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## CONTRIBUTIONS TO THE KNOWLEDGE ON THE SPHECID LARVAE IN JAPAN (Hymenoptera) Part II

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This is the continuation of the first part in which the larvae of five species were treated. In this part, the author dealt with the larvae of seven species belonging to Nyssoninae, Pemphredoninae and Philanthinae.

As for the literature cited, see part I.

### **Pemphredon (Cemonus) lethifer (Shuckard)**

Body: Length 9.5 mm, width 2.26 mm, yellow. Pleural lobes convex in thorax and very weakly convex in abdomen. Anus terminal, transverse slit. Each segment with a pair of projections on dorsal side. Integument with very sparse setae, but smooth except dorsal side of thorax, dorsal side of thorax weakly spinulose. Spiracles very slightly pigmented, rim of peritremes circular and relatively distinct, wall of atria without distinct ridges or spinules, openings into subatria small and without spines, subatria slender, separated from trachea by a constriction. Head yellowish white. Width 0.85 mm, height 0.78 mm. Coronal suture weak, parietal bands indistinct. Epistomal suture and labro-clypeal suture distinct. Head capsule with sparse setae and punctures. Antennal papilla absent, orbits circular,  $53 \times 50 \mu$ . Clypeus with setae and punctures. Frons with a pair of depressions. Mouthparts: Labrum 0.32 mm in width, maximum height 0.13 mm, median height 0.11 mm, apical half with several setae, punctures and sensilla, the setae  $12 \mu$  in length, basal half of labrum smooth, median part of base with irregular reticulations. Epipharynx spinulose, the spines comparatively small and weak, each sensory area with several sensilla, median part without spines. Mandibles brown, apex dark brown, length 0.31 mm, width 0.15 mm, apex with four teeth, the most basal tooth is very weak, outside near base with a seta. Maxillary palpi  $46 \mu$  in length, thickness  $30 \mu$ , galeae small, length  $14 \mu$ , thickness  $10 \mu$ , lacinial area with small and weak spines, lateral portion of stipes with sparse setae about  $10 \mu$  in length. Labium smooth, labial palpi  $30 \mu$  in length, thickness  $27 \mu$ , spinneret paired, fairly projected relatively to palpi, each projecting truncate apically.

**Material.** 9 exs. (diapausing larvae), Arashi, Ohno, Fukui Pref., 25. VIII. 1966, leg. T. Iida.

**Remarks.** Evans (1964) has treated the larva of *lethifer* and Grandi (1961) has treated that of *lethifer littoralis*. The larva which is treated in this paper agrees well with the descriptions of them in general. But this differs from those species in the following two points: (1) Head not very much wider than high, (2) coronal suture visible.

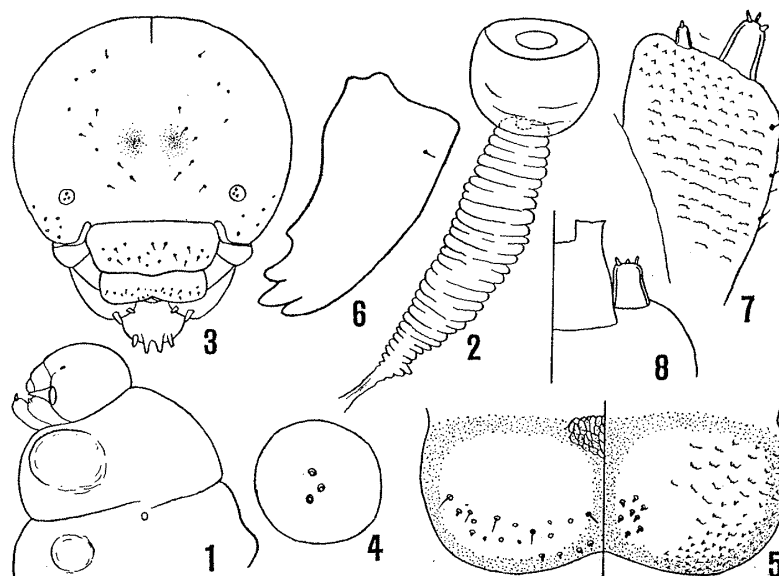


Fig. 1. *Pemphredon (Cemonus) lethifer* (Shuckard).  
 1, Anterior portion of body in the lateral view. 2, Spiracle. 3, Head. 4, Right antennal orbit. 5, Labrum (left) and epipharynx (right). 6, Left mandible. 7, Apex of right maxilla seen in front. 8, Right half of labium seen in front.

