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STUDIES ON THE FORMOSAN SPHECIDAE (XI)
A SUPPLEMENT TO THE SUBFAMILY LARRINAE
(HYMENOPTERA)

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AUGUST 30, 1971

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The material used in the present investigation was collected by the writer during his second visit to Formosa from June 10 to August 31, 1968. In this study *Liris fuscata* was newly described and *Tachysphex bengalensis* which was in his previous paper (1967) dealt with, with a query, as a single species was as a result of reinvestigation split into 4 distinct species, one of which was referred to *T. mindorensis* Williams, known from the Philippines, on the basis of the structure of the male genital organs and two of which were described as new to science (*T. formosanus* and *T. lihyuetanus*). On this occasion he described also a new species of *Liris* (*L. hanedai*) and *Tachytes* (*T. toyensis*) respectively basing upon the specimens collected recently by Mr. Y. Haneda and brought to him for identification.

During the study Mr. T. Tano brought to him a number of the specimens of *Tachysphex* for investigation which he collected on the Islands of Ishigaki and Iriomote, the Yaeyama Group of the Ryukyus. The result of the investigation was given also in this paper as an appendix.

He thanks Mr. Y. Haneda and Mr. T. Tano for their kind assistance given to his investigation.

RECORDS AND DESCRIPTIONS

1. *Larra amplipennis* (Smith, 1873)

Larra amplipennis: Tsuneki*, Etizenia, 20: 18, 1967 (3 ♀ 14 ♂).
Larra amplipennis: Haneda, Life Study, 15 (1-2): 29, 1971 (1 ♀ 1 ♂).

Material: 10 ♂. 1 ♂, Ilan Pref. (Erhchieh, 18. VI.); 1 ♂, Chiai Pref. (Chuchi, 24. VII.); 8 ♂, Pingtung Pref. (Checheng, 15. VII.).

Remarks. The specimens collected in the a river bed of Checheng came successively to the yellow flowers of Leguminosae.

2. *Larra carbonaria* (Smith, 1858)

Larra carbonaria: Tsuneki*, Etizenia, 20: 20, 1967 (13 ♀ 26 ♂).
Larra carbonaria: Haneda, Life Study, 15: 29, 1971 (1 ♂).

Material: 3 ♀ 10 ♂. 1 ♂, Taoyuan Pref. (Kuangyin, 14. VI); 1 ♂, Hualien Pref. (Liyuchih, 22. VI.); 3 ♀ 8 ♂, Nantou Pref. (1 ♀, Puli, 2 ♀ 8 ♂, Pempuchi, 10, 17, 25. VIII.).

3. *Larra fenchihuensis* Tsuneki 1967

Larra fenchihuensis Tsuneki, Etizenia, 20: 22, 1967 (4 ♀ 11 ♂).

Material: 1 ♀ 1 ♂, Chiai Pref. (Kuanghua, 1300 m, 2, 7. VIII.).

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* *Contribution No. 160 from the Biological Laboratory, Fukui University, Japan.*
Reference with an asterisk at the recorder's name indicates that it includes a list of literature.

4. *Larra luzonensis* Rohwer, 1919

Larra luzonensis: Tsuneki*, Etizenia, 20: 22, 1967 (10 ♀ 70 ♂).

Material: 1 ♀ 1 ♂, Hualien Pref. (Kuangfu, 24. VI.).

5. *Larra polita* (Smith, 1858)

Larra polita: Tsuneki*, Etizenia, 20: 24, 1967 (24 ♀ 45 ♂).

Larra polita: Haneda, Life Study, 15: 29, 1971 (1 ♀ 7 ♂, Nantou and Chiai Prefs.).

Material: 9 ♀ 19 ♂. 1 ♀, Taoyuan Pref. (Kuangyin, 14. VI.); 1 ♀ 3 ♂ *Hualien* Pref. (Liyuchih, 22. VI.); 2 ♀ 3 ♂, Nantou Pref. (Puli, 23, 25. VIII.); 5 ♀ 13 ♂, Pingtung Pref. (Checheng, 15. VII.).

Remarks. This species was collected from the eastern side of Formosa for the first time. According to the fact the biogeographic consideration presented by me came to lose its supporting ground.

6. *Motes larroides taiwanus* Tsuneki, 1967

Motes larroides taiwanus Tsuneki, Etizenia, 20: 25, 1967 (6 ♀ 3 ♂).

Material: 1 ♀ 1 ♂. 1 ♂, Ilan Pref. (Liyuchih, 22. VI.); 1 ♀, Pingtung Pref. (Hengchun, 8. VII.).

7. *Liris* (*Cratolarra*) *pitamawa* (Rohwer, 1919)

Liris (*Cratolarra*) *pitamawa:* Tsuneki*, Etizenia, 20: 41, 1967 (5 ♀ 4 ♂).

Liris (*Cratolarra*) *pitamawa:* Haneda, Life Study, 15: 29, 1967 (1 ♀ 1 ♂, Lihyuetan).

Material: 8 ♀ 7 ♂. All Pingtung Pref. (7 ♀ 4 ♂, Hengchun, 8–17. VII; 1 ♀ 1 ♂, Manchou, 14. VII; 1 ♂, Checheng, 15. VII; 1 ♂, Paoli, 19. VII.).

8. *Liris* (*Liris*) *aurulenta* (Fabricius, 1787)

Liris (*Liris*) *aurulenta:* Tsuneki*, Etizenia, 20: 27, 1967 (9 ♀ 121 ♂).

Liris (*Liris*) *aurulenta:* Haneda, Life Study, 15: 29, 1971 (1 ♀ 19 ♂).

Material; 2 ♀ 24 ♂. 1 ♀ Hualien Pref. (Liyuchih, 22. VI.); 1 ♀ 17 ♂, Nantou Pref. (Puli, 20–25. VII.); 7 ♂ Pingtung Pref. (Manchou, Checheng, 13–15. VII.).

9. *Liris* (*Dociliris*) *deplanata binghami* Tsuneki, 1967

Liris (*Notogonidea*) *deplanata binghami* Tsuneki, Etizenia, 18: 1–6. 1967 (Ryukyus.).

Liris (*Dociliris*) *deplanata binghami:* Tsuneki*, Etizenia, 20: 27, 1967 (18 ♀ 28 ♂).

Liris (*Dociliris*) *deplanata binghami:* Okumura, Life Study, 15: 22, 25, 1971 (biol.).

Material: 5 ♀ 12 ♂, Nantou Pref. (Pempuchi, 10, 11, 23, 26. VIII.).

Remarks. In one male specimen captured on the 26th the golden hue of the pubescence on the front side of the head is weaker downwards and on the clypeus it turns into a silvery tone. On the abdomen the velvety pile bands are also silvery. Otherwise, however, it retains completely the characters of *L. d. binghami.*

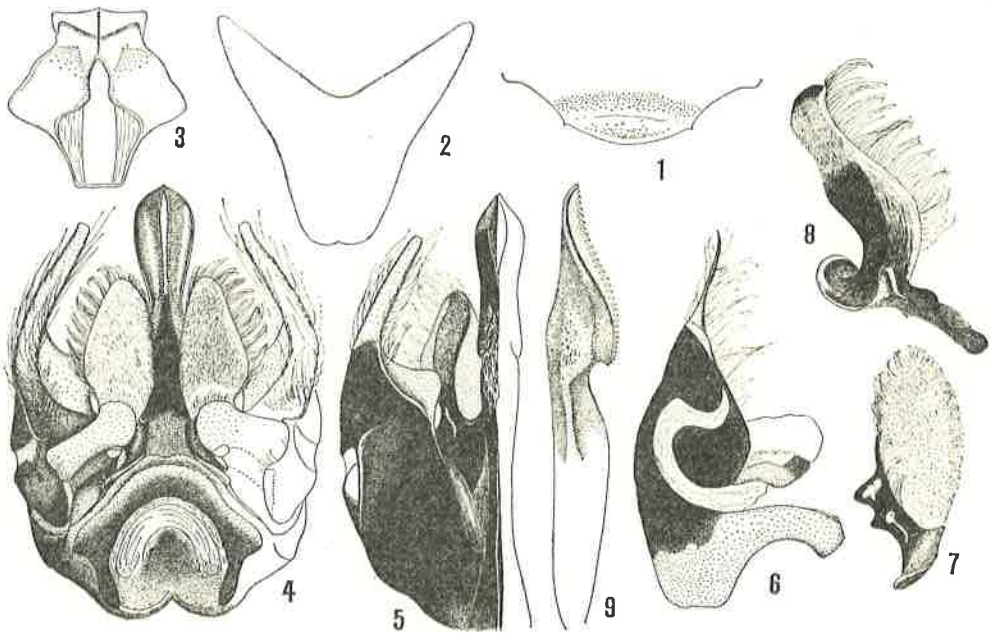
10. *Liris* (*Dociliris*) *fuscata* sp. nov.

♂. Closely resembles the preceding species and also *L. surusumi* m., differing, however, from both in that the pubescence on the front side of the head is silvery and no single bordering carina is present between the dorsal and the posterior aspects of the propodeum. From the former species it differs further in that the punctures on the mesonotum are finer and the pile bands on the abdomen are silvery (except the abnomal one given in the above remarks) and from the latter in that no distinct puncture is ob-

served on the mesopleuron. As to the genitalia the volsella is markedly different in structure from both the compared species.

