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SHORT COMMUNICATION

The correct interpretation and lectotypification of the name *Cardamine fallax* (Brassicaceae)

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Abstract The name *Cardamine fallax* (O. E. Schulz) Nakai, based on *Cardamine flexuosa* subsp. *fallax* O. E. Schulz, is lectotypified by the specimen originating from Japan (Mama-mura, Shimosa) in accordance with the original description and with the current use of the name by the majority of Japanese and Korean authors. Contrary to the treatment in the recent editions of the *Flora of China* and *Flora of Japan*, hexaploid *C. fallax* is considered here as a taxon different from diploid *C. parviflora* L. The main morphological difference between these two species is in the shape of cauline leaves. Those of *C. parviflora* are pinnatisect (lower ones seldom pinnate), with oblanceolate to linear, entire or almost entire segments or leaflets, and those of *C. fallax* are pinnate, usually with petiolulate, lobate, pinnatipartite to pinnatisect leaflets. The distribution area of *C. fallax* includes Japan, Korea and Eastern China.

Keywords China · Cruciferae · Japan · Korea · Lectotypification · Nomenclature

Introduction

The genus *Cardamine*, one of the largest genera of the Brassicaceae family, comprises more than 200 species distributed on all continents except mainland Antarctica. Major centers of its diversity, inferred from the total number of species and abundance of local endemics, appear to be in the Far East and the Himalayas with about 70 representatives (Al-Shehbaz 1988). Nevertheless, unlike European species of the genus, to which considerable attention has been paid (summarized by Lihová and Marhold 2006), there are only few studies devoted to the Asian taxa. Here, we deal with the taxonomy and nomenclature of the Eastern Asian species *C. fallax* (O. E. Schulz) Nakai.

Cardamine fallax was originally described as *C. flexuosa* subsp. *fallax* O. E. Schulz from Japan and China, and later reported also from Korea. It is currently recognized by some as a separate species (Kitagawa 1982; Kudoh et al. 1993; Pak 2005) or as a subspecies (Kimata 1983) or variety (Ohwi 1972, 1984; Lee 1996; Cheo et al. 1987) of *C. flexuosa*. However, in the recent Flora of China (Zhou et al. 2001) and Flora of Japan (Al-Shehbaz et al. 2006), both *C. fallax* and *C. flexuosa* subsp. *fallax* have been included in the synonymy of *C. parviflora* L.

The lack of agreement among various authors about the taxonomic rank and status of *Cardamine fallax* prompted

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us to re-examine the problem more closely, especially in connection with *C. parviflora* and related species. The main and most apparent morphological difference between *C. parviflora* and *C. fallax* is in the shape of cauline leaves. While cauline leaves of *C. parviflora* are pinnatisect (lower ones sometimes pinnate), with 2–11 pairs of oblanceolate to linear, entire or almost entire segments or leaflets (Marhold 1995; Al-Shehbaz et al. in prep.), those of *C. fallax* are pinnate, with 3–8 pairs of usually petiolulate, lobate, pinnatipartite to pinnatisect leaflets, narrowly ovate to obovate in outline. The general habit of *C. fallax* is similar to that of *C. impatiens* L., a species with which it is often misidentified and confused. The latter species always has auriculate stem leaves, whereas *C. fallax* always lacks the auricles.

Consistent with the morphological differences between *Cardamine fallax* (sensu Japanese and Korean authors) and *C. parviflora*, molecular studies using both nrDNA ITS and cpDNA (*trnL-trnF*) sequence data (Lihová et al. 2006) showed that the two species belong to different, well-supported clades. Furthermore, *C. fallax* is hexaploid ($2n = 6x = 48$; Lihová, unpublished), whereas *C. parviflora* is diploid throughout its distribution area ($2n = 2x = 16$; for references see Kučera et al. 2005). As shown by Kudoh et al. (2006), *C. parviflora* in the original sense of Linnaeus (1753) is absent in Japan, and all reports of this taxon from Japan were based on misidentifications. Different origin and ploidy levels of European (tetraploid) and Asian (octoploid) populations of *C. flexuosa* (Lihová et al. 2006) preclude the infraspecific treatment of *C. fallax* within *C. flexuosa* and favor its status as a distinct species.

