

New Midge Galls from Japan

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Introduction

Plant galls are so conspicuous in shape and numerous in sort that they are easily found outdoors not only by entomologists or botanists but also by other naturalists. Particularly, those caused by gall midges (Diptera, Cecidomyiidae) are most abundant among the insect galls in Japan. More than 200 sorts of midge gall on 193 Japanese plant species were collectively listed in the previous papers of the present author^{20,21}), and many new galls were added to them thereafter^{12-17,22,24}). There are, however, no bounds to the rapid increasing in the number of newly detected galls in Japan at the moment. Following the successive detections of new galls, supplemental descriptions and records of them are occasionally necessary to facilitate the identification of both the midge galls and the gall makers and to aid further study in the cecidological field. In this paper, 39 sorts of midge gall on 35 plant species are described, including 17 new galls, 21 new host plant records and 1 new combination of gall and gall maker.

Materials and Methods

The midge galls described in the present paper were collected from various parts of Japan through occasional field surveys conducted by the author and his collaborators, except one case in which a midge gall was recognized by examining the herbarium collection kept in the Laboratory of Silviculture, Kagoshima University. 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 were counted and the developmental stages were also examined. The rest of the galls were retained in the laboratory to rear adults. The collections of gall midge and midge gall specimens examined here are kept in the Entomological Laboratory of Kagoshima University.

In listing the gall-bearing plants and describing entries for each gall, the author adopts a method similar to the one used in the previous papers^{20-22,24}). The Japanese names of some previously described galls are changed into new ones in this paper for a better understanding of their appearance and position on the host plants.

Taxaceae

Taxus cuspidata Sieb. et Zucc. "Ichii"

Fruit, "Mi-fukure-fushi" **new gall rec.** Adult unknown.

Galled fruits somewhat irregularly swollen, distinctly larger than normal ones; pale green to greenish brown; smooth on surface; height 4.3 to 7.3 mm, maximum diameter 3.4 to 7.0 mm; normally 1 to 5 larvae inhabiting each gall (Fig. 1). Galls falling to the ground

by the summer. Yagishiri, Tomamae, Hokkaido, 23. VI.–22. VII. 1980, 30. V.–29. VI. 1981, T. Isono leg.

Fagaceae

Quercus mongolica Fischer var. *grosseserrata* (Blume) Rehd. et Wils. “Mizunara”

Leaf, “Ha-fukure-fushi” new name, new host rec. Adult unknown.

Circular bristers appearing on both the upper and lower surfaces of the leaf blade; brister often exhibiting yellowish or pale brownish discolouration which is surrounded by a brownish ring. This gall is quite similar to the brister gall, “Ha-fukure”^{3,4,18)} produced on the leaves of *Quercus serrata* Thunb. and *Q. acutissima* Carr., and is probably caused by the same or a closely related species of gall midge. Hikosan, Fukuoka-ken, 1. VI. 1965, A. Taketani leg.

Quercus dentata Thunb. “Kashiwa”

Leaf, “Ha-fukure-fushi” new name, new host rec. Adult unknown.

This gall is also quite similar to that produced on the above-mentioned species of the genus *Quercus*. Kurinodake, Kagoshima-ken, 30. V. 1978, K. Nakagawa leg.

Ulmaceae

Celtis jessoensis Koidz. “Ezo-enoki”

Leaf, “Ha-togari-tamafushi” new name, new host rec. Adult unknown.

This gall is quite similar to the conical leaf gall, “Togari-tamafushi”^{1,5,18,20)} produced on *Celtis sinensis* Pers. var. *japonica* (Planch.) Nakai, probably caused by the same species. Senchômuta, Kujû, Ôita-ken, 10. VIII. 1922, T. Naitô leg. [From the herbarium collection kept in the Laboratory of Silviculture, Kagoshima Univ.]

Aphananthe aspera (Thunb.) Planch. “Mukunoki”

Leaf, “Ha-fukure-fushi” new gall rec. Adult unknown.

