



## Insect Fauna of Mt. Jang-san, Yeongwol-gun, Gangwon-do, Korea

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**Abstract:** An entomofauna study of Jangsan Mountain (1,408.8 m) in Yeongwol-gun, Gangwon-do was carried out from April to September, 2010. The distribution of 384 species, 91 families and 12 orders was confirmed from the study area.

**Keywords:** Entomofauna, Mt. Jangsan, Gangwon-do, Korea

### Introduction

Mt. Jangsan (1,408.8 m), located in Yeongwol-gun, Gangwon-do and between Gurae-ri and Cheonpyeong-ri, Sangdong-eup, is a rocky mountain branched southwestward from Manhangjae of Mt. Hambaek (1,572 m). The mountain has lots of hills, crushed stones and rolling stones, as well as deep valleys and thick forests. The northern side is sloping gradually, while the southern slope is steep and mostly rocky. Mt. Jangsan has mixed forests of pines and oaks, as well as shrubs including lace shrub (*Stephanandra incisa* (Thunb.) Zabel), manshurian fullmoon maple (*Acer pseudo-sieboldianum* (Pax) Kom.), royal azalea (*Rhododendron schlippenbachii* Maxim.) and Asian hazel (*Corylus heterophylla* Fisch. ex Trautv.). *Sasa boriales* (Hack.) Makino was dominant among low-growing plants. Manchurian fir (*Abies nephrolepis* (Trautv.) Maxim.), japanese yew (*Taxus cuspidata* Siebold & Zucc.) and *Thuja koraiensis* Nakai were confirmed to have grown from the areas higher than 1,200 m altitude.

There have been few researches on biota of Mt. Hambaek and Mt. Taebaek, which are as high as and located near Mt. Jangsan (Kim & Chang, 1988, Bae & Paek, 1999). However, a biota survey on Mt. Jangsan has never been made up to date. Therefore the present study holds valuable meanings in securing information and fundamental data on entomofauna of the mountain which can be used for studies related to changes on insect distribution or fauna driven by global warming.

### Materials and Methods

The surveys were conducted for a total of five times to investigate entomofauna at Jangsan Mountain (1,408.8 m) in Sangdong-eup, Yeongwol-gun, Gangwon-do, Republic of Korea from April to September, 2010. The collections were carried out during day and night. The daytime collection was performed from 10am to 5pm and the nighttime one was performed for 3-4 hours after sunset. For day-time collections the brandishing and sweeping methods mainly were used on bushes and shrubs along forest paths and trails. The light traps with UV light bulbs (?? Kw) were installed to attract insects for night-time collections. Among attracted insects microlepidopteras were individually collected with small glass vials ( $\phi \pm 1.0 \text{ mm} \times 5.0 \text{ mm}$ ). Other insects were anesthetized with ammonia. Collected samples were taken to a laboratory of Korean National Arboretum, pinned and mounted at the laboratory. Dried specimens were classified first into orders and families and species were identified (Asahina *et al.*, 1973, Byun *et al.*, 1998, Han *et al.*, 2001, Hong *et al.*, 2000, Inoue *et al.*, 1973, Nagane *et al.*, 1973, Park & Ponomrenko, 2007, Park & Kim, 1997), Names of identified species were listed according to Checklist of Insects from Korea (1994) and Checklist of Korean Insects (2010). In addition, unidentified species were treated with sp. on the list and all the specimens are stored at the Korea National Arboretum.

### Results and Discussion

A total of 1,032 insects of 384 species, 91 families and 12 orders were collected through the survey. Lepidoptera was the largest group with 460 individuals of 27 families and 168 species, followed by Coleoptera with 227 of 62 species and 21 families and Diptera with 153 of 69 species and 13 families (Table 1). Among them, 16 species including

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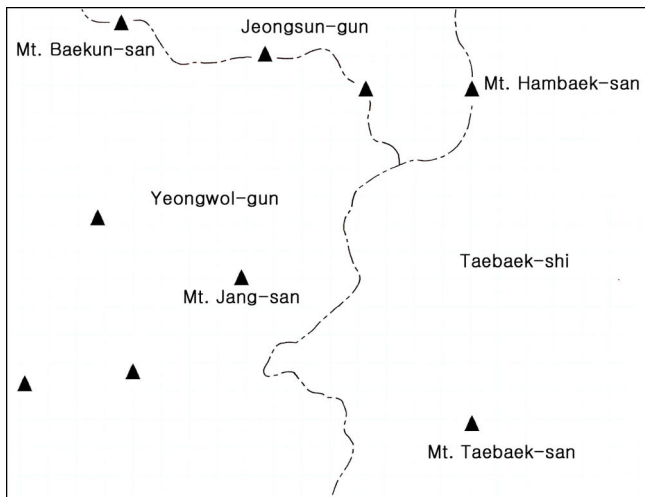


Fig. 1. Location of Mt. Jangsan in Gangwon-do.

*Brahmaea tancrei* (Austaut) and *Apatura iris* (Linnaeus) were of the biological resources which are subject to permission for taking abroad. Six of Korean endemic species like *Piletocera luteosignata* Park were collected as well (Table 3).

The collection in April was the lowest record with only 36 individuals of 16 species, 2 families and 1 order and in July the highest with 367 individuals of 183 species, 56 families and 10 orders. A total of 209 individuals under 9 orders, 32 families and 89 species were collected in September, showing that the largest number of insects appeared from May to July (Table 2).

