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Studies on the Distribution of Ants (Formicidae) in Korea(20) - Ant fauna in Chiaksan -

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한국산 개미의 분포에 관한 연구(20) - 치악산의 개미상 -

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ABSTRACT

To find out ant fauna in the Mt. Chiak, collection tours were taken in three courses for two years. As a result, The ant fauna of Mt. Chiak were confirmed to be 45 species belonging to 23 genera under 4 subfamilies. Among them, ten species were new to Gangweon - province and *Myrmica* sp. 6 was new to Korea. Ants fauna of Gangweon - province at together became 74 species under 28 genera.

In Ponerinae, ants fauna have become 5 species under 4 genera, in Myrmicinae, 20 species under 13 genera, in Dolichoderinae 1 species under 1 genera and in Formicinae 19 species under 5 genera.

Key word : ant, ant fauna, distribution, Korea, Mt. Chiak, *Myrmica* sp. 6

Introduction

Ants are mainly nest in soil even though some are tree - dwelling. They are distributed world - wide because their food range is variable and the strongly endure to environmental risks. According to Hölldobler and Wilson(1990), 8,800 ant species are recorded under 197 genera, 11 subfamilies and it is estimated that about 20,000 species may exist on earth.

On the ant fauna of Gangweon - province, Teranishi(1940) first recorded 15 species from Mt. Kumkang and 2 from Chunchon, Collingwood also recorded 24 species from Mt. Kumkang. Two species were recorded by Kim and Murakami (1980), one by Kim and Kim(1983), three by Kim and Kim(1983), 29 by Choi(1986) and 2 by Kim(1988). Choi *et al.* (1992), and Park et al(1998) revised 63 species under 24 genera belonging to 4 subfamilies, including 36 species form the literatures and 28 species new to Kangwon - province collected in 11 areas.

This study is for the distribution of ant in

Korea. It is carried out to revise ant fauna and distribution from Mt. Chiak with collection and review from the literature.

Materials and Methods

1. Tools : 1) Aspirator 2) Root trowel
   3) Altimeter 4) Vial bottles
   5) Selection net
   6) Dissection stereomicroscope
   7) Ethyl acetate
   8) 85% Ethyl alcohol
2. Period : from 3rd of July in 1997 to 21th July in 1998
3. Methods :
   1) Three collection courses were selected and qualitative surveys were carried out for two hours every altitude of 200 meters.
   2) The collection courses were as table 1 and figure 1.
   3) For identification, collected specimens were anesthetized in Ethyl acetate. Soil particles and debris were removed with selection nets. Specimens were preserved in 85% Ethyl alcohol and identified under dissection stereomicroscope.

Table 1. The Coures and Date of Collection in Mt. Chiak, Korea

Date	Course of Collection
July. 3, 1997	Kumdaeri → Yongwonsa → Namdaebong
June. 21, 1998 July. 21, 1998	Kuryongsa→Selyumpokpo(Village)→Pillobong
June. 21, 1998 July. 21, 1998	Kuryongsa→Selyumpokpo(Ridgeline)→Pillobong

Results and Discussion

1. Species composition of ants

The ants in Mt. Chiak were found to be 4 subfamilies: Ponerinae, Myrmicinae, Dolichoderinae and Formicinae exclusive of Cerapachinae of which make 5 subfamilies in Korea. In 1997 to 1998, 746 colonies of ant were collected and as a result, 45 species belonging to 23 genera under 4 families were identified as in table 2. Among

Figure 1. Map of Mt. Chiak

Table 2. The List of Ants in Mt. Chiak, Korea

Scientific name	Korea name
PONEINAE	
• *Amblyopone silvestrii* Wheeler, 1960	톱니침개미
Pachcondyla javanus Mayr, 1867	일본침개미
Cryptopone sauteri Wheeler, 1906	장님침개미
Ponera japonica Wheeler, 1906	침개미
Ponera scabra Wheeler, 1928	거치른침개미
MYRMICINAE	
Myrmica lobicornis Nylander, 1846	곰배자루뿔개미
Myrmica ruginodis Latreille, 1810	빗개미
Myrmica incurvata Collingwood	굽은자루뿔개미
• • *Myrmica* sp.(6)	(미 정)
• *Stenamma owstoni* Wheeler, 1906	오스톤개미
Aphaenogaster famelica F. Smith 1974	황장다리개미
Aphaenogaster japonica Forel, 1911	일본장다리개미
Messor aciculatus F. Smith, 1874	장구개미
Pheidole fervida F. Smith, 1874	극동혹개미
Pristomyrmex pungens Mayr, 1886	그물등개미
Leptothorax congruus Forel, 1901	호리가슴개미

