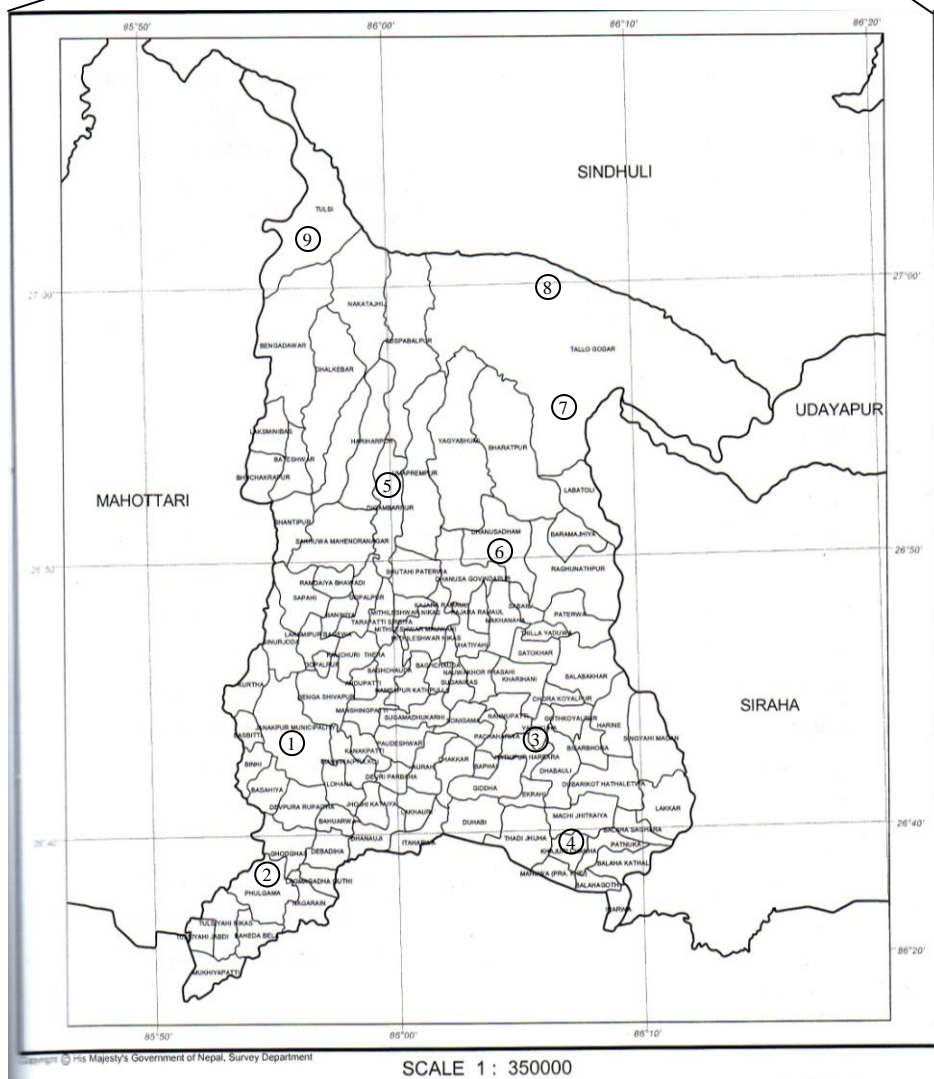
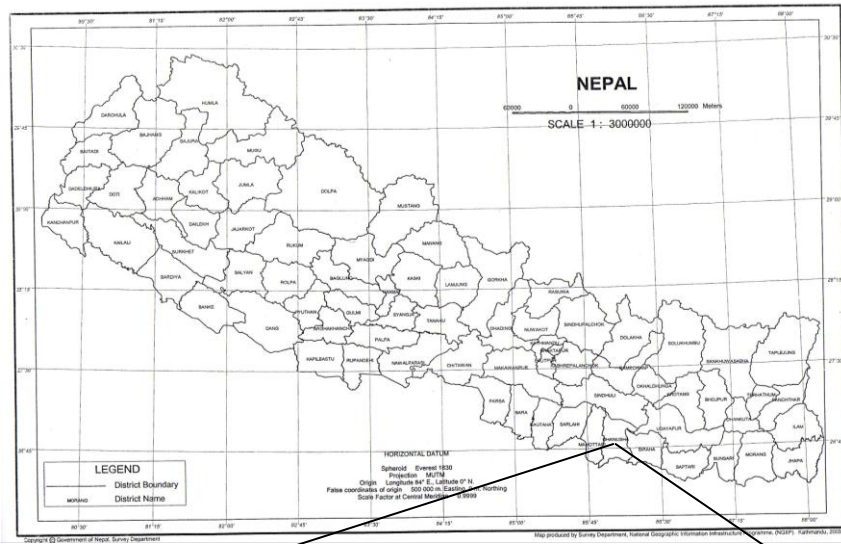


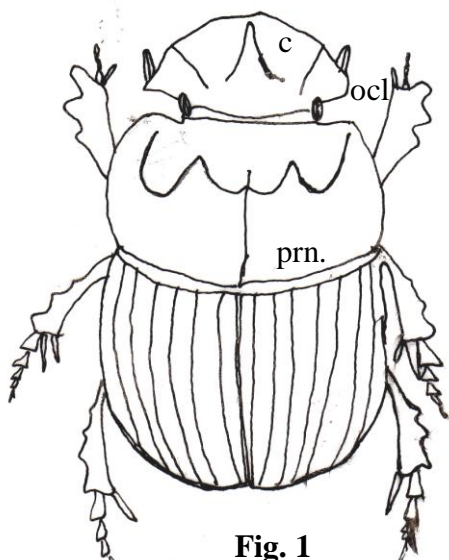
# Map 1



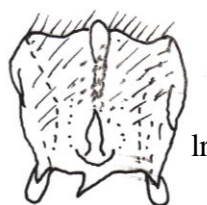
**Map of Dhanusha district showing the 9 sites used in study**

1. Janakpur, 2. Phulgama, 3. Yadukuha, 4. Khajuri Chanha, 5. Dhalkebar, 6. Dhanushadham
7. Godar, 8. Chisapani (Churiya Hills), 9. Bahunmara (Chuirya Hills).

