

## The Dung Beetle Fauna (Coleoptera, Scarabaeidae) of Northeast Thailand

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**Abstract** A list of the scarabaeine dung beetles collected from both cultivated and forested areas in Northeast Thailand is presented. Altogether 154 species of 15 genera in 7 tribes are recorded. The genus *Onthophagus* is the most diverse group in which 103 species were found. The genera *Caccobius*, *Cassolus*, *Panelus*, *Phacosoma* and *Sisyphus* are mainly confined to forested habitats, while the genera *Onitis* and *Oniticellus* occur very commonly in the dung of domestic animals. The ecological habitat of each dung beetle species found is also recorded.

### Introduction

The dung beetles (Coleoptera, Scarabaeidae) are one of the most beneficial groups of insects ever known. With few exceptions, they feed as larvae and adults on the dung of vertebrates.

In spite of the important ecological and beneficial roles of dung beetles, very little is known about the dung beetles of Thailand as compared to those of other regions. On the world basis, classification and distribution of the Scarabaeidae, above the generic level, is generally better known than those of most other comparable sized groups of insects. Worldwide there are nearly 5,000 described species arranged in 234 genera

and 10–12 tribes (HANSKI & CAMBEFORT, 1991). This well developed understanding of the group is no doubt due to their economic importance and the spectacular morphological modifications of many species. Of all the world's regional faunas, that of Southeast Asia is probably the poorest known (HANSKI & KRIKKEN, 1991).

Records of species occurring in Thailand have been included in the three classic regional faunas covering parts of Southeast Asia (ARROW, 1931; PAULIAN, 1945; BALTHASAR, 1963 a, b, 1964). More recently, MASUMOTO (1987, 1988, 1989 a–c, 1990, 1991, 1992 a, b, 1995, 1996) surveyed the fauna of the Scarabaeidae and Aphodiidae in Northwest Thailand and STEBNICKA (1992) published a summary, including previous published records, of the Aphodiidae known from Thailand. However, no work or publication of dung beetles from Northeast Thailand has been made before.

The Northeast Region of Thailand, usually called Isan, covers approximately 170,000 square kilometers or about 1/3 of the country. Most of the area is a high plateau with a height between 150–1,000 metres above sea-level. The boundaries of Northeast are connected with the Lao border to the north and the east, with Cambodia and the Centre Region to the south, and with the lower region of the North to the west.

Currently, we have a fund from the Thailand Biodiversity and Training Programme to conduct a one year pilot study of the dung beetle fauna of the Northeast Region of Thailand. We hope to be able to extend this to a full survey of the fauna of Thailand.

### Methods

Nineteen provinces in the Northeast Region were surveyed in both cultivated and forested areas, Natural Parks and Wildlife Sanctuaries to sample the dung beetle fauna. Sampling was carried out throughout the year in several different ways such as hand searching directly on the dung pads, light trapping (only the dung beetles that are nocturnal and positively phototactic were caught) and pitfall traps baited with pig dung, rotten chicken, etc. Forest leaf litter was also collected and extracted with Berlese funnels to sample the small litter dwelling species.

Specimens have been sorted into morphological species, or recognizable taxonomic units, by eye or using binocular magnifiers. Identifications have then been made using reliably identified materials in the Insect Museum at the Department of Agriculture in Bangkok, and MASUMOTO'S collection in Yokohama. Some specimens were identified by comparing with the types and other materials preserved in the Natural History Museum, London, and Muséum National d'Histoire Naturelle, Paris. Others were determined from literature.

### Results and Discussion

A total of 154 dung beetle species of the Scarabaeidae, of 15 genera in 7 tribes, were found in the Northeast Region (Table 1). This compares with 137 species of 22

genera collected by MASUMOTO in Northwest Thailand. Most dung beetle species are coprophagous, while a few species such as *Onthophagus tricornis* WIEDEMANN, etc., are necrophagous which feed on animal carrion, and *Onthophagus bonarae* ZUNINO, *Cassolus nudus* SHARP, etc., feed on rotting vegetable matters.

