DATA ON THE COMPOSITION OF BEETLES (COLEOPTERA) IN XUAN NHA NATURE RESERVE, SON LA PROVINCE

Le BaoThanh
Vietnam National University of Forestry

SUMMARY

Beetle sampling was conducted on transects in Xuan Nha Nature Reserve, Son La Province using hand searching on the ground and trees, pitfall traps, light traps and fly interception traps. A total of 129 species belonging to 11 families were recorded. In which, the most abundant family was *Scarabaeidae* with 39 species accounting for 30.2% the total number of the recorded species, *Chrsomelidae* accounted for 17.8%, *Coccinellidae* accounted for 14.7%, *Cerambycidae* accounted for 13.2%, *Curculionidae* accounted for 7.8%, *Buprestidae* accounted for 6,2%, and *Tenebrionidae, Elateridae* and *Anobiidae* acounted for 2.3%. The two sub families *Meloidae* and *Anthribidae* indicated the lower number of species accounting for 1.6%. *Scarabaeidae* contributed the highest number of genera accounting for 31.4% the total number of the genera, *Cerambycidae* accounted for 18.6%, *Coccinellidae* accounted for 12.8%, *Chrsomelidae* accounted for 11.6%, *Curculionidae* accounted for 9.3%, *Elateridae* and *Tenebrionidae* accounted for 3.5%, the remaining families accounted for only 2.3%. More than 70% the total number of the species were rare species. The common species accounted for 21%, and the species were collected randomly accounting for 6%. The meadows had the high number of species accounting for 36.8% the total number of the species, the residential habitats accounted for 35,3%, the primary forests accounted for 22.5%, the secondary forests accounted for 22.1%, the agricultural habitats accounted for 19.9%, the bamboo forests accounted for 8.5%. The phytophaga species (leaves, bark, stems, root shoots) accounted for 62%, the necrophaga, detritophaga and corprophaga species accounted for 21.7%, the zoo phaga species accounted for 14.7%. Two species have not been identified yet accounting for 1.6%.

Keywords: Beetle, reserve, Xuan Nha.

I. INTRODUCTION

The Coleoptera is the largest of all orders and plays an important role in forest ecosystems. Xuan Nha Nature Reserve was established under the decision number 3440/QD-UBND of Son La Province covering an area of 16316.8 hectares. The reserve is considered as the region with a high level of biodiversity. So far 1074 species of 606 genera, 173 families representing 04 phyla of higher vascular plants have been recorded. In addition, 66 species of primates, 145 species of birds, 43 reptiles, and 24 frog species were recorded in the reserve (Son La People Committee, 2002). Although beetles were studied in some nature reserves in Vietnam, there is still a poor understanding of the beetle fauna inhabiting in Xuan Nha Reserve. Here, we provide the composition and distribution of the beetle fauna in Xuan Nha.

II. RESEARCH METHODOLOGY

Beetle sampling was carried out on three transects across six major habitats: the residential habitats, agricultural habitats, secondary forests, meadows, primary forests, and bamboo forests. For each transect, a sampling site with 10 m radius was selected to collect beetles. These sites are characterized by the plant composition and forest canopy cover.

Transect 1 (2 km): Chieng Son commune: from Na Ten village to Na Tan village containing the residential, agricultural habitats and bamboo forests.

Transect 2 (6 km): Chieng Xuan commune from Co village to Kho Hong village comprising the habitats: agriculture, bamboo forests andprimary forests

Transect 3 (4 km): Xuan Nha commune: from Chieng Nua village to Tun village going through agricultural habitats, bamboo forests,

secondary forests and primary forests.

Transect 4 (6 km): Xuan Nha commune: from Xuan Nha Commune People's Committee to Na Henh village going through agricultural habitats, bamboo forests, secondary forests and primary forests.

