundipennis* REITTER is closely related to the *P.* (s. str.) *porcicollis* (ILLIGER). I placed this animal into this subgenus particularly to facilitate the identification. From phylogenetic standpoint, the two species should be probably placed in one subgenus.

On the other hand, the subgenus is closely related to the genus *Rhyssemodes* REITTER. The species of the subgenus *Granulopsemmodius* can be distinguished from the genus *Rhyssemodes* by widened posterior femora and different shapes of the clypeus and genae. Problems are with *P.* (*G.*) *mesopotamicus* (PETROVITZ), whose head (Fig. 84) shape is similar to those in most *Rhyssemodes* and *Rhyssemus* species. It can be considered as a bridge between the genera *Psammodius* FALLÉN and *Rhyssemodes* REITTER.

The subgenus is relatively homogeneous. All the species have elytra with humeral teeth (except for *P.* (*G.*) *plicatulus* (FAIRMAIRE)) and non-shortened 10th interval. In all species the pronotum lateral margins are crenulate, with setae; in *P.* (*G.*) *rotundipennis* the setae are clavate, in the remaining five species they are hairlike. All the species have transverse ridges on the pronotum. Most species have oblique ridges on the head vertex; at least one pair of oblique ridges is more or less distinct, in the *P.* (*G.*) *petrovitzi* RAKOVIČ, there is a pair of oblique furrows instead of the ridges; in the *P.* (*G.*) *centralasiae* RAKOVIČ the whole head is uniformly granulate, without oblique ridges on the head.

Key to species

1(12) The clypeus lateral margins at least anteriorly concave to straight. Pronotum lateral margins with fine hairs.

2(11) The genae prominent (Figs 79–83).

3(4) The genae strongly asymmetrical about their transversal axes (Fig. 81). Only the first (anterior) transverse ridge on the pronotum broken into discrete tubercles, the second ridge continuous, though if tuberculate. Reddish brown, 2.5 to 3 mm. – USSR – Transcaspia (Dortkuju), Uzbekistan (desert Kizilkum) ..... *P.* (*G.*) *transcaspicus* (PETROVITZ) (3.3.3)

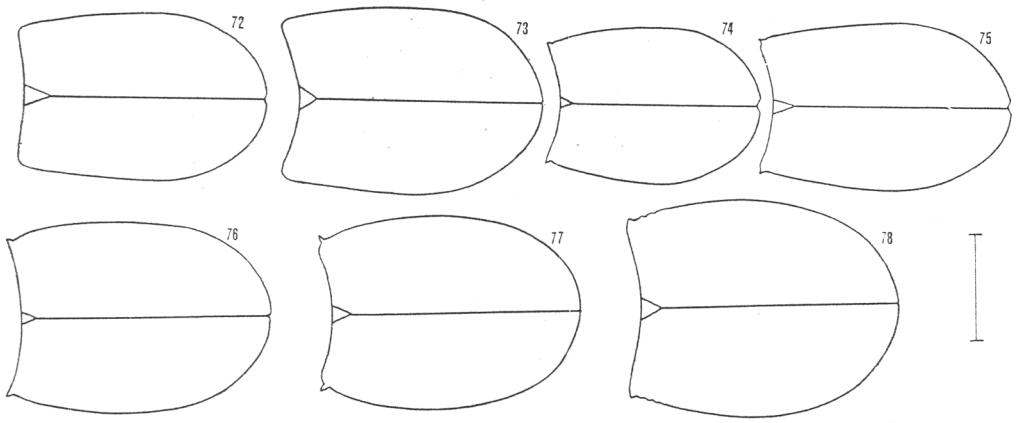
4(3) The genae nearly semicircular, or truncate, essentially symmetrical about their transversal axes (Figs. 79–80, 82–83). The first and second transverse ridges consisting of distinct tubercles.

5(6) The genae truncate (Fig. 82). The ventral surface remarkably haired. Reddish brown, 3.7 mm. – Mongolia .... *P.* (*G.*) *mongol* (ENDRÖDI) comb. n. (3.3.4)

6(5) The genae about semicircular (Figs. 79, 80, 83). The ventral surface bare or sparingly haired.

7(8) The tenth elytral interval shortened posteriorly (achieving about 0.65 to 0.7 elytra length). A somewhat laterally situated row of sharp granules behind the fifth pronotal ridge. The head vertex without oblique ridges or furrows. Reddish brown, 3.4 to 3.9 mm. – Soviet Central Asia (Turkmeniya, Uzbekistan) ..... *P.* (*G.*) *centralasiae* RAKOVIČ (3.3.5)

8(7) The tenth elytral interval complete, achieving essentially the apex. No row of granules present between the fifth transverse ridge and the pronotum base. The head posteriorly with oblique ridges and/or furrows.



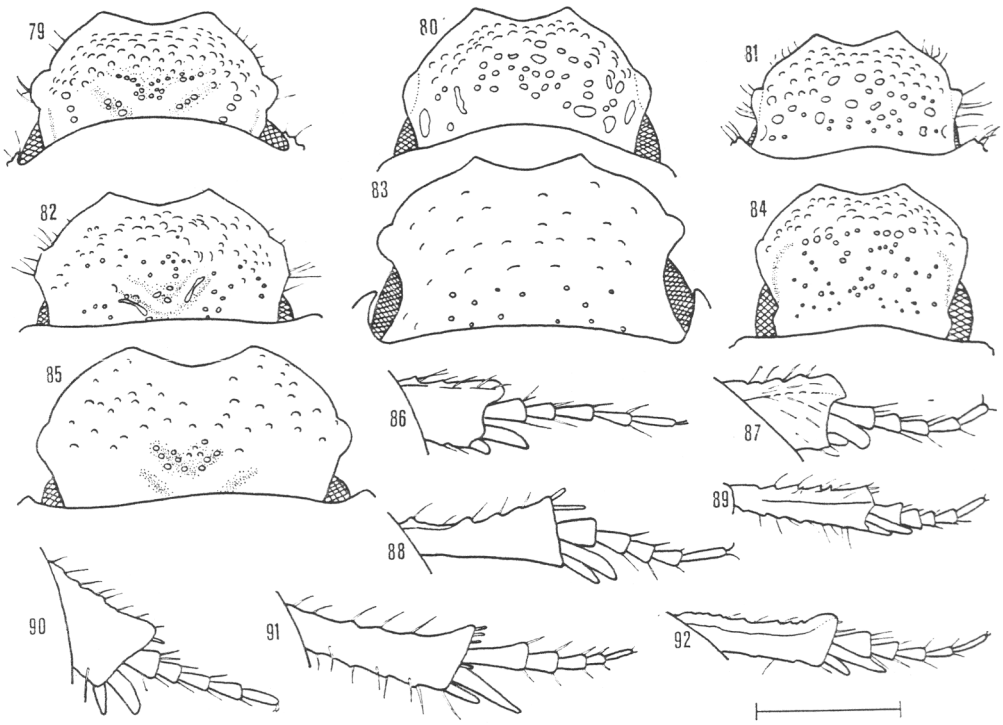
Figs. 72—78. Elytra shapes of *Psammodius* (*Granulopsammodius*) species: 72 — *P.* (*G.*) *plicatulus* (FAIRMAIRE), 73 — *petrovitzi* RAKOVIČ, 74 — *transcaspicus* (PETROVITZ), 75 — *mesopotamicus* (PETROVITZ), 76 — *mongol* (ENDRÖDI) comb. n., 77 — *centralasiae* RAKOVIČ, 78 — *rotundipennis* REITTER.

9(10) A paler species. The genae more prominent (Fig. 79). All the pronotal ridges essentially consisting of discrete tubercles – the fourth and fifth ridge distinct only laterally (nearly not visible from above). At least one pair of the head oblique ridges distinct, though if consisting of discrete tubercles. Reddish brown, 3 to 3.5 mm. – Algeria, Egypt, Sudan, Ethiopia, Djibouti .... *P.* (*G.*) *plicatulus* (FAIRMAIRE) (3.3.1)

10(9) A darker species. The genae less prominent (Fig. 73). The third to fifth transverse ridges on the pronotum continuous, all well visible from above (the third ridge granulate, the fourth ridge medially smooth the fifth ridge relatively weak). A pair of oblique furrows instead of the posterior oblique ridges of the head. Dark brown, 3.9 mm. – Ethiopia .... *P.* (*G.*) *petrovitzi* RAKOVIČ (3.3.2)

11(2) The clypeus lateral margins either directly or nearly directly changed into the genae and thus, the genae either not prominent or only weakly prominent (Fig. 84). Reddish brown, 3.8 mm. – Iraq, Iran .... *P.* (*G.*) *mesopotamicus* (PETROVITZ) (3.3.6)

12(1) The entire clypeus lateral margins convex. The pronotum lateral margins with clavate setae. Dark brown, 3 to 4.2 mm. South Spain, South Italy, Morocco, Algeria, Tunisia, Libya ..... *P.* (*G.*) *rotundipennis* REITTER (3.3.7)



Figs. 79—92. Heads and tarsi of *Psammodius* (*Granulopsammodius*) species: heads 79 — *P.* (*G.*) *plicatulus* (FAIRMAIRE), 80 — *petrovitzi* RAKOVIČ, 81 — *transcaspicus* (PETROVITZ), 82 — *mongol* (ENDRÖDI), 83 — *centralasiae* RAKOVIČ, 84 — *mesopotamicus* (PETROVITZ), 85 — *rotundipennis* REITTER; tarsi 86 — *P.* (*G.*) *plicatulus* (FAIRMAIRE), 87 — *petrovitzi* RAKOVIČ, 88 — *centralasiae* RAKOVIČ, 89 — *transcaspicus* (PETROVITZ), 90 — *mongol* (ENDRÖDI) comb. n., 91 — *rotundipennis* REITTER, 92 — *mesopotamicus* (PETROVITZ).

