

## ON THE TAXONOMY OF CATTLEYARD DUNG INHABITING COPRINE BEETLES

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Three dung beetle species of the subfamily Coprinae are recorded so far from the dairy farms of Rajasthan and West Bengal, India. Descriptions of the recorded species, viz. *Caccobius (Caccophilus) unicornis* (Fabricius), *Oniticellus* (s.str.) *cinctus* (Fabricius) and *Tiniocellus spinipes* (Roth) with suitable illustrations (digital images) and their distributions are provided. The first and second named species are supposed to be new from Rajasthan.

*Keywords:* Cattleyard, dung beetles, Coprinae, redescription, new records, Rajasthan, India.

### INTRODUCTION

Saha and her associates (2021) while working on the bioecology of dung inhabiting community, reported the occurrence of three coprine beetle species, viz. *Caccobius (Caccophilus) unicornis* (Fabricius), *Oniticellus* (s.str.) *cinctus* (Fabricius) and *Tiniocellus spinipes* (Roth). Of these, the first two species are recorded for the first time from Rajasthan (cattlesheds of Sawai Madhopur) while the last two from dairy farms of N & S - 24 Parganas, West Bengal respectively. Regional reports on the occurrence of these beetles from India were made by: Veenakumari & Veeresh (1997), Chandra (2000, 2008, 2009), Chandra & Ahirwar (2005, 2007), Priyadarsanan (2006), Chandra & Gupta (2012, 2013), Jadhav & Sharma (2012), Ali *et al.* (2015), Kalawate (2018), Singh *et al.* (2018), Sarkar & Kharel (2020) and Kharel & Sarkar (2021). It is worthwhile to mention that all the three species still demand the updated trend of taxonomy. Hence we are inclined to provide a detail description and illustrations (digital images) of the encountered taxa nearly after a century.

Study area (Fig. 1).

Survey was conducted once in a week since August, 2019-till 2<sup>nd</sup> week of March, 2020, in the Dairy Farm of Ramakrishna Mission Ashrama Campus, Narendrapur, South 24 Parganas & Naihati, North 24 Parganas, West Bengal. Coprine beetles were also sampled from a buffalo farm, Ranthambhore, near the town of Sawai Madhopur during the field trip in February, 2020.

