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Separation of the Aucuba Fruit Midge, *Asphondylia aucubae* sp. nov. from the Ampelopsis Fruit Midge, *Asphondylia baca* MONZEN (Diptera, Cecidomyiidae)

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Abstract The aucuba fruit midge is morphologically quite similar to the ampelopsis fruit midge, *Asphondylia baca*, but is biologically distinguished from it and is newly described as *Asphondylia aucubae*. Information is given for the two species on their host plant range, gall, life history, parasitoids and geographical distribution.

Introduction

Aucuba japonica THUNB. (Cornaceae), called "Aoki" in Japanese, is an evergreen tree which was originally distributed in Japan and southern islands of Korea and is now used as an ornamental plant throughout the temperate region. In Japan it grows in southwestern Honshu, Shikoku, Kyushu and the Ryukyus, and its variety *borealis*, called "Hime-aoki", grows in Hokkaido and northern and mountainous parts of Honshu. On both *A. japonica* and its variety there can be seen irregularly transformed fruit galls (Fig. 1) caused by a gall midge of the genus *Asphondylia*. The gall is so conspicuous by its shape and colour that the occurrence has been recorded many times from various localities in Japan (MONZEN, 1929, 1937; SHINJI, 1944; SUNOSE, 1982; USUBA, 1977; YUKAWA, 1967, 1971, 1976, 1982).

Ampelopsis brevipedunculata (MAXIM.) TRAUTV. (Vitaceae), called "Nobudo", is a vine, being distributed in Japan, Taiwan, Korea, China and Sakhalin. Fruit galls (Fig. 2) on *Ampelopsis* are also common in Japan (MONZEN, 1929, 1937; MUKAIGAWA, 1917; SHINJI, 1938, 1939, 1944; SUNOSE, 1982; USUBA, 1977; YUKAWA, 1971, 1976, 1982; YUKAWA & SUNOSE, 1976).

When MONZEN (1937) described the ampelopsis fruit midge as *Asphondylia baca*, he stated in the last line of the description that *A. baca* is responsible for the fruit galls not only on *Ampelopsis* but also on *Aucuba*. His brief statement did not seem to be backed by the precise comparison of morphology and biology between the aucuba and ampelopsis fruit midges, but it has restricted an attempt to separate the two species. Although a doubt was expressed as to their conspecificity (YUKAWA, 1971), the aucuba fruit midge has been left unnamed and tentatively referred to *A. baca* because life histories of both the fruit midges were not adequately known at that time.

Since *Asphondylia* species are very difficult to separate morphologically, species identifications have been based mainly on host data and partly on biological information, setal counts and measurements of specimens (HARRIS, 1975). In recent years the present authors had opportunities to compare the morphological and biological features between the two fruit midges, and reached the conclusion that they are not identical. Therefore in this paper, the aucuba fruit midge is newly described as *Asphondylia aucubae*, and information is given for the two species on the host plant range, gall, life history, parasitoids and geographical distribution.

Materials and Methods

Slide mounted specimens examined here are listed in Table 1. In preparing microscope slides, the xylene-balsam method was adopted. All the specimens were examined by high power microscopy and illustrations were based on camera lucida drawings. Wing length was measured from the basal end of costa to apex. Setal counts are of setal insertions rather than of actual setae, since many setae are lost during collection, preservation and preparation.

The holotype and most of the paratypes of the aucuba fruit midge and the neotype of the ampelopsis fruit midge are kept in the collection of the Entomological Laboratory of Kagoshima University, and some paratypes of the aucuba fruit midge are in the collection of the Osaka Museum of Natural History (4 ♂♂, 4 ♀♀ and 5 pupae, Cecid. Nos. A39124–127, A39142–144; B4203–06, B4214–15; see Table 1).

The fruit galls on *Aucuba* and *Ampelopsis* were collected mainly from Kagoshima Prefecture and partly from other localities in Japan through occasional field surveys from 1965 to 1978. Some of the collected galls were measured, and then dissected to obtain larval and pupal specimens. The number of larvae or pupae per gall was counted, and the developmental stages of the gall midges and parasitoids were also examined to know their life histories. To rear adult midges, the galls were retained in the laboratory of Kagoshima University, using a method similar to the one described in YUKAWA *et al.* (1976).

