



Title	日本産桑屬の分類學的知見（一）：北海道及樺太産桑屬
Author(s)	堀田, 禎吉
Citation	札幌博物学会会報, 14(3), 193-206
Issue Date	1936-06-30
Doc URL	https://hdl.handle.net/2115/64180
Type	journal article
File Information	Vol.14No.3_007.pdf



CONTRIBUTIONS TO THE KNOWLEDGE OF THE SYSTEMATICS OF MORUS IN JAPAN. I

MORUS IN HOKKAIDO AND SAGHALIEN

BY

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(With one plate and five textfigures)

The writer has been engaged in systematic studies on the genus *Morus* since 1929, and is going to report in the present paper on the *Morus* in Hokkaido and Saghalien. Various papers have been hitherto written on the *Morus* in these districts by T. KAWAKAMI²⁾ K. MIYABE and T. MIYAKE³⁾, G. KOIDZUMI^{4), 5)} M. TATEWAKI⁶⁾, T. NAKAI⁷⁾, I. YAMAMOTO and K. TSUKAMOTO⁸⁾ K. MIYABE and Y. KUDO⁹⁾ and likewise by H. HARA¹⁰⁾. They have, however, dealt with merely *Morus bombycis* KOIDZ. and its variety *maritima* KOIDZ.

Morus LINN.

Morus LINN. Sp. Pl. ed. 1, p. 986 (1753)—BUREAU, in ALP. DC., Prodromus, Syst. Nat. Regn. Veg., XVII, p. 237 (1873)—BENTHAM et HOOKER,

- 1) Deep acknowledgement is due to the Prof. Emer. K. MIYABE and Prof. S. ITO who have given constant guidance, and to Prof. Y. TOCHINAI and Dr. M. TATEWAKI who have rendered kind advices.
- 2) KAWAKAMI, T.:—Icons of Forest Trees in Hokkaido, p. 116 (1902).
- 3) MIYABE, K. & MIYAKE, T.:—Moraceae in Flora of Saghalien, p. 407 (1915).
- 4) KOIDZUMI, G.:—Decades Plantarum Novarum vel Minus Cognitarum in Bot. Mag. (Tokyo), XXIX, p. 313 (1915).
- 5) KOIDZUMI, G.:—Synopsis Specierum Generis Mori in Bull. Imp. Sericult. Exp. Stat., II, 1, p. 13 (1923).
- 6) TATEWAKI, M.:—The Vegetation of Mt. Apoi, Prov. Hidaka in Research Bull. Exp. For., Fac. Agr., Hokkaido Imp. Univ., V. p. 80 (1928).
- 7) NAKAI, T.:—Vegetation of Mt. Apoi in the province of Hidaka, Hokkaido, p. 19 and 46 (1930).
- 8) YAMAMOTO, I. & TSUKAMOTO, K.:—Flora of Hakodate, p. 21 (1932).
- 9) MIYABE, K. & KUDO, Y.:—Flora of Hokkaido and Saghalien, IV, in Journ. Fac. Agr., Hokkaido Imp. Univ., XXVI, p. 482 (1934).
- 10) HARA, H.:—Preliminary Report on the Flora of Southern Hidaka, Hokkaido in Bot. Mag. (Tokyo), XLIIX, p. 811 (1934).

[Trans. Sapporo Nat. Hist. Soc., Vol. XIV, Pt. 3, 1936]

Gen. Pl., III, p. 364 (1880)—ENGLER in ENGLER u. PRANTL, Nat. Pfl. Fam., III, Abt. 1, p. 72 (1889)—C.K. SCHNEIDER, Illust. Handb. Laubholz., I, p. 235 (1906)—KOIDZUMI, Bull. Imp. Sericult. Exp. Stat., II, 1, p. 2 (1923)—NAKAI, Fl. Syl. Korea., XIX, p. 93 (1923).

**Key to the species, varieties and forms of *Morus* found
in Hokkaido and Saghalien**

1. Style long, divided into two parts of stigma at its apex.
 Sect. **I. Dolichostylae** KOIDZ. 2
 Style none or very short with sessile or subsessile stigma divided into
 two parts. Sect. **II. Macromorus** KOIDZ. 13
2. Wood under the cortex assumes a begonia rose colour during spring
 to autumn; branches pendent, and shoots in the lower part are pro-
 cumbent over the ground. *M. Yoshimurai* HOTTA
 Wood yellowish-white or bluish-white during all seasons; and shoots
 and branch usually erect. *M. bombycis* KOIDZ. 3
3. Teeth of the leaf cuspidate, and shortly aristate at the apex.
 var. *armatica* HOTTA
 Teeth of the leaf acute or obtuse, usually not aristate. 4
4. Leaf with dense hairs on both surfaces or only on the under surface. 5
 Both surfaces with a few short hairs, rarely hairless only on the under
 surface. 6
5. Both surfaces with conspicuous hairs. var. *Tozuana* HOTTA
 Under surface with conspicuous hairs.
 var. *pubescens* (YENDO) HOTTA
6. Upper surface of the leaf rugose. var. *rugosa* HOTTA
 Upper surface of the leaf usually even. 7
7. Both surfaces or under surface lustrous. 8
 Both surfaces not lustrous. 10
8. Upper surface of the leaf has a strong luster, the under has an oily
 luster. var. *illinita* HOTTA
 Leaf has a luster on either upper or under surface. 9
9. Leaf has a luster on the upper surface, and mesophyll of the leaf is
 thick. var. *maritima* KOIDZ.
 Leaf has a luster on the under, and the upper is smooth and matt
 var. *tsurikakensis* HOTTA
10. Petiole is slender, and has conspicuously long hairs on the whole
 surface, and mesophyll of the leaf is very thin.

