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## Biodiversity of click beetles (Elateridae) of Tandojam

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### Abstract

For present studies click beetles were collected from various localities of Tandojam. Further examination and identification was carried out at Insect Systematic Postgraduate Laboratory, Department of Entomology, Sindh Agriculture University Tandojam. Specimens were collected through traditional hand net and on light trap from various localities and were killed in a jar containing potassium cyanide and mounted through entomological pins. To identify the specimen up to the species level, they were run through the keys available for the region in various publications. Images of habitus and genitalia were taken with cameras fitted on microscope. In present study total 73 members of the family Elateridae were collected from Tandojam, Sindh, Pakistan. This revealed the occurrence 08 species under three sub-families. Sub-family Agrypninae with five species under three tribes; Agrypnini including, *Agrypnus ellipticus* (Candèze, 1857) and *Agrypnus thibetanus* Reitter 1913; Pseudomelanactini with one species *Lanelater bipunctatus* (Candèze, 1857); Oophorini with two species; *Heteroderes heydeni* (Reitter, 1891) and *Heteroderes lenis* (Candèze, 1891). Subfamily with Elaterinae with tribe Ampedini including two species; *Melanotus punctosus* (Walker, 1858) and *Melanotus punctolineatus* Pelerin, 1829. Sub-family Cardiophorinae with only one species *Cardiophorus vari* 002.

**Keywords:** Biodiversity, click beetles, traditional hand net, light trap, potassium cyanide, entomological pins

### Introduction

The families Elateridae consist of insects are generally known as Click beetles "typical click beetles" that make different them from the allied families (Cerothyridae & Eucnemidae). Furthermore species i.e. Spring beetles' elaters, snapping beetles or skip jacks were described by William Elford Leach (1790–1836) 1815 in the family Elateridae. In current taxonomic study further 18 sub-families of this family are considered as cosmopolitan and described unusual click mechanism by [1], mover over about 400 genera, 10000 species of this Family were known worldwide reported by [2] and described their characters i.e. Body structure is less than 2 centimeters long, typically nocturnal and phytophagous. Larvae of click beetles are known wireworms, are usually saprophagous, living on dead material, a number of species are complete their environment in about 01 years e.g. *Conoderus*. Wireworms typically live in soil from 03 or 04 years and feeding on decomposing lion of plant and cause serious loss to Agricultural crops like, corn, wheat, potato, and strawberry [3, 4]. Their significant capability to get well from infirmity that induced by insecticides exposure. It is very difficult to control click beetles when they have been attacked to crop, the larvae of click beetles can easily pass in the soil on basis of structure and also having tendency for following pre-existing burrow they move on another causing damage to plant, roots in short time [5]. In Pakistan taxonomic study on family Elateridae was initiated by Akhter, A. in 2005, till date, who explored some important localities of Pakistan. Further new species of *Melanotus* Eschscholtz with reference to its male genitalia from Sindh, Pakistan described Atique, *et al.*, (2005) later genus *Lanelater* of this family from Dhabeji and Karachi re-described by (Arnett, 2006) further a new species of genus *Cardiophorus* Eschscholtz from Punjab, Pakistan was described by [6] a key given for the species of this family from Pakistan and formulated notes on other species of Cardiophorinae. [7] he was also added other new species *Melanotus raziaae* n. sp., from Northern Areas. More 02 new species, *Melanotus usrae* & *M. kalamensis* were collected Valley of Swat & Kalam Pakistan by [8] genus *Melanotus* comprises 32 species from Pakistan.

A new species to the *Melanotus* i.e. *Meristhus* from added by (Akhter, Platia, Rizvi and Ahmed, 2012a) another new species *M. afghanus* provided as country new record described by (Akhter, et al. 2012b) about 18 species, belonged to genera are provided in subfamily Agrypninae including two new species i.e. *Cryptalaus tamargrahensis* sp. nov. & *Agrypnus dadarensis* sp. Nov. and given key to the species of the genera of Pakistan i.e. *Heteroderes* LatreilleX,

*Drasterius* Eschscholtz, *Lanelater* Arnett & *Heteroderes* Latreille introduced 04 new species, that are *Adelocera baghensis* sp. nov. *Agrypnus baghensis* sp. Nov. *Lanelater pirsuhawaensis* sp. Nov. & *L. pulandriensis* sp. Nov.) Are provided by [9].