Nomenclature

In the protologue of *Cardamine flexuosa* subsp. *fallax*, Schulz (1903) cited several Japanese and Chinese specimens from herbaria such as B, GH, LE and US (listed as H. B., H. C., H. P. Ac. and H. N., respectively)—(for acronyms, see Holmgren et al. 1990). Part of this material was considered by Schulz (1903) as somewhat atypical, and for such specimens he coined the name *C. flexuosa* subsp. *fallax* f. *microphylla*. All specimens cited by Schulz from the Berlin herbarium (B) for *C. flexuosa* subsp. *fallax* and *C. flexuosa* f. *microphylla*, including all material of Chinese origin, were most probably lost during the fire in 1943 (Vogt, personal communication). The only two specimens identified by Schulz as *C. flexuosa* subsp. *fallax* f. *microphylla* and deposited currently in B were collected in 1904 and 1913, and they do not belong to the original material of that name. These two specimens, originating from China, were annotated by I. A. Al-Shehbaz in 2000 as *C. parviflora* and erroneously considered by Zhou et al. (2001) as "syntypes" of *C. flexuosa* subsp. *fallax*. Nevetheless, a duplicate of one of the specimens originally deposited in B (*Faurie 3032*) and cited by Schulz (1903) in the protologue, was found in KYO. The only specimen cited by Schulz (1903) from LE was not found in that herbarium during our visit in 2004, and it has been either lost or temporarily misplaced. Therefore, for the interpretation of the name *C. flexuosa* subsp. *fallax* and for its lectotypification, we are left with the specimens from the herbaria GH, US and KYO.

Altogether, there are five specimens, all originating from Japan, which should be considered as potential lectotypes of the name *Cardamine flexuosa* subsp. *fallax*:

(1) Japonia, s. dat., *s. coll.*, *s. n.* (Herb. Ludg. Batav.) (GH), annotated by O. E. Schulz on 24 Feb 1902 as *C. flexuosa* subsp. *fallax*.
(2) Japan, Nagasaki, 1862, *Oldham s. n.* (GH), annotated by O. E. Schulz on 24 Feb 1902 as *C. flexuosa* subsp. *fallax*.
(3) [Japan], Mama-mura, Shimosa, 11 May 1894, *s. coll.*, *s. n.* (US 00324475), annotated by O. E. Schulz on 12 March 1902 as *C. flexuosa* subsp. *fallax* (Fig. 1).
(4) [Japan], Simoda, s. dat., *[Perry] s.n.* (Perry's Expedition to Japan) (US 00324474), annotated by O. E. Schulz on 12 March 1902 as *C. flexuosa* subsp. *fallax*.
(5) [Japan], Yamakita, 8 May 1899, *U. Faurie 3032* (KYO).

There is only one specimen left, which belongs to the original material of the name *C. flexuosa* f. *microphylla*:

(6) [Japan], Simoda, s. dat., *C. Wright, s. n.* (Herbarium of the U. S. North Pacific Exploring Expedition under Commanders Ringgold and Rodgers, 1853–56) (GH), annotated by O. E. Schulz on 22 Feb 1902 as *C. flexuosa* subsp. *fallax* f. *microphylla* (Fig. 2, two plants on the right side of the herbarium sheet).

Specimens 3, 5 and 6 correspond well to the description of *Cardamine flexuosa* subsp. *fallax* and *Cardamine flexuosa* f. *microphylla*, respectively, as given in their protologues. They also all fit to the current concept of *C. fallax* (≡ *C. flexuosa* subsp. *fallax* ≡ *C. flexuosa* var. *fallax*) reported in the recent Japanese and Korean literature, as explained above. Specimen 1 very likely belongs to the taxon referred to by Lihová et al. (2006) as "Asian *C. flexuosa*" and treated by Schulz (1903) as *C. flexuosa* subsp. *debilis* O. E. Schulz. This is an octoploid taxon shown by Lihová et al. (2006) to be phylogenetically different from both the tetraploid native European *C. flexuosa* and hexaploid *C. fallax*. Its correct name at the species level remains to be resolved. Specimens 2 and 4 are fragmentary and, although they might belong to *C. fallax*, they cannot be excluded as "Asian *C. flexuosa*" (*C. flexuosa* subsp. *debilis*).

