Takuto SHITARA\textsuperscript{a,*}, Yuko ISHIDA\textsuperscript{b}, Shunsuke FUKUI\textsuperscript{c} and Jun’ichi FUJITA\textsuperscript{d}: New Localities of \textit{Betula costata} (Betulaceae) from Nagano Prefecture, Japan

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Summary: \textit{Betula costata} Trautv. (Betulaceae) is widely distributed in continental Northeastern Asia and also disjunctly distributed in Japan. However, there have been few reports on the distribution of this species in Japan, and previously no photograph of this species has been presented from Japan. In this study, we report four new locations of \textit{B. costata} in Nagano Prefecture, Japan. We also provided the photographs for the first time.

\textit{Betula costata} Trautv., a deciduous broad-leaved tree, is widely and commonly distributed in the southern Russian Far East, eastern Siberia, Northeastern China, and the middle-to-north of the Korean Peninsula; and it is one of the dominant canopy tree species in mixed conifer and broad-leaved forests (Tabata 1992, Kharkevich 1996, Li and Skvortsov 1999, Ashburner and McAllister 2013). Moreover, \textit{B. costata} has a disjunct distribution in Japan, and it is rare and sporadically occurs only in Nagano, Tochigi, Gifu, Gunma, and Shizuoka Prefectures (Tabata 1992).

Although \textit{B. costata} resembles \textit{B. ermanii} Cham., both species can be distinguished from each other on the basis of the following characteristics. \textit{Betula costata} has 9–16 pairs (average 13 pairs) of leaf lateral veins, while \textit{B. ermanii} has 7–12 pairs (average 10 pairs) of leaf lateral veins (Tabata 1992, Ashburner and McAllister 2013, Nemoto 2016). Leaves of \textit{B. costata} are triangular-oblong with long acuminate apex against triangular-ovate with short acuminate apex of \textit{B. ermanii} (Ashburner and McAllister 2013, Nemoto 2016). Moreover, the nutlet wings of \textit{B. costata} are wider than those of \textit{B. ermanii} (Tabata 1992, Ashburner and McAllister 2013).

The genus \textit{Betula} is widely distributed primarily in temperate and boreal climate zones in the northern hemisphere and comprises 40–60 species (Furlow 1990, Li and Skvortsov 1999, Ashburner and McAllister 2013, Nemoto 2016). Approximately 11 species have been recognized in Japan (Nakamura et al. 2015, Nemoto 2016), and each species has been verified to have a distinct distribution pattern and habitat (e.g., Suzuki 1998, Tsuda and Ide 2005, Okitsu 2006, 2017, Ogawa and Okitsu 2010, Ishida et al. 2014, Nakamura et al. 2015, Shitara et al. 2018). However, there have been few studies on the distribution and ecology of \textit{B. costata} in Japan since the study by Tabata (1992). Moreover, the most recent information available for this species was only categorized as “Data Deficient (DD)” in the Red Data Book of Gifu Prefecture (2010), and the distribution information for other prefectures is unavailable (Flora List of Nagano Prefecture Compilation Commission 1997, 2017, Environment Agency of Japan 2012, Gunma Prefecture 2012, Shizuoka Prefecture 2017, Tochigi Prefecture 2018). A summary of the morphological features of this species in Japan is described in the most recent Japanese


