Host Plant Ranges and Distribution Records of Identified and Unidentified Species of the Genus Lasioptera (Diptera : Cecidomyiidae) in Japan

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Host Plant Ranges and Distribution Records of Identified and Unidentified Species of the Genus *Lasioptera* (Diptera: Cecidomyiidae) in Japan

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Abstract. Thirteen identified and 12 unidentified gall-inducing species of *Lasioptera* are recognized to occur in Japan on 48 plant species/subspecies/varieties belonging to 25 genera of 15 families. Twenty of these 25 species induce galls on stems and the other galls develop on leaf veins or leaf blades. Two plant species and one subspecies were newly found to host Japanese *Lasioptera*. New Japanese names are given to some galls to distinguish host plants conveniently. Many prefectures and islands are newly added to known distribution ranges of respective species based on collecting data of galls. In order to identify *Lasioptera* species that infest tomato and cucumber in Greece and tomato in Japan, we emphasize the use of genetic data to determine host plant ranges of morphologically similar species.

Key words: Cecidomyiidae, distribution, gall, host plant, *Lasioptera*.

Introduction

The genus *Lasioptera* (Diptera: Cecidomyiidae: Lasiopterini) includes at least 130 species, mostly in the Old World (Europe, Japan, Russia and India), and some in North America and Australia (Gagné & Jaschhof, 2014). Most species induce stem galls on various plant taxa and some are responsible for galls on leaf veins, leaf blades, petioles and peduncles. *Lasioptera*, as well as other genera of Lasiopterini, Alycaulini and Asphondyliini, has been known as a genus of ambrosia gall midge, being associated with fungi (e.g., Yukawa & Rohfritsch, 2005). A few species of *Lasioptera* are successors living in galls vacated by the gall inducers (e.g., Yukawa & Haitsuka, 1994; Gagné & Jaschhof, 2014) and one species has been known as a facultative predator (Solinas, 1967).

In Japan, Shinji (1938a,d, 1939a,b,c,d,e, 1940, 1942, 1944) described 12 and Monzen (1955) described one new species of *Lasioptera*, of which two were synonymized with *Lasioptera rubi* (Schrank, 1803) and one with *Lasioptera achyranthii* Shinji, 1939 in Yukawa (1971). Shinji (1938b,c) identified a gall midge associated with *Impatiens noli-tangere* (Balsaminaceae) as a North American species, *Lasioptera impatientis* (Osten Sacken, 1862), which was later proved to be a misidentification for *Neolasioptera impatientifolia* (Felt, 1907) (Gagné & Jaschhof, 2014). Möhn (1968) redescribed *Lasioptera paederiae* Shinji, 1968 based on specimens forwarded from Japan. In 1971, Yukawa (1971) published a revision of the Japanese gall midges and referred to 12 identified and one unidentified species of *Lasioptera*. Thereafter, *Lasioptera camelliae* Ohno & Yukawa, 1984 and *Lasioptera yadokariae* Yukawa & Haitsuka, 1994 were newly described from Japan.

In addition to galls induced by the named species, those induced by unidentified species were found on various plant species (e.g., Monzen, 1929, 1930, 1932; Shinji, 1944; Usuba, 1977, 1979; Yamauchi *et al*., 1982; Yukawa, 1978, 1982, 1988a,b; Yukawa & Sunose, 1979). On the basis of these findings and the taxonomic studies, Yukawa & Masuda (1996) enumerated 13 identified and 11 unidentified species of *Lasioptera* in their book and provided color photographs of the gall, host ranges and distribution records for eight identified and seven unidentified species.

In recent years, a species of *Lasioptera* was newly

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found infesting stems of tomato, *Lycopersicon esculentum* (Solanaceae), and cucumber, *Cucumis sativus* (Cucurbitaceae), in Greece, and resulting necrosis induces wilting, stem breakages and reduction of fruit production (Perdikis *et al*., 2011). An infestation similar to that on tomato in Greece has been noted by tomato growers in Hokkaido, Japan (N. Hashimoto, 2012, personal com.). However, the species from Greece and Japan have been left unidentified owing to morphological similarities among congeners. Species identification of these gall midges by DNA analysis is now an urgent necessity to provide growers with appropriate control measures against the pest gall midges.

In this paper, we enumerate identified and unidentified species of Japanese *Lasioptera* and gather previous and current information on their host plant ranges and distribution records. This attempt is essential to collect specimens of *Lasioptera* from various wild plants in the Palaearctic Region for DNA analysis, by which we can determine if one or more Palaearctic congeners have been expanding their host range from wild plants to tomato that originated in the Neotropical Region. We also provide new host plant records, new distribution records, new gall names and some photographs of lasiopteran galls and larvae.

Materials and methods

We surveyed literature on galls and gall midges in order to find collecting records (host plants and localities) of galls induced by *Lasioptera*. We also checked our own field notes to find collecting records of *Lasioptera* galls that have not yet been reported previously in any journal. Most galls were collected ourselves from various wild plants in Japan during the period from 1965 to 2013 and some were collected by our colleagues listed in the Acknowledgements. Galls and gall-bearing plants collected were brought back to respective laboratories and some galls were dissected under a binocular microscope to identify the gall inducer and to obtain larval and pupal specimens. At the same time, the developmental stage of the gall midges was recorded. Some galls were kept in plastic bags to obtain adults and pupal exuviae. Gall midge specimens were preserved in 75% ethanol for morphological observation and in 99% ethanol or acetone for future DNA analysis. Galls and gall midge specimens collected are kept mainly in the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Japan and partly in the Laboratory of System Ecology, Faculty of Agriculture, Saga University, Japan.

In the present list (Table 1), each gall midge is indicated with gothic letters followed by the name of the host plant species and family. Unidentified gall midges are temporarily numbered from sp. 1 to sp. 12. All gall midges are arranged according to the order of galls in Yukawa & Masuda (1996). Names of plant families follow the Angiosperm Phylogeny Group (APG) system of plant classification (Stevens, 2008). Entries for each gall midge and its gall are arranged in the following order: (1) The name of synonym, if any, (2) Note, if any, (3) Galled organ, Japanese name of the gall and gall number in parenthesis, (4) Known distribution records expressed by the name of prefectures and islands, with literature citation, (5) Distribution outside Japan, if any and (6) Current collecting data including collecting sites, dates and collectors. New host plants, new Japanese names of gall and the name of prefectures or islands where the galls were newly found are indicated with gothic letters. Gall numbers consisting of an alphabet letter and three figures had been first designated by Yukawa & Masuda (1996) but Yukawa *et al*. (2013a) proposed to modify the gall numbers from three to four figures by adding one figure after the three figures to distinguish more abundant sorts of gall. If necessary, another alphabet letter is added to the bottom of the four figures to distinguish two or more species/subspecies/varieties of host plants used by a single oligophagous species of gall midge. Photographs of galls and larvae are provided for some species.