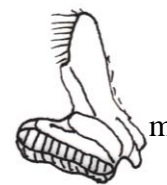
# Plate I



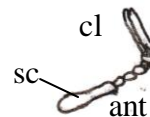
**Fig. 1**  
*Catharsius birmanensis*  
Lansb



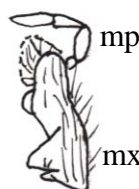
**Fig. 2**  
Labrum



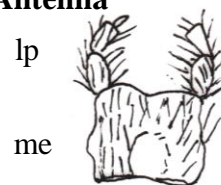
**Fig. 3**  
Mandible



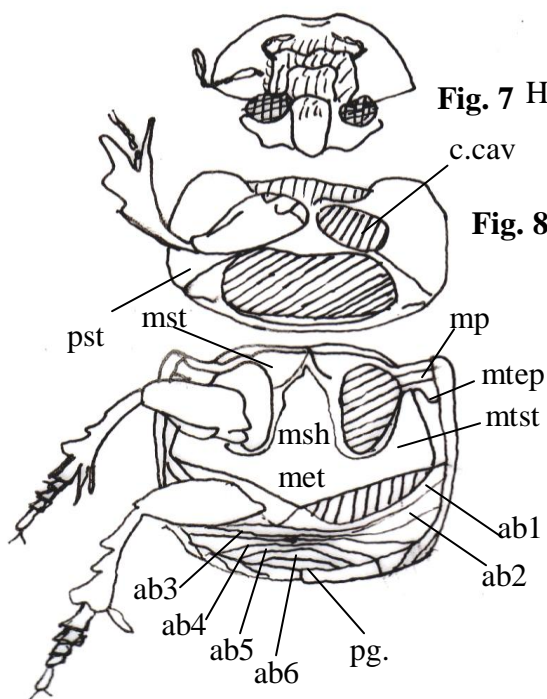
**Fig. 4**  
Antenna



**Fig. 5**  
Maxilla



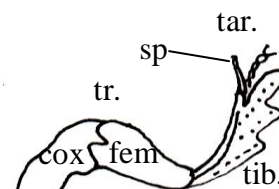
**Fig. 6**  
Labium



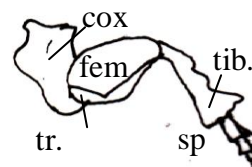
**Fig. 7** Head, Ventral view

**Fig. 8** Prosternum

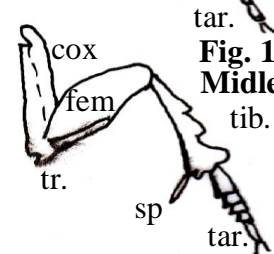
**Fig. 9** Mesosternum, Metasternum and Abdomen



**Fig. 10** Foreleg



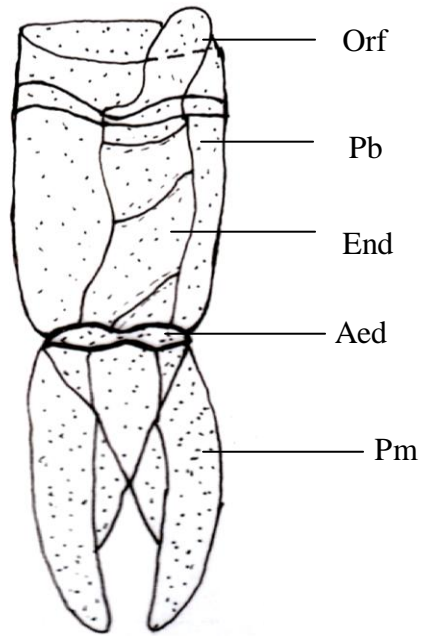
**Fig. 11**  
Midleg



**Fig. 12**  
Hind leg

Fig. 1: *Catharsius birmanensis* Lansb. and details of the body: ab, abdominal sternite; ant., antenna; c., clypeus; c.cav., coxal cavity; cl., club; cox., coxa; e., elytron; fem., femur; l., labium; lp., labial palpus; lr., labrum; m., mandible; me., mentum; mp., mesothoracic epimeron; mp., maxillary palpus; msh., metasternal shield; mst., mesosternum; mtep., metathoracic episternum; mtst., metasternum; mx., maxilla; oc.l., ocular lobe; pg., pygidium; prn., pronotum; pst., prosternum; sc., scape; sp., tibial spur; tar., tarsus; tib., tibia; tr., trochanter.

**Plate I A**



**Fig. 1 Male genitalia of *Catharsius birmanensis* Lansb**  
(Length 5mm)

**ABBREVIATIONS**

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm: Parameres

## Plate II



Fig. 1 *Scarabaeus devotus* Redt.



