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Studies on palearctic Onthophagus associated with burrows of small mammals.
I. O. furciceps, O. kindermanni, O. vitulus and closely related species
(Coleoptera Scarabaeidae)

Abstract - Some Onthophagus species of the subgenus Palaeonthophagus Zunino, 1979 are herein revised and placed in three groups. A new Northern Iranian species (O. (P.) excubitor n. sp.), belonging to the vitulus group, is described. Six new synonymies (Bubalonthophagus Ádám, 1994 and Citellonthophagus Ádám, 1994 = Palaeonthophagus Zunino, 1979; Onthophagus furcicornis Reitter, 1892 and Onthophagus krali Balthasar, 1963 and Onthophagus citellorum Medvedev, 1965 = Onthophagus ponticus Harold, 1883; Onthophagus vitulus ssp. thracum Pittino, 2004 = Onthophagus vitulus (Fabricius, 1776)) are established. Keys to all species treated and original drawings are supplied.


Key-words: Coleoptera, Scarabaeidae, Onthophagus, taxonomy, systematics, new species, new synonymies, Palearctic Region.

INTRODUCTION. This work is our first contribution to the taxonomic and systematic knowledge of palearctic Scarabaeoidea nidicolous species belonging to the genus Onthophagus Latreille, 1802. We revise ten species, all included in the subgenus Palaeonthophagus Zunino, 1979, and arrange them in three groups. Most of these species are little known and poorly represented in public and private collections, most likely for their biology more or less strictly associated with burrows of small mammals. Moreover, nomenclatural and/or taxonomic uncertainty is brought about by the type series of some of them being made up of specimens not conspecific, while other species are only known by a single specimen. The purpose of this revision is to clarify the taxonomic position of these species on the basis of the study of both external morphology and male genitalia.

GEOGRAPHICAL DISTRIBUTION. All species considered in this study are spread in the Palearctic Region, even though most species seem to be restricted to the Middle East or, more generally, the north-eastern Mediterranean.
SPECIES CHECKLIST

*Onthophagus* Latreille, 1802

subgenus *Palaeonthophagus* Zunino, 1979

*Bubalonthophagus* Ádám, 1994 **n. syn.**

*Citellonthophagus* Ádám, 1994 **n. syn.**

**furciceps** group

1. *Onthophagus bytinskii* Balthasar, 1960 (Israel, Lebanon)
2. *Onthophagus furciceps* Marseul, 1869 (Turkey, Lebanon)
3. *Onthophagus parma* N. Reitter, 1892 (South-Eastern Europe, Middle East)
4. *Onthophagus ponticus* Harold, 1883 (South-Eastern Europe, Middle East)
   - *Onthophagus furcicornis* Reitter, 1892 **n. syn.**
   - *Onthophagus granulosus* D. D. Koshantschikoff, 1894 ?
   - *Onthophagus krali* Balthasar, 1963 **n. syn.**
   - *Onthophagus citellorum* Medvedev, 1965 **n. syn.**

**kindermanni** group

1. *Onthophagus kindermanni* Harold, 1877 (South-Eastern Europe, Turkey)
2. *Onthophagus rodentium* Pittino, 2004 (Greece)
3. *Onthophagus strabo* Reitter, 1892 (Turkey, Syria)

**vitulus** group

1. *Onthophagus petrovitzianus* Pittino, 2006 (Turkey)
   - *Onthophagus citellorum* Petrovitz, 1967
   - *Onthophagus petrovitzi* Pittino, 2004
2. *Onthophagus excubitor* n. sp. (Northern Iran)
3. *Onthophagus vitulus* (Fabricius, 1776) (Central-Eastern Europe, Central Asia)
   - *Onthophagus camelus* (Fabricius, 1787)
   - *Onthophagus kaszabi* Balthasar, 1963
   - *Onthophagus vitulus* ssp. *thracum* Pittino, 2004 **n. syn.**

**Measurements.** Body length is measured from tip of clypeus to extremity of abdomen, that of pronotum along middle line and that of elytra along suture. Body width is measured from side to side of elytra somewhere in basal half, where they are widest. Length of head is measured from tip of clypeus to the imaginary line that unites hind edges of eyes; that is not the total length of head, but it is objectively defined and can be easily replicated.

**Label data.** All original data are quoted between inverted commas, using a forward slash to separate lines on the same label. Additional information, explanation or translation are placed in square brackets.

**Abbreviations of collections:**

- ABCB - A. Ballerio private collection, Brescia (Italy)
- CSCG - C. Sola private collection, Guiglia, Modena (Italy)
- DEI - Deutsches Entomologisches Institut, Müncheberg (Germany)
- DKCC - D. Keith private collection, Chartres (France)
- DKCP - D. Král private collection, Prague (Czech Republic)
- EBCT - E. Barbero private collection, Turin (Italy)
- HNHM - Termeszettudományi Muzeum Allattára, Budapest (Hungary)
Historical Review. The first author who divided *Onthophagus* species in groups was d’Orbigny (1898), who placed in his third group (“dessous du corps entièrement ou au moins en majeure partie à pubescence jaune; tête et prothorax ordinairement ciliés de jaune, rarement ciliés de brun.”) *O. kindermanni* Harold, 1877, *O. furciceps* Marseul, 1869, *O. furcicornis* Reitter, 1892, *O. parmaus* Reitter, 1892 and *O. ponticus* Harold, 1833, besides eighteen other species, and in his fourth group (“dessous du corps entièrement ou au moins en majeure partie à pubescence noire; tête et prothorax ordinairement ciliés de noire, rarement ciliés de brun clair ou de rougeâtre”) *O. vitulus* (Fabricius, 1776), besides eight other species.

Twenty years later Olsoufieff (1918) used the same d’Orbigny’s aggregates.

Iablokoff-Khnzorian (1967) arranged the Armenian *Onthophagus* species in fourteen groups and placed *O. furcicornis, O. ponticus* and *O. vitulus*, together with *O. sacharovskii* Olsoufieff, 1918 and *O. diversicornis* Kirschenblatt, 1935, in the eighth group which he called “*furcicornis* group”.

Baraud (1977) largely followed d’Orbigny’s subdivisions, with *O. vitulus* inserted in “groupe C”.

Zunino (1979) was the first who, after a study of both male and female genitalia, defined phylogenetically natural groups of subgeneric rank within the palearctic species of the genus *Onthophagus*. All the specific and subspecific taxa considered in the present paper were inserted in the subgenus *Palaeonthophagus* Zunino, 1979.

Later Ádám (1994) described, among others, two new genera, *Bubalonthophagus* for *O. furciceps*, which he considered senior synonym of *O. kindermanni*, and *Citelonthophagus* for *O. vitulus*.

Ethology. All species dealt with here are known to occur in burrows of small mammals. From all available evidence, it appears that for five of them (*O. petrovitzianus, O. vitulus, O. kindermanni, O. rodentium* and, most likely, *O. strabo*) this relationship is exclusive, which justifies considering them pholeobiont, i.e., species obligatorily associated with burrows (Ziani, 2003, 2005). The remaining species can be defined as pholeophile, i.e., species preferentially living in burrows and feeding on droppings of mammals. It must be noted that, outside the burrows, some of these species seem to be stenophagous, coming only to a certain type of excrement.
SECONDARY SEXUAL CHARACTERS. Both males and females of the species here considered possess similar outgrowths on the head and pronotum. Since the clypeal-frontal carina is always present in both sexes, the secondary sexual characters are often reduced to the difference in shape and size of the pygidium and sixth abdominal sternite, so that more significant morphological variability can be observed among specimens of the same sex than between the two sexes.

Poecilandry (in males) and poecilogyny (in females) are recurrent features in horned *Onthophagus* species: examples of intra-sexual polymorphism are known from diverse taxa (Goidanich & Malan, 1964) to demonstrate a differentiation of the species resulting from very favourable living conditions and from recent evolution. In *Onthophagus taurus* (Schreber, 1759), according to Moczek & Emlen (1999), males exceeding a critical body size develop an exuberant cephalic structure, while those smaller than this threshold body size remain essentially hornless: horn length and body size of male progeny are not predicted from paternal morphology, but determined by natural variation in an environmental factor, i.e. the amount of food available to larvae.

The intraspecific different development of cephalic horns and prothoracic tubercles, from a taxonomical point of view, has often produced systematic errors, misinterpretations and misidentifications in literature. To recognize morphological differences between individuals of the same species or, contrarily, between two or more closely related species, it would be very important to know the degrees of poecilandry and poecilogyny. According to Goidanich & Malan (1964) among males of several *Onthophagus* species, such as *O. taurus* (Schreber, 1759), *O. verticicornis* (Laicharting, 1781), *O. vacca* (Linnaeus, 1767) and *O. xanthopterus* d’Orbigny, 1908, hypertelic males, with maximum development of ornamentation, eutelic major, medium and minor males, less excessively ornate, and finally hypotelic males, smaller and with gynecoid appearance, can be distinguished. In the same way a report on poecilogyny, the intraspecific female variability, is given by the two Italian authors with examples in *O. vacca* (Linnaeus, 1767) and *O. sagittarius* (Fabricius, 1781).