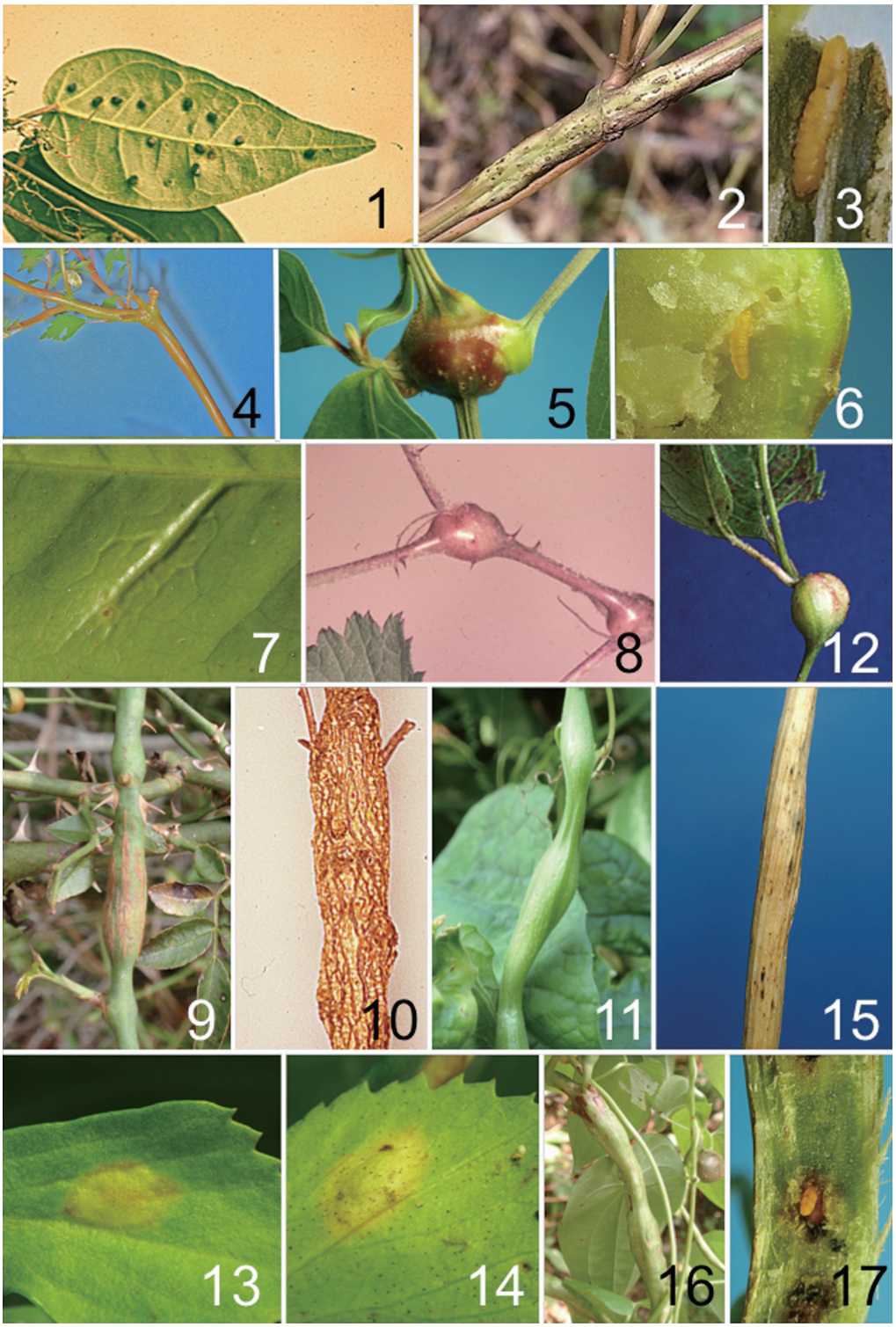
Results and discussion

Host range

Thirteen identified and 12 unidentified gall-inducing species of *Lasioptera* were recognized to occur in Japan on 48 plant species/subspecies/varieties belonging to 25 genera of 15 families (Table 1). Thus, gall-inducing *Lasioptera* has a wide host range across various plant families but no *Lasioptera* species have been found in Japan on tomato or any other species of Solanaceae. However, it should be remarked here that *Lasioptera* sp. 6 induces stem galls on *Trichosanthes* (Fig. 11)*, Melothria and Diplocyclos* of Cucurbitaceae, because cucumber of the same family is one of the host plants of the tomato-infesting species in Greece (Perdikis *et al*., 2011). Therefore, DNA sequencing data of *Lasioptera* sp. 6 is worth comparing with those of the species from Greece and Hokkaido.

Taxonomic treatment

Shinji (1938b,c) identified a gall midge that induces stem galls on *Impatiens noli-tangere* (Balsaminaceae) as a North American species, *Lasioptera impatientis* (Osten



Figs. 1-17. Galls and larvae of some Japanese *Lasioptera* species. **1.** Leaf galls of *Lasioptera* sp. 1 on *Ficus nipponica*, **2.** A stem gall of *Lasioptera* sp. 2 on *Boehmeria silvestrii*, **3.** A larva of *Lasioptera* sp. 2 in a stem gall on *B. silvestrii*, **4.** A stem gall of *Lasioptera* sp. 2 on *Boehmeria apicata*, **5.** A stem gall of *Lasioptera achyranthii* on *Achyranthes bidentata*, **6.** A larva of *L. achyranthii* in a stem gall on *A. bidentata*, **7.** A leaf vein gall of *Lasioptera camelliae* on *Camellia japonica*, **8.** Stem galls of *Lasioptera rubi* on *Rubus parvifolius*, **9.** A stem gall of *Lasioptera* sp. 4 on *Rosa multiflora*, **10.** A stem gall of *Lasioptera lespedezae* on *Lespedeza bicolor*, **11.** Stem galls of *Lasioptera* sp. 6 on *Trichosanthes cucumeroides*, **12.** A stem gall of *Lasioptera* sp. 9 on *Clinopodium macranthum*, **13.** A leaf gall of *Lasioptera artemisifoliae* on *Artemisia japonica* subsp. *littoricola* (upper surface), **14.** The same (under surface), **15.** A stem gall of *Lasioptera euphobiae* on *Eupatorium makinoi*, **16.** Stem galls of *Lasioptera* sp. 12 on *Dioscorea japonica*, **17.** A larva of *Lasioptera* sp. 12 in a gall on *D. japonica*.

Table 1. A list of identified and unidentified species of *Lasioptera* in Japan together with information on their host plants, galled organs, gall names in Japanese, known distribution records and current collecting data.

***Lasioptera* sp. 1 on *Ficus nipponica* (Moraceae) (Fig. 1)**

Galled organ & Japanese gall name (gall no.): Leaf, Itabikazura-haura-goma-fushi (C-2210a)

Known distribution record:

Chiba (Usuba, 1977, 1981a; Yukawa, 1978), Kanagawa (Usuba, 1977, 1981a), Yamaguchi (Usuba, 1981a), Oita (Usuba, 1977, 1981a), Kagoshima (Yukawa, 1978, 1979, 1988b), Tanegashima Is. (Yukawa *et al*., 2013a)

Current collecting data: **New rec. from Fukuoka Pref.**

Collecting site	Collecting date	Collector*
Mt. Tachibana, Fukuoka C., Fukuoka Pref.	28 Oct. 1978	KY
Terayama, Kagoshima C., Kagoshima Pref.	29 Apr. 2010	JY, MT, KM, TF
Ishiki, Kagoshima C., Kagoshima Pref.	7 Mar. 1999	JY, HH, MT, SM

***Lasioptera* sp. 1 on *Ficus thunbergii* (Moraceae)**

Galled organ & Japanese gall name (gall no.): Leaf, Himeitabi-haura-goma-fushi (C-2210c)

Known distribution record: Chiba (Usuba, 1977), Oita (Yukawa, 1978), Kagoshima (Yukawa, 1988b)

Current collecting data: **New rec. from Fukuoka Pref.**

Mt. Tachibana, Fukuoka C., Fukuoka Pref.	28 Oct. 1978	KY

***Lasioptera* sp. 2 on *Boehmeria silvestrii* (Urticaceae) (Figs 2 & 3)**

Galled organ & Japanese gall name (gall no.): Stem, Akaso-kuki-kobu-fushi (C-2353a)

Known distribution record: Chiba (Usuba, 1982)

Current collecting data: **New rec. from Aomori Pref.**

Okiura, Kuroishi C., Aomori Pref.	4 Nov. 2013	TI

***Lasioptera* sp. 2 on *Boehmeria apicata* (Urticaceae) (Fig. 4) New host rec.**

Galled organ & Japanese gall name (gall no.): Stem, Ko-akaso-kuki-kobu-fushi (C-2353b) **New name**

Known distribution record: None

Current collecting data: **New rec. from Fukuoka Pref.**

Ino, Hisayama T., Fukuoka C., Fukuoka Pref.	23 Sep. 2001	KM

***Lasioptera* sp. 3 on *Persicaria filiformis* (Polygonaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Mizuhiki-kuki-kobu-fushi (C-2397)

Known distribution record:

Hokkaido (Yukawa & Sunose, 1979), Iwate (Shinji, 1944), Tokyo (Usuba, 1979)

Current collecting data:

Honmachi, Assabu T., Hiyama Co., Hokkaido	9 Nov. 2013	AN

***L. achyranthii* Shinji, 1939 on *Achyranthes bidentata* (Amaranthaceae) (Figs. 5 & 6)**

Synonym: *L. inokozuchi* Shinji, 1944

Note: Two varieties of the host plant, *A. bidentata* var. *tomentosa* and *A. b.* var *japonica* are not distinguished.

