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Descriptions of Four New Species of the Genus *Halictoxenos* (Strepsiptera, Stylopidae) from Japan

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Abstract *Halictoxenos nambui*, *H. hondonis*, *H. evylaei*, and *H. duplicis* spp. nov. (Strepsiptera, Stylopidae) parasitic on *Lasioglossum* (*Lasioglossum*) *occidens*, *L. (L.) exiliceps* and *L. (L.) laeviventris*, *L. (Evylaeus) calceatum*, and *L. (E.) duplex* (Hymenoptera, Halictidae), respectively, are described from Honshu and Hokkaido, Japan. The male aedeagus and the female cephalothorax of *H. japonicus* are figured.

Key words: *Halictoxenos*; Stylopidae; Strepsiptera; new species; Japan.

By the kind entrustments of Prof. H. SASAJI (Fukui University), Prof. Y. MAETA (Shimane University), and Mr. T. NAMBU (Saitama), the author has been able to examine 11 stylopized halictid bees (Hymenoptera, Halictidae) collected in Fukui, Nagano, Iwate, and Saitama Prefectures, Honshu, and Hokkaido, Japan, and describes 4 new species as follows. The presentation style of the parasitic positions and sexes of the parasites and of the hosts are same as adopted in the author's previous papers.

Halictoxenos nambui sp. nov.

[Nom. Japon.: Futaten-nejirebane (new name)]

(Figs. 1 & 6)

Seven females naturally protruded from the intersegmental membranes of the hosts and two unprotruded females within the host abdomen were examined. Measurements were performed on the protruded ones.

Female. **Size:** Cephalothorax 0.93–0.98 mm in length, 0.86–1.02 mm in maximum breadth at the level a little posterior to the spiracles; basal breadth at the abdominal junction 0.60–0.70 mm; intermandibular distance 0.13–0.15 mm.

Characters: Cephalothorax subtriangular, its apical margin rounded, lateral margins almost straight, postspiracular margins angled; mandibles subtriangular, their antero-interior angles bluntly pointed or narrowly truncated, without tooth, not protruded from the cephalothoracic margin; mouth with only gently curved posterior margin; lateral extremities of opening of brood chamber directed backward and then slightly curved inwardly; pigmentation darker in the posterior portion of cephalothorax, but paler in other portion; two longitudinally elongated elliptical and transversely situated transparent pores visible near the posterior

margin of cephalothorax; spiracles situated near the lateral margins.

Type material: Holotype ♀ (No. 2799, Kyushu Univ.), extracted from a female host (4/5 L), Nagatoro, Saitama Pref., 3.viii.1967, T. NAMBU leg. (Figs. 1 & 6); 3 paratype ♀♀, extracted from the same host as above (4/5 R, & 2 inside); 2 paratype ♀♀, extracted from a male host (4/5 L & 4/5 R), Kodama, Saitama Pref., 14.xi.1971, T. NAMBU leg.; 1 paratype ♀, extracted from a female host (4/5 R), 1 paratype ♀, extracted from a male host (4/5 L), and 1 paratype ♀, extracted from another male host (5/6 R), Mt. Kanetsukidoyama, Yorii, Saitama Pref., 27.ix.1986, T. NAMBU leg.

Male. Unknown.

Host: *Lasioglossum (Lasioglossum) occidens* (SMITH).

Distribution: Honshu (Saitama).

Remarks. This new species is generally allied to *H. tumulorum* PERKINS, 1918, from Europe, but distinguishable from it by almost straight lateral margins of cephalothorax, and transversely straight anterior margin of opening of brood chamber.

Etymology. This new species is named after the collector of the type material.

Halictoxenos hondonis sp. nov.

[Nom. Japon.: Honshu-nejirebane (new name)]

(Figs. 2 & 7)

Four female specimens collected from *Lasioglossum (Lasioglossum) exilipes* in Fukui and Nagano are designated as type material, and a female from *L. (L.) laeviventris* obtained in Saitama Prefecture is identified to this new species.

Female. Size: A monoparasitized paratype specimen from Nagano Pref. is larger than triparasitized ones from Fukui Pref. as shown in parentheses. The measurements data of another specimen from Saitama Pref. are attached in the following brackets. Cephalothorax about 0.65–0.68 (0.78) [0.69] mm in length and 0.72–0.75 (0.86) [0.79] mm in maximum breadth at the spiracular level; basal breadth at the abdominal junction 0.52–0.56 (0.64) [0.60] mm; intermandibular distance 0.08–0.11 (0.11) [0.11] mm.