To obtain the growth curve of both the galled and normal fruits of *Aucuba*, their length and width were measured with slide calipers periodically from May 1972 to May 1973, based on samples collected from the census field on Shiroyama, which is situated in the centre of Kagoshima City and is covered by a natural forest consisting of broad-leaved evergreen trees.

Table 1. List of slide-mounted specimens examined.

♂	♀	L	P	Locality	Coll. date of galls	Leg.	Date of emergence	Host*	Cecid. No.
					Asphondylia aucubae sp. nov.				
—	2	—	—	Towada, Aomori Pref.	—. VI. 1928	K. MONZEN	20. VI. 1928	?Ajb	—
14	14	3	1	Hikosan, Fukuoka Pref.	26. VI. 1966	J. YUKAWA	2–11. VII. 1966	Aj	A3911–24, 39101–119
14	16	4	1	Ichifusayama, Kumamoto Pref.	2. VI. 1966	J. YUKAWA	16. VI.–5. VII. 1966	Aj	A3925–39, 3951–70
6	13	—	1	Hanandô Fukui City	15. V. 1968	J. YUKAWA	16–27. V. 1968	Aj	A3940–45, 3981–94
—	—	10	—	Shiroyama, Kagoshima City	16. IV. 1971	J. YUKAWA	—	Aj	A39175–184
12	12	—	4	Shiroyama, Kagoshima City	29. IV. 1977	J. YUKAWA	30. IV.–7. V. 1977	Aj	A39151–174, 39185–188
5	5	—	14	Tadasunomori, Kyoto City	—. V. 1976	M. HOTTA	3. VI. 1976	Aj	A39121–144
4	5	—	6	Ashiu, Kyoto Pref.	—. V. 1976	M. HOTTA	18. V. 1976	Ajb	B4201–15
					Asphondylia baca MONZEN				
8	8	6	—	Asamaonsen, Matsumoto City	29. VII. 1973	K. TAKAHASHI & T. SUNOSE	8–14. VIII. 1973	Abh	C1201–16, 1251–56
5	5	—	4	Arikawa, Gotô, Nagasaki Pref.	9. VIII. 1978	K. MIYAMOTO	9–16. VIII. 1978	Abh	C1221–34
—	—	—	2	Ono-Takeoka, Kagoshima City	26. X. 1977	H. IKENAGA	—	Abh	C1261–64

* Aj: *Aucuba japonica* THUNB., Ajb: *Aucuba japonica* var. *borealis* MIYABE et KUDO, Abh: *Ampelopsis brevipedunculata* var. *heterophylla* (THUNB.) HARA.

Asphondylia aucubae YUKAWA et OHSAKI, sp. nov.

[English name: The aucuba fruit midge. Japanese name: Aoki-mi-tamabae]

(Figs. 1–3)

Male. Eye bridge 8 to 11 facets long medially; fronto-clypeal setae 25 to 37 in number (Table 2); palpus consisting of 1+2 segments; first palpal segment (not basal tubercle) 2.4 to 3.0 times as long as wide; second palpal segment (terminal one) 1.2 to 2.4 times as long as first, with scattered setae. Antenna with 2+12 segments; scape distally a little broader, about 1.5 times as long as distal width, 2.1 to 2.3 times as long as pedicel, with dense dorsal and ventral setae; pedicel subcylindrical, 3/4 to 4/5 as long as wide, with dorsal setae relatively sparse and ventral setae dense; basal enlargement of third and fifth flagellomeres 3.25 to 4.50 (Table 3) and 3.33 to 5.44 times as long as wide, respectively. Claw simple on all legs, bent

Table 2. *Asphondylia baca* MONZEN on *Ampelopsis* and *Asphondylia aucubae* sp. nov. on *Aucuba*. Fronto-clypeal and thoracic setal counts.

