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## New records, distributional notes and species diversity of dung beetles (Coleoptera: Scarabaeidae: Scarabaeinae) from Pothohar Plateau of Punjab, Pakistan

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**Abstract**

The fauna of Scarabaeinae in Pothohar plateau of Punjab, Pakistan, is very diverse and has not been studied thoroughly. In the following paper, this subfamily of dung beetles was studied, using specimens collected during 2010–2011 across Pothohar plateau. The study presented taxonomic account of 14 species of dung beetles belonging to 5 genera and 3 tribes collected from 13 different localities of four districts i.e. Rawalpindi, Jhelum, Chakwal and Attock. Among this diverse fauna, four species, *Oniticellus pallipes* (Fabricius, 1781), *Oniticellus spinipes* (Roth, 1851), *Oniticellus cinctus* (Fabricius, 1775) and *Drepanocerus setosus* (Wiedemann, 1823) represent new records for dung beetle fauna of Pakistan. While, seven species, *Onthophagus catta* (Fabricius, 1787), *Oniticellus pallens* (Oliver, 1789), *Onitis subopacus* (Arrow, 1931) [3], *Onitis virens* (Lansberge, 1875), *Onitis castaneus* (Redtenbacher, 1848), *Onitis Crassus* (Sharp, 1875) and *Chironitis indicus* (Lansberge, 1875) are recorded first time from Pothohar plateau. Among the 14 species collected, *Onitis Crassus* found to be the most abundant in the Pothohar plateau with highest percentage (15.26%), while *Oniticellus pallens* was the least abundant species with percentage (0.76%). The species diversity vary slightly in three districts except Attock which contained only one specie *Drepanocerus setosus*, and this species was confined to Attock district only.

**Keywords:** Dung Beetles, Scarabaeinae, Species diversity, Pothohar plateau, Punjab, Pakistan

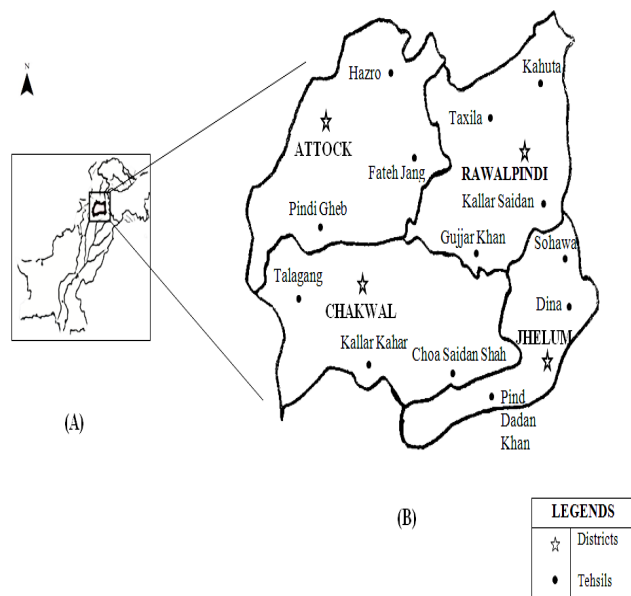
**1. Introduction**

Scarab beetles of family Scarabaeidae contain a speciose group and are a conspicuous component of the beetle fauna of the World. Adults of these beetles are noticeable due to their relatively large size, bright colors, often sumptuous ornamentation and interesting life histories. In Coleoptera, the Scarabaeoidea is one of the largest superfamilies and comprises of approximately 31,000 species worldwide of which the family Scarabaeidae is composed of about 91% of all the scarabaeoids and includes about 27,800 species worldwide [9, 15]. Chronologically, the studies on dung beetles diversity in Pakistan had been carried out by several researchers namely, Arrow (1931) [3]; Balthasar (1963) [5]; Abdullah and Roohi (1968) [1]; Abdullah and Roohi (1969) [2]; Hashmi and Tashfeen, (1992) [13]; Ratcliff and Ahmad, (2010) [19]. But none of them studied the dung beetle fauna of Pothohar region in detail except few studies conducted by Siddiqui and Kamaluddin, (2011) [22] and Siddiqui *et al.*, (2014) [21] who reported only three species *Onthophagus bonasus*, *O. gazella* and *O. variegates* from Pothohar plateau. To fill the gap of dung beetles diversity in Pakistan, this study was carried out. Here, we provide an annotated list of scarabs collected from all possible localities of Pothohar region with the aim of adding to the faunal composition of scarabs occurring in Pakistan. These species are recorded from the Pothohar region for the first time except *O. bonasus*, *O. gazella* and *O. variegates*.

