

Insects of Seonheul Gotjawal (covered by a rubble flow) in Jeju Is.

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Abstract: As a result of long-term monitoring of the Lepidoptera in Seonheul Gotjawal, Jeju Island, totally 402 individuals of 114 species in 19 families of the Lepidoptera were investigated. The Suborder Rhopalocera appeared in 134 individuals of 26 species in 6 families. Two species are reported for the first time from Korea; *Macrocilix mysticata watsoni* Inoue, 1958 of the Drepanidae and *Mixochlora vittata prasina* (Butler, 1879) of the Geometridae. Seven species are newly added to the Lepidoptera fauna of Jeju Island; *Acleris paradiseana* Walsingham, 1900 of the Tortricidae, *Dioryctria pryri* Ragonot, 1893, *Opsibotys perfuscalis* Munroe et Mutuura, 1969, and *Sylepta pallidinptalis* (Hampson, 1012) of the Pyralidae, *Operophera brumata* (Linnaeus, 1758) of the Geometridae, *Lymantria sakaguchii* Matsumura, 1927 of the Lymantriidae, and *Dysmilichia genella* (Leech, 1889) of the Noctuidae.

Key words: Gotjawal, Lepidoptera

Introduction

Jeju, enlisted as the first World Natural Heritage Site of Korea, has unique natural environments and various flora, so it serves as special habitats for various insects from subtropical insects to cold insects even though it is a small island. Recently, Jeju is being affected by increasing destruction of forests by artificial interferences, increase in the emissions of pollutants, and sharp increase of carbon dioxide by excessive use of fossil fuel. That leads to the appearance of unusual climate in Jeju. Concrete policies are urgently needed to preserve biodiversity and cope with climate change.

Gotjawal has a rugged topography because lava with high viscosity was split into rocks, small and large, at the time of volcanic eruption. So, it has been regarded as clean land. However, recently as natural forest like evergreen trees and thorny vines are mixed in Gotjawal, it keeps green forests even in winter and serves as a lung of ecosystem that consumes carbon dioxide, the main culprit of global warming. In addition, Gotjawal represents 6% of the whole area of Jeju and is distributed from Hallasan (Mt.) to Jungsangan and the coast, so they work as buffer zones for animals and plants.

Gotjawal in Jeju consists of four areas; Hankyeung-Andeok Gotjawal, Aewol Gotjawal, Chocheon-Hamdeok Gotjawal, and Gujwa-Seongsan Gotjawal. The study site,

Chocheon-Hamdeok Gotjawal, is divided into the headland starting at Minoreum, Daeheul-ri, Chocheon-eup (500 meters above sea level) and ending at Chocheon-ri, Chocheon-eup (20 meters above sea level), the headland from Dombaeoreum in Wasan-ri, Chocheon-eup (486 meters above sea level) to Hamdeok-ri, Chocheon-eup, and the headland from Seogeomeuneoreum in Seonheul-ri, Chocheon-eup (454 meters above sea level) to Seonheulgot, Chocheon-eup (80-100 meters above sea level). Among the headlands, Seonheulgotjawal was selected for the study.

In this study, the Lepidoptera was monitored on a long-term basis within Seonheulgotjawal that had a unique environment in Jeju under the management of the National Museum of Korea. The results will be used to build a database and serve as academically basic data to take countermeasures for climate change.

Materials and Method

Overview of the site

The thick forest within Seonheulgotjawal is Seonheul Dongbaekdongsan (camellia tree hill). The Seonheul Dongbaekdongsan, located in Seonheul-ri, Chocheon-eup, is 92 to 147 meters above sea level and has a gentle slope of 15. It has no valleys. It rises on the southeastern part while sinks on northwestern part. It is covered mostly with rocks, but soil develops here and there, and forests develop. The area is 138.6 ha (1,386,654 m²), and here the flora consists of 188 species and 12 varieties of 148 genera in 72 families (Kim, M.H., 1998). The dominant species were *Quercus glauca* Thunberg.