	Host and locality*	♂			♀		
		n	mean±s.d.	(range)	n	mean±s.d.	(range)
Fronto-clypeal setae	Abh-N	4	21.8±3.7	(17–26)	4	39.0±2.3	(37–41)
	-M	6	31.8±2.5	(29–36)	8	39.1±11.7	(26–63)
	Aj -S	12	34.4±2.1	(30–37)	11	31.0±5.5	(23–38)
	-I	11	32.7±2.5	(28–36)	12	29.3±5.3	(19–35)
	-H	13	29.1±3.0	(25–34)	11	30.5±3.6	(26–36)
	-K	5	30.0±2.6	(27–33)	5	25.8±5.5	(21–35)
	-F	4	32.3±3.7	(28–37)	11	28.7±7.5	(21–37)
	Ajb -A	4	33.5±2.5	(31–37)	4	27.8±4.9	(23–34)
Mesopleural setae	Abh-N	5	33.8±7.7	(27–47)	5	43.6±3.5	(40–49)
	-M	7	36.0±4.7	(30–43)	8	43.1±5.5	(33–49)
	Aj -S	12	46.2±4.4	(39–54)	12	52.1±5.5	(43–59)
	-I	12	32.8±3.4	(29–39)	16	36.1±9.7	(17–50)
	-H	10	35.8±5.3	(29–46)	12	37.7±6.9	(27–52)
	-K	5	29.2±3.3	(26–34)	5	35.0±7.9	(25–45)
	-F	2	41.5±2.1	(40–43)	12	48.2±5.2	(41–55)
	Ajb -A	4	36.8±1.7	(35–39)	5	37.0±2.9	(35–42)
Mesepimeral setae	Abh-N	5	39.4±7.3	(37–47)	5	49.4±4.8	(43–55)
	-M	8	36.5±7.3	(28–48)	8	44.0±5.7	(37–56)
	Aj -S	12	36.6±5.3	(29–46)	12	37.8±4.7	(29–47)
	-I	13	25.2±4.2	(19–34)	16	29.6±6.6	(18–43)
	-H	12	29.6±4.6	(21–36)	14	33.2±3.7	(27–37)
	-K	5	22.8±1.3	(21–24)	5	24.6±7.4	(17–36)
	-F	2	26.0±1.4	(25–27)	12	33.1±3.6	(28–37)
	Ajb -A	4	27.0±2.0	(24–28)	5	28.2±1.5	(26–30)

* Abh: *Ampelopsis brevipedunculata* var. *heterophylla* (THUNB.) HARA, Aj: *Aucuba japonica* THUNB., Ajb: *Aucuba japonica* var. *borealis* MIYABE et KUDO, A: Ashiu, F: Fukui, H: Hikosan, I: Ichifusayama, K: Kyoto, M: Matsumoto, N: Nagasaki, S: Shiroyama.

nearly at right angle; empodium nearly as long as claw. Wing 2.43 to 3.23 times as long as wide (Table 4); R_5 reaching costa beyond wing apex. Genitalia showing a typical shape of *Asphondylia* (see YUKAWA, 1971, p. 119, for drawings); cerci divided into 2 lobes; tegmen relatively deeply emarginated dorsally, shallowly emarginated ventrally; gonostylus subglobular, apically with a sclerotized and bidentate claw; gonocoxite massive, ventrally extending beyond insertion of gonostylus; aedeagus laterally sclerotized, distally tapering, basally with a relatively weakly sclerotized plate-like structure, which is developed into a pair of small lobes caudo-laterally and connected laterally with inner portion of gonocoxite.

Female. Flagellomeres successively shortened distally; terminal segment subglobular; basal enlargement of third and fifth flagellomeres 3.23 to 4.78 (Table 3) and 3.24 to 4.71 times as long as wide, respectively. Wing length 2500 to 4000 μm, 2.43 to 3.00 times as long as wide (Table 4). Seventh abdominal segment with a chitinized ventral sclerite. Ovipositor protractile, slender, aciculate, basally with a bilobed pouch (see YUKAWA, 1971, p. 119, for drawings). Otherwise es-

Table 3. *Asphondylia baca* MONZEN on *Ampelopsis* and *Asphondylia aucubae* sp. nov. on *Aucuba*. Measurements (μm) of the third flagellar segment.