Fig. 1 Photograph of the lectotype of the name *Cardamine flexuosa* subsp. *fallax* O. E. Schulz [≡*Cardamine fallax* (O. E. Schulz) Nakai; courtesy of the US National Herbarium Type Collection (US 00324475)]

Fig. 2 Photograph of the lectotype of the name *Cardamine flexuosa* f. *microphylla* O. E. Schulz [=*Cardamine fallax* (O. E. Schulz) Nakai; courtesy of the Harvard University Herbaria, Cambridge, USA]

Taking into account the above-mentioned facts, we have decided to select as a lectotype of the name *C. flexuosa* subsp. *fallax* specimen 3, which will fix the correct application of the name according to Japanese and Korean authors (Kitagawa 1982; Kudoh et al. 1993; Pak 2005).

Specimen 6 represents the only extant original material of *Cardamine flexuosa* f. *microphylla*, and it is selected here as the lectotype of this name, which is considered by us as a synonym of *C. fallax*.

Cardamine fallax (O. E. Schulz) Nakai, Rep. Veg. Ooryongto: 19. 1919.

≡ *Cardamine flexuosa* subsp. *fallax* O. E. Schulz, Bot. Jahrb. Syst. 32: 478. 1903.

Ind. loc.: "Japonia: ex Herb. Lugd. Batav. (H. B., H. C.), Schimosa ad Mama-mura 1894 sub nomine *C. impatiens* (H. N.), pr. Simoda leg. Perry (H. N.), pr. Nagasaki leg. R. Oldham 1862 (H. B., H. C.), Jamakita leg. Faurie 1899 n. 3032 (H. B.)".

Lectotype (here designated): [Japan], Mama-mura, Shimosa, s. coll., s. a., 11 May 1894 (US 00324475) (Fig. 1).

≡ *Cardamine flexuosa* var. *fallax* (O. E. Schulz) Nakai, J. Coll. Sci. Imp. University Tokyo 31: 441. 1911 ["*Cardamine flexuosa* var. *fallax* (O. E. Schulz) T. Y. Cheo and Fang", Bull. Bot. Lab. N. E. Forest. Inst., Harbin 1(6): 23. 1980 (isonym)].

≡ *Cardamine scutata* subsp. *fallax* (O. E. Schulz) H. Hara, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6(2): 59. 1952.

= *Cardamine flexuosa* f. *microphylla* O. E. Schulz, Bot. Jahrb. Syst. 32: 478. 1903.

Ind. loc.: "Japonia: leg. Ph. Fr. De Siebold 1859–63 (H. P. Ac.), pr. Simoda [leg.] C. Wright 1853–56 (H. C.); China: prov. Schen-si sept. ad Sce-kin-thuen leg. Gius. Giraldi 1897 (H. Biondi n. 3391 in H. B.), ad Lao-y-san leg. idem (H. Bi. n. 3374 in H. B.), Schen-si merid. pr. Ko-lu-pa leg. idem 1895 (H. Bi. n. 444 H. B.)".

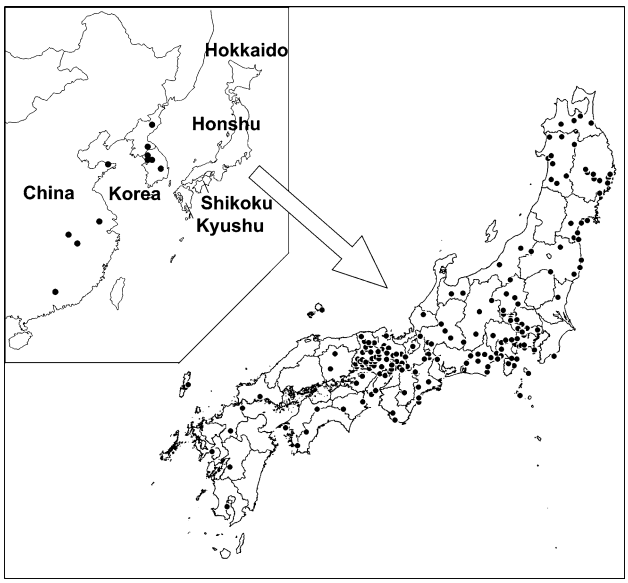

Fig. 3 Map showing the geographic distribution of *Cardamine fallax* (O. E. Schulz) Nakai

