

Pamphiliid Sawflies (Hymenoptera) from Aomori Prefecture, Northern Honshu, Japan

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Abstract Collection records are given for 27 species of the sawfly family Pamphiliidae from Aomori Prefecture, northern Honshu. They are four species of *Acantholyda*, two species of *Cephalcia*, one species of *Neurotoma*, five species of *Onycholyda*, and 15 species of *Pamphilius*. Of these, one species of *Cephalcia* remains unidentified and nine species of *Onycholyda* and *Pamphilius* are newly recorded from Aomori Prefecture. The pamphiliid fauna of Aomori Prefecture is compared with the pamphiliid faunas of other four well-investigated areas in Honshu and general species composition of the local pamphiliid faunas in Honshu is discussed.

Key words: Hymenoptera, Pamphiliidae, fauna, Aomori Prefecture, Honshu, Japan.

Introduction

The family Pamphiliidae consists of primitive sawflies generally known as the leaf-rolling or webspinning sawflies. The family is divided into two subfamilies, the Cephalciinae and the Pamphiliinae. Larvae of the Cephalciinae feed on conifers, whereas those of the Pamphiliinae are associated with broad-leaved trees. There are over 260 species distributed in the Holarctic region, of which about 75 species of six genera have been recorded from Japan (Abe & Togashi, 1989; Shinohara, 1994, 1997b, 2001b, 2004, 2005).

Aomori Prefecture is situated at the northern end of Honshu and has an area of 9,606.52 km², nearly 70% of which is covered with forests. The highest peak is Mt. Iwakistan (1625 m alt.), an independent volcano in the western part of the prefecture, while several peaks in Hakkoda Mountains in central part of the prefecture exceed 1500 m. The pamphiliid sawfly fauna of Aomori Prefecture has been little explored. The first reference to this family of sawflies in Aomori Prefecture is Torikata (1912), who reported on the injury of leaves of cherry trees by “*Lyda nigri-*

cans Mats.” (= *Neurotoma iridescens* (André, 1882)) in Tsugaru area, western part of the prefecture. Takeuchi (1923, 1930) recorded *Neurotoma iridescens* from Aomori Prefecture based on Torikata’s paper. Takeuchi (1930) also described a new species, *Cephalcia variegata*, on the basis of 17 specimens, one of them, a paratype, from Mt. Hakkoda in Aomori Prefecture. Shinohara (1980, 1985a, 1986a, b, 1997b, 1998, 2000, 2001a, b, 2005), in a series of taxonomic works on various groups of the family, and Ichita (1994) recorded a total of 15 species from Aomori Prefecture. These are all the references ever published on the pamphiliid fauna of the prefecture.

The present work is an attempt to put together all the available information, published or unpublished, on the pamphiliid fauna of Aomori Prefecture mainly based on the study of a collection made by M. Yamada in the last two decades. Besides this collection, very few specimens from Aomori Prefecture were available for study. Unless otherwise stated, the material used in this paper was collected by M. Yamada and is kept in his collection. Abbreviations for depositories are: —NSMT: National Science Museum, Tokyo;

UOP: Faculty of Agriculture, University of Osaka Prefecture, Sakai; KYU: Faculty of Agriculture, Kyushu University, Fukuoka.

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Results and Discussion

We have recognized 27 species of five genera of Pamphiliidae occurring in Aomori Prefecture (see Table 1 and the enumeration below). They are four species of *Acantholyda*, two species of *Cephalcia*, one species of *Neurotoma*, five species of *Onycholyda*, and 15 species of *Pamphilius*. Of these, 17 species have already been recorded from Aomori Prefecture, while nine species are new to the fauna of Aomori Prefecture. One remaining species, a *Cephalcia*, has not been identified.

General comments on the pamphiliid fauna of Honshu

The local faunae of pamphiliid sawflies have not been well documented in Japan (Shinohara, 2002b). Table 1 shows the Pamphiliidae known to occur in four prefectures and Kamiange area in western Tokyo (unidentified species are not included). The four prefectures are perhaps the best investigated prefectures in Honshu for the pamphiliid fauna, though further studies will certainly reveal occurrence of additional species. Other references to the comparatively well-known pamphiliid faunae at the prefecture level include Fukui Prefecture (18 species of three genera; Haneda *et al.*, 1998), Kanagawa Prefecture (16 species of five genera; Nagase, 2004), and Saitama Prefecture (13 species of four genera; Nambu, 1998). Kamiange is shown here as an

example of the best-known pamphiliid fauna in a small area in lower mountains of central Honshu (Shinohara, 2002b).

The subfamily Pamphiliinae is rather well studied taxonomically in Japan but we are much less informed about the subfamily Cephalciinae, which includes the genera *Acantholyda* and *Cephalcia*. The Japanese species of *Acantholyda* were recently revised (Shinohara, 2001b) but the material available for that work was rather limited and the distributional range of each species is not well known. The Japanese species of the genus *Cephalcia* are badly in need of revision and identification of the species is impossible in many cases. That is why some specimens of *Cephalcia* were left unidentified in Nakamura (2003) and in the present work. It is thus premature to make any meaningful comparisons among the local faunae of the cephalciine species in Japan.

Table 1 shows that a total of ten species of *Neurotoma*, *Onycholyda* and *Pamphilius* (darkly shadowed in Table 1) are known to occur in all the five regions treated and additional seven species of *Onycholyda* and *Pamphilius* (lightly shadowed in Table 1) have been found in four of the five regions. We regard these 17 species, all belonging to the subfamily Pamphiliinae, as constituting a “basic group” in the pamphiliid fauna of Honshu. The species of the “basic group” are expected to occur in most, if not all, areas in Honshu. The composition of the “basic group” will change (increase in the number of species) as our knowledge on the pamphiliid fauna of Honshu grows.