	Host and locality*	♂			♀		
		n	mean±s.d.	(range)	n	mean±s.d.	(range)
Distal stem	Abh-N	4	11.9±2.4	(10.0–15.0)	4	13.1±2.4	(10.0–15.0)
	-M	7	12.9±2.3	(10.0–15.0)	8	12.8±2.1	(10.0–15.0)
	Aj -S	12	10.2±1.3	(7.5–12.5)	12	10.0	—
	-I	13	11.9±1.8	(10.0–15.0)	15	12.2±1.6	(10.0–15.0)
	-H	13	11.2±1.7	(10.0–15.0)	14	12.7±2.1	(10.0–15.0)
	-K	5	10.0	—	4	10.0	—
	-F	4	12.5±2.0	(10.0–15.0)	13	12.3±1.6	(10.0–15.0)
	Ajb -A	4	11.3±1.4	(10.0–12.5)	4	10.6±1.3	(10.0–12.5)
Basal enlargement	Abh-N	5	222.0±9.8	(210.0–235.0)	4	211.3±6.0	(202.5–215.0)
	-M	7	248.2±21.8	(222.5–280.0)	8	210.0±15.4	(190.0–235.0)
	Aj -S	12	233.8±11.9	(200.0–245.0)	12	204.8±9.7	(190.0–225.0)
	-I	13	205.8±12.5	(187.5–227.5)	15	183.3±17.3	(152.5–207.5)
	-H	13	210.2±18.2	(185.0–245.0)	14	198.6±9.1	(190.0–215.0)
	-K	5	208.0±15.6	(195.0–235.0)	4	183.1±21.0	(165.0–202.5)
	-F	4	215.0±24.8	(190.0–245.0)	13	215.6±7.0	(200.0–230.0)
	Ajb -A	4	210.6±7.2	(200.0–215.0)	4	189.4±7.7	(182.5–200.0)
Maximum width of basal enlargement	Abh-N	5	55.5±2.1	(52.5–57.5)	4	51.3±2.5	(50.0–55.0)
	-M	7	57.9±2.3	(55.0–60.0)	8	51.3±2.7	(47.5–55.0)
	Aj -S	12	55.4±2.6	(52.5–60.0)	12	46.0±3.1	(40.0–50.0)
	-I	13	52.3±2.4	(50.0–55.0)	15	46.3±4.1	(40.0–55.0)
	-H	13	56.9±6.0	(47.5–67.5)	14	48.9±7.0	(42.5–65.0)
	-K	5	50.0±1.8	(47.5–52.5)	4	44.4±5.2	(40.0–50.0)
	-F	4	60.0±2.9	(57.5–62.5)	13	53.5±3.8	(50.0–60.0)
	Ajb -A	4	53.8±2.5	(50.0–55.0)	4	46.9±1.3	(45.0–47.5)

* See Table 2.

Table 4. *Asphondylia baca* MONZEN on *Ampelopsis* and *Asphondylia aucubae* sp. nov. on *Aucuba*. Measurements (μm) of wing length and width, and l/w ratio.