**2. Materials and Methods****2.1. Study Area**

The Pothohar region is a plateau in north-eastern Pakistan, forming the northern part of Punjab. It has the elevation of about 350 to 575 m (1150 to 1900 ft.). Pothohar plateau is bounded on the East by the Jhelum River, on the West by the Indus River, on the North by the Kala Chitta Range and the Margalla Hills and on the South by the Salt Range.

The present study was based on collection of dung beetles from four districts of Pothohar plateau viz; Rawalpindi, Attock, Jhelum Chakwal of Punjab province, Pakistan during year 2010-2011 as shown in Figure 1.



A total of 240 specimens were collected by hand picking and spade was used to excavate beetles from dung burrows. All the specimens were collected from dung pad, dung heap and dung burrows in rural areas (especially animal sheds) and pastures. Voucher specimens were deposited in the Insect Museum of Entomology department, PMAS-Arid Agriculture University and National Insect Museum, National Agricultural Research Centre (NARC), Islamabad, Pakistan.

Specimens were identified up to lowest possible taxa by studying characters under stereoscope Labomed (CZ6, 4X). A digital camera attached with the binoculars with 12X zoom, 30X eyepiece lens, 2X objective lens and 720X magnifications was used to capture magnified images of specimens in laboratory. Dung beetles were identified with the help of available literature by Arrow (1931) [3].

Adult dung beetles collected from Pothohar region of Pakistan during the year 2010-11 that revealed a total of three tribes, five genera and 14 species with the following details.

**Sub genus *Digitonthophagus* Fabricius, 1775**

**Material examined:** Jhelum 4♂♂ 2♀♀ (27-III-10), Pind Dadan Khan 1♂ (28-III-10)

**Habitat:** Specimens were collected from dung of cows and buffalos.

**Comments:** Before, it was recorded in Chichawatni, Lyallpur (Faisalabad), Bannu and Karachi [3]. It was judged from the published description of *O. catta* given by Arrow (1931) [3]. This species was distinct on the basis of horn present on clypeus and having tubercle placed in middle. The species had similarity with *O. bonasus*.

**Geographical distribution:** India, East Africa, West Africa and Madagascar [3].

**Tribe Oniticellini Kolbe, 1905**  
**Genus Oniticellus Serville, 1825**

**3.5. Oniticellus pallipes Fabricius, 1781** (Fig. 2E) New Record

**Material examined:** Kallar Kahar 2♂♂ (15-IV-11), Talagang 4♂♂ (8-IV-11), Taxila 2♂♂ (17-IV-10)

**Habitat:** Specimens were collected from dung of cows and buffalos.

**Comments:** It was new record to Pakistan. The specimens compared with published description of *O. pallipes* given by Arrow (1931) [3]. This species was distinct on the basis of clypeus which was thickened and excised in middle with strong curved carina between clypeus and forehead. It was similar to *O. pallens* with exposed sides of abdomen and pygidium.

**Geographical distribution:** India [3].

**3.6. Oniticellus pallens Oliver, 1789** (Fig. 2F)

**Material examined:** Kallar Kahar 1♀ (17-IV-10)

**Habitat:** Specimens were collected from dung of cows.

**Comments:** This species was formerly collected from diverse areas of Pakistan [3]. It showed similarity with the published description of *O. pallens* given by Arrow (1931) [3]. These species were distinct on the basis of clypeus little excised in middle with strong curved carina between clypeus and forehead.

**Geographical distribution:** Egypt, Somalia and Algeria [3].

**3.7. Oniticellus spinipes Roth, 1851** (Fig. 2G) New Record

**Material examined:** Kallar Kahar 5♂♂ (17-IV-10), Taxila 3♂♂ (17-IV-10)

**Habitat:** Specimens were collected from dung of cows and horse.

**Comments:** It was new record to Pakistan. *O. spinipes* collected specimens were similar to the published description given by Arrow (1931) [3] distinct on the basis of dark brown color and plain clypeus.