Length about 14 mm. Wholly black; only a patch on posterior margin of tegulae transparent ferruginous, mandibles in permeating light partly reddish, wings strongly fuscous, stigma and veins black. Pubescence on frons and clypeus silvery, on thorax, propodeum and abdomen also silvery, hairs on tergite 7 castaneous brown, pubescence beneath femora fairly long.

IOD on vertex nearly as great in length as antennal joints 2 and 3 united (under the stretched condition), joint 3 nearly twice as long as broad at apex. Clypeus: Fig. 1, temple in profile narrowed upwards, on top almost none, mesonotum medio-anteriorly distinctly depressed, on mesopleuron scrobal furrow shallow and weak, anterior oblique furrow deep and strongly crenate. Propodeum at extreme base transversely and strongly and in middle from base to half of the segment incompletely carinate, lateral carinae of dorsal aspect not strong and posteriorly intermittent by the transverse carinae, those of the posterior aspect only at apical portion present, fairly strong, median furrow of this aspect deep and comparatively narrow. Structure of abdomen normal, sternite 8 : Fig. 2. Genitalia in ventral view (with basal ring removed which is shown by Fig. 3): Fig.



Figs. 1-9. *Liris* (*Dociliris*) *fuscata* sp. nov., ♂.
1: Clypeus. 2: Sternite 8. 3: Basal ring of genitalia. 4: Genitalia (ventral view, with basal ring removed) 5: Ditto (dorsal view, the right half omitted). 6: Paramere (lateral view). 7: Volsella (ventral view, left one). 8: Ditto (lateral view). 9: Penis (lateral view).

4, in dorsal view: Fig. 5 (right half omitted), paramere in lateral view: Fig. 6, with a lamellate process medially, volsella in ventral view: Fig. 7 (left one), in lateral view: Fig. 8 (left one from inside), penis in lateral view: Fig. 9. Fore femur as in *L. surusumi* (cf. Tsuneki, 1967, Figs. 60 and 61), fore metatarsus with 4 long spines at apex

(in *L. d. binghami* 5) and 1 on each of dorsal, ventral and inner side towards middle (constant? in *binghami* more in number); relative length and structure of the longer tibial spur of hind legs as in this (basal third beneath densely pubescent, apical two thirds finely grooved and with the lateral edges minutely serrate, in length about 3/4 of the following metatarsus).

Punctures on vertex at ocellar area and at upper frons very fine and dense, on vertex behind postocelli somewhat large and sparse, with intervals shining. Mesonotum very finely punctate-reticulate, mesopleuron finely irregularly (both in form and size) reticulate, without puncture, the sculpture posteriorly and ventrally markedly finer; propodeum coarsely transversely (slightly arcuately) rugoso-striate, with intervals quadrately sectioned by the longitudinal carinulae, posterior aspect transversely coarsely, somewhat rugosely striate, the upper 3–4 striae on lateral portions highly raised and keel-like, sides of the segment obliquely striate, the striae upwards stronger and coarser, downwards weaker, finer and closer. Abdomen micropunctate and covered with micropubescence, completely mat.

♀. Unknown.

Holotype: ♂, Chiai Pref. (Kuanghua, about 1300 m), 2. VIII. 1968, K. Tsuneki leg.

11. *Liris* (*Dociliris*) *laboriosa* (Smith, 1859)

Liris (*Dociliris*) *laboriosa:* Tsuneki*, Etizenia, 20: 30, 1967 (4 ♂).
Liris sp., Haneda, Life Study, 15: 30, 1971 (3 ♂).

Material: 1 ♀ 13 ♂. All in Pingtung Pref. (Manchou, Hengchun, Paoli, Checheng, 11–19. VII.).

Remarks. The female of this species was new to me. Upon examining it well agrees in characters with the original and the Williams' descriptions and the key by me (1967). Some supplements:

Clypeus in form as in male (Tsuneki, 1967, Fig. 67), but as the specimen is more or less worn out, with the mandibles fairly rubbed off, the anterior margin is somewhat less deeply emarginated in middle. Length ratio of IOD and antennal joint 3 is 6 : 5. Velvety pile on head, thorax, propodeum and legs brassy, pile bands on abdomen 4 in numver, silvery in colour. Pygidial area lingiform and covered with golden hairs, the apical spiniform bristles indistinct, with a lamelliformed appendage composed of 6 short, fine stick-like hairs side by side fused together.

12. *Liris* (*Dociliris*) *rohweri* (Williams, 1928)

Liris (*Dociliris*) *rohweri:* Tsuneki*, Etizenia, 20: 31, 1967 (22 ♀ 41 ♂).
Liris (*Dociliris*) *rohweri:* Haneda, Life Study, 15: 29, 1971 (3 ♂).

Material: 5 ♂. 1 ♂, Taitung Pref. (Chihpenchi, 1. VII.); 3 ♂♂, Pingtung Pref. (Manchou, 13, 14. VII.); 1 ♂, Nantou, Pref. (Pempuchi, 20. VIII.).

13. *Liris* (*Dociliris*) *hanedai* sp. nov.

? *Notogonidea robustoides* Williams, Bull. Exp. Sta. Hawaii. Sug. Plant. Ass., Ent. Ser., 19: 77, 1928.
Liris sp., Haneda, Life Study, 15: 30, 1971 (1 ♂).

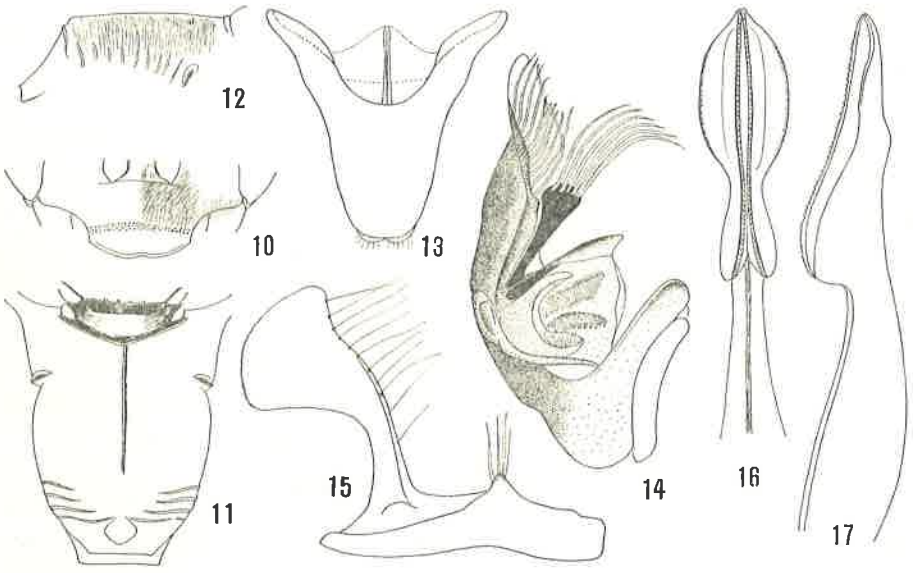
According to the Williams' key to the species of the Philippine Larrinae the male specimen dealt with here runs to *Notogonidea robustoides* and the figure of the male genital organs of this spcies also seems to be close to those of the present species. But

the figure does not afford us the information on the detailed structure necessary to the present day taxonomy and, further, as far as the description goes we can find at least the following differences between the species:

Liris hanedai is much smaller in body size, measuring only 5.5 mm in length (*robustoides* ♂, 9 mm), with IOD at vertex as great in length as antennal joint 3 + 4 (not less than so), sides of propodeum thoroughly obliquely striate (not on basal half only) and hind femur not with the posterior margin straight. In the genitalial structure (especially in the form of volsella) the present species rather closely resembles *L. rohweri* Williams; in the state of hairs on the paramere, however, it is markedly different. In the external characters the new species is easily separable from *rohweri* by the structure of antennae, propodeum and fore femora, by the sculpture of mesothorax and propodeum and by the pilosity of fore femora. Further, the wings are not so strongly darkened as in this.

♂. Length 5.5 mm. Black and dull, mandibles except base and apex dark brown, posterior half of wing tegulae ferruginous. Wings hyaline, apical margin broadly clouded, especially markedly so at the region of appendiculate cell. Pile on face and clypeus short, appressed, silvery, the pile bands on abdomen on 3 basal tergites noticeable (on 4th indistinct, due to dirt).

Interocular space at vertex as long as antennal joint 3 and 4 combined, the two joints equal in length to each other and 3 in the narrowest view 1.5 times as long as wide at apex, joint 7 distinctly less than twice as long as wide (in *rohweri* amply twice as long as wide), rhinaria on joints 4–13, each except 12 occupying a third of the surface of the joint, on joint 12 ending roundly before reaching apex. Clypeus: Fig. 10, inclination of the bevel very slight, disc medianly longitudinally bluntly ridged, mandibles



Figs. 10-17. *Liris* (*Dociliris*) *hanedai* sp. nov., ♂.
10: Clypeus. 11: Propodeum. 12: Ditto, in the lateral view. 13: Sternite 8. 14: Paramere (lateral view). 15: Volsella (lateral view). 16: Penis, seen from beneath. 17: Ditto, seen from the side.

with two teeth on inner magin as in *rohweri;* mesonotum slightly depressed medianly in front, on mesopleuron scrobal and anterior oblique furrows well-defined, both finely crenulate; propodeum markedly long and narrowed posteriorly (Fig. 11), longer and more strongly attenuate than in *rohweri* and rugoso-carinate in middle, the carina not reaching the apex, posterior wall more obtusely inclined (Fig. 12, in the lateral view) than in *rohweri,* with medio-dorsal excavation much deeper and greater; abdomen normal, 8th sternite: Fig. 13. As to genitalia, paramere: Fig. 14 (lateral view), volsella: Fig. 15 (lateral view), very similar to that of *rohweri,* penis in ventral view: Fig. 16 and in lateral view: Fig. 17. Radial cell of fore wing truncate at apex, with relative length of abscissae $4 > 1 > 3 > 5 \geqq 2$, legs normal, longer tibial spur of hind leg as in *rohweri* (or *fuscata*).

