



Studies on Scarabaeid Beetles (Coleoptera) of Govind Wildlife Sanctuary, Garhwal, Uttarakhand, India

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ABSTRACT : The paper presents faunal account of a small collection of scarab beetles from Govind Wildlife Sanctuary, Uttarakhand, comprising 11 species belonging to 11 genera, 5 subfamilies and 2 families of superfamily Scarabaeoidea. All the species are recorded for the first time from the sanctuary while three species viz. *Anomala cantori* (Hope), *Mimela passerinii* Hope, and *Oryctes nasicornis* (Linnaeus) are new records to the fauna of Uttarakhand. An updated checklist of the scarab beetles under superfamily Scarabaeoidea of Uttarakhand comprising about 167 species belonging to 52 genera, 21 tribes, 9 subfamilies and 3 families is also provided.

Keywords : Scarabaeid beetles, Govind Wildlife Sanctuary, Uttarakhand, Updated checklist.

INTRODUCTION

Lamellicorn scarab beetles are the most diverse and widely distributed insects which belong to the largest order Coleoptera under superfamily Scarabaeoidea which includes approximately 31,000 species worldwide of which the family Scarabaeidae is composed of about 91% of all scarabaeoids and represented by 27,800 species worldwide (Jameson and Ratcliffe 2001). Unlike the other groups of insects, the members of the family Scarabaeidae contains both beneficial (coprophagous) and harmful (phytophagous) beetles. Among which coprophagous beetles, through their habitat of burrowing and burying of dung, perform a series of ecological functions such as nutrient cycling, soil aeration (Mittal, 1993), secondary seed dispersal (Estrada and Coates-Estrada, 1991 & Larsen, 2004) and regulation of enteric parasites and dung breeding dipterans pests (Borenmissza, 1970 & Fincher, 1981). On the other hand phytophagous ones or leaf-chafers are agricultural pests of various commercial crops, feeding mostly on leaves, flowers, fruits, roots and other parts of the plants.

The first comprehensive account on the scarabaeid beetles of the Indian region was published by Arrow (1910, 1917, and 1931) in three volumes of Fauna of British India where in 72 species were reported from Uttarakhand. Later Mittal (1998) published an annotated list of the scarab fauna of Western Uttar Pradesh and recorded 151 species of these beetles belonging to 41 genera and 12 subfamilies. Recently Mittal (2005) also gave the diversity and conservation status of 136 species of Laparostict Scarabaeidae belonging to 26 genera and 8 subfamilies from North India. Subsequently Chatterjee (2010) while studying the scarab beetle fauna of Uttarakhand reported 44 species belonging to 16 genera and 3 subfamilies.

The present study includes faunal account of a small collection of the scarab beetles of Govind Wildlife Sanctuary, Uttarakhand comprising 11 species belonging to 11 genera, 5 subfamilies and 2 families of superfamily Scarabaeoidea (Plate 1). These species are recorded for the first time from the sanctuary while three species viz. *Anomala cantori* (Hope), *Mimela passerinii* Hope, and *Oryctes nasicornis* (Linnaeus) are new record to the fauna of Uttarakhand. The paper also includes an updated checklist of the scarab beetles of Uttarakhand comprising 167 species belonging to 52 genera, 21 tribes, 9 subfamilies and 3 families of superfamily Scarabaeoidea.

MATERIAL AND METHODS

Study area. Govind Wildlife Sanctuary is located in Uttarakashi district of Garhwal in the state of Uttarakhand and lies in between 35°55 and 31°17.30 latitudes and 77°47.30 and 78°37.30 longitudes at Purola tehsil. The sanctuary was established on 1st of March 1955 and spreads over an area of 957.969 sq km.

The beetle specimens for the present study were collected using light trap and preserved dry pinned. The beetles were then identified with help of available literature (Arrow, 1910; 1917; 1931 and Kuijten, 1983) and matched with the reference collections present in Zoological Survey of India, Jabalpur. The details of material examined and distribution of the newly recorded scarab beetles from the sanctuary is provided along with the species photographs (Plate 1). The classification adopted in the article is after Smith (2006) Voucher specimens are deposited in Zoological Survey of India, Jabalpur, Madhya Pradesh.