Beetles were collected by using hands searching on the ground and trees, light traps, pitfall traps (Nguyen The Nha et al, 2001). Beetles were identified based on the following literatures: Hoang Duc Nhuan (1983), Ek-Amnuay (2008), Mizunuma 1999), Li chengde (2006), Yang Zizhi (2002), Animal Research Department (1997), Xu Tiansen (2004), Li Yuansheng (2004), Xinan Forestry Institute (2003).

The recorded species in the study area were calculated according to this formula:

$$P(\%) = \frac{n}{N} * 100$$

n: The number of the recorded beetles in each site;

N: The total number of recorded beetles in all research sites;

P: Index is used to evaluate the popularity of the recorded species:

Common species: P(%) > 50%;

Less common species: 25 ≤ P(%) ≤ 50%;

Rare species: P% < 25%.

III. RESULTS AND DISCUSSION

3. 1. Species composition

One hundred and twenty nine species were detected in Xuan Nha Nature Reserve (Table 1).

Table 01. Species composition and frequency encountered at study sites

No	Species	P (%)	No	Species	P (%)
(1)	**Anobiidae**		65	*Exochomus quadripustulatus*	31.2
1	*Anobium fulvicorne*	62.5	66	*Harmonia axyridis*	50.0
2	*Anobium punctatum*	50.0	67	*Henosepilachna argus*	56.2
3	*Dorcatoma dresdensis*	43.7	68	*Hippodamia tredecimpunctata*	50.0
(2)	**Anthribidae**		69	*Hippodamia variegata*	31.2
4	*Brachytarsus nebulosus*	43.7	70	*Oenopia conglobata*	31.2
5	*Choragus horni*	37.5	71	*Subcoccinella vigintiquatuorpunctata*	75.0
(3)	**Buprestidae**		72	*Tytthaspis sedecimpunctata*	50.0
6	*Agrilus betuleti*	31.2	**(7)**	**Curculionidae**	
7	*Agrilus cinctus*	31.2	73	*Alcidodes frenatus*	31.2
8	*Agrilus sinuatus*	43.8	74	*Cyrtotrachelus longimanus*	50.0
9	*Anthaxia fulgurans*	37.5	75	*Depaurus marginatus*	31.2
10	*Anthaxia helvetica*	43.7	76	*Hypomyces ferrugineus*	68.7
11	*Anthaxia nitidula*	12.5	77	*Myllocerus* sp.	50.0
12	*Anthaxia podolica*	18.7	78	*Phyllobius maculicornis*	56.2
13	*Anthaxia quadripunctata*	31.2	79	*Phyllobius virideaeris*	25.0
(4)	**Cerambycidae**		80	*Polydrusus impar*	43.7
14	*Alosterna ingrica*	31.2	81	*Polydrusus pterygomalis*	37.5
15	*Aristobia approximator*	43.7	82	*Sitophilus oryzae*	62.5
16	*Batocera rubus Linn*	37.5	**(8)**	**Scarabaeoidae**	
17	*Batocera rufomaculata*	37.5	83	*Allissonotum impressicolle*	25.0
18	*Bacchisa tonkinensis*	50.0	84	*Amphimallon solstitiale*	37.5
19	*Blepephaeus succinctor*	56.2	85	*Anomala cuprea*	50.0
20	*Cacostola lineata*	37.5	86	*Anomala* sp.	25.0
21	*Calothyrza margatitifera*	31.2	87	*Aphodius biguttatus*	50.0