In view of the importance and lacking information on this group from Tandojam, the study is selected and intended to enrich the knowledge on insect fauna of locality.

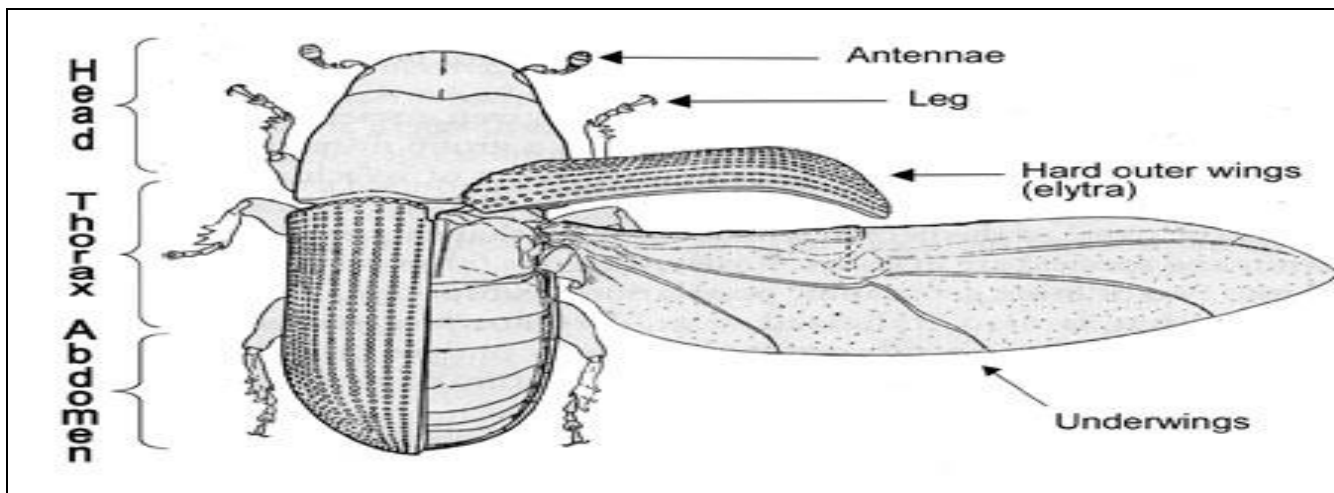


Fig 1: Basic morphology of click beetle

**2. Material and Methods**

**2.1 Place of study**

To conduct present study, click beetles were sampled from different areas Tandojam vicinity. The examination and identification were carried out at Insect Systematic Postgraduate Laboratory, Department of Entomology, Sindh Agriculture University Tandojam.

**2.2 Method of collection**

Insect collecting hand net and light trap were used to collect click beetles from various localities of Tandojam.

**2.3 Methods of Killing and preserving**

Insect killing bottle containing potassium cyanide was used for collecting and preserving the click beetles. After preservation these beetles mounted through entomological pins and marked specimens separately, each specimen was marked having like locality collection date collector & name of host plant were above the thorax at specimen.

**2.4 Methods of identification**

The labeled specimen up to the species level was identified through the keys available for the region in various publications.

**2.5 Methods of Imaging**

Digital images of habitus (adult) and genitalia were taken with high pixel camera 350 k pixel USB camera fitted on microscope (a) Labomed CSM2 (20X and 40X) (b) Kyowa Medilux 20 were used.

**2.6 About study area**

Tandojam is a town and Union Council of Hyderabad District in the Sindh province of Pakistan. It is located at 25°25'60N 68°31'60E and lies about 20 km away from Hyderabad city Pakistan, along Hyderabad and Mirpurkhas Road.

