

Occurrence of Some Beetles in Hinthada University Campus

Myint Myint Kyaing¹, Tin Aye Mu² and Thin Thin Nwe³

Abstract

Occurrence of some beetle species in Hinthada University Campus was investigated. A total of 11 species belonging to 11 genera under seven families of order Coleoptera were recorded during the study period from January 2017 to August 2017. Forest type, agricultural land, aquatic environs and human habitation were chosen as specific habitat types. The highest population of three species were recorded from families Coccinellidae followed by two species in Carabidae and Scarabaeidae. One species from each family was recorded in Brachinidae, Dytiscidae, Chrysomelidae and Buprestidae. The peak population occurrence was observed in agricultural land. The findings were presented with scaled photographs, figures and tables.

Keywords: Occurrence, beetles, Hinthada University Campus

INTRODUCTION

Beetles are a group of insects that form the order Coleoptera, in the Superorder Endopterygota. Their front pair of wings is hardened into wing-cases, elytra, distinguishing them from most other insects. The Coleoptera, with about 400,000 species, is the largest of all order, constituting almost 40% of described insects and 25% of all known animal life-forms, new species are discovered frequently. Family Scarabaeidae (Scarabs, dung beetles, chafers) 3000 species. Chrysomelidae (leaf beetles): 3000 species, Carabidae (ground beetles) 2500 species, Staphylinidae (rove beetles) 1600 species. They are found in almost every habitats except the sea and polar regions. They interact with their ecosystem in several ways: beetles often feed on plants and fungi, breakdown animal and plant debris, and eat other invertebrates. Some species are serious agriculture pests, such as the Colorado potato beetle, such as Coccinellidae (ladybird or ladybugs) eat aphids, scale insects, thrips and other plant-sucking insects that damage crops (Evans and Bellamy 2000).

The beetle varies in length from less than a millimeter up to about 125 mm in some tropical species. All beetles have chewing mouthparts with well-developed mandibles that depending in the species is variously adapted to accommodate a wide variety of foods. Most beetles are either herbivorous or scavengers, but there are also many predators among them. Beetles are the most diverse group of insects. There are 500 families, 23000 genera and 370,000 species of beetles in worldwide (Green, 2006).

Order Coleoptera, characterized by having forewings which are thickened and hardened into elytra, and which are used to protect delicate folded hind wings. They range in size, from minute to gigantic insects, and this is the largest order in the animal kingdom numbering some 220000 species. The group exhibits great diversity of form and habits (Dennis, 1983) A great many species of Coleoptera prey upon other insects and for this reason are indirectly of great value to man (Britton, 1979).

A small number of beetles have become important economic pests, as the result of their feeding and egg-laying activities on stored products, pastures, crops and timber. Beetles feeding on legumes, tomatoes, potatoes, melons, gourds and grains are some of humanity's greatest competitors for food. Predatory beetles, especially ground beetles (Carabidae) and

¹ Associate Professor, Dr, Department of Zoology, Hinthada University

² Associate Professor, Dr, Department of Zoology, Hinthada University

³ Lecturer, Dr, Department of Zoology, Hinthada University

ladybirds (Coccinellidae) are used to control insect pests around the world, and many herbivores have been recruited as biological control agents for plant pest projects (Hill, 2012).

Insect populations can fluctuate dramatically over time. Population can also virtually disappear for long time period under adverse conditions (Schowalter, 2000). Most beneficial species achieve their greatest efficiency within habitats where conditions are most suitable for their well-being (Debach, 1974). People regard as economic pest when the crop damage caused by insects leads to a loss in yield loss reaches certain proportion the pest can be defined as economic pest (Hill, 1983).

Thus, the present study was conducted with the objectives to assess the species composition of beetles in Hinthada University Campus and to determine the distribution of recorded beetles in different habitat types.

MATERIALS AND METHODS

Study area

Hinthada University Campus is located between Latitude 17°38'37" N and Longitude 92°26'39" E. The total area is 0.37 km sq and situated at the northern part of the Hinthada Township (Fig. 1).

Study period

The study period lasted from January 2017 to August 2017.