Punctures on head fine and dense as in *rohweri,* but the punctuation of mesonotum and mesopleuron differs from this, simply finely and densely (on mesopleuron further somewhat rugosely) punctured, in *rohweri* intervalic ridges of punctures further micro-punctulate, showing a more complex appearance; dorsal aspect of propodeum finely closely transversely rugoso-striate, the striae on the lateral portions reduced in number, turned into stronger and coarser, with intervals finely, longitudinally, but very weakly (observable only in certain light) and irregularly sectioned by carinulae (as in *robustoides*), on latero-posterior areas with 4 fairly strong transverse carinae (Fig. 11), the posteriormost of which is very closely approaching each other, posterior wall on the side transversely, comparatively coarsely striate (the area of the medial furrow without striae), sides of the segment obliquely, fairly closely striate, the striae antero-ventrally stronger and dorso-posteriorly weaker (reverse to the case of *robustoides*), the bordering longitudinal rugose carina btween dorsal aspect and sides of the segment repeatedly interrupted by the raised transverse striae. Abdominal tergites microcoriaceous.

♀. Unknown.

Holotype: ♂, Chiai Pref. (Chuchi), 2. VIII. 1970, Y. Haneda leg. and in the writer's collection.

Remarks. In the specimen the pronotum is slightly detached from the mesonotum and it appears to be raised near level of mesonotum and somewhat thick. But the same state is also observed in *rohweri* when the condition becomes similar. The specimen is considerably spoiled possibly in the killing bottle and in spite of careful cleaning with alcohol the pile bands of the abdomen can not completely be recovered to the original condition. Thus it could not distinctly be determined whether the pilosity on tergite 4 possessed a silvery glittering or not.

14. *Liris* (*Dociliris*) *subtessellata* (Smith, 1856)

Liris (*Dociliris*) *subtessellata:* Tsuneki*, Etizenia, 20: 32, 1967 (41 ♀ 164 ♂).
Liris (*Dociliris*) *subtessellata:* Haneda, Life Study, 15: 29, 1971 (3 ♀ 19 ♂).

Material: 3 ♀ 16 ♂. 2 ♂, Taoyuan Pref. (Kuangyin, 14. VI.); 1 ♂, Hualien Pref. (Yuili, 26. VI.); 1 ♀, Nantou Pref. (Pempuchi, 26. VIII.); 4 ♂♂, Chiai Pref. (Chuchi, 22–25. VII.); 2 ♀ 9 ♂, Pingtung Pref. (Hengchun, Manchou, Checheng and Oluampi, 8–18. VII.).

Remarks. Of the specimens listed above 3 (1 each from Kuangyin, Yuili and Chuchi) bear only 3 pile bands on the abdomen.

15. *Liris* (*Dociliris*) *docilis* (Smith, 1873)

Liris (*Dociliris*) *docilis:* Tsuneki*, Etizenia, 22: 33, 1967 (30 ♀ 137 ♂).
Liris (*Dociliris*) *docilis:* Haneda, Life Study, 15: 29, 1971 (1 ♀ 8 ♂).

Material: 5 ♀ 18 ♂. Hualien Pref. (Kuangfu), Nantou Pref. (Puli, Tahnan, Pempuchi), Chiai Pref. (Chuchi, Chiannouliao), Pingtung Pref. (Hengchun, Manchou, Kentin).

16. *Liris* (*Nigliris*) *japonica* (Kohl, 1883)

Liris (*Nigliris*) *japonica:* Tsuneki*, Etizenia, 20: 34, 1967 (53 ♀ 55 ♂).
Liris (*Migliris*) *japonica:* Haneda, Life Study, 15: 29, 1971 (1 ♀ 2 ♂).

Material: 20 ♀ 9 ♂. 2 ♀ 3 ♂, Taoyuan Pref. (Kuangyin); 4 ♀, Hualien Pref. (Liyuchih); 1 ♂, Nantou Pref. (Tahnan); 1 ♀, Chiai Pref. (Chuchi); 13 ♀ 5 ♂, Pingtung Pref. (Oluampi, Kentin, Hengchun, Paoli).

Remarks. Of the 9 male specimens 4 (3 from Kuangyin and 1 from Tahnan) belong to type 1 (Tsuneki, 1967, p. 35), 4 (2 from Oluampi and 2 from Hengchun) to type 4 and 1 (from Oluampi) to type 6.

17. *Liris* (*Nigliris*) *albopilosa* Tsuneki, 1967

Liris (*Nigliris*) *albopilosa* Tsuneki, Etizenia, 20: 38, 1967 (20 ♀ 32 ♂).
Liris (*Nigliris*) *albopilosa:* Haneda, Life Study, 15: 29, 1971 (1 ♂, Chuchi).

Material: 17 ♀ 13 ♂. 2 ♀, Ilan Pref. (Erhchieh); 5 ♀ 1 ♂, Hualien Pref. (Liyuchih, Yuili); 6 ♀ 1 ♂, Taitung Pref. (Tulan, Chihpenchi, Taitung); 4 ♂, Nantou Pref. (Tahnan); 4 ♀ 7 ♂, Chiayi Pref. (Chuchi).

Remarks. Of the male specimens 1 shows rhinaria on antennal joints 6–11, 6 on joints 7–11, 5 on 6–12 and the remaining 5 on joints 7–12. However, the rhinarium on joint 6 and 12 is, as a rule, very small and indistinct and apt to be overlooked. Only in one specimen the impression is comparatively large and distinct on joint 6 and in two similarly so on joint 12.

18. *Tachytes formosanus* Tsuneki, 1966

Tachytes formosanus Tsuneki, Etizenia, 17: 12, 1966 (♂).
Tachytes formosanus: Tsuneki, Ibid., 20: 44, 1967 (♂♀), (5 ♀ 37 ♂).
Tachytes formosanus: Haneda, Life Study, 15: 30, 1971 (2 ♀ 7 ♂).

Material: 9 ♀ 61 ♂. 1 ♂, Ilan Pref. (Tsukeng, 16. VI.); 2 ♂, Hualien Pref. (Kuangfu, 24. VI.); 8 ♀ 16 ♂, Nantou Pref. (Puli, Tahnan, 20, 23, 25. VIII.); 1 ♀ 20 ♂, Chiai Pref. (Changnouliao, 500 m, 27. VII.); 6 ♂, Tainan Pref. (Kuantsuling, 23, 24. VII.); 12 ♂, Taitung Pref. (Chulu, Chihpenchi, 29. VI.–2. VIII.); 4 ♂, Pingtung Pref. (Manchou, 13, 14. VII.).

Remarks. Interocular space at the vertex in males is in relative width from about 1/2 to about 1/3 of the length of antennal joint 3.

19. *Tachytes modestus* Smith, 1856

Tachytes modestus: Tsuneki*, Etizenia, 20: 46, 1967 (15 ♀ 33 ♂).
Tachytes modestus: Haneda, Life Study, 15: 30, 1971 (9 ♀ 23 ♂).

Material: 37 ♀ 66 ♂. 1 ♀ 3 ♂. Ilan Pref. (Tsukeng, 16. VI.); 2 ♂, Taoyuan Pref. (Kuangyin, 14. VI.); 3 ♀ 1 ♂, Hualien Pref. (Kuangfu, 23–24. VI.); 8 ♀ 24 ♂, Nautou Pref. (Puli, Tahnan, 10–25. VIII.); 8 ♀ 6 ♂, Chiai Pref. (Chuchi, Chiangnouliao, 24–27. VII); 4 ♀ 4 ♂, Tainan Pref. (Kuantsuling, 23–24. VIII.); 6 ♀ 16 ♂, Taitung

Pref. (Chihpenchi, Tulan, 27. VI. -5. VIII.); 3 ♀ 10 ♂, Pingtung Pref. (Manchou, Checheng 13-15. VII.).

Remarks. This species is very common and on the flowers of *Ampelopsis heterophylla* Sied. et Zucc. it is everywhere fairly abundant. I did not collect all the specimens that I saw. As to the local characters none of such could be found against the Japanese population.

20. *Tachytes shirozui* Tsuneki 1966

Tachytes shirozui Tsuneki, Etizenia, 17: 11, 1966 (♀).
Tachytes shirozui: Tsuneki, Ibid., 20: 43, 1967 (♀♂, 4 ♀ 38 ♂).
Tachytes shirozui: Haneda, Life Study, 15: 30, 1971 (2 ♂).

