

TAXONOMIC ACCOUNT OF DYNASTINAE FAUNA (COLEOPTERA: SCARABAEIDAE) OF BUXA TIGER RESERVE (WEST BENGAL, INDIA)

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Systematics of Dynastinae fauna included under 8 genera recorded from Buxa Tiger Reserve, Dooars, West Bengal are dealt with. The generated data is the outcome of long term faunistic investigations of the authors. Each of the taxa is diagnosed, described and illustrated supplementarily by digital images. Further, keys to genera and species are also provided.

Key words: Dynastinae, new records, Dooars, Buxa Tiger Reserve, India.

INTRODUCTION

Though Dynastinae does not rank among the large subfamilies of Scarabaeidae yet is extremely important for their economic importance as pests. The members of the group are included within eight tribes, out of which only Oryctoderini represents the oriental species (Ratcliffe & Jameson, 2014). Endrödi (1985) in his world catalogue provided a concise knowledge on the taxonomy of the group. In the New World there are approximately 87 genera (Ratcliffe 1981; Endrödi 1985), while exact knowledge on the total number of genera and species from this part of the globe is still wanting and is limited to the monographic works of Arrow (1910) and Balthasar (1963). Indian members are known by 46 species only (Arrow, 1910; Balthasar, 1963; Chatterjee & Biswas 1995). Moreover, some regional works on Indian Dynastinae were done by Biswas (1978), Saha & Raychaudhuri (1998), Chandra (1988, 2000, 2004), Chandra & Singh (2004), Chandra & Ahirwar (2005), Chandra & Uniyal (2007), Sarkar *et al.* (2010).

It is worthwhile mentioning that Entomology Laboratory, University of Calcutta since 1993 is engaged in the exploration of scarab fauna of Dooars.

Detail taxonomy of the members of Oryctoderini (Dynastinae) recorded from Buxa Tiger Reserve (BTR) is presented hereunder. The taxa are considered sensu Ratcliffe & Jameson (2014).

Out of the 8 recorded species, *Microrhyctes monodon* (Fairmaire) is reported as new from the country, while *Eophileurus platypterus* (Wiedemann) from the state and *Alissonotum crassum* Arrow, *Heteronychus lioderes* Redtenbacher, *Oryctes rhinoceros* (Linnaeus) and *Phyllognathus Dionysius* (Fabricius) from the study area (Sarkar *et al.*, 2010).

MATERIAL AND METHODS

Both extensive and intensive surveys were conducted during 1993-2005 in different beats under different ranges of Buxa Tiger Reserve. Field visits were made every month of each calendar year during the period of survey (except for 15th June to 15th September when the forest remains closed). For collection of scarabs sweep nets, bush beating and collection in inverted umbrella, hand picking techniques were used. Several pit fall traps were laid in the collection localities of the Reserve to trap ground dwelling scarabs. Dung of various animals was also examined to make collections. In the evening hours UV light trap was used to collect nocturnal scarabs. Samples after collection were killed in chloroform and preserved in 70% alcohol in glass vials. Necessary data regarding locality, date of collection, collector's name was noted in a note book in the field. They were then brought to the laboratory where stretching, pinning and labeling is done as per the guidelines laid down by Zoological Survey of India. Part of the male samples stored in 70% alcohol were kept separately in order to dissect out the genitalia. This was met out under the microscope with the help of very sharp scalpel, forceps, needles and brush. After dissection the genital capsule containing parameres was cleared in clove oil. The genital capsule was then boiled in 10% KOH for 5-10 minutes to remove muscles. After study, the male genitalia were preserved in a micro vial containing 70% alcohol along with the adult specimen.

The samples were studied under Sterozoom Binocular Microscopes Zeiss SV6, SV11 and Olympus SZ 30. Drawings were made with the aid of necessary accessories attached to the microscopes SV6 and SV11. Photographs were taken by a digital camera attached to the microscopes. All measurements are in millimeters, made with an eye piece graticule and each scale bar represents 1 mm, if not otherwise mentioned.

All materials are preserved in the collection of Entomology Laboratory, Department of Zoology, University of Calcutta, Kolkata, India.

RESULTS

DYNASTINAE MacLeay, 1819 (Common name: Rhinoceros beetles)

Diagnosis: Elongate or short, compact, usually globose & convex. Head transverse, males usually with horn. Clypeus small with apex more or less reflexed. Pronotum bluntly triangular. Antenna 9-10 segmented. Labrum hidden beneath clypeus. Each of mid and hind tibial apex with 2 spurs. Tarsal claws usually equal.

Biological notes: Members of Dynastinae are commonly called as rhinoceros beetles because of the characteristic horn borne by the males. Such horns are dedicated in mating battle against other males. Their greatest economic importance

is as pests: *Oryctes rhinoceros* (Linnaeus) especially can defoliate and sometimes kill coconut and oil palms in the SE Asian and Pacific regions.

Distribution: Central & South America, Europe, South East Africa, Asia & Australia (Arrow, 1910; Ratcliffe & Jameson, 2014; GBIF, 2014).

Tribe Oryctoderini

Key to Genera

1. Propygidium with stridulatory file/s or ridges..... 2
- Propygidium without stridulatory file/s or ridges..... 5
2. Head provided with horn 3
- Head not provided with horn 4
3. Clypeus pointed at front; mid and hind tibiae truncate at extremity and fringed with spines.....*Phyllognathus* Eschsch
- Clypeus bifid at front; mid and hind tibiae digitate at extremity and not fringed with spines.....*Oryctes* Illiger
4. Fronto clypeal suture carinate.....*Heteronychus* Burmeister
- Fronto clypeal suture tuberculate.....*Alissonotum* Arrow
5. Fronto clypeal suture with tubercle/s..... 6
- Fronto clypeal suture without tubercle/s..... 7
6. Fronto clypeal suture with two tubercles.....*Clyster* Arrow
- Fronto clypeal suture with one tubercle..... *Microrhyctes* Arrow
7. Pronotum medially with an apically bifurcate horn, clypeus bidentate*Xylotrupes* Hope
- Pronotum without horn, clypeus not bidentate.....*Eophileurus* Arrow

Genus *Phyllognathus* Eschsch

Phyllognathus, Eschsch, 1830, Bull. Soc. Moscou, p. 65.

Diagnosis: Short, more or less compact, globose and convex; head short, horned in males; clypeus short and usually pointed, reflexed at front; pronotum transverse; elytra distinctly or indistinctly punctate striate; fore tibia tridentate, mid and hind tibiae truncate at extremity and fringed with closely set short spines.

