

- bees. *Jpn. J. Ent.*, **63**: 347–375.
- MAETA, Y., S. F. SAKAGAMI & M. SHIOKAWA, 1985. Observation of a nest aggregation of the Taiwanese bamboo carpenter bee, *Xylocopa (Biluna) tranquebarorum tranquebarorum* (Hymenoptera, Anthophoridae). *J. Kansas entomol. Soc.*, **58**: 36–41.
- , N. SUGIURA & M. GOUBARA, 1992. Patterns of offspring production and sex allocation in the small carpenter bee, *Ceratina flavipes* SMITH (Hymenoptera, Xylocopinae). *Jpn. J. Ent.*, **60**: 175–190.
- SAKAGAMI, S. F. & S. LAROCA, 1971. Observation on the bionomics of some Neotropical xylocopine bees, with comparative and biofaunistic notes. *J. Fac. Sci., Hokkaido Univ.*, **18**: 57–127.
- , H. FUKUDA & H. KAWANO, 1974. Bionomics survey of wild bees. Problems and methods, with results taken at Mt. Moiwa, Sapporo. *Materials Biol. Educ., Hakodate*, (**9**): 1–60.
- & Y. MAETA, 1985. Multifemale nests and rudimentary castes in the normally solitary bee *Ceratina japonica* (Hymenoptera: Xylocopinae). *J. Kansas entomol. Soc.*, **57**: 639–654.
- & ——— 1995. Task allocation in artificially induced colonies of a basically solitary bee, *Ceratina (Ceratinidia) okinawana*, with a comparison of sociality between *Ceratina* and *Xylocopa* (Hymenoptera, Anthophoridae, Xylocopinae). *Jpn. J. Ent.*, **63**: 115–150.
- SONAN, J., 1932. On the *Xylocopa* of Formosa (Hym. Apidae). *Trans. Nat. Hist. Soc. Formosa*, **22**: 133–140. (In Japanese.)
- YU, Feng-Ling, 1954. The carpenter or xylocopine bees of Formosa. *Bull. Fac. Agric., Natl. Taiwan Univ.*, **3**: 64–75. (In Chinese.)

(Received October 31, 1995; Accepted February 14, 1996)

Jpn. J. Ent., **64**(3): 680–681. September 25, 1996

New Prey Record of *Symmorphus foveolatus* (Hymenoptera, Eumenidae) in Japan

You HAMANISHI

Division of Environmental Sciences, Graduate School of Science and Technology,
Kobe University, Rokkodai, Kobe, 657 Japan

Key words: *Symmorphus foveolatus*; Eumenidae; prey record.

Symmorphus foveolatus GUSSAKOWSKIJ is a solitary wasp which nests in tubular cavities such as wheat straws used for thatched roof, reed tubes, or deserted beetle burrows in wood (IWATA, 1938). It occurs in Hokkaido, Honshu, Shikoku and Kyushu of Japan; East Siberia and Korea (YAMANE, 1990), and has a univoltine life cycle. The nesting season is from mid-May to early July in the Kinki district. Mature larvae of chrysomelids, *Gastroidea atrocyanea* and *Plagioderia versicolora*, have hitherto been listed as the prey of this wasp, and most of the Japanese species of this genus hunt for coleopteran larvae (IWATA, 1978; YAMANE, 1990). I observed nesting activities of *S. foveolatus* during 1991–1994 at several

New Prey Record of *Symmorphus foveolatus* (Hymenoptera, Eumenidae) in Japan 681Table 1. The prey list of *Symmorphus foveolatus* from the nest-cell contents in the study site in 1991.

No. of cells/nest	No. of nest tubes	No. of cells provisioned with				Total
		<i>Linnaeidea aenea</i>	<i>Plagiodera versicolora</i>	<i>Gastrolina depressa</i>	(Not identified)	
1	45	34	9	1	1	45
2	21	38	1	3	0	42
3	3	6	3	0	0	9
Total	69	78	12	4	1	96
No. of prey/cell	Mean \pm S.D. Range	7.3 \pm 1.7* ²⁾ 3–11* ²⁾	31.2 \pm 7.8 19–43	7.0 \pm 1.2 5–8		
Fresh weight of prey* ¹⁾	Mean \pm S.D. (mg) Sample size	15.18 \pm 4.21 <i>n</i> = 63	5.42 \pm 1.36 <i>n</i> = 49	(No data)		

*¹⁾ Supplemented by the data on the nests constructed in 1993.

*²⁾ The data from 73 cells excluding the multiple-cell nests of which contents were shuffled by larvae of cleptoparasite fly, *Symmorphomyia katayamai*.

trap-nest sites in the "Gakushu-no-Mori" of the Kobe Municipal Arboretum on the west slope of Mt. Futatabi, Kobe City, Hyogo Prefecture. Species of prey from 68, 104, 115 and 99 nests were identified during 1991, 1992, 1993 and 1994 respectively by inspecting the cell contents of the nests and direct observations of returning wasps that carried prey to their nests. The results showed that the population of *S. foveolatus* in this area utilized mature larvae of three chrysomelids, mainly *Linnaeidea aenea* infesting *Alnus pendula*, and supplementarily *Plagiodera versicolora* on *Salix* spp. and *Gastrolina depressa* on *Juglans mandshurica*. *G. depressa* is recorded here as a prey of this wasp for the first time. Table 1 is an example of the richest menu (1991). In the other years, all the cells were provisioned with *L. aenea*, except for three cells and a half in 1993 and one cell in 1994 with *P. versicolora*. Each cell contained a single species of prey, with the only exception where the cell accidentally contained two species of prey brought by two respective provisioners in 1993. A 2-cell nest, which was made by a female wasp marked with color paint, however, contained one cell provisioned with *G. depressa* and the other with *L. aenea* in 1991, while another 2-cell nest had one cell provisioned with *L. aenea* and the other with *P. versicolora*. It is therefore concluded that females of *S. foveolatus* can switch the prey species.

I thank Dr. Setsuya MOMOI for his helpful comments, and Drs. Tikhiko NAITO and Makio TAKEDA of Kobe University for reading the manuscript. Mr. Shin-ya MIYAKE and the staff of the "Gakushu-no-Mori" of the Kobe Municipal Arboretum helped me during the field survey in the arboretum.

References

- IWATA, K., 1938. Habits of eight species of Eumenidae (*Rhynchium*, *Lionotus*, and *Symmorphus*) in Japan. *Mushi, Fukuoka*, **11**: 110–132.
 ——— K., 1978. Observations on Insect Life for 50 years (II). 330 pp. The Asahi Shinbun-sha, Tokyo. (In Japanese.)
 YAMANE, Sk., 1990. A revision of the Japanese Eumenidae (Hymenoptera, Vespoidea). *Insecta Matsumurana*, new series **43**: 1–189.

(Received November 30, 1995; Accepted February 16, 1996)