

## Occurrence of Some Beetle Species in Mezaligone Environs, Hinthada District

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### Abstract

The present study deals with the occurrence of beetle species from Mezaligone Environs during the study period from November, 2015 to February, 2016. Totally 20 species belonging to 20 genera and 11 families under two suborders Adephaga and Polyphaga were recorded. Among them, eight species of family Scarabaeidae was the largest numbers of species throughout the study period. Detailed morphological characteristics structures for each recorded species were examined. The percentages of occurrence were 40% (family - Scarabaeidae), 10% (families - Carabidae and Coccinellidae), and 5% (families - Chrysomelidae, Cerambycidae, Curculionidae, Cicindelidae, Brachinidae, Burprestidae, Dytiscidae, Hydrophilidae). Also their habits and their beneficial or harmful effects for the nature were also recorded. The result noted that the families Carabidae, Brachinidae, Coccinellidae, and some species of Scarabaeidae are beneficial while Curculionidae, Chrysomelidae, and some species of Scarabaeidae are harmful to many commercial plants.

**Keywords:** Beetles, Occurrence, Morphological characteristics, Habits

### Introduction

Insects are the dominant group of animals on the earth today and occur everywhere. A great many insects are extremely valuable to man and human society by their pollinating activities. They make many agricultural crops productive and provide us with honey, bee wax, silk and other products of commercial value. Also they serve as the food of many birds, fish and other useful animals; they perform services as scavengers; they help to keep harmful animals and plants in check and they have been useful in medicine and scientific researches (Borror and DeLong, 1970). Class insecta is divided into 29 orders on the basis of the structure of wings and mouth parts, the metamorphosis and on various other characters. Among them, the order Coleoptera is the largest order on insects and contains about 40 percent of the known species. Over a quarter of a million species of beetles have been described (Richard and Davis, 1977).

One of the distinct features of the Coleoptera is the structure of the wings. Most beetles have four wings, with the front pair thickened leathery or hard and brittle and usually meeting in a straight line down middle of the back and covering the hind wings hence the order name, (coleo - sheath, ptera – wings). The wings are membranous, usually longer than the front wings, and when not in use is folded up under the front wings. The front wings of a beetle are called elytra (singular, elytron). The elytra normally serve only as protective sheaths, the wings are only ones ordinarily used for flight. The front or hind wings are greatly reduced in a few beetles (Borror and DeLong, 1954). Generally their stout bodies and exoskeleton are usually thick and strong. Both larvae and adult possess chewing mouthparts which are strongly developed. Some families of beetles have the head prolonged into a snout which may be longer than the entire body. This long snout enables the insects to feed on the inner tissues of plants and makes deep holes for the deposition of eggs (Dennis, 1983).

According to their habitat utilization, beetles are most abundant in the tropics, but at the same time, they have adapted to life at all latitudes and in nearly every habitat, feeding on any substances of organic origin. They have not been found in the open sea, but are abundant on sea coasts; they have not been found beyond the boundary of external snows (Foltz, 1998)

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and also found in nearly all natural habitats including freshwater and marine habitats; everywhere vegetative foliage is found; from trees and their barks to flowers; and leaves and underground near roots (Grzimek, 2004).

As their feeding habit, they are small-sized invertebrates and omnivorous animals. They mainly inhabit as they consume the debris from plants and animals including fallen petals and animal dung. A small number of beetles have become important economic pests as the results of the feeding and egg – laying activities on stored products, pastures, crops and timber. Predatory beetle, especially ground beetles and ladybirds (Coccinellidae) are used to control insect pests around the world. The leaf and metallic wood boring beetles are utilized to control the spread of noxious weeds throughout the world, as they feed on the leaves, bores into twigs and stems or destroy the seeds (Grzimek, 2004).

In fact, a great many species of Coleoptera prey upon other insects and for this reason are indirectly of great value to man. Predatory species have been used for the control of insect pests and they are also of great importance by virtue of the role of many species in braking down, consuming or burying plants and animal remains, including dung (Britton, 1979). Species occurrence of beetles is associated with environmental conditions. Some members of beetles are of economic importance and threatening as the potential pests (Chapman, 2012). The present study was conducted to know the occurrence of beetles around Mezaligone environs at Hinthada District by the following objectives such as to record and identify of beetle species around the study area environs and to examine their morphological characteristics of recorded species and to investigate the habits and status.