Circular bristers appearing mainly on the under surface of the host leaves; brister exhibiting pale greenish discolouration; hypophyllous portion with a small, conical elevation in the centre; diameter 2.4 to 3.2 mm, thickness 0.6 to 1.1 mm; each gall containing one midge larva (Fig. 2). Third instar larvae escaping from the galls and falling to the ground in May. Shiroyama, Kagoshima-shi, 29. IV. 1978, K. Nakagawa leg.

Urticaceae

Boehmeria spicata Thunb. “Koakaso”

Fruit, “Mi-toge-fushi” new name, new host rec. Adult unknown.

This gall is almost identical in appearance and structure with the fruit gall, “Mi-fushi”²⁴⁾ produced on *Boehmeria tricuspis* Makino, and is probably caused by the same species of gall midge. Hikosan, Fukuoka-ken, 21. IX. 1966, J. Yukawa leg.; Mukabakiyama, Nobeoka-shi, 15. VII. 1967, M. Shiga leg.; Miike, Kirishima, Miyazaki-ken, 22. X. 1977, J. Yukawa & H. Ikenaga leg.; Shibisan, Kagoshima-ken, 7. XI. 1977, J. Yukawa leg.

Magnoliaceae

Magnolia salicifolia (Sieb. et Zucc.) Maxim. "Tamushiba"

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

Terminal or lateral buds transformed into fir-cone-like swellings; height 10.0 to 14.0 mm, maximum diameter 10.0 to 13.0 mm; many larvae inhabiting among leaves in the central portion of the gall. Makihatayama, Niigata-ken, 6. X. 1975, K. Yamagishi leg.

Illicium religiosum Sieb. et Zucc. "Shikimi"

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

Terminal buds transformed into subconical swellings, ceasing further development; height 5.2 to 11.0 mm, maximum diameter 4.8 to 14.3 mm; a large larval cavity being present in the centre; 1 to 5 larvae inhabiting each cavity (Fig. 3). Third instar larvae escaping from the galls in late autumn. Iriki, Kagoshima-ken, 5. X. 1978, H. Ikenaga leg.; Kurinodake, Kagoshima-ken, 18. XI. 1978, K. Nakagawa leg.; Shibisan, Kagoshima-ken, 26. XI. 1978, S. Satô leg.

Lauraceae

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

Leaf, "Ha-ore-fushi" **new gall rec.** Midge not identified.

Young leaves folded upward, associated with inconspicuous and irregular swellings of the affected parts; many larvae inhabiting each folded leaf (Fig. 4). Mature larvae escaping from the leaves in May. Ishiki, Kagoshima-shi, 4. IV. 1978, J. Yukawa & H. Ikenaga leg.

Lindera umbellata Thunb. var. *membranacea* (Maxim.) Momiyama "Ôba-kuromoji"

Bud, "Me-uroko-fushi" **new name, new host rec.** Adult unknown.

This gall is quite similar to the bud gall, "Me-fushi"¹⁵⁾ produced on *Lindera umbellata* Thunb., and is probably caused by the same species. Makihatayama, Niigata-ken, 6. X. 1975, K. Yamagishi leg.

Parabenzoin trilobum (Sieb. et Zucc.) Nakai "Shiromoji"

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

A part of leaf margin rolled downward; smooth on surface; green with dark purplish tinge; length 5.2 to 10.5 mm, thickness 0.6 to 1.1 mm; each roll containing one midge larva; 1 to 11 galls produced on a leaf (Fig. 5). Mature larvae escaping from the galls in autumn. Ebino-kôgen, Miyazaki-ken, 8. VIII. 1977, H. Ikenaga & J. Yukawa leg.; Shibisan, Kagoshima-ken, 7. XI. 1977, H. Ikenaga leg.; Ishizuchiyama, Ehime-ken, 16. X. 1980, J. Yukawa leg.

Rosaceae

Rosa rugosa Thunb. "Hamanasu"

Leaf, "Ha-ore-fushi" **new name, new host rec.** Adult unknown.

This gall resembles the leaf fold gall, "Haore"^{2, 3, 9, 11, 12, 19, 20)} produced on *Rosa multiflora* Thunb., and may be caused by the same or a closely related species (Fig. 6). Asari, Otaru-shi, 5. IX. 1978, T. Sunose leg.; Sapporo-shi, 27. VI. 1979, M. Nakata leg.