Galled organ & Japanese gall name (gall no.): Stem, Inokozuchi-kuki-maru-zui-fushi (C-2450a)

Known distribution record:

Niigata (Yukawa & Sunose, 1988; Yukawa, 1994), Tochigi (Sonoda, 2013), Chiba (Usuba, 1977), Saitama (Sunose, 1986), Tokyo (Shinji, 1944; Yukawa *et al*., 2000), Shizuoka (Yukawa *et al*., 2013b), Aichi (Monzen, 1932; Suzuki, 1980), Shiga (Monzen, 1932), Hyogo (Ide, 1928), Wakayama (Yukawa, 1971), Fukuoka (Monzen, 1932; Yukawa, 1971), Oita (Monzen, 1932), Kumamoto (Monzen, 1932), Miyazaki (Yukawa *et al*., 2012b), Kagoshima (Ide, 1928; Yukawa, 1979, 1988b), Sadogashima Is. (Sunose, 1982), Hachijoujima Is. (Tokuda *et al*., 2012b), Tanegashima Is. (Yukawa *et al*., 2013a)

Distribution outside Japan: Korean Peninsula & Jeju Is. (on *Achyranthes bidentata*) (Yukawa *et al*., 2012)

Current collecting data: **New rec. from Ibaraki, Nagano, Kyoto, Osaka, Okayama, Shimane, Yamaguchi, Tokushima, Kagawa, Ehime, Kochi, Saga, Nagasaki Prefs., Miyakejima Is., Iki Is. & Himejima Is.**

Kamitakatsu, Tsuchiura C., Ibaraki Pref.	7 Oct. 2004	MT
Tairo-ike, Miyake Is., Tokyo	8 Dec. 2013	MT
Sashikirikyo − Omachi C., Nagano Pref.	20 Sep. 2011	JY, WK, TF, SK
Mt. Ibuki, Maibara C., Shiga Pref.	2 Oct. 1998	JY, MT, JA
Maibara C., Shiga Pref.	6 Nov. 1974	TS
Ichihara-inuyama, Kyoto C., Kyoto Pref.	18 Oct. 1978	HI
Yamanaka, Higashi-tottori, Osaka Pref.	11 Jun. 1975	KY
Kimiidera, Wakayama C., Wakayama Pref.	9 Aug. 1975	KY
Mikawa, Ohtou, Tanabe C., Wakayama Pref.	4 Aug. 1965	JY

Uetsuki-naka, Shouou T., Okayama Pref.	14 Oct. 1978	JY, HI
Tanokuma, Tsuyama C., Okayama Pref.	14 Oct. 1978	JY, HI
Mt. Tsurugata, Kurashiki C., Okayama Pref.	11 Oct. 1978	JY
Kubota, Taki, Izumo C., Shimane Pref.	2 Apr. 2001	MT
Akiyoshidai, Miya C., Yamaguchi Pref.	26 Sep. 2012	Observed by JY
Iyadani, Miyoshi C., Tokushima Pref.	30 Oct. 1972	MYF
Orono, Kamiyama T., Tokushima Pref.	29 Sep. 2013	KM
Saihou, Takamatsu C., Kagawa Pref.	2 Oct. 1990	JY
Higashibun, Ayagawa T., Kagawa Pref.	16 Sep. 2008	JY, MT, SS, NU, KM
Kanno, Mannou T., Kagawa Pref.	16 Sep. 2008	JY, MT, SS, NU, KM
Nahari T., Kochi Pref.	27 Sep. 2005	JY, TG, THC
Sugi, Ohtoyo T., Kochi Pref.	5 Dec. 2001	MT
Hiraishi, Tosa T., Kochi Pref.	5 Dec. 2001	MT
Hakawa, Ino T., Kochi Pref.	15 Oct. 1980	JY
Mt. Fukuchiyama, Kitakyushu C., Fukuoka Pref.	30 Jul. 1997	JY
Shounji, Fukutsu C., Fukuoka Pref.	21 Aug. 1999	JY, MT, HH, JA, TK
Yakuouji, Koga C., Fukuoka Pref.	18 Nov. 1998	MTK, MTD, TN
Oronoshima Is., Fukuoka C., Fukuoka Pref.	26 May 2001	MT
Mt. Tachibana, Fukuoka C., Fukuoka Pref.	26 Oct. 1974	KY
Mt. Wakasugi, Sasaguri T., Fukuoka Pref.	20 Jun. 2004	TG
Motooka, Fukuoka C., Fukuoka Pref.	15 Jun. 2000	JY
Magaribuchi, Sawara, Fukuoka C., Fukuoka Pref.	30 Oct. 2013	MT
Usa-hachimangu, Usa C., Oita Pref.	19 Sep. 1978	JY, MNK
Haramaki, Sefurimachi, Kanzaki C., Saga Pref.	13 Aug. 2013	MT, SA
Taniguchi, Minamihata, Imari C., Saga Pref.	24 Sep. 2012	MT
Kushiyama, Unzen C., Nagasaki Pref.	27 May 2004	JY, TG
Iki Is., Nagasaki Pref.	8 Mar. 1977	TS
Himejima Is., Nagasaki Pref.	16 Jun. 1978	AM
Otohime, Aso C., Kumamoto Pref.	19 Jul. 2002	MT, MM
Nagakusa, Aso C., Kumamoto Pref.	3 Oct. 2013	MT, MM
Kousa T., Kumamoto Pref.	30 Jul. 1975	ET
Kuzuha, Kitagawa, Nobeoka C., Miyazaki Pref.	15 Nov. 2001	JY, MT
Irino-obaru, Aya T., Miyazaki Pref.	1 Dec. 2001	JY, MT, NU, FK, HK
Kohrimoto, Kagoshima C., Kagoshima Pref.	20 Jul. 2001	JY, MT, NU, FK
Ohkubo, Shimo-fukumoto, Kagoshima C., Kagoshima Pref.	21 Jul. 2001	JY, MT, NU, FK

***L. achyranthii* Shinji, 1939 on *Achyranthes longifolia* (Amaranthaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Yanagi-inokozuchi-kuki-maru-zui-fushi (C-2450c)

Known distribution record: Iwate (Shinji, 1939e, 1944), Tokyo (Shinji, 1944)

Current collecting data: **New rec. from Ishikawa Pref.**

Mt. Funaoka, Hakusan C., Ishikawa Pref.	15 Sep. 2004	IT

***L. camelliae* Ohno & Yukawa, 1984 on *Camellia japonica* (Theaceae) (Fig. 7)**

Galled organ & Japanese gall name (gall no.): Leaf vein, Yabu-tsubaki-hamyaku-fukure-fushi (C-2800a)