Instead of the terms hyper-, eu- and hypotelism, in our opinion to be applied only to an organ or a biological structure beyond the bounds of the useful and not to an individual, we use herein the expressions “major” for the specimens with overgrown cephalic horns and “minor” for the specimens with undergrown horns or without them. Of course “over” and “under” have to be seen in relation to the known range of development of cephalic armament of that species. If that range is not known because the species is known only by a few specimens of similar size, it is only possible to advance hypotheses about the development degree. Anyway, it is better to remember that all sorts of intermediates, from the very small individual virtually with no horns or tubercles to the very large one with long horns and big tubercles, can be observed. The keys in this study can only be used, relatively to the characters regarding cephalic and pronotal armaments, for major specimens.

SPECIES-GROUPS AND TAXONOMIC CHARACTERS. The species are arranged into three groups, which are characterized by combinations of external morphological characters, mainly the outgrowths of head and pronotum and the shape of elytral pubescence, and male genitalia, particularly the copulatory lamina.
The dorsal pubescence of the treated species, particularly that of pronotum and elytra, is of two types: a) pubescence formed by more or less erect fine trichia with no significant thickness variation throughout, or b) pubescence formed by stout, foliaceous/lanceolate trichia, markedly thicker basally or at middle than apically. We herein use the term hairs for the former and the term bristles for the latter. In some species bristles can be trifid, with trifurcation at apex, therefore the longest seta is the central one, or bifid, therefore the bifurcation is along the length of the bristle itself.

The taxonomic value of the epipharynx, contrarily to what happens in other genera of Onthophagini (Josso & Prévost, 2000; Barbero et al., 2004), is here very little or not at all meaningful. According to Verdú & Galante (2004) the mouthparts of the Iberian Onthophagus species associated with rabbit dung show morphological modifications to exploit the dry pellets of the small mammals. More than anything else, according to the two Spanish authors, the epipharynx of “dung-fibre consumers”, the species living in rabbits’ burrows and eating their excrement, presents epizygum and zygum with strongly developed spinulae, as well as the spinulae of acropariae well-developed and strongly curved apically. In all the Onthophagus species here considered the setae of epizygum, zygum and acropariae are not significantly different from the ones of several “fresh-dung consumers” Palaeonthophagus species examined by us.

Finally, for the species concerned, the study of female genitalia did not prove essential for discriminating between either groups of species or species.

KEY TO THE GROUPS OF SPECIES

1. Black or blackish brown, very rarely with metallic lustre, and if so in pronotum only; pubescence yellowish white to yellow. Head with clypeus not emarginate or barely emarginate at middle, never denticulate or subdenticulate at sides. Pronotum strongly declivous towards anterior edge, with an anterolateral tubercle, sometime hardly distinguishable, on each side, and an anteromedian gibbosity usually bilobate or divided in two apically. Pronotal surface punctate, each puncture with a small granule at the anterior margin, sometimes granulose. Head with obvious clypeo-frontal carina in both sexes. Secondary sexual characters not evident, almost entirely reduced to the difference in size and shape of pygidium and sixth abdominal sternite ................................................................................................................2

   Not all the above characters present simultaneously ....................all other Palaeonthophagus

2. Pronotal anterolateral gibbosities clearly distinct; horns of the occipital carina, when present, never incurved and reclined outwards .................................................................3

   - Pronotal anterolateral gibbosities only very slightly traced, sometimes almost indistinct; occipital carina with two horns incurved and reclined outwards, sometimes joined by a low lamina basally .............................................................................................................I. kindermannii group

3. Elytra with slender hairs, thin, slightly or not at all thicker basally than distally ..........4

   - Elytra with stout bristles, sometimes bifid or trifid along their length or lanceolate, always distinctly thicker basally than distally ................................................................II. furceiceps group

4. Species relatively small: length up to 7.5 mm; head very short, clearly wider than long (width/length ratio more than 1.70) ........................................................................(semicornis group*)

   - Species relatively large: length over 8.0 mm; head slightly wider than long (width/length ratio 1.50 - 1.63) ........................................................................III. vitulus group

* The “semicornis group” will be the subject of our next study.
I. THE FURCICEPS GROUP

DIAGNOSIS. *Palaeonthophagus* pholeophile species of medium size (length 6.0 - 10.0 mm), black, sometimes with dark brown lustre, dorsal pubescence yellowish white to reddish yellow. Head short, clearly wider than long, clypeus barely or not at all emarginate at middle, with obvious clypeo-frontal carina in both sexes; occipital carina with a high slender lamina, expanding and bifurcate apically in major specimens. Pronotum convex, strongly declivous towards anterior edge, with a distinct anterolateral tubercle on either side and with a more or less bilobate anteromedian gibbosity. In males of the *ponticus* lineage at least, pronotum anteromedian gibbosity clearly divided in two, only slightly or not at all in females. Pronotal anterior angles subtruncate. Bristles of pronotum and elytra stout, lanceolate or progressively widened from the base to the top, sometimes divided in two at about two thirds of their length or in three at apex. Aedeagus slender, apices of parameres curved ventrally, divergent and always more or less hooked, the outer margin of each paramere bearing a proximal denticle. Copulatory lamina overall shape quadrangular, excluding the basal emargination. Internal sac of the aedeagus with a raspula, twice longer than wide. Epipharynx nearly hexagonal, subangular at sides, anterior margin barely emarginate at middle; tylus, in ventral view, with very close strong setae, acropariae consisting of long setae of different thickness; outline of gymnopariae scarcely sclerotized.

KEY TO SPECIES

1. Bristles on elytral disc simple; dorsal surface shining, disc of pronotum barely or not at all microreticulate................................................................................................................ ......3
   - Bristles on elytral disc bifid or trifid, or lanceolate; dorsal surface dull, with distinct microreticulation .................................................................2

2. Lamellae of antennal club thin and elongate, much longer than in most *Onthophagus* species, somewhat resembling those of some Melolonthini.............*parmatus* Reitter, 1892
   - Lamellae of antennal club usually shaped .......................................*ponticus* Harold, 1883

3. Pronotal sides obviously sinuate behind anterior angles; pronotum approximately as long as elytra.................................................................*furciceps* Marseul, 1869
   - Pronotal sides not sinuate behind anterior angles; pronotum longer than elytra..........................


*Onthophagus* (Palaeonthophagus) *bytinskii* Balthasar, 1960

*Onthophagus* *bytinskii*, Balthasar, 1960: 201; Balthasar, 1963: 300; Chikatunov & Pavlíček, 1997: 45


TYPE LOCALITY. “der Küstenebene bei Nataniah” [costal plain near Netanya, Israel].

TYPE MATERIAL. Holotype, a major male, fixed by original designation, at DEI.


DIAGNOSTIC FEATURES. Length 7.5 - 9.8 mm, width 4.5 - 5.6 mm. Pronotum longer than
elytra (length ratio 1.16 - 1.18). Black with dark brown lustre, upper side shiny with hardly appreciable microreticulation, pubescence reddish yellow, antennal scape, pedicel and funicle dark red, antennal club fulvous.

Head (figs 2, 4) short, clearly wider than long (width/length ratio 1.63 - 1.81), clypeus round, not emarginate at middle in male, barely emarginate in female, sides not sinuate, genae distinctly protruding; clypeo-frontal carina very distinct, backwards bent in male, slightly so in female, its edge reaching clypeo-genal suture; occipital carina with a transverse erect lamina, only just longer than the width of its base, apically bifurcate, in male, extended in a lamina ending in a pair of erect horns, margin between horns slightly sinuate in frontal view; clypeal surface with very close, coarse punctures, frontal surface with few large punctures; antennal club usually round and sized.

Pronotum (figs 1, 3) convex, strongly declivous towards anterior edge with distinct anterolateral tubercle on either side and with an anteromedian gibbosity distinctly bilobate in male, neither bilobate nor sinuate at middle in female; anterior angles subtruncate, sides not sinuate behind anterior angles but with a light sinuation further back; base distinctly margined; dorsal surface doubly subregularly and densely punctate on disc, large punctures, two to three times larger than small ones, with a very small granule at their anterior margin and with a short but obvious yellowish white bristle thinner apically than basally.

Elytral striae wide, their punctures slightly crenating interstriae; the latter flat to barely convex, the sutural one crushed near the anterior edge; intervals shiny, without microreticulation, with wide punctures differently sized, the larger ones with a very small granule at their anterior margin and with a short bristle thinner apically than basally.

Pygidium setigerously punctate, punctures large, widely spaced, with very short almost indistinguishable hairs, surface between punctures shining, clearly microreticulate.

Fore tibial spur bent inwards and downwards. Middle and hind femora ventrally with small, rather sparse setigerous punctures, fore femora with closer punctures.

Variability. The occipital lamina is narrower and the pronotal tubercles are smaller in the only minor male examined.

Male genital armature. Figs 5, 6, 7.

Distribution. Israel (Balthasar, 1963a). Lebanon (Zunino, 1976, as O. furciceps)

Material examined. 5 specimens other than the holotype, as follows. Lebanon: “Liban”, 1 specimen ♂ (paralectotype of O. furciceps, Marseul collection, MHNH). Israel: Tel-Aviv, 10.II.1959, 1 specimen ♀ (Lewinshon collection, TAUI); Tel-Aviv, 6.V.1973, Bytinski-Salz leg. 1 specimen ♂ (TAUI); Nahal Oren, 15.XII.1997, V. Chikatunov & T. Pavlček leg. 1 specimen ♀ (TAUI); Judean Foothills, Adullam, 15.XII.2004, V. Chikatunov & E. Grouner leg. 1 specimen ♂ (SZCM).