- var. *sachalinensis* HOTTA
 Petiole and mesophyll of the leaf are medium in thickness and the
 petiole is more or less hairy usually in the groove.
 var. *typica* HOTTA 11
11. Petiole and young shoot are greenish-blue. 12
 Petiole and young shoot are bluish-white. ... f. *albicaerulea* HOTTA
12. Leaf lobate or not lobate. In the former case usually the length of
 the lobe is about half-way between the margin and midrib.
 f. *normalis* HOTTA
 Leaf is pinnatisect or pinnatifid and the segments are slender.
 f. *dissecta* NAKAI
 Lobes are usually shallow, and the segments are very anormal. ...
 f. *anormalis* HOTTA
13. Leaf is usually elliptical or ovate-elliptical, and dentate-serrate, and
 veins are thick. *M. latifolia*, var. *typica* HOTTA
 Leaf is oblong-ovate with smaller dentate-serrate teeth and the veins
 are very slender. var. *gracilis* HOTTA

Sect. I. *Dolichostilae* KOIDZUMI

Imp. Sericult. Exp. Stat., II, 1, p. 3 (1923).

(1) *Morus Yoshimurai* HOTTA, sp. nov.

Frutex; cortice fusca vel fuliginosa vel scabrida, ligno trunci ramulique tempestate calida incarnato (angl: Begonia rose colour*). Frutex primo vere odoratus. Juventus facillime flexibilis fere glabra; ramulis pendentibus infra procumbentibus terra, lenticellis brunneis ellipticis vel ovalibus vel rotundis irregulariter dispersis. Gemmae ovoideae acutae, perulis 5-6 rarissime 7, acutis utrinque fere glabriusculis coriaceis. Folia juniora supra nitida, venis dense albipubescentibus, subtus etiam dense pubescentibus; adulta utrinque fere scabrida, venis supra pubescentibus, subtus fere pubescentibus vel rarissime fere glabris, 4 vel 2-3 lobata; folia in superiore parte ramulorum non lobata; fere crassa, cordata vel ovalia, basi profunde vel aperte cordata, apice 2.3-2.5 cm. longa acuminata vel subito longa acuminata fere dentataque margine crenato-dentata vel dentato-serrata, rarissime duplo-serrata, dentibus semper mucronatis. Lamina fere 18 mm. longa, 15 cm. lata, nervis axillaribus 5-6; cystolitho fere papillato (Fig. 1), apice fere attenuato, petiolo pro lamina breve, 2.5-3 cm. longo, supra

* The descriptions as to colours conform with RIDGEWAY'S "Colour Standard and Nomenclature".

atropurpureo, glabro vel sulco petioli pubescente, sed non conspicuo. Stipulae linearilanceolatae caducae subtus sericeae. Amenta mascula pendula circ. 17 mm. longa, rarissime pedicellata; 5-7 floribus remotis, pediculis pilosis filiformibus circ. 15 mm. longis. Amenta feminea globosa vel ellipsoidea, 3-7 mm. longa, paucipluriflorifera; rachidibus pubescentibus.

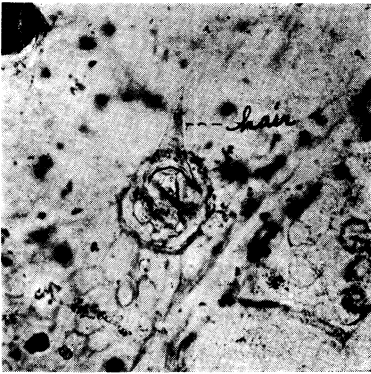


Fig. 1. Cystolith of a leaf of *M. Yoshimurai* HOTTA. 4×8
($\times 140$).



Fig. 2. Male flower of *M. Yoshimurai* HOTTA.

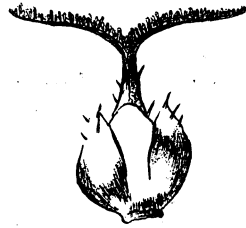


Fig. 3. Female flower of *M. Yoshimurai* HOTTA.

Perianthii masculii tepala 4 lanceolato-oblonga obtusa extus supra laeviter ciliolata, circ. 2.5 mm. longa; staminibus 4 filamentosis tepala superantibus (Fig. 2). Tepala feminei perianthii ovario approximata. Ovarium ovatum circ. 1.8 mm. longum. Stylus fere brevis 1.0 mm., stigmatibus 2 eum sessilibus, intus densissime longipuberulis (Fig. 3). Spicae fructiferae circ. 3-8 mm. longae, primo rubrae mox atratae.

Nom. Jap. *Sekizai-so*.

Nom. Vern. *Murasaki-gurwa*, *Shisekiei*, *Kusuri-gurwa*.

Hab. *Hokkaido*:

Prov. Shiribeshi: insula Okushiri. (cult.).