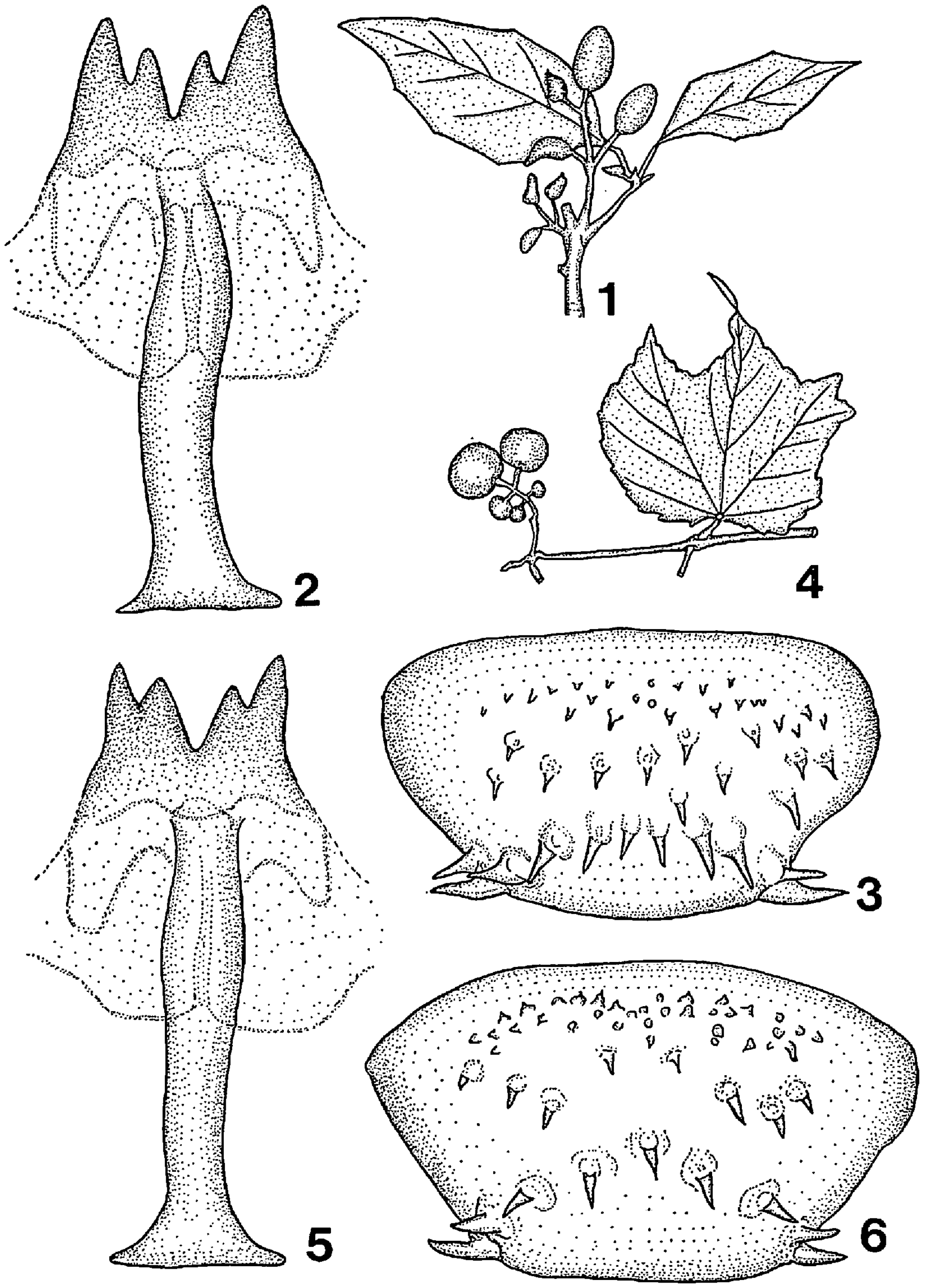
	Host and locality*	♂			♀		
		n	mean±s.d.	(range)	n	mean±s.d.	(range)
Wing length	Abh-N	5	2613±112	(2500–2750)	5	3263±81	(3188–3375)
	-M	8	2961±142	(2750–3188)	8	3453±228	(3125–3750)
	Aj -S	12	3151±101	(2938–3250)	12	3568±140	(3313–3688)
	-I	14	2701±161	(2500–3000)	15	3013±245	(2500–3250)
	-H	7	2831±203	(2625–3125)	14	3206±241	(2813–3500)
	-K	5	2638±103	(2500–2750)	5	2950±291	(2500–3188)
	-F	2	3344±221	(3188–3500)	11	3864±121	(3625–4000)
	Ajb -A	4	2813±51	(2750–2875)	5	3163±137	(3000–3375)
Wing width	Abh-N	4	914±30	(875–938)	5	1250±88	(1188–1375)
	-M	7	1103±90	(1000–1250)	8	1344±129	(1188–1563)
	Aj -S	12	1219±48	(1125–1250)	12	1355±81	(1188–1500)
	-I	13	959±56	(875–1031)	15	1119±112	(906–1250)
	-H	7	1018±129	(813–1188)	13	1189±86	(1000–1250)
	-K	2	875	—	5	1013±69	(938–1063)
	-F	2	1313	—	8	1422±93	(1313–1563)
	Ajb -A	4	1000±51	(938–1063)	5	1188±77	(1125–1313)
l/w ratio	Abh-N	4	2.89±0.03	(2.86–2.93)	5	2.62±0.15	(2.45–2.79)
	-M	7	2.72±0.13	(2.55–2.94)	8	2.58±0.16	(2.40–2.80)
	Aj -S	12	2.59±0.08	(2.45–2.78)	12	2.64±0.12	(2.43–2.81)
	-I	13	2.82±0.13	(2.55–3.04)	15	2.70±0.12	(2.50–2.94)
	-H	6	2.85±0.23	(2.63–3.23)	13	2.70±0.11	(2.45–2.87)
	-K	2	3.00±0.10	(2.93–3.07)	5	2.91±0.14	(2.67–3.00)
	-F	2	2.55±0.17	(2.43–2.67)	8	2.73±0.17	(2.52–2.95)
	Ajb -A	4	2.81±0.09	(2.70–2.93)	5	2.67±0.08	(2.57–2.78)

* See Table 2.

sentially as in male.

