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THREE NEW RECORDS OF SCARABAEINAE (SUBFAMILY: SCARABAEINAE; FAMILY: SCARABAEIDAE; ORDER: COLEOPTERA) FROM THE ARID ZONE OF SOUTH PUNJAB, PAKISTAN

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ABSTRACT

The Cholistan Desert in South Punjab, Pakistan, represents a historically under-surveyed arid ecosystem where the insect fauna, particularly dung beetles (Scarabaeidae: Scarabaeinae), remains poorly documented**.** Given the crucial ecological services provided by dung beetles, including nutrient cycling, soil aeration, and pest control, understanding their diversity is essential for appreciating the functioning and health of desert ecosystems. This study addresses this knowledge gap by surveying the Scarabaeinae fauna of this region. A total of 123 specimens were collected from the Cholistan Desert and identified as belonging to two genera: *Onitis* Fabricius, 1798 and *Digitonthophagus* Balthasar, 1959. The species include *Onitis philemon* Fabricius, 1801, *Digitonthophagus uks* Génier, 2017, and *Digitonthophagus catta* Fabricius, 1787, This study documents all of these species for the first time in this arid zone. This discovery enhances the known biodiversity of the region. It underscores the ecological value of scarab beetles in Pakistan's desert ecosystems, highlighting the importance of further entomological research to inform conservation efforts.

Keywords: Beetles, Biodiversity, Cholistan desert, Regional record, Scarabaeinae, Systematics

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INTRODUCTION

Dung beetles are a significant group of insects, often distinguished by their large size (Shah and Shah, 2022). They possess fascinating life histories and feed on a variety of resources, including dung, carrion, fungi, and pollen. While subfamilies like Scarabaeinae and Aphodiinae primarily depend on dung, others feed on agricultural and plant products. Among these, dung beetles are ecologically vital, contributing substantially to ecosystem functions such as nutrient cycling and soil aeration (Chandra and Gupta, 2013). Ancient Egyptians once considered the scarab beetle a holy symbol, and it remains vital in modern times (Shah and Shah, 2022). Dung beetles constitute a significant portion of the Scarabaeidae family, consisting of around 7,000 species (Ghazanfar et al., 2017). Previous studies have documented diverse dung beetle assemblages across Pakistan's varied landscapes, highlighting regional variations in species composition. For example, Siddiqui et al. (2014) reported several new country records for Scarabaeinae from provinces including Sindh, Punjab, and Khyber Pakhtunkhwa, such as *Onitis virens* Lansberge, 1875, and *Sisyphus longipes* (Olivier, 1789), highlighting the poorly understood fauna in these areas. Similarly, Hussain et al. (2020) investigated spatio-temporal diversity in Sialkot, Punjab, identifying 16 species across three functional guilds (paracoprid, endocoprid, and telecoprid), with *Onitis excavatus* (27.68%) and *Onitis crassus* (9.59%) as the most abundant species. Ali et al. (2015) documented 14 species from the Pothohar Plateau of Punjab, including new national records, such as *Onthophagus catta* (Fabricius, 1787) and *Oniticellus cinctus* (Fabricius, 1775), with *Onitis crassus* being the most common (15.26%). In agro-forest areas of Faisalabad, Punjab, a study recorded 5,863 scarab beetle specimens representing 41 species in crop areas and 57 species in forest areas, with a greater overall diversity observed in the forests compared to the crops(Zahoor et al., 2003). Further north, new country records for scarabaeoids include *Dorcus curvidens*, *Heteronychus annulatus*, and *Rhomborrhina microcephala*, underscoring the need for continued biodiversity inventories in understudied regions (Zubair

and Ratcliffe, 2015). In northern Pakistan, including Gilgit-Baltistan, Khyber Pakhtunkhwa, and Islamabad Capital Territory, extensive sampling across alpine meadows, sub-alpine zones, montane temperate forests, and subtropical deciduous forests has revealed six species from the dung beetle tribe Onitini: *Onitis falcatus*, *O. lama*, *O. philemon*, *O. subopacus*, *O. virens*, and *Cheironitis arrowi*, with the genus *Cheironitis* representing a new record for the region (Abbas et al., 2023). From Sialkot, Punjab, 595 specimens across 25 species, nine genera, and five tribes were reported, including new national records such as *Tiniocellus modestus*, *Aphodius moestus*, *Aphodius granarius*, and *Onthophagus troglodyta*, collected from croplands and pastures (Nasir et al., 2016). Broader surveys across subtropical and temperate climatic zones in Punjab revealed distinct dung beetle assemblages, with higher diversity in pastures compared to croplands, influenced by factors such as tillage, soil texture, and the availability of mammalian dung (Hussain et al., 2022). Habitat modifications in Punjab, such as croplands (34.8%), cropland habitats (40.4%), and urban areas (25.7%), have shown varying impacts on dung beetle abundance, with natural habitats supporting higher species richness (e.g., 17 species from 540 specimens) compared to modified ones (Noureen et al., 2021). Limited data on Coleoptera from the Cholistan desert is available.