Habitat types

(1) Forest type, (2) agricultural land, (3) aquatic environs and (4) human habitation were selected as specific habitat types (Fig.1). Forest type consists of dense vegetation such as herbs, shrubs and large area of tree-covered land. Agricultural land comprises paddy-field and farming. Aquatic environs contain lake, pond, ditches and living in or near water. Human habitation involves hostel areas.

Specimen collection

Specimen collection was done twice a week. Hand picking, digging method were used to collect specimens. The beetles were killed by chloroform vapor and preserved with 70% alcohol. Photographs of the specimens were taken at required profile.

Identification

Identification of the species is followed after Arrow (1917) and Borror and Delong (1970).

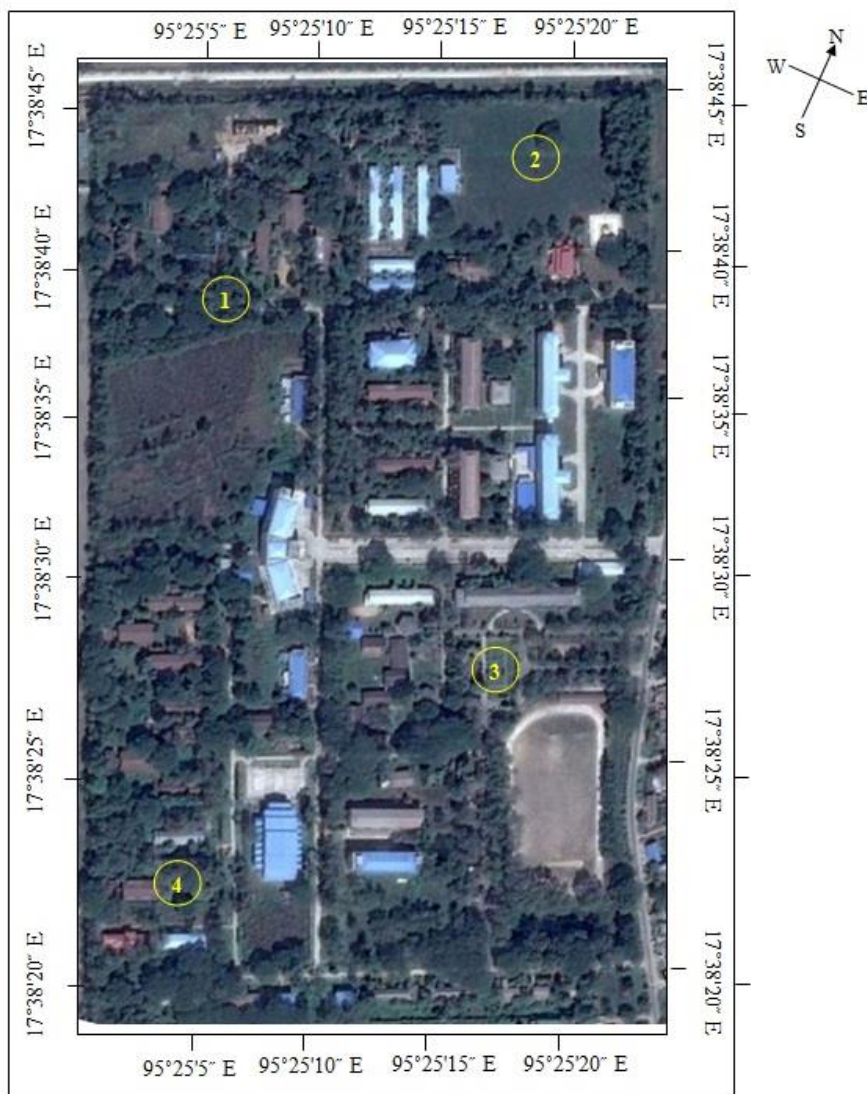


Figure (1). Map of the study area. (Source: Geography Department of Hinthada University)

Results

A total of 11 species belonging to 11 genera under seven families of one order were recorded in study sites of Hinthada University Campus. Among them, Coccinellidae family was recorded to possess highest species number (Three species) followed by (Two species) in Carabidae and Scarabaeidae, each one species from family Brachinidae, Dytiscidae, Chrysomelidae and Buprestidae were recorded (Table.1).

