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Altitudinal distribution of moths (Lepidoptera) in Mt. Jirisan National Park, South Korea

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Abstract. The relationship between species richness of plants and animals and altitude can be either hump-shaped, a monotonic decrease or increase. In this study the altitudinal distribution of moths on one of the highest mountains in South Korea was investigated. Moths were captured using a UV-light trap from May to October in 2007 and 2008. This revealed that the relationship between the total numbers of moth species and individuals and altitude is hump-shaped. A significant relationship was also recorded between the size of the area at each altitude and moth abundance and richness. However, the evenness index yielded a consistent decrease with increase in altitude because of the dominance of few species at high altitudes. Non-metric multidimensional scaling identified two major axes for the moth assemblage on Mount Jirisan. The correlations between the axes and variables demonstrated that the first axis was strongly correlated with altitude and aspect and the second axis with forest and site location.

INTRODUCTION

Mountains are found on all continents. High altitude ecosystems on mountains differ from all other ecosystems as the environment at high altitudes is uniquely harsh (Mani, 1990). Mountain habitats are spatially and structurally complex when trees or larger shrubs form part of the landscape, producing a mosaic of different habitat types with their own particular vegetation and/or microclimate (Haslett, 1997; Hodkinson, 2005). Utilization of these mosaic patches by different plants and animals may reflect more their specific life history strategies and ability to exploit a particular type of habitat than the total taxonomic diversity present at a particular altitude (Haslett, 1997; Hodkinson, 2005).

Patterns in the altitudinal distribution of species richness have frequently been cited as compelling evidence for hypotheses that propose associations with productivity and ambient energy, as well as past and current climates, since these factors vary with altitude (Rahbek, 2005). Two patterns in the altitudinal distribution of species richness are frequently observed (Rahbek, 2005). The first is a monotonic decrease with altitude. This is expected if resource limitation and thermal constraints govern species diversity (Fiedler & Beck, 2008). The second is that the pattern of species richness is hump-shaped, the mid-domain effect (Colwell & Lees, 2000). This pattern is expected if the geometric constraints on habitat areas change with altitude. Lomolino (2001) indicates that peaks in diversity at intermediate levels along an incline correspond to points where the combined effects of many environmental factors and associated processes promote the co-occurrence of many species. Additionally, several insect groups demonstrate no clear altitudinal trends. For example, grasshoppers on a Mediterranean mountain (Claridge & Singrao, 1978) and hemipteran insects in Indonesian tropical rainforests (Casson & Hodkinson, 1991) exhibit no clear altitudinal trends (Hodkinson, 2005). Therefore, it appears that the changes in species richness with altitude may be determined by more complicated mechanisms than previously believed.

Mount Jirisan National Park (highest peak: 1915 m, area: 440.517 km^2) includes the highest mountain on the mainland of South Korea. The annual average temperature is 12–13°C and annual precipitation is 1,200 mm, mostly falling in summer. The vegetation is divided into three main zones: subalpine (> 1,400 m), cool temperate (400–1,400 m) and warm temperate (200–300 m on southern aspects) (Yim, 1977). The subalpine zone is characterized by coniferous (*Abies koreana* Wilson, *Abies nephrolepisv* Maximowicz, *Picea jezoensis* (Sieb. & Zucc.) Carriere, *Pinus koraiensis* Sieb. & Zucc., *Taxas cuspidate* Sieb. & Zucc.) and deciduous (*Betula ermani* Chamisso, *B. costata* Trautvetter, *Quercus mongolica* Fischer, *Rhododendron schlippenbachii* Maxim. var. *schlippenbachii*) trees. Below the subalpine zone, the forest consists mainly of deciduous trees, such as *Quercus mongolica*, *Quercus serrata* Thunberg, *Carpinus laxiflora* (Sieb. & Zucc.) Blume, *C. tschonoskii* Maxim., *Quercus aliena* Blume and *Quercus variabilis* Blume. Trees such as *Pinus densiflora* Sieb. & Zucc., *Cornus controversa* Hemsley, *Zelkova serrata* (Thunberg) Makino and *Fraxinux mandshurica* Ruprecht commonly occur on ridges and in valleys at low altitudes. The mountain range runs 34 km east to west and 26 km north to south in the southwestern part of Korea and is a barrier to dispersal for many species. Its geographic location and difference in altitude from the majority of the mainland have facilitated many studies on the altitudinal distribution of species richness.

Studies on the patterns in the altitudinal distribution in species richness in Mount Jirisan National Park have

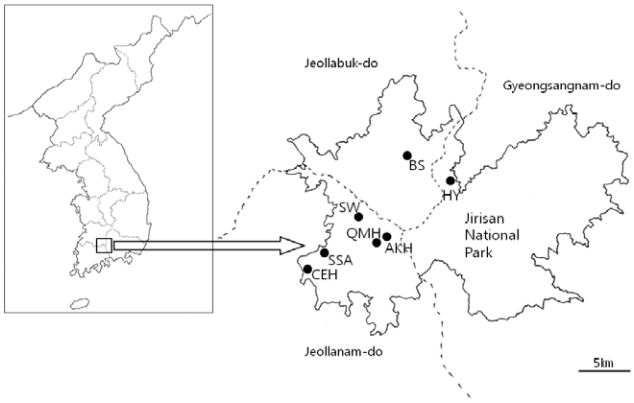

Fig. 1. Location of Mt. Jirisan National Park in South Korea and of the seven sites sampled in the National Park.

revealed it mostly either decreases monotonically or is hump-shaped. Namkung et al. (1972) record a monotonic decrease in spider species richness with increasing altitude over the range of 600 to 1750 m. Lee et al. (2008) compared communities of breeding birds and found that bird species richness and density were higher at low than at high altitudes. However, the species richness of millipedes is highest at middle altitudes (700 m) (Lim et al., 1992) as is that of soil microarthropods and pseudoscorpions, which peak at 700 and 900 m, respectively (Hong et al., 1996, 1997). Similarly, the distribution with altitude of stone fly species richness (Plecoptera) is also hump-shaped with a peak at 750 m (Ra et al., 1991).

This study sought to determine the altitudinal distribution of moths in Mount Jirisan National Park and the influence of altitude on moth species richness and abundance.

MATERIAL AND METHODS

Study sites

Seven sites in the Mount Jirisan National Park in South Korea were sampled in this study (Fig. 1, Table 1). These sites were selected based on accessibility from the lowest CEH (295 m) to the highest altitude QMH (1372 m). Of the seven sites, three (CEH, AKH, QMH) were Korea Long-Term Ecological Research sites. Altitudinal area (ha) data for Mount Jirisan National Park was obtained from the Korea Forest Research Institute (Seoul, Korea).

Vegetation at the sites was categorized as either conifer-dominant or deciduous-dominant. The vegetation at CEH consisted mainly of pine trees and at AKH mainly of *Abies koreana*. SSA, BS, HY, SW and QMH were covered with diversity of hardwood deciduous trees with little understory vegetation beneath a closed canopy. These seven sites were also designated as either riparian or upland, depending on their proximity to streams. BS, SSA, SW and AKH were designated riparian sites and CEH, HY and QMH upland sites. Two sites (CEH, SSA) were located on southern aspects and the remaining sites on northern aspects.

Moth data and sampling

The Lepidopteran species targeted included the moth families traditionally falling under the category of Macrolepidoptera (Kristensen & Skalski, 1999), plus two more readily identifiable families of Microlepidoptera (Limacodidae, Thyrididae). A total of 8,706 individuals belonging to 664 species were identified. Eighteen families were represented in the collections by the following numbers of species: Arctiidae (22), Bombycidae (3), Brahmaeidae (1), Cyclidiidae (1), Drepanidae (24), Endromidae (1), Epiplemidae (2), Geometridae (214), Lasiocampidae (9), Limacodidae (10), Lymantriidae (20), Noctuidae (285), Nolidae (4), Notodontidae (46), Saturniidae (2), Sphingidae (16), Thyrididae (3) and Uraniidae (1). See Appendix 1 for species list.

A light trap consisting of a 22-watt ultraviolet light powered by a 12 V battery (BioQuip Co., USA) was used to collect insects at each site. Moths were sampled once a month from May to October in 2007 and 2008. To avoid the effect of weather or moonlight on moth catches by each trap, the moths were sampled simultaneously at all seven sites. Moth sampling continued for six hours after dusk. Moths were identified to species and are preserved in a collection at Mokpo National University, South Korea.

Data analysis

The catches of moths for the two years were pooled. Species richness (total number of species), abundance (total number of individuals), Simpson's diversity index (D) and the Shannon evenness index (E) were calculated for each site (altitude). Simpson's diversity index calculates the probability of any two individuals drawn at random from an infinitely large community belonging to the same species (Magurran, 2003). The Shannon evenness index is H'/(ln S) where H' is the Shannon diversity index and (ln S) is the log-transformed species richness. Altitude, altitudinal area, species richness, and abundance were log-transformed prior to analysis.