Known distribution record:

Ehime (Ohno & Yukawa, 1984), Kochi (Ohno & Yukawa, 1984), Fukuoka (Ohno & Yukawa, 1984), Oita (Ohno & Yukawa, 1984), Saga (Ohno & Yukawa, 1984), Miyazaki (Ohno & Yukawa, 1984; Yukawa *et al*., 2012b), Kagoshima (Yukawa, 1979, 1988b; Ohno & Yukawa, 1984), The Izu Islands (Sunose, 1981; Ohno & Yukawa, 1984; Tokuda et al., 2012a, b, 2013; Tokuda & Kawauchi, 2013), Iki (Ohno & Yukawa, 1984), Tsushima Is. (Ohno & Yukawa, 1984), The Goto Is. (Ohno & Yukawa, 1984), Kami-koshikijima Is. (Ohno & Yukawa, 1984), Shimo-koshikijima Is (Ohno & Yukawa, 1984), Tanegashima Is. (Yukawa, 1988b, Yukawa *et al*., 2013a), Yakushima Is. (Ohno & Yukawa, 1984; Yukawa, 1984, 1988b), Okinawajima Is. (Ohno & Yukawa, 1984; Yamauchi *et al*., 1982)

Current collecting data: **New rec. from Yamaguchi Pref.**

Toragasaki, Kosigahama, Hagi C., Yamaguchi Pref.	3 Apr. 2001	MT
Minamimata, Aya T., Miyazaki Pref.	1 Dec. 2001	JY, MT, NU, FK, HK
Sarugajou, Tarumizu C., Kagoshima Pref.	11 Nov. 2010	MT, KM, TF

***L. camelliae* Ohno & Yukawa, 1984 on *Camellia japonica* var. *rusticana* (Theaceae)**

Galled organ & Japanese gall name (gall no): Leaf vein, Yuki-tsubaki-hamyaku-fukure-fushi (C-2800b)

Known distribution record: Niigata (Yukawa & Sunose, 1988)

Current collecting data: None

***L. rubi* (Schrank, 1803) on *Rubus parvifolius* (Rosaceae) (Fig. 8)**

Synonym: *L. ichigo* Shinji, 1939, *L. rubicola* Monzen, 1955

Galled organ & Japanese gall name (gall no.): Stem, Nawashiro-ichigo-kuki-kobu-fushi (C-3200a) **New name**

Known distribution record:

Iwate (Shinji, 1944; Monzen, 1955), Niigata (Yukawa & Sunose, 1988), Tokyo (Shinji, 1944; Yukawa, 1971), Kyoto (Miyazaki, 1934), Hyogo (Ide, 1928), Ehime (Yano, 1964), Fukuoka (Yukawa, 1971), Kagoshima (Yukawa, 1988b)

Distribution outside Japan: Korean Peninsula (on *Rubus* spp.) (Paik *et al*., 2004), China & Palaearctic Region (on *Rubus* spp.) (Gagné & Jaschhof, 2014)

Current collecting data: **New rec. from Aomori, Osaka & Kumamoto Prefs.**

Okonogi, Kuroishi C., Aomori Pref.	17 Nov. 2013	TI
Yamanaka, Higashi-tottori, Osaka Pref.	11 Jun. 1975	KY
Tateno, Minami-aso V., Kumamoto Pref.	31 May 1975	KY

***L. rubi* (Schrank, 1803) on *Rubus idaeus f. concolor* (Rosaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Ezo-ichigo-kuki-kobu-fushi (C-3200b) **New name**

Known distribution record: Hokkaido (Yukawa & Sunose, 1979)

Current collecting data:

Takadomari, Fukagawa C., Hokkaido	18 Sep. 2013	JY, TM, WK

***L. rubi* (Schrank, 1803) on *Rubus phoenicolasius* (Rosaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Ebigara-ichigo-kuki-kobu-fushi (C-3200c) (=Urajiro-ichigo-kuki-kobu-fushi) **New name**

Known distribution record: Iwate (Yukawa, 1971)

Current collecting data: **New rec. from Aomori Pref.**

Goushizawa, Aomori C., Aomori Pref.	17 Nov. 2013	TI

***L. rubi* (Schrank, 1803) on *Rubus trifidus* (Rosaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Kaji-ichigo-kuki-kobu-fushi (C-3200d) **New name**

Known distribution record: Iwate ? (Shinji, 1939e)

Current collecting data: None

***L. rubi* (Schrank, 1803) on *Rubus crataegifolius* (Rosaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Kuma-ichigo-kuki-kobu-fushi (C-3200e) **New name**

Known distribution record: Iwate (Monzen, 1930)

Current collecting data: None

***Lasioptera* sp. 4 on *Rosa multiflora* (Rosaceae) (Fig. 9)**

Galled organ & Japanese gall name (gall no.): Stem, Noibara-kuki-kobu-fushi (C-3210)

Known distribution record:

Iwate (Monzen, 1930), Niigata (Yukawa & Sunose, 1988), Tokyo (Yukawa *et al*., 2000), Kyoto (Miyazaki, 1934)

Current collecting data: **New rec. from Ishikawa, Mie, Wakayama & Fukuoka Prefs.**

Mt. Shiritaka, Hakusan C., Ishikawa Pref.	7 Oct. 1975	IT
Mt. Asakuma, Toba C., Mie Pref.	14 Oct. 2009	JY, TK, TGK, KM
Sandou, Wakayama C., Wakayama Pref.	15 Apr. 1975	KY
Motooka, Fukuoka C., Fukuoka Pref.	27 Dec. 2000	JY

***L. puerariae* (Shinji, 1938) on *Pueraria lobata* (Fabaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Kuzu-kuki-nagatsuto-fushi (C-3385)

Known distribution record: Iwate (Shinji, 1938a, 1944)

Distribution outside Japan: Korean Peninsula (on *Pueraria lobata*) (Paik *et al*., 2004)

Current collecting data: None

***L. lespedezae* Shinji, 1939 on *Lespedeza bicolor* (Fabaceae) (Fig. 10)**

Galled organ & Japanese gall name (gall no.): Stem, Yama-hagi-kuki-tsuto-fushi (C-3480a)

Known distribution record:

Aomori (Ishimura & Sato, 1941), Iwate (Shinji, 1939b), Niigata (Yukawa & Sunose, 1988), Shikoku & Kyushu (Shinji, 1944)

Distribution outside Japan: Korean Peninsula (on *Lespedeza* spp.) (Paik *et al*., 2004), Russian Far East (Gagné & Jaschhof, 2014)

Current collecting data: **New rec. from Fukuoka & Oita Prefs.**

Mt. Wakasugi, Sasaguri T., Fukuoka Pref.	6 Mar. 1978	ET
Inoseto, Beppu C., Oita Pref.	31 Aug. 2001	JY, MNH, HK

***L. lespedezae* Shinji, 1939 on *Lespedeza cyrtobotrya* (Fabaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Maruba-hagi-kuki-tsuto-fushi (C-3480b)

Known distribution record: Kagoshima (Yukawa, 1971, 1988b)

Current collecting data: **New rec. from Okayama Pref.**

Tanokuma, Tsuyama C., Okayama Pref.	14 Oct. 1978	JY, HI

***L. lespedezae* Shinji, 1939 on *Lespedeza thunbergii* var. *patens* (Fabaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Ke-hagi-kuki-tsuto-fushi (C-3480c)

Known distribution record: Tanegashima Is. (Yukawa *et al*., 2013a)

Current collecting data: None

***Lasioptera* sp. 5 on *Impatiens noli-tangere* (Balsaminaceae)**

Note: *Lasioptera impatientis* was proved to be a misidentification for *Neolasioptera impatientifolia* (see text).