No	Species	P (%)	No	Species	P (%)
22	*Chlorophorus annularis*	62.5	88	*Aphodius depressus*	37.5
23	*Lamia textor*	18.7	89	*Aphodius granarius*	43.7
24	*Nortia geniculata*	68.7	90	*Canthon imitator*	43.7
25	*Paraphrus granulosus*	37.5	91	*Catharsius aethiops*	37.5
26	*Plagionotus arcuatus*	50.0	92	*Cercyon ustulatus*	50.0
27	*Plocaederus ruficornis*	62.5	93	*Copris lunaris*	37.5
28	*Rosalia sanguinolenta*	6.2	94	*Copris lecontei*	62.5
29	*Stromatium longicorne*	56.2	95	*Cyclocephala lurida*	43.7
30	*Rhytidodera bowringii*	37.5	96	*Megasoma elephas*	50.0
(5)	**Chrysomelidae**		97	*Geotrupes mutator*	62.5
31	*Agelastica alni*	50.0	98	*Geotrupes spiniger*	50.0
32	*Cassida margaritacea*	50.0	99	*Geotrupes stercorarius*	56.2
33	*Cassida murraea*	31.2	100	*Gonioctena fornicata*	50.0
34	*Cassida vibex*	37.5	101	*Gonioctena viminalis*	37.5
35	*Cassida viridis*	50.0	102	*Gymnopleurus* sp.	43.7
36	*Chrysolina fastuosa*	31.2	103	*Heliocopris dominus*	62.5
37	*Chrysolina graminis*	6.2	104	*Holotrichia sauteri*	75.0
38	*Chrysolina polita*	43.7	105	*Holotrichia sinensis*	75.0
39	*Crepidodera aurea*	43.7	106	*Maladera* sp.	37.5
40	*Crepidodera plutus*	18.7	107	*Melanocanthon nigricornis*	62.5
41	*Clytra laeviuscula*	37.5	108	*Onthophagus taurus*	37.5
42	*Crepidodera aurata*	25.0	109	*Onthophagus verticicornis*	37.5
43	*Cryptocephalus biguttatus*	37.5	110	*Onthophagus gazella*	50.0
44	*Donacia cinerea*	37.5	111	*Onthophagus ovatus*	43.7
45	*Donacia clavipes*	18.7	112	*Oryctes nasicornis*	56.2
46	*Donacia crassipes*	37.5	113	*Oryctes rhinoceros*	50.0
47	*Donacia semicuprea*	37.5	114	*Osmoderma eremita*	43.7
48	*Donacia sparganii*	31.2	115	*Parascatonomus*	50.0
49	*Pachnephorus pilosus*	31.2	116	*Pleurophorus caesus*	43.7
50	*Pachybrachis picus*	37.5	117	*Rhizotrogus aestivus*	43.7
51	*Pachybrachis tessellatus*	37.5	118	*Serica brunna*	75.0
52	*Plagiodera versicolora*	37.5	119	*Trematodes tenebrioides*	56.2
53	*Podagrica fuscicornis*	43.7	120	*Trypoxylus dichotomus*	31.2
(6)	**Coccinellidae**		121	*Xylotrupes gideon*	62.5
54	*Adalia bipunctata*	75.0	**(9)**	**Meloidae**	
55	*Adalia conglomerate*	25.0	122	*Mylabris cichorii*	37.5
56	*Adalia decempunctata*	37.5	123	*Epicauta rufidorsum*	37.5
57	*Anatis ocellate*	50.0	**(10)**	**Elateridae**	
58	*Chilocorus bipustulatus*	56.5	125	*Agriotes* sp.	25.0
59	*Chilocorus renipustulatus*	50.0	126	*Anelastes druryi*	50.0
60	*Coccidula scutellate*	31.2	124	*Melanotus crassicoliss*	56.2
61	*Coccinella magnifica*	37.5	**(11)**	**Tenebrionidae**	
62	*Coccinella quinquepunctata*	62.5	127	*Cylindromicrus* sp.	37.5
63	*Coccinella septempunctata*	56.2	128	*Tribolium destructor*	18.7
64	*Coccinella undecimpunctata*	43.7	129	*Tenebrio molitor*	37.5

Most of the recorded species were less common species (94 species), accounting for 73% of total species followed by the most common group (27 species), accounting for 21%, and the rare species group comprised 8 species, accounting for 6%.

The number of species and genera of the families is illustrated in the table 2.