Dominant species in April and May were *Esakiopteryx volitans* (Butler) and *Serica polita* (Gebler), respectively.

Table 1. List and number of insect groups collected from Mt. Jangsan in 2010

No.	Order (Korean name)	Family	Species	Individuals
1	Odonata 잠자리목	2	4	7
2	Plecoptera 강도래목	2	2	2
3	Orthoptera 메뚜기목	2	2	2
4	Hemiptera 노린재목	6	19	40
5	Homoptera 매미목	5	12	27
6	Neuroptera 풀잠자리목	1	3	6
7	Coleoptera 딱정벌레목	21	62	227
8	Hymenoptera 벌목	8	36	91
9	Mecoptera 밀들이목	1	4	8
10	Diptera 파리목	13	69	153
11	Trichoptera 날도래목	3	3	9
12	Lepidoptera 나비목	27	168	460
Total	12	91	384	1032

Table 2. Monthly collection of insects from Mt. Jangsan in 2010

Site	Month	Order	Family	Species	Individuals
Jangsan	4	1	2	16	36
	5	7	31	69	116
	6	11	40	92	304
	7	10	56	183	367
Total	9	9	32	89	209
	12	91	384	1032	

Also, other dominant species by month were *Cephaloon pallens* (Motschulsky) in June, *Typloptera bella* (Butler) and *Palpita ingropunctalis* (Bremer) July and *Helophilus virgatus* Coquillett and *Cnaphalocrocis medinalis* Guenee September.

The result of the present study is expected to be used for long-term investigation on changes of entomofauna driven

Table 3. List of Korean endemic and legally protected insects among the collection

Order	Family	Scientific name	Korean name	Remark
Orthoptera	Acrididae	<i>Zubovskya koreana</i> Mistshenko	한국민날개밀들이메뚜기	Overseas Export Approval Species Endemic Species
Coleoptera	Lucanidae	<i>Platycerus hongwonpyoi</i> Imura et Choe	원표애보라사슴벌레	"
Coleoptera	Geotrupidae	<i>Chromogeotrupes auratus</i> Motschulsky	보라금풍뎡이	Overseas Export Approval Species
Coleoptera	Cantharidae	<i>Podabrus fragiliformis</i> Kang et Kim	연노랑목가는병대벌레	Overseas Export Approval Species Endemic Species
Hymenoptera	Apidae	<i>Apis cerana</i> Fabricius	재래꿀벌	Overseas Export Approval Species
Mecoptera	Panorpidae	<i>Panorpa coreana</i> Okamoto	참밀들이	Endemic Species
Lepidoptera	Crambidae	<i>Piletocera luteosignata</i> Park	노랑띠들명나방	Overseas Export Approval Species Endemic Species
Lepidoptera	Geometridae	<i>Ourapteryx koreana</i> Inoue	굵은줄제비가지나방	Overseas Export Approval Species
Lepidoptera	Geometridae	<i>Phigalia viridularia</i> Beljaev	북방겨울가지나방	"
Lepidoptera	Brahmaeidae	<i>Brahmaea tancrei</i> Austaut	산왕물결나방	"
Lepidoptera	Sphingidae	<i>Sphingulus mus</i> Staudinger	갈색박각시	"
Lepidoptera	Notodontidae	<i>Nerice leechi</i> Staudinger	두툽니재주나방	"
Lepidoptera	Arctiidae	<i>Lemyra boghaika</i> Tsistjakov et Kishida	등붉은뿔흰불나방	"
Lepidoptera	Noctuidae	<i>Pseudopanolis heterogyna</i> Bang-Haas	각시얼룩무늬밤나방	"
Lepidoptera	Noctuidae	<i>Catocala eminens</i> Staudinger	북방노랑뿔날개나방	"
Lepidoptera	Noctuidae	<i>Eupsilia silla</i> Kononenko & Ahn	광릉무지개밤나방	Overseas Export Approval Species Endemic Species
Lepidoptera	Nymphalidae	<i>Apatura iris</i> Linnaeus	번개오색나비	Overseas Export Approval Species

by the climate changes, especially the global warming, as well as comparative studies of seasonality and species composition by altitude.

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## Appendix 1. Total list of insect collection from Mt. Jangsan in Gangwon-do

