

SOME CRABRONIDS FROM SHIKOKU, JAPAN
(HYMENOPTERA: SPHECIDAE)⁽¹⁾

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During the course of review of the Crabronid-examples preserved in the collection of the Entomological Institute of the Hokkaido University the writer found a considerable number of specimens from Shikoku remained unrecorded. The present paper is based chiefly upon this material. The examples were collected in the main by Mr. Yuzo Sugihara in Kochi Prefecture and comprised several species which seemed of interest from the point of view of the geographical distribution of this group of wasps.

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In the following pages the species marked with an asterisk are new to the known fauna of Shikoku and localities given in italics represent the first recorded location of the species concerned.

1. *Ectemnius (Metacrabro) iridifrons* (Pérez, 1905)

Crabro iridifrons Pérez, 1905, p. 154; Yasumatsu, 1950, p. 1480.

Crabro (Crabro) iridifrons Kohl, 1915, p. 45; Iwata, 1933, p. 8; 1933 b, p. 81; Shibuya, 1933, p. 8; Yasumatsu, 1942, p. 87; Tsuneki, 1947 a, p. 232 1947 b, p. 398.

Specimens examined: 4 ♀♀, Kochi Pref. (Tebako-yama), 20. VII. 1931 (Y. Sugihara leg.); 1 ♀, Kochi, 1. IX. 1936 (H. Okamoto leg.); 1 ♂, Kochi Pref. (Shiraga-yama), 24. VII. 1930 (Y. Sugihara leg.).

Habitat: Korea, Honshu, Kyushu, Shikoku and Hokkaido.

Biology: Shibuya, K. (1938). In Hokkaido, this species nidificates in decayed wood of dead trees and stores the brood-cells with Dipterous insects belonging to Anthomyidae and Tachinidae.

2. *Ectemnius (Clytochrysus) mizuho* sp. nov.

Crabro (Clytochrysus) nigratarsus Herrich-Schaeffer f. *mizuho* Tsuneki, 1948 b, p. 400.

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E. mizuho, is not such a species as has been found for the first time during the present study, but a species that has been long known erroneously under another specific name. The wasps belonging to the newly erected species have been placed by all the taxonomists hitherto dealing with the examples under the name, *Crabro nigratarsus* H.-Schaef. Kohl, in his monograph of the Palae-arctic species (1915), paid no notice to the structural distinctions among his "Japanische Stücke", although he referred to some differences of the examples in the yellow markings on the thorax and legs. Iwata (1938) only followed his opinion. The present writer (1948 b) also treated them merely as one of the various colour forms of the same species and named the Japanese form as *C. nigratarsus* f. *mizuho*. According to the later investigations, however, it was affirmed that there was no intermediate form between them, although a great number of specimens from many districts of Japan and the adjacent regions were examined. On the other hand, it was observed in nature that the both forms lived within the same locality. The fact made the writer suspect that the taxonomical rank they had been assigned was erroneous and led him to the detailed re-examination of their structural differences. The result convinced him that f. *mizuho* merits designation as a valid species not only by reason of its different pattern of yellow markings of the body, but also on the basis of its structural distinctions. The differences found between the two species are as follows:

♂. 1) In *E. mizuho*, vertex somewhat convex, slightly more largely punctured, with the surface less shining; frontal median furrow in front of anterior ocellus very feeble. In *E. nigratarsus* vertex flattened, punctures somewhat finer, with the surface more shining; frontal furrow rather deep, the area on both sides fairly remarkably inclined toward the furrow. 2) The tooth produced on the inner margin of mandible comparatively larger in *miz.* than in *nigr.* 3) Clypeus with the produced median portion truncate at the apex in *miz.*, while in *nigr.* the portion distinctly emarginated. 4) In *miz.* punctures on mesopleuron distinctly larger and sometimes subrugosely disposed, always with the upper portion striated; in *nigr.* they are comparatively finer, somewhat sparser and without striae on any portion. 5) Medial longitudinal furrow on the posterior surface of propodeum more broadly open in *miz.* than in *nigr.* 6) Pygidial area rounded at the apex in *miz.*, but truncate in *nigr.* 7) Yellow markings in *mizuho*: Scape of antennae, medianly interrupted band on pronotum, a spot on each side of abdominal tergites 2, 3 and 4, L-shaped macula on mid femora, a broad ring on the lower portion of hind tibiae and tibial spurs; sometimes also humeral angles and axillae of scutellum and rarely two spots on postscutellum. Differences in *nigr.* (in the form occurring in Japan): Pronotum and mid legs black, abdominal tergites 5 and 6 always adorned with a yellow band respectively, lateral marks on tergites 3 and 4 very small. 8) Genitalia and the last ventral plate of abdomen similar in both species, except the slight difference in color: In *miz.* yellowish brown and in *nigr.* dark brown.

