Journal of Korean Nature Vol. 3, No. 1 11-13, 2010

Study on Moth Diversity in islands and land borders, in the southwest area of Korean Peninsula

Jin-Taek Lim[1]*, Seong-jun Gang[1], and Sei-Woong Choi[2]
[1]*Mokpo Natural History Museum, Mokpo, Jeonnam 530-739, Korea*
[2]*Department of Environmental Education, Mokpo National University, Muan, Jeonnam 534-729, Korea*

Abstract: In order to investigate moth diversity in the bordering islands and inland in the southwest area of Korean Peninsula, a total of 1,127 individuals of 270 species from 214 genera, 16 families, 1 order were collected from four inland sites and four island sites near Mokpo, at the southern end of the Korean Peninsula from April to October of 2009. According to the analysis of the collected moths, Noctuidae with its 102 species were the most frequently collected order and followed by Geometridae and Pyralidae. Among the 5 regions studied every month (Yangeulsan (Mt.), Oedaldo, Yudalsan (Mt.), Ibamsan (Mt.), Seungdalsan (Mt.)), Mt. Seungdalsan showed the highest species diversity with 129 species from 452 moths collected, followed by decreasing order of Yangeulsan at 70 species from 139 moths, Ibamsan at 59 species from 116 moths, Oedaldo at 58 species from 133 moths and Yudalsan of 48 species from 125 moths. In the three regions in which samples were taken once, Dalido showed the highest figure at 49 species from 98 moths collected, followed by Gohado at 23 species from 37 moths and Heosado at 14 species from 27 moths.

Key words: Moth, Biodiversity, Southwest area, Islands

Introduction

The southwest coast regions, where Mokpo is located, is a region where islands meet inland, and while it is known that the area acts as a bridge which allows various species to migrate among approximately 2,000 islands in the region according to climate changes, such approach is found be quite difficult, making species analysis more difficult compared to other regions. Furthermore, various man made connections are being established for the sake of tourism, so the region needs a systematic study on the living organisms in the area.

Study Content and Method

Study subjects and Methods

Since many studies are conducted on the functions and species of primary herbivorous consumers and secondary consumers, moths were used in this study. In order to collect the moths necessary for the study, a photo switch, which reacts automatically to surrounding light (Bioquip, USA), was installed in areas suitable for collecting moths. In the equipment, 22W UV traps (Bioquip, USA) which operates with mobile 12V battery with insecticide containing DDVP were installed, and the moths were collected 2 days after installation. The captured moths were studied more than once a month in order to study their activity and diversity depending on the time of the year. The collected moths were then safely stored in the Mokpo Natural History Museum.

Fig. 1. Study Area (S1: Yangeulsan, S2: Yudalsan, S3: Ibamsan, S4: Seungdalsan, S5: Oedaldo, S6: Dalido, S7: Gohado and S8: Heosado)

*To whom correspondence should be addressed.
Tel: +82-61-270-8318
E-mail: hbdlawls@korea.kr

Table 1. Study Area

	Site	GPS Coordination
S1	Yangeulsan	E126°24'36.2" N34°48'64.7"
S2	Yudalsan	E126°22'35.9" N34°47'39.5"
S3	Ibamsan	E126°24'91.3" N34°47'77.7"
S4	Seungdalsan	E126°27'44.9" N34°54'59.6"
S5	Oedaldo	E126°17'76.6" N34°46'65.0"
S6	Dalido	E126°18'85.9" N34°46'35.7"
S7	Gohado	E126°22'26.5" N34°46'23.8"
S8	Heosado	E126°21'53.3" N34°44'94.9"

Study Area

The area for this study included Yudalsan, Yangeulsan, Ibamsan, Seungdalsan located in Muan-gun, Oedaldo in Mokpo, Dalido, Gohado and Heosado (Fig. 1), and specific locations are listed in Table 1. The study was conducted between April and October of 2009 in order to study their diversity in relation to seasonal changes.

Results

Conclusion

During the study, a total of 1,127 individuals of 270 species in 214 genera, 16 families, 1 order were collected. Upon analysis of the collected moths, the collection showed 102 species of Noctuidae, followed by decreasing order of Geometridae and Pyralidae. In the four sites which were studied (Yangeulsan, Oedaldo, Yudalsan, Ibamsan, Seungdalsan), Seungdalsan showed the highest species diversity at 452 moths of 129 species, followed by decreasing order of Yangeulsan at 139 moths of 70 species, Ibamsan of 116 moths of 59 species, Oedaldo at 133 moths of 58 species and Yudalsan at 125 moths of 48 species. The reason why Seungdalsan showed such a high diversity is that the region had a high number of evergreen broad-leaved trees forest compared to other regions. In the case of Yangeulsan and Ibamsan, the figure was low due to close human contact, and in the case of Oedaldo, the region showed low figure since the area was less suitable for such growth when compared to Seundalsan.

There were no endangered species or government protected species found in any of the samples, but there were 2 species which needed permission before leaving the country (*Ourapteryx koreana, Hypomecis phantomaria*) and 3 rare species (*Bombyx mandarina, Pyralidae Oncocera semirubella, Acherontia styx*).