Relationships among altitude, altitudinal area, species richness, abundance, diversity and moth evenness were investigated. First, correlation analyses between altitude, altitudinal area and four dependent variables (species richness, abundance, Simpson's D and the Shannon evenness index) were carried out to determine any significant relationships among the variables. Second, a piecewise regression was carried out with a break-point at 760 m (UCLA). The two models were combined into a single model by creating four new variables. Two of the new

TABLE 1. Description of the sites sampled in Mount Jirisan National Park, South Korea. Location of the sites within the park is indicated in Fig.1.

Site	Altitude (m)	Site location	Forest	Aspect
CEH	295	upland	Conifer	South
BS	518	riparian	Mixed deciduous	North
SSA	660	riparian	Mixed deciduous	South
HY	760	upland	Mixed deciduous	North
SW	923	riparian	Mixed deciduous	North
AKH	1320	riparian	Conifer	North
QMH	1372	upland	Mixed deciduous	North

TABLE 2. Summary of the species richness (total number of species), abundance (total number of individuals), Simpson's diversity (D) and Shannon's evenness (E) indices recorded at each of the sites.

Site	Species richness	Abundance	Diversity (1-D)	Evenness (E)
CEH	159	660	0.97	0.846
BS	314	1215	0.99	0.899
SSA	268	1396	0.98	0.827
HY	355	1615	0.99	0.870
SW	230	1330	0.95	0.768
AKH	161	1269	0.93	0.732
QMH	143	1221	0.86	0.638

variables, alt1 and alt2, represent the effect of altitude on species richness above and below 760 m, respectively.

alt1 = (altitude – 760), if (altitude ≥ 760) alti1 = 0

alt2 = (altitude – 760), if (altitude < 760) alt2 = 0

The other two new variables, int1 and int2, represent the intercepts below and above 760 m, respectively.

int1 = 1, if (altitude ≥ 760) int1 = 0

int2 = 1, if (altitude < 760) int2 = 0

All correlations and piecewise regression analyses were carried out using SPSS (SPSS Inc., 2006).

The relationship between moth assemblage and site location (distance from site to site) was examined using the Mantel test. The Mantel test was undertaken with an initial matrix of seven sites and 402 species (after deleting species unique to particular sites), and using a second matrix of distances (in km) between sites. Distance measures for the first and second matrices were Sørensen (Bray-Curtis) and Euclidean distances, respectively. A Monte Carlo randomization test with 999 runs was applied using PC-ORD (ver. 5.17; McCune & Mefford, 2006).

Non-metric multidimensional scaling (NMDS), an ordination method, was used to compare differences in composition and abundance among samples (McCune & Grace, 2002). The NMDS procedure was initiated following data transformation, which included the deletion of singletons (species occurring only at one altitude) and log-transformations after adding one to the number caught of each species. A data matrix with seven sampling units and 402 species was produced. The second matrix was created based on four characters, altitude, forest type (conifer vs. mixed deciduous forest), site location (riparian vs. upland), and aspect (northern vs. southern). The significances of the clusters in the NMDS space were calculated using the multi-response permutation procedure (MRPP), which tests the hypothesis of no difference between two a priori defined groups of entities, in PC-ORD (version 5.17; McCune & Mefford, 2006).

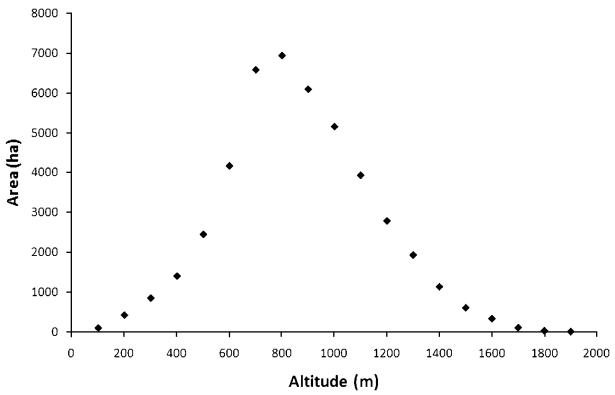

Fig. 2. The relationship between altitudinal area and altitude in Mt. Jirisan National Park, South Korea.

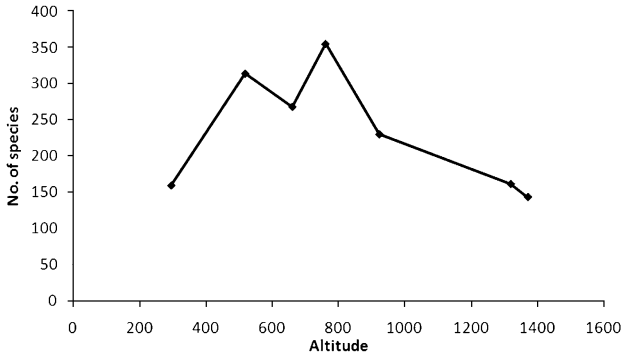

Fig. 3. Hump-shaped relationship between species richness (total number of moth species collected in 2007 and 2008) and altitude in Mt. Jirisan National Park, South Korea.

RESULTS

The species richness, abundance, diversity and evenness results are detailed in Table 2. The distribution of these variables relative to altitude has a hump-shaped pattern, with the exception of the evenness index (Figs 3–6). There were no significant correlations between species richness, abundance or diversity and altitude. However, the inverse correlation between altitude and evenness is significant (Pearson's $r = –0.766$, $P = 0.045$).

The pattern in the distribution of altitudinal area (ha) with increasing altitude is hump-shaped (Fig. 2). Altitudinal area is significantly correlated with species richness (Spearman $\rho = 0.793$, $P = 0.033$) and abundance (Spearman $\rho = 0.847$, $P = 0.016$), but not with diversity or evenness. Regression analysis of altitude and altitudinal area revealed a significant relationship between species richness, altitude ($t = 5.01$, $P = 0.007$) and altitudinal area ($t = –3.60$, $P = 0.023$). In addition, abundance is significantly related to altitudinal area ($t = 5.41$, $P = 0.006$) and evenness to altitude ($t = –4.47$, $P = 0.011$) (Table 3).

The piecewise regression between log-transformed species and individuals in the catches below and above 760 m (breakpoint) revealed that species richness is strongly affected by the variables studied above (alt2 $t = –0.34$, $p < 0.05$), while species abundance was strongly affected by the variables studied both below (alt1 $t = 5.04$, $p < 0.05$) and above the breakpoint (alt2 $t = –7.53$, $p < 0.05$) (Table 4). The relationship between the diversity index and the variables studied is not significant.

TABLE 3. Regression analysis of the abundance, species richness and evenness of moths, altitude and altitudinal area. Simpson's diversity D is not significantly associated with any of the independent variables. * $P < 0.5$, ** $P < 0.05$.

Dependent variable	R^2	F	Independent variable	
			Altitude	Altitudinal area
Abundance	0.93	27.06*		5.41**
Species richness	0.87	13.41*	–3.6*	5.01**
Evenness	0.83	10.03*	–4.47*	

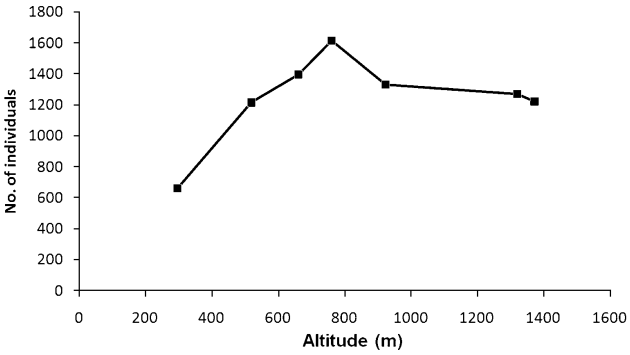

Fig. 4. Hump-shaped relationship between abundance (total number of moths collected in 2007 and 2008) and altitude in Mt. Jirisan National Park, South Korea.

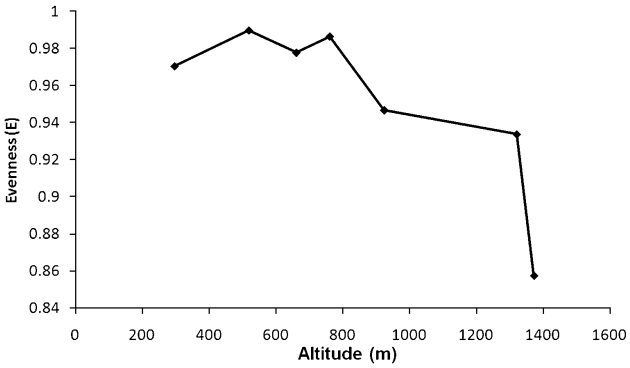

Fig. 6. Monotonic decrease in the relationship between the evenness index of the moths collected in 2007 and 2008 and altitude in Mt. Jirisan National Park, South Korea.