## **Materials and Methods**

### **Study area and study period**

The present study was conducted at Mezaligone environs locating 17° 54' 12.181" N and 95° 13' 32.864" E (Fig. 1). This study period was lasted from November, 2015 to February, 2016.

### **Specimen collection, preservation and identification**

The specimens were collected by using insect net from different sites during day time and night time because some beetles are diurnal and some are nocturnal. The surveys were carried out by two weeks interval. The collected specimens were killed by chloroform vapour and preserved with 70% alcohol. The size and shape of the body and coloration of live specimen were examined immediately because the color of specimen was changed after death. The morphometric length and breadth of the body was measured and also the type of antenna and numbers of antennae segments were also studied. The classification and identification of beetle have been followed after Arrow (1917) and Borror and Delong (1970).

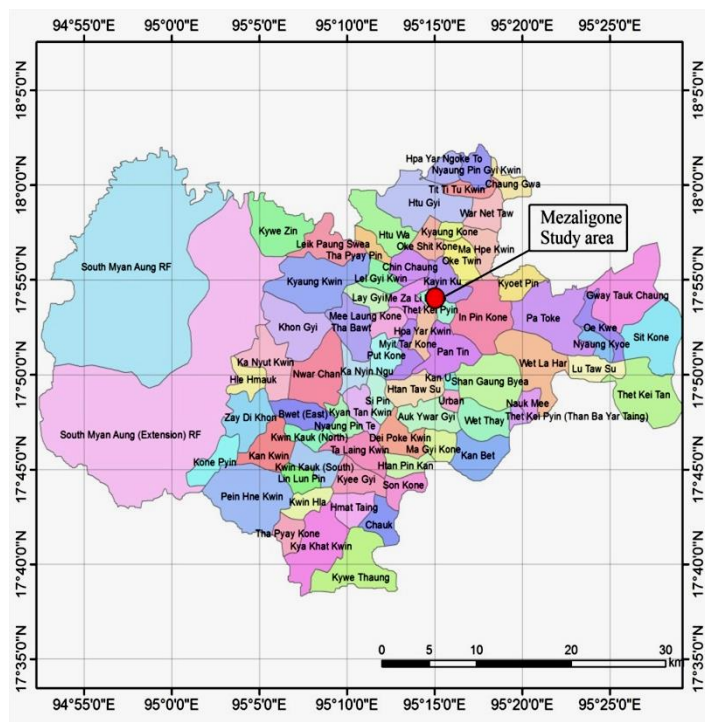


Figure (1) Location map of study area, Mezaligone environs.

### Results

#### Species composition and their habit of recorded beetle species

During the study period, a total of 20 species belonging to 11 families under order Coleoptera were recorded. Among them, Scarabaeidae family was the highest species number (8 species, 40%) and followed by Carabidae (2 species, 10%) and Coccinellidae (2 species, 10%); one species each from Brachinidae, Cicindelidae, Dytiscidae, Chrysomelidae, Cerambycidae, Burprestidae, Hydrophilidae and Curculionidae (5%) (Fig. 2 & Plate. 1.). The morphological characteristics of recorded beetle species were shown in Table 1.

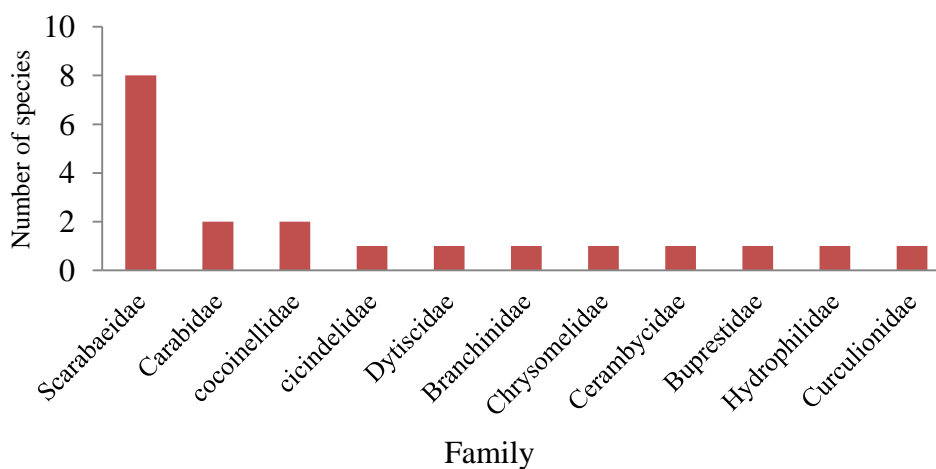


Figure (2) Number of beetle species under different family.

