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**STUDIES ON THE FORMOSAN SPECIDAE (IX)
A SUPPLEMENT TO THE SUBFAMILY SPHECINAE (HYM.)**

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In my second visit to Formosa from June 10 to August 31, 1968, my collection was rather selectively made. The species that were clarified to be common by the first visit were not abundantly captured, while those which were known to be rare or uncommon were particularly pursued. As for Sphecinae, therefore, *Sphex haemorrhoidalis* (= *S. subtruncatus*: van der Vecht, 1947), *S. sericeus* (though a fair number were captured), *Ammophila clavus*, *Sceliphron madraspatanum*, *S. inflexum* etc. were not all captured that could be done so. On the other hand, *Sphex sonani*, *S. nigellus* and *Ammophila* spp. except *clavus* were comparatively abundantly collected. This was to get the other closely resembling species. In examining the specimens, however, it was made clear that only a single unknown species was included among them which was described as new in this paper.

It must be mentioned that I emended on this occasion a specific and a subspecific trivial name that were used in my previous paper (Etizenia, 26, 1967).

RECORDS AND A DESCRIPTION OF THE SPECIES NEWLY COLLECTED

1. *Sphex* (*Sphex*) *flammitricus* Strand, 1913

Sphex (*Sphex*) *flammitricus*: Tsuneki, Etizenia, 26: 1, 1967.

Specimens newly collected: 1 ♂, Pingtung Pref. (Kentin Park, 20. VII.); 1 ♂, Taitung Pref. (Chihpenchi, 1. VII.); 1 ♂, Chia Pref. (Chiagnouliao, 29. VII.); 1 ♂, Nantou Pref. (Puli, 25. VIII).

2. *Sphex* (*Sphex*) *argentatus* Fabricius, 1787

Sphex (*Sphex*) *argentatus*: Tsuneki, *l. c.*, p. 2.

Specimens collected: 2 ♂♂, Taitung Pref. (Chihpenchi, 30. VI.); 2 ♂♂, Nantou Pref. (Puli, 15, 22. VIII).

3. *Sphex* (*Sphex*) *haemorrhoidalis* Fabricius, 1781

Sphex subtruncatus: van der Vecht, Verh. Naturf. Ges. Basel, 68 (2) : 364, 1947.

Sphex (*Sphex*) *haemorrhoidalis*: Tsuneki, *l. c.*, p. 3.

Sphex (*Sphex*) *haemorrhoidalis*: Tsuneki, Etizenia, 37: 1-3, 1969 (biol.).

Specimens collected: 10 ♀♀ 9 ♂♂, Pingtung Pref. (8 ♀♀, Kentin Park; 2 ♀♀ 8 ♂♂, Manchou; 1 ♂, Uluampi; 9-20. VII.); 4 ♀♀ 4 ♂♂, Taitung Pref. (1 ♀ 4 ♂♂, Chihpenchi; 3 ♀♀, Tulan; 1-5. VII.); 19 ♀♀, Tainan Pref. (Kuantzuling, 22-24. VII.); 4 ♀♀ 8 ♂♂, Chia Pref. (2 ♀♀ 7 ♂♂, Chiagnouliao; 2 ♀♀ 1 ♂, Chuchi; 25-28. VII.); 2 ♀♀ 1 ♂, Nantou Pref. (1 ♀, Puli; 1 ♀, Nanshanchi; 1 ♂, Liyuchi; 1 ♂, Wushe, 1300 m; 9-26. VIII).

Remarks. J. van der Vecht in his 1947 paper on the Sphecoidea of the Lesser Sunda Islands, I, adopted the name, *S. subtruncatus* Dahlbom, for the species which we consider conspecific with African *S. haemorrhoidalis* and described 3 new subspecies. He did not give, however, any remarks on the difference of characters between *haemorrhoidalis* and *subtrunc-*

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atus. To me it seems that *S. subtruncatus* is a synonym or at most (if it was really the Asiatic species) falls within the specific range of *S. haemorrhoidalis* F. Until the persuading evidence will be presented, therefore, the name, *haemorrhoidalis* will be used for the Asiatic red-legged *Sphex*.