Order	Korean name	Apr.	May	Jun.	Jul.	Sep.	Total
		36	116	304	367	209	1032
<b>Odonata 잠자리목</b>							
<b>Coenagrionidae 실잠자리과</b>							
	<i>Ischnura asiatica</i> (Brauer)			1			1
<b>Libellulidae 잠자리과</b>							
	<i>Sympetrum frequens</i> (Selys)				1	3	4
	<i>Sympetrum pedemontanum elatum</i> (Selys)				1		1
	<i>Sympetrum striolatum</i> (Charpentier)				1		1
<b>Plecoptera 강도래목</b>							
<b>Scopuridae 민날개강도래과</b>							
	<i>Scopuridae</i> sp.				1		1
<b>Perlodidae 그물강도래과</b>							
	<i>Perlodidae</i> sp.			1			1
<b>Orthoptera 메뚜기목</b>							
<b>Tettigoniidae 여치과</b>							
	<i>Elimaea fallax</i> Bey-Bienko					1	1
<b>Acrididae 메뚜기과</b>							
	<i>Zubovskya koreana</i> Mistshenko					1	1
<b>Hemiptera 노린재목</b>							
<b>Miridae 장님노린재과</b>							
	<i>Adelphocoris triannulatus</i> (Stal)					1	1
	<i>Miridae</i> sp-1			2			2
	<i>Miridae</i> sp-2					1	1
	<i>Miridae</i> sp-3					3	3
	<i>Miridae</i> sp-4					1	1
	<i>Miridae</i> sp-5			4			4
<b>Coreidae 허리노린재과</b>							
	<i>Molypteryx fuliginosa</i> (Uhler)					1	1
<b>Rhopalidae 잡초노린재과</b>							
	<i>Rhopalus sapporensis</i> (Matsumura)					5	5
<b>Urostylididae 참나무노린재과</b>							
	<i>Urostylis</i> sp.					1	1
<b>Acanthosomatidae 뿔노린재과</b>							
	<i>Acanthosoma crassicaudum</i> Jakovlev				1		1
	<i>Acanthosoma haemorrhoidale</i> (Linnaeus)			1			1
<b>Pentatomidae 노린재과</b>							
	<i>Halyomorpha halys</i> (Stal)				1		1
	<i>Palomena angulosa</i> (Motschulsky)			1		1	2
	<i>Palomena viridissima</i> (Poda)			1			1
	<i>Pentatoma japonica</i> (Distant)				3		3
	<i>Pentatoma metallifera</i> (Motschulsky)				1		1
	<i>Pentatoma semiannulata</i> (Motschulsky)				6		6
	<i>Plautia stali</i> Scott				1		1
<b>Homoptera 매미목</b>							
<b>Aphrophoridae 거품벌레과</b>							
	<i>Aphrophoridae</i> sp.				1		1
<b>Membracidae 뿔매미과</b>							
	<i>Butragulus flavipes</i> (Uhler)				2		2
<b>Cicadellidae 매미총과</b>							
	<i>Bothrogonia japonica</i> Ishihara					1	1
	<i>Drabescus fasciatus</i> (Kato)					3	3
	<i>Cicadellidae</i> sp-1					3	3
	<i>Cicadellidae</i> sp-2					1	1
	<i>Cicadellidae</i> sp-3				2	3	5
	<i>Cicadellidae</i> sp-4					2	2
	<i>Cicadellidae</i> sp-5					1	1
	<i>Ledra auditura</i> Walker				1		1

Appendix 1. Continued

Order	Korean name	Apr.	May	Jun.	Jul.	Sep.	Total
		36	116	304	367	209	1032
<b>Fulgoridae 꽃매미과</b>							
	<i>Limois emelianovi</i> Oshanin					6	6
<b>Dictyopharidae 상투벌레과</b>							
	<i>Dictyopharidae</i> sp.			1			1
<b>Neuroptera 풀잠자리목</b>							
<b>Hemerobiidae 뱀잠자리붙이과</b>							
	<i>Ninga deltoides</i> Navas					1	1
	<i>Drepanopteryx phalaenoides</i> Linnaeus ( <i>Drepanopteryx</i> sp.)		2	1			3
	<i>Homerobius</i> sp.		2				2
<b>Coleoptera 딱정벌레목</b>							
<b>Carabidae 딱정벌레과</b>							
	<i>Calleida onoha</i> Bates			2			2
	<i>Lebidia bioculata</i> Morawitz		1				1
	<i>Carabidae</i> sp.				1		1
<b>Silphidae 송장벌레과</b>							
	<i>Nicrodes littoralis</i> (Linnaeus)			3	1	4	8
	<i>Nicrophorus quadripunctatus</i> Kraatz			2	1		3
<b>Staphylinidae 반날개과</b>							
	<i>Staphylinidae</i> sp.		1				1
<b>Lucanidae 사슴벌레과</b>							
	<i>Platycerus hongwonpyoi</i> Imura et Choe		1				1
	<i>Lucanidae</i> sp.				2		2
<b>Geotrupidae 금풍뎡이과</b>							
	<i>Chromogeotrupes auratus</i> (Motschulsky)		2				2
<b>Melolonthidae 검정풍뎡이과</b>							
	<i>Holotrichia niponensis</i> (Lewis)				2		2
	<i>Serica polita</i> (Gebler)		13	9			22
<b>Rutelidae 풍뎡이과</b>							
	<i>Spilota plagiicollis</i> (Fairmaire)				4		4
<b>Cetoniidae 꽃무지과</b>							
	<i>Trichius succinctus</i> (Pallas)				3		3
<b>Elateridae 방아벌레과</b>							
	<i>Elateridae</i> sp-1			4			4
	<i>Elateridae</i> sp-2			1	2		3
	<i>Elateridae</i> sp-3				1		1
	<i>Gambrinus kraatzi</i> (Candéze)			1			1
<b>Lycidae 홍반디과</b>							
	<i>Macrolycus flabellatus</i> (Motschulsky)				2		2
<b>Cantharidae 병대벌레과</b>							
	<i>Athemus attristatus</i> (Kiesenwetter)			5			5
	<i>Cantharidae</i> sp-1			12			12
	<i>Cantharidae</i> sp-2			5			5
	<i>Podabrus fragiliformis</i> Kang et Kim			2			2
<b>Silvanidae 가는납작벌레과</b>							
	<i>Psammoeceus triguttatus</i> Reitter				2		2
<b>Coccinellidae 무당벌레과</b>							
	<i>Aiolocaria hexaspilota</i> (Hope)		1	1			2
	<i>Anatis halonis</i> Lewis		2		6	2	10
	<i>Calvia decemguttata</i> (Linnaeus)				3	6	9
	<i>Harmonia axyridis</i> (Pallas)				3		3
	<i>Vibidia duodecimguttata</i> (Poda)		1	1		1	3
	<i>Coccinellidae</i> sp.					4	4
<b>Cephaloidae 목대장과</b>							
	<i>Cephaloon pallens</i> (Motschulsky)			37			37
<b>Oedemeridae 하늘소붙이과</b>							
	<i>Xanthochroa luteipennis</i> Marseul				1		1
	<i>Oedemeridae</i> sp.			1			1