***Psenulus fuscipennis japonicus* Tsuneki**

Body: Length 9.2 mm, maximum width 2.5 mm. Pale yellowish white. Surface of dorsal side transversely furrowed, ventral side longitudinally furrowed. Integument not spinulose or granulose, but with very sparse setae about  $20\ \mu$  in length. Pleural lobes distinct, each segment with a pair of projections on dorsal side. Spiracles slightly pigmented, prothoracic spiracles very slightly larger than the others, atria with irregular rings of weak furrows, openings into subatria small and unarmed, subatria slender. Head pale yellowish white and more whitish than in body, width 0.90 mm, height 0.83 mm. Coronal suture weak, parietal bands absent. Epistomal suture and labro-clypeal suture weak. Head capsule with very sparse punctures and setae about  $35\ \mu$  in length, front view circular. Antennal orbits  $75 \times 68\ \mu$ , papillae  $27\ \mu$  in length, thickness at base  $16\ \mu$ , apex with three long sensilla (length about  $6\ \mu$ ). Clypeus with setae. Mouthparts: Labrum 0.25 mm in width, maximum height 0.10 mm, median height 0.10 mm, with punctures and setae about  $10\ \mu$  in length, apical margin with a few sensilla. Epipharynx smooth, but with a weakly spinulose area on each side, and with four pairs of sensilla. Mandibles stout and brown, apex dark brown, length 0.22 mm, width at base 0.15 mm, apex with four stout teeth, outside near base with a seta. Maxillary palpi  $40\ \mu$  in length, thickness at base  $30\ \mu$ , galeae small, lacinial area weakly spinulose, lateral portion of stipes smooth

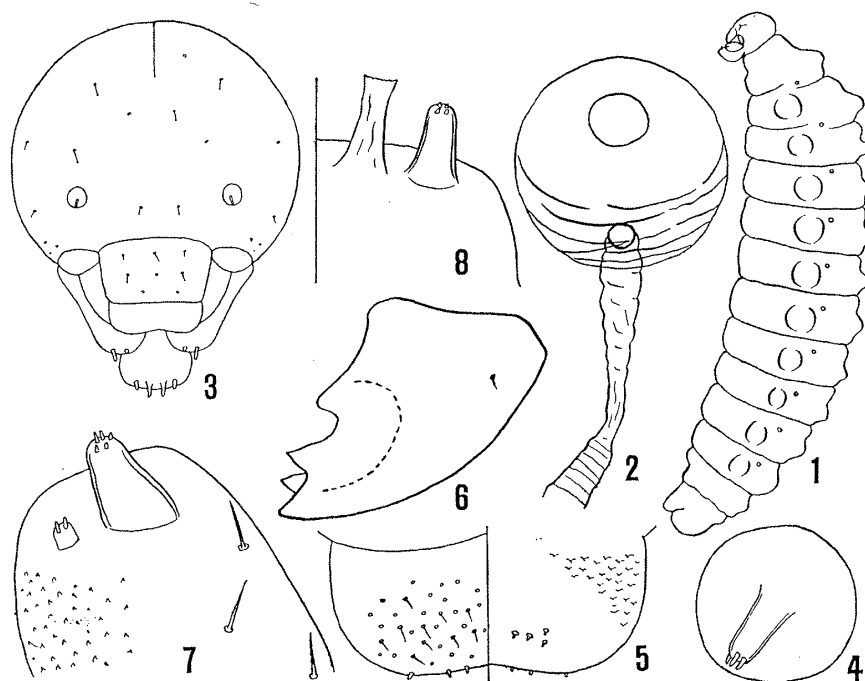


Fig. 2. *Psenulus fuscipennis japonicus* Tsuneki.

1, Body in the lateral view. 2, Spiracle. 3, Head. 4, Right antenna. 5, Labrum (left) and epipharynx (right). 6, Left mandible. 7, Apex of right maxilla seen in front. 8, Right half of labium seen in front.

and with a few setae about  $30\mu$  in length. Labium smooth both inside and outside, outside with several setae about  $35\mu$  in length, palpi  $37\mu$  in length, thickness  $29\mu$ , spinneret paired, truncate apically, length  $48\mu$ .