Galled organ & Japanese gall name (gall no.): Stem, Ki-tsurifune-kuki-tama-fushi (C-3710)

Known distribution record:

Hokkaido (Yukawa & Sunose, 1979), Aomori (Ishimura & Sato, 1941), Iwate (Shinji, 1938b, c), Niigata (Yukawa & Sunose, 1988), Tochigi (Usuba, 1979), Nagano (Usuba1979), Okushirito Is. (Sunose, 1982)

Current collecting data: **New rec. from Miyagi Pref.**

Sanyoushigawa, Sotogahama T., Aomori Pref.	29. Sep. 2004	JY, SY, TG
Akiu-ohtaki, Sendai C., Miyagi Pref.	18 Sep. 2001	JY, MT, NU, MNH
Nuruyu, Kurihara C., Miyagi Pref.	17 Sep. 2001	JY, MT, NU, MNH

***Lasioptera* sp. 6 on *Trichosanthes cucumeroides* (Cucurbitaceae) (Fig. 11)**

Galled organ & Japanese gall name (gall no.): Stem, Karasu-uri-kuki-fukure-fushi (C-4100a)

Known distribution record:

Kanagawa (Usuba 2005), Shizuoka (Yukawa *et al*., 2013b), Miyazaki (Yukawa *et al*., 2012b; Nagai, 2012), Kagoshima (Ide, 1928; Yukawa, 1979, 1988b), Tanegashima Is. (Yukawa *et al*., 2013a)

Current collecting data: **New rec. from Ibaraki, Tokushima, Kochi, Fukuoka, Oita, Saga, Nagasaki, Kumamoto Prefs., Iki Is. & Iriomotejima Is.**

Nagaoka, Makabe, Sakuragawa C., Ibaraki Pref.	19 Feb. 2006	MT
Kamiyama Forest Park, Kamiyama T., Tokushima Pref.	not recorded	MYK
Makino Botanical Garden, Kochi C., Kochi Pref.	27 Sep. 2005	JY, TG, THC
Konomiyama, Fukutsu C., Fukuoka Pref.	21 Aug. 1999	JY, MT, HH, JA, TK
Mt. Tachibana, Fukuoka C., Fukuoka Pref.	20 Jul. 1973	KY
Shiomi Park, Shikanoshima Is., Fukuoka C., Fukuoka Pref.	14 Aug. 2001	MT, NU, FK, HK
Inunaki Pass, Hisayama T., Fukuoka Pref.	14 Oct. 1998	JY, MT, JA, NU
Motooka, Fukuoka C., Fukuoka Pref.	27 Dec. 2000	JY
Usa-hachimangu, Usa C., Oita Pref.	19 Sep. 1997	JY, MNK
Gokoku Shrine, Maki, Oita C., Oita Pref.	8 Nov. 2011	JY, DY, KM, THR
Haramaki, Sefurimachi, Kanzaki C., Saga Pref.	13 Aug. 2013	MT, SA
Taniguchi, Minamihata, Imari C., Saga Pref.	24 Sep. 2012	MT
Sakamoto, Nagasaki C., Nagasaki Pref.	17 Sep. 1972	AM
Intsuji, Ishida T., Iki Is., Nagasaki Pref.	6 Aug. 1979	KMY
Kousa T., Kumamoto Pref.	30 Jul. 1975	ET
Kuzuha, Kitagawa, Nobeoka C., Miyazaki Pref.	15 Nov. 2001	JY, MT
Irino-obaru, Aya T., Miyazaki Pref.	1 Dec. 2001	JY, MT, NU, FK, HK
Miyazaki Univ. Campus, Miyazaki C., Miyazaki Pref.	2 Dec. 2001	MT, NU, HK
Ibusuki C., Kagoshima Pref.	13 Oct. 2001	JY, MS, MNH, HK
Hirakiki Shrine, Ibusuki C., Kagoshima Pref.	13 Oct. 2001	JY, MS, MNH, HK
Nakama River, Iriomotejima Is., Taketomi T., Okinawa Pref.	23 Nov. 1994	JY, TMR

***Lasioptera* sp. 6 on *Trichosanthes bracteata* (Cucurbitaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Oh-karasu-uri-kuki-fukure-fushi (C-4100b)

Known distribution record: Tanegashima Is. (Yukawa *et al*., 2013a), Okinawajima Is. (Yamauchi *et al*., 1982)

Current collecting data: None

***Lasioptera* sp. 6 on *Trichosanthes kirilowii* var. *japonica* (Cucurbitaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Ki-karasu-uri-kuki-fukure-fushi (C-4100c) **New name**

Known distribution record: Miyazaki (Nagai, 2012)

Current collecting data: None

***Lasioptera* sp. 6 on *Trichosanthes rostrata* (Cucurbitaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Ke-karasu-uri-kuki-fukure-fushi (C-4100d)

Known distribution record: Tanegashima Is. (Yukawa *et al*., 2013a)

Current collecting data: **New rec. from Takarajima, Kikaijima, Amamioshima, Okinawajima & Iriomotejima Islands**

Takarajima Is., Kagoshima Pref.	9 Nov. 1977	HI
Kikaijima Is., Kagoshima Pref.	9 Nov. 1977	ATN
Keten, Amamioshima Is., Kagoshima Pref.	13 Jul. 1978	HI
Hijigawa, Kunigami V., Okinawajima Is., Okinawa Pref.	31 Jul. 2008	JY, TGK, SY, SO
Ginoza V., Okinawajima Is., Okinawa Pref.	24 Jul. 2010	JY, TGK, SY
Uehara, Iriomotejima Is., Taketomi T., Okinawa Pref.	9 Jul. 2009	JY, TGK

***Lasioptera* sp. 6 on *Trichosanthes boninensis* (Cucurbitaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Munin-karasu-uri-kuki-fukure-fushi (C-4100e)

Known distribution record:

Takarajima Is. (Yamauchi *et al*., 1982; Yukawa, 1988b), Amamioshima Is. (Yamauchi *et al*., 1982; Yukawa, 1988b), Kikaijima Is. (Yamauchi *et al*., 1982; Yukawa, 1988b), Okinawajima Is. (Yamauchi *et al*., 1982)

Current collecting data: None

***Lasioptera* sp. 6 on *Melothria liukiuensis* (Cucurbitaceae)**

Galled organ & Japanese gall name (gall no.): Stem Kuromino-okinawa-suzume-uri-kuki-fukure-fushi (C-4100f)

Known distribution record:

Amamioshima Is. (Yukawa, 1988a, b), Okinawajima Is. (Yamauchi *et al*., 1982), Kumejima Is. (Yamauchi *et al*., 1982)

Current collecting data: None

***Lasioptera* sp. 6 on *Melothria japonica* (Cucurbitaceae) New host rec.**

Galled organ & Japanese gall name (gall no.): Stem, Suzume-uri-kuki-fukure-fushi (C-4100g) **New name**

Known distribution record: None

Current collecting data: **New rec. from Mie Pref.**

Mt. Asakuma, Toba C., Mie Pref.	14 Oct. 2009	JY, TK, TGK, KM

***Lasioptera* sp. 6 on *Diplocyclos palmatus* (Cucurbitaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Okinawa-suzume-uri-kuki-fukure-fushi (C-4100h)

Known distribution record:

Amamioshima Is. (Yukawa, 1988a, b), Kikaijima Is. (Yukawa, 1988b; Yamauchi *et al*., 1982), Okinawajima Is. (Yamauchi *et al*., 1982), Kumejima Is. (Yamauchi *et al*., 1982)

Current collecting data: **New rec. from Yonagunijima Is.**

Hedo, Kunigami V., Okinawa Is., Okinawa Pref.	3 Jun. 1999	TMY
Kubura, Yonagunijima Is., Okinawa Pref.	26 May 1999	MTN

***L. ukogi* Shinji, 1940 on *Eleutherococcus sieboldianus* (Araliaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Ukogi-eda-tsuto-fushi (C-4164)

Known distribution record: Iwate (Shinji, 1940, 1944)

Current collecting data: None

***Lasioptera* sp. 7 on *Styrax japonica* (Styracaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Egonoki-eda-fukure-fushi (D-0100)

Known distribution record:

Kanagawa (Usuba, 1989a), Tanegashima Is. (Yukawa *et al*., 2013a), Okinawajima Is. (Yamauchi *et al*., 1982)

Distribution outside Japan: Korean Peninsula (on *Styrax japonica*) (Paik *et al*., 2004)

Current collecting data: **New rec. from Fukuoka Pref.**

Ino, Hisayama T., Fukuoka Pref.	23 Apr. 2000	MT, MNH

***L. paederiae* Shinji, 1968 on *Paederia foetida* (Rubiaceae)**

Note: See text.