Material: 5 ♀ 40 ♂. 1 ♂ Taitung Pref. (Chihpenchi, 700 m, 4. VIII.); 5 ♀ 39 ♂, Nantou Pref. (2 ♀ 5 ♂, Wushe, 1200-1300 m, 14. 16, 19. VIII; 3 ♀ 34 ♂, Chienching — Wushe, 1800-1300 m, 13. 24. VIII.).

Remarks. In one comparatively small example (about 11 mm) captured at the road side between Chenching and Wushe (about 1700 m) the interocular distance relatively markedly large, the length ratio to antennal joint 3 being 23/17 (usually 23/20 or so), the golden glittering of the pubescence on the head and thorax is weak, rather brassy, and the smooth area on the medio-apical part of the propodeum is very narrow and coarsely irregularly rugose, not shining. Otherwise, however, it retains the characters of *T. shirozui*. It seems to be better to treat it as an aberratio

21. *Tachytes fruticis* Tsuneki, 1964

Tachytes fruticis: Tsuneki, Etizenia, 20: 46, 1967 (4 ♀ 11 ♂).
Tachytes fruticis: Haneda, Life Study, 15: 30, 1971 (4 ♂).

Material: 12 ♀ 25 ♂. 2 ♀ 2 ♂, Taitung Pref. (Chulu, Chihpenchi, 29. VI. -5. VII.); 2 ♀ 12 ♂, Chiai Pref. (Chuchi, Chiangnouliao, 24-28. VII.); 8 ♀ 11 ♂, Nantou Pref. (Puli, Tahnan, 20-27. VIII.).

Remarks. A male specimen collected by Mr. Y. Haneda at the sea-shore of Shatao, near Oluampi, the southermost promontry of the Island, has the pubescence of the head and thorax suffused with golen coloration and appears as if to be a different species. In the usual specimens the pubescence is rather pale brassy.

22. *Tachytes hengchunensis* Tsuneki, 1967

Tachytes hengchunensis Tsuneki, Etizenia, 20: 47, 1967 (1 ♀ 2 ♂).
Tachytes hengchunensis: Haneda, Life Study, 15: 30, 1971 (1 ♀ 8 ♂, Nantou and Pingtung Prefs.).

Material: 8 ♀ 12 ♂. 6 ♀ 12 ♂, Pingtung Pref. (Manchou, Checheng, Kentin, 13-20. VII.); 1 ♀, Taitung Pref. (Tulan, 5. VIII.); 1 ♀, Hualien Pref. (Liyuchih, 22. VI.).

23. *Tachytes toyensis*, sp. nov.

This species (♂) closely resembles *Tachytes hengchunensis* m., differs from it mainly in the following characters:

(1) Clypeus at the sides of the median produced part much more deeply twice incised, with the appearance of the median part much narrower (Fig. 20, cf. Fig. 18 in *hengchunensis*).

(2) Tarsi of legs wholly black (in *hengchunensis* apical portion of fore tarsi and

apical area of each joints of mid and hind tarsi ferruginous).

(3) Pygidial area slightly broader (Fig. 21).

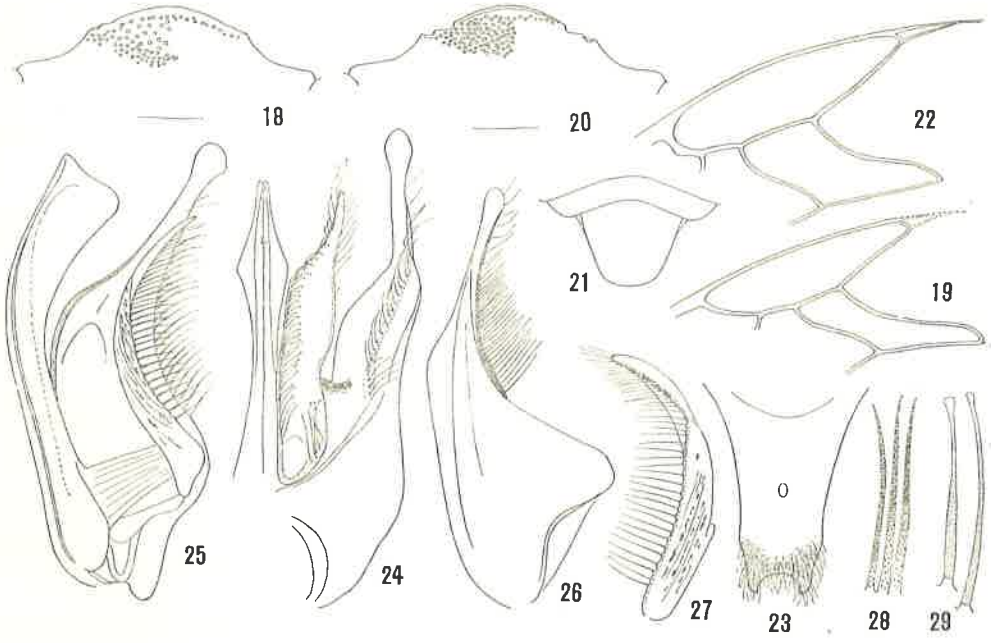
(4) The 8th sternite different in form (Fig. 23).

(5) Of the genitalia, paramere not lobiform at the apical portion, but narrowed into a stick and markedly enlarged at apex (Figs. 24, 25 and 26). Volsella more stoutly built, seen from beneath much broader, narrowed only towards apex (Fig. 24 and 27). Penis in the lateral view not sinuate at the lower margin (Fig. 25).

Length 11 mm. Coloration, except tarsi of legs, and pilosity of the body as in *T. hengchunensis*. Clypeus: Fig. 20, anterior lamellate margin thicker than in *hengchunensis* and not shining as in this, disc more closely punctured; interocular space at vertex almost equal in length to antennal joints 2 + 3, joint 3 in the narrowest view 1.7 times, in the broadest view 1.3 times as long as broad at apex, only slightly longer than joint 4 or 5; propodeum similar, but the posterior wall rather gently concave than flattened and longitudinally, somewhat more shallowly furrowed in middle. Pygidial area: Fig. 21, fore metatarsus with 4 spines on outer margin (in *hengchunensis* with 5 spines); abscissae of radial vein: $4 > 3 > 2 > 1$, appendiculate cell much more distinctly marked off than in *hengchunensis*, 3rd cubital cell much broader, nearly twice as broad as in *hengchunensis* and not tongue-shaped (Fig. 22, cf. Fig. 19). In punctuation and sculpture including those of propodeum similar to *hengchunensis*.

Holotype: ♂, Taoyuan (or Toyen) Pref., Taoyuan, 23. VII. 1970, Y. Haneda leg.

Remarks. According to the key by Williams on the Philippine representatives this



Figs. 18-29. Figs. 18 and 19: *Tachytes hengchunensis* Tsuneki, ♂. Figs. 20-29: *Tachytes toyensis* sp. nov., ♂.
18 and 20: Clypeus. 19 and 22: Radial and 3rd cubital cells. 21: Pygidial area. 23: Sternite 8. 24: Genitalia (left half) seen from beneath. 25: Ditto seen from inside. 26: Paramere. seen from outside. 27: Volsella. 28: Hairs on paramere. 29: Hairs on volsella.

species goes to *T. bakeri*, with a slight inconsistency. With respect to the interocular space at the vertex as against the length of antennal joints 2 + 3, it is utterly different from the new species dealt with here.

Revision of the *bengalensis* allied species of *Tachysphex* in Formosa

In my previous paper on the Formosan Larrinae (Etizenia, 20, 1967) I dealt with the black bodied and silverily pubescent specimens of *Tachysphex* as a whole as one and the same species, viz. *T. bengalensis* Cameron, although I threw a doubt as to whether they really belong to a single species or they included more than one species, because among them a considerable variation was observed not only in regard to coloration and punctuation, but also to structure of some parts, especially of the male genital organs. Recently I have had a chance of studying the members of the genus occurring in the western and central parts of the palaearctic Region and could acquire a broad knowledge regarding the characters of the genus which included in the eastern part of the Region only a scanty number of the species.

I revised the material used in the previous investigation and further observed the newly collected specimens from the standpoints different from those of the former study and could separate them with a fair certainty into several distinct species. Despite the fact, however, I had to deal with some of them still as varieties of a certain species, one of which was related to the minor difference in the structure of the genitalia and could not be discernible from the outside observation. First, in order to grasp the general features of the species the synoptic key to each species will be presented.