Richness of dung beetle species in the forested areas is greater than in the lowland or cultivated areas. This is possibly due to an abundant supply of food from animal biomass and vegetation in the forested areas where the areas are well preserved and protected for faunal and floral habitats. In contrast with the cultivated areas of the Northeast, there is a progressive decrease of cultivated farmlands and the domestic animals like cows and buffalos are gradually reducing number and being replaced by machine.

Of the 18 genera reported here, the genus *Onthophagus*, mainly found in the forested areas, is the most diverse group, of which 43 species were identified and approximately 60 species are still unknown. There are, almost certainly, a substantial number of additional *Onthophagus* species, in other forested habitats of Thailand. Therefore, further work should be carried out for this group.

The study has also shown that some dung beetle genera are restricted to one kind of habitat, such genera as *Catharsius*, *Onitis* and *Oniticellus* are dominant in the lowland or cultivated areas while other genera like *Caccobius*, *Cassolus*, *Panelus*, *Phacosoma* and *Sisyphus* are confined to forested habitats. Since the genera *Onitis* and *Oniticellus* occur very commonly in the dung of domestic animals like cow and buffalo, the local people in the Northeast use the dung beetles as a food protein source. Particularly, *Oniticellus cinctus* (FABRICIUS) is the most favourite edible dung beetle species.

In conclusion, this study is the first report of dung beetles from the Northeast of Thailand and the data were accumulated only from one year study. However, we confidently expect the fauna of Northeast to be significantly larger than that documented here. With a comprehensive sampling programme, using various baited pitfall traps and litter extraction, in different forested areas, the number of identified species will, we are sure, increase significantly.

In addition to the Scarabaeidae, material of the Aphodiidae and Geotrupidae are also being accumulated for future reference. We have material of about a half of the 19 species of the Aphodiidae currently known from the Northeast of Thailand (STEBNICKA, 1992) and at least three species of the Geotrupidae have been collected.

Table 1. Dung Beetles from Northeast Thailand.

Species	Food sources	Habitats
Tribe Gymnopleurini		
<i>Gymnopleurus (Paragymnopleurus) melanarius</i> HAROLD	cow, pig, light trap	cultivated area
<i>G. (P.) rudis</i> SHARP	pig	cultivated area
<i>G. (P.) sinuatus</i> OLIVIER	barking deer, pig	forested area
<i>G. (Garreta) ruficornis</i> MOTSCHULSKY	cow, pig, light trap	cultivated area
Tribe Sisyphini		
<i>Sisyphus maniti</i> MASUMOTO	pig	forested area
<i>S. longipes</i> (OLIVIER)	pig	forested area
<i>Sisyphus</i> 1 sp. indet.	pig	forested area
Tribe Canthonini		
<i>Panelus tonkinensis</i> PAULIAN	wild cat	forested area
<i>Phacosoma fallacilaetum</i> MASUMOTO	wild cat, jackal	forested area
<i>Cassolus nudus</i> SHARP	gaur, mushroom	forested area
Tribe Coprini		
<i>Synopsis birmanicus</i> GILLET	pig	forested area
<i>Synopsis</i> 2 spp. indet.	pig	forested area
<i>Heliocopris bucephalus</i> (FABRICIUS)	cow, buffalo, gaur, banteng	cultivated & forested areas
<i>H. dominus</i> BATES	elephant	forested area
<i>Catharsius birmanensis</i> LANSBERGE	buffalo, cow, elephant, pig	cultivated area
<i>C. javanus</i> LANSBERGE	buffalo, cow, gaur, pig, light trap	cultivated area
<i>C. molossus</i> (LINNÉ)	buffalo, elephant	cultivated & forested areas
<i>Copris angusticornis</i> ARROW	elephant	forested area
<i>C. carinicus</i> GILLET	gaur	forested area
<i>C. corpulentus</i> GILLET	elephant, gaur	forested area
<i>C. iris</i> SHARP	buffalo, elephant	cultivated & forested areas
<i>C. laevigatus</i> GILLET	cow, sambar deer, elephant, pig, light trap	cultivated & forested areas
<i>C. nevinsoni</i> WATERHOUSE	buffalo, cow, pig, light trap	cultivated area
<i>C. sinicus</i> HOPE	pig	cultivated area
<i>C. (Microcopris) vitalisi</i> GILLET	elephant, gaur, banteng	forested area
<i>C. (M.) reflexus</i> (FABRICIUS)	cow, buffalo, pig, gaur, elephant, light trap	cultivated area
<i>C. (Paracopris) cariniceps</i> FELSCHÉ	elephant, pig	forested area
<i>C. (P.) punctulatus</i> WIEDEMANN	elephant, cow	cultivated & forested areas
<i>C. (P.) furciceps</i> FELSCHÉ	elephant	forested area
<i>Copris</i> 2 spp. indet.	elephant	forested area
Tribe Onitini		
<i>Onitis bordati</i> CAMBEFORT	elephant	forested area
<i>O. excavatus</i> ARROW	elephant, gaur	forested area
<i>O. virens</i> LANSBERGE	cow, buffalo, pig	cultivated area
<i>Onitis</i> 3 spp. indet.	cow, buffalo, light trap	cultivated area