## Appendix 1. Continued

Order	Korean name	Apr.	May	Jun.	Jul.	Sep.	Total
		36	116	304	367	209	1032
	<i>Oedemera amurensis</i> Heyden			4			4
	<i>Oedemerina concolor</i> Lewis			1			1
	<i>Eobia chinensis</i> (Hope)			1			1
<b>Pyrochroidae 홍날개과</b>							
	<i>Pseudopyrochroa rubricollis</i> (Lewis)		4				4
<b>Lagriidae 잎벌레붙이과</b>							
	<i>Lagria nigricollis</i> Hope				1		1
<b>Cerambycidae 하늘소과</b>							
	<i>Arhopalus rusticus</i> (Linné)				1		1
	<i>Corymbia rubra</i> (Linné)				1		1
	<i>Corymbia variicornis</i> (Dalman)				1		1
	<i>Eutetrappa sedecimpunctata</i> (Motschulsky)				1		1
	<i>Monochamus saltuarius</i> (Gebler)				1		1
	<i>Obrium obscuripenne</i> Pic				1		1
	<i>Pidonia gibbicolis</i> (Blessig)			1			1
	<i>Pidonia puziloi</i> (Solsky)			13			13
	<i>Pidonia similis</i> (Kraatz)				1		1
	<i>Pseudosieversia rufa</i> (Kraatz)				1		1
	<i>Rhaphuma gracilipes</i> (Faldermann)				2		2
	<i>Thyestilla gebleri</i> (Faldermann)			3			3
	<i>Xylariopsis mimica</i> Bates				1		1
	<i>Pidonia amurensis</i> (Pic)			5			5
	<i>Obrium obscuripenne</i> Pic				1		1
<b>Chrysomelidae 잎벌레과</b>							
	<i>Agelasa nigriceps</i> Motschulsky		2	2	1	1	6
	<i>Agelastica coerulea</i> Baly		1				1
	<i>Cassida nebulosa</i> Linné				1		1
	<i>Gonioctena fulva</i> (Motschulsky)				1		1
	<i>Paridea angulicollis</i> (Motschulsky)			2	1		3
	<i>Entomoscelis orientalis</i> Motschulsky				1		1
<b>Attelabidae 거위벌레과</b>							
	<i>Apoderus rubidus</i> Motschulsky		1				1
	<i>Attelabidae</i> sp.					1	1
<b>Curculionidae 바구미과</b>							
	<i>Curculio sikkimensis</i> (Heller)				7		7
	<i>Pseudocneorhinus setosus</i> Roelofs				1		1
<b>Hymenoptera 벌목</b>							
<b>Tenthredinidae 잎벌과</b>							
	<i>Siobla ruficornis</i> (Cameron)				2		2
	<i>Tenthredinidae</i> sp.				1		1
	<i>Dolerus ephippiatus</i> Smith				3		3
	<i>Jermakia sibirica</i> (Kriech-Baumer)				1		1
<b>Pteromalidae 금줄벌과</b>							
	<i>Pteromalidae</i> sp.					1	1
<b>Braconidae 고치벌과</b>							
	<i>Braconidae</i> sp-1			2			2
	<i>Braconidae</i> sp-2				3		3
<b>Ichneumonidae 뱀시벌과</b>							
	<i>Ichneumonidae</i> sp-1				2		2
	<i>Ichneumonidae</i> sp-2		1	2	3	6	12
	<i>Ichneumonidae</i> sp-3					2	2
	<i>Ichneumonidae</i> sp-4				4		4
	<i>Ichneumonidae</i> sp-5		2	4	1	2	9
	<i>Ichneumonidae</i> sp-6			6		6	12
	<i>Ichneumonidae</i> sp-7		2			1	3
	<i>Ichneumonidae</i> sp-8			1		1	2
	<i>Ichneumonidae</i> sp-9		1				1