Mature larva. Second antennal segment relatively short, conical, about 10 μm in length, about 1.4 times as long as basal width; 2 ventral and lateral cervical papillae each with a seta, 2 dorsal and sometimes 1 of 2 lateral cervical papillae invisible. Number and position of stigmata normal; 4 of 6 dorsal papillae each with a seta; 3 pleural papillae present on each side, each with a seta; 2 dorsal papillae of eighth abdominal segment each with a seta; 2 of 6 terminal papillae somewhat cone-shaped, remaining 4 terminal papillae each with a short seta. Sternal spatula 290 to 360 μm, distally with 4 lobes (Fig. 3); 2 outer lobes a little longer than 2 inner lobes; 3 inner and 2 outer lateral papillae all with a seta; sternal and inner pleural papillae with a seta; 2 anterior ventral papillae and 2 posterior ventral papillae each with a seta; 2 ventral papillae of eighth abdominal segment each with a seta; anal papillae without seta.

Pupa. Apical spine of antennal horn long, 305 to 400 μm, acutely pointed, with finely denticulate inner margin (see Yukawa, 1971, p. 119, for drawings); apical papillae with 45 to 58 μm long setae; an anterior facial protuberance present, strongly sclerotized; 3 posterior facial protuberances present, strongly sclerotized;



Figs. 1–6. —— 1–3. *Asphondylia aucubae* sp. nov.; 1, normal (larger) and galled (smaller) fruits on *Aucuba japonica*; 2, sternal spatula of mature larva; 3, terminal abdominal segment of pupa (dorsal view). —— 4–6. *Asphondylia baca* Monzen; 4, normal (smaller) and galled (larger) fruits on *Ampelopsis brevipedunculata* var. *heterophylla*; 5, sternal spatula of mature larva; 6, terminal abdominal segment of pupa (dorsal view).

usually 1 of 2 posterior facial papillae and 1 of 3 lateral facial papillae each with a seta; prothoracic spiracle relatively short, 90 to 125 μm long; short stigmatal tubercles present on first to eighth abdominal segments; each abdominal segment, except first and terminal ones, dorsally with several transverse rows of spines which are successively longer and more regularly arranged posteriorly; normally 4 of 8 dorsal papillae each with a seta; terminal segment dorsally with strong spines relatively dense (Fig. 3).

Host plants. *Aucuba japonica* THUNB. "Aoki"; *Aucuba japonica* var. *borealis* MIYABE et KUDO "Hime-aoki" (Cornaceae).

Gall. The galled fruits of *A. japonica* (Fig. 1) are not distinguishable from normal ones in appearance until September. Thereafter, differences between them become clear because the normal fruits develop more rapidly than the galled fruits (Fig. 7), changing colour from green to red. In addition, the normal fruits on wild plants usually fall down to the ground during the winter. The galled fruits normally remain on the tree without changing colour, and develop gradually and somewhat irregularly through the winter and spring. Fully matured galls are seedless, mostly green tinged with red, and are distinctly smaller than normal fruits. Usually, each gall contains 1 to 7 larvae. In some cases for *A. japonica* and many cases for var. *borealis*, however, the galled fruits are somewhat larger than normal fruits, containing at least an entire seed together with 1 to 18 larvae. The difference in gall size may be due to the difference in developmental stages of the fruits attacked. Japanese name of the gall: "Aoki-mifushi" MONZEN, 1929; YUKAWA, 1976. "Aoki-okuremi" SHINJI, 1944; USUBA, 1977. "Aoki-mi-fukure-fushi" YUKAWA, 1981.

Type specimens. Holotype, ♂, galls collected from Mt. Shiroyama, Kagoshima City, 29. IV. 1977, J. YUKAWA leg., emerged on 30. IV. 1977, Cecid. No. A39151. Paratypes, 54 ♂♂, 17 larvae and 27 pupae, Cecid. Nos. A3911–45, A3951–70, A3981–94, A39101–119, A39121–144, A39152–188; B4201–15 (Table 1). Two