**Material.** 3 exs. (1 ex. diapausing larva, 2 exs. larvae), Arashi, Ohno, Fukui Pref., 4. VIII. 1965, leg. T. Iida.

**Remarks.** Grandi (1961) has treated the larva of *P. fuscipennis* Dahlbom. The larva of *fuscipennis japonicus* agrees with descriptions of Grandi in general. But this differs from it in the following points: (1) Wall of spiracular atria with irregular rings of weak furrows, (2) each epipharyngeal sensory area with only four sensilla, (3) apex of maxillary palpi with five small sensilla.

#### ***Psenulus lubricus* (Pérez)**

**Body:** Length 6.6 mm, width 1.6 mm. Pale yellowish white. Integument smooth. Pleural lobes distinct. Each segment with a pair of weak projections on dorsal side. Anus transverse slit. Spiracles very slightly pigmented, prothoracic spiracles very slightly larger than the others, peritremes comparatively transparent and wide, wall of atria with a series of irregular rings of weak furrows, openings into subatria small, unarmed, subatria rather long, separated from trachea by a

short constriction. Head yellowish white. Width 0.75 mm, height 0.67 mm. Coronal suture indistinct, parietal bands distinct but unpigmented. Antennal papillae  $38\ \mu$  in length, thickness at base  $14\ \mu$ , apex with three long sensilla, orbits slightly swelled, orbits not defined distinctly from its surroundings. Epistomal suture and labro-clypeal suture distinct. Head capsule with sparse punctures and setae  $27\ \mu$  in length, frons with a pair of depressions, the depressions distinct but unpigmented, head more densely setose than in *fuscipennis japonicus*. Mouthparts: Labrum 0.22 mm in width, maximum or median height 0.11 mm, apical half with sparse punctures and setae  $11\ \mu$  in length, basal half smooth, apical margin with several sensilla. Epipharynx spinulose except median area, the spinules comparatively short, each sensory area with two or three large sensilla and about the same numbers of small sensilla. Mandibles brown, apex dark brown, length 0.24 mm, width 0.14 mm, with four stout teeth, outside near base with a seta about  $20\ \mu$  in length. Maxillary palpi  $38\ \mu$  in length, thickness  $20\ \mu$ , galeae very small, length about  $10\ \mu$ , thickness  $13\ \mu$ , lacinial area with spinules, lateral portion of stipes smooth, with sparse setae about  $20\ \mu$  in length. Labium smooth both outside and inside, outside with sparse setae about  $17\ \mu$  in length, thickness at base  $27\ \mu$ , spinneret paired and tapering, each projecting about  $33\ \mu$  in length.

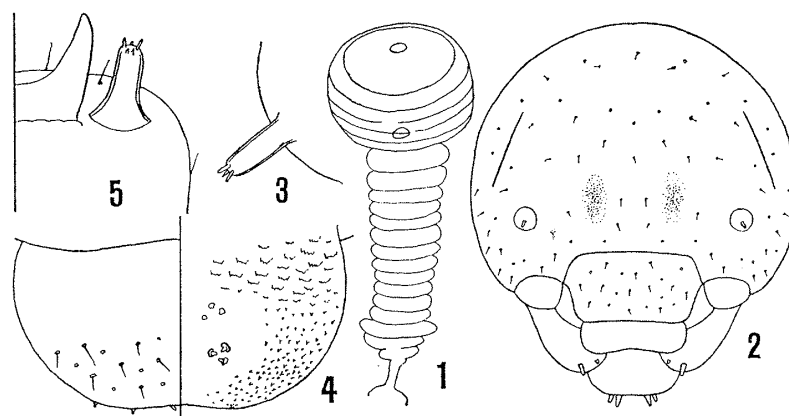


Fig. 3. *Psenulus lubricus* (Pérez).