Most of the members of the “basic group” belong to the subgenus *Neurotoma* of the genus *Neurotoma*, the *amplecta* group of the genus *Onycholyda*, and the *alternans*, *sulphureipes*, and *sylvaticus* groups of the genus *Pamphilius* (Shinohara, 2002a). These are comparatively southern species mainly associated with the Rosaceae and Aceraceae. On the other hand, the “basic group” includes no species of the Cephalciinae, the subgenus *Gongylocorsia* of the genus *Neurotoma*, the genus *Chrysoleyda*, the *luteicornis*

Table 1. Pamphiliidae recorded in five areas in Honshu (undetermined species not included)

	Hyogo Pref. [0–1510 m alt.]	Ishikawa Pref. [0–2702 m alt.]	Kamiange [ca. 400 m alt.]	Tochigi Pref. [12–2578 m alt.]	Aomori Pref. [0–1625 m alt.]
Subfamily CEPHALCIINAE					
Genus ACANTHOLYDA					
Subgenus <i>Acantholyda</i>					
Subgenus <i>Iycorsia</i>					
<i>A. nipponica</i>		○ ¹		○	○ ¹
<i>A. albomaculata</i>					
<i>A. alpina</i>		○			
<i>A. iwatai</i>				○ ¹³	○ ¹³
<i>A. kojimai</i>				○	○ ¹⁴
<i>A. mizunoi</i>				○	
<i>A. posticalis posticalis</i>	○			○	
<i>A. sasakii</i>		○		○ ¹³	○ ¹³
<i>A. tsuyukii</i>				○	
Genus CEPHALCIA					
<i>C. lariciphila japonica</i>				○ ¹	○ ¹⁵
<i>C. variegata</i>		○			
Subfamily PAMPHILIINAE					
Genus NEUROTOMA					
Subgenus <i>Neurotoma</i>					
<i>N. iridescens</i>	○	○	○	○	○ ^{16,17}
<i>N. atrata</i>		○			
<i>N. harai</i>		○ ²		○ ⁵	
Genus CHRYSOLYDA					
<i>C. leucocephala</i>		○			
Genus ONYCHOLYDA					
<i>O. decorata</i>	○	○	○	○	○ ^{18,19}
<i>O. esakii</i>	○	○	○	○	○ ^{18,19}
<i>O. lucida</i>	○	○	○	○	○ ²⁰
<i>O. minimalis</i>	○	○	○	○ ⁵	○
<i>O. mortuati</i>	○	○	○	○	○
<i>O. similis</i>	○	○	○	○	○
<i>O. tenuis</i>	○	○	○	○	○
<i>O. viridibialis</i>	○	○	○	○	○ ¹⁸
<i>O. tumamotonis</i>		○		○	○
Genus PAMPHILIUS					
<i>P. basilaris</i>	○				
<i>P. alternans</i> group					
<i>P. komonenis</i>	○	○	○	○ ^{6,7}	○
<i>P. takeuchii</i>	○	○	○	○ ^{6,7}	○
<i>P. ishikawai</i>	○	○	○	○	○ ¹⁹
<i>P. zhelochovtsevi nipponicus</i>	○	○	○	○	○

Table 1. (Continued).

	Hyogo Pref. [0–1510 m alt.]	Ishikawa Pref. [0–2702 m alt.]	Kamiange [ca. 400 m alt.]	Tochigi Pref. [0–2578 m alt.]	Aomori Pref. [0–1625 m alt.]
<i>P. histrio</i> group					
<i>P. vafer</i> group					
<i>P. brevicornis ibukii</i>		○			
<i>P. confusus</i>		○ ³		○ ⁸	○ ⁸
<i>P. flavipectus</i>				○ ⁸	○ ⁸
<i>P. nakagawai</i>		○		○	○ ⁸
<i>P. lobatus</i>	○	○		○	○
<i>P. venustus</i>		○		○ ⁹	○
<i>P. kamikochensis</i>				○	○ ²¹
<i>P. archiducalis</i>		○			
<i>P. hortorum</i>				○	
<i>P. itoi</i>	○	○	○	○ ^{7,10}	○
<i>P. varius</i>	○	○		○ ¹¹	
<i>P. togashii</i>	○	○	○	○	
<i>P. sylvaticus</i> group					
<i>P. alnicola</i>	○	○ ⁴	○	○	○
<i>P. benesi</i>	○		○	○	○ ⁴
<i>P. daisenus</i>	○			○	○ ^{4,19}
<i>P. japonicus</i>	○	○	○	○	○ ²²
<i>P. volatilis</i>	○	○	○	○	○
<i>P. hilaris</i>			○	○ ¹²	
Total number of species	24	31	19	35	26
B/T ratio (see text for explanation)	0.71	0.52	0.84	0.43	0.54
N/B ratio (see text for explanation)	0.18	0.56	0	1	0.63
Main references	Naito <i>et al.</i> (2004)	Togashi (1998)	Shinohara (2002b)	Nakamura (2003)	present work
Additional references for respective species	¹ Shinohara (1997b); ² Shinohara (1997a); ³ Shinohara (2005); ⁴ Shinohara (2001a); ⁵ Katayama (2004a); ⁶ Shinohara (2002b); ⁷ Katayama (2004b); ⁸ Shinohara (2005); ⁹ Shinohara & Morita (2003); ¹⁰ Shinohara (1985c); ¹¹ new record, 1 female, Chuzenji, Nikko, 4. VI. 1977, N. Matsuba leg. [NSMT]; ¹² Nakamura (2004); ¹³ Shinohara (2001b); ¹⁴ Shinohara (2000); ¹⁵ Takeuchi (1930); ¹⁶ Torikata (1912); ¹⁷ Shinohara (1980); ¹⁸ Shinohara (1986a); ¹⁹ Ichita (1994); ²⁰ Shinohara (1986b); ²¹ Shinohara (1998); ²² Shinohara (1985a).				

group of the genus *Onycholyda*, and the *basilaris*, *histrion*, and *inanitus* groups of the genus *Pamphilius*, and it includes only a few species of the *vafer* group of the genus *Pamphilius*. Particularly the absence or poor representation of the Cephalciinae and *Pamphilius vafer* group in the “basic group” is important, because these two groups contain considerable number of species, most of them northern in distribution.