Remarks. The bark is rough and brown, wood under the cortex assumes a begonia rose colour in the warm seasons—from the beginning of spring to the end of autumn—branches pendent, and shoots in the lower part are procumbent over the ground. Leaves are cordate or ovate, apex long acuminate or abruptly long acuminate, margine crenate-dentate or dentate-serrate. Bud scales are 5. Petiole is short, 2.5-3 cm. in length, and reddish purple on the upper surface. Cystolith of mesophyll is conico-papillate in shape (Fig. 1).

Style is rather short, 1.0 mm. and stigma has small papillate hairs on the inside (Fig. 3).

The syconium is 3–8 mm., red at first turning black in time. According to Mr. EIKICHI FUKUDA, a villager of the Okushiri Island of Prov. Shiribeshi, this species, which is said to be very promising for the purpose of sericulture, was introduced from Yokohama. It had been carefully cultivated until some years ago, when an overflow of the Aonae River swept away most of the plant, leaving only some which are now growing as wild mulberry trees at several places in the island.

Prof. M. YOSHIMURA of the Kyôto Sericultural College, informed me of the so-called *Murasaki-guwa* (Purple Mulberry Tree) growing in the island of Okushiri; and he advised me to study it carefully. Thereupon I went over that island to study the plant at the spot, and also transplanted some into the experimental plot of the Agricultural Department of the Hokkaido Imperial University in order to make further observations. As a result I have found that this species is quite different from those hitherto reported in many respects; and I have described it in the present paper as a new species. Microscopic studies of hand sections of the wood, show that only wood parenchyma, vessels and medullary rays have a begonia rose colour, whereas the parts next to the pith are slightly coloured. The wood of the root is entirely colourless. The colouring matter in small sections of the wood is readily soaked out, when they are treated with sodium borate normal solution, acetone, glycerin, ammonium chloride and potassium hydroxide. The infusion in glycerin turned maize yellow in colour; that in potassium hydroxide orange buff, and that in dilute sodium hydroxide light orange yellow. In 1924 Prof. YOSHIMURA gave to the plant the name, *Sekizai-so** (Red Wood Mulberry) on account of its reddish wood.

(2) *Morus bombycis* KOIDZUMI

Morus bombycis KOIDZUMI, Bot. Mag. (Tokyo), XXIX, p. 313 (1915); Bull. Imp. Sericult. Exp. Stat., I, 3, p. 210, t. 6, fig. 1-2; t. 7, fig. 1 (1916); Bot. Mag. (Tokyo), XXXI, p. 36 & Bull. Imp. Sericult. Exp. Stat., III, 1, p. 32, t. 2, fig. a-b, d-g (1917); Bull. Imp. Sericult. Exp. Stat., II, 1, p. 10 t. 2, fig. a-b, d-g (1923)—NAKAI, Veg. Diamond Mts., 199, p. 170 (1918); Veg. Dagelet Isl., 113, p. 17 (1919); Fl. Sylv. Korea., XIX, p. 98, t. 29 A et 30 (1932)—MORI, Enum. Pl. Con., p. 124 (1922)—MAKINO & NEMOTO, Fl. Jap., p. 1085 (1925); Fl. Jap. ed. 2, p. 219 (1931)—MIYABE & KUDO, Icon. Ess. For.

* YOSHIMURA, M. & SAITO, K.:—Journ. Sakura-kai, no. 15, p. 107 (1924).

Trees Hokk., II, 23, t. 41 (1926); Icon. Ess. For. Hokk., XIV, t. 41 (1926)—TATEWAKI, Pl. Teshio Exp. For., I, p. 15; Veg. Mt. Apoi, p. 32 (1928)—MASAMUNE, Prel. Rep. Veg. Yakushima, p. 67 (1929)—YAMAMOTO & TSUKAMOTO, Fl. Hakodate p. 21—OHVI, Fl. Shikotan, p. 129 (1932)—HARA, Bot. Mag. (Tokyo), XLVIII, p. 811 (1934)—HATSUSHIMA, Report Exp. For., Fac, Agr., Kyushu Imp. Univ., 5, p. 54 (1934).

Syn. *Morus alba* (non LINN.) THUNBERG, Fl. Jap., p. 71 (1784)—NAKAI, Journ. Coll. Sci. Imp. Univ. Tokyo, XXXI, p. 193 (1911) pro parte.

Morus indica (non LINN.) THUNBERG, l. c. p. 76 (1784)—MIQUEL, Ann. Mus. Bot. Lugd. Bot., II, p. 198 (1866); Prol. Fl. Jap., p. 130 (1866); Cat. Mus. Bot. Lugd. Bot., p. 91 (1870).

Morus japonica (non AUDIB), SIEBOLD Verb. Bat. Genoot., XII, p. 27 (1830) nom. nud.; SIEBOLD et ZUCCARINI, Abh. Muench. Akad., IV, 3, p. 219 (1846), nom. nud.

Morus alba ò. *M. japonica* NOISETTE et ENDLICHER, Gen. Pl. Suppl., IV, p. 33 (1847).

Morus stylosa SERINGE, Descrip. Mur., p. 225 (1855), excl. var. 2 et 3.