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Fig. 1. Night-time collection at Seonheul Gotjawal.

Method

To study nocturnal moths, UV Bucket light traps (Bioquip 12 V, 18 AH, 31.3 cm in diameter, 32 cm high) were installed 50 meters apart on two sites in each region. The traps are manufactured by Global & Yuasa Battery Co., Ltd. and quantitatively collect insects using short wavelengths. The collection lasted 10 to 12 hours after sunset (Fig. 1). As light or bright moonlight near the collecting sites interferes the collecting and reduces efficiency, the collecting was carried out on cloudy days with dim moonlight to reduce competition with other sources of light. The moths caught in a UV trap were retrieved the next day and made into specimens for classification and identification.

The insects of the Rhopalocera were collected with an insect net. The insects caught were classified and identified in the lab.

A total of 17 collections were made; Ten times at night and seven times in the daytime (Table 1). The specimens are stored in the Folklore & Natural Museum Jeju Special Self-Governing Province and the Halla Arboretum.

Results

This study found that the Lepidoptera appeared in 402 individuals of 114 species in 19 families, the Heterocera in 268 individuals of 88 species in 13 families and the Rhopalocera in 134 individuals of 26 species in 6 families at Seonheul Gotjawal (See Table 2.).

The largest population among the Heterocera was Geometridae (28.4%) followed by Pyralidae (19.3%),

Table 2. The Lepidoptera at Seonheul Gotjawal

Family	Numbers of species	Individuals
Family 1. Tortricidae	3	5
Family 2. Oecophoridae	1	1
Family 3. Pyralidae	17	52
Family 4. Zygaenidae	1	14
Family 5. Limacodidae	2	2
Family 6. Drepanidae	3	10
Family 7. Geometridae	25	99
Family 8. Saturniidae	1	2
Family 9. Sphingidae	3	10
Family 10. Notodontidae	9	21
Family 11. Lymantriidae	7	21
Family 12. Arctiidae	1	1
Family 13. Noctuidae	15	30
Family 14. Hesperidae	3	7
Family 15. Papilionidae	4	7
Family 16. Pieridae	4	41
Family 17. Lycaenidae	5	24
Family 18. Nymphalidae	8	29
Family 19. Satyridae	2	26
Total	114	402

Noctuidae (17%), Notodontidae (9.1%), Lymantriidae (7.6%), Tortricidae (3.4%), Drepanidae (3.4%), Sphingidae (3.4%), Limacodidae (2.3%), and others [Oecophoridae (6.1%), Arctiidae, Saturniidae, and Zygaenidae] (See Fig. 2.). Given the collection data of other areas, the Noctuidae had higher species diversity than the Geometridae. The reason for the difference in the study seems that by nature the UV bucket light trap attracts more microlepidoptera than macrolepidoptera.

The largest population of the Rhopalocera was Nymphalidae (30.8%) followed by Lycaenidae (19.2%), Papilionidae (15.4%), Pieridae (15.4%), Hesperidae (11.5%), and Satyridae (6.7%) (See Fig. 3.).

Given the appearances of the Heterocera by month at Seonheul Gotjawal, there appeared 131 individuals of 45 species in 9 families in August, 80 individuals of 22 species in 7 families in September and 8 individuals of 5 species in 2 families in October (See Fig. 4.). The sharp drop in species diversity and the number of individuals in October can be attributable to lowered temperature.