Synoptic key to the species

Females

(*T. lihyuetanus* remains unknown)

1 Tarsi of legs with apical 3 (or 4) joints wholly or largely ferruginous, comb-bristles on apical portion of fore metatarsi under the natural condition (viz. not glued together) separated from each other and divergent outwards (also those of the subsequent joints), anterior lamella of median part of clypeus on anterior margin gently rounded out, or nealy straight, not medianly bluntly toothed even in the fresh specimens (medial impressed line of the central depression of vertex reaches the posterior end of vertex, puncture-intervals duplicately micro-punctulate, mesopleuron fairly closely punctate, with intervals less than as large as the punctures, mandibles in middle very extensively ferruginous, pectinate bristles of fore tarsi ferruginous, hairs on mesopleuron, propodeum and femora beneath markedly long and abundant, 3 sillvery pile bands on abdomen), length 6.7-9.3 mm. ***T. formosanus* sp. nov.**

– Tarsi of legs black (sometimes apically somewhat brownish), pectinate bristles on apical portion of fore metatarsi almost contiguous to each other, more or less bundled, at least at the apical portion (also those of the subsequent joints), anterior lamella of median part of clypeus on anterior margin in middle in fresh specimens more or less produced into a blunt tooth, sometimes the tooth further

incised in middle (with 3 silvery pile bands on abdomen) 2

2 Punctuation on upper frons finely irregularly reticulate, with intervalic carinae smooth, not micropunctulate, pectinate bristles of fore tarsi white in colour, mesopleuron closely uniformly punctured, with intervals smaller in width than the punctures, punctures on pygidial area very sparse and fine (hairs on mesopleuron, propodeum and femora beneath comparatively short, medial impressed line of the central depression of vertex sometimes reaches the posterior end of vertex, sometimes not), 6.5–8.5 mm ***mindorensis* Williams, 1928**

– Punctuation on upper frons finely reticulate or subreticulate, with intervalic spaces irregularly micropunctulate, pectinate bristles of fore tarsi usually only apically ferruginous, rarely wholly so, mesopleuron on central part somewhat grossly and more or less sparsely punctured, with intervals nearly as large as the punctures, on upper and lower parts punctures finer and closer, punctures on pygidial area more abundant and somewhat larger than in *T. mindorensis* (basal elevation of sternite 2 with apical margin medianly slightly roundly produced), 7.0–9.5 mm ***bengalensis japonicus* Iwata, 1933**

Males

1 Fore tarsi without pectinate bristles (tarsi black, sometimes apicalwards slightly brownish, the incision on underside of femora without medial longitudinal carina) 2

– Fore tarsi with pectinate bristles 3

2 Puncture intervals on frons delicately micropunctulate, punctures of mesopleuron on central part larger and sparser than on lower and upper parts, with intervals nearly as large as punctures (posterior elevation of the central impression of vertex not incised in middle by the medial furrow of the impression, antennal joint 3 slightly longer than 2, sternite 8: Figs. 33–35, never constricted toward middle, penis of genitalia: Figs. 37–40, lamellar appendage of volsella with outer margin nearly straight (Fig. 36), 6–8 mm

***bengalensis japonicus* Iwata, 1933**

– Puncture intervals on frons smooth and shining, not micropunctulate, punctures on mesopleuron almost uniform all over, close and fine, on subalar epimeral area very weak (posterior elevation of central impression of vertex distinctly incised medially by the longitudinal furrow of the impression, antennal joints 2 and 3 subequal in length, sternite 8: Fig. 56, somewhat narrowed towards middle, volsella and paramere: Fig. 58, lamellar appendage of the former broadly rounded on outer margin, Penis: Fig. 59), 5–5.5 mm

***mindorensis* Williams, 1928**

3 Tarsi of legs black, interocular distance at vertex distinctly less than as long as antennal joints 2 + 3 + 4, incision beneath fore femur without medial carina, apical two of the pectinate bristles on fore metatarsus close to and run parallel with each other, mesopleuron finely and sparsely punctured, with intervals larger than punctures (volsella: Fig. 64, penis: Figs: 65 and 66), 7.5 mm

***lihyuetanus* Tsuneki, sp. nov.**

– Tarsi of legs with apical 3 or 4 joints ferruginous to brown, interocular distance at vertex subequal in length to antennal joints 2 + 3 + 4, incision of fore

femur medianly distinctly carinated, pectinate bristles on fore metatarsus more or less separated from each other and slightly divergent outwards (unless some of them glued together), mesopleuron fairly closely punctured, with intervals somewhat smaller than punctures (volsella: Figs. 74–76, Penis: Figs. 77–79), 4.5–7.3 mm ***formosanus* Tsuneki, sp. nov.** 4

4 Penis at glans beneath 3-(or 4-)dentate (Fig. 77–78) ..... typical form

– Penis 5-dentate (Fig. 69) 5

5 Sternites 2 and 3 with a ferruginous spot on each side ..... var. *A*

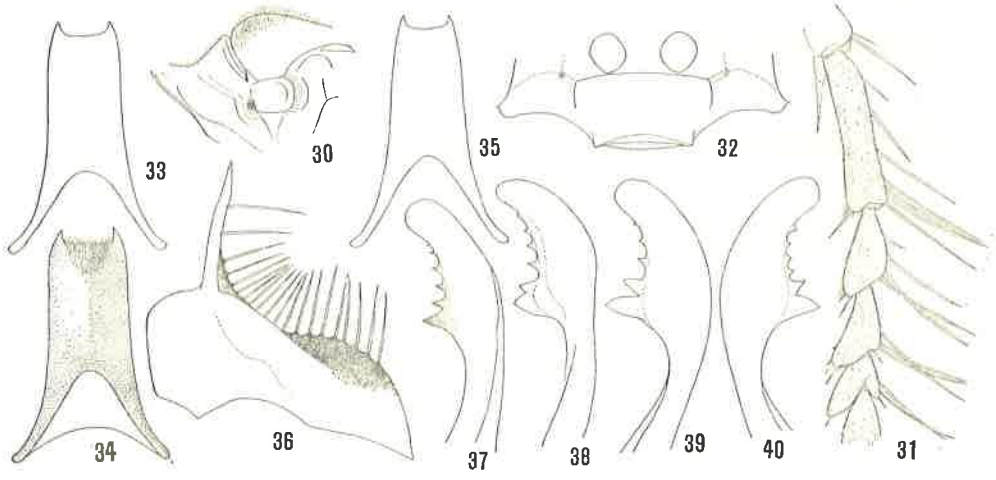
– Sternites wholly black ..... var. *B*

24. *Tachysphex bengalensis japonicus* Iwata, 1933

Tachysphex japonicus Iwata, Trans. Kansai Ent. Soc., 4: 27, 1933.
Tachysphex bengalensis japonicus: Tsuneki*, Etizenia, 20: 49, 1967.

Material: 13 ♀ 4 ♂. 2 ♀, Kentin Park; 1 ♀, Hengchun; 1 ♀, Suchungchi; 1 ♀, Chulu, 4 ♀ 1 ♂, Pempuchi; 1 ♀, Erhchieh; 2 ♀, Tsukeng (Illan Pref.); 2 ♀ 2 ♂, Yangminshan, 3. VII. – 22. VIII. 1966, 68, K. Tsuneki et T. Tano leg.

Remarks. This subspecies differs from the typical race in the number of the pile bands on the abdomen, in this subspecies only 3 (in the typical race 5). The species is characterized by the combination of characters of the clypeus, frons and fore tarsi as given in the key. In the genital organs the dentate margin of the penis is fairly varied in form and in the number of the teeth (Figs. 37–40, also Figs. 41–52), but the volsella with the finely serrate margin of the lamellate appendage constantly running straight. Interocular space at the vertex in the female twice as great in length as antennal joint 3, in the male subequal to the combined length of antennal joints 2 + 3 + 4.



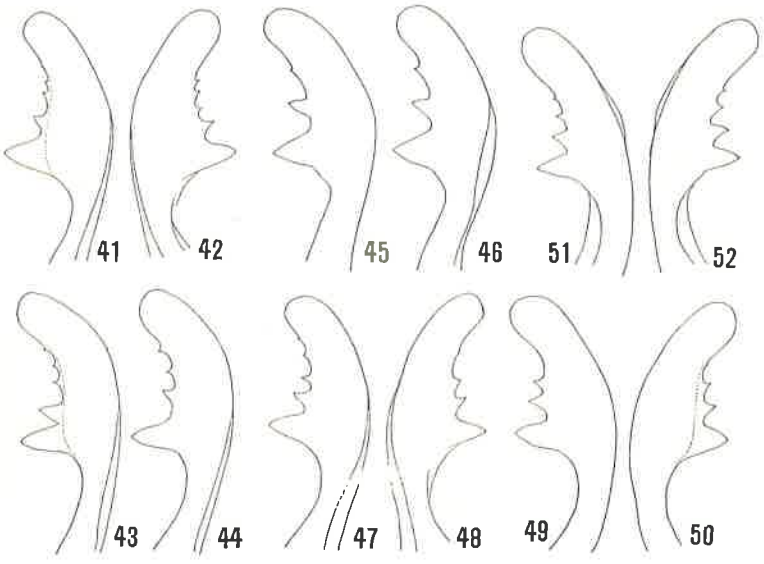
Figs. 30-40. *Tachysphex bengalensis japonicus* Iwata. 30–31, ♀; 32–40, ♂.
30: Pro- and mesonotum in lateral view. 31: Fore tarsus. 32: Clypeus. 33-35: Sternite 8. (33 and 34, usual form, 35, rare form). 36: Volsella. 37–40: Penis (37, left half, ex. from Yangmingshan; 38, ditto, ex. from Tsukeng; 39, left and 40, right; ex. from Pempuchi).

On the geographical variations of *Tachysphex bengalensis japonicus*.

Tachysphex bengalensis Cameron is, so far known, widely distributed over the eastern parts of Asia. Strictly, however, the true characters of the species remain doubtful, because the descriptions given with the topotypical specimens as well as the type by the original and other previous authors are not detailed and it has been known that some closely allied forms occur in sympatric with the so-called *bengalensis*. As to *T. bengalensis:* Williams, 1928, the description of which is fairy detailed and which is believed to be the same as the species dealt with here we can not say without doubt it is identical with *T. bengalensis* Cameron or *T. bengalensis:* Bingham. In the following description, however, I will treat the forms under consideration as a geographical race of this species.