Morus alba var. *stylosa* BUREAU, ALP. DC. Prodromus, XVII, p. 243 (1873), pro parte—KAWAKAMI, Bot. Mag. (Tokyo), XXII, p. 108 (1908) SHIRASAWA, Icon. Ess. For. Trees Jap., II, t. 6, fig. 1-11 (1908)—MATSUMURA, Ind. Pl. Jap., II, 2, p. 40 (1912)—NAKAI, Veg. Isl. Quelp., p. 39, no. 517 a (1914); Veg. Mt. Chirisan. p. 30, no. 152 (1915)—MIYABE & MIYAKE, Fl. Saghal., p. 407 (1915).

Morus alba var. *indica* (non BUREAU) FRANCHET et SAVATIER, Enum. Pl. Jap., I, p. 433 (1475)—PALIBIN, Acta. Petrop., XVIII, p. 191 (1900).

Morus longistyla (non SERING.) DIELS, Notes. Roy. Bot. Gard. Edinb., XXV, p. 293 (1910).

Morus acidosa (non GRIFF.) C. K. SCHNEIDER in SARGENT. Pl. Wils., III, p. 297 (1916), pro parte—REHDER, Manual, p. 197 (1927).

Morus japonica (non SIEB.) AUDIB in L. H. BAILEY, Standard Cyclop. Horticult. p. 2070 (1928)—YENDO et HIGUCHI, Traité sur la Cult. du Mûr. au Jap., p. 17 (1930), nom. seminud.

Nom. Jap. *Yama-guwa*, (*Noguwa*)*, (*Takinokawa-guwa*), (*Hokuno No. 10*), (*Dosan No. 6*), (*Sapporo-guwa*), (*Chitose-guwa*), (*Kamikawa-guwa*), (*Dosan-guwa*), (*Dosankairyoshu*), (*Sapporo-kireha*).

Nom. Vern. *Momiji-guwa*, *Keiso*, *Hana-guwa*, *Toza-guwa*, *Azami-guwa*, *Bara-guwa*, *Yabu-guwa*.

* The Japanese names written in the parenthesis are of the cultivating races.

Nom. Ainu. *Torepuni, Teshimani, Topemube.*

Hab. *Hokkaido:*

Prov. Oshima: Onuma (T. HOTTA, no. 2456, fl. ♀, ♂); Sikabe (T. HOTTA, no. 1277); Nanaye (T. HOTTA, no. 1088, fl. ♀ typus); Yunokawa (T. HOTTA, no. 1281, fl. ♀); Mt. Hakodate (K. MIYABE et Y. TOKUBUCHI, fr. ♀); Hakodate (I. YAMAMOTO, fl. ♂); Kamiiso (K. UCHIYAMA); Kikonai (T. HOTTA, no. 3865, fl. ♀, ♂); Tomonai (T. HOTTA, no. 1934, fl. ♀); Sumikawa (T. ISHIYAMA, fr. ♀); Fukuyama (T. HOTTA, no. 197, fl. ♀); Chiisago (T. HOTTA, no. 1283, fl. ♀); Ishizaki (T. HOTTA, no. 338); Yanosawa (F. C. GREATREX); Yesashi (T. HOTTA, no. 2334, fl. ♀).

Prov. Iburi: Kunnui (T. HOTTA, no. 124, fl. ♂); Oshamanbe (T. HOTTA, no. 2928, fl. ♂); Rebunge (K. MIYABE et K. HINO, fr. ♀); Matsukaribetsu (T. HOTTA, no. 3047, fl. ♀); Abuta (K. MIYABE); Toya (T. HOTTA, no. 143, fr. ♀); Horobetsu (T. HOTTA, no. 207, fl. ♀); Datemachi (S. OKADA); Muroran (T. HOTTA, no. 1284); Kuchan (T. HOTTA, no. 307); Shiraoi (T. HOTTA, no. 2115, fl. ♂); Morappu (Y. TOKUNAGA); Shikotsu muu (S. ITO, T. FUKUSHI et KAMEI); Tomakomai (Y. KUDO et Y. TOKUBUCHI).

Prov. Shiribeshi: Aonaye, insula Okushiri (T. HOTTA, no. 1203, fl. ♀); Tsurikake, insula Okushiri (T. HOTTA, no. 1120, fl. ♀); Hayaishizawa, insula Okushiri (S. YOKOYAMA); Kaitorima (T. HOTTA, no. 139, fl. ♀); Setana (T. HOTTA, no. 1275, fl. ♀, ♂); Konbu (T. HOTTA, no. 1933, fr. ♂); Iwanai (T. HOTTA, no. 1934, fl. ♂); OZAWA (T. HOTTA, no. 1932, fl. ♀); Yoichi (T. HOTTA, no. 132); Hariusu (T. HOTTA, no. 2485, fl. ♀, ♂); Zenibako (G. TAKEE, MURAYAMA, S. YABE et D. ABUMIYA).