Fig. 2 *Scarabaeus devotus* Redt.

## Plate III

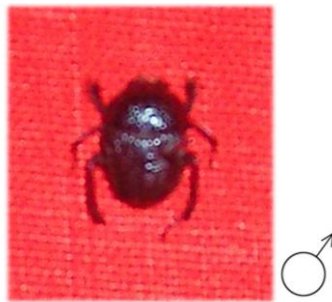


Fig. 1 *Gymnopleurus cyaneus* Arrow



Fig. 2 *Gymnopleurus parvus* Macl.

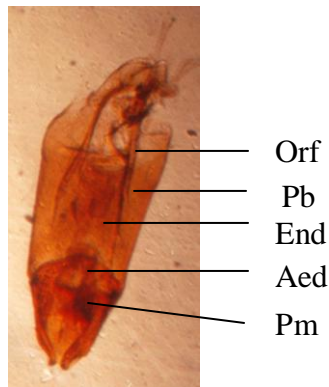


Fig. 3 Male Genitalia of *Gymnopleurus parvus* Macl.  
(Length 1mm)

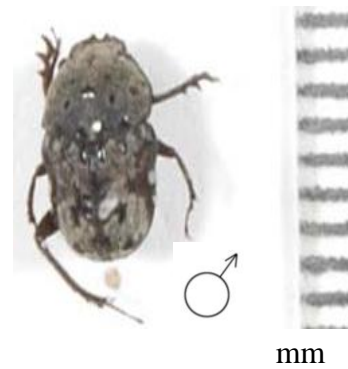


Fig. 4 *Gymnopleurus gemmatus* Har.

### ABBREVIATIONS

Aed: Aedeagus, End: Endophallus,  
Orf: Orifice, Pb: Phallobase, Pm:Parameres

## Plate IV

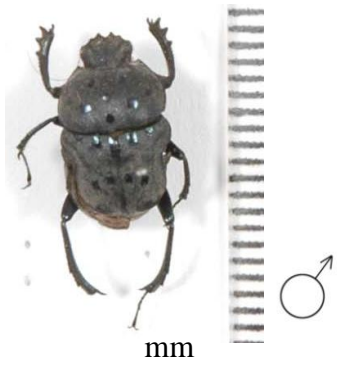


Fig 1. *Gymnopleurus maculosus* Macl.

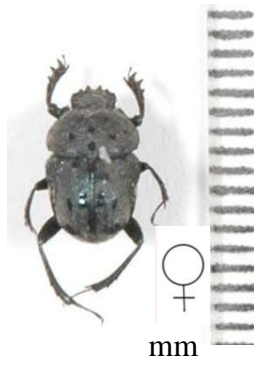


Fig 2. *Gymnopleurus maculosus* Macl.

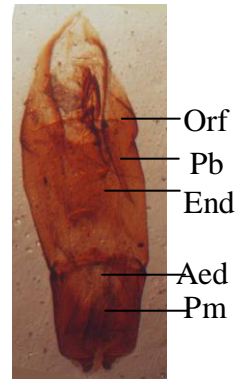


Fig. 3 Male genitalia of *Gymnopleurus maculosus* (Length 1mm)

## Plate V

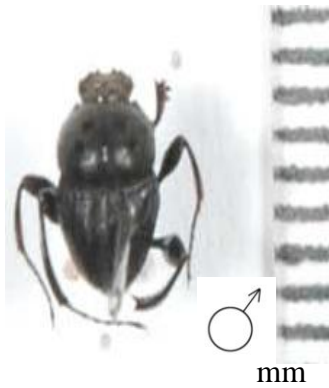


Fig 1. *Sisyphus longipes* Oliv.



Fig 2. *Sisyphus indicus* Hope.



Fig 3. *Sisyphus hirtus* Wied.



Fig 4. *Sisyphus hirtus* Wied.

### ABBREVIATIONS

Aed: Aedeagus, End: Endophallus,  
Orf: Orifice, Pb: Phallobase, Pm: Parameres

## Plate VI



Fig. 1: *Heliocopris bucephalus*  
F. ] (Large)

Fig. 2: *Heliocopris bucephalus*  
F. ] (Small)

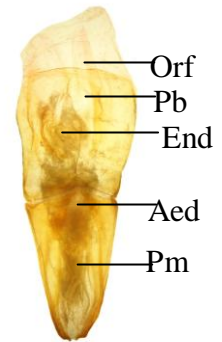


Fig. 3. Male genitalia of  
*Heliocopris bucephalus* F  
(Length 6mm)

## Plate VII



Fig. 1. *Catharsius*  
*granulatus* Sharp

Fig. 2. *Catharsius*  
*granulatus* Sharp

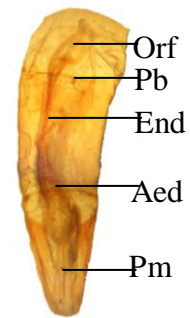


Fig. 3. Male genitalia of  
*Catharsius granulatus*  
Sharp  
(Length 6mm)

### ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm: Parameres

# Plate VIII



Fig. 1: *Catharsius molossus* L. ]



Fig. 2: *Catharsius molossus* L. [

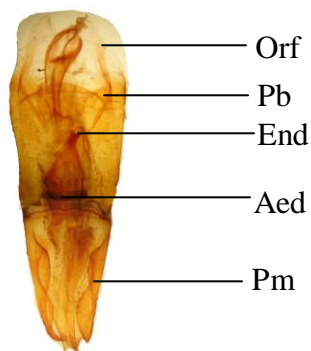


Fig. 3. Male genitalia of *Catharsius molossus* L. (Length 7mm)