**Geographical distribution:** India, Ethiopia, Zimbabwe, Uganda and South Africa [3].

**3.8. Oniticellus cinctus Fabricius, 1775** (Fig. 2H) New Record

**Material examined:** Taxila 5♂♂ (17-IV-10)

**Habitat:** Specimens were collected from dung of cows and buffalos.

**Comments:** It was new record to Pakistan. Specimens were identified from published description of *O. cinctus* given by Arrow (1931) [3]. This species distinct on the basis of dark black color and pygidium generally yellowish at the base and apex that was similar to *O. spinipes* on the basis of plain clypeus.

**Geographical distribution:** India, Burma and South China [3].

**Genus: Drepanocerus Kirby, 1828**

**3.9. Drepanocerus setosus Wiedemann, 1823** (Fig. 2I) New Record

**Material examined:** Fateh Jhang 2♂♂ (27-IV-11), Pindi Ghaib 5♂♂ (28-V-11)

**Habitat:** Specimens were collected from dung of cows and buffalos.

**Comments:** It was a new record to Pakistan. The collected specimens were similar with the published description of *D. setosus* given by Arrow (1931) [3]. This species was distinct on the basis of dark brown color and pronotum covered with shallow pits but in male slender dorsal horn present at the middle.

**Geographical distribution:** India and Sri Lanka [3].

**Tribe Onitini Laporte, 1840**  
**Genus: Onitis Fabricius, 1798**

**3.10. Onitis subopacus Arrow, 1931** (Fig. 2J)

**Material examined:** Jhelum 1♀ (27-III-10), Kallar Kahar 2♂♂ (17-IV-10), Pind Dadan Khan 1♂ and 1♀ (27-III-10), Dina 1♂ and 2♀♀ 19-III-10, Taxila 1♂ (17-IV-10)

**Habitat:** Specimens were collected from dung of cows and buffalos.

**Comments:** Before, it was recorded from few areas of Pakistan [3, 5, 21]. *O. subopacus* species were distinct on the basis of middle tibia elongate and curved with single or double tooth near base.

**Geographical distribution:** Austro-Oriental, Oriental, South and West Palearctic [5, 16].

**3.11. Onitis virens Lansberge, 1875** (Fig. 2K)

**Material examined:** Gujjar Khan 1♂ (10-IV-10), Pind Dadan Khan 3♂♂ 1♂ (28-III-10), Sohawa 2♀♀ (20-III-10), Jhelum 4♂ 1♀ (27-III-10), Taxila 2♂ 1♀ (17-IV-10)

**Habitat:** Specimens were collected from dung of cows and buffalos.

**Comments:** This species already has been found in few areas

of Pakistan [21]. Identified specimens of *O. virens* were distinct on the basis of front tibia elongate having blunt spine and middle femur bears strong rounded lobe at middle. Trochanter of hind leg sharply toothed.

**Geographical distribution:** India, Myanmar, Vietnam, Laos, S. China, Bangladesh [5, 16].

### 3.12. *Onitis castaneus* Redtenbacher, 1848 (Fig. 2L)

**Material examined:** Gujjar Khan 2♂♂ (10-IV-10), Pind Dadan Khan 5♂♂ 2♀♀ (28-III-10), Sohawa 2♂♂ 20-III-10, Jhelum 2♂♂ (27-III-10), Taxila 3♂♂ (17-IV-10)

**Habitat:** Specimens were collected from dung of cows and buffalos.

**Comments:** This species was previously reported from different areas of Pakistan [3]. *O. castaneus* was distinct on the basis of red color pygidium and legs clothed with erect yellow hair.

**Geographical distribution:** India [3].

### 3.13. *Onitis crassus* Sharp, 1875 (Fig. 2M)

**Material examined:** Gujjar Khan 3♂♂ 1♀ (10-IV-10), Pind Dadan Khan 3♂♂ 2♀♀ (28-III-10), Sohawa 2♂♂ (20-III-10), Jhelum 2♂♂ 1♀ (27-III-10), Taxila 2♂♂ 1(7-IV-10), Kallar Kahar 2♂♂ 2♀♀ (12-VI-10)

**Habitat:** Specimens were collected from dung of cows and buffalos.

**Comments:** This species from various areas of Pakistan has been reported before [3, 21]. Specimens were identified with the help of published description given by Arrow (1931) [3]. *O. crassus* species were distinct on the basis of black not shining color and clypeus excised in the middle. Hind femur has hooked process at the middle.