Cholistan Desert (locally known as Rohi) is located in South Punjab. It is classified as a hot desert and holds the status of driest desert in Pakistan (Malik et al., 2017). Despite comprising only 5% of the Earth's surface, desert dunes are home to many endemic plants and animals; notably, in these dry landscapes, beetles are the major insect group in these dry landscapes (Akbar et al., 1996). Despite these insights, a paucity of data remains on Coleoptera in the Cholistan desert. Given the ecological importance of the region and the scarcity of entomological data, this survey explores the Scarabaeinae fauna of the Cholistan Desert.

MATERIALS AND METHODS

Sampling Areas and Site Selection: The present study was conducted in the Cholistan Desert, which extends through the Bahawalpur Division of South Punjab, Pakistan, between 27°42' N and 29°45' N latitude and 69°52' E and 75°24' E longitude, at an altitude of approximately 112 meters above sea level (Khan, 2009). To ensure a comprehensive investigation, the study area was stratified based on habitat variations and ecological significance noted in previous entomological surveys (Waseem et al., 2023, 2025).

Four sampling sites were selected, representing key habitat gradients: agricultural areas, a riparian zone near a water channel, open dunes with sparse vegetation, and areas with high anthropogenic disturbance from pilgrimage and livestock movement. This design ensured a broad survey across different ecological conditions, ranging from the driest interiors to heavily anthropized habitats (Table 1, Figure 1).

Table 1. Co-ordinates of surveyed localities for Scarabaeinae in District Bahawalpur.

S. No	Name	Latitudes	Longitudes
1	Basti Yar Muhammad	29.2961	71.58492
2	Chak 12 Mor	29.33687	71.70336
3	Chak 44 DB	29.22932	71.78615
4	Channan Pir	28.97684	71.66521

Collection Methods: Sampling of beetles was conducted bimonthly from January 2022 to December 2023. Two primary methods were employed across all four sites: **Pitfall Trapping:** Traps consisted of 500 ml plastic containers buried flush with the ground surface, spaced approximately 50 meters apart. These were baited with fresh cattle dung to attract coprophagous species and partially filled with a solution of water and a few drops of detergent to break surface tension. Traps were active for a continuous 48-hour period during each sampling visit. **Active Hand Collecting with Nets:** In addition to trapping, active searching was conducted for 60 minutes per site per visit using hand nets during two time periods: morning before sunrise and evening after sunset**.** This method targeted beetles on dung pats, under decaying vegetation, and in the soil.

Specimen Processing, Killing, and Preservation: Collected specimens were transported to the Entomological Laboratory at Cholistan University of Veterinary and Animal Sciences (CUVAS), Bahawalpur. For killing, specimens were placed in a killing jar containing 70% Ethanol**.** Subsequently, specimens were carefully pinned using entomological pins of appropriate sizes. Each pinned specimen was labelled with detailed information, including site location, date of collection, collector's name, and collection method. Specimens were then dried and preserved in insect storage boxes alongside naphthalene balls to prevent pest damage.

Identification, Morphometry, and Depository: Taxonomic identification was conducted based on terminologies and keys from relevant taxonomic literature using an Olympus CX23 microscope (Abbas, 2015; Génier and Moretto, 2017; Abbas et al., 2023, 2024). Diagnostic characters were examined and documented. High-resolution images were captured using a Canon EOS 4000D camera for detailed morphological illustration.

Morphometric measurements of various body parts (e.g., total body length, pronotum width, elytral length) were recorded in millimeters (mm) using an ocular micrometer calibrated for the microscope.

Distribution maps were generated using the open-source QGIS software, version 3.28.

Following identification, all specimens were deposited in the Cholistan Entomological Museum, Department of Zoology, CUVAS Bahawalpur, Punjab, Pakistan, for permanent preservation and future scholarly reference.