Given the appearances of the Rhopalocera at Seonheul

Table 1. Collection time at Seonheul Gotjawal

No.	2008 Month/Day	Place	Method	Remarks
1	7/6	Seonheulim	Daytime	
2	7/8	Seonheul	Nighttime	<i>Quercus glauca</i> Thunberg forest
3	8/8	Seonheul	Nighttime	<i>Quercus glauca</i> Thunberg forest
4	8/10	Seonheulim	Daytime	
5	9/12	Seonheul	Nighttime	<i>Quercus glauca</i> Thunberg forest
6	9/13	Seonheulim	Daytime	
7	10/5	Seonheulim	Daytime	
8	10/6	Seonheul	Nighttime	<i>Quercus glauca</i> Thunberg forest

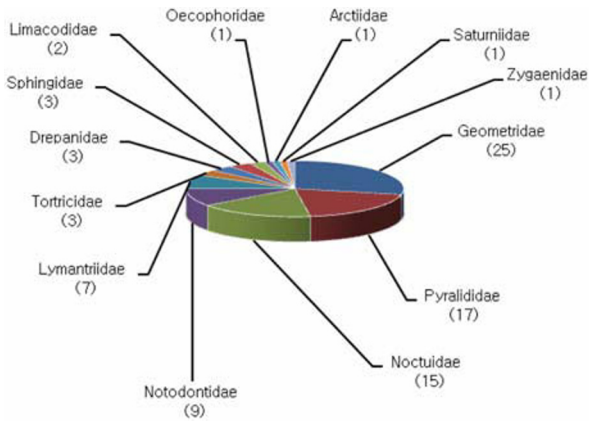


Fig. 2. Species and families of the Heterocera at Seonheul Gotjawal

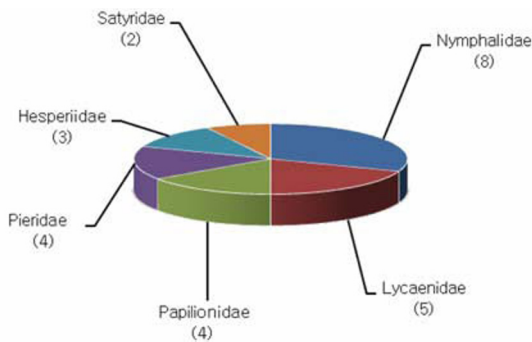


Fig. 3. Species and families of the Rhopalocera at Seonheul Gotjawal

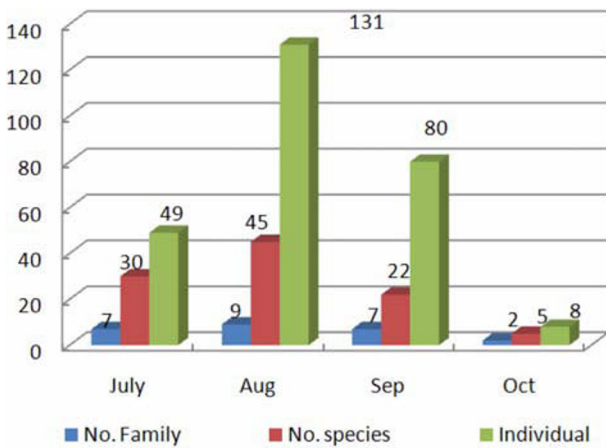


Fig. 4. Monthly appearances of the Heterocera at Seonheul Gotjawal

Gotjawal, there appeared 37 individuals of 20 species in 6 families in July, 43 individuals of 14 species in 6 families in September, 25 individuals of 14 species in 5 families in August and 29 individuals of 10 species in 4 families in October (See Fig. 5).

The appearing species from July to October were four species; *Colias erate* (Esper, 1804), *Eurema hecabe* (Linnaeus, 1758), *Pieris rapae* (Linnaeus, 1758) and *Polygonia c-aureum* (Linnaeus, 1758). This is because these species appear in Jeju 3-4 times in a year. The low appearance of

