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CHANGE OF THE TAXONOMIC POSITION OF THREE SPECIES OF  
CRABRONINI OCCURRING IN JAPAN  
WITH NOTES ON SOME SPECIES (HYM., SPHECIDAE)

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CRABRONINI OCCURRING IN JAPAN  
WITH NOTES ON SOME SPECIES (HYM., SPHECIDAE)\*

By K. TSUNEKI

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1. Genus *Towada* nov.

Genotype: *Crossocerus* (*Crossocerus* ?) *leclercqi* Tsuneki, 1959.

References:

*Crossocerus* (*Crossocerus* ?) *leclercqi* Tsuneki, Akitu (Kyoto), VII: 83, 1959 (♀).

*Piyumoides leclercqi*: Tsuneki, Ins. Matsumurana (Sapporo), XXVI (2): 103, 1963 (♀).

*Piyumoides* (?) *leclercqi*: Tsuneki et Tano, Life Study, XIII (1-2): 32, 1969 (♀).

The new genus is most closely allied to *Piyumoides* Leclercq, 1963, in which it has been included until now. Reinvestigation of the increased number of the specimens made it better to separate *leclercqi* from *Piyumoides* at the generic rank, rather than to enlarge the category of *Piyumoides* to receive *leclercqi*. So the genus *Towada* was newly erected. The differences of this genus from *Piyumoides* are as follows:

- (1) Antennal scape ecarinate.
- (2) Occipital carina not open at the end, but completely reaches the hypostomial carina, with a short interval between both the ends.
- (3) Collar of pronotum always distinctly separated from mesonotum by a deep furrow, the raised portion in lateral view narrow on top, obliquely inclined anteriorly (without the medial notch as in *Piyumoides*).
- (4) Abdominal segment 1 only slightly longer than wide at apex, not so constricted before segment 2 as in *Piyumoides*.
- (5) Pygidial area (♀) at the apical half laterally margined by the carina and medianly bluntly raised, with the surface finely granulate, mat.
- (6) Lacking of the fine crenulated groove along the inner orbits of eyes (from frons to base of mandible).

However, the structure of the frons and clypeus, length relation between antennal joints 3 and 4 and frontal impression (very indistinct) as in *Piyumoides*.

Other characters: Ommatidia of eyes very large at the fore side and very small at the upper and lateral portions, the difference is extraordinary. The first and second abscissae of cubital vein of the fore wing subequal in length. (Propodeum without enclosed area cordata, smooth and shining). Male characters unknown.

*Distribution*: Endemic to Japan (Hokkaido and northern half of Honshu).

2. A new subgenus of *Ectemnius*, *Ceratocrabro* nov.

Type: *Ectemnius* (*Nesocrabro*) *shimoyamai* Tsuneki, 1958.

\* Contribution No. 145 from the Biological Laboratory, Fukui University, Japan.

## References:

- Ectemnius* (*Nesocrabro*) *shimoyamai* Tsuneki, Kontyu, XXVI (4): 197-199, 1958. (♀).  
*Ectemnius* (? *Nesocrabro*) *shimoyamai*: Yoshimoto, Pac. Ins., II (3): 301, 1960.  
*Ectemnius* (*Nesocrabro* ?) *shimoyamai*: Tsuneki et Tano, Life Study, XIII (1-2): 30, 1969.

In his 1960 paper Dr. C. M. Yoshimoto threw doubt regarding the allocation of *Ectemnius shimoyamai* within the subgenus *Nesocrabro*, and later kindly sent to me 1 ♀ 1 ♂ of *E. (Nesocrabro) rubrocaudatus* for study. Close comparison revealed a considerable difference between this and mine which seemed to justify their separation at the subgeneric level. Since that time I have waited to obtain the male of *shimoyamai*, but until now it remains undiscovered. In order to avoid to use the improper name further I propose on this occasion a new subgeneric name to receive *shimoyamai* correctly.

