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# A New Record of Opossum Beetle, *Mesostena Puncticollis* Solier, 1835 (Coleoptera: Tenebrionidae: Pimeliinae) from Kurdistan Region- Iraq

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## ABSTRACT

The present study provides a morphological description of *Mesostena puncticollis* Solier, 1835 (Coleoptera: Tenebrionidae), which is recorded for the first time in the Kurdistan Region of Iraq. Specimens were collected from sheep and goat dung pads between January and July 2024. Diagnostic morphological characters of the species are; The head nearly globular, black with thin spotting. Clypeus black and slightly concave. Mandibles triangular, heavily sclerotized with tridentate apices; molar area with a tuft of yellow setae. Labrum nearly goblet-shaped. The terminal segment of maxillary palp is funnel-shaped, and about three times the length of the second segment. Antennae are clavate, with 11 segments; 11th segment triangular, equal in length to the 10th. Pronotum cup-shaped, shiny black, and smooth. Elytra black, elongate-oval, with seven rows of minute punctures. Protibia tubular in shape, the basal part bearing a small spines. Fore tarsus five-segmented, 1st to 3rd tarsomeres are cup-shaped and nearly equal in length. Hind tarsus four segmented, 4th tarsomere 2.1 times as long as the 2nd . Abdomen shining black, elongated oval, bare, consisting of five segments. Eighth abdominal sternite pale to dark yellow, posterior parts pincer-like. Eight abdominal tergite cup-shaped, anterior margin striate, posterior margin slightly concave. Anterior and posterior margin of ninth abdominal sternite moderately concave. Spiculum gastrale inverted V -shaped, apical part clavate shaped. Aedeagus elongate-oval; parameres sword-like, and median lobe tubular and slightly shorter than parameres.

The habitus, date of collection and the important parts were photographed.

**Keywords:** New record, *Mesostena puncticollis*, Iraq.

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## INTRODUCTION

Darkling beetles (Coleoptera: Tenebrionidae) are a morphologically heterogeneous group with over 20,000 described species worldwide [1]. Approximately 8,000 of these species occur in the Palearctic Region [2]. The family Tenebrionidae is classified into 11 subfamilies, 96 tribes, 61 subtribes, about 2,300 genera, and approximately 20,000 species globally [3,4,5,6]. Tenebrionids typically feed on plant material like decomposing organic matter, wood, leaf litter, pollen, fungi, and algae. Some species are scavengers, and others are predators, particularly on wood-boring beetles [7]. A number of species are also, some tenebrionids have adapted to human environments and are cosmopolitan pests of stored grain products [8,9]. Darkling beetles are key ecological dominant detritivores in semi-arid and arid ecosystems [10], and some are strictly saprophagous [11]. Various authors like [12] and [13], have addressed the classification of the genera of the family and its tribes. One of the largest and most prominent tribes is Pimeliini, which occurs in the subfamily Pimeliinae Latreille, and it has 64 genera. They are primarily distributed across the Palearctic region and the transitional zones of the Afrotropical and Indo-Malayan regions [14,15]. The majority of the genera are found in desert habitats of Central Asia, Iran, Pakistan, Afghanistan, the Near East, and North Africa [16]. *Mesostena puncticollis* Solier is one of important and a significant species of this genus, which occur on exposed carrion as well as at depths of 20–40 cm below ground [17]. It is characterized by a body length of approximately 12 mm; the head, thorax, and elytra are black, while the ventral surface is reddish-brown; the pronotum is goblet-shaped, and the elytra are elongate-elliptical with prominent spots along the puncture rows [9]. *M. puncticollis* Solier is distributed in many countries includes, Turkey, Saudi Arabia, Egypt, Jordan, Syria, Iraq, Iran, and extends as far north as Turkmenistan [18,19]. In Iraq, [20] indicated 35 species of the family in 18 genera. [21] listed 17 species of the family under 12 genera. And 20 species of 10 genera were reported by [22].

The aim of the present study is to provide a detailed description of opossum beetle, *Mesostena puncticollis* Solier, 1835, newly recorded from Kurdistan Region, Iraq.