ABBREVIATIONS  
 Aed: Aedeagus, End: Endophallus,  
 Orf: Orifice, Pb: Phallobase,  
 Pm: Parameres

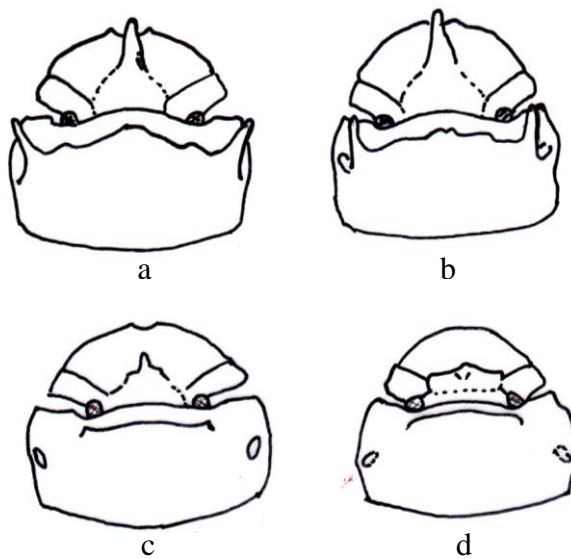


Fig. 4. Head and Pronotum of *Catharsius molossus* L. a-c ]; d [

# Plate IX



Fig. 1. *Catharsius sagax* Quens

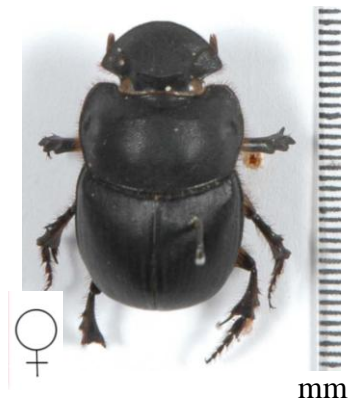


Fig. 2. *Catharsius sagax* Quens

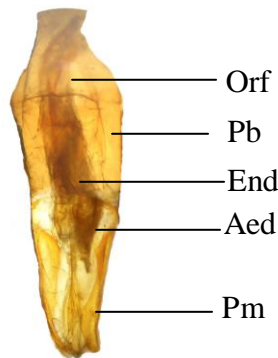


Fig. 3. Male genitalia of *Catharsius sagax* Quens. (Length 7mm)



Fig. 4. *Catharsius birmanensis* Lansb



Fig. 5. *Catharsius birmanensis* Lansb

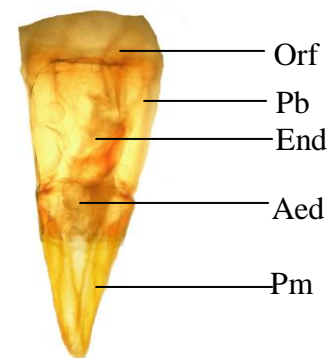


Fig. 6. Male genitalia of *Catharsius birmanensis* Lansb (Length 5mm)

## ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm:Parameres



# Plate X



Fig. 1. *Catharsius capucinus* F. ]



Fig. 2. *Catharsius capucinus* F. [

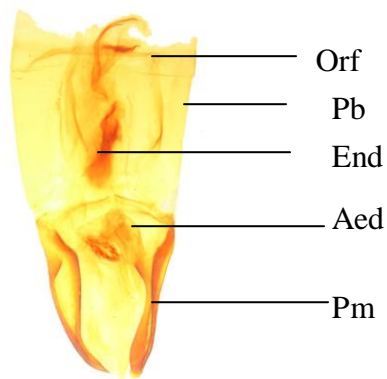


Fig. 3. Male genitalia of *Catharsius capucinus* (Length- 5mm)



Fig. 4. *Catharsius pithecius* F.



Fig. 5. *Catharsius pithecius* F.

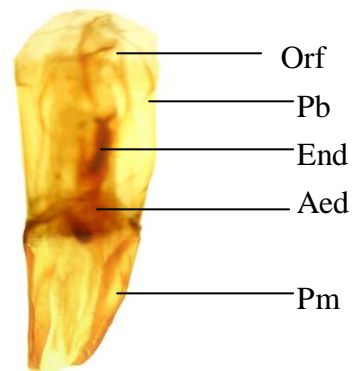


Fig. 6. Male genitalia of *Catharsius pithecius* (Length- 5mm)

## ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm:Parameres

# Plate XVII



Fig. 1: *Onthophagus atropolitus* d' Orb.



Fig. 2: *Onthophagus atropolitus* d' Orb.

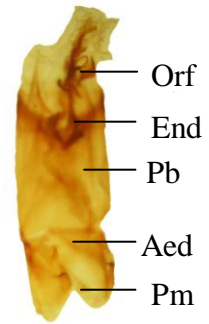


Fig. 3: Male genitalia of *Onthophagus atropolitus* d' Orb. (Length 3mm)

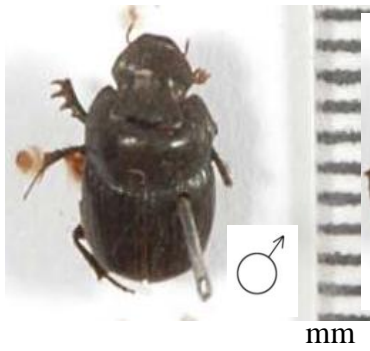


Fig. 4: *Onthophagus armatus* Bl.