Galled organ & Japanese gall name (gall no.): Stem, Hekuso-kadsura-kuki-fukure-fushi (D-0378)

Known distribution record:

Fukuoka (Yukawa, 1971), Miyazaki (Yukawa *et al*., 2012b), Kagoshima (Yukawa, 1988b), Okinawajima Is. (Yamauchi *et al*., 1982)

Distribution outside Japan: Korean Peninsula (on *Paederia foetida*) (Yukawa *et al*., 2012)

Current collecting data: **New rec. from Oita & Nagasaki Prefs.**

Motooka, Fukuoka C., Fukuoka Pref.	27 Dec. 2000	JY
Usa-hachimangu, Usa C., Oita Pref.	19 Sep. 1997	JY, MNK
Kushiyama, Unzen C., Nagasaki Pref.	27 May 2004	JY, TG
Hinokami Park, Makurazaki C., Kagoshima Pref.		JY, MS, MNH, HK

***L. callicarpae* (Shinji, 1938) on *Callicarpa japonica* (Lamiaceae)**

Galled organ & Japanese gall name (gall no.): Murasaki-shikibu-eda-tsuto-fushi (D-0420)

Known distribution record:

Iwate (Shinji, 1938d, 1939e), Niigata (Yukawa & Sunose, 1988), Miyazaki (Yukawa *et al*., 2012b), Kagoshima (Yukawa, 1988b), Yakushima Is. (Yukawa, 1984, 1988b)

Current collecting data: **New rec. from Fukuoka Pref.**

Sharikura, Fukutsu C., Fukuoka Pref.	19 Sep. 1999	JY

***Lasioptera* sp. 8 on *Leucosceptrum japonicum* (Lamiaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Tenninsou-kuki-kobu-fushi (D-0470a)

Known distribution record: Tochigi (Usuba, 1980)

Current collecting data: **New rec. from Shizuoka, Shiga & Kochi Prefs.**

Igawa-pass 1100m, Umegashima, Shizuoka C., Shizuoka Pref.	26 Aug. 1979	MK
Mt. Senmaidake 2000m, Shizuoka C., Shizuoka Pref.	27 Jul. 1980	MK
Mt. Ibuki, Maibara C., Shiga Pref.	2 Oct. 1998	JY, MT, JA, SS
Mt. Tsutsujou 1600m, Ino T., Kochi Pref.	3 Jun. 1979	MK

***Lasioptera* sp. 8 on *Leucosceptrum stellipilum* var. *tosaense* (Lamiaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Ohmarubano-tenninsou-kuki-kobu-fushi (D-0470b)

Known distribution record: Ehime (Yukawa, 1982)

Current collecting data: None

***Lasioptera* sp. 8 on *Leucosceptrum stellipilum* (Lamiaceae)**

Galled organ & Japanese gall name (gall no.): Petiole & leaf vein, Mikaerisou-hamyaku-kobu-fushi (D-0500)

Known distribution record: Gifu (Suzuki, 1974)

Current collecting data: **New rec. from Kyoto Pref.**

Kifune, Kyoto C., Kyoto Pref.	3 Apr. 1980	MK

***Lasioptera* sp. 9 on *Clinopodium micranthum* (Lamiaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Inutoubana-kuki-kobu-fushi (D-0471)

Known distribution record: Tochigi (Usuba, 1979), Saitama (Usuba, 1979)

Current collecting data: None

***Lasioptera* sp. 9 on *Clinopodium macranthum* (Lamiaceae) (Fig. 12)**

Galled organ & Japanese gall name (gall no.): Stem, Miyama-kuruma-bana-kuki-tama-fushi (D-0510)

Known distribution record: Sadogashima Is. (Sunose, 1982)

Current collecting data: None

***L. azami* Shinji, 1939 on *Hemistepta lyrata* (Asteraceae)**

Galled organ & Japanese gall name (gall no.): Stem, Kitsune-azami-kuki-kobu-zui-fushi (D-0718a)

Known distribution record: Iwate (Shinji, 1939d), Niigata (Yukawa, 1994)

Current collecting data: None

***L. azami* Shinji, 1939 on *Cirsium mipponicumu* var. *incomptum* (Asteraceae)**

Galled organ & Japanese gall name (gall no.): Stem, Tone-azami-kuki-kobu-zui-fushi (D-0718b)

Known distribution record: Tochigi (Usuba, 1981b)

Current collecting data: None

***Lasioptera* sp. 10 on *Artemisia montana* (Asteraceae)**

Galled organ & Japanese gall name (gall no.): Stem, Oh-yomogi-kuki-hosotsuto-fushi (D-0720a)

Known distribution record: Hokkaido (Yukawa & Sunose, 1979)

Current collecting data:

Arashiyama, Etanbetsu, Asahikawa C., Hokkaido	17 Sep. 2013	JY, TM, WK
Osarappegawa, Takasu T., Kamikawa Co., Hokkaido	17 Sep. 2013	JY, TM, WK
Takadomari, Fukagawa C., Hokkaido	18 Sep. 2013	JY, TM, WK

***Lasioptera* sp. 10 on *Artemisia princeps* (Asteraceae)**

Galled organ & Japanese gall name (gall no.): Stem, Yomogi-kuki-hosotsuto-fushi (D-0720b)

Known distribution record: Shizuoka (Yukawa *et al*., 2013b), Miyazaki (Yukawa *et al*., 2012b)

Current collecting data: **New rec. from Aomori, Ishikawa & Okayama Prefs.**

Okiura, Kuroishi C., Aomori Pref.	4 Nov. 2013	TI
Iouzan, Kanazawa C., Ishikawa Pref.	14 Oct. 1978	JY
Tanokuma, Tsuyama C., Okayama Pref.	14 Oct. 1978	SS

***L. artemisifoliae* Shinji, 1939 on *Artemisia japonica* (Asteraceae)**

Galled organ & Japanese gall name (gall no.): Leaf, Otoko-yomogi-ha-fukure-fushi (D-0740a)

Known distribution record: Aomori (Ishimura & Sato, 1941), Iwate (Shinji, 1939a), Niigata (Yukawa & Sunose, 1988)

Current collecting data: **New rec. from Hokkaido, Yamaguchi & Fukuoka Prefs.**

Tomakomai Experimental Forest, Hokkaido Univ., Tomakomai C., Hokkaido	1 Aug. 2002	JY, MNH, FK
Akiyoshidai, Miya C., Yamaguchi Pref.	26 Sep. 2012	Observed by JY
Hiraodai, Kitakyushu C., Fukuoka Pref.	1 Oct. 2010	Observed by JY
Ideura, Kitakyushu C., Fukuoka Pref.	2 Oct. 2011	JY
Shikanoshima, Fukuoka C., Fukuoka Pref.	14 Oct. 1979	HI

***L. artemisifoliae* Shinji, 1939 on *Artemisia japonica* subsp. *littoricola* (Asteraceae) (Figd. 13 & 14) New host rec.**

Galled organ & Japanese gall name (gall no.): Leaf, Hama-otoko-yomogi-ha-fukure-fushi (D-0740b) **New name**

Known distribution record: None

Current collecting data: **New rec. from Yamagata Pref.**

Ohiwagawa, Tsuruoka C., Yamagata Pref.	22 Sep. 2010	JY, TGK, KM, TF

***L. gibaushi* Shinji, 1939 on unknown host**

Note: Unlike the adult, larvae from drop-shaped galls on *Aster scaber* belong to *Asteralobia* (see text).