Table 1. (Continued).

Species	Food sources	Habitats
Tribe Oniticellini		
<i>Drepanocerus striatulus</i> PAULIAN	cow	cultivated area
<i>Oniticellus cinctus</i> (FABRICIUS)	cow, buffalo, gaur	cultivated area
<i>O. tessellatus</i> HAROLD	cow, buffalo	forested area
<i>O. freyi</i> BALTHASAR	cow, buffalo	cultivated area
<i>Oniticellus</i> 2 spp. indet.	cow, buffalo	forested area
<i>Liatongus affinis</i> (ARROW)	elephant, gaur, deer	forested area
<i>L. gagatinus</i> (HOPE)	elephant, gaur	forested area
<i>L. phanaeoides</i> (WESTWOOD)	pig	forested area
<i>L. rhadamistus</i> (FABRICIUS)	cow, buffalo, pig	cultivated area
<i>L. tridentatus</i> (BOUCOMONT)	elephant, gaur	forested area
<i>L. venator</i> (FABRICIUS)	cow	forested area
<i>L. vertagus</i> (FABRICIUS)	gaur, pig	forested area
Tribe Onthophagini		
<i>Caccobius</i> ( <i>Caccophilus</i> ) <i>unicornis</i> FABRICIUS	monkey, bird, pig, cow	forested area
<i>Onthophagus aeropictus</i> BOUCOMONT	pig	forested area
<i>O. pilularius</i> LANSBERGE	pig	forested area
<i>O. balthasari</i> VŠETETKA	elephant, wild cat, pig	forested area
<i>O. bonorae</i> ZUNINO	pig, rotten passion fruit	forested area
<i>O. brutus</i> ARROW	pig	forested area
<i>O. coracinus</i> BOUCOMONT	pig	forested area
<i>O. crassicollis</i> BOUCOMONT	monkey	forested area
<i>O. dapcauensis</i> BOUCOMONT	pig	forested area
<i>O. doipuiensis</i> MASUMOTO	pig	forested area
<i>O. duporti</i> BOUCOMONT	monkey	forested area
<i>O. gracilipes</i> BOUCOMONT	jackal, wild cat	forested area
<i>O. hastifer</i> LANSBERGE	cow, buffalo, gaur, light trap, banteng	cultivated area
<i>O. jacobaeus</i> BOUCOMONT	cow, pig	cultivated area
<i>O. laevis</i> HAROLD	elephant, pig	forested area
<i>O. lindae</i> MASUMOTO	wild cat, monkey, silver pheasant	forested area
<i>O. luridipennis</i> BOHEMAN	cow, deer, porcupine, pig	forested area
<i>O. maniti</i> MASUMOTO	pig	forested area
<i>O. naaroon</i> MASUMOTO	pig	forested area
<i>O. orientalis</i> HAROLD	cow, buffalo, monkey, pig, light trap	cultivated area
<i>O. pacificus</i> LANSBERGE	pig	forested area
<i>O. papulatus</i> BOUCOMONT	cow, buffalo, pig, light trap	cultivated area
<i>O. proletarius</i> HAROLD	cow, buffalo, pig, light trap	cultivated & forested areas
<i>O. phrutsaphakhomus</i> MASUMOTO	rotten banana, pig	forested area
<i>O. rudis</i> SHARP	pig	forested area
<i>O. sarawakus</i> HAROLD	pig	forested area
<i>O. taurinus</i> WHITE	elephant, wild cat, pig	forested area
<i>O. tragiodes</i> BOUCOMONT	cow, buffalo, pig, light trap	cultivated area
<i>O. trituber</i> (WIEDEMANN)	monkey, buffalo, pig	cultivated area
<i>O. (Colobonthophagus)</i> <i>tragus</i> (FABRICIUS)	buffalo, banteng, gaur, pig, light trap	cultivated area