Lectotype (here designated): [Japan], Simoda, s. dat., *C. Wright, s. n.* (Herbarium of the U. S. North Pacific Exploring Expedition under Commanders Ringgold and Rodgers, 1853–56) (GH) (Fig. 2, larger plant on the right side of the herbarium sheet).

Distribution and ecology

Based on the study of herbarium specimens from AKPM, B, GH, KYO, MAK, PE, TI, TNS, TUS, US (for acronyms see Holmgren et al. 1990), Shoei Junior College and Iwate Prefectural Museum (both in Japan), the species is restricted to Eastern China, the Korean Peninsula and Japan (Fig. 3). In Japan, it occurs on the islands of Honshu, Kyushu and Shikoku but seems to be absent from Hokkaido (Fig. 3). The species is a strict winter annual, and its seeds germinate in autumn and overwinter as rosettes. The flowering periods are from late April to June (Kudoh et al. 1993). The species does not occur on dry or water-logged soils, and in Japan it grows along forest edges, roads and rivers, where the density of vegetation covers are reduced by mowing or flooding during the summer period. The flowers of the species are self-compatible and produce many seeds, presumably through self-pollination.

Representative specimens

SHO and IWPM represent herbaria of Shoei Junior College, Kobe, Japan and Iwate Prefectural Museum, Morioka, Japan, respectively; other acronyms are listed in the Index Herbariorum (Holmgren et al. 1990). A complete list of revised specimens is included in the Electronic Supplementary Material.