♀. Similar to the case in ♂. Special remarks: 1) Difference in punctuation on mesopleuron not so remarkable as in ♂. 2) Difference of characters of propodeum more remarkable: in *miz.*, posterior surface flattened and medianly sharply grooved, with the lateral carinae definable up to above the middle of the segment; in *nigr.*, the portion rounded and remarkably inclined toward the medial groove, lateral carinae distinct only on the apical portion of the segment. 3) No difference on pygidial area. 4) In colour similar to ♂ in *miz.*, except for the mandibles partly adorned with yellow. Differences in *nigr.*: Thorax, mid legs and abdominal tergites 3 and 4 always lacking any marking, while tergite 5 always with two spots or a band.

Holotype: ♂, Hokkaido (Sōunkyō), 7. VII. 1944. **allotype:** ♀, Hokkaido (Sōunkyō), 22. VII. 1947 (K. Tsuneki leg.).

Other specimens examined: 63 ♂♂ 117 ♀♀, Hokkaido, Saghalien, Honshu and Shikoku. A specimen from Shikoku: 1 ♂, Kochi Pref. (Kamegamori-yama), 15. VII. 1931 (Y. Sugihara leg.).

Habitat: Saghalien, Hokkaido, Honshu and Shikoku.

Remarks: 1) In one bright coloured specimen (from Honshu) yellow marks beside the usual ones are as follows: Two spots on scutellum, a broad band on postscutellum, humeral angles, two large maculae on episternum, a streak on front femora and tibiae, and a large macula on mid legs. One male example from Hokkaido shows the yellow spots even on the 5th abdominal tergite, while in several male specimens from Honshu the 4th tergite is not adorned with yellow marks. In general in the male specimens the yellow band on pronotum tend to become small. 2) In our regions *E. nigritarsus* occurs more rarely as compared with *E. mizuho*, especially the male, and the male was once erroneously described by the writer (1947 b) as new under the name of *C. munakatai*, on the basis of characters different from those of *E. mizuho* which was believed at that time to represent a form of *E. nigritarsus*. 3) The true *E. nigritarsus* widely spreads over Europe, Siberia (including the Ussuri region), China, Korea, Honshu, Hokkaido and Saghalien, but is generally rather rare. 4) In the year 1933 Iwata recorded 2 ♂♂ 1 ♀ of *E. nigritarsus* from Ehime Pref. (NAMEDOKO). However, it is uncertain to which of the two species here compared the examples belonged.

3. *Ectemnius* (*Hypocrabro*) *schlettereri* (Kohl, 1888)

Crabro (*Solenius*) *schlettereri* Kohl, 1915, p. 72; Iwata, 1933, p. 10; 1941, p. 6; Tsuneki, 1947 a, p. 234; 1947 b, p. 403.

Specimens examined: 8 ♂♂ 2 ♀♀, Kochi Pref. (Uranouchi, Ananai, Kochi, Kajigamori-yama, Sakawa), 24. VI. - 16. IX. 1929-37 (Y. Sugihara, K. Oike, T. Wada, H. Okamoto, S. Earia leg.); 1 ♂, Tokushima Pref., date unknown (R. Ohgushi leg.); 3 ♀♀ Matsuyama, 12. V. 1947, 9. VII. 1948 (M. Miyatake leg.), 11. VI. 1952 (T. Edashige leg.).