Type species: *Geotrupes silenus* Fabricius, 1788.

Distribution: India, Southern Europe, South-Western Asia and West Africa (Arrow 1910; Chatterjee & Biswas, 1995).

Phyllognathus dionysius (Fabricius)

(Plate I A; Fig. 1)

Scarabaeus dionysius Fabricius, 1792, Ent. Syst, 1: 20.

Phyllognathus dionysius Arrow, 1910, The fauna of British India including Ceylon and Burma (Col: Lamellicornia: Cetoninae & Dynastinae), i, p. 307.

Description: Male

Length: 17.62 mm; **humeral width** 10.00 mm. Body short, compact, globose and convex.

Colour and markings (Plate I A; Fig. 1 a): Dorsum shiny red brown with the margins of head, clypeus, pronotum, scutellum and elytra black; venter with long tawny hairs.

Head (Fig. 1 a, b, c): Rugo-punctate, triangular with the outer angles obtuse; armed with a long, recurved, basally dilated, parallel sided, apically triangular and acute horn.

Clypeus (Fig. 1 b, c): Rugose, bluntly pointed and reflexed at the middle of front with margins elevated.

Fronto - Clypeal suture (Fig. 1 a, b): Marked by the horn.

Interocular width 4 x transverse eye diameter.

Antenna (Fig. 1 d): 10 segmented, club 1.36 x stem.

Pronotum (Fig. 1 a): Minutely and densely punctured; transverse with sides round; front margin straight, immediate behind deeply excavate and strongly rugose, extending nearly up to 2/3rd of length; submedially close to front margin with an obtusely produced tubercle on each side, further laterally excavate; hind margin roundly extended at middle; front angles obtuse, hind angles round.

Scutellum (Fig. 1 a): minutely punctured, obtusely triangular.

Elytra (Fig. 1 a): Coarsely punctate-striate, striae medially defined and the intervals minutely punctured and nearly equal.

Propygidium (Fig. 1 e): Densely punctured with a longitudinal stridulatory file on each side of the middle.

Pygidium (Fig. 1 e): Minutely punctured, densely towards the margin and scantily at the centre; apex round.

Fore tibia (Fig. 1 f): Tridentate with one short pointed terminal spur.

Mid and hind tibiae (Fig. 1 g, h): Excavate externally, truncate at extremity, fringed with short spines and with 2 unequal terminal spurs.

Tarsi (Fig. 1 f, g, h): 5 segmented.

Claws (Fig. 1 f, g, h): equal and curved internally.

Parameres (Plate I A; Fig. 1 i, j): Short and broad; sides with two blunt and broad protuberance projecting outwards; base with a broad tubercle medially; apex progressively curved downwards and club shaped.

Female: Head armed with a sharp and small tubercle; pronotum with distinct and coarse punctures; pygidium thinly clothed with erect hairs.

Material examined: one Male, Rajabhatkhawa, 29.III.02, Coll.S.K. Sarkar; one Female, Poro, 28.III.03, Coll. S.K. Sarkar.

Distribution: India: Chattisgarh, Karnataka, Maharashtra, Orissa, Sikkim, Tamilnadu, West Bengal; Sri Lanka (Arrow, 1910; Chatterjee & Biswas, 1995; Sarkar *et al.*, 2010).

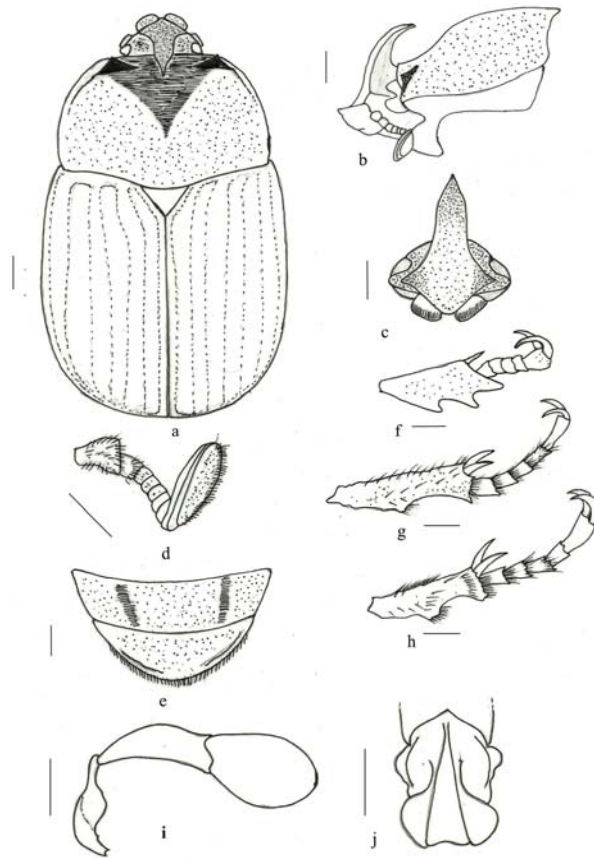


Fig. 1 (a-j). *Phyllognathus dionysius* (Fabricius): Male: a. Dorsal habitus; b. Head & Clypeus, lateral view; c. Head & Clypeus, frontal view; d. Antenna, lateral view; e. Propygidium & Pygidium, dorsal view; f. Fore tibia, tarsi & claws; g. Mid tibia, tarsi & claws; h. Hind tibia, tarsi & claws; i. Genital capsule, lateral view; j. Parameres, dorsal view.

Genus *Oryctes* Illiger

Oryctes Illiger, 1798, Kufer Preussens, p.11.

Diagnosis: Body narrowly cylindrical and convex; clypeus bifid with angles directed forward; head in both sexes armed with a horn, this longer in males; front angles of pronotum acute and hind angles round; entire surface of propygidium with stridulatory ridges; fore tibia tridentate or quadridentate; mid and hind tibiae digitate at extremity.

Type species: *Scarabaeus nasicornis* Linnaeus, 1783.

Distribution: Africa, Asia, Europe and Madagascar (Arrow 1910; Chatterjee & Biswas 1995; Sarkar *et al.*, 2010).