3.3.1 *Psammodius* (*Granulopsammodius*) *plicatulus* (FAIRMAIRE)

Psammobius plicatulus FAIRMAIRE, 1892: 95.
Psammobius plicatulus: SCHMIDT, 1922: 482 (rev.); BALTHASAR, 1964: 539 (rev.).

Oblong oval, moderately broader behind, the length of 3.2 to 3.7 mm, the length — to — width ratio 1 : 0.44. Moderately shining, reddish brown (Fig. 116).

The head anteriorly with large, rather transversal tubercles. More posteriorly the tubercles rounded, each furnished with a small puncture. The posterior oblique ridges broken into individual tubercles, the second pair of ridges only very indistinct. The

clypeus anteriorly with a rounded emargination. An only slightly rounded, elevated angle each side of the emargination. The clypeus lateral margins shortly haired, first moderately, however yet distinctly concave and then convex. The genae with long hairs, nearly semicircular (Fig. 79).

The pronotum with five transverse ridges, with a distinct, complete basal margin line. The widest behind the middle, the length – to – width ratio 1 : 1.41. All the transverse ridges formed by discrete granules. The first and second ridges remarkably widened medially (about three tubercles in the width). The third ridge narrower, represented by an only one row of tubercles. The fourth and fifth ridges less distinct, medially interrupted by a longitudinal furrow and, besides this, their tubercles low and flat and thus, the two ridges less visible from above. The area between the ridges essentially smooth, the tubercles of the first to third ridges each equipped with a puncture. The lateral and basal margins with pale, non-clavate hairs, anteriorly the hairs longer than those occurring posteriorly. The lateral margins remarkably crenulate anteriorly.

The scutellum small, rather elongate, with a fine, however, distinct microscopic structure.

The elytra without distinct basal margin line and humeral teeth, moderately broader in posterior half, the length – to – width ratio 1 : 0.68 (Fig. 72). With ten striae and ten intervals. The striae distinct, their punctures in some specimens indistinct, in most specimens darkened and thus distinct. The elytral intervals granulate, more or less shining, the tenth interval flat, non-shortened.

The posterior tibiae remarkably widened apically, the upper terminal spur longer than the first tarsal segment. The tarsal segments only slightly shortened (the tarsi as long as the tibiae) and only moderately widened apically (Fig. 86). The upper terminal edge of the tibiae toothed, essentially achieving the apex, the outer area with a longitudinal row of distinct, medium-sized teeth.

The ventral surface also reddish brown, the legs slightly darker than the sternites. The pygidium and abdominal sternites matt, shagreened, haired. The metasternal plate shiny, planar, with a complete medial furrow, having the same depth along its whole length. The mesosternum finely wrinkled. The prosternum haired, with fine structure. The femora shining, essentially smooth or with only very fine structure, with rows of hairs along their margins. The width of the intermediate femur to that of the posterior one – 1 : 1.56, the posterior femur length – to – width ratio 1 : 0.72.

Distribution: Algeria, Libya, Egypt, Sudan, Ethiopia, Djibouti.

Material examined: Type — Afars et Issas, Djibouti, Obock, 1890—91, Dr. GAUJAN,  and 16 specimens — CR, ZMUH.

As a species with essentially symmetrical, semicircular genae, the *P. (G.) plicatulus* (FAIRMAIRE) can be compared with an Ethiopian sp., *P. (G.) petrovitzi* RAKOVIČ. The latter species is different by continuous third to fifth pronotal ridges and by the presence of humeral teeth.

3.3.2 *Psammodius* (*Granulopsammodius*) *petrovitzi* RAKOVIČ

Psammobius somalicus PETROVITZ, 1971: 221.
Psammodius petrovitzi RAKOVIČ, 1978: 140 (nom. nov. for *Psammobius somalicus* PETROVITZ 1971: 221, not for *P. somalicus* PETROVITZ 1961: 129).

Oblong oval, nearly parallel only slightly broadened behind, 3.9 × 1.8 mm. Moderately shining, dark brown (Fig. 117).

The whole surface of the head coarsely tuberculate. Without oblique ridges, however, with a pair of oblique furrows. The clypeus emarginate anteriorly, lifted and angular each side of the emargination. The clypeus lateral margins first distinctly concave and then, before the genae, convex. The genae rounded, only moderately prominent, with fine, pale hairs (Fig. 80). Longitudinal swellings along the eyes. The tubercles, particularly posteriorly, each with a small puncture.

The pronotum with a complete basal margin line and 5 transverse ridges. Wider in posterior half, the length – to – width ratio 1 : 1.50. Lateral margins crenulate anteriorly, with fine, pale, non-clavate hairs. The base with shorter, pale, fine hairs, rather sparsely distributed. The first (widest) transverse ridge represented by a wide, laterally narrowed, flat zone of discrete tubercles (about 2 to 4 tubercles in the ridge width). The second ridge also narrowed laterally, partially continuous and partially consisting of discrete tubercles. The third ridge is the highest, continuous, granulate. The fourth ridge flat, essentially non-granulate at the middle (granulate only laterally). The fifth ridge very low and flat, the surface similar as with the fourth ridge. The fourth and fifth ridges interrupted by a longitudinal furrow. The first transverse furrow rather indistinct (the first and second transverse ridges nearly fused). The second and third transverse ridges wrinkled and shagreened. The fourth transverse ridge coarsely punctate. The tubercles of the first two ridges with one puncture each. Similar punctures on the third, tuberculate ridge. The longitudinal furrow essentially smooth.

The scutellum small, triangular, shagreened.

The elytra with a slightly margined base and with distinct humeral teeth, the length – to – width ratio 1 : 0.72 (Fig. 73). With 10 striae and 10 intervals. The striae very distinct, punctate. The intervals remarkably convex, their whole area covered by a continuous row of granules, which are not round, the boundaries between neighbouring tubercles nearly transversal. The 10th interval complete.

The posterior tibiae extremely widened apically. The segments of the posterior tarsi only moderately shortened and triangularly widened. The upper terminal spur of the posterior tibia thick, rounded apically, shorter than the metatarsus (Fig. 87). The ratio of the length of the posterior tibia to that of the posterior tarsus 1 : 0.89.

The ventral surface paler, shining (except for the mesosternum), reddish brown, coxae, trochanters and both ends of femora darkened. The prosternum and mesosternum shagreened, matt, the mesosternum also with large, shallow punctures. The sternites, femora and metasternum finely, microscopically punctate, with pale

hairs directed prevalently backward. The metasternal plate with a complete, narrow and deep longitudinal furrow. The ratio of the width of the intermediate femur to that of the posterior one 1 : 2.1.

Distribution: Somalia.
Material examined: Holotype — Somalia Fr., Obok, MNHG.

Out of the species of this subgenus only the *P. petrovitzi* RAKOVIČ and *P. plicatulus* (FAIRMAIRE) have about semicircular genae. In the *P. petrovitzi* RAKOVIČ — the third to fifth ridges are continuous, well visible from above whereas in the latter species all the ridges consist of tubercles, the fourth and fifth ridges being nearly invisible from above. The *P. petrovitzi* RAKOVIČ is larger, darker and has extraordinarily widened posterior tibiae.

3.3.3 *Psammodius* (*Granulopsammodius*) *transcaspicus* (PETROVITZ)

Psammobius transcaspicus PETROVITZ, 1961: 134.
Psammobius transcaspicus: BALTHASAR, 1964: 539 (rev.).

Oval, broader behind, the length of 2.6 to 2.9 mm, the length — to — width ratio 1 : 0.45. Shining, reddish brown, swellings on the head and pronotum sometimes darker (Fig. 118).