**2.7 Map of the Study area**

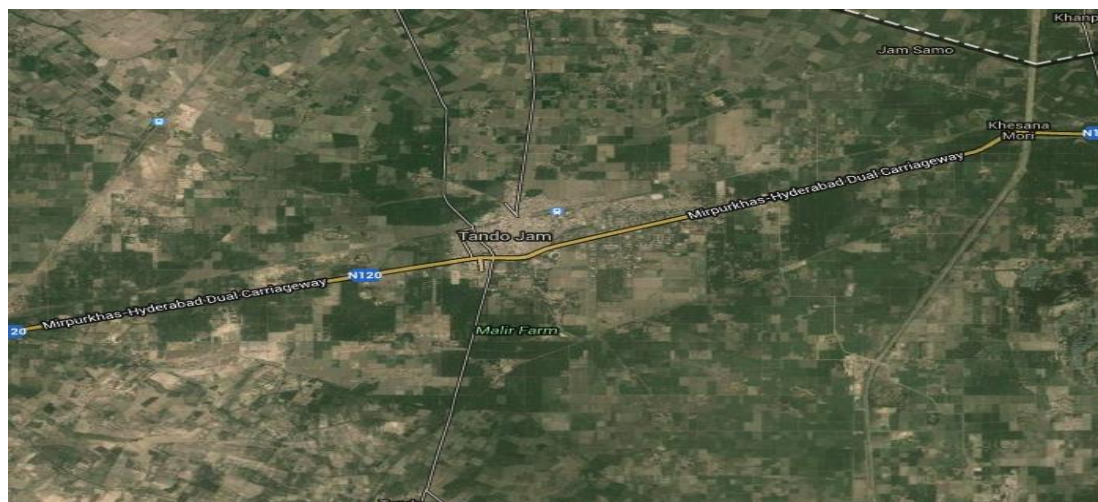


Fig 2: Satellite image of frequently visited areas



Note: Distributional map is provided separately for each species, i.e. without country label

Fig 3: Countries where the studied species of Hymenopteran pollinators are distributed

### 3. Results

Present study total 73 members of the family Elateridae were sampled from Tandojam, Sindh, Pakistan. This finding discovered the presence of 08 species under three sub-families. Sub-family Agrypninae with five species under three tribes; Agrypnini including, *Agrypnus ellipticus* (Candèze, 1857) and *Agrypnus thibetanus* Reitter 1913; Pseudomelanactini with one species *Lanelater bipunctatus* (Candèze, 1857); Oophorini with two species; *Heteroderes heydeni* (Reiter, 1891) and *Heteroderes lenis* (Candèze, 1891). Sub-family with Elaterinae with tribe Ampedini including two species; *Melanotus punctosus* (Walker, 1858) and *Melanotus punctolineatus* Pelerine, 1829. Subfamily Cardiophorinae with only one species *Cardiophorus varius* Cate *et al.*, 2002.

#### 3.1 *Agrypnus ellipticus* (Candèze, 1857)

##### 3.1.1 Taxonomic Hierarchy

Order: Coleoptera, Linnaeus, 1758  
 Suborder: Polyphaga, Emery, 1886  
 Superfamily: Elateroidea, Leach, 1815  
 Family: Elateridae, Leach, 1815  
 Subfamily: Agrypninae, Candèze, 1857  
 Tribe: Agrypnini Candèze, 1857  
 Genus: *Agrypnus*, Eschscholtz, 1829  
 Species: *ellipticus*  
 Author: Candèze  
 Year: 1857

##### 3.2 Description

Prothorax wider than long. Lateral margin of elytra entire without carina, apices of elytra weakly spinose.

##### 3.3 Material examined

Pakistan: 1♂, 1♀, Sindh Prov., Tandojam, 12.vi.2015, R.A. Dejar, Horticulture garden.

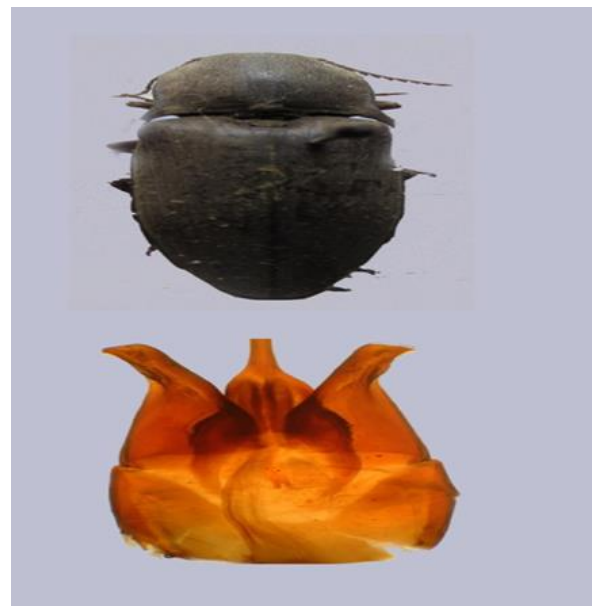


Fig 4: *Agrypnus ellipticus* (Candèze, 1857)

