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## Faunistic Record of Click Beetles (Elateridae: Coleoptera) from Tea Gardens of Darjeeling, West Bengal, India

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### ABSTRACT

Eleven species are recorded from six tea gardens of Darjeeling namely Badamtam T.E., Ging T.E., Happy valley T.E., Namring T.E., Selimhill T.E. and Thurbo T.E. of Darjeeling. Out of these six are recorded for the first time from Darjeeling. It is to mention that one species of *Melanotus* Eschscholtz is considered as new to science.

**Keywords:** *Agrypnus costicollis*, *Aeoloderma brachmana*, *Conoderus longipenis*, *Cardiophorus flexus*, *Phorocardius moorii*, *Horistonotus spatulatus*, *Melanotus cribriventris*, *Melanotus fuscus*, *Melanotus kumaunensis*, *Melanotus bifoveatus*, Click beetle, Tea Garden, Darjeeling, West Bengal

### 1. INTRODUCTION

Elaterids are commonly called click beetles. They are one of the important group of insects having considerable significance as pests, predators and pollinators. These beetles are

one of the classical example of insects exhibiting a wide range of diversity by virtue of their occurrence in the entire zoogeographical region. Nearly 16,740 species under 840 genera of elaterids are present globally (<http://insectoid.info/beetles/click-beetles/>). And in India about 527 species under 102 genera present (<http://insectoid.info/checklist/elateridae/india/>). In 1979, Stibik proposed the higher classification of elaterids. He (op.cit.) dealt up to tribes and provided keys and diagnosis for each of the higher taxa. In the past few decades several authors Vats & Chauhan (1991a,b,c; 1992a,b,c,d,e,f,g,h; 1993); Vats & Kashyap (1992a,b,c,d,e,f; 1995a,b; 1996); Vats & Vasu (1993a,b,c,d,e,f); Punan *et.al* (1995; 1997a,b,c); Punam & Saini (1996); Punam & Vasu (1996a,b); Garg & Vasu (1997; 1998; 1999a,b); Garg *et.al* (1998); Vasu & Garg (1998a,b; 1999); Chakraborty & Chakraborty (2000, 2006); Schimmel (2007); Patwardhan & Athalye (2008; 2010a,b; 2012); Patwardhan *et al.* (2008, 2009a,b); Schimmel & Tarnawski (2012); Sarkar *et.al* (2012; 2015a,b,c; 2016a,b) have enriched our knowledge on Indian Elateridae. In order to explore other available habitats, attempt is made to unveil the diversity spectrum of the said beetles in tea ecosystem of Darjeeling. The species are considered sensu <http://insectoid.info/beetles/click-beetles/>.

## 2. MATERIAL & METHODS

Click beetles were mainly collected during April, 2012 to March, 2014 by visual search, hand picking and UV light trap. Collected samples were preserved following Chakraborty & Chakrabarti (2006). The recorded samples were studied under Stereo Zoom Binocular Microscopes Olympus SZX7 and SZX 16.

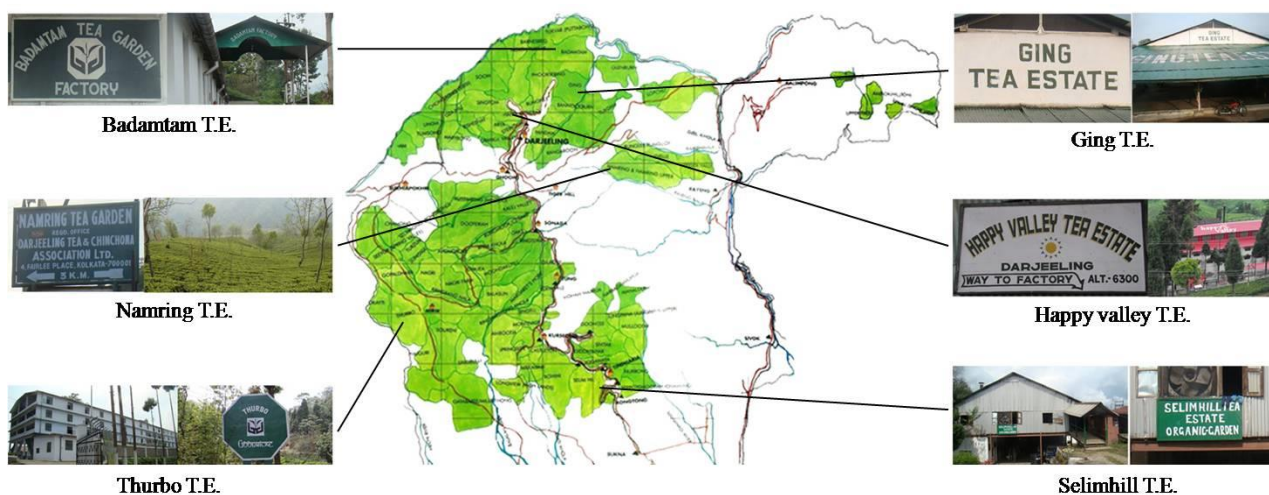
Materials are in the deposition of Department of Agricultural Biotechnology, Ramakrishna Mission Vivekananda University.