**Geographical distribution:** Oriental [3, 5].

**Genus: *Chironitis* Lansberge, 1875**

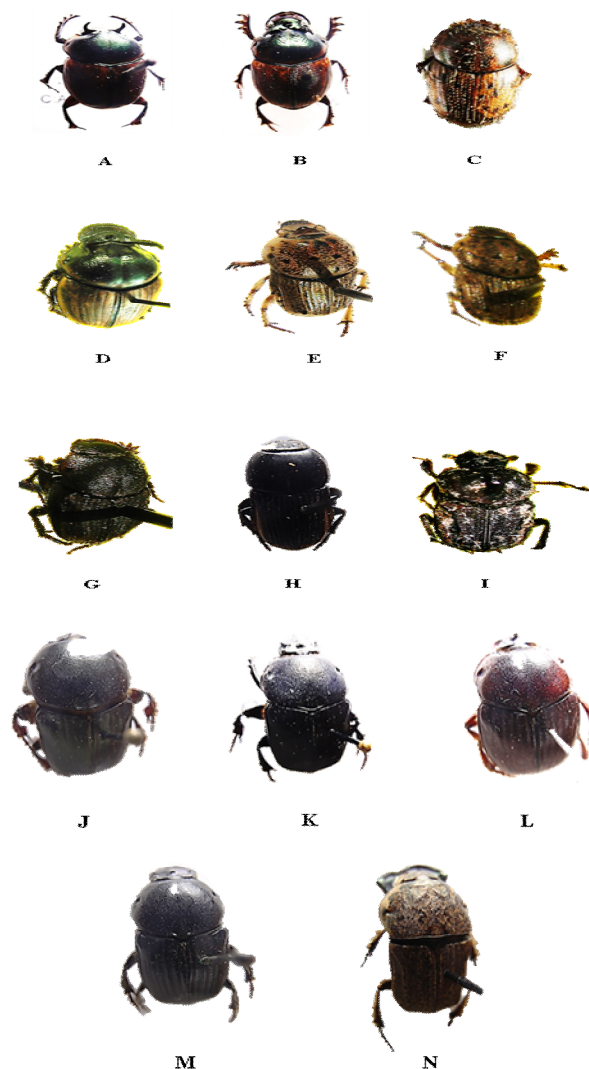
### 3.14. *Chironitis indicus* Lansberge, 1875 (Fig. 2N)

**Material examined:** Dina 1♂ 1♀ (19-III-10), Gujjar Khan 1♂ 1♀ (10-IV-10), Taxila 1♂ (17-IV-10)

**Habitat:** Specimens were collected from dung of cows and buffalos.

**Comments:** This species was reported by Arrow (1931) [3] in different areas of Pakistan. The collected specimens were similar to the published description given by Arrow (1931) [3]. This species was distinct on the basis of brown and yellow speckled on the body and long knob like spine present on front femur.

**Geographical distribution:** India [3].



**Fig 2:** Dung beetles; A, *Onthophagus gazella*; B, *Onthophagus bonasus*; C, *Onthophagus variegates*; D, *Onthophagus catta*; E, *Oniticellus pallipes*; F, *Oniticellus pallens*; G, *Oniticellus spinipes*; H, *Oniticellus cinctus*; I, *Drepanocerus setosus*; J, *Onitis subopacus*; K, *Onitis virens*; L, *Onitis castaneus*; M, *Onitis crassus*; N, *Chironitis indicus*.

### 3.15. Species Diversity

There is a need of information about the species diversity of scarab beetle, including, specifically, the number of species present because of their valuable ecological services. Present study has been carried out for the first time in the Pothohar plateau Punjab, Pakistan that has accounted for the richness of dung beetles. In spite of the fact that extensive survey and field collections were carried out, it is evident that we have sampled only a portion of the full scarabaeinae diversity in Pothohar plateau. The secondary objective of this study was to estimate the scarabaeinae diversity found in Pothohar plateau. The table 1 provides a quick glimpse of the scarab beetles biodiversity in Pothohar plateau. This table illustrates that a total of 240 specimens collected from different areas in Pothohar region comprised of 14 species. Out of these 14 species, *O. crassus* and *O. castaneus* were more abundant, while *O. pallens* with lowest percentage found to be the least abundant species in the Pothohar plateau. Whereas others species richness found to be in between these species as shown in Table 1. In this study, *Onitis* found to be the dominating genera, while in Chhattisgarh and Madhya Pradesh, India, *Onthophagus* genera



found to be the leading genera [6, 7, 8].