continued

Scientific name	Korea name
Leptothorax spinosior Forel, 1990	긴호리가슴개미
• *Leptothorax* sp. C	머리검은호리가슴개미
Tetramorium caespitum Linnaeus, 1758	주름개미
Solenopsis japonica Wheeler, 1976	일본열마디개미
Vollenhovia emeryi Wheeler, 1928	에메리개미
• *Myrmecina nipponica* Wheeler, 1926	방패개미
• *Crematogaster teranishii* Santschi, 1930	검정밑드리개미
Crematogaster osakensis Forel, 1900	노란밑드리개미
• *Strumigenys lewisi* Cameron, 1887	비늘개미
DOLICHODERINAE	
Dolichoderus sibirica Emery, 1988	시베리아개미
FORMICINAE	
Camponotus atrox Emery, 1925	한국흉가슴개미
Camponotus japonica Mayr, 1866	일본왕개미
• *Camponotus kiusiuensis* Santschi, 1937	갈색발왕개미
Camponotus quadrinotatus Forel, 1866	네눈개미
Camponotus itoi Forel, 1912	이도왕개미
Camponotus nipponensis Wheeler, 1928	털왕개미
Formica japonica Motschulsky, 1866	곰개미
Formica lemani Bondroit, 1917	레만개미
• *Formica hayashi* Terayama&Hashimoto, 1996	숲곰개미
Lasius alienus Forster, 1850	누은털개미
Lasius brunneus Latreille, 1798	나도누은털개미
Lasius flavus Fabricius, 1781	황개미
Lasius japonicus Santschi, 1758	고동털개미
Lasius spathepus Wheeler, 1910	민냄새개미
Lasius morisitai Yamauchi, 1979	강릉냄새개미
Lasius teranishii Wheeler, 1928	테라니시냄새개미
Paratrechina flavipes F. Smith, 1874	스미드개미
Paratrechina sakurae Ito, 1914	사구라개미
Polyrhachis lamellidens F. Smith, 1874	가시개미

•• : unrecord species in Korea
• : unrecord species in Kangweon Province.

Table 3. The Ant Species of New Record From Gangweon Province.

Subfamily / Science name	Korea name
PONEINAE	
Amblyopone silvestrii	톱니침개미
MYRMICINAE	
Myrmica sp.(6)	
Stenamma owstoni	오스톤개미
Leptothorax congruus	호리가슴개미
Leptothorax sp. C	머리검은호리가슴개미
Myrmecina nipponica	방패개미
Crematogaster teranishii	검정밑드리개미
Strumigenys lewisi	비늘개미
FORMICINAE	
Camponotus kiusiuensis	갈색발왕개미
Formica hayashi	숲곰개미

them ten species were new to Kangwon province (table 3): *Amlyopone silvestrii, Myrmica* sp. 6, *Stenamma owstoni, Leptothorax congruus, Leptothorax* sp. C, *Myrmecina nipponica, Crematogaster teranishii, Strumigenys lewisi, Camponotus kiusiuensis and Formica hayashi.* Therefore, ant fauna of Gangweon-province were confirmed to be 74 species belonging to 28 genera under subfamilies when 64 species under 24 genera in literature were included.

The ratio of colonies by subfamily were presented as table 4. Ponerinae amount to 3.2%, Myrmicinae 30.3%, Dolichoderinae 0.3% and Formicinae 58.2%. Formicinae was the most speciose subfamily.

Table 4. The Comparison of the Abundance among

Sub Family	Genus	Species	No. of Colony	Ratio(%)
PONERINAE	4	5	24	3.2
MYRMICINAE	13	20	286	38.3
DOLICHODERINAE	1	1	2	0.3
FORMICINAE	5	19	43	58.2
Total	23	45	746	100

Table 5. The Variety of Species and Colony Frequency

Genus	Number	
	Species(%)	Coloy(%)
Amblypone	1(2.2)	1(0.1)
Pachycondyla	1(2.2)	8(1.1)
Cryptopone	1(2.2)	1(0.1)
Ponera	2(4.4)	14(1.9)
Myrmica	4(8.8)	78(10.5)
Stenamma	1(2.2)	1(0.1)
Aphaenogaster	2(4.4)	44(6.0)
Messor	1(2.2)	5(0.7)
Pheidole	1(2.2)	62(8.3)
Pristomyrnex	1(2.2)	7(0.9)
Leptothorax	3(6.7)	10(1.3)
Tetramorium	1(2.2)	53(7.1)
Solenopsis	1(2.2)	1(0.1)
Vollenhovia	1(2.2)	9(1.2)
Myrmrcina	1(2.2)	4(0.5)
Crematogaster	2(4.4)	10(1.4)
Strumigenys	1(2.2)	2(0.3)
Hypoclimea	1(2.2)	2(0.3)
Camponotus	6(13.3)	57(7.6)
Formica	3(6.7)	79(10.6)
Lasius	7(15.6)	206(27.6)
Paratrechina	2(4.4)	90(12.1)
Polyhachis	1(2.2)	2(0.3)
Total	45(100)	746(100)

The ratio by genus were as in table 5. Among 23 genera, genus *Lasius* was the most speciose with 15.6% and its ratio of colonies was 27.6%. The second genus, *Camponotus* was 13.3% by number of species and 7.6% by colony. Genus *Vollenhovia* had only one species but its ratio by colony was comparatively high with 1.2 %.