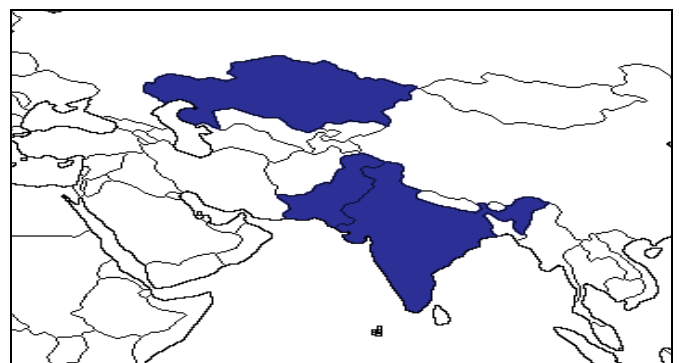


Fig 5: *Agrypnus ellipticus* (Candèze)

**3.4 *Agrypnus thibetanus* Reitter 1913**

**3.4.1 Taxonomic Hierarchy**

Order: Coleoptera, Linnaeus, 1758  
 Suborder: Polyphaga, Emery, 1886  
 Superfamily: Elateroidea, Leach, 1815  
 Family: Elateridae, Leach, 1815  
 Subfamily: Agrypninae, Candèze, 1857  
 Tribe: Agrypnini Candèze, 1857  
 Genus: *Agrypnus*, Eschscholtz, 1829  
 Species: *thibetanus*  
 Author: Reitter  
 Year: 1913

**3.5 Description**

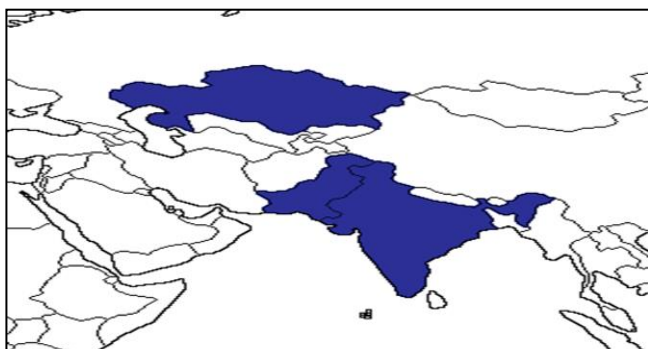
Prothorax longer than wide, Aedeagus with parameres without any out growth, Hypomeron and metasternum without grooves, Elytra not crenulate laterally before middle, Scutellum pentagonal shaped Scutellum punctate, not depressed medially.

**3.6 Material examined**

Pakistan: 1♂, 1♀, Sindh Prov., Tandojam, 12.vi.2015, R.A. Depar, Horticulture garden.



**Fig 6: *Agrypnus thibetanus* Reitter 1913**



**Fig 7: *Agrypnus thibetanus* Reitter 1913**

**3.7 *Lanelater bipunctatus* (Candèze, 1857)**

**3.7.1 Taxonomic Hierarchy**

Order: Coleoptera, Linnaeus, 1758  
 Suborder: Polyphaga, Emery, 1886  
 Superfamily: Elateroidea, Leach, 1815

Family: Elateridae, Leach, 1815

Subfamily: Agrypninae, Candèze, 1857

Tribe: Pseudomelanactini Arnett, 1967

Genus: *Lanelater* Arnett 1952

Species: *bipunctatus*

Author: Candèze

Year: 1857

**3.8 Description**

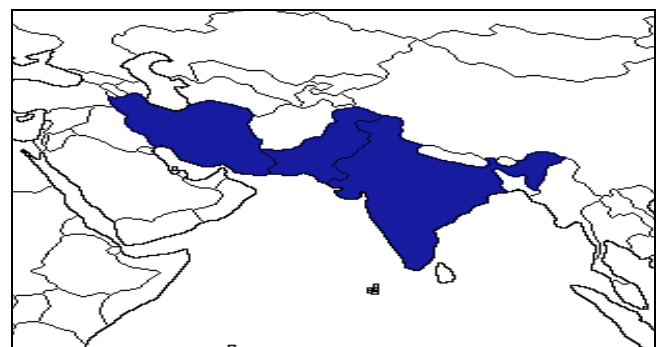
Antennae reaching the apices of hind angle of pronotum, Apical margin of parameres truncate, Pronotum without depressions, Pronotum without distinct median line, parameres and median lobe equal in length