Onthophagus (Palaeonthophagus) furciceps Marseul, 1869

Onthophagus (Palaeonthophagus) furciceps: Zunino, 1979: 9; Ziani & Gudenzi, 2001: 94; Pittino, 2004: 146

TYPE LOCALITY. “la Bekaa” [Bekaa valley, Lebanon].

TYPE MATERIAL. Lectotype, a major male, designated by Zunino (1976), and a paralecotype male (not conspecific, see remarks) in Marseul collection (MHNH).


DIAGNOSTIC FEATURES. Length 10.0 - 10.1 mm, width 5.6 - 5.7 mm. Pronotum approximately as long as elytra (length ratio 0.97 - 1.02). Black, upper side shiny, pronotum with hardly appreciable microreticulate surface on disc, elytra with more distinguishable microreticulation, pubescence yellow, antennal scape, pedicel and funicle dark red, antennal club fulvous.

Head (fig. 9) short, clearly wider than long (width/length ratio 1.65 - 1.72), clypeus round, not emarginate at middle, sides with no sinuation, genae distinctly protruding; clypeo-frontal carina very distinct, backwards bent, its edge in contact with clypeo-genal suture; occipital carina with a high, slender, terminally expanding and bifurcate horn, once to twice as long as width at its base, weakly dentate at middle apically; clypeal surface with very close, coarse setigerous punctures, frontal surface with few large setigerous punctures, bristles long and erect, thick at their base, gradually thinner apically; antennal club usually round and sized.

Pronotum (fig. 8) convex, strongly declivous towards anterior edge with distinct anterolateral tubercle on either side and with an anteromedian gibbosity barely or not at all sinuate apically, protruding and slightly overhanging base of head; anterior angles truncate, sides doubly sinuate, obviously behind anterior angles and slightly further back; dorsal surface doubly, subregularly setigerous and densely punctate on disc, each larger puncture bearing a small granule at its anterior margin, and a bristle thinner apically than basally.

Elytral striae wide, their punctures slightly crenating interstriae; the latter flat to barely convex apically, the sutural one crushed near the anterior edge; interstriae shiny, irregularly granulose, granules very spaced, clearly smaller than strial punctures, each with a shallow puncture at the posterior margin and with a bristle thinner apically than basally.

Pygidium setigerously punctate, punctures very widely spaced, with short hairs.

Fore tibial spur bent inwards and downwards. Fore, middle and hind femora ventrally with small, rather sparse setigerous punctures.

Female unknown.

Male genital armature. Figs 10, 11, 12.

DISTRIBUTION. Lebanon (Marseul, 1869). Iran (Heyden, 1892). Syria, Kurdistan (Reitter, 1892). Irak (d’Orbigny, 1898). Turkey (Tauzin, 2000). All these localities, except for Lebanon and Turkey, need to be confirmed.
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**Material Examined.** 1 specimen other than the lectotype, as follows. **Turkey:** Adıyaman distr., Nemrut Dağı, 1200/1400 m, 1.V.2000, C. Sola leg. 1 specimen ♀ (SZCM).

**Remarks.** According to Zunino (1976), who designated the lectotype, the typical material of *O. furciceps* includes two males, both from Lebanon and both belonging to Marseul collection, even if Marseul himself, in the original description, did not specify how many specimens formed the type series. As a matter of fact, as noticed also by Pittino (2004), Zunino failed to notice that lectotype and paralectotype are not conspecific. The latter, for the anteromedian prominence of pronotum clearly divided in two, for the pronotal anterior angles not sinuate and gently curved outwards, and for the structure of the copulatory lamella, cannot be considered conspecific with the former, but is actually a male of *Onthophagus bytinskii* Balthasar, 1960, quoted herein. Furthermore, the third specimen of *O. furciceps*, a female from Southern Turkey, studied and quoted by Zunino (1976) and belonging to Pic collection (MHNH), is actually a female of *O. strabo* (cfr.).

*Onthophagus (Palaeonthophagus) parmatus* Reitter, 1892

*Onthophagus parmatus* Reitter, 1892: 181; d’Orbigny, 1898: 172; Reitter, 1906: 729; Olsoufieff, 1918: 83; Gillet & Boucomont, 1927: 127; Winkler, 1929: 1032; Balthasar, 1963a: 359 (as junior synonym of *O. furcicornis*); Iablokoff-Khnzorian, 1967: 139 (as junior synonym of *O. furcicornis*); Ieniştea, 1975: 144; Carpaneto, 1977: 32 (in part, as junior synonym of *O. furcicornis*); Zunino, 1978: 85 (as junior synonym of *O. furcicornis*);

*Onthophagus (Palaeonthophagus) parmatus*: Pittino, 2004: 159; Baraud, 1992: 374 (as junior synonym of *O. furcicornis*);

*Onthophagus furcicornis*: Petrovitz, 1954: 265

**Type Locality.** “Araxesthal” [Araxes Valley, Armenia].

**Type Material.** Lectotype, a minor male, designated by Zunino (1978), and a paralectotype female in Reitter collection (HNHM); a paralectotype female in Petrovitz collection (MHNG).


**Diagnostic Features.** Length 6.2 - 10.6 mm, width 3.7 - 5.7 mm. Pronotum approximately as long as elytra (length ratio 0.95 - 1.00). Black, elytra dark brownish red to black, upper side moderately shiny with a distinct isodiamic microreticulation, pubescence yellowish white, antennal scape, pedicel and funicle red, antennal club dark red.

Head (figs 14, 15, 17) short, clearly wider than long (width/length ratio 1.66 to 1.68), clypeus round, emarginate at middle, anterior angles very broadly round, sides evenly arcuate with no sinuations, genae distinctly protruding; clypeo-frontal carina distinct, strongly bent backwards, its edges in contact with clypeo-genal suture; occipital carina with a high, slender, terminally expanding and bifurcate horn, weakly dentate at middle apically, more...
than twice as long as width of its base in major specimens, with a lamina, half as long as width of its base, ending in a pair of short horns, margin between horns sinuate in front view, in specimens with a medium degree of development, with a narrow lamina weakly dentate at sides and at middle in minor specimens; clypeal and frontal surface with rather coarse setigerous punctures, more spaced frontally than in clypeus, bristles thinner apically than basally; antennal club in both sexes with very crushed and long lamellae distinctly separate among them, the first two lamellae arcuate, distinctly thinner than the third, from 4 to 6 times longer than wide, their length more than twice the maximum length of the 6th article (fig. 21), each lamella with a long dense pubescence.

Pronotum (figs 13, 16) convex, strongly declivous towards anterior edge with distinct anterolateral knoblike on either side, and with two small anteromedian, weak, very closely placed tubercles in major males, with an anteromedian gibbosity, sometimes slightly sinuate at middle, in minor males and in females; anterior angles subtruncate, sides obviously sinuate behind anterior angles; dorsal surface setigerously punctate, punctures separated by one to two diameters on disc, each puncture bearing a very small granule at its anterior margin; bristles yellowish white, long, scale-shaped, thick at their base, gradually slightly thinner and normally bifid or trifid at about two thirds of their length, only lanceolate in minor specimens.

Elytral striae fine, shallow, their punctures slightly crenating interstriae; the latter flat, except the sutural one, granulose, granules minute, as big as strial punctures or a little smaller, each granule bearing a long yellowish white bristle at its base, sometimes bifid or trifid at about two thirds of its length, or lanceolate.

Pygidium setigerously punctate, punctures large, widely spaced, with long fine white yellowish hairs.

Fore tibial spur bent inwards and downwards. Fore, middle and hind femora ventrally with small, rather sparse setigerous punctures.

Male genital armature. Figs 18, 19, 20.


MATERIAL EXAMINED. 24 specimens, other than the lectotype, as follows. ROMANIA: Cerna, IV.1987, Ernest leg. 1 specimen ♀ (DKCP); TURKEY: Afyon distr., 10 km S of Çay, 1000 m, 26.IV.1982, L. & R. Pittino leg. 1 specimen ♂ (RPCM); “Asia minor”, 1 specimen ♂ (Solman collection, MRSN); Eskişehir distr., “70 km sö. Eskişehir / Asia minor / leg. Petrovitz-Ressl” 1 specimen ♂ (Petrovitz collection, MHNG); Çankırı distr., “Nw. Çerkes, Çankırı / As. min.; leg. Kreissl” 1 specimen ♂ (Petrovitz collection, MHNG); Kırşehir distr., Mucur, 800-900 m, VI.2003, C. Sola leg. 1 specimen ♂ (CSCG); Konya distr., Yeşilköy, 17 km SE Akşehir, 1100 m, 25.IV.1993, L. & R. Pittino leg. 1 specimen ♂ (RPCM); Erzurum distr., 40 km from Erzurum towards Tortum, 2100 m, 15.VI.1992, A Ballerio leg. 1 specimen ♂ (ABCB); Erzurum distr., Ispir, 1700 m, 1.VII.1983, P. Cavazzuti leg. 1 specimen ♂ (EBCT); Van distr., “Zw. Van und / Özlalp; 27.5.66” “Zieselbau / Eingang”, 1 specimen ♂ (Petrovitz collection, MHNG); Van distr., “Baskale, Paßhöhe, / (Van), 2800 m; 26.5.66” “Zieselbau / Eingang”, 1 specimen ♂ (Petrovitz collection, MHNG); Van distr., “Zw. Van und / Özlalp; 27.5.66” “Zieselbau / Eingang”, 2 specimens ♀ ♀ (Petrovitz collection,
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REMARKS. Balthasar (1963a), on the basis of the examination of the types, firstly stated the synonymy between *O. parmatus* Reitter, 1892 and *O. furcicornis* Reitter, 1892 (the latter considered here junior synonym of *O. ponticus* Harold, 1883) giving priority to *O. furcicornis*. For the art. 24.2.1 of the International Code of Zoological Nomenclature, 4th edition, he is to deemed as First Reviser. All the subsequent authors accepted these statements, even if Ieniștea (1975) gave, quite incorrectly from a nomenclatorial point of view, the priority to *O. parmatus*. We believe the above two taxa to be distinct species especially on the basis of the very particular morphology of the antennal club of *O. parmatus*. On this subject it is interesting to note the curious similarity between the antennal club of *O. parmatus* and that, drawn by the author, of *Onthophagus antennalis* Frey, 1961, an Afrotropical species quoted from the Democratic Republic of the Congo (type locality: “Parc National de la Garamba”) and Ivory Coast. The drawings of the aedeagus and the internal sac of *O. antennalis* presented by Branco (1989) clearly show that there are no close relationship between Frey’s species and *O. parmatus*, and, more generally, the subgenus *Palaeonthophagus."

