

New Midge Galls from Kyushu

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Received for Publication August 20, 1977

Introduction

Over 200 sorts of midge gall on 193 plant species have been recorded in Japan, and they were collectively arranged in the author's check list^{4,5}. After having published the check list, the author had some opportunities to examine many unrecorded midge galls from various parts of Kyushu, including Tokara Islands. In the present paper, the author describes 14 sorts of midge gall on 16 plant species under new Japanese names, together with the collecting data and brief notes on the biology of the associated gall midges. In addition, the present paper refers to new combinations of gall midges and previously described galls, and includes new host-plant-records of gall midges.

Before going further, the author wishes to express his thanks to Prof. A. Nagatomi (Kagoshima Univ.) for his encouragement and support. Gall bearing plants were identified by Mr. S. Sako (Kagoshima Univ.), to whom the author is deeply indebted. His thanks are also due to the following persons for their kindness in offering materials: Messrs. H. Ikenaga, K. Miyamoto, S. Nagai, A. Naito, K. Nakagawa, K. Ohno, T. Sunose, E. Tokuhisa, K. Tsuda, S. Usuba and S. Yamauchi.

Materials and Methods

The midge galls described in the present paper were collected from various parts of Kyushu through occasional field investigations mainly by the author and his collaborators. Some of the collected galls were measured by slide calipers, and dissected to confirm whether they were caused by gall midges. The number of larvae and larval chambers per gall was counted and the developmental stages were also examined. The rest of the galls were retained in the laboratory to rear adult midges. The collections of gall midge and the midge gall specimens examined here are kept in Entomological Laboratory of Kagoshima University.

In listing gall bearing plants and describing entries for each gall, the author adopts a method similar to the one used in the check list^{4,5}.

Fagaceae

Quercus acuta Thunb. "Akagashi"

Leaf, "Haore" **new gall rec.** *Contarinia* sp.

Young leaves folded upward, associated with subglobular swellings of the affected parts; frequently, more than 1 swelling arising continuously; normally only 1 larva inhabiting each swelling (cf. Fig. A). Mature larvae escape from

the galls and jump down to the ground in April and May. Shibisan, Kagoshima-ken, 24. IV. 1977, K. Nakagawa leg.

Quercus glauca Thunb. "Arakashi"

Leaf, "Haore" **new gall rec.** *Contarinia* sp.

This gall is quite similar to that on *Quercus acuta* Thunb., probably caused by the closely related species (Fig. A). Shiroyama, Kagoshima-shi, 14. IV. 1977, H. Ikenaga leg.

Moraceae

Ficus erecta Thunb. "Inubiwa"

Leaf, "Ha-maru-fushi" **new gall rec.** Adult unknown.

Rather flattened, disc-shaped swellings of leaf blade; galled area discoloured; epiphyllous portion slightly elevated, with a dark brownish spot in the centre; hypophyllous portion more conspicuously swollen, with a dark brownish elevation in the centre; diameter 2.7 to 3.7 mm, thickness 2.0 to 2.8 mm; monothalamus; larval cavity situated in the centre, surrounded by a rather hard, thick-walled tissue; each cavity containing 1 midge larva (Fig. B). The biology of the gall midge is unknown. Nakanoshima, Tokara, Kagoshima-ken, 28.VI. 1977, H. Ikenaga leg.; Miike, Kirishima, Miyazaki-ken, 14.VIII.1977. J. Yukawa leg.

Ficus nipponica Fr. et Sav. "Itabi-kazura"

Leaf, "Goma-fushi" **new gall rec.** *Lasioptera* sp.

Ellipsoidal swellings mainly on under surface; sometimes with a slight elevation on upper surface; green in the early stage, sombre colour later; major axis 1.5 to 2.0 mm, minor axis 1.3 to 1.6 mm; monothalamus; each gall containing 1 midge larva (Fig. C). Mature larvae hibernate in the galls and adults emerge in April. In heavy infestations, over 100 galls occur on a single leaf. This gall was first collected by Mr. S. Usuba from Kiyosumi, Chiba-Ken, Honshu, on 21. III.1976. The following collections have been made in Kyushu: Ishiki, Kagoshima-shi, 27.X.1976, S. Yamauchi leg.; Sendai-shi, Kagoshima-ken, 5.I.1977, K. Ohno leg.