JAPAN. Aomori Pref.: Aomori (1900/5, *U. Faurie s.n.*, KYO); Aomori (1907/5/20, *U. Faurie 6184*, KYO); Hirosaki (1904/5/27, *U. Faurie 6182*, KYO); Kamikita-gun, Shiwa-mura, Yoita (1946/5/14, *U. Narita s.n.*, TI); Higashitsugaru-gun, Natsudomari-hanto (1951/5/27, *K. Hosoi s.n.*, TI). **Iwate Pref.:** Hayachine (1905/6, *U. Faurie 6971*, KYO); Rikuzen, Takekoma-mura (1934/5/27, *S. Sasamura 1201*, IWPM); Riktyu, Shiwa-gun, Enzan-mura (1935/5/27, *G. Toba 97002*, TNS); Rikutyu, Ohtsuchi-machi (1936/5/9, *S. Sasamura 83462, 83463*, IWPM); Rikutyu, Kassimura, Kogawa-onsen (1936/6/7, *S. Sasamura 1200*, IWPM). **Akita Pref.:** Ugo, Kitaakita-gun, Yamase-mura, Shigeya (1935/5/19, *M. Matuda 97098*, TNS); Akita-shi, Tegata (1955/5/17, *K. Takeuchi s.n.*, AKPM); Kazuno-shi, Shibauchi (1965/5/21, *H. Yoneda s.n.*, AKPM); Yatsumori-machi, Yakushidake (1973/5/20, *S. Takahashi s.n.*, AKPM); Hachirogata-machi, Takadakeyama (1978/5/12, *J. Takada s.n.*, AKPM). **Miyagi Pref.:** Rikuzen, Rihu (1950/5/13, *J. Chida s.n.*, TUS); Monou-gun, Naruse-machi, Miyatojima (1981/5/4, *H. Ohashi et al. 10875*, TUS); Sendai-shi, Kawauchi (1981/5/26, *A. Takehara 363*, TUS); Kakuda-shi, Shimada, Takase Pass (1987/5/11, *T. Mori 4916*, TUS); Watari-gun, Yamamoto-machi, Yamadera (1990/4/30, *T. Mori 7411-1*, TUS). **Fukushima Pref.:** Iwashiro, Bentenyama (1901/5/2, *Y. Nakahara s.n.*, TI); Nishisirakawa-gun, Saigo-mura, Shinkashi (1989/5/13, *N. Fukuoka & N. Kurosaki 4643*, SHO); Naraha-gun, Hirono-cho, Kamiasamigawa, Asami-gawa Gorge (1993/5/17, *K. Yonekura 93372*, TUS); Iwaki-shi, Ohisa-cho, Ohisa, Ohisa-gawa River, Mitsumori Gorge (1993/5/17, *K. Yonekura 93356*, TUS); Futaba-gun, Namie-machi, Takasegawa-keikoku, Komaru (1994/4/26, *T. Fukuda & S. Matsumura 255*, TUS). **Gunma Pref.:** Kouzuke, Nishimaki-mura (1953/5/10, *T. Wakana 117300*, TNS); Tsukigata-mura, Ozawa (1954/4/23, *T. Wakana s.n.*, MAK); Kouzuke, Maebashi (1955/5/13, *T. Takei s.n.*, TNS); Kitagunma-gun, Komochi-mura (1960/4/27, *T. Takei s.n.*, MAK); Tano-Gun, Onishi-machi, Takenokaito (1975/4/27, *J. Murata et al. 277*, KYO). **Ibaragi Pref.:** Gozenyama (1928/5/20, *M. Sato 45*, TI); Mitsukaido-shi, Kokai River (1999/4/26, *H. Kudoh & S. Aoki 99-042*, MAK). **Chiba Pref.:** Awa, Amatsu (1952/4/20, *K. Komatsuzaki s.n.*, TNS); Awa-gun, Mt. Kiyosumi (1976/5/11, *H. Ohashi & Y. Tateishi s.n.*, TI). **Saitama Pref.:** Chichibu (1878/4/29, *Anonymous s.n.*, TI); Mt. Izugadake (1937/5/16, *T. Tuyama s.n.*, TI); Kaahuri-toge (1960/5/15, *Y. Meshiizumi s.n.*, MAK); Musashi, Ryojin-yama (1968/5/18, *M. Fugashi s.n.*, TI); Chichibu, Tochimoto (1970/5/24, *S. Kurosawa & M. Togashi s.n.*, KYO). **Tokyo Pref.:** Izu,