Leguminosae

Wisteria brachybotrys Sieb. et Zucc. "Yama-fuji"

Leaf, "Ha-ibo-fushi" new name, new combination of gall & gall maker. Midge not identified. Hemispherical pouch galls produced on the upper surface of the leaves; galled portion exhibiting pale greenish or pale brownish discolouration; smooth on surface; height 0.8 to 1.9 mm, diameter 1.2 to 2.2 mm; each gall with a hairy ostiole on the hypophyllous portion (Figs. 7A, 7B). This gall was considered to be caused by a chalcid wasp⁵⁾, but it is apparently produced by a gall midge species. Ishiki, Kagoshima-shi, 8. III. 1979, H. Ikenaga leg.; *ibid.* 5. IV. 1979, J. Yukawa leg.; Shiroyama, Kagoshima-shi, 10. VIII. 1979, K. Tsuda leg.

Aquifoliaceae

Ilex leucoclada (Maxim.) Makino "Himemochi"

Axillary bud, "Me-tama-fushi" new host rec. *Asteralobia* sp.

This gall is quite similar to the axillary bud gall on *Ilex* species²⁰⁾, and is probably caused by the same or a closely related species. Saigawa-dam, Kanazawa-shi, 18. X. 1978, J. Yukawa & K. Nakamura leg.

Ilex chinensis Sims. "Nanaminoki"

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

The same sort of midge gall is also produced on *Ilex crenata* Thunb. For the description, see the next plant species. Ichihara-inuyama, Kyoto-shi, 18. X. 1978, H. Ikenaga leg.

Ilex crenata Thunb. "Inutsuge"

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

Relatively thin, circular blisters produced on the leaves; dark green or blackish green; diameter 4.0 to 8.0 mm; each blister containing one midge larva (Fig. 8). Ichihara-inuyama, Kyoto-shi, 18. X. 1978, H. Ikenaga leg.

Celastraceae

Celastrus orbiculatus Thunb. "Tsuru-umemodoki"

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

No distinct differences in appearance between galled and normal fruits, except that the former is slightly taller than the latter; height about 8.6 mm, diameter about 10.5 mm; usually one midge larva inhabiting each gall (Fig. 9). Kurinodake, Kagoshima-ken, 15. IX. 1980, J. Yukawa leg.

Araliaceae

Boninofatsia oligocarpella Nakai "Habira-munin-yatsude"

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

Distinct swellings on both sides of the leaves; epiphyllous portion hemispherical, sometimes truncated and flattened; hypophyllous portion hemispherical or subconical, usually

with a small hollow apically; diameter 4.3 to 6.2 mm, thickness 3.9 to 5.6 mm; a larval cavity situated in the centre, containing one midge larva (Fig. 10). Hahajima, Ogasawara, Tokyo-to, 16. III. 1981, S. Kawai leg.

Cornaceae

Helwingia japonica (Thunb.) F. G. Dietr. "Hanaikada"

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

Overwintering buds transformed into relatively short and thick swellings, ceasing further development; each galled bud containing one midge larva (Fig. 11). Ishiki, Kagoshima-shi, 29. I. 1980, S. Ohsako leg.

Ericaceae

Menziesia multiflora Maxim. var. *multiflora* Maxim. "Urajiro-yôroku"

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

Terminal buds transformed into hairy subglobular swellings; height about 4.5 mm, maximum diameter about 3.5 mm; each gall containing 1 to 3 larvae (Fig. 12). Ichihara-inuyama, Kyoto-shi, 18. X. 1978, H. Ikenaga leg.

Rhododendron mayebarae Nakai et Hara "Nangoku-mitsuba-tsutsuji"

Fruit, "Mi-maru-fushi" **new host rec.** Adult unknown.

Subglobular or irregularly swollen fruit gall, similar to that^{3,14)} produced on other *Rhododendron* species, probably caused by the same or a closely related species. Takachiho-gawara, Kirishima, Kagoshima-ken, 26. X. 1969, S. Sako leg.