## Material and Methods

This study was conducted using 20 specimens collected from sheep and goat dung pads between January and July 2024 in various governorates and cities of the Kurdistan Region, Iraq. Sampling locations included Erbil (Qushtappa, Kasnazan, and Shaqlawa) and Sulaymaniyah (Kalar and Kifri). Specimens were collected using pitfall traps and insect forceps. A total of six specimens (four males and two females) were submerged in boiling water for 15–20 minutes to soften their body parts. The specimens were then dissected into three parts, head, thorax and abdomen by using two fine pins, and the head and abdomen were placed in a beaker containing 10% potassium hydroxide (KOH). The beaker was heated with continuous shaking for approximately 15–20 minutes to dissolve body lipids and break down muscle tissues. Subsequently, the head and abdomen were rinsed in distilled water for 3–4 minutes to neutralize the alkali and dissected in petri dish consist 25% ethanol and examined under a binocular microscope. To dehydrate the tissues, the parts were sequentially passed through increasing concentrations of ethanol (50%, 75%, and 100%), each for two minutes. For translucency, samples were placed in Xylene for two minutes. Lastly, the slides were mounted with body parts with Dibutylphthalate Polystyrene Xylene (DPX) as artificial non-aqueous natural mounting medium to observe under the microscope and had a coverslip over them for future observation. Various body parts were measured using an ocular micrometer [23,24,25]. The species identification was done based on the taxonomic keys provided by [19]. The identification of the species was confirmed by Prof. Dr. Nabeel A. Mawlood, College of Agricultural Engineering Sciences, Salahaddin University-Erbil and, Assist. Prof. Dr. Hanna Hani Alsafar at the Iraq Natural History Research Center and Museum, University of Baghdad. The prepared specimens were deposited in the Insect Museum of the Department of Plant Protection, College of Engineering Sciences - University of Salahaddin-Erbil Governorate Kurdistan region of Iraq.

## Results And Discussions

### Description

*Mesostena puncticollis* Solier, 1835

#### Body (Fig.1a)

Shining black, elongated oval in shape. Length 8.5-12.1 mm and the width 2.8-3.6mm.

**Head:** Nearly globular, black with thin spotting. Frons black, slightly convex with a high density of coarse punctures. Clypeus black and slightly concave; lateral parts sparsely fine punctured. Eyes oval, shiny black and prominent, 1.8–2.3 mm in length; dorsal margin of the eyes bears a distinct carina. Labrum (Fig. 1b) dark brown, nearly goblet-shaped, 0.5–0.7 mm in length; surface densely punctate. Epipharynx pale brown; posterior margin with a row of short brown setae.

Mandibles (Fig. 1c) dark brown to black, triangular, heavily sclerotized with tridentate apices; molar area with a tuft of yellow setae; scrobe smooth and glabrous, length ranges from 1.0 to 1.5 mm. Maxillae (Fig. 1d) brown to dark brown, cardo and stipes triangular; apical part of the lacinia rectangular, bearing sparse of short yellow setae, distal part densely covered with crinkled, long, dark yellow setae; galea hook-shaped; with the basal three-quarters covered with dense dark yellow setae. Maxillary palp four-segmented, terminal segment black, funnel-shaped, and three times as long as the second segment. Mentum nearly cup-shaped, anterior margin moderately concave; basal margin straight; apical margin moderately concave. Labial palps yellow, the second segment oval in shape, approximately 1.1 times as long as the third segment. Antennae (Fig. 2e) dark brown, nearly clavate, composed of 11 segments, length 2.7–3.4 mm, the first and second segments are equal in length, segments 1 to 10 nearly fusiform, the 11th segment is triangular, and equal in length to the 10th.

**Thorax:** Pronotum cup-shaped, shiny black, and smooth; length 2.8 to 3.6 mm in length. Anterior margin slightly concave, posterior margin strongly convex; lateral margins moderately curved; anterior angles rounded and the posterior curved; surface densely covered with fine, round punctures and fringed of long setae.

Scutellum dark brown. Prosternum shining black, smooth, moderately convex; the basal half without punctures, the apical half with moderate density of coarses punctures. Elytra black, elongated oval in shape, surface bearing seven longitudinal rows of fine punctures. Forelegs (Fig. 1f) black; coxa rounded, with a small spine on the posterior part; trochanter small and triangular; fore femur nearly cylindrical; 0.8–1.1 mm in length, the basal quarter is narrow, apical part bears two red spurs; protibia tubular, 0.8–1.1 mm in length; basal part bearing a small spines; fore tarsus five-segmented, 1st to 3rd tarsomeres are cup-shaped and nearly equal in length. 4th segment 1.1 times as long as the 3<sup>rd</sup>; 5th segment tubular and is the longest, 1.4 times as long as the 1st; apical margin of 1-4 segments bears row of small red spines; claw simple, long and hood-shaped. Middle legs similar to fore legs except, middle coxa conical in shaped and 1st tarsomere 1.7 times as long as the 2nd. Hind legs similar to forelegs except, metacoxae boat-shaped, hind tarsus four segmented, 4th tarsomere 2.1 times as long as the 2<sup>nd</sup>.

**Abdomen:** Shining black, elongated oval, bare, consisting of five segments. 1-4 abdominal sternites rectangular in shape, 2nd abdominal sternite 1.4 times as long as the 2nd and twice times as long as the 4th. 5th sternite (Fig. 1g) cup shaped. 8th abdominal sternite (Fig.1 h) pale to dark yellow, posterior parts pincer-shaped, with the apical one-third of the surface bearing a high density of short yellow setae. 8th abdominal tergite (Fig. 1i) yellow and cup shaped, anterior margin striat, posterior margin slightly concave, surface is densely covered with short yellow setae

9th abdominal sternite (Fig. 1j) nearly cup-shaped, anterior and posterior margins moderately concave, posterior margin bears dense of yellow setae. Spiculum gastrale (9th abdominal tergite) (Fig. 1k) inverted V-shaped, apical part clavate shaped. Length 1.5-2.1 mm.