The head tuberculate anteriorly, posteriorly with only one pair of oblique ridges, which may be more or less distinct. The clypeus anteriorly with a slightly rounded (nearly angular) emargination, distinctly angular and finely lifted each side of the emargination. The clypeus lateral margins first distinctly concave and then (before the genae) convex. The genae prominent, strongly asymmetrical about their transversal axes (Fig. 81). The clypeus lateral margins and genae with fine, pale hairs.

The pronotum with a distinct, complete basal margin line and 5 transverse ridges, the widest behind its half, the length — to — width ratio 1 : 1.55. The lateral margins finely crenulate anteriorly. The lateral and basal margins relatively densely finely haired. The first transverse ridge consisting of discrete tubercles, the second ridge continuous, tuberculate, the third ridge remarkably higher than all the others, continuous, essentially not tuberculate, the fourth and fifth ridges also continuous, not tuberculate, at the middle interrupted by a longitudinal furrow, remarkably broadened behind, so that the interruption of the fifth ridge is much wider than that of the fourth one. The longitudinal furrow essentially smooth, the transverse furrows (particularly that behind the third ridge) with medium-sized punctures.

The scutellum very small, narrow, triangular, with a longitudinal impression along the midline.

The elytra with a finely margined base, with very distinct and sharp humeral teeth, the widest behind the middle, the length — to — width ratio 1 : 0.68 (Fig. 74). With 10 striae and 10 intervals. The striae very distinct, with distinct, rather longitudinal

punctures, somewhat disturbing the intervals. The intervals convex with relatively weak, flat tubercles, the tenth interval achieving about 0.8 elytra length.

The posterior tibiae remarkably widened apically, with the upper terminal spurs slightly shorter than the first two tarsal segments combined. The first to fourth tarsal segments distinctly triangularly widened (Fig. 89).

The ventral surface also ferrugineous, the coxae, trochanters, and apical ends of the tibiae and femora slightly darkened. The abdominal sternites finely shagreened, bare, the femora and metasternum bright, sparsely, finely haired. The metasternal plate with a narrow, longitudinal furrow along its whole length, distinctly impressed at the middle. The ratio of the width of the intermediate femur to that of the posterior one 1 : 1.7. The ratio of the length of the posterior tarsus to that of the posterior tibia 1 : 1.42.

Distribution: USSR (Transcaspia, Uzbekistan).

Material examined: Holotype — Transcaspia, Dortkuju, Apr 1900, coll. HAUSER, MHNG; and 3 specimens — all desert Kizilkum, near city Bukhara, Uzbekistan, USSR, CB, CO, CR.

In the subgenus *Granulopsammodius*, this species is very characteristic by its strongly asymmetrical genae.

3.3.4 *Psammodius* (*Granulopsammodius*) *mongol* (ENDRÖDI) comb. n.

Rhyssemus mongol ENDRÖDI, 1962: 295.

Oblong oval, convex, moderately broader behind, 3.7 mm, the length – to – width ratio 1 : 0.46. Shining, reddish brown, the punctures of elytral striae, apical ends of posterior tibiae and transversal furrows of the pronotum somewhat darkened (Fig. 119).

The head granulate anteriorly as well as posteriorly. Posteriorly some granules arranged in a pair of oblique ridges. Anteriorly the granules somewhat transversal. The clypeus anteriorly emarginate, angular each side of the emargination. The lateral margins anteriorly slightly concave or straight, then (before the genae) convex. The genae prominent, truncate, with few hairs (Fig. 82).

The pronotum transversal (length – to – width ratio 1 : 1.50), with five transverse ridges. All the ridges granulate. The first ridge essentially broken into individual granules, about 2 to 3 granules in its width. The second ridge medially broadened (about 6 granules in its width) and essentially also consisting of individual granules, which are somewhat less distinctly bounded than those of the first ridge. The third to fifth ridges continuous, not particularly high, with indistinctly bounded tubercles. The first transversal furrow essentially missing medially because of the widening of the second ridge. The second to fifth transverse furrows distinct, impunctate, their surface rather uneven. The posterior longitudinal furrow, interrupting the fourth and fifth ridges, relatively shallow, of about the same width as the transverse furrows.

The pronotum lateral margins relatively finely crenulate anteriorly, with long, pale, non-clavate hairs. The basal margin represented by a sharp edge, equipped with somewhat shorter hairs.

The scutellum small, triangular, shagreened.

The elytra with margined base and humeral teeth, with moderately convex lateral margins (the length – to – width ratio 1 : 0.72), with 10 striae and 10 intervals (Fig. 76). The striae very distinct, with very distinct, medium-sized, darkened punctures disturbing the intervals. The intervals granulate, impunctate, finely shagreened, however, yet shining, the tenth interval achieving about 0.78 elytra length, then fused with the ninth interval, the fusion of the tenth and ninth interval achieving about 0.87 elytra length.

The posterior tibiae widened apically (the length – to – width ratio 1 : 0.42), remarkably haired, their upper edge with about 4 rather indistinct teeth, their outer surface with a longitudinal row of very indistinct teeth (those occurring close to the apex low and extended transversally and thus changed into transversal wrinkles). The posterior tarsi shortened, the length of the tibia to that of the tarsus 1 : 0.69. The first to fourth tarsal segments triangularly widened, the upper terminal spur of the posterior tibia hardly as long as the first and second tarsal segments combined (Fig. 90).

The ventral surface also reddish brown. The abdominal sternites, femora, and metasternum smooth, shining, remarkably haired. The metasternal plate somewhat concave medially, with a longitudinal, posteriorly somewhat shortened furrow. The prosternum and mesosternum coriaceous. The posterior femur wide, the length – to – width ratio 1 : 0.592. The width of intermediate femur to that of the posterior one 1 : 1.33.

Distribution: Mongolia.

Material examined: Holotype — Mongolia, Südgobi aimak, 100 km West von Grenzposten, Ovot Chuural, 1250 m, exp. Dr. KASZAB, June 22, 1967, HNMB.

The *P.* (*G.*) *mongol* (ENDRÖDI) comb. n. can be compared with the following palearctic species: *P.* (*G.*) *plicatulus* (FAIRMAIRE), *P.* (*G.*) *transcaspicus* (PETROVITZ) and *P.* (*G.*) *centralasiae* RAKOVIČ. The *P.* (*G.*) *plicatulus* (FAIRMAIRE) has essentially all the ridges on the pronotum broken into tubercles, the fourth and fifth ridges being indistinct when observed from above, the elytra without humeral teeth, the tarsal segments much slender and the pronotum margin crenulation stronger; *P.* (*G.*) *transcaspicus* (PETROVITZ) has somewhat rounded angles each side of the clypeus emargination and quite different pronotal ridges (particularly the second ridge, which is high, continuous, non-widened). *P.* (*G.*) *centralasiae* RAKOVIČ has a different shape of elytra, stronger crenulation, shorter hairs of the pronotum margins and sharp grains behind the fifth pronotal ridge. Besides these differences, the *P.* (*G.*) *mongol* (ENDRÖDI) comb. n. may be characterized by truncate genae and richly haired ventral surface.

3.3.5 *Psammodius* (*Granulopsammodius*) *centralasiae* RAKOVIČ

Psammodius centralasiae RAKOVIČ, 1978: 123.

Oblong oval, convex, broader behind, 3.4 to 3.9 mm, the length – to – width ratio 1 : 0.45. Moderately shining, reddish brown, posterior and anterior margins of the pronotum, punctures of elytral striae, and apical ends of posterior and intermediate tibiae somewhat darkened (Fig. 120).

The head granulate, without frontal suture and oblique swellings. The granules present on the whole head surface, transversal anteriorly, rather rounded and indistinctly bounded posteriorly. The clypeus roundly emarginate anteriorly, with a lifted angle each side of the emargination (Fig. 83). The clypeus lateral margins distinctly concave anteriorly, then (before the genae) convex. The genae about semicircular, equipped with few pale hairs.

The pronotum transversal, the length – to – width ratio 1 : 1.39, with five transverse ridges and five transverse furrows. The first ridge broken into discrete granules, with 2 granules in its width. The second ridge essentially also consisting of individual granules, remarkably broadened medially (about 4 granules in its width). The third, fourth and fifth ridges relatively flat, continuous, granulate. Behind the fifth ridge, somewhat laterally, a transverse row of sharp tubercles (about 3 to 5 tubercles each side). The transverse ridges laterally fused together (as in all *Psammodius* species with transversal ridges). The lateral area between this fusion and the pronotum lateral margin equipped with distinct, discrete tubercles. The first and second ridges medially nearly fused together and thus, the first transverse furrow essentially indistinct when observed from above. The other transverse furrows more distinct, impunctate, however, disturbed by areas between granules of the ridges. The longitudinal furrow, interrupting the fourth and fifth transverse ridges, rather flat, indistinct. The pronotum lateral margins relatively finely crenulate anteriorly, with fine, pale, non-clavate hairs. The pronotum posterior margin represented by a sharp edge, with few short, pale, non-clavate hairs.

