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Short Communication

An updated checklist of *Adonis* (Ranunculaceae) from Korea, with a new locality record for *Adonis multiflora*

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ABSTRACT

Adonis multiflora Nishikawa & Koji Ito was discovered in Gijang-gun, Busan-si, the Republic of Korea. Until now, this species was only recorded in Korea (Jeju-do) and Japan (Honshu, Kyushu). This finding is a remarkable case of disjunct distribution. We provide an updated checklist of Korean *Adonis* with a new locality record for *A. multiflora* and an identification key for all species of *Adonis* that occur in Northeast Asia.

Introduction

The genus *Adonis* L. (Adonis, Pheasant's eye) comprises the annual and perennial herbaceous plants of the buttercup family (Ranunculaceae). It consists of about 30 taxa distributed in the Northern Hemisphere including Asia, Europe, and North America, whereas some annual species are found in Southwest Asia to North Africa and along the shores of the Mediterranean (Mabberley 2008; Meusel et al 1965). Owing to their ornamental properties, several taxa are cultivated for gardening. In Northeast Asia (including northeastern China, Republic of Korea, Japan, and Far East Russia), seven taxa have been reported (Fu and Robinson 2001; Nishikawa and Kadota 2006; Son et al 2016, 2018).

The geographical distribution of plants is greatly influenced by the environment conditions, including current climate state which is temperature, humidity, sunshine, winds, etc., and soil, but flora did not always match with environment conditions (Son et al 2008) because distribution of the region of flora and the specific species is determined by the historical progress of the topography and climate and then diffusion, reduction, and evolution of the species (Tateoka 1983).

During extensive field surveys for floristic research, an interesting *Adonis* population was discovered in Gijang-gun, Busan-si, the Republic of Korea. Based on detailed examination of morphological features and relevant publications (Fu and Robinson 2001; Lee et al 2003; Nishikawa and Kadota 2006; Park 2007; Son 2015), this population seems to consist of *Adonis multiflora* Nishikawa & Koji Ito individuals. Until now, this species has only been reported from the islands of Jeju-do, in the Republic of Korea, and Honshu and Kyushu, in Japan (Kaneko et al 2008; Lee et al 2003; Park 2007; Son et al 2016). Thus, the present study formally reports an updated checklist of Korean *Adonis* with a new locality record for *A. multiflora*. Based on the detailed morphological features examined to classify the *A. multiflora* individuals found in Gijang-gun, an identification key for all species of *Adonis* that are found in Northeast Asia is also provided.

Material and methods

Observations of morphological features were conducted based on living plants and on dry specimens. Field photographs were captured using a digital D810 camera equipped with an AF 105 mm Macro lens with a GP-1A GPS Unit (all Nikon, Tokyo, Japan). Morphological characters were measured using a digital vernier

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caliper, and data were acquired from field notes. Flowering and fruiting periods are given as cited on collector's labels. The voucher specimen has been deposited in the Korea National Arboretum (KH), and herbarium acronyms follow Thiers (2018).

Results and discussion

Checklist of the Korean Adonis

1) ***Adonis amurensis*** Regel & Radde, Bull. Soc. Imp. Naturalistes Moscou 34(2): 35 (1861).
(Figure 1)

Type. RUSSIA: Amur, in montibus Burejae, *Radde s.n.* (isosyntype, UPS!)

Adonis vernalis var. *amurensis* (Regel & Radde) Finet & Gagnep., Bull. Soc. Bot. France 51: 132 (1904)

Adonanthe amurensis (Regel & Radde) Chrtek & Slavíková, 1978 Preslia 50(1): 24 (1978)

Chrysocyathus amurensis (Regel & Radde) Holub, Preslia 70(2): 102 (1998)

Adonis amurensis var. *puberula* Honda, Bot Mag. (Tokyo) 52: 49 (1939)

Type. JAPAN: Hokkaido, Kitami, H. Iwamoto 86 (holotype, TI!)