At my hand there are specimens of this species from North China (Peking), Korea, Hokkaido, Honshu, Shikoku, Kyushu and the Amami Group of the Ryukyus. Besides the above, I could have examined the specimens from the Yaeyama Group (the southern Ryukyus). As above given this species also occurs in the Philippines. The localities of the specimens above listed are so different in latitude (and the temperature accordingly) that it is natural to presume the occurrence of several local races among them. In sofaras examined by me, however, there can be discovered no note-worthy difference whatever on the external distinctions among them, except those from the Yaeyama Group, even in respect of the body length; the difference in this last mentioned character is most usually met with among the local representatives of the species of Sphecidae — the more northern, the larger the form.

However, when we try to examine the comparative study of the male genital organs



Figs. 41–52. *Tachysphex bengalensis japonicus*, penis of male genitalia, ex. from various localities of japan. 41, left and 42, right; ex. from Amami Is. the Ryukyus; 43, left and 44, right; ex from Asizuri, Kyushu; 45–46, 47–48; ex. from Fukui Pref. (45, Mikuni, seashore; 47, Hatogayu, 600 m); 49–50, ex. from Ishikawa Pref. (Tetori Park, 400 m): 51–52, ex. from Sapporo, Hokkaido.

we can easily find a distinct tendency towards the cline on the dentation at the inner margin of the penis valve.

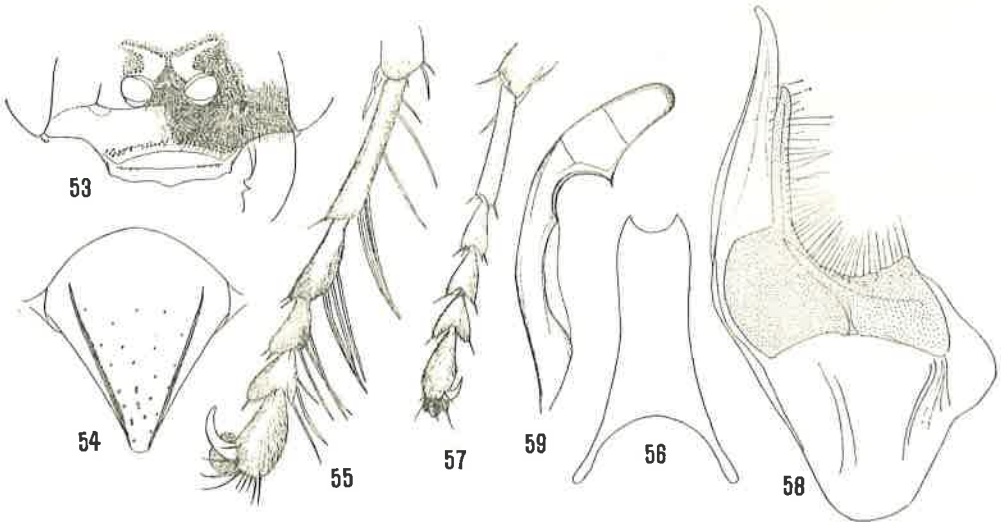
In the Formosan exmaples the teeth are usrally 5–6 in number (Figs. 37–40), in those of the Central Ryukyus and Kyushu the number of the teeth diminishes to 4–5 (Figs. 41–44) and in those from Honshu and Hokkaido the teeth are most usually 3 in number (Figs. 45–52). However, it must particularly be mentioned that the dentation in these examples has a common character — the basal one is very large and others suddenly diminish in size apically. The reduction in the number of the teeth, however. is only a genral inclination and not as yet fixed with locality. The feature of the dentation shows a more or less difference among the individual from the same locality and, moreover, it must particularly be mentioned that the dentation of the two halves is not always uniform, but rather it seems to be the rule that it differs more or less between the right and the left. Except for the basalmost largest tooth the teeth of both the halves, at least in part, are alternately arranged to constitute a series (Figs. 43–44, 47–48, 49–50). But the variation in these organs can not be observed without the particular preparation and so it may be said to be practically incipient.

Only on the examples from the Yaeyama Group of the Ryukyus a certain series of differences can be observed upon the external distinctions, though they fall completely within the range of the Formosan type in regard to the structure of the male genital organs (Figs. 87–88). This form is dealt with as a distinct geographic race and described later in the appendix of the present paper.

25. *Tachysphex mindorensis* Williams, 1928

Tachysphex mindorensis Williams. Bull. Exp. Sta. Hawaii. Sug. Plant. Ass., Ent. Ser., 19: 92, 1928 (♂♀).

Specimens examined: 9 ♀ 3 ♂. 1 ♀ 1 ♂, Kentin Park, 9. Vlll. 1966, T. Tano leg.; 7 ♀ 2 ♂, Hengchun, 8. VII. 1966; 8, 11. VII. 1968, K. Tsuneki leg.; 1 ♀, Chin-



Figs. 53-59. *Tachysphex mindorensis* Williams. 53–55, ♀; 56–59, ♂.
53: Clypeus. 54: Pygidial area. 55 and 57: Fore tarsus 56: Sternite 8. 58: Paramere and volsella seen from inside. 59: Penis.

shan, Taipei Pref., 25. VIII. 1966, T. Tano leg.

Remarks. In the original description the characters of the species are poorly given and except for the structure of the penis valve of the male genital organs (and somewhat for the length proportion of the antennal joints) no reliable clue to separate the species from the closely resembling relatives is treated. Besides the characters enumerated in the key which are successively clarified on the basis of the structure of the penis (Fig. 59) the following seem to be of use to identify the species (♀♂):

(1) Collar of pronotum in the lateral view roundly swollen, in *bengalensis japonicus* from posterior margin directly inclined nearly straight forwards (Fig. 30).

(2) Dorsal side of propodeum finely (more finely than in *T. b. japonicus*), irregularly (not quadrately) reticulate, longtudinal carinae only at the extreme base (at most before middle) well-defined, in *japonicus* the longitudinal rugose carinae mostly till near the end (at least beyond middle) of the segment well-defined, and, subquadrately sectioned by the numerous transverse carinulae.

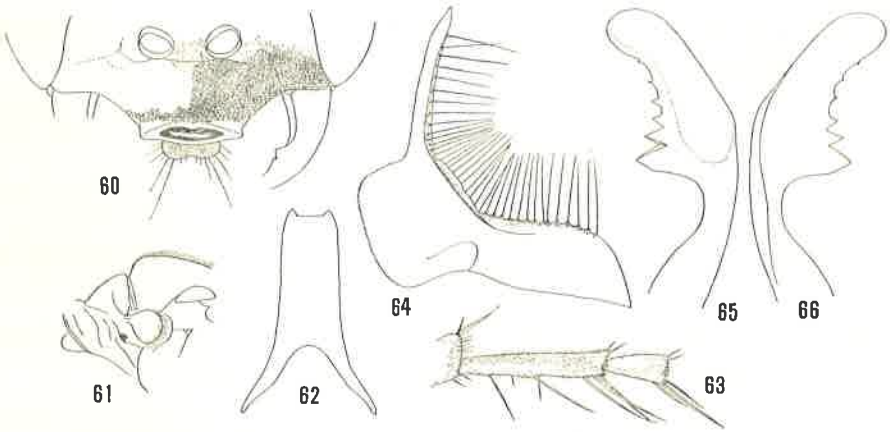
(3) Middle femora on posterior aspect distincly flattened, in males apparently somewhat excavated (in *japonicus* not).

(4) Antennal joint 4 1.3-times as long as broad at apex (in *japonicus* 1.5–1.7 times so.)

The form of the anterior margin of clypeus in males, as explained by Williams, with the lateral angles greater than 90°, in females mostly at the lateral angles somewhat produced anteriorly into a tooth (Fig. 53), but with a more or less variation, pygidial area very delicately coriaceous and scattered sparsely with fine (finer than in *japonicus*) punctures. Abdomen always with 3 pile bands. Penis: Fig. 59, paramere and volsella: Fig. 58. Length ♀ 7–9 mm, ♂ 5–7.5 mm.

26. *Tachysphex lihyuetanus* sp. nov.

♂. Length 8.0 mm. Closely resembles *T. b. japonicus*, differing therefrom mainly in that the interocular space at the vertex is distinctly less than as long as antennal joints



Figs. 60–66. *Tachysphex lihyuetanus* sp. nov., ♂.
60: Clypeus. 61: Pro- and mesonotum in lateral view, 62: Sternite 8. 63: Basal two joints of fore tarsus. 64: Volsella. 65–66: Penis (65, left half; 66, right half).

2 + 3 + 4 and the fore tarsi are provided with the comb spines. Black, mandibles near apex narrowly and tegulae of wings on posterior half ferruginous, wings hyaline, extreme apical margin narrowly somewhat darkened. Pubescence on lower frons and clypeus silvery, dense and appressed, hairs on temples, mesopleuron and femora of legs also silvery, comparatively long, but not so dense as in *japonieus*, on propodeum hoary white, not so long and dense as in this.

