

Analysis of Phylogenetic Relationships among Peach Cultivars and Related Species based on ITS Sequences

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Nucleotide sequences of the ITS (internal transcribed spacer) regions were determined for 52 peach cultivars (*Prunus persica* L. Batsch) from China, Japan, North America and Korea, and compared with three related species, *P. ferganensis*, *P. davidiana* and *P. mume*. The ITS regions of 52 peach cultivars, from 624 bp to 629 bp, showed few difference. ITS 1 region was 229~232 bp, the 5.8s rDNA gene was 85 bp, and ITS 2 was 278~281 bp. Polymorphism varied little between cultivars as the 5.8s rDNA genes had 2 sites and ITS 1 and ITS 2 regions had 21 sites and 20 sites, respectively. Based on phylogenetic analysis, the 52 peach cultivars and two related species (*P. ferganensis*, *P. davidiana*) were divided into 4 branches. Branch I: "Baishanbitao and American yellow peaches" contains all yellow peaches, except 1 Chinese local yellow peach, 2 Chinese ornamental cultivars, and 6 Chinese white peaches. Branch II contains the Japanese yellow peach mutation, 'Janghowenhwangdo' obtained in Korea. Branch III: "Japanese white peaches" contains mainly Japanese white peach cultivars with a greater difference in genetic distance than that of the other 3 branches. Branch IV: "*P. davidiana* and Chinese local peaches" was divided into two sub-branches. Only two Chinese Northwestern local cultivars were included in subgroup 1, and subgroup 2 contains mainly flat peaches and Chinese Northern local cultivars. Also, two related species, *P. davidiana* and *P. ferganensis*, and a dwarf peach (*P. persica* var. *densa*) were clustered into subgroup 2. The genetic background of *P. mume* is very different from *P. persica*, in consequence, it is independent and not assigned to a branch. Based on the phylogenetic tree constructed from sequence comparisons of the ITS region, it is suggested that *P. davidiana* could be one of the ancient cultivated peaches and *P. ferganensis* could be a variety of *P. persica*. The Chinese local cultivars in Branch IV of "*P. davidiana* and Chinese local peaches" may be older than the Chinese local cultivars found in the other two branches, and 'Wuyuexian' and 'Baimangpantao' may be the oldest cultivars among the cultivars tested in this study. Moreover, the results obtained by ITS markers confirmed the hypothesis that 'Baishanbitao' is a *davidiana* - *persica* hybrid.