Rhododendron nudipes Nakai "Saikoku-mitsuba-tsutsuji"

Fruit, "Mi-maru-fushi" **new host rec.** Midge not identified.

Subglobular or irregularly swollen fruit gall, similar to that^{3,14)} produced on other *Rhododendron* species, probably caused by the same or a closely related species. Tanokuma, Tsuyama-shi, 14. X. 1978, K. Nakagawa leg.; Ichihara-inuyama, Kyoto-shi, 18. X. 1978, H. Ikenaga leg.

Vaccinium vitisidaea Linn. var. *minus* Loddiges "Kokemomo"

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

Terminal bud transformed into well developed swelling, which consists of several young leaves; outer 1 or 2 leaves distinctly swollen, thickened and arched, with a reddish tinge; height about 9.0 mm, maximum diameter about 7.0 mm; each gall containing several midge larvae in the centre (Fig. 13). Ecchû-sawadake, 2591 m, Toyama-ken, 20. V. 1981, K. Soroida leg.

Oleaceae

Ligustrum lucidum Ait. "Tô-nezumimochi"

Fruit, "Mi-midori-fushi" new name, new host rec. *Asphondylia sphaera* Monzen

Galled fruits smaller than normal ones, remaining on the tree without changing colour throughout the winter. See Yukawa & Miyamoto²³⁾ for further description of the fruit gall, "Mi-okure"^{11,19,21)} or "Mi-fushi"^{8,19)} which is produced on other *Ligustrum* species.

Kôrimoto, Kagoshima-shi, IV-VI. 1980, S. Ohsako leg.

Labiatae

Glechoma hederacea Linn. var. *grandis* (A. Gray) Hara "Kakidôshi"

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

Flower buds transformed into subglobular swellings, of which maximum diameter is 4.0 to 5.0 mm, distinctly longer than that of normal flower bud; 5 to 23 larvae found in the central portion of each gall (Figs. 14A, 14B). Kamiozoegawa, Fuji-machi, Saga-ken, 6. V. 1976, C. Okuma leg.

Leucosceptrum stellipilum (Miq.) Kitamura et Murata "Mikaerisô"

Leaf vein, "Hamyaku-kobu-fushi" new host rec. *Lasioptera* sp.

Subglobular or spindle-shaped swellings on the mid-rib; major axis about 10.8 mm, minor axis about 8.0 mm. This gall is possibly caused by the same species as that produces the stem gall¹⁶⁾ on other *Leucosceptrum* species. Kifune, Kyoto-shi, 3. IV. 1980, M. Kato leg.

Leucosceptrum stellipilum (Miq.) Kitam. et Murata var. *tosaense* (Makino) Kitam. et Murata "Ômaruba-no-tenninsô"

Stem, "Kuki-kobu-fushi" new host rec. *Lasioptera* sp.

Subglobular or spindle-shaped swellings of the stem. This gall is quite similar to that¹⁶⁾ produced on *Leucosceptrum japonicum* (Miq.) Kitam. et Murata, and may be caused by the same or a closely related species. Ishizuchiyama, Ehime-ken, 16. X. 1980, J. Yukawa leg.

Plectranthus trichocarpus Maxim. "Kurobana-hikiokoshi"

Axillary bud, "Me-fukure-fushi" new name, new host rec. Midge not identified.

Axillary buds transformed into irregular swellings which dehisce later. This gall is similar to the bud gall, "Me-fukure"⁵⁾ produced on *Plectranthus inflexus* (Thunb.) Vahl, ex Benth., and is probably caused by the same or a closely related species. Saigawa-dam, Kanazawa-shi, 18. X. 1978, J. Yukawa & K. Nakamura leg.

Rubiaceae

Galium pseudoasprellum Makino "Ôba-yaemugura"

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

Relatively thin, circular or elliptical bristles produced on the leaves; bristle exhibiting brownish discolouration surrounded by a dark brownish ring; maximum diameter about 8.5 mm; each containing one midge larva (Fig. 15). Shikanoshima, Fukuoka-shi, 14. X. 1979, H. Ikenaga leg.