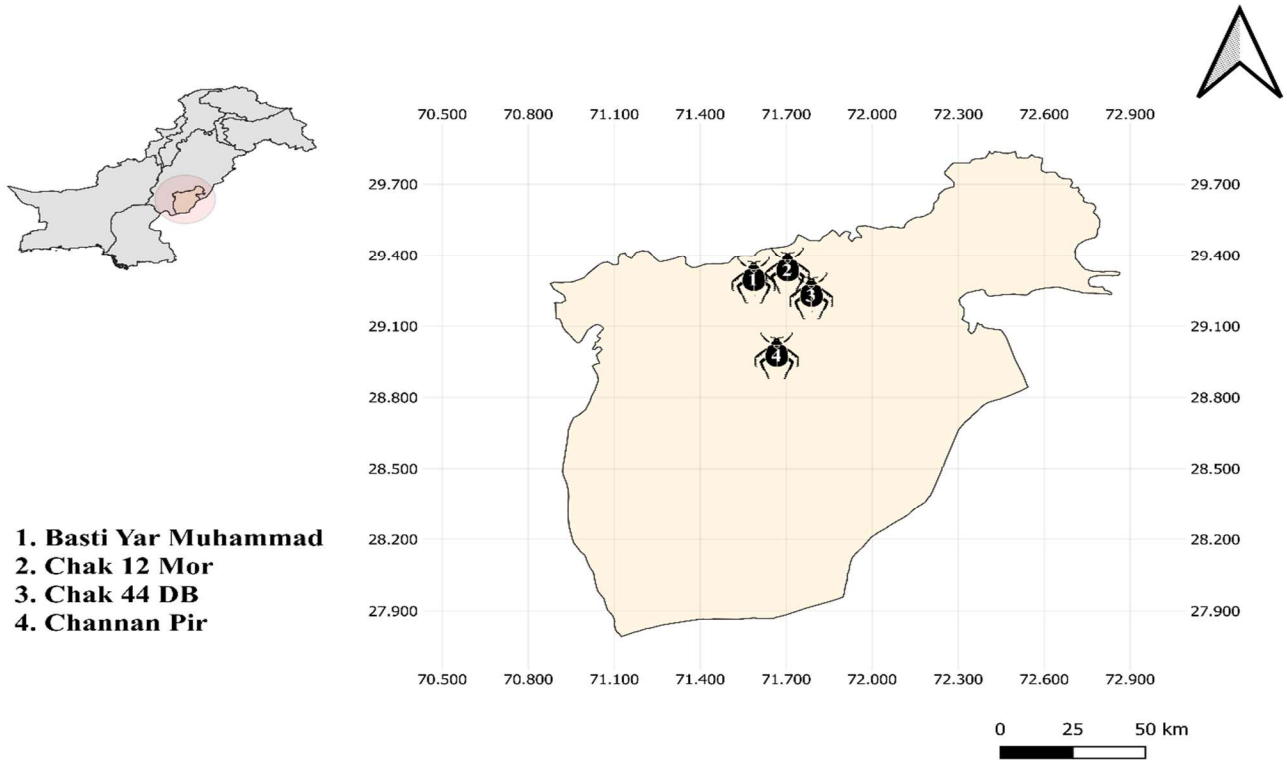

Figure 1 Localities for the sampling of Scarabaeinae in District Bahawalpur

RESULTS AND DISCUSSION

Locality-wise collection data for the three beetle species *Onitis philemon*, *Digitonthophagus uks*, and *Digitonthophagus catta* are organized across four sampling sites (Table 2). The counts from each site reveal variations in abundance, with a grand totaling 123 specimens collected across the study area. A satellite map spanning 71.460°–71.940° longitude and 28.920°–29.340° latitude represented by a pie chart at each locality, reflecting species proportions through color-coded segments (green: *D. catta*, blue: *O. philemon*, orange: *D. uks*) (Figure 2).

Table 2 Locality--wise collection of Scarabaeinae from the Cholistan desert.

S. No.	Name of Species	Basti Yar Muhammad	Chak 12 Mor	Chak 44 DB	Channan Pir	Total
1.	***Onitis philemon***	18	7	10	9	**44**
2.	***Digitonthophagus uks***	20	0	7	18	**45**
3.	***Digitonthophagus catta***	15	0	10	9	**34**
	Total	**53**	**7**	**27**	**36**	**123**

***Scarabaeinae* Latreille, 1802:** The body is elongated and slightly rounded at the abdomen, with coloration ranging from dark brown to black. The head has prominent, irregularly shaped teeth and a granulated or heavily punctured surface, with no extruded glands in the prothorax, metathorax, or abdomen. The antennae are lamellate type, consisting of 8 to 9 segments. The pronotum is convex, slightly triangular at the base, and varies in size, with smooth or small-pitted surfaces used for identification. Margins contain small teeth. The dorsal body surface is glabrous or sub-glabrous, sometimes covered with distinct setae or scales, and lacks small pits (fovea). The elytra are striated, with a shiny surface, slightly shorter than the abdomen, and less convex compared to other body parts. The scutellum is reduced or absent. The abdomen is pygidium type, with 5 to 7

visible sternites after the hind legs. Forelegs have prominent, visible teeth on the tibia, and all legs possess strong, hard, spiny tibial spurs covered with hairs or bristles.

