



RESEARCH ARTICLE

**Description of a new Moroccan *Pachydema* Laporte, 1832
(Coleoptera: Scarabaeidae: Melolonthinae: Tanyproctini)**

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Abstract: The authors describe *Pachydema hingrati* **sp. nov.** from eastern Morocco. This new species is closely related to other Moroccan species: *Pachydema curvipedes* Escalera, 1914, described from Oujda, and *Pachydema renaudi* Chavanon & François, 2014 described from Missouri. An update of the key by Baraud (1985) to the males of the Moroccan *Pachydema* group I (*Pachydema* s. str. *sensu* Baraud 1985) is included.

Key words: Coleoptera, Melolonthinae, Tanyproctini, *Pachydema*, new species, description, Morocco, key.

Introduction

The genus *Pachydema* Laporte includes 101 species (Lacroix 2007; Micó & Galante 2009; Chavanon & Labrique 2013; Chavanon & François 2014), most of them with a restricted geographical range, distributed from the Canary Islands and Mauritania to the Middle East (Lacroix 2007). Twenty-three of them occur in Morocco and twenty are endemic to the country (Baraud 1985; Chavanon & Zirari 1998; Miessen 2000; Chavanon & Labrique 2013; Chavanon & François 2014).

We describe here a new species recently discovered in southeastern Morocco. The number of species known to occur in eastern Morocco is now eleven, eight of them have their type locality there (Fig. 1) and seven are endemic to the region.

Material and methods

The studied specimen was sampled on the plain of Tamlelt, Figuig district, southeastern Morocco (Fig. 1). It was caught while flying over the steppe, at 7h30 in the morning. It has been killed with ethyl acetate and then glued on a pinned white board with the dissected genitalia glued on a second board below. The holotype has been deposited in the Emirates Center of Wildlife Propagation collection, Missouri, Morocco. This collection is registered in the Insects and Spiders Collections of the World by the Bishop Museum under the acronym ECWP.

Results

Pachydema hingrati sp. nov. (Figs. 2–3)

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Description

Male (Fig. 2). Measurements (n=1): 12 mm. Black, except elytra, antennae, palps and tarsi, which are brown to reddish-brown. Setae long, generally dense, black at the base and then brownish to light gray, often covered with very short setae visible at high magnification.

Clypeus transverse, about three times as wide as long, with the edge of the outer margin slightly shiny, with an irregular surface and a more or less glabrous and matt contour; this margin is separated from the rest of the clypeus by a row of fairly short erect setae. Anterior margin distinctly raised, especially at the front, where it is widely sinuate in the middle and slightly marked. Lateral margins converging towards the front, connected to the anterior margin by a wide curve, the anterior angles being, therefore, very broadly rounded and indistinct. Clypeus disc covered with strong punctuation and more or less rugose, forming a network of very large points each bearing a long seta on its anterior edge. Ventral side glabrous on its anterior edge, the rest with setae generally denser and shorter than on the disk. Frontoclypeal suture largely erased except on the extreme sides, where it is distinct.

Frons with punctures and setae of the same type as those of the clypeus but denser.

Vertex glabrous, lateral margins with strong and dense punctation, the disc impunctate and shiny.

Eye canthi prominent, lateral margins with an irregular surface, covered with thick black setae.

Antennae dark brown, with the club a little bit longer than the length of the preceding antennomeres combined. Antennomere 1 elongate, dark, gradually expanded into a club bearing dorsally long, dark and rather thick setae, posterior margin with more slender setae, the anterior margin glabrous. Antennomere 2 slightly longer than wide, stalked at its base then abruptly expanded into a sphere just before the posterior margin, with some rather short setae. Antennomere 3 much longer than wide, gradually expanded into a narrow club and bearing few short setae. Antennomere 4 subcylindrical, about 2 times longer than wide, with few short dorsal setae. Antennomere 5 spatulate, approximately the same length as the second. Club covered with a few adpressed setae, denser at the apex, lamellae rounded at the top and outer surface glabrous and shiny except on the center, which is longitudinally narrowly striate.