The specimens were selectively collected and some effort to capture the male specimens was made. Because the coloration of the legs in males is markedly variable. In all the specimens collected the fore legs are wholly black, at most with the femora on the posterior side dark reddish. In about 2/5 of the specimens the middle legs are also black, sometimes with the femora posteriorly dark red maculated. In two specimens the hind legs are also wholly black, only the tibiae are partly reddish and in seven the femora and the tibiae only partly red or dark red. In all others the middle and hind legs are bright red. It is to be noted that in two specimens all the legs are nearly completely black. However, the change in the colour of the legs has no connection with the localities of the specimens.

4. *Sphex (Sphex) sericeus lineolus* Lepeletier, 1845

Sphex (Sphex) sericeus lineolus: Tsuneki, Etizenia, 26, p. 3, 1967.

Sphex (Sphex) sericeus lineolus: Tsuneki, Ibid., 37: 3-4, 1969 (biol.).

Specimens newly collected: 28 ♀♀ 101 ♂♂ (27 ♂♂, Pingtung Pref.; 15 ♀♀ 35 ♂♂, Taitung Pref.; 3 ♂♂, Tainan Pref.; 2 ♂♂, Chiai Pref., 13 ♀♀ 35 ♂♂, Nantou Pref.).

5. *Sphex (Prionyx) viduatus* Christ, 1791

Sphex (Prionyx) viduatus: Tsuneki, Etizenia, 26, p. 4, 1967.

Sphex (Prionyx) viduatus: Tsuneki, Etizenia, 37, 1969 (biol.).

Sphex (Prionyx) viduatus: Iida, Ibid., p. 16 (larval description).

Specimens collected: 4 ♀♀ 6 ♂♂, Pingtung Pref. (4 ♀♀ 5 ♂♂, Hengchun, 8, 11. VII.; 1 ♂, Checheng, 15. VII.); 1 ♀, Chiai Pref. (Chuchi, 24. VII.); 1 ♀, Nantou Pref. (Puli, 23. VIII.).

Remarks. As for the nesting behaviour observed on the sandy bed of a stream near Hengchun a description has already been made (Etizenia, 37).

6. *Sphex (Isodontia) sonani* Yasumatsu, 1938

Sphex (Isodontia) sonani: Tsuneki, Etizenia, 26, p. 4, 1967.

Specimens collected: 1 ♂, Pingtung Pref. (Kentin Park, 9. VII.); 3 ♀♀ 38 ♂♂, Taitung Pref. (Chihpenchi, 30. VI. - 6. VII.); 4 ♂♂, Tainan Pref. (Kuantzuling, 23. VII.); 1 ♀ 5 ♂♂, Chiai Pref. (Changnouliao, 27-28. VII.); 2 ♀♀ 1 ♂, Nantou Pref. (1 ♀ 1 ♂, Wushe, 14, 16. VIII.; 1 ♀, Jihyuehtan, 27. VIII.).

Remarks. The male specimens are considerably varied in length, the largest measuring 22 mm, while the smallest only 14 mm. In two male specimens from Chihpenchi the mandibles bear a large red marking toward middle and the apical margin of each abdominal segment is discoloured, appearing pale brownish, and in one the abdominal segments alone are discoloured on each apical margin.

7. *Sphex (Isodontia) nigellus* Smith, 1856

Sphex (Isodontia) nigellus: Tsuneki, *l. c.*, p. 4.