The scutellum small, triangular, situated somewhat below the level of the convex sutural interval.

The elytra with very strongly pronounced, sharp humeral teeth, with convex lateral margins (Fig. 77), the length – to – width ratio 1 : 0.72. With ten striae and ten intervals. The striae very distinct, their punctures surrounded by dark spots; diameters of the spots nearly as large as the span of the punctures and thus, there are nearly continuous darkened longitudinal zones in each stria. The elytral intervals convex, granulate, the tenth interval shortened, achieving at the most 0.7 elytra length.

The posterior tibia with toothed upper edge. Their outer area with a longitudinal row of about 7 teeth. The first to fourth tarsal segments of posterior tarsi (Fig. 88) moderately triangularly broadened, the upper terminal spur about as long as the first and second tarsal segments combined. The posterior tarsus length – to – width (at apex) ratio 1 : 0.36.

The ventral surface also reddish brown. The third to sixth abdominal sternit and metasternum bright, smooth, bare, the first and second abdominal sternites wit short hairs. The femora bright, smooth, with rows of setae along their posteri margins. The mesosternum with a medially broadened longitudinal furrow. Th prosternum and mesosternum coriaceous. The posterior femur length – to – widt ratio 1 : 0.59, the width of intermediate femur to that of posterior femur 1 : 1. The posterior tibia length – to – the posterior tarsus length ratio 1 : 0.86.

Distribution: USSR (Turkmeniya, Uzbekistan).

Material examined: Holotype — USSR, Uzbekistan, Samarkand, STENROOS, ZMUH; 1 par type — USSR, Turkmeniya, Aschkhabad, AHNBERG, CR.

The *P.* (*G.*) *transcaspicus* (PETROVITZ), which also occurs in the Central Asia, ca be distinguished from this species on the basis of a different shape of genae. Fo differences from the other species see the key to species.

3.3.6 *Psammodius* (*Granulopsammodius*) *mesopotamicus* (PETROVITZ

Psammobius mesopotamicus PETROVITZ, 1971: 222.

Oblong oval, only moderately broader behind, the length of 3.4 to 3.7 mm, th length – to – width ratio 1 : 0.44. Moderately shining, reddish brown (Fig. 121

The head tuberculate, the tubercles rather penetrating backwards, thus leaving a only narrow, non-tuberculate zone before the pronotum anterior margin. At th most only one pair of posterior oblique ridges, which is, however, sometimes qui absent, lost in the granulate structure of the head. The microscopic structure of th whole head variable, from quite bright to quite matt – remarkably shagreene The clypeus anteriorly with a rounded emargination and lifted angles each side o the emargination. The clypeus lateral margins moderately, however, yet distinct concave anteriorly and then, before the genae, convex. The genae with only sho anterior margins (Fig. 84). The clypeus margins bare, the genae with pale, fine hai

The pronotum with a distinct, complete basal margin line. The widest in th posterior half, the length – to – width ratio 1 : 1.45. The lateral margins crenula anteriorly, the lateral as well as basal margins with hairlike, non-clavate set (posteriorly the setae shorter). With five transverse ridges. The first and second ridg consisting of discrete granules, remarkably widened and mutually essentially fus at the middle. The third to fifth ridges rather flat, however, well distinct, continuou moderately granulate. The fourth and fifth ridges interrupted by a longitudinal fu row. The transverse furrows with not very distinct small grains and/or transver wrinkles. The longitudinal furrow either smooth or with a structure similar to th of the transverse furrows. Similarly as with the head, the microstructure variabl from quite smooth to remarkably shagreened.

The scutellum small, narrow, triangular.

The elytra with only indistinctly margined base and with distinct, laterally directed humeral teeth, only moderately broadened behind, the length – to – width ratio 1 : 0.66 (Fig. 75). With 10 striae and 10 intervals. The narrow, distinct striae with indistinct punctures. The intervals moderately convex, tuberculate, the tubercles distinct particularly laterally and posteriorly. The 10th interval not shortened.

The posterior tibiae broadened apically. The posterior tarsi essentially non-shortened, with only moderately triangularly widened first to fourth segments. The upper terminal spur of the posterior tibiae about as long as the first and second tarsal segments combined (Fig. 92). The upper edge of the tibia nearly achieving the apex. The outer area of the tibiae with sharp teeth.

The ventral surface also reddish brown, with darkened coxae, trochanters, apical ends of tibiae and femora and irregular areas on the metasternum. The abdominal sternites with a very fine microscopic structure, moderately shining, bare. The metasternum smooth, bright, only very sparsely, finely haired; the metasternal plate with a complete, narrow longitudinal furrow, essentially uniformly deep along its whole length. The mesosternum and prosternum granulate. The femora bright. The anterior femora sparsely, finely, irregularly haired. The intermediate and posterior femora each with two rows of hairs, parallel with anterior and posterior margins.

Distribution: Iraq, Iran.

Material examined: Holotype — Kirkuk, Irak, Dr. W. SCHERS lgt.; and 1 specimen from Iran — NMP.

This species differs from all species of the subgenus by the characteristic shape of the genae (Fig. 84).

3.3.7 *Psammodius (Granulopsammodius) rotundipennis* REITTER

Psammodius rotundipennis REITTER, 1892: 159.
Psammobius rotundipennis: SCHMIDT, 1922: 482 (rev.); BALTHASAR, 1964: 538 (rev.).
Psammobius rotundicollis D'ORBIGNY, 1896: 254 (syn.).

Oval, strongly broader behind, 3.0 to 3.8 mm, the length – to – width ratio 1 : 0.50. Moderately shining, dark brown (Fig. 122).

The head granulate anteriorly, the granules somewhat indistinctly bounded, posteriorly with one pair of flat oblique ridges. The area between the granules and ridges, and mostly also the granules and ridges themselves, more or less shagreened. The clypeus roundly, rather deeply emarginate anteriorly, with an only slightly rounded angle each side of the emargination. The clypeus lateral margins convex. The genae rounded, their anterior margins being either slightly pronounced or represented only by a smooth continuation of the clypeus lateral margins (Fig. 85). The clypeus marginsbare, the genae with rather long, fine, pale hairs.

The pronotum broader posteriorly, the length – to – width ratio 1 : 1.45. Its base represented by a sharp edge. The lateral as well as basal margins with clavate

setae. The lateral margins distinctly crenulate anteriorly, the notches smaller, h ever, yet distinct posteriorly, and even the basal margins with petit notches clavate setae situated just in these notches). With five flat transverse ridges. The (anterior) ridge strongly disturbed by punctures or even granulate, the remai four ridges non-granulate, more or less irregularly disturbed by large punct penetrating there from the transverse furrows. The surface of ridges with a microscopic structure. The transverse furrows, as well as the longitudinal fu interrupting the fourth and fifth ridges coarsely punctate, the punctate areas (most typically 2 to 3 coarse punctures in the furrow width).

The scutellum small, triangular, moderately shagreened.

The elytra with ten striae and ten intervals, with margined base and very dis humeral teeth, strongly broadened posteriorly, the length – to – width ratio 1 : (Fig. 78). The striae very distinct, their punctures indistinct, slightly disturbing intervals. The intervals convex, granulate (particularly laterally, i.e. the sixth tenth intervals), the tenth interval non-shortened, essentially achieving the a

The posterior tibiae moderately broadened posteriorly, the upper edge with 2 relatively small teeth, the outer surface with a longitudinal row of about 4 to 5 te The tarsi only moderately shortened, their first to fourth segments modera triangularly widened. The upper terminal spur of the tibia about as long as the two tarsal segments combined (Fig. 91).

The ventral surface ferrugineous, the trochanters dark, nearly black. The pygidi abdominal sternites, metasternal plate, and femora smooth, rather shining, and (except for few setae on femora – along margins, trochanters, and pygidium). prosternum and mesosternum coriaceous. The metasternal plate with a longitud furrow, which is widened medially and is located rather posteriorly (extended f about 1/2 to about 3/4 metasternal plate length). The ratio of the intermediate fe width to the posterior femur width 1 : 1.22. The posterior tibia length – te posterior tarsus length ratio 1 : 0.87.

Distribution: S. Spain, S. Italy, Morocco, Algeria, Tunisia, Libya.
Material examined: 29 specimens — IPE, MHNG, MNHUB, SMTD, ZMUH.

P. (*G.*) *rotundipennis* REITTER is strongly broadened posteriorly, thus being distin vely different from all the other species with granulate elytral intervals. When fai to observe the granules on the elytra, this species can be considered as simila *P.* (s. str.) *porcicollis* (ILLIGER), however, it differs from the latter by a comp tenth interval and wider punctate areas in transverse furrows of the pronotum. the synonymy with the name *P. rotundicollis* d'ORBIGNY see SCHMIDT (1922).