Maxillary palps with a glabrous terminal palpomere, thin, subcylindrical, shortly stalked at the base, the apex bluntly rounded; on the dorsal surface is a frosted depression, elongate, shallow, very narrow and complete to the front and rear forming a very acute angle.

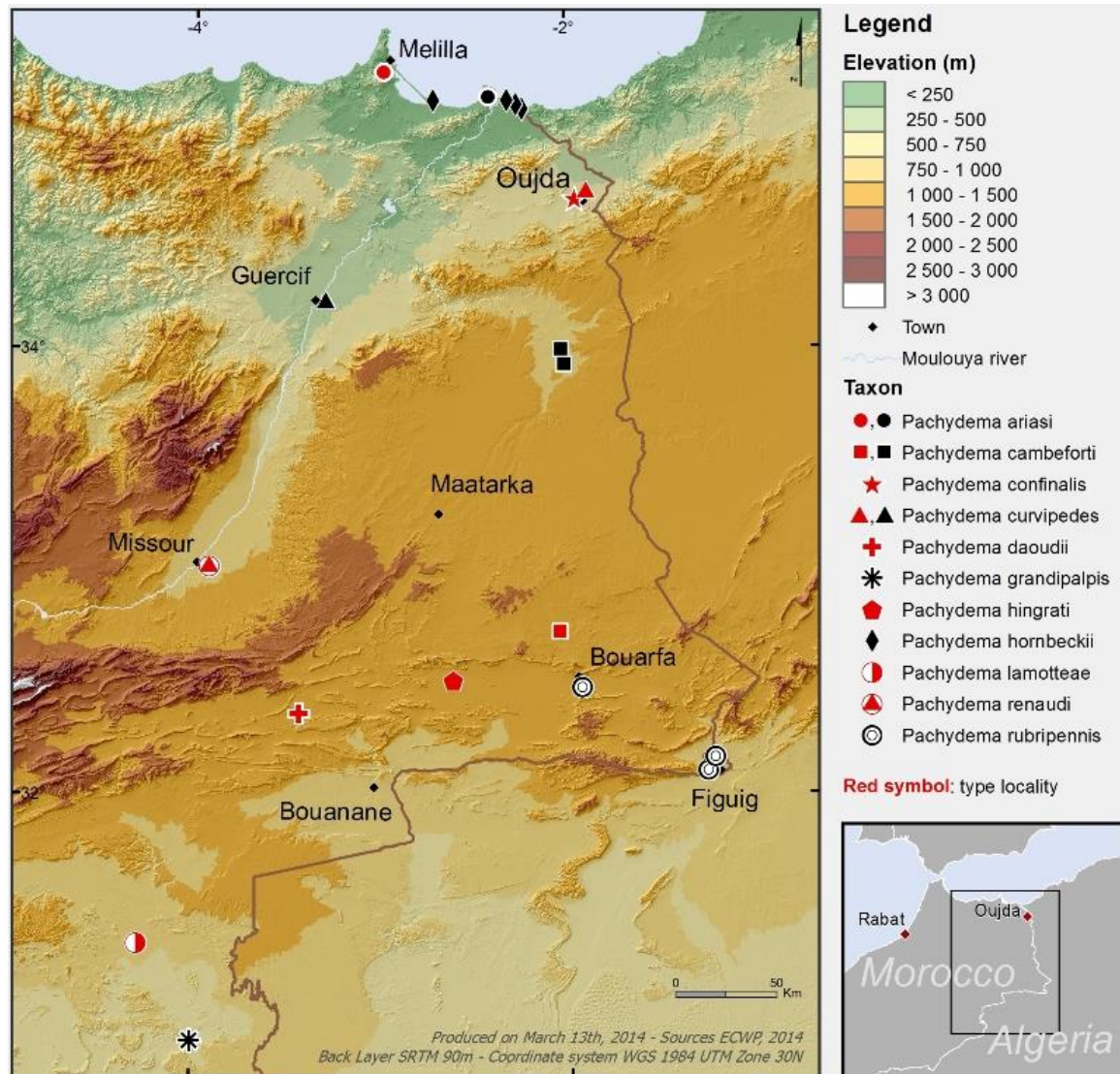


Figure 1. Type localities and collecting sites of *Pachydema* species from eastern Morocco.