According to the prevailing keys of the genera of Crabronini *Ceratocrabro* can not be assigned to *Ectemnius*, since it has the very distinct and deep frontal impressions. But the sculpture of the thorax and general other characters agree with those of *Ectemnius*, so I dealt with the character of the frontal marks as exception and placed *Ceratocrabro* within the range of *Ectemnius*. However, there remains still some doubt regarding the taxonomic rank of this group, because its frontal and clypeal structure is quite exceptional to the group of *Ectemnius* and if there were not the existence of *Nesocrabro* that shows the intermediate state in the feature of the inner orbits *Ceratocrabro* might be raised to the generic rank without question. In this the inner orbits of the eyes are widely separated from each other and run almost parallel to each other; the clypeus possesses three short horns on the surface of the median lobe (not at the anterior margin, though the lateral two are close to the margin).

Subgeneric characters: Mandibles tridentate at apex, with only a slight swelling on inner margin, without the stout tooth, Clypeus on the surface of the median lobe with three teeth (Fig. 1), at the anterior margin of the lateral lobes with a comparatively broad lamella, lower frons broad, with inner orbits of the eyes run almost parallel to each other (*vide* figures in the original description of *shimoyamai*), oculoantennal distance twice as great as the width of the antennal socket, facial basin polished, with a small Y-shaped carina on lower portion, antennal scape unicarinate, joint 3 longer than 4, frontal impressions distinct, deep, but far smaller than the usual case of *Ectemnius* s. l., no transverse carina at the verge of the upper frons, ocelli in a curved line, posterior part of the front ocellus cuts the supposed line connecting the anterior margins of postocelli, collar of pronotum anteriorly acutely edged, without the median notch, abdomen dorso-ventrally somewhat flattened, strongly tapering towards the apex, pygidial area normal to the genus, in fore wing second abscissa of cubital nervure one third as long as the first and equal to the transverse cubital nervure; femora of legs incrassate. Lower frons and clypeus rather sparsely covered with long silvery hairs, the surface well visible, on clypeus they are erected.

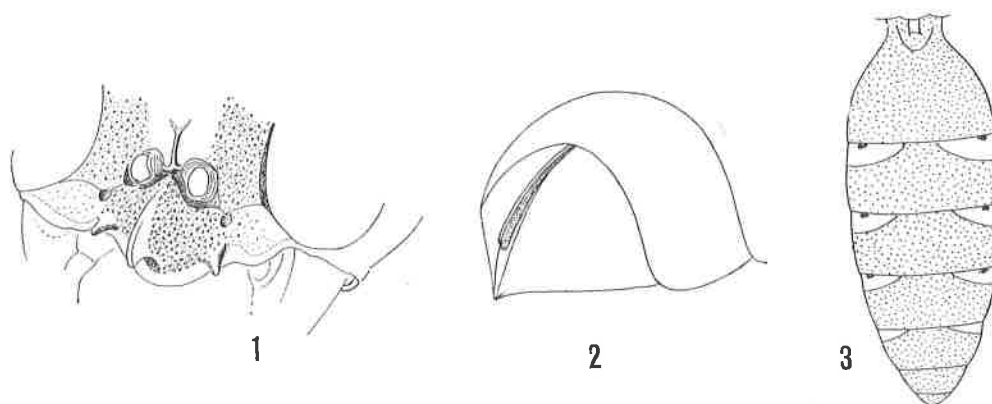
♂, unknown.

*Distribution*: Endemic to Japan (northern part of Honshu).

### 3. *Crossocerus congener* Dhlb. found in Japan is a subspecies

Recent reinvestigation of the Japanese specimens of *Crossocerus (Ablepharipus) congener* Dahlbom confirmed that they are different in some characters from those of the European and are better to be treated as a geographical race.

*Crossocerus (Ablepharipus) congener fukuimensis* subsp. nov.



Figs. 1-3. 1: Clypeus of *Ectemnius (Cerato crabro) shimoyamai* Tsuneki. 2: Pygidial area of an aberrant form of *Rhopalum (Calceorhopalum) calceatum* Tsuneki. 3: Abdominal maculation of *Crossocerus (Coelocrabro) walkeri* occurring in Japan.