Appendix 1. Continued

Order	Korean name	Apr.	May	Jun.	Jul.	Sep.	Total
		36	116	304	367	209	1032
	<i>Ichneumonidae</i> sp-10		1				1
	<i>Ichneumonidae</i> sp-11					1	1
	<i>Exenterini</i> sp.					1	1
	<i>Ichneumon cyaniventris</i> (Wesmael)					1	1
<b>Vespidae 말벌과</b>							
	<i>Vespa simillima simillima</i> Smith					1	1
	<i>Vespa</i> sp.					1	1
	<i>Vespula rufa schrenckii</i> Radoszkowski		1		1		2
	<i>Vespula</i> sp-1		1	2		1	4
	<i>Vespula</i> sp-2					1	1
<b>Apidae 꿀벌과</b>							
	<i>Apis cerana</i> Fabricius					1	1
	<i>Apis mellifera</i> Linné			1	2		3
	<i>Bombus</i> sp-1					1	1
	<i>Bombus</i> sp-2					1	1
	<i>Bombus</i> sp-3					1	1
	<i>Bombus</i> sp-4				2		2
	<i>Bombus</i> sp-5		2			1	3
	<i>Bombus</i> sp-6		1			1	2
	<i>Bombus schrencki albidopleuralis</i> Skorikov					1	1
<b>Crabronidae 은주둥이벌과</b>							
	<i>Blepharipus</i> sp.				2		2
<b>Megachilidae 가위벌과</b>							
	<i>Megachilidae</i> sp.		1				1
<b>Mecoptera 밀들이목</b>							
<b>Panorpidae 밀들이과</b>							
	<i>Panorpa coreana</i> Okamoto				1		1
	<i>Panorpa orientalis</i> MacLachlan				1		1
	<i>Panorpodes paradoxus</i> MacLachlan		1	2			3
	<i>Panorpidae</i> sp.			1	2		3
<b>Diptera 파리목</b>							
<b>Tabanidae 등에과</b>							
	<i>Haematopota pluvialis tristis</i> Bigot				1		1
<b>Solvidae 점밀들이파리매과</b>							
	<i>Xylomya moiwana</i> (Matsumura)				1		1
<b>Asilidae 파리매과</b>							
	<i>Neoitamus cothurnatus univittatus</i> (Loew)				3		3
	<i>Trichomachimus scutellaris</i> (Coquillett)					1	1
<b>Bombyliidae 재니등에과</b>							
	<i>Bombylius major</i> Linné		1				1
<b>Empididae 춤파리과</b>							
	<i>Empis flavobasalis</i> Matsumura		1				1
<b>Syrphidae 꽃등에과</b>							
	<i>Chrysotoxum</i> sp-1			1			1
	<i>Chrysotoxum</i> sp-2			3			3
	<i>Chrysotoxum</i> sp-3			1			1
	<i>Epistrophe</i> sp-1		1				1
	<i>Epistrophe</i> sp-2					3	3
	<i>Episyrphus balteata</i> (De Geer)			4	1	4	9
	<i>Eristalis cerealis</i> Fabricius			1	4	7	12
	<i>Eristalis tenax</i> (Linné)					1	1
	<i>Helophilus virgatus</i> Coquillett			2	3	11	16
	<i>Melanostoma mellinum</i> Linné			1			1
	<i>Meliscaeva cinctella</i> (Zetterstedt)		1				1
	<i>Metasyrphus nitens</i> (Zetterstedt)			1		3	4
	<i>Platycheirus clypeatus</i> (Meigen)		2				2
	<i>Platycheirus scutatus</i> (Meigen)		1				1

## Appendix 1. Continued

Order	Korean name	Apr.	May	Jun.	Jul.	Sep.	Total
		36	116	304	367	209	1032
<i>Platycheirus urakawensis</i> (Matsumura)	푸른점곱슬꽃등에		1				1
<i>Platycheirus</i> sp-1			1				1
<i>Platycheirus</i> sp-2			1				1
<i>Platycheirus</i> sp-3			2				2
<i>Rhingia laevigata</i> Loew	진꽃등에			1			1
<i>Syrphus</i> sp.						2	2
<i>Triglyphus primus</i> Loew	좁꽃등에					1	1
<i>Volucella nigricans</i> Coquillett	검정대모꽃등에				2		2
<i>Volucella</i> sp.						1	1
<b>Conopidae 벌불이파리과</b>							
<i>Conops santaroi</i> Ouchi	산타로벌불이파리			1			1
<b>Pyrgotidae 풍뎡이기생파리과</b>							
<i>Porpomastix fasciolata</i> Enderlein	긴꼬리풍뎡이파리			1		1	2
<b>Tephritidae 과실파리과</b>							
<i>Paragastrozona japonica</i> (Miyake)	조릿대과실파리			3			3
<b>Calliphoridae 검정파리과</b>							
<i>Calliphora lata</i> Coquillett	큰검정파리		4				4
<i>Calliphoridae</i> sp.			1				1
<i>Stomorhina obsoleta</i> (Wiedemann)	점박이꽃검정파리					1	1
<b>Sarcophagidae 쉬파리과</b>							
<i>Helicophagella melamura</i> (Meigen)	검정불기쉬파리					2	2
<b>Muscidae 집파리과</b>							
<i>Muscidae</i> sp.			1				1
<b>Tachinidae 기생파리과</b>							
<i>Ectophasia rotundiventris</i> (Loew)	중국벌똥보기생파리					7	7
<i>Ernestia</i> sp.			2				2
<i>Cylindromyia</i> sp.						1	1
<i>Linnaemya</i> sp.						1	1
<i>Lyphosia</i> sp.			1				1
<i>Phasia</i> sp-1						2	2
<i>Phasia</i> sp-2						1	1
<i>Peleteria</i> sp-1			1				1
<i>Peleteria</i> sp-2			3				3
<i>Peleteria</i> sp-3			1				1
<i>Smidtia amoena</i> (Meigen)					1	3	4
<i>Tachina amurensis</i> (Zimin)	아무르털기생파리					9	9
<i>Tachina luteola</i> Coquillett	노랑털기생파리					5	5
<i>Tachina nupta</i> (Rondani)	등줄기생파리					2	2
<i>Tachinidae</i> sp-1						1	1
<i>Tachinidae</i> sp-2					1		1
<i>Tachinidae</i> sp-3					1		1
<i>Tachinidae</i> sp-4			1				1
<i>Tachinidae</i> sp-5				2		1	3
<i>Tachinidae</i> sp-6						1	1
<i>Tachinidae</i> sp-7			3				3
<i>Tachinidae</i> sp-8			1				1
<i>Tachinidae</i> sp-9			2				2
<i>Tachinidae</i> sp-10			1				1
<i>Tachinidae</i> sp-11			1				1
<i>Tachinidae</i> sp-12					1		1
<i>Tachinidae</i> sp-13			1				1
<i>Tachinidae</i> sp-14					1		1
<i>Tachinidae</i> sp-15					1		1
<i>Tachinidae</i> sp-16			1				1
<i>Tachinidae</i> sp-17			1				1