**3.9 Material examined**

Pakistan: 1♂, 1♀, Sindh Prov., Tandojam, 12.vi.2015, R.A. Depar, Horticulture garden.



**Fig 8: *Lanelater bipunctatus* (Candèze)**



**Fig 9: *Lanelater bipunctatus* (Candèze)**

**3.10 *Heteroderes heydeni* (Reitter, 1891)**

**3.10.1 Taxonomic Hierarchy**

Order: Coleoptera, Linnaeus, 1758  
 Suborder: Polyphaga, Emery, 1886  
 Superfamily: Elateroidea, Leach, 1815  
 Family: Elateridae, Leach, 1815  
 Subfamily: Agrypninae Candèze, 1857  
 Tribe: Oophorini Gistel, 1848  
 Genus: *Heteroderes* Latreille 1834  
 Species: *heydeni*  
 Author: Reitter  
 Year: 1891

### 3.11 Description

Head blackish, thorax and abdomen ferruginous brown, Length 6.5-7mm; width 1.5-1.75mm. Head globose anteriorly, Pronotum longer than broad, sides, entire angles acute, pointed with a distinct carina, without spine at base.

### 3.12 Material examined

Pakistan: 1♂, 1♀, Sindh Prov., Tandojam, 12.vi.2015, R.A. Depar, Horticulture garden

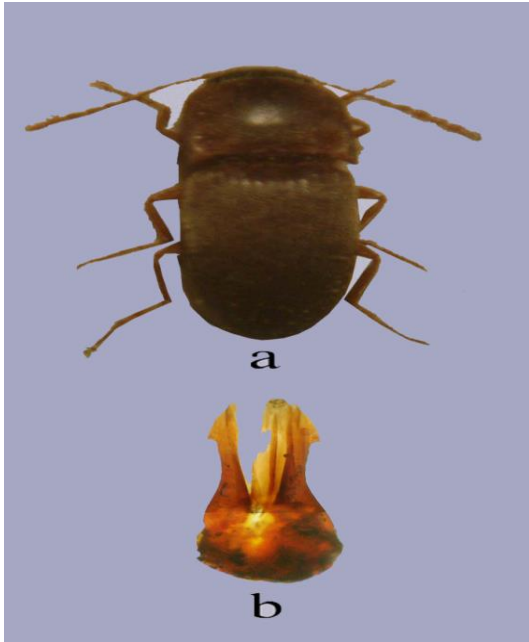


Fig 10: *Heteroderes heydeni* (Reitter)

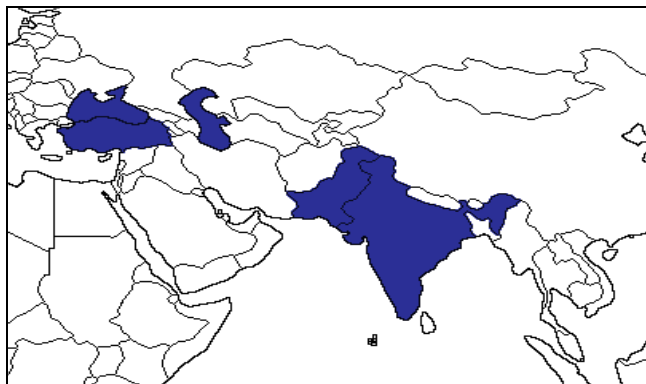


Fig 11: *Heteroderes heydeni* (Reitter)

### 3.13 *Heteroderes lenis* (Candeze, 1891)

#### 3.13.1 Taxonomic Hierarchy

Order: Coleoptera, Linnaeus, 1758  
 Suborder: Polyphaga, Emery, 1886  
 Superfamily: Elateroidea, Leach, 1815  
 Family: Elateridae, Leach, 1815  
 Subfamily: Agrypninae Candèze, 1857  
 Tribe: Oophorini Gistel, 1848  
 Genus: *Heteroderes* Latreille 1834  
 Species: *lenis*  
 Author: Candeze  
 Year: 1891

### 3.14 Description

Adults entire blackish brown, legs and antennae rust brown, length 11-13mm, head depressed and dilated anteriorly, clypeus with anterior margin rounded; Pronotum longer than

broader, sides entire, aedeagus with median lobe shorter than parameres.