In general, a local pamphiliid fauna in Honshu may be represented by three, very roughly determined categories of species:

- 1) the “basic group” as discussed above;
- 2) the mainly “northern group” of species of the Cephalciinae and *Pamphilius vafer* group (excluding the three species included in the “basic group”); and

- 3) other, mostly rare or very localized species or species with only scanty information, such as the species of *Neurotoma (Gongylocorsia)* and *Chrysolyda*.

In more southern regions (e.g., Hyogo Prefecture) or in the lower altitude (e.g., Kamiange), the “basic group” is predominant, with few species of the “northern group”, whereas in the region with higher mountains in central and northern Honshu (e.g., Ishikawa, Tochigi, and Aomori Prefectures), the “northern group” is richly represented in addition to the “basic group”.

For making comparisons of local pamphiliid faunas in Honshu easier, two indices are proposed here, the “B/T ratio” and the “N/B ratio”, both ratios in the number of the species. The B/T ratio (the ratio of the species number of the “basic group” to the total number of species occurring in the area) shows the portion of the “basic group” sharing in the total pamphiliid fauna of the area. The higher this ratio becomes, the more “basic” becomes the fauna; in other words, the fauna is less diversified, with fewer elements of the “northern” or “other” categories. On the other hand, a pamphiliid fauna with a rich representation of the “northern group” and/or the species in the category 3 will have a low B/T

ratio. To understand the share of the “northern group” in a particular local pamphiliid fauna, the N/B ratio may be useful. It is a ratio of the number of species of the “northern group” to that of the “basic group” found in the area.

The B/T and N/B ratios are given for each area in Table 1. Among the five regions, Kamiange is peculiar in having the B/T ratio as high as 0.84 and the N/B ratio 0 (“northern group” not found). The research field in Kamiange is a small area about 400 meters high in southwestern part of Tokyo in central Honshu (Shinohara, 2002 b). This is probably a typical pamphiliid fauna in the lowlands to lower mountains in Honshu. The pamphiliid fauna of Hyogo Prefecture (B/T ratio 0.71; N/B ratio 0.18) has much in common with that of Kamiange but has some elements of the “northern group”. This is well explained by its southwestern location in Honshu and the presence of high but not very high mountains (slightly over 1500 meters in altitude) in the prefecture. Each of the other three prefectures, Ishikawa Prefecture (B/T ratio 0.52; N/B ratio 0.56), Tochigi Prefecture (B/T ratio 0.43; N/B ratio 1), and Aomori Prefecture (B/T ratio 0.54; N/B ratio 0.63), covers a large area from lowlands to high mountains and has a pamphiliid fauna of mixed elements of the three categories (B/T ratio 0.43–0.54; N/B ratio 0.56–1). This is a general composition of the pamphiliid fauna expected to be found in most of the prefectures in central to northern Honshu insofar as the prefecture has higher places over 1500–2000 meters. The very high value of N/B ratio in Tochigi Prefecture (1) probably reflects the presence of good collection of sawflies from higher mountains (particularly from Nikko area), where the “northern group” is richly represented.

Characteristics of the pamphiliid fauna of Aomori Prefecture

Of the 26 pamphiliid species now known to occur in Aomori Prefecture, 14 species belong to the “basic group” and ten species belong to the “northern group”. A low value of B/T ratio (0.54) and a high value of N/B ratio (0.63) show

that the pamphiliid fauna of Aomori Prefecture is typical of the pamphiliid fauna of a prefecture with a wide range of altitudes in central and northern Honshu.

No species endemic to Aomori Prefecture has been found. *Pamphilius zhelochovtsevi nipponicus*, *P. daisenus*, and *P. japonicus* are rarely collected species but they are rather widely distributed (Shinohara, 2001a, 2002b).

Considering that 31 species of Pamphiliidae have been recorded from Ishikawa Prefecture and 35 species from Tochigi Prefecture (Table 1), we assume that the pamphiliid fauna of Aomori Prefecture, with 26 recorded species, has not been fully explored. Of the 17 species recognized as members of the "basic group" of the Honshu pamphiliid fauna (see discussion above), three species (*Onycholyda decorata*, *O. similis*, and *Pamphilius togashii*) have not been discovered in Aomori Prefecture. The northernmost localities recorded for the three species are Sendai, Miyagi Prefecture for *O. decorata* (Shinohara, 1985b, known also from southwestern Hokkaido), Mt. Gassan, Yamagata Prefecture for *O. similis* (Shinohara, 1987; recorded erroneously as Akita Prefecture), and Hachimantai, Iwate Prefecture for *P. togashii* (Shinohara, 2002b). These three species are very likely to be found in Aomori Prefecture. Other species expected to be discovered are a birch-feeding species, *P. varius*, alder-feeding species, *P. archiducalis* and *P. alnicola*, and *P. hortorum* (host unrecorded in Japan), because they are known to occur rather widely in mountainous regions of Honshu and Hokkaido.

List of Pamphiliidae from Aomori Prefecture

(The numerals in brackets after the locality names in the collection data refer to the numerals in the map, Fig. 1)

Acantholyda nipponica Yano & Sato, 1928

[Japanese name: Nihon-akazu-hiratahabachi]

Material examined. 1♂, Mt. Hakkoda [23], 21. VII. 1985.

Distribution. Japan (Hokkaido, Honshu).

Host plants. *Larix leptolepis* (Sieb. & Zucc.) Gord., *Pinus strobus* L., *Pinus pumila* (Pallas) Regel (Shinohara, 2001b).