***Oryctes rhinoceros* (Linnaeus)**

(Plate I A; Fig. 2)

Scarabaeus rhinoceros Linnaeus, 1758, Syst. Nat. i, p.346.*Oryctes rhinoceros* Arrow, 1910, The fauna of British India including Ceylon and Burma (Col: Lamellicornia: Cetoninae & Dynastinae), 1: 278.**Description:** Female**Length:** 1.25 mm; **humeral width** 14.38 mm. Body, long, cylindrical and convex.**Colour and markings** (Plate I A; Fig. 2 a): Dorsum brown black and shiny; venter red brown and clothed with short erect hairs.**Head** (Fig. 2 a, b): Short, coarsely punctured and armed with a basally dilated, short, backwardly directed, blunt horn.**Clypeus** (Fig. 2 a, b): Coarsely punctured, bifid with angles acute and directed forward; outer margin straight and inner margin curved.**Fronto clypeal suture** (Fig. 2 a, b): Concealed and marked by the horn.**Interocular width** 3 x transverse eye diameter.**Antenna** (Fig. 2 c): 10 segmented, club 1.65 x stem.**Pronotum** (Fig. 2 a, b): Rugose at depressions and excavations, finely and minutely punctured at the rest; strongly margined with the front sinuate and bilobed; sides round; excavate from front margin to little beyond middle with margins of excavation carinate; further beyond with two depressions, one anterior on each side and another beneath along entire posterior and lateral margins.**Scutellum** (Fig. 2 a): Rugose, obtusely triangular with the sides gradually round.**Elytra** (Fig. 2 a): Coarsely, densely and annularly punctured in rows, forming closely set sutural lines, these becoming finer towards lateral side; outer and inner margins rather smooth with few fine and minute punctures; at apex with humps.**Propygidium** (Fig. 2 d): Coriaceous, with the entire surface having transverse stridulatory ridges.**Pygidium** (Fig. 2 d): Coriaceous, with centre elevated and apex blunt.**Fore tibia** (Fig. 2 e): Quadridentate, the 4th very short compared to rest, lower surface with a terminal tooth; spur single at tibial apex.**Mid and hind tibiae** (Fig. 2 f, g): Carinate externally, digitate at extremity with short spines at carinae and outer margins; terminally with two unequal spurs.**Tarsi** (Fig. 2 e, f, g): 5 segmented, 1st joint of mid and hind with one terminal spur.**Claws** (Fig. 2 e, f, g): Equal; strongly curved with the base broad.**Material examined:** two Females, Newlands, 29.IV.03, coll. S.K. Sarkar.**Distribution:** India: Maharashtra, Tamilnadu, West Bengal; China; Indonesia; Philippines; Singapore; South Korea (Arrow 1910; Chatterjee & Biswas 1995; Sarkar *et al.*, 2010).

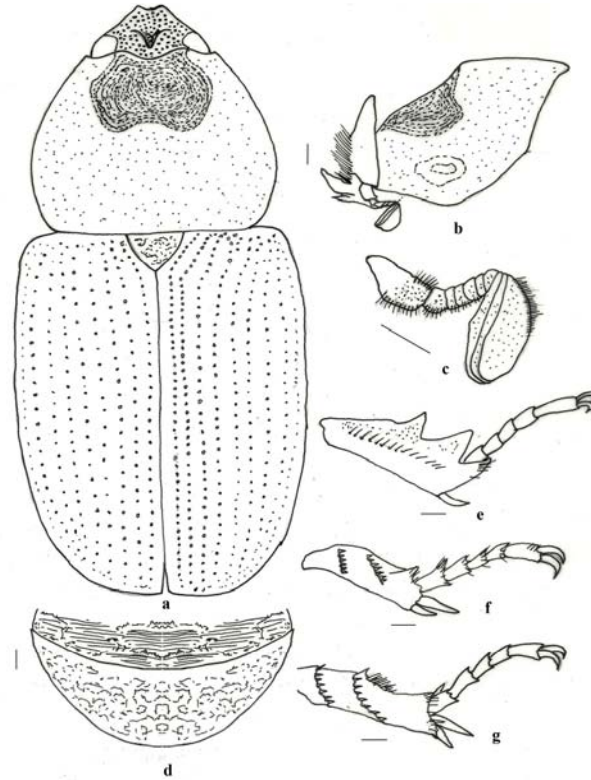


Fig. 2 (a-g). *Oryctes rhinoceros* (Linnaeus): Female: a. Dorsal habitus; b. Head & Clypeus, lateral view; c. Antenna, lateral view; d. Propygidium & Pygidium, dorsal view; e. Fore tibia, tarsi & claws; f. Mid tibia, tarsi & claws; g. Hind tibia, tarsi & claws.

Genus *Heteronychus* Burmeister

Heteronychus Burmeister, 1847, Handb. Ent. V, p. 90.

Diagnosis: Body short, convex, smooth and shining; clypeus bidentate in front with the tips tapering and reflexed; pronotum nearly smooth with the sides round; elytra deeply punctate striate; propygidium with longitudinal stridulatory ridges; fore tibia tridentate with three denticles; mid and hind tibiae digitate at extremity.

Type species: *Geotrupes arator* Fabricius, 1792.

Distribution: Africa and Southern Asia (Arrow 1910; Chatterjee & Biswas 1995; Sarkar *et al.*, 2010).

Heteronychus lioderes Redtenbacher

(Plate I A, Fig. 3)

Heteronychus lioderes Redtenbacher, 1867, Reise der Novara, Zool. ii.col, p.75.

Heteronychus lioderes Arrow, 1910, The fauna of British India including Ceylon and Burma (Col: Lamellicornia: Cetoninae & Dynastinae), i. p. 295.

Description: Female

Length: 13.50 mm; **humeral width** 06.25 mm. Body short, stumpy, oval and convex.

Colour and markings (Plate I A; Fig. 3 a): Dorsum black; venter reddish brown with few yellow erect hairs; smooth and shining excepting opaque pronotum and head.

Head (Fig. 3 a, b): Transversally rugose, these coarse anteriorly fine posteriorly.

Clypeus (Fig. 3 a, b): Rugopunctate; front margin notched at the middle forming two indentations with tips tapering and reflexed.

Fronto - Clypeal suture (Fig. 3 b): Carinate, interrupted at the middle.

Interocular width 4.75 x transverse eye diameter.

Antenna (Fig. 3 c): 10 segmented, club 1.2 x stem.

Pronotum (Fig. 3 a): Smooth, except for few scattered punctures; basally broad, anteriorly narrow; sides round, margined continued at front; front angles acute and hind angles obtuse.

Scutellum (Fig. 3 a): Smooth; triangular with apex acute.