Prov. Ishikari: Hort. Bot. Sapporo (T. HOTTA, no. 3083, fr. ♀); Soyen, Sapporo (T. HOTTA, no. 140, fr. ♂); Mt. Sankaku (T. HOTTA, no. 168, fr. ♀); Maruyama (M. TATEWAKI, no. 8103, fl. ♀); Hassamu, Mt. Teine (H. YANAGISAWA, fr. ♂); Nakashima, Sapporo (T. HOTTA, no. 193, fr. ♀); Nakanoshima (T. HOTTA, no. 3094, fr. ♀); Yamahana, Sapporo (T. HOTTA, no. 274); Hattaribetsu (M. NAGAI); Mt. Moiwa (G. YAMASA et Y. TOKUBUCHI, fr. ♀); Naebo, Sapporo (T. HOTTA, no. 193, fr. ♀); Toyohira, Sapporo (K. KAWAI, H. OTANI et M. SAKAMOTO); Hiragishi, Sapporo (T. HOTTA, no. 48, fl. ♂); Makomanai (T. HOTTA, no. 163); Mt. Ishikiri (T. HOTTA, no. 162); Soranuma (T. HOTTA, no. 2078); Jyozankei (T. HOTTA, no. 142); Motomura (T. HOTTA, no. 239); Barato (T. HOTTA, no. 161); Nopporo (T. HOTTA, no. 247, fl. ♀); Yebetsu (T. HOTTA, no. 169, fl. ♀); Iwamizawa (S. NAKAJIMA); Yuubari-tannai (M. TOKUBUCHI); Urausu (T. HOTTA, no. 1384); Takikawa (F. HIRAYAMA); Takasu (F. MATSUDAIRA).

Prov. Hidaka: Niikkapu (Y. MATSUMURA, no. 5860); Mitsuishi (T. HOTTA,

no. 3018, fl. ♀); Ogibushi (T. HOTTA, no. 1180, fl. ♀); Urakawa (T. HOTTA, no. 2337, fl. ♀, ♂); Horoizumi (T. HOTTA, no. 2079); Mt. Apô (K. KONDO).

Prov. Tokachi: Monbetsu (T. HOTTA, no. 2022, fr. ♀); Bîro (T. HOTTA, no. 1263); Obihiro (T. HOTTA, no. 1343).

Prov. Kushiro: Kushiro (T. HOTTA, no. 1087); Ponto, Akkeshi (H. SHIMADA, no. 9025, fl. ♀,); Teshikara (J. SASAKI, no. 5973); Kutcharo muu (K. MIYABE); Kutcharo-Oyokot (K. MIYABE, fr. ♀).

Prov. Nemuro: Planitics Nishibetsu (T. ISHIKAWA).

Prov. Kitami: Abashiri (Assoc. Indust. in Abashiri); Engaru (K. KOYAMA, no. 5710); Ikutahara (H. MAYEMORI, no. 5709); Oniwaki insula Rishiri (S. HORI, fl. ♂); Motodomari, insula Rishiri (W. HIROSE); Obiyatannai, insula Rishiri (N. SUZUKI, S. KOMIYA et K. SHIRAHAMA, fr. ♀); Funadomari, insula Rebun (M. TATEWAKI, no. 19422, fl. ♀); Shicotanmisaki, insula Rebun (M. TATEWAKI, no. 19422, fl. ♀); Shicotanmisaki, insula Rebun (M. TATEWAKI, no. 19422, fl. ♀); Shikotanmisaki, insula Rebun (M. TATEWAKI, no. 19518); Notsukeushi (M. TOMIDA, no. 9900, fl. ♀).

Prov. Teshio: Mashike, Mt. Ogon (M. TATEWAKI); Wassamu (Y. ADACHI, no. 9035, fl. ♀); Okiuchi (T. ISHIKAWA); Kotanbetsu (T. ISHIKAWA); Tentonosawa (M. TATEWAKI, no. 10816); Konpira (S. NINOMYA); Uto (K. ONUMA, no. 5873, fl. ♂ et no. 5874, fl. ♀); Tobetsu (K. HASEGAWA, no. 9027, fr. ♀); Menashibetsu (S. HORAZOME, no. 9029, fr. ♀); insula Teuri (S. KODAMA, fl. ♀); Nakagawa (M. YOSHIDA, no. 9898, fl. ♂); Teshio (K. HIROSE, no. 9957, fl. ♀).

Prov. Chishima: Umanose, insula Shikotan (M. TATEWAKI, no. 20549, fl. ♀, ♂); Mt. Masuba, insula Shikotan (M. TATEWAKI, no. 3604).

Hav. *Saghalien*:

Prov. Honto, Tanantomari, W. Litus (T. MIYABE); Konimura (Y. MIURA); insula Kaiba (S. TERASHIMA, fr. ♀); Shimizutani, insula Kaiba (T. MIYAKE, fl. ♀); Kitakotan, Todomoshiri (U. KIMOTO, D. MURAYAMA et G. TAKEE).

Prov. Tomarioro, Tomon (N. SIRASAKA).

Remarks. Cystolith of mesophyll is rather acute at apex, rarely crooked (Fig. 4).

Distr. Saghalien, Yezo, Honshu, Shikoku, Kiusiu, Korea, Manchuria et China.

var. ***armatica*** HOTTA, var. nov.

Folium fere herbaceum, serris cuspidatis, apice aristulato. Petiolus fere brevis.

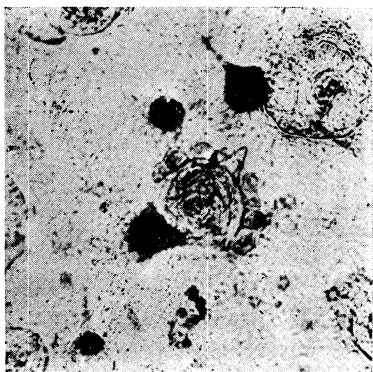


Fig. 4. Cystolith of a leaf of *M. bombycis* KOIDZ.
4 × 8 (× 140).