Galium kikumugura Ohwi "Kikumugura"

Bud, "Me-fukure-fushi" new name, new host rec. Adult unknown.

Terminal or lateral buds transformed into subglobular swellings, which are often produced continuously, resulted in irregular swellings; each gall containing 1 to 9 midge larvae. This gall is quite similar to the bud gall, "Me-fushi"¹⁴⁾ produced on *Galium varum* Linn. var. *trachycarpum* DC., probably caused by the same or a closely related species. Kamiozoegawa, Fuji-machi, Saga-ken, 20. V. 1976, C. Okuma leg.

Caprifoliaceae

Viburnum dilatatum Thunb. "Gamazumi"

Stem, "Eda-kobu-fushi" **new gall rec.** Midge not identified.

Irregular or subglobular woody swellings on the stem; maximum thickness about 8.0 mm; polythalamus; each larval cavity containing one midge larva (Fig. 16). Ageo-shi, Saitama-ken, 5. I. 1974, T. Sunose leg.; Minami-urawa, Saitama-ken, 27. II. 1977, S. Usuba leg.

Compositae

Aster ageratoides Turcz. var. *ovatus* (Fr. et Sav.) Nakai "Nokon-giku"

Flower, "Hana-hossu-fushi" new name, new host rec. Adult unknown.

Subglobular swellings of the flowers; height 7.0 to 11.0 mm, diameter 6.3 to 7.5 mm; green and smooth on surface, apically with a spine-like protuberance; a large larval cavity situated in the centre, containing many larvae. This gall is quite similar to the flower gall, "Hossu-fushi"^{10,11,19,21)} on *Aster scaber* Thunb., and is probably caused by the same species. Iôzan, Kanazawa-shi, 17. X. 1978, J. Yukawa & H. Ikenaga leg.

Aster ageratoides Turcz. var. *harae* (Makino) Kitam. forma *leucanthus* Honda "Yamashiro-giku" (= "Inaka-giku")

Flower, "Hana-hossu-fushi" new name, new host rec. Adult unknown.

This gall is practically the same as the flower gall, "Hossu-fushi"^{10,11,19,21)} produced on other species of *Aster* or other varieties of *A. ageratoides* (Fig. 17). Kanmuridake, Yamaguchi-ken, 18. X. 1980, J. Yukawa leg.

Bud, "Me-uroko-fushi" new name for "Shintome-fushi"⁵⁾, Adult unknown.

Terminal and axillary buds transformed into fir-cone-shaped swellings, consisting of many scale-like leaves; green or pale green, sometimes with a reddish or purplish tinge; height 4.0 to 13.0 mm, maximum diameter 3.0 to 8.0 mm; subconical larval chamber situated in the centre, containing 1 to 6 midge larvae. This midge gall is commonly observed on the relatives of *Aster ageratoides* Turcz. Tachibanayama, Fukuoka-shi, 5. XI. 1977, K. Yamagishi leg.; Terayama, Kagoshima-shi, 1. XI. 1978, H. Ikenaga leg.

Aster ageratoides Turcz. var. *harae* (Makino) Kitam. forma *ovalifolius* (Kitam.) Ohwi "Tamabashiro-yomena"

Bud, "Me-uroko-fushi" new name for "Shintome-fushi"⁵⁾, Adult unknown.

Practically the same as that produced on the above-mentioned forma of *Aster ageratoides* Turcz. Makihatayama, Niigata-ken, 6. X. 1975, K. Yamagishi leg.

Cacalia tebakoensis (Makino) Makino "Tebako-momijigasa"

Leaf, stem, "Ha-togari-kobu-fushi" new name, new host rec. Adult unknown.

This gall is practically the same as the leaf gall, "Togari-kobu-fushi"²¹⁾ produced on *Cacalia delphniifolia* Sieb. et Zucc., and is probably caused by the same species. Ishizuchi-yama, Ehime-ken, 16. X. 1980, J. Yukawa leg.

Chrysanthemum pacificum Nakai "Iso-giku"

Leaf, "Ha-ibo-fushi" new name, new host rec. Adult unknown.

