

A STUDY ON THE VARIATIONS OF SOCIAL WASPS

I. On the Marking-variations of *Vespa vulgaris* L.
and on its Synonyms

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金昌煥 : 社會性 벌의 變異에 관한 研究

第 1 報 “광벌” *Vespa vulgaris* L. 의

斑紋變異와 Synonyms에 관하여

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INTRODUCTION

The following 6 species of Genus *Vespa* THOMSON from Korea were on the hymenopterous list by RADOSZKOWSKI, DOI, KAMIZO, YANO, YASUMATSU, UCHIDA ect..

Vespa austriaca FANZER

Fauna Ins. Germ., VI, P.63 1799

Habitat in Korea : Mokpo, Kwangneung, Seoul, Rankok, Hwasan and Sukwansa

Distribution : Korea, Japan, Europe

Vespa germanica fleviceps SMITH

Trans. Zool. Soc. Lond., 7. Ser.3, P.174 1870

Habitat in Korea : ?

Distribution : India, China, Korea, Assam, Siberia

Vespa media RETZUIS

Gen. et Spec. Ins., P.63 1733

= *Vespa geerti* LEPELETIER, Hist. Nat. Ins. Hym., I, P.510 1836

Habitat in Korea : ?

Distribution : Korea, China, Saghalien, Europe

Vespa koensis RADOSZKOWSKI

Hor. Soc. Ent. Ross., XXI, P.432 1387

Habitat in Korea : ?

Distribution : Korea

Vespa rufa L. var. *schrenckii* RADOSZKOWSKI

Hor. Soc. Ent. Ross., I, P.84 1861

= *Vespa sibirica* ANDRE, Spec. Hym. Eur., 2, P.559 1834= *Vespa rufa* var. *sibirica* du BUTSSON, Ann. Soc. Ent. Fr., 73, P.591 1904

Habitat in Korea : Sinyang, Sambang, Seoul, Injoo and Kongjoo

Distribution : Korea, Japan, China, Saghalien, Siberia

Vespa vulgaris L. var. *lewisii* CAMERON

Entomologist, 36, P.230 1903

= *Vespa japonica* SAUSSURE Rev. Mag. Zool., 10, P.261 (non MOTSCHULSKI 1857) 1858= *Vespa saussurei* SCHULZ, Spolia, Hym., P.231 1905

Habitat in Korea : Taegu, Donghwasa, Pusan, Chungjoo, Tanyang, Suwon, Hwasan, Seoul, Kwangneung, Sambang and Sinyang.

Distribution : Korea, Japan, Formosa, Saghalien, Manchuria, Ussuri.

Hitherto three species of them, *V. austriaca*, *V. rufa* and *V. vulgaris* were collected in many localities in Korea as stated above but the others were not so. They are almost similar morphologically, so we often classify them with the markings but there are many variations of their markings. Therefore we shall collect all the materials in their nests and investigate on their marking variations. At first we shall study on a species, *V. vulgaris*, which is common near Seoul.

INVESTIGATION

We spread oil DDT into 8 nests of *V. vulgaris* in the ground at night, dig the ground and collect all the materials in them. This time I report about the results of investigation on 2 nests of the them and the number of materials in a nest is as follow.






Nest No.	Collecting Date	Collecting Local.	The Number of Individuals			
			Workers	Females	Males	Total
I III	13 · Sep · '56	Uldong, Seoul	685	1	40	726
	4 · Oct · '56		576	29	56	661
Total			1261	30	96	1387











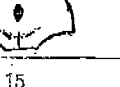
The species, *V. vulgaris* has so gross variations of markings and the results of investigation on their markings are as following.

1. The Variation of Markings on Clypeus.

Half of females have a anchorformed black markings(it's apex pale red-brown) in the middle of clypeus and the next are the type of *V. austriaca* having three small black markings situated triangularly on clypeus. The others are a few, clypeus of which have a broken stalk of the anchor.

Markings on clypeus of males and workers are very variable from the type having nothing to the type, clypeus of which are divided into two parts by a black streak.