Table 2. Number of species, genera of families of the beetles

No	Species	Number of species	Percent of species	Number of genus	Percent of genus
1	Anobiidae	3	2.3	2	2.3
2	Anthribidae	2	1.6	2	2.3
3	Buprestidae	8	6.2	2	2.3
4	Cerambycidae	17	13.2	16	18.6
5	Chrysomelidae	23	17.8	10	11.6
6	Coccinellidae	19	14.7	11	12.8
7	Curculionidae	10	7.8	8	9.3
8	Scarabaeoidae	39	30.2	27	31.4
9	Meloidae	2	1.6	2	2.3
10	Elateridae	3	2.3	3	3.5
11	Tenebrionidae	3	2.3	3	3.5
	Total	**129**	**100**	**86**	**100**

Of the recorded families, *Scarabaeidae* contributed the highest number of species and genera (39 species, 27 genera) accounting for 30.2% the total number of the species, *Chrsomelidae* had 23 species accouting for 17.8%, *Cerambycidae* had 17 species accounting for 13.2%, and *Curculionidae* had 10 species accounting 7.8%. The families of Meloidae and Anthribidae had the lower number species (2 species) making 1.6%.

3.2. Beetle distribution in habitats

The distribution of beetles in Xuan Nha Nature Reserve is presented in figure 1.

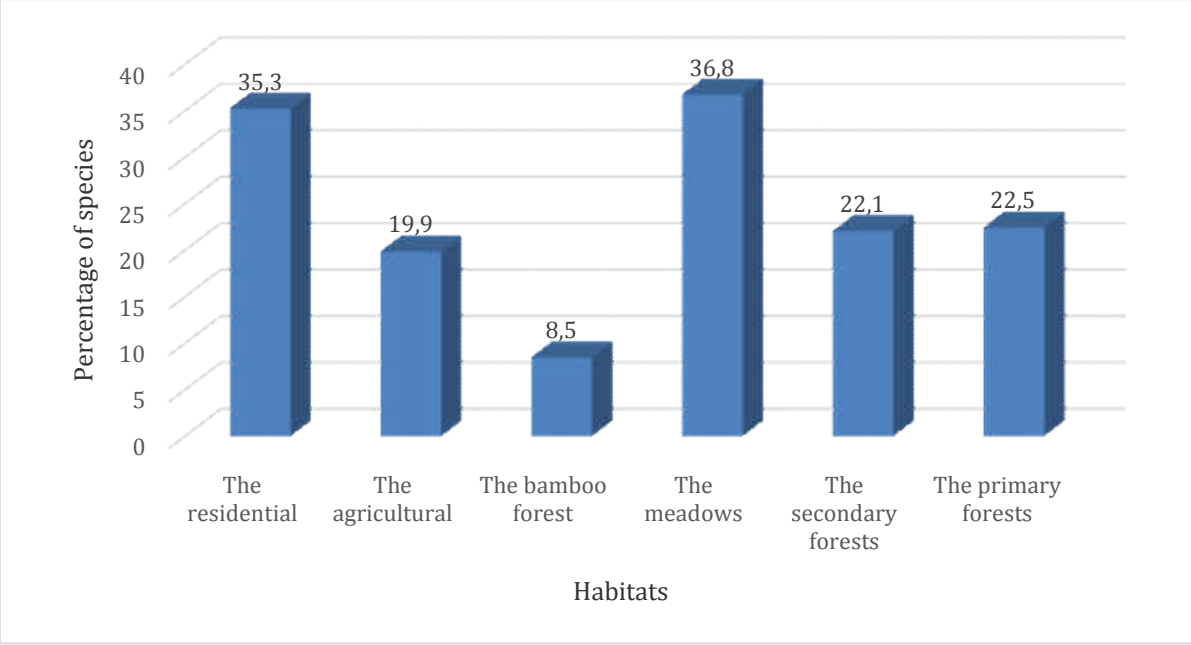

Figure 1. Species Distribution of beetles on habitat types

The meadows had the large number of species accounting 36.8% of the total number of the recorded species. The residential habitats accounted for 35.3%, primary forests accounted for 22,5%, secondary forests accounted for 22.1%, agricultural habitats accounted for 19.9%, and bamboo forests accounted for 8.5%. *Anobiumful vicorne, Nortiageniculata, Chlorophorus annularis, Sitophilus oryzae* were found in all types of habitat... *Rosaliasanguinolenta, Chrysolinagraminis, Tribolium destructor* were collected in this habitat.