*Onthophagus (Palaeonthophagus) ponticus* Harold, 1883


*Onthophagus granulifer* Reitter, 1892: 204 [type locality: “Algier” [Algeria]]; type material: holotype female, fixed by monotypy, at ?, unknown to the authors; d’Orbigny, 1898: 172, footnote (doubtfully as junior synonym of *ponticus*); Gillet & Boucomont, 1927: 123 (as synonym of *O. granulosus* D. D. Koshantschikoff); Winkler, 1929: 1032 (as synonym of *O. granulosus* D. D. Koshantschikoff); Zunino, 1978: 87 (as rejected name for *O. granulosus* D. D. Koshantschikoff).
Onthophagus granulosus D. D. Koshantschikoff, 1894: 102, replacement name for O. granulifer Reitter, 1892, not O. granulifer Harold, 1886; d’Orbigny, 1898: 172, footnote (as junior synonym of O. granulifer Reitter); Gillet & Boucomont, 1927: 123; Winkler, 1929: 1032; Zunino, 1978: 87 (as name under enquiry)

Onthophagus gorhami Shipp, 1895: 178, replacement name for O. granulifer Reitter, 1892, not O. granulifer Harold, 1886; d’Orbigny, 1898: 172, footnote (as junior synonym of O. granulifer Reitter); Gillet & Boucomont, 1927: 123 (as junior synonym of O. granulosus D. D. Koshantschikoff); Winkler, 1929: 1032 (as junior synonym of O. granulosus D. D. Koshantschikoff)

Onthophagus bicuspis Steven, in litteris: Dejean, 1833: 141 (as “var.” of O. camelus Fabricius); Dejean, 1836: 157 (as “var.” of O. camelus Fabricius); Reitter, 1892: 181 (as synonym of O. ponticus); d’Orbigny, 1898: 237 (as synonym of O. ponticus)

Onthophagus krali Balthasar, 1963a: 603 [type locality: “Umgebung von Kirovabad (Jelisavetpol) in Transcaucasien stammen” [Gjandža, Azerbaijan]; type material: 2 male syntypes in Balthasar collection (NMPC)] (new synonymy)

Onthophagus citellorum Medvedev, 1965: 186 [type locality: “Yug stepi” [Southern steppes: Ukraine? Southern European Russia?]}; type material: at ?, unknown to the authors] (new synonymy); Ieniștea, 1975: 144 (as junior synonym of O. parmatus)

TYPE LOCALITY. “Mzchet (Grusien)” [Georgia].

TYPE MATERIAL. Lectotype female, designated by Zunino (1976), in Oberthür collection (MHNH); a paralectotype (not conspecific according to Zunino, 1976, see remarks), at ?, unknown to the authors.


DIAGNOSTIC FEATURES. Length 6.7 - 8.2 mm, width 3.7 - 4.6 mm1. Pronotum shorter than elytra (length ratio 0.87 - 0.93). Black, upper side dully shining with a distinct isodiametric microreticulation, pubescence yellowish white, antennal scape, pedicel and funicle red, antennal club fulvous.

Head (figs 23, 24, 26) short, clearly wider than long (width/length ratio 1.61 - 1.85), clypeus usually round, semicircular, even if sometimes almost subtruncate, barely emarginate at middle, anterior angles very broadly round, sides evenly, gently arcuate with no sinuations, geneae distinctly protruding; clypeo-frontal carina distinct, backwards bent, its edge in contact with clypeo-genal suture; lamina of occipital carina with a high, slender, terminally expanding and bifurcate horn, sometimes twice as long as width of its base, weakly sinuate at middle apically in major males, broader basally, more or less elevate and horned in females and minor males; clypeal and frontal surface with close, rather coarse setigerous punctures, bristles erect and slightly thicker basally than apically. Antennal club usually round and sized (fig. 30).

1 The majority of specimens we have seen measure 6.7 to 8.2 mm in length and 3.7 to 4.6 mm in width, but we have also seen two individuals, syntypes of O. krali, 4.8 and 4.9 mm long, and 2.9 and 3.1 mm wide, respectively.
Pronotum (figs 22, 25) convex, strongly declivous towards anterior edge, with distinct anterolateral tubercle on either side and with two small anteromedian very closely placed tubercles in major males, an anteromedian gibbosity, neither bilobate nor sinuate at middle in females, just sinuate or slightly sinuate in minor males, more or less barely protruding towards head; anterior angles subtruncate, apices produced and turned out, sides obviously sinuate, almost concave behind anterior angles; dorsal surface setigerously irregularly punctate, punctures separated by one to three diameters on disc, each puncture bearing a granule at its anterior margin; bristles yellowish white, long, thick at their base, gradually thinner apically. These bristles can be either simple, or lanceolate, or bifid or, very seldom, trifid at about two thirds of their length.

Elytral striae fine, shallow, their punctures slightly or not at all crenating interstriae, the latter flat, biseriately granulose, granules minute, as big as strial punctures, posterior margin of each granule with a small setigerous puncture, bristles erect, as long as pronotal bristles, sometime bifid rarely trifid at about two thirds of their third, always simple and lanceolate in minor specimens.

Pygidium setigerously punctate, punctures widely spaced, with long fine white yellowish hairs.

Fore tibial spur bent inwards and downwards. Fore, middle and hind femora ventrally with small, rather sparse setigerous punctures.

Male genital armature. Figs 27, 28, 29.


S. & R. Ziani leg. 1 specimen ♂ and 1 specimen ♀ (SZCM); Khorāsān distr., 10 km S Bojnūrd, 1400-1600 m, 7.IV.2001, S. Murzin leg. 1 specimen ♂ (DKCC); Māzandarān distr., Karīm Tsān, Minudasht, 500 m, 5.IV.2001, S. Murzin leg. 1 specimen ♀ (DKCC). LEBANON: Mt. Lebanon, El Barouk, 1400 m, 12.IV.2001, S. & R. Ziani leg. 1 specimen ♀ (SZCM); Mt. Lebanon, Maass-er e. Couf, 1600 m, 13.IV.2001, S. & R. Ziani leg. 1 specimen ♂ (SZCM).

REMARKS. *O. ponticus* was described by Harold on two specimens, a male and a female according to the author. d’Orbigny (1898) confirmed that the typical material consists of two specimens of opposite sex. Zunino (1976) specified that the two specimens on which the original description was based were both females and not conspecific. We were able to study only one of them, the lectotype designated by Zunino: the real identity and sex of the second specimen remain unknown to us.

Iablokoff-Khnzorian (1967), following perhaps Reitter (1892) or, more likely, d’Orbigny (1898), distinguished *O. ponticus* from *O. furcicornis* by the colour of the antennal club only. Years later Iablokoff-Khnzorian (1983) provided new features to distinguish the two species, such as the shape of pronotal punctuation and the distance between punctures. After the study of the holotype of *O. furcicornis*, as well as of some specimens collected in Taurus mountains (type locality of *O. furcicornis*, see below), we can establish beyond doubt the new synonymy *Onthophagus furcicornis* Reitter, 1892 = *Onthophagus ponticus* Harold, 1883.

The type locality of *O. furcicornis* is, according to the original description, “Syrien” [Syria], and “Syriens” appears too in the second label of the holotype. In spite of this, the holotype bears the first label, in the same handwriting as the second one (Felsche’s? Reitter’s?), with: “Syriens / Taurus”. Taurus (Toros Dağları) is a mountain-chain of the Southern Anatolian Peninsula, belonging to Syria in the late 19th Century but at present belonging to Turkey. According to the recommendations 76A.1.1 and 76A.2 of the Code (4th edition), the type locality of *O. furcicornis* Reitter should be corrected as: “Taurus” [Toros Dağları, Turkey].