Elytra (Fig. 3 a): Deeply punctate-striate; striae 11 on each disc, 2nd, 9th and 11th irregular; apical margin irregularly and densely punctured.

Propygidium (Fig. 3 d): Medially with two longitudinal stridulatory ridges.

Pygidium (Fig. 3 d): Coarsely punctured, these coalesce at margins; sides straight; apex blunt.

Fore tibia (Fig. 3 e): Tridentate with three denticles, one behind the second tooth and two short, behind the third; terminally with a long spur.

Mid and hind tibiae (Fig. 3 f, g): Carinate externally; truncate at extremity; fringed with short, stout spines at the end; terminally with two unequal spurs.

Tarsi (Fig. 3 e, f, g): 5 segmented.

Claws (Fig. 3 e, f, g): Equal, separately movable and curved internally.

Material examined: one Female, Poro, 17.IV.02, coll. S. K. Sarkar; 1Female, Cheko, 07.VI.02, coll. S. K. Sarkar.

Distribution: India: Assam, Orissa, West Bengal; Bangladesh; Indonesia; Malaysia; Myanmar; Nepal (Arrow, 1910; Chatterjee & Biswas, 1995; Sarkar *et al.*, 2010).

Genus *Alissonotum* Arrow

Alissonotum Arrow, 1908, Trans. Ent. Soc. Lond, p. 322.

Diagnosis: Body stumpy, convex and more or less shining; head with prominent interocular ridges; clypeus attenuated and bidentate at front; pronotum with an elevation at front; elytra punctate striate; propygidium medially with two longitudinal stridulatory files; fore tibia tridentate with three denticles; mid and hind tibiae truncate at the extremity.

Type species: *Geotrupes piceus* Fabricius, 1842.

Distribution: Southern Asia (Arrow 1910; Chatterjee & Biswas 1995; Sarkar *et al.*, 2010).

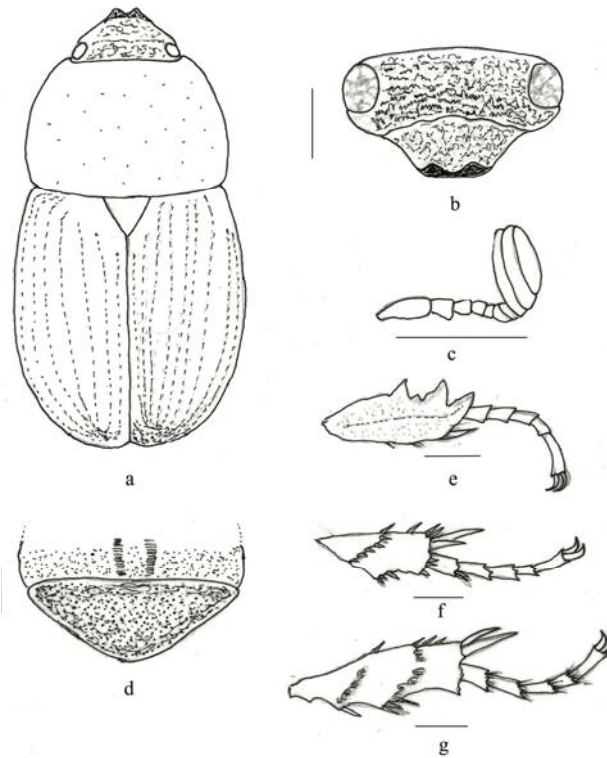


Fig. 3 (a-g). *Heteronychus lioderes* Redtenbacher: Female: a. Dorsal habitus; b. Head & Clypeus, lateral view; c. Antenna, lateral view; d. Propygidium & Pygidium, dorsal view; e. Fore tibia, tarsi & claws; f. Mid tibia, tarsi & claws; g. Hind tibia, tarsi & claws.

***Alissonotum crassum* Arrow**

(Plate I A; Fig. 4)

Alissonotum crassum Arrow, 1908, Trans. Ent. Soc. Lond., p. 323.

Description: Female

Length: 15.11 mm; **humeral width:** 7.55 mm. Body stumpy, oval and convex.

Colour and markings (Plate I A; Fig. 4 a): Smooth and shiny, head opaque; dorsum shiny brown excepting black head and clypeus; venter lighter than dorsum and with few yellow hairs.

Head (Fig. 4 a, b): Transversally rugose, base smooth; with prominent interocular ridges.

Clypeus (Fig. 4 a, b): Transversally rugose, attenuated in front; front margin reflexed and feebly notched at the middle forming two indentations.

Fronto clypeal suture (Fig. 4 a, b): Transverse with a tubercle on each side of the middle placed close together and pointed backwards.

Interocular width: 3.66 x transverse eye diameter.

Antenna (Fig. 4 c): 10 segmented, club 1.2 x stem.

Pronotum (Fig. 4 a): Closely punctured, coarser laterally, finer at rest; medially with a short elevation at front forming a shallow pit behind; sides round; front angles acute and hind angles round.

Scutellum (Fig. 4 a): Smooth; obtusely triangular; margin membranous.

Elytra (Fig. 4 a): Punctate-striate; striae 8 on each disc, sutural striae broad at base, 5th, 6th and 7th striae incomplete at humeral hump; subsutural interval with few coarse punctures; outer margins finely and extremities coarsely punctured.

Propygidium (Fig. 4 d): Finely rugose; scantily pubescent; medially produced with a longitudinal stridulatory file on each side.

Pygidium (Fig. 4 d): Coarsely and scantily punctured.

Fore tibia (Fig. 4 e): Tridentate with three denticles, one behind the second tooth and other two behind the third; terminally with one long spur.

Mid and hind tibiae (Fig. 4 f, g): Carinate externally; truncate at extremity; carinae and extremity have closely set spines; terminally with two unequal spurs.

Tarsi (Fig. 4 e, f, g): 5 segmented, slender with the basal joint of hind triangular and broader than other.

Claws (Fig. 4 e, f, g): Equal, separately movable and curved internally.

Material examined: one Female, Rajabhatkhawa, 29.III.02, coll. M. K. Biswas; one Female, Poro, 28.III.03, coll. S.K. Sarkar.

Distribution: India: Assam, West Bengal; Bangladesh; Myanmar (Arrow, 1910; Chatterjee & Biswas, 1995; Sarkar *et al.*, 2010).

Genus *Clyster* Arrow

Clyster Arrow, 1908, Trans. Ent. Soc. Lond., p. 10.