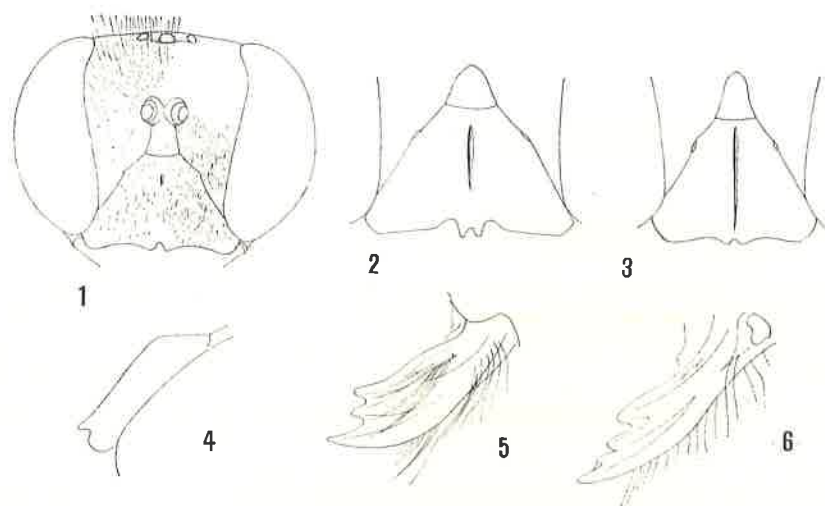
Specimens collected: 3 ♂♂, Pingtung Pref. (Manchou, 14. VIII.); 3 ♂♂, Taitung Pref. (2 ♂♂, Chihpenchi, 4, 6. VII.; 1 ♂, Chulu, 29. VI.); 4 ♀♀, Tainan Pref. (Kuantzuling, 22-24. VII.); 1 ♀ 8 ♂♂, Chiai Pref. (Changnouliao, 27-29. VII.); 10 ♀♀ 5 ♂♂, Nantou

Pref. (Puli, 8-26. VII.); 1 ♂, Ilan Pref. (Tsukeng, 16. VI.); 1 ♂, Taoyuan Pref. (Kuangyin, 14. VI.).

Remarks. In one female specimen from Puli (Tahnan) the 3rd cubital cell of the left fore wing is sectioned at the apico-posterior part by a short nervulus, thus bearing 4 cubital cells.

8. *Sphex (Isodontia) pempuchi* sp. nov.

This species (♀) belongs to the group of *sonani* and *maidli*, but is much smaller, with the pile on the lower frons and clypeus bright golden in colour, the medial carina on the clypeus is much shorter and inconspicuous, rhinaria on the flagellar joints of the antennae run somewhat oblique and the wings are much darkened. Further it differs from either of them in the form of the clypeus (Fig. 1, cf. Figs. 2 and 3).



Figs. 1-6. 1, 4 and 5: *Sphex (Isodontia) pempuchi* sp. nov. 2: *Sphex (Isodontia) sonani* Yasumatsu. 3 and 6: *Sphex (Isodontia) maidli* Yasumatsu.
1: Head seen in front. 2 and 3: Clypeus. 4: Clypeus seen in profile. 5 and 6: Mandible.

♀. Length 15-17 mm. Black, apical margin of each abdominal tergite pale brownish. wings fairly strongly darkened, often somewhat brownish, veins anteriorly dirty yellow, posteriorly darker. Short, dense, appressed pile on lower frons and clypeus golden, also the long hairs on the areas golden, hairs on upper frons, vertex and temples long, soft and dark brown, those on thorax and propodeum pale brown, on ventral side somewhat whitish and on all femora beneath greyish white; velvety pile on the inside of hind tibiae ferruginous red, at apex the pilose area enlarged and remarkable.