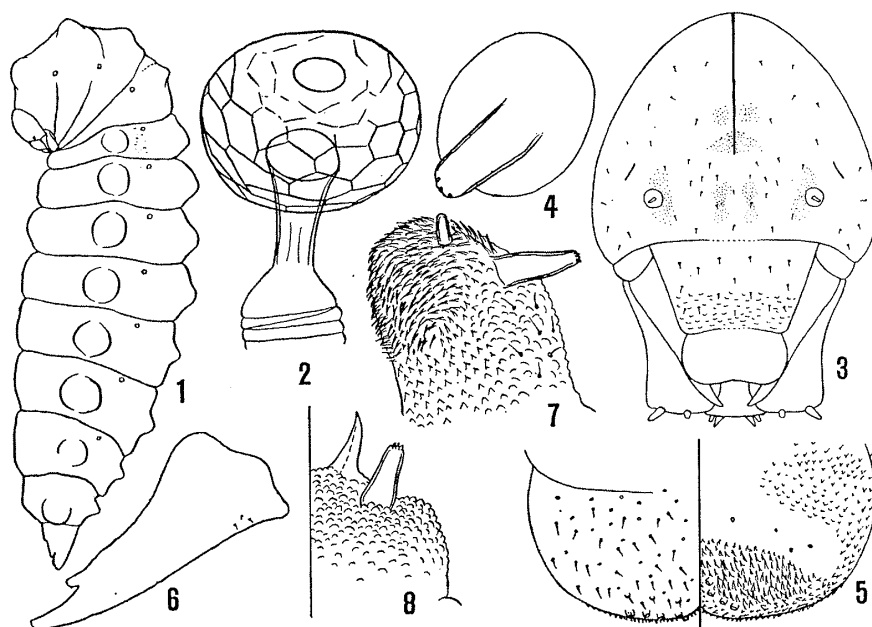
1, Spiracle. 2, Head. 3, Right antenna seen obliquely from left. 4, Labrum (left) and epipharynx (right). 5, Right half of labium seen in front.

**Material.** 1 ex. (diapausing larva), Arashi, Ohno, Fukui Pref., 4. VIII. 1965, leg. T. Iida.

**Remarks.** The larva of this species differs from that of *fuscipennis japonicus* in the following points: (1) Coronal suture indistinct, (2) parietal bands distinct, (3) head more densely setose, (4) antennal papilla more long, (5) antennal orbits not defined distinctly from its surroundings, (6) each sensory area with two groups of sensilla, (7) spinneret tapering.

*Cerceris hortivaga* Kohl

Body: Length 12 mm, maximum width 4.3 mm. Pale yellowish white. Integument densely spinulose, the spinules long, maximum length  $27\ \mu$ , but sparse, short and fine in last segment and near spiracles. Pleural lobes distinct, each segment with a pair of projectings on dorsal side, surface of projectings radially furrowed. Supra-anal lobe strongly projected and sharpened, anus directed ventrally. Spiracles small, slightly pigmented, atria with ridges forming more or less regular hexagons, the ridges without spinules, openings into subatria unarmed, subatria constricted, then abruptly expanded to the width of the trachea. Head yellowish white, width 0.9 mm, height 1.0 mm. Coronal suture long, unpigmented, parietal bands very short. Head capsule with depressions and with sparse setae  $17\ \mu$  in length. Epistomal suture and labro-clypeal suture distinct, both very weak near median line. Antennal papillae  $44\ \mu$  in length, thickness  $17\ \mu$ , apex with three sensilla, antennal orbits about  $80 \times 65\ \mu$ , border between antennal orbits and surroundings indistinctly visible. Apical half of clypeus weakly papillose. Mouthparts: Labrum 0.42 mm in width, maximum height 0.22 mm, median height 0.15 mm, labrum with sparse setae  $17\ \mu$  in length, apical margin with several large sensilla. Epipharynx with dense spinules about  $10\ \mu$  in length, the spinules on anterior half directed inward, a larger part of the central area of epipharynx bare, four or five pores present on each side.

Fig. 4. *Cerceris hortivaga* Kohl.

- 1, Body in the lateral view. 2, Spiracle. 3, Head. 4, Right antenna. 5, Labrum (left) and epipharynx (right). 6, Left mandible. 7, Apex of right maxilla seen in front. 8, Right half of labium seen in front.