Table 1. (Continued).

Species	Food sources	Habitats
<i>O. (Digitonthophagus) bonasus</i> (FABRICIUS)	elephant, cow, buffalo, gaur, banteng	cultivated area
<i>O. (Indachorius) doisuthepensis</i> MASUMOTO	pig	forested area
<i>O. (Matashia) anguliceps</i> BOUCOMONT	elephant, pig	forested area
<i>O. (M.) avocetta</i> ARROW	pig	forested area
<i>O. (M.) manipurensis</i> ARROW	pig	forested area
<i>O. (Micronthophagus) falsivigilans</i> MASUMOTO	monkey, dog	forested area
<i>O. (Paraphanaeomorphus) jeanelianus</i> PAULIAN	pig	forested area
<i>O. (Parascatonomus) topali</i> ENDRÖDI	carrion trap	forested area
<i>O. (P.) tricornis</i> (WIEDEMANN)	cow, pig, dead snake, light trap	cultivated & forested areas
<i>O. (Proagoderus) mouhoti</i> HAROLD	cow, buffalo	cultivated area
<i>O. (Serrophorus) rectecornutus</i> LANSBERGE	buffalo, light trap	cultivated & forested areas
<i>O. (S.) sagittarius</i> (FABRICIUS)	cow, buffalo, banteng, gaur, light trap	cultivated area
<i>O. (S.) seniculus</i> (FABRICIUS)	cow, buffalo, elephant, banteng, pig, light trap	cultivated area
<i>Onthophagus</i> 60 spp. indet.	pig, cow, buffalo, jackal, light trap	forested area

\* Though the species on the list is mainly arranged according to the BALTHASAR system (1963), some changes are given as regards subgeneric names and species described after it.

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### 要 約

Y. HANBOONSONG · S. CHUNRAM · S. PIMPASALEE · R. W. EMBERSON · 益本仁雄：東北タイの食糞性コガネムシ相。—— 東北タイに分布する食糞性コガネムシ (Scarabaeidae) について、耕作された地域と自然林の両方で採集をおこなった。その結果、合計7族、15属、154種がみとめられた。そのうち、エンマコガネ属 (*Onthophagus*) がもっとも種数が多く103種である。コエンマコガネ属 (*Caccobius*) および *Cassolus*, *Panelus*, *Phacosoma*, *Sisyphus* などの属はおもに自

然林内に生息し、*Onitis*属、*Oniticellus*属などは、家畜の糞にきわめて普通にみられた。添付した種名一覧表には、採集した糞虫が来集した糞の種類および生息地域を併記した。

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