The differences are as follows:

(1) Vertex and upper frons very delicately microreticulate (fairly shining) and furthermore, finely, sparsely but distinctly punctulate (according to the key by Leclercq, 1949, in the European specimens the punctures are completely lacking on the area). (2) Mesopleuron on central part broadly without or with very weak microsculpture, fairly strongly shining. (3) Apical portions of fore and middle femora fairly broadly and basal half of hind metatarsi distinctly yellow.

♀. Length 5.5-7.0 mm. Black, without bronzy shine. Yellow: Scapes of antennae in front, sometimes two spots or medianly interrupted band on collar of pronotum (usually lacking), knees broadly, tibiae except inside and tarsi of fore and middle legs, hind tibiae at base and basal half of hind metatarsi (often light brown).

♂. Length 4.5-6.5 mm. Colour and punctuation are similar to ♀, but fore femora except dark brown posterior side and yellow apex almost wholly ferruginous red, and antennal flagellum beneath ferruginous. Clypeus with medial protuberance as in ♀ or as in *podagricus*, but the lateral teeth very feeble, almost lacking, antennal joint 3 approximately 1.3 times as long as broad at apex, flagellum beneath fringed with white pubescence, not very long but distinct, joints 3-13 beneath provided with tyloidea, on mesopleuron precoxal tooth present, hind tibia clavate, almost without the outside spines, only occasionally a few very weak short spines observable, but the trace of their basal tubercles always present. Head beneath, pro- and mesosternum and underside of coxae and basal half of femora of fore legs densely covered with long, silky white pubescence.

Holotype: ♂, Arashi, Fukui Pref., 2. VI. 1966, K. Tsuneki leg.

Paratypes: 10 ♀♀ 10 ♂♂, Koike and Arashi, Fukui Pref., 4. VI. 1956 - 5. IX. 1970, K. Tsuneki leg.

Other specimens: A number of males and females from Hokkaido and northern half of Japan proper

#### 4. An aberrant form (mutant ?) of *Rhopalum calceatum* Tsuneki

A female specimen of *Rhopalum (Calceorhopalum) calceatum* m. that I captured on the

20th of September, 1970, on the leaf of a shrub sprinkled with aphides' nectar found at the lane side near the village of Arashi, Fukui Prefecture, had an abnormally structured pygidial area. The median longitudinal carina was strikingly developed, while the lateral carinae were completely disappeared, leaving no trace of even the obtuse edge (Fig. 2). The petiole of the abdomen was less claviform than usual, only weakly convergent towards the apex, with the contiguous part with segment 2 broader than in the most of the specimens.

The characters are quite tempting for the foundation of a new species on their bases. On other characters, however, there could be no note-worthy difference observed from those of *R. calceatum*. A male specimen captured at the same place about 4 weeks before (26. VIII.) had the similarly built petiole of the abdomen, but otherwise quite identical with other males of *calceatum*. I reexamined the petiole of a number of specimens of this species and found that the form of the segment was more or less varied among them.

Possibly the female may be a mutant. Under the condition that only a single specimen is obtained, however, the erection of a new species is unnecessary.

##### 5. On the abdominal maculation of *Crossocerus walkeri* occurring in Japan

In the paper collaborated with E. Tanaka (1955) on the Crabroninae collected in Nikko we pointed out that some of the specimens carried yellowish white or white maculae on tergites and sternites of the abdomen. Since that time I could collect a fair number of specimens of this species from various parts of this country and confirm that the appearance of the maculae on the abdomen, though quite exceptional in the group of *Coelocrabro*, was not a rare phenomenon among the members of this species found in Japan. Further, it was also discovered that the specimens carrying maculae on the abdomen, especially the males, very frequently had the head and thorax also unusually broadly yellow-maculated.