3.3. The role of beetles

Due to their adaptability and high reproductive capacity, beetles have a large number of species and individuals. They are widely distributed in nature and are an indispensable part of the forest ecosystem. Based on behavioral characteristics of the beetles in the study area, we highlighted the role of them in table 3.

Table 3.The role of the beetles in the ecosystem

Number	The role of the beetles	Species	Percentage
1	Zoophaga	19	14.7
2	Necrophaga, detritophaga and corprophaga	28	21.7
3	Phytophaga (leaves, bark, stems, root shoots)	80	62.0
4	Not yetidentified	2	1.6

Table 3 showed that the phytophaga species (leaves, bark, stems, and roots) having the highest number of species (80 species), accounting for 62.0%, necrophaga, detritophaga, and corprophaga species had28 species accounting for 21.7%, zoophaga species had 19 species accounting for 14.7%, and 02 species have not been identified yet accounting for 1.6%.

Among recorded Zoophaga species, *Coccinellids* are best known as predators of aphids. The two recorded genera *Chilocorus* and *Coccinella* with nearly 10 abundant species that could be considered as biological control agents. Further studies on the composition, distribution of these *Coccinellid* species are needed to maintain consistently their population in relation to other beetles. Dung beetles (Scarabaeoidea, corprophaga) with 39 collected species playing a key role in the ecosystems. Because of being highly sensitive to changes in the physical structure of forest habitats, the composition and structure of dung beetles are predicted to change and seen as an important indicator taxon and early monitor system to study the influence of anthropic disturbances on ecosystem processes in tropical habitats. On the other hand, dung beetles rely on mammal droppings. The patchy and ephemeral micro habitats depend on mammal density, composition that affects dung beetle fauna. Thus, dung beetles also can be used to monitor changes in mammal community in the nature reserve.

The leaf beetles, *Chrysomelidae* were diverse but not abundant in Xuan Nha Nature Reserve. Our observation showed low occurrence of leaf beetles (less than 1%) of the

examined plants.

IV. CONCLUSIONS

A total of 129 species of 48 genera representing 11 families of beetles were recorded in Xuan Nha Nature Reserve. Scarabaeidae contributed the highest number of species and genera (39 species, 27 genera), accounting for 30.2% of the total number of species, Chrsomelidae with 23 species accounting for 17.8%, Cerambycidae with 17 species, accounting for 13.2%, and Curculionidae is comprised of 10 species, accounting for 7.8%. The families of Meloidae and Anthribidae have lower number species (2 species), each making 1.6%.

Most of the recorded species belonged to the less common group (94 species), accounting for 73%, followed by species in the most common group of 27 species, accounting for 21% and the rare species group with 8 species, accounting for 6%.

The meadows had the high number of species accounting for 36.8% the total number of the recorded species, the residential habitats accounted for 35.3%, the primary forests accounted for 22.5%, the secondary forests accounted for 22.1%, the agricultural habitats accounted for 19.9%, bamboo forests accounted for 8.5%. The phytophaga species (leaves, bark, stems, and roots) had the highest number of the species (80 species) accounting for 62.0%, the necrophaga, detritophaga, and corprophaga species had 28 species accounting for 21.7%, zoophaga species included 19 species accounting for 14.7% and 2 species have not been identified yet accounting for 1.6%. *Anobiumfulvicorne, Nortiageniculata, Chlorophorusannularis* and *Sitophilus* appeared in all habitats. *Rosaliasanguinolenta, Chrysolinagraminis, Tribolium destructor* were found only in this habitat

REFERENCES

1. Hoang Duc Nhuan (1983). *Lady Beetles of Vietnam*. Scientific and Technological Publishing House, Hanoi.

2. Ek-Amnuay P. (2008). *Beetles of Thailand, Siam Insect-Zoo and Museum, Chiang Mai, Thailand, second Edition.*

3. Mizunuma T. (1999). *Giant Beetles: Euchirinae, Dynastinae*. Endless Secience Information, Tokuo, Japan.

4. Li chengde (2006). *Forest Entomology*. China Forestry Publishing House.

5. China Wildlife Conservation Society (1999). *Chinese rare insects classification by Picture.* China Forestry Publishing House.

