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Two New Species of the Genus *Osmia* from Japan and N. China (Hymenoptera, Megachilidae) *

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Two new taxa, *Osmia* (*Melanosmia*) *ishikawai* and *Osmia* (*Chalcosmia*) *imaii*, are described. Result of a liberation of *O. imaii* in the Kyushu University campus is presented, which is suggestive of a possibility of its management.

This paper reports the results of two important findings which were made on the genus *Osmia* of Japan during last 23 years since Yasumatsu and Hirashima published the revisional work in 1950 (*Mushi* 21 (1) : 1-18, 3 pls.).

As early as 1953, Dr. R. Ishikawa of the National Museum of Natural History, Tokyo, collected two females of a strange species belonging to the subgenus *Melanosmia*, which will be described as *ishikawai* sp. nov. in this paper, at fairly high altitude of Mt. Meakan, one of the famous mountains in Hokkaido. It was the discovery of the 6th species of *Osmia* of Japan. Unfortunately, no information of this species has been accumulated since the finding of it.

Another discovery was made by Mr. K. Imai of the Hyogo Agricultural Experiment Station in 1972 in Himeji City, Hyogo Prefecture. He observed the species named as *imaii* sp. nov. in this paper was nesting in the trap nests of reed tubes set by himself. I was surprised to see the fact that such a distinct, formerly unknown species from Japan like this (unlike other Japanese species, hairs of the female bright red) was easily caught by trap nests in such a big city like Himeji. According to Mr. Imai's investigation, the species is only found in Hyogo Prefecture so far, most common in the vicinity of Himeji City. It is very probable that the 7th species of *Osmia* of Japan is a recent immigrant from China. As stated below, the species is found also in Peking, N. China.

This paper also reports the result of liberation of *Osmia imaii* in the Hakozaki campus of Kyushu University from the original stock gathered in Hyogo Prefecture. From the result a possibility is suggested of the management of this species for the pollinations of certain crops such as *Brassica*.

* Contribution from the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka.

Osmia (Melanosmia) ishikawai sp. nov.

和名: イシカ 7 ツツハナバチ (新称)

Female: Length about 11 mm.

Black, with very faint metallic blue tints on face only; apical margins of 1st to 5th terga brownish; distitarsi dark reddish brown; tibial spurs nearly black. Wings slightly dusky; veins and stigma brown; tegulae nearly black.

Hairs on head rather long, dull white (slightly yellowish) mixed with blackish ones on clypeus, face and frons; hairs on lower portions of genal areas slightly brownish; hairs on thorax above dull ochreous or slightly paler, those on sides of thorax pale (may be more bright when specimens are fresh); thorax with none of hairs black dorsally and laterally; hairs on legs primarily black; hairs on 1st tergum whitish, those on 2nd to 5th terga brownish to blackish, mixed with sparse whitish hairs; metasomal terga without hair band; 6th tergum subappressed, rather short white hairs mixed with brownish ones; scopa black.

Frons and area between antennae well convex like the European species *O. aenea* Linnaeus (in the Japanese species *O. (Chalcosmia) orientalis* Benoist these areas nearly flat and much lower than level of clypeus); genal areas well developed. Median portion of scutellum with flat, shiny, irregular impunctate spaces one to two or three puncture's widths apart; propodeal enclosure finely granular, dull. Metasomal terga nearly shagreened, with punctures roughened and not distinct.

Type material: Holotype female (Type No. 2024, Kyushu Univ.), and 1 paratype female, Mt. Meakan, Hokkaido, 18. vii. 1953 (R. Ishikawa).

In addition to the material recorded above, I examined 1 female specimen from North China (Taihuaichen-Chenhaissu, Shansi, 1. vi. 1942, K. Yasumatsu leg.) in the collection of Kyushu University which may be conspecific with *ishikawai*.

Type depository: The holotype is in the collection of Entomological Laboratory, Faculty of Agriculture, Kyushu University.

Distribution: Japan (Hokkaido) and N. China (Shansi).

Remarks: This species is easily separable from *O. (Chalcosmia) orientalis* Benoist in having the black integument, black scopa, black hairs on the legs, etc. When I examined the material from Mt. Meakan for the first time, I thought this might be *O. nigriventris* (Zetterstedt) which ranges widely in the Palaearctic Region (although not common). The newly found species, however, is quite different from the latter.

This species is named in honor of Dr. Ryosuke Ishikawa of the National Museum of Natural History, Tokyo.

Osmia (Chalcosmia) imaii sp. nov.