4 SPECIES REMOVED FROM THE GENUS *PSAMMODIUS* FALLÉN

It is beyond the scope of this work to discuss all the species, which were ever placed in the genus *Psammodius* FALLÉN (or *Psammobius* HEER). I'do like just to remind two animals, which were yet considered as *Psammobius* species in two basic monographs of *Aphodiinae* – SCHMIDT, 1922, BALTHASAR, 1964.

BALTHASAR (1964) did not have a chance to examine two doubtful species, however, on the basis of quite insufficient original descriptions, he was able to draw a correct conclusion that these species should be probably transferred into a different genus. He introduced them as *Psammobius* (?) *comis* LEWIS and *Psammobius* (?) *ainu* LEWIS.

The BALTHASAR's assumption was definitely supported by NAKANE (1972) and RAKOVIČ (1979), respectively, who transferred these two species into genera *Psammoporus* and *Petrovitzius*, respectively. STEBNICKA (1977), in her revision of the tribe *Aegialiini*, placed the first species in the genus *Aegialia*. Thus, the present status of the two species is as follows:

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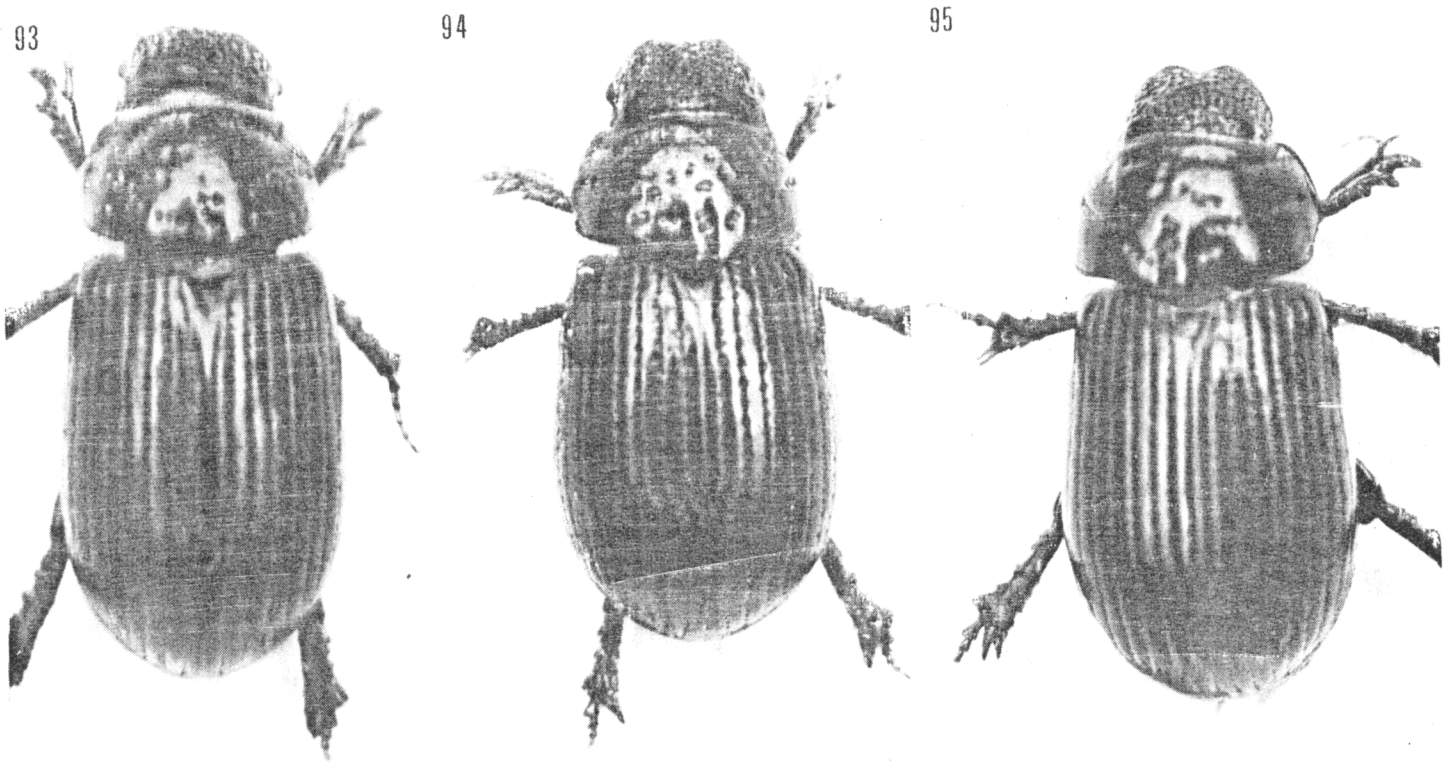
(synonyms are printed in italics)



Figs. 93—95. Photos (dorsal views) of *P.* (*L.*): 93 — *laevicollis* KLUG (3.5 mm), 94 — *indicus* (HAROLD) (3.3 mm), 95 — *kenyensis* RAKOVIČ (holotype 3.7 mm).

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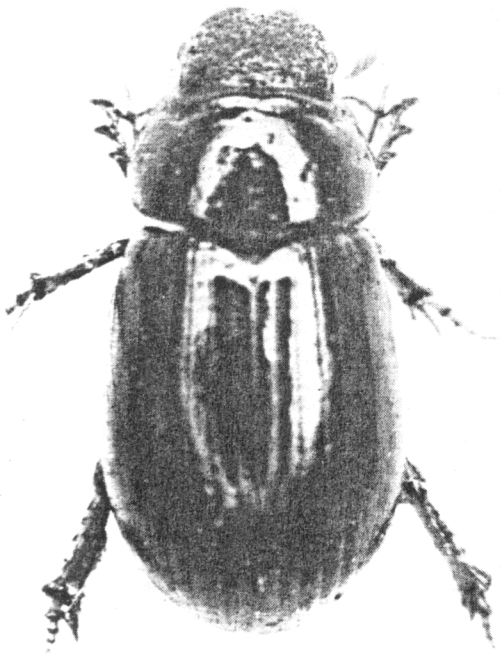

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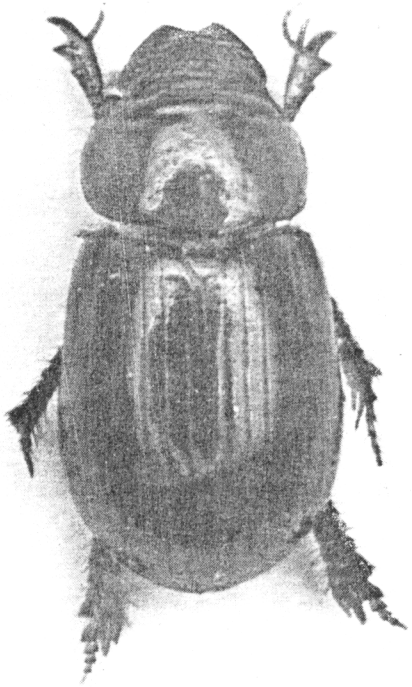