6. Yang Zizhi (2002). *Garden Plant pest control and classification by Picture*. China Forestry Publishing House.

7. Nguyen The Nha, Tran Cong Loanh, Tran Van Mao (2001). *Insect population survey and forecasting for forestry*. Agricultural Publishing House, Ha noi.

8. Animal Research Department, Chinese Academy of Sciences (1973). *Insect Natural enemies Atlas*. Science Publishing House, China.

9. Xu Tiansen (2004). *Main pest of bamboo in China.* China Forestry Publishing House.

10. Li Yuansheng (2004). *Insects Record in China*, Shanghai Academy of Social Sciences Publishing House.

11. Son La People Committee (2002). *Demonstration of Technical economics for establishing Xuan Nha Nature Reserves, Son La.*

12. Xinan Forestry Institute (2003), *Lady Beetles of Yunnan.* Yunnan Science and Technology Publishing House.

THÀNH PHẦN CÔN TRÙNG CÁNH CỨNG (COLEOPTERA) TẠI KHU BẢO TỒN THIÊN NHIÊN XUÂN NHA, SƠN LA

Lê Bảo Thanh
Trường Đại học Lâm nghiệp

TÓM TẮT

Bằng phương pháp thu thập mẫu trên các điểm điều tra tại Khu Bảo tồn thiên nhiên Xuân Nha, Sơn La đã ghi nhận được 129 loài thuộc 11 họ thuộc bộ cánh cứng, trong đó họ Scarabaeidae là họ có số loài nhiều nhất chiếm 30,2% tổng số loài, họ Chrsomelidae chiếm 17,8%, họ Coccinellidae chiếm 14,7%, họ Cerambycidae chiếm 13,2%, họ Curculionidae chiếm 7,8%, họ Buprestidae chiếm 6,2%, họ Tenebrionidae, họ Elateridae và họ Anobiidae chiếm 2,3%, ít nhất là họ Meloidae và họ Anthribidae chiếm 1,6%. Họ *Scarabaeidae* có số giống lớn nhất chiếm 31,4%, họ *Cerambycidae* chiếm 18,6%, họ *Coccinellidae* chiếm 12,8%, họ *Chrsomelidae* chiếm 11,6%, họ *Curculionidae* chiếm 9,3%, họ Elateridae và họ *Tenebrionidae* chiếm 3,5%, còn lại các họ khác chỉ chiếm 2,3%. Phần lớn các loài thuộc nhóm ít gặp chiếm 73% tổng số loài, các loài trong nhóm thường gặp chiếm 21% và các loài nhóm ngẫu nhiên gặp chiếm 6%. Sinh cảnh thảm cỏ cây bụi lớn nhất chiếm 36.8% tổng số loài, tiếp đến là sinh cảnh khu vực dân cư sinh sống chiếm 35,3%, sinh cảnh rừng tự nhiên chiếm 22,5%, sinh cảnh rừng phục hồi chiếm 22,1%, sinh cảnh trồng cây nông nghiệp chiếm 19,9%, sinh cảnh rừng tre nứa chiếm 8,53%. Các loài ăn lá, vỏ cây, đục thân cành, hại rễ có số lượng nhiều nhất chiếm 62,0%, số loài có vai trò phân hủy xác động – thực vật, cải tạo đất chiếm 21,7%, số loài có vai trò ăn thịt chiếm 14,7% và có 2 loài chưa xác định được vai trò chiếm 1,6%.

Từ khoá: Cánh cứng, khu bảo tồn thiên nhiên, Xuân Nha.

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