Reitter (1892) described *Onthophagus granulifer*, from “Algier”, based on a female. Two years later D. D. Koshantschikoff (1894) noticed the homonymy between Reitter’s taxon and *Onthophagus granulifer* Harold, 1886 (type locality: “Oranje-Freistaat” [South Africa]), rejected the junior homonym and replaced it with the new name, *Onthophagus granulosus*. Probably unaware of D. D. Koshantschikoff’s note, one year later Shipp (1895) created the replacement name *Onthophagus gorhami* for *Onthophagus granulifer*. D’Orbigny (1898) doubtfully synonymized *O. granulifer* Reitter (= *granulosus* D. D. Koshantschikoff, 1894 = *gorhami* Shipp, 1895) with *O. ponticus*, on the basis of the comparison of Reitter’s type with the type female of *O. ponticus*, and regarded as wrong the type locality (Algeria) of *O. granulifer*. Anyway the real identity of *O. granulosus* remains unknown, because Reitter’s type is at this moment untraceable. According to Zunino (1978) *O. granulosus* must be deemed as name under enquiry.

*Onthophagus krali* was described by Balthasar (1963a) on two males. The two typical specimens bear labels “holotypus” and “paratypus” respectively, probably written

\(^2\) Transliteration according Schmitt et al. (1998).
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by Balthasar himself. However the Czech author, in the original description, did not nominate a holotype, hence the two specimens have to be deemed as “syntypes”. Their study has allowed us to verify that they are minor males, very small indeed, of *O. ponticus*. Therefore we propose the new synonymy *Onthophagus krali* Balthasar, 1963 = *Onthophagus ponticus* Harold, 1883.

In 1965 Medvedev described *Onthophagus citellorum* directly in the dichotomical key to species of *Onthophagus*, without specifying type material, and stated that *O. citellorum* n. sp. = *O. ponticus* auct., nec Harold. What the Russian author meant with “*O. ponticus sensu auctorum*” still remains unknown to us. Ieniștea (1975) synonymized *O. citellorum* with *O. parmatus*, without giving any systematic explanation for this nomenclatural act. We were not able to examine Medvedev’s typical material, but the study of two specimens from Ukraine, determined as *O. citellorum* Medvedev and preserved in SZMN, allows us to propose, even if doubtfully, the new synonymy *Onthophagus citellorum* Medvedev, 1965 = *Onthophagus ponticus* Harold, 1883.

*Onthophagus truchmenus citellorum* in Bothmer, 1974 is not an available name, because Bothmer failed to provide a description or a definition (Art. 13.1.1. of the Code, 4th Edition) in his 1974 paper and, to the best of our knowledge, did never publish it elsewhere.

II. THE KINDERMANNI GROUP

**Diagnosis.** *Palaeonthophagus* pholeobiont species of large size (over 10 mm long), dark brown to black, shiny, pubescence yellow. Head very short, clearly wider than long, clypeus broadly subtruncate anteriorly, with obvious clypeo-frontal carina in both sexes; occipital carina with a pair of long, slender, divergent, incurved horns, strongly reclined, flattened and slightly wider apically. Pronotum convex, with a strong anteromedian gibbosity; anterolateral tubercles hardly appreciable. Pronotal anterior angles subtruncate, sides obviously sinuate behind anterior angles. Bristles of pronotum and elytra stout, lanceolate or progressively widened from base to top. Aedeagus slender, parameres apices curved ventrally, divergent and always more or less hooked, the outer margin of each paramere bearing a proximal denticle. Copulatory lamina overall shape quadrangular, excluding the very deep side-recess, right branch, in ventral view, divided by a transverse lamellar carina. Internal sac of the aedeagus with a slender raspula, three times longer than wide. Epipharynx nearly quadrangular, barely round at sides, barely or not at all sinuate anteriorly; tylus, in ventral view, with very close strong setae, acropariae consisting of long setae of different thickness; outline of gymnopariae scarcely sclerotized. Secondary sexual characters reduced to the difference in shape and size of the pygidium and sixth abdominal sternite.

**Key to Species**

1. Pronotal anteromedian prominence thin, slender and sharp apically ..................................2
2. Pronotal anteromedian prominence round, sinuate, almost bilobate at middle apically, flat and broad dorsally .................................................................kindermanni Harold, 1877

2. Clypeo-frontal carina distinctly more elevate than the carina joining occipital horns; occip-
ital carina slightly or not at all elevate at middle; occipital horns not expanded apically, in lateral view .............................................. *strabo* Reitter, 1892

- Clypeo-frontal carina less elevate than or as elevate as the carina joining occipital horns; occipital carina remarkable elevate at middle; occipital horns gradually expanded apically, in lateral view .................................................. *rodentium* Pittino, 2004

**Onthophagus (Palaeonthophagus) kindermanni** Harold, 1877


*Bubalonthophagus furciceps*: Ádám, 1994: 15 (as senior synonym of *Onthophagus kindermanni*); Ádám, 2003: 122

**TYPE LOCALITY.** “Rumelia” [Thrace, Greece/Turkey].

**TYPE MATERIAL.** Holotype male, fixed by monotypy, in Oberthür collection (MHNH).


**DIAGNOSTIC FEATURES.** Length 8.9 - 11.5 mm, width 4.8 - 6.6 mm. Pronotum approximately as long as elytra (length ratio 0.93 - 1.02). Dark brown to black, upper side shiny with an hardly appreciable microreticulation in pronotal disc, more distinct in elytral surface, pubescence dark yellow, antennal scape, pedicel and funicle red, antennal club brown.

Head (figs 32, 34) very short, clearly wider than long(width/length ratio 1.61 - 1.94), clypeus broadly subtruncate, rest of margin nearly round to genal angles, which are strongly projecting from eyes and round; clypeo-frontal carina distinct, backwards bent, its edge in contact with clypeo-genal suture; occipital carina with a pair of long, slender divergent incurved horns, strongly reclined, flattened and wider apically, apex spatulate and obliquely truncate in lateral view, joined across frons by a transverse ridge, tuberculate at middle; head surface broadly setigerously punctate, punctures more spaced in frontal surface, each puncture with a fine, long and erect hair.

Pronotum (figs 31, 33) very convex, strongly declivous towards anterior edge with an indistinct anterolateral lobe on either side, almost in front of the apex of the horn, and with a strong anteromedian gibbosity, slightly protruding towards head, sinuate, almost bilobate at middle apically and flat, broad dorsally; anterior angles quadrate, apices produced, turned out, the margin behind them strongly concave; base distinctly margined; dorsal surface double setigerously punctate, punctures irregular, each puncture, except large basal ones, bearing a granule at their anterior margin; bristles long, thicker at their base, gradually thinner apically.
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Elytral striae shining, wide, their punctures slightly crenating interstriae; intersstriae flat or barely convex, all, except the sutural one, rather regularly biseriately granulose, granules approximately as big as strial punctures, posterior margin of each granule with a very small, indistinct setigerous puncture, bristles erect, only slightly thicker basally than apically.

Pygidium setigerously punctate, punctures widely spaced, with fine hairs.

Fore tibial spur bent inwards and outward, particularly in males. Fore, middle and hind femora ventrally with small, very sparse setigerous punctures.

Female. The two females examined don’t show significant diagnostic differences except for the pronotum, with the anterolateral lobes somewhat more obsolete, and for the colour, black (head and pronotum) to dark brownish black (elytra).

Male genital armature. Figs 35, 36, 37.


**Material examined.** 7 specimens, other than the holotype, as follows. **Serbia:** Belgrade, Kostanjak, 13-18.V.1937, M. Grebenscikoff leg. 1 specimen ♂ (RPCM). **Bulgaria:** Pernik distr., Radomir, 22.IV.1985, M. Souček leg. 1 specimen ♂ (DKCP); Dobrič distr., Albena, 5.VI.1990, Batelka leg. 1 specimen ♂ (DKCP). **Turkey:** “Constantinople” [Istanbul, Istanbul distr.], 1 specimen ♂ (Oberthür collection, MHNH); “Smyrne” [Izmir, Izmir distr.], 1 specimen ♂ (Endrodi collection, HNHM); “Kleinasien / Anatolien”, 1 specimen ♂ (MWNH); Konya distr., 17 km SE of Aksşehir, Yeşilköy, 1000 m, 25.IV.1993, L. & R. Pittino leg. 1 specimen ♀ (RPCM).

**Remarks.** After the study of genital armature of the typical specimens, Zunino at first supposed (1976), then confirmed (1978) *O. kindermanni* to be junior synonym of *O. furciceps* Marseul, 1869. We strongly disagree with this statement and, for the reasons explained elsewhere (Ziani & Gudenzi, 2001), herein confirm the validity of both taxa.

In 1994 Ádám, with reference to the Hungarian fauna, split the subgenus *Palaeonthophagus* in seven groups of generic rank, among which the new genus *Bubalonthophagus* to include *Onthophagus furciceps* Marseul, 1869 (considered senior synonym of *Onthophagus kindermanni*) as type species. It is here necessary to underline that, as already noticed by one of us (Ziani, 2003), Ádám’s brief diagnoses of *Bubalonthophagus* and two other new genera (*Citellonthophagus*, see ahead and *Troglonthophagus*, type species *Scarabaeus semicornis* Panzer, 1798) are almost interchangeable, and do not bring discriminating characters. Anyway, in our opinion, the groups created by Ádám (1994) have neither generic nor subgeneric value, so we here-in consider *Bubalonthophagus* Ádám, 1994 junior synonym of *Palaeonthophagus* Zunino, 1979.