Habitat: Europe, Siberia, Kashmir, North China, *Manchuria*, Korea, KUSHU, *Shikoku*, Honshu and Hokkaido.

Remarks: Among the specimens examined two males did not carry yellow

spots on the 4th tergite of the abdomen and in three others the spots became extremely small, while in another one a narrow band was observed on the 5th tergite.

Biology: K. Iwata (1941).

* 4. **Ectemnius (Hypocabro) rubicola (Dufour et Perris, 1840)**

Crabro (Solenius) larvatus Iwata, 1933, p. 10; 1933 b, p. 83; Tsuneki, 1947 b, p. 407; Maruyama, 1951, p. 10.

Solenius larvatus Iwata, 1933 a, p. 33.

Specimens examined: 2 ♂♂, Tokushima Pref., date unknown (R. Ongusui leg.); 1 ♀, Matsuyama, 2. VII. 1951 (T. Ishihara leg.).

Habitat: Europe, Siberia, Honshu, *Shikoku* and Hokkaido.

Biology: K. Iwata (1933 a), K. Maruyama (1951).

* 5. **Lestica (Lestica) heros (Kohl, 1915)**

Crabro (Ceratoctolus) heros Kohl, 1915, p. 120; Iwata, 1933 b, p. 84; Tsuneki, 1947 a, p. 286; 1947 b, p. 407.

Specimen examined: 1 ♂, Kochi Pref. (Irazu-yama), 2. VII. 1931 (Y. Suginara leg.).

Habitat: Korea, Honshu (1 ♂, Doai, Nagano Pref., 27. VII. 1931, S. Asahina leg.), Shikoku and Hokkaido.

Remarks: This is one of the rarest species of Crabronids. Only 3 ♀♀ 10 ♂♂ have ever been collected up to now. Out of the specimens listed above 1 ♀ 6 ♂♂ was assembled at Jōzankei, near Sapporo, through the efforts of the writer during 8 years. This indicates the rarity of the species. Therefore the specimens newly obtained from Shikoku and Honshu are valuable in themselves. But they are more valuable in view of the geographical distribution of the species. Because if such rare species as this occurred only in Korea and Hokkaido, such isolate distribution should require a particular explanation.

Biology: Unknown; but as the writer found wing scales of some Lepidopterous insects attached to the bodies of some of his examples, this species can be supposed to hunt moths as food for the larvae, as is usually the case in its allied species.

* 6. **Lestica (Clypeocrabro) reiteri (Kohl, 1915)**

Crabro (Ceratoctolus) reiteri Kohl, 1915, p. 119.

Crabro (Thyreus) reiteri kuramensis Iwata, 1933, p. 11; 1914, p. 3.

Crabro (Clypeocrabro) reiteri kuramensis Tsuneki, 1947 a, p. 285.

Crabro (Ceratoctolus) reiteri kuramensis Tsuneki, 1947 b, p. 402.

Specimen examined: 1 ♀, Kochi Pref. (Nagasawa), 21. VII. 1936 (H. Okamoto leg.).

Habitat: Korea, Honshu, *Shikoku* and Hokkaido.

Remarks: In his original description Kohl states that the sides of the propodeum of this species is "im ganzen wie bei *Clypeatus* matt infolge überaus feiner und dichter nadelrissiger Streifen, die nur bei stärkerer (60 facher) Vergrößerung einzeln sichtbar sind." In the year 1938, Iwata founded a new subspecies, *kuramensis* on the basis of the examples having the portion in question much more coarsely striated. In his previous papers the present writer followed his opinion. Recently, however, it comes to his mind that the fact that a subspecies of *L. reiteri* occurs in Kyoto and the district as well as in Hokkaido, while the type (♀) of the nominate race was captured in Tokio is quite questionable. So, in the opportunity of investigating the example from *Shikoku*, he examined carefully the material at his hand, 57 female specimens from Hokkaido, North Korea and Honshu. As the result he found that striation on that portion was considerably variable, with no connection whatever with the localities of the examples, including the states of both the forms at the extreme ends of variation, although the coarse striation was more frequently met with than the fine and dense one. According to the result *L. reiteri* occurring in our regions seems not deserving of splitting into subspecies.