### Abbreviations and symbol used

T.E.- Tea Estate.

\* New to Darjeeling.

### 2. 2. Study Area



### 3. RESULTS

#### A. Subfamily: Agrypninae

##### I. Tribe: Agrypnini

##### 1. *Agrypnus costicollis* (Candeze)

[Plate: 1, Fig. a]

1857. *Lacon costicollis* Candeze, *Mem. Soc. r. Sci. Liege*, 12: 116.

1971. *Agrypnus costicollis* Ohira, *Annls. Hist. Nat. Mus. Natn. hung*, 63 : 205.

1973. *Agrypnus costicollis* von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.) Suppl.*, 20: 144.

1979. *Agrypnus costicollis* von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.)*, 38(5): 216.

**Material Examined:** 2♀♀, Happy valley T.E., Darjeeling, West Bengal, India, Coll. S. Saha, 17.vii.2012.

**Distribution:** India: Assam, Sikkim, Uttar Pradesh, West Bengal (Kolkata & Darjeeling); Cambodia, Nepal, Tonkin, Yunnan [Chakraborty & Chakrabarti, 2006; Ohira, 1971; Vats & Kashyap, 1992c; [http://insectoid.info/insecta/coleoptera/elateridae/agrypnus\\_costicollis/](http://insectoid.info/insecta/coleoptera/elateridae/agrypnus_costicollis/) accessed on 18.01.2017].

##### II. Tribe: Oophorini

##### 2. *Aeoloderma brachmana* (Candeze)\*

[Plate: 1, Fig. b]

1859. *Aeolus brachmana* Candeze, *Mon. Elat.*, II: 283, 345.

1929. *Aeoloderma brachmana* Fleutiaux, *Ency. Ent., Coleoptera*: 34.

1934. *Aeoloderma brachmana* Miwa, *Fauna Elat. Japan*: 192.

1967. *Aeoloderma brachmana* Ohira, *Ent. Rev., Japan, XIX (2)*: 41.

1970. *Aeoloderma brachmana* Ohira, *Annls. Hist. Nat. Mus. Natn. hung*, 62: 211.

1972. *Aeoloderma brachmana* Ohira, *Pacific Insects*, 14(1): 5.

**Material Examined:** 1♀, Happy valley T.E., Darjeeling, West Bengal, India, Coll. S. Saha, 17.vii.2012.

**Distribution:** India: West Bengal (Kolkata, North 24 Parganas & Darjeeling); Borneo, China, Formosa, Java, Myanmar, Philippines, Sri Lanka, Sulawesi, Sumatra, Taiwan, Vietnam [Chakraborty & Chakrabarti, 2006; Ohira, 1972; [http://insectoid.info/insecta/coleoptera/elateridae/aeolus\\_brachmana/](http://insectoid.info/insecta/coleoptera/elateridae/aeolus_brachmana/) accessed on 18.01.2017].

##### III. Tribe: Monocrepidini

##### 3. *Conoderus longipenis* Vats & Chauhan\*

[Plate: 1, Fig. c; Plate: 2, Fig. I]

1992. *Conoderus longipenis* Vats & Chauhan, *Uttar Pradesh J. Zool.*, 12 (1): 33.

**Material Examined:** 2♂♂, Happy valley T.E., Darjeeling, West Bengal, India, Coll. S. Saha, 17.vii.2012.

**Distribution:** India: Uttarakhand, West Bengal (Darjeeling) [Vats & Chauhan, 1992f; [http://insectoid.info/insecta/coleoptera/elateridae/conoderus\\_longipenis/](http://insectoid.info/insecta/coleoptera/elateridae/conoderus_longipenis/) accessed on 18.01.2017]

**B. Subfamily: Cardiophorinae**

**IV. Tribe: Cardiophorini**

**4. *Cardiophorus flexus* Vats & Chauhan\***

**[Plate: 1, Fig. d; Plate: 2, Fig. m]**

1991. *Cardiophorus flexus* Vats & Chauhan, *Res. Bull. (Sci.) Panjab University*, 42 (I-IV): 15.