Pronotum narrower than elytra at their base, transverse (about 2.5 times wider than long), its greatest width at the anterior third. Anterior margin hardly bisinuate, its center located behind the anterior angles. These are well marked and of about 90°. Lateral margins straight and distinctly divergent towards the anterior third, where they suddenly become convergent. They are then joined to the posterior margin by a wide curve, so the posterior angles are completely erased. Posterior margin with a fairly regular curve but a little more marked in the center. Entire margin is covered with long erect setae. There is also, at the anterior edge, a fringe of short yellowish-white setae addressed at the vertex and inserted below the margin.

Posterior half of the disk with a slightly marked median furrow, especially visible at a certain incidence and prolonged anteriorly by a low depression. Entire surface covered with big punctures rather irregularly distributed, but overall pretty dense on a microreticulated but quite shiny background. This punctation, often aciculate, is more or less rugose, especially at the front, where it is generally very dense. It is accompanied, in the anterior part of the disc, by quite dense long erect setae that cover the anterior half of the lateral margins and the

anterior 2/3 of the center and, in the posterior part of the disk, by very short, adpressed brownish setae, with some scarce long, erect setae.

Scutellum triangular, not furrowed on the sides, with the apex rounded and microreticulate but the surface quite shiny. Punctuation limited to the sides, where it is more or less rugose and consists of very large, deep punctures associated with long setae.

Elytra reddish-brown, darker at the base, the suture and external margin also narrowly darker. Their greatest width is at the posterior third. The sides are slightly divergent at the front and more strongly convergent at the back. Apex rounded, the sutural angle completely erased. Base of elytra with long erect setae, rather dense, particularly on the anterior margin. Some setae, more scattered and shorter, are also located on the sides and along the suture. Lateral margins with somewhat thicker setae becoming shorter from front to rear. Surface shiny, covered with large, deep dense punctures, except at the first interstria, where they are thinner and scattered. Only the first stria is well marked.

Lateral margins of abdomen covered with long and dense setae. Propygidium microreticulate, relatively densely punctate and setose at the front; this punctuation and the setae are gradually reduced rearward until they completely disappear at the posterior edge. Pygidium ogival, microreticulate, with marginal bead, with sparse, irregular punctures, associated with setae very variable in size.