Head from above with sides behind eyes similar in the state of backward convergency to those of *S. maidli* (in *sonani* more strongly roundly convergent), OOD : POD : OCD = 17 : 13 : 21, width of postocellus relatively 5, ocelli in a curved line and ocellar area enclosed by an impressed line, vertex behind postocelli with a broad, transverse, gently raised area which is gently inclined sideways and on both ends bordered by a round impressed line, frontal median furrow fine and weak, faintly extending forward up to supra-antennal swelling (as in *maidli*, in *sonani* the furrow deeper and distinct). Head seen in front (Fig. 1) much shorter than in *maidli*, rather resembling that of *sonani*, in the relative width of the face, however,

narrower than in this and more distinctly convergent towards clypeus. Clypeus (Fig. 1) different in form from either of the species compared (cf. Figs. 2 and 3), in lateral view: Fig. 4; mandible robust as in *sonani* (in *maidli* narrower and longer as in Fig. 6). Antennal joints 2, 3, 4 and 5 relatively 9, 7, 7 and 7, joint 3 in the widest view 3.7 times, in the narrowest view 4 times as long as wide at apex, rhinaria on joints 3-10 defined, those on joints 6-10 somewhat obliquely located and slightly curved. On mesonotum medio-anterior three streaks and parapsidal furrows much less distinct than in *maidli*, also somewhat weaker than in *sonani*, on the sides of thorax metapleural scrobe much less deep than in both the compared species, petiole of abdomen markedly longer than in the two species cited, strongly curved downwards, seen from above as long as hind femur; legs including the claws normal. In fore wing cubital cell 2 distinctly longer than high (as in *maidli*, in *sonani* nearly rhombic in form).

♂. Unknown.

Holotype: ♀, the valley of Pempuchi, Nantou Pref., 11. VIII. 1968, K. Tsuneki leg.

Paratypes: 1 ♀, ditto, 16. VIII.; 1 ♀, Wushe (1200 m), the same Pref., 26. VIII. 1968, K. Tsuneki leg.

Remarks. One of the paratypes captured in the valley of Pempuchi came flying to a broken and dead end of the stem of a live bamboo and entered there. The opening was about 15-20 mm in diameter and directed sideways. Possibly she was nesting there.

On *Ammophila atripes formosana* Strand, 1913

In my previous paper on the Formosan Sphecinae (Etizenia 26) I neglected the Strand's *Ammophila atripes formosana* and during the reexamination of the literature in the present investigation I took notice of the fact. The separation of the Formosan representative from the Indian by Strand has no substantial significance whatever; strictly, therefore, it is invalid, because his attempt is based upon the erroneous description by Cameron (the male coloured as in the female, but in reality the male of the Indian *atripes* is different in coloration from the female just as in the Formosan representative; it is strange that Strand neglected the Bingham's correct description in his Fauna of British India). Whatever may be the situation taxonomically it is true that *Ammophila formosana* is preoccupied.

So I emend the subspecific and specific names used by me in the paper above mentioned as follows:

Ammophila clavus taiwana Tsuneki, 1967 → *A. clavus formosana* Strand, 1913

Ammophila formosana Tsuneki, 1967 → *A. formosensis* Tsuneki nom. nov.

9. *Ammophila clavus formosana* Strand, 1913

Ammophila atripes formosana Strand, Arch. f. Naturg. Abt. A, 79 (3): 85, 1913.

Ammophila clavus taiwana Tsuneki, Etizenia, 26: 15, 1967.

Ammophila (Ammophila) clavus taiwana: Tsuneki, Etizenia, 37: 6, 1969 (biol.).

Ammophila clavus formosana (!): Iida, Ibid., p. 17 (larval description).

Specimens collected: 5 ♀♀ 9 ♂♂, Pingtung Pref. (4 ♀♀ 6 ♂♂, Hengchun, 12, 16, 18. VII.; 1 ♀ 1 ♂, Manchou, 13. VII.; 1 ♀ 1 ♂, Checheng, 15. VII.; 1 ♂, Paoli, 19. VII.); 2 ♂♂, Tainan Pref. (Kantzuling, 23. VII.); 1 ♀ 1 ♂, Taitung Pref. (Tulan, 5. VII.); 2 ♀♀ 6 ♂♂, Chiai Pref. (1 ♀. Chuchi, 24. VII.; 1 ♀ 6 ♂♂, Changnouliao, 27, 28. VII.); 5 ♀♀ 12 ♂♂, Nantou Pref. (3 ♀♀ 7 ♂♂, Puli, 12, 20, 23. VIII.; 1 ♂, Nanshanchi, 9. VIII.; 1 ♀ 1 ♂, Pempuchi, 20. VIII.; 1 ♂. Wushe, 19. VIII.); 1 ♀ 1 ♂, Ilan Pref. (Tsukeng, 16. VI.).