Biology: K. Iwata (1941). The writer also observed five instances of the nidification of this species in Hokkaido. The wasps burrow their tunnels in decayed wood, sometimes utilizing a part of the old nest and store their brood-chambers exclusively with moths belonging in the main to small species of Noctuidae and Tortricidae. The preys are so packed in the brood-cell as to form an envelop with their wings, directing their bodies inward, as usually observed in the nest of moth-hunting Crabronids. The larva which is laid as the egg on the throat of one of the victims lying innermost, after devouring the preys, utilizes the envelope of the wings as a outermost layer of its cocoon. The number of preys per one cell ranges from 6 to 17. The number of brood-cells involved in one nest reaches as many as 25.

* 7. *Crossocerus (Acanthocrabro) vagabundus yamatonicus* (Tsuneki, 1947)

Crabro (Cuphocterus) vagabundus Iwata, 1933, p. 12.

Crabro (Blepharipus) vagabundus Gussakovskij?, 1933, p. 22; Iwata, 1933 b, p. 85; Tsuneki, 1947 a, p. 289.

Crabro (Acanthocrabro) vagabundus Masuda (det. by K. Yasumatsu), 1940, p. 33.

Crabro (Acanthocrabro) vagabundus yamatonicus Tsuneki, 1947 b, p. 498.

Crossocerus (Blepharipus) vagabundus Leclercq, 1950, p. 7.

Specimens examined: 2 ♀♀, Ehime Pref., 13. V. 1914 (Arakawa leg.).

Habitat: Korea, (the Ussuri region?), Saghalien, Hokkaido, Honshu and *Shikoku*.

Remarks: The present race has its subspecific distinction in the structure of front femora in the male. They are not provided with a spine on the under surface near the base which is characteristic of the nominate species. The latter is widely distributed over Europe, Asia Minor, Kashmir and Siberia.

Biology: H. Masuda (1940). The writer also observed several instances of nidification of this subspecies. The wasp, like the typical species, nest in decayed wood and store their brood-cells with Daddy-long-legs which are always amputated. In his previous paper (1947 b), however, the writer recorded that a wasp of this subspecies carried a moth to her burrow. In 1949, at Jōzankei, Hokkaido, he also observed a wasp of the subspecies transporting some unusual preys to her nest. On digging the burrow 9 preys were obtained which were stored in two cells of which one was yet in the course of provisionment. Out of the 9 preys 8 belonged to Rhagionidae (*Chrysopi* sp. and Gen. sp.) and the remaining 1 to the moth, Tortoricidae. This is a very aberrant instance of preys in this species and seems worthy of special notice.

* 8. *Crossocerus (Blepharipus) monstrosus suzukii* (Matsumura, 1912)

Crabro (Crossocerus) suzukii Matsumura, 1912, p. 169.

Crabro (Cuphocterus) monstrosus Gussakovskij (?), 1933, p. 21.

Crabro (Cuphocterus) serripes Iwata, 1933, p. 12.

Crabro (Cuphocterus) monstrosus-suzukii Iwata, 1933 b, p. 85; Tsuneki, 1947 b, p. 408.

Blepharipus monstrosus Yasumatsu, 1939, p. 377.

Specimens examined: 1 ♂ 4 ♀ ♀, Kochi Pref. (Kitagawa, Kochi, Shiraga-yama, Nagasawa), 25. V. — 26. VII. 1930-36 (Y. Sugihara, T. Wada, H. Okamoto leg.).

Habitat: Saghalien, (the Ussuri region ?), the Kuriles, Hokkaido, Honshu, Kyushu and *Shikoku*.