### 3.15 Material examined

Pakistan: 1♂, 1♀, Sindh Prov., Tandojam, 12.vi.2015, R.A. Depar, Horticulture garden.



Fig 12: *Heteroderes lenis* (Candeze)



Fig 13: *Heteroderes lenis* (Candeze)

### 3.16 *Melanotus punctosus* (Walker, 1858)

#### 3.16.1 Taxonomic Hierarchy

Order: Coleoptera, Linnaeus, 1758  
 Suborder: Polyphaga, Emery, 1886  
 Superfamily: Elateroidea, Leach, 1815  
 Family: Elateridae, Leach, 1815  
 Subfamily: Elaterinae, Leach, 1815  
 Tribe: Ampedini, Johnson, 2002  
 Genus: *Melanotus* Eschscholtz 1829  
 Species: *punctosus*  
 Author: Walker  
 Year: 1858

### 3.17 Description

Adults Entirely blackish, shiny with antennae and legs ferruginous brown, length 12-18mm; width 3.8-4.5mm. Head with eyes slightly narrower than anterior margin of pronotum; Pronotum longer than broader, aedeagus with median lobe evidently longer than parameres, basally broad.

### 3.18 Material examined

Pakistan: 1♂, 1♀, Sindh Prov., Tandojam, 12.vi.2015, R.A. Depar, Horticulture garden.

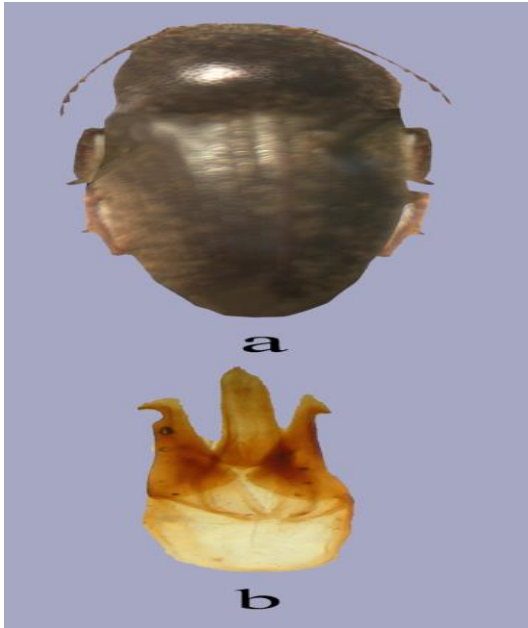


Fig 14: *Melanotus punctosus* (Walker)

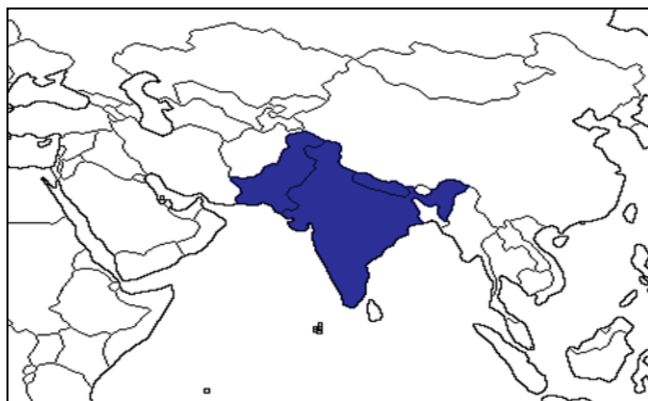


Fig 15: *Melanotus punctosus* (Walker)