OBSERVATIONS**Systematic account**

Order: Coleoptera Linnaeus, 1758

Suborder: Polyphaga Emery, 1886

Super family: Scarabaeoidea Latreille, 1802

Family: Hybosoridae Erichson, 1847

I. Subfamily: Hybosorinae Erichson, 1847

1. *Hybosorus orientalis* Westwood, 1845

1845. *Hybosorus orientalis* Westwood, *Trans. Ent. Soc. Lond.*, 6 : 159.

Material examined: Uttarakhand, Garhwal, (GWLS), 10.xii.2009 (1ex.), Coll. Manish Bharadwaj.

Distribution: India: Bihar, Haryana, Himachal Pradesh, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, Uttarakhand, and West Bengal. *Elsewhere:* England, Pakistan, Nepal, and U.S.A.

Family: Scarabaeidae Latreille, 1802

I. Subfamily: Scarabaeinae Latreille, 1802

2. Oniticellus (Oniticellus) cinctus (Fabricius, 1775)

1775. *Scarabaeus cinctus* Fabricius, *Syst. Ent.* : 30.

1931. *Oniticellus cinctus*, Arrow, *Faun. Brit. India*, (Lamellicornia : Coprinae) 3 : 379-380.

1963. *Oniticellus (Oniticellus) cinctus*, Balthasar, *Mon. der Scarabaeidae und Aphodiidae der Palaeark. und Orientalis. Region* (Coleoptera : Lamellicornia), Coprinae, II: 77.

Material examined: Uttarakhand, Garhwal, (GWLS), 10.xii.2009 (1ex.), Coll. Manish Bharadwaj.

Distribution: India: Haryana, Himachal Pradesh, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttarakhand, Uttar Pradesh, and West Bengal.

3. Liatongus gagatinus Hope, 1831

1831. *Liatongus gagatinus* Hope, *Gray's Zool. Misc.* : 22.

1931. *Liatongus gagatinus*, Arrow, *Faun. Brit. India*, (Lamellicornia : Coprinae) 3 : 365-366.

1963. *Liatongus gagatinus*, Balthasar, *Mon. der Scarabaeidae und Aphodiidae der Palaeark. und Orientalis. Region* (Coleoptera : Lamellicornia), Coprinae, II: 104.

Material examined: Uttarakhand, Garhwal, (GWLS), 08.vii.2009 (1ex.), Coll. A. K. Sanyal.

Distribution: India: Arunachal Pradesh, Assam, Meghalaya, Nagaland, Sikkim, Uttarakhand and West Bengal.

Elsewhere: Myanmar and Nepal.

II. Subfamily: Rutelinae MacLeay, 1819

4. Anomala cantori (Hope, 1840)

1840. *Euchlora cantori* Hope, *Mag. Nat. Hist.* iv : 284.

1917. *Anomala cantori*: Arrow, *Faun. Brit. India* (Lamellicornia: Rutelinae), 2 : 220.

Material examined: Uttarakhand, Garhwal, (GWLS), 10.xii.2009 (1ex.), Coll. Manish Bharadwaj.

Distribution: India: Assam, Himachal Pradesh, Haryana, Madhya Pradesh, Uttarakhand and West Bengal. *Elsewhere:* Myanmar.

5. Popillia cyanea Hope, 1831

1831. *Popillia cyanea* Hope,* *Gray's Zool. Miscell.* : 23.

1917. *Popillia cyanea*: Arrow, *Faun. Brit. India* (Lamellicornia: Rutelinae), 2 : 62.

Material examined: Uttarakhand, Garhwal, (GWLS), 10.xii.2009 (1ex.), Coll. Manish Bharadwaj.

Distribution: India: Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Punjab, Sikkim, Uttarakhand and West Bengal. *Elsewhere:* Nepal.

6. Mimela passerinii Hope, 1842

1842. *Mimela passerinii* Hope,* *Proc. Linn. Soc.* I : 128.

1917. *Mimela passerinii*, Arrow, *Faun. Brit. India* (Lamellicornia: Rutelinae), 2 : 105.

Material examined: Uttarakhand, Garhwal, (GWLS), 10.xii.2009 (1ex.), Coll. Abesh K. Sanyal.

Distribution: India: Himachal Pradesh, Kashmir, Meghalaya, Sikkim and Uttarakhand. *Elsewhere:* China and Tibet.

III. Subfamily: Melolonthinae MacLeay, 1819

7. Hilyotrogus holosericeus Redtenbacher, 1844

1844. *Hilyotrogus holosericeus* Redtenbacher, in *Hugel Reise Kaschmir* IV, 2 : 524.