**Male genitalia:** The aedeagus (Fig. 1l) elongated - oval in shape and dark yellow to brown, length 1.4 to 2.0 mm. Parameres sword-shaped. Phallobase nearly oval and slightly longer than the parameres. Median lobe tubular in shape and slightly shorter than the parameres. Aedeagal apodeme dark brown and slender.

### Conclusions

Tenebrionidae are primarily scavengers, feeding on a wide variety of decaying plant, fungal, and animal materials. Some tenebrionid species may play a beneficial role in controlling fly populations in poultry houses, where the beetles modify the dung they feed on, making it unsuitable for fly breeding. *Mesostena puncticollis* Solier is one of a significant species of on exposed carrion as well as at depths of 20–40 cm below. The species distributed in many localities, includes Turkey, Saudi Arabia, Egypt, Jordan, Syria, Iraq, Iran, and extends as far north as Turkmenistan.

This species found on dung pads of animale in Kurdistan Region- Iraq. Therefore, it is necessary to comprehensive survey of different regions of Iraq, to collect the samples and update the database of the family Tenebrionidae.

### Akownoldgments

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### Conflict of interests

None



Fig.1 *Mesostena puncticollis*

a. Habitus (2X)   b. Labrum   c. Mandible   d. Maxilla   e. Antenna   f. Foreleg  
g. 4<sup>th</sup> and 5<sup>th</sup> abdominal sternites   h. 8<sup>th</sup> abdominal sternite   i. 8<sup>th</sup> abdominal tergite   j. 9<sup>th</sup> abdominal sternite   k.  
Spiculum gastrale   l. Aedeagus (Lateral view)   m. Aedeagus (Ventral view). Scale bar= 0.5mm.

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## تسجيل جديد لخنفساء بنكتيكوليس *Mesostena puncticollis* Solier, 1935 (Coleoptera: Tenebrionidae: Pimeliinae) في إقليم كردستان العراق

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### الخلاصة

تقدم هذه الدراسة وصفاً مظهرياً لخنفساء بنكتيكوليس *Mesostena puncticollis* Solier, 1935 (Coleoptera: Tenebrionidae) والتي تُسجل لأول مرة في إقليم كردستان العراق. جُمعت العينات من روث الأغنام والماعز بين شهر كانون الثاني - تموز 2024. الصفات المظهرية التشخيصية لهذا النوع هي: الرأس شبه كروي، أسود اللون مع وجود بقع رقيقة. الدرق سوداء اللون ومقعر قليلاً. الفك العلوي مثلث الشكل، متصلب بشدة وقمتها ثلاثية الشكل، تحتوي المنطقة الطاحنة على خصلة من الشعيرات الصفراء. الشفة العليا كاسية الشكل تقريباً. العقلة الطرفية من ملمس الفك السفلي قمعي الشكل، يبلغ طوله حوالي ثلاثة أضعاف العقلة الثانية. اللامس صولجاني الشكل، يتكون من 11 عقلة؛ العقلة 11 مثانة الشكل، طوله بقدر طول العقلة العاشرة. ظهر الصدر الأمامي كاسي الشكل، أسود اللون براق، وناغم. الأجنحة سوداء، متطولة. بيضاوية، تحمل سبعة صفوف من الثقوب الدقيقة. ساق الرجل الأمامي أنبوبي الشكل، يحمل جزءه القاعدي أشواكاً صغيرة. يتكون رصغ الرجل الأمامي من خمسة قطع، والقطع من الأول إلى الثالث كاسية الشكل ومتساوية تقريباً في الطول. يحتوي الرصغ الخلفي على أربع قطع، والقطعة الرابعة أطول بمرتين ورابع من القطعة الثانية. البطن أسود براق، بيضاوي الشكل، خالي من الشعيرات، يتكون من خمس صفائح. الصفيحة القصبية البطنية الثامنة ذات لون شاحب إلى أصفر داكن، وجزءها الخلفي ملقطي الشكل. الصفيحة الظهرية البطنية الثامنة كاسية الشكل حاقته الأمامية مستقيمة، والخلفية مقعرة قليلاً. الحواف الأمامية والخلفية للصفيحة البطنية التاسعة مقعرتان بشكل معتدل. يكون ظهر الصفيحة البطنية التاسعة بشكل حرف v مقلوب وجزءها الأمامي صولجاني الشكل. السوء الذكورية متطولة بيضاوية الشكل، المقابض الجانبية شبيهة بالسيف، والفص الأوسط أنبوبي وأقصر قليلاً من المقابض الجانبية. تم تحديد مكان وتاريخ الجمع وتصوير الأجزاء المهمة.

الكلمات المفتاحية: تسجيل جديد، خنفساء بنكتيكوليس، العراق.