和名: イマイツツハナバチ (新称)

Female: Length 9-10 mm.

Dark metallic blue with coppery tints especially on metasomal terga; mandibles, antennae and legs black; tibial spurs reddish. Wings slightly smoky

with distal margins broadly darkened ; veins and stigma brown ; tegulae piceous or nearly black.

Hairs almost uniformly bright red including scopa in fresh specimens, long, rather abundant ; posterior margins of 2nd to 5th terga with complete hair bands, loose on 2nd, more or less dense on 3rd, and dense on 4th and 5th; 6th terga with hairs paler and appressed.

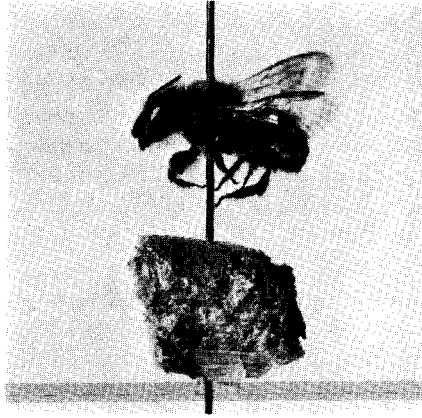


Fig. 1. Female of *Osmia imaii* with a cocoon on the pin.

Cutting edge of mandibles dentate, so that mandibles nearly quadridentate ; clypeus distinctly convex; frons and area between antennae well convex; genal areas broad and well developed. Mesoscutum densely punctured even in median portion, without shiny impunctate space ; propodeal enclosure dull, finely granular, very weakly wrinkled basally. Metasomal terga shiny, with punctures weak and roughened.

Male: Slightly smaller than female.

Metallic blue with slightly coppery tints ; mandibles and antennae black; legs black with blue tints on coxae and femora. Wings as in female; tegulae with blue tints anteriorly.

Unlike female, hairs whitish to pale even in fresh specimens, not mixed with black ones; apical margins of terga with hairs denser than elsewhere, forming very loose hands on 2nd to 5th terga.

Mandibles bidentate ; 1st flagellar segment as long as broad, slightly shorter than next segment; apical margin of 6th tergum deeply emarginate in middle.

Type material: Holotype female (Type No. 2025, Kyushu Univ.), 14 paratopotype females and 39 paratopotype males, reared from trap nests, Himeji City, Hyogo Pref., March 1973 (K. Imai) ; 28 paratype females, reared from trap nests, Yashiro-machi, Kato-gun, Hyogo Pref., March 1973 (K. Imai).

In addition to the material recorded above, I examined 4 female and 2 male specimens from N. China (Peking, 1938, K. Tsuneki leg.), which may be conspecific with *imaii*, although the Chinese specimens are slightly smaller than the Japanese ones.

Type depository: The holotype is deposited in the collection of the Entomological Laboratory, Faculty of Agriculture, Kyushu University.

Distribution: Japan (Hyogo Prefecture, Fukuoka City) and N. China (Peking).

This species has been introduced from Hyogo Prefecture to Fukuoka City in 1973, as shown below. As stated elsewhere in this paper, Japanese populations now found in Hyogo Prefecture may be descendants of (a) recent immigrant(s) from China. Possible source of immigration is timbers of trade, as is supposed from the tube (=hole) nesting habits of this species.

Remarks: Bright red hairs of the female are very characteristic of this species. According to the literature, this species is identified as *Osmia pieli* Cockerell with no hesitation, which was described from Shanghai, China. In order to confirm my determination, I sent a female specimen to the American Museum of Natural History where the type female of *O. pieli* is deposited. Dr. Rozen wrote to me that the length of clypeus is different. Comparison of the type female of *pieli*, which was kindly sent to me by Dr. Rozen, with newly found Japanese material convinced me that the latter represents another species. Thus, it differs from *pieli* as follows:

Clypeus shorter and genal areas broader and more convex; thus, habitus of head delicately differs from that of *pieli*; cutting edge of mandibles dentate below (only slightly produced in *pieli*); punctures on clypeus and frons slightly larger; punctures on metasomal terga coarser and looser (close and fine in *pieli*); metallic reflection of head, thorax, and metasoma weaker and less greenish (for example, as seen in front, head nearly entirely blackish in *imaii*, while sides of face greenish in *pieli*).

This species is named in honor of Mr. Kunitaka Imai of the Hyogo Agricultural Experiment Station.