Remarks. This species has been recorded from Hokkaido, Aomori, Miyagi, Saitama, Tokyo, Yamanashi, Nagano, and Ishikawa Prefectures (Shinohara, 2001b). In Hokkaido, this is a pest on planted larch trees (Shinohara, 1997b), but it is usually rare in Honshu.

Acantholyda iwatai Takeuchi, 1938

[Japanese name: Iwata-hiratahabachi]

Material examined. 1♂, Hakkoda (Aomori) [23], 17. VII. 1997 (recorded by Shinohara, 2001b).

Distribution. Japan (Honshu, Shikoku, Kyushu).

Host plants. Unknown.

Remarks. This species was first recorded from Aomori Prefecture by Shinohara (2001b). It is known to occur in Honshu (Aomori, Tochigi, Yamanashi, Nagano, Aichi Prefectures), Shikoku (Tokushima Prefecture), and Kyushu (Kagoshima Prefecture).

Acantholyda kojimai Shinohara, 2000

[Japanese name: Kita-atoguro-hiratahabachi]

Material examined (all paratypes). 1♂, Mt. Iwaki [6], 16. VI. 1991; 3♂, Mt. Iwaki (Iwaki) [6], 17. VI. 1997; 1♂, Hakkoda (Aomori) [23], 17. VII. 1997; 1♂, Mt. Hakkoda [23], 24. VI. 1984; 1♂, Mt. Hakkoda [23], 8. VII. 1989; 1♂, Mt. Hakkoda [23], 3. VIII. 1986.

Distribution. Japan (Honshu).

Host plants. *Pinus parviflora* Sieb. & Zucc., *Pinus pumila* (Pallas) Regel (Shinohara, 2000).

Remarks. This species is known to occur in Aomori, Miyagi, Niigata, Fukushima, Tochigi, Gumma, and Nagano Prefectures (Shinohara, 2000). The Aomori specimens listed above are paratypes.

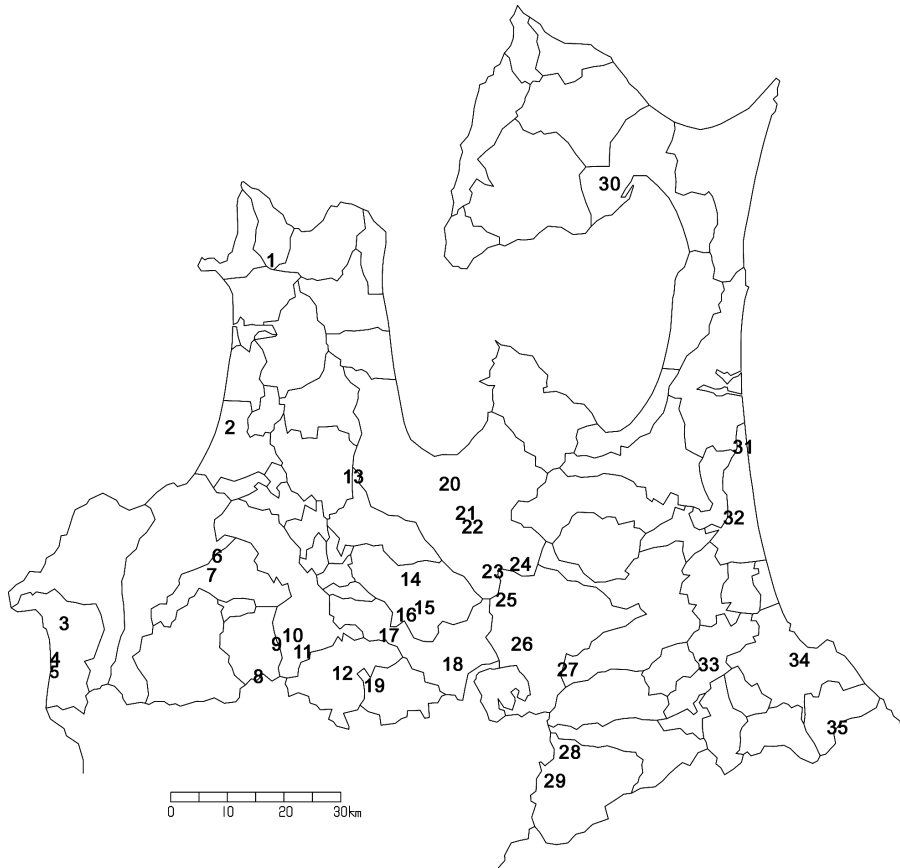


Fig. 1. Map of Aomori Prefecture. The numerals show the approximate locations of the sites; see numerals given in brackets in the collection data.

Acantholyda sasakii (Yano, 1916)

[New Japanese name: Haraaka-matsu-hiratahabachi]

Material examined. 1♂, Hakkoda (Aomori) [23], 22. VII. 1997 (recorded by Shinohara, 2001b); 1♂, Hakkoda (Aomori) [23], 23. VI. 1997 (recorded by Shinohara, 2001b).

Distribution. Japan (Honshu).

Host plants. *Pinus densiflora* Sieb. & Zucc., *Pinus parviflora* var. *pentaphylla* (Mayr) Henry, *Pinus koraiensis* Sieb. & Zucc. (Shinohara, 2001b).

Remarks. Shinohara (2001b) recorded this species from Aomori, Yamagata, Miyagi, Fukushima, Tochigi, Gumma, Ibaraki, Saitama, Tokyo, Kanagawa, Yamanashi, Nagano, Ishikawa, and Tottori Prefectures.

Cephalcia variegata Takeuchi, 1930

[Japanese name: Takane-hiratahabachi]

Material examined. 5♀5♂, Mt. Hakkoda [23], 21. VII. 1985; 4♀14♂, Hakkoda (Aomori) [23], 22. VII. 1997.

