Phylogenetic Relationships of East Asian Endemic Species of *Filipendula* (Rosaceae-Rosoideae) as Revealed by nrITS Markers

Ivan Alekseyevich SCHANZER

Main Botanical Garden of Russian Academy of Sciences, Botanicheskaya Ul. 4, 127276 Moscow, RUSSIA
E-mail: ischanzer@gmail.com

(Accepted on January 9, 2016)

Phylogenetic relationships of East Asian representatives of the genus *Filipendula* Mill. (*Rosaceae-Rosoideae*) as revealed by the analyses of nrITS markers do not completely coincide with either of the existing taxonomic systems of the genus. The NW American *F. occidentalis* (S. Watson) Howell is a strongly isolated species which is not closely related to the Asian representatives of the genus. This study confirms close phylogenetic relations between *F. tsugwou* Ohwi (endemic to S Japan) and *F. kiraishiensis* Hayata (endemic to Taiwan), as well as their relationships to *F. multijuga* Maxim. (endemic to Honshu Island, Japan). This clade also includes the Himalayan species *F. vestita* Maxim. Two widely distributed species, *F. camtschatica* (Pall.) Maxim. and *F. glaberrima* Nakai, appear to be related to members of the sect. *Albicomae*. *Filipendula formosa* Nakai, a narrow endemic to S Korea, seems to be basal to this clade. *Filipendula yezoensis* H. Hara, endemic to Hokkaido Island, Japan, which is usually synonymized with *F. glaberrima*, appears to be weakly differentiated from the latter more widely distributed species.

**Key words:** East Asia, *Filipendula*, nrITS, *Rosaceae*.

The genus *Filipendula* Mill. comprises ca. 15 species distributed in temperate areas of the Northern Hemisphere. Most of the species are confined in their distribution to East Asia, where several endemic species with narrowly restricted distribution occur. The genus is phylogenetically sister to the rest of the subfamily *Rosoideae* (Potter et al. 2007), however, phylogenetic relationships of its species have never been studied so far. In the last taxonomic revision of the genus Schanzer (1994) proposed some changes to the systems suggested earlier by Shimizu (1961) and Seregievskaya (1967) and suggested some ideas on their probable phylogenetic liaisons based on their morphology and distribution. In this paper I attempt to test these ideas using the internal transcribed spacer of ribosomal DNA nuclear markers. The study is focused on the East Asian species, especially on the narrowly distributed endemics of Japan (*F. multijuga* Maxim. and *F. tsugwou* Ohwi [Fig. 1]), Korea (*F. formosa* Nakai), and Taiwan (*F. kiraishiensis* Hayata).

**Material and Methods**

Twenty-eight specimens of 13 taxa used in the study are listed in Table 1. DNA was extracted from dry leaves of herbarium or silica gel-dried specimens using the CTAB method (Doyle and Doyle 1987). The complete ITS region (ITS1, 5.8S and ITS2) was amplified using the primers NNC-18S10 and C26A (Wen...
I. A. Schanzer: nrITS マーカーに基づくシモツケソウ属（バラ科バラ亜科）の東アジア産固有種の系統関係

nrITS マーカーにもとづく解析結果によると、シモツケソウ属（バラ科バラ亜科）の東アジア産の種の系統関係は本属の分類システムのどれとも完全には一致してなかった。北西アメリカ産のFilipendula occidentalis (S. Watson) Howell は著しく隔離されており、東アジアの種とはほとんど関係がなかった。本研究ではシコクシモツケソウ F. tsugwoki Ohwi（四国・九州）とタイワンシモツケソウ F. kiraishiensis Hayata（台湾）の 2 種がシモツケソウ F. multijuga Maxim.（本州）に関係があるのみならず、互いに密接な関係があることを確認した。このクレードにはヒマラヤ産の F. vestita Maxim. が含まれる。2 つの広分布種オニシモツケ F. camtschatica (Pall.) Maxim. とエゾノシモツケソウ F. glaberrima Nakai は Albicome 節の種と関係がある。韓国産の狭分布種チイサンシモツケソウ F. formosa Nakai はこのクレードの基部に位置する。北海道固有のエゾノシモツケソウ Filipendula yezoensis H. Hara は F. glaberrima と同一種とされることが多いが、広分布種である F. glaberrima から軽微に分化した種らしい。

（ロシア・科学アカデミー Main Botanical Garden）