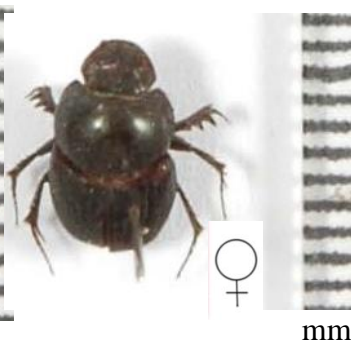


Fig. 5: *Onthophagus armatus* Bl.

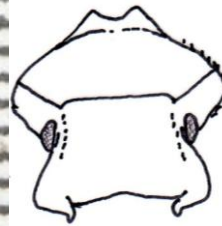


Fig. 6: Head of *Onthophagus armatus* Bl. ]

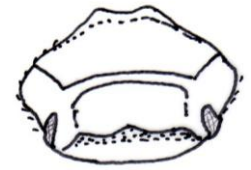


Fig. 7: Head of *Onthophagus armatus* Bl. ]

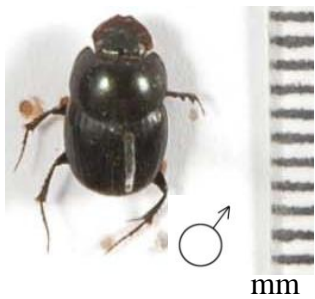


Fig. 8: *Onthophagus tragus* F.



Fig. 9: *Onthophagus tragus* F.



Fig. 10: Head of *Onthophagus tragus* F. ] (major form)



Fig. 11: Head of *Onthophagus tragus* F. ] (minor form)

## ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm:Parameres

# Plate XVIII



Fig. 1: *Onthophagus sagittarius* F.

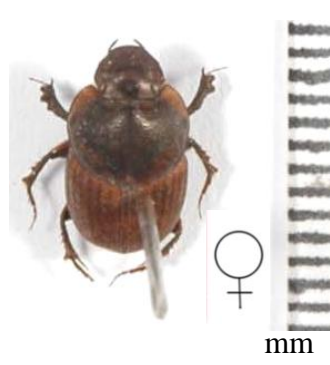


Fig. 2: *Onthophagus sagittarius* F.

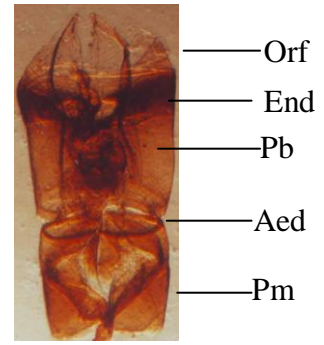


Fig. 3: Male genitalia of *Onthophagus sagittarius* F. (Length 1mm)



Fig. 4: Head of *Onthophagus sagittarius* F. ]



Fig. 5: Head of *Onthophagus sagittarius* F. [



Fig. 6: *Onthophagus mopsus* F.



Fig. 7: *Onthophagus mopsus* F.

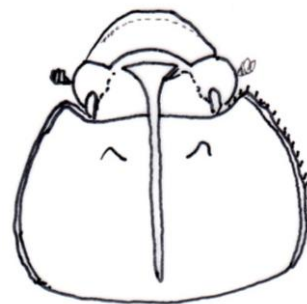


Fig. 8: Head and pronotum of *Onthophagus mopsus* F. ]

## ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm:Parameres

## Plate XIX



Fig. 1: *Onthophagus duporti* Bouc.

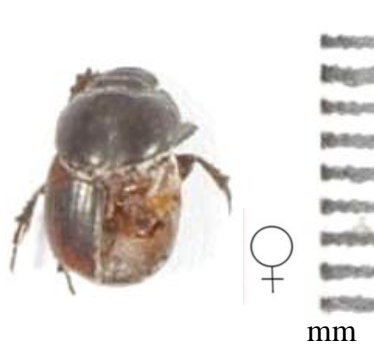


Fig. 2: *Onthophagus duporti* Bouc.



Fig. 3: Head and Pronotum of *Onthophagus duporti* Bouc. ]

## Plate XX

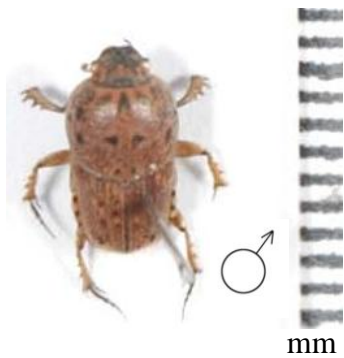


Fig. 1: *Oniticellus pallipes* F.

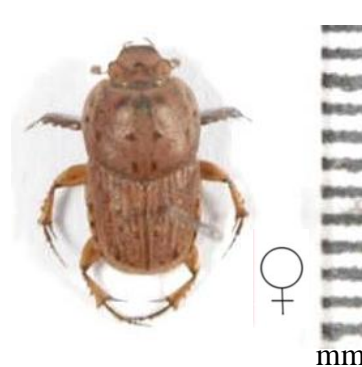


Fig. 2: *Oniticellus pallipes* F.