Mandibles slender, yellowish white on basal half, and brown on apical half, length 0.5 mm, width at base 0.26 mm, apex with two teeth, outside near base with two or three setae. Maxillary palpi 92  $\mu$  in length, thickness at base 34  $\mu$ , galeae 40  $\mu$  in length, thickness 17  $\mu$ , lacinial area densely spinulose, the spinules slightly hooked inward and about 22  $\mu$  in length, lateral portion of stipes weakly papillose, with very sparse setae. Labium papillose both outside and inside, outside with sparse setae about 14  $\mu$  in length, palpi 68  $\mu$  in length, spinnerets paired, apex of projections sharpened, length 70  $\mu$ .

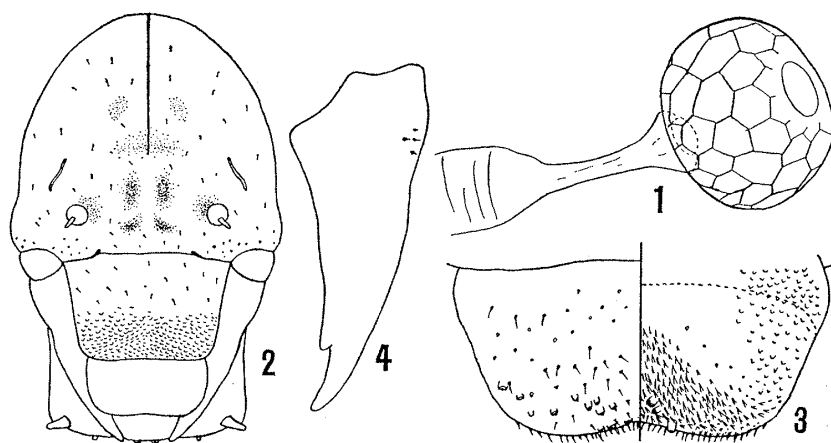
**Material.** 1 ex. (diapausing larva), Arashi, Ohno, Fukui Pref., 3. VIII. 1965, leg. T. Iida. 9 exs. (diapausing larvae), Mt. Monju, Fukui Pref., 26. VIII. 1965, leg. T. Iida.

**Remarks.** Within the larvae dealt with by Evans (1957, 1959, 1964) and Grandi (1961), the larva of this species agrees with that of *C. flavofasciata floridensis* Banks in many points. But this differs from it in the following points: (1) Short parietal bands present, (2) epipharynx with four or five large sensilla.

#### *Cerceris arenaria* (Linné)

Body: Length 11.6 mm, maximum width 4.7 mm. Yellowish white. Each segment with a pair of remarkable projectings on dorsal side. Integument densely spinulose, the spinules long, 27  $\mu$  in maximum length, but the spinules very short in the last segment, which is more densely setose than the others. Pleural lobes distinct in abdominal segments. Supra-anal lobe strongly projecting and slightly sharpened, anus directed ventrally. Spiracular atria with ridges forming more or less regular hexagons, the ridges without spinules, rim of peritremes not circular, openings into subatria unarmed, subatria very small and constricted. Head yellowish white. Width 1.10 mm, height 1.43 mm. Coronal suture long. Parietal bands short, slightly pigmented. Antennal papillae 51  $\mu$  in length, thickness at base 24  $\mu$ , apex with three sensilla, antennal orbits circular, 85  $\mu$  in diameter. Epistomal suture relatively distinct, labro-clypeal suture distinct. Head capsule with nine depressions, head with sparse setae and punctures, the density of setae less than that in the last segment. Clypeus with sparse setae and punctures, most of them on basal half, apical half densely papillose. Mouthparts: Labrum 0.51 mm in width, maximum height 0.27 mm, median height 0.25 mm, surface with punctures on basal half, with setae and sensilla on apical half, setae 20  $\mu$  in length. Epipharynx densely spinulose, most of spinules directed inward, with relatively large sensilla near medium of apex. Mandibles slender, basal half yellow, apical half brown, length 0.75 mm, width 0.25 mm, apex with two teeth, outside near base with four or five short setae. Maxillae with sparse setae on outside, palpi 100  $\mu$  in length, thickness at base 44  $\mu$ , galeae rather slender, 45  $\mu$  in length, 15  $\mu$  in thickness, lacinial area densely spinulose, the spinules hooked inward. Labium papillose, palpi 65  $\mu$  in length, thickness 30  $\mu$ , spinnerets paired, apex of projectings sharpened, projected rather than palpi.

