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Evidence of pre-zygotic reproductive isolation between *Prunus armeniaca* and *Prunus mume*

X. Li[1], L. Shangguan[1], Y. Wang[2], N.K. Korir[1], C. Wang[1], J. Zhang[2], C. Song[1] and J. Fang[1]

[1]*College of Horticulture, Nanjing Agricultural University, Nanjing, China and* [2]*Institute of Forestry and Pomology, Beijing Academy of Agriculture and Forestry Sciences, Beijing, China*

ABSTRACT

Background: The trees *Prunus armeniaca* (apricot), *P. mume* (mei or Chinese plum), and *Armeniaca mume* (xingmei) are all members of the *Armeniaca* section of the genus *Prunus*. The three trees are cultivated widely in China.

Hypotheses: Geographical distribution and divergent flowering phenologies constitute pre-zygotic, reproductive isolation barriers that promoted the speciation of *P. armeniaca* and *P. mume*. Xingmei is an artificial hybrid of the other two species.

Methods: We studied the geographic distribution and flowering phenologies of *P. armeniaca* and *P. mume* cultivars from different regions of China. We analysed the copious data of the China Fruit Records (mei and apricot). To examine the origin of xingmei, we analysed the F_2 progenies of *P. armeniaca* × *P. mume* using a species-specific molecular marker. Finally, we researched the genotypes of *P. mume*, *P. armeniaca*, and xingmei to determine whether the three are post-zygotically isolated.

Results: Isolation due to geographical location and flowering phenology are strong pre-zygotic isolation barriers that maintain the separation of *P. armeniaca* and *P. mume*. That separation limits the opportunity for natural hybridization between these two species, and probably prevented the natural appearance of xingmei. Furthermore, no post-zygotic reproductive isolation exists between *P. armeniaca* and *P. mume*.

Conclusions: Pre-zygotic isolation played an important role in the evolution of *P. armeniaca* and *P. mume*. It prevented their natural hybridization. Xingmei is likely to be an artificial hybrid.

Keywords: pre-zygotic isolation, *Prunus armeniaca*, *Prunus mume*, research, speciation.

INTRODUCTION

The evolution of reproductive isolation is central to the speciation process (Kay, 2006). Understanding the genesis and reasons for development of reproductive isolation barriers during speciation of organisms is a formidable challenge of evolutionary biology (Dobzhansky, 1937;

Correspondence: J. Fang, College of Horticulture, Nanjing Agricultural University, Nanjing 210095, China. e-mail: fanggg@njau.edu.cn

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