Diagnosis: Body cylindrical, convex, smooth and shining. Head produced in front. Clypeus produced, reflexed and bidentate at front. Pronotum with a transverse elevation at the middle. Elytra punctate striate in paired lines. Fore tibia tridentate with four denticles. Mid and hind tibiae digitate at the extremity.

Type species: *Scarabaeus itys* Olivier, 1882.

Distribution: India: West Bengal; Indonesia; Malayasia; Myanmar (Arrow, 1910; Chatterjee & Biswas, 1995; Saha & Raychaudhuri, 1998).

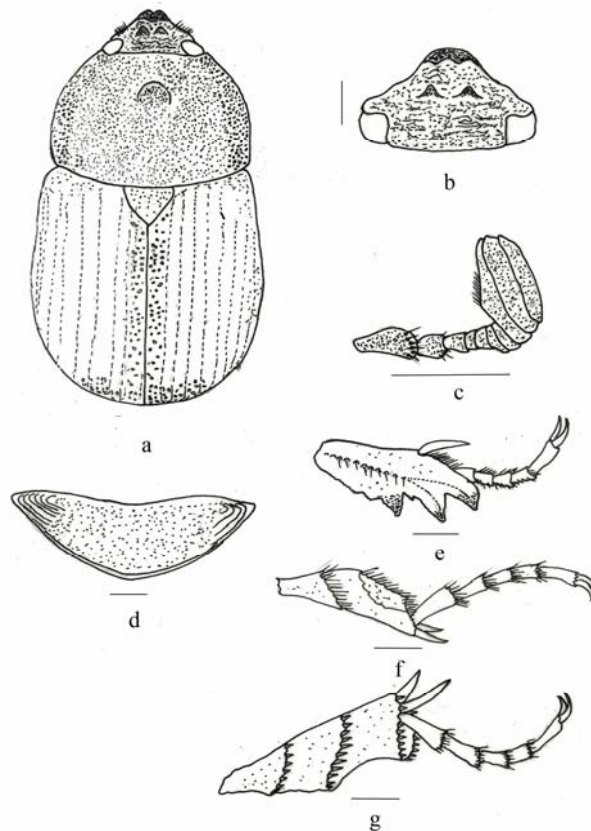


Fig. (4a-g). *Alissonotum crassum* Arrow: Female: a. Dorsal habitus; b. Head & Clypeus, dorsal view; c. Antenna, lateral view; d. Pygidium, dorsal view; e. Fore tibia, tarsi & claws; f. Mid tibia, tarsi & claws; g. Hind tibia, tarsi & claws.

***Clyster retusus* Arrow**
(Plate I A; Fig. 5)

Clyster retusus Arrow, 1908, Trans. Ent. Soc. Lond., p. 10.

Clyster retusus Arrow, 1910, The fauna of British India including Ceylon and Burma (Col: Lamellicornia: Cetoninae & Dynastinae), i. p. 293.

Description: Female

Length: 18.12 mm; **humeral width** 8.87 mm. Body cylindrical, oval and convex.

Colour and markings (Plate I A; Fig. 5 a): Dorsum brown black; venter brown, with few brown erect setae; smooth and shining.

Head (Fig. 5 a, b): Transversally and coarsely rugose; produced in front; sides round and slightly reflexed.

Clypeus (Fig. 5 a, b): Transversally rugose; narrowly produced with the front margin reflexed and notched at middle forming two indentations.

Fronto - Clypeal suture (Fig. 5 b): Marked by a transverse line; medially with a tubercle on each side placed close together.

Interocular width: 4.07 x transverse eye diameter.

Antenna (Fig. 5 c): 10 segmented; club nearly as long as stem.

Pronotum (Fig. 5 a): Finely punctured at the middle elsewhere coarse; sides round; uniformly margined except at the base; transversally elevate at the middle behind front margin, followed by a traceable depression; front angles acute and hind angles obtuse.

Scutellum (Fig. 5 a): Smooth; broadly triangular; apex acute; margins membranous.

Elytra (Fig. 5 a): Punctate-striate; striae forming four pairs of line and one single line near the suture on each disc; intervals with few fine irregular punctures; apex minutely and densely punctured; completely margined.

Propygidium (Fig. 5 d): Minutely punctured; medially finely rugose and produced.

Pygidium (Fig. 5 d): Coarsely and densely punctured at sides and minutely and scatteredly at middle; sides straight; apex blunt.

Fore tibia (Fig. 5 e): Tridentate with four denticles, one behind the second tooth and three behind the third; terminally with a long spur.

Mid and hind tibiae (Fig. 5 f, g): Carinate externally; digitate at the extremity; fringed with short spines at the end and carinae; terminally with two unequal spurs.

Tarsi (Fig. 5 e, f, g): 5 segmented; basal joint of mid and hind triangular and broad.

Claws (Fig. 5 e, f, g): Equal, separately movable and curved internally.

Material examined: one Female, Rajabhatkhawa, 16.IX.96, coll. S. Saha.

Distribution: India: West Bengal; Myanmar (Arrow, 1910; Chatterjee & Biswas, 1995; Saha & Raychaudhuri, 1998).

Genus: *Microrycles* Arrow

Microrycles Arrow, 1908, Trans. Ent. Soc. Lond, p. 324.

Diagnosis: Body stumpy, oval, convex and shiny; head rugopunctate; clypeus attenuated and bidentate at front; sides of pronotum round and bears fringe of long hairs; elytra punctate striate; fore tibia tridentate with one denticle; mid and hind tibiae truncate at the extremity.

Type species: *Microrycles kanarensis* Arrow, 1890.

Distribution: Tropical Asia (Arrow 1910; Sarkar *et al.*, 2010).