Galled organ: Unknown

Known distribution record: None

Current collecting data: None

***Lasioptera* sp. 11 on *Aster scaber* (Asteraceae)**

Galled organ & Japanese gall name (gall no.): Leaf, Shirayama-giku-ha-eboshi-fushi (D-0811)

Known distribution record: Iwate (Shinji, 1938b)

Current collecting data: None

***L. astericola* Shinji, 1939 on *Aster scaber* (Asteraceae)**

Galled organ & Japanese gall name (gall no.): Stem, Shirayama-giku-kuki-fukure-fushi (D-0812)

Known distribution record: Iwate (Shinji, 1939c), Tokyo (Shinji, 1944)

Distribution outside Japan: Korean Peninsula (on *Aster scaber*) (Paik *et al*., 2004)

Current collecting data: None

***L. euphobiae* Shinji, 1944 on *Eupatorium makinoi* (Asteraceae) (Fig. 15)**

Note: *L. eupatrii* Shinji, 1944 is misspelling for *euphobiae* (see text).

Galled organ & Japanese gall name (gall no.): Stem, Hiyodori-bana-kuki-zui-fushi (D-0920a)

Known distribution record:

Hokkaido (Yukawa & Sunose, 1979), Iwate (Monzen, 1932), Niigata (Yukawa & Sunose, 1988; Yukawa, 1994), Fukushima (Usuba, 1979), Tochigi (Usuba, 1979), Tokyo (Monzen, 1932), Nagano (Monzen, 1932)

Distribution outside Japan: Korean Peninsula (on *Eupatorium lindleyanum*) (Yukawa *et al*., 2012)

Current collecting data: **New rec. from Yamagata & Hyogo Prefs.**

Shizu, Nishikawa T., Yamagata Pref.	21 Sep. 2010	JY, MT, TGK, KM, TF
Amadera, Sanda C., Hyogo Pref.	23 Nov. 2009	HY

***L. euphobiae* Shinji, 1944 on *Eupatorium chinense* subsp. *sachalinense* (Asteraceae)**

Galled organ & Japanese gall name (gall no.): Stem, Yotsuba-hiyodori-kuki-zui-fushi (D-0920b)

Known distribution record: Hokkaido (Yukawa & Sunose, 1979)

Current collecting data:

Takadomari, Fukagawa C., Hokkaido	18 Sep. 2013	JY, TM, WK
Kyowa, Etanbetsu, Asahikawa C., Hokkaido	20 Sep. 2013	TM

***Lasioptera* sp. 12 on *Dioscorea japonica* (Dioscoreaceae) (Figs. 16 & 17)**

Note: Shinji (1944) named a gall midge associated with *D. jaopinica* as *Lestremia yasukuni.* Because *Lestremia* is a saprophagous or fungivorous genus, Shinji possibly reared adults not from galls but from soil in a rearing cage.

Galled organ & Japanese gall name (gall no.): Stem, Yamanoimo-tsuru-fukure-fushi (E-0020a)

Known distribution record:

Tochigi (Sonoda, 2013), Tokyo (Shinji, 1942), Miyazaki (Yukawa *et al*., 2012b), Kagoshima (Yukawa, 1988b)

Current collecting data: **New rec. from Akita, Saitama, Mie, Kyoto, Kagawa, Fukuoka, Kumamoto Prefs. & Shimo-koshikijima Is.**

Tazawako-Obonai, Senboku C., Akita Pref.	20 Aug. 1975	KY
Ageo, Saitama Pref.	5 Jan. 1974	TS
Minami-Urawa, Saitama Pref.	6 Apr. 1978	SU
Sinmura, Omata T., Ise C., Mie Pref.	14 Oct. 2009	JY, TK, TGK, KM
Momoyama, Fushimi, Kyoto C., Kyoto Pref.	12. Nov. 1967	ATK
Higashibun, Ayagawa T., Kagawa Pref.	16 Sep. 2008	JY, MT, SS, NU, KM
Kanno, Mannou T., Kagawa Pref.	16 Sep. 2008	JY, MT, SS, NU, KM
Konomiyama, Fukutsu C., Fukuoka Pref.	8 Aug. 2001	MT, NU, HK
Inunaki Pass, Hisayama T., Fukuoka Pref.	14 Oct. 1998	JY, MT, JA, NU
Aobanomori, Fukuoka C., Fukuoka Pref.	14 Aug. 2001	MT, FK, HK
Motooka, Fukuoka C., Fukuoka Pref.	12 Aug. 2001	MT, FK, HK
Mt. Koura, Kurume C., Fukuoka Pref.	7 Oct. 2010	JY, NG
Otohime, Aso C., Kumamoto Pref.	17 Jul. 2002	MT, MM
Okoba, Hitoyoshi C., Kumamoto Pref.	10 Aug. 1975	ET
Shimo-koshikijima Is., Satsumasendai C., Kagoshima Pref.	29 Sep. 1982	TMK

***Lasioptera* sp. 12 on *Dioscorea batatas* (Dioscoreaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Naga-imo-tsuru-fukure-fushi (E-0020b)

Known distribution record: Tokyo (Shinji, 1942)

Current collecting data: None

***Lasioptera* sp. 12 on *Dioscorea tokoro* (Dioscoreaceae)**

Galled organ & Japanese gall name (gall no.): Stem, Onidokoro-tsuru-fukure-fushi (E-0020c)

Known distribution record: Niigata (Yukawa & Sunose, 1988), Tokyo (Shinji, 1942)

Distribution outside Japan: Korean Peninsula (on *Dioscorea opposita* & *D. tokoro*) (Paik *et al*., 2004)

Current collecting data: **New rec. from Miyagi & Fukuoka Prefs.**

Akiu-ohtaki, Sendai C., Miyagi Pref.	18 Sep. 2001	JY, MT, NU, MNH
Mt. Tachibana, Fukuoka C., Fukuoka Pref.	20 Jul. 1973	KY

***L. yadokariae* Yukawa & Haitsuka, 1994 [Successor]**

As a successor, larvae inhabit galls vacated by other gall-inducing cecidomyiids (see text).

Known distribution record:

Saitama (Yukawa & Haitsuka, 1994), Fukuoka (Yukawa & Haitsuka, 1994), Kagoshima (Yukawa & Haitsuka, 1994)

Current collecting data: None

*Abbreviation of collector's names: AM: A. Mori, AN: A. Nomura, ATK: A. Taketani, ATN: A. Tanaka, DY: D. Yamaguchi, ET: E. Tokuhisa, FK: F. Kodoi, HH: H. Hoshina, HI: H. Ikenaga, HK: H. Kuratomi, HY: H. Yoshimura, IT: I. Togashi, JA: J. Abe, JY: J. Yukawa, KM: K. Matsuo, KMY: K. Miyamoto, KY: K. Yamagishi, MK: M. Kato, MM: M. Mishima, MNH: M. Nohara, MNK: M. Nakashima, MS: M. Shobu, MT: M. Tokuda, MTD: M. Tuda, MTK: M. Takagi, MTN: M. Taniguchi, MYF: M. Yafuso, MYK: M. Yukinari, NG: N. Gyoutoku, NU: N. Uechi, SA: S. Adachi, SK: S. Kumashiro, SM: S. Masaoka, SO: S. Ohno, SS: S. Sato, SU: S. Usuba, SY: S. Yamauchi, TF: T. Fujii, TGK: T. Ganaha-Kikumura (= TG: T. Ganaha), THC: T. Higuchi, THR: T. Hirooka, THS: T. Higashi, TI: T. Ichida, TK: T. Katsuda, TM: T. Minami, TMK: T. Maki, TMR: T. Moriya, TMY: T. Miyatake, TN: T, Nakata, TS: T. Sunose, WK: W. Kim

Sacken, 1862), which was later proved to be a misidentification for *Neolasioptera impatientifolia* (Felt, 1907) (Gagné & Jaschhof, 2014). However, larvae inhabiting the stem galls on *I. noli-tangere* in Japan belong to *Lasioptera*. Hence, we left the Japanese species as *Lasioptera* sp. 5 in Table 1. This treatment is supported by the fact that *Neolasioptera* is a Nearctic and Neotropical genus of Lasiopteridi.