Interocular space at vertex less than as long as antennal ioints 2 + 3 + 4 (ratio about 20 : 25) and almost twice as long as joint 5, length relation of these joints: $2 > 3 > 4 > 5$, medial longitudinal impressed line in the central depression of vertex extended posteriorly and a feeble groove crosses over the posterior raised area, but not so distinct as in *T. formosanus*. Head in front with OAD : WAS : IAD = 13 : 5.5 : 9, clypeus: Fig. 60, disc gently raised, anterior bevelled area in a low triangle, very narrow, distinctly and fairly acutely inclined, with the upper margin bluntly edged, marginal lamellate area comparatively thick, almost truncate at apex, with the lateral angles nearly 90°. Head in profile with temple narrowed upwards, with the posterior margin gently roundly curved. Collar of pronotum in lateral view: Fig. 61, in its inclination somewhat intermediate between *T. b. japonicus* and *T. formosanus;* on mesopleuron anterior oblique furrow deep and strongly crenate, scrobal furrow shallow, not crenate, but the scrobe itself moderately large and deep, on propodeum medio-posterior area flattened and somewhat roundly produced posteriorly, the transverse carina near top of posterior wall, in the type, strongly and hightly raised (constant?) and medianly interrupted by the medial furrow which is broad spindle-shaped and margined by the carinae. The incision at the base of front femur beneath without the medial carina, front metatarsus with 5 whitish bristles on the outer margin, the apical two (or three) close together and apically gathered in a bundle, joint 2 with 2 or 3 bristles apically, joints 3 and 4 each with one comparatively short bristle. In fore wing the abscissae of radial vein with the relative length: $4 > 2 > 1 \geqq 3 > 5$. Of the genitalia volsella: Fig. 64, the abundant and long bristles on upper margin of the main body and the obtuse angle formed by the lamellate appendage with the apical slender arm are characteristic, penis: Figs. 65 and 66.

Frons finely, irregularly subreticulate, with puncture-intervals micropunctulate (Fig. 82), vertex moderately and sparsely (puncture-intervals 1–2 times as large as punctures), clypeus densely, covered with pile-bearing points, the glabrous bevel with a puncture-line just behind the bordering line against the anterior lamella; mesonotum finely punctate-subreticulate, without micropunctules; mesopleuron finely and sparsely punctured, upwards and downwards the punctures finer and closer, propodeum coarsrsely rugoso-reticulate, on basal half longitudinal rugose striae well-defined and the middle one of which stronger and reaches the end of the segment, posterior wall transversely and sides of the segment obliquely and coarsely striate; sternite 2 finely and not strongly coriaceous, with a few fine punctures on the anterior marginal line of the medio-posterior slight depression, which is subtriangularly extended forwards.

♀. Unknown.

Holotype: ♂, Nantou Pref. (Lihyuetan), 24. VIII. 1966. K. Tsuneki leg.

27. *Tachysphex formosanus* sp. nov.

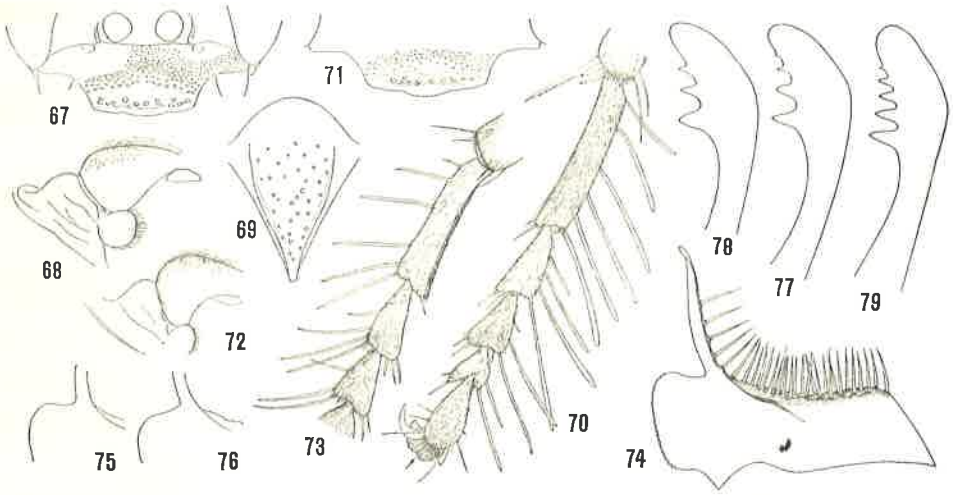
? *Tachysphex testaceipes* Bingham, Faun. Brit. Ind., Hym., I, p. 103, 1897.

The species described here as new seems very close to *T. testaceipes*. It differs, however, from this at least in that the tarsi are basally fairly broadly black, sculpture on the propodeum at the dorsal surface is very finely rugoso-reticulate, at the lateral surface not punctate, but obliquely striate and the silvery pile bands on the abdomen are not 5 in number, but always only 3.

The informations given by the original description are inevitably insufficient viewed from the now-a-day standard of taxonomy (no touch on the characters of the fore legs and the male genitalia). The comparative investigation in future may bring to light the affinity between them and the Formosan species may become a geographic race of *testaceipes*.

♀. Length 7.0–9.5 mm. Black; mandibles in middle broadly and base of wings (not tegulae) ferruginous; tarsi from middle of joint 2 or from 3 apically slightly darkened brown, sometimes fairly light brown; wings hyaline, extreme apical margin narrowly clouded, veins and stigma brown. Tegulae transparent except the black base, hairs on clypeus, lower frons, temples, sides of thorax, propodeum and femora beneath abundant, not particularly long and silvery.

General structure of the body and appendages very similar to that of *T. b. japonicus*. Head seen from above with a marked depression on vertex, the medial furrow of which runs posteriorly over the posterior elevation and reaches the posterior margin of vertex, the furrow anteriorly deeply divides the rounded swelling of the ocellar area and reaches the anteriorly ocellus; interocular distance at vertex as great as the doubled length of antennal joint 3 (greater than joints 2 + 3 and smaller than 3 + 4), OAD : WAS : IAD* = 12 : 6 : 9; clypeus: Fig. 67, anterior margin gently roundly arched,

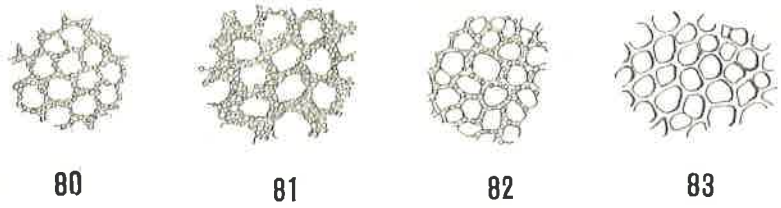


Figs. 67–79. *Tachysphex formosanus* sp. nov. 67-70, ♀; 71–79, ♂.
67 and 71: Clypeus. 68 and 72: Pro- and mesonotum in lateral view. 69: Pygidial area. 70 and 73: Fore tarsus. 74–76: Volsella (75 and 76 variation). 77–79: penis (77–78, right and left half of the same indivldual, common form). 79: ditto (left half, variation).

* Oculo-antennal distance; Width of antennal socket; Interantennal distance.

sometimes very weakly trilobate, not produced in middle into a blunt tooth, the lamellar rim and the glabrous bevel (Schnittfläche) are separated from each other by a weakly punctured line, the elevation of the disc rather gentle and no distinct edged line between this and the bevel; head in profie with temple narrowed upwards (but not naught at the upper end), with occipital margin running straight; antennal joint 3 in the narrowest view twice, in the broadest view 1.7 times as long as wide at apex, distinctly shorter than joint 4. Collar of pronotum in the lateral view (Fig. 68) roundly swollen, mesonotum without the anterior deperession, mesopleuron with the anterior oblique furrow deep and crenate, scrobal furrow weak, not crenate, on mesosternum a short longitudinal carina present a short distance in front of mesocoxa; scutellum and postscutellum gently roundly raised, dorsal aspect of propodeum without medial furrow or carina, medio-posterior raised area slightly roundly produced posteriorly, on posterior aspect upper medial excavation broad but not deep, a transverse carina on each side upward of the aspect varied in development, sometimes distinct and high, but sometimes very weak and indistinct. Pygidial area: Fig. 69 (most usual form), disc longitudinally, fairly strongly roundly raised; fore tarsus: Fig. 70 (often apical 2 or 3 bristles accidentally glued together, then examine the tarsus of the other side), the pectinate bristles or spines pale brown (the short spines of mid and hind legs hoary white as a rule, rarely slightly brownish); longer tarsal spur of the hind leg not reaching the length of the following metatarsus, with the inner margin densely covered with short hairs. As to the relative length of the abscissae of radial vein abscissa 4 always the longest and 5 always the shortest, 1, 2 and 3 subequal and varied in the strict relative length individually.

Vertex rather sparsely covered with moderate-sized punctures, with intervals as large as, or slightly larger than, the width of punctures and shining, upper frons somewhat more finely, very closely punctured, subreticulate, with intervals irregularly, fairly closely punctulate (Figs. 80 and 81); clypeus finely and closely punctured, bevelled area glabrous and usually with a few comparatively gross punctures scattered. Mesonotum finely punctate-reticulate, but not duplipunctate as on frons, scutellum more sparsely punctured, punctures on mesopleuron somewhat weaker (not distinctly observed by the close pubescence under the natural condition), fairly close, on central part somewhat larger and sparser (but not so much in degree as in *bengalensis*), metapleuron very finely, weakly coriaceous, with short longitudinal striae on dorso-posterior part, propodeum on dorsal aspect moderately closely, longitudinally rugoso-striate, the striae reach middle or beyond middle of the segment, intervals of the striae and on posterior portion transversely, closely rugoso-striate, sometimes whole the surface finely rugoso-reticulate, with the main trend of rugoso-striae running longitudinal, posterior aspect transversely,



Figs. 80–83. Punctuation on the frons. 80–81: In *Tachysphex b. japonicus* and *T. formosanus*. 82: In *T. lihyuetanus*. 84: In *T. mindorensis*.

sides of the segment obliquely striate; pygidial area delicately microcoriaceous and comparatively grossly, sparsely punctured, the punctures tend to be distributed on the lateral portions; sternite 2 on the sides finely coriaceous, on the median part very weakly, transversely and very closely microstriate and whole the surface scattered with comparatively gross punctures.