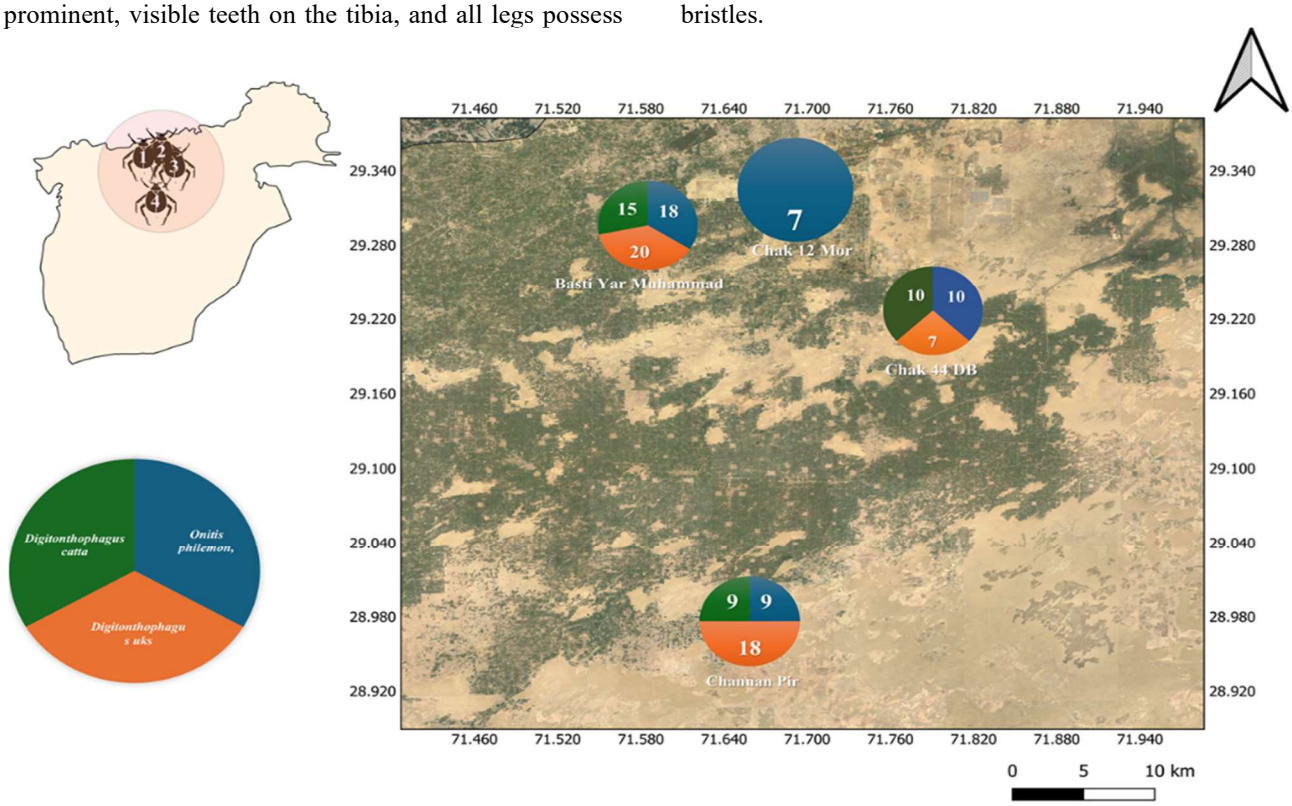

Figure 2 Abundance of *O. philemon*, *D. uks*, and *D. catta* collected from four sampling localities in the Cholistan desert.

Key for Beetle Genera *Onitis* and *Digitonthophagus*

1a. Ventral surface entirely metallic; pronotum with four distinct depressions or pits; middle femur with a sharp tooth near the end of the lower edge → ***Onitis philemon***

1b. Ventral surface not metallic; pronotum without four distinct depressions, often with a median longitudinal sulcus or tubercle; middle femur without a sharp tooth → 2

2a. Pronotal anteromedian tubercle well-developed and round in lateral view; elytra without fine granules on interval 2 → ***Digitonthophagus uks***

2b. Pronotal anteromedian tubercle atrophied and appears simply round in lateral view; elytra with fine granules on the apical declivity of interval 2 → ***Digitonthophagus catta***

***Onitis* Fabricius, 1798**

The body is oblong, with a narrow head that lacks teeth. The dorsal side is covered with hair, and the eyes are visible from both the dorsal and ventral sides of the head. Elongated ridges are present near the eyes. The body is not entirely dark in coloration. The pronotum is large and elliptical, featuring four depressions or pits—two located toward the head near the lateral margins and two positioned near the elytra at the middle of the pronotum. The elytra are not fully rounded and appear less shiny, with heavy striations. Lateral sides are less convex and form ridges on the latero-ventral side at the base of the elytra. Forelegs have four external teeth. The abdomen has elongated, oval-shaped ridges near the mid-leg. The last seven sternites are visible after the hind legs.

Onitis philemon Fabricius, 1801
Onitis distinctus Lansberge, 1875
Onitis distinctus sub sp. *minor* Lansberge, 1875

Identification: The body length varies from 21 to 23 mm, with a clearly and deeply punctured pronotum. The meta sternum is longitudinally grooved in the front, and the ventral surface is entirely metallic, while the upper side of the body appears shiny. The head, measuring 3.5 mm, has a wrinkled surface with ocular lobes present. The clypeus is granulated, and in females, it is closely transversely rugose. The pronotum, measuring 7.7 mm, is convex and features four depressions or pits—two near the lateral margins towards the head and two at the middle of the pronotum near the elytra. The pronotal margins are thick, and it is not perfectly convex from the lateral side. The elytra, approximately 9.1 mm in length, have two ridges, are moderately to highly punctured, and exhibit strong striations. The abdomen ranges from 10 to 12 mm in length. The middle femur has a sharp tooth

near the end of the lower edge, and the hind trochanter is slightly toothed and bent. The foreleg measures 11.2 mm, the mid-leg 9.1 mm, and the hind leg 10.5 mm in length (Figure 3 & 4).