2. Dominant and rare species

For qualitative survey, the collection was carried out throughly and all colonies found were collected. Table 6 shows that dominant species is *Paratrechina flavipes* which has 75 colonies among 746 with 10.1% in three courses. Secondly, *Lasius alienus* has 73 colonies with 9.8%. And *Pheidole fervida* is 62 colonies with 8.3%, *Tetramorium caespitum* 53 colonies with 7.1%, *Myrmica ruginodis* 52 colonies with 7.1% and *Aphaenogaster japonicus* 42 colonies with 5.6%. The ratio of these 6 species amounts 48.6% of all.

Table. 6 The Dominant and Rare species in Mt. Chiak

Dominant species	Scarce species
Paratrechina flavipes	*Amblyopone silvestrii*
Lasius alienus	*Cryptopone sauteri*
Pheidole fervida	*Stenamma owstoni*
Tetramorium caespitum	*Myrmica* sp.(6)
Myrmica ruginodis	*Solenopsis japonica*
Aphaenogaster japonica	*Camponotus kiusiuensis*
	Camponotus quadrinotatus
	Camponotus itoi

The species rarely found were *Amblyopone silvestrii, Cryptopone sauteri, Stenamma owstoni, Myrmica* sp. 6, *Solenopsis japonica, Camponotus kiusiuensis, Camponotus quadrinotatus,* and *Camponotus itoi* and the colony number of these species was one, respectively.

3. Vertical and horizontal distribution

The horizontal distribution of ant fauna is as table 7. The ants, collected from only Namdaebong course in southern slope of Mt. Chiak were *Cryptopone sauteri, Messor aciculatus, Pristomyrmex pungens, Solenopsis japonica, Lasius teranishii, and Polyrhachis lamellidens.* One the other hand, Amblyopone silvestrii, Stenamma owstoni, Myrmica sp. 6, *Crematogaster teranishii, Strumigenys lewisi, Camponotus kiusiuensis, Camponotus itoi, Formica hayashi* and *Lasius morisitai* were collected from only Birobong course as northern slope.

Table 7. The Horizontal Distribution of Species

Collected Land	Collected species	Total species
Namdaebong (1,118m)	*Cryptopone sauten* *Messor aciculatus* *Pristomyrmex pungens* *Leptothorax spinosior* *Solenopsis japonica* *Lasius teranishii* *Polyrhachis lamellidens*	7
Pillobong (1,288m)	*Amblyopone silvestrii* *Stenamma owstoni* *Myrmica* sp.(6) *Crematogaster teranishii* *Strumigenys lewisi* *Camponotus kiusiuensis* *Camponotus itoi* *Formica hayashi* *Lasius morisitai*	9

Figure 2 shows the vertical distribution of genus *Formica. Formica lemani* was found only from 800 to 1200 meters above sea level, *Formica hayashi* only from 500 to 800 meters above sea level and *Formica japonica* under 400 meters above sea level. With a results of the vertical distribution ranges, three species of *Formica* might be distinguishable.

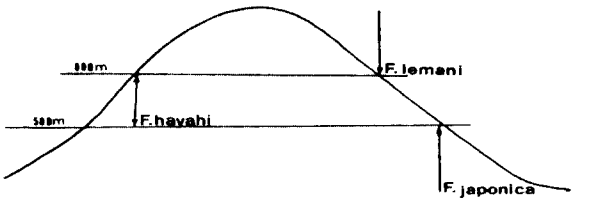

Figure 2. Distribution layer of three ant species in Mt. Chiak.

요 약

치악산의 개미상을 조사하기 위해서 1997년부터 1998년까지 2년간 3개의 코스에서 746 colony를 채집하였다. 해부현미경하에서 관찰 동점한 결과 4아과 23속 45종이 확인되었으며, 이들 중 10종은 강원도의 미기록 종이었으며, 특히 *Myrmica* sp.6은 한국의 미기록종으로 추가된다. 이로 인해 강원도에 분포하는 개미종은 4아과 28속 73종이 된다.

검색어 : 개미, 분포, 한국, 치악산 개미상

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