When appear the maculae on the abdomen can be varied in number from one to five pairs, most usually 2 (♀) and 3 (♂) pairs, appearing on tergites 2 and 3, and 2, 3 and 4, rarely also on tergite 1 and 5, in the last case, however, always as a small spot. In the well developed case the maculae are transversely, fairly broadly enlarged and very conspicuous, always locating at the anterior part of the tergite, those on tergite 2 being the largest and by degrees smaller posteriorly (Fig. 3). In the less developed case the maculae are nearly rounded. In the male when the maculae on the tergites are well developed some sternites are also whitish maculated.

Table 1. Variation in the appearance of the abdominal maculae of *Crossocerus walkeri* locally seen. (Numerals in upper line show the number of pairs).

Locality	Pref.	♀					♂						
		0	1 <sup>1)</sup>	2 <sup>2)</sup>	3 <sup>3)</sup>	4	0	1	2 <sup>2)</sup>	3 <sup>3)</sup>	4 <sup>5)</sup>	5 <sup>6)</sup>	
Jozankei	Hokkaido	-	-	-	-	-	2	-	-	-	-	-	-
Towada	Aomori	-	-	1	-	2 <sup>4)</sup>	-	-	1	-	-	-	-
Kuzukawa	Aomori	1	-	-	-	-	-	-	-	-	-	-	-
Sendai	Miyagi	-	-	-	-	-	-	-	1	-	-	-	-
Senjo-hara	Tochigi	3	-	12	2	3 <sup>5)</sup>	-	-	-	14	3	-	-
Shobu-hama	Tochigi	11	1	2	1	-	3	-	1	-	-	-	-
Simajima	Nagano	1	-	-	-	-	-	-	-	-	-	-	-
Chugu spa	Isikawa	-	-	-	1	-	-	-	-	1	-	-	-
Ichinose	Isikawa	5	1	-	-	-	-	-	-	-	-	-	1
Koike	Fukui	1	1	-	-	-	-	-	-	-	-	-	-
Arashi A	Fukui	-	-	1	4	1 <sup>4)</sup>	-	-	-	-	-	2	-
Arashi B	Fukui	1	-	-	-	-	-	-	-	-	-	-	-

Remarks. 1) Tergite 2 only. 2) Tergites 2 and 3. 3) Tergites 2, 3 and 4. 4) Tergites 1, 2, 3 and 4. 5) Tergites 2, 3, 4 and 5. 6) Tergites 1, 2, 3, 4, and 5.

In this case, however, they are not paired and not always distinct on the outline. Usually they occupy the broad central area of sternites 2-4, also the largest being on sternite 2 and smallest on sternite 4. In some case when the marking appears on sternite 2 alone it is divided in two rounded spots and fairly sharply outlined. In the female the sternites are, as a rule, not maculated, only in one specimen sternite 3 carries a pair of distinct white markings.

When the head and thorax are well maculated the maculae appear as follows (in the following descriptions and also in the tables the yellow on clypeus and humeral tubercles in both sexes and on mandibles in males is placed out of consideration, because it is invariably met with in every related specimen):

The striae along the inner orbits are fused together, only leaving the upper parts as spurs, turning as a whole into Y-shaped, underside of the head up to lower third of the temples, a large spot on nape (usually concealed under the head) and on mesonotum medio-posteriorly, collar and humeral tubercles wholly, a patch on antero-lateral corners of mesonotum, a spot on wing tegulae, scutellum and postscutellum wholly, two medium-sized spots on area cordata, underside of thorax broadly up to the lower third of mesopleuron, including whole the space of epicnemium and prepectus (sens. the area anterior to the anterior oblique furrow), antennal

Table 2. Distribution of the colour pattern types of the anterior body of *Crossocerus walkeri* locally seen (numerals indicate the number of individual).