Material examined: Uttarakhand, Garhwal, (GWLS), 07.xii.2009 (1ex. ♂), Coll. Manish Bhardwaj.

Distribution: India: Himachal Pradesh, Kashmir and Uttarakhand.

8. Holotrichia longipennis Blanchard, 1850

1850. *Holotrichia longipennis* Blanchard, *Cat. Coll. Ent.* I : 140.

Plate - 1



Hybosorus orientalis
Westwood



Oniticellus (Oniticellus)
cinctus (Fabricius)



Liatongus gagatinus
Hope



Anomala cantori
(Hope)



Popillia cyanea
Hope



Mimela passerinii
Hope



Hilyotrogus holosericeus
Redtenbacher



Holotrichia longipennis
Blanchard



Melolontha cuprescens
Blanchard



Brahmia crinicollis
Burmeister



Oryctes nasicornis
(Linnaeus)

Material examined: Uttarakhand, Garhwal, (GWLS), 10.xii.2009 (♂), Coll. Abesh K. Sanyal.

Distribution: India: Himachal Pradesh Uttarakhand and Uttar Pradesh.

9. *Melolontha cuprescens* Blanchard, 1871

1871. *Melolontha cuprescens* Blanchard, *Compt. Rend. Ac. Paris*, LXXII : 811a.

Material examined: Uttarakhand, Garhwal, (GWLS), 10.xii.2009 (1ex. ♀), Coll. Manish Bhardwaj.

Distribution: India: Himachal Pradesh and Uttarakhand.

10. *Brahmina crinicollis* Burmeister, 1855

1855. *Brahmina crinicollis* Burmeister, *Handb. Ent.* IV, 2: 364.

Material examined: Uttarakhand, Garhwal, (GWLS), 10.xii.2009 (1ex.), Coll. Abesh K. Sanyal.

Distribution: India: Himachal Pradesh and Uttarakhand.

IV. Subfamily: Dynastinae MacLeay, 1819

11. *Oryctes nasicornis* (Linnaeus, 1758)

1758. *Scarabaeus nasicornis* Linnaeus, *Syst. Nat.*, I : 346.

1910. *Oryctes nasicornis*, Arrow, *Faun. Brit. India*, (Lamellicornia: Cetoniinae and Dynastinae), I : 275.

Material examined: Uttarakhand, Garhwal, (GWLS), 14.xii.2009 (1ex.), Coll. Manish Bhardwaj.

Distribution: India: Himachal Pradesh, Kashmir and Uttarakhand. *Elsewhere:* Baluchistan, South West Asia and South & South East Europe.

RESULTS AND DISCUSSION

Specimens collected from Govind Wildlife Sanctuary, Garhwal, Uttarakhand resulted in the identification of eleven

species of the scarab beetles belonging to two families (Scarabaeidae and Hybosoridae) and five subfamilies (Hybosorinae, Scarabaeinae, Rutelinae, Melolonthinae and Dynastinae) of superfamily Scarabaeoidea (Coleoptera). All the species are reported for the first time from the sanctuary of which *Anomala cantori* (Hope), *Mimela passerinii* Hope and *Oryctes nasicornis* (Linnaeus) are new records to the scarab beetle fauna of Uttarakhand. Combining almost all the previously published information (Arrow, 1910, 1917; 1931, Mittal, 1998; 2005, Chatterjee, 2010) and current report regarding the scarab beetle diversity of Uttarakhand, an updated checklist of the scarab beetles under superfamily Scarabaeoidea has also been prepared which reports the occurrence 167 species belonging to 52 genera, 21 tribes, 9 subfamilies and 3 families of superfamily Scarabaeoidea from Uttarakhand (Table 1). The family Scarabaeidae (162 species) was dominating over Hybosoridae (3 species) and Geotrupidae (2 species). Of the family Scarabaeidae, the dominant subfamily Scarabaeinae includes 68 species followed by Rutelinae (33 species), Cetoniinae (20 species), Aphodiinae (18 species), Melolonthinae (15 species), Dynastinae (6 species) and Orphninae (2 species) (Fig. 1).