**Material.** 1 ex. (diapausing larva), Neagari-machi, Nomi-gun, Ishikawa Pref., 8. VIII. 1967, leg. T. Tano. 4 exs. (diapausing larvae), same locality, 15. IX. 1967, leg. T. Iida.

Fig. 5. *Cerceris arenaria* (Linné).

1, Spiracle. 2, Head. 3, Labrum (left) and epipharynx (right). 4, Left mandible.

**Remarks.** The larva of this species differs from that of *hortivaga* in the following points: (1) Mandible with four or five setae, (2) head slightly elongate, 1.10 mm in width, 1.43 mm in height.

***Bembix niponica niponica* (Smith)**

**Body:** Length 24 mm, maximum width 7.3 mm. Specimens discoloured and colour unknown. Surface with very sparse setae about  $80\mu$  in length, and a part of prothorax sparsely spinulose, and dorsal surface transversely furrowed, furrows on thorax and on two or three anterior abdominal segments strong. Pleural lobes strongly convex. Spiracular peritremes narrow and well defined, atria with a series of rings of fine spines, wall thick and brown, without ridges, openings into subatria with long spines, the spines with minute spinules, subatria short and not separated from trachea. **Head:** Colour unknown. Width 1.7 mm, height 1.8 mm. Coronal suture very distinct, short parietal bands present, but faint. Antennal papillae  $40\mu$  in length, thickness  $24\mu$ , antennal orbits  $110 \times 95\mu$ , circumference of antennal orbits dark brown. Epistomal suture indistinct, labro-clypeal suture distinct. Head capsule with sparse setae, the setae very short and appear to be punctures. **Mouthparts:** Labrum 0.63 mm in width, maximum height 0.63 mm, median height 0.24 mm, labrum with punctures and setae  $45\mu$  in length, most of punctures on basal half, most of setae on anterior half, but without puncture or seta on narrow area near median line, labrum with a series of sensilla near anterior margin, which is densely spinulose. Epipharynx densely spinulose, epipharyngeal sensory area with several pores and sensilla, and a narrow area near pores blotched, spinules on lateral area short and weak. Mandibles brown, length 0.9 mm, width 0.38 mm, apex simple, inner margin with a tooth, outside of mandibles with several very fine setae and punctures. Maxillary palpi  $95\mu$  in length, thickness  $40\mu$ , galeae  $95\mu$  in length, thickness

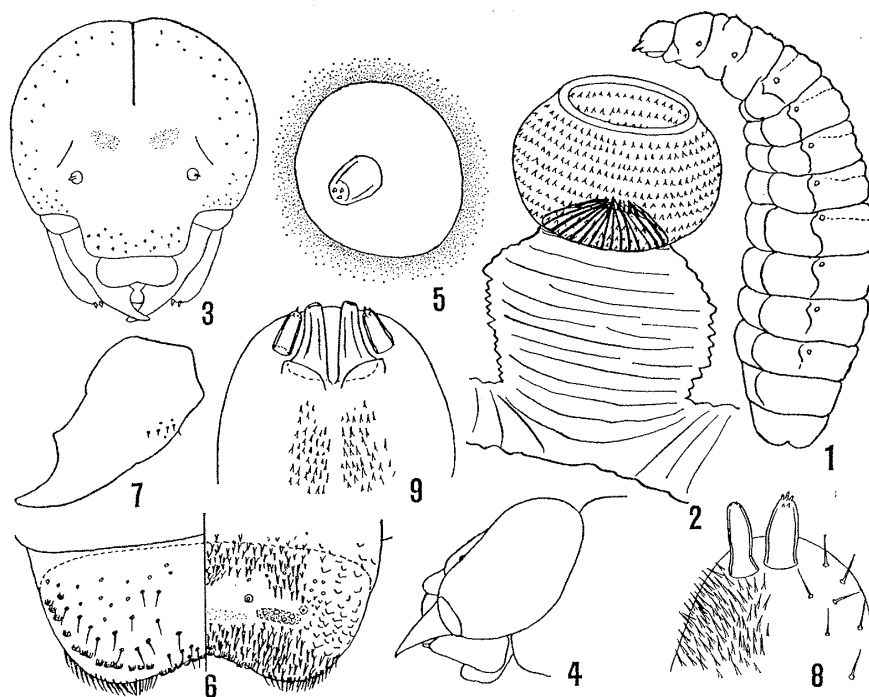


Fig. 6. *Bembix niponica niponica* (Smith).