Appendix 1. Continued

Order	Korean name	Apr.	May	Jun.	Jul.	Sep.	Total
		36	116	304	367	209	1032
<b>Trichoptera 날도래목</b>							
<b>Stenopsychidae 각날도래과</b>							
	<i>Stenopsyche griseipennis</i> McLachlan			1			1
<b>Hydropsychidae 줄날도래과</b>							
	<i>Macronema radiatum</i> (McLachlan)				4		4
<b>Rhyacophilidae 물날도래과</b>							
	<i>Rhyacophilidae</i> sp.		4				4
<b>Lepidoptera 나비목</b>							
<b>Adelidae 긴수염나방과</b>							
	<i>Nematopogon distincta</i> Yasuda				1		1
	<i>Nemophora aurifera</i> (Butler)				1		1
<b>Tortricidae 잎말이나방과</b>							
	<i>Ancylis partitana</i> (Christoph)				12		12
<b>Yponomeutidae 집나방과</b>							
	<i>Ypsolopha strigosus</i> (Butler)				4		4
<b>Gelechiidae 뽕나방과</b>							
	<i>Dichomeris ustalella</i> (Fabricius)			2			2
<b>Crambidae 포충나방과</b>							
	<i>Ancylolomia japonica</i> Zeller				1		1
	<i>Catoptria permiaca</i> (Petersen)				2		2
	<i>Eurrhynx hortulata</i> (Linnaeus)			2			2
	<i>Eurrhynx contortalis</i> (Hampson)			1	2		3
	<i>Nacoleia commixta</i> (Butler)				1		1
	<i>Nacoleia sibirialis</i> (Milliere)				4		4
	<i>Palpita nigropunctalis</i> (Bremer)				9	1	10
	<i>Pileocera luteosignata</i> Park			10			10
	<i>Pleuroptya quadrimaculalis</i> (Kollar)				1		1
	<i>Spoladea recurvalis</i> (Fabricius)					4	4
	<i>Tyspanodes hypsalis</i> Warren				1		1
	<i>Ostrinia zaguliaevi</i> Mutuura et Munroe				1		1
	<i>Tabidia strigiferalis</i> Hampson				2		2
	<i>Pleuroptya deficiens</i> (Moore)				1		1
	<i>Simbotys obliquilinealis</i> Inoue				1		1
	<i>Cnaphalocrocis medinalis</i> (Guenée)					11	11
	<i>Maruca vitrata</i> (Fabricius)					6	6
	<i>Diaphania indica</i> (Saunders)					1	1
<b>Pyralidae 명나방과</b>							
	<i>Lista ficksi</i> (Christoph)				6		6
	<i>Oncocera semirubella</i> (Scopoli)				2		2
	<i>Pyralis regalis</i> Denis et Schiffermüller				1		1
	<i>Pyralidae</i> sp.				1		1
<b>Zygaenidae 알락나방과</b>							
	<i>Chalcosia remota</i> (Walker)				1		1
<b>Limacodidae 췌기나방과</b>							
	<i>Ceratonema christophi</i> (Graeser)				1		1
	<i>Rhamnosa angulata</i> Fixsen				3		3
	<i>Chibiraga banhaasi</i> (Hering et Hopp)				1		1
<b>Drepanidae 갈고리나방과</b>							
	<i>Nordstroemia grisearia</i> (Staudinger)				2		2
	<i>Sabra harpagula olivacea</i> (Inoue)			3			3
<b>Thyatiridae 뽕족날개나방과</b>							
	<i>Habrosyne aurorina</i> (Butler)			5	1		6
	<i>Habrosyne dieckmanni roseola</i> Matsumura				3		3
	<i>Habrosyne pyritoides derasoides</i> Butler				1		1
	<i>Parapsestis argenteopicta</i> (Oberthür)				1		1
	<i>Tethea ampliata</i> (Butler)			1			1
	<i>Tethea consimilis</i> (Warren)			3	7		10