Moth assemblages did not vary according to the distances between sites. The Mantel test revealed that the null hypothesis (no relationship between the site-to-site distance and moth assemblages) was not rejected (r = 0.16, P = 0.25). Non-metric multidimensional scaling identified two major axes for moth assemblage on Mount Jirisan (final stress = 0.006, Fig. 7). The correlations between the two axes and the four variables from the second matrix demonstrated that the first axis is strongly correlated with altitude (r = 0.95) and aspect (r = 0.71). The second axis, on the other hand, is negatively correlated with forest (r = –0.51) and site location (r = –0.47). The MRPP test did not reject the hypothesis of no relationship between groups for the variables forest (A = –0.01, P = 0.53), site location (A = –0.03, P = 0.89) and aspect (A = 0.01, P = 0.34).

DISCUSSION

Moth assemblages in Mount Jirisan National Park are primarily affected by altitude and altitudinal area. Moth assemblages at different altitudes are not strongly affected by the distance between sites (Mantel test r = 0.16, P = 0.25). In addition, NMS ordination revealed that the first axis is strongly correlated with altitude (r = 0.95) and aspect (r = 0.71). This suggests that factors related to altitude and aspect affect the species richness and abundances of moths in Mount Jirisan National Park. As altitude increases, many conditions such as temperature, precipitation, relative humidity, solar radiation, wind and soil conditions change (Körner, 2007; Fiedler & Beck, 2008). For example, temperature is altitude-specific and decreases by an average of 0.65°C for every 100 m of altitude. Other climatic factors (e.g., precipitation, humidity, wind speed, solar radiation) and geophysical characteristics are also collectively altered by altitude and aspect. Organisms respond to these integrative indicators of environmental change that depend on a multitude of physical and chemical factors along altitudinal gradients (Fiedler & Beck, 2008; Chen et al., 2009).

The distribution of species richness and abundance of moths relative to altitude in Mount Jirisan National Park is hump-shaped with the peak at 760 m (Figs 3–4). Species richness strongly decreased above 760 m and species

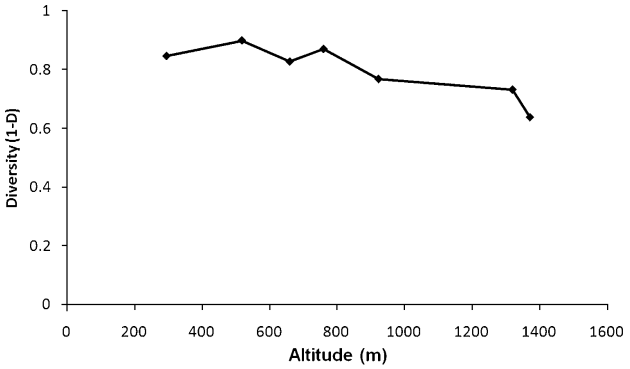

Fig. 5. Relationship between species diversity index of the moths collected in 2007 and 2008 and altitude in Mt. Jirisan National Park, South Korea.

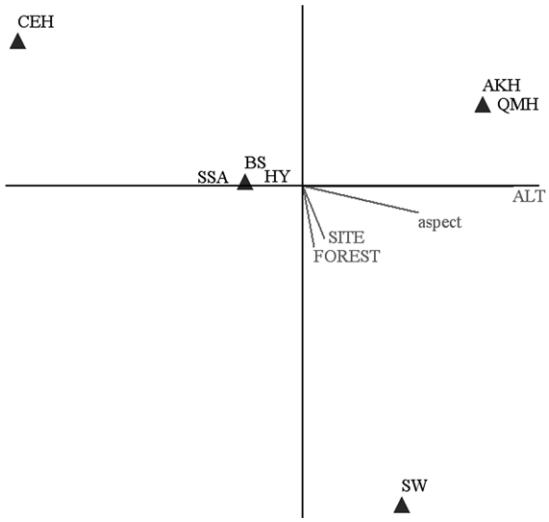

Fig. 7. Non-metric multidimensional scaling graph of 7 sites and 402 moth assemblages in Mount Jirisan National Park (final stress = 0.006, 348 degree rotated). Dark triangles indicate sites and if bearing designations for two or more sites overlapping between sites. Each site is identified in Fig 1. Lines indicate the degree of correlation between moth assemblages and variables. Abbreviations and explanation: site (site location, riparian vs. upland), alt (altitude), forest (forest type, conifer vs. deciduous) and aspect (north vs. south).

TABLE 4. The results of a piecewise regression analysis of species richness and abundance relative to altitude. Variables, alt1 and alt2, represent the effect of altitude on species richness above and below 760 m and int1 and int2 the intercepts below and above 760 m. * $P < 0.5$, ** $P < 0.05$.

Dependent variables	R_{adj}^2	ANOVA *F*-ratio	Independent variables				
			Alt	Alt1	Alt2	Int1	Int2
Log Species	0.83	10.98	3.78*		–3.64*		
Log Individuals	0.88	15.70		5.04*			
	0.98	88.69	16.00**		–7.53*		–3.34*

abundance increased up to 760 m and decreased above it. The pattern in the distribution of altitudinal area relative to altitude for Mount Jirisan is also hump-shaped. Regression analyses revealed that altitudinal area is closely related to abundance and species richness, suggesting a close species-area relationship (MacArthur & Wilson, 1967).

The hump-shaped pattern in the altitudinal distribution of moths is similar to that recorded for other taxa on Mount Jirisan, including millipedes (Lim et al., 1992), microarthropods (Hong et al., 1996), soil pseudoscorpions (Hong et al., 1997) and stoneflies (Ra et al., 1991), although their peaks vary from 700 to 900 m. Fiedler & Beck (2008) record peaks of from 1000 to 2000 m for many groups and commented on the range in the values. The difference in the peak values for Korean and other mountains is likely to be a result of differences in the heights of the mountains and their latitudinal position (e.g. tropic, temperate, arctic). Compared to several high mountains in tropical areas, which far exceed 2000 m a.s.l. (e.g., Papua New Guinea, Hebert, 1980; Andean mountains, Brehm & Fiedler, 2003; Mt. Kilimanjaro, Axmacher et al., 2004), Mount Jirisan National Park is relatively low, with a height of less than 2000 m and is located in a temperate zone (latitude 35°N).

Unlike the hump-shaped patterns for the relationships between species richness and abundance relative to altitude recorded in Mount Jirisan National Park, the relationship for evenness consistently decreased with altitude (Fig. 6). Shannon evenness is a measure of heterogeneity that considers the degree of evenness in species abundances in terms of the ratio of observed diversity to maximum diversity (Magurran, 2003). The consistent decrease in evenness recorded in the present study suggests that the observed diversity decreased relative to the maximum diversity. Insect communities at high altitudes are characterized by few species and a greater abundance of individuals (Mani, 1968; Hebert, 1980; Brehm & Fiedler, 2003). Due to the generally extreme conditions at high altitudes, a high degree of inter-specific integration with concomitant community independence and isolation is one of the peculiar characteristics of high altitude insect communities (Mani, 1968). For example, Brehm & Fiedler (2003) suggest that the relatively high diversity of larentiine moths (Geometridae) in the Andean mountains may result from low predation pressure at high altitudes. Six species of which more than 170 individuals were caught (about 20% of total catch of 8,706 individuals) included 970 *Hydriollodes morosa* (Butler, 1879) (Noctuidae), 589 *Lemyra boghaika* Tsistjakov & Kishida, 1994 (Arctiidae), 336 *Odontopera arida* (Butler, 1878), 320 *Alcis angulifera* (Butler, 1878), 190 *Idaea biselata* (Hufnagel, 1767) (Geometridae) and 173 *Drymonia dodonides* (Staudinger, 1887) (Notodontidae). Among these species, the three most abundant were found primarily at high altitudes (SW, AKH, QMH).

Comparative studies of altitudinal gradients are needed to identify the consistent patterns in scale effects, which can then be used to study the effects of contemporary climate, history and stochastic factors (Rahbek, 2005). Although the pattern in the altitudinal distribution of moths on Mount Jirisan is hump-shaped those for other taxa (e.g. spiders, breeding birds) present on the same mountain are not. While the underlying mechanisms determining the different altitudinal patterns were not examined in the present study; that there are different taxa dependent altitudinal patterns (monotonic decrease vs. hump-shaped) in species richness at the same locality, Mount Jirisan National Park, is intriguing.

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APPENDIX 1. List of the moth species sampled at Mount Jirisan National Park from 2007 to 2008. See Fig. 1. for the location and abbreviations of the sites.