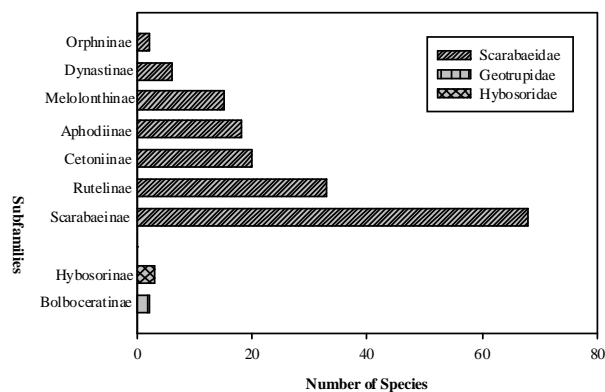


Fig. 1. Species diversity of the scarab beetles in different subfamilies and families of superfamily Scarabaeoidea.

Table 1: An updated checklist of the Scarabaeid beetles of Uttarakhand.

Order: COLEOPTERA
Suborder: POLYPHAGA
Super family: SCARABAEOIDEA
(I). FAMILY: GEOTRUPIDAE
Subfamily: Bolboceratinae
Tribe Bolboceratini
1. <i>Bolboceras quadridens</i> (Fabricius)
2. <i>Bolboceras transversale</i> Westwood

(II). FAMILY: HYBOSORIDAE

Subfamily: Hybosorinae

3. *Phaeochrous emarginatus* (Castelnau)
4. *Hybosorus illigeri* Reiche
5. *Hybosorus orientalis* Westwood

(III). FAMILY: SCARABAEIDAE

Subfamily: Orphninae

Tribe Orphnini

6. *Orphnus impressus* Westwood
7. *Orphnus mysoriensis* Westwood

Subfamily: Aphodiinae

Tribe Aphodiini

8. *Aphodius campestris* Mittal
9. *Aphodius crenatus* Harold
10. *Aphodius devabhumi* Mittal
11. *Aphodius finctarius* Olivier
12. *Aphodius irregularis* Westwood
13. *Aphodius liesenfeldti* Petrovitz
14. *Aphodius lividus* (Olivier)
15. *Aphodius marginellus* Fabricius
16. *Aphodius moestus* Fabricius
17. *Aphodius paravatia* Mittal
18. *Aphodius parvulus* Harold
19. *Aphodius rufolaterus* Motsch.
20. *Aphodius musooriensis* Mittal
21. *Aphodius rufopustulatus* Wiedemann
22. *Aphodius testaceus* Germ.
23. *Aphodius urostigma* Har. Berl
24. *Aphodius ustulatus* Harold
25. *Rhyssemus germanus* (Linnaeus)

Subfamily: Scarabaeinae

Tribe Gymnopleurini

26. *Gymnopleurus (Metagymnopleurus) gemmatus* Harold
27. *Paragymnopleurus sinuatus* (Olivier)

Tribe Coprini

28. *Copris (Copris) repertus* Walker
29. *Copris (Copris) sacontala* Redtenbacher
30. *Copris (Copris) sarpedon* Redtenbacher
31. *Catharsius (Catharsius) molossus* (Linnaeus)
32. *Catharsius (Catharsius) pithecius* (Fabricius)
33. *Catharsius (Catharsius) sagax* (Quenstedt)

Tribe Oniticellini

34. *Drepanocerus setosus* (Wiedmann)
35. *Drepanocerus sinicus* Harold
36. *Euoniticellus pallens* (Olivier)
37. *Euoniticellus pallipes* (Fabricius)
38. *Oniticellus (Oniticellus) cinctus* (Fabricius)

39. *Tiniocellus spinipes* (Roth)
40. *Liatongus gagatinus* (Hope)
41. *Liatongus phanaeoides* (Westwood)
42. *Liatongus vertagus* (Fabricius)

Tribe Onitini

43. *Onitis excavatus* Arrow
44. *Onitis falcatus* (Wulf.)
45. *Onitis philemon* Fabricius
46. *Onitis subopacus* Arrow
47. *Onitis virens* Lansberge