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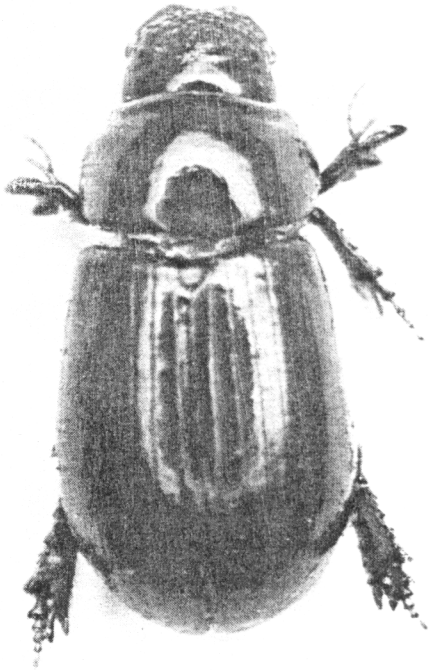
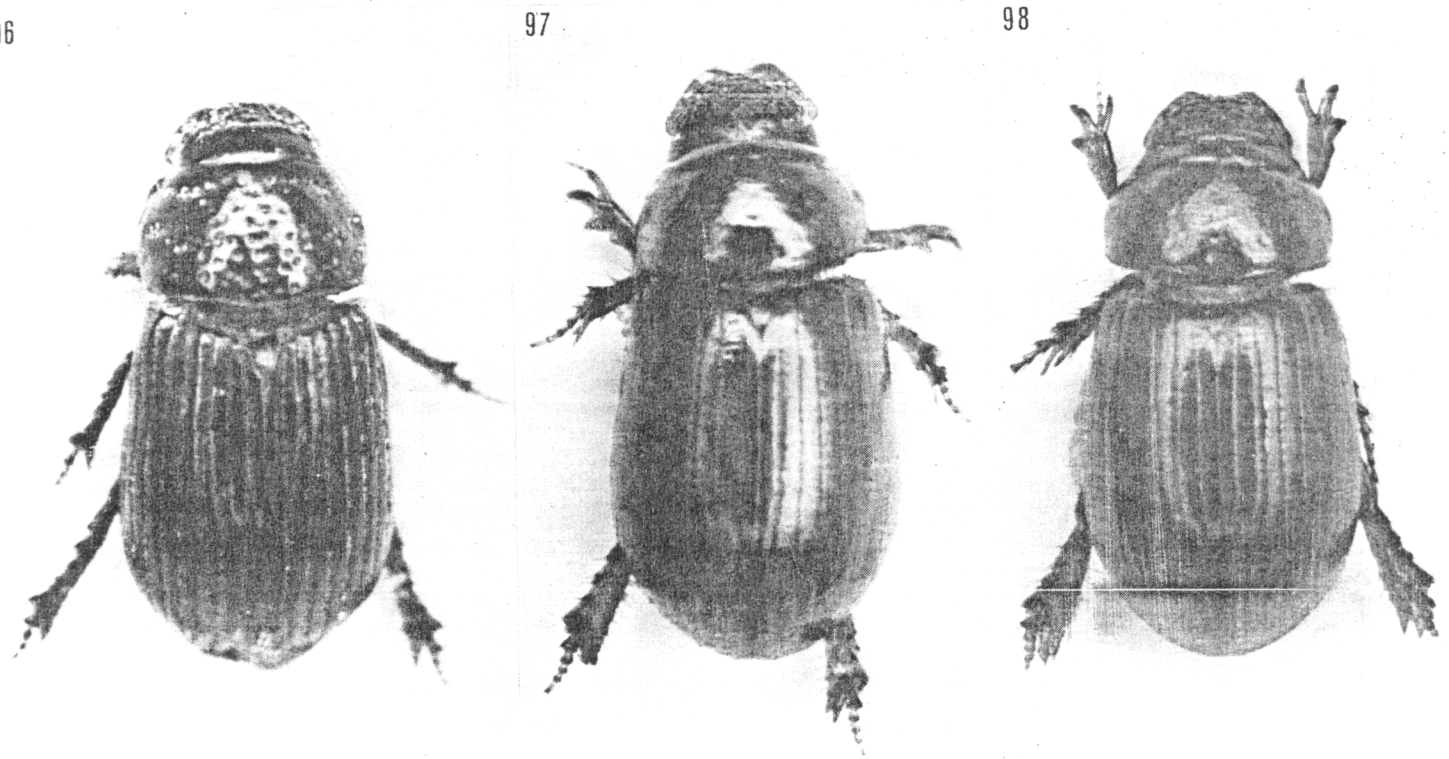


Figs. 99—101. Photos (dorsal views) of *P. (L.)*: 99 — *substriatus* (BALTHASAR) (holotype, 3.3 mm), 100 — *desertorum* (FAIRMAIRE) (3.4 mm), 101 —



Figs. 96—98. Photos (dorsal views) of *P.* (*L.*): 96 — *subciliatus* (HAROLD) (3.2 mm), 97 — *pelluscens* (PETROVITZ) (holotype, 3.0 mm), 98 — *laevis* (PAULIAN) (3.2 mm).

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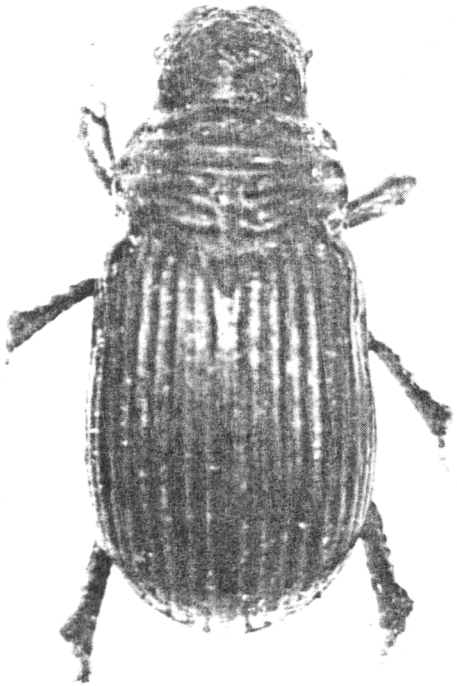

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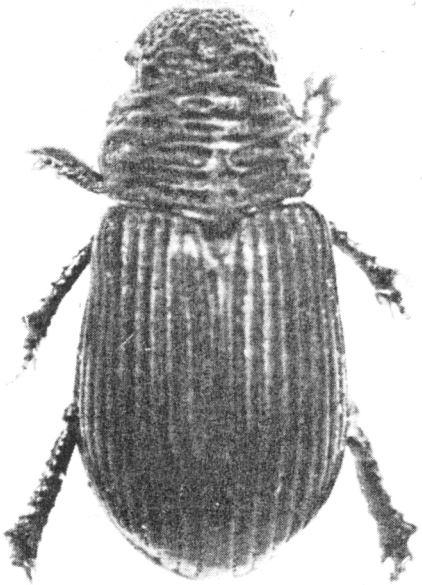