Family / scientific name	CHE	BS	SSA	HY	SW	AKH	QMH	TOTAL
LIMACODIDAE								
Austrapoda dentata (Oberthür, 1879)	4		1			1		6
Ceratonema christophi (Graeser, 1888)	1	3	1	11	5	4		25
Heterogenea asella (Denis & Schiffermüller, 1775)					1			1
Latoia hilarata (Staudinger, 1887)					1			1
Latoia sinica (Moore, 1877)	5	10	16	3	1	3	2	40
Microleon longipalpis Butler, 1885	1	2		1	1			5
Narosa fulgens (Leech, 1889)	2							2
Phrixolepia sericea Butler, 1877		3		2			1	6
Rhamnosa angulata Fixsen, 1887	5	6	1		3			15
Thosea coreana Okano & Pak, 1964		1		8				9
DREPANIDAE								
Agnidra scabiosa fixseni (Bryk, 1948)	7	4	1	1			6	19
Auzata minuta nigrata Park & Shin, 1981		2	4	9	4			19
Auzata superba (Butler, 1878)		2	1	2	5	1	1	12
Callidrepana patrana (Moore, [1866])	2	3	1	2	4			12
Demopsestis punctigera (Butler, 1885)							1	1
Deroca inconclusa (Walker, 1856)	2		3					5
Ditrigona conflexaria (Walker, 1861)					2			2
Ditrigona komarovi (Kurentzov, 1935)		1	7	6				14
Ditrigona virgo (Butler, 1878)			2		1			3
Drepana curvatula acuta Butler, 1881				1	1			2
Epipsestis nikkoensis (Matsumura, 1921)					1			1
Epipsestis ornata obscurata Tshistjakov, 1987						1		1
Euparyphasma maxima (Leech, 1889)	1	1	4		1	2	1	10
Habrosyne aurorina (Butler, 1881)	2	19		20	10	22		73
Habrosyne violacea (Fixsen, 1887)					1			1
Nordstromia japonica (Moore, 1877)	1	17	39	5	24	7	4	97

Oreta pulchripes Butler, 1871	6	4	8		4	5		27
Parapsestis argenteopicta (Oberthür, 1879)			6	12				18
Pseudalbara parvula (Leech, 1890)		3		2	1			6
Sabra harpagula olivacea (Inoue, 1958)						2	1	3
Tethea ampliata (Butler, 1878)	1	13	27	4	10	2	4	61
Tethea consimilis (Warren, 1912)		2	1	12				15
Tethea octogesima (Butler, 1878)	1				1			2
Thyatira batis (Linnaeus, 1758)				2				2
CYCLIDIIDAE								
Cyclidia substigmaria (Hübner, 1831)		1			1			2
THYRIDIDAE								
Rhodoneura erecta (Leech, 1889)		1	2					3
Rhodoneura vittula Guenée, 1877			4	1				5
Striglina fixseni Alphéraky, 1897			3					3
GEOMETRIDAE								
Abraxas latifasciata Warren, 1894		1			2	1	1	5
Abraxas niphonibia Wehrli, 1935	1		2	6		1		10
Abraxas sylvata (Scopoli, 1762)		5	3	1				9
Acasis viretata (Hübner, 1799)					6		1	7
Aethalura ignobilis (Butler, 1878)		19	2	7	15	2	1	46
Aethalura nanaria (Staudinger, 1897)							1	1
Agaraeus parva (Hedemann, 1881)					2			2
Alcis angulifera (Butler, 1878)	43	28	101	87	27	25	9	320
Alcis picata (Butler, 1881)						1	1	2
Alsophila japonensis (Warren, 1894)						1	1	2
Amraica superans (Butler, 1878)		2	1	5	1			9
Angerona prunaria (Linnaeus, 1758)	5	7	2	18	1	2		35
Anticypella diffusaria (Leech, 1897)			1				11	12
Antipercnia albinigrata (Warren, 1896)	3							3
Aperia syringaria (Linnaeus, 1758)				2	1			3
Arichanna albomacularia Leech, 1891			4	3	8	3	3	21
Arichanna melanaria (Linnaeus, 1758)	9	4	1		3		2	19
Asthena amurensis (Staudinger, 1897)				1				1
Asthena corculina Butler, 1878		2		22		2	8	34
Asthena nymphaeata (Staudinger, 1897)		7	4	8	9			28
Astygisa chlorophnodes (Wehrli, 1936)			1					1
Astygisa morosa (Butler, 1881)				2				2
Biston panterinaria (Bremer & Grey, 1853)	1							1
Biston regalis (Moore, 1888)			1	1	1			3
Brabira artemidora (Oberthür, 1884)				2	1			3
Bupalus vestalis Staudinger, 1897		3	1	5				9
Cabera griseolimbata (Oberthür, 1879)		5	24	6	3			38
Cabera purus (Butler, 1878)		7	1	5				13
Cabera schaefferi (Bremer, 1864)		4						4
Calicha nooraria (Bremer, 1864)			2					2
Calleuoype whitelyi (Butler, 1878)		1	9	8	4		1	23
Carige cruciplaga (Walker, 1861)		1						1
Cepphis advenaria (Hübner, 1790)				1			1	2
Chiasmia defixaria (Walker, 1861)		4	1	3	1			9
Chiasmia hebesata (Walker, 1861)		6			1			7
Chlorissa amphitritaria (Oberthür, 1879)				1				1
Chlorissa anadema (Prout, 1930)	2	1						3
Chlorissa macrotyro Inoue, 1954				1				1
Chlorissa obliterata (Walker, 1863)				1				1
Chloroclystis subcinctata Prout, 1915				1		1		2
Chloroclystis v-ata (Haworth, 1809)		4	1	2		1		8
Chloromachia infracta (Wileman, 1911)				1				1
Cleora insolita (Butler, 1878)		1	4	6	9	9	7	36
Comibaena amoenaria (Oberthür, 1880)	1							1
Comibaena delicatior (Warren, 1897)		3	1		1			5

Comibaena procumbaria (Pryer, 1877)		1	1	1				3
Comibaena tancrei Graeser, 1889		1						1
Comostola subtiliaria (Bremer, 1864)		2		1	1	1		5
Corymica pryeri (Butler, 1878)	1	4	1					6
Ctenognophos grandinaria (Motschulsky, 1860)		1						1
Deileptenia ribeata (Clerck, 1759)						33	3	36
Devenilia corearia (Leech, 1891)		1						1
Dindica virescens (Butler, 1878)		2	8	6	18	4	2	40
Duliophyle majuscularia (Leech, 1899)			2	6	1	1		10
Dysstroma cinereata japonica (Heydemann, 1929)				1		7	12	20
Ecliptopera capitata (Herrich-Schäffer, 1839)			1	2	1			4
Ecliptopera umbrosaria (Motschulsky, 1861)		4	1	14				19
Ecpetelia albifrontaria (Leech, 1891)			1		1			2
Ectropis aigneri Prout, 1930		3	8	3		1		15
Ectropis crepuscularia (Denis & Schiffermüller, 1775)	1	12	8	18	13	22	11	85
Ectropis excellens (Butler, 1884)		8		5			2	15
Ectropis obliqua (Prout, 1915)				1				1
Eilicrinia nuptaria (Bremer, 1884)			1	2				3
Eilicrinia parvula Wehrli, 1940				1				1
Eilicrinia wehrlii Djakonov, 1933		1		1	1			3
Electrophaes corylata (Thunberg, 1792)				3				3
Endropiodes abjectus (Butler, 1879)			1	1				2
Endropiodes indictinaria (Bremer, 1864)				2	5		1	8
Ennomos autumnaria (Werneburg, 1859)		2	2					4
Epholca arenosa (Butler, 1878)		2	1	2				5
Epirrhoe supergressa (Butler, 1878)				2			1	3
Erebomorpha fulguraria Walker, 1860			3	15	4	4	1	27
Eulithis fabiolaria (Oberthür, 1884)			1	1	1			3
Eulithis ledereri (Bremer, 1864)			1	1				2
Euphyia cinerearia (Butler, 1878)		2		1			5	8
Eupithecia abietaria debrunneata Straudinger, 1897					1	1		2
Eupithecia clavifera Inoue, 1995					1			1
Eupithecia gigantea Staudinger, 1897						1		1
Eupithecia homogrammata Dietze, 1908				4				4
Eupithecia interpunctaria Inoue, 1979		1						1
Eupithecia masuii Inoue, 1980	4							4
Eupithecia okadai Inoue, 1958					1			1
Eupithecia signigera Butler, 1879		1					6	7
Eupithecia spadix Inoue, 1955		3	2		1			6
Eupithecia subbreviata Staudinger, 1897						28		28
Eupithecia supercastigata Inoue, 1958					2			2
Eupithecia tripunctaria (Herrich-Schäffer, 1852)				2				2
Eustroma aerosum (Butler, 1878)		12	8	26	37	8	1	92
Eustroma melancholicum (Butler, 1878)		4	3	6	11	23	2	49
Evecliptopera decurrens (Moore, 1888)				8				8
Fascellina chromataria Walker, 1868	2	2		2				6
Gandaritis agnes (Butler, 1878)		4	3	3	1			11
Gandaritis fixseni (Bremer, 1864)	1	1	4	4				10
Garaeus mirandus (Butler, 1881)						8		8
Geometra dieckmanni Graeser, 1889		2	11			1		14
Geometra sponsariai (Bremer, 1864)			1	1	2			4
Geometra valida Felder & Rogenhofer, 1875			5		3			8
Gymnoscelis deleta (Hampson, 1891)			1					1
Heterolocha aristonaria (Walker, 1860)			1					1
Heterophleps confusa (Wileman, 1911)				2	2			4
Heterostegane hyriaria Warren, 1894	2	9	1					12
Heterothera postalbida (Wileman, 1911)	69	17	13	14	2	5	2	122
Heterothera quadrifulta (Prout, 1938)						10	11	21
Horisme stratata (Wileman, 1911)				1				1
Hydrelia adesma Prout, 1930		2		8				10
Hydrelia flammeolaria (Hufnagel, 1767)			1		1			2