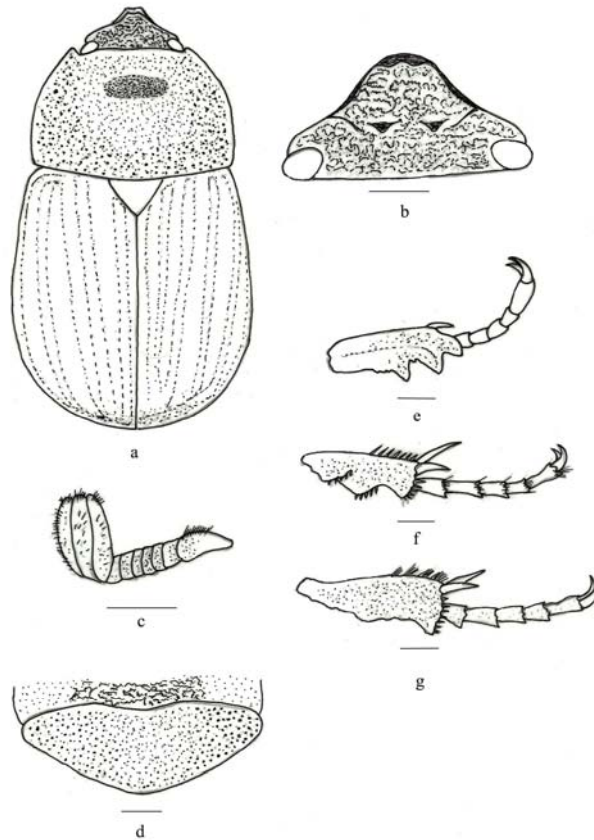


Fig. (5a-g). *Clyster retusus* Arrow: Female: a. Dorsal habitus; b. Head & Clypeus, dorsal view; c. Antenna, lateral view; d. Propygidium & Pygidium, dorsal view; e. Fore tibia, tarsi & claws; f. Mid tibia, tarsi & claws; g. Hind tibia, tarsi & claws.

***Microrhyctes monodon* (Fairmaire)**

(Plate I A; Fig. 6)

Heteronychus monodon Fairmaire, 1893, Ann. soc. Ent. Belgique, p. 313.

Microrhyctes monodon Arrow, 1910, The fauna of British India including Ceylon and Burma (Col: Lamellicornia: Cetoniinae & Dynastinae), i.p.305.

Description: Female

Length 14.25 mm; **humeral width** 6.37 mm. Body short, stumpy, oval and convex.

Colour and markings (Plate I A; Fig. 6 a): Dorsum shiny red brown; venter reddish with few long yellow erect setae.

Head (Fig. 6 a, b): Coarsely rugopunctate.

Clypeus (Fig. 6 a, b): Coarsely rugose; attenuated in front with front margin reflexed and feebly notched at the middle forming two indentations; clypeal margin entirely fringed with hairs.

Fronto - Clypeal suture (Fig. 6 b): Transverse with a tubercle at the middle.

Interocular width: 5.8 x transverse eye diameter.

Antenna (Fig. 6 c): 10 segmented, club 1.3 x stem.

Pronotum (Fig. 6 a): Minutely and sparingly punctured; broad at base narrow anteriorly; sides round, margined and bearing a fringe of long hairs; base little dilated at the middle and without margin; front angles acute and hind angles round.

Scutellum (Fig. 6 a): Smooth; triangular; apex bluntly conical.

Elytra (Fig. 6 a): Strongly punctate-striate; intervals smooth except at regions and nearly equal except the subsutural one which is wide anteriorly; striae 8 on each disc, apically coalescing except at the hump; apical margin membranous.

Propygidium (Fig. 6 d): Finely and densely punctured.

Pygidium (Fig. 6 d): Strongly and densely punctured; apex blunt.

Fore tibia (Fig. 6 e): Acutely tridentate with one denticle behind the third tooth; terminally with one long spur.

Mid and hind tibiae (Fig. 6 f, g): Carinate externally; truncate at extremity and fringed with short stout spines at the end; terminally with two unequal spurs.

Tarsi (Fig. 6 e, f, g): 5 segmented.

Claws (Fig. 6 e, f, g): Equal; separately movable and curved internally.

Material examined: one Female, Damanpur, 10.IV.02, coll. S.K. Sarkar; 1 Female, South Rydak, 09.III.03, coll. S.K. Sarkar.

Distribution: India: West Bengal; China; Indonesia; Myanmar; Thailand; Vietnam (Arrow, 1910; Sarkar *et al.*, 2010).

Genus *Xylotrupes* Hope

Xylotrupes Hope, 1837, Coleopterist's Manual, i, p.19.

Diagnosis: Body oval, moderately convex and more or less shiny; head armed with a long and apically diverged and recurved horn in males; clypeus bidentate at front; pronotum with a long and apically bidentate horn in males; fore tibia tridentate; mid and hind tibiae carinate and fringed with short spines at the extremity.

Type species: *Scarabaeus gideon* (Linnaeus), 1832.

Distribution: Asia; Northern Australia and Polynesia (Arrow 1910; Chatterjee & Biswas, 1995; Saha & Raychaudhuri, 1998).

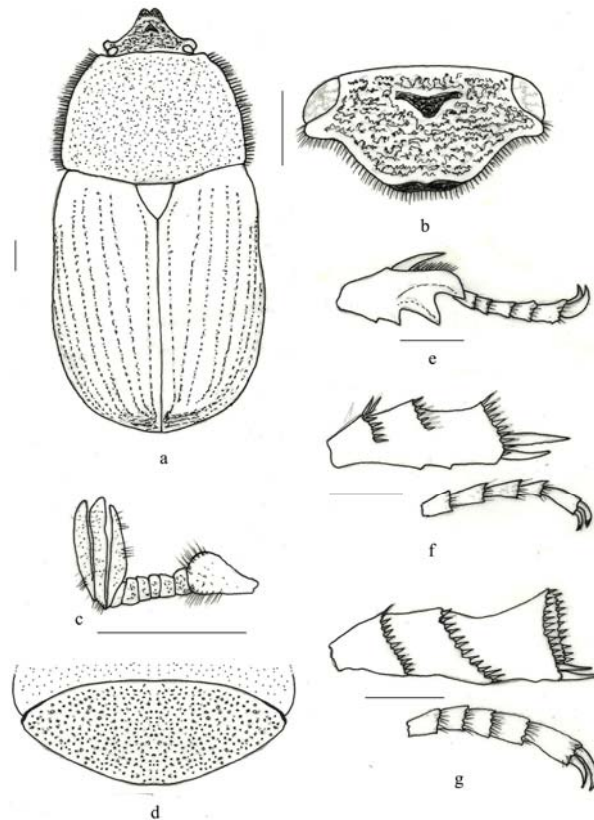


Fig. (6a-g). *Microrhyctes monodon* (Fairmaire): Female: a. Dorsal habitus; b. Head & Clypeus, dorsal view; c. Antenna, lateral view; d. Propygidium & Pygidium, dorsal view; e. Fore tibia, tarsi & claws; f. Mid tibia, tarsi & claws; g. Hind tibia, tarsi & claws.

