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Lepidopterous Insect Fauna of Mt. Geumwonsan, Prov. Gyeongsangnam-do, Korea

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Abstract: The present research was conducted to gain the comprehensive knowledge of Lepidopterous insect fauna in Mt. Geumwon Recreational Forest, Geochang-gun, Prov. Gyeongsangnam-do, Korea. The field collecting of Lepidopterous insects was carried out from May to September, 2011. A total of 174 species representing 25 families were identified from 1,053 individuals.

Keywords: forest insects, fauna, dominant species, Lepidoptera

Introduction

The natural recreational forests are established to offer a variety of public benefits of forests such as dense forests, fresh air, clean water, and beautiful scenery. It, in particular, provide and maintain minimum facilities to offer relaxation for healthy recreation in the forests to the public. In addition to providing places for wandering amongst the trees and experiencing the natural environments of forest, the forests also function as the educational center of nature for emotional improvement of the public by giving them opportunities to learn about the nature and culture of the forests. Currently, there are a total of 117 recreational forests in Korea. Of them, 36 are run by the provincial governments and 81 are run by private agencies. Mt. Geumwon Recreational Forest is located between Wicheon-myeon, Buksang-myeon (Geochang-gun, Gyeongsangnam-do), and Anui-myeon (Hamyang-gun, Gyeongsangnam-do). This mountain range straddles Mt. Gibaek (1,331 m above sea level) to the south, Namryung, and the south of Mt. Deogyusan (1,507 m above sea level). Mt. Geumwon Recreational Forest, run by Geyongsangnam-do, is noted for its abundant historic relics and beautiful scenery. It is also in the middle of expanding efforts to restore and preserve alpine endemic and rare plants.

The present research was focused to gain the basis of Lepidopterous insect fauna in Mt. Geumwon Recreational Forest (Geyongsangnam-do, Korea) and the findings to be used for the study-related applied researches.

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Kim (1999) reported a total of 1,028 individuals representing 13 orders, 78 families, 211 genera, 244 species of insects from Mt. Geumweon. More recently, with regard to flora which is closely related to insect fauna, Oh *et al*. (2008) investigated vascular plants of Mt. Geumweon. Moreover, Shin *et al.* (2010) conducted the research on plant phenology in Mt. Geumweon.

The research site of this study (i.e., Mt. Geumweon) was registered as a natural recreational forest in Gyeongsangnam-do on November, 12, 1992 (National Forestry Administration Announcement, 1992-18th issue) and it opened on November, 30, 1993 (Kim, 1999).

Materials and Methods

Research period

The sample collection was carried out bimonthly at Mt. Geumweon from May to September, 2011, in order to investigate the seasonal occurence of Lepidopterous insects. It will be used as the crucial information with regard to the seasonal changes of the insect fauna in 2011.

Research method

During the night, the light trap was used to collect the moths with a killing bottles. In the daytime, butterfly were surveyed along the forest roads. The collected specimens were made into the dried specimens for identification. The daytime collection was conducted from 9 am to 3 pm, and the night collection was mainly made from after sunset to 11 pm. This study was focused on the investigation of the moths, which had not been studied so far. The categories of insects were listed according to Check List of Insects from Korea (1994).

Table 1. The survey period, site and collecting methods of Mt. Geumwon in 2011

Period	Main site	Collectiong method	GPS data
17~19 May	Foot of Mt. Geumweon	Sweeping, light trap, LTM	35°43'51.12"N, 127°47'54.14"E, Alt. 499 m
25~26 July	"	"	35°43'52.90"N, 127°48'02.40"E, Alt. 470 m
29~30 September	"	"	35°43'52.90"N, 127°48'02.40"E, Alt. 470 m

LTM: line transect method

Table 2. The number of species and individuals for each family of Lepidoptera in Mt. Geumwon (2011)

Family	No. of species	No. of individuls
Agaristidae 얼룩나방과	2	3
Arctiidae 불나방과	5	14
Bombycidae 누에나방과	2	3
Callidulidae 뿔나비나방과	1	1
Cossidae 굴벌레나방과	1	6
Cyclidiidae 왕민갈고리나방과	1	1
Drepanidae 갈고리나방과	4	17
Geometridae 자나방과	53	345
Hesperiidae 팔랑나비과	1	42
Lasiocampidae 솔나방과	1	4
Libytheidae 뿔나비과	1	3
Limacodidae 쐐기나방과	1	3
Lycaenidae 부전나비과	4	29
Lymantriidae 독나방과	5	9
Noctuidae 밤나방과	36	141
Notodontidae 재주나방과	8	39
Nymphalidae 네발나비과	7	50
Papilionidae 호랑나비과	5	151
Pieridae 흰나비과	4	29
Pyralidae 명나방과	14	37
Satyridae 뱀눈나비과	3	35
Sphingidae 박각시과	8	65
Thyatiridae 뾰족날개나방과	3	16
Tortricidae 잎말이나방과	3	5
Zygaenidae 알락나방과	1	5
Total	174	1,053

Result

The Result of Lepidopterous insect fauna in Mt. Geumweon

Based on the result of identification, the family Geometridae is most dominant taxa, with 53 species, followed by Noctuidae (36), Pyralidae (14).

In the number of the collected individuals, Geometridae (345) in moth family and Papilionidae (151) in butterfly family were the most abundant taxonomic groups in the investigation site. Additionally, the number of species and individuals of Noctuidae (141) was relatively high.

The number of Lepidopterous insect individuals collected in the investigation site from May, 2011 to September, 2011 was 1,053 individuals including a total of 174 species representing 25 families. The species are listed in Appendix 1.

Table 3. Monthly number of species and individuals of lepidopterous insect in Mt. Geumwon (2011)

Period	Family	Species	No. of individuals
May	19	72	448
July	18	117	521
September	2	7	84
Total	39	196	1,053

Table 4. The main dominant species of Mt. Geumwon in May, 2011

Species	No. of individuals
Papilio macilentus Jason 긴꼬리제비나비	80
Erynnis montanus (Bremer) 멧팔랑나비	42
Neptis sappho (Pallas) 애기세줄나비	36

Table 5. The main dominant species of Mt. Geumwon in July, 2011

Species	No. of individuals
Hydrillodes morosa Butler 넓은띠담흑수염나방	46
Abraxas niphonibia Wehrill 각시얼룩가지나방	39
Chiasmia liturata (Clerck) 다색띠큰가지나방	39

The number of species and individuals according to the study period

Based on the number of investigated species according to the study period, a total of 69 species representing 19 families from 448 individuals were collected in May. In July, there was the largest number of species; a total of 521 individuals including 117 species in 18 families. Only 84 individuals including 7 species in 2 families were collected in September (fall).

Monthly dominant species

In this study, the monthly distribution of Lepidopterous insects and the inhabitation of diverse taxonomic groups were investigate. The table 1 represents the dominant species with the large number of individuals in different study periods . In order to indicate the periodic dominant species, 3 species with the largest number of individuals for each survey period are listed.

The results show that *Papilio macilentus* Jason (80 individuals) is the dominant species in May, followed by *Erynnis montanus* (Bremer) with 42 individuals, and *Neptis sappho* (Pallas) with 36 individuals.

Moreover, the largest number of species in July is *Hydrillodes morosa* Butler (46), followed by *Abraxas*