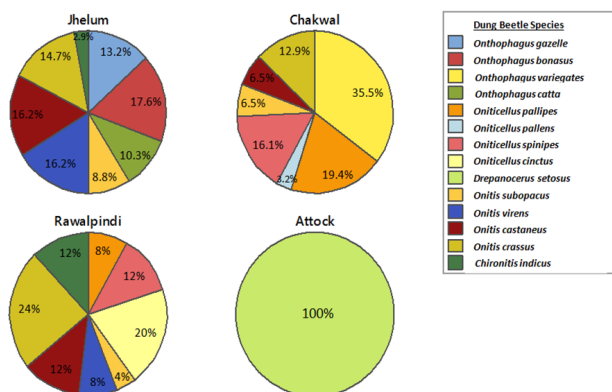
Among the four studied districts of Pothohar plateau, Rawalpindi and Jhelum contained the most diverse number of species (8 species in both) followed by Chakwal (7 species) and Attock (only 1 specie) as shown in Figure 3. In Jhelum, *O. bonasus*, *O. virens* and *O. castaneus* were more abundant species and *C. indicus* was the least abundant. While percentage of others species were in between these species. The abundance of species, in Rawalpindi, found in following order; *O. crassus* > *O. cinctus* > *O. spinipes* > *O. castaneus* > *C. indicus* > *O. pallipes* > *O. virens* > *O. subopacus*. The scarab species more abundant in Chakwal district were; *O. variegates*, *O. pallipes* and *O. spinipes*, whereas *O. pallens* was the least abundant species. Only one species *D. setosus* was collected from Attock district and this species was restricted to this district only. This species diversity could be the result of climatic conditions that favor the development of these insects [10, 11, 12].

#### 4. Conclusion

**Table 1:** List of species in percentage (%) of Scarab beetles collected from Pothohar plateau, Pakistan

Species	%age
<i>Onthophagus gazella</i>	6.87
<i>Onthophagus bonasus</i>	9.16
<i>Onthophagus variegates</i>	8.39
<i>Onthophagus catta</i>	5.34
<i>Oniticellus pallipes</i>	6.10
<i>Oniticellus pallens</i>	0.76
<i>Oniticellus spinipes</i>	6.10
<i>Oniticellus cinctus</i>	3.81
<i>Drepanocerus setosus</i>	5.34
<i>Onitis subopacus</i>	6.87
<i>Onitis virens</i>	9.92
<i>Onitis castaneus</i>	12.21
<i>Onitis crassus</i>	15.26
<i>Chironitis indicus</i>	3.81

The results of this research indicate that there is a diverse fauna of Scarabaeidae in Pothohar region, Pakistan. The collection of 240 specimen comprised of 3 tribes, 5 genera and 14 species resulted in four new records to Pakistan and seven new distributional records to Pothohar plateau. *Onitis crassus* found to be the most abundant and dominating species in Pothohar plateau. While *Oniticellus pallens* was the least abundant species. *Drepanocerus setosus* was confined to district Attock only, whereas no any other specie was found in this district.