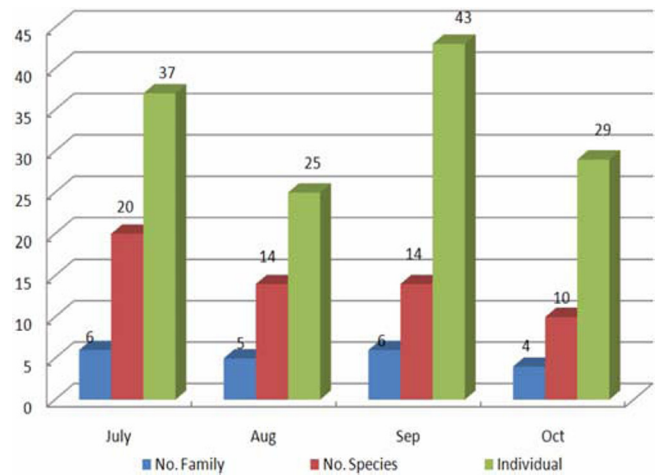


Fig. 5. Monthly appearances of the Rhopalocera at Seonheul Gotjawal



Fig. 6. *Macrocilix mysticata watsoni* Inoue, 1958



Fig. 7. *Mixochlora vittata prasina* (Butler, 1879)

species in August is attributed to the rise in ambient temperature. The insects turn into aestivation or eggs or caterpillars.

What was unusual in the study is:

A. Newly recorded species from Korea were 2 species of 2 families. Two individuals of *Macrocilix mysticata watsoni* Inoue, 1958 of the Drepanidae (Fig. 6) were caught in August 8 and two individuals of *Mixochlora vittata prasina* (Butler, 1879) of the Geometridae were collected in

September 12 (Fig. 7).

B. So far, Jeong (2006) recorded 4,361 species of insects in Jeju. Newly recorded species of Jeju were 7 species of 5 families: *Acleris paradiseana* Walsingham (Tortricidae), *Dioryctria pryeri* Ragonot, *Opsibotys perfuscalis* Munroe et Mutuura, *Sylepta pallidinptalis* (Hampson, 1012) (Pyralidae) *Operophera brumata* (Linnaeus, 1758), (Geometridae) *Lymantiria sakaguchii* Matsumura (Lymantiriidae), *Dysmilichia genella* (Leech, 1889) (Noctuidae).

Discussion

With the development of the society and rapid advancement of science and technology, the number of biological individuals is reduced and ecosystem is more severely disturbed by human interferences. Therefore, Gotjawal in Jeju becomes ecologically important to maintain the minimum species diversity. That means Gotjawal is both an ecological repository and a buffer zone within development sites. Thus Gotjawal must be preserved.

Acknowledgment

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Insect index at Seonheulgotjawal

Making a list followed the sequence of Korean Entomological Names. The names below species are organized in an Alphabetical order. The species with ** indicate they are unknown species of Korea and the species with * means unknown species of Jeju.

Family 1. Tortricidae 잎말이나방과

1. *Acleris paradiseama* Walsingham, 1900* 산가목잎말이나방 [Specimen research] 1ex, 8--2008.
2. *Adoxophyes orana* (Fischer von R?slerstamm, 1834) 애모무늬잎말이나방 [Specimen research] 2ex, 8--2008.
3. *Homona magnanima* Diakonoff, 1948 차잎말이나방 [Specimen research] 2ex, 8--2008.

Family 2. Oecophoridae 원뿔나방과

1. *Cryptolechia malacobyrsa* Meyrick, 1921 갈색띠원뿔나방 [Specimen research] 1ex, 8--2008.