Now, 4 species of *Osmia sensu stricto*, 2 species of *Chalcosmia* and 1 species of *Melanosmia* are found in Japan. Key to the 4 species of *Osmia sensu stricto* which was proposed by Yasumatsu and Hirashima (1950, pp. 3-4) is still useful. The rest of them may be separable by the following key.

- | | |
|--|-------------------|
| 1. Females | 2 |
| Males (male of <i>ishikawai</i> not known) | 4 |
| 2. Integument primarily black; scopa black | <i>ishikawai</i> |
| - Integument distinctly metallic; scopa red | 3 |
| 3. Larger species; integument shining metallic blue; hairs dull white; cutting edge of mandibles not dentate, so that mandibles tridentate; frons and area between antennae flat | <i>orientalis</i> |
| - Smaller species; integument dark blue with coppery tints; hairs bright red when fresh; cutting edge of mandibles dentate, so that mandibles quadridentate; frons and area between antennae well convex | <i>imaii</i> |
| 4. First segment of flagellum longer than broad, indistinctly longer than next segment; apical margin of 6th tergum weakly emarginate in middle | <i>orientalis</i> |
| First segment of flagellum as long as broad, slightly shorter than next segment; apical margin of 6th tergum deeply emarginate in middle | <i>imaii</i> |

Liberation of *Osmia imaii* in the Hakozaki campus of Kyushu University

On February 22, 1973, I received a number of cocoons of *Osmia imaii* from Mr. Imai, which were shared for me, according to my request, from a stock gathered by him in Yashiro-machi, Kato-gun, Hyogo Pref. in 1972. From this material, I picked up 49 females and 22 males, put them into 11 reed tubes in a manner close to a natural condition, and set them in an open box along with 4 bundles of 95 reed tubes in total. The reed tubes were 46 mm in inner diameter and about 30 cm in length having a joint at about the middle of each of them. Thus, the potential number of reed tubes for nesting were 190 for the 49 females. The box was then nailed down onto the wall of a wooden house, which was faced to the east, in the Hakozaki campus of the Faculty of Agriculture, Kyushu University on the same day (Fig. 2).



Fig. 2. Trap nest used for *Osmia imaii*.

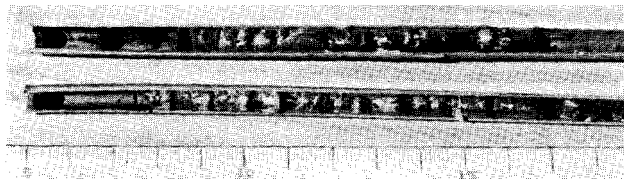


Fig. 3. Insides of two nests of *Osmia imaii*.

The aim of the liberation of this species in the university campus was (1) to observe its nesting habits, and (2) to know whether this species can be successfully managed or not.

The winter of this year was unusually warm and no snow fall was observed in Fukuoka City. Toward the beginning of March, *Brassica* began to bloom in the experimental fields of the campus.

On April 20, I observed no less than half a dozen fresh females were entering into the reed tubes of their own with yellow pollen loads. It was clear

that the females of *Osmia imaii* were attracted to the flowers of *Brassica* for pollen and nectar, because they were full in bloom nearby the trap nest at that time. Some of the females were seen still entering in the trap nest on April 27. Neither daily activities of females nor developmental stages of this species were observed this year. Observations on the biology of this species may be published by Mr. Imai in detail.

The trap nest was left afield until September 27 when I examined all the reed tubes and found that 18 tubes were utilized. Insides of two nests were shown in Fig. 3. It is noteworthy to report here that the cell partitions of this species were made of chewed plant leaves, not of mud like *O. (Osmia) excavata* or *O. (Osmia) cornifrons*.

From the 18 nests, I obtained 36 females and 32 males in total. They were already in the adult stage by the time of dissection on September 27. Thus, the yielding of descendants was rather poor in this year's experiment considering the number of females liberated (49 females). All the descendants were again put back to the field until October 1. Observations will be done successively on this material.

In summary, *Osmia imaii* is an univoltine species flying in late spring, nests in the tubes and hibernates in the adult stage like other Japanese species of *Osmia sensu stricto*. It seems probable that *Osmia imaii* will be established in the university campus, Fukuoka City.

Acknowledgment: I am grateful to Dr. Ishikawa and Mr. Imai for the disposal of specimens. My thanks are also due to Dr. Kunio Iwata of Kobe City who forwarded the specimens of *imaii* for identification. Finally but not least, I am much indebted to Dr. Jerome G. Rozen, Jr., American Museum of Natural History, New York, for the loan of the type female of *Osmia pieli* Cockerell for comparison with *imaii*.