### 3.18 *Melanotus punctolineatus* Pelerin, 1829

#### 3.18.1 Taxonomic Hierarchy

Order: Coleoptera, Linnaeus, 1758  
 Suborder: Polyphaga, Emery, 1886  
 Superfamily: Elateroidea, Leach, 1815  
 Family: Elateridae, Leach, 1815  
 Subfamily: Elaterinae, Leach, 1815  
 Tribe: Ampedini, Johnson, 2002  
 Genus: *Melanotus* Eschscholtz 1829  
 Species: *punctolineatus*  
 Author: Pelerin  
 Year: 1829

#### 3.19 Description

Unicolourous black and elongated, with tapering elytra, more pronounced in the male. Longitudinal rows of pits are obvious running the length of the elytra, as well as densely scattered shallower pits also covering the elytra and the pronotum. There is a dense covering of brown hairs.

#### 3.20 Material examined

Pakistan: 1♂, 1♀, Sindh Prov., Tandojam, 12.vi.2015, R.A. Depar, Horticulture garden. Distribution, Pakistan, India Europe.

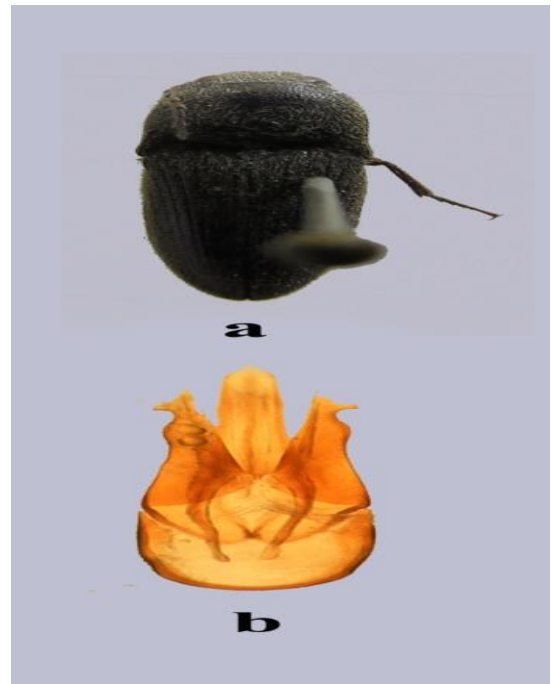


Fig 16: *Melanotus punctolineatus* Pelerin, 1829

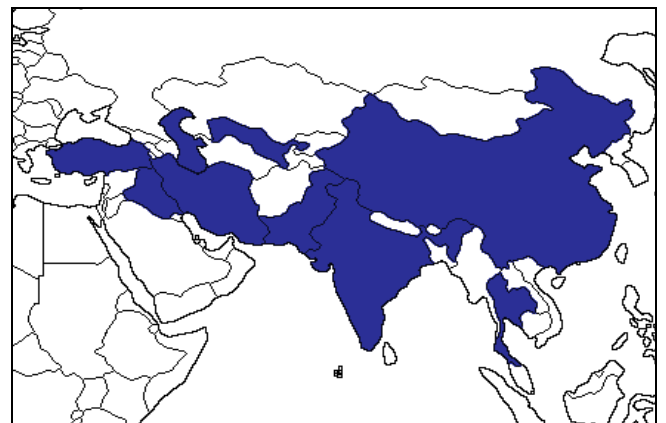


Fig 17: *Melanotus punctolineatus* Pelerin, 1829

### 3.21 *Cardiophorus varius* Cate *et al.*, 2002

#### 3.21.1 Taxonomic Hierarchy

Order: Coleoptera, Linnaeus, 1758  
 Suborder: Polyphaga, Emery, 1886  
 Superfamily: Elateroidea, Leach, 1815  
 Family: Elateridae, Leach, 1815  
 Subfamily: Cardiophorinae (Candèze, 1860)  
 Genus: *Cardiophorus* Eschscholtz, 1829  
 Species: *varius*  
 Author: Cate *et al.*,  
 Year: 2002

#### 3.22 Description

Head, Pronotum, scutellum and legs chocolate brown, Length 5.8-8mm; width 1.8-2.5mm. Head Moderately lobulate, depressed, deep punctures with sparse vestiture. Prothorax broader than longer, sides entire, aedeagus with median lobe longer than parameres.

#### 3.23 Material examined

Pakistan: 1♂, 1♀, Sindh Prov., Tandojam, 12.vi.2015, R.A. Depar, Horticulture garden.