Nom. Jap. *Kabuto-guwa* (nov.).

Hab. *Hokkaido*:

Prov. Ishikari: Toyohira, Sapporo (T. HOTTA, no. 2094, fl. ♀, typus).

Prov. Teshio: insula Rishiri (S. KOMIYA, N. SUZUKI et K. SIRAHAMA).

Remarks. Leaf is rather thin, teeth of the leaf are cuspidate, and their apices rather short aristate. Petiole rather short.

Distr. Yezo.

var. ***Tozuana*** HOTTA, var. nov.

Folium utrinque insigniter pubescens, serris crenato-serratis vel dentato-serratis.

Nom. Jap. *Takatomo-guwa* (nov.).

Hab. *Hokkaido*:

Prov. Ishikari: Hiragishi, Sapporo (T. HOTTA, no. 1043, fl. ♀, typus); Toyohira, Sapporo (T. HOTTA, no. 1072); Chitose (T. HOTTA, no. 1311); Iwamizawa (T. HOTTA, no. 1311).

Prov. Iburi: Toya (T. HOTTA, no. 1238).

Remarks. Leaf has conspicuous hairs on both surfaces. Teeth of the leaf has conspicuous hairs on both surfaces. Teeth of the leaf are crenate-serrate or dentate-serrate.

Distr. Yezo.

var. ***pubescens*** (YENDO) HOTTA, comb. nov.

Syn. *Morus japonica* AUDIB, var. *pubescens* YENDO, Traité sur la Cult. du Mûr. au Jap., p. 17 (1930) nom. seminud.

Ramulus tenuis, fere declinatus. Folium subtus insigniter tomentosum.

Nom. Jap. *Keyama-guwa*, (*Ichimurasaki*), (*Suyematsudosan*).

Hab. *Hokkaido*:

Prov. Oshima: Futamata, Ideto (T. ISHIYAMA).

Prov. Teshio: Oniwaki, insula Rishiri (S. TERASHIMA, fl. ♀).

Prov. Iburi: Horobetsu (T. HOTTA, no. 1398).

Prov. Ishikari: Kottoni (T. Hotta, no. 1313, typus, cult., no. 49); Nakano-shima, Sapporo (T. HOTTA, no. 2993); Hiragishi, Sapporo (T. HOTTA, no. 1160).

Remarks. Branch is slender and rather pendent. Under surface of the leaf with many conspicuous hairs.

Distr. Yezo, Honshu.

var. ***rugosa*** HOTTA, var. nov.

Folium supra rugosum valde viride, apice acuminato vel subito lineari-attenuato. Petiolus fere brevis.

Nom. Jap. *Chizire-guwa* (nov.).

Hab. *Hokkaido*: in hortis culta.

Remarks. Upper surface of the leaf is rugose and has a deep green colour, its apex acuminate or abruptly linear-attenuate. Petiole is rather short.

Distr. Yezo.

var. ***illinita*** HOTTA, var. nov.

Folium utrinque fere glabriusculum, supra laeve, subchartaceum, subtus inunctum.

Nom. Jap. *Yogonokami*.

Hab. *Hokkaido*:

Prov. Oshima; Yesashi (T. HOTTA, no. 1210, fl. ♀, typus).

Remarks. Both surfaces are rather glabrous, the upper is smooth and is conspicuously lustrous, the under has also an oily luster.

Distr. Yezo.

var. ***maritima*** KOIDZUMI, Bull. Imp. Sericult. Exp. Stat., II, no. 1, p. 13, t. 31, A-E (1923)—NAKAI, Veget. Apoi, p. 19 et 46 (1930); Fl. Sylv. Korea., XIX, p. 101, t. 31 (1932)—MIYABE & KUDO, Fl. Hok. Saghal., IV, p. 483 (1934)—HARA, Bot. Mag. (TOKYO), XLVIII, 575, p. 811 (1934).

Folium lucidum subchartaceum supra fere laeve, adultum utrinque fere glabriusculum.

Nom. Jap. *Hama-guwa*, *Takeshima-guwa*.

Hab. *Hokkaido*:

Prov. Hidaka: Nikappu (Y. MATSUMURA, no. 5859); Mitsuishi (T. HOTTA, no. 1187, fl. ♀).

Prov. Oshima: Fukuyama (T. HOTTA, no. 195, fl. ♀); Yeramachi (T. HOTTA, no. 290, fl. ♀); Chiisago (T. HOTTA, no. 211, fl. ♀, typus); Ishizaki (T. HOTTA, no. 282, fl. ♀).

Distr. Yezo et Korea.

var. ***tsurikakensis*** HOTTA, var. nov.

Folium utrinque fere glabriusculum, supra laeve, subtus nitidum.

Nom. Jap. *Tsurikake-guwa* (nov.).

Hab. *Hokkaido*:

Prov. Shiribeshi: Tsurikake, insula Okushiri (T. HOTTA, no. 2287, fr. ♀, typus).

Remarks. Both surfaces of the leaf are glabrous, the upper surface is smooth, and the under has a luster.

Distr. Yezo.

var. ***sachalinensis*** HOTTA, var. nov.

Petiolus tenuis, omnino insigniter longi-pubescent. Folium parvum fere herbaceum.

Nom. Jap. *Himeyama-guwa* (nov.).

Hab. *Saghalien*:

Prov. Mauka: Hirozi (T. Suzuki,) fl. ♀, typus).