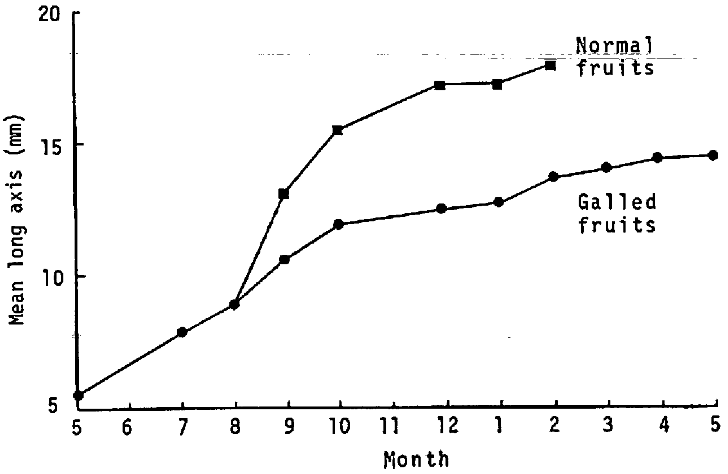


Fig. 7. *Asphondylia aucubae* sp. nov. Growth of normal and galled fruits of *Aucuba japonica* in Kagoshima City.

♀♀ in MONZEN's collection have been largely destroyed and are not useful for taxonomic study.

Life history. This species is univoltine. The emergence of adults in the field usually starts in late April and continues until the third week of May in southern Kyushu. The egg stage lasts for 7 to 10 days. The first instars pass through the summer, autumn and winter in the gall. Overwintered first instars moult to the second in March, and to the third in early to mid-April. A laboratory experiment indicated that the overwintered first instars started to develop into further stages at temperatures above 14°C (OHTANI *et al.*, 1983). Pupation takes place in the galls on the host plant in mid- to late April. The pupal stage lasts for about 2 weeks.

Parasitoids. One pteromalid, 1 eurytomid and 1 braconid have been reared from the galls. The pteromalid is identical with *Pseudocatlaccus sayatamabae* ISHII which has been known to attack the soybean pod gall midge, *Asphondylia* sp. (YUKAWA *et al.*, 1981). The eurytomid belongs to the genus *Eurytoma* and seems to be a univoltine endoparasitoid. The braconid, *Ipobracon scurra* FISCHER, is a multivoltine and polyphagous ectoparasitoid, attacking the third instars or pupae of the host midge (YUKAWA *et al.*, 1981).

Distribution. This gall midge is commonly distributed in Japan. During the course of this study the galls have been collected from the following prefectures and islands in Japan: Hokkaido; Honshu (Aomori, Akita, Yamagata, Fukushima, Niigata, Fukui, Chiba, Saitama, Tokyo, Kanagawa, Shizuoka, Shiga, Kyoto, Osaka, Hyôgo, Tottori, Shimane and Okayama); Shikoku (Kôchi); Kyushu (Fukuoka, Nagasaki, Kumamoto, Miyazaki and Kagoshima), Hachijô Is., and Izu Is.

Asphondylia baca MONZEN

[English name: The ampelopsis fruit midge. Japanese name: Nobudô-mi-tamabae]

(Figs. 4–6)

Asphondylia baca MONZEN, 1937.

Asphondylia baca MONZEN: SHINJI, 1944; MONZEN, 1955; YUKAWA, 1971; YUKAWA, 1976; USUBA, 1977; YUKAWA, 1984.

Contarinia ampelopsivora SHINJI, 1939.

Host plants. *Ampelopsis brevipeduculata* (MAXIM.) TRAUTV. var. *heterophylla* (THUNB.) HARA "Nobudô"; *Vitis labrusca* L. "Budô"; *Cayratia japonica* (THUNB.) GAGN. "Yabugarashi" (Vitaceae).

Another gall midge, *Cecidomyia* sp., has been noted to attack both *Ampelopsis* and the cultivated grape, *Vitis labrusca* L. in Japan. The description and illustrations of *Cecidomyia* sp. (TAKAHASHI, 1930) prove that this species belongs to the genus *Asphondylia.* In 1975, one of the present authors, YUKAWA, had an opportunity to examine an *Asphondylia* species which was reared from fruits of "Delaware" grape in Nagano Prefecture. This species could not be distinguished morphologically from the ampelopsis fruit midge. The specimens reared by USUBA (1977) from the fruit galls on *Cayratia japonica* was also quite similar to *A. baca*. These facts seem to indicate that *Asphondylia baca* has a host range over *Ampelopsis*, *Vitis* and *Cayratia* in the family Vitaceae.