10. *Ammophila formosensis* nom. nov.

Ammophila formosana Tsuneki, Etizenia, 26, p. 18, 1967, nec Strand, 1913.

Specimens collected: 3 ♀♀ 1 ♂, Chiai Pref. (Kuanghua, 1200 m, 6, 7. VIII.); 2 ♀♀ 25 ♂♂, Nantou Pref. (2 ♀♀ 24 ♂♂, Wushe-Chienching, 1400 m, 13, 24, VIII.); 1 ♂, Nanshan-

chi, 800 m, 9. VIII.).

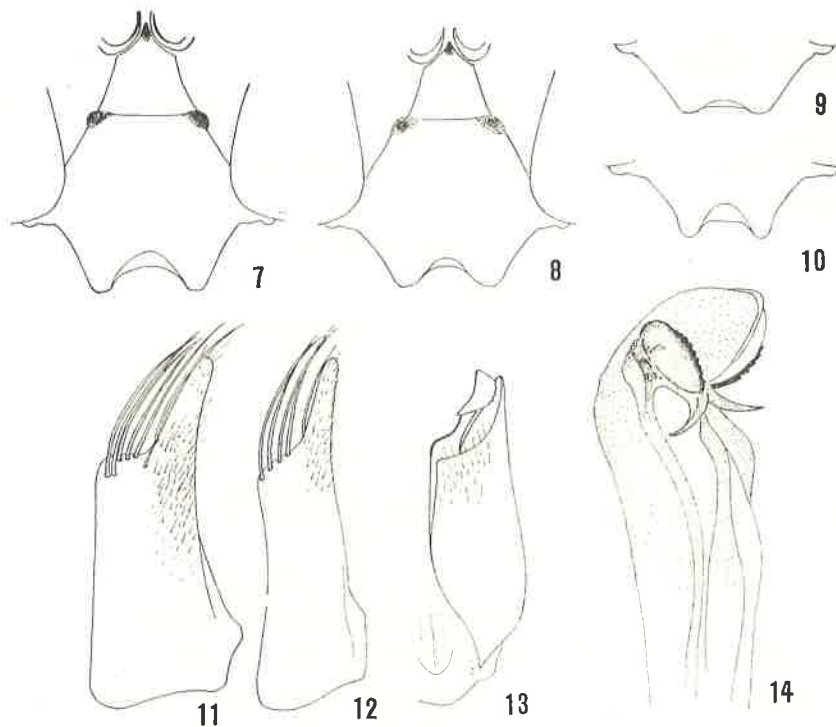
Remarks. This species is a mountain inhabitant, appearing from about 800 m in altitude. I could capture the specimens at the place as high as 1800 m on the mid way to Mt. Ali.

11. *Ammophila sickmanni wusheensis* Tsuneki, 1967

Ammophila sickmanni wusheensis Tsuneki, Etizenia, 26: 16, 1967.

Specimens collected: 1 ♀ 12 ♂♂, Nantou Pref. (1 ♀ 11 ♂♂, Chienching-Wushe, 1700-1300 m, 24. VIII.; 1 ♂, Nanshanchi, 800 m, 9. VIII.).