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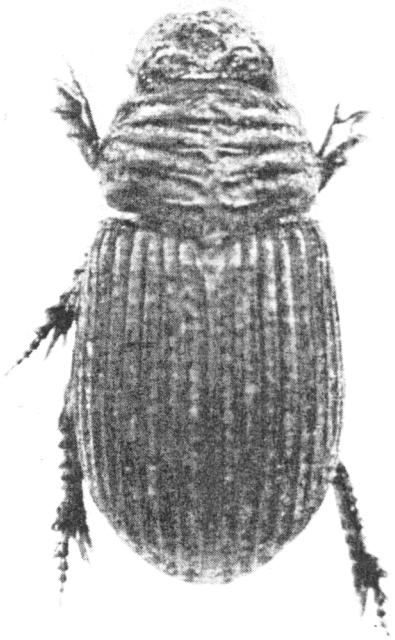
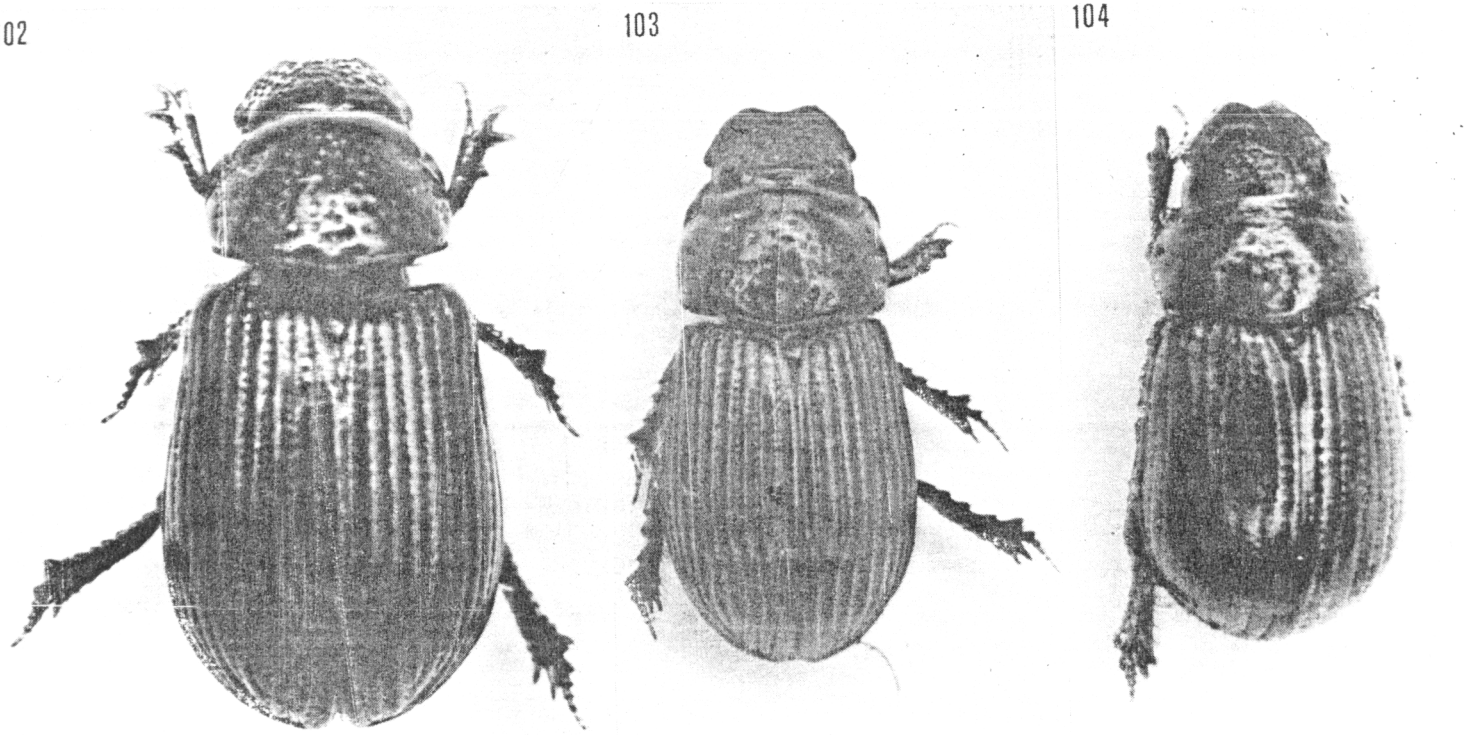
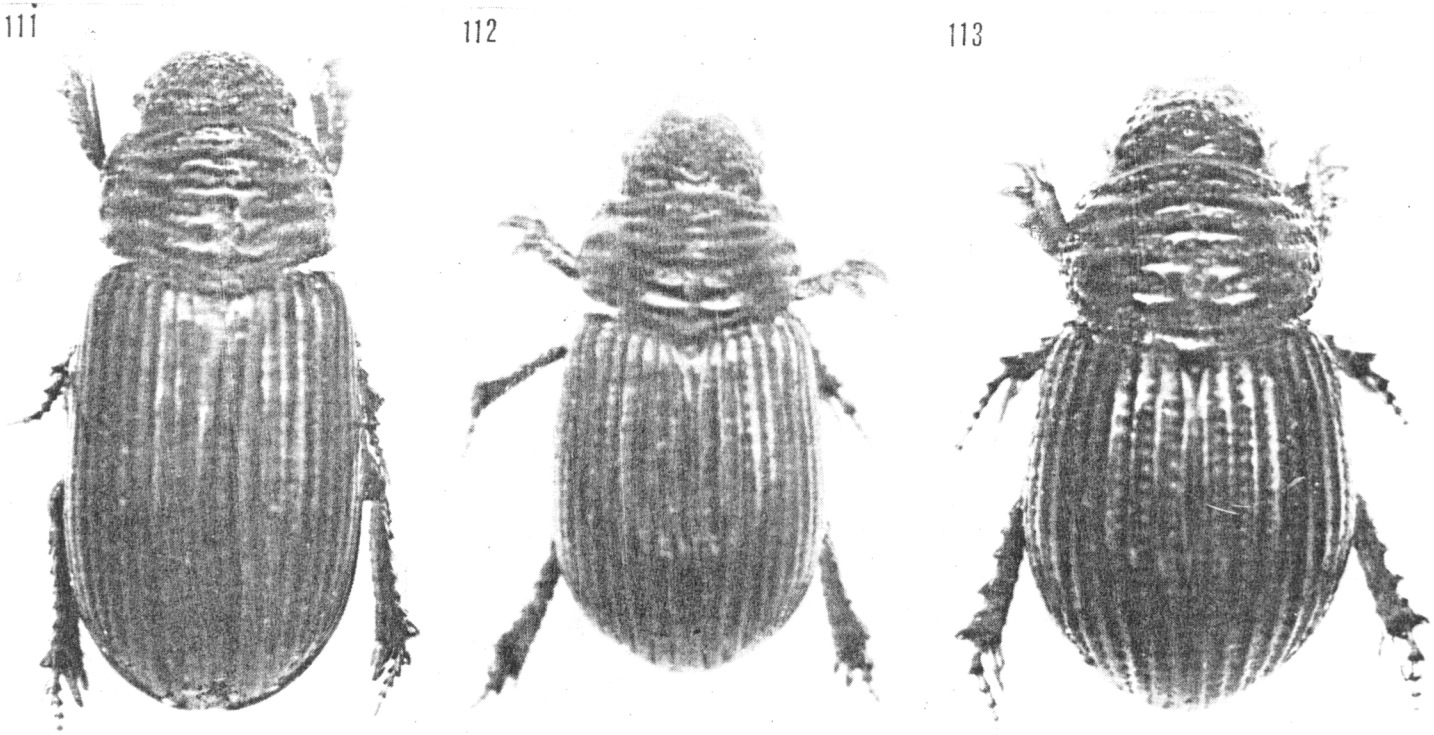


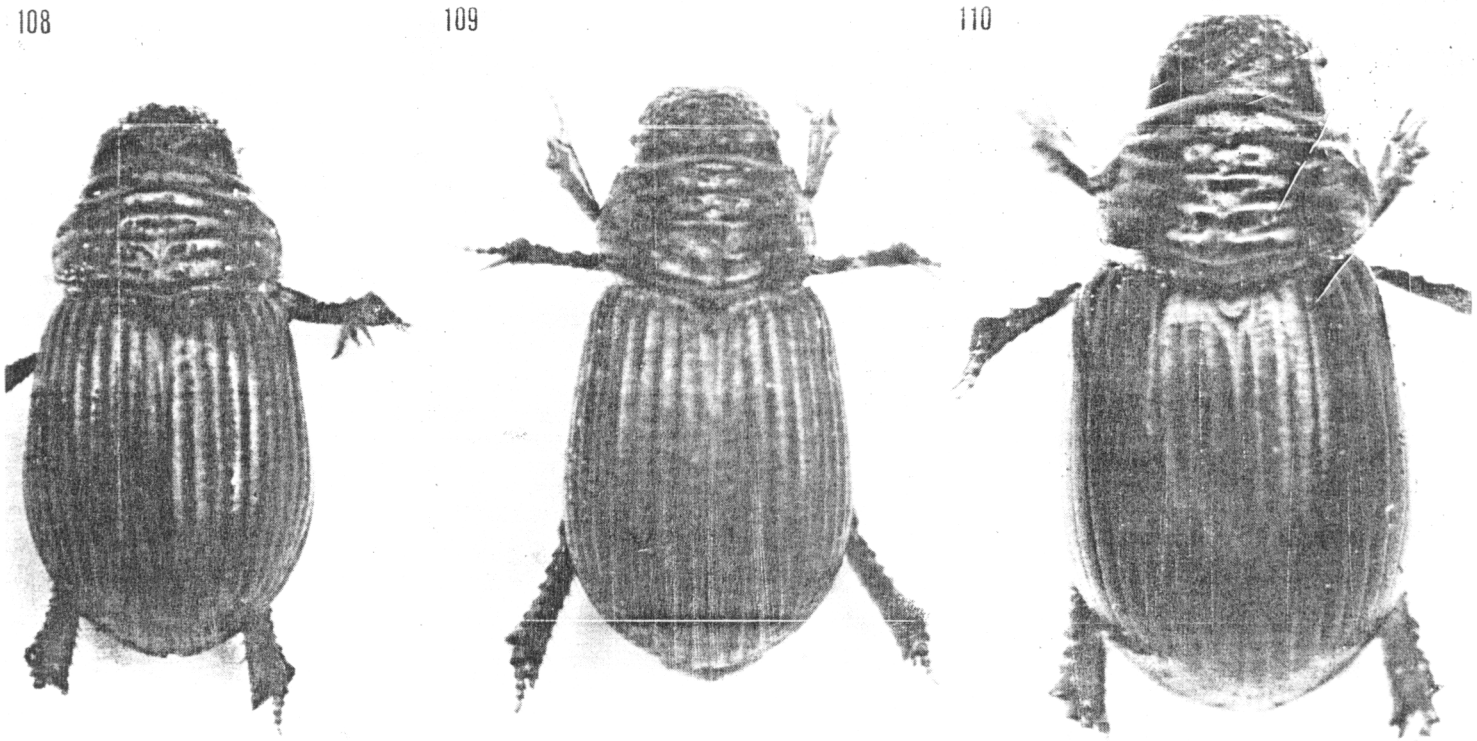
Figs. 105—107. Photos (dorsal views) of *P.* (s. str.): 105 — *asper* (FABRICIUS) (3.3 mm), 106 — *convexus* WATERHOUSE (3.3 mm), 107 — *thailandicus*



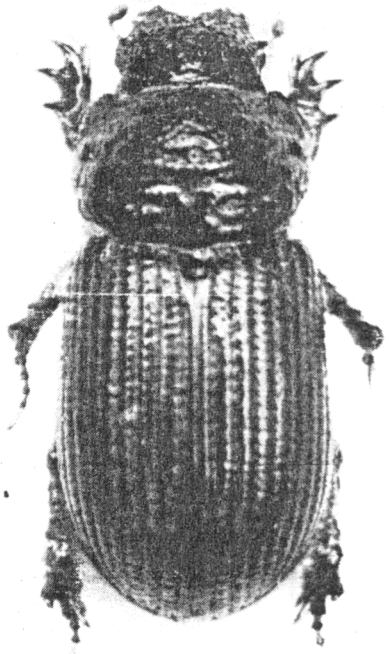
Figs. 102—104. Photos (dorsal views) of *P.* (*L.*): 102 — *japonicus* (HAROLD) (4.0 mm), 103 — *abyssynicus* (MÜLLER) (3.2 mm), 104 — *gestroi* (CLOUËT) (2.5 mm).