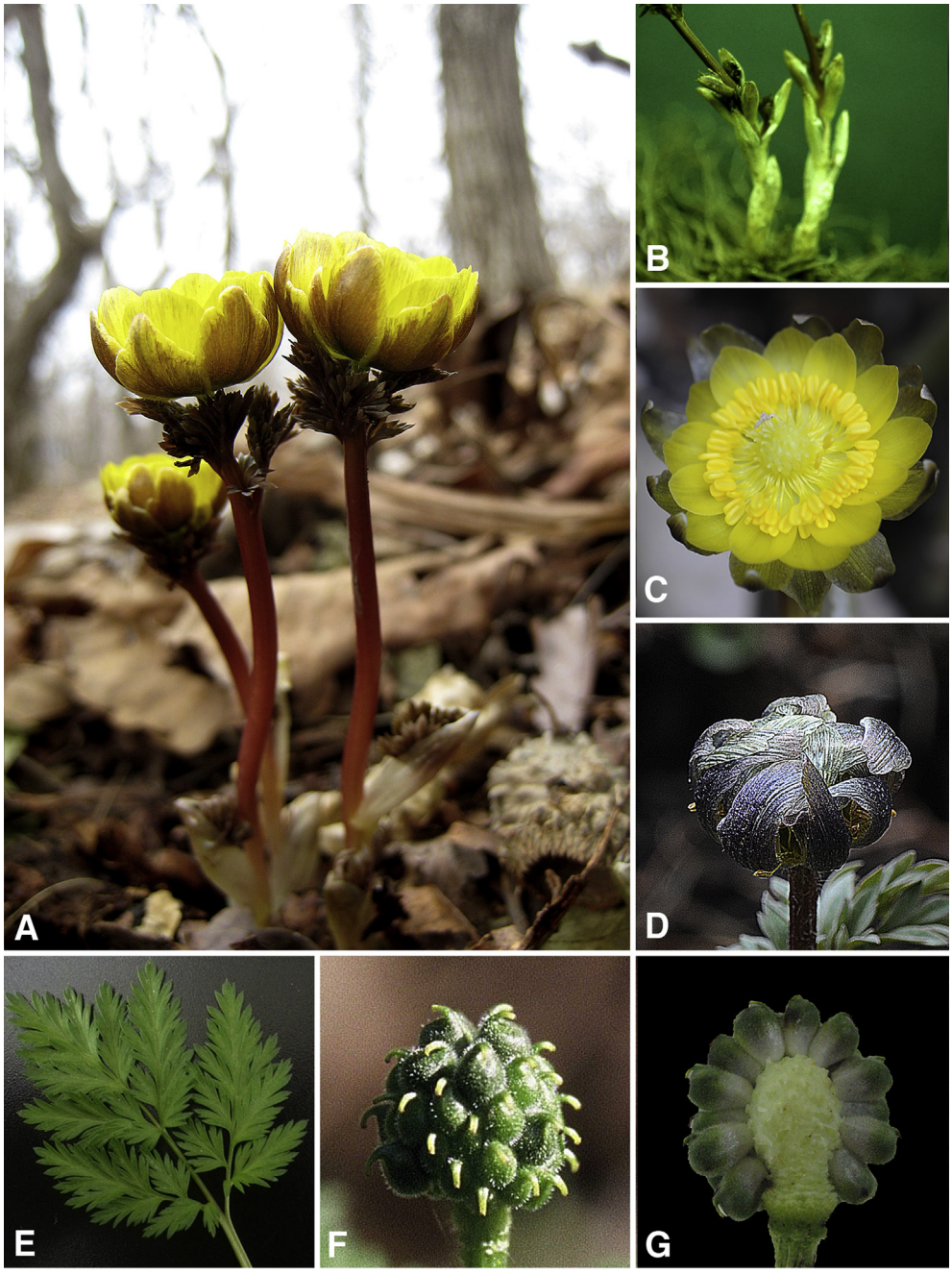

Figure 1. *Adonis amurensis* Regel & Radde.: A, whole plant; B, stem; C, flower, front view; D, flower, sepals close up at night; E, leaves; F, aggregate fruit; G, fruit receptacle and achenes. Photographs by Dong Chan Son and Beom Kyun Park.