Hydrelia nisaria (Christoph, 1881)			2	2				4
Hypomecis akiba (Inoue, 1963)					1			1
Hypomecis lunifera (Butler, 1879)			1		1	2	1	5
Hypomecis punctinalis (Scopoli, 1763)		8		5		1		14
Hypomecis roboraria ([Denis & Schiffermüller], 1775)		15	41	3				59
Hysterura declinans (Staudinger, 1897)				1	7	16		24
Idaea auricruda (Butler, 1879)	13	6	13	3				35
Idaea biselata (Hufnagel, 1767)	6	45	20	41	39	29	10	190
Idaea denudaria (Prout, 1913)	1							1
Idaea effusaria (Christoph, 1881)	1							1
Idaea impexa (Butler, 1879)		1						1
Idaea nitidata (Herrich-Schäffer, 1861)		7	1					8
Idiotephria evanescens (Staudinger, 1897)						2		2
Isturgia vapulata (Butler, 1879)		1						1
Jankowskia fuscaria (Leech, 1891)	4	3						7
Jankowskia pseudathleta (Sato, 1980)	3	1		1	3			8
Jodis angulata Inoue, 1961						1		1
Jodis lactearia (Linnaeus, 1758)	5		1				2	8
Laciniodes unistirpis (Butler, 1878)				6		1		7
Lampropteryx minna (Butler, 1881)				1		1	2	4
Leptostegna tenerata Christoph, 1881		1		8	8			17
Ligdia japonaria Leech, 1897			3	1	2			6
Lomographa bimaculata (Fabricius, 1775)	4	25	6	16	13	3	1	68
Lomographa nivea (Djakonov, 1936)		1		3				4
Lomographa pulverata (Bang-Haas, 1910)				4				4
Lomographa subspersata (Wehrli, 1939)				5				5
Lomographa temerata ([Denis & Schiffermüller], 1775)		2	1	2	13	25	12	55
Macaria liturata (Clerck, 1759)		16		4		49	9	78
Macaria notata (Linnaeus, 1758)							3	3
Megabiston plumosaria (Leech, 1891)		1	1					2
Melanthia procellatus (Denis & Schiffermüller, 1775)				1	2			3
Menophra senilis (Butler, 1878)	1	11	3	22	5	13	7	62
Microcalicha invenustaria Leech, 1897		2						2
Microcalicha seolagensis Beljaev & Park, 1998		1		6				7
Microlygris complicata (Butler, 1897)	2			1				3
Myrioblephara cilicornaria (Püngeler, 1903)					1	2	2	5
Myrteta angelica Butler, 1881					2	6		8
Myrteta punctata (Warren, 1894)		1						1
Ninodes splendens (Butler, 1878)	1	5	4	2				12
Ninodes watanabei Inoue, 1976	1	1	2					4
Nothomiza aureolaria Inoue, 1982	5	3	9	2	3	3		25
Obeidia tigrata (Guenée, 1857)				1			1	2
Ocoelophora lentiginosaria (Leech, 1891)					2			2
Odontopera arida (Butler, 1878)			1	4	12	92	227	336
Orthocabera sericea Butler, 1879	2	15	35	24	15	25	18	134
Orthocabera tinagmaria (Guenée, 1857)					1			1
Orthonama obstipata (Fabricius, 1794)		1						1
Ourapteryx koreana Inoue, 1993	7	7	8	22		4		48
Ourapteryx subpunctaria Leech, 1891			3	1	1			5
Oxymacaria normata (Alphéraky, 1892)				2				2
Pachyodes superans (Butler, 1888)		1	1		1		1	4
Parabapta clarissa (Butler, 1878)		10	12	9	3			34
Paradarisa consonaria (Hübner, 1799)		1		3	16		20	40
Parapercnia giraffata (Guenee, 1857)		1						1
Pareclipsis gracilis (Butler, 1879)	3	6	4	2	1		1	17
Parectropis nigrosparsa (Wileman & South, 1917)			4	2	1			7
Parectropis similaria (Hübner, 1767)		2	3	4	4	6	10	29
Perizoma saxeum (Wileman, 1911)						2	1	3
Photoscotosia atrostrigata (Bremer, 1864)				1			1	2
Phthonandria atrilineata (Butler, 1881)		1						1
Phthonandria emaria (Bremer, 1864)		1		5				6

Phthonosema tendinosaria (Bremer, 1864)	1	1						2
Plagodis dolabraria (Linnaeus, 1767)	1	1	6	1	4	3	4	20
Plagodis pulveraria (Linnaeus, 1758)	8	4	5	3	5	6	24	55
Polymixinia appositaria (Leech, 1891)	1	2		2				5
Problepsis minuta Inoue, 1958			1					1
Problepsis plagiata (Butler, 1881)		1						1
Protoboarmia simpliciaria (Leech, 1897)	3			4				7
Pseudepione magnaria (Wileman, 1911)	2		1					3
Pseuderannis lomozemia (Prout, 1930)	1	11				2		14
Psyra boarmiata (Graeser, 1892)		1		1	12	3	3	20
Pylargosceles steganioides (Butler, 1878)		3						3
Racotis petrosa (Butler, 1879)		2	3	4				9
Ramobia mediodivisa Inoue, 1953		2	1	3	2			8
Rhynchobapta cervinaria (Moore, 1888)	4	6	3	2	9	1	2	27
Rikios atoagrisea (Butler, 1878)	35	8	4	12		9	3	71
Satoblephara parvularia parvularia (Leech, 1891)			2					2
Scionomia anomala anomala (Butler, 1881)						1	1	2
Scionomia mendica mendica (Butler, 1879)					3			3
Scopula apicipunctata (Christoph, 1881)				3				3
Scopula confusa (Butler, 1878)				1				1
Scopula ignobilis (Warren, 1901)	1	1	3	2				7
Scopula longicerata Inoue, 1955		3						3
Scopula modicaria (Leech, 1897)				2				2
Scopula nigropunctata (Hufnagel, 1767)	4			1				5
Scopula nupta (Butler, 1878)			2					2
Scopula semiignobilis Inoue, 1942	6							6
Scopula superior (Butler, 1878)	3	3	2	1			3	12
Selenia sordidaria Leech, 1897			1		2			3
Selenia tetralunaria (Hufnagel, 1767)			2		1	2	3	8
Sibatania mactata (Felder & Rogenhofer, 1875)				1	2			3
Spilopera debilis (Butler, 1878)	3	5	18	12	44	22	8	112
Synegia hadassa (Butler, 1878)	1	1	2		2			6
Synegia limitatoides Inoue, 1982		1	2	1				4
Taeniophora unio (Oberthür, 1880)		1					1	2
Telenomeuta punctimarginaria (Leech, 1891)				1				1
Thinopteryx crocoptera (Kollar, 1844)	1	1						2
Timandra comptaria Walker, 1863		5	1	5	1			12
Timandromorpha enervata Inoue, 1944			1					1
Tristrophis veneris (Butler, 1878)						2		2
Tyloptera bella bella (Butler, 1878)				7	1			8
Xandrames dholaria Moore, 1868	5	3	13	8	10			39
Xanthorhoe abraxina (Butler, 1879)							6	6
Xanthorhoe biriviata (Borkhausen, 1794)				1	4			5
Xanthorhoe hortensiaria (Graeser , 1889)				6				6
Xanthorhoe muscicapata (Christoph, 1881)		4	1	9	6			20
Xerodes albonotaria (Bremer, 1864)	7	6	6	7	8	2	1	37
Xerodes rufescentaria (Motschulsky, [1861])				2				2
URANIIDAE								
Acropteris iphiata (Guenée, 1857)					1			1
EPIPLEMIDAE								
Epiplema moza (Butler, 1878)	4							4
Epiplema plagifera (Butler, 1881)	13	3	1	1				18
ENDROMIDAE								
Mirina christophi Staudinger, 1887				1	7	4		12
LASIOCAMPIDAE								
Bhima idiota (Graeser, 1888)			2					2
Dendrolimus spectabilis (Butler, 1877)	4							4
Dendrolimus superans (Butler, 1877)	6	3	11	5	1	9		35
Euthrix albomaculata (Bremer, 1861)			1					1
Euthrix laeta (Walker, 1855)				6				6
Gastropacha populifolia angustipennis (Walker, 1885)			2	1				3
Kunugia undans (Walker, 1855)		3	1	5				9