Locality	Pref.	Sex	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Jozankei	Hokkaido	♂	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
Towada	Aomori	♂	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-
"	"	♂	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Kuzukawa	"	♂	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Sendai	Miyagi	♂	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Senjo-hara	Tochigi	♂	-	-	-	-	-	-	-	-	1	-	1	1	1	9	7
"	"	♂	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shobu-hama	"	♂	-	-	-	-	-	4	-	1	5	4	-	-	-	-	1
Simajima	Nagano	♂	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Chugu spa	Isikawa	♂	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
"	"	♂	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Ichinose	"	♂	-	-	-	-	-	2	1	1	1	1	-	-	-	-	-
"	"	♂	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Koike	Fukui	♂	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Arashi A	"	♂	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-
"	"	♂	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
Arashi B	"	♂	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-

Type A: Maculae maximum as explained in the text, only lacking those on antero-lateral portion of mesonotum and on area cordata.

Type B: maculae as in A, only lacking that on postscutellum.

Type C: Genal area (area just behind base of mandible), collar, antero-lateral marks on mesonotum, tegula, epicnemium, prepectus, scutellum, postscutellum and 2 marks on sternite 2.

Type D: Maculated as in C, but yellow of epicnemium and prepectus turned into small mark respectively.

Type E: Genal area, collar (band or two spots), scutellum and postscutellum (both either wholly or partly).

Type F: As in E, but genal mark lacking.

Type G: Collar and Scutellum (either wholly or in part).

Type H: Collar and postscutellum (ditto).

Type I: Collar alone.

Type J: None except the fundamental maculae.

Type K: Gena, nape, collar, scutellum, prepectus, 2 spots on area cordata and a pair of marks on sternite 3.

Type L: As in K, but maculae on sternite 3 lacking.

Type M: Gena, nape, collar, scutellum, a spot on prepectus.

Type N: Gena, nape, collar (two spots) scutellum (a spot).

Type O: Gena, nape, collar (two spots).

scapes wholly, fore and middle legs nearly wholly (a narrow streak on femora and tibiae of fore legs black or dark brown) and greater part of hind legs (inside of femora, a patch on tibiae and 3 apical joints dark brown).

Of the maculae listed above those on the area cordata are, so far examined, confined to the female alone and appear only rarely, while the case wherein the lower frons is completely yellow and the underside of the head and thorax is broadly (including the epicnemium and prepectus) yellow is only met with in the male. The last fact is also true with respect to the maculae on the mesopleuron and mesonotum.

Appearance of the abdominal maculae locally arranged is shown in Table 1.

According to this, though the material is mostly too meagre to draw any general conclusion, the appearance of the abdominal maculae seems to be not at random. The instances from Senjogahara and Shobugahama, both Nikko, give us an interesting suggestion in this regard. Both the places are close together, being separated by the Ryudzu-fall, the former being located upper and by about 100 m above the latter. The wasps living in the first place nested in the dead twigs of *Deutzia scabra* Thunb. or of *Quercus crispula* Bl., standing along the brook, Yugawa, where the surroundings were open and well shined by the sun, while those found in the second place nest in the dried branches of *Diervilla japonica*, growing at the shaded place along the brook or the lake shore covered with tall wood.

The specimens obtained from the cocoons found in the nests made in the first place (Senjogahara) are far more brightly maculated than those gotten from the nests or taken at the second place (Shobugahama). In the former only 3 specimens were immaculated on the abdomen and 34 distinctly and broadly maculated, while in the latter 14 specimens were immaculated and only 5 were more or less maculated. The maculated individuals in the former reach 92 % and in the latter only 26 %. A similar relationship is perceived to occur with respect to the maculation of the anterior body (Table 2). I think further that the same relation may also exist in regard to the specimens from Arashi, because post A is shiny, but post B is shaded, though the latter material is too scanty.

The abdominal maculae of the specimens from Senjogahara are always well developed and transversely lengthened and different in this respect from the nearly rounded maculae from other localities, with only a single exception of the specimen from Sendai in which the maculae are close in form to those of Senjogahara.

The colour pattern types of the head and thorax-complex are locally given in Table 2. Types A-E appeared mainly in the male and types K-O solely in the female, while types F-I in both. Generally speaking, the development of the maculae between the two parts here divided, that is to say, the abdomen on the one hand and the head and thorax on the other, is rather proportional and it is better in the male than in the female. Locally seen the specimens from Senjogahara and Sendai are in the well developed state of the maculae close together, as above stated.