Table (1) Recorded beetle species and their morphometric characteristics.

Sr. no.	Species	Family	Types of antenna	Body coloration	Mean	
					Length (mm)	Breadth (mm)
1	<i>Scarites bengalensis</i>	Carabidae	Moniliform	Black	30.00 ± 3.8	8.00 ± 1.9
2	<i>Calosoma marginale</i>		Filiform	Black	27.00 ± 3.2	13.00 ± 1.5
3	<i>Pheropsophus jessoensis</i>	Brachinidae	Filiform	Yellow-black	17.00 ± 2.2	7.00 ± 1.8
4	<i>Cicindela fabricil</i>	Cicindelidae	Filiform	Black with green spots	12.00 ± 1.8	5.00 ± 1.2
5	<i>Dytiscus verticalis</i>	Dytiscidae	Lamellate	Black	36.00 ± 3.4	17.00 ± 1.3
6	<i>Catharus molossus</i>	Scarabaeidae	Lamellate	Black	36.00 ± 2.8	26.00 ± 2.2
7	<i>Oryctes rhinoceros</i>		Lamellate	Black and abdomen reddish brown	48.00 ± 4.5	24.00 ± 3.1
8	<i>Xylotrupes gideon</i>		Lamellate	Reddish brown	44.00 ± 2.5	22.00 ± 3.4
9	<i>Mimela macleayana</i>		Lamellate	Bright coppery red and grass green	26.00 ± 3.1	15.00 ± 2.7
10	<i>Heliocopris bucephalus</i>		Lamellate	Blackish brown	50.00 ± 2.5	34.00 ± 3.5
11	<i>Ontis virens</i>		Lamellate	Black	20.00 ± 2.7	9.00 ± 2.8
12	<i>Onthophagus tricornis</i>		Lamellate	Black	17.00 ± 2.6	10.50 ± 2.5
13	<i>Protaetia inanis</i>		Lamellate	Uniform coppery	13.00 ± 3.4	7.00 ± 2.3
14	<i>Coccinella transversalis</i>	Coccinellidae	Filiform	Orange and yellow with black markings	5.00 ± 1.5	3.00 ± 1.7
15	<i>Harmonia octomaculata</i>		Filiform	Dark-yellow	3.00 ± 1.2	1.50 ± 1.3
16	<i>Aulacophora foveicollis</i>	Chrysomelidae	Filiform	Bright red	6.00 ± 1.5	4.00 ± 1.5
17	<i>Batocera titana</i>	Cerambycidae	Serrate	Yellowish, mottled with blackish markings and bright red spots	46.00 ± 3.7	18.00 ± 2.7
18	<i>Chrysochlora vittata</i>	Buprestidae	Serrate	Shiny metallic green	38.00 ± 4.8	12.00 ± 2.8
19	<i>Hydrophilus inquirenda</i>	Hydrophilidae	Lamellate	Black	28.00 ± 4.5	15.00 ± 3.2
20	<i>Phyllobius glaucus</i>	Curculionidae	Geniculate	Extremely variable with green scales	15.00 ± 2.7	5.00 ± 1.2

Table (2) Habit and the recorded individuals of beetles during the study periods.