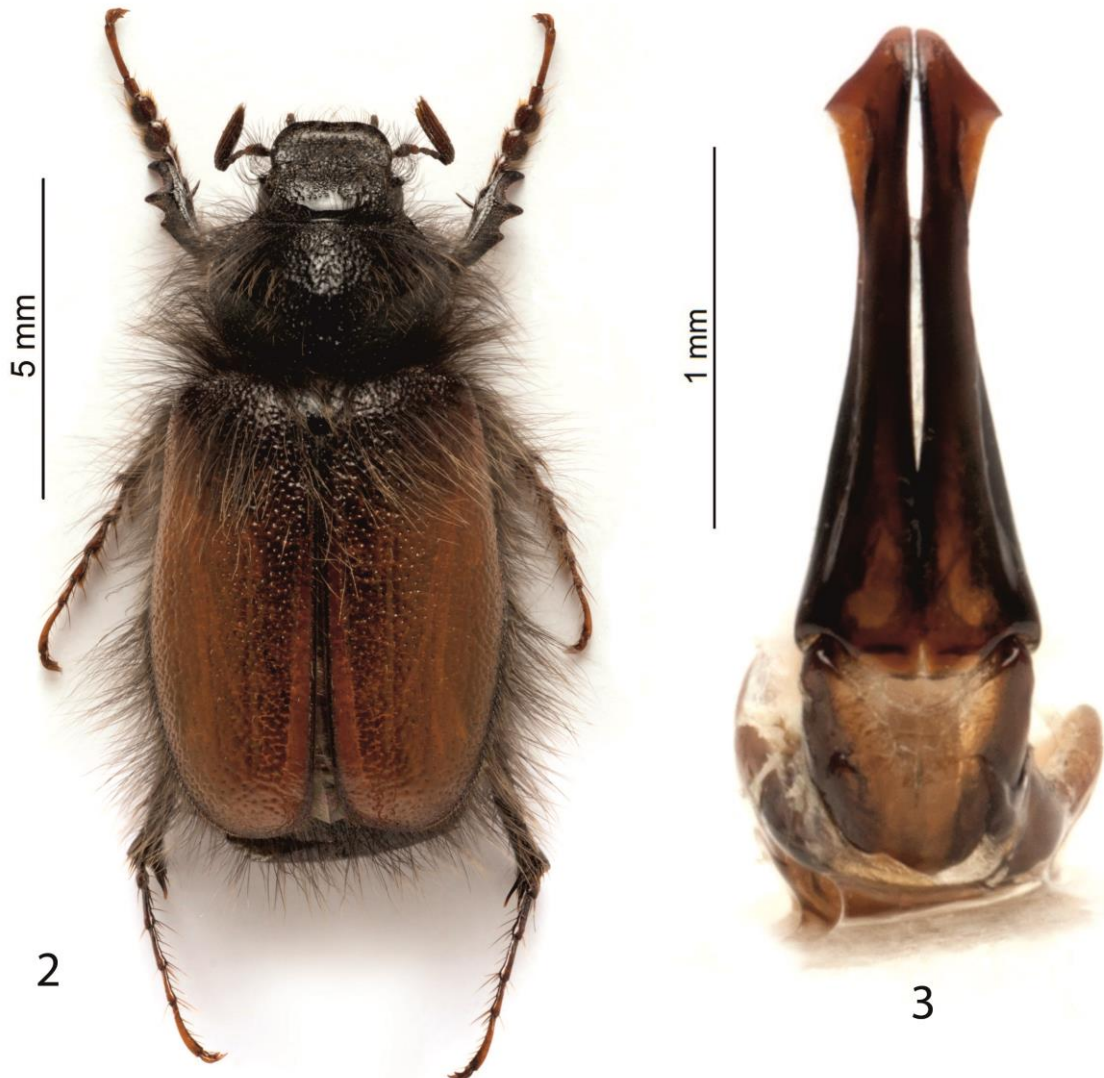
Protibiae with three nearly blunt teeth, the middle one closer to the basal one, which is shorter. Internal spur inserted just behind the middle tooth. Internal margin and dorsal surface with a row of setae. Some shorter setae are also located on the outside, especially at the base of the middle tooth. Protarsomeri finely microreticulate. First tarsomere elongate, ending in a club truncate at its inner angle and covered with appendages on its underside. Tarsomeres 2 and 3 greatly enlarge, dilated especially by their outer edge, bearing over their entire underside appendages similar to those of the first tarsomere. The second tarsomere is subcircular, slightly wider than long, its inner edge strongly rounded and its outer edge slightly curved, the third subquadrangular, barely as wide as long. Tarsomere 4 at most slightly thickened, about 2 times longer than wide, with appendages on its underside. These four tarsomeres bear a few thick, brown setae on their anterior edge. Tarsomere 5 thin, very elongate, with a few rare thick setae on the ventral surface and ending in two bifid claws with parallel teeth, the dorsal one longer, sinuate at the end and tapering to an acute end.

Mesotibiae with parallel edges, slightly widened at the apex, which is bordered by a row of spines. Dorsal margin with three oblique carinae: the first, thin, is near the anterior quarter; the second is located at the anterior third; the third, stronger, is located behind the middle. Each of these carinae carries a row of thick setae of different lengths. External side smooth, bordered by a few setae. Mesotarsomeri microreticulate but shiny. First tarsomere elongate, straight on 2/3 of its length and expanded into a club on its apical third, which bears appendages on its underside. Tarsomeres 2 and 3 much narrower than those of the protarsomere, gradually widened from base to apex, truncate on the sides at the top, covered with appendages on their underside, the 2nd a little longer than the 3rd. Tarsomere 4 elongate, straight, barely expanded at the apex, without any ventral appendages. There are thick setae of varying length at the apex and sides of each tarsomere.