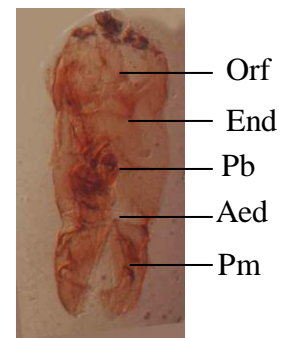


Fig. 3: Male genitalia of *Oniticellus pallipes* F. (Length 1mm)



Fig. 4: *Oniticellus spinipes* Roth



Fig. 5: *Oniticellus spinipes* Roth.

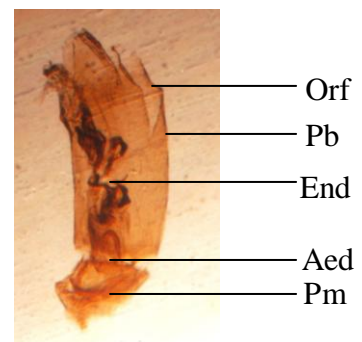


Fig. 6: Male genitalia of *Oniticellus spinipes* Roth. (Length 1mm)

### ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm:Parameres

## Plate XXI

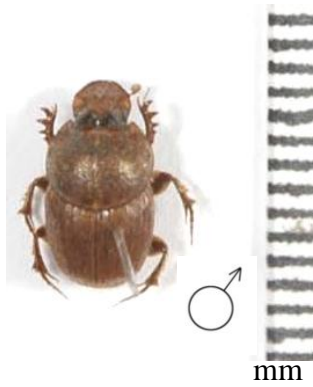


Fig. 1. *Oniticellus cinctus* F.



Fig. 2. *Oniticellus cinctus* F.

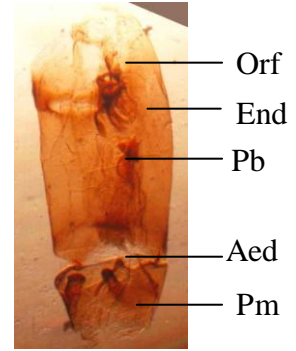


Fig. 3. Male genitalia of *Oniticellus cinctus* (Length 1mm)

## Plate XXII



Fig. 1. *Drepanocerus setosus* Wied.



Fig. 2. *Drepanocerus setosus* Wied.

## Plate XXIII



Fig. 1. *Onitis lama* Lansb.



Fig. 2. *Onitis lama* Lansb.

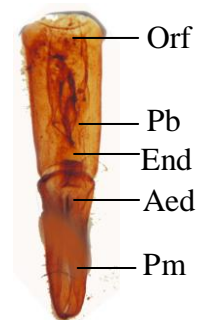


Fig. 3. Male genitalia of *Onitis lama* Lansb (Length 55mm)

### ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm: Parameres

# Plate XXIV



Fig 1. *Onitis philemon* F.



Fig 2. *Onitis philemon* F.

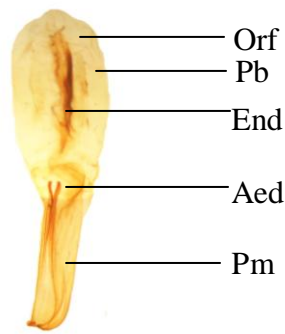


Fig 3. Male genitalia of *Onitis philemon* F.  
(Length 5mm)

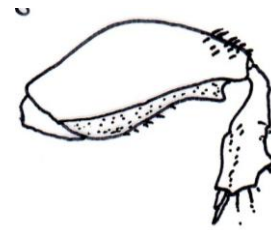


Fig. 4. Middle-leg of *Onitis philemon* F. ]



Fig. 5. *Onitis singhalensis* Lansb.

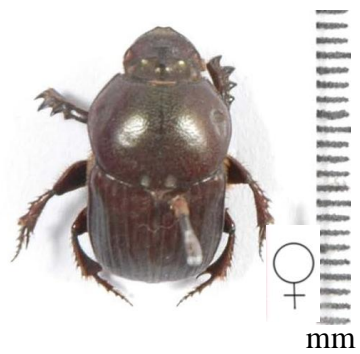


Fig. 6. *Onitis singhalensis* Lansb.

## ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm:Parameres

# Plate XXV



Fig. 1. *Onitis subopacus* Arrow.

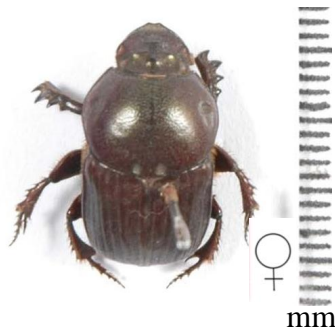


Fig. 2. *Onitis subopacus* Arrow.

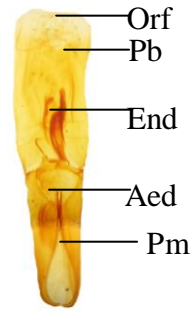


Fig. 3. Male genitalia of *Onitis subopacus* Arrow. (Length 5mm)

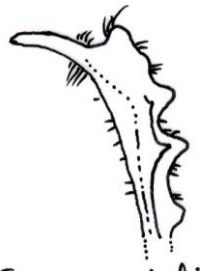


Fig. 4. Front tibia of *Onitis subopacus* Arrow ]

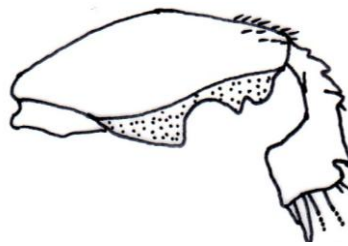


Fig. 5. Middle-leg of *Onitis subopacus* Arrow ]



Fig. 6. *Onitis virens* Lansb.