Sr. No	Species	Habit		Population								Total
				November		December		January		February		
				1 <sup>st</sup> Week	2 <sup>nd</sup> Week	1 <sup>st</sup> Week	2 <sup>nd</sup> Week	1 <sup>st</sup> Week	2 <sup>nd</sup> Week	1 <sup>st</sup> Week	2 <sup>nd</sup> Week	
1	<i>Scarites bengalensis</i>	√	-	2	3	1	3	-	3	2	-	14
2	<i>Calosoma marginale</i>	√	-	-	3	2	4	1	2	-	1	13
3	<i>Pheropsophus jessoensis</i>	√	-	4	1	3	2	4	-	1	1	16
4	<i>Cicindela fabricil</i>	√	-	-	3	-	-	2	-	-	1	6
5	<i>Dytiscus verticalis</i>	√	-	1	-	3	2	4	3	-	2	15
6	<i>Catharus molossus</i>	√	-	4	5	2	2	5	1	1	2	22
7	<i>Oryctes rhinoceros</i>	√	-	-	-	2	-	-	3	2	1	8
8	<i>Xylotrupes gideon</i>	√	-	-	-	1	-	-	1	-	1	3
9	<i>Mimela macleayana</i>	√	√	-	-	-	-	1	-	-	-	1
10	<i>Heliocopriss bucephalus</i>	√	-	-	-	-	-	-	-	-	2	2
11	<i>Ontis virens</i>	√	-	-	1	-	2	-	-	1	1	5
12	<i>Onthophagus tricornis</i>	√	-	-	-	1	-	1	1	1	-	4
13	<i>Protaetia inanis</i>	-	√	1	-	-	-	1	-	1	-	3
14	<i>Coccinella transversalis</i>	-	√	5	4	6	-	3	5	3	4	30
15	<i>Harmonia octomaculata</i>	-	√	-	1	-	2	-	1	1	-	5
16	<i>Aulacophora foveicollis</i>	-	√	-	-	2	1	3	-	2	2	10
17	<i>Batocera titana</i>	√	√	-	1	-	1	-	2	1	-	5
18	<i>Chrysochlora vittata</i>	√	√	6	4	3	2	2	3	4	4	28
19	<i>Hydrophilus inquirenda</i>	√	-	1	-	2	-	3	1	2	1	10
20	<i>Phyllobius glaucus</i>	√	-	-	1	-	2	-	-	1	1	5
Total		16	7	24	27	28	23	30	26	23	24	205

### Habits and occurrence of populations in the study area environs

Among the recorded species, a total of 16 species were nocturnal in habit, four species of *C. transversalis*, *A. foveicollis*, *P. inanis* and *H. octomaculata* were diurnal in habit whereas three species *M. macleayana*, *B. titana* and *C. vittata* were both nocturnal and diurnal habits. As the population occurrence, a total of 205 individuals of beetle were recorded. Among them, the highest number 30 individual in *Coccinella transversalis* and the lowest number one individual in *Mimela macleayana* found in January. Moreover, *C. molossus*, *C. vittata* and *C. transversalis* were found in every month while *M. macleayana* and *H. bucephalus* were found in January and February respectively. The monthly occurrences were varied from November to February. The highest number was observed in January and lowest in February (Fig. 3 & Table. 2).

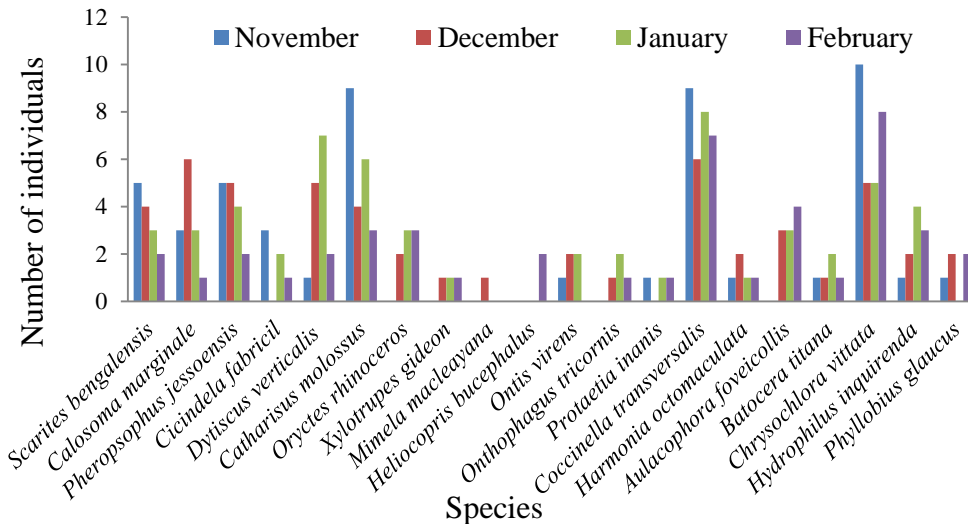


Figure (3) Monthly variation of recorded beetle species during the study period.