Systematic position and descriptions of recorded beetle

Family	-	Carabidae
Genus	-	<i>Calosoma</i>
(i) Species	-	<i>Calosoma marginale</i> Casey, 1897
Common name	-	Ground beetle

Length 27 mm and breadth 13 mm, body was elongated and little flattened. Color was shining black but in conspicuous. Head was small, eyes were large and prominent. Antennae were filiform, prothorax was wider than the head. Five segmented abdomen and were stout and slender (Fig.2, A).

Genus - *Scarites*
(ii) Species - *Scarites bengalensis* Dejean, 1826
Common name - Predaceous ground beetle

Length 30 mm and breadth 7 mm, elongated body and shining black color. Head was fairly wide, nearly rectangular in shape, eyes rounded and prominent. Antennae were moniliform, reaching hind angles of thorax and eleven segments. Abdomen was convex and shining black. Legs were stout (Fig.2, B).

Family - Brachinidae
Genus - *Pheropsophus*
(iii) Species - *Pheropsophus jessoensis* Morawitz, 1862
Common name - Ground beetle

Length 17 mm and breadth 7 mm, body was broad, yellow and dark-brown dorsally and lower surface was black color. Head was small and had rounded spots on each side. Antennae were eleven segmented and filiform, thorax is oblong, six segmented and convex abdomen. Elytra were broad, two irregular bands on the shoulder and the apex. Legs were elongate, yellowish and joints black (Fig.2, C).

Family - Dytiscidae
Genus - *Dytiscus*
(iv) Species - *Dytiscus verticalis* Say, 1823
Common name - Predacious diving beetle

Length 36 mm and breadth 17 mm. Body oval and Shiny black color. Head short and broad with prominent eyes. Prothorax black with yellow margin and smooth. Elytra were well developed (Fig.2, D).

Family - Scarabaeidae
Genus - *Protoetia*
(v) Species - *Protoetia inanis* Arrow, 1910
Common name - Flower beetle

Length 13 mm and breadth 7 mm. Body was short and stout, uniform coppery color. Antennae were lamellate type. Five segmented abdomen almost smooth and shiny. Elytra were incomplete rows of puncture on the disc. Legs were stout (Fig.3, A).

- Genus - *Heliocopris*
 (vi) Species - *Heliocopris bucephalus* Fabricius, 1775
 Common name - Large dung beetle

Length 50 mm and breadth 34mm. Body broad and quadrate in shape. Head small, black color and shiny with the elytra. The male has a long, curved horn extending from the front of the head. Pronotum was a slight depressed area in the middle of the basal part (Fig.3, B).

- Family - Chrysomelidae
 Genus - *Aulacopora*
 (vii) Species - *Aulacophora foveicollis* Lucas, 1849
 Common name - Red pumpkin beetle

Length 6 mm and breadth 3 mm, body was oblong. In live beetles the color is bright red, but after death they fade to brown. Head was narrower than the thorax, eyes were large prominent. Antennae were filiform and eleven segments. Thorax was slightly broader than long. Abdomen was six visible segmented and black colors. Elytra were convex, shining red, covered with fine punctured. Legs were slender (Fig.3, C).

- Family - Coccinellidae
 Genus - *Coccinella*
 (viii) Species - *Coccinella transversalis* Fabricius, 1775
 Common name - Transverse lady beetle

Adult were about 5 mm -6.50 mm in length. Body was hemispherical in shaped. Head comprised a pair of short club shaped antenna. Thorax composed of three pairs of black segmented leg , two pairs of wings brighting orange red in color with black marking, a transverse band at apical third not reaching lateral margin and three smaller apical spots, one suture and two lateral on the elytra. Abdomen was strongly convex dorsally; nearly flat ventrally (Fig.3, D).

- Genus - *Micraspis*
 (ix) Species - *Micraspis crocea* Mulsant, 1863
 Common name - Ladybird beetle

It was 4 to 5 mm long. *Micraspis crocea* has an oval body. The elytra have no markings. The adults were yellow in color with variable spots behind the head. It was very active beetle (Fig.3, E).