Odonestis pruni rufescens Kardakoff, 1928		2		3				5
Paralebeda plagifera Walker,1855	2		5	10	6	2		25
BOMBYCIDAE								
Bombyx mandarina (Moore, 1872)		5		3				8
Oberthueria caeca (Oberthür, 1880)					4		1	5
Rondotia menciana Moore, 1885		1						1
BRAHMAEIDAE								
Brahmaea certhia (Fabricius, 1793)				1	2		1	4
SATURNIIDAE								
Actias artemis (Butler & Grey, 1853)			5	2	1	1		9
Antheraea yamamai (Guérin-Méneville, 1861)			2					2
SPHINGIDAE								
Acosmeryx naga (Moore, [1858])		2		2	5	4	6	19
Ambulyx japonica Rothschild, 1894			1					1
Ampelophaga rubiginosa Bremer & Grey, [1852]		6	7	12	1	4	2	32
Callambulyx tatarinovii (Bremer & Grey, 1852)		1	1	5	2			9
Clanis bilineata (Walker, 1886)			1					1
Dolbina exacta Staudinger, 1892		1						1
Dolbina tancrei Staudinger, 1887						1		1
Kentochrysalia consimilis Rothschild & Jordan, 1887	2	4	11	22	35	10	6	90
Kentochrysalia sieversi Alphéraky, 1897							2	2
Marumba jankowskii (Oberthür, 1880)					3			3
Marumba maackii (Bremer, 1861)					5	2		7
Marumba spectabilis (Butler, 1875)			3					3
Marumba sperchius (Ménétriès, 1857)		2	2	2	1			7
Meganoton scribae (Austaut, 1911)		1		1				2
Phillosphingia dissimilis (Bremer, 1861)		1	1					2
Psilogramma increta (Walker, [1865])			1	1			1	3
NOTODONTIDAE								
Allodonta plebeja (Oberthür, 1881)						1		1
Clostera albosigma curtuloides Erschoff, 1870					1			1
Cnethodonta grisescens Staudinger, 1887		2	2	1	1	3	4	13
Drymonia dodonides Staudinger, 1887	2	15	38	14	15	52	37	173
Dudusa sphigiformis Moore, 1872		2		3				5
Ellida branickii (Oberthür, 1881)		3	3	1				7
Ellida viridimixta (Bremer, 1861)				4	2	3	2	11
Epodonta lineata (Oberthür, 1880)				1			1	2
Euhampsonia cristata (Butler, 1877)		1		1				2
Euhampsonia splendida (Oberthür, 1880)		1	3					4
Fentonia ocypete (Bremer, 1861)		2	1	1			2	6
Furcula sangacia (Moore, 1877)			1		1		1	3
Gangarides dharma Moore, 1866	1	1		8				10
Gonoclostera timoniorum (Bremer, 1861)				1				1
Harpyia umbrosa (Staudinger, 1892)		1				1		2
Hexafrenum leucodera (Staudinger, 1892)		1						1
Leucodonta bicoloria ([Denis & Schiffermüller], 1775)		1			3	3	4	11
Lophocosma atriplaga Staudinger, 1892	1	1	2	1	1		1	7
Lophontosia cuculus Staudinger, 1887		1	1	2				4
Lophontosia pryeri (Butler, 1879)				1				1
Micromelalopha flavomaculata Thistjakov, 1977	1	10		4				15
Micromelalopha troglodyta (Graeser, 1890)		1		2				3
Neodrymonia coreana Matsumura, 1922			1			1	1	3
Neodrymonia delia (Leech, 1889)	9	4	10	2	5		3	33
Neodrymonia marginalis (Matsumura, 1925)		1						1
Nerica davidi (Oberthür, 1881)				2				2
Notodonta dembowskii (Oberthür, 1879)					1			1
Peridea aliena (Staudinger, 1892)	1	2		1				4
Peridea elzet Kiriakoff, 1963		1	3	2	2			8
Peridea gigantea Butler, 1877		2	6	6	1	3	2	20
Phalera angustipennis Matsumura, 1919					1			1
Pheosiopsis cinerea (Butler, 1879)			5		1	12	10	28

Pterostoma sinicum Moore, 1877	1				1			2
Ptilodon hoegei (Graeser, 1888)					1	1		2
Ptilodon ladislai (Oberthür, 1879)			7	3	4		16	30
Ptilodon nohirae (Matsumura, 1920)				2	1	2		5
Semidonta biloba (Oberthür, 1880)		1	1	2	2		1	7
Shaka atrovittatus (Bremer, 1861)		1		3			1	5
Spatalia dives Oberthür, 1884		1	1	1		1		4
Spatalia doerriesi Graeser, 1888		1	2	4	1	1		9
Stauropus fagi persimilis Butler, 1897							2	2
*Syntypistis cyane*a (Leech, 1889)			2	2				4
Syntypistis subgeneris (Strand, 1915)			1		1			2
Togepteryx velutina (Oberthür, 1880)					3		9	12
Torigea straminea (Moore, 1877)				4				4
Wilemanus bidentatus ussuriensis (Püngeler, 1912)	1							1
LYMANTRIIDAE								
Arctornis album (Bremer, 1861)		11	17	1				29
Arctornis kumatai Inoue, 1956		5	5	2		2		14
Arctornis l-nigrum (Müller, 1764)		3		1				4
Calliteara argentata (Butler, 1881)			1					1
Calliteara lunulata (Butler, 1877)		1	2				4	7
Cifuna locuples Walker, 1855		1			1			2
Euproctis piperita Oberthür, 1880	2	2		2				6
Euproctis pulverea (Leech, 1888)	3	3	2	1		1		10
Euproctis similis (Fuessly, 1775)				2	1			3
Ilema eurydice (Butler, 1885)		5		11				16
Ilema jankowskii (Oberthür, 1884)		3						3
Ilema nachiensis (Marumo, 1917)	1	2	2	3		2		10
Ivela auripes (Butler, 1877)			4	1	2			7
Leucoma salicis (Linnaeus, 1758)				2				2
Lymantria mathura Moore, 1865		13	93	19	16			141
Lymantria monacha (Linnaeus, 1758)		1	11		3	1	13	29
Numenes albofascia (Leech, 1889)			11	1				12
Numenes disparilis Staudinger, 1887	1		8					9
Parocneria furva (Leech, 1888)	1							1
Pida niphonis (Butler, 1881)			2					2
ARCTIIDAE								
Aglaeomorpha histrioi (Walker, 1855)		2		1				3
Agrisius fuliginosus Moore, 1872		1						1
Agylla collitoides (Butler, 1885)	2	1	2	2		2		9
Chionarctia nivea (Ménétriès, 1859)				1				1
Cyana adelina (Staudinger, 1887)					6			6
Cyana hamata (Walker, 1854)		2	2	7	6			17
Eilema cribrata (Staudinger, 1887)			1	2		3	2	8
Eilema deplana (Esper, 1789)	3	5		8		1		17
Eilema griseola (Hübner, 1792)		2		3	62	1		68
Eilema japonica (Leech, 1888)		1		2				3
Eilema sororculum (Hufnagel, 1766)				1				1
Lemyra boghaika Tsistjakov & Kishida, 1994		8	79	57	266	130	49	589
Lithosia quadra (Linnaeus, 1785)					2	1	2	5
Miltochrista aberrans Butler, 1877							1	1
Miltochrista miniata (Forester, 1771)	1		2		6	1	1	11
Miltochrista pulchera Butler, 1877				2				2
Miltochrista striata (Bremer & Grey, 1853)	2	6	6	9	3			26
Paraona staudingeri Alphéraky, 1897	1			1	2			4
Pelosia noctis (Butler, 1881)	1							1
Spilarctia seriatopunctata (Motschulsky, 1860)		8	3	19	1	3	4	38
Spilarctia subcarnea (Walker, 1885)			1	5	1			7
Spilosoma album (Bremer & Grey, 1853)				1				1
NOLIDAE								
Meganola fumosa (Butler, 1879)		10	1	3	1			15
Meganola mediofascia (Inoue, 1958)			1	6				7