Small, ovoid, brownish protuberances appearing on the leaves; major axis about 2.0 mm, minor axis about 0.7 mm. This gall is quite similar to the leaf gall, "Ibo-fushi"^{5,21)} or

“Hime-fushi”⁷⁾ produced on *Chrysanthemum morifolium* Hemsl. by the chrysanthemum gall midge, *Rhopalomyia chrysanthemum* Monzen⁶⁾, and is probably caused by the same species. Kurone, Niijima, Tokyo, 15. III. 1980, T. Sunose leg.

Artemisia princeps Pampan. “Yomogi”

Leaf, “Ha-hime-eboushi-fushi” new gall rec. Midge not identified.

Subconical, purplish red swellings on the under surface of the leaves; height 1.0 to 3.0 mm, maximum diameter 0.5 to 1.0 mm; each gall containing one midge larva (Fig. 18). This gall is similar to the leaf gall, “Eboushi-fushi”^{11,21)} (=“Ha-tsubo-fushi”³⁾) produced on the same host plant, but is easily distinguishable from it as follows: distinctly smaller in size; apically more sharply pointed; usually hypophyllous. Toso, Kagoshima-shi, 11. V. 1971, A. Mori leg.; Shiroyama, Kagoshima-shi, 9. VI. 1977, J. Yukawa leg.; Ishizuchi-yama, Ehime-ken, 16. X. 1980, J. Yukawa leg., Miyagi, Kunigami, Okinawa-ken, 11. XII. 1980, H. Ikenaga leg.

Ixeris dentata (Thunb.) Nakai var. *albiflora* (Makino) Nakai forma *amplifolia* (Kitam.) Hiyama “Ôbana-nigana”

Leaf, “Ha-fukure-fushi” new name, new host rec. Midge not identified.

This gall is quite similar to the brister gall, “Ha-fukure”^{5,21)} produced on the leaves of *Taraxacum platycarpum* Dahlst., and is probably caused by the same or a closely related species. Toyotaki, Sapporo-shi, 29. VIII. 1979, T. Sunose leg.

Summary

In the present paper, 39 sorts of midge gall on 35 plant species are described, together with the collecting data. Seventeen sorts of gall on 17 plant species are newly recorded from Japan, and they are briefly described under new Japanese names. Seventeen plant species and 4 varieties are newly recognized as host plants of gall midges, and one previously described gall is combined with a gall midge. The Japanese names of some previously described galls are changed into new names for a better understanding of their appearance and position on the plants.