*Onthophagus (Palaeonthophagus) rodentium* Pittino, 2004  
*Onthophagus (Palaeonthophagus) rodentium* Pittino, 2004: 155

**Type locality.** “Greek Macedonia, NE of Kozani, Drepano” [Greece].

**Type material.** Holotype male, fixed by original designation, in RPCM; allotype and 73 paratypes (RPCM; ABCB; SZCM).

DIAGNOSTIC FEATURES. Length 7.1 - 11.8 mm, width 4.3 - 7.0 mm. Pronotum approximately as long as elytra (length ratio 0.94 - 1.00). Black, upper side shiny with a hardly appreciable microreticulation in pronotal disc, distinct in elytral surface, pubescence dark yellow, antennal scape, pedicel and funicle red, antennal club brown.

Head (figs 39, 41) very short, clearly wider than long (width/length ratio 1.60 - 1.93), clypeus broadly subtruncate, rest of margin nearly round to genal angles, which are strongly projecting from eyes and round; clypeo-frontal carina almost straight, less elevate than the carina joining occipital horns, its edge not in contact with clypeo-genal suture; occipital carina with a pair of long, slender, divergent horns, slightly reclined, gradually expanding apically, apex round, joined across frons by a transverse ridge strongly dentate at middle; head surface broadly setigerously punctate, punctures more spaced on frontal surface, closer and subrugose in clypeus, each puncture with a long, erect bristle.

Pronotum (figs 38, 40) very convex, strongly declivous towards anterior edge with an indistinct anterolateral lobe on either side, almost in front of the apex of the horn, and with an anteromedian slender and almost sharp apically gibbosity; anterior angles quadrate, apices produced but barely turned out, the margin behind them concave; base distinctly margined; dorsal surface setigerously punctate, punctures sub-regular, each puncture, except large basal ones, bearing a granule at their anterior margin; bristles erect, distinctly thicker basally than apically.

Elytral striae barely shining, wide, their punctures slightly crenating interstriae; interstriae flat or barely convex, irregularly granulose, granules approximately as big as strial punctures, posterior margin of each granule with a very small indistinct setigerous puncture, bristles short, only slightly thicker basally than apically.

Pygidium setigerously punctate, punctures widely spaced, with fine hairs.

Fore tibial spur bent inwards and outward, more so in males than in females. Fore, middle and hind femora ventrally with small, very sparse setigerous punctures.

The female specimens examined don’t show significative diagnostic differences.

Male genital armature. Figs 42, 43, 44.

DISTRIBUTION. Northern Greece (Pittino, 2004).


Onthophagus (Palaeonthophagus) strabo Reitter, 1892

Onthophagus strabo Reitter, 1892: 181; d’Orbigny, 1898: 170, footnote (as junior synonym of O. kindermannii); Gillet & Boucomont, 1927: 123 (doubtfully as junior synonym of O. kin-
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*O. kindermanni*; Winkler, 1929: 1032 (doubtfully as junior synonym of *O. kindermanni*); Panin, 1940: 187 (as valid species); Knechtel & Panin, 1944: 158 (doubtfully as junior synonym of *O. kindermanni*); Panin, 1957: 87 (doubtfully as junior synonym of *O. kindermanni*); Balthasar, 1963a: 402 (as junior synonym of *O. kindermanni*); Muche, 1964: 62; Hariri, 1971: 161 (with question mark); Carpaneto, 1977: 33 (as junior synonym of *O. kindermanni*); Zunino, 1978: 104 (as junior synonym of *O. furciceps*)

*Onthophagus (Palaeonthophagus) strabo*: Baraud, 1992: 374 (as junior synonym of *O. kindermanni*); Pittino, 2004: 153 (as valid species)

*Onthophagus (Palaeonthophagus) kindermanni*: Chikatunov & Pavlíček, 1997: 45; Ziani & Gudenzi, 2001: 96 (as senior synonym of *O. strabo*)

**TYPE LOCALITY.** “Syrien” [Syria].

**TYPE MATERIAL.** Holotype, a minor female, fixed by monotypy, in Petrovitz collection (MHNG).


**DIAGNOSTIC FEATURES (cfr. remarks).** Length 11.1 mm, width 6.9 mm. Pronotum longer than elytra (length ratio 1.12). Black, upper side dully shining with a hardly appreciable microreticulation on pronotal disc, distinct on elytra, pubescence dark yellow, antennal scape, pedicel and funicle red, antennal club brown.

Head (fig. 46) very short, clearly wider than long (width/length ratio 1.81), clypeus broadly subtruncate, rest of margin nearly round to genal angles, which are strongly projecting from eyes and round; clypeo-frontal carina consisting of a distinctly backwards bent ridge, descending at sides, sinuate in frontal view, more elevate than the carina joining occipital horns, its edge not in contact with clypeo-genal suture; occipital carina with a pair of long, slender divergent horns, slightly reclined, not dilate apically, joined across frons by a transverse ridge slightly tuberculate at middle; head surface broadly setigerously punctate, punctures more spaced on frons, closer and subrugose in clypeus, each puncture with a bristle.

Pronotum (fig. 45) very convex, strongly declivous towards anterior edge with an indistinct anterolateral lobe on either side, almost in front of the apex of the horn, and with an anteromedian round apically gibbosity; anterior angles quadrate, apices produced, turned out, the margin behind them strongly concave; base distinctly margined; dorsal surface setigerously punctate, punctures irregular, the larger ones with a trace of granule, sometimes indistinguishable, at their anterior margin; bristles short, thicker at their base than apically.

Elytral striae barely shining, wide, their punctures slightly crenating interstriae; interstriae flat or barely convex, irregularly granulose, granules approximately as big as strial punctures, posterior margin of each granule with a very small indistinct setigerous puncture, bristles short, only slightly thicker basally than apically.

Pygidium setigerously punctate, punctures widely spaced, with fine hairs.

Fore tibial spur bent inwards and outward. Fore, middle and hind femora ventrally with small, very sparse setigerous punctures.
Male unknown.

Variability. The minor specimen examined (Reitter’s holotype, figs 47, 48) is 7.6 mm long, 4.4 mm wide, with the clypeo-frontal carina distinct, its edges not in contact with clypeo-genal suture, only slightly more elevate than the occipital ones, the latter reduced to a very short almost straight lamina ending in a pair of short erect horns, margin between horns sinuate in frontal view. Pronotum has a very small anteromedian tubercle and an almost indistinct antelateral knob on either side, anterior angles narrowly round, the margin behind them only barely sinuate.


Material examined. 4 specimens other than the holotype, as follows. Turkey: “Syrie (m)” [Syria Minor = South Turkey], 1 specimen ♂, Pic collection (MHNH); “Adana”, 1 specimen ♂, Demaison collection (MHNH); “Akbé” [Gazelus¸ag˘i], C.D. 1891, 1 specimen ♂ (MHNH); Konya distr., Ereğli Ivriz, 1310 m, 22.IV.2001, D. Keith leg. 1 specimen ♂ (DKCC).

Remarks. Onthophagus strabo was described by Reitter on a female. d’Orbigny (1898) firstly synonymyzed O. strabo Reitter, 1892 with O. kindermanni, and pointed out that Reitter himself, in O. strabo’s original description, supposed that the type of O. strabo could be a female of O. kindermanni, a species unknown to him. Panin first (1940) considered both taxa as valid species, then (1957) accepted, even if doubtfully, the synonymy. That synonymy was confirmed by all subsequent authors. Is really O. strabo a junior synonym of O. kindermanni or is it a valid species? The answer is not at all easy. The study and the comparison of the two holotypes based on the cephalic and pronotal armaments, one being a minor female (figs 47, 48) and the other a major male (figs 31, 32), leads to a no way out road.

Pittino (2004) has proposed an interpretation of the taxon based on the study of three major females collected in Southern Turkey, close to O. kindermanni and, especially, O. rodentium, but clearly distinguishable by the anteromedian prominence, slender and sharp apically, the clypeo-frontal carina, strongly raised, more elevate than the carina joining occipital horns, and the pubescence on elytral intervals, with short scale-like truncate bristles. The first two characters are intuitable also in the holotype of O. strabo. Waiting for the study of a male specimen, we are now accepting such interpretation, adding to Pittino’s arguments that the type locality of O. strabo, the “Syria” of the 19th Century, could be now in Southern Turkey (see remark for the type locality of O. furcicornis). Furthermore, we have examined another female, on which our re-description is based, collected as well in Southern Anatolian Peninsula (Konya distr.) with the same characteristic features of the three specimens quoted by Pittino to explain his interpretation of the taxon.

III. The vitulus group

Diagnosis. Palaeonthophagus probably pholeobiont species of large size (over 10 mm long), black, pronotum rarely with green metallic lustre, sometimes elytra with humeral red spot, pubescence yellow. Head slightly wider than long, clypeus barely emarginate; occipital carina variously erected, from a transverse crest, elevate at sides, to a lamina
ending in a pair of more or less erect horns, or simply with two not joined horns. Pronotum convex, strongly declivious towards anterior edge, with a distinct anterolateral tubercle on either side and with an anteromedian gibbosity distinctly bilobate. Pronotal sides obviously sinuate behind anterior angles. Pronotum and elytra with short, fine hairs. Aedeagus slender, parameres apices curved ventrally, divergent and always more or less hooked, the outer margin of each paramere bearing a proximal denticle. Copulatory lamina overall shape oval, excluding the basal emargination, bearing a denticle on the superior edge of the right branch, in ventral view. Epipharynx nearly quadrangular, barely round at sides, not sinuate anteriorly; tylus, in ventral view, with very close strong setae, acropari-ae consisting of long setae of different thickness; outline of gymnopariae scarcely sclerotized. Secondary sexual characters reduced to the difference in shape and size of pygidium and sixth abdominal sternite.