Characters: Cephalothorax triangular, its apical margin rounded, posterolateral angles also rounded; mandibles trapezoidal, their antero-interior angles slightly and bluntly protruded, but not forming teeth, not protruded from the cephalothoracic margin in triparasitized specimens from Fukui, but slightly protruded from it in a monoparasitic paratype from Nagano; anterior margin of mouth obscure, posterior margin obvious, rounded; opening of brood chamber arch-formed, its lateral extremities somewhat remote from the cephalothoracic margins; basal portion of cephalothorax with transversely straight pigmented band which continues to the basal portion of abdomen; about a dozen transparent pores

distributing in two rows in the median area of cephalothorax; spiracles a little remote from the lateral margins of cephalothorax.

Type material: Holotype ♀ (No. 2800, Kyushu Univ.), extracted from a female host (4/5 M), Mt. Jôhôji, Yoshida, Fukui Pref., 5.vi.1981, Y. HANEDA leg. (Figs. 2 EF & 7 EF); 2 paratopotypes ♀♀ (4/5 L & 4/5 R), extracted from the same host; 1 paratype ♀, extracted from another female host (4/5 R), Minamiminowa, Ina, Nagano, Pref., 30.iv.1963, Y. MAETA leg. (Figs. 2 EN & 7 EN). All of these type specimens were obtained from *L. (L.) exilipes*.

Specimen examined other than type material: 1 ♀, gravid, extracted from a female of *L. (L.) laeviventre* (4/5 R), Urayamagawa, Saitama Pref., 21.v.1972, T. NAMBU leg. (Figs. 2 LS & 7 LS).

Male. Unknown.

Host: *Lasioglossum (Lasioglossum) exilipes* (VACHAL) [type host] and *L. (L.) laeviventre* (PÉREZ).

Distribution: Honshu (Saitama, Nagano, and Fukui).

Remarks. The present new species is generally allied to *H. borealis* KIFUNE, HIRASHIMA et MAETA, 1982, from Iwate Pref., Northern Honshu, but differs from it by undentate mandibles and greater size of cephalothorax.

Etymology. The specific name is derived from the Japanese noun, "Hondo", which means the mainland.

Halictoxenos evylaei sp. nov.

[Nom. Japon.: Ooezo-nejirebane (new name)]

(Figs. 3 & 8)

Only one female specimen was obtained.

Female. Size: Cephalothorax 0.74 mm in length and 0.77 mm in maximum breadth at the spiracular level; basal breadth at the abdominal junction 0.60 mm; intermandibular distance 0.13 mm.

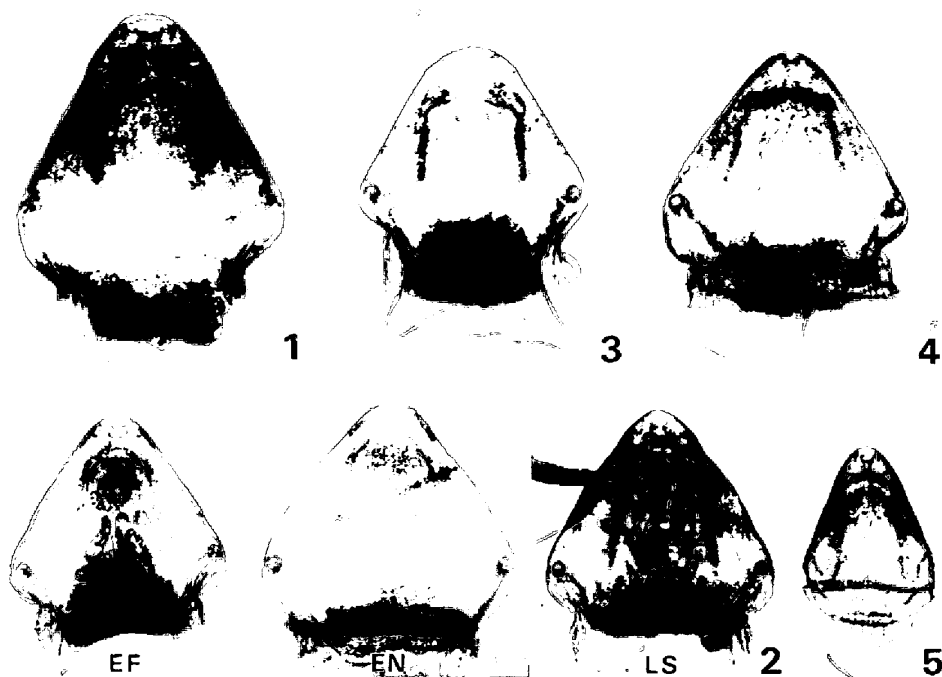
Characters: Cephalothorax subtriangular, its apical margin broadly rounded, lateral margins almost straight, postspiracular margins rounded; mandibles subtriangular, their antero-interior angles bluntly pointed, each with a minute tooth; mouth with gently curved posterior margin; opening of brood chamber with almost transversely straight anterior margin and its lateral extremities curved backward; about a dozen transparent pores visible in the median area of cephalothorax; spiracles longitudinally elongated, elliptical.