### Discussion

During the study period, 20 species, belonging to 20 genera and 11 families under two suborders were collected. The largest numbers of species were found in family Scarabaeidae. According to Borror and DeLong (1954), some beneficial beetles are family Scarabaeidae (the dung beetles), Coccinellidae (Ladybird beetles except Genus – *Epilachna*) and Carabidae and some ground beetles of family Brachinidae. All the dung beetles are scavengers, some of them feeding upon dungs, carrion and a few upon decaying fungi and others are feed on vegetable substances.

In this study, twelve species out of 20 recorded species were beneficial, *Catharicus molossus*, *Heliocopris bucephalus*, *Ontis virens* and *Onthophagus tricornis* are the dung beetle of family Scarabaeidae. They feed on cow dungs and decomposing plant materials and found in near cow dungs at night time. They may reduce the population of flies and worms that breed in cattle dungs. They also improve the fertility and nutrient cycling of the soil. According to Kyaw Min Htike (2012), family Carabidae, Scarabaeidae and Coccinellidae were most abundant in Hinthada University Campus.

Regarding to the types of antennae, Ross, *et al.*, (1947) described the various types of antennae which are filiform, modified filiform, geniculate, clavate, bipectinate, capitate, pectinate, moniliform, serrate, lamellate in different beetle species. In the present study, five different types of antennae, moniliform, filiform, geniculate, lamellate, and serrate were recorded. As the recorded respective species, one species in each family Carabidae, Brachinidae, Chrysomelidae and Cicindelidae, two species in Coccinellidae were found the filiform type whereas the moniliform type of antennae was found in species, *Scarites bengalensis*. The serrate type of antennae was found in one species in family Cerambycidae and Buprestidae. The geniculate type was in one species of family Curculionidae. The lamellate type was in eight species in family Scarabaeidae, though one species in family Hydrophilidae and Dytiscidae.

As the comparison of their body size, the largest size of beetle ( $50 \pm 2.5$  mm) was found in *H. bucephalus* and the smallest length size ( $3 \pm 1.2$  mm) was found in *H. octomaculata*, the largest breadth size of beetles ( $34 \pm 3.5$  mm) was found in *H. bucephalus* and the smallest breadth size ( $1.5 \pm 1.3$  mm) was found in *H. octomaculata*.

Wint War War Myint (2003) stated that the distribution and relative abundance of 45 beetle species from Hlawga Park. The occurrence of species was recorded in each family 11.83% (Carabidae), 0.34% (Dytiscidae), 0.68 % (Histeridae), 15.88% (Scarabaeidae), 4.73%

(Buprestidae), 0.68% (Cleridae), 2.7% (Cerambycidae), 50.33% (Chrysomelidae), 7.09% (Curculionidae), 4.39% (Harpalidae) and 1.35% (Hydrophilidae). Also Khin Mar Htwe (2007) recorded that the species diversity, distribution and habitat preference of 40 beetle species from Maubin area. The percentages of the beetle species were 25% in family (Scarabaeidae), 20% (Chrysomelidae), 15% (Carabidae), 7.5% (Curculionidae), 5% (Bruchidae and Cerambycidae), 10% (Coccinellidae), and 2.5% in each family (Cicindelidae, Brachinidae, Hydrophilidae, Buprestidae and Tenebrionidae) respectively. The family Scarabaeidae was the highest species composition around Maubin area.

Compared with the present study families Carabidae, Scarabaeidae, and Coccinellidae were found to be the most abundant in Mezaligone environs, Hinthada District. The percentage of species composition of family Scarabaeidae was 40%, families Carabidae and Coccinellidae was 10% each, and 5% of each families Brachinidae, Cicindelidae, Dytiscidae, Chrysomelidae, Cerambycidae, Buprestidae, Hydrophilidae and Curculionidae were observed. Thus the present study was agreed with the previous statements, in family Scarabaeidae was recorded maximum percentage of species composition. In conclusion, the diversity and abundance of beneficial beetle species should be attempted in biological pest control at the study area environs.