Types of markings on clypeus of females	T 1	T 2	T 3	T 4	T 5
					
Number of females	11	2	1	1	15

Types of markings on clypeus of males	T 1	T 2	T 3	T 4	T 5	T 6
						
						
Number of males	4	4	10	21	42	15

	T 1	T 2	T 3	T 4	T 5	T 6	T 8	T 9	T 10	T 11
Type of markings on clypeus of workers										
Number of workers	7	8	269	146	35	119	38	369	26	244

2. The Variations of Markings on Scutellum, Metanotum and Propodeum.

The size of the markings on Scutellum, Metanotum and Propodeum are variable. Generally many of females have nothing but males have two pairs of markings on Scutellum and Metanotum as same as *V. rufa* and most of workers have the markings on Propodeum too, as same as *V. vulgaris*.

	T 1	T 2	T 3	T 4	T 5	T 6
Types of markings on Scutellum, Metanotum and Propodeum						
Number of materials	♂ 0 ♀ 135 ± 0	♂ 33 ♀ 776 ± 7	♂ 6 ♀ 259 ± 7	♂ 45 ♀ 91 ± 1	♂ 12 ♀ 0 ± 0	♂ 0 ♀ 0 ± 15

3. The Variations of Markings on Tergites.

The variations of markings on tergites are continuous from a simple type of lineal marking to a complex type having a large yellow parts. It seems there is a cline to enlarge the yellow parts.

	T 1	T 2	T 3	T 4	T 5
Types of markings on first tergite					
Number of materials	♂ 10 ♀ 98	♂ 5 ♀ 26	♂ 40 ♀ 1124	♂ 2 ♀ 0	♂ 30 ♀ 13

	T 1	T 2	T 3	T 4	T 5
Types of markings on second tergite					
Number of materials	♂ 0 ♀ 17	0 2	♂ 5 ♀ 39	65 811	31 392

The typical types of the markings on tergites are as follows.

	T 1	T 2	T 3	T 4	T 5	T 6	
Typical types of markings on tergites of females							
Number of females	3	3	11	10	2	1	

	T 1	T 2	T 3	T 4	T 5	T 6	T 7	T 8
Typical types of markings on tergites of males and workers								
Number of materials	♂ 0 ♀ 13	♂ 0 ♀ 6	♂ 0 ♀ 36	♂ 5 ♀ 265	♂ 21 ♀ 570	♂ 19 ♀ 13	♂ 20 ♀ 256	♂ 31 ♀ 2

As we know at above, the second type(T2) of males and workers unites with *V. rufa* L. var. *schrenckii*, RADOSZKOWSKI the third type (T3) of them with *V. koreensis* RADOSZKOWSKI and last type (T8) of them with *V. vulgaris* L. var. *lewisii* CAMERON. And after we investigate on the specimens preserved in our specimen-room, 2 ♀♀ collected on 5th June, 1954 at Mt. Yongmoon by the author of this report are the third type of females. and 5 ♂♂ collected on 25th July, 1955 at Choonchon by G. H. Kim are the first type of workers and 1 ♂ collected at the same time is 4th type of them. 2 ♂♂ collected on 20th Aug. 1955 at Kwangneung by the author are 5th type and 3 ♂♂ collected at the same time and 4 ♀♀ collected on 21th Aug. 1955 at Oeyun Island by the author 7th type of them.

4. Body length.

females 15~20mm, males 14~18mm, workers 10~15mm

CONCLUSION

By this investigation we know that the markings of *V. vulgaris* are very variable and I come to the conclusion that the differences between the species, *V. rufa*, *V. austriaca*, *V. koreensis* and *V. vulgaris* are no more than the individual variations within a same species.

LINNE described about *V. vulgaris* in his 'Systema Naturae Regnum Animale' (P. 572, 1753) : Thorace lineolis 3 parium differentium flavescendum, abdominis incisuris punctis nigris distinctis. And next this species he also described about *V. rufa* : Thorace lineolis punctisque dubus flavis, abdomine flavo antice ferrugineo. UCHIDA (1929) described that *V. austriaca* is similar with *V. rufa* var. *sibirica* ANDRE but the former differs from the latter to have three small black marking triangularly on it's clypeus. YANO described about *V. lewisi* SAUSSURE in the "Iconographia Insectorum Japonicorum" (P. 1461, 1953) but YASUMATSU recognized that species as *V. vulgaris* L. var. *lewisii* CAMERON And *V. koreensis* unites with *V. vulgaris* by my investigation. Therefore I conclude that *V. rufa*, *V. austriaca* and *V. koreensis* are the synonyms of *V. vulgaris* L..