**KEY TO SPECIES**

1. Pronotal sides not sinuate behind anterior angles; clypeo-frontal carina almost extending from side to side of the head ............................................................(*quadrinodus* Reitter, 1896*)
   - Pronotal sides sinuate behind anterior angles; edges of clypeo-frontal carina connected with clypeo-genal sutures ............................................................... 2
2. Pronotal surface dull, with obvious isodiametric microreticulation on disc; pronotum, laterally at least, granulose; occipital carina with horns ............................................................. 3
   - Pronotal surface shining, without microreticulation on disc; pronotum punctate; occipital carina, in females at least, without horns ........................................................... *excubitor* n. sp.
3. Occipital carina with an erect lamina between the two lateral straight horns ................................................................. ................................. *vitulus* (Fabricius, 1776)
   - Occipital carina without a lamina between the two lateral straight horns ................................................................. *petrovitzianus* Pittino, 2006

* O. quadrinodus, for the above-mentioned characters, does not belong to this group but we include it because its pronotal “ornamentation” is very similar to species of *vitulus* group.

**Onthophagus (Palaeonthophagus) excubitor** n. sp.

**TYPE LOCALITY.** Iran, 35 km W Khoj, Āzarbājān-e Gharbī distr.


**TYPE DEPOSITARY.** Holotype in Termeszettudományi Muzeum Allattára, Budapest. Paratype in SZCM.


**ETYMOLOGY.** From the latin “excubitor”, sentinel, referring both to the large size of the new species and to the type locality, in the Northern Iran just below the Caucasus chain, near the borders with Turkey and Azerbaijan. Noun in apposition.

**DESCRIPTION.** Holotype. Length 12.0 mm, width 6.9 mm. Pronotum approximately as long as elytra (length ratio = 1.04). Black, with an almost indistinct red spot basally be-
between 6th and 7th elytral intervals, moderately shining, microreticulation appreciable only basally on pronotum, distinct on elytral surface, pubescence and antennal scape, pedicel and funicle yellowish red, antennal club black.

Head (fig. 50) slightly wider than long (width/length ratio = 1.54), clypeus sub-truncate, weakly reflexed anteriorly, emarginate at middle, anterior angles round, sides not sinuate in front of genae, which are protruding; clypeo-frontal carina distinct, carinate, bent backwards, its edges in contact with clypeo-genal sutures; occipital carina with a transverse crest, as elevate as the frontal one, slightly more elevate at sides than at middle, undulate in dorsal view, extending from side to side of the head; clypeus with very close, rather coarse, rugose setigerous punctures, only less close on frons, clypeus with long erect bristles, clearly thicker basally, gradually thinner apically, frons with yellowish red hairs, long, fine and erect, shorter and thinner than clypeal ones.

Pronotum (fig. 49) strongly convex, declivous towards anterior edge, with distinct anterolateral tubercles and with an anteromedian prominence forming a bilobate process, more protruding towards head than the two lateral ones; anterolateral angles round, sub-truncate, sides distinctly sinuate; base margined; dorsal surface subregularly strongly punctate, punctures large, separated by half to once their diameter on disc, each of them bearing a very small granule at the anterior margin and a very short almost indistinguishable fine reddish yellow hair.

Elytral striae shining and very shallow, their punctures slightly crenating interstriae; the latter flat to gradually convex apically, granulose, granules minute, some smaller than strial punctures, each of them with very short fine hairs.

Pygidium setigerously punctate, punctures widely and irregularly spaced, with reddish yellow fine hairs longer than elytral and pronotal ones.

Fore tibial spur bent inwards and downwards. Fore, middle and hind tibiae ventrally with sparse, double punctures, the bigger ones with long fine hairs.

Male unknown.

VARIABILITY. Paratype. Length 12.5 mm, width 7.2 mm. Pronotum as long as elytra (length ratio = 1.0). Red spots of the elytra more obvious. Pronotum anteromedian prominence clearly separated in two lobes, protruding towards head as much as two lateral ones.

DISTRIBUTION. Known only from the type locality.

REMARKS. As said above, the typical series is composed by two females, both with no trace of erect laminae or horns in the head. In spite of this, the great size of them both is a characteristic of major specimens, as suggested by all the species herein studied and reported by Arrow (1951) and Moczek & Emlen (1999; 2000). For that reason it is well-founded to presume that the head of males of *O. excubitor* n. sp. should, like females', lack significant cephalic protuberances.

**Onthophagus** (*Palaeonthophagus*) *petrovitzianus* Pittino, 2006


Onthophagus citellorum: Carpaneto and oth., 2000: 231


TYPE LOCALITY. “70 km sö. Eskişehir” [Turkey].

TYPE MATERIAL. Holotype male, fixed by original designation, in NMW (according to Pittino, 2004); allotype in ?, unknown to the authors; 8 paratypes in Petrovitz collection (MHNG). Holotype not examined.

DIAGNOSTIC FEATURES. Length 8.0 - 12.1 mm, width 5.0 - 7.1 mm. Pronotum approximately as long as elytra (length ratio 0.96 - 1.00). Black, dully shining with isodiametric microreticulation, pubescence yellow, antennal scape, pedicel and funicle dark red, antennal club dark brown to black.

Head (figs 52, 54) slightly wider than long (width/length ratio 1.58 - 1.61), clypeus round, barely emarginate at middle, anterior angles very broadly round, sides barely sinuate in front of genae, which are protruding; clypeo-frontal carina distinct, backwards bent, its edges in contact with clypeo-genal sutures; occipital carina with a pair of erect conical, subparallel horns arising between eyes, the horns not joined by a transverse lamina; minor specimens’ occipital carina reduced to a bisinuate narrow lamina, more or less raised at the edges; clypeal and frontal surface with rather coarse setigerous subrugose punctures, clypeus with long erect hairs, frons with yellow hairs, long, fine and erect, shorter than the clypeal ones.

Pronotum (figs 51, 53) convex, dull, strongly declivous towards anterior edge, with distinct anterolateral tubercle on either side and an anteromedian broad prominence clearly sinuate at middle; anterior angles produced, sides sinuate behind them; dorsal surface subregularly setigerously granulose, granules shiny, separated by once to twice their diameter, each bearing a short, laid backwards, dark yellow hair, shorter than the ones of clypeal surface.

Elytral surface a little more shining than pronotum, striae barely impressed, their punctures larger than strial width and clearly crenating interstrial sides; interstriae flat to barely convex, with small granules bearing very short yellowish white hairs, shorter than the ones on clypeus.

Pygidium with widely spaced setigeous granulate punctures, hairs yellowish white longer than the ones on pronotum and elytra.

Males’ fore tibial spur bent inwards and outward, less so and thinner in females. Fore, middle and hind femora ventrally with sparse, setigerous, wide punctures, mixed with smaller ones, hairs blackish red and very long.

Male genital armature. Figs 55, 56, 57.

DISTRIBUTION. Recorded by Petrovitz (1967) from central and south-eastern Anatolian Peninsula, but actually widespread throughout its central plateau (Pittino, 2004).

MATERIAL EXAMINED. Specimens from central and south Anatolian Peninsula, including 8 paratypes (TURKEY: Eskişehir distr., 70 km SE, 1 specimen ♂ and 3 specimens ♀; Eskişehir distr., Sivrihisar, 1 specimen ♂; Afyon distr., 16 km N of Bolvadin, 2 specimens ♂♂ and 1 specimen ♀; all in Petrovitz collection, MHNG).

REMARKS. The taxon, with the name citellorum, was described by Petrovitz as subspecies
of *O. vitulus* (Fabricius, 1776) and raised to specific rank by Carpaneto et al. (2000). Because *O. citellorum* Petrovitz, 1967 is a junior homonym of *O. citellorum* Medvedev, 1965 (actually junior synonym of *O. ponticus* Harold, 1883), Pittino (2004) proposed the replacement name *petrovitzi* which, unfortunately, is in its turn a junior homonym of *O. petrovitzi* Frey, 1975 (type locality: “Mozambique, Gorongosa NP” [Mozambique]). At the end Pittino (2006) replace once more the preoccupied name with *O. petrovitzianus*.