Shinji (1944) described *Dasyneura paederiae* Shinji, 1944 (misspelling for *Dasineura*) but did not mention anything about galls except the name of the host plant, *Paederia foetida* (Rubiaceae). Later, this species was listed as *Lasioptera paederiae* (Shinji, 1944) in Gagné (2004). We are still not sure if this species belongs to *Lasioptera* and induces stem galls on the host plant because Shinji's description is inadequate for

identification. Separately, Möhn (1968) redescribed *Lasioptera paederiae* Shinji, 1968 based on specimens reared certainly from stem galls on *P. foetida* in Japan. Therefore, we tentatively used *L. paederiae* Shinji in this paper with collecting data of the stem gall.

Shinji (1939e) described *Lasioptera gibaushi* Shinji, 1939 that induces drop-shaped galls on flowers of *Aster scaber* (Asteraceae). Later, Yukawa (1982) added *A. microcephalus* var. *ovatus* and *A. semiamplexicaulis* to the host range of *L. gibaushi* based on the same sort of drop-shaped galls induced on the same organ of the congeneric plant species. Tokuda *et al*. (2003), who examined larvae obtained from drop-shaped galls on *A. scaber*, noted that the larvae did not have characteristics of *Lasioptera*. The larvae and structure of the galls on *A. scaber* were identical to those of Russian Far Eastern *Asteralobia doellingeriae* Kovalev, 1964 (Kovalev, 1964). However, the description of *L. gibaushi* by Shinji (1939e) indicates that the adult is morphologically different from *A. doellingeriae* and possibly belongs to *Lasioptera*. Tokuda *et al*. (2003) considered that Shinji (1939e) erroneously described adults of *L. gibaushi* based on specimens reared from galls other than the drop-shaped galls on *A. scaber*. Tokuda *et al*. (2003) also proposed to combine the gall midges from drop-shaped galls on *A. microcephalus* var. *ovatus* and *A. semiamplexicaulis* with *Asteralobia*. Therefore, we left *L. gibaushi* in the present list without information on its gall, host plant and collecting record.

A name, *Lasioptera eupatrii* was used on page 147 of Shinji (1944) in the explanation of photograph for *Lasioptera euphobiae* Shinji, 1944 and its stem gall on *Eupatrium makinoi* (Asteraceae). Apparently, *eupatrii* was a misspelling for *euphobiae* (Yukawa, 1971). At the same time, he mentioned that stem galls are induced on *Aster tataricus* (Asteraceae) and *Patrinia villosa* (Caprifoliaceae) but we have not seen them on these plants. Further investigations are needed to confirm if *L. euphobiae* induces stem galls on *Aster* and *Patrinia* that belong to two different plant families.

Gall name

Boehmeria apicata (Urticaceae), *Melothria japonica* (Cucurbitaceae) and *Artemisia japonica* subsp. *littoricola* (Asteraceae) are newly included as host plants of *Lasioptera* and a new gall name is given to each gall on these plants (Table 1). A single common gall name, 'Ichigo-kuki-kobu-fushi' had been used for stem galls induced by *Lasioptera rubi* (Schrank, 1803) on several species of *Rubus* (Rosaceae), but we gave in this paper a new name to the gall on each species of *Rubus* to distinguish host plant species. The name of stem galls induced by *Lasioptera* sp. 6 on *Trichosanthes kirilowii* var. *japonica* (Cucurbitaceae) was changed from 'Kikarasuuri-tsuru-fukure-fushi' (Nagai, 2012) to 'Ki-karasu-uri-kuki-fukure-fushi' to unify the writing system for the galls on the other species of *Trichosanthes*.

Galled organ

Among 25 gall-inducing species of Japanese *Lasioptera*, 20 (80%) induce stem galls (e.g., Figs. 2, 4, 5, 8, 9, 10, 11, 12, 15, 16) and the others are responsible for galls on leaf veins (Fig. 7) or leaf blades (Fig. 1) (Table 1). The relative abundance of stem gallers in Japan was similar to that in all *Lasioptera* species of the world. We need to pay more attention to stem gallers than to the others when we search for close relatives to the species infesting tomato and cucumber.

Distribution range

Many prefectures and islands were newly added to known distribution ranges of respective gall midge species based on the current collecting data of galls (Table 1). Many species appeared to be distributed widely in Japan, while some are restricted to northern or southern parts of Japan.

Nine (36%) out of 25 gall-inducing species of Japanese *Lasioptera* are commonly distributed in the Korean Peninsula, China or the Russian Far East. The percentage will increase when the cecidomyiid fauna of these areas is more intensively surveyed. In contrast, only *Lasioptera rubi* (Schrank, 1803) on *Rubus* spp. (Fig. 8) is distributed both in Japan and in Europe because 24 (96%) out of 25 plant genera listed in Table 1 are not recorded as host plants of European *Lasioptera* (Gagné & Jaschhof, 2014). It is remarkable that plant genera, *Achyranthes*, (Amaranthaceae), *Camellia* (Theaceae) and *Melothria* (Cucurbitaceae) host *Lasioptera* in India or Indonesia (Gagné & Jaschhof, 2014), which means that some of the Japanese species or their relatives will be found in the Oriental Region.

Non-gall inducing species

Lasioptera yadokariae Yukawa & Haitsuka, 1994 is a successor. Larvae of *L. yadokariae* inhabit leaf galls vacated by gall-inducing cecidomyiids, such as *Pseudasphondylia neolitseae* Yukawa, 1974, *Daphnephila* sp. and *Masakimyia pustulae* Yukawa & Sunose, 1976, and their parasitoids. The larvae feed on mycelia of *Pestalotia* sp. (Fungi Imperfecti: Melanconiales: Melanconiaceae) growing in the empty galls (Yukawa & Haitsuka, 1994). The abundance of *L. yadokariae* is

influenced by the population dynamics of gall-inducing cecidomyiids and the parasitoids (Yukawa *et al*., 2006). No predatory species of *Lasioptera* has been found in Japan.

Future implication for determining host range

The host plant range of almost all species of *Lasioptera* has been determined based on morphological similarities between gall midges occurring on congeneric host plants or sometimes on plants belonging to two or more genera within a single family. Galled organ and gall shape may be the factual basis for the decisions. This paper also follows the same process to determine host ranges. However, we need to re-examine the known host ranges of respective species using DNA analysis, which is able to confirm the host ranges determined based on morphological similarities, as have been noted for other gall midges such as *Asphondylia* (e.g., Uechi *et al*., 2004), *Asteralobia* (Tokuda *et al*., 2004), *Daphnephila* (Tokuda *et al*., 2008) and *Contarinia* (e.g., Uechi *et al*., 2003). The gall midges infesting tomato and cucumber need to be identified morphologically and genetically.

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