Ficus stipulata Thunb. "Hime-itabi"

Leaf, "Goma-fushi" **new gall rec.** *Lasioptera* sp.

This gall is quite similar to that on *Ficus nipponica* Fr. et Sav., probably caused by the same species. Usuki-shi, Ôita-ken, 5.IV.1977, S. Usuba leg.

Rosaceae

Pourthiaea villosa (Thunb.) Decne. var. *laevis* (Thunb.) Stapf "Kamatsuka"

Leaf, "Ha-ibo-fushi" Monzen²⁾. Adult unknown. new combination of gall and gall maker.

Suboval swellings mostly epiphyllous, opening along a slit; height 0.6 to 2.5 mm, major axis 1.2 to 3.1 mm, minor axis 0.9 to 2.0 mm; monothalamus; larval cavity rather large, thin-walled; each cavity with 1 midge larva (Fig. D). Monzen²⁾ considered that this gall was caused by a chalcid species. However, a spe-

cies of gall midge is undoubtedly responsible for this gall. The biology of the species is unknown. Takachiho-gawara, Kirishima, Kagoshima-ken, 6.VII.1977, K. Ohno leg.

Leguminosae

Wisteria floribunda (Willd.) "Fuji"

Leaf, "Ke-fushi" **new gall rec.** Adult unknown.

Hairy subglobular swellings, usually on under surface, sometimes on upper surface; diameter about 2.5 mm; monothalamus, only 1 larva inhabiting each gall (Fig. E). Galls containing mature larvae fall apart from the leaves in June. The larvae probably pass through the summer and winter in the galls on the ground, and pupate in the next spring. Shiroyama, Kagoshima-shi, 4.VI.1977, S. Yamauchi & K. Tsuda leg.

Saxifragaceae

Hydrangea serrata Seringe "Yama-ajisai"

Leaf vien, petiole, stem, "Haguki-fushi" **new gall rec.** Adult unknown.

Irregular, fleshy swellings on midrib, which are hypophyllous and often continuous with those on petiole and stem (Fig. F). The first instar larvae pass the summer, and come to mature in autumn. The mature larvae hibernate probably in the galls, either on fallen leaves or on withered stems. Ishiki, Kagoshima-shi, 20.V.1975, 9.VIII.1976, 5.XI.1976, J. Yukawa leg.

Theaceae

Camellia japonica L. "Yabu-tsubaki"

Leaf, "Hamyaku-fushi" **new gall rec.** *Lasioptera* sp.

Rather hard, sometimes woody swellings on midrib and larger secondary veins, with fine branches of the swelling on netted veins; mostly hypophyllous, with a slight elevation on upper surface; monothalamus; each gall with a spot, or a "window" for emergence of adult midges, on under surface; only 1 midge larva inhabiting each gall (Fig. G). Larvae hibernate in the galls, and adults emerge in April and May. Kunisaki-hantô, Ôita-ken, 12.III.1976, S. Nagai leg.; Ishiki, Kagoshima-shi, 10.IV.1976, E. Tokuhisa leg.; Shiroyama, Kagoshima-shi, 26.IV.1976, J. Yukawa leg.

Eurya japonica Thunb. "Hisakaki"

Bud, "Me-fushi" **new gall rec.** Adult unknown.

Terminal or axillary buds transformed into fir-cone-like swellings; green with a purplish tinge; only 1 larval cavity being present in the centre; 1 to 20 midge larvae inhabiting each cavity (Fig. H). The bud galls containing mature larvae fall away from the tree during the winter. Ishiki, Kagoshima-shi, 5.XI.1976, J. Yukawa leg.

Araliaceae

Kalopanax septemlobus (Thunb.) Koidz. "Harigiri"

Leaf vein, "Hamyaku-fushi" **new gall rec.** Adult unknown.