**Material Examined:** 2♂♂ & 1♀, Ging T.E., Darjeeling, West Bengal, India, Coll. D. Raychaudhuri, 17.v.2013; 2♀♀ & 1♂, Ging T.E., Darjeeling, West Bengal, India, Coll. S. Sarkar, 17.v.2013; 1♀, Ging T.E., Darjeeling, West Bengal, India, Coll. D. Dhali, 17.v.2013; 1♂, Ging T.E., Darjeeling, West Bengal, India, Coll. S. Saha, 17.v.2013; 2♂♂ & 1♀, Ging T.E., Darjeeling, West Bengal, India, Coll. T. K. Roy, 17.v.2013; 1♂, Namring T.E., Darjeeling, West Bengal, India, Coll. T. K. Roy, 18.v.2013; 1♀, Namring T.E., Darjeeling, West Bengal, India, Coll. D. Raychaudhuri, 18.v.2013; 1♀, Namring T.E., Darjeeling, West Bengal, India, Coll. S. Sarkar, 18.v.2013.

**Distribution:** India: Haryana, West Bengal (Darjeeling) [Vats & Chauhan, 1991b; [http://insectoid.info/insecta/coleoptera/elateridae/cardiophorus\\_flexus/](http://insectoid.info/insecta/coleoptera/elateridae/cardiophorus_flexus/) accessed on 18.01.2017].

**5. *Phorocardius moorii* (Candeze)**

**[Plate: 1, Fig. e; Plate: 2, Fig. n]**

1860. *Cardiophorus moorii* Candeze, *Mon. Elat.*, 3: 206.

1971. *Phorocardius moorii* Ohira, *Annls. Hist. Nat. Mus. Natn. Hung.*, 63: 215.

**Material Examined:** 1♂, Ging T.E., Darjeeling, West Bengal, India, Coll. S. Saha, 25.iv.2013; 1♂, Ging T.E., Darjeeling, West Bengal, India, Coll. D. Dhali, 26.iv.2013; 1♂ & 1♀, Ging T.E., Darjeeling, West Bengal, India, Coll. S. Sarkar, 26.iv.2013; 1♂, Ging T.E., Darjeeling, West Bengal, India, Coll. D. Raychaudhuri, 14.v.2013; 1♂, Ging T.E., Darjeeling, West Bengal, India, Coll. D. Raychaudhuri, 17.v.2013; 2♂, Ging T.E., Darjeeling, West Bengal, India, Coll. S. Sarkar, 17.v.2013; 2♂, Ging T.E., Darjeeling, West Bengal, India, Coll. T. K. Roy, 17.v.2013.

**Distribution:** India: Sikkim, Tamil Nadu, West Bengal (Darjeeling); Bhutan [Chakraborty & Chakrabarti, 2006; Ohira, 1971; [http://insectoid.info/insecta/coleoptera/elateridae/phorocardius\\_moorii/](http://insectoid.info/insecta/coleoptera/elateridae/phorocardius_moorii/) accessed on 18.01.2017]

**6. *Horistonotus spatulatus* Vats & Chauhan\***

**[Plate: 1, Fig. f]**

1993. *Horistonotus spatulatus* Vats & Chauhan, *J. Ent. Res.*, 17(1): 37.

**Material Examined:** 1♀, Badamtam T.E., Darjeeling, West Bengal, India, Coll. T. K. Roy, 24.iv.2013.

**Distribution:** India: Himachal Pradesh, Jammu & Kashmir, Uttarakhand, Uttar Pradesh, West Bengal (Darjeeling) [Vats & Chauhan, 1993]  
[http://insectoid.info/insecta/coleoptera/elateridae/horistonotus\\_spatulatus/](http://insectoid.info/insecta/coleoptera/elateridae/horistonotus_spatulatus/) [accessed on 18.01.2017]

**C. Subfamily: Elaterinae**

**V. Tribe: Ampedini**

**7. *Melanotus cribriventris* Blatchley**

**[Plate: 1, Fig. g; Plate: 2, Fig. o]**

1860. *Melanotus longicornis* Candeze, *Mon. Elat.* III: 332.

1910. *Melanotus cribriventris* Blatchley, An illustrated descriptive catalogue of the Coleoptera or beetles (exclusive of the Rhynchophora) known to occur in Indiana: 747.