Material examined: Pakistan, Punjab Province, Bahawalpur • Cholistan desert, Basti Yar Muhammad, 29.296, 71.58492, 3 (Males) ♂♂ 2 (Females) ♀♀ (Waseem, M & Kumar, S) 3, iii, 2022; 4 ♂♂ 2 ♀♀ (Waseem, M & Irfan, M) 12, vi, 2022; 4 ♂♂ 1♀ (Waseem, M & Abdullah, M) 16, iii, 2023; 1♀ (Waseem, M & Abdullah, M) 18, vi, 2023; 1 ♂ (Waseem, M & Kumar, S) 4, iii, 2022; Cholistan desert, Chak 12 Mor, 29.33687, 71.70336, 4 ♂♂ 1♀ (Waseem, M & Abdullah, M) 16, iii, 2023; 1♂ 1♀ (Waseem, M & Irfan, M) 12, vi, 2022; Cholistan desert, Chak 44 DB, 29.22932, 71.78615, 3 ♂♂ (Waseem, M & Abdullah, M) 19, iii, 2023; 3♂♂ 2♀♀ (Waseem, M & Abdullah, M) 16, v, 2023; 1♂ 1♀ (Waseem, M & Kumar, S) 3, iii, 2022; Cholistan desert, Channan Pir, 28.97684, 71.66521, 2 ♂♂ (Waseem, M & Irfan, M) 11, vi, 2022; 2 ♂♂ 2♀♀ (Waseem, M & Abdullah, M) 16, iii, 2023; 1♀ (Waseem, M & Abdullah, M) 18, vi, 2023.

Recorded distribution: China, Bengal, Pakistan, Azad Kashmir, and India (Abbas et al., 2023).

Comments: Specimens were collected primarily from cattle dung pats in areas with loamy soil. The morphological characters, including the slightly toothed and bent hind trochanter, conform to the description by Abbas et al. (2023).

Figure 3 *Onitis philemon* (a) Dorsal view, (b) Lateral view, and (c) Ventral view.

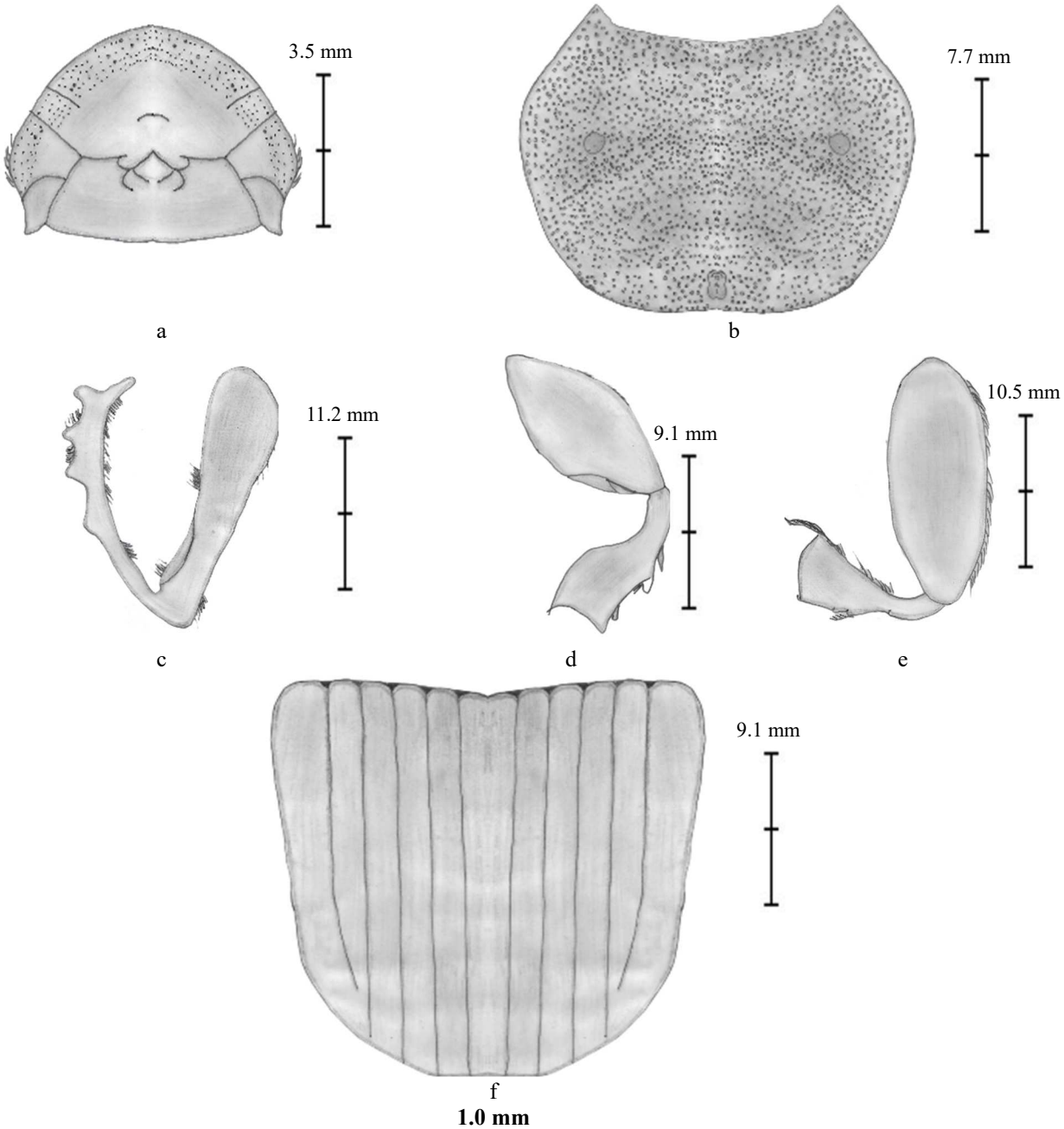

Figure 4 *Onitis Philemon* drawing line (a) Head (b) Pronotum (c) Fore leg (d) Mid leg (e) Hind leg, and (f) Elytra.