Metatibiae with a carina that is well marked on the dorsal side and very broadly interrupted and erased on the external side. In front of the carina, the dorsal margin is straight and bears some short, more or less marked peaks, fitted, as the carina, with one or several thick setae. At the back, it is smooth and slightly concave. Ventral margin long and widely convex in the center. Behind the carina, the metatibiae widen quite strongly, especially at their lower edge. Apical plateau especially expanded ventrally, surface more or less granular,

its outer edge fitted internally with a row of short setae and with some spiniform setae at the dorsal and ventral edges. Metatarsomeri normal, first tarsomere shorter than the upper spur.

Aedeagus: (Fig. 3).



Figures 2–3. *Pachydema hingrati* sp. nov.. **2**, holotype, male; **3**, aedeagus.

Female: Unknown.

Type material: Holotype ♂, dissected (genitalia glued on board below the specimen), local coordinates: N 32.51480°, W 2.61558°, 1048 m, Tamlelt, Bouârfa (Maroc), 03.XII.2013, 7h30, steppe of *Hammada scoparia* (Pomel), flying, L. Bacon leg., deposited in ECWP collection at Missouri (Morocco).

Etymology: We dedicate this species to Mr. Yves Hingrat, Director of the Ecology and Conservation Division of RENECO Wildlife Consultants LLC. He was the first to study arthropod communities in the Missouri region and has worked to promote this group in the habitat studies of ECWP.

Discussion

Pachydema hingrati **sp. nov.** belongs to the group I of J. Baraud (1985) (*Pachydema* s. str.). It is very close to *Pachydema curvipedes* Escalera, 1914 (Fig. 4), described from Oujda (Morocco), and to *Pachydema renaudi* Chavanon & François, 2014 (Fig. 6), described from Missour (Morocco), with which it shares several features: clypeus and frons setose, pronotum covered with long setae around its entire circumference, elytra lighter than the anterior body and with long setae at the base, protarsus with tarsomere 2 and 3 well enlarged and tarsomere 4 barely expanded, metatibiae with external carina largely interrupted and lower margin broadly convex. It differs from the first by the brown to reddish-brown elytra, the partly black setae, the more transverse clypeus, the pronotum with an anteriorly setose disk and the relatively densely punctate propygidium. It also differs by the shape of the aedeagus (Fig. 3), particularly the apical portion of the parameres, whose edge is slightly concave in front of the lateral sharp projection and progressively shrinks thereafter. It differs from the second by a somewhat stronger and denser punctation, the more transverse clypeus and pronotum, the shape of the clypeus, with its anterior margin slightly sinuate and the lateral margins less convergent, the last maxillary palpomere much narrower and its dorsal depression also, and the pilosity of the anterior part of the pronotum disc with more invasive setae. It also differs by the shape of the aedeagus (Fig. 3), particularly at the lateral sharp projection of the tip portion of parameres, which is shorter.

Update of the identification key by Baraud (1985) to the males of the Moroccan *Pachydema* species of group I (*Pachydema* s. str. *sensu* Baraud 1985)

The discovery of *Pachydema hingrati* **sp. nov.**, added to that of two other recently described species, also in the group I of Baraud (1985), (*P. daoudii* Chavanon & Labrique, 2013 - Fig. 5, and *P. renaudi* Chavanon & François, 2014), leads us to update the identification key created by Baraud (1985) for the *Pachydema* of his group I (*Pachydema* s. str.). We limit this key to males and Moroccan species.