Remarks. In my previous paper on the Formosan Sphecinae (Etizenia, 26) I recorded 2 ♀♀ 3 ♂♂ of this species, based on the male and female specimens derived from the different localities respectively. In my recent journey I could capture 1 ♀ 11 ♂♂ of this species in the same place as that which furnished the female specimens of the previous material. Of the male specimens, however, there were two forms. One is the form previously recorded, having the golden pubescence on the head and thorax, while the other is a new form in which the pubescence on the parts is silver white. The difference is especially marked on the clypeus, lower frons and the pile patches of the thorax-complex. The detailed comparison of the two forms made it clear that there were some further differences between them. In the golden pubescent form the clypeus is more strongly produced anteriorly (Fig. 7) than in the silverily pubescent one (Fig. 8) and at a glance the part between the eyes appears to be longer and narrower; the tentorial pits were more broadly separated from each other (OTD : ITD = 1 : 2), than in the



Figs. 7-14. *Ammophila (Ammophila) sickmanni wusheensis* Tsuneki, ♂.
 7 and 11: Golden pubescent form. 8, 9, 10 and 12: Silverily pubescent form.
 13 and 14: Common to both forms. 7 and 8: Clypeus. 9 and 10: Ditto, variation.
 11 and 12: Paramere. 13: Volsella. 14: Penis seen obliquely from the side.

other (the proportion mostly 2 : 3 or nearly); of the genitalia the paramere is generally broader and with the humeral angle more angulated (Fig. 11, cf. Fig. 12).

The differences were so marked between the extreme ones of the two forms that I came to have doubt as to whether they were the variations within the same species, or they belonged to a different species respectively. However, further studies showed that there was a wide range of variation as to the form of the clypeus (Figs. 9 and 10) and that in some of the silver ones the proportion of OTD : ITD approached to that of the golden ones. Still further it was clarified that the relative width of the paramere of the genitalia was more or less variable within a species and that as to the structure of the penis, volsella and the substantial character of the paramere there was no note-worthy difference between them. With respect to the colour of the pubescence, in two specimens that were placed heretofore within the silver form it was rather brassy in colour, an intermediate state between the two. Regarding other characters, the relative length of the antennal joints, of the abdominal petiole, the tyloidea of the flagellum, the ocellar location, the sculpture of the bodily parts, there was no essential difference at all, save those that were considered to be the individual variation.

If in future the female that corresponds to the golden form here mentioned and that has distinct specific distinctions is found, the two form of the males dealt with here should be reexamined and reconsidered. Until that time are they to be treated as mere variations.

12. *Sceliphron (Sceliphron) madraspatanum formosanum* van der Vecht, 1968

Sceliphron (Sceliphron) madraspatanum: Tsuneki, l. c., p. 5.

Sceliphron madraspatanum formosanum van der Vecht, Tijds. Ent., 111 (6): 204, 1968.

Specimens collected: 5 ♀♀ 9 ♂♂, Pingtung Pref. (Hengchun, Ulampi, Checheng, Manchou); 1 ♀ 1 ♂, Taitung Pref. (Chihpenchi); 1 ♀, Chiai Pref. (Chuchi); 1 ♀ 6 ♂♂, Nantou Pref. (Puli); 1 ♀ 1 ♂, Taoyuan Pref. (Kuangyin).

Remarks. Only a part of the specimens observed was collected. This species is in Formosa everywhere abundant.

13. *Sceliphron (Sceliphron) deforme* (Smith, 1856)

Sceliphron (Sceliphron) deforme: Tsuneki, l. c., p. 6.

Specimens collected: 8 ♀♀, Taitung Pref. (Chihpenchi, 30. VI.; Tulan, 5. VII.; Chulu, 29. VI.).

Subspecies taiwanum ssp. nov.

The Formosan specimens of this species are more brightly maculated than the typical ones from North China and differ in pattern of maculation from any allied form hitherto described. They resemble most closely the relative, *rufopictus* Smith, from Celebes, but are different from it in the maculation of the abdomen.