Site results

Yangeulsan: During the time of the study, a total of 139 individuals of 70 species were collected, and Noctuidae showed the highest species diversity at 30 species. Yangeulsan's dominant species was *Spilarctia seriatopunctata* at 14 individuals collected, followed by decreasing order of *Polypogon gryphalis* at 11 individuals and *Zanclognatha helva* at 10 individuals. It was also shown that the region is unique in its presence of *Oncocera semirubella*.

Table 2. Species Diversity

	Site	Collected species	
		species	Number of moths
S1	Yangeulsan	70	139
S2	Oedaldo	58	133
S3	Yudalsan	48	125
S4	Ibamsan	59	116
S5	Seungdalsan	129	452
S6	Heosado	14	27
S7	Gohado	23	37
S8	Dalido	49	98
	Total	270	1,127

Table 3. Family diversity

Family	species	Number of moths
Noctuidae	102	345
Geometridae	71	384
Pyralidae	42	201
Notodontidae	11	18
Lymantriidae	9	16
Sphingidae	7	10
Arctiidae	6	28
Drepanidae	5	29
Limacodidae	4	9
Thyatiridae	3	9
Tortricidae	3	23
Epiplemidae	2	2
Thyrididae	2	42
Bombycidae	1	1
Cossidae	1	1
Nolidae	1	9
Total	270	1,127

Yudalsan: During the time of the study, a total of 125 individuals of 48 species were collected. Yudalsan's dominant species was *Spilarctia seriatopunctata* at 14 individuals, followed by decreasing order of *Polypogon gryphalis* at 11, *Zanclognatha helva* at 10, *Sylepta fuscomarginalis* at 9. Yudalsan also showed the highest number of Noctuidae at 28 species, and the region also showed the presence of *Hypomecis phantomaria*.

Ibamsan: During the time of the study, a total of 116 individuals of 59 species were collected, and Noctuidae showed the highest species diversity at 28 species. Ibamsan's dominant species was *Alcis angulifera* at 23 individuals, followed by *Gonepatica opalina* at 9. It was also shown that the region is unique in its presence of *Hypomecis phantomaria*.

Seungdalsan: During the time of the study, a total of 452 individuals of 129 species were collected. Noctuidae showed the highest species diversity at 42 species. Seungdalsan's dominant species was *Alcis angulifera* at 86 individuals, followed by decreasing order of *Goniorhynchus explicatalis* at 25, *Culcula panterinaria* at 20 and *Endotricha olivacealis* at 12. It was also shown that the region is unique in its presence of *Ourapteryx koreana* and Bombyx *mandarina.*

Oedaldo: During the time of the study, a total of 133 individuals of 58 species were collected, and Noctuidae showed the highest species diversity at 20 species. Oedaldo's dominant species was *Rhodoneur asugitanii* at 37 individuals. It was also shown that the region is unique in its presence of *Oncocera semirubella* and *Ourapteryx koreana*.

Dalido: During the time of the study, a total of 98 individuals of 49 species were collected. Dalido also showed the highest number of Noctuidae at 12 species. Dalido's dominant species was *Sineugraphe oceanica* at 10 individuals, followed by decreasing order of *Ostrinia orientalis* at 6, *Hipoepa fractalis* at 5 and *Amphipyra pyramidea* at 5. It was also shown that the region is unique in its presence of *Ourapteryx koreana and Acherontia styx*.

Gohado: During the time of the study, a total of 37 individuals of 23 species were collected, and Noctuidae showed the highest species diversity at 13 species. Gohado's dominant species were *Loboschiza koenigianus* and *Epiblema foenella* at 4 individuals.

Heosado: During the time of the study, a total of 27 individuals of 14 species were collected, and the dominant species was found to *Epiblema foenella*. The site also showed the presence of *Oncocera semirubella.*

Acknowledgment

This study was conducted in partnership with the National Institute of Biological Resources for the study and the protection of the environment.

References

BAE, Y.S. (2001) Pyraloidea:Pyraustinae & Pyralinae

Kim, S.S., E.A. Beljaev and S.H. Oh (2001) Illustrated Catalogue of Geometridae in Korea (Lepidoptera: Geometrinae, Ennominae)

Kononnenko, V.S. and H.L. Han (2007) Atlas Genitalia of Noctuidae in Korea (Lepidoptera)

Kononnenko, V.S., S.B.Alm and L. Ronkay (1998) Illustrated Catalogue of Noctuidae in Korea (Lepidoptera)

Korean forest service (accessed 12 April 2009) http://www.nature.go.kr/

Lim, J.T. (2009) Biodiversity on the Moth (Lepidoptera, Insecta) of the Aphae Islands Sinan-gun, Jeonnam, Korea and investigation of indicator species for agro-ecosystem, These for the degree of Doctor. Mokpo University

Park K. T. and S.S.Kim (1997) Atlas of Butterflies (Lepidoptera), Insecta Koreana ser. 1

Park K. T. and Y.D. Kwan (2001) Bombycoidea; Ceruridae

Park K.T. (1999) Illustrated Catalogue of moths in Korea(1)

The Entomological Society of Korea and Korean Society of Applide Entomology (1994) Check List of Insects from Korea

[Received on January 20, 2010]