♂. Length 4.5–7.3 mm. Similar to the female. Interocular distance at vertex subequal to the length of antennal joints 1 + 2 + 3 (strictly in most specimens somewhat more than as long as the combined length of the 3 joints); clypeus: Fig. 71, lateral angles of the anterior margin of the medial part almost rectangle as in *bengalensis*. The excavation on the underside of fore femur medially longitudinally keeled, fore tarsus: Fig. 73. Volsella of genitalia: Figs. 74–76 (75 and 76 variations), similar to that of *T. b. japonicus*, but the lamellate appendage with the outer margin gently rounded out, not straight as in this species and the bristles relatively thicker and shorter; however, the angle between the upper margin of the appendage and the apical slender arm of the main body is fairly markedly varied with the individual (Figs. 75 and 76). Penis: Figs. 77–79 (77 and 78 are the right and left half of the same individual, normal form). Sculpture as in the female, except that sternite 2 is more broadly coriaceous, with postmedial part alone somewhat glossy.

Holotype: ♀, Taoyeh, Taitung Pref., 14. VIII. 1966.

Paratypes: 15 ♀ 10 ♂, Pingtung (Oluampi, Hengchun, Kentin Park), Taitung (Chihpenchi, Taitung, Tulang), Chiai (Chuchi), Nantou (Puli), Hualien (Liyuchih), Ilan (Tsukeng) and Tayuan (Kuangyin) Prefectures. 20. VI. – 25. VIII. 1966, 68.

Other specimens: 9 ♀ 11 ♂ (besides the above including Taipei Pref. .. Chianshan).

Var. *A*. Sternite 2 (some times also 3) with a ferruginous or dark brown spot on each side.

Specimens: 3 ♂, Taitung, 14. VIII. 1966; 1 ♀, Liyuchih (Hualien Pref.), 16. VIII. 1966; 1 ♂, Chinshan (Taipei Pref.), 25. VIII. 1966.

28. *Lyroda taiwana* Tsuneki, 1967

Lyroda taiwana Tsuneki, Etizenia, 20: 56, 1967 (14 ♀ 24 ♂).
Lyroda taiwana: Haneda, Life study, 15: 30, 1971 (5 ♀).

Material: 10 ♀ 13 ♂. 10 ♀ 12 ♂, Pingtung Pref. (Hengchun, Paoli, Manchou, 8–19. VII.); 1 ♂, Chiai Pref. (Chuchi, 26. VII.).

29. *Lyroda japonica takasago* Tsuneki, 1967

Lyroda japonica takasago Tsuneki, Etizenia, 20: 58, 1967 (8 ♀ 4 ♂).
Lyroda japonica takasago: Haneda, Life Study, 15: 30, 1971 (2 ♀).

Material: 12 ♀ 28 ♂. 12 ♂, Ilan Pref. (Erhchieh, 18. VI.); 8 ♀ 6 ♂, Hualien Pref. (Liyuchih, Kuangfu, Yuili, 22–26. VI.); 1 ♀ 1 ♂, Taitung Pref. (Tulan, Chihpenchi, 1, 5. VIII.); 3 ♀ 9 ♂, Chiai Pref. (Chuchi, 24, 25. VII.).

APPENDIX

TACHYSPHEX FROM THE SOUTHERN RYUKYUS

In the summer of 1969 Mr. T. Tano, Usui High School, Fukui, made a collecting excursion to the Islands of Iriomote and Ishigaki, of the Yaeyame Group of the Ryukyus and brought back a number of the Hymenopterous insects. At my revision of the Formosan *Tachysphex* he was kind enough to bring to me all the specimens of the genus he collected on the Islands above mentioned, together with the Formosan examples he possessed and placed them at my disposal.

The two Islands of the Ryukyus lie eastwards off the north-eastern coast of Formosa and are situated at nearly the same latitude as that of Taichung and Tienshang. Hence it is expected that the insect fauna of the Islands has a close relationship with that of Formosa.

The *Tachysphex*-specimens collected by Mr. Tano attain as many as 90 in number, including 3 species, of which 2 are common with Formosa and one was a new subspecies of *T. bengalensis*. One of the common species involves an interesting variety which I thought at first sight to be a new species; so much it differs from the typical race in coloration.

1. *Tachysphex changi* Tsuneki, 1967

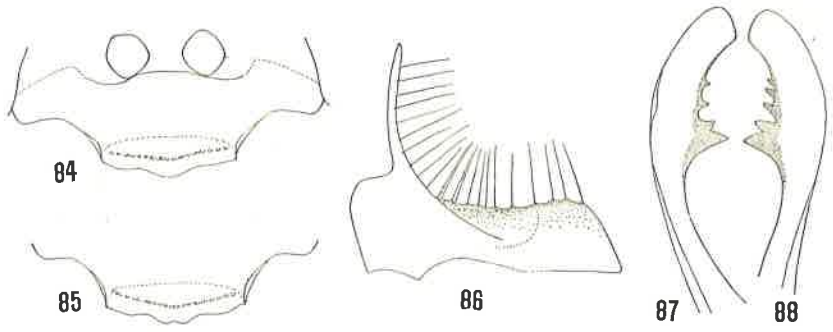
Specimens examined: 5 ♀♀, 3 ♂♂, Nagurahama, Ishigaki Is., 31. VII. 1969; 2 ♂♂, Inaba, Iriomote Is., 26. VII. 1969.

2. *Tachysphex bengalensis yaeyamanus* ssp. nov.

The specimens of *T. bengalensis* from the Yaeyama Group differ from the Japanese and Formosan representatives (ssp. *japonicus* Iwata) in the following points and form doubtlessly a local race:

♀♂. Punctures on frons finer and weaker and the longitudinal carinae in front of anterior ocellus better developed and longer, punctures on mesopleuron and sculpture on dorsal aspect of propodeum also comparatively finer.

♂. Medial part of clypeus narrower, its anterior margin nearly as wide as the



Figs. 84–88. *Tachysphex bengalensis yaeyamanus* ssp. nov. 84–85, ♀; 86–88, ♂. 84: Clypeus (usual form). 85: Ditto (unusual form). 86: Volsella. 87 and 88: penis (87, left half; 88, right half).

lateral margin measured straight (in *japonicus* the former is distinctly wider than the latter). Volsella of the genitalia with the basal main part distinctly narrower than in *japonicus* (Fig. 86).

Clypeus in ♀: Figs. 84 and 85, penis valve (right and left half): Fig. 87 and 88.

Holotype: ♂. Mt. Banna, Ishigaki Is., 31. VII. 1969, T. Tano leg. (Coll. Tsuneki).

Paratypes: 9 ♀ 5 ♂. 7 ♀, Iriomote Is. (Sonai, 25. VII; Ohara, 2. VIII. 1969); 2 ♀ 5 ♂, Ishigaki ls. (Kabira Park and Mt. Banna, 31. VII.; Nosoko, l. VIII. 1969).

Remarks. In females the anterior margin of the clypeus is usually as in *japonicus* (Fig. 84), sometimes, however, it is distinctly incised in the middle (Fig. 85). The incision on the fore femur beneath without the longitudinal carina in the middle as in *japonicus*. Penis with 4 or 5 teeth on the inner margin (Figs. 87 and 88).

3. *Tachysphex formosanus* Tsuneki, 1971

Specimens examined: 25 ♀ 39 ♂. 19 ♀ 33 ♂, Iriomote Is. (3 ♀, Sonai, 25. VIII; 7 ♀ 17 ♂, Shirahama, 25, 28. VII; 8 ♀ 4 ♂, Inaba, 26. VII; 1 ♀ 12 ♂, Ohara, 2. VIII. 1969); 6 ♀ 6 ♂, Ishigaki Is. (Kabira Park, 30, 31. VII. 1969).

A variety. In the following specimens the tarsi are wholly black as in *T. b. japonicus*, that is to say, only very slightly brownish towards apex, otherwise, however, no note-worthy distinction can be observed on any of the specific characters including those of the genitalia:

1 ♂, Inaba, Iriomote Is., 26. VII. 1969; 5 ♂, Shirahama, Iriomote Is., 28. VII. 1969.

References

Haneda, Y. 1971. Sphecidae collected in Formosa in 1970. Life Study, 15 (1-2): 29-33, 1971.

Tsuneki, K. 1967. Studies on the Formosan Sphecidae (I). The subfamily Larrinae. Etizenia, 20: 1-60, 1967.

Williams, F. X. 1928. Studies in tropical wasps — their hosts and associates. III. The Larridae of the Philippine Islands. Bull. Exp. Sta. Hawaii. Sug. Plant. Ass., Ent. Ser., No. 19, pp. 61-111.