Gall. Fruit swelling, 2 to 3 times as large as normal fruit, yellowish green tinged with purple; usually 1, sometimes 2 or more larvae inhabiting each gall (Fig. 4). This gall was first reported in MUKAIGAWA (1917). Japanese name of the gall: "Nobudô-mifushi" MONZEN, 1929, 1937, 1955; SHINJI, 1938, 1944; YUKAWA, 1971, 1976; YUKAWA & SUNOSE, 1979; "Nobudô-mi-fukure-fushi" YUKAWA, 1981.

Type specimens. Because types of *A. baca* reared from the fruit galls on *Ampelopsis* could not be found in MONZEN's collection, which is presently in the Entomological Laboratory of Kagoshima University, a neotype is designated in the present paper. Neotype, ♂, galls collected from Asama-onsen, Matsumoto City, 29. VII. 1973, K. TAKAHASHI & T. SUNOSE leg., emerged on 8. VIII. 1973, Cecid. No. C1201 (Table 1).

Life history. According to MUKAIGAWA (1917), the emergence of adults occurs in mid-September to early October and overwintered females lay their eggs into young fruits of *Ampelopsis*. However, it is difficult for gall midges to hibernate as adults. In Hokkaido, females lay their eggs in the flower buds or young fruits of *Ampelopsis* in July, adults emerge in September, and some of them occasionally produce adults of the next generation in October (SUNOSE, 1980, personal communication). USUBA (1977) also reared adults in October from the fruit galls on *Ampelopsis* and *Cayratia* which were collected from Chiba Prefecture, Honshu. The collecting data (Table 1) indicates that this species has at least 2 generations also in Honshu and Kyushu on *Ampelopsis* from July to October, and it is likely to hibernate as an immature stage on a host plant other than *Ampelopsis*, *Vitis* and *Cayratia* which wither in winter.

Parasitoids. An *Eurytoma* sp. (Eurytomidae) and *Ipobracon scurra* FISCHER (Braconidae) have been reared from the fruit galls on *Ampelopsis* (YUKAWA *et al*., 1981). The *Eurytoma* sp. is very similar in appearance to the species that attacks *A. aucubae*, but it may have a different pattern of life history because the host midge is not univoltine. As already mentioned, *I. scurra* is a multivoltine and polyphagous ectoparasitoid, attacking many gall midge species of the supertribe Asphodyliidi.

Distribution. The galls have been collected from the following prefectures in Japan: Hokkaido, Honshu (Aomori, Nagano, Ishikawa and Chiba), Kyushu (Fukuoka, Nagasaki including Gotô Is. and Meshima Is., Kumamoto and Kagoshima).

Discussion

Both the aucuba and ampelopsis fruit midges have typical characteristics of the genus *Asphondylia*. There are some differences between them in the mean values of measurements and setal counts, but they are not distinguishable in morphological features since the ranges overlap in most cases (Tables 2, 3 & 4). Therefore, as has been adopted for identifications of many *Asphondylia* species, biological information and host data have to be taken into consideration to separate the two species.

Asphondylia aucubae is apparently univoltine, its life history pattern being associated closely with *Aucuba* and not with *Ampelopsis* or *Vitis*. Therefore, the life history of *A. aucubae* can be completed on *Aucuba* alone. In contrast *A. baca* is multivoltine, and its life history is not synchronized with the flowering and fruiting season of *Aucuba*. In addition the plant family Cornaceae, which includes *Aucuba*, belongs to the order Umbelliflorae, and is quite distinct from the order Rhamnales in which the family Vitaceae is included. Although ORPHANIDES (1975) showed evidence that a multivoltine species, *Asphondylia gennadii* (MARCHAL), has a relatively wide host range over several plant families, there are few such examples of a univoltine gall midge being associated with host plants in two or more unrelated plant orders. Thus the aucuba fruit midge is distinguishable biologically from the ampelopsis fruit midge.

The ligustrum fruit midge, *Asphondylia sphaera* MONZEN (1937) is a univoltine and common species in Japan and is also very similar to *A. aucubae*. However, in addition to the host data, *A. aucubae* differs from *A. sphaera* in having flagellomeres with a slightly longer basal enlargement and a slightly shorter distal stem (see YUKAWA & MIYAMOTO, 1979, for measurements of *A. sphaera*).

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