Fig. 7. *Onitis virens* Lansb.



Fig. 8. Front tibia of *Onitis virens* Lansb. ]

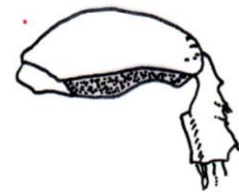


Fig. 9. Middle-leg of *Onitis virens* Lansb. ]

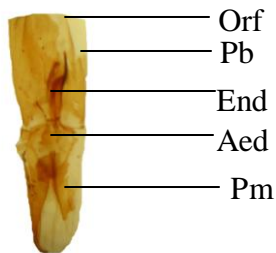


Fig. 10. Male Genitalia of *Onitis virens* Lansb. (Length 4mm)

## ABBREVIATIONS

Aed: Aedeagus, End: Endophallus,  
Orf: Orifice, Pb: Phallobase, Pm: Parameres

## Plate XXVI



Fig. 1. *Onitis castaneus*  
Redt



Fig. 2. *Onitis castaneus*  
Redt

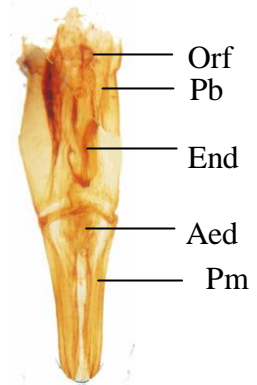


Fig. 3. Male genitalia of  
*Onitis castaneus* Redt  
(Length 5mm)

## Plate XXVII



Fig. 1. *Chironitis*  
*indicus* Lansb.



Fig. 2. *Chironitis*  
*indicus* Lansb.

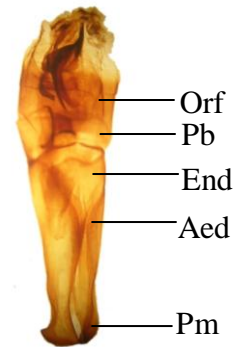


Fig. 3. Male genitalia of  
*Chironitis indicus* Lansb.  
(Length 4mm)

### ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm: Parameres



# Plate XI



Fig. 1: *Copris magicus* Har.



Fig. 2: *Copris magicus* Har.

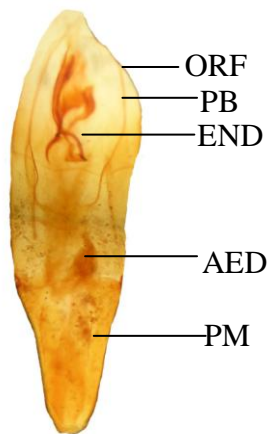


Fig. 3: Male genitalia of *Copris magicus* Har. (Length- 4mm)



Fig. 4: *Copris sinicus* Hope



Fig. 5: *Copris sinicus* Hope

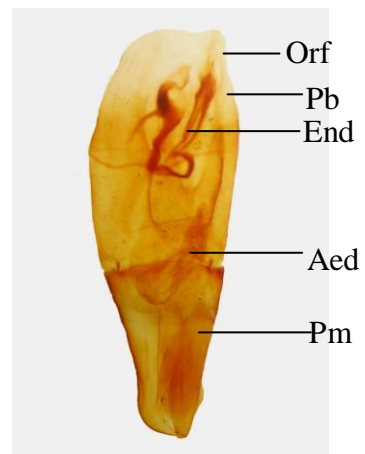


Fig. 6: Male genitalia of *Copris sinicus* Hope

## ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm: Parameres

## Plate XII



Fig. 1: *Copris repertus* Walk.



Fig. 2: *Copris repertus* Walk.

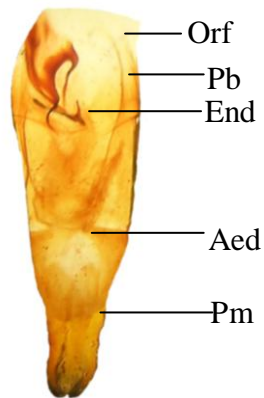


Fig. 3: Male genitalia of *Copris repertus* Walk. (Length-4mm)

### ABBREVIATIONS

Aed: Aedeagus, End: Endophallus,  
Orf: Orifice, Pb: Phallobase,  
Pm: Parameres

## Plate XIII



Fig. 1: *Phalops divisus* Wied.



Fig. 2: *Phalops divisus* Wied.

## Plate XIV

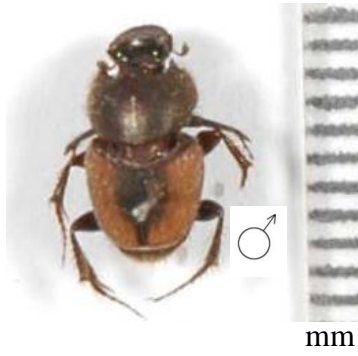


Fig. 1: *Onthophagus tarandus* F.



Fig. 2: *Onthophagus tarandus* F.

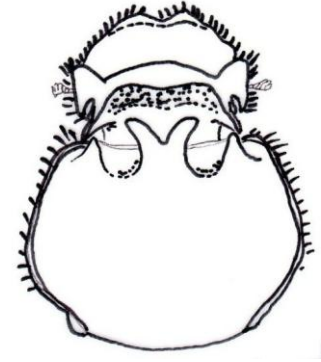


Fig. 3: Head & Pronotum of *Onthophagus tarandus* F.



Fig. 4: *Onthophagus pactolus* F.