Gouty vein galls on under surface, opening along a slit on upper surface, usually with a reddish tinge; length 5 to 6 mm, maximum thickness 2 to 3 mm; each gall containing 1 midge larva (Fig. I) Mature larvae escape from the galls and jump down to the ground in early summer. Hikosan, Fukuoka-ken, 11.VI.1977, K. Miyamoto leg.

Cornaceae

Cornus macrophylla Wallich "Kumano-mizuki"

Leaf vein, "Hamyaku-fushi" **new gall rec.** Adult unknown.

Rather elongated vein galls usually on under surface, opening along a slit on opposite surface; galled portion somewhat discoloured, sometimes with a reddish tinge; length 1.8 to 2.5 mm; usually 1 midge larva inhabiting each gall (Fig. J). Mature larvae escape from the galls and jump down to the ground in April and May. Shiroyama, Kagoshima-shi, 2.V.1977, H. Ikenaga leg.

Helwingia japonica (Thunb.) F.G.Dietr. "Hana-ikada"

Fruit, "Mi-fushi" **new gall rec.** *Asphondylia* sp.

Galled fruits somewhat irregularly swollen, a little larger than normal fruits, green and smooth on surface; height 4.2 to 8.7 mm, maximum diameter 3.1 to 8.3 mm; usually 3 to 5, sometimes 2 or 6 larvae inhabiting each gall (Fig. K). Adults emerge from the galls on the host plant in May and June. Iso, Kagoshima-shi, 22.V.1977, K. Ohno leg.

Symplocaceae

Symplocos coreana (Lev.) Ohwi "Tanna-sawafutagi"

Bud, "Me-fushi" **new gall rec.** Adult unknown.

Buds transformed into fir-cone-like swellings; height 6.5 to 10.3 mm, maximum thickness 3.5 to 5.2 mm, a large larval cavity being present in the centre; usually 1, sometimes more larvae inhabiting each cavity (Fig. L) The biology of the gall midge is unknown. Hikosan, Fukuoka-ken, 11.VI.1977, H. Ikenaga & K. Miyamoto leg.

Apocynaceae

Trachelospermum asiaticum Nakai "Teika-kazura"

Root, "Ne-kobu-fushi" **new gall rec.** *Ametrodiplosis* sp.

Subglobular, solid swellings on aerial roots; yellowish brown; maximum diameter 3.0 to 5.2 mm; each gall containing 1 gall midge larva (Fig. M). Immature larvae hibernate in the galls, adults emerge in June and July. This gall was first collected by Mr. A. Naito from Nokogiriyama, Chiba-ken, Honshu on 15.VI.1969. The following collections have been made in Kyushu: Shiroyama,

Kagoshima-shi, 7.IV.1972, 27.V.1972, J. Yukawa leg.; Shiroyama, Kagoshima-shi, 20.VI.1977, H. Ikenaga leg.

Verbenaceae

Callicarpa japonica Thunb. var. *luxurians* Rehd. "Ômurasaki-shikibu"

Fruit, "Mi-fushi" Shinji³⁾. Adult unknown. new host rec.

Irregularly swollen fruit galls, larger than normal fruits; height 2.7 to 4.7 mm, maximum diameter 3.3 to 5.3 mm; oligothalamus, 1 to 5 chambers per galled fruit; each chamber surrounded by a rather hard, thick-walled tissue, containing 1 midge larva. This gall is the same as that on *Callicarpa japonica* Thunb., probably caused by the same species. Shinji³⁾ mentioned that galled fruits remained on the trees throughout the winter. However, the present author observed that the large majority of the galled fruits containing mature larvae fell apart from the trees in July. The larvae probably pass through the summer and winter in the gall on the ground, and pupate in the next spring. Shiroyama, Kagoshima-shi, 14.VII.1977, J. Yukawa leg.

Callicarpa mollis Sieb. et Zucc. "Yabu-murasaki"

Fruit, "Mi-fushi" Shinji³⁾. Adult unknown. new host rec.

This gall is the same as that on *Callicarpa japonica* Thunb. and its variety *luxurians* Rehd., probably caused by the same species. Iriki, Kagoshima-ken, 12.VII.1977, K. Ohno leg.

Caprifoliaceae

Viburnum erosum Thunb. "Kobano-gamazumi"

Fruit, "Mi-fushi" Yukawa⁵⁾. Adult unknown. new host rec.