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#### References

- Arrow, G. J., (1917). *Fauna of British India*. Order Coleoptera, Lamellicornia Part I. Cetoninae and Dyanastinae, London.
- Borror, D. J., DeLong, D. M., (1954). *An introduction to the study of insects*. Revised Edition Coloumbus, Ohio.
- Borror, D. J., DeLong, D. M., (1970). *An introduction to the study of insects*. Third Edition Coloumbus, Ohio.
- Britton, E. B., 1979. *The insect of Australia*. A Textbook for students and Research workers. Melboume University Press.
- Chapman, A. D., (2012). Number of living species in Australia and the world (2<sup>nd</sup> Edition). Department of the Environment water, Heritage and the Arts (internet) (Cited 2012 march 10). Available from <http://en.Wikipedia.Org/Wiki/beetles>.
- Dennis, S. H., (1983). *Agricultural insect pest of the Topic and their control*. 2<sup>nd</sup> Edition, Cambridge University.
- Foltz, J., (1998). Introduction about beetles electric document; ( [http; // gardening wsu- edu library inse 002. Html](http://gardening.wsu-edu/library/inse002.html)) accessed on 8 may 2010.
- Grzimek, (2004). *Animal life Encyclopedia*. Order Coleoptera. Vol.3: Insects Second Edition, Inc. 27500 Drake Rd. Farmington Hills. MI.48331 – 13535. Internet site at [http; // www. gale.com](http://www.gale.com).
- Khin Mar Htwe, (2007). Species Diversity, Distribution and Habitat Preferences of Beetles Species around Maubin area, Ayeyarwady Division, *PhD Dissertation*, University of Yangon.
- Kyaw Min Htike, (2012). Some Beetles of Hinthada University Campus. *M.Sc Thesis*, University of Hinthada.
- Richard, O. W., and Davies, R.G., (1977). *A General text book of entomology*. 10<sup>th</sup> Edition. Vol. II. Classification and Biology, London.
- Ross, H. A., Down, N. M., Jaques, H. E., 1947. How to know the beetles, 2<sup>nd</sup> edition. London.
- Wint War War Myint, 2003. Distribution and Relative Abundance of Some Beetles around Hlawga Park, *M.Sc Thesis*, University of Yangon.



(A) *Scarites bengalensis*



(B) *Calsoma marginale*



(C) *Pheropsophus jessoensis*



(D) *Cicindela fabricil*



(E) *Dytiscus verticalis*



(F) *Catharismus molossus*



(G) *Oryctes rhinoceros*



(H) *Xylotrupes gideon*



(I) *Mimela macleayana*



(J) *Heliocopriss bucephalus*



(K) *Ontis virens*



(L) *Onthophagus tricornis*

Plate (1) The recorded beetle species in the study area environs.



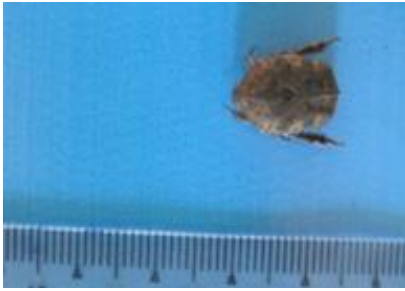
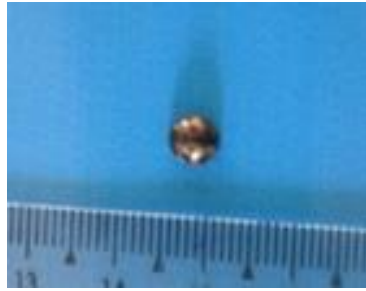
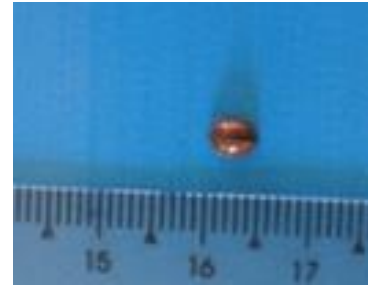
(M) *Prottaetia inanis*(N) *Coccinella transversalis*(O) *Harmonia octomaculata*(P) *Aulacophora foveicollis*(Q) *Batocera titana*(R) *Chrysochloa vittata*(S) *Hydrophilus inquirenda*(T) *Phyllobius glaucus*

Plate (1) The recorded beetle species in the study area environs (continued).