1, Body in the lateral view. 2, Spiracle. 3, Head in the frontal view. 4, Head in the lateral view. 5, Right antenna. 6, Labrum (left) and epipharynx (right). 7, Left mandible. 8, Apex of right maxilla seen in front. 9, Labium seen in front.

30  $\mu$ , frequently galeae bended weakly, apex with two small sensilla, lacinial area spinulose, the spinules very long, about 37  $\mu$  in length, lateral portion of stipes with setae 44  $\mu$  in length. Labium with sparse setae 50  $\mu$  in length on outside, and with a pair of spinulose areas on inside near base, the spinules 13  $\mu$  in length, spinnerets paired, truncate apically and 100  $\mu$  in length, labium with a pair of projections near base of spinnerets, labial palpi 70  $\mu$  in length, thickness 34  $\mu$ .

**Material.** 3 exs. (larvae), Sapporo, Hokkaido, date unknown, leg. K. Tsuneki.

**Remarks.** Evans (1964) has divided the species of the genus *Bembix* into two groups as follows: (1) The larvae with large, thick galeae terminating in numerous sensilla, and the mother wasps lay their egg upright glued to the substrata near centre of the empty cell, (2) the larvae with slender, tapering galeae which terminate in two minute sensilla, and the mother wasps lay their egg on the prey or loosely in the empty cell. This species belongs to the second group.

#### ***Bembecinus hungaricus japonicus* (Sonan)**

Body : Length 6.3 mm, maximum width 2.3 mm. Pale yellowish white. Abdomen



thick. Surface of body transversely furrowed, these furrows distinct on ventral side. Most of integument smooth, but parts of prothorax near head and parts near spiracles of each segment weakly granulose. Anus transverse. Pleural lobes very distinct. Spiracles weakly pigmented and very large relatively to body size (diameter of atria about 0.1 mm), the prothoracic spiracles very slightly larger than the others, the thoracic spiracles offset slightly below the line of abdominal spiracles, wall of atria with ridges forming more or less regular hexagons, openings into subatria with long spines, subatria comparatively large. Head pale yellow. Width 0.83 mm, height 0.98 mm. Coronal suture fairly long but unpigmented, parietal bands barely evident. Epistomal suture indistinct, labro-clypeal suture distinct and slightly pigmented. Head capsule with sparse punctures, clypeus with sparse setae and punctures. Antennal papillae  $17\ \mu$  in length and thickness  $14\ \mu$ , apex with three sensilla, the sensilla comparatively large, orbits about  $40 \times 35\ \mu$ . Mouthparts: Labrum 0.34 mm in width, maximum height 0.17 mm, median height 0.16 mm, with setae and punctures, most of setae on apical half, most of punctures on basal half, setae about  $17\ \mu$  in length, labrum with sensilla near side margin, apical margin with blunt spinules. Epipharynx spinulose, partly the spinules blunt and like papillae, each epipharyngeal sensory area with several small sensilla, epipharynx with a series of