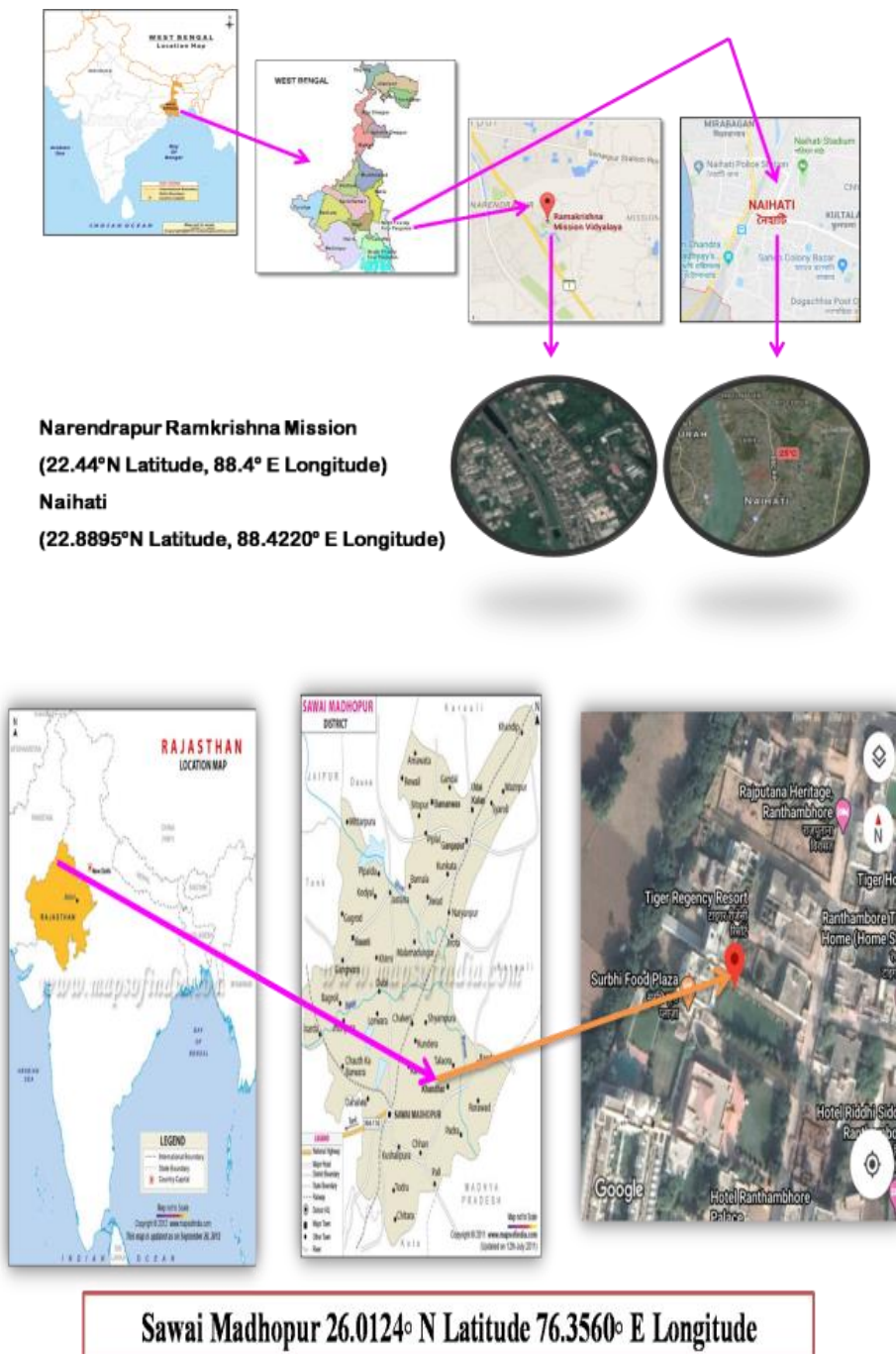


Fig. 1 – Study area.

### MATERIAL AND METHODS

Samplings were done by pitfall trap and hand picking methods (Fig. 2). Live forms encountered were killed and preserved in 70% alcohol as per recommendation of Raychaudhuri & Saha (2014). Necessary data regarding date of collection, no. of individuals, etc were noted in a notebook in the field. The samples were then brought to the laboratory where stretching, pinning and labeling was done as per guidelines laid down by Raychaudhuri & Saha (2014). The materials were studied using Stereo Zoom Binocular Microscope, model Olympus SZX-16. Specimens were identified following Arrow (1931) and confirmed following Chandra & Gupta (2013). The photos were taken by a digital camera attached to the microscope. All measurements are in millimeters, made with an eye piece graticule. Materials are in the deposition of Post Graduate Department of Zoology, Barasat Government College, Barasat, Kolkata, India.



Fig. 2 – Collection of specimens.



- Pronotum densely and sub-rugosely punctate; elytral intervals minutely granulate

.....*Tiniocellus Péringuey*

#### TAXONOMIC ACCOUNT

#### Tribe Onthophagini Burmeister, 1846

#### Genus *Caccobius* Thomson 1859

#### *Caccobius (Caccophilus) unicornis* (Fabricius) (Plate 1)

*Copris unicornis* Fabricius, 1798, Ent. Syst. Suppl.,: 33.

*Caccobius unicornis* Arrow, 1931, Faun. Brit. India, (Lamellicornia: Coprinae), 3: 145-146.

*Caccobius (Caccophilus) unicornis*, Balthasar, 1963, Mon. der Scarabaeidae und Aphodiidae der Palaeark. und Orientalis. Region (Coleoptera: Lamellicornia), Coprinae, II: 142-143.

**Length:** 6.83–6.85 mm; humeral width: 3.4 mm.

**Description: Male**

**Shape:** Body short, oval, compact.

**Colour and markings:** Black or pitchy brown with clypeus, elytra and legs dark red; antennae and mouthparts yellow, upper and lower surface clothed with minute setae; elytra basally near humeral angles and apically with orange bands.

**Head:** Shining, short and broad, transverse, moderately convex, finely punctured, basal carina of forehead terminating into short, erect horns.