The frontal streaks are in types A and B (both ♂) fused together into Y-shape, while in the well maculated females the streaks are markedly extended upwards over the frontal edge of the upper frons into the dorsal aspect of the head. The medio-posterior macula of the mesonotum (♂) is fairly large, nearly as large as the tegula of the wing.

However, the appearance of the particular maculae is macrodistributionally quite at random and can not be arranged in a cline, or as a character of the inhabitants of a certain locality. Japan, or Honshu, as a whole can be taken as a particular locality, but the inhabitant can not be classified as a local race, because to do so the exception is too large.

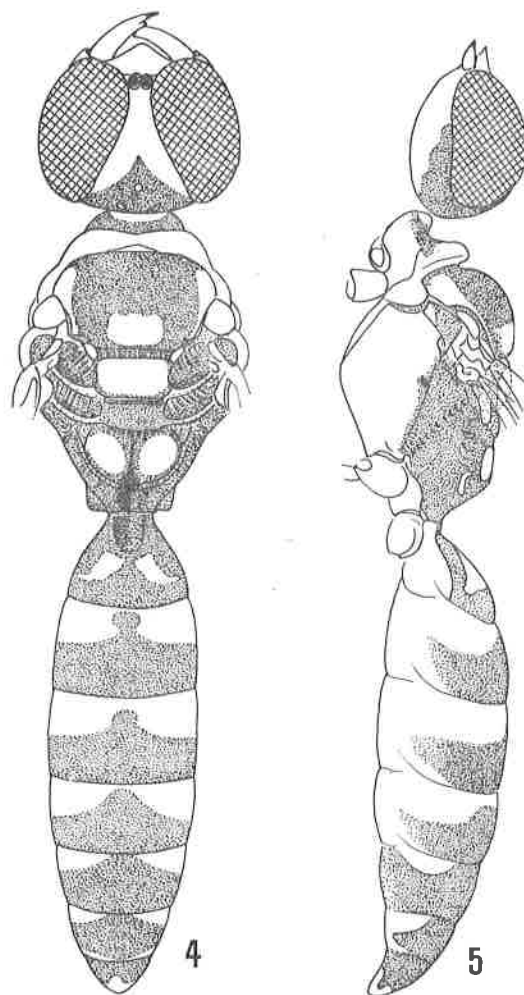
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## Addendum

During the proof reading I could have observed a male specimen of *Crossocerus walkeri* (Shuckard) which was the brightest maculated of all that I ever met with. In the following the coloration of the specimen will be put on record.

Yellow are mandibles except apex, clypeus and scape wholly, greater part of joint 2, underside of joints 3-8, a broad Y-shaped mark occupying whole the lower frons and reaching upwards the frontal impressions, temples up to two thirds from below, a large mark on nape (usually hidden under the occiput), collar and humeral tubercles wholly, prosternum, lateral surface of pronotum nearly wholly, a large mark on each antero-lateral corner of mesonotum, extending posteriorly along the lateral margin of the scutum as a stripe to the axilla, a large mark on posterior portion of mesonotum, axillae, scutellum except the lateral impressed areas and anterior furrow, a spot on transparent yellowish tegulae, base of wings except a central brown spot, mesosternum, mesopleuron except hypoepimeral area, metasternum, two large marks on area dorsalis almost occupying whole the space, abdominal maculae on each tergite and sternites nearly wholly as given in Figs. 4 and 5. Legs except a narrow stripe on fore femora and tibiae and



A brightest coloured male specimen of *Crossocerus walkeri* (Shuckard).



outer side on apical two thirds of femora and a spot on tibiae of hind legs.

The specimens: ♂, Mt. Kanagura, Ojiya-shi, Niigata Pref., 19. VIII. 1970, K. Yamagishi leg. (in the coll. of Mr. H. Yamada, Nagoya.).

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