(*vespula*) *vulgaris* LINNE

Syst. Nat., P. 527 1753

= *Vespa rufa* LINNE Syst. Nat., P. 527 1753

= *Vespa austriaca* FANLER, Fauna Ins. Germ., VI, P. 63 1799

= *Vespa japonica* SAUSSURE, Rev. Mag. Zool., 10, P. 261 (non MOTSCHULSKY 1857) 1853

= *Vespa schrenckii* RADOSZKOWSKI, Hor. Soc. Ent. Ross., I, P. 84 1361

= *Vespa sibirica* ANLFE Spec. Hym. Eur., 2, P. 399 1384

= *Vespa koreensis* RADOSZKOWSKI, Hor. Soc. Ent. Ross., XXI, P. 432 1387

= *Vespa lenisii* CAMERON, Entomologist, EY, P. 230 1903

= *Vespa saussurei* SCHULZ, Spolia Hym., P. 231 1906

LITERATURES

- KAMIZO, N. : On a Collection of Insects from North Keisho-Do, Korea. Jour. Chosen Nat. Hist. Soc., No. 15 1933
- LINNE, C. : Systema Naturae Regnum Animale 1753
- MATSUMURA, S. : Thous. Ins. Jap. Suppl., IV, 1912
- : Erster Beitrag zur Insekten-Fauna von Sachalin. Tohoku Imp. Univ., IV, 1911
- : III. Common Ins. Japan. IV, 1932
- YANO, M. : Iconographia Insectorum Japonicorum, 1931 & 1953
- : Report of the First Scientific Expedition to Manchoukuo, Sec. V, Div. I, Pt. IX 1939
- YASUMATSU, K. : Les Hymenopteres de L'ile Yakushima. Mushi, 7, 2, P. 61—67 1934
- : Hymenoptera collected in Tadao Kan's expeditions to Botol-Tobago Island (IV), Trans. Sapporo Nat. Hist. Soc., XVI, Pt. 2 1940
- : Hymenoptera of Tsushima Soc. Hist. Nat. Kokuikensis, 2, 2, 1937
- UCHIDA, T. : Zur Kenntnis der Gattungen von japonischen Hornissen. Botany and Zoology 3, 5, 1935
- : A list of known species of the Korean Hymenoptera which I collected in 1922, and their geographical distributions. Insect World, 29, 1925

摘要

韓國産 Genus *Vespula* THOMSON 으로는 다음 6種이 알려져있고 있다.

Vespula austriaca PANZER 합성말벌

- V. germanica fleviceps* SMITH 매점배기말벌
V. media RETZIUS 쯘말벌
V. koreensis YADOSZKOWSKI 참땅벌
V. rufa L. var. *schrenckii* RADOSZKOWSKI 슈랭크말벌
V. vulgaris L. var. *lewisii* CAMERON 땅벌

上記種中에서 *V. austriaca*, *V. rufa*, *V. vulgaris*의 種간은 各地에서 採集된 記錄이 있으나 나머지 것은 韓國에 産한다그만 되어있다. 採集된 上記 3種은 形態學的으로는 거의 비슷하고 斑紋만을 달리하여 그 斑紋의 變異를 調査하는 것은 重大한 意義를 가진다. 筆者는 서울 近郊牛耳洞에서 밤을 利用하여 8個의 벌집속 벌을 모조리 採集하여 그中 2벌집의 個體만개 관찰하여 그 變異를 調査한 結果를 第1報로 여기에 發表한다.

한 벌집속 個體數는 725과 661이었고 따라서 總個體數 1337마리를 調査한 結果 상당히 甚히 紋斑變異가 있음을 알였고 더우기 *V. austriaca*, *V. rufa*, *V. koreensis*와 *V. vulgaris*間의 斑紋差는 同一種內的 變異에 不過함을 알게 되었다. 따라서 *V. austriaca*, *V. rufa*, *V. koreensis*는 *V. vulgaris*의 synonym임을 밝히는 바이다.

本研究에 있어서 貴重한 文獻을 빌려 주신 高大理學部長 趙福茂教授와 材料의 採集과 調査에 助力해준 高大理學科生 金元任, 李敬魯, 李秉準, 李東澗 諸君에게 謝意를 表하는 바이다.