## Appendix 1. Continued

Order	Korean name	Apr.	May	Jun.	Jul.	Sep.	Total
		36	116	304	367	209	1032
<b>Cyclidiidae 왕갈고리나방과</b>							
<i>Cyclidia substigmata</i> (Hübner)	왕갈고리나방			2			2
<b>Geometridae 자나방과</b>							
<i>Abraxas fulvobasalis</i> Warren	점얼룩가자나방			1	6		7
<i>Angerona prunaria</i> (Linnaeus)	오얏나무가자나방			3	3		6
<i>Arichanna melanaria</i> (Linnaeus)	뒷노랑점가자나방			1	5		6
<i>Auaxa sulphurea</i> (Butler)	외출노랑가자나방				1		1
<i>Bupalus vestalis</i> Staudinger	깃검은가자나방			4			4
<i>Cabera griseolimbata</i> (Oberthür)	뒷검은그물가자나방				1		1
<i>Comibaena argentataria</i> (Leech)	쌍눈푸른자나방				1		1
<i>Cryptochorina amphidasyaria</i> (Oberthür)	얼룩수염가자나방	1					1
<i>Eilicrinia wehrlii</i> Djakonov	귀무늬가자나방			1			1
<i>Epholca arenosa</i> (Butler)	흰점고운가자나방			3	4		7
<i>Erebomorpha fulguraria</i> Walker	흰그물왕가자나방		3	3			6
<i>Esakiopteryx volitans</i> (Butler)	뒷흰얼룩물결자나방	6					6
<i>Eupithecia clavifera</i> Inoue	이른봄애기물결자나방	2					2
<i>Eupithecia subbreviata</i> Staudinger	맷시꼬리물결자나방	1					1
<i>Eustroma melancholicum</i> (Butler)	톱날물결자나방			14			14
<i>Gandaritis agnes</i> (Butler)	회색물결자나방				4		4
<i>Gandaritis fixseni</i> (Bremer)	큰노랑물결자나방					1	1
<i>Hydrelia flammeolaria</i> (Hufnagel)	노랑꼬마물결자나방			2			2
<i>Lomasipilis marginata</i> (Linnaeus)	고운애기가자나방				1		1
<i>Maxates grandificaria</i> (Graeser)	큰제비푸른자나방				1		1
<i>Myrteta punctata</i> (Warren)	점줄흰가자나방				3		3
<i>Ninodes watanabei</i> Inoue	구름애기가자나방			2			2
<i>Obeidia tigrata</i> (Guenée)	노랑날개무늬가자나방				3		3
<i>Ourapteryx koreana</i> Inoue	굵은줄제비가자나방				2		2
<i>Pachyodes superans</i> (Butler)	점선두리자나방				1		1
<i>Phigalia viridularia</i> Beljaev	북방겨울가자나방	2					2
<i>Plagodis dolabraria</i> (Linnaeus)	줄고운노랑가자나방		1				1
<i>Trichopteryx terranea</i> (Butler)	갈색띠잔날개물결자나방	4					4
<i>Tyloptera bella</i> Butler	얼룩물결자나방			4	9		13
<i>Eupithecia repentina</i> Vojnits et Laever	긴집애기물결자나방				1		1
<i>Parectropis nigrosarsa</i> (Wileman et South)	가랑잎가자나방				1		1
<i>Descoreba simplex</i> Butler	큰빗줄가자나방		1				1
<i>Eustroma inextricata</i> Walker				6			6
<i>Eupithecia</i> sp-1			1				1
<i>Eupithecia</i> sp-2					1		1
<b>Callidulidae 빨나비나방과</b>							
<i>Pterodecta felderi</i> (Bremer)	빨나비나방					1	1
<b>Lasiocampidae 솔나방과</b>							
<i>Dendrolimus superans</i> (Butler)	솔송나방				3		3
<i>Odonestis pruni rufescens</i> Kiriakoff	사과나무나방				4		4
<b>Bombycidae 누에나방과</b>							
<i>Bombyx mandarina</i> (Moore)	멧누에나방				1	4	5
<i>Oberthueria falcigera</i> (Butler)	참물결멧누에나방				1		1
<b>Brahmaeidae 왕물결나방과</b>							
<i>Brahmaea tancrei</i> (Austaut)	산왕물결나방				1		1
<b>Saturniidae 산누에나방과</b>							
<i>Actias gnoma mandschurica</i> Staudinger	옥색긴꼬리산누에나방			2	1		3
<i>Aglia tau amurensis</i> (Jordan)	네눈박이산누에나방		6				6
<b>Sphingidae 박각시과</b>							
<i>Acosmeryx naga</i> (Moore)	포도박각시		3	2			5
<i>Ampelophaga rubiginosa</i> Bremer et Grey	머루박각시				6		6
<i>Callambulyx tatarinovii</i> (Bremer et Grey)	녹색박각시				4		4
<i>Dolbina tancrei</i> Staudinger	물결박각시			2			2
<i>Kentochrysalis consimilis</i> Rothschild et Jordan	검정무늬점박각시			9	4		13