Prov. Tomarioro: Tomarioro (K. USUKI).

Remarks. The leaf is small and very thin. The petiole has conspicuous long hairs on the whole surface.

Distr. *Saghalien*.

form. ***albicaerulea*** HOTTA, f. nov.

Juventus albicaerulescens. Petiolus albicaerulescens plerumque omnino fere insigniter pubescens.

Nom. Jap. *Shiroe-guwa* (nov.).

Hab. *Hokkaido*:

Prov. Oshima: Yesashi (T. HOTTA, no. 9023 fl. ♀, Typu).

Remarks. Petiole and young shoot are bluish-white, and petiole usually has conspicuous hairs on the whole surface.

Distr. *Yezo*.

form. ***dissecta*** NAKAI, Fl. Sylv. Korea., XIX, p. 101, t. 29 B (1932). (New to *Yezo*).

Syn. *Morus alba* var. *stylosa* form *dissecta* NAKAI, Veget. Isl. Quelpaert, p. 39, no. 5176 (1914), nom. nud.

Folium pinnatifidum vel bipinnatifidum, lobis angustis.

Nom. Jap. *Hosoba-yamaguwa*.

Hab. *Hokkaido*:

Prov. Iburi: Toya (T. HOTTA, no. 1182, fl. ♀).

Prov. Ishikari: Soyen, Sapporo (T. HOTTA, no. 5844); Kotoni (T. HOTTA, no. 428, cult.); Mt. Sankaku (T. HOTTA, no. 242); Barato (T. HOTTA, no. 101, typus); Nopporo (S. IMAI, no. 5845); Horomui (K. MIYABE).

Prov. Shiribeshi: insula Okushiri (T. HOTTA, no. 112); Setana (H. YANAGISAWA, fl. ♀).

Prov. Oshima: Prope Nanae (F. C. Greatrex); Yeramachi (T. HOTTA, no. 1107); Yesashi (T. HOTTA, no. 1103).

Distr. *Yezo*, Honshu, Korea.

form. ***anormalis*** HOTTA, f. nov.

Segmenta folii valde anormalia; petiolo plerumque omnino fere insigniter pubescente.

Nom. Jap. *Okina-yamaguwa* (nov.).

Hab. *Hokkaido*:

Prov. Ishikari: Moiwa (T. HOTTA, no. 2425, fl. ♀, typus); Kotoni (T. HOTTA, no. 2453).

Remarks. Lobes are usually shallow, and segments are very anormal, and petiole usually has conspicuous hairs on the whole surface.

Distr. Yezo.

Sect. **II. Macromorus** KOIDZUMI

Imp. Sericult. Exp. Stat., II, 1, p. 4 (1923).

(3) ***Morus latifolia*** POIRET

Morus latifolia POIRET in LAMARCK, Encycl. Bot., IV, p. 381 (1796)—NAKAI, Journ. Arnold Arboret., VIII, p. 237 (1927); Fl. Sylv. Korea., XIX, p. 95 (1932).

Syn. *Morus tatarica* DESFONTAINES (non LINN.) Cat. Pl. Hor. Reg., III, p. 347 (1829).

Morus multicaulis (non RAF.) PERROTTET, Mem. Soc. Ann. Soc. LINN., II, p. 129 (1824); Ann. Erom., III, p. 338 et 341 (1831); Arch. Bot., I, p. 228 (1833)—SERINGE, Descrip. Mûr., p. 213 t. 18 (1855)—MIQUEL Ann. Mus. Bot. Rugd. Bat., II, p. 198 (1865)—MAKINO & NEMOTO, Fl. Jap., p. 220 (1931).

Morus cucullatta BONAFOUS, Mém. Cult. Mûr., p. 7 et Sul. Gel. Ph., p. 7 (1831).

Morus intermedia PERROTTET, Arch. Bot., I, p. 234 (1833).

Morus alba var. *multicaulis* LOUDON, Arb. Frut. Brit., III, p. 1348, fig. 1223 (1838).

Morus alba var. *macrophylla* MORETTI (non HORT.), Arb. Frut. Brit., p. 1349 (1838).

Morus alba var. *Lhou* SERINGE, Descrip. et Cult. Mûr., p. 208 (1855)—YENDO et HIGUCHI, Traité sur la Cult. du Mûr. au Jap. p. 21 (1930).

Morus alba var. *latifolia* BUREAU, ALP. DC. Prodrômus, XVII, p. 224 (1873), pro parte.

Morus Lhou KOIDUMI, Fl. Sym. Orientali-Asiaticae. p. 54 (1930), nom nud.

Nom. Jap. *Roso*, *Hiroba-gawa*.*

Nom. Vern. *Shina*, *Shina-guwa*, *Okame*, *Kairyomarba*, *Ohba*, *Ma-guwa*, *Maru-guwa*, *Mochi-guwa*.

Hav. *Hokkaido*:

Prov. Iburi: Datemachi (S. OKADA, fl. ♀, cult.).

* J. B. de LAMARCK:—Encyclopédie methodique de la Botanique. Paris, p. 381 (1796).

Prov. Ishikari: Hort. Bot. Sapporo (T. HOTTA, fl. ♀, cult.); Kotoni (T. HOTTA, fl. ♀, Cult.).