Oshima, Okatamura (1887/4/18, *Anonymous s.n.*, TI); Tokyo (1900/5, *U. Faurie 3967*, KYO); Hachioji-shi, Mt. Takao (1903/4/21, *T. Makino 119911*, KYO, TUS); Toda (1920/4/18, *K. Hisauchi 927*, TI); Musashi, Kariyose-yama (1930/5/8, *T. Nakai s.n.*, TI). **Kanagawa Pref.:** Sohsyu, Ohyama (1900/5/18, *S. U. s.n*., TI); Hiratsuka (1927/5/15, *M. Honda s.n.*, TI; 1927/5/15, *S. Nakajima s.n*., TI); Sohsyu, Jinmu-ji (1938/5/20, *K. Yamatsuta 1513*, TNS); Tanzawa, Yabitsu-touge (1952/5/5, *H. Kanai s.n.*, TI). **Yamanashi Pref.:** Ashiyasu-mura, Momonoki-kosen (1954/4/24, *T. Yamazaki s.n.*, TI); Huruseki-mura, Neko, Misaka Mts. (1956/4/28, *H. Kanai s.n*., TI); Minamitsuru-gun, Kawaguchiko-cho, Ubuyagasaki (1962/5/29, *G. Murata 16266*, KYO); Ohchi-touge (1966/4/29, *C. Okawa s.n.*, TNS); Tsuru-shi, Mt. Kuki (1975/4/23, *T. Yamazaki 793*, KYO, TI). **Nagano Pref.:** Shimashimadani (1933/5/7, *H. Kiyosawa s.n.*, TNS); Matsumoto-shi (1953/5/8, *G. Koidzumi 43234*, TNS); Kamiina-gun, Minakata-mura, Ohgusa (1956/5, *Y. Karayama s.n.*, MAK); Chiisagata-gun, Sanada-cho, Kakuma Gorge (1977/5/24, *G. Murata et al. 30303*, KYO); Iida-shi, Tatsue, Garyukyo (1992/5/5, *K. Asano & H. Asano 53609*, MAK). **Niigata Pref.:** Minamiuonuma-gun, Ueda-mura, Kinjyo-san (1950/5/8, *Y. Huruse s.n*., MAK); Higashikanbara-gun, Tsugawa-machi, Kirin-san (1950/5/26, *T. Nakai & Maruyama s.n*., TNS); Kashiwazaki-shi, Hachikoku-san, Kunogi-toge (1973/5/5, *S. Iwano 15610*, KYO); Gosen-shi, Satori, Sakihanaonsen (1985/5/10, *I. Itoh 26571*, TI, TUS). **Toyama Pref.:** Ettyu (1937, *R. Kotoh s.n.*, KYO); Nei-gun, Tomikawa-mura, Shimoyoshikawa (1939/5/10, *R. Kotoh 37*, KYO); Nakaniikawa-gun, Kamiichi-machi, Inamura (1989/4/19, *H. Kudoh 89913*, MAK, SHO). **Gifu Pref.:** Gujyo-gun, Shirotori-cho (1939/5/15, *Y. Araki 14895*, KYO); Ibi-gun, Kasuga-mura, Ashiuchi-dani (1963/5/24, *N. Fukuoka 5662*, KYO); Ibi-gun, Ikeda-cho, Kasumagakei (1968/5/8, *K. Hasegawa s.n*., TI); Gujyo-gun, Hachiman-cho, Aioi (1979/5/6, *N. Kurosaki 10219*, KYO, SHO, TUS); Kamo-gun, Hichiso-ch, Katsu (1994/4/29, *N. Nimura 11277*, TNS). **Shizuoka Pref.:** Suruga, Shida-gun Setonoya-mura (1930/5/4, *D. Shimizu s.n*., TI); Abe-gun, Shizuhata-mura (1935/5/5, *H. Koidzumi 95710, 95711*, TNS); Atami-shi, Mt. Izusan (1938/2/27, *T. Makino s.n*., KYO, TI, TUS); Suruga, Mt. Fuji (1943/6/19, *R. Endo s.n*., TUS); Idzu, Toda (1947/4/27, *K. Teramoto s.n*., TI). **Aichi Pref.:** Mikawa, Toyone-mura, Shimokurokawa (1962/4/29, *K. Torii s.n.*, KYO); Minamishitara-gun, Horai-cho, Horaiji-san (1987/5/2, *M. Shimizu 6024*, SHO). **Mie Pref.:** Owase, Uotobi (1938/5/2, *N. Yasui s.n.