Xylotrupes gideon (Linnaeus)

(Plate-IB, Fig. 7)

Scarabaeus gideon Linnaeus, 1767, Syst. Nat. 12th ed., i (2), p. 541.

Xylotrupes gideon Arrow, 1910, The fauna of British India including Ceylon and Burma (Col: Lamellicornia: Cetoninae & Dynastinae), i, p. 305.

Description: Male

Length 31.75 mm; **humeral width** 18.66 mm. Body, long, compact, oval and moderately convex.

Colour and markings (Plate I B; Fig. 7 a): Chocolate brown with the head, margins of pronotum and elytra black; venter pubescent.

Head (Fig. 7 b): Transverse, scantily punctured; armed with a long, straight, basally dilated, marginally incurved, obliquely projected, forward and upward

horn, apex of which diverging into two recurved points; sides along the horn base depressed.

Clypeus (Fig. 7 a, b): Elongate, scantily & minutely punctured; front margin reflexed and notched at the middle forming two indentations, lateral margin with a depression anteriorly.

Fronto clypeal suture (Fig. 7 a): Marked by the horn.

Interocular width: 3 x transverse eye diameter.

Antenna (Fig. 7 c): 10 segmented, club 1.5 x stem.

Pronotum (Fig. 7 a): Scantily and minutely punctured; sides round and base little lobed in the middle; front angles acute, hind angles obtuse; medially produced into an apically narrowed, forwardly directed, bidentate horn.

Scutellum (Fig. 7 a): Scantily and minutely punctured; obtusely triangular; sides round.

Elytra (Fig. 7 a): Coriaceous, finely and scantily punctured with a humeral hump near the antero lateral angle and an apical hump near the sutural end.

Propygidium (Fig. 7 d): Finely rugose.

Pygidium (Fig. 7 d): Coriaceous, scantily and minutely punctured.

Fore tibia (Fig. 7 e): Tridentate; terminally with one long spur.

Mid and hind tibiae (Fig. 7 f, g): Carinate externally, truncate and fringed with short spines at the extremity; terminally with two unequal spurs.

Tarsi (Fig. 7 e, f, g): 5 segmented.

Claws (Fig. 7 e, f, g): Equal and curved internally.

Parameres (Plate I B; Fig. 7 h, i): Short and broad. Sides nearly straight and simple. Apex nearly flat with the angles round.

Female: Dorsum rugose. Pronotum coarsely and densely punctured with the punctures coalesce at front and sides. Pygidium finely rugose.

Material examined: two Females, Rajabhatkhawa, 17.IX.96, coll. S. Saha; one Female, Rajabhatkhawa, 09.IX.02, coll. M.K.Biswas; one Male, Panbari, 11.IX.02, coll. S.K. Sarkar.

Distribution: India: Assam, Kerala, Maharashtra, Sikkim, West Bengal; SriLanka (Arrow, 1910; Chatterjee & Biswas, 1995; Saha & Raychaudhuri, 1998).

Genus *Eophileurus* Arrow

Eophileurus Arrow, 1908, Trans. Ent. Soc. Lond., p. 12.

Diagnosis: Body long, cylindrical, parallel sided, flat and shiny; head armed with a median horn in males and tubercle in females; clypeus triangular and pointed at front; pronotum with a median excavation in males; fore tibia sharply tridentate; mid and hind tibiae carinate and fringed with short spines at the extremity.

Type species: *Geotrupes planatus* Wiedemann, 1889.

Distribution: Tropical Asia (Arrow 1910; Sarkar *et al.*, 2010).

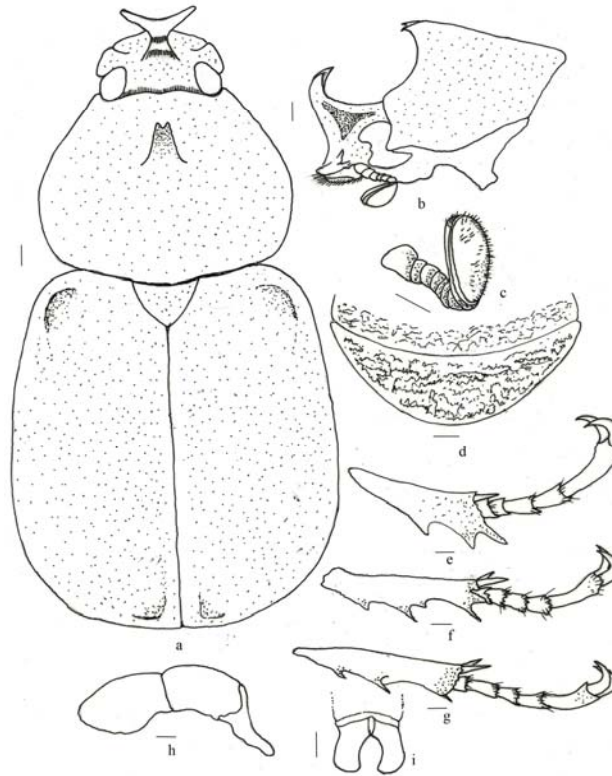


Fig. 7 (a-i). *Xylotrupes gideon* (Linnaeus): Male: a. Dorsal habitus; b. Head & Clypeus, lateral view; c. Antenna, lateral view; d. Propygidium & Pygidium, dorsal view; e. Fore tibia, tarsi & claws; f. Mid tibia, tarsi & claws; g. Hind tibia, tarsi & claws; h. Genital capsule, lateral view; i. Parameres, dorsal view.

***Eophileurus platypterus* (Wiedemann)**

(Plate I B; Fig. 8)

Eophileurus platypterus Wiedemann, 1823, Zool. Mag. ii, 1, p. 5.

Eophileurus platypterus Arrow, 1910, The fauna of British India including Ceylon and Burma (Col: Lamellicornia: Cetoninae & Dynastinae), i, p.289.

Description: Male

Length: 19.50 mm; **humeral width** 8.10 mm. Body long, cylindrical, parallel sided and flat.

Colour and markings (Plate-IB; Fig. -8): Dorsum shiny black; venter brown with scanty bristles.

Head (Fig. 8 a, b): Minutely and scantily punctured, smooth posteriorly; medially with a basally dilated, backwardly and upwardly directed, parallel sided blunt horn.

Clypeus (Fig. 8 a, b): Finely and scantily punctured; triangular; front margin pointed and reflexed at middle.