Identification key to the males of Moroccan *Pachydema* of Baraud's group I

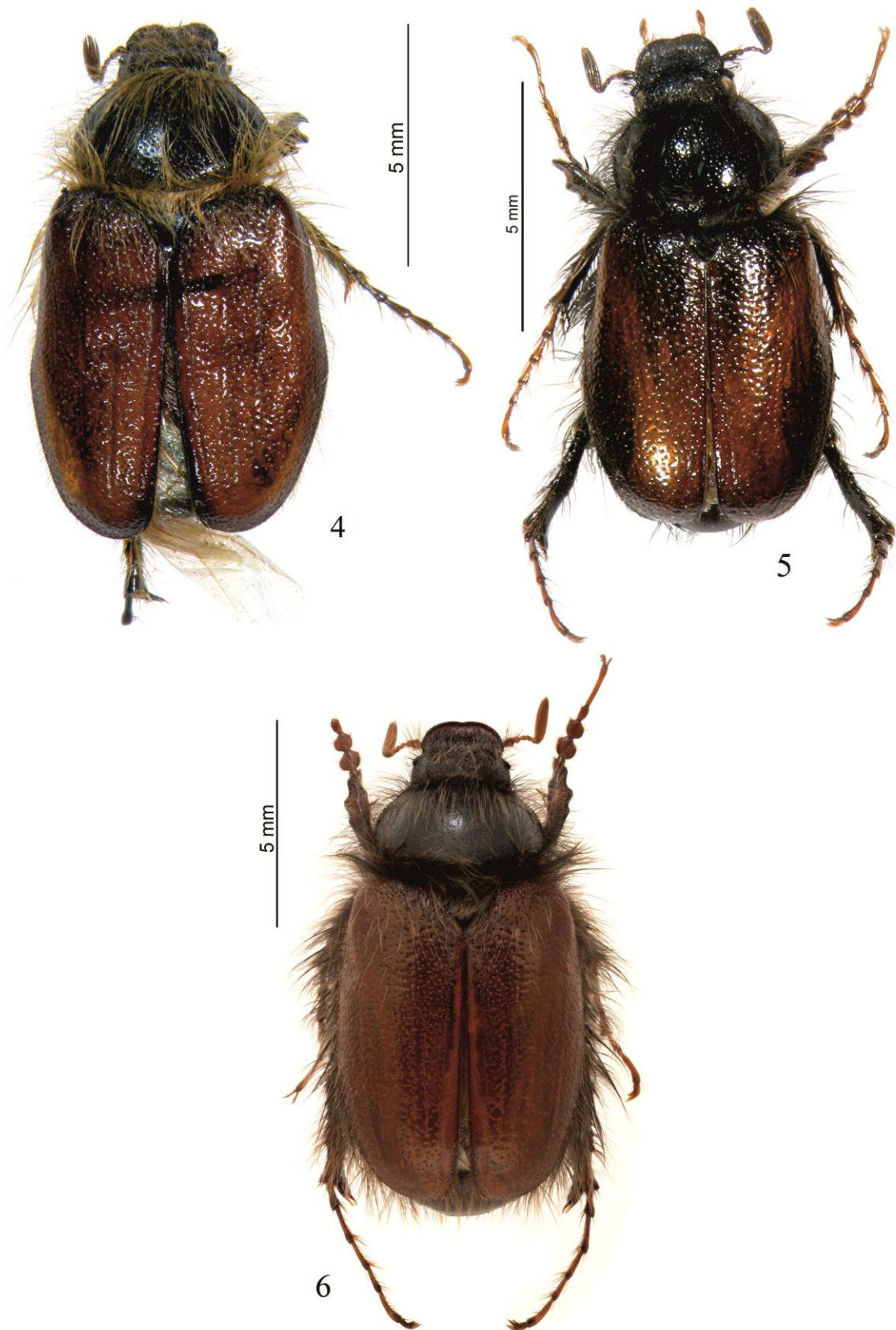
- | | | |
|---|--|---|
| 1 | Posterior margin of pronotum with some short or very short setae; base of elytra sometimes glabrous..... | 2 |
| – | Posterior margin of pronotum with some setae as long or almost as long as the ones on the anterior margin; base of elytra always with long erect setae | 3 |
| 2 | Frons with a big central gibbosity, wide but low | <i>P. emflusi</i> Escalera, 1914 |
| – | Frons flat or slightly convex, without central gibbosity | <i>P. hontoriai</i> Escalera, 1914 ⁽¹⁾ |
| 3 | Frons setose | 4 |
| – | Frons glabrous | 8 |
| 4 | Clypeus glabrous, anteriorly impunctate and posteriorly with a few punctures | <i>P. rungsi</i> Peyerimhoff, 1949 |
| – | Clypeus setose, fully punctate | 5 |
| 5 | Protarsomeri 2 and 3 much wider than long; clypeus with quite fine sparse punctuation and with short setae | <i>P. otini</i> Peyerimhoff, 1949 |
| – | Protarsomeri 2 and 3 at most slightly wider than long; clypeus with coarse punctuation, wrinkled or rugose and with longer setae | 6 |
| 6 | Elytra yellowish-brown; setae completely yellow; propygidium smooth | <i>P. curvipedes</i> Escalera, 1914 |