Nola confusalis (Herrich-Schäffer, 1847)		1		2	2		1	6
Nola ebatoi (Inoue, 1970)			1			4	7	12
NOCTUIDAE								
Abrostola triplasia (Linnaeus, 1758)						2	1	3
Acontia bicolora Leech, 1889		1		3				4
Acronicta catocaloida (Graeser, 1888 [1889])				1				1
Acronicta hercules (Felder & Rogenhofer, 1874)		1		1				2
Acronicta intermedia (Warren, 1909)				1				1
Acronicta major (Bremer, 1861)			1	1	1			3
Acronicta rumicis (Linnaeus, 1758)	1			2	2			5
Adisura atkinsoni Moore, 1881	5		2			1		8
Aedia leucomelas (Linnaeus, 1758)		1						1
Agrotis ipsilon (Hufnagel, 1766)				2				2
Agrotis tokionis Butler, 1881				1				1
Albocosta triangularis (Moore, 1867)					1		1	2
Amphipoea ussuriensis (Petersen, 1914)		1		1		1		3
Amphipyra acheron Draudt, 1950		1		2		1	1	5
Amphipyra erebina Butler, 1878	4	1		1	2			8
Amphipyra livida ([Denis & Schiffermüller], 1775)	2	2	1					5
Amphipyra monolitha Guenée, 1852			2					2
Amphipyra pyramidea (Linnaeus, 1758)					1			1
Amphipyra schrenckii Ménétriès, 1859					1			1
Amphipyra tripartita Butler, 1878	1		2	3	1			7
Amphitrogia amphidecta (Butler, 1879)		1		2	2			5
Amyna stellata Butler, 1878		1		1				2
Anachrostis nigripunctalis (Wileman, 1911)	1		1					2
Anadevidia peponis (Fabricius, 1775)							1	1
Anthoculeora locuples (Oberthür, 1881)		1						1
Antivaleria viridimacula (Graeser, 1888 [1889])	3	6	3	2				14
Apamea aquila oriens (Warren, 1911)				2				2
Apamea brunnescens Kononenko, 1985				1				1
Apamea hampsoni Sugi, 1963			1	1				2
Apamea striata Haruta & Sugi, 1958				1				1
Athetis albisignata (Oberthür, 1879)	2	3	3	32		1	1	42
Athetis cinerascens (Motschulsky, [1861] 1860)						2		2
Athetis correpta (Püngeler, 1907)		2						2
Athetis funesta (Staudinger, 1888)	1	3						4
Athetis gluteosa (Treitschke, 1835)	1	3				1		5
Athetis lapidea Wileman, 1911	11	1						12
Athetis lineosa (Moore, 1881)	1							1
Athetis pallidipennis Sugi, 1982					1			1
Athetis stellata (Moore, 1882)							1	1
Atrachea nitens (Butler, 1878)		2						2
Atuntsea kogii (Sugii, 1977)		1						1
Autoba tristalis (Leech, 1909)	2			5				7
Aventiola pusilla (Butler, 1879)		1						1
Axylia putris (Linnaeus, 1761)		3		4		4		11
Balsa leodura (Staudinger, 1887)		1						1
Belciades niveola (Motschulsky, 1866)				1	1	1		3
Belciana staudingeri (Leech, 1900)		1						1
Bertula bistrigata (Staudinger, 1888)	1			1				2
Bertula spacoalis (Walker, 1859)				1				1
Blenina senex (Butler, 1878)			1					1
Bryophila granitalis (Butler, 1881)				1	1			2
Bryophila orthogramma (Boursin, 1954)		2						2
Bryophilina mollicula (Graeser, [1889])		5	2	7	1	1	1	17
Callopistria albolineola (Graeser, 1888 [1889])	2							2
Callopistria juventina (Stoll, 1782)	2							2
Callopistria placodoides (Guenée, 1852)				1				1
Callopistria repleta Walker, 1858				1				1

Calyptra fletcheri (Berio, 1956)				1				1
Catocala dissimilis Bremer, 1861			1	3	3		1	8
Catocala doerriesi Staudinger, 1888							1	1
Catocala dula Bremer, 1861			3					3
Catocala duplicata Butler, 1885		2	2					4
Catocala jonasii Butler, 1877			2					2
Catocala nubila Butler, 1881			2					2
Cerastis violetta Boursin, 1955						1		1
Chasminodes albonitens (Bremer, 1861)					1			1
Chasminodes atrata (Butler, 1884)					1			1
Chasminodes cilia (Staudinger, 1888)			4		1	1		6
Chasminodes nigrilinea (Leech, 1889)			8					8
Chytonix albonotata (Staudinger, 1892)		2		2				4
Cidariplura gladiata Butler, 1879	1							1
Clavipalpula aurariae (Oberthür, 1880)				7	7	11	11	36
Colobochyla salicalis ([Denis & Schiffermüller], 1775)		1						1
Colocasia mus (Oberthür, 1884)		1	2	2		5	2	12
Corgatha dictaria (Walker, 1861)				1				1
Corgatha nitens (Butler, 1879)	1							1
Corsa petrina (Butler, 1879)				1				1
Cosmia sanguinea Sugi, 1955						1	1	2
Cosmia trapezina (Linnaeus, 1758)						1		1
Cranionycta albonigra (Herz, 1904)			2					2
Cranionycta jankowskii (Oberthür, 1880)	11	4	22	7	5	11		60
Cranionycta oda de Lattin, 1949		4		1				5
Craniophora ligustri ([Denis & Schiffermüller], 1775)				1	1	1		3
Craniophora praeclara (Graeser, 1890)					2			2
Ctenoplusia albostriata (Bremer & Grey, 1853)		1		1		2		4
Cucullia artemisiae (Hufnagel, 1766)				1				1
Daseochaeta viridis (Leech, 1889)	2		1					3
Diachrysia leonina (Oberthür, 1884)						2		2
Diarsia canescens (Butler, 1878)		2					1	3
Diarsia deparca (Butler, 1879)			1				3	4
Diarsia pacifica Boursin, 1943		1		1	1			3
Diarsia ruficauda (Warren, 1909)				1		9		10
Dimorphicosmia variegata (Oberthür, 1879)					1			1
Dinumma deponens Walker, 1858				1				1
Diomea discisigna Sugi, 1963	1			4	2			7
Diomea jankowskii (Oberthür, 1880)		2		2				4
Dryobotodes angusta Sugi, 1980						1		1
Dysmilichia gemella (Leech, 1889)		6		1				7
Earias pudicana Staudinger, 1887		6			2			8
Ectogonia butleri (Leech, 1900)		1	1					2
Edessena hamada (Felder & Rogenhofer, 1874)	3	4	1	2	2			12
Enispa bimaculata (Staudinger, 1892)		1						1
Enispa lutefascialis (Leech, 1889)	1							1
Ercheia niveostrigata Warren, 1913				10		1		11
Ercheia umbrosa Butler, 1881		1	1	11	1			14
Erebus ephesperis (Hübner, [1823])		1						1
Erythroplusia pyropia (Butler, 1879)		2						2
Erythroplusia rutilifrons (Walker, 1858)					1			1
Eucarta fasciata (Butler, 1878)			1		4			5
Euplexia lucipara (Linnaeus, 1758)		2						2
Euromoia subpulchra (Alphéraky, 1897)			33	2	1			36
Euxoa sibirica (Boisduval, 1834)			2					2
Gabala argentata Butler, 1878		4		2				6
Gelastocera exusta Butler, 1877		1	2	4		1	5	13
Gerbathodes paupera (Staudinger, 1892)		4	8	3				15
Gonepatica opalina (Butler, 1879)	2		1	1				4

Hadennia incongruens (Butler, 1879)		4	3	4	7	1		19
Helicoverpa assulta (Guenée, 1852)				1				1
Hemiglaea costalis (Butler, 1789)			1					1
Hemipsectra fallax (Butler, 1789)	1							1
Hepatica anceps Staudinger, 1892			1					1
Herminia arenosa Butler, 1879	1	13	1					15
Herminia grisealis ([Denis & Schiffermüller], 1775)		9	3	4	3	2	1	22
Herminia innocens Butler, 1878			1	1				2
Herminia tarsicrinalis (Knoch, 1782)	1	1		4				6
Hermonassa arenosa (Butler, 1881)		19	2	6	8	12	7	54
Hermonassa cecilia Butler, 1878	1	1	1	4			2	9
Hipoepa fractalis (Guenée, 1854)		3		1	1			5
Hoplodrina euryptera Boursin, 1937			3	1	3			7
Hydrillodes morosa (Buter, 1879)	18	61	61	97	83	259	391	970
Hypena albopunctalis Leech, 1889						1		1
Hypena amica (Butler, 1878)	1	7	1			1		10
Hypena nigrobasalis (Herz, 1904)	1	1	1	3		1		7
Hypena sagitta (Fabricius, 1775)					1			1
Hypena squalida Butler, 1878				1			2	3
Hypena stygiana Butler, 1878	2		2		1			5
Hypena trigonalis (Guenée, 1854)	2			1				3
Hypena tristalis Lederer, 1853		1			4			5
Hypena zilla Butler, 1879		5	2	2	11	5		25
Hypenomorpha calamina (Butler, 1879)				1				1
Hyperstrotia flavipuncta (Leech, 1889)		1						1
Hypersypnoides astrigera (Butler, 1885)				4	1			5
Hypocala rostrata (Fabricius, 1794)							1	1
Hyposemansis albipuncta (Wileman, 1914)	1		3					4
Iambia japonica Sugi, 1958		1						1
Idia quadra (Graeser, [1889])			4					4
Iragaodes nobilis (Staudinger, 1887)			6	3	1			10
Kerala decipiens (Butler, 1878)		4	4	3	3		1	15
Koyaga falsa (Butler, 1885)	4	13	8	7	26	10	6	74
Koyaga numisma (Staudinger, 1888)	10	1	2					13
Lacanobia contrastata (Bryk, 1942)							1	1
Lacanobia dentata (Kononenko, 1981)					2			2
Leiostola mollis (Butler, 1879)	17	24	2	3	1		2	49
Leucapamea askoldis (Oberthür, 1880)				1				1
Lithophane nagaii Sugi, 1958		1						1
Lophomilia flaviplaga (Warren, 1912)		2		2				4
Lophoruza pulcherrima (Butler, 1879)		6	3	2				11
Lygephila recta (Bremer, 1864)		1						1
Macdunnoughia purissima (Butler, 1878)				1				1
Maliattha bella (Staudinger, 1888)		11					1	12
Maliattha chalcogramma (Byrk, 1948)	2	3		3		1		9
Maliattha rosacea (Butler, 1889)	1							1
Meganephria extensa (Butler, 1879)						1		1
Melanchra persicariae (Linnaeus, 1761)					1			1
Micreremites pyraloides Sugi, 1982	3	3	4	3				13
Microxyla confusa (Wileman, 1911)	1			2				3
Mocis ancilla (Warren, 1913)			1					1
Mocis annetta (Butler, 1878)				1	2			3
Moma alpium (Osbeck, 1778)		1	3		2		1	7
Mosopia sordidum (Butler, 1879)		3	2	1				6
Mythimna divergens Butler, 1878		1						1
Mythimna grandis Butler, 1878							1	1
Mythimna loreyi (Duponchel, 1827)		1						1
Mythimna monticola Sugi, 1958				1			14	15
Mythimna placida (Butler, 1878)			1	4	1	6		12