*Onthophagus (Palaeonthophagus) vitulus* (Fabricius, 1776)

*Scarabaeus vitulus* Fabricius, 1776: 209; Fabricius, 1787: 15; Olivier, 1789: 126


*Onthophagus vitulus* ab. *humeralis* Mikšić, 1950: 167 (chromatic variation)


*Citellonthophagus vitulus*: Ádám, 1994: 15

*Scarabaeus camelus* Fabricius, 1787: 13 [type locality: “Germania” [Germany]; type material at ?, unknown to the authors]; Olivier, 1789: 126 (as junior synonym of *Scarabaeus vitulus*);

*Onthophagus camelus*: Ericson, 1847: 777; Mulsant & Rey, 1871: 90; Heyden, 1880: 103; Reitter, 1892: 64; Heyden, 1896: 48; d’Orbigny, 1898: 174 (as junior synonym of *O. vitulus*); Gillet & Boucomont, 1927: 131 (as junior synonym of *O. vitulus*);


*Onthophagus (Palaeonthophagus) vitulus* ssp. *thracum* Pittino, 2004: 167 [type locality: “Greek Thrace, nearly 18 km W of Orestiada, NW of Valtos” [Greece]; type material: holotype male, fixed by original designation, allotype and 65 paratypes in RPCM] (new synonymy)

**Type locality.** “Austria”.

**Type material.** Type in Copenhagen Zoological Museum, according to Balthasar, 1963a. Type not examined.

**Diagnostic features.** Length 8.7 - 12.0 mm, width 5.0 - 6.8 mm. Pronotum approximately as long as elytra or a little shorter (length ratio 0.94 - 1.00). Black, pronotum rarely with green metallic lustre, humeri sometimes with a red spot between 6th and 7th elytral intervals (ab. *humeralis* Mikšić, 1950), dully shining with isodiametric microreticulation, pubescence reddish yellow, antennal scape, pedicel and funicle dark red, antennal club dark brown to black.
Head (figs 59, 61, 62) slightly wider than long (width/length ratio 1.57 - 1.63), clypeus round, barely emarginate at middle, anterior angles very broadly round, sides barely sinuate in front of genae, which are protruding; clypeo-frontal carina distinct, slightly backwards bent, its edges in contact with clypeo-genal sutures; major specimens’ occipital carina extended in a lamina, half as long as width of its base, ending in a pair of erect horns, margin between horns usually slightly sinuate in frontal view; minor specimens’ lamina of occipital carina reduced to a bisinuate narrow lamina, more or less raised at the edges; clypeus and frons with rather coarse setigerous punctures, clypeus with long erect bristles, clearly thicker basally, gradually thinner apically, frons with yellow reddish hairs, long, fine and erect, shorter and thinner than the clypeal ones.

Pronotum (figs 58, 60) convex, dull, strongly declivous towards anterior edge, with distinct anterolateral tubercle on either side and with an anteromedian broad prominence clearly sinuate at middle; anterior angles produced, sides sinuate, sometime barely, behind the anterior angles; disc irregularly setigerously punctate, punctures separated by once to twice their diameter, granulose on sides, each puncture bearing a small granule at the anterior margin, and a short, laid backwards, yellowish black hair, shorter than the ones on clypeus.

Elytra a little more shining than pronotum, striae barely impressed, their punctures larger than strial width and clearly crenating interstrial sides; interstriae flat to barely convex, with granules smaller than strial punctures, bearing very short whitish yellow hairs, shorter than the ones on clypeus.

Pygidium with widely spaced setigerous punctures, hairs dark yellow longer than the ones of pronotum and elytra.

Fore tibial spur bent inwards and outward. Fore, middle and hind femora ventrally with sparse setigerous punctures, hairs dark red and very long.

Male genital armature. Figs 63, 64, 65.

DISTRIBUTION. Central-Eastern Europe, from Eastern France to Russia; Caucasus; Turkestan, Kazakhstan, Mongolia, Western Siberia (Lumaret, 1990). Iran (Horion, 1958). North-Western Thibet (Reitter, 1887). Greece (Pittino, 2004). All the records from Anatolian Peninsula should be referred to *O. petrovitzianus*. The record from Balearic Island (Menorca) by Tenenbaum (1915) has to be considered as doubtful (Martín-Piera & Lobo, 1992); Luigioni (1929) reports *O. vitulus* from Piemonte and Venezia Tridentina, but we have never examined specimens collected in Italy: the species should be considered extraneous to Italian fauna, as already stated by Pittino (1979).


REMARKS. Balthasar (1963b) described *Onthophagus kaszabi* on two males from Kazakhstan. Subsequently Kabakov (1982) established the synonymy between Balthasar’s
taxon and *O. vitulus*. After studying the paratype of *O. kaszabi*, a minor specimen, we herein confirm the synonymy. It’s however interesting to point out that in the original description Balthasar compared *O. kaszabi* to *Onthophagus curvispina* Reitter, 1892, a rather mysterious taxon of which the type, a male from Beijing according to the author, seems to be lost, as noticed by Zunino (1978) who deemed *O. curvispina* as name under inquire.

A subspecies *thracum* of *O. vitulus* was described by Pittino (2004) from Eastern Greece and separated from the nominotypical species on the basis of some external morphologic characters as well as the copulatory lamina. After examination of the holotype and allotype, besides more than 130 specimens coming from the locality (Ládi, Évros distr., in Greece) of 14 paratypes, we believe that the differences shown by Pittino (l.c.) are in the range of variability of the species. Therefore we propose the new synonymy *Onthophagus vitulus* ssp. *thracum* Pittino, 2004 = *Onthophagus vitulus* (Fabricius, 1776).

The genus *Citellonthophagus*, created by Ádám (1994) to include *Onthophagus vitulus* (Fabricius, 1776) as type species, is herein considered junior synonym of *Palaeonthophagus* Zunino, 1979 (see remarks for *Onthophagus kindermanni* Harold, 1877).

**ACKNOWLEDGMENTS**

Thanks to: Dirk Ahrens (Deutsches Entomologisches Institut, Müncheberg), Armen L. Amiryan (National Academy of Sciences of Armenia, Yerevan), Enrico Barbero (Dipartimento di Biologia Animale e dell’Uomo, Università degli Studi, Turin), Luca Bartolozzi (Museo Zoologico de “La Specola”, Florence), Marek Bunalski (Department of Entomology, Agricultural University, Poznań), Yves Cambefort (Paris), Giuseppe Carpaneto (Dipartimento di Biologia, Università degli Studi “Roma 3”, Rome), Radek Cervenka (Prague), Vladimir Chikatunov (Tel-Aviv University), Ettore Contarini (Bagnacavallo, Ravenna), Giulio Cuccodoro (Muséum d’Histoire Naturelle, Genève), Mauro Daccordi (Museo Regionale di Scienze Naturali, Turin), Giovanni Dellacasa (Genoa), Marco Dellacasa (Museo di Storia naturale e del Territorio, Università di Pisa, Calci), Amnon Freidberg (Tel-Aviv University), Leonid Friedman (Tel-Aviv University), Gabriele Fiumi (Forlì), Jiří Hájek (Natural History Museum, Prague), Olaf Jaeger (Staatliches Museum für Tierkunde, Dresden), Jacek Kalisiak (Lodz), Denis Keith (Muséum d’Histoire Naturelle et de Préhistoire, Chartres), David Král (Department of Zoology, Charles University, Prague), Tomas Lackner (Zoologisch Museum, Afdeling Entomologie, Amsterdam), Pietro Magnanini (Bagnacavallo, Ravenna), Otto Merkl (Hungarian Natural History Museum, Budapest), Olivier Montreuil (Muséum National d’Histoire Naturelle, Paris), Eylon Orbach (Kiryat Tiv’on), Maurizio Pavesi (Museo Civico di Storia Naturale, Milan), Emanuele Piattella (Dipartimento di Biologia Animale e dell’Uomo, Università di Roma “La Sapienza”, Rome), Riccardo Pittino (Milan), Antonio Rey (Genoa), Eckehard Rößner (Schwerin), José Luis Ruiz (Ceuta), Gianfranco Sama (Cesena, Forlì), Igor V. Shokhin (Southern Scientific centre of Russian Academy of Science, Rostov-on-Don), Claudio Sola (Guiglia, Modena), Iuri Zappi (Casalecchio di Reno, Bologna), Lothar Zerche (Deutsches Entomologisches Institut, Müncheberg), Vadim Zinchenko (Siberian Zoological Museum, Novosibirsk). Special thanks to Alberto Ballerio (Brescia) and to Tristão and Ana Maria Branco (Porto).
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Figs 1-7: *Onthophagus bytinskii* Balthasar, 1960. Major male, holotype (Israel, Netanya); female (Israel, Tel-Aviv). 1 - major male: head and pronotum, dorsal view; 2 - major male: head, frontal view; 3 - female: head and pronotum, dorsal view; 4 - female: head, frontal view; 5 - parameres, lateral view; 6 - parameres, dorsal view; 7 - copulatrix lamina, ventral side. Drawings by I. Gu-denzi. (scales: see table of figs 47-50).
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Fig. 13-21: *Onthophagus parmatus* Reitter, 1892. Major male (Turkey, Kırşehir distr., Mucur); minor male, lectotype, and female, paralectotype (Armenia, Araxes valley). 13 - minor male: head and pronotum, dorsal view; 14 - minor male: head, frontal view; 15 - major male: head, frontal view; 16 - female: head and pronotum, dorsal view; 17 - female: head, frontal view; 18 - parameres, lateral view; 19 - parameres, dorsal view; 20 - copulatrix lamina, ventral side; 21 - antenna, dorsal view. Drawings by I. Gudenzi. (scales: see page of figs 47-50).
Figs 22-30: *Onthophagus ponticus* Harold, 1883. Major male (Turkey, Erzurum distr., 40 km N Erzurum); minor male (Iran, Tehran distr., Fasham); female, lectotype (Georgia). 22 - major male: head and pronotum, dorsal view; 23 - major male: head, frontal view; 24 - minor male: head, frontal view; 25 - female: head and pronotum, dorsal view; 26 - female: head, frontal view; 27 - parameres, lateral view; 28 - parameres, dorsal view; 29 - copulatrix lamina, ventral side; 30 - antenna, dorsal view. Drawings by I. Gudenzi. (scales: see page of figs 47-50).
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Figs 49-50: *Onthophagus excubitor* n. sp. Female, holotype (Iran, A`z`arba`i`ja`n-e Gharb`i` distr., 35 km W Khoy). 49 - head and pronotum, dorsal view; 50 - head, frontal view. Drawings by I. Gudenzi.