Fronto - Clypeal suture (Fig. 8 a, b): Marked medially by the horn.

Interocular width: 4 x transverse eye diameter.

Antenna (Fig. 8 c): 10 segmented; club 1.2 x stem.

Pronotum (Fig. 8 a): Densely and coarsely punctured; medially with a large, nearly circular excavation extending from the front margin to the centre; sides round; basal margin straight; front angles acute and hind angles obtuse.

Scutellum (Fig. 8 a): Scantily and coarsely punctured; sides gradually round; apex conical.

Elytra (Fig. 8 a): Coarsely punctate-striate, Striae 8 on each disc with the punctures on the striae close and annular and those on the humps minute; apical angles not acute.

Propygidium (Fig. 8 d): Rugose.

Pygidium (Fig. 8 d): Scantily and minutely punctured.

Fore tibia (Fig. 8 e): Sharply tridentate; terminally with a long and recurved spur.

Mid and hind tibiae (Fig. 8 f, g): Carinate externally; truncate at extremity; fringed with short stiff spines at the end and carinae; terminally with two spurs, these on midtibiae subequal and on hind tibiae unequal.

Tarsi (Fig. 8 e, f, g): 5 segmented, basal joint of front flat, mid and hind triangular.

Claws (Fig. 8 e, f, g): Unequal with the inner one flattened and cleft; mid and hind equal and undivided.

Parameres (Plate I B; Fig. 8 i, j): Incurved, elongate and slender. Laterally sinuate and provided with a sharp tooth at the outer margin. Inner margin gently curved. Apex flat and straight.

Female (Plate I B): Head coarsely punctured and bears a small median tubercle. Pygidium with a shallow and small excavation on each side of middle.

Material examined: one Male, Rajabhatkhawa, 04.iv.03, coll. S.K. Sarkar; one Female, Newlands, 21.XI.03, coll. S.K. Sarkar.

Distribution: India: Bihar, Maharashtra, Tamilnadu, West Bengal (Arrow, 1910; Sarkar *et al.*, 2010).

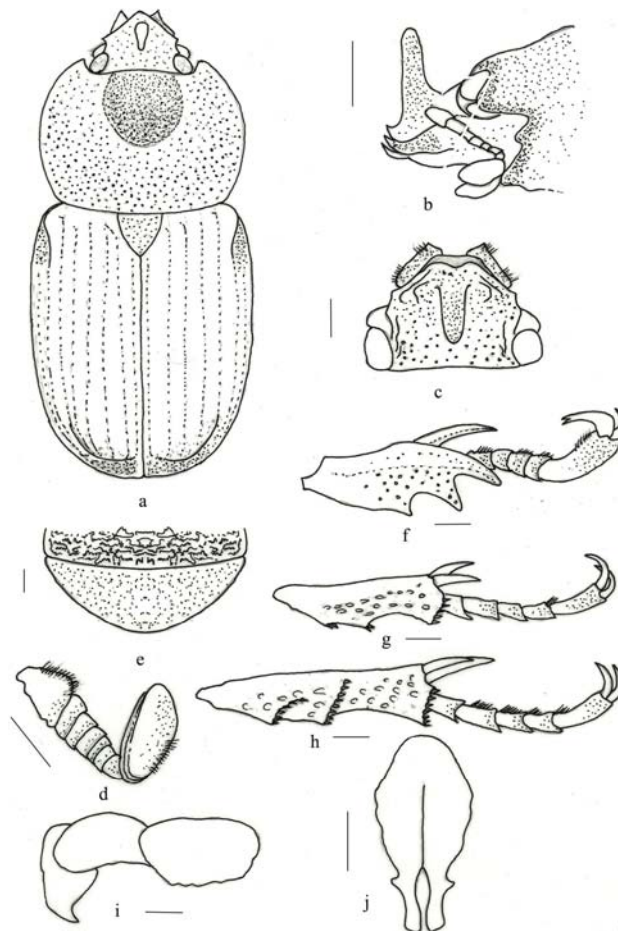


Fig. 8 (a-j). *Eophileurus platypterus* (Wiedemann): Male: a. Dorsal habitus; b. Head & Clypeus, dorsal view; c. Head & Clypeus, lateral view; d. Antenna, lateral view; e. Propygidium & Pygidium, dorsal view; f. Fore tibia, tarsi & claws; g. Mid tibia, tarsi & claws; h. Hind tibia, tarsi & claws; i. Genital capsule, lateral view; j. Parameres, dorsal view.

PLATE - IA

Male Dorsal habitus Female Dorsal habitus Male Genital capsule
Phyllognathus dionysius (Fabricius)

Parameres



Female Dorsal habitus
Oryctes rhinoceros (Linnaeus)



Female Dorsal habitus
Heteronychus lioderes Redtenbacher



Female Dorsal habitus
Alissonotum crassum Arrow



Female Dorsal habitus
Clyster retusus Arrow



Female Dorsal habitus
Microrhyctes monodon (Fairmarie)

PLATE - IB

Male Dorsal habitus Female Dorsal habitus Male Genital capsule Parameres
Xylotrupes gideon (Linnaeus)



Male Dorsal habitus Female Dorsal habitus Male Genital capsule Parameres
Eophileurus platypterus (Wiedemann)

DISCUSSION AND CONCLUSIONS

The present work is intended to provide a comprehensive taxonomic account of dynastine beetles (Scarabaeidae: Dynastinae) occurring in Buxa Tiger Reserve.

The diversity spectrum of the beetles in BTR yielded in the recognition of 8 species under 8 genera. Of these, *Oreoderus bhutanus* Arrow is recorded new from the country (Sarkar *et al.*, 2010) while *Eophileurus platypterus* (Wiedemann) is recorded new from the state (Sarkar *et al.*, 2010). At the species level, BTR is found to harbor nearly half of the state fauna recorded till date. While at the level of higher taxa it is at least two-third of the state fauna known. The generated data speaks high of BTR in terms of species richness and therefore calls for necessary conservation measures.

Acknowledgements. The authors are grateful to MOEF, GOI for financing the research work (Sanction no. 14/34/2000-ERS/RE, Dt.17/10/01). Head of Department of Zoology, University of Calcutta for providing necessary laboratory facilities. Thanks are extended to all officials and field staffs of Buxa Tiger Reserve for their cooperation during field work. Thanks are due to all colleagues of Entomology Laboratory, Department of Zoology, University of Calcutta for their assistance.

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Received September 25, 2014

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