Remarks: The present subspecies differs from the nominate species in having the body maculated with milky-white instead of yellow. Also the maculae are somewhat different in pattern. The original race is known to occur in the eastern part of Russia and is said to be very rare. In Japan this subspecies is fairly common.

Biology: In Hokkaido this subspecies nidicates in rotten wood of dead trees and provisions the brood-cells with Dipterous insects belonging to Muscidae, Anthomyidae and Sarcophagidae.

* 9. *Crossocerus (Blepharipus) yanoi* (Tsuneki, 1947)

Crabro (Cuphocterus) yanoi Tsuneki, 1947 b, p. 409.

Specimen examined: 1 ♀, Kochi Pref. (Kajigamori-yama), 21. VI. 1936 (H. Okamoto leg.).

Habitat: Hokkaido and *Shikoku*.

* 10. *Crossocerus* (*Blepharipus*) *aino* (Tsuneki, 1947)

Crabro (*Cuphocterus* ?) *aino* Tsuneki, 1947 b, p. 413.

Specimen examined: 1 ♀, Mt. Ishizuchi, 28. VII. 1946 (T. Isihara leg.).

Habitat: Hokkaido, *Honshu* (Nikko, 1 ♀, date unknown, E. Tanaka leg.) and *Shikoku*.

* 11. *Crossocerus* (*Coelocrabro*) *capitosus* (Shuckard, 1837)

Crabro (*Coelocrabro*) *capitosus* Iwata, 1933, p. 12; Tsuneki, 1947 b, p. 416.

Specimen examined: 1 ♀, Kochi Pref. (Kajigamori-yama), 23. V. 1932 (Y. Sugihara leg.).

Habitat: Europe, Hokkaido, *Honshu*, Kyushu and *Shikoku*.

* 12. *Crossocerus* (*Crossocerus*) *yasumatsui* (Tsuneki, 1947)

Crabro (*Crossocerus*) *yasumatsui* Tsuneki, 1947 b, p. 424.

Specimens examined: 1 ♂, Kochi, 4. VII. 1929 (Y. Sugihara leg.); 1 ♂, Kochi Pref. (Hiro-oka), 21. VII, 1934 (H. Okomoto leg.).

Habitat: Hokkaido (Sapporo, Hakodate) and *Shikoku*.

Remarks: In the examples from *Shikoku* the yellow maculae on the clypeus are very large and there are two small spots on the pronotum.

* 13. *Crossocerus* (*Crossocerus*) *emarginatus* (Kohl, 1915)

Crabro (*Crossocerus*) *emarginatus* Kohl, p. 260; Iwata, 1933 b, p. 83.

Crabro (*Crossocerus*) *pacificus* Gussakovskij, 1933, p. 25; Yasumatsu, 1942, p. 89; Tsuneki, 1947 a, p. 290.

Crabro (*Crossocerus*) *emarginatus* Kohl f. *pacificus* Tsuneki, 1947 b, p. 432.

Specimen examined: 1 ♂, Kochi (Kamegamori-yama), 15. VII. 1932 (Y. Sugihara leg.).

Habitat: North Mongolia, Korea, the Ussuri region, Saghalien, Hokkaido, *Honshu* (many examples, Nikko and Nasu, Tochigi Pref., E. Tanaka, S. Usuba leg.), *Shikoku* and Yaku-shima.

Remarks: When the writer studied the Crabronids from Korea he felt doubtful about the validity of *C. pacificus* Gussakovskij known from the Ussuri region and gave some discussion concerning the taxonomical relationship between this species and *C. emarginatus* Kohl. According to the further investigations with a good series of specimens from Saghalien, Hokkaido and *Honshu* it was confirmed that the distinctions assigned to *C. pacificus*, namely the striation on the area cordata of the propodeum and yellow maculae beneath the chin, were quite variable and should be included within the range of variation of *C. emarginatus* Kohl. To speak from the specimens of our regions, however, characters ascribed to *C. emarginatus* represent rather an uncommon status. In the example from *Shikoku* the striae on the area cordata were well developed, but the maculae beneath the head near the base of the mandibles completely disappeared.

