Su-Juan Lin\textsuperscript{a,\*}, Takeshi Suzuki\textsuperscript{b}, Atsushi Ebihara\textsuperscript{c}, Haisheng Lu\textsuperscript{d}, Jianqiu Liu\textsuperscript{d}, Sugong Wu\textsuperscript{e} and Kunio Iwatsuki\textsuperscript{b}: A New Record of \textit{Polystichum otomasui} Sa. Kurata (\textit{Dryopteridaceae}) from Fujian Province, China

\textsuperscript{a}Department of Biological Science, Faculty of Life and Environmental Science, Shimane University, Nishikawatsu 1060, Matsue, Shimane, 690-8504 JAPAN
\textsuperscript{b}Museum of Nature and Human Activities, Hyogo, 6, Yayoigaoka, Sanda, Hyogo, 669-1546 JAPAN
\textsuperscript{c}Department of Botany, National Museum of Nature and Science, 4-1-1, Amakubo, Tsukuba, 305-0005 JAPAN
\textsuperscript{d}College of Life Science, Fujian Normal University, Fuzhou, Fujian, 350108 P. R. CHINA
\textsuperscript{e}Kunming Institute of Botany, Chinese Academy of Sciences, 132, Lanheilu, Kunming, Yunnan, 650204 P. R. CHINA
\textsuperscript{\*}Corresponding author: sjlin@life.shimane-u.ac.jp

Summary: \textit{Polystichum otomasui} Sa. Kurata, which had been regarded as an endemic fern to Japan, was discovered in the Wuyi Mountains, Fujian Province, South East China. Cytological investigations confirmed that the new collections were sexual diploids with a chromosome number of $2n = 82$ ($x = 41$) and there were 64 spores per sporangium. These morphological data (including spore perisporis) accorded with the characteristics of the Japanese \textit{Polystichum otomasui}.

The evergreen fern \textit{Polystichum otomasui} Sa. Kurata (\textit{Dryopteridaceae}) was known as a Japanese endemic, distributed in an extremely restricted area on humus-rich floor of mountain forest in Kyusyu, Japan (Kurata 1963, Nakaike 1992, Iwatsuki 1992, Mitsushima et al. 2009). In our field researches on “The comparative study of evergreen forests of Japan and Southern China” during 2006–2007, thirteen plants of \textit{Polystichum} that resembled the Japanese \textit{P. otomasui} were collected from three populations in Wuyishan National Nature Reserve, Fujian province. One population with only several plants was found on a light slope by a stream under a secondary \textit{Lithocarpus} forest of Xianfengling at 1500 m altitude, and another two populations with more than ten individuals each were found in an Old Tree Village (1100 m alt.) and Tongmuguan (1700 m alt.) in the shady and humid floors along small streams, under mixed \textit{Phyllostachys heterocycla}, \textit{Lithocarpus} and \textit{Tsuga} evergreen forests. The field research area was further enlarged to Mt. Emeifeng (1714 m alt., 27°03′N, 116°48′E), the southwestern part of the Wuyi Mountains (Fig. 1) in 2008, where a big population (more than a hundred individuals) was found on a path slope under the broadleaf evergreen forest.

A comparative study was carried out between the Chinese collections and Japanese \textit{Polystichum otomasui}, and the specimens collected from the Wuyi Mountains were confirmed to be \textit{P. otomasui}, which is a new record in China (Fig. 2).

Morphology

\textit{Polystichum otomasui} is closely related to \textit{P. makinoi} (Tagawa) Tagawa. It was described as having shining blackish scales on stipes and rachis; sori medial on pinnules of upper pinnae and marginal on auricles of pinnules of lower pinnae or sometimes only one sorus preferentially on each auricle at basal acrosopic side of pinnules; indusia entire (Kurata 1963, Nakaike 1992, Iwatsuki et al. 1995). The morphological characters of the plants from the Wuyi Mountains accord with above mentioned characters of Japanese \textit{P. otomasui} (Fig. 2).
The fundamental similarities between the Chinese specimens and Japanese \textit{P. otomasui} (from Kumamoto Pref., 071112-55) were also confirmed by SEM observations of the spores (Fig. 3). The spores of both samples are monolete, about 29 µm × 36 µm, ellipsoidal, and echinate fenestrate and more or less cristaed in perispore, although there are some more or less discernable difference in the surface appearance which could be explained as intraspecific variation between populations due to geographical isolation.