♀. The colour pattern of the body similar to that of the typical form, but generally more broadly extended, especially so the maculae on mesopleuron, propodeum and on abdomen. Tergite 1 wholly except a small medio-basal blackish mark ferruginous yellow, with a glossy brownish lustre broadly in the middle, orange-yellow band (with apex narrowly ferruginous) on tergite 2 usually reaches half the length of the segment and those on 3-5 also broad, occupying in the usual posture whole the length and in the extended state more than half the length of each segment, tergite 6 wholly orange-yellow; the same is also the case with sternites 2-6. Femora of legs largely (except the basal blackish mark) ferruginous red, with a yellow streak on each apical portion above (in hind legs short), tibiae ferruginous, in fore and middle legs

in front and on outer margin yellow; tarsi ferruginous (in typical race blackish) stained dark brownish at apex of each joint and on joints 4 and 5 of fore and hind legs and end joint of middle legs. Wings light yellow, apical margin somewhat clouded, veins pale brown.

♂. In maculation of the body similar to ♀, but generally the maculae less developed, the marks on the clypeus usually reduced to two spots fused together, maculae on tegulae, mesopleuron, scutellum and propodeum comparatively more or less smaller and the bands on abdomen narrower. In the developmental degree of the maculation, however, there is a wider range of variation than in the female. In the brightest maculated specimens the maculae of the body are nearly equal to the female, while in the melanic ones the clypeal marks are consisted of two small spots, the maculae on mesopleuron and of the posterior end of propodeum markedly smaller and latero-basal maculae of this segment completely lacking and the bands on abdomen very narrow, showing on every tergite distinctly the basal black area. The chief difference in maculation from the female lies in the legs: Femora largely black above, with a narrow apical yellow or ferruginous mark and reddish brown narrow streak beneath, tibiae largely dark brown or brownish black, with a yellowish streak on fore and middle legs in front and on hind legs externally, from apex of metatarsi of all legs apically almost completely dark brown to black. Wings far more strongly darkened than in ♀.

Holotype: ♀, Taitung Pref. (Chulu), 12 VIII. 1966, K. Tsuneki leg.

Paratypes: 30 ♀♀ 10 ♂♂, Taitung Pref. (Chulu, Chihpenchi), Taipei Pref. (Ulai, Yangmingshan), Nantou Pref. (Liyuchih), VII, VIII. 1966, 68 K. Tsuneki leg.

14. *Sceliphron (Chalybion) bengalense* (Dahlbom, 1845)

Sceliphron (Chalybion) bengalense: Tsuneki, l. c., p. 8.

Specimens collected: 17 ♀♀ 38 ♂♂, Pingtung Pref. (4 ♀♀ 4 ♂♂, Hengchun, 8, 11. VII.; 5 ♀♀ 8 ♂♂, Paoli, 19. VII.; 3 ♀♀ 3 ♂♂, Kentin, 20. VII.; 2 ♂♂, Checheng, 15. VII.; 5 ♀♀ 3 ♂♂, Manchou, 13. VII.); 8 ♂♂, Taitung Pref. (Tulan, 5. VII.); 1 ♀ 7 ♂♂, Chiai Pref. (Chuchi, 25, 26. VII.); 2 ♂♂, Ilan Pref. (Tsukeng, 16. VI.); 1 ♂, Taoyuan Pref. (Kuangyin, 14. VI.).

15. *Sceliphron (Chalybion) inflexum* Sickmann, 1895

Sceliphron (Chalybion) inflexum: Tsuneki, l. c., p. 7.

Specimens collected: 2 ♀♀ 3 ♂♂, Pingtung Pref. (Kentin, Manchou); 4 ♀♀ 2 ♂♂, Taitung Pref. (Chihpenchi, Tulan); 2 ♀♀, Chiai Pref. (Changnouliao), 8 ♀♀ 23 ♂♂, Nantou Pref. (Puli, Pempuchi, Chienching-Wushe, 1800 m); 2 ♀♀ 1 ♂, Hualien Pref. (Kuangfu); 7 ♀♀ 1 ♂, Ilan Pref. (Tsukeng.)

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