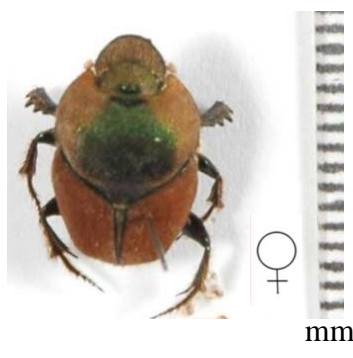


Fig. 5: *Onthophagus pactolus* F.

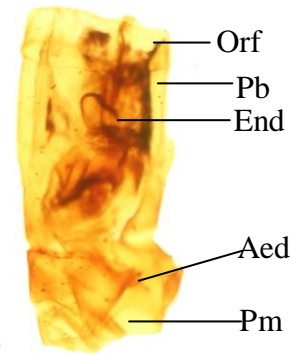


Fig. 6: Male Genitalia of *Onthophagus pactolus* F. (Length 1.5 mm)



Fig. 7: *Onthophagus aenescens* Wied.



Fig. 8: *Onthophagus aenescens* Wied.

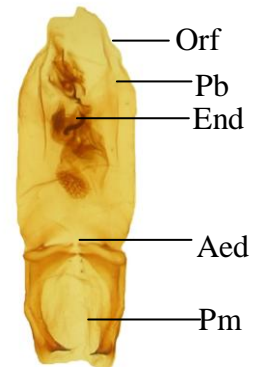


Fig. 9: Male genitalia of *Onthophagus aenescens* Wied (Length 1.5 mm)

ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm: Parameres

## Plate XV



Fig. 1: *Onthophagus ramosellus* Bates



Fig. 2: *Onthophagus ramosellus* Bates

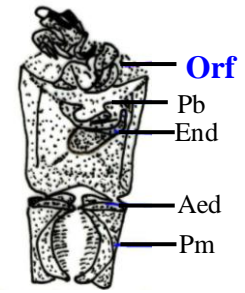


Fig. 3: Male genitalia of *Onthophagus ramosellus* Bates  
(Length - 1mm)



Fig. 4: *Onthophagus sternalis* Arrow



Fig. 5: *Onthophagus sternalis* Arrow

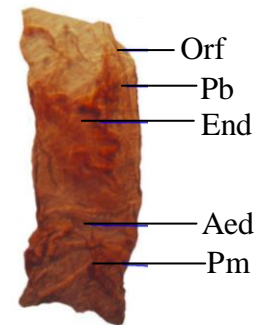


Fig. 6 Male genitalia of *Onthophagus sternalis* Arrow



Fig. 7: *Onthophagus catta* F.



Fig. 8: *Onthophagus catta* F.

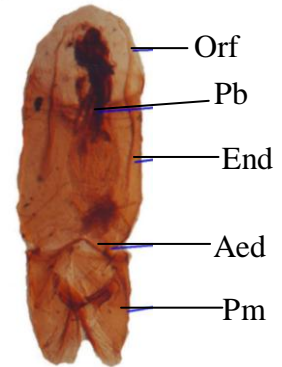


Fig. 9: Male genitalia of *Onthophagus catta* F.  
(Length-2mm)

### ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm: Parameres

## Plate XVI



Fig. 1: *Onthophagus bonasus* F.



Fig. 2 *Onthophagus bonasus* F.

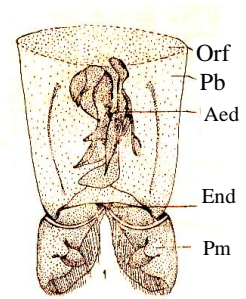


Fig. 3: Male genitalia of *Onthophagus bonasus* F.  
Length 1.5 mm  
(Source: Sewak, 1986)



Fig. 4: Head of *Onthophagus bonasus* F.

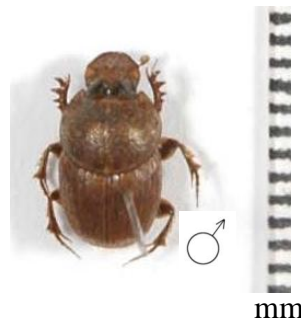


Fig. 5: *Onthophagus rectecornutus* Lansb.



Fig. 6 *Onthophagus rectecornutus* Lansb.

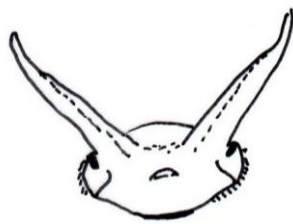


Fig. 7: Head of *Onthophagus rectecornutus* Lansb.

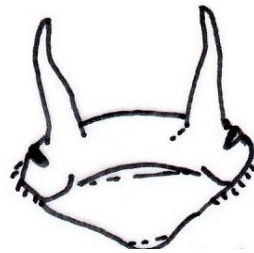


Fig. 8: Head of *Onthophagus rectecornutus* Lansb.

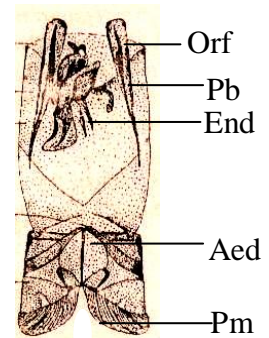


Fig. 9: Male genitalia of *Onthophagus rectecornutus* Lansb.  
Length 1.5mm  
(Source: Sewak, 1986)

### ABBREVIATIONS

Aed: Aedeagus, End: Endophallus, Orf: Orifice, Pb: Phallobase, Pm: Parameres