Type material: Holotype ♀ (No. 2801, Kyushu Univ.), extracted from a male host (4/5 R), Souunkyo, Kamikawa, Hokkaido, 27.vii.1971, T. NAMBU leg. (Figs. 3 & 8).

Male. Unknown.

Host: *Lasioglossum (Evylaeus) calceatum* (SCOPOLI).

Distribution: Hokkaido.



Remarks. This new species is allied to *H. calceati* NOSKIEWICZ et POLUSZYŃSKI, 1924 (considered as a synonym of *H. spencii* (NASSONOW, 1893) by KINZELBACH (1971)) which is parasitic on the same host species in Europe, but differs from it by the almost straight lateral margins of cephalothorax and geographical remoteness.

Etymology. The specific name is derived from the subgeneric name of the host bee.

Halictoxenos duplicis sp. nov.

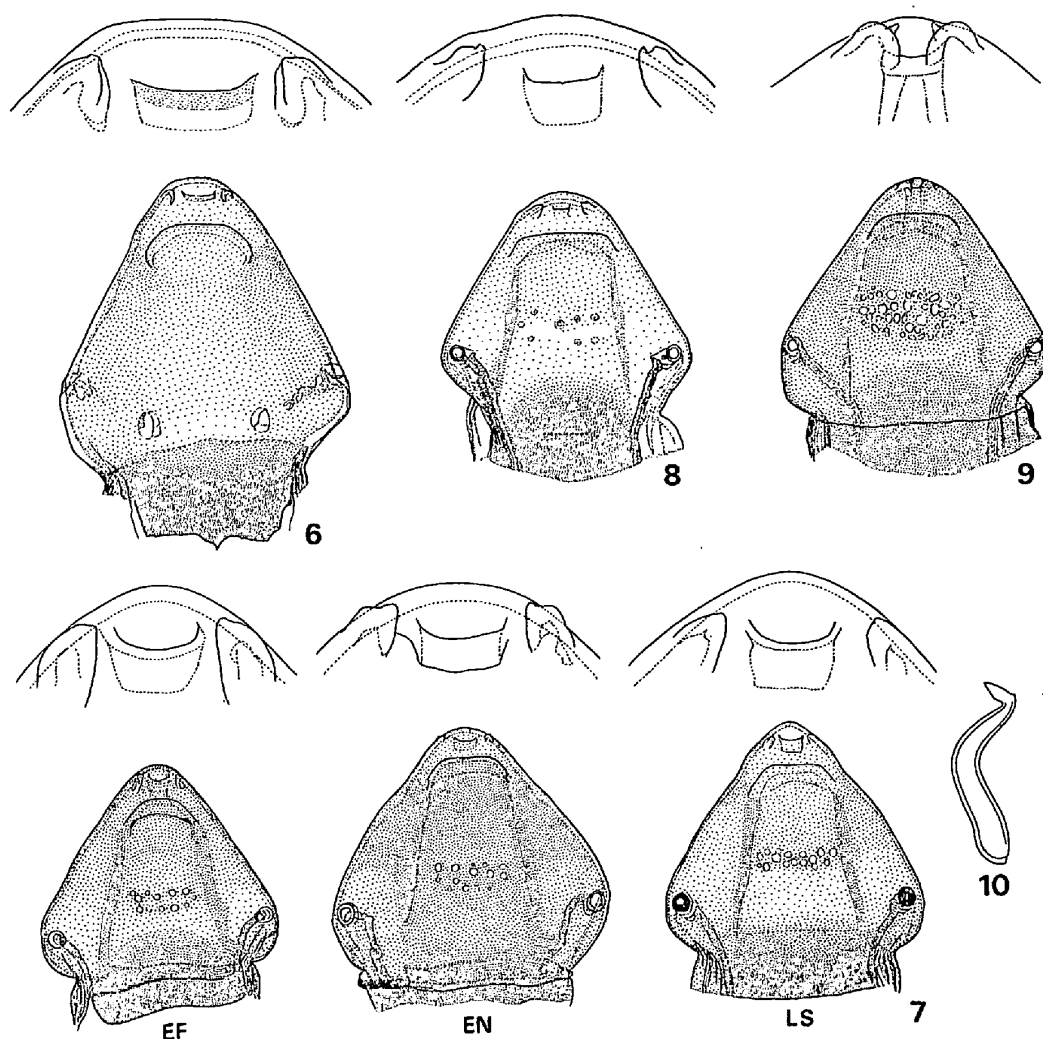
[Nom. Japon.: Agonaga-nejirebane (new name)]