Distribution. Japan (Hokkaido, Honshu); Sakhalin.

Host plants. *Pinus pumila* (Pallas) Regel (Togashi & Yoshida, 1988).

Remarks. This species occurs in the alpine *Pinus pumila* zone in Hokkaido and northern and central Honshu (recorded from Aomori, Nagano, and Ishikawa Prefectures) (Takeuchi, 1930; Togashi, 1961). One of the paratypes was obtained from Mt. Hakkoda (Takeuchi, 1930).

***Cephalcia* sp.**

Material examined. 1♂, Mt. Iwaki [6], 8. VII. 1990.

Remarks. This male specimen has not been determined. The Japanese species of *Cephalcia* need a taxonomic revision and are not identifiable for now, except for a few very characteristic species.

***Neurotoma iridescens* (André, 1882)**

[Japanese name: Sakura-hiratahabachi]

Material examined. 1♀, Mt. Kuromori (Kuroishi) [14], 6. VI. 1985.

Distribution. Japan (Hokkaido, Honshu, Shikoku, Kyushu), Korea, Siberia, and Europe.

Host plants. *Prunus* spp., *Sorbus* spp., *Crataegus chlorosarca* (Shinohara & Hara, 1999).

Remarks. Torikata (1912) reported on the damage of leaves of cherry trees by the present species (under the name of “*Lyda nigricans* Mats.”) in Tsugaru area. This is a widely distributed species and the gregarious larvae are quite noticeable; however, the adults are not commonly collected.

***Onycholyda esakii* (Takeuchi, 1938)**

[Japanese name: Esaki-hiratahabachi]

Material examined. 1♀, Juniko (Iwasaki) [3], 16. VI. 1985; 1♂, Zato-Ishi (Hirosaki) [11], 14. VI. 1984; 1♀, Ikarigaseki [19], 14. VIII. 1982 (recorded by Shinohara, 1986a); 1♂, Nagasaka (Kuroishi), 2. VII. 1988; 1♀, Yokouchi-Yaegiku [20], Aomori-shi, 7. VIII. 1993, T. Ichita (NSMT; recorded by Ichita, 1994); 1♀, Tsuta (Towadako) [25], 17. VIII. 1986; 1♂, Tsuta (Towadako), 24. VIII. 1986.

Distribution. Japan (Honshu, Shikoku, Kyushu).

Host plant. Unknown.

Remarks. This rather uncommon species was already recorded from Aomori Prefecture by Shinohara (1986a) and Ichita (1994).

***Onycholyda lucida* (Rohwer, 1910)**

[Japanese name: Tsuya-hiratahabachi]

Material examined. 2♀, Kudojiyama (Hirosaki) [9], 27. V. 1989; 1♀1♂, Hayaseno (Owani) [13], 18. V. 1985 (recorded by Shinohara, 1986b); 2♂, Shiroywa (Onoe), 11. V. 1985; 1♂, Mt. Tashiro (Kuroishi) [15], 20. V. 1990; 1♀, Mt. Tashiro (Kuroishi), 26. V. 1990; 1♀, Mt. Tomioka (Kuroishi) [16], 3. VI. 1989; 1♀, Okawara (Kuroishi), 29. V. 1984; 9♂, Mt. Yasute (Hiraka) [17], 22. V. 1989; 1♂, Kayanochaya (Aomori) [22], 30. V. 1986; 1♂, Tsuta (Towadako) [25], 28. V. 1997; 3♀, Tsuta (Towadako), 31. V. 1987; 2♀, Yasumiya (Towadako), 1. VI. 1987; 1♀ Mt. Herai (Shingo) [27], 19. V. 1986; 1♀, Nagashita (Gonohe) [33], 14. V. 1987; 1♀, Mt. Hashikami (Hashikami) [35], 8. VI. 1986.

Distribution. Japan (Honshu, Shikoku, Kyushu).

Host plants. *Rubus* spp. (Okutani & Fujita, 1955).

Remarks. This is probably the commonest species of Pamphiliidae in Honshu. It was first recorded from Aomori Prefecture by Shinohara (1986b).

***Onycholyda minomalis* (Takeuchi, 1930)**

[Japanese name: Komon-hiratahabachi]

Material examined. 2♂, Amagamori (Misawa) [31], 6. VI. 1988; 1♀, Sabishiroi (Misawa) [32], 6. VI. 1988.

Distribution. Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Host plant. *Rubus parviflora* L. (Okutani, 1967).

Remarks. This is the first record of *O. minomalis* from Aomori Prefecture. It is not uncommon in central Honshu, but rarely found in northern Honshu, with only one previous record from Miyagi Prefecture (Shinohara, 1987).

Onycholyda viriditibialis (Takeuchi, 1930)

[Japanese name: Aosune-hiratahabachi]

Material examined. 1 ♀, Mt. Tomioka (Kuroishi) [16], 18. VI. 1988; 1 ♂, Shigabou (Hiraka), 6. VI. 1999; 1 ♀, Ikarigaseki [19], 14. VIII. 1982 (recorded by Shinohara, 1986a); 1 ♂, Okuromori (Takko) [28], 2. VIII. 1986.

Distribution. Japan (Hokkaido, Honshu, Shikoku, Kyushu), Korea, Russia (Primorskij kraj).

Host plant. *Rubus crataegifolius* Bunge (Okutani & Fujita, 1956).

Remarks. This is a widespread species already recorded from Aomori Prefecture by Shinohara (1986a).

Onycholyda kumamotonis (Matsumura, 1912)

[Japanese name: Onishimotsuke-hiratahabachi]

Material examined. 1 ♂, Chokeimori (Soma) [8], 10. VI. 1989; 1 ♀, Kudojiyama (Hirosaki) [9], 27. V. 1989; 1 ♀, Hayaseno (Owani) [13], 18. V. 1985; 2 ♂, Nurukawa (Hiraka) [18], 10. VI. 1999; 1 ♀4♂, Tsuta (Towadako) [25], 31. V. 1987; 2 ♀, Yasumiya (Towadako), 1. VI. 1987; 1 ♀, Natsusaka (Takko) [29], 6. VI. 1987.