*, KYO); Inabe-gun, Nishifujiwara-mura, Mt. Fujiwara-dake (1955/5/1, *G. Murata 8641*, KYO); Mt. Fujiwara-dake (1956/5/5, *S. Kurosawa s.n*., TI); Owase-shi, Kochidani (1959/4/25, *Y. Koze 35*, TNS). **Shiga Pref.:** Echi-gun, Eigenji – Mandokoro (1955/4/29, *G. Murata 8564*, KYO); Ika-gun, Yogo-machi, Obara, (1984/5/3, *Y. Tateishi & H. Hoshi 13769*, TUS); Lake Biwa, Takashima-gun, Shinasahi-cho, north of Fukamizo and Harie (1993/5/6, *S. Fujii 3574*, KYO, TUS); Takashima-gun, Shinasahi-cho, east of Harie (2001/5/22, *H. Kudoh & S. Fujii 01-108*, MAK); Lake Biwa, Takashima-gun, Shinasahi-cho, east of Harie (2002/4/24, *S. Fujii et al. 9042*, MAK, SHO; 2002/4/24, *J. Lihová, K. Marhold & H. Kudoh s.n.*, SAV). **Fukui Pref.:** Maruoka-cho, Jyouryu-san (1996/6/7, *T. Wakasugi 43043*, SHO). **Kyoto Pref.:** Hodzu-gawa (1922/4/26, *G. Koidzumi s.n*., KYO); Tanba, Mitake-mura (1930/4/20, *Y. Araki 4040*, KYO); Uji-gawa (1930/5/10, *G. Koidzumi s.n*., KYO); Kasa-gun Oheyama (1931/5/3, *Y. Araki 4049*, TI); Uji (1931/5/23, *S. Kitamura s.n.*, KYO). **Nara Pref.:** Anou (1935/4/15, *Y. Ogawa 8*, TI); Kawakami-mura, Yoshino river, Shimotako (1993/5/7, *H. Kato & M. Kuribayashi 930122*, KYO); **Osaka Pref.:** Minoh (1929/4/28, *H. Ui s.n*., KYO; 1931/5/10, *H. Ui s.n.*, TI); Mishima-gun, Minoh (1955/5/8, *G. Murata 8791*, KYO); Hirakata (1981/5/1, *K. Tsuchiya 1504*, KYO); Takatsuki-shi, Banda (2004/5/2, *N. Kurosaki 24153*, SHO). **Wakayama Pref.:** Nishimuro-gun, Shimohaya-mura (1911/4/20, *I. Ui s.n*., KYO); Nishimuro-gun, Tanabe-cho (1929/4/15, *T. Nakazaki s.n*., TI); Nishimuro-gun, Hikigawa-cho, Atagi (1993/4/21, *M. Sakota 829*, SHO). **Hyogo Pref.:** Kobe (1892/4/30, *U. Faurie 7848*, KYO); Kobe (1922/5, *T. Makino s.n*., KYO, TI, TUS); Izushi-gun, Ajiyama-toge (1933/4/23, *Y. Araki 4046*, SHO); Asako-gun, Dandangamine (1934/5/13, *Y. Araki 6898*, KYO, TI); Hikami-gun, Sannan-cho (1940/4/15, *S. Hosomi 1817*, SHO). **Okayama Pref.:** Maniwa-gun, Yubaraonsen (1959/5/3, *G. Murata 12422*, KYO); Takahashi-shi, Tamagawa-cho, Funatsu – Kouzaki (1988/9/5, *N. Kurosaki 16394*, SHO). **Shimane Pref.** Oki-gun, Saigo-cho, Araki – Mt. Daimanji-san (1979/4/20, *N. Kurosaki 9974*, KYO, SHO). **Yamaguchi Pref.:** Yamaguchi-shi, Nagahama (1969/4/11, *K. Oka 32679*, TI). **Kagawa Pref.:** Syodo-gun, Shodo-shima (1962/5/7, *K. Izawa 3058*, MBK); Shodo-shima, Shodo-gun, Uchinomi-cho, Kankakei (1999/4/27, *T. Shimizu & F. Konta 19054*, TNS). **Tokushima Pref.:** Tokushima (1938, *T. Makino s.n*., KYO); Ashyu, Shiroyama (1957/6/7, *H. Kimura s.n*., TI); Miyoshi-gun, Higashiiyayama-mura, Mt. Tsurugi-san, Nishijima – Tsurugi jinjya (2002/5/25, *N. Kurosaki 23329*, SHO). **Ehime Pref.:** Nii-gun, Saijyo-mach, Hotokezaki (1939/4/25, *K. Ochi 23*, TI); Mt. Kokenzan, Kitauwa-gun, Hiyoshi-mura – Kochi Pref., Takaoka-gun, Yuzuhara-machi (1983/4/11, *J. Murata 15020*, TI); Nishiuwa-gun, Seto-cho, Shionari – Kawanohama (2005/4/25, *K. Miyagi & H. Kudoh M-0203*, SHO). **Kochi Pref.:** Takaoka-gun (undated, *T. Makino s.n*., TI); Takaoka-gun, Higashitsuno-mura, Ochimen, Shinden – Tanono (1959/5/23, *G. Murata & T. Shimizu 2441*, KYO). **Fukuoka Pref.:** Mii-gun, Kitano-machi, Ohki (1997/3/23,

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