- Genus - *Menochilus*
 (x) Species - *Menochilus sexmaculatus* (Fabricius, 1781)
 Common name - Six spotted beetle

Adult beetles were about 4 mm-5 mm in length. Body was hemispherical in shape and orange color. Head bears a pair of short club-shaped antennae. T-like black marking was found with a black transverse wave band and six black spots on the elytra covers including two zigzag lines and a near black spot on each elytron. Abdomen strongly convex dorsally, nearly flat ventrally. Black segment legs were short (Fig.3, F).

Family	-	Buprestidae
Genus	-	<i>Chrysochlora</i>
(xi) Species	-	<i>Chrysochlora vittata</i> Fabricius, 1774
Common name	-	Metallic wood boring beetle

Length 38 mm and breadth 12 mm. Body was elongated, depressed, very smooth and shiny metallic green color. Head was deeply and widely excavated. Eyes were prominent and shining black. Antennae were serrated and eleven segmented. Abdomen was five segmented. Elytra were wider than the prothorax. Legs were broad and stout with metallic green (Fig.3, G).



A. *Calosoma marginale*



B. *Scarites bengalensis*



C. *Pheropsophus jessoensis*



D. *Dytiscus verticalis*

Figure (2). Recorded beetle species of family Carabidae, Brachinidae and Dytiscidae.

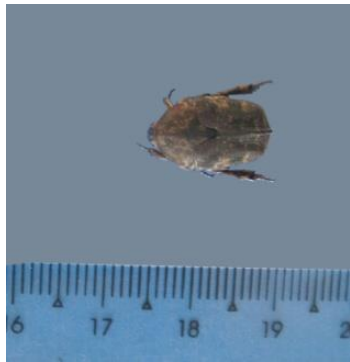
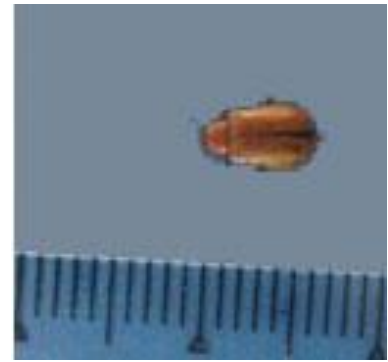
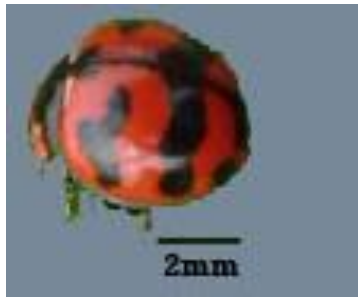
A. *Protaetia inanis*B. *Heliocopris bucephalus*C. *Aulacophora foveicollis*D. *Coccinella transversalis*E. *Micraspis crocea*F. *Menochilus sexmaculatus*G. *Chrysochlorda vittata*

Figure (3). Recorded beetle species of family Scarabaeidae, Chrysomelidae, Coccinellidae and Buprestidae.

Table (1). Species composition of beetle in Hinthada University Campus.

No.	Scientific name	Common name	Family	Order
1.	<i>Calosoma marginale</i>	Ground beetle	Carabidae	Coleoptera
2.	<i>Scarites bengalensis</i>	Predaceous ground beetle		
3.	<i>Pheropsophus jessoensis</i>	Ground beetle	Brachinidae	
4.	<i>Dytiscus verticalis</i>	Predaceous diving beetle	Dytiscidae	
5.	<i>Protaetia inanis</i>	Flower beetle	Scarabaeidae	
6.	<i>Heliocopris bucephalus</i>	Large dung beetle		
7.	<i>Aulacophora foveicollis</i>	Red pumpkin beetle	Chrysomelidae	
8.	<i>Coccinella transversalis</i>	Transverse lady beetle	Coccinellidae	
9.	<i>Micraspis crocea</i>	Ladybird beetle		
10.	<i>Menochilus sexmaculatus</i>	Six spotted beetle		
11.	<i>Chrysochlorda vittata</i>	Metallic wood boring beetle	Buprestidae	