Distribution. Japan (Hokkaido, Honshu), Sakhalin, southern Kuriles.

Host plant. *Filipendula kamschatica* (Palas.) Maxim. (Shinohara & Okutani, 1983).

Remarks. *Onycholyda kumamotonis* was known from Iwate, Tochigi, Nagano, Gifu, and Ishikawa Prefectures in Honshu (Shinohara, 1985d), and this is the first record from Aomori Prefecture.

Pamphilius komonensis Takeuchi, 1930

[Japanese name: Kaede-hiratahabachi]

Material examined. 1 ♂, Omagoshi (Iwasaki) [5], 2. VI. 1999; 5 ♂, Tozando (Dake-Iwaki) [7], 29. V. 1994; 1 ♀, Chokeimori (Soma) [8], 10. VI. 1989; 1 ♂, Chokeimori (Soma), 7. VI. 1998; 2 ♂, Mt. Kuromori (Kuroishi) [14], 6. VI. 1985; 1 ♀6♂, Mt. Tashiro (Kuroishi) [15], 11. VI. 1994.

Distribution. Japan (Honshu, Shikoku,

Kyushu).

Host plant. *Acer mono* Maxim. (Shinohara & Okutani, 1983).

Remarks. This species is commonly found in central Honshu (Shinohara, 2002b) but has not been recorded from the Tohoku district. In addition to the Aomori specimens listed above, I have examined the following specimens from the Tohoku district. Akita Prefecture: 2 ♂, Kuroyu, 16. VI. 1951, K. Takeuchi (UOP). Iwate Prefecture: 1 ♂, Tsunagi-onsen, 3. VI. 1981, T. Tanabe (NSMT); 1 ♂, Tsunagi-onsen, 3. VI. 1981, T. Oku (NSMT); 10 ♂, Tsunagi-onsen, 29. V. 1982, A. Shinohara (NSMT); 1 ♂, near Hachimantai (ca. 1000–1300m), Ashiro-cho, 10–13. VII. 1995, H. Yoshitomi (NSMT). Fukushima Prefecture: 15 ♂, Shitokigawa-keikoku, Iwaki, 6. V. 1982, A. Shinohara (NSMT).

One female from Mt. Tashiro is aberrant in that its head color pattern is very different from that of an ordinary female but resembles that of an ordinary male of the same species.

Pamphilius takeuchii Beneš, 1972

[Japanese name: Usumon-hiratahabachi]

Material examined. 1 ♀, Juniko (Iwasaki) [3], 16. VI. 1985; 1 ♀, Juniko (Iwasaki), 23. VII. 1988; 1 ♀, Omagoshi (Iwasaki) [5], 2. VI. 1999; 1 ♂, Sukayu (Aomori) [23], 22. VI. 1995; 1 ♂, Mt. Hakkoda (Aomori) [23], 29. VI. 1995; 1 ♂, Mt. Kamafuse (Mutsu) [30], 12. VI. 1997.

Distribution. Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Host plant. *Acer mono* Maxim. (Okutani, 1959).

Remarks. This widespread species has not been recorded from the Tohoku district. I have examined the following specimens from the Tohoku district, besides the specimens from Aomori Prefecture listed above. Iwate Prefecture: 11 ♂, Tsunagi-onsen, 29. V. 1982, A. Shinohara (NSMT). Miyagi Prefecture: 1 ♂, Mt. Maeyama, Zao, 23. VI. 1974, K. Shirahata (NSMT). Yamagata Prefecture: 1 ♀, Mt. Gassan, 19. VI. 1960, K. Shirahata (NSMT). Fukushima Prefecture: 1 ♀,

Mt. Azumayama, 19. VII. 1959, K. Sato (NSMT).

Pamphilius ishikawai Shinohara, 1979

[Japanese name: Tsuya-kuro-hiratahabachi]

Material examined. 1 ♀, Kudojiyama (Hirosaki) [9], 27. V. 1989; 1 ♂, Zatoishi (Hirosaki), 6. VI. 1984; 1 ♀, Itadome, Kuroishi [15], 18. VI. 1983.

Distribution. Japan (Honshu).

Host plant. Unknown.

Remarks. This is the first record of *P. ishikawai* from Aomori Prefecture. It is widespread in Honshu, though it has been recorded only from Akita and Fukushima Prefectures in the Tohoku district (Shinohara, 2002b).

Pamphilius zhelochovtsevi nipponicus

Shinohara, 1993

[Japanese name: Mon-tsuya-kuro-hiratahabachi]

Material examined. 1 ♀, Moyasawa, Aomori-shi [21], 6-13. VI. 1992, yellow sticky trap, T. Ichita (NSMT; recorded by Ichita, 1994); 1 ♀, Nagashita (Gonohe) [33], 23. V. 1986.

Distribution. Japan (Honshu).

Host plant. Unknown.

Remarks. Ichita (1994) was the first to record this species from Aomori Prefecture. Otherwise, this rare species is known to occur in Iwate, Tokyo, Nagano, Gifu, Ishikawa, Hyogo, and Totori Prefectures (Shinohara, 2002b).

Pamphilius confusus Shinohara, 2005

[Japanese name: Hannoki-hiratahabachi]

Material examined (holotype and paratypes). 51 ♀ (incl. holotype) 115 ♂, Mt Iwaki (Iwaki) [6], 6. VI-27. VII., 1981–1997 (partly in NSMT, see Shinohara, 2005, for more details); 1 ♂, Dakeonsen (Iwaki) [7], 27. V. 1989; 1 ♀3 ♂, Kudojiyama (Hirosaki) [9], 27. V. 1989; 1 ♀, Hayaseno (Owani) [13], 18. V. 1985; 1 ♀, “Aomori” “*Pamphilius (Anoplolyda) ♂ pallipes* Zetter., det. K. Sato, 1957” (NSMT); 1 ♀, Mt. Hakkoda, 10. VII.