(Figs. 4 & 9)

This species is also described on a female specimen.

Female. Size: Cephalothorax 0.75 mm in length and 0.83 mm in maximum breadth at the spiracular level; breadth at the abdominal junction 0.64 mm; intermandibular distance 0.03 mm.

Characters: Cephalothorax almost triangular, its apical margin rounded, lateral margins almost straight, postspiracular margins rounded; mandibles semielliptical, each with a conspicuous bluntly pointed tooth projected from a slight inside of its dorsal side near the antero-interior angle; intermandibular distance very short, shorter than mouth breadth; mouth with gently curved posterior margin; opening of brood chamber with medianly transversely straight anterior margin and its lateral extremities curved backward; basal pigmentation



Figs. 1–9. Female cephalothoraces of *Halictoxenos* spp., ventral view. — 1 & 6, *Halictoxenos nambui* sp. nov., holotype; 2 & 7, *H. hondonis* sp. nov., 2EF & 7EF, holotype *ex Lasioglossum (Evylaeus) exilipes* from Fukui Pref., 2EN & 7EN, a paratype from the same host species collected in Nagano Pref., 2LS & 7LS, undesignated specimen *ex L. (L.) laeviventre* from Saitama Pref.; 3 & 8, *H. evylaei* sp. nov., holotype; 4 & 9, *H. duplicis* sp. nov., holotype; 5, *H. japonicus*.

Fig. 10. Male aedeagus of *H. japonicus*, right lateral view.

Scale: 0.5 mm for the cephalothoraces of the bottom rows, 0.125 mm for others in Figs. 6–10.

not so dark; about a dozen larger and 35 smaller transparent pores distributed on the median area of cephalothorax in about 5 transverse rows; spiracles almost circular, situated slightly inside from the lateral margins.

Five openings of genital tubes visible on the abdomen.

Type material: Holotype ♀ (No. 2802, Kyushu Univ.), extracted from a female host (4/5 R), Yunokawa near Hakodate, [Oshima,] Hokkaido, 15.viii.1956, R. ISHIKAWA leg. (donated by Y. MAETA) (Figs. 4 & 9).

Table 1. A list of stylopized Halictidae of Japan and their parasites.

Host*	Locality	Parasite (<i>Halictoxenos</i>)
<i>H. (S.) aerarius</i> SMITH	Honshu (Iwate)	<i>H. japonicus</i> K., H. et M., 1982†
<i>L. (L.) occidentis</i> (SMITH)	Kyushu (Fukuoka)	<i>H. mirabilis</i> K., H. et M., 1982
<i>L. (L.) laeviventris</i> (PEREZ)	Honshu (Saitama)	<i>H. nambui</i> sp. nov.
<i>L. (L.) exilipes</i> (VACHAL)	Honshu (Saitama)	<i>H. hondonis</i> sp. nov.
<i>L. (E.) calceatum</i> (SCOPOLI)	Honshu (Nagano, Fukui)	
<i>L. (E.) apristum</i> (VACHAL)	Hokkaido (Kamikawa)	<i>H. evylaei</i> sp. nov.
<i>L. (E.) duplex</i> (DALLA TORRE)	Hokkaido (Shiribeshi)	<i>H. borealis</i> K., H. et M., 1982
<i>L. (E.) trispine</i> (VACHAL)	Hokkaido (Oshima)	<i>H. duplicis</i> sp. nov.
	Kyushu (Fukuoka)	<i>H. latifemoralis</i> K., H. et M., 1982

* *E.* = *Evylaeus*, *H.* = *Halictus*, *L.* = *Lasioglossum*, *S.* = *Seladonia*.