14. *Rhopalum (Latrorhopalum) latronum* (Kohl, 1915)

Crabro (Rhopalum) latronum Kohl, 1915, p. 344; Iwata, 1933, p. 14; 1933 b, p. 83; Tsuneki, 1947 b, p. 423.

Rhopalum latronum Yasumatsu, 1950, p. 1430.

Rhopalum (Latrorhopalum) latronum Tsuneki, Jour. Fac. Sci. Hokkaido Univ., Ser. VII, Zool., 1952. (Now in press).

Specimens examined: 1 ♂, Kochi Pref. (Kamegamori-yama), 15. VII. 1931 (Y. Sugihara leg.); 1 ♂ 1 ♀, Kochi Pref. (Kajigamori-yama), 1-5. VIII. 1934 (H. Okamoto leg.).

Habitat: Saghalien, Hokkaido, Honshu and *Shikoku*.

Remarks: As to the subdivision of the genus an account will be given in the writer's paper which is at the moment of writing in press.

References

- Gussakovskij, V. 1933 Verzeichniss der Herrn Dr. R. Malaise im Ussuri und Kamschaka gesammelten aculeaten Hymenopteren. Ark. Zool., 24 A (10): 1-66, 23 Figs.
- Iwata, K. 1933 Beitrag zur Kenntnis der Gattung *Crabro* Fabricius aus Japan (Formosa und die Ryukyu Inseln ausgenommen). Trans. Kansai Entom. Soc., 4: 7-16; 1933 a Habits of some Japanese Pempheconids and Crabronids. Mushi, 11 (1): 20-41, 7 Figs. 1 Pl; 1933 b Die Crabronen aus den Kurilen, Saghalin und Hokkaido. Ins. Mats., 12 (3 & 4): 81 - 88; 1941 Habits of some Japanese Crabronids. Mushi, 14 (1): 1 - 7, 6 Figs.
- Kohl, F. F. 1915 Die Crabronen der Paläarktischen Region. Ann. k. k. Nat. Hist. Hofmus. Wien, 29; 1 - 452, 86 Figs., 14 Taf.
- Leclercq, J. 1950 Remarques sur les *Crossocerus* du sous-genre *Blepharipus* Lapeletier et Brullé, 1834 (Syn. *Acanthocrabro* Perkins, 1913) (Hym. Sphecidae, Crabroninae). Bull. Inst. Sci. Nat. Belg., 26 (28): 1 - 10, 1 Fig.
- Maruyama, K. 1951 Takeni-gusa no ginguchi-bachi (The Crabronid nesting in the living stem of a noxious plant, *Macleaya cordata* R. Br.). Shin-Konchu, 4 (8): 10 - 11, 4 Figs. (in Japanese).
- Masuda, H. 1940 Biological notes on *Crabro (Acanthocrabro) vagabundus* (Panzer, 1798) (Hymenoptera, Crabronidae). Mushi, 13 (1): 33 - 39, 1 Pl. (in Japanese).
- Shibuya, K. 1938 Notes on the nesting-habits of *Odynerus (Ancistrocerus) shibuyai* Yasumatsu and *Crabro (Crabro) iridifrons* Pérez from Japan (Eumenidae and Crabronidae). Mushi, 11 (1): 1 - 10, 4 Figs.
- Tsuneki, K. 1947 a Crabronidae fauna of Korea. Jour. Fac. Sci. Hokkaido Univ., Ser. VII, Zool., 9 (3): 281 - 295, 1 Fig; 1947 b On the wasps of the genus *Crabro* s. l. from Hokkaido, with descriptions of new species and subspecies (Hymenoptera). Ibid., 9 (4): 397-435, 5 Figs.
- Yasumatsu, K. 1939 Hym. in Ins. Jap. Ill. Icon., Tokyo; 1942 Contribution to the knowledge of the Crabronidae-fauna in Eastern Asia (Hymenoptera). Mushi, 14 (2): 87-97, 2 Pls; 1950 Hym. in Icon. Ins. Jap., Ed. 2, Tokyo.