1932, K. Takeuchi (UOP); 1 ♀, Mt. Hakkoda [23], 26. VI. 1983; 1 ♀2 ♂, Mt. Hakkoda, 24. VI. 1984; 4 ♂, Mt. Hakkoda [23], 29. VI. 1988; 1 ♀1 ♂, Mt. Hakkoda (Aomori) [23], 23. VI. 1997.

Distribution. Japan (Hokkaido, Honshu, Shikoku).

Host plant. *Alnus maximowiczii* Call. (Shinohara, 2005)

Remarks. This species was long known under the name of *Pamphilius pallipes* (Zetterstedt) in Japanese literature (e.g., Takeuchi, 1938; Togashi, 1961; Okutani, 1967; Shinohara & Okutani, 1983), but Shinohara (2005) described it as a new species. All the Aomori specimens listed above belong to the type series, including the holotype from Mt. Iwakisan.

Pamphilius flavipectus Shinohara, 2005

[Japanese name: Kimune-hiratahabachi]

Material examined (paratypes). 1 ♀, Mt. Bonju, Namioka [12], 29. V. 1983; 1 ♀, Oirasegawa (Towadako) [26], 12. V. 1997.

Distribution. Japan (Honshu, Shikoku, Kyushu).

Host plant. *Alnus hirsuta* Turcz. (Shinohara, 2005).

Remarks. This species was very recently described on the basis of 125 specimens including the two paratypes from Aomori Prefecture (Shinohara, 2005).

Pamphilius nakagawai Takeuchi, 1930

[Japanese name: Nakagawa-hiratahabachi]

Material examined (all recorded by Shinohara, 2005). 1 ♀, Shiroya (Hiraka), 6. V. 1989; 1 ♀, Tsuta (Towadako) [25], 30. V. 1999.

Distribution. Japan (Honshu, Shikoku, Kyushu).

Host plants. *Alnus hirsuta* Turcz. and its variety, var. *sibirica* (Fischer) C. K. Sch., *Alnus matsumurae* Call. (Shinohara, 2005).

Remarks. This species is sometimes commonly found in central Honshu, but seems to be

scarce in Aomori Prefecture.

Pamphilius lobatus Maa, 1950

[Japanese name: O-haraaka-hiratahabachi]

Material examined. 1 ♀, Ichinowatari (Hirosaki) [10], 23. VI. 1985; 1 ♀, Mt. Tashiro (Kuroishi) [15], 12. VI. 1993; 1 ♂, Mt. Hakkoda [24], 11. VI. 1989.

Distribution. Japan (Hokkaido [new distribution record], Honshu), Korea, China (Jilin) (Shinohara & Xiao, 2005).

Host plant. Unknown.

Remarks. This is the first distribution record of *P. lobatus* from Aomori Prefecture and the Tohoku district. I have also examined the following specimens from Akita and Miyagi Prefectures. Akita Prefecture: 1 ♀, Kuroyu, 14. VI. 1951, K. Takeuchi (UOP). Miyagi Prefecture: 1 ♂, Ippit-suyama, Hanayama-mura, 5. VI. 1990, K. Goukon (NSMT). In Japan, this species has been recorded from Honshu only (Shinohara, 1988). The following specimens represent the first distribution record of *P. lobatus* from Hokkaido: 1 ♂, Yamada-onsen, Tokachi, 21. VI. 1990, A. Shinohara (NSMT); 1 ♂, Horoshika-toge, 1100 m, Tokachi, 7. VII. 1994, A. Shinohara (NSMT); 2 ♂, same locality, 21–23. VI. 2000, A. Shinohara (NSMT); 2 ♀, Asahidake-onsen, Daisetsuzan Mountains, Kamikawa, 29–30. VI. 2000, A. Shinohara (NSMT); 1 ♀, same locality, 25–28. VI. 2002, A. Shinohara (NSMT); 1 ♂, Akadake-Ginsendai, Daisetsuzan Mountains, Kamikawa, 12–14. VII. 2001, A. Shinohara (NSMT).

Pamphilius venustus (Smith, 1874)

[Japanese name: Haraaka-hiratahabachi]

Material examined. 1 ♀, Mt. Masukawa (Mimmaya) [1], 22. V. 1988; 1 ♂, Chokeimori (Soma) [8], 10. VI. 1989; 1 ♀, Chokeimori (Soma), 25. VI. 1989; 1 ♂, Kudojiyama (Hirosaki) [9], 27. V. 1989; 1 ♀, Zatoishi (Hirosaki) [11], 19. V. 1983; 1 ♀, Zatoishi (Hirosaki), 7. VI. 1983; 1 ♀2♂, Nurukawa (Hiraka) [18], 10. VI. 1999;

1 ♀, Tsuta (Towadako) [25], 31. V. 1987; 2 ♀, Tsuta (Towadako), 30. V. 1999; 11 ♀4♂, Yasumiya (Towadako), 1. VI. 1987.

Distribution. Japan (Hokkaido, Honshu, Shikoku) (Shinohara & Morita, 2003).

Host plant. *Filipendula kamtschatica* (Pall.) Maxim. (Shinohara & Okutani, 1983).

Remarks. In Honshu, this species is known to occur in Aomori, Iwate, Tochigi, Niigata, Yamanashi, Nagano, Gifu, Ishikawa, and Shiga Prefectures (Shinohara & Morita, 2003), but the collection data in Aomori Prefecture have not been published.