**Clypeus:** Entire, weakly sinuate at the middle, rounded at sides, minutely punctate.

**Frontoclypeal suture:** Raised, marked laterally by oblique carina on each side.

**Interocular width:** 1.32 mm x transverse eye diameter.

**Antennae:** 9 segmented, club 3 segmented, 0.39 mm x stem.

**Pronotum:** Oval, anteromedially broad, medially strongly raised, anteriorly sloped, punctures coarse, evenly distributed, front angles blunt, not produced, hind angles obsolete, sides round, at apical 1/3<sup>rd</sup> medially with a raised transverse carina, basally with a longitudinal median depression forming 2 flat gibbositities on either side, at apical 1/3<sup>rd</sup> laterally with raised smooth, more or less round area marked by few coalescing punctures.

**Scutellum:** Not visible from above.

**Elytra:** Punctate-striate, striae 7 on each side, 7<sup>th</sup> carinate anteriorly, intervals flat with deep punctures, humeral angles blunt, apical angles round, sutural angles obtuse.



**Pygidium:** Yellow, blackish near base; tongue like, broad, basally obtuse, deeply punctate.

**Mesosternum:** Finely punctured.

**Legs:** Middle coxae widely separate, fore tibia rather sharply quadridentate, terminally with short blunt spur; mid and hind tibia carinate externally, truncate at extremity, terminally with 2 long unequal spurs; tarsi 5 segmented, more or less flat, basal joint of hind tarsus longer than the middle.

**Claws:** Equal, inwardly curved and separately movable.

**Parameres:** Short, base broad, apically narrow, beak-like.

**Female:** Elytra basally near humeral angles with orange spots and apically also with orange bands; clypeus entire; forehead bears strongly raised 2 transverse carinae, basal one strongly raised and the other behind the clypeus, depressed behind; fore tibia bluntly quadridentate.

**Material examined:** 2♂♂s, 1 ♀, Sawai Madhopur, Rajasthan, 4.2.2020/5.4.2020, coll. A. Ghosh & S. Saha, 26.0124°N, 76.3560°E, elevation 257m, dung (pitfall trap).

**Habitat:** Collected from dung pat of cows and buffaloes.

**Nesting strategy:** Tunnelers (paracoprid).

**Distribution:** Borneo, China, India [Chhattisgarh, Haryana, Karnataka, Madhya Pradesh, Orissa, Rajasthan (**New record**), Uttarakhand, Uttar Pradesh, West Bengal], Indonesia, Java, Japan, Malaysia, Philippines, Sri Lanka, Thailand (Veenakumari & Veeresh, 1997; Davis *et al.*, 2001; Chandra & Ahirwar, 2005; Chandra & Gupta, 2012, 2013; Chandra, 2014; Kabakov & Shokhin, 2014; Saha *et al.*, 2021).