***Digitonthophagus* Balthasar, 1959:** Species of the genus *Digitonthophagus* can be distinguished by the following combination of characters: The cylindrical protibia of males is long or slightly curved, with four external teeth that are short in size and positioned at a right angle to the anterior edge. The clypeus is rounded, and the head bears two long horns. The pronotum has a sulcus, is convex, and appears granulated upon observation. The body is brownish in color, though with darker shades. The scutellum is absent, while the elytral sutures are prominent, and elytral striations are clearly visible. The hind femur is wide and flat, whereas the foreleg femur is non-glabrous.

Digitonthophagus uks Génier, 2017

Identification*:* The pronotal anteromedian tubercle is well-developed, round in lateral view, and has a wide and deep anterior median longitudinal sulcus. The body length ranges from 11 to 18 mm. The head, measuring 2.8 mm, has two horns that are 6 mm long. The antennae are 3.5 mm long with 10 segments, including a 3-segmented club. The head has a prominent median sulcus,

punctured, and blackish in color, while the clypeus and the boundary near the elytra appear brownish. The eyes are positioned beneath the clypeus. The pronotum, measuring 6.3 mm, is brown in color and has a well-developed, round anteromedian tubercle, along with a wide and deep anterior median longitudinal sulcus. The elytra, measuring 7 mm, have regular dotted striations, a prominent elytral suture, and are brown in color. The abdomen, measuring 10.1 mm, covered in hair. The legs are hairy with elongated, darker bands on the femur, while the tibial and tarsal margins are darker. The femur is wider at the midsection, and the fore tibia has four external teeth. The foreleg measures 10.5 mm, the midleg 10 mm, and the hind leg 11.2 mm (Figure 5 & 6).

Material examined: Pakistan, Punjab Province, Bahawalpur Cholistan desert, Basti Yar Muhammad, 29.296, 71.58492: 3 ♂♂ 2 ♀♀ (Waseem, M & Kumar, S) 5, iii, 2022; 4 ♂ 3 ♀ (Waseem, M & Zain, M) 18, iv, 2022; 3 ♂♂ 1 ♀ (Waseem, M & Abdullah, M) 12, vii, 2023; 2 ♂ 2 ♀ (Waseem, M & Kumar, S) 5, x, 2022. Chak 44 DB, 29.22932, 71.78615: 2 ♂ 1 ♀ (Waseem, M & Zain, M) 7, ii, 2022; 1 ♂ 1 ♀ (Waseem, M & Abdullah, M) 15, iv, 2022; 1 ♂ (Waseem, M & Kumar, S) 30, vii, 2022; 1 ♂ (Waseem, M & Zain, M) 8, xi, 2022. Channan Pir, 28.97684, 71.66521: 3 ♂♂ 4 ♀♀ (Waseem, M & Zain, M) 10, iii, 2022; 2 ♂♂ 4 ♀♀ (Waseem, M & Abdullah, M) 18, v, 2022; 1 ♂ 2 ♀ (Waseem, M & Kumar, S) 25, viii, 2022; 1 ♂ 1 ♀ (Waseem, M & Zain, M) 13, xi, 2023.

Recorded distribution: This beetle has already been recorded from Afghanistan, India, Iran, and Pakistan (specifically from the Awaran and Khuzdar districts) (Génier and Moretto, 2017).

Comments: During the field survey, the collected specimens were found in moist cattle dung. The morphology of the pronotal tubercle and sulcus matched the original description by Génier and Moretto (2017). Notably, the species name "*uks*" is a Sanskrit noun for "ox" used in apposition, pertaining to the aspect of its cephalic horns (Génier and Moretto, 2017).

Figure 5 *Digitonthophagus uks* (a) Dorsal view, (b) Latera view, and (c) Ventral view.