Appendix 1. Continued

Order	Korean name	Apr.	May	Jun.	Jul.	Sep.	Total
		36	116	304	367	209	1032
	<i>Kentochrysalis sieversi</i> Alphéraky				7		7
	<i>Sphingulus mus</i> Staudinger				1		1
<b>Notodontidae 제주나방과</b>							
	<i>Clostera albosigma curtuloides</i> (Erschoff)		1				1
	<i>Leucodonta bicoloria</i> (Denis et Schiffermüller)			1	1		2
	<i>Lophontotia cuculus</i> (Staudinger)		1	3			4
	<i>Nerice leechi</i> Staudinger				1		1
	<i>Peridea moltrechti</i> (Oberthür)		1		1		2
	<i>Spatalia doerriesi</i> Graeser				1		1
<b>Lymantriidae 독나방과</b>							
	<i>Arctornis l-nigrum</i> (Müller)				1		1
	<i>Euproctis piperita</i> Oberthür				2		2
	<i>Euproctis similis</i> (Fuessly)				1		1
	<i>Lymantria monacha</i> (Linnaeus)				2		2
	<i>Arctornis kumatai</i> Inoue				1		1
<b>Arctiidae 불나방과</b>							
	<i>Agylla gigantea</i> (Oberthür)					1	1
	<i>Eilema deplana</i> (Esper)				2	2	4
	<i>Eilema griseola</i> (Hübner)				5		5
	<i>Eilema nankingica</i> (Daniel)				1		1
	<i>Lithosia quadra</i> (Linnaeus)				5		5
	<i>Mitochondria calaima</i> Butler					2	2
	<i>Mitochondria miniata</i> (Forester)				9		9
	<i>Mitochondria striata</i> (Bremer et Grey)				1		1
	<i>Paraona staudingeri</i> Alphéraky				2		2
	<i>Spilarcia seriatopunctata</i> (Motschulsky)				5		5
	<i>Agylla collitoides</i> (Butler)				1		1
	<i>Lemyra boghaika</i> Tsistjakov et Kishida				1		1
	<i>Eilema minor</i> Okano				1		1
<b>Noctuidae 밤나방과</b>							
	<i>Acrionicta cuspis</i> (Hubner)			1			1
	<i>Amphitrogia amphidecta</i> (Butler)			1	2		3
	<i>Anorthoa munda</i> (Denis & Schiffermüller)	1					1
	<i>Axylia putris</i> (Linnaeus)				1		1
	<i>Brachionycha nubeculosa</i> (Esper)	3					3
	<i>Callopietria repleta</i> Walker				1		1
	<i>Catocala eminens</i> Staudinger				1		1
	<i>Cerastis pallascens</i> (Butler)	1					1
	<i>Chasminodes albonitens</i> (Bremer)				1		1
	<i>Clavipalpula aurariae</i> (Oberthur)			1			1
	<i>Conistra albipuncta</i> (Leech)	1					1
	<i>Conistra filipjevi</i> Kononenko	2					2
	<i>Conistra grisescens</i> Draudt	1					1
	<i>Cymatophoropsis trimaculata</i> (Bremer)				1		1
	<i>Edessena gentiusalis</i> Walker				1		1
	<i>Ercheia niveostrigata</i> Warren			3			3
	<i>Eupsilia silla</i> Kononenko & Ahn	1					1
	<i>Hypersynpnoides astrigera</i> (Butler)			8			8
	<i>Lygephila subrecta</i> Sugi	1					1
	<i>Macdunnoughia purissima</i> (Butler)				1		1
	<i>Naganoella timandra</i> (Alpheraky)				1		1
	<i>Panolis japonica</i> Draudt		1				1
	<i>Panthea coenobita</i> (Esper)				2		2
	<i>Polia goliath</i> (Oberthur)				1		1
	<i>Pseudopanolis heterogyna</i> (Bang-Haas)	6					6
	<i>Pygopteryx suava</i> Staudinger					3	3
	<i>Sarbanissa venusta</i> (Leech)				4		4

## Appendix 1. Continued

Order	Korean name	Apr.	May	Jun.	Jul.	Sep.	Total
		36	116	304	367	209	1032
<i>Sineugraphe exusta</i> (Butler)	쌍검은밤나방					1	1
<i>Sphragifera sigillata</i> (Menetries)	봉인밤나방				3		3
<i>Synnoides fumosa</i> (Butler)	애흰줄씩은잎밤나방				2		2
<i>Trichosea ludifica</i> (Linnaeus)	북방배노랑버짐나방		1				1
<i>Xestia c-nigrum</i> (Linnaeus)	씨자무늬거세미밤나방			8			8
<i>Xestia fuscostigma</i> (Bremer)	점보라밤나방					1	1
<i>Xylena confusa</i> Kononenko & Ronkay	북방이른봄밤나방	3					3
<i>Pyralidae</i> sp.					2		2
<i>Noctuidae</i> sp-1				1			1
<i>Noctuidae</i> sp-2					1		1
<i>Catocala fraxini</i> (Linnaeus)	푸른띠뿔날개나방					2	2
<b>Hesperiidae 팔랑나비과</b>							
<i>Erynnis montanus</i> (Bremer)	멧팔랑나비		1				1
<b>Papilionidae 호랑나비과</b>							
<i>Atrophaneura alcinous</i> (Klug)	사향제비나비			2	1		3
<b>Pieridae 흰나비과</b>							
<i>Gonepteryx mahaguru</i> Gistel	각시멧노랑나비				1		1
<i>Pieris canidia</i> (Linnaeus)	대만흰나비				1		1
<i>Pieris melete</i> Ménétrières	큰줄흰나비				1		1
<i>Pieris dulcinea</i> Butler	줄흰나비		2				2
<b>Lycaenidae 부전나비과</b>							
<i>Celastrina argiolus</i> (Linnaeus)	푸른부전나비				1		1
<i>Cupido argiades</i> (Pallas)	암먹부전나비				1		1
<i>Ussuriana michaelis</i> (Oberthür)	금강산굴빛부전나비				1		1
<b>Nymphalidae 네발나비과</b>							
<i>Apatura iris</i> (Linnaeus)	번개오색나비				1		1
<i>Argynnis paphia</i> (Linnaeus)	은줄표범나비				2		2
<i>Brenthis ino</i> (Rottemburg)	작은표범나비				1		1
<i>Lethe diana</i> Buter	먹그늘나비				4		4
<i>Limenitis camilla</i> (Linnaeus)	줄나비				1		1
<i>Melanargia epimede</i> Staudinger	조흰뺨눈나비				1		1
<i>Neptis sappho</i> Pallas	애기세줄나비		1				1