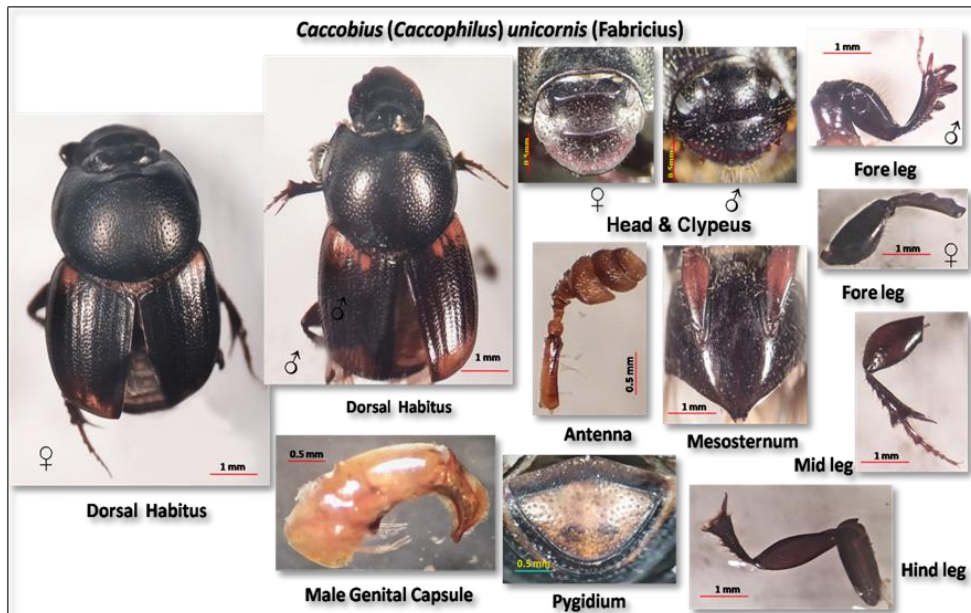


Plate 1 – *Caccobius (Caccophilus) unicornis* (Fabricius); male & female.

**Tribe Oniticellini Kolbe, 1905****Genus *Oniticellus* Serville, 1825*****Oniticellus (Oniticellus) cinctus* (Fabricius) (Plate 2)**

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

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

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

**Length:** 10.13–10.22 mm; humeral width: 4.30 mm.

**Description: Male**

**Shape:** Body oblong-oval, compact, not very convex, very smooth & shining.

**Colour and markings:** Black, elytra opaque, from the base of humeral angles along margin with a yellowish brown band with the turning forming a semicircular area continuing upto the elytral apex leaving the last striae; pygidium distally yellowish; venter suffused with slight coppery or greenish metallic lusture, shiny.

**Head:** Smooth and shining; transverse, finely sparsely punctured near base and front, forehead at apex with a strongly raised lamellate margin, medially flat, laterally depressed, margin with short spike hairs, sharply sloped followed by strongly raised area, vertex without horn.

**Clypeus:** Semicircular, frontal margin medially feebly raised and bilobed, minutely punctured.

**Frontoclypeal suture:** Marked laterally by oblique carina on each side.

**Interocular width:** 1.88 mm x transverse eye diameter.

**Antennae:** 8 segmented, club 3 segmented, 0.75 mm x stem.

**Pronotum:** Transverse, very smooth, front angles bluntly produced, hind angles obsolete, sides feebly sinuate, margin raised, base round, sulcate posteromedially.

**Scutellum:** Present, very small, obtuse, minutely punctate.

**Elytra:** Punctate-striate, striae 7 on each side, 7<sup>th</sup> carinate anteriorly, intervals flat with few minute and setigerous punctures, margins elevated, humeral angles acute, apical angles round, sutural angles obtuse.

**Pygidium:** Broadly obtuse, coarsely punctate.

**Mesosternum:** Nearly smooth.

**Leg:** Middle coxae widely separate, fore tibia sharply quadridentate, blunt, first smallest, terminally with a short blunt spur; mid and hind tibia carinate externally, truncate and dilated at extremity, terminally with 2 long unequal spurs; tarsi 5 segmented, more or less flat, basal joint of hind tarsus longer than the second, hindlegs not extremely long.

**Claws:** Equal, inwardly curved and separately movable.

**Parameres:** Short, base broad, sides sinuate, inner margin straight, curved at apex with titilaters.

**Female:** Fore tibial teeth sharper and pointed, spur shorter than male.

**Material examined:** 123 (31♂♂s, 92♀♀s), Narendrapur, South 24 Parganas, West Bengal, August 2018 – November 2019, coll. A. Biswas & S. Saha 22.44°N, 88.4°E, elevation 9 m, dung (handpicking & pitfall trap); 15 (4♂♂s, 11♀♀s), Naihati, North 24 Parganas, West Bengal, August 2019 – January 2020, coll. A. Ghosh 22.8895°N, 88.4220°E, elevation 15 m, dung (handpicking & pitfall trap); 2♂♂s, 6♀♀s, Sawai Madhopur, Rajasthan, 4.2.2020/5.4.2020, coll. A. Ghosh & S. Saha, 26.0124°N, 76.3560°E, elevation 257 m, dung (pitfall trap).