Family 3. Pyralidae 명나방과

1. *Ancylolomia japonica* Zeller, 1877 벼포충나방 [Specimen research] 1ex, 8--2008.
2. *Arippara indicator* Walker, 1864 붉은띠비단명나방 [Specimen research] 2ex, 8--2008.
3. *Botyodes principalis* Leech, 1889 큰점노랑들명나방 [Specimen research] 1ex, 12--2008.
4. *Bradina geminalis* Caradja, 1927 외줄들명나방 [Specimen research] 6ex, 8--2008.
5. *Diasemia accalis* (Walker, 1859) 집애기들명나방 [Specimen research] 5ex, 8--2008.
6. *Dioryctria pryeri* Ragonot, 1893 * 애기술알락명나방 [Specimen research] 1ex, 8--2008.
7. *Endotricha olivacealis* (Bremer, 1864) 검은점뽕죽명나방 [Specimen research] 4ex, 8--2008.
8. *Goniorhynchus butyrosa* (Butler, 1881) 남방노랑들명나방 [Specimen research] 3ex, 8--2008.
9. *Herpetogramma luctuosalis* (Guenee, 1854) 포도들명나방 [Specimen research] 6ex, 8--2008.
10. *Oncocera semirubella* (Scopoli, 1763) 앞붉은명나방 [Specimen research] 4ex, 8--2008.
11. *Opsibotys perfuscalis* Munroe et Mutuura, 1969 * 연검은들명나방 [Specimen research] 1ex, 8--2008.
12. *Palpita inusitata* (Butler, 1879) 애기흰들명나방 [Specimen research] 9ex, 8--2008
13. *Piletocera sodalis* (Leech, 1889) 콩팔무늬들명나방 [Specimen research] 1ex, 8--2008.
14. *Stemmatophora valida* (Butler, 1879) 검은날개비단명나방 [Specimen research] 2ex, 8--2008.
15. *Sylepta pallidinptalis* (Hampson, 1912) * 연무늬들명나방 [Specimen research] 3ex, 8--2008.
16. *Tyspanodes hypsalis* Warren, 1891 줄검은들명나방 [Specimen research] 2ex, 12--2008.
17. *Pycnarmon pantherata* (Butler, 1878) 끝무늬들명나방 [Specimen research] 1ex, 8--2008.

Family 4. Zygaenidae 알락나방과

1. *Pidorus glaucopsis* (Drury, 1773) 흰띠알락나방 [Specimen research] 14ex, 12--2008.

Family 5. Limacodidae 췌기나방과

1. *Latoia sinica* (Moore, 1877) 뒷검은푸른췌기나방 [Specimen research] 1ex, 8--2008.
2. *Phlossa conjuncta* (Walker, 1855) 남방췌기나방

[Specimen research] 1ex, 8--2008.

Family 6. Drepanidae 갈고리나방과

1. *Macrauzata maxima* Inoue, 1960 유리창갈고리나방 [Specimen research] 1ex, 8--2008.
2. *Macrocilix mysticata watsoni* Inoue, 1958 ** ---갈고리나방 [Specimen research] 2ex, 8--2008.
3. *Oreta loochooana timutia* Watson, 1967 멧쟁이갈고리나방 [Specimen research] 7ex, 8--2008.