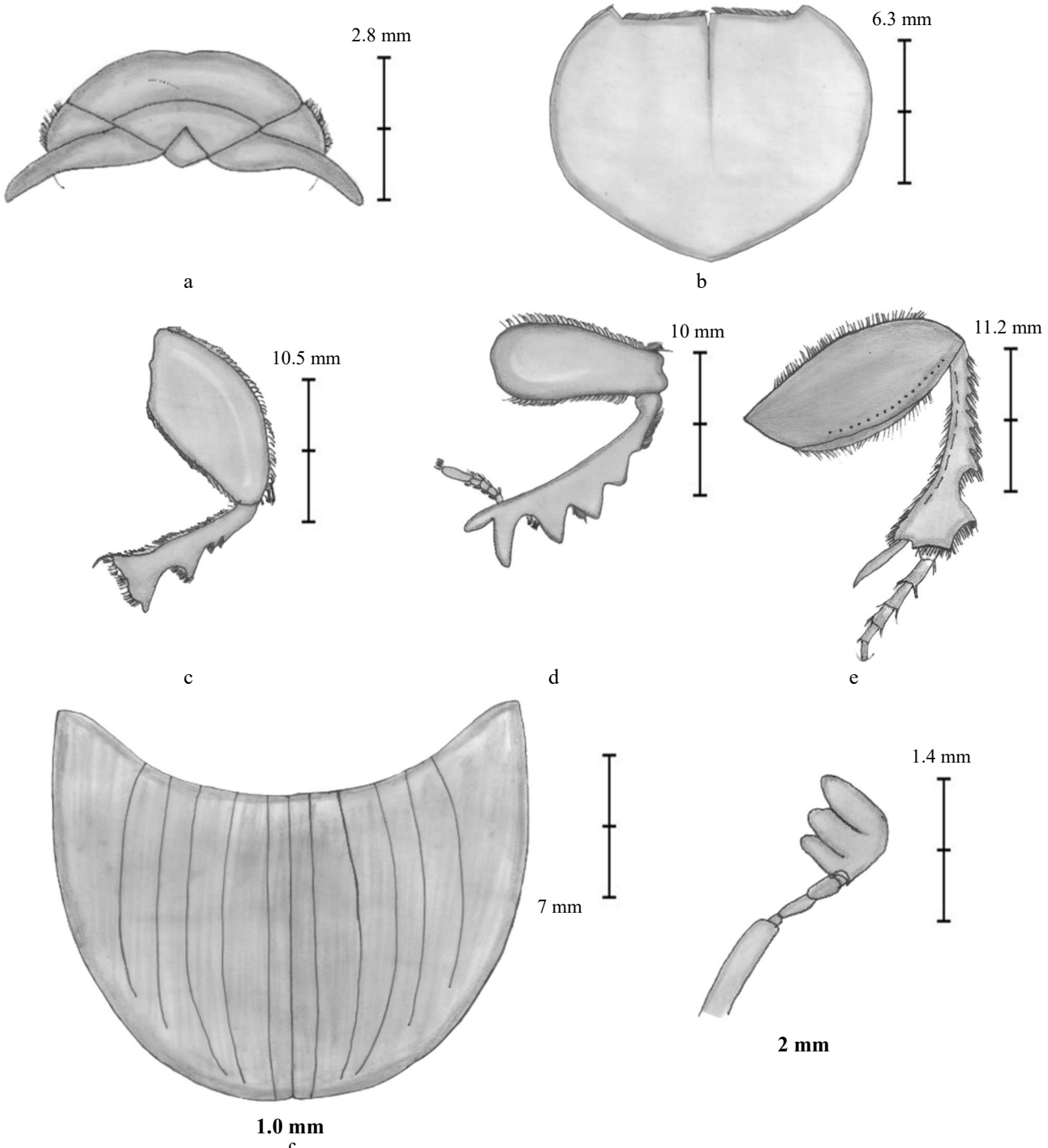

Figure 6 *Digitonthophagous uks* Drawing line (a) Head (b) Pronotum (c) Foreleg (d) Mid leg (e) Hind leg and (f) Elytra (g) Antennae.

Digitonthophagus catta (Fabricius, 1787)
Onthophagus catta (Fabricius, 1787)
Scarabaeus catta Fabricius, 1787

Identification: The pronotum has scattered punctures, which become smaller toward the posterior half. The anterior pronotal angles are concave, with well-developed and deeply concave anterior pronotal tubercles. The anteromedian tubercle is atrophied and appears simply round in lateral view, while the median longitudinal sulcus is well-defined. The surface behind the eyes is slightly concave, and the anterior angles are concave with unmodified anterior edges. The anterior half of the lateral

edge is arcuate in dorsal view and slightly sinuous anteriorly in lateral view, while the posterior angles are simply arcuate in dorsal view. The anterior hypomeral ridge is broadly arcuate, and the anterior hypomeral depression is slightly darker medially. The granulated punctures are restricted to the anterior half medially, with smaller, irregularly scattered, simple punctures on the posterior half of the disc. The posterolateral region lacks punctures, but minute punctures are present throughout the area. The head has a straight anterior clypeal edge at the median fifth when viewed dorsally. The clypeofrontal carina is broadly arcuate and interrupted at the gena. The vertex lacks a median tubercle, with fine to small punctures spaced one to four diameters apart. Horns are moderately long and arcuate in frontal view, parallel-sided on the basal four-fifths, distinctly tapering externally before the apex, and narrower on the apical sixth. The posterointernal edge is unmodified basally, and the apicointernal surface lacks granules. The genal edge is upturned and distinctly angulated on the anterior third, forming a broad angle with the clypeal edge. The elytra display fine granules on the apical declivity of interval 2, while interval 4 lacks granules from base to apex. The elytral sutures are prominent, with fine and regular striations. Legs have an enlarged protibial apicointernal tooth, with a dorsal ridge extending to the apex. The parameres of the aedeagus have dorsal and ventral edges that slightly diverge toward the apex in lateral view (Figure 7).