Tribe Onthophagini

48. *Phalops divisus* (Wiedmann)
49. *Caccobius (Caccobius) denticollis* Harold
50. *Caccobius (Caccophilus) diminutivus* (Walker)
51. *Caccobius (Caccophilus) indicus* Harold
52. *Caccobius (Caccophilus) inermis* Arrow
53. *Caccobius (Caccophilus) ultor* (Sharp)*
54. *Caccobius (Caccophilus) vulcanus* (Fabricius)
55. *Onthophagus (Colobonthophagus) bengalensis* Harold
56. *Onthophagus (Colobonthophagus) tragus* (Fabricius)
57. *Onthophagus (Digitonthophagus) bonasus* (Fabricius)
58. *Onthophagus (Digitonthophagus) gazella* (Fabricius)
59. *Onthophagus (Digitonthophagus) kuluensis* Bates
60. *Onthophagus (Micronthophagus) hystrix* Boucomont
61. *Onthophagus (Micronthophagus) questus* Sharp
62. *Onthophagus (Onthophagus) abreui* Arrow
63. *Onthophagus (Onthophagus) aenescens* (Wiedmann)
64. *Onthophagus (Onthophagus) centricornis* (Fabricius)
65. *Onthophagus (Onthophagus) circulifer* Arrow
66. *Onthophagus (Onthophagus) compactus* Arrow
67. *Onthophagus (Onthophagus) dama* (Fabricius)
68. *Onthophagus (Onthophagus) duporti* Boucomont
69. *Onthophagus (Onthophagus) expansicornis* Bates
70. *Onthophagus (Onthophagus) falsus* Gill.
71. *Onthophagus (Onthophagus) furcicornis* Arrow
72. *Onthophagus (Onthophagus) furcillifer* Bates

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| <p>73. <i>Onthophagus (Onthophagus) gratus</i> Arrow</p> <p>74. <i>Onthophagus (Onthophagus) griseosetosus</i> Arrow</p> <p>75. <i>Onthophagus (Onthophagus) marginalis</i> Gebler</p> <p>76. <i>Onthophagus (Onthophagus) nasalis</i> Arrow</p> <p>77. <i>Onthophagus (Onthophagus) orientalis</i> Harold</p> <p>78. <i>Onthophagus (Onthophagus) ramosellus</i> Bates</p> <p>79. <i>Onthophagus (Onthophagus) ramosus</i> (Wiedmann)</p> <p>80. <i>Onthophagus (Onthophagus) spinifex</i> (Fabricius)</p> <p>81. <i>Onthophagus (Onthophagus) sternalis</i> Arrow</p> <p>82. <i>Onthophagus (Onthophagus) tarandus</i> (Fabricius)</p> <p>83. <i>Onthophagus (Onthophagus) tibetanus</i> Arrow</p> <p>84. <i>Onthophagus (Onthophagus) productus</i> Arrow</p> <p>85. <i>Onthophagus (Onthophagus) quadridentatus</i> (Fabricius)</p> <p>86. <i>Onthophagus (Onthophagus) troglodyta</i> (Wiedemann)</p> <p>87. <i>Onthophagus (Onthophagus) unifasciatus</i> (Schall.)</p> <p>88. <i>Onthophagus (Paraphanaeomorphus) bifasciatus</i> (Fabricius)</p> <p>89. <i>Onthophagus (Proagoderus) amplexus</i> Sharp</p> <p>90. <i>Onthophagus (Proagoderus) pactolus</i> (Fabricius)</p> <p>91. <i>Onthophagus (Serrophorus) atropolis</i> d'Orb.</p> <p>92. <i>Onthophagus (Strandius) gagates</i> Hope</p> <p>Tribe Sisyphini</p> <p>93. <i>Sisyphus (Sisyphus) neglectus</i> Gory</p> <p>Subfamily: Melolonthinae</p> <p>Tribe Sericini</p> <p>94. <i>Cephaloserica thomsoni</i> (Brenske)</p> <p>95. <i>Maladera insanabilis</i> (Brenske)</p> <p>96. <i>Maladera iridescens</i> (Blanchard).</p> <p>Tribe Diplotaxini</p> <p>97. <i>Apogonia proxima</i> Waterhouse</p> <p>98. <i>Apogonia setosa</i> Arrow</p> <p>Tribe Melolonthini</p> <p>99. <i>Asactopholis dehradunus</i> Mittal</p> <p>100. <i>Brahmina crinicollis</i> Burmeister</p> <p>101. <i>Brahmina cupreus</i> Mittal</p> <p>102. <i>Holotrichia longipennis</i> (Blanchard)</p> <p>103. <i>Holotrichia problematica</i> Brenske</p> | <p>104. <i>Holotrichia sikkimensis</i> Brenske</p> <p>105. <i>Lepidiota albistigma</i> Burmeister</p> <p>106. <i>Hilyotrogus holosericeus</i> Redtenbacher</p> <p>107. <i>Idionycha excisa</i> Arrow</p> <p>108. <i>Melolontha cuprescens</i> Blanchard*</p> <p>Subfamily: Rutelinae</p> <p>Tribe Adoretini</p> <p>109. <i>Adoretus bimarginatus</i> Ohaus</p> <p>110. <i>Adoretus duvauceli</i> Blanch</p> <p>111. <i>Adoretus serratipes</i> Arrow</p> <p>112. <i>Rhinyptia meridionalis</i> Arrow</p> <p>Tribe Anomalini</p> <p>113. <i>Anomala bengalensis</i> Blanchard</p> <p>114. <i>Anomala biharensis</i> Arrow</p> <p>115. <i>Anomala cantori</i> (Hope)*</p> <p>116. <i>Anomala dorsalis</i> (Fabricius)</p> <p>117. <i>Anomala fraterna</i> (Burmeister)</p> <p>118. <i>Anomala pellucida</i> Arrow</p> <p>119. <i>Anomala polita</i> (Blanchard)</p> <p>120. <i>Anomala ruficapilla</i> Burmeister</p> <p>121. <i>Anomala rugosa</i> Arrow</p> <p>122. <i>Anomala tristis</i> Arrow</p> <p>123. <i>Anomala varicolor</i> (Gyll.)</p> <p>124. <i>Anomala xanthoptera</i> Blanchard</p> <p>125. <i>Anomala propinqua</i> Arrow</p> <p>126. <i>Anomala siliguria</i> Arrow</p> <p>127. <i>Anomala lineatopennis</i> Arrow</p> <p>128. <i>Anomala dimidiata</i> (Hope)</p> <p>129. <i>Anomala rufiventris</i> Redtenbacher</p> <p>130. <i>Anomala stoliczkae</i> Sharp</p> <p>131. <i>Anomala flavipes</i> Arrow</p> <p>132. <i>Mimela passerinii</i> Hope*</p> <p>133. <i>Mimela horsfieldi</i> Hope</p> <p>134. <i>Popillia cupricollis</i> Hope</p> <p>135. <i>Popillia cyanea</i> Hope</p> <p>136. <i>Popillia nasuta</i> Newman</p> <p>137. <i>Popillia laevicollis</i> Kraatz</p> |
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138. *Popillia lucida* Newmann
 139. *Popillia sulcata* Redtenbacher
 140. *Popillia pilosa* Arrow
 141. *Trichanomala fimbriata* (Newmann)