Family 7. Geometridae 자나방과

1. *Abraxas fulvobasalis* Warren, 1894 점얼룩자나방 [Specimen research] 1ex, 8--2008.
2. *Agathia visenda* Butler, 1880 검띠발푸른자나방 [Specimen research] 14ex, 12--2008.
3. *Alcis angulifera* (Butler, 1878) 털빨자나방 [Specimen research] 6ex, 8--2008; 1ex, 12--2008.
4. *Ascostis selenaria* (Denis et Schiffermüller, 1775) 네눈썹자나방 [Specimen research] 4ex, 8--2008.
5. *Chiasmia defixaria* (Walker, 1861) 두줄점자나방 [Specimen research] 1ex, 8--2008.
6. *Duliohyale agitata* (Butler, 1878) 넓은띠큰자나방 [Specimen research] 2ex, 12--2008.
7. *Ecliptopera umbrosaria* (Motschulsky, 1861) 큰톱날물결자나방 [Specimen research] 2ex, 8--2008.
8. *Ectropis aigneri* Prout, 1930 연회색자나방 [Specimen research] 5ex, 8--2008.
9. *Eulithis fabiolaria* Oberthür, 1884 무늬박이흰물결자나방 [Specimen research] 1ex, 8--2008.
10. *Eurybeidia languidata* (Walker, 1862) 깃노랑자나방 [Specimen research] 2ex, 8--2008.
11. *Evecliptopera decurrens* (Moor, 1888) 흰그물물결자나방 [Specimen research] 1ex, 8--2008.
12. *Fascellina chromataria* Walker, 1860 갈고리자나방 [Specimen research] 1ex, 8--2008; 2ex, 8--2008.
13. *Gandaritis fixeni* (Bremer, 1864) 큰노랑물결자나방 [Specimen research] 1ex, 6--2008.
14. *Heterolocha aristonaria* (Walker, 1860) 뒷분홍자나방 [Specimen research] 1ex, 8--2008.
15. *Hypomecis roboraria* (Denis et Schiffermüller, 1775) 세줄날개자나방 [Specimen research] 3ex, 8--2008; 3ex, 8--2008; 2ex, 12--2008.
16. *Jankowskia pseudathleta* Sato, 1980 북방구름무늬자나방 [Specimen research] 3ex, 8--2008; 5ex, 12--2008; 2ex, 6--2008.
17. *Krananda semithyalina* Moore, 1868 줄점겨울자나방 [Specimen research] 6ex, 8--2008.
18. *Menophra senilis* (Butler, 1878) 먹그림자나방 [Specimen research] 1ex, 8--2008; 1ex, 8--2008.
19. *Mixochlora vittata Prasina* (Butler, 1879) ** ---자나방 [Specimen research] 2ex, 12--2008.
20. *Operophera brumata* (Linnaeus, 1758) * 겨울물결자나방 [Specimen research] 1ex, 8--2008.
21. *Oxymacaria normata* (Alpheraky, 1892) 고운날개자나방 [Specimen research] 7ex, 12--2008.
22. *Oyrapteryx nivea* Butler, 1883 연노랑제비자나방 [Specimen research] 3ex, 6--2008.
23. *Parecilipsis gracilis* (Butler, 1879) 끝빨룩자나방 [Specimen research] 1ex, 8--2008; 2ex, 8--2008; 12ex, 12--2008.
24. *Rikiosaroa grisea* (Butler, 1878) 두줄자나방 [Specimen research] 1ex, 8--2008.
25. *Tanaorhinus reciprocata* (Walker, 1861) 갈고리왕푸른자나방 [Specimen research] 1ex, 8--2008.

Family 8. Saturniidae 산누에나방과

1. *Antheraea yamamai ussuriensis* Schachbazov, 1953 참나무산누에나방 [Specimen research] 2ex, 12--2008.

Family 9. Sphingidae 박각시과

1. *Callambulyx tatarinovi* (Bremer et Grey, 1852) 녹색박각시 [Specimen research] 4ex, 8--2008.
2. *Marumba sperchius* (Menetries, 1857) 등줄박각시 [Specimen research] 5ex, 8--2008.
3. *Marumba saishiuana* Okamoto, 1924 제주등줄박각시 [Specimen research] 1ex, 8--2008.

Family 10. Notodontidae 제주나방과

1. *Cnethodonta grisescens* Staudinger, 1887 뒷검은제주나방 [Specimen research] 1ex, 8--2008.
2. *Epodonta lineata* (Oberthür, 1880) 줄제주나방 [Specimen research] 1ex, 12--2008.
3. *Euhampsonia cristata* (Butler, 1877) 곱추제주나방 [Specimen research] 2ex, 8--2008; 1ex, 8--2008.
4. *Fentonia ocypte* (Bremer, 1861) 밤나무제주나방 [Specimen research] 1ex, 8--2008.
5. *Mesophalera sigmata* (Butler, 1877) 동백나무제주나방 [Specimen research] 1ex, 8--2008; 1ex, 12--2008.
6. *Neodymonia delia* (Leech, 1889) 노린재나무제주나방 [Specimen research] 2ex, 8--2008.
7. *Phalera flavescens* (Bremer et Grey, 1853) 먹무늬제주나방 [Specimen research] 2ex, 8--2008.
8. *Syntypistis pryri* (Leech, 1899) 회색제주나방 [Specimen research] 5ex, 8--2008.
9. *Syntypistis subgeneris* (Strand, 1915) 연갈색제주나방 [Specimen research] 4ex, 8--2008.