Pamphilius kamikochensis Takeuchi, 1930

[Japanese name: Ko-haraaka-hiratahabachi]

Material examined. 1 ♀, Mt. Masukawa (Mimmaya) [1], 22. V. 1988; 1 ♀, Tsubaigawa (Iwasaki) [4], 2. VI. 1999; 1 ♂, Kudojiyama (Hirosaki) [9], 27. V. 1989; 1 ♂, Mt. Bonju (Namioka) [12], 15. V. 1983; 1 ♂, Mt. Bonju (Namioka), 29. V. 1983 (recorded by Shinohara, 1998); 1 ♀4♂, Hayaseno (Owani) [13], 18. V. 1985; 1 ♀1♂, Hayaseno (Owani), 18. V. 1985 (recorded by Shinohara, 1998); 1 ♀10♂, Towadasan (Owani), 19. V. 1991; 2 ♀2♂, Mt. Tashiro (Kuroishi) [15], 2. VI. 1994; 2 ♂, Mt. Tashiro (Kuroishi), 20. V. 1990; 1 ♀, Mt. Tashiro (Kuroishi), 24. V. 1993; 1 ♀18♂, Mt. Tashiro (Kuroishi), 26. V. 1990; 1 ♂, Mt. Tashiro (Kuroishi), 28. V. 1994; 1 ♀, Takinosawa (Hiraka), 10. VI. 1999; 1 ♀, Tsuta (Towadako) [25], 30. V. 1999; 1 ♀, Yasumiya (Towadako), 1. VI. 1987.

Distribution. Japan (Hokkaido, Honshu).

Host plant. *Prunus ssiori* F. Schmidt (Shinohara & Okutani, 1983; Shinohara, 1998)

Remarks. This species is usually uncommon but sometimes occurs in great numbers near the trees of *Prunus ssiori* (Shinohara & Okutani, 1983). Shinohara (1998) recorded this species from Aomori Prefecture, and it was the only available distribution record of *P. kamikochensis* from the Tohoku district.

Pamphilius itoi Shinohara, 1985

[Japanese name: Hanno-haraaka-hiratahabachi]

Material examined. 1 ♂, Mt. Bonju (Namio-ka) [12], 27. V. 1995.

Distribution. Japan (Hokkaido, Honshu), Kunashiri Is.

Host plant. *Alnus hirsuta* Turcz. (Shinohara & Hara, 1995)

Remarks. In the Tohoku district, this species was known only from Iwate Prefecture (Shinohara, 1985c). This is the first distribution record from Aomori Prefecture.

Pamphilius benesi Shinohara, 1985

[Japanese name: Hashibami-hiratahabachi]

Material examined. 1 ♀, Mt. Hakkoda [24], 11. VI. 1989.

Distribution. Japan (Hokkaido, Honshu, Shikoku, Kyushu), Korea.

Host plant. *Corylus sieboldiana* Blume (Shinohara & Hara, 1997).

Remarks. This is an uncommon though widely distributed species. In the Tohoku district, *P. benesi* was known only from Iwate Prefecture (Shinohara, 1985a, 2001a), and this is the first distribution record from Aomori Prefecture.

Pamphilius daisenus Takeuchi, 1938

[Japanese name: Daisen-kuro-hiratahabachi]

Material examined. 1 ♂, Mt. Kamafuse (Mutsu) [30], 12. VI. 1997 (recorded by Shinohara, 2001a).

Distribution. Japan (Honshu), Korea.

Host plant. Unknown.

Remarks. This is a rare species known only by several specimens from Aomori, Miyagi, Tochigi, Saitama, Nagano, Hyogo, and Tottori Prefectures and Korea (Shinohara, 2001a).

Pamphilius japonicus Shinohara, 1985

[Japanese name: O-kuro-hiratahabachi]

Material examined. 1 ♀, Moyatoge, Aomori-shi [21], 13–27. VI. 1992, yellow sticky trap, T.

Ichita (NSMT; recorded by Ichita, 1994, and Shinohara, 2001a); 1 ♂, Sabishiroi (Misawa) [32], 6. VI. 1986 (recorded by Shinohara, 2001a).

Distribution. Japan (Honshu, Kyushu).

Host plant. Unknown.

Remarks. This uncommon species was recorded from Aomori Prefecture by Ichita (1994) and Shinohara (2001a). Besides, it is known to occur in Iwate, Tokyo, Aichi, Ishikawa, Fukui, Hyogo, and Tottori Prefectures in Honshu, and in Fukuoka and Oita Prefectures in Kyushu (Shinohara, 2001a).

Pamphilius volatilis (Smith, 1874)

[Japanese name: Shima-hiratahabachi]

Material examined. 11 ♂, Hiratakinuma (Kizukuri) [2], 22. V. 1991; 3 ♀, Hiratakinuma (Kizukuri), 27. V. 1990; 1 ♂, Mt. Iwaki (Iwaki) [6], 17. VI. 1997; 1 ♂, Tozando (Dake-Iwaki) [7], 29. V. 1994; 24 ♂, Kudojiyama (Hirosaki) [9], 27. V. 1989; 1 ♀, Zatoishi flow [11], 19. V. 1984; 1 ♂, Towadasan (Owani), 19. V. 1991; 1 ♂, Mt. Hakkoda [23], 1. VII. 1984; 1 ♂, Mt. Hakkoda [23], 8. VII. 1989; 2 ♀, Sabishiroi (Misawa) [32], 6. VI. 1988; 1 ♂, Hachinoe [34], 17. V. 1960, A. Fukuda (KYU; recorded by Shinohara, 1985a).

Distribution. Japan (Hokkaido, Honshu, Kyushu), Korea, and Russia (Primorskij Kraj).

Host plants. *Prunus* spp., *Crataegus chlorosarca* (Shinohara & Hara, 1999).

Remarks. This is a common species already recorded from Aomori Prefecture by Shinohara (1985a).

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