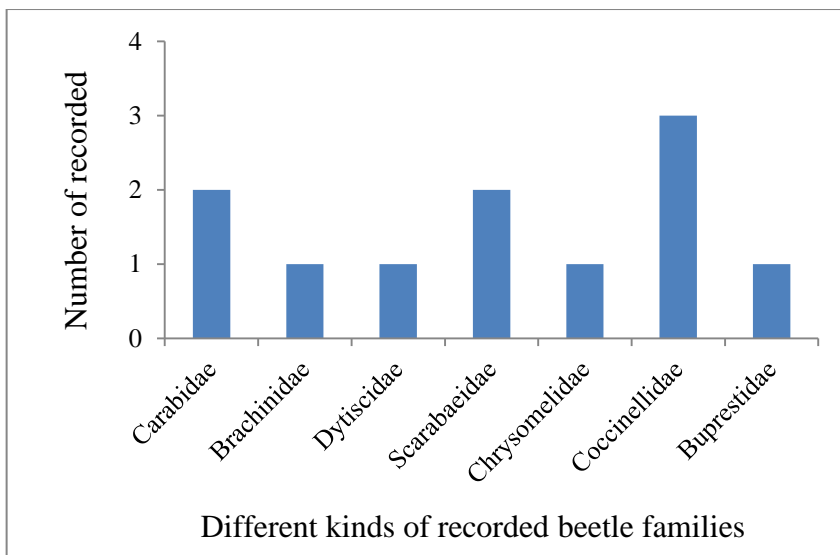


Figure (4). Number of recorded beetle species under different families.

Table (2). Distribution of recorded beetle species in different habitats.

No.	Family	Scientific name	F	Ag	Aq	H
1.	Carabidae	<i>Calosoma marginale</i>	2	2		2
2.		<i>Scarites bengalensis</i>	3			3
3.	Brachinidae	<i>Pheropsophus jessoensis</i>			3	3
4.	Dytiscidae	<i>Dytiscus verticalis</i>			2	1
5.	Scarabaeidae	<i>Protaetia inanis</i>	2	2		
6.		<i>Heliocopris bucephalus</i>	1	1		
7.	Chrysomelidae	<i>Aulacophora foveicollis</i>	1	3		
8.	Coccinellidae	<i>Coccinella transversalis</i>	5	10		
9.		<i>Micraspis crocea</i>	1	2		
10.		<i>Menochilus sexmaculatus</i>	3	6		
11.	Buprestidae	<i>Chrysochlora vittata</i>	5			
Total individual			23	26	5	9
Total species			9	7	2	4

F - Forest type
 Ag - Agricultural land
 Aq - Aquatic environs
 H - Human habitation

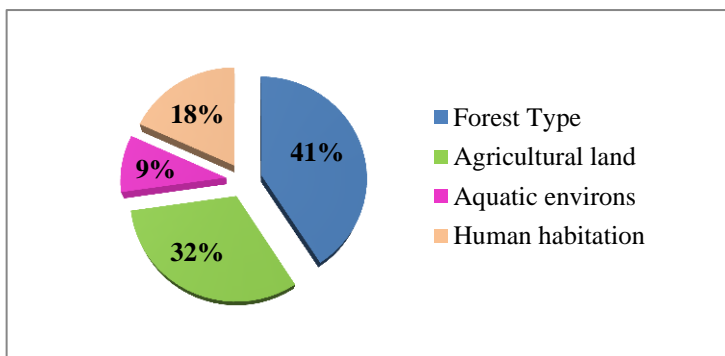


Figure (5). Percentage of beetle species in specific habitat types.

In this study, a total of 11 species were recorded in all designated four different habitat types. Among them, forest type (nine species), agricultural land (seven species), human habitation (four species) and aquatic environs (two species) were recorded. The agricultural land (26 individuals) and forest type (23 individuals) were noted of the most abundant habitats of this study (Table. 2).

Distribution of recorded beetles in different habitat types revealed that there are 41% in forest type, 32% in agricultural land, 18% in human habitation and 9% in aquatic environs (Fig. 5).