Family 11. Lymantriidae 독나방과

1. *Arctornis kumatai* Inoue, 1956 점흰독나방 [Specimen research] 1ex, 8--2008.
2. *Calliterea argentata* (Butler, 1881) 삼나무독나방 [Specimen research] 2ex, 12--2008.
3. *Calliterea lunulata* (Butler, 1877) 붉은수염독나방 [Specimen research] 1ex, 12--2008
4. *Euproctis pulverea* (Leech, 1889) 꼬마독나방 [Specimen research] 5ex, 12--2008.
5. *Euproctis subflava* (Bremer, 1861) 독나방 [Specimen research] 1ex, 8--2008.
6. *Euproctis torasan* (Holland, 1889) 뒷검은독나방 [Specimen research] 6ex, 8--2008.
7. *Lymantria sakaguchii* Matsumura, 1927 * 큰물결매미나방 [Specimen research] 5ex, 8--2008.

Family 12. Arctiidae 불나방과

1. *Eilema griseola* (Hübner, 1803) 노랑테불나방 [Specimen research] 1ex, 8--2008.

Family 13. Noctuidae 밤나방과

1. *Adris tyrannus* (Guenée, 1852) 으름밤나방 [Specimen research] 1ex, 8--2008 ; 1ex, 12--2008.
2. *Blasticorhinus ussuriensis* (Bremer, 1861) 우수리밤나방 [Specimen research] 1ex, 8--2008.
3. *Dictyestra dissectus* (Walker, 1865) 노랑맥검은밤나방 [Specimen research] 1ex, 8--2008.
4. *Dysmilichia genella* (Leech, 1889) * 점띠애기밤나방 [Specimen research] 1ex, 12--2008.
5. *Ercheia niveostrigata* Warren, 1913 청백무늬밤나방 [Specimen research] 1ex, 8--2008.
6. *Lygephila maxima* (Bremer, 1861) 큰목검은밤나방 [Specimen research] 1ex, 8--2008.
7. *Macdunnoughia purissima* (Butler, 1878) 은무늬밤나방 [Specimen research] 1ex, 6--2008.

8. *Mecodina subviolacea* (Butler, 1881) 보라애기잎밤나방 [Specimen research] 10ex, 8--2008.
9. *Metopta rectifasciata* (Ménétrières, 1863) 흰줄테극나방 [Specimen research] 2ex, 8--2008.
10. *Orthogonia sera* Felder et Felder, 1862 모진밤나방 [Specimen research] 1ex, 8--2008.
11. *Pangrapta curtalis* (Walker, 1866) 끝잘름나방 [Specimen research] 1ex, 12--2008.
12. *Simplicia niphona* (Butler, 1878) 곧은띠수염나방 [Specimen research] 2ex, 8--2008 ; 1ex, 6--2008.
13. *Sineugraphe exusta* (Butler, 1878) 쌍검은밤나방 [Specimen research] 2ex, 12--2008.
14. *Sypnoides fumosa* (Butler, 1877) 애흰줄썩은잎밤나방 [Specimen research] 1ex, 8--2008; 1ex, 12--2008.
15. *Trachea atriplicis* (Linnaeus, 1758) 메밀거세미나방 [Specimen research] 1ex, 12--2008.

Family 14. Hesperidae 팔랑나비과

1. *Daimio tethys* (Menetries, 1857) 왕자팔랑나비 [Specimen research] 1ex, 6--2008; 1ex, 10--2008; 1ex, 13--2008.
2. *Parnara guttata* (Bremer et Grey, 1852) 줄점팔랑나비 [Specimen research] 2ex, 10--2008; 1ex, 13--2008.
3. *Pyrgus maculatus* (Bremer et Grey, 1852) 흰점팔랑나비 [Specimen research] 1ex, 6--2008.

