

Midge Galls of Amami-ôshima

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Introduction

Sixty-three sorts of midge gall on 47 plant species belonging to 24 families are known to occur on the Nansei-shotô, south of Yakushima, Japan,^{1,3)}. Among them 58 sorts have been collected from Okinawa-hontô (1,211 km²) and only 16 sorts from Amami-ôshima (718 km²). The figure for the latter island is distinctly fewer than what is expected from its area and vegetation, and the ecological information about gall midges is also limited. The reason is apparently referable to fewer attempts of field surveys on Amami-ôshima than those on Okinawa-hontô. To fill some of these gaps the present author visited Amami-ôshima in March 1987 and collected 13 sorts of midge gall including one new and six known sorts which have never been recorded from Amami-ôshima. As a result, the total number of midge galls found on the island amounts to 23. The 13 sorts of midge gall are listed in this paper together with their collecting data and ecological information, and the new sort of midge gall is described.

Materials and Methods

The author devoted three days to collecting on the island from 21 to 23 March 1987. Some of the collected galls were retained in the laboratory to rear adults, and the rest were measured by slide calipers and then dissected to know developmental stages and other ecological information of gall-inhabitants. The specimens examined here are kept in the Collection of the Entomological Laboratory, Kagoshima University.

In relation to the emergence season of the machilus leaf gall midge, *Daphnephila machilicola* Yukawa²⁾, the percentage of host shoots extended was surveyed on 22 March 1987 for 38 trees of *Machilus thunbergii* Sieb. et Zucc. (Lauraceae) growing along the road from Naze to Sumiyô.

In enumerating the collection records, entries for each gall are arranged in the following order: 1) Host plant family and species; 2) Galled part; 3) Japanese name of the gall; 4) Scientific name of the gall midge if it has been identified, otherwise generic or supertribal position. In the case where the gall midge is not identified because the adult has not been reared, the term "Adult unknown" is used; 5) Collecting data (all the galls were collected or found by the present author); 6) Comments and ecological data if available; 7) Newly recorded galls are indicated as "New rec. from Amami-ôshima" or "New rec. from Japan".

Moraceae

Ficus retusa L. "Gajumaru"

Leaf, "Ha-ko-hiratafushi". Adult unknown.

Akaogi, Tatugô, 23. March 1987. Many old and decayed galls with exit holes were found.
Ficus wightiana Wall. "Akou"

Leaf, "Ha-ko-hiratafushi". Adult unknown.

Uragami, Naze, 23. March 1987. Many old and decayed galls with exit holes were found.

Lauraceae

Cinnamomum japonicum Sieb. "Yabu-nikkei"

Stem, "Eda-kobufushi". A species of Asphondyliidi.

Wase, Sumiyô, 22. March 1987. The author collected two galls, from which 10 males emerged in the laboratory from 31. March to 7. April 1987.

Machilus japonica Sieb. et Zucc. "Hosoba-tabu"

Stem, "Eda-zuifushi". Adult unknown.

Nishinakama, Sumiyô, 22. March 1987. The author collected two old galls with exit holes. This gall has been recorded from Okinawa-hontô¹⁾. The present data expands the northern limit of the distribution range. **New rec. from Amami-ôshima.**

Leaf, "Ha-fukurefushi". A species of Cecidomyiidi.

Nishinakama, Sumiyô, 22. March 1987. Many old galls with exit holes were found. This gall has been collected from various localities in Honshu, Shikoku, Kyushu and Okinawa-hontô, but has never been recorded from islands between Yakushima and Okinawa-hontô^{1,4)}. The

Table 1. Results of dissection of the galls produced by three gall midge species

Gall midge	<i>Daphnephila machilicola</i>		<i>Pseudasphondylia</i> sp.		Unidentified	
Host plant	<i>Machilus thunbergii</i>		<i>Elaeocarpus sylvestris</i>		<i>Symplocos microcalyx</i>	
Galled part	Leaf* ¹		Leaf		Twig	
Total galls examined	13	100%	24	100%	12	100%
Gall midge						
Adult (emerged)	4* ²	30.8	0		5	41.7
Pupa	1	7.7	0		0	
Larva (third ins.)	0		1	4.2	0	
Larva (second ins.)	0		0		1	8.3
Total	5	38.5	1	4.2	6	50.0
Parasitoid						
Adult (emerged)	2	15.4	22* ⁴	91.7	0	
Pupa (late)	1	7.7	1* ⁴	4.2	1* ⁴	8.3
Pupa (early)	5	38.5	0		4* ⁴	33.3
Larva	0		0		0	
Egg	0		0		1* ⁵	8.3
Total	8* ³	61.5	23	95.8	6	50.0

*¹ "Haura-usufushi"; *² Emergence of ectoparasitoids, if any, could not be distinguished;

*³ Endoparasitic pteromalid, *Gastrancistrus* sp.; *⁴ Unidentified parasitoids; *⁵ An egg was found to be placed on a second instar of the gall midge.