**Habitat:** Collected from dung of cows from dairy farm & buffaloes from cattleshed.

**Nesting strategy:** Dwellers (endocoprid).

**Distribution:** Bangladesh, China, India (Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chattisgarh, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kashmir, Kerala, Madhya Pradesh, Maharashtra, Rajasthan (**New record**), Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal), Indonesia, Malaysia, Myanmar, Pakistan, Thailand, Vietnam (Veenakumari & Veeresh, 1997; Chandra & Ahirwar, 2005; Priyadarsanan, 2006; Jadhav & Sharma, 2012; Chandra & Gupta, 2013; Chandra, 2014; Ali *et al.*, 2015; Singh *et al.*, 2017; Kalawate, 2018; Sarkar & Kharel, 2020; Saha *et al.*, 2021).

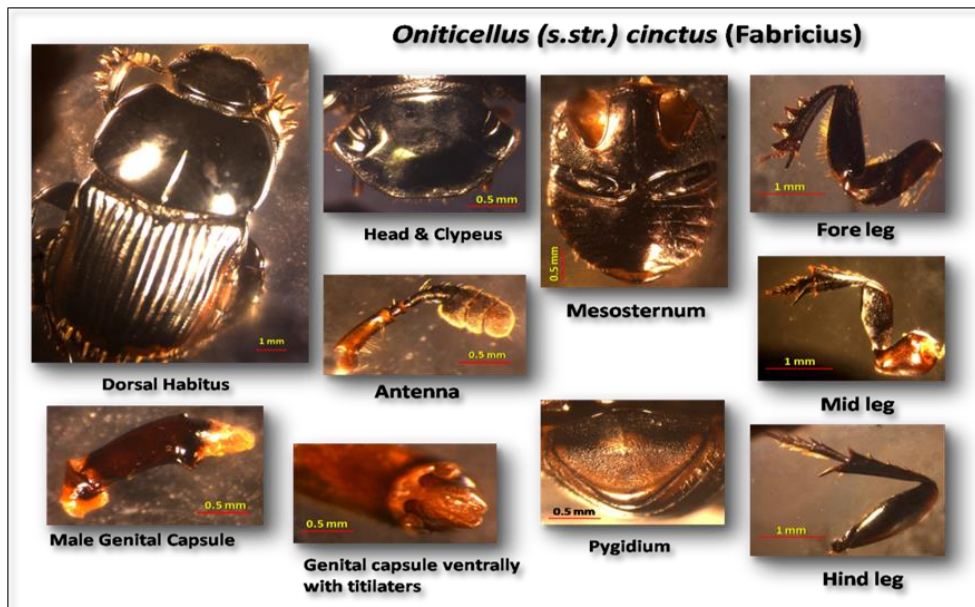


Plate 2 – *Oniticellus (Oniticellus) cinctus* (Fabricius); male.



**Genus *Tiniocellus* Péringuey, 1901*****Tiniocellus spinipes* (Roth) (Plate: 3)**

*Oniticellus spinipes* Roth, 1851, Arch., F. Nat., (17) 1: 128.

*Tiniocellus spinipes* (Roth), Péringuey, 1900. Trans. Phil. Soc. S. Afr., 12: 116.

*Tiniocellus spinipes*, Arrow, 1931, Faun. Brit. India, (Coleoptera: Lamellicornia) 3: 378.

*Tiniocellus spinipes*, Balthasar, 1963, Mon. der Scarabaeidae und Aphodiidae der Palaeark. und Orientalis. Region (Coleoptera: Lamellicornia), Coprinae, 2: 108.

**Length:** 5.83 mm; humeral width: 2.50 mm.

**Description: Male**

**Shape:** Body short, elongate-oval, flat, compact.

**Colour and markings:** Opaque, dark brown, pronotum laterally and elytra, venter and pygidium suffused with brownish yellow lusture.

**Head:** Transverse, finely sparsely punctured near base and front, forehead laterally with gibbosity, margin with short spike hairs.

**Clypeus:** Semicircular, entire, weakly sinuate at the middle, punctures coarse.

**Frontoclypeal suture:** Marked laterally by oblique carina on each side.

**Interocular width:** 0.87 mm x transverse eye diameter.

**Antennae:** 8 segmented, club 3 segmented, 0.50 mm x stem.

**Pronotum:** More or less squarish, coarsely and densely punctured, front angle bluntly produced, hind angles obsolete, sides gently curved, margin raised, base round, sulcate posteromedially, at apical 1/3<sup>rd</sup> laterally with raised smooth, more or less round area marked by few coalescing punctures.