**Material Examined:** 1♂, Happy valley T.E., Darjeeling, West Bengal, India, Coll. S. Saha, 17.vii.2012.

**Distribution:** India: Assam, Sikkim, West Bengal, (Darjeeling & Kolkata); China, Sri Lanka, USA [Chakraborty & Chakrabarti, 2006; Ohira, 1971; Quate & Thompson, 1967; [http://insectoid.info/insecta/coleoptera/elateridae/melanotus\\_cribriventris/](http://insectoid.info/insecta/coleoptera/elateridae/melanotus_cribriventris/) accessed on 18.01.2017]

**8. *Melanotus fuscus* (Fabricius)**

**[Plate: 1, Fig. h; Plate: 2, Fig. p]**

1801. *Elater fuscus* Fabricius, *Syst. Eleuth.* II: 228.

1860. *Melanotus fuscus* Candeze, *Mon. Elat.*, III: 335.

**Material Examined:** 2♂♂, Happy valley T.E., Darjeeling, West Bengal, India, Coll. S. Saha, 17.vii.2012; 1♀, Namring T.E., Darjeeling, West Bengal, India, Coll. S. Sarkar, 18.v.2013.

**Distribution:** India: Sikkim, Tripura, West Bengal. (Darjeeling, Jalpaiguri, Kolkata & Murshidabad); Ambon, Cambodia, Indonesia, Laos, Myanmar, Sri Lanka, Taiwan, Thailand, Vietnam, Yunnan. [Chakraborty & Chakrabarti, 2006; Ohira 1970; [http://insectoid.info/insecta/coleoptera/elateridae/melanotus\\_fuscus/](http://insectoid.info/insecta/coleoptera/elateridae/melanotus_fuscus/) accessed on 18.01.2017].

**9. *Melanotus kumaunensis* Vats & Chauhan\***

**[Plate: 1, Fig. i]**

1991. *Melanotus kumaunensis* Vats & Chauhan, *J. ent. Res.*, 15(3): 188.

**Material Examined:** 1♀, Happy valley T.E., Darjeeling, West Bengal, India, Coll. S. Saha, 17.vii.2012.

**Distribution:** India: Uttarakhand, West Bengal (Darjeeling) [Vats & Chauhan, 1991a; [http://insectoid.info/insecta/coleoptera/elateridae/melanotus\\_kumaunensis/](http://insectoid.info/insecta/coleoptera/elateridae/melanotus_kumaunensis/) accessed on 18.01.2017]. [mis spelt in Vats & Chauhan, 1991; [http://insectoid.info/insecta/coleoptera/elateridae/melanotus\\_kumaunensis/](http://insectoid.info/insecta/coleoptera/elateridae/melanotus_kumaunensis/) accessed on 18.01.2017; Type locality : Almora that falls within Kumaun Himalaya; for further detail see Final Technical Report, L.K. Vats, 1991]

**10. *Melanotus bifoveatus* Vats & Chauhan\***

[Plate: 1, Fig. j]

1991. *Melanotus bifoveatus* Vats & Chauhan, *J. Ent. Res.*, 15(3): 192.

**Material Examined:** 2♀♀, Happy valley T.E., Darjeeling, West Bengal, India, Coll. S. Saha, 17.vii.2012.

**Distribution:** India: Uttrakhand, West Bengal (Darjeeling) [Vats & Chauhan, 1991a; [http://insectoid.info/insecta/coleoptera/elateridae/melanotus\\_bifoveatus/](http://insectoid.info/insecta/coleoptera/elateridae/melanotus_bifoveatus/) accessed on 18.01.2017].

**11. *Melanotus* n. sp. (to be communicated elsewhere)**

[Plate: 1, Fig.: k; Plate: 2, Fig. q]

**Material Examined:** 2♂♂, Happy valley T.E., Darjeeling, West Bengal, India, Coll. S. Saha, 17.vii.2012.

**Distribution:** India: West Bengal (Darjeeling).

#### 4. DISCUSSION AND CONCLUSIONS

First ever attempt to explore elaterids in tea ecosystem of Darjeeling has lead to the recognition of 11 species of which a *Melanotus* species is considered new to science. Six more species viz., *Aeoloderma brachmana* (Oophorini), *Conoderus longipenis* (Monocrepidiini), *Cardiophorus flexus*, *Phorocardius moorii*, *Horistonotus spatulatus* (Cardiophorini) and *Melanotus kumaunensis* (Ampedini) are additions to the list of recorded species from Darjeeling. It is probable that such habitat is conducive for the click beetles to sustain. However, further data may conclude on their regular occurrence and exploitation of the habitat.