Mythimna rufipennis Butler, 1878		1						1
Mythimna turca (Linnaeus, 1761)		3	1		1	2	3	10
Naganoella timandra (Alphéraky, 1879)		5		1				6
Naranga aenescens Moore, 1881	3		1					4
Narcotica niveosparsa (Matsumura, 1926)			7					7
Negritothripa hampsoni (Wileman, 1911)	1							1
Neustrotia costimacula (Oberthür, 1880)	1							1
Neustrotia noloides (Butler, 1879)	3	2		4				9
Neustrotia rectilineata Ueda, 1987	8	9	2	5				24
Niphonyx segregata (Butler, 1878)		4		3			2	9
Nodaria tristis (Butler, 1879)		1	2	1				4
Nolathripa lactaria (Graeser, 1892)		1						1
Ochropleura plecta (Linnaeus, 1761)				1				1
Oligia fodinae (Oberthür, 1880)		1						1
Oligia leuconephra Hampson, 1908					1			1
Oligonyx vulnerata (Butler, 1878)			1					1
Olivenebula oberthueri (Staudinger, 1892)	1	1						2
Orthogonia sera Felder & Felder, 1862			2					2
Orthogonia tapaishana (Draudt, 1939)		1						1
Orthosia paromoea (Hampson, 1905)		1						1
Oruza divisa (Walker, 1862)					1			1
Oruza mira (Butler, 1879)	8	1	3	1				13
Oruza submira Sugi, 1982		3						3
Pangrapta disruptalis (Walker, [1866])		1	1					2
Pangrapta flavomacula Staudinger, 1888				2				2
Pangrapta lunulata (Sterz, 1915)	2	5		3	1			11
Pangrapta obscurata (Butler, 1879)		2		1				3
Pangrapta perturbans (Walker, 1858)		1		1				2
Panthea coenobita (Esper, 1785)	1							1
Paracolax contigua (Leech, 1900)	2	8	3		5			18
Paracolax fascialis (Leech, 1889)		2	1	5	2		4	14
Paracolax fentoni (Butler, 1879)	1							1
Paracolax pryeri (Butler, 1879)	5	4	2	1				12
Paracolax trilinealis (Bremer, 1864)	1	6	2	2	3	7	2	23
Paracolax tristalis (Fabricius, 1794)		8						8
Paragabara flavomacula (Oberthür, 1880)	1		1	2	1			5
Paragabara ochreipennis Sugi, 1962	1							1
Paragona inchoata (Wileman, 1911)	3							3
Peridroma saucia (Hübner, [1808])				1				1
Perinaenia accipiter (Felder & Rogenhofer, 1874)		1		1	1			3
Prometopus flavicollis (Leech, 1889)				2				2
Prospalta cyclica (Hampson, 1908)				1	1			2
Protodeltote maculana Ahn, 1998		1						1
Protodeltote pygarga (Hufnagel, 1766)			1					1
Protomiselia bilinea (Hampson, 1905)	18							18
Pseudoips faganus (Fabricius, 1781)		2	2	1	1			6
Pygopteryx suava Staudinger, 1887				1				1
Pyrrhidivalva sordida (Butler, 1881)	2			1				3
Rhizedra lutosa (Hübner, [1803])			1					1
Rivula sericealis (Scopoli, 1763)	6		1					7
Sarbanissa subflava (Moore, 1877)		1	1					2
Sarbanissa venusta (Leech, [1889])			14	26	2			42
Scedopla diffusa Sugi, 1959		2	2		2		1	7
Schrankia separatalis (Herz, 1904)				1				1
Scoliopteryx libatrix (Linnaeus, 1758)				1				1
Sesamia turpis (Butler, 1879)		2						2
Siglophora ferreilutea Hampson, 1895		1	2					3
Siglophora sanguinolenta (Moore, 1888)		1	1	2				4

Simplicia niphona (Butler, 1878)	1	3	1	3		1		9
Sinarella japonica (Butler, 1881)					1			1
Sinarella nigrisigna (Leech, 1900)		1						1
Sinarella rotundipennis Owada, 1982		2		1		3		6
Sineugraphe bipartita (Graeser, 1888 [1889])				1				1
Sineugraphe exusta (Butler, 1878)		1	1	2	2	2		8
Sineugraphe oceanica (Kardakoff, 1928)						1		1
Sophta subrosea (Butler, 1881)	45	2	1					48
Sphragifera biplagiata (Walker, 1865)	1							1
Sphragifera sigillata (Ménétriès, 1859)						1		1
Spirama retorta (Clerck, 1759)	1	4						5
Spodoptera depravata (Butler, 1879)		1						1
Spodoptera litura (Fabricius, 1775)							5	5
Stenbergmania albomaculalis (Bremer, 1864)	5							5
Stenoloba clara (Leech, 1889)	3							3
Stenoloba jankowskii (Oberthür, 1884)		1						1
Stenoloba manleyi (Leech, 1889)	1							1
Sypnoides fumosa (Butler, 1877)							1	1
Sypnoides hercules (Butler, 1881)					1			1
Sypnoides picta (Butler, 1877)				3				3
Telorta acuminata (Butler, 1878)				1				1
Telorta divergens (Butler, 1879)		1						1
Telorta edentata (Leech, 1889)		11	25	20	10	6		72
Teratoglaea pacifica Sugi, 1958							1	1
Thysanoplusia intermixta (Warren, 1913)				1				1
Trachea punkikonis Matsumura, 1927				3				3
Trichosea champa (Moore, 1879)						1	9	10
Trichosea ludifica (Linnaeus, 1758)						1		1
Triphaenopsis cinerescens Butler, 1885						1	4	5
Triphaenopsis jezoensis Sugi, 1962			2	2	5	2		11
Triphaenopsis lucilla Butler, 1878		1			1	3		5
Trisateles emortualis ([Denis & Schiffermüller], 1775)			2					2
Xanthia togata (Esper, 1788)				1				1
Xanthograpta basinigra Sugi, 1982	1						3	4
Xanthomantis contaminata (Draudt, 1937)		3	1					4
Xestia c-nigrum (Linnaeus, 1758)				3		1	6	10
Xestia dilatata (Butler, 1879)		1		1				2
Xestia ditrapezium ([Denis & Schiffermüller], 1775)				2		3		5
Xestia fuscostigma (Bremer, 1861)		1			2			3
Xestia stupenda (Butler, 1878)						1		1
Xestia tabida (Butler, 1878)				1				1
Xestia vidua (Staudinger, 1892)				1	1			2
Zanclognatha curvilinea (Wileman & South, 1917)						1		1
Zanclognatha fumosa (Butler, 1879)		1				1		2
Zanclognatha griselda (Butler, 1879)	5	4	4	21	3	2		39
Zanclognatha helva (Butler, 1879)			1	2	2			5
Zanclognatha lilacina (Butler, 1879)		1						1
Zanclognatha lunalis (Scopoli, 1763)		2		2				4
Zanclognatha tarsipennalis (Treitschke, 1835)		4		1				5
Zanclognatha triplex (Leech, 1900)	2	2		1				5
Zanclognatha umbrosalis Staudinger, 1892			1					1
Zekelita plusioides (Butler, 1889)		1						1