† K., H. et M. = KIFUNE, HIRASHIMA et MAETA.

Male. Unknown.

Host: *Lasioglossum (Evylaeus) duplex* (DALLA TORRE).

Distribution: Hokkaido.

Remarks. This new species is very characteristic in the closely situated and unidentate mandibles which are conspicuously protruding from the anterior margin of cephalothorax.

The unidentified stylopid species appearing in SAKAGAMI *et al.* (1961, 1968, 1984) may be identical to this new species from its host preference and geographical neighbourhood.

Etymology. The specific name is derived from the host specific name.

All of the holotypes are deposited in the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka. Other specimens are tentatively kept in the author's private collection for the comparison with other material in his hand. Those will be finally transferred to the above-mentioned Laboratory.

As the result of the present study, there are 8 species of the Japanese *Halictoxenos* (Table 1) which are distinguishable by the following key.

Key to the species of the Japanese *Halictoxenos* by females

1. Mandible without tooth, occasionally with a blunt process 2
- Mandible with a tooth of which tip more or less pointed 4
2. Lateral extremities of opening of brood chamber approaching to the lateral margins of cephalothorax. Host: *Lasioglossum (Evylaeus) trispine*
latifemoralis KIFUNE, HIRASHIMA et MAETA, 1982
- Lateral extremities of opening of brood chamber not so close to the lateral margins of cephalothorax 3
3. Lateral extremities of opening of brood chamber strongly curved posteriorly and then inwardly; a pair of round transparent pores situated near the basal

- margin of cephalothorax. Host: *L. (L.) occidentalis* *nambui* sp. nov.
- Lateral extremities of opening of brood chamber gently and obliquely directed posteriorly but not inwardly; about a dozen round transparent pores distributed in the median area of cephalothorax. Hosts: *L. (L.) exilipes* & *L. (L.) laeviventris* *hondonis* sp. nov.
4. Intermandibular distance narrower than the breadth of mouth opening. Host: *L. (E.) duplex* *duplicis* sp. nov.
- Intermandibular distance broader than the breadth of mouth opening 5
5. Lateral extremities of opening of brood chamber approaching to the lateral margins of cephalothorax. Host: *L. (E.) apristum* *borealis* KIFUNE, HIRASHIMA et MAETA, 1982
- Lateral extremities of opening of brood chamber not so close to the lateral margins of cephalothorax 6
6. Anterior margins of opening of brood chamber transversely straight. Host: *L. (E.) calceatum* *evylaei* sp. nov.
- Anterior margin of opening of brood chamber strongly curved. Host: *Halictus (Seladonia) aerarius* 7
7. Posterior margin of mouth strongly curved, semicircular; mandible subtriangular, with a conspicuous tooth. Distribution: Honshu *japonicus* KIFUNE, HIRASHIMA et MAETA, 1982
- Posterior margin of mouth gently curved, semielliptical; mandible elliptical, with a very minute tooth. Distribution: Kyushu *mirabilis* KIFUNE, HIRASHIMA et MAETA, 1982

***Halictoxenos japonicus* KIFUNE, HIRASHIMA et MAETA, 1982**

(Figs. 5 & 10)

The following 3 specimens were obtained from a type host at the type locality.

Specimens examined: 2♂♂ (4/5 L & 4/5 L) & 1♀ (4/5 M) (Fig. 10), extracted from a female, Kuriyagawa, Morioka, Iwate Pref., Honshu, 17.vii.1974, Y. MAETA leg.

Host: *Halictus (Seladonia) aerarius* (SMITH).

Distribution: Honshu (Iwate).

Remarks. This is the second record of the species since its original description. Aedeagus is as shown in Fig. 5.

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