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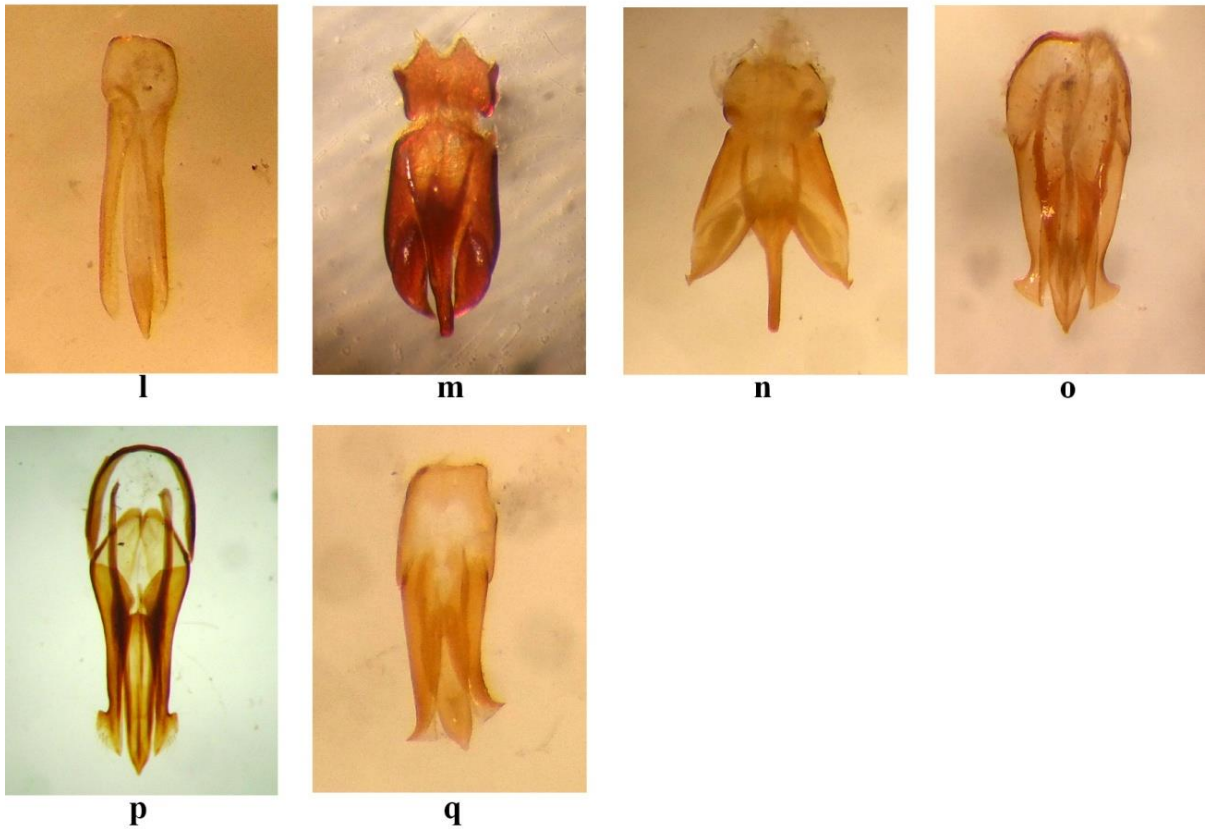
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Plate : 1



**Fig.** Dorsal habitus of **a.** *Agrypnus costicollis* (Candeze); **b.** *Aeoloderma brachmana* (Candeze); **c.** *Conoderus longipenis* Vats & Chauhan; **d.** *Cardiophorus flexus* Vats & Chauhan; **e.** *Phorocardius moorii* (Candeze); **f.** *Horistonotus spatulatus* Vats & Chauhan; **g.** *Melanotus cribriventris* Blatchley; **h.** *Melanotus fuscus* (Fabricius); **i.** *Melanotus kumaunensis* Vats & Chauhan; **j.** *Melanotus bifoveatus* Vats & Chauhan; **k.** *Melanotus* n. sp.

Plate : 2



**Fig.** Male genitalia of **l.** *Conoderus longipenis* Vats & Chauhan; **m.** *Cardiophorus flexus* Vats & Chauhan; **n.** *Phorocardius moorii* (Candeze); **o.** *Melanotus cribriventris* Blatchley; **p.** *Melanotus fuscus* (Fabricius); **q.** *Melanotus* n. sp.