Cytology

The basic number of chromosomes in the genus \textit{Polystichum} was reported to be \( x = 41 \) (Manton 1950, Daigobo 1973). Daigobo (1973) reported that the Japanese \textit{P. otomasui} was a sexual diploid with a chromosome number of \( n = 41 \). Two samples from Wuyishan Nature Reserve (Lin & al. 070814-1, 070814-2) and another two from Emeifeng mountain (Lin & al. 080812-42, 080812-50) were observed cytologically. All of them have the same somatic chromosome number of \( 2n = 82 \) (Fig. 4). In addition, two samples (Lin & al. 060816-6, 060816-9) were estimated to be diploid based on the genome size estimated by a flow cytometer. All twenty samples collected from the Wuyi Mountains were counted to have 64 spores in each sporangium. Based on these results, the Chinese samples were identified with \textit{P. otomasui}, a diploid sexual species. It was named ‘Nanbi Erjue’ as Chinese name.

Three related species, \textit{P. makinoi} (Tagawa) Tagawa, \textit{P. acutipinnulum} Ching & Shing, and \textit{P. wuyishanense} Ching & Shing were recorded in the vascular plant checklist of Wuyishan National Nature Reserve (Lin et al. 1993). \textit{Polystichum makinoi} is a tetraploid species (Kurita 1966, Mitui 1968), morphologically distinguished by lacking black scales on rachis, sori distributed on apical portion of laminae downwardly on auricles of pinnules in lower pinnae (Daigobo 1971, Iwatsuki et al. 1995), and
Polystichum otomasui from Wuyishan National Nature Reserve, Fujian Province, China.

spore about 50 µm × 60 µm (Lin unpublished). However, P. acutipinnulum is a Chinese endemic species, the type specimens were also collected from Tongmuguan, Wuyishan National Nature Reserve (Ching 1981), is very similar to P. otomasui morphologically, but different in its falcate deltoid pinnules and indusia with irregular projections. Polystichum wuyishanense has not been recognized as a distinct species, which was included in P. acutipinnulum by Kung et al. (2001).

Cytological and genetic information of the Chinese Polystichum is unsatisfactory for understanding the relationships among these species. Further systematic researches are expected.

Voucher specimens from Fujian Province:

Wuyishan National Nature Reserve: on the way from Tongmuguan to an Old Tree Village, 1100 m alt., 2006, Lin & al. 060816-6 (FNU, KUN, HYO, TNS); near by the Observation Tower of Xianfengling Peak, 1500 m alt., and on the way to Sangang, on a humid & light slope near a stream under a secondary forest, 2006, Lin & al. 0608Lin-1, 0608Lin-2, 0608Lin-5, 0608Lin-6, 0608Lin-9 (FNU, KUN, HYO, TNS). Tongmuguan, 1700 m alt., on a humid slope under a bamboo forest, 2007, Lin & al. 070814-1, 070814-2, 070814-36, 070814-37, 070814-38, 070814-39, 070814-46 (FNU and Herb. Faculty of Life and Environmental Science, Shimane University, Japan).

Taining Prefecture: Emeifeng mountain, 1714 m alt., on the way to Emeifeng Nature Reserve, on a path slope under broad leaf evergreen forest, 2008, Lin & al. 080812-4, 080812-7, 080812-11, 080812-13, 080812-20, 080812-21, 080812-33, 080812-39, 080812-40, 080812-42, 080812-44, 080812-45, 080812-46, 080812-50 (FNU, and Herb. Faculty of Life and Environmental Science, Shimane University, Japan).

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References
Fig. 4. Somatic chromosomes (2n = 82) of Polystichum otomasui (Lin & al. 070814-1) from Wuyishan National Nature Reserve, Fujian Prov., China. Bar = 10 μm.