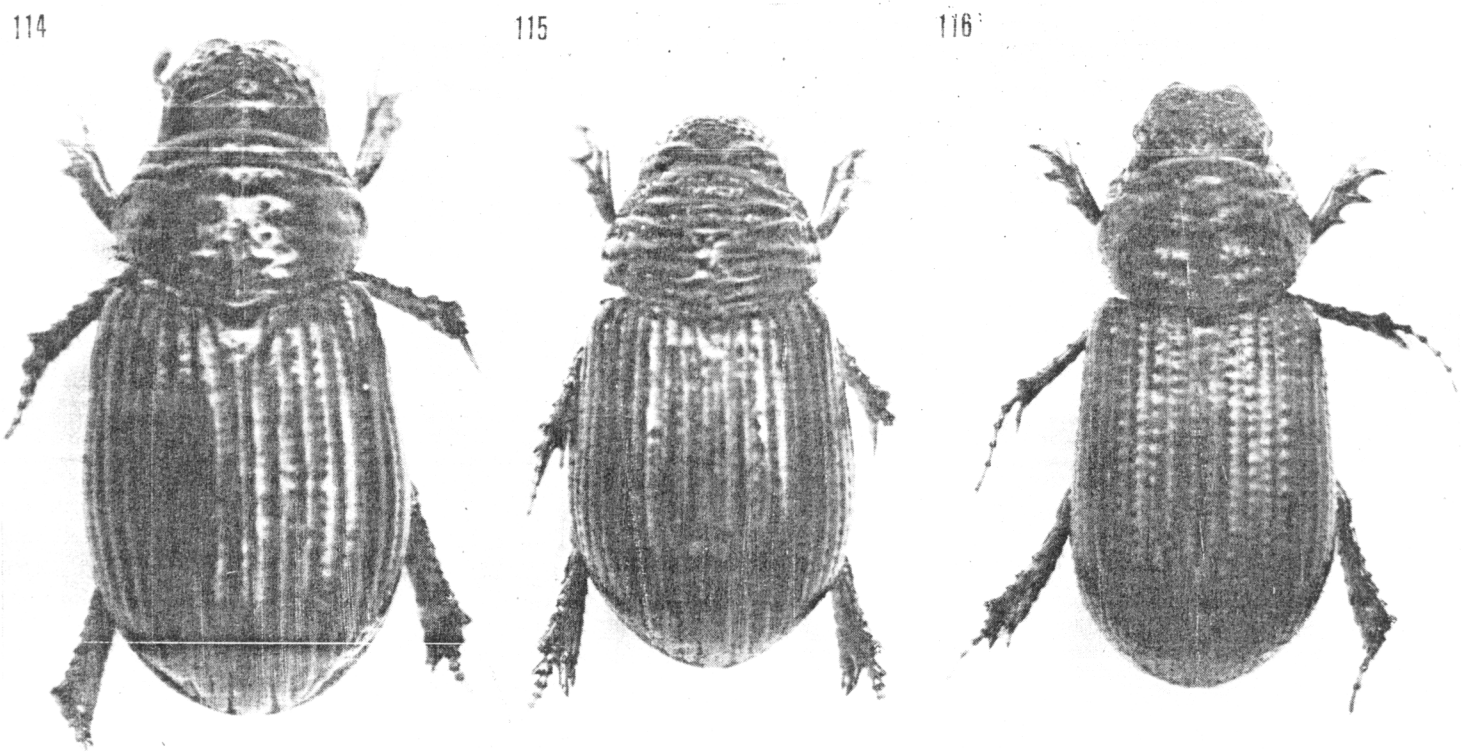
Figs. 111—113. Photos (dorsal views) of *P.* (s. str.): 111 — *laevipennis* COSTA (4.3 mm), 112 — *tesari* RAKOVIČ (holotype, 3.0 mm), 113 — *porcicolli*



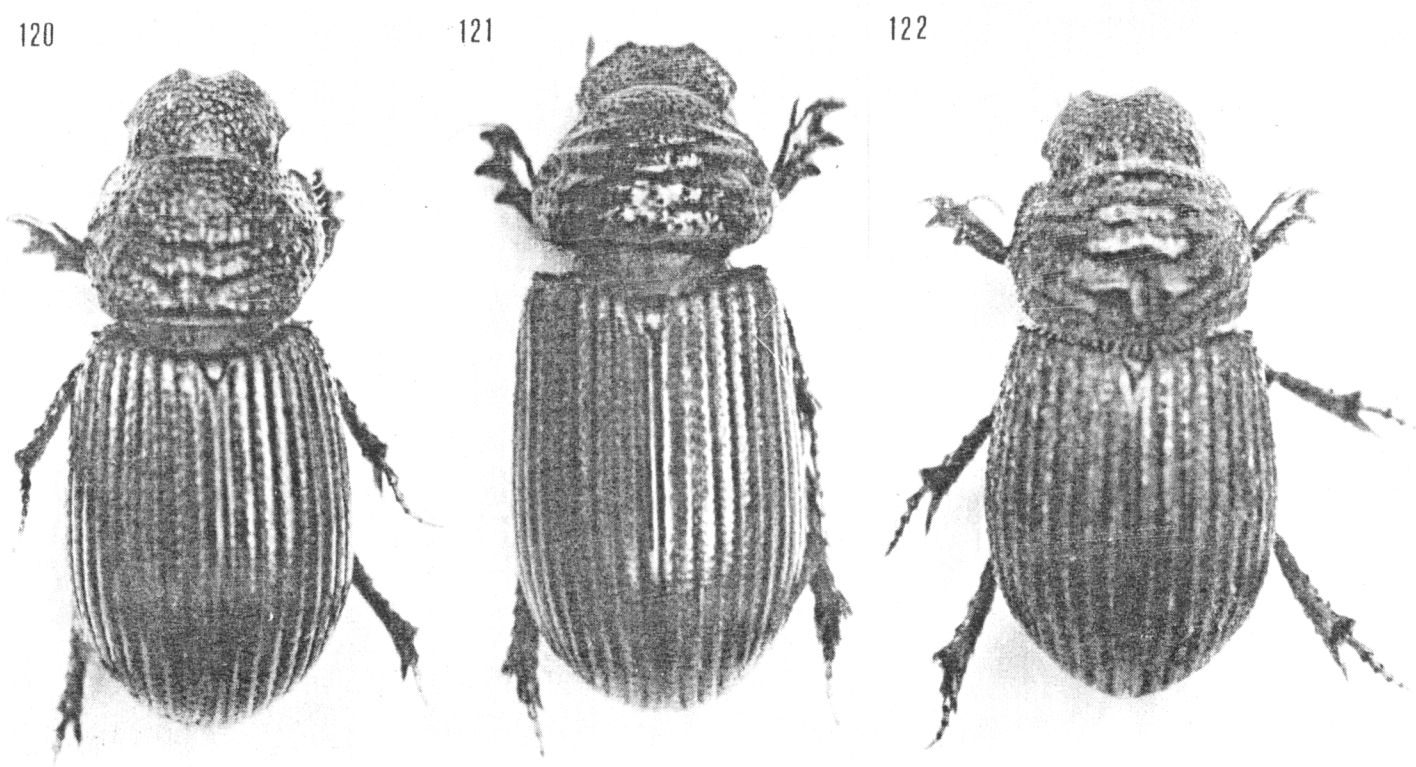
Figs. 108—110. Photos (dorsal views) of *P.* (s. str.): 108 — *nocturnus* REITTER (3.3 mm), 109 — *besucheti* (PETROVITZ) (3.1 mm), 110 — *basalis* MULSANT et REY (4.4 mm).



Figs. 117—119. Photos (dorsal views) of *P.* (*G.*): 117 — *petrovitzi* RAKOVIČ (holotype, 3.9 mm), 118 — *transcaspicus* (PETROVITZ) (holotype, 2.9 mm), 119 — *mongol* (ENDRÖDI) comb. n. (holotype, 3.7 mm).



Figs. 114—116. Photos (dorsal views) of *P.*: 114 — (s. str.) *sefrensis* (PETROVITZ) (paratype, 3.5 mm), 115 — (s. str.) *nepalensis* (BALTHASAR) (paratype, 3.0 mm), 116 — (*G.*) *plicatulus* (FAIRMAIRE) (3.6 mm).



Figs. 120—122. Photos (dorsal views) of *P.* (*G.*): 120 — *centralasiae* RAKOVIČ (holotype, 3.9 mm), 121 — *mesopotamicus* (PETROVITZ) (holotype, 3.4 mm), 122 — *rotundipennis* REITTER (3.7 mm).