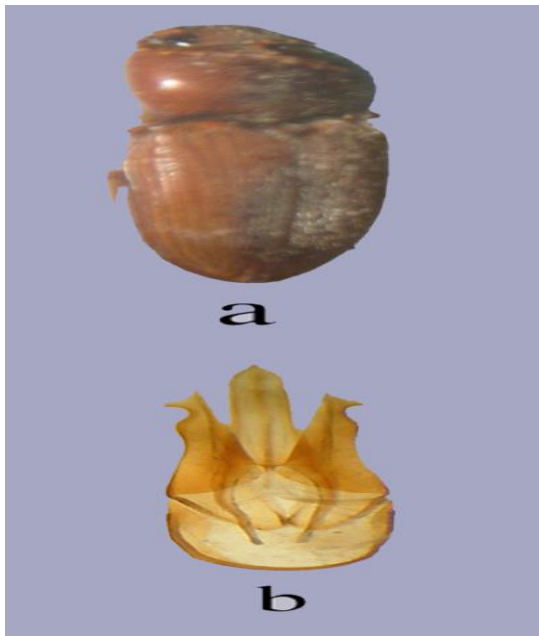


Fig 18: *Cardiophorus varius* Cate et al., 2002

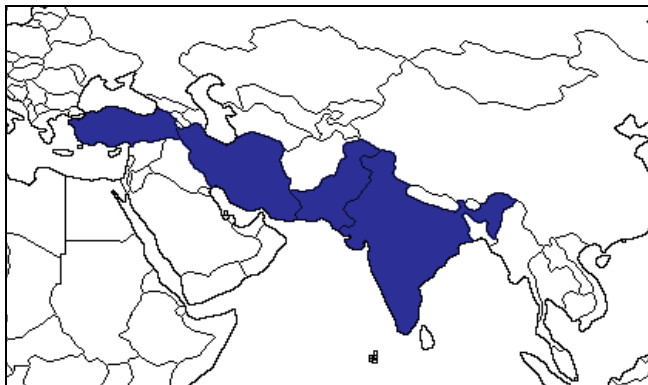


Fig 19: *Cardiophorus varius* Cate et al., 2002

#### 4. Discussion

Pakistan is situated in Southern Asia between in the East in has India on the West Afghanistan and Iran. Pakistan is the west part of the Oriental region and the fauna of this country has some provisional characteristics among the Palearctic and Oriental regions. Elements within the present studies limits Tandojam consists of Palearctic and Ethiopian fauna. Dr. Guido Sabatinelli as head of the (WHO) office for Pakistan. After flood in Pakistan in 2010, collected elaterids and Platia (2015) expert on world Elaterid fauna published that data interestingly he described 20 new species and 18 new country records for Pakistan. He described one species *Melanotus punctosinus* Cate, Platia & Schimmel, 2002, from Sindh Province, Hyderabad collected by Atique on August 26-2007; and other record from Tharparkar, Mithi on 19.VII.2008. All new species holotypes were from Norther part of Pakistan. Some of gn species studied from Tandojam had very close association with allied species within same genera; *Heteroderes heydeni* (Reiter) is closely related to *H. gallagheri* in having antennal segment 2<sup>nd</sup> and 3<sup>rd</sup> not equal, pronotum without spine and hind angles of pronotum acute but can be easily separated by having last antennal segment cylindrical in *H. heydeni*. *Heteroderes lenis* (Candèze) similarity relates to *Heteroderes subtilis* in having clypeus with anterior margin rounded, hind angles of pronotum truncated, but can be easily separated by having scutellum lobate shaped in *H. lenis*. *Melanotus punctosus* (Walker) is found allied to *M. badgleyi* with shape of scutellum, it can be

distinguished from *M. badgleyi* presence of small erect pubescence. *Cardiophorus varius* Cate et al., 2002 is very similar to *Dicronychus hobertlandi* in general body shape, color and male genitalia but it can easily be separated from same having simple claws and two median struts just enter the basal cavity of male genitalia.

#### 5. Conclusion

In present study total 08 species of family Elateridae are found from Tandojam

#### 6. Acknowledgment

We are thankful to our friends who helped us to make this research complete.

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