DISCUSSION

The present study is the occurrence of some beetle species in Hinthada University Campus. A total of 11 beetle species belonging to 11 genera of seven families under one order were recorded during the study period.

Four different habitats were selected to observe the distribution of recorded beetles. Among 11 species, nine species in forest type, seven species in agricultural land, four species in human habitation and two species in aquatic environs were recorded. Minn Shwe Khae (2016) stated that there are 15 species in forest type and human habitation, 10 species in agricultural land and two species in aquatic environs. This finding was slightly different with the present study. It may be due to the environmental factors, and habitat preference.

According to Kyaw Min Htike (2012), family Carabidae, Scarabaeidae and Coccinellidae were most abundant in Hinthada University Campus. In the present study, the recorded species belonging to families Carabidae, Scarabaeidae and Coccinellidae were found to be the most abundant in Hinthada University Campus. The present finding was similar to that his finding.

Maulik (1936) reported that a great many species of Coleoptera prey upon other insects and such predatory species have been used for the control of insect pests. Among the recorded 11 species, seven predatory species were observed. During the study period, the three species of family Coccinellidae (ladybird beetles), *Coccinella transversalis*, *Micraspis crocea* and *Menochilus sexmaculatus* were found in the leaves of Black gram, gourd and paddy fields. They are also predators and feed on aphids, scale insects and mealybugs which are pests of these plants and forests. Thus, the present findings are similar to that of Borror and Delong (1954) who stated that the ladybird beetles are predators which feed on aphids, scale insects and mealybugs. Some ground beetles are predators and feed on other insects chiefly on caterpillars which attack trees and shrubs.

Ladybird beetle, *C. transversalis* was observed as the predominant species because it was collected in highest number and large dung beetle *Heliocopris bucephalus* was the least dominant because only one individual was recorded in this study. This finding agree with the records of previous researcher, Kyaw Min Htike (2012).

CONCLUSION

The present study provides baseline information about the distribution of some beetle species in different habitat types and for a more detailed study to be undertaken in the area. This study also showed that the natural balance and ecosystem in the studied areas have not yet been destroyed and some insect pests are being controlled by some beneficial insects.

Acknowledgements

We would like to express our sincere gratitude to Dr Tin Htwe, Rector of Hinthada University, and Dr Theingi Shwe, Pro-Rector, Hinthada University, for permission and allowing to submit the research paper. We would especially thank Professor Dr Aye Aye Tin, Head of Zoology Department, Hinthada University, for her kind encouragement, valuable suggestions and editing in our research paper.

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 insects of Australia*. A Textbook for Students and Research Workers. Melbourne University Press.
- Debach, P., (1974). *Biological Control by Natural Enemies*. Cambridge University Press, Cambridge. 323 pp.
- Dennis, S. H., (1983). *Agricultural Insect pest of the Tropic and Their Control*. 2nd Edition, Cambridge University.
- Evans, A. V., Bellamy, C.L., (2000). *An Inordinate Fontness for Beetles*.
- Green, J., (2006). *The big bug book*. Discover the amazing world of beetles, bugs, butterflies, moths, insects and spiders. Hermes House is an important of Anness Publishing Ltd, 88-89 Black friars Road, London SE1 SHA.
- Hill, D. S., (1983). *Agricultural Insect pests of the Tropics and their control*. 2nd Edition Cambridge University Press, Cambridge, UK. 746 pp.
- Hill, (2012). *Agricultural insect pests of the tropics and their control*. Second Edition. Cambridge University Press, London, New York, New Rachelle.
- Kyaw Min Htike, (2012). Some Beetles of Hinthada University Campus. *M.Sc Thesis*, University of Hinthada.
- Maulik, S., (1936). *Fauna of British India*, Including Ceylon and Burma. Order Coleoptera. Chrysomellidae (Galerucinae). Taylor and Franicus. Red Lion Court, Fleet Street, London.
- Minn Shwe Khae, (2016). Species composition and diversity of some beetles in Maubin University Envirions. *M.Sc thesis* . Maubin University.
- Schowalter, T. D., (2000). *Insect Ecology. An Ecosystem Approach*. Academic Press Printed in U.S.A 576 pp.