Table 2. Condition of leaf buds of *Machilus thunbergii*, one of the host plants of *Daphnephila machilicola*, in late March on Amami-ôshima

No. of trees on which all buds were not shooting	2
No. of trees on which about 20% of buds were shooting*	1
No. of trees on which about 50% of buds were shooting*	6
No. of trees on which 100% of buds have shot	29
Total number of trees examined	38

* Suitable condition for oviposition of *D. machilicola*.

present data fills the gap of distribution range. **New rec. from Amami-ôshima.**
Machilus thunbergii Sieb. et Zucc. "Tabunoki"

Stem, "Eda-kobufushi". A species of Asphondyliidi.

Wase, Sumiyô, 22. March 1987. The author collected one old gall with exit holes.

Leaf, "Haura-usufushi". *Daphnephila machilicola* Yukawa. Asato, Naze, 22. March 1987. The author collected 13 galls on seven leaves. Dissection of the galls indicated that most of the gall midges had emerged and the percentage parasitism by an endoparasitic pteromalid, *Gastrancistrus* sp., was markedly high (Table 1). Shoots had already extended and were not available for oviposition any more on most of the host trees (Table 2). These data seem to show that emergence of adult midges and burgeoning of leaf buds occur about one month earlier on Amami-ôshima than in Kagoshima-shi where adults emerge during the period from late April to early May²⁾.

Elaeocarpaceae

Elaeocarpus sylvestris Poir. var. *ellipticus* Hara "Horutonoki"

Leaf, "Haura-eboushifushi". *Pseudasphondylia* sp.

Nishinakama, Sumiyô, 22. March 1987. The author collected 24 galls on 10 leaves. The percentage parasitism by an unidentified parasitic wasp was extremely high (Table 1).

Symplocaceae

Symplocos microcalyx Hay. "Amashiba"

Stem, "Kuki-marufushi", **New gall name.** Adult unknown.

Asiken-Imasato, Uken, 22. March 1987. The author collected 12 galls produced on twigs. They are hemispherical or subglobular in shape, and the surface is smooth and dark brown. The height of the galls ranges from 1.6 to 2.7 mm, the diameter from 1.6 to 2.6 mm (Fig. 1). In the centre of the gall there is an ellipsoidal larval chamber which contains a yellowish midge larva. Host trees are growing in sunny places such as road sides. Dissection of the galls indicated that adult midges had already emerged from at least four galls and about 50% of the midge larvae were parasitized by an unidentified parasitic wasp (Table 1). **New rec. from Japan.**



Fig. 1. Midge galls produced on the twig of *Symplocos microcalyx* Hay. "Amashiba" (Symlocaceae).

Styracaceae

Styrax japonica Sieb. et Zucc. "Egonoki"

Leaf, "Hirata-marufushi". Adult unknown.

Wase, Sumiyô, 22. March 1987. The author found a few old galls on a leaf. This gall has been found from Honshu and Kyushu, but never from islands south of Tanegashima. The present record expands the southern limit of the distribution range. **New rec. from Amami-ôshima.**

Flower bud, "Tsubomi-fukurefushi". Adult unknown.

Wase, Sumiyô, 22. March 1987. Four galls were collected from a host tree growing along the road. Two of them each contain a yellowish midge larva, and the remaining two contain three milky white parasitoid larvae, respectively. This gall has been known from Honshu, Kyushu and Okinawa-hontô¹⁾ and the present data fills the gap between the latter two localities. **New rec. from Amami-ôshima.**

Cucurbitaceae

Diplocyclos palmatus C. Jeffrey "Okinawa-suzume-uri"

Stem, "Kuki-fukurefushi". *Lasioptera* sp.

Ura, Tatsugô, 21. March 1987. Two galls were collected. Each gall contains several midge larvae. The detection of this gall from Amami-ôshima is considered to be quite natural as it is commonly seen on such islands as Kikai, Kume and Okinawa¹⁾ in the Nansei-shotô. **New rec. from Amami-ôshima.**

Melothria liukiuensis Nakai "Kuromino-okinawa-suzume-uri"

Stem, "Kuki-fukurefushi". *Lasioptera* sp.

Wase, Sumiyô, 22. March 1987. The author collected one gall which contains several midge larvae. This gall is produced by the same species that attacks *Diplocyclos palmatus* and therefore the presence of this gall on the island has also been predicted. **New rec. from Amami-ôshima.**

Summary

Thirteen sorts of midge gall on 10 plant species belonging to six families were collected from Amami-ôshima in March 1987. Among them one sort was newly added to the midge gall fauna of Japan and six sorts were collected for the first time from the island. As a result, the total number of midge galls found on Amami-ôshima amounts to 23. Ecological information about gall-inhabitants was obtained by dissecting or rearing the midge galls. The shooting season of *Machilus thunbergii*, one of the host plants of *Daphnephila machilicola*, was surveyed in the field.

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