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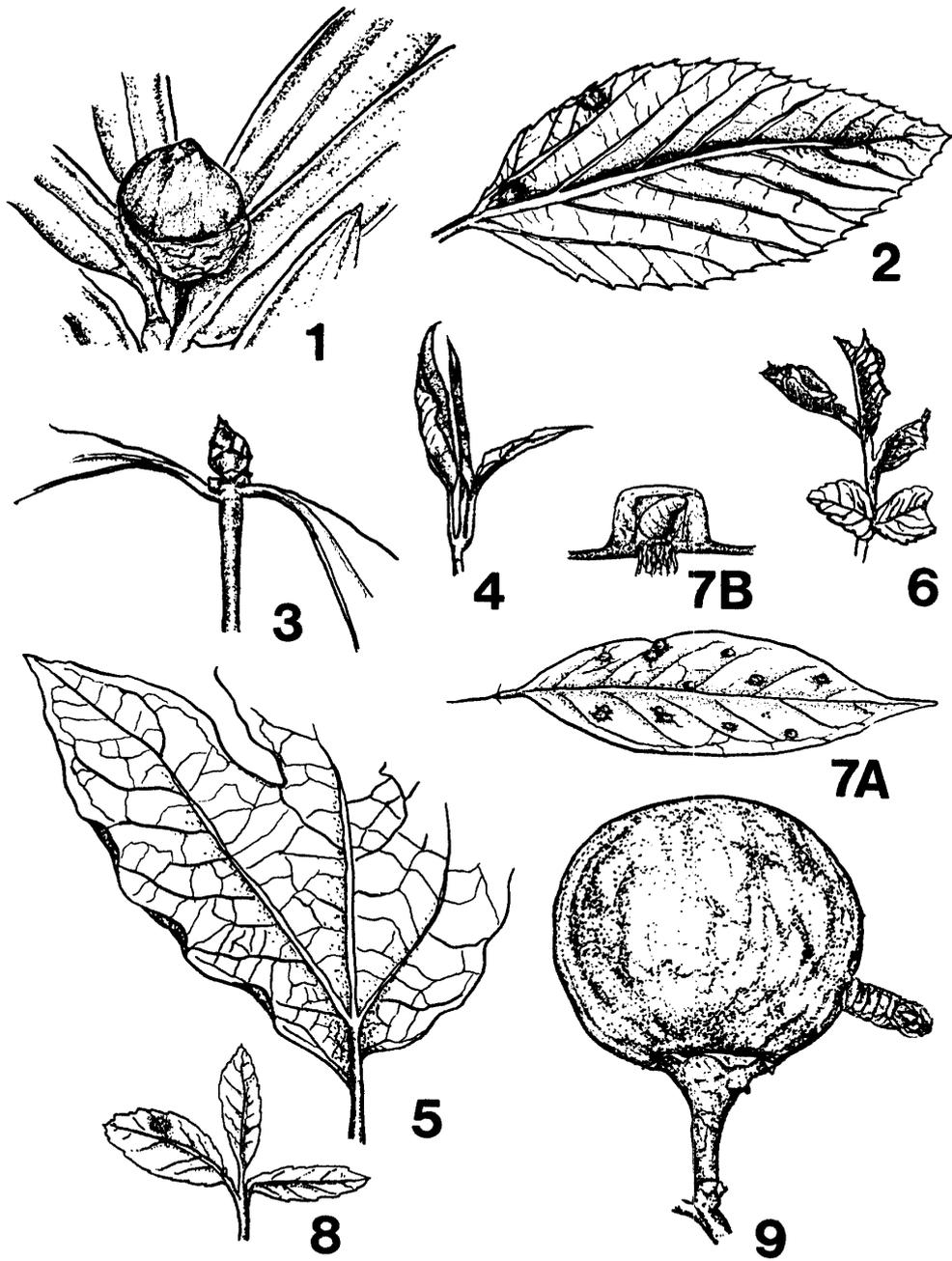
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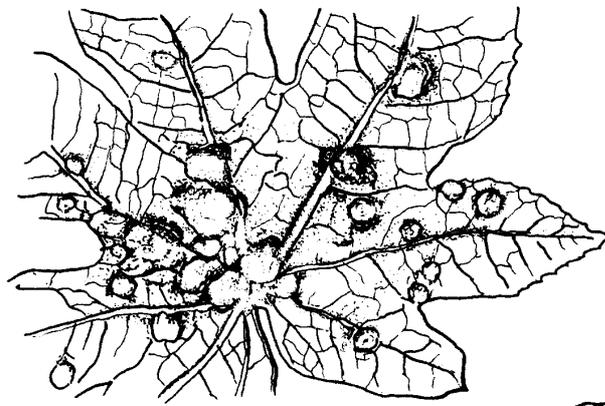
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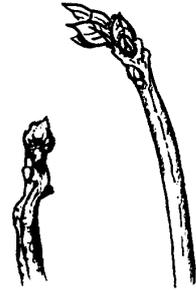
Explanation of figures