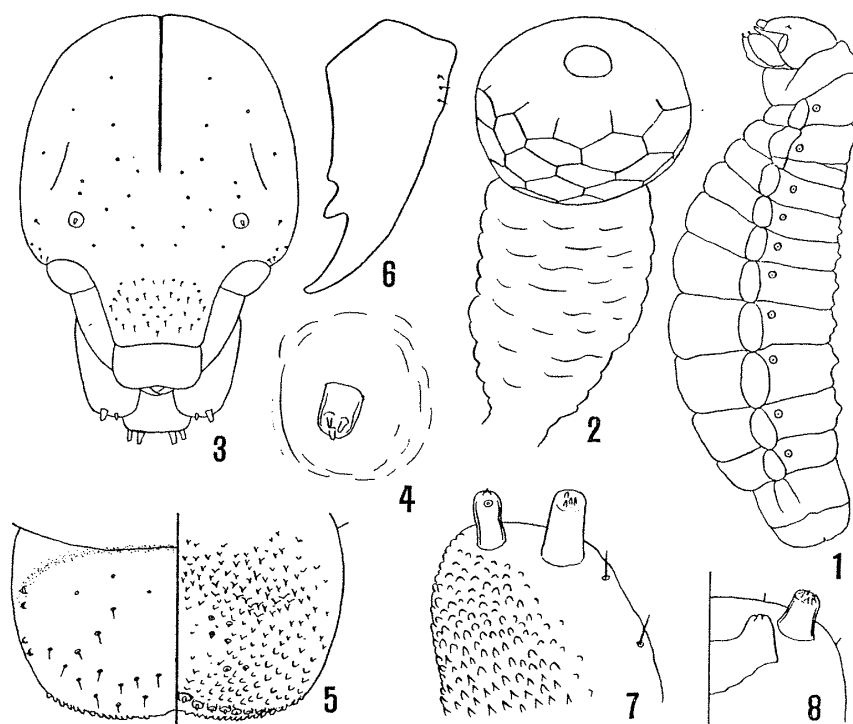


Fig. 7. *Bembecinus hungaricus japonicus* (Sonan).

1, Body in the lateral view. 2, Spiracle. 3, Head. 4, Right antenna. 5, Labrum (left) and epipharynx (right). 6, Left mandible. 7, Apex of right maxilla seen in front. 8, Right half of labium seen in front.

several large sensilla near apical margin. Mandibles relatively slender, length 0.45 mm, width 0.20 mm, with a slender apical tooth and with two teeth on inner margin, outside of mandibles with three setae near base, the setae about  $20\ \mu$  in length, but most basal seta hooked and relatively shorter than the others. Maxillary palpi  $57\ \mu$  in length, thickness  $31\ \mu$ , galeae  $51\ \mu$  in length, thickness  $21\ \mu$ , basal part of lacinial area papillose, basal part spinulose, lateral portion of stipes smooth and with sparse setae. Labium smooth both outside and inside, but outside with sparse setae about  $20\ \mu$  in length, palpi about  $44\ \mu$  in length, thickness  $30\ \mu$ , spinnerets paired, its projections about  $30\ \mu$  in length, apex not truncated or sharpened.

*Material.* 1 ex. (larva), Sanrihama, Mikuni-machi, Sakai-gun, Fukui Pref., 5. IX. 1965, leg. T. Iida. 1 ex. (larva), same locality, 16. IX. 1965, leg. K. Saki.

*Remarks.* The larvae which are used for the description in this paper have died before they begin to spin their cocoon, and it is unknown that they are full-grown larvae or not. Therefore no differences in size of body between this species and the others can be used. The other differences between this species and *neglectus* (Cresson) which has been described by Evans (1956) are as follows: (1) Width of head more than 20 times as long as diameter of antennal orbit, (2) diameter of antennal orbit less than three times as long as length of antennal papilla, (3) epipharynx with smooth area.

## 小笠原島の原尾目

今立源太良

伊豆・小笠原の諸島からの原尾目の記録は少く、わずかに八丈島からモリウワカマアシ (*Berberentulus morikawai*) が報告されている (昆虫, 35:64) ばかりであつたが、昨年東京都第二次小笠原調査隊が、父島、母島で採集した土壌動物の中に、次の2種の原尾目が含まれていた。

### 1. *Eosentomon udagawai* Imadaté

小笠原父島中央山, 1 ♂, 17-VIII-1968, 北沢右三採集。

第七腹節背板の刺毛A1, A3を欠く点では関東各地のものと一致するが、第五～六腹節背板のA3を欠除していないところは沖縄～西日本型 (昆虫, 35:64, 36:74) と同じである。分布: 宮古島, 九州, 本州, 北海道。

### 2. *Berberentulus tosanus tosanus* (Imadaté et Yosii) トサカマアシ

小笠原父島中央山, 1 m. J., 10-VIII-1968, 北沢採集, 小笠原母島沖港, 1 ♀, 13-VIII-1968, 北沢採集。

分布: 西表島, 九州, 四国, 本州。

資料検鏡の機会を与えて下さった北沢右三, 新島溪子両氏に謝意を表する。