This gall is the same as that on *Viburnum japonica* (Thunb.) Spreng., probably caused by the same species. Takachiho-gawara, Kirishima, Kagoshima-ken, 8.VIII.1977, J. Yukawa & K. Miyamoto leg.

Viburnum japonicum (Thunb.) Spreng. "Hakusan-boku"

Flower bud, "Tsubomi-fushi" **new gall rec.** Adult unknown.

Flower buds somewhat swollen, remaining closed; usually only 1 midge larva inhabiting each galled flower bud (Fig. N). Both the galls containing mature larvae and the large majority of normal flower buds fall down to the ground in April and May. Larvae probably hibernate in cocoons. Shiroyama, Kagoshima-shi, 16.IV.1977, T. Sunose leg.

Viburnum phlebotrichum Sieb. et Zucc. "Otoko-yôzome"

Leaf, "Ha-fukure" **new gall rec.** Adult unknown.

Rather thin, rounded blisters mainly on upper surface; centre of the blister dark green, surrounded by a reddish ring; diameter 3.0 to 3.5 mm, maximum thickness about 0.5 mm; monothalamus; each blister containing 1 midge larva (Fig. O). Mature larvae probably escape from the blister before summer. Hikosan, Fukuoka-ken, 11.VI.1977, H. Ikenaga leg.

Weigela hortensis (Sieb. et Zucc.) K.Koch "Tani-utsugi"

Leaf, "Haber-ore" Monzen¹⁾. *Contarinia* sp. new combination of gall and gall maker.

Narrow marginal areae of the leaf blade rolled upward; usually 1 or 2, sometimes 3 rolls being present on a single leaf; length of the rolling 10 to 20 mm; pale brown with a reddish tinge; each roll containing 7 to 12 larvae (Fig. P). Mature larvae escape from the galls and jump down to the ground in early summer. Terayama, Kagoshima-shi, 22.V.1977, H. Ikenaga leg.

Compositae

Chrysanthemum indicum L. "Shima-kangiku"

Bud, "Naga-tsubo-fushi" Yukawa⁵⁾. Adult unknown. new host rec.

Terminal and axillary buds transformed into elongated bottle-shaped swellings which are provided apically with several triangular lobes; mono- or oligothalamus; each chamber containing 1 midge larva. This gall is quite similar to that on *Chrysanthemum ornatum* Hemsl. var. *spontaneum* (Makino) Kitam.⁵⁾, probably caused by the same species. Kawaura, Amakusa, Kumamoto-ken, 18. X.1976, J. Yukawa leg.

Summary

In the present paper, 14 sorts of midge gall on 16 plant species are described under new Japanese names, together with the collecting data of the galls and brief notes on the biology of the associated gall midges. Two previously described galls are newly combined with gall midges, and 3 plant species and 1 variety are recognized as new host plants.

References

- 1) Monzen, K.: Chûei-no-Kenkyû. *Saitô Hoonkai Jigyô Nenpô* (in Japanese), 5, 295-368, pls. (1929)
- 2) Monzen, K.: Chûei-no-Kenkyû (III). *Bull. Sci. Res. Alumni Assoc. Morioka Coll. Agric. Forest* (in Japanese), 7, 53-78, pls. (1932)
- 3) Shinji, O.: *Chûei-to-Chûeikonchû* (in Japanese), p. 162, Shunyôdô, Tokyo (1944)
- 4) Yukawa, J.: Check list of midge galls of Japan, with descriptions of newly recorded galls, I. Choripetalae. *Mem. Fac. Agr. Kagoshima Univ.*, 12, 109-123 (1976)
- 5) Yukawa, J.: Check list of midge galls of Japan, with descriptions of newly recorded galls, II. Plants other than Choripetalae. *Mem. Fac. Agr. Kagoshima Univ.*, 13, 89-99 (1977)

Explanation of figures

- Fig. A. Leaf gall, "Haore" on *Quercus glauca*, "Arakashi"
 Fig. B. Leaf gall, "Ha-maru-fushi" on *Ficus erecta*, "Inubiwa"
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