**Scutellum:** Present, very small, obtuse, minutely punctate.

**Elytra:** Punctate-striate, striae 7 on each side, 7<sup>th</sup> carinate anteriorly, intervals flat with few minute and setigerous punctures, margins elevated, humeral angles acute, apical angles round, sutural angles obtusely little produced.

**Pygidium:** Tongue like, stumpy, basally obtuse, smooth and shiny.

**Mesosternum:** Coarsely punctured.

**Legs:** Middle coxae widely separate, fore tibia bluntly quadridentate, first smallest, terminally with a short blunt spur; mid and hind tibia carinate externally, truncate and dilated at extremity, terminally with 2 long unequal spurs; tarsi 5 segmented, more or less flat, basal joint of hind tarsus longer than the second, hind legs not extremely long.

**Claws:** Equal, inwardly curved and separately movable.

**Parameres:** Short, obtuse, with titilaters.

**Female:** Not found.

**Material examined:** 1♂, Naihati, North 24 Parganas, West Bengal, 18.9.2019, coll. A. Ghosh, 22.8895°N, 88.4220°E, elevation 15.69 m, dung (pitfall trap).

**Habitat:** Collected from dung of buffaloes.

**Nesting strategy:** Dwellers (endocoprid).

**Distribution:** Africa, India (Chattisgarh, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu, Uttarakhand, Uttar Pradesh, West Bengal), Pakistan (Chandra & Ahirwar, 2005; Ali *et al.*, 2015; Chandra, 2014; Singh *et al.*, 2017; Sarkar & Kharel, 2020; Kharel & Sarkar, 2021; Saha *et al.*, 2021).

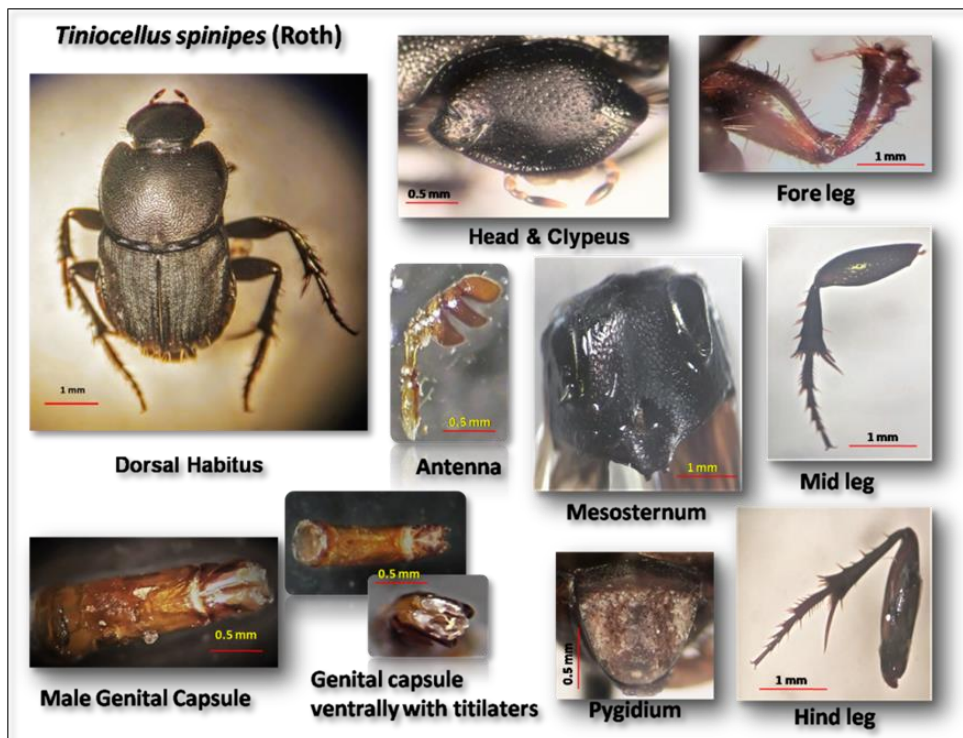


Plate 3 – *Tiniocellus spinipes* (Roth); male.

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