Subfamily: Dynastinae

Tribe Dynastini

142. *Xylotrupes gideon* (Linnaeus)

Tribe Pentodontini

143. *Phyllognathus dionysius* (Fabricius)
 144. *Heteronychus annulatus* Bates
 145. *Heteronychus lioderes* Redtenbacher

Tribe Oryctini

146. *Oryctes nasicornis* (Linnaeus)*

Tribe Phileurini

147. *Eophileurus planatus* (Wiedemann)

Subfamily: Cetoniinae

Tribe Cetoniini

148. *Anatona castanoptera* (Burmeister)
 149. *Anatona stillata* (Newmann)
 150. *Anthracophora crucifera* (Olivier)

151. *Anthracophora dalmanni* (Hope)
 152. *Cetonia bensoni* (Westwood)
 153. *Cetonia rhododendri* Gestro
 154. *Chiloloba acuta* (Wiedemann)
 155. *Oxycetonia albopunctata* (Fabricius)
 156. *Oxycetonia jucunda* (Foldermann)
 157. *Protaetia coenosa* (Westwood)
 158. *Protaetia neglecta* (Hope)
 159. *Protaetia confusa* (Gory & Percheron)
 160. *Protaetia alboguttata* (Vigors)

Tribe Goliathini

161. *Heterorrhina mutabilis* (Hope)
 162. *Heterorrhina nigratarsis* (Hope)
 163. *Jumnos ruckeri* Saunders
 164. *Rhomborrhina glaberrima* (Westwood)
 165. *Torynorrhina opalina* (Hope)

Tribe Gymnetini

166. *Clinteria klugi* (Hope)
 167. *Clinteria spilota* (Hope)

*New Records from Uttarakhand

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