Prov. Kitami: Yesashi (Z. TAKIMOTO, fl. ♀, cult.).

Hab. *Hokkaido* et *Saghalien*.

The present species is cultivated in Hokkaido and Saghalien and it grows wild escaping from the cultivation.

Remarks. Cystolith of mesophyll is obtuse and papillate, and deeply placed in the tissue. (Fig. 5).

Distr. China.

var. *nervigracilis* HOTTA, var. nov.

Folium oblongi-ovatum dentato-serrulatum, nervis valde gracilis.

Nom. Jap. *Miura-roso* (nov.).

Hab. *Hokkaido*:

Prov. Kitami: Yesashi (Z. TAKIMOTO, no. 2248, fl. ♀).

Prov. Iburi: Datemachi (S. OKADA, no. 2251, fl. ♀ typus).

Remarks. Leaf is oblong-ovate with small dentate-serrate teeth, and veins are very slender.



Fig. 5. Cystolith of a leaf of *M. latifolia* POIRET. 4×8 ($\times 140$).

Botanical Institute, Faculty of Agriculture,
Hokkaido Imperial University, Sapporo Japan.

Explanation of Plate

Plate VI.

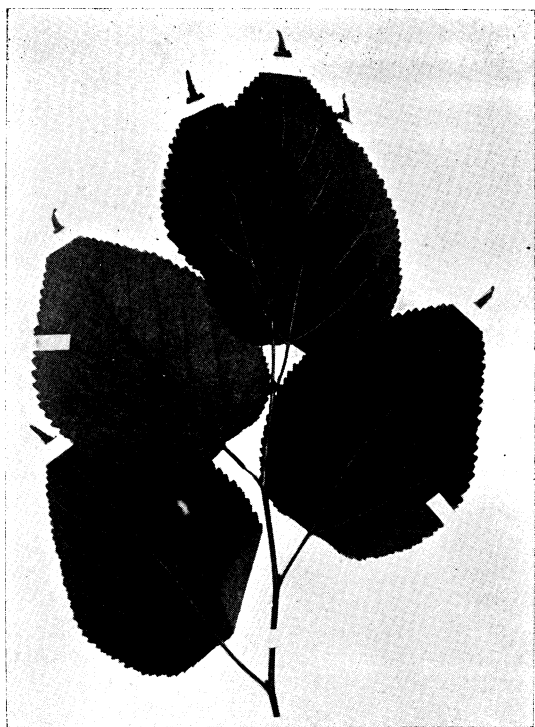
- a. *M. Yoshimurai* HOTTA.
- b. *M. bombycis* KOIDZ., var. *Tozuana* HOTTA.
- c. *M. bombycis* KOIDZ., var. *pubescens* (YENDO) HOTTA.
- d. *M. bombycis* KOIDZ., f. *anormalis* HOTTA.

摘 要

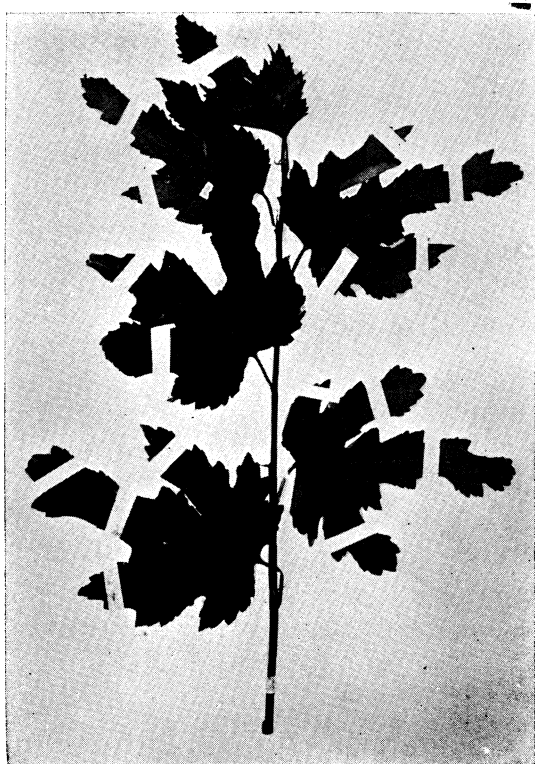
Morus Yoshimurai HOTTA の一新種の外 *Morus bombycis* KOIDZUMI var. *armatica*, var. *Tozuana*, var. *pubescens*, var. *rugosa*, var. *ilimita*, var. *nitida*, var. *sachalinensis* の七新變種、f. *albicaerulea*, f. *anormalis* の二新品種を創定し又 f. *dissecta* NAKAI を發見し、尙元明に栽培種と推定せらるゝ *Morus latifolia* POIRET に var. *nervi-gracilis* の一新變種を創定した。即北海道及樺太に産する桑屬は從來報告せられた *Morus bombycis* KOIDZUMI と其變種 var. *maritima* 及び *Morus latifolia* POIRET の二種一變種を合し三種九變種三品種となる。

尙 *Morus Yoshimurai* HOTTA の組織及び赤材部の色素、葉液の紫外線の吸收度の檢定等をも附記した。又葉肉部の房狀体は種類に依つてその特有の形態あることも確め得た。

更に分布に就きては從來報告せられたるものより其範圍が擴大せられ、樺太の北緯 47°80′、千島の國後島に迄産することが確認せられた。



c



d



b