- Elytra reddish-brown; setae at least partly black or dark brown; propygidium punctate 7
- 7 Maxillary palps' last segment thin and cylindrical; clypeus transverse, at least sinuate in the center; pronotum with coarser and denser punctuation and with setae covering at least the anterior half of the disk *P. hingrati* **sp. nov.**
- Maxillary palps' last segment fusiform; clypeus round, narrowly sinuate in the center; pronotum with less coarse and less dense punctuation and with setae limited to the anterior third of the disk *P. renaudi* Chavanon & François, 2014
- 8 Mesotarsomeri strongly widened, almost as much as those of the protarsomeri 9
- Mesotarsomeri hardly widened, or not at all 10
- 9 Entirely light reddish-brown; anterior margin of clypeus flattened and slightly sinuate in the middle *P. gourvesi* Baraud, 1985
- Entirely black; anterior margin of clypeus neither flattened nor sinuate *P. confinalis* Peyerimhoff, 1949
- 10 Setation top at least partly black, more or less mixed with gray or light brown 11
- Setation on top entirely light yellow 12
- 11 Head and pronotum black; external side of metatibia with a briefly interrupted keel ..
..... *P. daoudii* Chavanon & Labrique, 2013
- Head and pronotum dark reddish-brown; external side of metatibia without a keel ...
..... *P. amphiomella* Peyerimhoff, 1943
- 12 Entirely yellowish-brown on top; scutellum smooth; propygidium with very long sparse setae, longer at the base *P. marraquensis* Escalera, 1914
- At least the head black or brownish-black 13
- 13 Pronotum and elytra yellowish-brown *P. schrammi fusciceps* Peyerimhoff, 1949
- Pronotum black, elytra brown or yellowish-brown, more or less sooty 14
- 14 Clypeus slightly elongated, anteriorly rounded, with dense punctuation; metatibia very short, wide, triangular; antennal club much longer than the funiculus, outwardly arcuate *P. cinctipennis* Peyerimhoff, 1949
- Clypeus transversal, anteriorly flattened, its punctuation moderately dense; metatibia normal, elongated and slightly flattened; antennal club as long as the funiculus, not arcuate *P. schrammi schrammi* Peyerimhoff, 1949

⁽¹⁾ Here would be placed some specimens of *P. anthracina* Fairmaire with metatibial keel interrupted in the middle (this keel is usually complete in *P. anthracina* belonging to the group II of Baraud: *Artia* Rambur, 1843). These specimens differ from *P. hontoriai* Esc. particularly by the black-brown antennal club a little shorter than the funiculus and the protibiae's external teeth finer and acute.

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Figures 4–6. **4**, *Pachydema curvipedes* Escalera, 1914 (G. Chavanon collection in Lyon Museum - France); **5**, *Pachydema daoudii* Chavanon & Labrique, 2013 (paratype from Lyon Museum - France); **6**, *Pachydema renaudi* Chavanon & François, 2014 (holotype from Rabat Museum - Morocco).

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