- Fig. 1. Fruit gall, "Mi-fukure-fushi" on *Taxus cuspidata*, "Ichii"
- Fig. 2. Leaf gall, "Ha-fukure-fushi" on *Aphanatha aspera*, "Mukunoki"
- Fig. 3. Bud gall, "Me-fukure-fushi" on *Illicium religiosum*, "Shikimi"
- Fig. 4. Leaf gall, "Haore-fushi" on *Machilus japonica*, "Hosoba-tabu"
- Fig. 5. Leaf gall, "Haber-maki-fushi" on *Parabenzoin trilobum*, "Shiromoji"
- Fig. 6. Leaf gall, "Ha-ore-fushi" on *Rosa rugosa*, "Hamanasu"
- Fig. 7A. Leaf gall, "Ha-ibo-fushi" on *Wisteria brachybotrys*, "Yama-fuji"
- Fig. 7B. *ibid.* (longitudinal section)
- Fig. 8. Leaf gall, "Ha-fukure-fushi" on *Ilex crenata*, "Inutsuge"
- Fig. 9. Fruit gall, "Mi-fukure-fushi" on *Celastrus orbiculatus*, "Tsuru-umemodoki"
- Fig. 10. Leaf gall, "Ha-tama-fushi" on *Boninofatsia oligocarpella*, "Habira-munin-yatsude"
- Fig. 11. Bud gall, "Me-fukure-fushi" on *Helwingia japonica*, "Hanaikada"
- Fig. 12. Bud gall, "Me-fukure-fushi" on *Menziesia multiflora*, "Urajiro-yôraku"
- Fig. 13. Bud gall, "Me-fukure-fushi" on *Vaccinium vitisidaea*, "Kokemomo"
- Fig. 14A. Flower bud gall, "Tsubomi-fukure-fushi" on *Glechoma hederacea*, "Kakidôshi"
- Fig. 14B. *ibid.* (longitudinal section)
- Fig. 15. Leaf gall, "Ha-fukure-fushi" on *Galium pseudoasprellum*, "Ôba-yaemugura"
- Fig. 16. Stem gall, "Eda-kobu-fushi" on *Viburnum dilatata*, "Gamazumi"
- Fig. 17. Flower gall, "Hana-hossu-fushi" on *Aster ageratoides* var. *harae* forma *leucanthus*, "Yamashiro-giku"
- Fig. 18. Leaf gall, "Ha-hime-eboushi-fushi" on *Artemisia princeps*, "Yomogi"

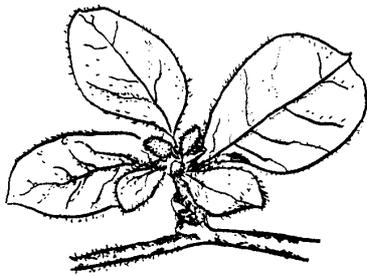




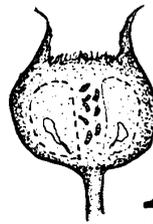
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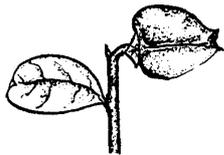
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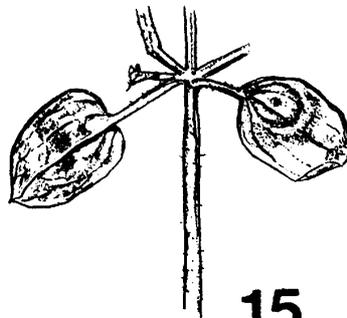
14B



14A



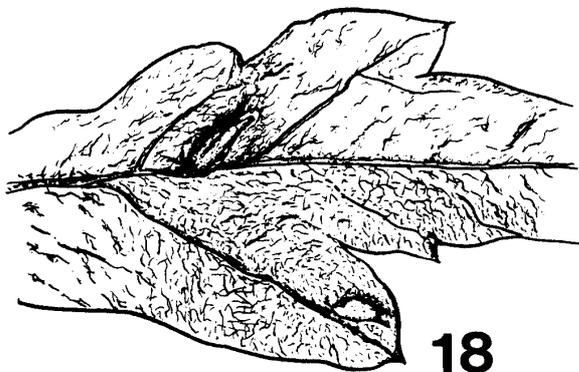
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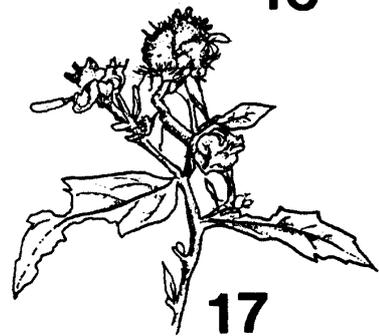
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