Family 15. Papilionidae 호랑나비과

1. *Graphium sarpedon* (Linnaeus, 1758) 청띠제비나비 [Specimen research] 1ex, 6--2008; 1ex, 5--2008.
2. *Papilio bianor* Cramer, 1777 제비나비 [Specimen research] 2ex, 6--2008
3. *Papilio protenor* Cramer, 1775 남방제비나비 [Specimen research] 1ex, 10--2008.
4. *Papilio xuthus* Linnaeus, 1767 호랑나비 [Specimen research] 1ex, 6--2008; 1ex, 13--2008.

Family 16. Pieridae 흰나비과

1. *Colias erate* (Esper, 1804) 노랑나비 [Specimen research] 2ex, 6--2008; 3ex, 10--2008; 4ex, 13--2008; 1ex, 5--2008.
2. *Eurema hecabe* (Linnaeus, 1758) 남방노랑나비 [Specimen research] 2ex, 6--2008; 3ex, 10--2008; 4ex, 13--2008; 2ex, 5--2008;
3. *Eurema laeta* (Boisduval, 1836) 극납노랑나비 [Specimen research] 2ex, 6--2008; 1ex, 10--2008; 1ex, 5--2008.
4. *Pieris rapae* (Linnaeus, 1758) 배추흰나비 [Specimen research] 3ex, 6--2008; 2ex, 10--2008; 10ex, 13--2008; 1ex, 5--2008.

Family 17. Lycaenidae 부전나비과

1. *Everes argiades* (Pallas, 1771) 암떡부전나비 [Specimen research] 2ex, 6--2008; 2ex, 10--2008; 1ex, 13--2008.
2. *Lycaena phlaeas* (Linnaeus, 1761?) 작은주홍부전나비 [Specimen research] 2ex, 6--2008; 1ex, 10--2008; 3ex, 13--2008.
3. *Pseudozizeeria maha* (Kollar, 1844) 남방부전나비 [Specimen research] 5ex, 6--2008; 3ex, 10--2008; 2ex, 13--2008.
4. *Taraka hamada* (Druce, 1875) 바둑돌부전나비 [Specimen research] 1ex, 6--2008
5. *Tongeia fischeri* (Eversmann, 1843) 떡부전나비 [Specimen research] 1ex, 10--2008; 1ex, 13--2008.

Family 18. Nymphalidae 네발나비과

1. *Argyreus hyperbius* (Linnaeus, 1763) 암끝검은표범나비 [Specimen research] 3ex, 12--2008; 1ex, 5--2008.
2. *Cynthia cardui* (Linnaeus, 1758) 작은멋쟁이나비 [Specimen research] 3ex, 6--2008; 1ex, 10--2008; 2ex, 13--2008.
3. *Damora sagana* (Doubleday, 1847) 암검은표범나비 [Specimen research] 1ex, 5--2008.
4. *Hestina assimilis* (Linnaeus, 1758) 흥점알락나비 [Specimen research] 1ex, 6--2008
5. *Kaniska canace* (Linnaeus, 1763) 청띠신선나비

- [Specimen research] 1ex, 6--2008; 1ex, 5--2008.
6. *Neptis sappho* (Pallas, 1771) 애기세줄나비
[Specimen research] 1ex, 6--2008; 1ex, 10--2008.
7. *Polygonia c-aureum* (Linnaeus, 1758) 네발나비
[Specimen research] 3ex, 6--2008; 2ex, 10--2008; 5ex, 13--2008.; 2ex, 5--2008.
8. *Vanessa indica* (Herbst, 1794) 큰멋장이나비
[Specimen research] 1ex, 6--2008.

Family 19. Satyridae 뱀눈나비科

1. *Melanargia halimede* (Menetries, 1858) 흰뱀눈나비
[Specimen research] 2ex, 6--2008; 1ex, 10--2008.
2. *Minois dryas* (Scopoli, 1793) 굴뚝나비
[Specimen research] 5ex, 12--2008; 18ex, 5--2008.

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