Material examined: Cholistan desert, Basti Yar Muhammad, 29.296, 71.58492: 2 ♂♂ 2 ♀♀ (Waseem, M & Kumar, S) 5, iii, 2022; 3 ♂♂ 2 ♀♀ (Waseem, M & Zain, M) 18, iv, 2022; 2 ♂♂ 2 ♀♀ (Waseem, M & Abdullah, M) 12, vii, 2022; 2 ♂♂ (Waseem, M & Kumar, S) 5, x, 2022. Chak 44 DB, 29.22932, 71.78615: 1 ♂ 1 ♀ (Waseem, M & Zain, M) 7, ii, 2022; 2 ♂♂ 1 ♀ (Waseem, M & Abdullah, M) 15, iv, 2022; 2 ♂♂ 2 ♀♀ (Waseem, M & Kumar, S) 30, vii, 2022; 1 ♂ (Waseem, M & Zain, M) 8, xi, 2022. Channan Pir, 28.97684, 71.66521: 2 ♂♂ 1 ♀ (Waseem, M & Zain, M) 10, iii, 2022; 1 ♂ 2 ♀♀ (Waseem, M & Abdullah, M) 18, v, 2022; 1 ♂ 1 ♀ (Waseem, M & Kumar, S) 25, viii, 2022; 1 ♂ 1 ♀ (Waseem, M & Zain, M) 13, xi, 2022.

Recorded distribution: Afghanistan, India, Bangladesh, Nepal, Pakistan and Sri Lanka (Génier and Moretto, 2017).

Comments: This species, often encountered in large numbers within dung, closely resembles *D. uks*, but can be distinguished by certain clypeal characteristics. Specimens were distinguished from *D. uks* by the atrophied pronotal tubercle and granulation on the elytral intervals, as per Génier and Moretto (2017).

a b

Figure 7 (a) Dorsal view, (b) Latera view, and (c) Ventral view of the *Digitonthophagous catta*.

O. philemon was discovered in the Cholistan desert, which is a significant expansion of its geographic distribution in Pakistan. Up to now, *O. philemon* had been reported in the north and central regions of the country

(Azad Kashmir and Khyber Pakhtunkhwa) and one locality in Punjab (Siddiqui et al., 2014). Conversely, this species is recorded in the arid zone of southern Punjab for the first time in our surveys. This indicates that *O. philemon* is ecologically flexible than it had been believed. Remarkably, other areas are dominated by related *Onitis* species; e.g. Hussain et al. (2020) discovered that *O. excavatus* (27.68%) and *O. crassus* (9.59%) were the most prevalent dung beetles in Sialkot, Punjab. Similarly, Ghazanfar et al. (2017) also reported that *O. excavatus* and *Onthophagus catta* (now known as *D. catta*) were very abundant in Jhelum, Punjab. In comparison, *O. philemon* was the only species of *Onitis* that was found in Cholistan, This suggests that it may be particularly adapted to the desert habitat. This contrasts with a geographic shift in species diversity: the humid and grassy areas of Punjab are conducive to other *Onitis* species, whereas the arid pastures of Cholistan are conducive to *O. philemon*.

D. uks was first described by Génier and Moretto (2017) from the dry plateaus of Balochistan (districts of Awaran and Khuzdar) and from Afghanistan, India (Rajasthan) and Iran. Our records from Cholistan significantly extend the species known range eastward, demonstrating a wide tolerance for arid climates. As part of its arid-adapted distribution, we found *D. uks* in damp cow dung traps, and this observation is consistent with the overall coprophagous nature observed in the genus. Its presence with other species of *Digitonthophagus* and *Onitis* species highlights the fact that cattle dung is likely to provide suitable habitat to a variety of scarabs in Cholistan. The combination of evidence indicates that *D. uks* can cross deserts and semi-deserts of South Asia, and its occurrence in Cholistan bridges a geographic gap between already known populations.

D. catta, a species commonly referred to as *Scarabaeus catta* in earlier literature, is also verified in Cholistan. It is widely found in South Asia and has been introduced to other areas, where it is used to control dung-breeding pests biologically (Abbas et al., 2024). It was recorded in north and central Punjab in Pakistan. Ali et al. (2015) indicated *O. catta* as a new record in the Pothohar Plateau, while Ghazanfar et al. (2017) found *O. gazella* in large numbers in Jhelum. Our observations in the southern desert confirm that the range of *D. catta* extends across the entire breadth of Punjab, encompassing both humid and arid plains. *D. catta* was also co-captured with *D. uks* and *O. philemon* in our collections, found in large dung resources. Similarity in the rate of trapping between *D. catta* and *D. uks* (34 vs. 45 specimens) in Cholistan reflects the same co-dominance observed in other surveys and underscores the fact that more than one *Digitonthophagus* species uses identical dung resources.

Conclusion: This study documents three species of Scarabaeinae, representing two genera, as new records for the Cholistan Desert, thereby enhancing the known biodiversity of the region. However, due to the vastness of the Cholistan desert, extensive surveys are required to compile a comprehensive checklist of beetle species. Future research should focus on behavioral ecology and physiological adaptations of beetles to extreme desert conditions. Since dung beetles play a crucial role in nutrient cycling within arid ecosystems like Cholistan, their conservation is essential for maintaining the ecological health and stability of such environments.

List of Abbreviations

CUVAS: Cholistan University of Veterinary and Animal Sciences

EBCRL: Entomology & Bio-Control Research Lab

CEM: Cholistan Entomological Museum

Declaration

Ethics Approval, and Consent to Participate
Not applicable

Consent for Publication
Not applicable

Data Availability: The morphological data and beetle samples used in this study have been deposited at the Cholistan Entomological Museum (CEM) at Cholistan University of Veterinary and Animal Sciences (CUVAS), Bahawalpur, Pakistan, and are available for research purposes upon request.

Competing Interests

None

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