**Fig 3:** Species diversity of Scarab beetles in different districts of Pothohar plateau, Pakistan

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#### 6. References

1. Abdullah M, Roohi RA. The cockchafer and dung-rollers of Pakistan of the Desmoryninae, Euchirinae and Rutelinae (Peltonotini, Parastasiini and Adorrhynptini) along with the description of five new species of *Anomala* (Coleoptera: Scarabaeidae). Pakistan Journal of Scientific & Industrial Research 1969; 12:121-126
2. Abdullah M, Roohi RA. The dung-rollers of Pakistan with observations on the genus *Anomala* Hope including the economic importance and descriptions of new species from Karachi (Coleoptera: Scarabaeidae). Pakistan Journal of Scientific & Industrial Research 1968; 11:427-440.
3. Arrow GJ. The fauna of British India including Ceylon and Burma (Coleoptera: Lamellicorina: Coprinae). Taylor and Francis, London 1931; 3:428.
4. Ashraf M, Kahlown MA, Ashfaq A. Impact of small dams on agriculture and groundwater development: a case study from Pakistan. Agricultural Water Management 2007; 92(1-2):90-98.
5. Balthasar V. 1963. Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region. Tschechoslowakische Akademie der Wissenschaften, Prague 1967; 2:627.
6. Chandra K, Gupta D. Scarab beetles (Coleoptera: Scarabaeoidea) of Barnawapara Wildlife Sanctuary, Chhattisgarh, India. Journal of Threatened Taxa 2013; 5(12):4660-4671
7. Chandra K, Gupta D. Taxonomic Studies on Dung Beetles (Coleoptera: Scarabaeidae, Geotrupidae, Hybosoridae) Of Chhattisgarh, India. 2013; Mun. Ent. Zool, 8(1), 331-360
8. Chandra K, Khan S, Gupta D. New Records to the Species Diversity of Family Scarabaeidae and Hybosoridae (Coleoptera: Scarabaeoidea) of Jabalpur, Madhya Pradesh (India). Academic Journal of Entomology 2012; 5(1):28-36.
9. Fincher GT. The potential value of dung beetles in pasture ecosystem. Journal of the Georgia Entomological Society 1989; 16:316-333.
10. Gill BD. Dung Beetles in Tropical American Forests. In: Dung Beetle Ecology (eds. I. Hanski & Y. Cambeftor). Princeton University Press, Princeton, 1991, 211-229, 481.
11. Halfiter G, Edmonds WD. The Nesting Behavior of Dung Beetles (Scarabaeinae): An Ecological and Evolutive Approach. Instituto de Ecología, México, D. F., 1982, 176.
12. Halfiter G, Matthews EG. The natural history of dung beetles of the subfamily Scarabaeinae (Coleoptera, Scarabaeidae). Folia Entomológica Mexicana 1966; 12(14):1-312.
13. Hashmi A, Tashfeen A. Coleoptera of Pakistan. Proceedings of Pakistan Congress of Zoology 1992; 12:133-170.
14. [http://en.wikipedia.org/wiki/Pothohar\\_Plateau](http://en.wikipedia.org/wiki/Pothohar_Plateau) 14 March, 2013.
15. Jameson ML, Ratcliffe BC. Scarabaeoidea: Scarabaeoid beetles (=Lamellicornia). In, Ratcliffe BC and ML Jameson (eds.), Generic guide to new world Scarab

- beetles 2001; (URL: <http://www-museum.unl.edu/research/entomology/Guide/index4.htm>).
16. Kabakov ON, Napolov A. Fauna and ecology of Lamellicornia of subfamily Scarabaeinae (Scarabaeidae, Coleoptera) of Vietnam and some parts of adjacent countries: South China, Laos and Thailand 1999; Lat. Ent, 37, 58-96.
17. Löbl I, Smetana A. Catalogue of Palearctic Coleoptera. Scarabaeoidea- Scirtoidea-Dascilloidea-Buprestoidea-Byrrhoidea. Apollo Books, Stenstrup, Denmark 2006; 3:690.
18. Noriega JA, Finbarr GH, Trond HL, Valencia G. Records of an invasive dung beetle species, *Digitonthophagus gazella* (Fabricius, 1787) (Coleoptera: Scarabaeidae), in Peru Acta Zoologica Mexican 2010; 26:2.
19. Ratcliff BC, Ahmad Z. Additions to the Distribution of Scarabaeidae (Insecta: Coleoptera) in Northern Pakistan. Pakistan Journal of Zoology 2010; 42(6):827-830.
20. Sewak R. Dung beetles (Coleoptera: Scarabaeidae: Coprinae) of Rajasthan. Records of Zoological Survey of India Occasional paper Published by Director of Zoological Survey India Kolkatta 2009; 296:1-106.
21. Siddiqui H, Ahmed Z, Khatri I. Distributional notes and new records for the Dung Beetles (Coleoptera: Scarabaeidae: Scarabaeinae) of Pakistan. Pakistan Journal of Zoology 2014; 46(2):295-307.
22. Siddiqui H, Kamaluddin S. The genus *Onthophagus* Latreille, 1802 (Sensu Lato) (Coleoptera: Scarabaeidae) in Pakistan. International Journal of Biology & Biotechnology 2011; 8(3):347-352.